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**ADDITIONS, ALTERATIONS AND RENOVATIONS (PHASE 1)  
AT THE NORTHERN BURLINGTON COUNTY REGIONAL  
HIGH SCHOOL**

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**NORTHERN BURLINGTON COUNTY REGIONAL SCHOOL DISTRICT  
COLUMBUS - BURLINGTON COUNTY - NEW JERSEY**



**FVHD PROJECT #5086.3A / NBC Bid #19-010 / NJDOE# 3690-050-17-1000**

**Van Cleef Engineering Associates  
Consulting Civil Engineers**

**Harrison-Hamnett, P.C.  
Consulting Structural Engineers**

**Sharpe Engineering, Inc.  
Consulting MEP Engineers**

**July 12, 2019**

**VOLUME 1 OF 2**

**SPECIFICATIONS**

for

**ADDITIONS, ALTERATIONS AND RENOVATIONS (PHASE 1) AT THE  
NORTHERN BURLINGTON COUNTY REGIONAL HIGH SCHOOL**

160 Mansfield Road East, Columbus, NJ 08022

for the

**NORTHERN BURLINGTON COUNTY REGIONAL SCHOOL DISTRICT**

COLUMBUS, BURLINGTON COUNTY, NEW JERSEY

**FVHD PROJECT #5086.3A / NBC Bid #19-010 / NJDOE #3690-050-17-1000**

**FRAYTAK VEISZ HOPKINS DUTHIE, P.C.**

**Architects – Planners**

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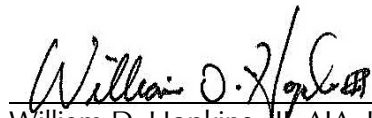
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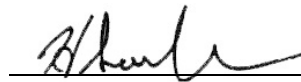


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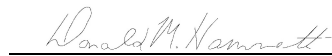


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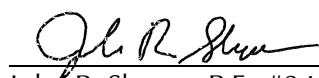


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## TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Pages</u>
	Advertisement for Bid.....	1 to 2
	<b>BIDDING INFORMATION</b>	
00100	Instructions to Bidders .....	1 to 10
	Bidder's Checklist .....	1 to 2
	Bid Bond .....	1
	Consent of Surety .....	1
	Subcontractor Identification Statement .....	1
	Ownership Disclosure Certification .....	1 to 4
	Performance Record Certification.....	1 to 3
	Compliance with New Jersey Prevailing Wage Act.....	1
	Non Collusion Affidavit .....	1
	Certificate of Equal Opportunity .....	1
	Affirmative Action Questionnaire .....	1
	Certification of No Material Change of Circumstances .....	1
	Status of Present Contracts .....	1
	Political Contribution Disclosure Form.....	1
	Disclosure of Investment Activities in Iran .....	1
	Certification of Insurance Statement.....	1
	Contractor/Subcontractor Certification of Qualifications and Credentials..	1 to 4
	Exhibit B - Mandatory Equal Employment Opportunity Language.....	1 to 4
	Performance Bond .....	1 to 4
	Payment Bond.....	1 to 4
	Maintenance Bond, 10%-1yr. (All Work other than HVAC).....	1 to 2
	Maintenance Bond, 10%-2yr. (HVAC Work).....	1 to 2
	Prevailing Wage Rate Determination .....	1 to 75
	AIA Document A132 - 2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition ...	1 to 10
	<b>CONTRACT CONDITIONS AND GENERAL REQUIREMENTS</b>	
00700	AIA Document A232 - 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition.....	1 to 46
00800	Supplementary General Conditions .....	1 to 32
00850	Contract Drawings .....	1
00860	Laws Governing Public Work .....	1 to 8
00870	Miscellaneous Requirements.....	1 to 6
01010	Summary of Work.....	1 to 7
01020	Allowances .....	1 to 3
01030	Alternate Bids .....	1 to 2
01040	Coordination.....	1 to 12
01050	Alterations, Cutting, Patching and Refinishing Work.....	1 to 12
01151	Unit Prices.....	1 to 6
01200	Project Meetings.....	1 to 4

**TABLE OF CONTENTS**

<b><u>Section</u></b>	<b><u>Title</u></b>	<b><u>Pages</u></b>
01380	CPM Schedule . . . . .	1 to 7
01400	Material Testing/Quality Control Services . . . . .	1 to 8
01410	References and Industry Standards . . . . .	1 to 3
01455	Concrete In-Situ Relative Humidity and pH Testing . . . . .	1 to 3
01505	Temporary Facilities . . . . .	1 to 10
	Project Sign Details. . . . .	1 to 2
01524	Construction Waste Management . . . . .	1 to 5
01600	Product Requirements . . . . .	1 to 6
01700	Project Closeout Documents and Procedures. . . . .	1 to 14
	Sample Closeout Checklist . . . . .	1
01800	Time of Completion and Liquidated Damages . . . . .	1 to 3
01900	Guarantees and Warranties. . . . .	1 to 11
01950	Subsoil . . . . .	1
	Geotechnical Engineering Report . . . . .	1 to 34
 <b>PART 2 - GENERAL CONSTRUCTION WORK</b> 		
02070	Selective Demolition . . . . .	1 to 6
	Asbestos Abatement, prepared by Briggs Associates . . . . .	1 to 105
02071	Selective Site Demolition. . . . .	1 to 6
02100	Traffic Control . . . . .	1
02110	Site Clearing . . . . .	1 to 4
02150	Shoring and Bracing . . . . .	1 to 3
02200	Earthwork. . . . .	1 to 13
02241	Dewatering . . . . .	1 to 3
02248	Shoring and Bracing . . . . .	1 to 3
02450	Radon Mitigation System. . . . .	1 to 3
02480	Landscape Work. . . . .	1 to 10
02485	Finish Grading, Seeding and Amenities . . . . .	1 to 10
02506	Hot Mix Asphalt Pavement . . . . .	1 to 7
02514	Sitework Concrete . . . . .	1 to 8
02516	Storm Sewer . . . . .	1 to 12
02600	Soil Erosion and Sediment Control . . . . .	1 to 4
02730	Sanitary Sewers and Manholes . . . . .	1 to 12
02750	Cleaning and Televising of Sewer Lines . . . . .	1 to 5
02957	Cured-in-Place Pipe (CIPP). . . . .	1 to 8
03300	Cast-in-Place Concrete . . . . .	1 to 12
03450	Self-Drying Finishing Underlayment . . . . .	1 to 4
03480	Precast Concrete Valve Vaults and Meter Boxes . . . . .	1 to 4
04200	Unit Masonry . . . . .	1 to 27
05450	Cold-Formed Metal Framing . . . . .	1 to 8
05500	Metal Fabrications . . . . .	1 to 11
06100	Carpentry. . . . .	1 to 5
06650	Solid Polymer Fabrications. . . . .	1 to 6



**TABLE OF CONTENTS**

<b><u>Section</u></b>	<b><u>Title</u></b>	<b><u>Pages</u></b>
07070	Selective Roof Demolition . . . . .	1 to 3
07200	Building Insulation. . . . .	1 to 5
07214	Closed Cell Spray Foam Insulation . . . . .	1 to 6
07241	Water Managed Exterior Insulation and Finish System (EIFS). . . . .	1 to 19
07250	Sprayed-On Fireproofing . . . . .	1 to 7
07270	Fluid Applied Air/Vapor Barriers . . . . .	1 to 12
07275	Sheet Applied Air Barriers . . . . .	1 to 12
07415	Aluminum Composite Material Facade/Cladding . . . . .	1 to 9
07500	Roofing, General. . . . .	1 to 6
	Pre-Approved Independent Roofing Inspection Firms . . . . .	1
07530	Single Ply EPDM Roofing Membrane System . . . . .	1 to 18
07600	Flashing, Sheet Metal and roof Accessories. . . . .	1 to 11
07800	Roof Specialties and Accessories . . . . .	1 to 6
07840	Through-Penetration Firestop Systems . . . . .	1 to 8
07900	Joint Sealer Assemblies. . . . .	1 to 9
08110	Hollow Metalwork . . . . .	1 to 5
08211	Wood Doors. . . . .	1 to 8
08305	Access Doors . . . . .	1 to 5
08410	Aluminum/FRP Doors . . . . .	1 to 9
08415	Aluminum Framed Entrances and Storefronts . . . . .	1 to 8
08520	Aluminum Windows. . . . .	1 to 10
08700	Finish Hardware . . . . .	1 to 24
08800	Glass and Glazing. . . . .	1 to 9
08872	Security Glazing Films . . . . .	1 to 3
09250	Gypsum Drywall . . . . .	1 to 8
09300	Tile . . . . .	1 to 7
09400	Terrazzo. . . . .	1 to 4
09510	Acoustical Ceilings . . . . .	1 to 6
09650	Resilient Flooring. . . . .	1 to 8
09775	Interlocking Rubber Flooring. . . . .	1 to 3
09900	Painting . . . . .	1 to 10
10100	Dry Markerboards and Exhibition Boards. . . . .	1 to 7
10440	Specialty Signs. . . . .	1 to 6
10522	Fire Extinguishers, Cabinets and Accessories. . . . .	1 to 3
10670	Metal Shelving. . . . .	1 to 2
10800	Toilet and Bath Accessories. . . . .	1 to 4
10830	Infant Changing Table. . . . .	1 to 3
11000	General Requirements - Casework and Equipment Work . . . . .	1 to 5
11010	Premanufactured Plastic Laminate Casework . . . . .	1 to 12
11011	Casework and Equipment . . . . .	1 to 11

**TABLE OF CONTENTS**

<b><u>Section</u></b>	<b><u>Title</u></b>	<b><u>Pages</u></b>
<b>PART 3 - STRUCTURAL &amp; MISCELLANEOUS STEEL WORK</b>		
05120	Structural Steel Framing . . . . .	1 to 7
05210	Steel Joist Framing . . . . .	1 to 4
05310	Steel Decking . . . . .	1 to 4
05400	Miscellaneous Structural Steel. . . . .	1 to 6
<b>PART 4 - PLUMBING WORK</b>		
15015	General Requirements for Plumbing. . . . .	1 to 8
15050	Common Work Results for Plumbing. . . . .	1 to 14
15065	Hangers and Supports for Plumbing Piping and Equipment. . . . .	1 to 13
15076	Identification for Plumbing Piping and Equipment . . . . .	1 to 5
15140	Domestic Water Piping . . . . .	1 to 11
15145	Domestic Water Piping Specialties . . . . .	1 to 9
15150	Sanitary Waste and Vent Piping . . . . .	1 to 9
15155	Sanitary Waste Piping Specialties . . . . .	1 to 6
15160	Storm Drainage Piping . . . . .	1 to 7
15165	Storm Drainage Piping Specialties . . . . .	1 to 5
15185	General-Duty Valves for Plumbing Piping . . . . .	1 to 7
15194	Facility Natural-Gas-Piping . . . . .	1 to 18
15410	Plumbing Fixtures . . . . .	1 to 12
15420	Radon Mitigation System . . . . .	1 to 3
15460	Plumbing Insulation . . . . .	1 to 14
15490	Meters and Gages for Plumbing Piping . . . . .	1 to 4
<b>PART 5 - HEATING, VENTILATING, AIR CONDITIONING &amp; REFRIGERATION</b>		
15010	General Requirements for HVAC . . . . .	1 to 8
15051	Common Work Results for HVAC . . . . .	1 to 12
15055	Motors . . . . .	1 to 5
15056	Hangers and Supports for HVAC Piping and Equipment . . . . .	1 to 12
15071	Vibration Controls for HVAC Piping and Equipment . . . . .	1 to 8
15081	Duct Insulation . . . . .	1 to 9
15083	Pipe Insulation. . . . .	1 to 9
15100	Valves. . . . .	1 to 8
15181	Hydronic Piping . . . . .	1 to 10
15185	Hydronic Pumps . . . . .	1 to 5
15530	Refrigerant Piping . . . . .	1 to 10
15732	Packaged Air Conditioning Units . . . . .	1 to 16
15761.11	Hydronic Air Coils . . . . .	1 to 3
15763	Fan Coil Units . . . . .	1 to 8
15766	Cabinet Unit Heaters . . . . .	1 to 5
15769	Energy Recovery Classroom Unit Ventilators. . . . .	1 to 9
15815	Metal Ducts. . . . .	1 to 14
15820	Duct Accessories . . . . .	1 to 7

**TABLE OF CONTENTS**

<b><u>Section</u></b>	<b><u>Title</u></b>	<b><u>Pages</u></b>
15838	Power Ventilators . . . . .	1 to 8
15855	Diffusers, Registers, and Grills . . . . .	1 to 5
15856	Intake and Relief Ventilators . . . . .	1 to 5
15950	Testing, Adjusting and Balancing . . . . .	1 to 28
15975	Control Systems Equipment . . . . .	1 to 32
 <b>PART 6 - ELECTRICAL WORK</b>		
16010	General Requirements for Electrical . . . . .	1 to 8
16073	Hangers and Supports for Electrical Systems . . . . .	1 to 5
16075	Identification for Electrical Systems . . . . .	1 to 6
16091	Sleeves and Sleeve Seals for Electrical Raceways and Cabling . . . . .	1 to 4
16120	Low-Voltage Electrical Power Conductors and Cables . . . . .	1 to 6
16130	Raceways and Boxes for Electrical Systems . . . . .	1 to 12
16140	Wiring Devices . . . . .	1 to 8
16145	Digital Lighting Controls . . . . .	1 to 11
16410	Enclosed Switches and Circuit Breakers . . . . .	1 to 10
16442	Panelboards . . . . .	1 to 10
16511	LED Interior Lighting . . . . .	1 to 7
16721	Addressable Fire-Alarm Systems . . . . .	1 to 20

**END TABLE OF CONTENTS**

**NOTICE TO BIDDERS**  
**NORTHERN BURLINGTON COUNTY REGIONAL SCHOOL DISTRICT**  
**BURLINGTON COUNTY, NEW JERSEY**

NOTICE IS HEREBY GIVEN THAT sealed bids will be received by the Northern Burlington County Regional School District for **Additions, Alterations and Renovations at Northern Burlington County Regional High School – Phase 1**, together with all work incidental thereto, in accordance with the requirements of the drawings and specifications prepared by Fraytak Veisz Hopkins Duthie, P.C., Architects/Planners (FVHD), **FVHD Project #5086.3A, NBC Bid #19-010**.

Separate Bids will be received for:

- Contract No. 1 – General Construction Work (C009)
- Contract No. 2 – Structural & Miscellaneous Steel Work (C029)
- Contract No. 3 – Plumbing Work (C030)
- Contract No. 4 – HVACR Work (C032)
- Contract No. 5 – Electrical Work (C047)
- Contract No. 6 – Combined Single Overall Contract comprising Contracts 1 through 5

Sealed Bids are due by **September 5, 2019, 3:00 PM**, to the Northern Burlington County Regional School District Board of Education; Business Offices located at 160 Mansfield Road, Columbus, NJ 08022, and will be publicly opened and read immediately thereafter in the Director of Facilities Office. Any Bid received after that time shall be rejected.

Pre-Bid meeting is scheduled for **August 8, 2019 at 11 AM**, in the Media Center of the NBCR High School West Building, 160 Mansfield Road East, Columbus, NJ 08022. Attendance at the pre-bid meeting is recommended.

Bid Documents for the proposed Work are on file at the office of the Architect, FVHD, 1515 Lower Ferry Road, Trenton, NJ 08618, [www.fvhdpc.com](http://www.fvhdpc.com), and may be inspected by prospective bidders during regular business hours. Any bidder should contact the Architect's Office at (609) 883-7101 to confirm availability of documents. Bid Documents will be available from the Architect for a non-refundable fee of \$100.00 for a disk; if shipped, a direct shipping account must be provided. Checks payable in advance to Fraytak Veisz Hopkins Duthie, P.C. Paper sets available for \$350 non-refundable fee; if shipped, a direct shipping account number must be provided to the Architect and an additional non-refundable handling fee of \$25.00 per set payable in advance. **All questions must be sent only via mail or facsimile at (609) 883-2694 with the job number referenced.**

Bid Proposal shall be submitted in duplicate (one original and one copy) in separate sealed envelopes for each contract, addressed to the owner, bearing the name and address of the bidder written on the face of the envelope, and clearly marked "BID" with the contract title and Bid No. 19-010 on the outside of the envelope and must be accompanied by a Certified Check, Cashier's Check or Bid Bond drawn to the order of the Owner for not less than ten percent (10%) of the amount of the bid, but in no case in excess of \$20,000; and must be delivered to the above place on or before the hour named. The Board of Education and the Architect assume no responsibility for bids mailed or misdirected in delivery.

Pursuant to N.J.S.A. 18A:18A-26, the bidder must be pre-qualified by the New Jersey Division of Property Management and Construction (DPMC) prior to the date that bids are received if the cost of the work exceeds \$20,000. Any bid submitted under the terms of New Jersey statutes not including a copy of a valid and active Pre-qualification/Classification Certificate may be rejected as being non-responsible to bid requirements.

Pursuant to N.J.S.A. 18A:18A-25, each proposal shall be accompanied by a Proposition of Surety from a Surety Company stating it will provide each bidder with separate Performance and Payment Bonds, each in the amount of 100% of the contract sum. Also, Surety agrees to furnish Bidder with a Maintenance Bond in required form. The Proposition of Surety shall be executed by an approved surety company authorized to do business in the State of New Jersey and in accordance with N.J.S.A. 2A:44-143 and 2A:44-144 and with the three highest rating categories of rating companies nationally recognized and listed as per Appendix A (go to [www.nj.gov/dobi/surety.htm](http://www.nj.gov/dobi/surety.htm)).

Bidding shall be in conformance with the applicable requirements of N.J.S.A. 18A:18A-1 et seq. pertaining to the "Public School Contracts Law."

Per N.J.S.A. 52:32-44(b) all contractors and subcontractors must provide a Business Registration Certificate prior to contract award.

This project is subject to the New Jersey Prevailing Wage Act, N.J.S.A. 34:11-56.27 et seq.

"The Public Works Contractor Registration Act", N.J.S.A. 34:11-56.51 et seq. (P.L. 199, c.238) requires bidders and their subcontractors to be registered with the New Jersey Department of Labor and Workforce Development at the time and date that bids are received.

All bidders must comply with the requirements Laws Against Discrimination N.J.S.A. 10:5-1 et seq., Affirmative Action Regulations, N.J.S.A. 10:5-31 et seq. (P.L. 1975, c.127), N.J.S.A. 17:27-1.1 et seq. and N.J.A.C. 6A:7-1.8. An Initial Project Workforce Report will be required from the successful bidder (Form AA-201).

No bid may be withdrawn for a period of sixty (60) days after the date set for the opening thereof. The right is reserved to reject all bids or to waive minor informality in the bidding if it is in the interest of the School District to do so.

BY ORDER OF THE NORTHERN BURLINGTON COUNTY REGIONAL SCHOOL DISTRICT  
BURLINGTON COUNTY, NEW JERSEY

Richard Kaz, Business Administrator

## **BIDDING INFORMATION**

### **SECTION 00100 - INSTRUCTIONS TO BIDDERS**

#### **1. INVITATION TO BID**

- A. All Bidders are required to prepare bids in accordance with all plans and specifications (Bid Documents) prepared by Fraytak Veisz Hopkins Duthie, P.C.
- B. DISCLAIMER: Bidders should only rely on original digital and paper versions of the bidding contract documents obtained directly from the Architect's office. Fraytak Veisz Hopkins Duthie, PC (FVHD) Architects-Planners is not responsible for any unauthorized copies made of the digital or paper bidding contract documents obtained from sources other than the Architect's office. All information provided by Fraytak Veisz Hopkins Duthie, PC (FVHD) Architects-Planners is intellectual property and is protected under copyright laws. It is not to be used for any purpose other than for the indicated project. Any other use or manipulation of the information is strictly prohibited.
- C. Proposals for Contracts as listed in the Advertisement for Bids as hereinafter described, will be received for the performance of the Project. The bids shall cover all cost of any nature, incident to and growing out of the work. In explanation but not in limitation thereof, these costs shall include the cost of all work, labor, materials, equipment, transportation and cost of all else necessary to perform and complete the Project in the manner and within the time required, all incidental expenses in connection therewith, all costs on account of loss by damage or destruction of the Project to the extent that the cost of such loss is not recovered from insurance carried by the Owner and the Contractor, and any additional expenses for unforeseen difficulties encountered, for settlement of damages and for replacement of defective work and materials.
- D. Before submitting a Proposal, the Bidder shall become familiar with the Drawings, Specifications and other documents that will form the Contract, shall investigate the site of the Project and make such examination thereof as may be necessary to determine the character and amount of work involved. He/She shall also determine that he/she can secure the necessary labor and equipment and that the materials he/she proposes to use will comply with the requirements specified therefor and can be obtained by him/her in the quantities and at the time required.
  - 1. Roofing Projects: The Bidder shall review Section 07500 regarding the requirement for the Contractor to engage and pay for the services of a qualified independent Roofing Inspection Firm (RIF).
- E. The Owner reserves the right to accept or reject all bids including Alternate Bids, if any, pursuant to applicable law under any Contract for a period up to sixty (60) days after receipt of bids.

## 2. OBLIGATION OF BIDDER

- A. At the time of the opening of bids each Bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the Drawings and other Contract Documents, including all Addenda and Bulletins. The failure or omission of any Bidder to receive or examine any form, instrument or document or to visit the site and acquaint himself/herself with conditions there existing, shall not relieve any Bidder from obligation with respect to his/her bid.

## 3. PREQUALIFICATION OF BIDDERS, (CONTRACTORS AND SUBCONTRACTORS)

- A. Pursuant to N.J.S.A. 18A:18A-27 et seq., as amended, and N.J.A.C.17:19-2.1 through N.J.A.C. 17:19-2.7, Bidders on any Contract on public work for a Board of Education in the State of New Jersey in which the entire cost of the Contract exceeds \$20,000.00, must be prequalified by the Division of Property Management and Construction (DPMC), as to character and amount of public work on which they may submit bids. Prequalified bidder must submit with his/her Proposal, a "Notice of Classification" setting forth the type of work and the amount of work for which he/she has been qualified, that there has been no material adverse change in his/her qualification information, the total amount of uncompleted work on contracts at the time and the date of the bid due date. Any bid submitted under the terms of New Jersey Statutes not including a copy of a valid and active Prequalification /Classification Certificate shall be rejected as being nonresponsive to bid requirements. (Forms for this purpose are available from the Director of the Division of Property Management and Construction - DPMC, Trenton, New Jersey 08625.)
  1. Each classified bidder's aggregate rating shall be calculated in accordance with formula prescribed by N.J.A.C. 17:19-2.8.
    - a. Calculations shall be based on Bidder's base bid amount only at time of bid or total amount of base bid and accepted Alternate Bids at time of Award.
- B. In accordance with N.J.S.A. 34:11-56.48 et seq. and N.J.S.A. 18A:7G-37, each bidder must be properly registered with the New Jersey Department of Labor at the time of the bid. The Contractor shall enter into subcontracts only with subcontractors who are registered pursuant to N.J.S.A. 34:11-56.48 et seq.
  1. No Contractor/Subcontractor will be permitted to bid on or engage in any contract for public work, as defined in "The Public Works Contractor Registration Act," N.J.S.A. 34:11-56.48 et seq. (P.L. 1999, c.238), unless that Contractor/Subcontractor is registered with the New Jersey Department of Labor and Workforce Development at the time of the bid.
- C. The Owner may make such additional investigations as it deems necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that he/she is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.

#### 4. INTERPRETATIONS AND ADDENDA

A. No oral interpretations will be made to any Bidder as to the meaning of the drawings and specifications. Every request for such an interpretation shall be made in writing and addressed and forwarded by mail or facsimile transmission to the Architect's Office. No inquiry received within seven (7) business days prior to the date fixed for opening of bids will be given consideration.

1. Every interpretation made to a Bidder will be in the form of an Addendum. During the bidding period, the Architect may furnish Addenda for additions to or alterations of the drawings and specifications, which shall be included in the work covered by the Bid Proposal(s).
2. In accordance with N.J.S.A. 18A:18A-21(c), as amended, Addenda, when issued, will be submitted by certified mail or by certified facsimile transmission no later than seven (7) days prior to the date for receiving bid proposals, Saturday, Sunday or holidays excepted, to all persons to whom the drawings and specifications have been issued.
  - a. Failure to obtain a receipt when good faith notice is sent or delivered to the Bidder's address or his/her telephone facsimile number on file with the Architect's office shall not be considered failure by the Owner/Architect to provide notice.
3. Addenda will also be available for examination at the Architect's office.
4. Bidders shall verify what Addenda and Bulletins have been issued during the bidding period before the Bid Opening, examine all of these Addenda, reflect and acknowledge all of these Addenda in their Proposal Forms.
5. **It shall be the responsibility of the Bidder to ascertain that he/she has received and examined all Addenda issued, prior to submitting his/her bid.**
  - a. **Failure of the Bidder to receive or examine any Addenda shall not relieve the Bidder from any of the requirements of the Bid Documents.**
  - b. **All Addenda issued, whether or not received or examined by the Bidder, are part of the Bid Documents, and shall be part of the Contract Documents, as though originally incorporated in the Project Manual.**

#### B. QUESTIONS DURING BIDDING PERIOD

1. **Questions will not be received or answered verbally.** All communications must be sent by one of the following forms:
  - a. Electronic Facsimile
  - b. Overnight and common carrier delivery (UPS, FedEx, DSL, etc.)
2. Direct all questions pertaining to the project as shown and described in the contract documents to the project designer listed below.



**Fraytak Veisz Hopkins Duthie, P.C.**  
Architects / Planners  
Nelson Hemstreet, AIA, Project Manager  
1515 Lower Ferry Road, Trenton, NJ 08618  
Electronic Facsimile (609) 883-2694

3. All Pre-Bid Request for Information must state in the Subject Line: **"PRE-BID REQUEST FOR CLARIFICATION"**.
4. All Bidders correspondence must clearly indicate the project identification number **FVHD-5086.3A**, the construction company name, author's name, address, phone #, facsimile # and the addressee of the communication.
5. **E-MAIL COMMUNICATIONS (PRE & POST BID)**: The use of E-mail is **prohibited**. Information transmitted via this form of communication **will not** be recognized as a valid form of communication, and **will not** be responded to.
6. Failure to submit questions or a request for information (RFI) shall be deemed a waiver of any claims for future compensation regarding discrepancies within the Contract Documents. The submission of a Price Proposal shall constitute conclusive evidence that the Bidder has completely reviewed the Contract Documents and fully understands and agrees to all the requirements, terms, conditions set forth therein.

## 5. PREPARATION OF BIDS

- A. Enclose **two copies (one original and one copy)** of the Proposal in a sealed envelope, identified on the outside of the envelope with the name and address of the bidder, name of the project and contract number in which the bidder is submitting. **Bidders submitting a proposal for more than one contract shall submit their proposals in separate sealed envelopes.**
- B. Proposals shall be submitted on the form of proposal furnished by the Architect, properly filled out and duly executed. Proposal forms shall not be altered or added to in any way. Lump Sum Bid or Base Bid prices shall be filled in, in ink or typewritten, in both words and figures. In case of discrepancy, the amount described in words shall govern.
  1. **Bids containing any conditions, omissions, unexplained erasure or alteration, items not called for in the Bid Proposal Form, attachment of additive information not required by the Specifications, or irregularities of any kind may be rejected by the Owner.**
  2. **Any changes, white-outs, strike-outs, etc. on the Proposal Form must be initialed in ink by the person responsible for signing the Bid Proposal.**
- C. When the proposal is made by an individual, his/her post office address shall be stated and he/she shall sign the proposal. When made by a firm or partnership, its name and post office address shall be stated and the proposal shall be signed by one or more of the partners. When made by a corporation, its name and principal post office address shall be stated, and the proposal shall be signed by an authorized official of the corporation.

- D. Alternate Bids and Unit Prices for the various portions of work or Contracts shall be as stated in other Sections of the Specifications.
1. Attention is called particularly to the requirements for filling in all Alternate Bids called for on the Proposal Form, as the Owner reserves the right to award a Contract based upon the possible inclusion of one or more such Alternate Bids.
  2. The amounts of the Alternate Bids shall include any and all modifications to related, adjacent or surrounding work made necessary by use of such Alternate Bids.
  3. The Alternate Bids must be stated as additions to or deductions from the Base Bid, unless otherwise noted.
  4. **The term "No Bid" shall not be used with respect to Alternate Bids and Unit Prices requested on the Proposal Forms. The Bidder who does not desire to make a change from the Base Bid under a particular Alternate Bid shall so indicate by using the words "No Change." Failure to bid or use of the term "No Bid" on every Alternate may cause rejection of entire bid.**
  5. Bidders must bid on every alternate bid. Additions to, or deductions from, the base bid shall be indicated in the appropriate blanks on the proposal form with additions to or deductions from the base bid filled in as appropriate. If a particular alternate bid does not result in an addition to or deduction from the base bid, the words "No Change" or N/C" shall be written in the blank for "No Change" on the proposal form, and the words "No Change" shall be written in the blank provided for the purpose of stating the numeric amount in words. Failure to bid on every alternate bid shall render the bid nonresponsive and cause the bid to be rejected.
  6. The criteria for the selection of alternate bids for the project will be based on the available funds remaining after the accounting for the Base Bid amount, and the actual cost of each alternate bid cost versus that of another. The selections will take place in order to achieve the most completed construction within the project description for closest overall cost in the amount nearest the budget for the project. No other criteria will be used
- E. Attention is called particularly to the requirements for filling in all Alternate Bids called for on the Proposal Form, as the Owner reserves the right to award a Contract based upon the possible inclusion of one or more such Alternate Bids. The amounts of the Alternate Bids shall include any and all modifications to related, adjacent or surrounding work made necessary by use of such Alternate Bids. The Alternate Bids must be stated as additions to or deductions from the Base Bid, unless otherwise noted.
- F. Bidders submitting Proposals for Single Overall Bid pursuant to N.J.S.A. 18A:18A-18 shall include name of subcontractor proposed for use in performance of Structural Steel, Plumbing, Drainage & Sprinkler System, Heating, Ventilating and Air Conditioning and Electrical Work. Subcontractors named shall be qualified in accordance with N.J.S.A. 18A:18A-27.
- G. Conditions, limitations or provisos attached by the Bidder to the Proposal may cause its rejection.

## 6. PROPOSAL GUARANTEE

- A. The Proposal, when submitted, shall be accompanied by a Proposal Guarantee in the form of a Certified Check, Cashier's Check or acceptable Bid Bond made payable unconditionally to the Owner, in the sum of ten percent (10%) of the Bid Proposal, but in no case in excess of \$20,000.00 and as per Bid Bond Form included:
1. Bid Bond Form: Bid Bond shall be as per bid form included and shall include an effective and current Power of Attorney authorizing the Attorney-in Fact to bind the surety, on Bid Date and Time, for the full amount of the Bond.
  2. Proposal shall be accompanied by a Proposition of Surety in accordance with paragraph 1.7
  3. **For Bidders who are submitting multiple proposals for a project, the Bidders shall submit one Bid Bond Form for each contract proposal in the separate sealed envelopes.**
- B. Pursuant to N.J.S.A. 18A:18A-36, all Proposal Guarantees, except those of the three apparent lowest responsible bidders, will be returned, if requested, after ten days from opening of bids, Sundays and holidays excepted. Within 3 days after the awarding of the contract and the approval of the Contractor's performance bond and payment bond, the bid security of the remaining unsuccessful bidders will be returned, Sundays and holidays excepted.
- C. The Proposal Guarantee shall be forfeited if successful Bidder fails to execute the Agreement between Owner and Contractor identified in Section 9 hereof and furnish the Performance-Payment Bond within ten (10) days after notification of award of Contract to him/her.
1. Any failure by the successful bidder to perform its obligations regarding the time, manner, and substance of compliance with Bidding Documents in relation to the Award of a Contract, shall constitute an Event of Default, entitling the Owner to:
    - a. Demand, from said guarantor, immediate payment of the entire Bid Bond amount, as liquidated damages, not as a penalty, for the delay acknowledged and agreed that the Owner will sustain in connection with said Default; and addition thereto,
    - b. Recovery of any and all other Losses incurred by the Owner, to which the Owner shall, to the fullest extent permitted by Applicable Law, be entitled to recover, including with limitation Special Damages.

## 7. CONTRACT BONDS

- A. The Bidder to whom the Contract has been awarded shall, within ten (10) days after notification of award of contract to him/her, furnish and deliver a Performance Bond and Payment Bond, each equal to one hundred percent (100%) of the Contract Amount. If, at any time after execution and approval of a Contract and Performance-Payment Bond required by Contract Documents, such Bond shall cease to be adequate security for the Owner, the Contractor shall, within five (5) days after

notice to do so, furnish a new or additional Bond, in form, sum and signed by such Sureties as shall be satisfactory to the Owner. No further payment shall be deemed due nor shall any further payment be made to the Contractor unless and until such new or additional Bond shall be furnished and approved.

- 1. Surety Company must be an approved surety company authorized to do business in the State of New Jersey and in accordance P.L. 1995, c.384 (amending N.J.S.A. 2A:44-143 and 2A:44-144, effective January 10, 1996) and with the three highest rating categories of rating companies nationally recognized and listed as per Appendix A (go to [www.nj.gov/dobi/surety.htm](http://www.nj.gov/dobi/surety.htm)).**
  - B. Pursuant to N.J.S.A. 18A:18A-25, Proposals shall be accompanied by a Proposition of Surety in form as bound in these documents, assuring that satisfactory arrangements have been made between the surety and the Bidder by which surety agrees to furnish Bidder with a Performance Bond and Payment Bond; each in the amount of 100% of the amount bid. Also surety agrees to furnish Bidder with a Maintenance Bond in form as bound herein.
    1. The Proposition of Surety shall be executed by an approved surety company authorized to do business in the State of New Jersey and in accordance P.L. 1995, c.384 (amending N.J.S.A. 2A:44-143 and 2A:44-144, effective January 10, 1996) and with the three highest rating categories of rating companies nationally recognized and listed as per Appendix A.
  - C. Prior to start of guarantee period and before the final payment is made, the Contractor shall provide the Owner with a Maintenance Bond in the amount of ten percent (10%) of Final Contract Amount, to insure the replacement or repair of defective materials or workmanship during the **one-year / two-year** guarantee period (refer to Section 01900).
  - D. The cost of all Bonds shall be paid for by the Contractor and shall be included as a part of Contractor's bid price.
- 8. POWER OF ATTORNEY**
- A. Attorneys-in-fact who sign Bid Bonds, Performance-Payment Bonds, Maintenance Bonds and Proposition of Surety forms must accompany each bond or proposition with a certified and effectively dated copy of their power-of-attorney.
- 9. FORM OF AGREEMENT**
- A. The form of agreement shall be AIA Document A132/CMA Standard Form of Agreement between Owner and Contractor, Construction Manager as Advisor, 2009 Edition, and in accordance with AIA Document A232/CMA General Conditions of the Contract, Construction Manager as Advisor, 2009 Edition as amended, and all other documents referenced herein.
- 10. AWARD OF CONTRACT(S)**
- A. Award(s), if made, will be to the lowest responsible bidder(s) for the separate contracts or the Single Overall Building Contract selected to include Alternate Bids,

- if any, which the Owner chooses to accept, that result(s) in the lowest aggregate total sum.
- B. Award made to a Bidder not a resident of the State of New Jersey is conditioned upon Bidder designating a proper agent in the State of New Jersey on whom service can be made in the event of litigation.
  - C. If the successful Bidder is a corporation not organized under the laws of New Jersey, the award of Contract and payment of consideration thereunder shall be conditioned upon Corporation promptly filing a certificate of doing business in the State of New Jersey pursuant to N.J.S.A. 14A:13-2 and complying with the provisions of N.J.S.A.14A:13-4.
  - D. The Owner reserves the right to reject all bids, or to waive minor informalities or non-material exceptions in a bid, pursuant to applicable law, if it is in the interest of the Owner to do so.
  - E. In accordance with requirements of the N.J.S.A. 18A:18A-36b, execution of the Contract by all parties shall not exceed twenty one (21) days, Sundays and holidays excepted, after making the award.
    - 1. The Bidder to whom contract is awarded shall be required to execute said Contract no later than ten (10) days of the notification of the award to him/her, Sundays and holidays excepted.
  - F. Upon award of the Contract, the Contractor shall execute and return to the Owner the "Contractor Certification and Consent Upon Award of Contract," attached to the Contract as an Exhibit.

## **11. BIDDING DOCUMENTS**

- A. The Bidding Documents consist of but not limited to the following:
  - 1. Instructions To Bidders in accordance with this Section,
  - 2. General Conditions, AIA Document A232, and as supplemented in the Supplementary General Conditions; Section 00800,
  - 3. Proposal Form including attachments as per Bidder's Checklist,
  - 4. Erratum, Addenda , if issued,
  - 5. Specifications: As outlined in the "Index" included in the Project Manual,
  - 6. Drawings: As per List of Drawings indicated on Project Title Sheet and in accordance with Section 00850,
  - 7. Agreement Between Owner & Contractor, AIA Document A132 and as amended by the Project Specifications.
- B. Note: The above list is not intended to establish order of precedence.

## **12. TIME OF COMPLETION AND LIQUIDATED DAMAGES**

- A. Refer to Section 01800, "Time of Completion and Liquidated Damages".

## **13. LISTING OF STOCKHOLDERS OR PARTNERS**

- A. Pursuant to N.J.S.A. 52:25-24. (P.L. 1977, c.33, as amended by P.L. 2016, c.43), no corporation, partnership, or limited liability company shall be awarded any contract nor shall any agreement be entered into for the performance of any work or the furnishing of any materials or supplies, the cost of which is to be paid with or out of any public funds, by the State, or any county, municipality or school district, or any subsidiary or agency of the State, or of any county, municipality or school district, or by any authority, board, or commission which exercises governmental functions, unless prior to the receipt of the bid or accompanying the bid, of said corporation, said partnership, or said limited liability company there is submitted a statement setting forth the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be. If one or more such stockholder or partner or member is itself a corporation or partnership or limited liability company, the stockholders holding 10 percent or more of that corporation's stock, or the individual partners owning 10 percent or greater interest in that partnership, or the members owning 10 percent or greater interest in that limited liability company, as the case may be, shall also be listed. The disclosure shall be continued until names and addresses of every noncorporate stockholder, and individual partner, and member, exceeding the 10 percent ownership criteria established in this act, has been listed.
- B. To comply with this section, a bidder with any direct or indirect parent entity which is publicly traded may submit the name and address of each publicly traded entity and the name and address of each person that holds a 10 percent or greater beneficial interest in the publicly traded entity as of the last annual filing with the federal Securities and Exchange Commission or the foreign equivalent, and, if there is any person that holds a 10 percent or greater beneficial interest, also shall submit links to the websites containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent and the relevant page numbers of the filings that contain the information on each person that holds a 10 percent or greater beneficial interest.

## **14. NON-COLLUSION AFFIDAVIT**

- A. Pursuant to N.J.S.A. 52:34-15, bidder shall submit with his/her bid Non-Collusion Affidavit on form as bound herein.

## **15. CONTRACT**

- A. As indicated in the Advertisement for Bids, it is intended to receive sealed bids and to award and administrate contracts for the work required by the Contract Documents as follows:

Separate sealed bids will be received for:

**Contract No. 1 - General Construction Work (C009)**

**Contract No. 2 - Structural, Miscellaneous Steel & Iron Work (C029)**

**Contract No. 3 - Plumbing, Drainage, Gas Fittings Work (C030)**

**Contract No. 4 - Heating, Ventilating, Air Conditioning Work & Refrigeration (C032)**

**Contract No. 5 - Electrical Work (C047)**

**Contract No. 6 - Combined Single Overall Contract, Contract No. 1 through 5**

- B. The Bidder shall be in possession of the required DPMC Classification(s) for the specified work. If they possess the DPMC Classification(s) in one or more of the required categories, but not in all of the required categories, the Contractor must list the prime subcontractor(s) bidding the scope of work for the other categories. The subcontractor must possess the DPMC Classification(s) in that category.**

**END OF SECTION 00100**

## BIDDER'S CHECKLIST

**THE FOLLOWING CHECKLIST MUST BE SIGNED AND SUBMITTED WITH THE BID PACKAGE TO THE OWNER AS PART OF THE BID DOCUMENTS.**

### ITEM

- REVIEWED THE CONTRACT DOCUMENTS (INCLUDING THE PERMITS OBTAINED BY THE BOARD), WORK SITE, LOCALITY, AND ALL LOCAL CONDITIONS AND LAWS AND REGULATIONS THAT IN ANY MANNER MAY AFFECT COST, PROGRESS, PERFORMANCE OR FURNISHING OF WORK
- REVIEWED GENERAL BOND REQUIREMENTS
- REVIEWED AGREEMENT (OWNER/CONTRACTOR)
- (\* ) BIDDER'S PROPOSAL
- (\* ) BID BOND, CERTIFIED CHECK, CASHIER'S CHECK OR ANY COMBINATION THEREOF IN AN AMOUNT NO LESS THAN TEN PERCENT (10%) OF THE TOTAL AMOUNT OF BID, NOT TO EXCEED \$20,000 (TWENTY THOUSAND DOLLARS)
- (\* ) CONSENT OF SURETY (CONTRACTOR)
- (\* ) CONSENT OF SURETY (SUBCONTRACTOR)  
If surety is being provided for subcontractors by bidder, please indicate here. \_\_\_\_ initial
- (\* ) SUBCONTRACTOR IDENTIFICATION STATEMENT
- (\* ) OWNERSHIP DISCLOSURE CERTIFICATION
- (\* ) DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN (P.L. 2012, c.25)
- PERFORMANCE RECORD CERTIFICATION
- COMPLIANCE WITH NEW JERSEY PREVAILING WAGE ACT
- NON COLLUSION AFFIDAVIT
- CERTIFICATE OF EQUAL OPPORTUNITY
- AFFIRMATIVE ACTION COMPLIANCE NOTICE
- CERTIFICATION OF NO MATERIAL CHANGE OF CIRCUMSTANCES - CONTRACTOR
- CERTIFICATION OF NO MATERIAL CHANGE OF CIRCUMSTANCES - SUBCONTRACTOR
- POLITICAL CONTRIBUTION DISCLOSURE FORM
- CERTIFICATION OF INSURANCE STATEMENT
- CONTRACTOR CERTIFICATION OF QUALIFICATIONS AND CREDENTIALS AFFIDAVIT AND  
CERTIFICATION FOR ALL PRIME SUBCONTRACTORS REQUIRED TO BE NAMED UNDER (N.J.S.A. 18A:7G-1 ET SEQ. (P.L. 2000, C.72), WHERE APPLICABLE



**BIDDER'S CHECKLIST**

CURRENT NEW JERSEY DEPARTMENT OF LABOR PUBLIC WORKS CONTRACTOR REGISTRATION ACT CERTIFICATE (P.L. 1999 C. 238) OR COPY OF APPLICATION AND CHECK - ALL CONTRACTOR(S) AND SUBCONTRACTOR(S)

BUSINESS REGISTRATION CERTIFICATE - ALL CONTRACTOR(S) AND SUBCONTRACTOR(S) ENCOURAGED TO SUBMIT WITH BID BUT PRIOR TO CONTRACT AWARD

CURRENT NOTICE OF CLASSIFICATION/PRE-QUALIFICATION CERTIFICATE(S) DPMC CLASSIFICATION CERTIFICATE(S) - ALL CONTRACTOR(S) AND SUBCONTRACTOR(S)

DIVISION OF PROPERTY MANAGEMENT & CONSTRUCTION (DPMC) FORM 701 - TOTAL AMOUNT OF UNCOMPLETED CONTRACTS - ALL CONTRACTOR(S) AND SUBCONTRACTOR(S)

STATUS OF PRESENT CONTRACTS

TRADE LICENSE

HVACR MASTER LICENSE (HVACR CONTRACTORS)

**NOTE: (\*) FAILURE TO SUBMIT THESE DOCUMENTS SHALL BE AUTOMATIC CAUSE FOR REJECTION OF THE BID.**

By signing below, I acknowledge having read and fully understand all the requirements of each of the documents referenced herein.

\_\_\_\_\_  
BIDDER (Signature)

Dated: \_\_\_\_\_

\_\_\_\_\_  
BIDDER (Print Name)

**BID BOND**

**THE UNDERSIGNED BIDDER** and "**Surety**", a corporation duly authorized to transact business in the State of New Jersey, are held and firmly bound unto \_\_\_\_\_  
\_\_\_\_\_ (the "**OWNER**") for the full and just sum of:  
\_\_\_\_\_ Dollars (\$\_\_\_\_\_),  
(10% of the Bid Price not to exceed \$20,000.00: words) (figures)

The payment of which sum the **BIDDER** has submitted a Bid to perform certain Work described in Bidding Documents entitled:

**CONTRACT NO.:** \_\_\_\_\_

**TITLE:** \_\_\_\_\_

The **Surety** hereby agrees to pay the full face value of this Bond to the **OWNER**, as Liquidated Damages, and not as a penalty, unless this Bond is void.

This Bond shall only be void if the **BIDDER** well, truly and faithfully performs all requirements contained in the Bidding/Contract Documents incident to an Award of the Contract including, but not limited to, proper execution and submission of the Contract Forms and all other required documentation.

On this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_, the **BIDDER** and **Surety** hereby bind themselves herein:

**FOR THE BIDDER:**

**FOR THE SURETY:**

\_\_\_\_\_  
(Name of **BIDDER**)

\_\_\_\_\_  
(Name of **Surety**)

By: \_\_\_\_\_  
(Print Name-**BIDDER's** Authorized Representative)

By: \_\_\_\_\_  
(Print Name of Attorney-in-Fact)

By: \_\_\_\_\_  
(Signature-**BIDDER's** Authorized Representative)

By: \_\_\_\_\_  
(Signature of Attorney-in-Fact)

**IMPORTANT – ATTACH AND SUBMIT WITH THE BID: A POWER OF ATTORNEY FOR THE ATTORNEY-IN-FACT WHICH IS CURRENTLY DATED AND VALID FOR THE ENTIRE AMOUNT OF THE BOND**

**END OF DOCUMENT**

**FORM OF CONSENT OF SURETY**

**PERFORMANCE BOND, PAYMENT BOND and MAINTENANCE BOND**

For and in consideration of the sum of one dollar (\$1.00) lawful money of the United States, the receipt is hereby acknowledged, paid to the undersigned surety, and for other valuable consideration, the undersigned surety, authorized to transact business in the State of \_\_\_\_\_, certifies and agrees that if the Contract entitled: \_\_\_\_\_

CONTRACT \_\_\_\_\_,  
(NUMBER) (TITLE)

is awarded to: \_\_\_\_\_  
(BIDDER'S NAME)

the undersigned hereby warrants that it is in all respects qualified to provide the required Bonds as set forth in the Contract Documents, and that it will provide and execute the **Performance Bond** in the full amount of awarded contract in the event that said contractor is awarded a contract for the above project, the **Payment Bond**, and the **Maintenance Bond** in the form and as otherwise required by the Contract Documents.

\_\_\_\_\_  
(Print Name of Surety)

\_\_\_\_\_  
(Print Name of Attorney-in-Fact)

\_\_\_\_\_  
(Signature of Attorney-in-Fact)

**ATTACH AND SUBMIT WITH THE BID: A POWER OF ATTORNEY FOR THE ATTORNEY -IN-FACT WHICH IS CURRENTLY DATED AND VALID FOR THE TOTAL AMOUNT OF ALL BONDS.**

Consent of Surety must be signed by an authorized agent or representative of a surety company and not by the individual or company representative submitting the bid.

NOTE: IF SUBCONTRACTORS ARE LISTED ON BID FORM, N.J.S.A. 18A:18A-18 REQUIRES THAT EVIDENCE OF PERFORMANCE SECURITY AS TO SUBCONTRACTORS BE SUBMITTED WITH THE BID, EITHER BE THE BIDDER ON ITS OWN BEHALF AND ON BEHALF OF ALL LISTED SUBCONTRACTORS, OR BY EACH SUBCONTRACTOR, OR ANY COMBINATION THEREOF, PROVIDED THAT THE PERFORMANCE SECURITY IN TOTAL EQUALS, BUT DOES NOT EXCEED, THE TOTAL AMOUNT OF THE BID.

**SUBCONTRACTOR IDENTIFICATION STATEMENT**

The following information is to be provided in the case of all subcontractors who will furnish labor of the various trades governed by N.J.S.A. 18A:18A-18 (b) (**General Construction, Steel, Plumbing, HVAC, Electric, and all DPMC Specialty Trades**, where applicable).

TRADE	Contractor's Name/Address/Telephone	NJ License No.

If work of the types designated by the above referenced law will be performed by the Bidder, the Bidder shall state below and shall enclose copies of licenses covering each trade.

TRADE	N.J. License No.

BIDDER \_\_\_\_\_

**STATEMENT OF OWNERSHIP**  
**(OWNERSHIP DISCLOSURE CERTIFICATION)**

N.J.S.A. 52:25-24.2 (P.L. 1977, c.33, as amended by P.L. 2016, c.43)

**This Statement Shall Be Included with  
All Bid and Proposal Submissions**

**Name of Business:** \_\_\_\_\_

**Address of Business:** \_\_\_\_\_

**Name of person completing this form:** \_\_\_\_\_

**N.J.S.A. 52:25-24.2:**

"No corporation, partnership, or limited liability company shall be awarded any contract nor shall any agreement be entered into for the performance of any work or the furnishing of any materials or supplies, unless prior to the receipt of the bid or proposal, or accompanying the bid or proposal of said corporation, said partnership, or said limited liability company there is submitted a statement setting forth the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be.

If one or more such stockholder or partner or member is itself a corporation or partnership or limited liability company, the stockholders holding 10 percent or more of that corporation's stock, or the individual partners owning 10 percent or greater interest in that partnership, or the members owning 10 percent or greater interest in that limited liability company, as the case may be, shall also be listed. The disclosure shall be continued until names and addresses of every non-corporate stockholder, and individual partner, and member, exceeding the 10 percent ownership criteria established in this act, has been listed.

To comply with this section, a bidder with any direct or indirect parent entity which is publicly traded may submit the name and address of each publicly traded entity and the name and address of each person that holds a 10 percent or greater beneficial interest in the publicly traded entity as of the last annual filing with the federal Securities and Exchange Commission or the foreign equivalent, and, if there is any person that holds a 10 percent or greater beneficial interest, also shall submit links to the websites containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent and the relevant page numbers of the filings that contain the information on each person that holds a 10 percent or greater beneficial interest."

The Attorney General has advised that the provisions of N.J.S.A. 52:25-24.2, which refer to corporations and partnerships, apply to limited partnerships, limited liability partnerships, and Subchapter S corporations.

This Ownership Disclosure Certification form shall be completed, signed and notarized.

**Failure of the bidder/proposer to submit the required information is cause for automatic rejection of the bid or proposal**

**Part I**

**Check the box that represents the type of business organization:**

- Sole Proprietorship (skip Parts II and III, sign and notarize at the end)
- Non-Profit Corporation (skip Parts II and III, sign and notarize at the end)
- Partnership  Limited Partnership  Limited Liability Partnership
- Limited Liability Company
- For-profit Corporation (including Subchapters C and S or Professional Corporation)
- Other (be specific): \_\_\_\_\_

**Part II**

I certify that the list below contains the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be.

**OR**

I certify that no one stockholder in the corporation owns 10 percent or more of its stock, of any class, or no individual partner in the partnership owns a 10 percent or greater interest therein, or that no member in the limited liability company owns a 10 percent or greater interest therein, as the case may be.

**Sign and notarize the form below, and, if necessary, complete the list below. (Please attach additional sheets if more space is needed):**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

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Address: \_\_\_\_\_

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Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

**Part III - Any Direct or Indirect Parent Entity Which is Publicly Traded:**

“To comply with this section, a bidder with any direct or indirect parent entity which is publicly traded may submit the name and address of each publicly traded entity and the name and address of each person that holds a 10 percent or greater beneficial interest in the publicly traded entity as of the last annual filing with the federal Securities and Exchange Commission or the foreign equivalent, and, if there is any person that holds a 10 percent or greater beneficial interest, also shall submit links to the websites containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent and the relevant page numbers of the filings that contain the information on each person that holds a 10 percent or greater beneficial interest.”

Pages attached with name and address of each publicly traded entity as well as the name and address of each person that holds a 10 percent or greater beneficial interest.

**OR**

Submit here the links to the Websites (URLs) containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent.

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**AND**

Submit here the relevant page numbers of the filings containing the information on each person holding a 10 percent or greater beneficial interest.

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Subscribed and sworn before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
(Affiant)

(Notary Public)

My Commission expires:

\_\_\_\_\_  
(Print name of affiant and title if applicable)

(Corporate Seal if a Corporation)



PERFORMANCE RECORD

How many years has your organization been in business as a Contractor under your present business name? \_\_\_\_\_

How many years experience in construction work has your organization had:

(a) As a Prime contractor? \_\_\_\_\_ (b) As a subcontractor? \_\_\_\_\_

What is the construction experience of the principal individuals of your organization?

Individual's Name	Present Position or Office	Years of Constr. Experience	Magnitude and Type of Work	In What Capacity

Have you ever failed to complete any work contracted to you? \_\_\_\_\_

If so, where and why? \_\_\_\_\_

Has any officer or partner of your organization ever failed to complete a construction contract handled in its own name?

If so, state name of individual, name of owner, location and type of project and reason for the failure to complete.

PERFORMANCE RECORD (Continued)

List of all contracts completed by you.

<b>Name of Owner</b>	<b>Name &amp; Location of Project/ Type of Work</b>	<b>Prime or Sub- Contractor</b>	<b>Architect or Engineer in Charge for Owner</b>	<b>Contract Price (Omit Cost)</b>	<b>Date Completed</b>	<b>Was* Time Extension Necessary</b>	<b>Were any Penalties Imposed</b>	<b>Were* Liens Claims or Stop Notice Filed</b>

\*Explain "Yes" answers.

PERFORMANCE RECORD  
CERTIFICATION

Explanation of details in connection with non-completion of contracts, time extensions, penalties imposed, labor troubles experience, liens, termination of contracts, poor performance, debarment, claims and notices filed against contracts.

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The information above is true and complete to the best of my knowledge and belief.

\_\_\_\_\_  
(Name of Organization)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Title)

STATE OF                                    )  
  )ss.  
COUNTY OF                                )

\_\_\_\_\_, being duly sworn to law, deposes and says that it is authorized to make this affidavit for, and on behalf of, the individual, partnership or corporation herein first named as the Bidder, that deponent is familiar with the books of the said Bidder and that the foregoing statement is a true and accurate statement taken from the books of said Bidder of such financial condition as of the date herein first named; that the answers to the foregoing interrogatories are true and correct.

Subscribed and sworn to before me

This \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Seal) Notary Public of New Jersey/  
Specify Other State  
My Commission Expires \_\_\_\_\_, 20 \_\_\_\_.

**COMPLIANCE WITH NEW JERSEY PREVAILING WAGE ACT**

Title of Bid: \_\_\_\_\_

Date: \_\_\_\_\_

Bidder's Past Record under the New Jersey Prevailing Wage Act (N.J.S.A. 34:11-56.25, inclusive) and all acts amendatory thereof and supplemental hereto.

Answer each question with a "yes" or "no" entered in the space provided and furnish additional information when required.

1. I certify that our company understands that this project requires prevailing wages to be paid in full accordance with the law.
2. I further certify that all subcontractors named in this bid understand that this project requires the subcontract to pay prevailing wages in full accordance with the law.
3. Has the Bidder been notified by the Commissioner of Labor and Industry by notice issued pursuant to N.J.S.A. 34:11-56:37 that it has been found to be in violation for failure to pay prevailing wages as required by the New Jersey Prevailing Wages Act? \_\_\_\_\_
4. Has any person having an "Interest" in the Bidder within the meaning of N.J.S.A. 34:11-56:38 been found to be in violation of the New Jersey Prevailing Wage Act as aforesaid? \_\_\_\_\_
5. Has any person having an "Interest" in the Bidder with the meaning of N.J.S.A. 34:11-56:38 had an "Interest" as aforesaid in any firm, corporation, or partnership which has been found to be in violation of the New Jersey Prevailing Wage Act as aforesaid? \_\_\_\_\_
6. If the answer to any of the aforesaid questions is "Yes," annex a full statement showing the date of the action taken by the Commissioner of Labor and Industry, the subsequent action, if any, taken with respect to such action of the Commissioner, the name of the person, firm corporation or partnership debarred by the commissioner, and the nature, character and extent of the interest existing between the Bidder and the name which was debarred as aforesaid.

Name of Company:

\_\_\_\_\_

Authorized Agent:

\_\_\_\_\_

Authorized Signature:

\_\_\_\_\_

**NON-COLLUSION AFFIDAVIT**

STATE OF NEW JERSEY/ \_\_\_\_\_  
(Specify, if Other)

COUNTY OF \_\_\_\_\_

I, \_\_\_\_\_, of the (City, Town, Borough) of \_\_\_\_\_ State of \_\_\_\_\_, of full age, being duly sworn according to law on my oath depose and say that:

I am \_\_\_\_\_ of the firm of \_\_\_\_\_, the Bidder making the Proposal for the above named Projects, and that I executed the said Proposal with full authority to do so; that said Bidder has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named Project; and that all statements contained in said Proposal and in this affidavit are true and correct, and made with full knowledge, and the State of New Jersey relies upon the truth of the statements contained in this affidavit in awarding the contract for the said Project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by \_\_\_\_\_. (Name of Contractor)

(N.J.S.A. 52:34-15)

By: \_\_\_\_\_  
(Signature of Authorized Representative)

Subscribed and sworn to before me  
this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
(Seal) Notary Public of New Jersey/

Specify Other State

My Commission Expires \_\_\_\_\_, 20 \_\_\_\_.

**THIS FORM MUST BE COMPLETED, SIGNED, NOTARIZED, AND SUBMITTED WITH BID**

**CERTIFICATE OF EQUAL OPPORTUNITY**

**Name of Bidder**

**Project No.**

**INSTRUCTIONS**

This certification is required pursuant to executive order 11246, Part II, 203(B), (30 F.R. 12319-25). Each Bidder is required to state in its Bid whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable filing requirements.

**CONTRACTOR'S CERTIFICATE**

**Contractor's Name:**

\_\_\_\_\_

**Address:** \_\_\_\_\_

1. Bidder has participated in previous contract or subcontract subject to the equal opportunity clause. Yes \_\_\_\_\_ No \_\_\_\_\_
2. Compliance reports were required to be filed in connection with such contract or subcontract. Yes \_\_\_\_\_ No \_\_\_\_\_  
If Yes, state what reports were filed and with what agency.
3. Bidder has filed all compliance reports due under applicable instructions. Yes \_\_\_\_\_ No \_\_\_\_\_
4. If answer to Item 3 is "No", please explain in detail on reverse side of this certification.

Certification: The information above is true and complete to the best of my knowledge and belief. A willfully false statement is punishable by law. (U.S.Code, Title 17, Section 1001.)

\_\_\_\_\_  
(Name and Title of Signer - Please Type

\_\_\_\_\_  
(Signature)

Date: \_\_\_\_\_

**AFFIRMATIVE ACTION QUESTIONNAIRE**

COMPANY NAME \_\_\_\_\_

1. Our company has a federal Affirmative Action Plan approval.

YES \_\_\_\_\_ NO \_\_\_\_\_

2. Our company has a New Jersey State Certificate of Approval

YES \_\_\_\_\_ NO \_\_\_\_\_

A. If yes, a copy of the New Jersey State Certificate shall be submitted to the board of education within seven (7) working days of the notice of intent to award the contract or the signing of the contract.

3. If you answered NO to both questions above, you will need to complete an Affirmative Action Employee Information Report (AA-302) and forward to the Affirmative Action Office, Department of Treasury, Division of Purchase & Property, Contract Compliance Audit Unit, EEO Monitoring Program P.O. Box 206, Trenton, NJ 08625. A copy shall be submitted to the board of education within seven (7) days of the notice of the intent to award the contract or the signing of the contraction.

I certify that the above information is correct to the best of my knowledge.

AUTHORIZED BIDDER \_\_\_\_\_  
(Print or Type)

TITLE \_\_\_\_\_ DATE \_\_\_\_\_  
(Print or Type)

SIGNATURE \_\_\_\_\_

**CERTIFICATION OF NO MATERIAL CHANGE OF CIRCUMSTANCES**

Bidder's Name: \_\_\_\_\_

Address: \_\_\_\_\_

1. A statement as to the financial ability, adequacy of plant equipment, organization and prior experience of the Bidder, as required by N.J.S.A. 18A:18A-28 has been submitted to the Department of Treasury within the last twelve (12) months preceding the date of opening of bids for this contract.
  
2. I certify, as required by N.J.S.A. 18A:18A-32, that there has been no material adverse change in the qualification except:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Name and Title of Signer - Please print or type)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)



STATUS OF PRESENT CONTRACTS

**PURSUANT TO N.J.A.C. 17:19-2.13, BIDDER DECLARES THE FOLLOWING WITH RESPECT TO ITS UNCOMPLETED CONTRACTS, ON ALL WORK, FROM WHATEVER SOURCE (PUBLIC AND PRIVATE), BOTH IN NEW JERSEY AND FROM OTHER GOVERNMENTAL JURISDICTIONS.**

- Each classified bidder's aggregate rating shall be calculated in accordance with formula prescribed by N.J.A.C. 17:19-2.8.
- Calculations shall be based on Bidder's base bid amount only at time of bid or total amount of base bid and accepted Alternate Bids at time of Award.

Entity	Project Title	Original Contract Amount	Uncompleted Amount As of Bid Opening Date	Name and Telephone Number of Party To Be Contacted From Entity For Verification

Sworn and Subscribed to before me  
 this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

BIDDER

Notary Public \_\_\_\_\_

\_\_\_\_\_  
 (Print and Signature)

# C. 271 POLITICAL CONTRIBUTION DISCLOSURE FORM

Required Pursuant To N.J.S.A. 19:44A-20.26

**This form or its permitted facsimile must be submitted to the local unit  
no later than 10 days prior to the award of the contract.**

## Part I – Vendor Information

Vendor Name:			
Address:			
City:	State:	Zip:	

The undersigned being authorized to certify, hereby certifies that the submission provided herein represents compliance with the provisions of N.J.S.A. 19:44A-20.26 and as represented by the Instructions accompanying this form.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Title

## Part II – Contribution Disclosure

Disclosure requirement: Pursuant to N.J.S.A. 19:44A-20.26 this disclosure must include all reportable political contributions (more than \$300 per election cycle) over the 12 months prior to submission to the committees of the government entities listed on the form provided by the local unit.

Check here if disclosure is provided in electronic form.

Contributor Name	Recipient Name	Date	Dollar Amount
			\$

Check here if the information is continued on subsequent page(s)

STATE OF NEW JERSEY -- DIVISION OF PURCHASE AND PROPERTY  
DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN

Quote Number: \_\_\_\_\_

Bidder/Offeror: \_\_\_\_\_

**PART 1: CERTIFICATION**

**BIDDERS MUST COMPLETE PART 1 BY CHECKING EITHER BOX.**

**FAILURE TO CHECK ONE OF THE BOXES WILL RENDER THE PROPOSAL NON-RESPONSIVE.**

Pursuant to Public Law 2012, c. 25, any person or entity that submits a bid or proposal or otherwise proposes to enter into or renew a contract must complete the certification below to attest, under penalty of perjury, that neither the person or entity, nor any of its parents, subsidiaries, or affiliates, is identified on the Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran. The Chapter 25 list is found on the Division's website at <http://www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf>. Bidders **must** review this list prior to completing the below certification. **Failure to complete the certification will render a bidder's proposal non-responsive.** If the Director finds a person or entity to be in violation of law, s/he shall take action as may be appropriate and provided by law, rule or contract, including but not limited to, imposing sanctions, seeking compliance, recovering damages, declaring the party in default and seeking debarment or suspension of the party

**PLEASE CHECK THE APPROPRIATE BOX:**

I certify, pursuant to Public Law 2012, c. 25, that neither the bidder listed above nor any of the bidder's parents, subsidiaries, or affiliates is listed on the N.J. Department of the Treasury's list of entities determined to be engaged in prohibited activities in Iran pursuant to P.L. 2012, c. 25 ("Chapter 25 List"). I further certify that I am the person listed above, or I am an officer or representative of the entity listed above and am authorized to make this certification on its behalf. **I will skip Part 2 and sign and complete the Certification below.**

**OR**

I am unable to certify as above because the bidder and/or one or more of its parents, subsidiaries, or affiliates is listed on the Department's Chapter 25 list. I will provide a detailed, accurate and precise description of the activities in Part 2 below and sign and complete the Certification below. Failure to provide such will result in the proposal being rendered as non-responsive and appropriate penalties, fines and/or sanctions will be assessed as provided by law.

**PART 2: PLEASE PROVIDE FURTHER INFORMATION RELATED TO INVESTMENT ACTIVITIES IN IRAN**

You must provide a detailed, accurate and precise description of the activities of the bidding person/entity, or one of its parents, subsidiaries or affiliates, engaging in the investment activities in Iran outlined above by completing the boxes below.

**EACH BOX WILL PROMPT YOU TO PROVIDE INFORMATION RELATIVE TO THE ABOVE QUESTIONS. PLEASE PROVIDE THOROUGH ANSWERS TO EACH QUESTION. IF YOU NEED TO MAKE ADDITIONAL ENTRIES, CLICK THE "ADD AN ADDITIONAL ACTIVITIES ENTRY" BUTTON.**

Name _____	Relationship to Bidder/Offeror _____
Description of Activities _____ _____	
Duration of Engagement _____	Anticipated Cessation Date _____
Bidder/Offeror Contact Name _____	Contact Phone Number _____

Delete

**ADD AN ADDITIONAL ACTIVITIES ENTRY**

Certification: I, being duly sworn upon my oath, hereby represent that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I acknowledge: that I am authorized to execute this certification on behalf of the bidder; that the State of New Jersey is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the completion of any contracts with the State to notify the State in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the State, permitting the State to declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print): \_\_\_\_\_ Signature: \_\_\_\_\_

**Do Not Enter PIN as a Signature**

Title: \_\_\_\_\_ Date: \_\_\_\_\_

CERTIFICATION OF INSURANCE STATEMENT

The Bidder fully understands the Owner's insurance requirements as stated in the Supplementary Conditions and agrees to provide all insurance required by these documents at award of contract.

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COMPANY NAME

---

BIDDER (Signature)

---

BIDDER (Print Name)

**Note:** Failure to sign this document may result in the rejection of your Proposal.

CERTIFICATION OF INSURANCE STATEMENT

**CONTRACTOR / SUBCONTRACTOR CERTIFICATION OF  
QUALIFICATIONS AND CREDENTIALS**

**CONTRACTOR**

STATE OF NEW JERSEY/ \_\_\_\_\_  
(Specify, if Other)

COUNTY OF \_\_\_\_\_

I, \_\_\_\_\_, of the ( City, Town, Borough) of  
\_\_\_\_\_ State of \_\_\_\_\_, of full age,

being duly sworn according to law on my oath depose and say that:

I am \_\_\_\_\_ of the firm of \_\_\_\_\_ the  
Bidder making the Proposal for the above named Projects, or a Subcontractor to the Bidder required  
to be named under (N.J.S.A. 18A:7G-1 et al. and N.J.S.A. 18A:18A-18), and that I executed the said  
Proposal with full authority to do so. Pursuant to N.J.S.A. 18A:7G-37, the firm of  
\_\_\_\_\_ possess the following qualifications and credentials:

- (1) A current, valid Certificate of Registration from the Department of Labor issued pursuant to "The Public Works Contractor Registration Act," P.L.1999, c. 238 (C.34: 11-56.48 et seq.), a copy of which is attached hereto.
- (2) A current, valid "Certificate of Authority to perform work in New Jersey"/Notice of Classification issued by the Department of the Treasury, a copy of which is attached hereto.
- (3) A current, valid Contractor or Trade License required under applicable New Jersey law for any trade or specialty area in which the firm seeks to perform work, a copy of which is attached hereto.
- (4) A suitable quality control and quality assurance program, as well as an appropriate safety and health plan that the firm will have in place during the term of construction of the School Facilities Project.

- (5) An executed Affidavit, attached hereto, demonstrating that the amount of the firm's Bid Proposal and the value of all of its outstanding incomplete contracts does not exceed the firm's existing aggregate rating limit, as well as a certified copy of Department of the Treasury Form DPMC 701.

\_\_\_\_\_  
Name of Contractor

By: \_\_\_\_\_  
(Signature of Authorized Representative)

Subscribed and sworn to before  
me this \_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
(Seal) Notary Public of New Jersey/  
Specify Other State  
My Commission Expires \_\_\_\_\_ 20 \_\_\_\_.

**THIS FORM MUST BE COMPLETED, SIGNED, NOTARIZED,  
AND SUBMITTED WITH BID**

CONTRACTOR / SUBCONTRACTOR CERTIFICATION OF  
QUALIFICATIONS AND CREDENTIALS FORM

**CONTRACTOR / SUBCONTRACTOR CERTIFICATION OF  
QUALIFICATIONS AND CREDENTIALS**

**SUBCONTRACTOR**

STATE OF NEW JERSEY/\_\_\_\_\_

Specify, if Other

COUNTY OF \_\_\_\_\_

I, \_\_\_\_\_, of the ( City, Town, Borough) of  
\_\_\_\_\_ State of \_\_\_\_\_, of full age,

being duly sworn according to law on my oath depose and say that:

I am \_\_\_\_\_ of the firm of \_\_\_\_\_ the Bidder  
making the Proposal for the above named Projects, or a Subcontractor to the Bidder required to be  
named under (N.J.S.A. 18A:7G-1 et al. and N.J.S.A. 18A:18A-18), and that I executed the said  
Proposal with full authority to do so. Pursuant to N.J.S.A. 18A:7G-37, the firm of

\_\_\_\_\_ possess the following qualifications and credentials:

- (1) A current, valid Certificate of Registration from the Department of Labor issued pursuant to "The Public Works Contractor Registration Act," P.L.1999, c. 238 (C.34: 11-56.48 et seq.), a copy of which is attached hereto.
- (2) A current, valid "Certificate of Authority to perform work in New Jersey"/Notice of Classification issued by the Department of the Treasury, a copy of which is attached hereto.
- (3) A current, valid Contractor or Trade License required under applicable New Jersey law for any trade or specialty area in which the firm seeks to perform work, a copy of which is attached hereto.
- (4) A suitable quality control and quality assurance program, as well as an appropriate safety and health plan that the firm will have in place during the term of construction of the School Facilities Project.

- (5) An executed Affidavit, attached hereto, demonstrating that the amount of the firm's Bid Proposal and the value of all of its outstanding incomplete contracts does not exceed the firm's existing aggregate rating limit, as well as a certified copy of Department of the Treasury Form DPMC 701.

\_\_\_\_\_  
Name of Contractor

By: \_\_\_\_\_  
(Signature of Authorized Representative)

Subscribed and sworn to before  
me this \_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_ .

\_\_\_\_\_  
(Seal) Notary Public of New Jersey/  
Specify Other State  
My Commission Expires \_\_\_\_\_ 20 \_\_\_\_ .

**THIS FORM MUST BE COMPLETED, SIGNED, NOTARIZED,  
AND SUBMITTED WITH BID**

CONTRACTOR / SUBCONTRACTOR CERTIFICATION OF  
QUALIFICATIONS AND CREDENTIALS FORM



## **EXHIBIT B**

### **MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE**

**N.J.S.A. 10:5-31 et seq. (P.L.1975, c.127)**

**N.J.A.C. 17:27-1.1 et seq.**

#### **CONSTRUCTION CONTRACTS**

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor will send to each labor union, with which it has a collective bargaining agreement, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer, pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by N.J.A.C. 17:27-7.2; provided, however, that the Dept. of LWD, Construction EEO Monitoring Program, may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures prescribed by the following provisions, A, B, and C, as long as the Dept. of LWD, Construction EEO Monitoring Program is satisfied that the contractor or subcontractor is employing workers

## EXHIBIT B (Cont)

provided by a union which provides evidence, in accordance with standards prescribed by the Dept. of LWD, Construction EEO Monitoring Program, that its percentage of active "card carrying" members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with N.J.A.C. 17:27-7.2. The contractor or subcontractor agrees that a good faith effort shall include compliance with the following procedures:

(A) If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three business days of the contract award, seek assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et. seq., as supplemented and amended from time to time and the Americans with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union at least five business days prior to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the hiring or scheduling procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

(B) If good faith efforts to meet targeted employment goals have not or cannot be met for each construction trade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:

(1) To notify the public agency compliance officer, the Dept. of LWD, Construction EEO Monitoring Program, and minority and women referral organizations listed by the Division pursuant to N.J.A.C. 17:27-5.3, of its workforce needs, and request referral of minority and women workers;

(2) To notify any minority and women workers who have been listed with it as awaiting available vacancies;

(3) Prior to commencement of work, to request that the local construction trade union refer minority and women workers to fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;

## **EXHIBIT B** (*Cont*)

(4) To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;

(5) If it is necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and non-discrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;

(6) To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:

(i) The contractor or subcontractor shall interview the referred minority or women worker.

(ii) If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcontractor shall hire or schedule those individuals who satisfy appropriate qualification standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that the individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency, provided the referral agency is acceptable to the Dept. of LWD, Construction EEO Monitoring Program. If necessary, the contractor or subcontractor shall hire or schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provisions of (C) below.

(iii) The name of any interested women or minority individual shall be maintained on a waiting list, and shall be considered for employment as described in (i) above, whenever vacancies occur. At the request of the Dept. of LWD, Construction EEO Monitoring Program, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.

(iv) If, for any reason, said contractor or subcontractor determines that a minority individual or a woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the determination in its files, and send a copy to the public agency compliance officer and to the Dept. of LWD, Construction EEO Monitoring Program.

(7) To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Dept. of LWD, Construction EEO Monitoring Program and submitted promptly to the Dept. of LWD, Construction EEO Monitoring Program upon request.

## **EXHIBIT B (Cont)**

(C) The contractor or subcontractor agrees that nothing contained in (B) above shall preclude the contractor or subcontractor from complying with the union hiring hall or apprenticeship policies in any applicable collective bargaining agreement or union hiring hall arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in numbers which result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ratio established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that, in implementing the procedures of (B) above, it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union.

After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Dept. of LWD, Construction EEO Monitoring Program an initial project workforce report (Form AA-201) electronically provided to the public agency by the Dept. of LWD, Construction EEO Monitoring Program, through its website, for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7. The contractor also agrees to submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of this contract to the Dept. of LWD, Construction EEO Monitoring Program, and to the public agency compliance officer.

The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the-job and/or off-the-job programs for outreach and training of minorities and women.

(D) The contractor and its subcontractors shall furnish such reports or other documents to the Dept. of LWD, Construction EEO Monitoring Program as may be requested by the Dept. of LWD, Construction EEO Monitoring Program from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Dept. of LWD, Construction EEO Monitoring Program for conducting a compliance investigation pursuant to N.J.A.C. 17:27-1.1 et seq.



# AIA® Document A312™ – 2010

## Performance Bond

**CONTRACTOR:**  
*(Name, legal status and address)*

**SURETY:**  
*(Name, legal status and principal place of business)*

**OWNER:**  
*(Name, legal status and address)*

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

### CONSTRUCTION CONTRACT

Date:  
Amount: \$  
Description:  
*(Name and location)*  
Sample

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

### BOND

Date:  
*(Not earlier than Construction Contract Date)*

Amount: \$  
Modifications to this Bond:  None  See Section 16

**CONTRACTOR AS PRINCIPAL**  
Company: *(Corporate Seal)*

**SURETY**  
Company: *(Corporate Seal)*

Signature: \_\_\_\_\_  
Name and Title:

Signature: \_\_\_\_\_  
Name and Title:

*(Any additional signatures appear on the last page of this Performance Bond.)*

*(FOR INFORMATION ONLY — Name, address and telephone)*

**AGENT or BROKER:**

**OWNER'S REPRESENTATIVE:**  
*(Architect, Engineer or other party:)*

Init.

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

#### § 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

Init.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

*(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)*

**CONTRACTOR AS PRINCIPAL**

Company: \_\_\_\_\_  
*(Corporate Seal)*

**SURETY**

Company: \_\_\_\_\_  
*(Corporate Seal)*

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Address: \_\_\_\_\_

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Address: \_\_\_\_\_





# AIA<sup>®</sup> Document A312<sup>™</sup> – 2010

## Payment Bond

**CONTRACTOR:**

*(Name, legal status and address)*

**SURETY:**

*(Name, legal status and principal place of business)*

**OWNER:**

*(Name, legal status and address)*

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

**CONSTRUCTION CONTRACT**

Date:

Amount: \$

Description:

*(Name and location)*

Sample

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

**BOND**

Date:

*(Not earlier than Construction Contract Date)*

Amount: \$

Modifications to this Bond:  None  See Section 18

**CONTRACTOR AS PRINCIPAL**

Company: *(Corporate Seal)*

**SURETY**

Company: *(Corporate Seal)*

Signature: \_\_\_\_\_

Name and

Title:

*(Any additional signatures appear on the last page of this Payment Bond.)*

Signature: \_\_\_\_\_

Name and

Title:

*(FOR INFORMATION ONLY — Name, address and telephone)*

**AGENT or BROKER:****OWNER'S REPRESENTATIVE:**

*(Architect, Engineer or other party:)*

Init.

User Notes:

(892497972)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

## § 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

*(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)*

**CONTRACTOR AS PRINCIPAL**

**SURETY**

Company: \_\_\_\_\_  
*(Corporate Seal)*

Company: \_\_\_\_\_  
*(Corporate Seal)*

Signature: \_\_\_\_\_  
Name and Title: \_\_\_\_\_  
Address: \_\_\_\_\_

Signature: \_\_\_\_\_  
Name and Title: \_\_\_\_\_  
Address: \_\_\_\_\_

Init.

User Notes:

(892497972)

**MAINTENANCE BOND (All Work other than HVAC)**

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned, \_\_\_\_\_

\_\_\_\_\_

as principal, and \_\_\_\_\_

a Corporation organized and existing under the laws of the state of \_\_\_\_\_

\_\_\_\_\_

and duly authorized to do business in the State of New Jersey, as Surety,

are held and firmly bound unto the \_\_\_\_\_

\_\_\_\_\_

as Owner, in the penal sum of \_\_\_\_\_

\_\_\_\_\_

(10% of the Final Contract Amount)

for payment of which, well and truly to be made, we hereby, jointly, and severally, bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, That whereas

the above named principal did on the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_,

enter into a Contract with the Owner for \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(Project Name)

which said Contract is made a part of this bond the same as though set forth herein.

NOW, if the said principal shall remedy without cost to the Owner any defects which may develop during the one (1) year Maintenance Period (for all Work other than HVAC Work) of the work performed under the said Contract, provided such defects, in the judgment of the Owner are caused by defective or inferior materials or workmanship, then this obligation shall be void, otherwise it shall be and remain in full force and effect. The one (1) year period shall commence on the date established in the Certificate of Substantial Completion.

The said Surety hereby stipulates and agrees that no modifications, deletions or additions in or to the terms of the said Contract or the plans or specifications therefor shall in any way affect its obligations on this bond.

Signed and Sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
(Principal) (Seal)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Surety) (Seal)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Title)

**TWO YEAR MAINTENANCE BOND (HVAC WORK)**

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned, \_\_\_\_\_

\_\_\_\_\_

as principal, and \_\_\_\_\_

a Corporation organized and existing under the laws of the state of \_\_\_\_\_

\_\_\_\_\_

and duly authorized to do business in the State of New Jersey, as Surety,

are held and firmly bound unto the \_\_\_\_\_

\_\_\_\_\_

as Owner, in the penal sum of \_\_\_\_\_

\_\_\_\_\_

(10% of the Final Contract Amount)

for payment of which, well and truly to be made, we hereby, jointly, and severally, bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, That whereas

the above named principal did on the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_,

enter into a Contract with the Owner for \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(Project Name)

which said Contract is made a part of this bond the same as though set forth herein.

NOW, if the said principal shall remedy without cost to the Owner any defects which may develop during the one (2) year Maintenance Period for HVAC Work performed under the said Contract, provided such defects, in the judgment of the Owner are caused by defective or inferior materials or workmanship, then this obligation shall be void, otherwise it shall be and remain in full force and effect. The one (2) year period shall commence on the date established in the Certificate of Substantial Completion.

The said Surety hereby stipulates and agrees that no modifications, deletions or additions in or to the terms of the said Contract or the plans or specifications therefor shall in any way affect its obligations on this bond.

Signed and Sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
(Principal) (Seal)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Surety) (Seal)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Title)





STATE OF NEW JERSEY  
Department of Labor and Workforce Development  
Division of Wage and Hour Compliance - Public Contracts Section  
PO Box 389  
Trenton, NJ 08625-0389

**PREVAILING WAGE RATE DETERMINATION**

The New Jersey Prevailing Wage Act (N.J.S.A. 34:11-56.25 et seq.) requires that the Department of Labor and Workforce Development establish and enforce a prevailing wage level for workers engaged in public works in order to safeguard their efficiency and general well being and to protect them as well as their employers from the effects of serious and unfair competition.

Prevailing wage rates are wage and fringe benefit rates based on the collective bargaining agreements established for a particular craft or trade in the locality in which the public work is performed. In New Jersey, these rates vary by county and by the type of work performed.

Applicable prevailing wage rates are those wages and fringe benefits in effect on the date the contract is awarded. All pre-determined rate increases listed at the time the contract is awarded must also be paid, beginning on the dates specified. Rates that have expired will remain in effect until new rates are posted.

**Prevailing Wage Rate**

The prevailing wage rate for each craft will list the effective date of the rate and the following information:

**W** = Wage Rate per Hour                      **B** = Fringe Benefit Rate per Hour\*                      **T** = Total Rate per Hour

\* Fringe benefits are an integral part of the prevailing wage rate. Employers not providing such benefits must pay the fringe benefit amount directly to the employee each payday. Employers providing benefits worth less than the fringe benefit amount must pay the balance directly to the employee each payday.

Unless otherwise stated in the Prevailing Wage Rate Determination, the fringe benefit rate for overtime hours remains at the straight time rate.

When the Overtime Notes in the Prevailing Wage Rate Determination state that the overtime rates are "inclusive of benefits," the benefit rate is increased by the same factor as the wage rate (i.e. multiplied by 1.5 for time and one-half, multiplied by 2 for double time, etc.).

**Apprentice Rate Schedule**

An "apprentice" is an individual who is registered with the United States Department of Labor - Office of Apprenticeship and enrolled in a certified apprenticeship program during the period in which they are working on the public works project.

The apprentice wage rate is a percentage of the journeyman wage rate, unless otherwise indicated. The apprentice benefit rate is the full journeyman benefit rate, unless otherwise indicated.

If there is no apprentice rate schedule listed, the individual must be paid at least the journeyman rate even if that individual is in a certified apprentice program for that trade.

If there is no ratio of apprentices to journeymen listed for a particular craft, then the ratio shall be one (1) apprentice to every four (4) journeymen.

## **Comments/Notes**

For each craft listed there will be comments/notes that cover the definition of the regular workday, shift differentials, overtime, recognized holidays, and any other relevant information.

## **Public Works Contractor Registration**

The Public Works Contractor Registration Act (N.J.S.A. 34:11-56.48, et seq.) requires that **all** contractors, subcontractors, or lower tier subcontractors who are working on or who bid on public works projects register with the Department of Labor and Workforce Development. Applications are available at [www.nj.gov/labor](http://www.nj.gov/labor) (click on Wage & Hour and then go to Registration & Permits).

Pursuant to N.J.S.A. 34:11-56.51:

*No contractor shall bid on any contract for public work as defined in section 2 of P.L.1963, c. 150 (C.34:11-56.26) unless the contractor is registered pursuant to this act. No contractor shall list a subcontractor in a bid proposal for the contract unless the subcontractor is registered pursuant to P.L.1999, c.238 (C.34:11-56.48 et seq.) at the time the bid is made. No contractor or subcontractor, including a subcontractor not listed in the bid proposal, shall engage in the performance of any public work subject to the contract, unless the contractor or subcontractor is registered pursuant to that act.*

## **Snow Plowing**

Snow plowing contracts are not subject to the New Jersey Prevailing Wage Act or the Public Works Contractor Registration Act.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

County - BURLINGTON

**Craft: Air Conditioning & Refrigeration - Service and Repair**

**PREVAILING WAGE RATE**

	05/10/19
Journeyman (Mechanic)	W39.08 B24.87 T63.95

**Craft: Air Conditioning & Refrigeration - Service and Repair**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	Mo. 1-3	Mo. 4-12	2nd Year	3rd Year	4th Year	5th Year		Wage = %	of Jnymn	Wage
As Shown										
Wage and Bene	50%	55%	60%	65%	75%	85%		Bene = %	of Jnymn	Bene

**Ratio of Apprentices to Journeymen - 1:4**

APPRENTICE RATE SCHEDULE FOR THOSE APPRENTICES ENTERING PROGRAM AFTER 3-1-13:

INTERVAL	PERIOD AND RATES							
As Shown	1st Year	2nd Year	3rd Year	4th Year	5th Year		Wage =% of Jnymn Wage	
Wage and Benefit	40%	50%	60%	70%	80%		Bene. =% of Jnymn Bene	

**Craft: Air Conditioning & Refrigeration - Service and Repair**

**COMMENTS/NOTES**

THESE RATES MAY BE USED FOR THE FOLLOWING:

- Service/Repair/Maintenance Work to EXISTING facilities.
- Replacement or Installation of air conditioning and refrigeration equipment when the combined tonnage does not exceed 15 tons for refrigeration, or 25 tons for air conditioning.
- Replacement or Installation of "packaged" or "unitary" rooftop-type units when the combined tonnage of the units does not exceed 75 tons.

NOTE: These rates may NOT be used for any work in new construction (including work on new additions).

The regular workday shall consist of 8 hours, starting between 6:00 AM and 10:00 AM, Monday through Friday.

SHIFT DIFFERENTIALS:

- The second and third shifts shall be paid an additional 15% of the hourly rate.
- All shifts must run for a minimum of 5 consecutive days.

OVERTIME:

Hours worked in excess of 8 per day or before or after the regular workday, that are not shift work, and all hours on Saturday shall be paid at time and one-half the hourly rate, inclusive of benefits. All hours on Sunday and holidays shall be paid at double the hourly rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Boilermaker                      PREVAILING WAGE RATE**

	01/01/19
Foreman	W49.72 B44.34 T94.06
General Foreman	W51.72 B45.34 T97.06
Journeyman	W44.72 B42.70 T87.42

**Craft: Boilermaker                      APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
1000 Hours	65%	70%	75%	80%	85%	90%	95%			
Benefit =	36.36	37.26	38.18	39.07	39.39	40.89	41.79			

**Ratio of Apprentices to Journeymen - \***

\* 1 apprentice will be allowed for the first 5 journeymen, 1 apprentice for the next 10 journeymen and 1 apprentice for each succeeding 20 journeymen up to a maximum of 5 apprentices per contractor on any one job.

**Craft: Boilermaker                      COMMENTS/NOTES**

HIGH WORK: All apprentices working on the erection, repair, or dismantling of smoke stacks, standpipes, or water towers shall be paid the Journeyman rate.

The regular workday shall consist of 8 hours, between 8:00 AM and 4:30 PM.

**SHIFT DIFFERENTIALS:**

- The second shift shall work 7½ hours and receive 8 hours pay, at a rate equal to the regular hourly rate plus 10%.
- The third shift shall work 7 hours and receive 8 hours pay, at a rate equal to the regular hourly rate plus 20%.
- For "Municipal Water Works" projects only, the following shall apply: Two, four day, 10 hour shifts may be worked at straight time Monday through Thursday. The day shift shall work four days, at 10 hours, for 10 hours pay. The second shift shall work four days, at nine and a half hours, for 10 hours pay, plus 10% the hourly rate for new work and .25 cents on repair work. Friday may be used as a make-up day at straight time, due to weather conditions, holiday or any other circumstances beyond the employer's control.

**OVERTIME:**

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays (except Labor Day) shall be paid at double the hourly rate. All hours on Labor Day shall be paid at four times the hourly rate.
- If any other craft employed by the same contractor, or a subcontractor thereof, receives double time in lieu of time and one-half, then the Boilermaker shall receive double time in lieu of time and one-half.
- For "Municipal Water Works" projects only, the following shall apply: Four 10 hour days may be worked Monday through Thursday at straight time. Friday may be used as a make-up day for a day lost to inclement weather, holiday or other conditions beyond the control of the employer. Overtime shall be paid for any hours that exceed 10 hours per day or 40 hours per week.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

RECOGNIZED HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Boilermaker - Minor Repairs**

**PREVAILING WAGE RATE**

	01/01/19
Foreman	W32.80 B16.37 T49.17
General Foreman	W33.30 B16.37 T49.67
Mechanic	W31.30 B16.37 T47.67

**Craft: Boilermaker - Minor Repairs**

**COMMENTS/NOTES**

NOTE: These rates apply to MINOR REPAIR WORK ONLY (repair work in the field for which the contract amount does not exceed \$125,000.00).

**OVERTIME:**

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays (except Labor Day) shall be paid at double the hourly rate. All hours on Labor Day shall be paid at four times the hourly rate.

RECOGNIZED HOLIDAYS: New Year's Day, Washington's Birthday, Good Friday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Thanksgiving Day, day after Thanksgiving, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Bricklayer, Stone Mason**

**PREVAILING WAGE RATE**

	05/01/19
Deputy Foreman	W46.20 B33.03 T79.23
Foreman	W49.20 B33.03 T82.23
Journeyman	W43.20 B33.03 T76.23

**Craft: Bricklayer, Stone Mason**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	40%	50%	55%	60%	65%	70%	75%	80%		
6 Months										
Benefits	3.86	4.83	5.31	5.80	21.83	23.27	24.72	26.15		

**Ratio of Apprentices to Journeymen - 1:5**

**Craft: Bricklayer, Stone Mason**

**COMMENTS/NOTES**

The regular workday shall consist of 8 hours, between 6:00 AM and 4:30 PM.

**SHIFT DIFFERENTIALS:**

- When a 2 shift schedule (including a day shift) is established, the first, or day shift, shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular rate plus 10%, inclusive of benefits.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular hourly rate, the second shift shall receive the regular rate plus 10%, inclusive of benefits, and the third shift shall receive the regular rate plus 15%, inclusive of benefits.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular rate plus 10%, inclusive of benefits, and the third shift shall receive the regular rate plus 15%, inclusive of benefits.
- When an irregular shift must be established, this shift shall receive the regular rate plus 10%, inclusive of benefits.

**OVERTIME:**

- The first 2 hours in excess of 8 per day, or before or after the regular workday that are not shift work, Monday through Friday, shall be paid at time and one-half the regular rate, inclusive of benefits. Any additional overtime shall be paid at double the regular rate, inclusive of benefits. The first 10 hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits. Any additional overtime shall be paid at double the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.
- Saturday may be used as a make-up day for hours lost to inclement weather.
- When Bricklayers/Stone Masons work on Saturday with Laborers, and no other crafts are working on the project for the day, benefits may be paid at straight time. If other crafts are present, the applicable overtime rate for benefits shall be paid.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.



**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Carpenter**

**PREVAILING WAGE RATE**

	05/10/19
Foreman	W58.00 B33.64 T91.64
Journeyman	W50.43 B29.33 T79.76

**Craft: Carpenter**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
Yearly	40%	55%	65%	80%	90%					
Benefit	57% of	Appren	tice	Wage	for all	intervals	+ \$0.59			

**Ratio of Apprentices to Journeymen - 1:3**

**Craft: Carpenter**

**COMMENTS/NOTES**

**FOREMAN REQUIREMENTS:**

- When there are 2 or more Carpenters on a job, 1 shall be designated as a Foreman.
- When there are 21 or more Carpenters on a job, 2 shall be designated as Foremen.

The regular workday shall consist of 8 hours, starting between 7:00 AM and 9:00 AM.

**SHIFT DIFFERENTIALS:**

- When a 2 shift schedule (including a day shift) is established, the day shift shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular rate plus 15%, inclusive of benefits.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular hourly rate, the second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.

**OVERTIME:**

- All hours in excess of 8 per day, or before or after an established shift that are not shift work, and all hours on Saturdays shall be paid at time and one-half the hourly rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the hourly rate, inclusive of benefits.
- Four 10-hour days may be worked, Monday to Thursday, at straight time. Friday may be used as a make-up day for a day lost due to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate, inclusive of benefits.

**RECOGNIZED HOLIDAYS:** New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Carpenter - Resilient Flooring**

**PREVAILING WAGE RATE**

	05/10/19
Foreman	W58.00 B33.55 T91.55
Journeyman	W50.43 B29.24 T79.67

**Craft: Carpenter - Resilient Flooring**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
Yearly	40%	55%	65%	80%	90%					
Benefit	57% of	Appren	tice	Wage	for all	intervals	+ \$0.49			

**Ratio of Apprentices to Journeymen - \***

\* Ratio is 1 apprentice to 2 journeymen. No more than 3 apprentices may be on any 1 project.

**Craft: Carpenter - Resilient Flooring**

**COMMENTS/NOTES**

**FOREMAN REQUIREMENTS:**

- On any job where there are 4 or more Carpenters of Resilient Flooring, 1 must be designated a Foreman.

**FOR SYNTHETIC TURF INSTALLATION ONLY:**

- The rate shall be 90% of the wage and benefit rate.

The regular workday consists of 8 hours, starting between 6:00 AM and 9:00 AM.

**SHIFT DIFFERENTIALS:**

- When a 2 shift schedule (including a day shift) is established, the day shift, shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular wage rate plus 15%.

- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular wage rate, the second shift shall receive the regular wage rate plus 15% and the third shift shall receive the regular wage rate plus 20%.

- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular wage rate plus 15% and the third shift shall receive the regular wage rate plus 20%.

**OVERTIME:**

- Hours in excess of 8 per day or 40 per week, or before or after the regular workday, Monday through Friday, shall be paid at time and one-half the wage rate. Saturday may be used as a make-up day, at straight time, up to 8 hours, for hours lost to reasons beyond the control of the employer, up to a total of 40 hours per week; hours in excess of 8 on Saturday shall then be paid at time and one-half the wage rate. If Saturday is not a make-up day, all hours on Saturday shall be paid at time and one-half the wage rate. All hours on Sundays and holidays shall be paid at double the wage rate.

- Four 10-hour days may be worked, Monday to Thursday, at straight time. Friday may be used as a make-up day for hours lost to reasons beyond the control of the employer. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the wage rate.

**RECOGNIZED HOLIDAYS:** New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Cement Mason**

**PREVAILING WAGE RATE**

See " Bricklayer, Stone Mason" Rates

**Craft: Cement Mason**

**COMMENTS/NOTES**

\*\*\*See " Bricklayer, Stone Mason" Rates

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

County - BURLINGTON

**Craft: Diver                      PREVAILING WAGE RATE**

	07/03/19	05/01/20
Diver	W52.14 B36.17 T88.31	W0.00 B0.00 T89.81
Tender	W43.45 B36.17 T79.62	W0.00 B0.00 T81.12

**Craft: Diver                      APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	70%	75%	80%	85%						
1500 hours										
Benefit	26.23	26.98	27.71	28.43						

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Diver                      COMMENTS/NOTES**

**OVERTIME:**

- The first 2 hours in excess of 8 per day (9th and 10th hours), Monday through Friday, and the first 8 hours on Saturdays shall be paid at time and one-half the hourly rate. Hours in excess of 10 per day, Monday through Friday, hours in excess of 8 per day on Saturdays, and all hours on Sundays and holidays shall be paid at double the hourly rate.
- Employees may work four 10-hour days, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, the first 10 hours on Friday shall be paid at time and one-half the hourly rate. Hours in excess of 10 per day shall be paid at double the hourly rate.

**RECOGNIZED HOLIDAYS:** New Year's Day, Washington's Birthday, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Dockbuilder                      PREVAILING WAGE RATE**

	07/03/19	05/01/20
Foreman	W52.14 B36.17 T88.31	W0.00 B0.00 T89.81
Journeyman	W43.45 B36.17 T79.62	W0.00 B0.00 T81.12

**Craft: Dockbuilder                      APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	40%	60%	80%							
1500 hours										
Benefit	21.78	24.75	27.71							

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Dockbuilder                      COMMENTS/NOTES**

APPRENTICE RATE SCHEDULE FOR THOSE APPRENTICES ENTERING PROGRAM ON OR AFTER 12-1-16:

INTERVAL	PERIOD AND RATES			
1500 hours	40%	50%	65%	80%
Benefits	21.78	23.27	25.50	27.71

**Creosote Handling:**

- May 1st to Sept. 30th: + \$0.50 above hourly rate
- Oct. 1st to April 30th: + \$0.25 above hourly rate

**Hazardous Material Work:**

On hazardous material work on a state or federally designated hazardous work site where the worker is required to wear Level A, B or C personal protection, the worker shall receive an additional 20% of the hourly rate, per hour.

**OVERTIME:**

- The first 2 hours in excess of 8 per day (9th and 10th hours), Monday through Friday, and the first 8 hours on Saturdays shall be paid at time and one-half the hourly rate. Hours in excess of 10 per day, Monday through Friday, hours in excess of 8 per day on Saturdays, and all hours on Sundays and holidays shall be paid at double the hourly rate.
- Employees may work four 10-hour days, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, the first 10 hours on Friday shall be paid at time and one-half the hourly rate. Hours in excess of 10 per day shall be paid at double the hourly rate.

**RECOGNIZED HOLIDAYS:** New Year's Day, Washington's Birthday, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Drywall Finisher**

**PREVAILING WAGE RATE**

	11/01/18
Foreman	W43.95 B24.40 T68.35
General Foreman	W45.94 B24.40 T70.34
Journeyman	W39.95 B24.40 T64.35

**Craft: Drywall Finisher**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	40%	50%		60%	70%		80%	90%		
6 Months										
Benefits	Intervals	1 to 2 =	10.65	Intervals	3 to 4 =	13.17	Intervals	5 to 6 =	16.25	

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Drywall Finisher**

**COMMENTS/NOTES**

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

**SHIFT DIFFERENTIALS:**

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.
- When 3 shifts are worked, the second shift shall receive 8 hours pay for 7.5 hours of work, and the third shift shall receive 8 hours pay for 7 hours of work.
- Shift work must run for a minimum of 5 consecutive workdays.

**OVERTIME:**

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.

**RECOGNIZED HOLIDAYS:** New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Electrician - North**

**PREVAILING WAGE RATE**

	04/01/19	07/06/20	10/04/21
Asst. General Foreman	W59.00 B37.42 T96.42	W0.00 B0.00 T98.42	W0.00 B0.00 T100.42
Crane Operator, High Voltage Splicer, Welder	W53.83 B34.19 T88.02	W0.00 B0.00 T90.02	W0.00 B0.00 T92.02
Foreman	W56.40 B35.79 T92.19	W0.00 B0.00 T94.19	W0.00 B0.00 T96.19
General Foreman	W64.10 B40.60 T104.70	W0.00 B0.00 T106.70	W0.00 B0.00 T108.70
Journeyman	W51.27 B32.59 T83.86	W0.00 B0.00 T85.86	W0.00 B0.00 T87.86

**Craft: Electrician - North**

**APPRENTICE RATE SCHEDULE**

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	15.06	17.57	20.08	25.10	35.14					
Benefits	62.48% of	Apprentic	Wage	Rate	+ \$0.31					

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Electrician - North**

**COMMENTS/NOTES**

APPRENTICE RATE SCHEDULE AS OF 4-1-19:

INTERVAL	PERIOD AND RATES				
Yearly	15.38	17.94	20.51	25.64	35.89
Benefits	62.48% of Apprentice Wage Rate + \$0.56				

**FOREMAN REQUIREMENTS:**

- When there are 2 or more electricians on the job, 1 shall be designated a Foreman.
- 1 additional Foreman shall be designated for every 10 additional electricians.
- When there are 2 or more Foremen on the job, 1 shall be designated a General Foreman.

The regular workday is 8 hours between 7:00 AM and 4:30 PM.

**SHIFT DIFFERENTIAL:**

- Shift work must run for a minimum of 5 workdays.
- 2nd Shift (4:30 PM-12:30 AM) shall receive 8 hours pay for 7.5 hours of work, plus an additional 10% of the hourly rate,



**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

per hour, inclusive of benefits.

- 3rd Shift: (12:30 AM-8:00 AM) shall receive 8 hours pay for 7 hours of work, plus an additional 15% of the hourly rate, per hour, inclusive of benefits.

**OVERTIME:**

- The first 4 hours in excess of 8 per day, and hours before or after the regular workday that are not shift work, Monday through Friday, and the first 8 hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. Hours in excess of 12 per day, Monday through Friday, in excess of 8 on Saturdays, and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

- Four 10-hour days may be worked at straight time, Monday through Thursday or Tuesday through Friday.

**RECOGNIZED HOLIDAYS:** New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**\*\* MUNICIPALITIES COVERED:**

Bordentown City & Twp., Burlington City & Twp., Eastampton, Chesterfield, Fieldsboro, Florence, Mansfield, Mount Holly, New Hanover, North Hanover, Pemberton Boro. & Twp., Springfield, Tabernacle, Wrightstown.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Electrician - South**

**PREVAILING WAGE RATE**

	10/01/18
Asst. General Foreman	W56.45 B48.80 T105.25
Foreman	W52.68 B45.87 T98.55
General Foreman	W61.15 B52.47 T113.62
Journeyman, Cable Splicer	W47.04 B41.48 T88.52
Lead Foreman	W54.10 B46.99 T101.09
Working Foreman, Welder, Crane Operator (all types)	W49.39 B43.31 T92.70

**Craft: Electrician - South**

**APPRENTICE RATE SCHEDULE**

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	14.93	19.16	23.40	27.63	31.87					
Benefits	7.58	8.79	10.01	11.23	12.38					

**Ratio of Apprentices to Journeymen - 2:3**

**Craft: Electrician - South**

**COMMENTS/NOTES**

THESE RATES ALSO APPLY TO THE FOLLOWING:

- All new construction.
- All burglar and fire alarm work.
- All fiber optic work.
- Teledata work involving more than 15 instruments or voice/data lines.
- All camera installations.

Height Work: 40 feet above ground/floor: +10% of the wage and benefit amount.

FOREMAN REQUIREMENTS (number of Electricians on site):

(2 to 10) - a Working Foreman; (11 to 22) - a Foreman; (23 to 44) - a Lead Foreman; (35 to 48) - an Assistant General Foreman; (49 or more) - a General Foreman.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

The regular workday consists of 8 hours, between 7:00 AM and 4:30 PM.

**SHIFT DIFFERENTIALS:**

- Shift work must run for a minimum of 5 consecutive workdays
- 2nd Shift (4:30 PM to 12:30 AM): 8 hrs. pay for 7.5 hrs. work + an additional 10% of the wage rate, inclusive of benefits.
- 3rd Shift (12:30 AM to 8:00 AM): 8 hrs. pay for 7 hrs. work + an additional 15% of the wage rate, inclusive of benefits.

**OVERTIME:**

The first 4 hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and the first 8 hours on Saturdays, shall be paid at time and one-half the regular rate, inclusive of benefits. Hours in excess of 12 per day, Monday through Friday, in excess of 8 on Saturdays, and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

**RECOGNIZED HOLIDAYS:** New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**\*\*MUNICIPALITIES COVERED:**

Bass River, Beverly City, Cinnaminson, Delanco, Delran, Edgewater Park, Evesham, Hainesport, Lumberton, Maple Shade, Medford, Medford Lakes, Moorestown, Mount Laurel, Palmyra, Riverside, Riverton, Shamong, Southampton, Washington, Westampton, Woodland, Willingboro.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Electrician - Teledata - North (15 Instruments & Less)**

**PREVAILING WAGE RATE**

	01/01/19
Assistant General Foreman	W49.19 B31.29 T80.48
Foreman	W44.86 B28.58 T73.44
General Foreman	W51.16 B32.52 T83.68
Journeyman Technician	W39.35 B25.14 T64.49
Lead Foreman	W46.83 B29.81 T76.64
Working Foreman	W42.89 B27.35 T70.24

**Craft: Electrician - Teledata - North (15 Instruments & Less)**

**APPRENTICE RATE SCHEDULE**

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	19.28	22.82	28.73	33.84						
Benefits	62.48% of	Apprentic	Wage	Rate	+ \$0.56					

**Craft: Electrician - Teledata - North (15 Instruments & Less)**

**COMMENTS/NOTES**

NOTE: These rates are for service, maintenance, moves and/or changes affecting 15 instruments or less. These rates may NOT be used for any new construction or any fiber optic work.

**FOREMAN REQUIREMENTS:**

- 1 to 10 workers- 1 Working Foreman
- 11 to 20 workers- 1 Working Foreman and 1 Foreman
- 21 to 30 workers- 1 Working Foreman, 1 Foreman and 1 Lead Foreman
- 31 to 40 workers- 1 Working Foreman, 2 Foremen and 1 General Foreman
- 41 to 50 workers- 1 Working Foreman, 4 Foremen, 1 Assistant General Foreman and 1 General Foreman
- 51 to 60 workers- 1 Working Foreman, 5 Foremen, 1 Assistant General Foreman and 1 General Foreman
- 61 to 70 workers- 1 Working Foreman, 6 Foremen, 1 Assistant General Foreman and 1 General Foreman
- 71 to 80 workers- 1 Working Foreman, 7 Foremen, 2 Assistant General Foremen and 1 General Foreman
- 81 to 90 workers- 1 Working Foreman, 8 Foremen, 2 Assistant General Foremen and 1 General Foreman
- 91 to 100 workers- 1 Working Foreman, 9 Foremen, 2 Assistant General Foremen and 1 General Foreman.

HEIGHT WORK (40 feet above ground or floor):

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

Workers shall be paid an additional 10% of the regular rate, inclusive of benefits.

The regular workday shall be 8 hours, between 8:00 AM and 4:30 PM.

**SHIFT DIFFERENTIAL:**

- Shift work must run for a minimum of 5 workdays.
- 2nd Shift (4:30 PM-12:30 AM) shall receive 8 hours pay for 7.5 hours of work, plus an additional 10% of the hourly rate, per hour, inclusive of benefits.
- 3rd Shift: (12:30 AM-8:00 AM) shall receive 8 hours pay for 7 hours of work, plus an additional 15% of the hourly rate, per hour, inclusive of benefits.

**OVERTIME:**

Hours in excess of 8 per day, or outside the regular workday, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

**RECOGNIZED HOLIDAYS:** New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

=> See "Electricians - North" for the list of municipalities covered by these rates.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

County - BURLINGTON

Craft: Electrician - Teledata - North (16 Instruments & More)

PREVAILING WAGE RATE

	04/01/19	07/06/20	10/04/21
Assistant General Foreman	W59.00 B37.42 T96.42	W0.00 B0.00 T98.42	W0.00 B0.00 T100.42
Foreman	W56.40 B35.79 T92.19	W0.00 B0.00 T94.19	W0.00 B0.00 T96.19
General Foreman	W64.10 B40.60 T104.70	W0.00 B0.00 T106.70	W0.00 B0.00 T108.70
Journeyman Technician	W51.27 B32.59 T83.86	W0.00 B0.00 T85.86	W0.00 B0.00 T87.86
Lead Foreman	W56.40 B35.79 T92.19	W0.00 B0.00 T94.19	W0.00 B0.00 T96.19
Working Foreman	W56.40 B35.79 T92.19	W0.00 B0.00 T94.19	W0.00 B0.00 T96.19

Craft: Electrician - Teledata - North (16 Instruments & More)

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
	Yearly	15.06	17.57	20.08	25.10	35.14				
Benefits	62.48% of	Apprentic	Wage	Rate	+\$0.31					

Ratio of Apprentices to Journeymen - 1:4

Craft: Electrician - Teledata - North (16 Instruments & More)

COMMENTS/NOTES

APPRENTICE RATE SCHEDULE AS OF 4-1-19:

INTERVAL	PERIOD AND RATES				
Yearly	15.38	17.94	20.51	25.64	35.89
Benefits	62.48% of Apprentice Wage Rate + \$0.56				

NOTES:

1) These rates are for service, maintenance, moves and/or changes affecting 16 or more instruments, and fiber optic work. These rates may NOT be used for any new construction.

2) The number of electricians on the jobsite is the determining factor for which Foreman Category applies.

FOREMAN REQUIREMENTS:

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

1 to 10 workers- 1 Working Foreman  
11 to 20 workers- 1 Working Foreman and 1 Foreman  
21 to 30 workers- 1 Working Foreman, 1 Foreman and 1 Lead Foreman  
31 to 40 workers- 1 Working Foreman, 2 Foremen and 1 General Foreman  
41 to 50 workers- 1 Working Foreman, 4 Foremen, 1 Assistant General Foreman and 1 General Foreman  
51 to 60 workers- 1 Working Foreman, 5 Foremen, 1 Assistant General Foreman and 1 General Foreman  
61 to 70 workers- 1 Working Foreman, 6 Foremen, 1 Assistant General Foreman and 1 General Foreman  
71 to 80 workers- 1 Working Foreman, 7 Foremen, 2 Assistant General Foremen and 1 General Foreman  
81 to 90 workers- 1 Working Foreman, 8 Foremen, 2 Assistant General Foremen and 1 General Foreman  
91 to 100 workers- 1 Working Foreman, 9 Foremen, 2 Assistant General Foremen and 1 General Foreman.

HEIGHT WORK (40 feet above ground or floor):

Workers shall be paid an additional 10% of the regular rate, inclusive of benefits.

The regular workday shall be 8 hours, between 8:00 AM and 4:30 PM.

SHIFT DIFFERENTIAL:

- Shift work must run for a minimum of 5 workdays.

- 2nd Shift (4:30 PM-12:30 AM) shall receive 8 hours pay for 7.5 hours of work, plus an additional 10% of the hourly rate, per hour, inclusive of benefits.

- 3rd Shift: (12:30 AM-8:00 AM) shall receive 8 hours pay for 7 hours of work, plus an additional 15% of the hourly rate, per hour, inclusive of benefits.

OVERTIME:

Hours in excess of 8 per day, or outside the regular workday, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

=> See "Electricians - North" for the list of municipalities covered by these rates.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Electrician - Teledata - South (15 Voice/Data Lines & Less)**

**PREVAILING WAGE RATE**

	01/01/19
Master Technician/Gen. Foreman (31+ Workers on job)	W48.59 B34.67 T83.26
Senior Technician/Lead Foreman (21-30 Workers on job)	W44.01 B33.20 T77.21
Technician A/Foreman (11-20 Workers on job)	W41.89 B32.52 T74.41
Technician B/Working Foreman (4-10 Workers on job)	W40.64 B31.11 T71.75
Technician C/Journeyman (1-3 Workers on job)	W36.73 B28.86 T65.59

**Craft: Electrician - Teledata - South (15 Voice/Data Lines & Less)**

**APPRENTICE RATE SCHEDULE**

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
6 Months	17.26	17.26	20.54	20.54	25.48	25.48	30.02	30.02		
Benefits	9.45	9.45	10.42	10.42	12.37	12.37	14.72	14.72		

**Ratio of Apprentices to Journeymen - 2:3**

**Craft: Electrician - Teledata - South (15 Voice/Data Lines & Less)**

**COMMENTS/NOTES**

NOTE: These rates are for service, maintenance, moves and/or changes affecting 15 voice/data lines or less. These rates may NOT be used for any new construction or fiber optic work.

**FOREMAN REQUIREMENTS:**

The number of electricians on the jobsite is the determining factor for which Foreman category applies.

**HIGH WORK:** Any work performed 40 feet above ground or floor: +10% of the wage and benefit amount.

**SHIFT DIFFERENTIAL:**

- 2nd Shift (4:30 PM to 12:30 AM) - 8 hrs. pay for 7.5 hrs. work + an additional 10% of the wage rate, inclusive of benefits.
- 3rd Shift (12:30 AM to 8:00 AM) - 8 hrs. pay for 7 hrs. work + an additional 15% of the wage rate, inclusive of benefits.

**OVERTIME:**

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the regular rate, inclusive of



**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

=> See "Electrician - South" for the list of municipalities covered by these rates.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Electrician - Teledata - South (16 Instruments & More)**

**PREVAILING WAGE RATE**

**Craft: Electrician - Teledata - South (16 Instruments & More)**

**COMMENTS/NOTES**

\*\*\*See "Electrician - South" Rates\*\*\*

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Electrician- Outside Commercial- North**

**PREVAILING WAGE RATE**

	04/01/19	07/06/20	10/04/21
Assistant General Foreman	W59.00 B37.09 T96.09	W0.00 B0.00 T98.09	W0.00 B0.00 T100.09
Crane Operator, High Voltage Splicer, Welder	W53.83 B33.89 T87.72	W0.00 B0.00 T89.72	W0.00 B0.00 T91.72
Foreman	W56.40 B35.48 T91.88	W0.00 B0.00 T93.88	W0.00 B0.00 T95.88
General Foreman	W64.10 B40.25 T104.35	W0.00 B0.00 T106.35	W0.00 B0.00 T108.35
Groundman, Truck & Winch Operator- Level I	W15.38 B10.08 T25.46	W0.00 B0.00 T27.46	W0.00 B0.00 T29.46
Groundman, Truck & Winch Operator- Level II	W20.51 B13.26 T33.77	W0.00 B0.00 T35.77	W0.00 B0.00 T37.77
Groundman, Truck & Winch Operator- Level III	W25.64 B16.43 T42.07	W0.00 B0.00 T44.07	W0.00 B0.00 T46.07
Groundman, Truck & Winch Operator- Level IV	W33.33 B21.20 T54.53	W0.00 B0.00 T56.53	W0.00 B0.00 T58.53
Groundman, Truck & Winch Operator- Level V	W41.02 B25.96 T66.98	W0.00 B0.00 T68.98	W0.00 B0.00 T70.98
Heavy Equipment Operator	W51.27 B32.31 T83.58	W0.00 B0.00 T85.58	W0.00 B0.00 T87.58
Journeyman Lineman	W51.27 B32.31 T83.58	W0.00 B0.00 T85.58	W0.00 B0.00 T87.58

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Electrician- Outside Commercial- North**

**APPRENTICE RATE SCHEDULE**

<b>INTERVAL</b>	<b>PERIOD AND RATES</b>									
6 Months	30.12	32.63	35.14	37.65	40.16	42.67	45.18			
Benefits	61.93% of	Apprentic	Wage	Rate	+ \$0.31					

**Craft: Electrician- Outside Commercial- North**

**COMMENTS/NOTES**

APPRENTICE RATE SCHEDULE AS OF 4-1-19:

INTERVAL	PERIOD AND RATES									
6 Months	30.76	33.33	35.89	38.45	40.02	43.58	46.14			
Benefits	61.93% of Apprentice Wage Rate + \$0.56									

\* FOR UTILITY WORK PLEASE SEE STATEWIDE RATES

The regular workday is 8 hours between 7:00 AM and 4:30 pm.

**SHIFT DIFFERENTIALS:**

2nd Shift (4:30 PM to 12:30 AM): 8 hrs. pay for 7.5 hrs. work + an additional 10% of the regular rate, inclusive of benefits.  
 3rd Shift (12:30 AM to 8:00 AM): 8 hrs. pay for 7 hrs. work + an additional 15% of the regular rate per hour, inclusive benefits.

**FOREMAN REQUIREMENTS:**

When there are 2 or more electricians on the job, 1 shall be designated a Foreman.  
 1 additional Foreman shall be designated for every 10 additional electricians.  
 When there are 2 or more Foremen on the job, 1 shall be designated a General Foreman.  
 An Assistant General Foreman shall be designated for every 50 electricians working on the job.

**OVERTIME:**

The first 4 hours in excess of 8 per day, and hours before or after the regular workday that are not shift work, Monday through Friday, and the first 8 hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits.

Four 10-hour days may be worked at straight time, Monday through Thursday or Tuesday through Friday.

**RECOGNIZED HOLIDAYS:**

New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day and Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Electrician- Outside Commercial- South**

**PREVAILING WAGE RATE**

	10/01/18
Assistant General Foreman	W56.45 B48.57 T105.02
Foreman	W52.68 B45.62 T98.30
General Foreman	W61.15 B52.28 T113.43
Groundhand, Truck Driver, Conduit Installer (1 year or more experience)	W23.52 B22.71 T46.23
Groundhand, Truck Driver, Conduit Installer (2 years or more experience)	W32.93 B30.10 T63.03
Groundhand, Truck Driver, Conduit Installer (3 years or more experience)	W39.98 B35.64 T75.62
Groundhand, Truck Driver, Conduit Installer (less than 1 year exp.)	W18.82 B1.02 T19.84
Journeyman Lineman	W47.04 B41.18 T88.22
Lead Foreman	W54.10 B46.75 T100.85
Working Foreman	W49.39 B43.03 T92.42

**Craft: Electrician- Outside Commercial- South**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
6 Months	25.77	27.88	30.00	32.12	34.24	36.36	38.47			
Benefits	10.31	10.94	11.57	12.18	12.82	13.43	14.06			

**Craft: Electrician- Outside Commercial- South**

**COMMENTS/NOTES**

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

\* FOR UTILITY WORK PLEASE SEE STATEWIDE RATES

FOREMAN REQUIREMENTS (number of Electricians on site):

(1 to 10)- one Working Foreman.

(11 to 20)- one Working Foreman and one Foreman.

(21 to 30)- one Working Foreman, one Foreman and one Lead Foreman.

(31 to 40) - one Working Foreman, two (2) Foremen and one Lead Foreman.

(41 to 50)- one Working Foreman, four (4) Foremen, one Assistant General Foreman (runs 5 foremen), and one General Foreman.

(51 to 60)- one Working Foreman, five (5) Foremen, one Assistant General Foreman (runs 5 foremen), and one General Foreman

(runs one foreman).

(61 to 70)- one Working Foreman, six (6) Foremen, one Assistant General Foreman (runs 5 foremen), and one General Foreman

(runs two foremen).

(71 to 80)- one Working Foreman, seven (7) Foremen, two (2) Assistant General Foremen and one General Foreman.

(81 to 90)- one Working Foreman, eight (8) Foremen, two (2) Assistant General Foremen, and one General Foreman.

(91 to 100)- one Working Foreman, nine (9) Foremen, two (2) Assistant General Foremen and one General Foreman.

The regular workday consists of 8 hours, between 7:00 AM and 4:30 PM.

SHIFT DIFFERENTIALS:

Shift work must run for a minimum of 5 consecutive workdays.

2nd Shift (4:30 PM to 12:30 AM): 8 hrs. pay for 7.5 hrs. work + an additional 10% of the wage rate, inclusive of benefits.

3rd Shift (12:30 AM to 8:00 AM): 8 hrs. pay for 7 hrs. work + an additional 15% of the wage rate, inclusive of benefits.

OVERTIME:

All hours in excess of 8 per day, Monday through Friday, that are not shift work, and all hours on Saturday shall be paid at time and one-half the regular rate, inclusive of benefits. All hours on Sundays and Holidays shall be paid at double the regular rate, inclusive of benefits.

RECOGNIZED HOLIDAYS:

New Year's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Electrician-Utility Work (North)**

**PREVAILING WAGE RATE**

Rates are located in the "Statewide" rate package

**Craft: Electrician-Utility Work (North)**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
* 6 Months	60%	65%	70%	75%	80%	85%	90%			
Benefits	67% of	Appren	tice	Wage	Rate	for all	intervals			

**Craft: Electrician-Utility Work (North)**

**COMMENTS/NOTES**

Electrician-Utility Work (North) rates are located in the "Statewide" rate package.

\* The apprentice wage rate is paid at the percentage of the Journeyman Lineman wage rate located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Electrician-Utility Work (South)**

**PREVAILING WAGE RATE**

Rates are located in the "Statewide" rate package

**Craft: Electrician-Utility Work (South)**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
6 Months	28.53	30.91	33.29	35.66	38.04	40.42	42.80			
Benefits	25.01	26.41	27.83	29.24	30.65	32.05	33.47			

**Craft: Electrician-Utility Work (South)**

**COMMENTS/NOTES**

Electrician-Utility Work (South) rates are located in the "Statewide" rate package.



**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Elevator Constructor**

**PREVAILING WAGE RATE**

	01/01/19
Helper-Over 5 Years	W40.28 B37.34 T77.62
Helper-Under 5 Years	W40.28 B36.53 T76.81
Mechanic (Journeyman) over 5 years	W57.55 B38.72 T96.27
Mechanic (Journeyman) under 5 years	W57.55 B37.57 T95.12
Mechanic in Charge (Foreman) over 5 years	W64.74 B39.29 T104.03
Mechanic in Charge (Foreman) under 5 years	W64.74 B38.00 T102.74
Probationary Helper (1st 6 months)	W28.78 B35.84 T64.62

**Craft: Elevator Constructor**

**APPRENTICE RATE SCHEDULE**

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	55%	65%	70%	80%						
Benefits	full	journeyma	benefit	rate for	all	intervals				

**Ratio of Apprentices to Journeymen - \***

\* Total number of helpers and apprentices shall not exceed the number of mechanics on the job except where 2 teams are working, 1 additional helper or apprentice may be employed for first 2 teams and an extra helper or apprentice for each additional 3 teams. Further, the employer may use as many helpers or apprentices as needed under the direction of a mechanic in wrecking of old plants, handling and hoisting material, and on foundation work. When replacing cables on existing elevators, employer may use 2 helpers or apprentices to 1 mechanic.

**Craft: Elevator Constructor**

**COMMENTS/NOTES**

**SHIFT DIFFERENTIALS:**

- 2nd Shift (4:30 PM to 12:30 AM) shall be established on the basis of 7.5 hours of work for 8 hours of pay, plus an additional 10% per hour.
- 3rd Shift (12:30 AM to 8:00 AM) shall be established on the basis of 7 hours of work for 8 hours of pay, plus an additional 15% per hour.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**OVERTIME:**

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays, Sundays, and holidays shall be paid at double the hourly rate.
- Four 10-hour days may be worked, Monday to Thursday or Tuesday to Friday, at straight time. When working a 4-10 hour day schedule, all hours worked on a day other than the days established for the 4-10 hour schedule shall be paid at double the hourly rate.

**RECOGNIZED HOLIDAYS:** New Year's Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day and day after, Christmas Day. Saturday holidays observed the preceding Friday, Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Glazier                      PREVAILING WAGE RATE**

	06/05/19
Foreman	W47.37 B33.38 T80.75
Journeyman	W43.87 B33.38 T77.25

**Craft: Glazier                      APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
Yearly	18.80	23.15	28.25	35.50						
Benefits	17.69	19.54	20.71	22.68						

**Ratio of Apprentices to Journeymen - 1:3**

**Craft: Glazier                      COMMENTS/NOTES**

HIGH WORK (30 feet above ground /floor or using a swing stage): +\$1.00/hr

**FOREMAN REQUIREMENT:**

- When 4 or more Glaziers are working on a job that runs for 10 days or more, 1 shall be designated a Foreman.

The regular workday shall be 8 hours, between 6:00 AM and 4:30 PM.

**SHIFT DIFFERENTIALS:**

- Second and Third shift shall receive the regular hourly rate, plus 15% per hour.

**OVERTIME:**

- The first 2 hours in excess of 8 per day (9th and 10th hours), or outside the regular workday, Monday through Friday, that are not shift work, and the first 8 hours on Saturdays shall be paid at time and one-half the regular rate. All other daily overtime, and all hours on Sundays and holidays shall be paid at double the regular rate.

- Four 10-hour days may be worked at straight time, Monday through Friday. The 11th and 12th hours on the 4 days worked, and the first 12 hours on the fifth day shall be paid at time and one-half the regular rate. All other daily overtime, and all hours on Saturdays, Sundays, and holidays shall be paid at double the regular rate.

- Benefits on overtime hours are as follows:

Time and one-half = \$41.04/hr.

Double time = \$48.70/hr.

**RECOGNIZED HOLIDAYS:** New Year's Day, Memorial Day, July 4th, Thanksgiving Day, Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Heat & Frost Insulator**

**PREVAILING WAGE RATE**

	05/01/19
Foreman (11-20 workers)	W56.32 B36.95 T93.27
Foreman (1-5 workers)	W53.76 B36.95 T90.71
Foreman (21-49 workers)	W58.88 B36.95 T95.83
Foreman (50+ workers)	W61.44 B36.95 T98.39
Foreman (6-10 workers)	W54.78 B36.95 T91.73
Journeyman	W51.20 B36.95 T88.15

**Craft: Heat & Frost Insulator**

**APPRENTICE RATE SCHEDULE**

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
1000 Hours	45%	45%	48%	50%	55%	60%	65%	70%	75%	80%
Benefits	26.51	26.51	Intervals	3 to 10 =	30.86					

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Heat & Frost Insulator**

**COMMENTS/NOTES**

APPRENTICE RATE SCHEDULE AS OF 5-1-19:

INTERVAL	PERIOD AND RATES									
1000 Hours	45%	45%	48%	50%	55%	60%	65%	70%	75%	80%
Benefits	27.71	27.71	Intervals	3 to 10 =	31.96					

**FOREMAN REQUIREMENTS:**

- Foremen shall be designated based upon the number of Heat & Frost Insulators on the job, with the rates as shown above.
- If there is only 1 Heat & Frost Insulator on the job, he or she must be designated a Foreman.

The regular workday shall be 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

- Shift work must run for a minimum of 3 consecutive workdays, with a minimum of 2 consecutive shifts each day.
- 2nd Shift shall be between the hours of 4:00 PM and 12:00 AM.
- 3rd Shift shall be between the hours of 12:00 AM and 8:00 AM.
- All shift work shall be paid an additional 15% of the regular rate, inclusive of benefits.

**OVERTIME:**

- The 2 hours immediately before or after the regular workday, and the first 10 hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. All hours in excess of 10 per day, Monday through Saturday, and all hours on Sundays and holidays (except Labor Day), shall be paid at double the regular rate, inclusive of benefits. All hours on Labor Day shall be paid at triple the regular rate, inclusive of benefits.
- Four 10-hour days may be worked, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the regular rate, inclusive of benefits.

**RECOGNIZED HOLIDAYS:** New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Heat & Frost Insulator - Asbestos Worker**

**PREVAILING WAGE RATE**

	05/01/19
Material Handler - 1st Level	W29.35 B22.79 T52.14
Material Handler - 2nd Level	W42.15 B22.79 T64.94
Mechanic (Journeyman)	W51.20 B36.95 T88.15

**Craft: Heat & Frost Insulator - Asbestos Worker**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	SEE	Heat &	Frost	Insulator						

**Craft: Heat & Frost Insulator - Asbestos Worker**

**COMMENTS/NOTES**

NOTE: These rates apply ONLY to the REMOVAL of insulation containing asbestos from mechanical systems, including containment erection and demolition, and the placing of material in appropriate containers.

**JOB TITLES:**

- Mechanic: 8,000 hours or more of asbestos removal experience
- Material Handler - 2nd Level: 3,000 hours or more (up to 8,000 hours) of asbestos removal experience
- Material Handler - 1st Level: up to 3,000 hours of asbestos removal experience

**RATIOS:**

- The first worker on the project must be a Mechanic.
- Ratio of Material Handlers to Mechanics is 5:1 (5 Handlers to 1 Mechanic), with a minimum of two of the Handlers being 2nd Level Handlers.

**SHIFT DIFFERENTIALS:**

- 2nd Shift shall work 7.5 hours and receive 8 hours pay, plus \$0.25 per hour.
- 3rd Shift shall work 7 hours and receive 8 hours pay, plus \$0.50 per hour.

**OVERTIME:**

- Hours in excess of 40 per week, and all hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits.
- All hours on Sundays and holidays (except Labor Day) shall be paid at double the regular rate, inclusive of benefits.
- All hours on Labor Day shall be paid at triple the regular rate, inclusive of benefits.

**RECOGNIZED HOLIDAYS:** New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Ironworker**

**PREVAILING WAGE RATE**

	07/01/19
Foreman- Fence and Guardrail	W53.54 B30.79 T84.33
Foreman-Rod/Mesh	W54.62 B30.79 T85.41
Foreman-Structural	W55.70 B30.79 T86.49
Journeyman- Fence and Guardrail	W49.57 B30.79 T80.36
Journeyman-Rod/Mesh	W50.57 B30.79 T81.36
Journeyman-Structural	W51.57 B30.79 T82.36

**Craft: Ironworker**

**APPRENTICE RATE SCHEDULE**

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	60%	75%	85%							

**Ratio of Apprentices to Journeymen - \***

\* On all work EXCEPT Ornamental Iron and Bridge Cable Spinning Work 1:4; On Ornamental Iron and Bridge Cable Spinning Work 1:1.

**Craft: Ironworker**

**COMMENTS/NOTES**

Note: For work on hazardous waste sites, workers shall receive an additional \$3.00 per hour.

The regular workday shall consist of 8 hours between 7:00 AM and 5:00 PM.

**SHIFT DIFFERENTIALS:**

- Second shift shall receive an additional 10% per hour.
- Third shift shall receive an additional 15% per hour.

**OVERTIME:**

- Time and one-half the wage rate for hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and for all hours on Saturdays. Double the wage rate for all hours on Sundays and holidays.
- Employees may work four 10-hour days, Monday to Thursday, at straight time. Friday may be used as a make-up day

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

for a day lost to inclement weather. If Friday is not a make-up day, all hours worked on Friday shall be paid at time and one-half the wage rate.

- Benefits on overtime hours shall be paid at the following rates:

When wages are time and one-half, benefits = \$35.06.

When wages are double, benefits = \$39.33.

RECOGNIZED HOLIDAYS: New Year's Eve, New Year's Day, Memorial Day, July 4th, Labor Day, General and Presidential Election Day, Thanksgiving Day, Christmas Eve, Christmas Day. Saturday holidays observed the preceding Friday. Sunday holidays observed the following Monday.



**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Laborer - Asbestos & Hazardous Waste Removal**

**PREVAILING WAGE RATE**

	08/01/18
Journeyman (Handler)	W31.48 B22.31 T53.79

**Craft: Laborer - Asbestos & Hazardous Waste Removal**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
Yearly	18.89	22.04	25.18	28.33						
Benefit	20.66	for	all	intervals						

**Ratio of Apprentices to Journeymen - \***

\* Ratio of apprentices to journeymen shall not be more than one apprentice for the first journeyman and no more than one (1) apprentice for each additional three (3) journeymen.

**Craft: Laborer - Asbestos & Hazardous Waste Removal**

**COMMENTS/NOTES**

NOTE: These rates apply to work in connection with Asbestos, Radiation, Hazardous Waste, Lead, Chemical, Biological, Mold Remediation and Abatement.

The regular workday shall be 8 hours.

**OVERTIME:**

- Hours in excess of 8 per day, Monday through Saturday, and all hours on Sunday and holidays shall be paid at time and one-half the regular rate.
- Benefits on ALL overtime hours shall be paid at straight time.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Good Friday, Easter, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. (Holidays start at 12:00 am).

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

County - **BURLINGTON**

**Craft: Laborer - Building**

**PREVAILING WAGE RATE**

	05/01/19	05/01/20
Class A Journeyman	W34.05 B29.52 T63.57	W0.00 B0.00 T64.87
Class B Journeyman	W33.55 B29.52 T63.07	W0.00 B0.00 T64.37
Class C Journeyman	W28.52 B29.52 T58.04	W0.00 B0.00 T59.34
Foreman	W38.31 B29.52 T67.83	W0.00 B0.00 T69.13
General Foreman	W42.56 B29.52 T72.08	W0.00 B0.00 T73.38

**Craft: Laborer - Building**

**APPRENTICE RATE SCHEDULE**

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
	60%	70%	80%	90%						
6 Months										
Benefit	26.27	26.27	26.27	26.27						

**Ratio of Apprentices to Journeymen - \***

\* Ratio of apprentices to journeymen shall not be more than one apprentice for the first journeyman and no more than one (1) apprentice for each additional three (3) journeymen.

**Craft: Laborer - Building**

**COMMENTS/NOTES**

CLASS A: Specialist laborer including mason tender or concrete pour crew; scaffold builder (scaffolds up to 14 feet in height); operator of forklifts, Bobcats (or equivalent machinery), jack hammers, tampers, motorized tampers and compactors, vibrators, street cleaning machines, hydro demolition equipment, riding motor buggies, conveyors, burners; and nozzlemen on gunite work.

CLASS B: Basic laborer - includes all laborer work not listed in Class A or Class C.

CLASS C: Janitorial-type light clean-up work associated with the TURNOVER of a project, or part of a project, to the owner. All other clean-up work is Class B.

The regular workday shall be 8 hours between 6:00 AM and 6:00 PM.

**SHIFT DIFFERENTIALS:**

- Shift work must run for a minimum of 5 consecutive workdays.
- When a 2-shift schedule is worked, including a day shift, both shifts shall be established on the basis of 8 hours pay for 8 hours worked. The second shift shall receive the regular rate plus an additional 10%.
- When a 3-shift schedule is worked, the day shift shall be established on the basis of 8 hours pay for 8 hours worked, the second shift shall be established on the basis of 8 hours pay for 7.5 hours worked, and the third shift shall be established

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

on the basis of 8 hours pay for 7 hours worked. The day shift shall receive the regular rate, the second shift shall receive the regular rate plus an additional 10%, and the third shift shall receive the regular rate plus an additional 15%.

- When a second or third shift is worked with no day shift, the second or third shift shall be established on the basis of 8 hours pay for 8 hours worked. The second shift shall receive the regular rate plus an additional 10%, and the third shift shall receive the regular rate plus an additional 15%.

**OVERTIME:**

- Hours in excess of 8 per day, or outside the regular workday that are not shift work, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. Saturday may be used as a make-up day (paid at straight time) for a day lost to inclement weather, or for a holiday that is observed during the work week, Monday through Friday. All hours on Sundays and holidays shall be paid at double the regular rate.

- Four 10-hour days may be worked Monday to Thursday, at straight time, with Friday used a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the regular rate.

- Benefits on ALL overtime hours shall be paid at time and one-half.

**RECOGNIZED HOLIDAYS:** New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

County - BURLINGTON

**Craft: Laborer - Heavy & General**

**PREVAILING WAGE RATE**

Rates are located in the  
"Statewide" rate package

**Craft: Laborer - Heavy & General**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
1000 Hours	60%	70%	80%	90%						
Benefit	20.28	for	all	intervals						

**Ratio of Apprentices to Journeymen - \***

\* No more than 1 apprentice for the first journeyman and no more than 1 apprentice for each additional 3 journeymen.

**Craft: Laborer - Heavy & General**

**COMMENTS/NOTES**

As of 3-1-19, benefits shall be \$21.03.

As of 3-1-20, benefits shall be \$21.78.

Heavy & General Laborer rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Laborer-Residential and Modular Construction**

**PREVAILING WAGE RATE**

	05/03/19	04/01/20
* Skilled Tradesman (only applies to Modular Construction)	W26.20 B5.45 T31.65	W26.55 B5.45 T32.00
Foreman (person directing crew, regardless of his skill classification)	W30.20 B5.45 T35.65	W30.55 B5.45 T36.00
Laborer	W22.20 B5.45 T27.65	W22.55 B5.45 T28.00
Laborer (for single family and stand-alone duplex owned by single owner)	W16.70 B2.95 T19.65	W17.05 B2.95 T20.00

**Craft: Laborer-Residential and Modular Construction**

**APPRENTICE RATE SCHEDULE**

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
	As shown	800 hours	600 hours	600 hours						
wage & benefits	70%	80%	90%							

Ratio of Apprentices to Journeymen-

One (1) apprentice shall be allowed for the first journeyman on site and no more than one (1) additional apprentice for each additional three (3) journeymen on site.

**Craft: Laborer-Residential and Modular Construction**

**COMMENTS/NOTES**

\* SKILLED TRADESMAN- any worker doing work not typically done by a Building Laborer. Some examples are installing interior doors, sheet rock, hooking up appliances, installing light fixtures, installing railing systems, etc. Please note where local building codes require that certain work be performed under the supervision of a licensed tradesman (i.e. Plumber, Electrician, etc.) Laborers shall work under such supervision.

RESIDENTIAL CONSTRUCTION- All residential construction (not commercial), single-family, stand-alone duplex houses, townhouses and multi-family buildings of not more than four (4) floors. Each housing unit must be fully and independently functional; each housing unit must have its own kitchen and bathroom. The definition includes all incidental items such as site work, parking areas, utilities, streets and sidewalks. Please note the construction must be Residential in nature. A First Floor at or below grade may contain commercial space not to exceed 50% square footage of the floor; at least 50% of the First Floor must contain living accommodations or related nonresidential uses (e.g. laundry space, recreation/hobby rooms, and/or corridor space). Basement stories below grade used for storage, parking, mechanical systems/equipment, etc., are considered basement stories which are not used in determining the building's height. An attic is an unfinished space located immediately below the roof. Such space is not used in determining a building's height even if used for storage purposes. In addition, barracks and dormitories are not considered residential projects.

MODULAR RESIDENTIAL CONSTRUCTION- all aspects of modular residential construction (not commercial) at the site of installation of structures of no more than four (4) stories, including all excavation and site preparation, footings and

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

foundation systems whether poured on-site or prefabricated, all underground waterproofing, underground utilities, concrete slabs, sidewalks, driveways, paving, hardscape and landscaping. Please note the construction must be Residential as defined above. All work performed by the Set Crew (the crew of workers who set the modular boxes on the foundation), including the rigging, setting, attaching and assembly of all modules and structural members, preparation of the foundation to accept modules, such as sill plates, connection of all in-module and under-module connections including, but not limited to, plumbing, electrical, HVAC, fire suppression, CATS, telephone, television/internet, and fiber optic, the building or installation of any porches or decks regardless of material or method of construction, the on-site installation of, or completion of any roof system, doors, windows and fenestrations, including flashing, gutter and soffit systems, waterproofing, insulation and interior and exterior trim work, and painting. Please note that modular construction does not include on-site stick built construction, tip up construction or panel built construction.

The regular workday shall be 8 hours between 6:00 AM and 6:00 PM.

**OVERTIME:**

Hours worked in excess of 8 per day/40 per week, Monday through Saturday, and all hours worked on Sunday and holidays shall be paid at time and one-half the hourly rate.

**RECOGNIZED HOILDAYS:**

New Year's Day, Martin Luther King Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Millwright                      PREVAILING WAGE RATE**

	05/01/19
Foreman	W58.26 B34.39 T92.65
Journeyman	W50.66 B29.99 T80.65

**Craft: Millwright                      APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
6 Months	40%	45%	50%	55%	60%	65%	70%	75%	85%	95%
Benefits	58% of	Appren	tice	Wage	Rate	for all	intervals	+ \$.60		

**Ratio of Apprentices to Journeymen - 1:3**

**Craft: Millwright                      COMMENTS/NOTES**

**FOREMAN REQUIREMENTS:**

- When there are 2 or more Millwrights on a job, 1 shall be designated as a Foreman.
- When there are 21 or more Millwrights on a job, 2 shall be designated as Foremen.

The regular workday shall consist of 8 hours, starting between 7:00 AM and 9:00 AM.

**SHIFT DIFFERENTIALS:**

- When a 2 shift schedule (including a day shift) is established, the day shift shall be established on an 8 hour basis. The second shift shall be established on an 8 hour basis, and receive the regular rate plus 15%, inclusive of benefits.
- When a three shift schedule is established, the first shift shall be established on an 8 hour basis, the second shift on a 7.5 hour basis, and the third shift on a 7 hour basis. The first shift shall receive the regular hourly rate, the second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.
- When there is no day shift, and a second or third shift is established, it shall be established on an 8 hour basis. The second shift shall receive the regular rate plus 15% and the third shift shall receive the regular rate plus 20%, inclusive of benefits.

**OVERTIME:**

- All hours in excess of 8 per day, or before or after an established shift that are not shift work, and all hours on Saturdays shall be paid at time and one-half the hourly rate, inclusive of benefits. All hours on Sundays and holidays shall be paid at double the hourly rate, inclusive of benefits.
- Four 10-hour days may be worked, Monday to Thursday, at straight time. Friday may be used as a make-up day for a day lost due to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate, inclusive of benefits.

**RECOGNIZED HOLIDAYS:** New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT

PREVAILING WAGE RATE DETERMINATION

County - BURLINGTON

Craft: Operating Engineer

PREVAILING WAGE RATE

Rates are located in the  
"Statewide" rate package

Craft: Operating Engineer

APPRENTICE RATE SCHEDULE

INTERVAL	PERIOD AND RATES									
Yearly	60%	70%	80%	90%						

Ratio of Apprentices to Journeymen - \*

\* 1 apprentice for each piece of heavy equipment. At least 10 pieces of heavy equipment or a minimum of 5 Operating Engineers must be on site.

Craft: Operating Engineer

COMMENTS/NOTES

Operating Engineer rates are located in the "Statewide" rate package.



**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Operating Engineer - Field Engineer**

**PREVAILING WAGE RATE**

Rates are located in the  
"Statewide" rate package

**Craft: Operating Engineer - Field Engineer**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
Yearly	70%	75%	of Rod/	Chainman	Wage					
Yearly			80%	90%	Transit/	Instrument	man	Wage		

**Ratio of Apprentices to Journeymen - \***

\* No more than 1 Field Engineer Apprentice per Survey Crew.

**Craft: Operating Engineer - Field Engineer**

**COMMENTS/NOTES**

Operating Engineer - Field Engineer rates are located in the "Statewide" rate package.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Painter - Bridges**

**PREVAILING WAGE RATE**

	05/03/19
Foreman	W59.81 B28.74 T88.55
General Foreman	W61.81 B28.74 T90.55
Journeyman	W54.81 B28.74 T83.55

**Craft: Painter - Bridges**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	40%	50%			60%	70%		80%	90%	
6 Months										
Benefits	Intervals	1 to 2 =	10.00	Intervals	3 to 4 =	12.27	Intervals	5 to 6 =	15.28	

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Painter - Bridges**

**COMMENTS/NOTES**

These rates apply to: All bridges that span waterways, roadways, railways and canyons. All tunnels, overpasses, viaducts and all appurtenances.

**FOREMEN REQUIREMENTS:**

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

**SHIFT DIFFERENTIALS:**

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

**OVERTIME:**

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

**RECOGNIZED HOLIDAYS:** New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Painter - Line Striping**

**PREVAILING WAGE RATE**

	05/03/19
Apprentice (1st year)	W26.44 B11.65 T38.09
Apprentice (2nd year)	W30.44 B19.16 T49.60
Foreman (Charge Person)	W39.09 B19.94 T59.03
Journeyman 1 (at least 1 year of working exp. as a journeyman)	W34.32 B19.94 T54.26
Journeyman 2 (at least 2 years of working exp. as a journeyman)	W38.09 B19.94 T58.03

**Craft: Painter - Line Striping**

**COMMENTS/NOTES**

**OVERTIME:**

Hours in excess of 8 per day, Monday through Saturday, and all hours on Sundays and holidays shall be paid at time and one-half the hourly rate.

**RECOGNIZED HOLIDAYS:** New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans Day, Thanksgiving Day and Christmas Day. Veterans Day may be substituted for the day after Thanksgiving.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Painter - New Construction**

**PREVAILING WAGE RATE**

	05/01/19	05/01/20
Foreman	W45.45 B24.35 T69.80	W47.45 B24.35 T71.80
General Foreman	W49.43 B24.67 T74.10	W51.43 B24.67 T76.10
Journeyman	W41.47 B24.04 T65.51	W43.47 B24.04 T67.51

**Craft: Painter - New Construction**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	40%	45%	55%	65%	70%	75%	80%	80%		
6 Months										
Benefits	8.05	8.05	10.05	10.05	11.05	11.05	14.05	14.05		

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Painter - New Construction**

**COMMENTS/NOTES**

Spraying, sandblasting, lead abatement, work on tanks or stacks, work performed above 3 stories or 30 feet in height, or using swing scaffolds requires an additional 10% of the wage rate.

**FOREMEN REQUIREMENTS:**

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

**SHIFT DIFFERENTIALS:**

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

**OVERTIME:**

- Hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

**RECOGNIZED HOLIDAYS:** New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, General Election Day, Veterans' Day, Thanksgiving Day, Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Painter - Repainting** **PREVAILING WAGE RATE**

	05/01/19	05/01/20
Foreman	W33.07 B19.95 T53.02	W33.92 B19.95 T53.87
General Foreman	W36.00 B20.10 T56.10	W36.85 B20.10 T56.95
Journeyman	W30.14 B19.77 T49.91	W30.99 B19.77 T50.76

**Craft: Painter - Repainting** **APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES										
	SEE	Painter	NEW	CONSTR	UC	TION					

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Painter - Repainting** **COMMENTS/NOTES**

NOTE: These rates may only be used on jobs where no major alterations (only doing painting and carpeting with nothing else being changed in the office or on the project) occur, and where not more than 3 other trades are present on the job, but may NOT, under any circumstances, be used for work on bridges, stacks, elevated tank, or generating stations.

Spraying, sandblasting, lead abatement, work on tanks or stacks, work performed above 3 stories or 30 feet in height, or using swing scaffolds requires an additional 10% of the wage rate.

**FOREMEN REQUIREMENTS:**

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

**OVERTIME:**

- Hours in excess of 8 per day and 40 per week shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.
- Four 10-hour days may be worked, at straight time, Monday through Sunday.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, General Election Day, Veterans' Day, Thanksgiving Day, Christmas Day.

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION

County - BURLINGTON

Craft: Painter- Containment

PREVAILING WAGE RATE

	05/04/17
Journeyman	W35.18 B24.75 T59.93

Craft: Painter- Containment

COMMENTS/NOTES

NOTE: These rates shall require no painting, but used in a supporting capacity only, such as wrapping, boxing, fencing, etc. on tanks.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

SHIFT DIFFERENTIALS:

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

OVERTIME:

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate..

- Four 10-hour days may be worked, at straight time, Monday through Friday.

RECOGNIZED HOLIDAYS: New Year's Day President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Painter-Elevated Water Tanks**

**PREVAILING WAGE RATE**

	05/04/17
Foreman	W48.92 B24.92 T73.84
General Foreman	W50.92 B24.92 T75.84
Journeyman	W43.92 B24.92 T68.84

**Craft: Painter-Elevated Water Tanks**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	SEE	PAINTER	BRIDGES							

**Craft: Painter-Elevated Water Tanks**

**COMMENTS/NOTES**

These rates apply to: All new and repaint elevated water tanks (interior and exterior).

**FOREMEN REQUIREMENTS:**

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

**SHIFT DIFFERENTIALS:**

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

**OVERTIME:**

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

**RECOGNIZED HOLIDAYS:** New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Painter-Structural Steel**

**PREVAILING WAGE RATE**

	05/04/17
Foreman	W47.87 B25.27 T73.14
General Foreman	W49.87 B25.27 T75.14
Journeyman	W42.87 B25.27 T68.14

**Craft: Painter-Structural Steel**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	SEE	PAINTER	BRIDGES							

**Craft: Painter-Structural Steel**

**COMMENTS/NOTES**

These rates apply to: All work in power plants (any aspect). On steeples, on dams, on hangers, transformers, substations, etc. and on open steel, whether new or repaint. All new work (excluding traditional commercial painting work) in refineries, tank farms, water/sewerage treatment facilities and on pipelines.

**FOREMEN REQUIREMENTS:**

- When there are 4 or more Painters on a job, 1 shall be designated a Foreman.
- When there are 15 or more Painters on a job, 1 shall be designated a General Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

**SHIFT DIFFERENTIALS:**

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

**OVERTIME:**

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at double the regular rate.
- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.
- Four 10-hour days may be worked, at straight time, Monday through Friday.

**RECOGNIZED HOLIDAYS:** New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holiday observed the preceding Friday. Sunday holiday observed the following Monday.



**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Paperhanger - New Construction**

**PREVAILING WAGE RATE**

	05/01/19	05/01/20
Foreman	W46.75 B24.11 T70.86	W47.68 B24.11 T71.79
Journeyman	W41.68 B24.11 T65.79	W42.61 B24.11 T66.72

**Craft: Paperhanger - New Construction**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	SEE	PAINTER	NEW	CONSTR	TION					
				UC						

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Paperhanger - New Construction**

**COMMENTS/NOTES**

**FOREMEN REQUIREMENTS:**

- When there are 4 or more Paperhangers on a job, 1 shall be designated a Foreman.

The regular workday shall consist of 8 hours between 7:00 AM and 5:30 PM.

**SHIFT DIFFERENTIALS:**

- The second shift shall receive an additional 10% of the hourly rate, per hour, and the third shift shall receive an additional 15% of the hourly rate, per hour.

**OVERTIME:**

- Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.

- Saturday or Sunday may be used to make up a day lost to inclement weather, at straight time.

- Four 10-hour days may be worked, at straight time, Monday through Friday.

**RECOGNIZED HOLIDAYS:** New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, General Election Day, Veterans' Day, Thanksgiving Day, Christmas Day.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

County - BURLINGTON

**Craft: Paperhanger - Renovation**

**PREVAILING WAGE RATE**

	05/01/19	05/01/20
Foreman	W34.13 B19.81 T53.94	W35.15 B19.81 T54.96
Journeyman	W31.03 B19.81 T50.84	W31.96 B19.81 T51.77

**Craft: Paperhanger - Renovation**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
		SEE	PAINTER	NEW	CONSTR	TION				
					UC					

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Paperhanger - Renovation**

**COMMENTS/NOTES**

NOTE: These rates may only be used on jobs where no major alterations occur, and where not more than 3 other trades are present on the job, but may NOT, under any circumstances, be used for work on bridges, stacks, elevated tanks, or generating stations.

**FOREMEN REQUIREMENTS:**

- When there are 4 or more Paperhangers on a job, 1 shall be designated a Foreman.

**OVERTIME:**

- Hours in excess of 8 per day and 40 per week shall be paid at time and one-half the regular rate.

- Four 10-hour days may be worked, at straight time, Monday through Sunday.

NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION

County - BURLINGTON

Craft: Pipefitter

PREVAILING WAGE RATE

\*\*\* see PLUMBER Rates\*\*\*

Craft: Pipefitter

COMMENTS/NOTES

\*\*\*See PLUMBER Rates\*\*\*

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Plasterer**

**PREVAILING WAGE RATE**

See "Cement Mason" Rates

**Craft: Plasterer**

**COMMENTS/NOTES**

\*\*\*See CEMENT MASON Rates\*\*\*

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Plumber - North**

**PREVAILING WAGE RATE**

	07/02/19
Assistant General Foreman	W54.71 B39.65 T94.36
Foreman	W54.21 B39.65 T93.86
General Foreman	W57.22 B39.65 T96.87
Journeyman	W50.19 B39.65 T89.84

**Craft: Plumber - North**

**APPRENTICE RATE SCHEDULE**

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	35%	45%	55%	65%	75%					
Benefits	24.84	27.11	29.41	31.68	33.96					

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Plumber - North**

**COMMENTS/NOTES**

The regular workday shall consist of 8 hours between 6:00 AM and 4:30 PM.

FOREMAN REQUIREMENTS (number of Plumbers on site):

- (1 to 8)- 1 Foreman
- (9 to 16)- 1 Foreman and 1 Assistant General Foreman
- (17 to 40)- 1 Foreman for every (1 to 8 Plumbers) and 1 Assistant General Foreman every (1 to 5) gangs. One note, a "gang" is a group of 8 men.
- (41 and more)- 1 Foreman for every (1 to 8 Plumbers), 1 Assistant General Foreman every (1 to 5) gangs and 1 General Foreman. One note, for every additional Assistant General Foreman over five designated, the General Foreman shall receive an additional 10 cents per hour.

SHIFT DIFFERENTIALS:

- The second shift shall work 7.5 hours and receive 8 hours pay, at a rate equal to the hourly rate plus 25%, inclusive of benefits.
- When a third shift is worked, the third shift shall work 7.5 hours and receive 8 hours pay, at a rate equal to the hourly rate plus 30%, inclusive of benefits.
- A second shift may be established without a first shift, provided the second shift starts at 1:00 PM or later.

OVERTIME:

- Hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, that are not shift work, and the first 10 hours on Saturdays, shall be paid at time and one-half, inclusive of benefits. Hours in excess of 10 on

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

Saturdays, and all hours on Sundays and holidays, shall be paid at double time, inclusive of benefits.

- Four 10-hour days may be worked, Mon to Thurs, at straight time, with Friday used as a make-up day for a day lost due to inclement weather. If Fri. is not a make-up day, the first 10 hours shall be paid at time and one-half, and hours in excess of 10 at double time, inclusive of benefits.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**MUNICIPALITIES COVERED:**

Bordentown City and Twp., Burlington City and Twp., Eastampton Twp., Chesterfield Twp., Fieldsboro Boro., Florence Twp., Mansfield Twp., Mount Holly Twp., New Hanover Twp., North Hanover Twp., Pemberton Boro. and Twp., Springfield Twp., Westampton Twp., Wrightstown Boro.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Plumber - South**

**PREVAILING WAGE RATE**

	05/01/19
Foreman	W49.25 B45.29 T94.54
Journeyman	W44.77 B45.29 T90.06

**Craft: Plumber - South**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	35%	40%	50%	55%	60%	65%	70%	75%	80%	85%
6 months										
Benefits	27.98	29.25	31.78	33.03	34.28	35.54	36.82	38.07	39.34	40.59

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Plumber - South**

**COMMENTS/NOTES**

**FOREMAN REQUIREMENTS:**

- On any job having 2 or more Journeyman Plumbers, 1 must be designated a Foreman.
- There must be 1 additional Foreman for every 10 Plumbers on the job.

The regular workday is 8 hours, between 7:00 AM and 4:30 PM.

**SHIFT DIFFERENTIALS:**

- Shift work must run for a minimum of 5 consecutive workdays.
- When 2 shifts are worked, the second shift shall receive 8 hours pay for 8 hours of work.
- When 3 shifts are worked, the second shift shall receive 8 hours pay for 7.5 hours of work, and the third shift shall receive 8 hours pay for 7 hours of work.
- The rate of pay for all shift work shall be an additional 15% of the hourly rate, per hour.

**OVERTIME:**

The first 4 hours in excess of 8 per day, or before or after the regular workday that are not shift work, Monday through Friday, and the first 12 hours on Saturdays shall be paid at time and one-half the regular rate, inclusive of benefits. Hours in excess of 12 per day, and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

**RECOGNIZED HOLIDAYS:** New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**MUNICIPALITIES COVERED:**

Bass River Twp., Beverly City, Cinnaminson Twp., Delanco Twp., Delran Twp., Edgewater Park Twp., Evesham Twp., Hainesport Twp., Lumberton Twp., Maple Shade Twp., Medford Twp., Medford Lakes Boro, Moorestown Twp., Mount Laurel Twp., Palmyra Boro., Riverside Twp., Riverton Boro., Shamong Twp., Southampton Twp., Tabernacle Twp.,

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

Washington Twp., Woodland Twp., Willingboro Twp.



**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Roofer                      PREVAILING WAGE RATE**

	07/01/19
Foreman (5 workers or less)	W40.35 B31.80 T72.15
Foreman (6 workers or more)	W40.85 B31.80 T72.65
Journeyman	W38.35 B31.80 T70.15

**Craft: Roofer                      APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
Yearly	52%	55%	60%	75%						
Benefits	22.32	25.07	31.80	31.80						

**Ratio of Apprentices to Journeymen - \***

\* 1:2, 2:4, 3:6, 4:8, 5:10, 6:12, 7:14

**Craft: Roofer                      COMMENTS/NOTES**

NOTE: Mopper, Operator of Felt Laying Machine or Slag Dispenser shall receive an additional \$.50 per hour.

**FOREMAN REQUIREMENTS:**

- There must be a Foreman on all jobs.
- Foreman rate depends on the number of Roofers on the job, as indicated.

The regular workday is 8 hours between 5:00 AM and 4:30 PM.

**OVERTIME:**

Hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, and all hours on Saturdays, Sundays, and holidays shall be paid at time and one-half the wage rate.

**RECOGNIZED HOLIDAYS:** New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

County - **BURLINGTON**

**Craft: Roofer - Shingle, Slate & Tile**

**PREVAILING WAGE RATE**

	07/01/19
Foreman (3 workers or less)	W28.75 B20.87 T49.62
Foreman (4 workers or more)	W29.50 B20.87 T50.37
Helper	W14.25 B20.87 T35.12
Journeyman (shingle work)	W28.50 B20.87 T49.37

**Craft: Roofer - Shingle, Slate & Tile**

**APPRENTICE RATE SCHEDULE**

<u>INTERVAL</u>	<u>PERIOD AND RATES</u>									
Yearly	60%	70%	80%							

**Ratio of Apprentices to Journeymen - \***

\* 1:2, 2:4, 3:6, 4:8, 5:10, 6:12, 7:14

**Craft: Roofer - Shingle, Slate & Tile**

**COMMENTS/NOTES**

NOTE: Above rates are for Shingle work only. Slate and Tile work rates are an additional \$3.00 per hour.

HELPER RATIO: 1 Helper to 1 Journeyman

**FOREMAN REQUIREMENTS:**

- There must be a Foreman on all jobs.
- Foreman rate depends on the number of Roofers on the job, as indicated.

**OVERTIME:**

Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays, Sundays, and holidays shall be paid at time and one-half the wage rate.

**RECOGNIZED HOLIDAYS:** New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Sheet Metal Sign Installation**

**PREVAILING WAGE RATE**

	07/17/19
Foreman	W29.50 B23.01 T52.51
Journeyman	W27.50 B23.01 T50.51

**Craft: Sheet Metal Sign Installation**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
1000 Hours	40%	45%	50%	55%	60%	65%	70%	75%	80%	90%
Benefits	22.53	22.57	22.61	22.65	22.69	22.73	22.77	22.81	22.85	22.96

**Ratio of Apprentices to Journeymen - 1:2**

**Craft: Sheet Metal Sign Installation**

**COMMENTS/NOTES**

**HAZARDOUS DUTY:**

Sign Installers working from a bosun's chair or outside swinging scaffold at a height of 60 feet or more: + \$5.00 per hour.

**FOREMAN REQUIREMENTS:**

When there are 3 or more Sign Installers on a job, one must be designated a Foreman.

The regular workday shall be 8 hours, between 8:00 AM and 5:00 PM.

**OVERTIME:**

Hours in excess of 8 per day, or outside the regular workday, Monday through Friday, and all hours on Saturdays and Sundays shall be paid at time and one-half the regular rate. All hours on holidays shall be paid at time and one-half the regular rate.

**RECOGNIZED HOLIDAYS:** New Year's Day, Presidents' Day, Good Friday, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day, day after Thanksgiving, Christmas Day. Saturday holidays will be observed the preceding Friday, Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT**

**PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Sheet Metal Worker**

**PREVAILING WAGE RATE**

	06/01/19	06/01/20
Foreman	W52.89	W0.00
	B41.83	B0.00
	T94.72	T98.22
Journeyman	W49.89	W0.00
	B41.83	B0.00
	T91.72	T95.22

**Craft: Sheet Metal Worker**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%
6 months										
Benefits	14.06	15.63	17.20	18.76	20.32	27.74	29.75	31.75	33.77	35.80

Ratio of Apprentices to Journeymen- 1:3, except for the following types of work where the ratio shall be 1:1 (architectural metal work, testing and balancing, lockers, shelving and toilet partitions).\*

\* For work performed in a fabrication shop, the ratio will be applied on a "company-wide" basis (i.e. the total number of apprentices and journeymen employed by the company).

**Craft: Sheet Metal Worker**

**COMMENTS/NOTES**

**JOB SITE FOREMAN REQUIREMENTS:**

- When there are 2 to 9 Sheet Metal Workers on a jobsite, 1 must be designated a Foreman.
- When there are 10 to 16 Sheet Metal Workers on a job site, 2 must be designated Foremen.
- When there are 17 to 23 Sheet Metal Workers on a job site, 3 must be designated Foremen.
- For every 7 additional Sheet Metal Workers on a job site, there shall be 1 additional Foreman.

**SHOP FOREMAN REQUIREMENTS (For custom fabrication):**

- When there are 1 to 10 Sheet Metal Workers in the shop, 1 must be designated a Foreman.
- For every 10 additional Sheet Metal Workers in the shop, 1 must be designated a Foreman.

The regular workday consists of 8 hours, between 6:00 AM and 4:30 PM.

**SHIFT DIFFERENTIALS:**

- Shift work must run for a minimum of 5 consecutive workdays.
- There must be a day shift worked in order to have a 2nd and/or 3rd Shift.
- Shop work does not satisfy shift requirements.
- 2nd Shift (4:30 PM-12:30 AM) shall be paid an additional 15% of the regular rate per hour inclusive of benefits, and receive 8 hours pay for 7.5 hours of work.
- 3rd Shift (12:30 AM-8:00 AM) shall be paid an additional 25% of the regular rate per hour inclusive of benefits, and receive 8 hours pay for 7 hours of work.

**OVERTIME:**

Hours in excess of 8 per day, or before or after the regular workday, Monday through Friday, that are not shift work, and all

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

hours on Saturday, shall be paid at time and one-half the regular rate. All hours on Sundays and holidays shall be paid at double the regular rate.

- Benefits on overtime hours are as follows:

Time and one-half = \$48.17.

Double-time = \$55.19.

RECOGNIZED HOLIDAYS: New Year's Day, Presidents' Day, Good Friday, Memorial Day, July 4th, Labor Day, Presidential Election Day, Veterans' Day, Thanksgiving Day, Christmas Day. Saturday holidays will be observed the preceding Friday, Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Sprinkler Fitter**

**PREVAILING WAGE RATE**

	04/04/19
Foreman	W53.00 B26.26 T79.26
General Foreman	W55.25 B26.26 T81.51
Journeyman	W50.25 B26.26 T76.51

**Craft: Sprinkler Fitter**

**APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
1000 Hours	45%	50%	45%	60%	65%	70%	75%	80%	85%	90%
Benefits	8.52	8.52	18.29	18.29	18.54	18.54	18.54	18.54	18.54	18.54

**Ratio of Apprentices to Journeymen - 1:1**

**Craft: Sprinkler Fitter**

**COMMENTS/NOTES**

**FOREMAN REQUIREMENTS:**

- There must be a Foreman on all projects. If there is only 1 Sprinkler Fitter on the project, he/she shall be designated a Foreman.
- On any job with 22 or more Sprinkler Fitters 1 shall be designated a General Foreman.

The regular workday consists of 8 hours, between 6:00 AM and 6:00 PM.

**SHIFT DIFFERENTIALS:**

- Shift work must run for a minimum of 5 consecutive workdays.
- 2nd and/or 3rd shift shall receive an additional 15% of the hourly rate, per hour.

**OVERTIME:**

- Hours in excess of 8 per day, or before or after the regular workday that are not shift work, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.
- Four 10-hour days may be worked at straight time, Monday through Friday.

**RECOGNIZED HOLIDAYS:** New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Christmas Day. Saturday holidays will be observed the preceding Friday, Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Tile Worker                      PREVAILING WAGE RATE**

	06/03/19
Finisher	W40.81 B27.47 T68.28
Setter	W47.32 B33.09 T80.41

**Craft: Tile Worker                      APPRENTICE RATE SCHEDULE**

INTERVAL	PERIOD AND RATES									
750 Hours	40%	45%	50%	55%	60%	65%	70%	75%	80%	90%

**Ratio of Apprentices to Journeymen - 1:4**

**Craft: Tile Worker                      COMMENTS/NOTES**

NOTE: These rates also apply to Terrazzo and Marble work.

**OVERTIME:**

Hours in excess of 8 per day, Monday through Friday, and the first 10 hours on Saturdays shall be paid at time and one half the regular rate, inclusive of benefits. Hours in excess of 10 on Saturdays, and all hours on Sundays and holidays shall be paid at double the regular rate, inclusive of benefits.

**RECOGNIZED HOLIDAYS:**

New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day. Sunday holidays shall be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Truck Driver**

**PREVAILING WAGE RATE**

	06/25/19	05/01/20
Bucket, Utility, Pick-up, Fuel Delivery trucks	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Dump truck (single axle), Asphalt Distributor, Tack Spreader	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Euclid-type vehicles (large off-road equipment)	W42.00 B33.23 T75.23	W0.00 B0.00 T77.13
Helper on Asphalt Distributor truck	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Slurry Seal, Seeding/Fertilizing/Mulchi ng truck	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Straight 3-axle trucks, Dump Truck (3-axle), Dump Truck (tandem)	W41.90 B33.23 T75.13	W0.00 B0.00 T77.03
Tractor-Trailer truck (all types)	W42.00 B33.23 T75.23	W0.00 B0.00 T77.13
Vacuum or Vac-All truck (entire unit)	W41.85 B33.23 T75.08	W0.00 B0.00 T76.98
Winch Trailer Driver	W42.10 B33.23 T75.33	W0.00 B0.00 T77.23

**Craft: Truck Driver**

**COMMENTS/NOTES**

Foreman: + \$.75 cents per hour. Overtime rate shall be increased accordingly.

**HAZARDOUS WASTE REMOVAL WORK:**

- On a hazardous waste site requiring Level A, B, or C personal protection for any worker: + \$3.00 per hour.
- On a hazardous waste site not designated Level A, B, or C: + \$1.00 per hour.

The regular workday consists of 8 hours starting between 6:00 AM and 8:00 AM.

**SHIFT DIFFERENTIAL:**

Any shift starting at a time other than 6:00 AM or 8:00 AM shall receive an additional \$3.00 per hour.

**BLENDED RATE:**

- When a truck driver is performing work on site and also serving as a material delivery driver, the driver shall be paid a



**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

"blended rate" which shall be 80% of the above-listed wage rates, plus the full benefit rate. This rate shall be used when the driver "round robins" for a minimum of 6 hours during the work day.

**OVERTIME:**

- Hours in excess of 8 per day, or before or after the regular workday that are not shift work, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate.

- Benefits on overtime shall be \$38.91.

- Four 10-hour days may be worked, Monday through Thursday, at straight time, with Friday used as a make-up day for a day lost to inclement weather. If Friday is not a make-up day, all hours on Friday shall be paid at time and one-half the hourly rate.

**RECOGNIZED HOLIDAYS:** New Year's Day, Presidents' Day, Memorial Day, July 4th, Labor Day, Veteran's Day, Thanksgiving Day, Christmas Day. Veteran's Day may be substituted for the day after Thanksgiving. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Truck Driver-Material Delivery Driver**

**PREVAILING WAGE RATE**

	06/25/19	05/01/20
Driver	W33.91 B33.23 T67.14	W0.00 B0.00 T69.04
New Hires: 1st Year	W33.91 B33.23 T67.14	W0.00 B0.00 T69.04

**Craft: Truck Driver-Material Delivery Driver**

**COMMENTS/NOTES**

NOTE: These rates may only be used for the delivery of \*materials TO the job site (\*building materials that will become a permanent part of the job site, such as sand, stone, aggregates, asphalt, sheetrock, 2x4's, etc.). In addition, only the following types of truck may be used for such deliveries (Dump Truck or Flat-bed truck). Please note that this rate does not apply to material suppliers or their employees (who do not perform services at the job site), and for the delivery of equipment and/or items that will not become a permanent part of the job site.

OVERTIME: Hours in excess of 8 per day, Monday through Friday, and all hours on Saturdays shall be paid at time and one-half the hourly rate. All hours on Sundays and holidays shall be paid at double the hourly rate. Benefits on overtime shall be \$38.91.

RECOGNIZED HOLIDAYS: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Veteran's Day, Thanksgiving Day, Christmas Day. Veteran's Day may be substituted for the day after Thanksgiving. Sunday holidays will be observed the following Monday.

**NEW JERSEY DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT  
PREVAILING WAGE RATE DETERMINATION**

**County - BURLINGTON**

**Craft: Welder**

**PREVAILING WAGE RATE**

Welder

**Craft: Welder**

**COMMENTS/NOTES**

Welders rate is the same as the craft to which the welding is incidental .

# AIA<sup>®</sup> Document A132<sup>™</sup> – 2009

## **Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition**

**AGREEMENT** made as of the    day of    in the year  
(*In words, indicate day, month and year.*)

**BETWEEN** the Owner:  
(*Name, legal status, address and other information*)

and the Contractor:  
(*Name, legal status, address and other information*)

for the following Project:  
(*Name, location and detailed description*)

The Construction Manager:  
(*Name, legal status, address and other information*)

The Architect:  
(*Name, legal status, address and other information*)

FRAYTAK VEISZ HOPKINS DUTHIE, P.C.  
Architects/Planners  
1515 Lower Ferry Road  
Trenton, Mercer County, New Jersey 08618

The Owner and Contractor agree as follows.

### **ADDITIONS AND DELETIONS:**

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A232<sup>™</sup>–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132<sup>™</sup>–2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132<sup>™</sup>–2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser. ^AIA Document A232<sup>™</sup>–2009 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

**TABLE OF ARTICLES**

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS
- 10 INSURANCE AND BONDS

**ARTICLE 1 THE CONTRACT DOCUMENTS**

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

**ARTICLE 2 THE WORK OF THIS CONTRACT**

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

**ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION**

**§ 3.1** The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

*(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)*

As fixed in the Notice to Proceed

If, prior to the commencement of the Work, the Owner requires time to file mortgages, mechanics' liens and other security interests, the Owner's time requirement shall be as follows:

**§ 3.2**

**§ 3.3** The Contractor shall achieve Substantial Completion of the entire Work not later than ( ) days from the date of commencement, or as follows:

*(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)*

Portion of the Work

Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

Liquidated Damages to be assessed in Accordance with the Specification requirements, Page 1:01800-1 - , entitled "TIME OF COMPLETION AND LIQUIDATED DAMAGES'.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:

(Check the appropriate box.)

- [ X ] Stipulated Sum, in accordance with Section 4.2 below
[ ] Cost of the Work plus the Contractor's Fee without a Guaranteed Maximum Price, in accordance with Section 4.3 below
[ ] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below. Based on the selection above, also complete either Section 5.1.4, 5.1.5 or 5.1.6 below.)

§ 4.2 Stipulated Sum

§ 4.2.1 The Stipulated Sum shall be (\$ ), subject to additions and deletions as provided in the Contract Documents.

§ 4.2.2 The Stipulated Sum is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 4.2.3 Unit prices, if any:

(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)

Table with 3 columns: Item, Units and Limitations, Price per Unit (\$0.00)

§ 4.2.4 Allowances included in the Stipulated Sum, if any:

(Identify allowance and state exclusions, if any, from the allowance price.)

Table with 2 columns: Item, Allowance

§ 4.3

(Paragraph deleted)

§ 4.3.2

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

§ 4.3.3

§ 4.3.4

§ 4.3.5

§ 4.3.6

(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.3.7

§ 4.4

§ 4.4.1

§ 4.4.2

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

§ 4.4.3 :

§ 4.4.4

§ 4.4.5

§ 4.4.6

(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.4.7

§ 4.4.7.1

(Insert specific provisions if the Contractor is to participate in any savings.)

§ 4.4.7.2

§ 4.4.7.3

Init.

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User Notes:

(1882208303)

Item

Allowance

§ 4.4.7.4

**ARTICLE 5 PAYMENTS**

**§ 5.1 Progress Payments**

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and upon certification of the Project Application and Project Certificate for Payment or Application for Payment and Certificate for Payment by the Construction Manager and Architect and issuance by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the day of a month, the Owner shall make payment of the certified amount in the Application for Payment to the Contractor not later than the \_\_\_\_\_ day of the \_\_\_\_\_ month. .  
*(Federal, state or local laws may require payment within a certain period of time.)*

**§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum**

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.4.3 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of \_\_\_\_\_ percent ( \_\_\_\_\_ %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Section 7.3.9 of the General Conditions;
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of \_\_\_\_\_ percent ( \_\_\_\_\_ %);
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Construction Manager or Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of the General Conditions.

§ 5.1.4.4 The progress payment amount determined in accordance with Section 5.1.4.3 shall be further modified under the following circumstances:

- .1



- 2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of the General Conditions.

§ 5.1.4.5 Reduction or limitation of retainage, if any, shall be as follows:

*(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.4.3.1 and 5.1.4.3.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)*

§ 5.1.5

§ 5.1.5.1

§ 5.1.5.2

§ 5.1.5.3

§ 5.1.5.4

§ 5.1.5.5

§ 5.1.5.6 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.6

§ 5.1.6.1

§ 5.1.6.2

§ 5.1.6.3

§ 5.1.6.4

§ 5.1.6.5

§ 5.1.6.6

§ 5.1.6.7 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

## § 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2 of AIA Document A232-2009, and to satisfy other requirements, if any, which extend beyond final payment;
- .2 the Contractor has submitted a final accounting for the Cost of the Work, pursuant to Exhibit A, Determination of the Cost of the Work when payment is on the basis of the Cost of the Work, with or without a Guaranteed Maximum payment; and
- .3 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

## ARTICLE 6 DISPUTE RESOLUTION

### § 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A232-2009, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker. *(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)*

### § 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A232-2009, the method of binding dispute resolution shall be as follows:

*(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)*

- Arbitration pursuant to Section 15.4 of AIA Document A232-2009.
- Litigation in a court of competent jurisdiction.
- Other: *(Specify)* Mediation

## ARTICLE 7 TERMINATION OR SUSPENSION

### § 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232-2009.

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232-2009.

### § 7.2

#### § 7.2.1

#### § 7.2.2

#### § 7.2.3

#### § 7.2.4

§ 7.2.5

**ARTICLE 8 MISCELLANEOUS PROVISIONS**

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2009 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2

§ 8.3

*(Name, address and other information)*

§ 8.4

*(Name, address and other information)*

§ 8.5

§ 8.6 Other provisions:

8.6.1 A condition of this Agreement is that the Contractor will comply with all applicable governmental laws and regulations including, but without limitation, those set forth in Section 00860 of the Specifications, which are hereby incorporated by reference as if set forth herein at length.

**ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS**

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A132–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition.

§ 9.1.2 The General Conditions are, AIA Document A232–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition and its revisions.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
----------	-------	------	-------

§ 9.1.4 The Specifications:

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User Notes:

(1882208303)

(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

Section	Title	Date	Pages
Part 1	Contract Conditions and General Requirements		
And			
Part			

**§ 9.1.5 The Drawings:**

(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

Number	Title	Date
--------	-------	------

**§ 9.1.6 The Addenda, if any:**

Number	Date	Pages
--------	------	-------

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

**§ 9.1.7 Additional documents, if any, forming part of the Contract Documents are:**

.1

.2

.3

**.4 Other documents, if any, listed below:**

(List here any additional documents which are intended to form part of the Contract Documents. AIA Document A232-2009 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

Proposal dated

Exhibit B

**ARTICLE 10 INSURANCE AND BONDS**

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A232-2009.

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A232-2009.)

Type of Insurance or Bond	Limit of Liability or Bond Amount (\$0.00)
As per Specifications	

This Agreement is entered into as of the day and year first written above.

**OWNER**

\_\_\_\_\_  
**OWNER** *(Signature)*

Attest:

\_\_\_\_\_  
**CONTRACTOR** *(Signature)*

Attest

(SEAL)  
*(Row deleted)*

(SEAL)

**PART 1 - CONTRACT CONDITIONS AND GENERAL REQUIREMENTS**

**SECTION 00700 - GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION,  
CONSTRUCTION MANAGER AS ADVISER EDITION, AIA DOCUMENT A232 - 2009**



# AIA<sup>®</sup> Document A232<sup>™</sup> – 2009

## General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

**for the following PROJECT:**

*(Name, and location or address)*

Sample

**THE CONSTRUCTION MANAGER:**

*(Name, legal status and address)*

**THE OWNER:**

*(Name, legal status and address)*

**THE ARCHITECT:**

*(Name, legal status and address)*

**ADDITIONS AND DELETIONS:**

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TABLE OF ARTICLES

- 1 GENERAL PROVISIONS
- 2 OWNER
- 3 CONTRACTOR
- 4 ARCHITECT AND CONSTRUCTION MANAGER
- 5 SUBCONTRACTORS
- 6 CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS
- 7 CHANGES IN THE WORK
- 8 TIME
- 9 PAYMENTS AND COMPLETION
- 10 PROTECTION OF PERSONS AND PROPERTY
- 11 INSURANCE AND BONDS
- 12 UNCOVERING AND CORRECTION OF WORK
- 13 MISCELLANEOUS PROVISIONS
- 14 TERMINATION OR SUSPENSION OF THE CONTRACT
- 15 CLAIMS AND DISPUTES

## INDEX

(Topics and numbers in bold are section headings.)

### **Acceptance of Nonconforming Work**

9.6.6, 9.9.3, **12.3**

Acceptance of Work

9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, **12.3**

### **Access to Work**

**3.16**, 6.2.1, 12.1

Accident Prevention

10

Acts and Omissions

3.2.1, 3.2.2, 3.3.2, 3.12.8, 3.18, 8.3.1, 9.5.1, 10.1,

10.2.5, 13.4.2, 13.7

Addenda

1.1.1, 3.11, 4.2.14

Additional Costs, Claims for

3.2.4, 3.7.4, 3.7.5, 6.1.1, 7.3, 9.10.3, 9.10.4, 10.3,

10.4, 15.1.4

Additional Inspections and Testing

4.2.8, 12.2.1, 13.5

Additional Insured

11.1.4

Additional Time, Claims for

3.7.4, 3.7.5, 6.1.1, 7.3, 8.3, 10.3

### **Administration of the Contract**

3.10, **4.2**

Advertisement or Invitation to Bid

1.1.1

Aesthetic Effect

4.2.19

### **Allowances**

**3.8**, 7.3.8

All-risk Insurance

11.3.1, 11.3.1.1

### **Applications for Payment**

4.2.7, 4.2.15, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.7, 9.8.3,

9.10.1, 9.10.3, 9.10.5, 11.1.3, 14.2.4

Approvals

2.1.1, 2.2.2, 2.4, 3.1.4, 3.10.1, 3.10.2, 3.12.4 through

3.12.10, 3.13.2, 3.15.2, 4.2.9, 9.3.2, 13.4.2, 13.5

### **Arbitration**

8.3.1, 11.3.10, 13.1, 15.3.2, **15.4**

## **ARCHITECT**

**4**

Architect, Certificates for Payment

9.4

Architect, Definition of

4.1.1

Architect, Extent of Authority

5.2, 7.1.2, 7.3.7, 7.4, 9.3.1, 9.4, 9.5, 9.8.3, 9.8.4,

9.10.1, 9.10.3, 12.1, 12.2.1, 13.5.1, 13.5.2, 15.1.3,

15.2.1

Architect, Limitations of Authority and  
Responsibility

2.1.1, 3.12.8, 4.2.1, 4.2.2, 4.2.8, 4.2.13, 5.2.1, 9.6.4,  
15.2

Architect's Additional Services and Expenses

2.4, 11.3.1.1, 12.2.1, 12.2.4, 13.5.2

Architect's Administration of the Contract

4.2, 9.4, 9.5, 15.2

Architect's Approvals

3.12.8

Architect's Authority to Reject Work

4.2.8, 12.1.2, 12.2.1

Architect's Copyright

1.5

Architect's Decisions

4.2.8, 7.3.9, 7.4, 8.1.3, 8.3.1, 9.2, 9.4, 9.5, 9.8.3,

9.9.2, 13.5.2, 14.2.2, 14.2.4, 15.2

Architect's Inspections

3.7.4, 4.2, 9.8.3, 9.9.2, 9.10.1, 13.5

Architect's Instructions

3.2.4, 7.4, 9.4

Architect's Interpretations

4.2.8, 4.2.17, 4.2.18

Architect's On-Site Observations

4.2.2, 9.4, 9.5.1, 9.10.1, 12.1.1, 12.1.2, 13.5

Architect's Project Representative

4.2.16

Architect's Relationship with Contractor

1.1.2, 1.5, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4,

3.9.2, 3.9.3, 3.10, 3.11, 3.12.8, 3.16, 3.18, 4.2, 5.2,

6.2.2, 8.2, 11.3.7, 12.1, 13.5

Architect's Relationship with Construction Manager

1.1.2, 9.3 through 9.10, 10.3, 13.5.1, 10.3, 11.3.7,

13.4.2, 13.5.4

Architect's Relationship with Subcontractors

1.1.2, 4.2.8, 5.3, 9.6.3, 9.6.4

Architect's Representations

9.4, 9.5, 9.10.1

Architect's Site Visits

4.2.2, 9.4, 9.5.1, 9.8.3, 9.9.2, 9.10.1, 13.5

Asbestos

10.3.1

Attorneys' Fees

3.18.1, 9.10.2, 10.3.3

Award of Other Contracts

6.1.1, 6.1.2

### **Award of Subcontracts and Other Contracts for Portions of the Work**

**5.2**

### **Basic Definitions**

**1.1**

Bidding Requirements

1.1.1, 5.2.1, 11.4.1

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(1916171064)

Binding Dispute Resolution  
9.7, 11.3.9, 11.3.10, 13.1, 15.2.5, 15.2.6.1, 15.3.1,  
15.3.2, 15.4.1

**Boiler and Machinery Insurance**  
**11.3.2**

**BONDS, INSURANCE AND**  
**11**

Bonds, Lien  
7.3.7.4, 9.10.3

Bonds, Performance and Payment  
7.3.7.4, 9.6.7, 9.10.3, 11.3.9, 11.4

Building Permit  
2.2.2, 3.7.1

**Capitalization**  
**1.3**

Certificate of Substantial Completion  
9.8.3, 9.8.4, 9.8.5

**Certificates for Payment**  
4.2.2, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3,  
15.1.3

Certificates of Inspection, Testing or Approval  
13.5.4

Certificates of Insurance  
9.3.2, 9.10.2, 11.1.3

**Change Orders**  
1.1.1, 2.4, 3.4.2, 3.7.4, 3.8.2, 3.11, 3.12.8, 4.2.12,  
4.2.13, 4.2.14, 5.2.3, 7.1.1, 7.1.2, 7.2, 7.3.2, 7.3.4,  
7.3.6, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2,  
11.3.1.2, 11.3.4, 11.3.9, 12.1.2, 15.1.3

Change Orders, Definition of  
7.2

Changes  
7.1

**CHANGES IN THE WORK**  
2.2.1, 3.4.2, 3.11, 3.12.8, 4.2.13, 4.2.14, 7, 8.3.1,  
9.3.1.1

**Claims, Definition of**  
**15.1.1**

**CLAIMS AND DISPUTES**  
1.1.8, 3.2.4, 3.7.5, 6.1.1, 7.3.9, 8.3.2, 9.3.3, 9.10.3,  
9.10.4, 10.3.3, 15, 15.4

**Claims for Additional Cost**  
3.2.4, 3.7.5, 6.1.1, 7.3.9, 9.10.3, 9.10.4, 10.3.2, 10.4,  
**15.1.4**

**Claims for Additional Time**  
3.2.4, 3.7.5, 7, 8.3.2, 10.4, **15.1.5**

Concealed or Unknown Conditions, Claims for  
3.7

Claims for Damages  
3.2.4, 3.18, 6.1.1, 6.2.5, 8.3.2, 9.3.3, 9.5.1.2, 9.10.2,  
9.10.5, 10.3.3, 11.1.1, 11.3.5, 11.3.7, 15.1.6

**Cleaning Up**  
**3.15, 6.3**

Commencement of Statutory Limitation Period  
13.7

Commencement of the Work, Definition of  
8.1.2

Communications, Owner to Architect  
2.2.6

Communications, Owner to Construction Manager  
2.2.6

Communications, Owner to Contractor  
2.2.6

**Communications Facilitating Contract**  
**Administration**  
3.9.1, 4.2.6

**COMPLETION, PAYMENTS AND**  
**9**

**Completion, Substantial**  
4.2.15, 8.1.1, 8.1.3, 8.2.3, 9.4.3.3, 9.8, 9.9.1, 9.10.3,  
12.2.1, 12.2.2, 13.7

**Concealed or Unknown Conditions**  
3.7.4, 4.2.8, 8.3.1, 10.3

Conditions of the Contract  
1.1.1

**Consolidation or Joinder**  
**15.4.4**

**CONSTRUCTION BY OWNER OR BY OTHER**  
**CONTRACTORS**  
1.1.4, 6

Construction Change Directive, Definition of  
7.3.1

**Construction Change Directives**  
1.1.1, 3.4.2, 3.12.8, 4.2.12, 4.2.13, 7.1.1, 7.1.2, 7.1.3,  
7.3, 9.3.1.1

Construction Manager, Building Permits  
2.2.2

Construction Manager, Communications through  
4.2.6

Construction Manager, Construction Schedule  
3.10.1, 3.10.3

**CONSTRUCTION MANAGER**  
**4**

Construction Manager, Definition of  
4.1.2

Construction Manager, Documents and Samples at  
the Site  
3.11

Construction Manager, Extent of Authority  
3.12.7, 3.12.8, 4.1.3, 4.2.1, 4.2.4, 4.2.5, 4.2.9, 7.1.2,  
7.2, 7.3.1, 8.3, 9.3.1, 9.4.1, 9.4.2, 9.4.3, 9.8.2, 9.8.3,  
9.8.4, 9.9.1, 12.1, 12.2.1, 14.2.2, 14.2.4

Construction Manager, Limitations of Authority and  
Responsibility  
4.2.5, 4.2.8, 13.4.2

Construction Manager, Submittals  
4.2.9

Construction Manager's Additional Services and  
Expenses  
12.2.1

Construction Manager's Administration of the  
Contract  
4.2, 9.4, 9.5

Init.

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(1916171064)

Construction Manager's Approval  
2.4, 3.10.1, 3.10.2

Construction Manager's Authority to Reject Work  
4.2.8, 12.2.1

Construction Manager's Decisions  
7.3.7, 7.3.9, 9.4.1, 9.5.1

Construction Manager's Inspections  
4.2.8, 9.8.3, 9.9.2

Construction Manager's On-Site Observations  
9.5.1

Construction Manager's Relationship with Architect  
1.1.2, 4.2.1, 4.2.7, 4.2.8, 4.2.9, 4.2.13, 4.2.15, 4.2.16,  
4.2.20, 9.2.1, 9.4.2, 9.5, 9.6.1, 9.6.3, 9.8.2, 9.8.3,  
9.8.4, 9.9.1, 9.10.1, 9.10.2, 9.10.3, 11.1.3, 12.2.4,  
13.5.1, 13.5.2, 13.5.4, 14.2.2, 14.2.4

Construction Manager's Relationship with Contractor  
3.2.2, 3.2.3, 3.3.1, 3.5, 3.10.1, 3.10.2, 3.10.3, 3.11,  
3.12.5, 3.12.6, 3.12.7, 3.12.8, 3.12.9, 3.12.10, 3.13.2,  
3.14.2, 3.15.2, 3.16, 3.17, 3.18.1, 4.2.4, 4.2.5, 4.2.6,  
4.2.9, 4.2.14, 4.2.17, 4.2.20, 5.2, 6.2.1, 6.2.2, 7.1.2,  
7.2, 7.3.5, 7.3.7, 7.3.10, 8.3.1, 9.2, 9.3.1, 9.4.1, 9.4.2,  
9.7, 9.8.2, 9.8.3, 9.8.4, 9.9.1, 9.10.1, 9.10.2, 9.10.3,  
10.1, 10.3, 11.3.7, 12.1, 13.5.1, 13.5.2, 13.5.3, 13.5.4

Construction Manager's Relationship with Owner  
2.2.2, 4.2.1, 10.3.2

Construction Manager's Relationship with Other  
Contractors and Owner's Own Forces  
4.2.4

Construction Manager's Relationship with  
Subcontractors  
4.2.8, 5.3, 9.6.3, 9.6.4

Construction Manager's Site Visits  
9.5.1

Construction Schedules, Contractor's  
3.10, 3.12.1, 3.12.2, 6.1.2, 15.1.5.2

**Contingent Assignment of Subcontracts**  
5.4, 14.2.2.2

**Continuing Contract Performance**  
15.1.3

**Contract**, Definition of  
1.1.2

**CONTRACT, TERMINATION OR  
SUSPENSION OF THE**  
5.4.1.1, 11.3.9, 14

Contract Administration  
3.1.3, 4.2, 9.4, 9.5

Contract Award and Execution, Conditions Relating  
to  
3.7.1, 3.10, 5.2, 6.1, 11.1.3, 11.3.6, 11.4.1

Contract Documents, Copies Furnished and Use of  
1.5.2, 2.2.5, 5.3

**Contract Documents**, Definition of  
1.1.1

Contract Performance During Arbitration  
15.1.3

**Contract Sum**  
3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.2, 7.3, 7.4, 9.1, 9.2,  
9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.3.1.1, 12.3, 14.2.4,  
14.3.2, 15.1.4, 15.2.5

**Contract Time**  
3.7.4, 3.7.5, 4, 3.10.2, 5.2.3, 7.2.3, 7.3.1, 7.3.5,  
7.3.10, 7.4, 8.1.1, 8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7,  
10.3.2, 12.1.1, 14.3.2, 15.1.5.1, 15.2.5

**Contract Time, Definition of**  
8.1.1

**CONTRACTOR**  
3

Contractor, Definition of  
3.1.1

**Contractor's Construction Schedules**  
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.5.2

Contractor's Employees  
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3,  
11.1.1, 11.3.7, 14.1, 14.2.1.1

**Contractor's Liability Insurance**  
11.1

Contractor's Relationship with Other Contractors and  
Owner's Own Forces  
3.12.5, 3.14.2, 4.2.6, 6, 11.3, 12.1.2, 12.2.4

Contractor's Relationship with Subcontractors  
1.2.2, 3.3.2, 3.18, 5, 9.6.2, 9.6.7, 9.10.2, 11.3.1.2,  
11.3.7, 11.3.8, 14.2.1.2

Contractor's Relationship with the Architect  
1.1.2, 1.5, 3.2.2, 3.2.3, 3.2.4, 3.4.2, 3.5, 3.7.4, 3.10.1,  
3.11, 3.12, 3.16, 3.18, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3,  
9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3.7, 12, 13.5,  
15.1.2, 15.2.1

Contractor's Relationship with the Construction  
Manager  
1.1.2, 3.2.2, 3.2.3, 3.3.1, 3.5, 3.10.1, 3.10.2, 3.10.3,  
3.11, 3.12.5, 3.12.7, 3.12.9, 3.12.10, 3.13.2, 3.14.2,  
3.15.1, 3.16, 3.17, 3.18.1, 4.2.4, 4.2.5, 5.2, 6.2.1,  
6.2.2, 7.1.2, 7.3.5, 7.3.7, 7.3.10, 8.3.1, 9.2, 9.3.1,  
9.4.1, 9.4.2, 9.8.2, 9.9.1, 9.10.1, 9.10.2, 9.10.3, 10.1,  
10.2.6, 10.3, 11.3.7, 12.1, 13.5.1, 13.5.2, 13.5.3,  
13.5.4

Contractor's Representations  
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2

Contractor's Responsibility for Those Performing the  
Work  
3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8

Contractor's Review of Contract Documents  
3.2

Contractor's Right to Stop the Work  
9.7

Contractor's Right to Terminate the Contract  
14.1

Contractor's Submittals  
3.10.2, 3.11, 3.12, 4.2.9, 9.2, 9.3, 9.8.2, 9.9.1, 9.10.2,  
9.10.3, 11.1.3, 11.4.2

Contractor's Superintendent  
3.9, 10.2.6

Init.

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Contractor's Supervision and Construction Procedures  
 1.2.2, 3.3, 3.4, 4.2.5, 4.2.7, 6.1, 6.2.4, 7.1.3, 7.3.5, 7.3.7, 8.2, 10, 12, 14, 15.1.3  
 Contractual Liability Insurance  
 11.1.1.8, 11.2, 11.3.1.5  
 Coordination and Correlation  
 1.2, 3.2, 3.3.1, 3.10, 3.12.6, 6.1.2, 6.2.1  
 Copies Furnished of Drawings and Specifications  
 1.5, 2.2.5, 3.11  
 Copyrights  
 1.5, 3.17  
**Correction of Work**  
 2.3, 2.4, 9.4.1, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**  
**Correlation and Intent of the Contract Documents**  
**1.2**  
 Costs  
 2.4, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.6, 7.3.7, 7.3.8, 7.3.9, 11.3.1.2, 11.3.1.3, 11.3.4, 11.3.9, 12.1, 12.2.1, 13.5, 14  
**Cutting and Patching**  
**3.14, 6.2.5**  
 Damage to Construction of Owner or Other Contractors  
 3.14.2, 6.2.4, 9.5.1.5, 10.2.1.2, 10.2.5, 10.4, 11.1.1, 11.3, 12.2.4  
 Damage to the Work  
 3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 11.3.1, 12.2.4  
 Damages, Claims for  
 3.2.4, 3.18, 6.1.1, 8.3.2, 10.3.3, 11.1.1, 11.3.5, 11.3.7, 14.2.4, 15.1.6  
 Damages for Delay  
 6.1.1, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 15.1.5  
 Date of Commencement of the Work, Definition of  
 8.1.2  
 Date of Substantial Completion, Definition of  
 8.1.3  
 Day, Definition of  
 8.1.4  
 Decisions of the Architect  
 3.7.4, 4.2.7, 4.2.8, 4.2.10, 4.2.11, 4.2.13, 4.2.15, 4.2.16, 4.2.17, 4.2.18, 4.2.19, 4.2.20, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5, 9.8.3, 9.8.4, 9.9.1, 10.1.2, 13.5.2, 14.2.2, 14.2.4, 15.1, 15.2  
 Decisions of the Construction Manager  
 7.3.7, 7.3.8, 7.3.9, 15.1, 15.2  
**Decisions to Withhold Certification**  
 9.4.1, **9.5**, 9.7, 14.1.1.3  
 Defective or Nonconforming Work, Acceptance, Rejection and Correction of  
 2.3, 2.4, 3.5, 4.2.8, 6.2.5, 9.5.1, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1, 12.2.2  
 Definitions  
 1.1, 2.1.1, 3.1.1, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 4.1.2, 7.2, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1

**Delays and Extensions of Time**  
 3.2, 3.7.4, 5.2.3, 7.2, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.5, 15.2.5  
 Disputes  
 7.3.8, 7.3.9, 9.3, 15.1, 15.2  
**DISPUTES, CLAIMS AND**  
 3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, **15**, 15.4  
**Documents and Samples at the Site**  
**3.11**  
**Drawings, Definition of**  
**1.1.5**  
**Drawings and Specifications, Ownership and Use**  
 1.1.1, **1.5**, 2.2.5, 3.11, 5.3  
 Duty to Review Contract Documents and Field Conditions  
 3.2  
 Effective Date of Insurance  
 8.2.2, 11.1.2  
**Emergencies**  
**10.4**, 14.1.1.2, 15.1.4  
 Employees, Contractor's  
 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.1, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.1.1, 11.3.7, 14.1, 14.2.1.1  
 Equipment, Labor, Materials and or  
 1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12.2, 3.12.3, 3.13.1, 3.15.1, 4.2.8, 4.2.7, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.2  
 Execution and Progress of the Work  
 1.1.3, 1.2.1, 1.2.2, 2.2.3, 2.2.5, 3.1, 3.3.1, 3.4.1, 3.5, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.5, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.2, 14.2, 14.3.1, 15.1.3  
 Extensions of Time  
 3.2.4, 3.7.4, 5.2.3, 7.2.3, 7.4, 8.3, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.5, 15.2.5  
**Failure of Payment**  
 9.5.1.3, **9.7**, 13.6, 14.1.1.3, 14.1.3, 14.2.1.2, 15.1.4  
 Faulty Work (See Defective or Nonconforming Work)  
**Final Completion and Final Payment**  
 4.2.1, 4.2.15, 9.8.2, **9.10**, 11.1.2, 11.1.3, 11.3.1, 11.3.5, 12.3, 15.2.1  
 Financial Arrangements, Owner's  
 2.2.1  
**GENERAL PROVISIONS**  
**1**  
**Governing Law**  
**13.1**  
 Guarantees (See Warranty and Warranties)  
**Hazardous Materials**  
 10.2.4, **10.3**  
 Identification of Contract Documents  
 1.2.1  
 Identification of Subcontractors and Suppliers  
 5.2.1  
**Indemnification**  
**3.18**, 9.10.2, 10.3.3, 10.3.5, 10.3.6, 11.3.1.2, 11.3.7

## Information and Services Required of the Owner

2.1.2, 2.2, 4.2.6, 6.1.2, 6.2.5, 9.6.1, 9.6.4, 9.8, 9.9.1, 9.10.3, 10.3.2, 10.3.3, 11.2, 11.3.4, 13.5.1, 13.5.2, 14.1.1.4, 14.1.3, 15.1.2

## Initial Decision

### 15.2

## Initial Decision Maker, Definition of

### 1.1.8

Initial Decision Maker, Extent of Authority

14.2.2, 14.2.4, 15.1.3, 15.2.2, 15.2.3, 15.2.4, 15.2.5

## Injury or Damage to Person or Property

3.18.1, 10.2.1, 10.2.2, 10.2.8, 10.3, 10.3.3, 10.4, 11.1.1

## Inspections

3.1.3, 3.7.1, 4.2.2, 9.8.2, 9.9.2, 9.10.1, 13.5

## Instructions to Bidders

### 1.1.1

Instructions to the Contractor

3.1.4, 3.3.3, 3.7.1, 4.2.4, 5.2.1, 7, 8.2.2, 12.1, 13.5.2

## Instruments of Service, Definition of

1.1.7, 1.5, 1.6

## Insurance

6.1.1, 7.3.7, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5, 11

## Insurance, Boiler and Machinery

### 11.3.2

## Insurance, Contractor's Liability

### 11.1

Insurance, Effective Date of

8.2.2, 11.1.2

## Insurance, Loss of Use

### 11.3.3

## Insurance, Owner's Liability

### 11.2

## Insurance, Property

10.2.5, 11.3

Insurance, Stored Materials

9.3.2, 11.3.1

## INSURANCE AND BONDS

### 11

Insurance Companies, Consent to Partial Occupancy

9.9.1, 11.3.1.5

Insurance Companies, Settlement with

11.3.10

Intent of the Contract Documents

1.2, 4.2.18, 4.2.19, 7.4

## Interest

9.7, 13.6

## Interpretation

1.4, 4.2.8, 4.2.17, 4.2.18

Interpretations, Written

4.2.17, 4.2.18, 4.2.20

Joinder and Consolidation of Claims Required

15.4.4

Judgment on Final Award

15.4.2

## Labor and Materials, Equipment

1.1.3, 1.1.6, 3.4, 3.8.2, 3.8.3, 3.12.2, 3.12.3, 3.12.6, 3.12.10, 3.13.1, 3.15.1, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.6, 9.10.2, 10.2.1.2, 11.3.1, 14.2.1, 14.2.2

## Labor Disputes

### 8.3.1

Laws and Regulations

3.2.3, 3.2.4, 3.7, 3.13.1, 10.2.2, 10.2.3, 13.5.1, 14.2.1

## Liens

2.1.2, 9.3.3, 9.10.2, 9.10.4, 15.2.8

Limitation on Consolidation or Joinder

15.4.4

Limitations, Statutes of

15.4.1

Limitations of Authority

3.12.4, 4.1.3, 4.2.16

Limitations of Liability

9.6.7, 11.1.1, 12.2

Limitations of Time

3.10.1, 4.2.17, 4.2.20, 8.2.1, 9.3.3, 9.6.1, 9.8.4,

9.10.2, 10.2, 11.1.3, 12.1.1, 12.2.2.2, 12.2.5, 13.7,

14.1.1, 15.2.6.1

## Loss of Use Insurance

### 11.3.3

Material Suppliers

1.5.1, 1.5.2, 3.12, 4.2.6, 4.2.8, 9.3.1, 9.3.1.2, 9.3.3,

9.5.3, 9.6.4, 9.6.5, 9.6.7, 9.10.5, 11.3.1

## Materials, Hazardous

10.2.4, 10.3

Materials, Labor, Equipment and

1.1.3, 1.1.6, 1.5.1, 1.5.2, 3.4, 3.5, 3.8.2, 3.8.3, 3.12.2,

3.12.3, 3.12.6, 3.12.10, 3.13.1, 5.2.1, 6.2.1, 9.3.1,

9.3.2, 9.3.3, 9.5.1, 9.5.3, 9.6.4, 9.6.5, 9.6.7, 9.10.2,

9.10.5, 10.2.1, 10.2.4, 10.3

Means, Methods, Techniques, Sequences and

Procedures of Construction

3.3.1, 3.12.10, 4.2.5, 4.2.11

Mechanic's Lien

2.1.2, 15.2.8

## Mediation

8.3.1, 10.3.5, 15.2.1, 15.2.5, 15.2.6, 15.3, 15.4.1

## Minor Changes in the Work

1.1.1, 3.12.8, 4.2.13, 7.1, 7.4

## MISCELLANEOUS PROVISIONS

### 13

Modifications, Definition of

1.1.1

Modifications to the Contract

1.1.1, 1.1.2, 3.11, 4.1.3, 4.2.14, 5.2.3, 7, 11.3.1

## Mutual Responsibility

### 6.2

## Nonconforming Work, Acceptance of

9.4.3, 9.8.3, 12.3

Nonconforming Work, Rejection and Correction of

2.3, 2.4, 3.2.3, 3.7.3, 9.4.3.3, 9.8.2, 9.8.3, 9.9.1,

11.1.1, 12.2.2.1, 12.2.3, 12.2.4, 12.2.5

Init.

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User Notes:

(1916171064)

Notice  
 1.5, 2.1.2, 2.2.1, 2.4, 3.2.4, 3.3.1, 3.7.1, 3.7.2, 3.7.5,  
 3.9.2, 3.12.9, 5.2.1, 6.3, 9.4.1, 9.7, 9.10.1, 9.10.2,  
 10.2.2, 10.2.6, 10.2.8, 10.3.2, 11.3.6, 12.2.2.1, 13.3,  
 13.5.1, 13.5.2, 14.1.2, 14.2.2, 14.4.2, 15.1.2, 15.1.4,  
 15.1.5.1, 15.2, 15.4.1

**Notice of Claims**  
 3.7.2, 10.2.8, **15.1.2**, 15.4.1

Notice of Testing and Inspections  
 13.5.1, 13.5.2

Notices, Permits, Fees and  
 3.7, 7.3.7, 10.2.2

Observations, On-Site  
 3.2.1, 9.5.1, 12.1.1

Occupancy  
 2.2.2, 9.6.6, 9.9, 11.3.1.5

On-Site Inspections  
 4.2.2, 9.10.1, 9.4.4, 9.5.1

Orders, Written  
 4.2.7, 4.2.18, 4.2.20

Other Contracts and Contractors  
 1.1.4, 3.14.2, 4.2.9, 6, 11.3.7, 12.1.2

**OWNER**  
**2**

Owner, Definition of  
 2.1.1

**Owner, Information and Services Required of the**  
 2.1.2, **2.2**, 4.2, 6.1.2, 6.1.3, 6.2.5, 9.3.2, 9.6.1, 9.6.4,  
 9.9.2, 9.10.2, 10.3.3, 11.2, 11.3, 13.5.1, 13.5.2,  
 14.1.1, 14.1.3, 15.1.3

Owner's Authority  
 1.5, 2.1.1, 2.3, 2.4, 3.4.2, 3.12.10, 3.14.2, 4.1.2, 4.1.3,  
 4.2.8, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2, 7.3.1,  
 8.2.2, 9.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2,  
 11.3.3, 11.3.10, 12.2.2.1, 12.3, 13.5.2, 14.2, 14.3.1,  
 14.4, 15.2.7

Owner's Financial Capability  
 2.2.1, 13.2.2, 14.1.1

**Owner's Liability Insurance**  
**11.2**

Owner's Relationship with Subcontractors  
 1.1.2, 5.2.1, 5.3, 5.4.1, 9.6.4, 9.10.2, 14.2.2

**Owner's Right to Carry Out the Work**  
**2.4**, 12.2.4, 14.2.2

**Owner's Right to Clean Up**  
**6.3**

**Owner's Right to Perform Construction with Own  
 Forces and to Award Other Contracts**  
**6.1**

**Owner's Right to Stop the Work**  
**2.3**

Owner's Right to Suspend the Work  
 14.3

Owner's Right to Terminate the Contract  
 14.2

**Ownership and Use of Drawings, Specifications  
 and Other Instruments of Service**  
 1.1.1, 1.1.5, **1.5**, 1.6, 3.11, 3.12.10, 3.17, 4.2.14,  
 4.2.18, 4.2.20

**Partial Occupancy or Use**  
**9.9**, 11.3.1.5

**Patching, Cutting and**  
**3.14**, 6.2.5

Patents and Copyrights, Royalties  
**3.17**

**Payment, Applications for**  
 4.2.1, 4.2.7, 4.2.15, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.7,  
 9.10.1, 9.10.3, 9.10.5, 11.1.3

**Payment, Certificates for**  
 4.2.15, 7.3.9, 9.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1,  
 9.10.3, 14.1.1.3, 15.1.3

**Payment, Failure of**  
 9.4.1, 9.5, **9.7**, 14.1.1.3

Payment, Final  
 4.2.1, 9.8.2, **9.10**, 11.1.2, 11.3.1, 11.3.5, 12.3, 15.2.1

**Payment Bond, Performance Bond and**  
**5.4.1**, 7.3.7, 9.6.7, 9.10.2, 9.10.3, 11, **11.4**

**Payments, Progress**  
 9.3.1, 9.4.2, **9.6**

**PAYMENTS AND COMPLETION**  
**9**, 14

Payments to Subcontractors  
 5.4.2, 9.3, 9.5.1.3, 9.5.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7,  
 9.10.5, 14.2.1.2

PCB  
 10.3.1

**Performance Bond and Payment Bond**  
 5.4.1, 7.3.7, 9.6.7, 9.10.2, 9.10.3, 11, **11.4**

**Permits, Fees, Notices and Compliance with Laws**  
 2.2.2, **3.7**, 7.3.7.4, 10.2.2

**PERSONS AND PROPERTY, PROTECTION  
 OF**  
**10**

Polychlorinated Biphenyl  
 10.3.1

Product Data, Definition of  
 3.12.2

**Product Data and Samples, Shop Drawings**  
 3.11, **3.12**, 4.2.9, 4.2.10, 4.2.14

**Progress and Completion**  
**8.2**, 9.3.1, 9.4.2, 9.6, 9.8, 9.10, 14.2.4, 15.1.6

**Progress Payments**  
 9.3.1, 9.4.2, **9.6**

**Project, Definition of**  
**1.1.4**

Project Representatives  
 4.2.16

**Property Insurance**  
 10.2.5, **11.3**

Project Schedule  
 3.10.1, 3.10.3, 3.10.4, 4.2.2, 4.2.3, 4.2.4

Init.

## **PROTECTION OF PERSONS AND PROPERTY** **10**

### **Regulations and Laws**

1.5, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 9.6.4, 9.9.1, 10.2.2, 11.1, 11.4, 13.1, 13.4, 13.5.1, 13.5.2, 13.6, 14.1.1, 14.2.1, 15.2.8, 15.4

### **Rejection of Work**

3.5, 4.2.8, 12.2.1

### **Releases of and Waivers and of Liens**

9.10.2

### **Representations**

1.3, 2.2.1, 3.5, 3.12, 6.2.2, 8.2.1, 9.3.3, 9.4.3, 9.5.1, 9.8.2, 9.10.1

### **Representatives**

2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.1, 4.2.2, 4.2.10, 5.1.1, 5.1.2, 13.2.1

### **Requests for Information**

4.2.20

### **Resolution of Claims and Disputes**

15

### **Responsibility for Those Performing the Work**

3.3.2, 3.7.3, 3.12.8, 3.18, 4.2.2, 4.2.5, 4.2.8, 5.3, 6.1.2, 6.2, 6.3, 9.5.1, 9.8.2, 10

### **Retainage**

9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3

### **Review of Contract Documents and Field Conditions by Contractor**

1.2.2, 3.2, 3.7.3, 3.12.7

### **Review of Contractor's Submittals by Owner, Construction Manager and Architect**

3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 5.2, 9.2, 9.8.2

### **Review of Shop Drawings, Product Data and Samples by Contractor**

3.12.5

### **Rights and Remedies**

1.1.2, 2.3, 2.4, 3.7.4, 3.15.2, 4.2.8, 5.3, 5.4, 6.1, 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.2, 12.2.4, 13.4, 14, 15.4

### **Royalties, Patents and Copyrights**

3.17

### **Rules and Notices for Arbitration**

15.4

### **Safety of Persons and Property**

10.2, 10.3, 10.4

### **Safety Precautions and Programs**

3.3.1, 3.12, 4.2.5, 5.3, 10.1, 10.2, 10.3, 10.4

### **Samples, Definition of**

3.12.3

### **Samples, Shop Drawings, Product Data and**

3.11, 3.12, 4.2.9, 4.2.10

### **Samples at the Site, Documents and** **3.11**

### **Schedule of Values**

9.2, 9.3.1

### **Schedules, Construction**

3.10, 3.12.1, 3.12.2, 6.1.2, 15.1.5.2

### **Separate Contracts and Contractors**

1.1.4, 3.12.5, 3.14.2, 4.2.6, 4.2.11, 6, 8.3.1, 12.1.2

### **Shop Drawings, Definition of**

3.12.1

### **Shop Drawings, Product Data and Samples**

3.11, 3.12, 4.2.9, 4.2.10, 4.2.14

### **Site, Use of**

3.13, 6.1.1, 6.2.1

### **Site Inspections**

3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2.2, 4.2.3, 4.2.15, 9.4.3.3, 9.8.3, 9.9.2, 9.10.1, 13.5

### **Site Visits, Architect's**

3.7.4, 4.2.2, 4.2.15, 9.8.3, 9.9.2, 9.10.1, 13.5

### **Special Inspections and Testing**

4.2.8, 12.2.1, 13.5

### **Specifications, Definition of**

1.1.6

### **Specifications**

1.1.1, 1.1.6, 1.2.2, 1.5, 3.11, 3.12.10, 3.17, 4.2.14

### **Staffing Plan**

4.2.3

### **Statute of Limitations**

12.2.5, 13.7, 15.4.1.1

### **Stopping the Work**

2.3, 9.7, 10.3, 14.1

### **Stored Materials**

6.2.1, 9.3.2, 10.2.1.2, 10.2.4

### **Subcontractor, Definition of**

5.1.1

## **SUBCONTRACTORS**

5

### **Subcontractors, Work by**

1.2.2, 3.3.2, 3.12.1, 4.2.5, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7

### **Subcontractual Relations**

5.3, 5.4, 9.3.1.2, 9.6.2, 9.6.3, 9.10, 10.2.1, 14.1, 14.2

### **Submittals**

3.2.3, 3.10, 3.11, 3.12, 4.2.9, 4.2.10, 4.2.11, 5.2.1, 5.2.3, 7.3.7, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3, 11.1.3

### **Submittal Schedule**

3.10.2, 3.12.5, 4.2.9, 4.2.10

### **Subrogation, Waivers of**

6.1.1, 11.3.7

### **Substantial Completion**

8.1.1, 8.1.3, 8.2.3, 9.4.3.3, 9.8, 9.9.1, 9.10.3, 12.2.1, 12.2.2, 13.7

### **Substantial Completion, Definition of**

9.8.1

### **Substitution of Subcontractors**

5.2.3, 5.2.4

### **Substitution of Architect**

4.1.4

### **Substitution of Construction Manager**

4.1.4

### **Substitutions of Materials**

3.4.2, 3.5, 7.3.8

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User Notes:

(1916171064)



Sub-subcontractor, Definition of  
5.1.2

Subsurface Conditions  
3.7.4

**Successors and Assigns**  
**13.2**

**Superintendent**  
3.9, 10.2.6

**Supervision and Construction Procedures**  
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.3, 4.2.5, 4.2.8,  
4.2.9, 4.2.10, 4.2.11, 6.1.3, 6.2.4, 7.1.3, 7.3.7, 8.2,  
8.3.1, 9.4.3.3, 10, 12, 14, 15.1.3

Surety  
5.4.1.2, 9.8.5, 9.10.2, 9.10.3, 14.2.2, 15.2.7

Surety, Consent of  
9.10.2, 9.10.3

Surveys  
1.1.7, 2.2.3

**Suspension by the Owner for Convenience**  
**14.3**

Suspension of the Work  
5.4.2, 14.3

Suspension or Termination of the Contract  
5.4.1.1, 14

**Taxes**  
3.6, 3.8.2.1, 7.3.7.4

**Termination by the Contractor**  
**14.1**, 15.1.6

**Termination by the Owner for Cause**  
5.4.1.1, 14.2, 15.1.6

**Termination by the Owner for Convenience**  
**14.4**

Termination of the Contractor  
14.2.2

**TERMINATION OR SUSPENSION OF THE CONTRACT**  
**14**

**Tests and Inspections**  
3.1.4, 3.3.3, 4.2.2, 4.2.6, 4.2.8, 9.4.3.3, 9.8.3, 9.9.2,  
9.10.1, 10.3.2, 12.2.1, 13.5

**TIME**  
**8**

**Time, Delays and Extensions of**  
3.2.4, 3.7.4, 5.2.3, 7.2, 7.3.1, 7.4, 8.3, 9.5.1, 10.3.2,  
14.3.2, 15.1.5, 15.2.5

Time Limits  
2.1.2, 2.2, 2.4, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.1,  
5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3,  
9.4.1, 9.4.2, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 11.1.3, 11.4,  
12.2, 13.5, 13.7, 14, 15

**Time Limits on Claims**  
3.7.4, 10.2.8, 13.7, 15.1.2

Title to Work  
9.3.2, 9.3.3

**Transmission of Data in Digital Form**  
**1.6**

**UNCOVERING AND CORRECTION OF WORK**  
**12**

**Uncovering of Work**  
**12.1**

Unforeseen Conditions, Concealed or Unknown  
3.7.4, 8.3.1, 10.3

Unit Prices  
7.3.3.2, 7.3.4

Use of Documents  
1.1.1, 1.5, 2.2.5, 3.12.6, 5.3

**Use of Site**  
**3.13**, 6.1.1, 6.2.1

**Values, Schedule of**  
**9.2**, 9.3.1

Waiver of Claims by the Architect  
13.4.2

Waiver of Claims by the Construction Manager  
13.4.2

Waiver of Claims by the Contractor  
9.10.5, 13.4.2, 15.1.6

Waiver of Claims by the Owner  
9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.4.2, 14.2.4, 15.1.6

Waiver of Consequential Damages  
14.2.4, 15.1.6

Waiver of Liens  
9.10.2, 9.10.4

**Waivers of Subrogation**  
6.1.1, 11.3.7

**Warranty**  
3.5, 4.2.15, 9.3.3, 9.8.4, 9.9.1, 9.10.4, 12.2.2

Weather Delays  
15.1.5.2

**Work, Definition of**  
**1.1.3**

Written Consent  
1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.3, 9.3.2, 9.8.5,  
9.9.1, 9.10.2, 9.10.3, 10.3.2, 11.4.1, 13.2, 13.4.2,  
15.4.4.2

Written Interpretations  
4.2.17, 4.2.18

**Written Notice**  
2.3, 2.4, 3.3.1, 3.9, 3.12.9, 3.12.10, 5.2.1, 5.3, 5.4.1.1,  
8.2.2, 9.4, 9.5.1, 9.7, 9.10, 10.2.2, 10.3, 11.1.3,  
12.2.2, 12.2.4, 13.3, 13.5.2, 14, 15.4.1

Written Orders  
1.1.1, 2.3, 3.9, 7, 8.2.2, 12.1, 12.2, 13.5.2, 14.3.1,  
15.1.2

## ARTICLE 1 GENERAL PROVISIONS

### § 1.1 Basic Definitions

**§ 1.1.1 The Contract Documents.** The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement), and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding requirements).

**§ 1.1.2 The Contract.** The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

**§ 1.1.3 The Work.** The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

**§ 1.1.4 The Project.** The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Multiple Prime Contractors and by the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

**§ 1.1.5 The Drawings.** The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

**§1.1.5.1** Construction Drawings prepared by the Architect are intended to show the scope of work, including but not limited to general arrangement of stairs, equipment, ducts, piping and other elements of the structure, and approximate locations and sizes of equipment. This does not relieve the Contractor from providing all connections and accessories necessary to make structural, mechanical and electrical work complete, ready to operate, in compliance with all applicable codes, laws and other regulations, and acceptable to the Architect. As such, they are not to serve as Shop Drawings.

**§1.1.5.2** Locations and arrangements of items are designated by dimensions at less than full scale, unless otherwise noted. Such reductions of scale may vary and will be noted.

**§1.1.5.3** Designs, information, reports and other materials and/or data may be performed and /or provided for the project by other than the Architect. Such designs, information, reports and other materials and/or data may include, without limitations, designs, information, reports and other materials and/or data performed and/or provided by the Contractor(s) or by sub-contractors and/or other consultants retained by the Contractor(s) and/or the Owner. Such designs, information, reports and other materials and/or data may include without limitation the locations, quantities, sizes, conditions and scope of specific items of the construction Work required to be provided for the Project. The Contractor shall immediately notify the Construction Manager and Architect in writing upon its discovery or knowledge or any errors, omissions or defects in any designs, information, reports and other materials and/or data prepared or provided by the Contractor or on the Contractor's behalf which are provided to the Architect for the

Architect's preparation of its design documentation for the Project. The Contractor shall also be required to immediately notify the Architect in writing in the event that it discovers or becomes aware of any errors, omissions or defects in any designs, information, reports or other materials or data that are provided to the Architect by others for the preparation of the Architect's design documentation. The Contractor shall also be required to immediately notify the Construction Manager and Architect in writing if it discovers or becomes aware of any discrepancies between any design documentation prepared by the Architect and any designs, information, reports or other materials and/or data provided to the Architect by the Contractor(s), the Owner, subcontractors or sub-consultants retained by the Contractor(s) or Owner, or by others. In such event, the Contractor shall promptly submit a written request for resolution of such discrepancy to the Architect and Owner.

**§ 1.1.6 The Specifications.** The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

**§ 1.1.7 Instruments of Service.** Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

**§ 1.1.8 Initial Decision Maker.** The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

## **§ 1.2 Correlation and Intent of the Contract Documents**

**§ 1.2.1** The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

**§ 1.2.2** Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

**§ 1.2.3** Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

## **§ 1.3 Capitalization**

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

## **§ 1.4 Interpretation**

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

## **§ 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service**

**§ 1.5.1** The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect, or Architect's consultants' reserved rights.

**§ 1.5.2** The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the

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Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.5.3 The Contractor will be furnished free of charge two (2) sets of signed and sealed drawings and specifications. If more documents are required by the Contractors, the additional documents may be obtained at the Architect's cost.

#### § 1.6 Transmission of Data in Digital Form

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

### ARTICLE 2 OWNER

#### § 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Article 4, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

#### § 2.2 Information and Services Required of the Owner

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.4.1 The Contractor shall be responsible for all measurements that may be required for execution of the work to the exact position and elevation as prescribed in the specifications, shown on the drawings or as the same may be modified at the direction of the Architect to meet changed conditions or as a result of modification of the Contract.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

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§ 2.2.6 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents.

### § 2.3 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

### § 2.4 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect, after consultation with the Construction Manager. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

## ARTICLE 3 CONTRACTOR

### § 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The plural term "Multiple Prime Contractors" refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

§ 3.1.3 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

### § 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made

in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

**§ 3.2.3** The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

**§ 3.2.4** If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

### **§ 3.3 Supervision and Construction Procedures**

**§ 3.3.1** The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instruction concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner, the Construction Manager, and the Architect and shall not proceed with that portion of the Work without further written instructions from the Architect, through the Construction Manager. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

**§ 3.3.3.1** Contractor shall afford other Contractors retained by the Owner and all sub-contractors opportunity for introduction and storage of their materials and execution of their work, connect and coordinate his work with theirs and cooperate with the Architect and with other Contractors so that work shall be done at proper time, in a manner not to delay others or increase costs.

**§ 3.3.1.2** During the progress of the work, Contractor and subcontractors shall build in all material and apparatus furnished and set by other Contractors and subcontractors. Contractors and Subcontractors shall familiarize themselves with the work of every Contractor and subcontractor whose work affects or ties in with his own and shall be responsible for the finishes results.

**§ 3.3.2** The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

**§ 3.3.3** The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

**§ 3.3.4** The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. The Owner shall notify Contractor or any on-site issues and may request removal of personnel in the event of conduct which is not deemed in good order.

### **§ 3.4 Labor and Materials**

**§ 3.4.1** Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

**§ 3.4.2** Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

**§ 3.4.3** The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

### **§ 3.5 Warranty**

The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform with the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

### **§ 3.6 Taxes**

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

**§ 3.6.1** All Contractors, subcontractors, suppliers, etc. are required to pay all applicable taxes as required by law, outside of those taxes for which the Owner is exempt.

### **§ 3.7 Permits, Fees, Notices, and Compliance with Laws**

**§ 3.7.1** Unless otherwise provided in the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

**§ 3.7.2** The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. The Contractor shall arrange for any inspections by governmental authorities needed to obtain any necessary occupancy permits.

**§ 3.7.3** If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

**§ 3.7.4 Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the

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Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor in writing, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

### § 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

### § 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner and Architect through the Construction Manager, the name and qualifications of a proposed superintendent. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager, or the Architect has reasonable objection to the proposed superintendent or (2) that any of them require additional time to review. Failure of the Construction Manager to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.9.6 The Contractor's superintendent shall be present at the job site at all times that work is being performed, including work performed during overtime.

§ 3.9.8 The Contractor shall immediately remove from the Project, whenever requested by the Owner or Construction Manager, any employee, Project Manager or Superintendent who is considered by the Owner or Construction Manager to be incompetent or disposed to be disorderly, or who, for any reason, is not satisfactory to the Owner and



the Project, and that person shall not again be employed on the Project without the consent of the Owner or Construction Manager.

**§ 3.9.9** The Owner reserves the right to require the Contractor to replace any employee, project manager and/or Superintendent at no additional cost.

### **§ 3.10 Contractor's Construction Schedules**

**§ 3.10.1** The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information and the Construction Manager's approval a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project schedule to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Multiple Prime Contractors or the construction or operations of the Owner's own forces.

**§ 3.10.2** The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter update it as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

**§ 3.10.3** The Contractor shall participate with other Contractors, the Construction Manager and Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

**§ 3.10.4** The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager and Architect and incorporated into the approved Project schedule.

### **§ 3.11 Documents and Samples at the Site**

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These documents shall be available to the Architect and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

### **§ 3.12 Shop Drawings, Product Data and Samples**

**§ 3.12.1** Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

**§ 3.12.2** Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

**§ 3.12.3** Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

**§ 3.12.4** Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.9 through 4.2.11. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Construction Manager Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the Project submittal schedule approved by the Construction Manager and Architect, or in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Multiple Prime Contractors or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples and similar submittals with related documents submitted by other Multiple Prime Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed and approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Construction Manager and Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

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**§ 3.13 Use of Site**

**§ 3.13.1** The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

**§ 3.13.2** The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

**§ 3.13.5** The Contractor shall be responsible for obtaining proper parking permits (if required) for all vehicles which will be parked on or off site. All costs for parking permits and for fines due to improperly parked vehicles are the responsibility of the Contractor. Contractor is to assume there is no parking available on site.

**§ 3.13.6** The Owner reserves the right to grant or to deny permission for the erection of signs or advertisements of any kind, including Project Sign, on the building, site enclosure or premises. The Contractor shall not display or permit to be displayed any sign, trademark, poster or other advertising devices on or about the building, site enclosure or premises, except as may be required for proper conduct of the work, as a directory of Contractors engaged in the work, for emergency, or as may be specified.

**§ 3.13.7** All Contractors shall confirm their use of the premises for all purposes, to the areas occupied by the construction and related storage areas.

**§ 3.13.8** The Contractor shall send proper notices, make all necessary arrangements and perform all other services required in order to protect and maintain all marked, identified or known public utilities such as fire lines and plugs, electric, gas, water lines, sewer pipes, mechanical systems and all other items of this nature, and assume all responsibility and pay all costs for which the Owner may be liable if said services are interrupted by actions of the Contractor or subcontractors. Contractor acknowledges that all public utilities or other infrastructure may not be identified or marked, and Contractor acknowledges that all public utilities or other infrastructure may not be identified or marked and that Contractor has taken all reasonable precautions to identify all known and unknown utilities or other infrastructure.

**§ 3.14 Cutting and Patching**

**§ 3.14.1** The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

**§ 3.14.2** The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner's own forces or of other Multiple Prime Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner's own forces or by other Multiple Prime Contractors except with written consent of the Construction Manager, Owner and such other Multiple Prime Contractors; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the other Multiple Prime Contractors or the Owner the Contractor's consent to cutting or otherwise altering the Work.

**§ 3.14.3 All work that may be cut, damaged, disturbed or otherwise interfered with during the progress of the work of the various trades shall be fully, properly and carefully patched, repaired and made good in a first class manner satisfactory to the Architect by the Contractor whose work has been cut or damaged and requires repair.**

**§ 3.15 Cleaning Up**

**§ 3.15.1** The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

**§ 3.15.2** If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

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### **§ 3.16 Access to Work**

The Contractor shall provide the Owner, Construction Manager and Architect access to the Work in preparation and progress wherever located.

### **§ 3.17 Royalties, Patents and Copyrights**

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner, Architect, or Construction Manager. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect through the Construction Manager.

### **§ 3.18 Indemnification**

**§ 3.18.1** To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

**§ 3.18.2** In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

**§ 3.18.3** The Contractor's indemnity obligations under this Section 3.18 shall also specifically include, without limitation, all fines, penalties, damages, liability, costs, expenses (including, without limitation, reasonable attorneys' fees) and punitive damages (if any) arising out of, or in connection with, and (i) violation of or failure to comply with any law, statute, ordinance, rules, regulations, code or requirement of a public authority that bears upon the performance of the Work by the Contractor, a subcontractor or any person or entity for whom either is responsible, (ii) means, methods procedures, techniques or sequences of execution or performance of the Work, and (iii) failure to secure and pay for permits, fees, approvals, licenses and inspections as required under the Contract Documents, or any violation of any permit or other approval of a public authority applicable to the Work by the Contractor, a subcontractor or any person or entity for whom either is responsible.

**§ 3.18.4** The obligations of the Contractor under this Section 3.18 shall not extend to the liability of the Construction Manager, Architect, their consultants and agents and employees of any of them arising out of (i) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications, or (ii) the giving of or the failure to give directions or instruction by the Construction Manager, Architect, their consultants and agents and employees of any of them, provided such giving or failure to give is the primary cause of the injury or damage.

## **ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER**

### **§ 4.1 General**

**§ 4.1.1** The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

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§ 4.1.2 The Owner shall retain a construction manager lawfully licensed to practice construction management or an entity lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.3 Duties, responsibilities and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Construction Manager, Architect and Contractor. Consent shall not be unreasonably withheld.

§ 4.1.4 If the employment of the Construction Manager or Architect is terminated, the Owner shall employ a successor construction manager or architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

#### § 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner and Construction Manager (1) known deviations from the Contract Documents and from the most recent Project schedule prepared by the Construction Manager, and (2) defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide a staffing plan to include one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner reasonably informed of the progress of the Work, and will report to the Owner and Architect (1) known deviations from the Contract Documents and the most recent Project schedule, and (2) defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, or charge of, construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 **Communications Facilitating Contract Administration.** Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner's own forces shall be through the Owner.

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§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents and will notify each other about the rejection. The Construction Manager shall determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data and Samples. Where there are Multiple Prime Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from Contractor and other Multiple Prime Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.11 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Construction Manager and Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.12 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.13 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7 and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar

required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.15 The Construction Manager will assist the Architect in conducting inspections to determine the dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.16 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.17 The Architect will interpret and decide matters concerning performance under, and requirements of the Contract Documents on written request of the Construction Manager, Owner or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.18 Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

§ 4.2.19 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.20 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing to the Construction Manager to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

## ARTICLE 5 SUBCONTRACTORS

### § 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Multiple Prime Contractors or subcontractors of other Multiple Prime Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

### § 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect has reasonable objection to any such proposed person or entity or, (2) that the

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Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

**§ 5.2.2** The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

**§ 5.2.3** If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

**§ 5.2.4** The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

### **§ 5.3 Subcontractual Relations**

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

### **§ 5.4 Contingent Assignment of Subcontracts**

**§ 5.4.1** Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

**§ 5.4.2** Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

**§ 5.4.3** Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.



## ARTICLE 6 CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS

### § 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces including persons or entities under separate contracts not administered by the Construction Manager, the Owner shall provide for coordination of such forces with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11 and 12.

### § 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Construction Manager and other Multiple Prime Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces or other Multiple Prime Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Construction Manager and Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's own forces or other Multiple Prime Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a separate contractor or to other Multiple Prime Contractors because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces or other Multiple Prime Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors, or other Multiple Prime Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and other Multiple Prime Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

### § 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, other Multiple Prime Contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

## ARTICLE 7 CHANGES IN THE WORK

### § 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

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§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

#### § 7.2 Change Orders

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect and Contractor, stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

#### § 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager and Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

#### § 7.4 Minor Changes in the Work

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order issued through the Construction Manager and shall be binding on the Owner and Contractor.

### ARTICLE 8 TIME

#### § 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

#### § 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

### **§ 8.3 Delays and Extensions of Time**

**§ 8.3.1** If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner, Owner's own forces, Construction Manager, Architect, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration, or by other causes that the Architect, based on the recommendation of the Construction Manager, determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

**§ 8.3.2** Claims relating to time shall be made in accordance with applicable provisions of Article 15.

**§ 8.3.3** This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

## **ARTICLE 9 PAYMENTS AND COMPLETION**

### **§ 9.1 Contract Sum**

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

### **§ 9.2 Schedule of Values**

Where the Contract is based on a Stipulated Sum or Guaranteed Maximum Price, the Contractor shall submit to the Construction Manager, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. In the event there is one Contractor, the Construction Manager shall forward to the Architect the Contractor's schedule of values. If there are Multiple Prime Contractors responsible for performing different portions of the Project, the Construction Manager shall forward the Multiple Prime Contractors' schedules of values only if requested by the Architect.

### **§ 9.3 Applications for Payment**

**§ 9.3.1** At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner, Construction Manager or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

**§ 9.3.1.1** As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

**§ 9.3.1.2** Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier unless such Work has been performed by others whom the Contractor intends to pay.

**§ 9.3.2** Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

**§ 9.3.3** The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for

Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

#### **§ 9.4 Certificates for Payment**

**§ 9.4.1** Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

**§ 9.4.2** Where there are Multiple Prime Contractors performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives the Multiple Prime Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Multiple Prime Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Multiple Prime Contractors' application with information from similar applications for progress payments from other Multiple Prime Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Multiple Prime Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

**§ 9.4.3** Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

**§ 9.4.4** The Construction Manager's certification of an Application for Payment or, in the case of Multiple Prime Contractors, a Project Application and Certificate for Payment shall be based upon the Construction Manager's evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

**§ 9.4.5** The Architect's issuance of a Certificate for Payment or in the case of Multiple Prime Contractors, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

**§ 9.4.6** The representations made pursuant to Sections 9.4.4 and 9.4.5 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Construction Manager or Architect.

**§ 9.4.7** The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques,

sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

#### **§ 9.5 Decisions to Withhold Certification**

**§ 9.5.1** The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.3. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

**§ 9.5.2** When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

**§ 9.5.3** If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

#### **§ 9.6 Progress Payments**

**§ 9.6.1** After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

**§ 9.6.2** The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

**§ 9.6.3** The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

**§ 9.6.4** The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor

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Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

**§ 9.6.5** Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

**§ 9.6.6** A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

**§ 9.6.7** Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

#### **§ 9.7 Failure of Payment**

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

#### **§ 9.8 Substantial Completion**

**§ 9.8.1** Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

**§ 9.8.2** When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

**§ 9.8.3** Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the requirements of the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

**§ 9.8.4** When the Architect, assisted by the Construction Manager, determines that the Work or designated portion thereof is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.



**§ 9.8.5** The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

**§ 9.9 Partial Occupancy or Use**

**§ 9.9.1** The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

**§ 9.9.2** Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

**§ 9.9.3** Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

**§ 9.10 Final Completion and Final Payment**

**§ 9.10.1** Upon completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Construction Manager's recommendations, to the Architect who will promptly make such inspection. When the Architect, finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

**§ 9.10.2** Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

**§ 9.10.3** If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and



Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

**§ 9.10.4** The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

**§ 9.10.5** Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

## **ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY**

### **§ 10.1 Safety Precautions and Programs**

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

### **§ 10.2 Safety of Persons and Property**

**§ 10.2.1** The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors;
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and
- .4 construction or operations by the Owner or other Contractors.

**§ 10.2.2** The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

**§ 10.2.3** The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

**§ 10.2.4** When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

**§ 10.2.5** The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of

the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

**§ 10.2.6** The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

**§ 10.2.7** The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

**§ 10.2.8 Injury or Damage to Person or Property**

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

**§ 10.3 Hazardous Materials**

**§ 10.3.1** The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to, asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner, Construction Manager and Architect in writing.

**§ 10.3.2** Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

**§ 10.3.3** To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

**§ 10.3.4** The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

**§ 10.3.5** The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to

perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

#### § 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

### ARTICLE 11 INSURANCE AND BONDS

#### § 11.1 Contractor's Liability Insurance

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Architect prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness. The Contractor shall provide written notification to the Owner of the cancellation or expiration of any insurance required by Section 11.1. The Contractor shall provide such written notice within five (5) business days of the date the Contractor is first aware of the cancellation or expiration, or is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Construction Manager, the Construction Manager's consultants, the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or

omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

### § 11.2 Owner's Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

### § 11.3 Property Insurance

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for the Architect's, Contractor's, and Construction Manager's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 **Boiler and Machinery Insurance.** The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 **Loss of Use Insurance.** The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

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§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. The Owner shall provide written notification to the Contractor of the cancellation or expiration of any insurance required by Sections 11.2 and 11.3. The Owner shall provide such written notice within five (5) business days of the date the Owner is first aware of the cancellation or expiration, or is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.

§ 11.3.7 **Waivers of Subrogation.** The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees each of the other, and (2) the Construction Manager, Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or distribution of insurance proceeds in accordance with the direction of the arbitrators.

**§ 11.4 Performance Bond and Payment Bond**

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

**ARTICLE 12 UNCOVERING AND CORRECTION OF WORK**

**§ 12.1 Uncovering of Work**

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's or authority having jurisdiction's request to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their observation, inspection, testing or approval and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered which the Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

**§ 12.2 Correction of Work**

**§ 12.2.1 Before or After Substantial Completion**

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

**§ 12.2.2 After Substantial Completion**

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors or other Multiple Prime Contractors caused by the

Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.2.6 **If, in the opinion of the Architect and the Construction Manager, the Contractor delays Final Completion of the Work beyond a reasonable time after the Date of Substantial Completion of the Project to such extent that the period between the Date of Substantial Completion of the Project and the end of the guarantee period becomes less than eleven (11) months, the start of the guarantee period shall be the date of the Final Project Certificate of Payment in lieu of the Date of Substantial Completion of the Project.**

#### § 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

### ARTICLE 13 MISCELLANEOUS PROVISIONS

#### § 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

#### § 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

#### § 13.3 Written Notice

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity or to an officer of the corporation for which it was intended; or if delivered at or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

#### § 13.4 Rights and Remedies

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Construction Manager, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

#### § 13.5 Tests and Inspections

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and

approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Construction Manager, Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.5.5 If the Construction Manager or Architect is to observe tests, inspections or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

#### § 13.6 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

#### § 13.7 Time Limits on Claims

The Owner and the Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and the Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

### ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

#### § 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in



Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

#### § 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, after consultation with the Construction Manager, and upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

**§ 14.3 Suspension by the Owner for Convenience**

**§ 14.3.1** The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

**§ 14.3.2** The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of this Contract.

**§ 14.4 Termination by the Owner for Convenience**

**§ 14.4.1** The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

**§ 14.4.2** Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

**§ 14.4.3** In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

**ARTICLE 15 CLAIMS AND DISPUTES**

**§ 15.1 Claims**

**§ 15.1.1 Definition.** A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

**§ 15.1.2 Notice of Claims.** Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Construction Manager and or Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

**§ 15.1.3 Continuing Contract Performance.** Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decisions of the Initial Decision Maker.

**§ 15.1.4 Claims for Additional Cost.** If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.3.

**§ 15.1.5 Claims for Additional Time**

**§ 15.1.5.1** If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 **Claims for Consequential Damages.** The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

### § 15.2 Initial Decision

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect and Construction Manager, if the Architect or Construction Manager is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the

demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

### § 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

### § 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

### § 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

Init.

## **SECTION 00800 - SUPPLEMENTARY GENERAL CONDITIONS**

### **PART 1 - GENERAL**

#### **1.1 FUNCTION**

- A. The following supplements modify, change, delete from or add to the "General Conditions of the Contract for Construction, Construction Manager as Adviser Edition", AIA Document A232 - 2009 and the Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, AIA Document A132 - 2009. Where any Article of the General Conditions is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these supplements, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.
- B. Refer to Sections in Division 1 "General Requirements" for additional modifications, deletions and additions to the "General Conditions of the Contract for Construction".

#### **1.2 GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISER EDITION, AIA DOCUMENT A232-2009.**

- A. Document is modified in accordance with the following paragraphs and as indicated herein after:

#### **1.3 PARAGRAPH 1.1 - BASIC DEFINITIONS**

- A. Paragraph 1.1.1 - "The Contract Documents":

Delete last sentence "Unless specifically enumerated in the Agreement, the Contract Documents do not..... bidding requirements)."

- B. Supplement Paragraph 1.1 "Basic Definitions" as follows:

1.1.9 The Project Manual. The Project Manual is a volume, or volumes, assembled for the Work that includes, or is deemed to incorporate by reference the General Conditions, Supplementary Conditions, the Bidding Requirements and Documents related thereto, the Specifications, and all addenda issued prior to the execution of the Contract."

1.1.10 Final Completion. The date the Contract has been fully performed, all the Work has been completed and a final certificate for Payment approved by the Owner has been issued by the Architect.

1.1.11 Or Approved Equal and Equal To. Shall mean products by manufacturers other than those specified in the Contract Documents in which the Contractor may submit for those specified in the Contract Documents and which may be incorporated in the Work after review and acceptance by the Architect and acceptance by the Owner.

#### **1.4 PARAGRAPH 1.2 - CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS**

- A. Delete Paragraph 1.2.1 in its entirety and substitute with the following:

1.2.1 The Contract Documents include all items necessary for the proper execution and completion of the Work by each Contractor. The Work shall consist of all items specifically included in the Contract Documents as well as all additional items of work which are reasonably inferable from that which is specified in order to complete the Work in accordance with the Contract Documents. The Contract Documents are complementary, and what is required by any one Contract Document shall be as binding as if required by all. Any differences between the requirements of the Drawings and the Specifications or any differences noted within the Drawings themselves or within the Specifications themselves have been referred to the Owner, Architect and Construction Manager by Contractor(s) prior to the submission of bids and have been clarified by an Addendum issued to all bidders.

If any such differences or conflicts were not called to the Owner's and the Architect's attention prior to submission of bids, the Architect shall decide which of the conflicting requirements will govern based upon the most stringent of the requirements, and, subject to the approval of the Owner, the Contractor(s) shall perform the Work at no additional cost and/or time to the Owner in accordance with the Architect's decision. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results.

#### **1.5 PRECEDENCE OF LARGE SCALE DETAILS**

- A. Supplement Paragraph 1.2 "Correlation and Intent of the Contract Documents" as follows:

1.2.4 The general character of the detail work is shown on the drawings but minor modifications may be made in large scale details. Where the word "similar" occurs on the drawings it shall be used in its general sense and not as meaning identical, and all details shall be worked out in relation to their location and their connection to other parts of the work. Where on any drawings a portion of the work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to other like portions of the work. Where detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts in the work unless otherwise indicated. In case of differences between small and large scale drawings, the larger scale drawings shall take precedence. Dimensions given shall take precedence over scale measurements. Any discrepancies shall be referred to the Architect for adjustment before any work affected thereby has been performed.

1.2.5 During the course of the work, should any ambiguities or discrepancies be found in the Specifications or on the Drawings; or should there be found any discrepancies between the Drawings and Specifications to which the Contractor(s)

have failed to call attention before submitting his/her bid, then the Architect will interpret the intent of the Drawings and Specifications; and the Contractor(s) hereby agrees to abide by the Architect's interpretation and to carry out the work in accordance with the decision of the Architect. It is expressly stipulated that neither the Drawings nor the Specifications shall take precedence over the other, and it is further stipulated that the Architect may interpret or construe the Drawings and Specifications so as to secure in all cases the result most consistent with the needs and requirements of the work.

#### **1.6 PARAGRAPH 1.5 - OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE**

A. Supplement Paragraph 1.5.2, as follows:

- .1 Execution of the Contract(s) by the Contractor(s) is a representation that said Contract Documents are full and complete, are sufficient to have enabled the Contractor(s) to determine the cost of the Work therein to enter into the Contract and that the Contract Documents are sufficient to enable it to construct the Work outlined therein, and otherwise to fulfill all its obligations hereunder, including, but not limited to, Contractor's obligation to construct the Work for an amount not in excess of the Contract Sum on or before the date(s) of Substantial Completion established in the Agreement. Each Contractor further acknowledges and declares that they have visited and examined the site, examined all physical, legal, and other conditions affecting the Work and is fully familiar with all of the conditions thereon and thereunder affecting the same. In connection therewith, Contractor(s) specifically represents and warrants to Owner that they have, by careful examination, satisfied itself as to: (1) the nature, location and character of the Project and the site, including, without limitation, the surface and subsurface conditions of the site and all structures and obstructions thereon and thereunder, both natural and man-made, and all surface and subsurface water conditions of the site and the surrounding area; (2) the nature, location, and character of the general area in which the Project is located, including without limitation, its climatic conditions, available labor supply and labor costs, and available equipment supply and equipment costs; and (3) the quality and quantity of all materials, supplies, tools, equipment, labor, and professional services necessary to complete the Work in the manner and within the cost and time frame required by the Contract Documents. In connection with the foregoing, and having carefully examined all Contract Documents, as aforesaid, and having visited the site, the Contractor(s) acknowledge and declare that they have no knowledge of any discrepancies, omissions, ambiguities, or conflicts in said Contract Documents and that if they becomes aware of any such discrepancies, omissions, ambiguities, or conflicts, they will promptly notify Owner and Architect of such fact.

#### **1.7 PARAGRAPH 2.1 - GENERAL**

A. Delete Paragraph 2.1 in its entirety.



**1.8 PARAGRAPH 2.2 - INFORMATION AND SERVICES REQUIRED OF THE OWNER**

- A. Delete Paragraphs 2.2.1 through 2.2.4 in their entirety.
- B. Delete Paragraph 2.2.5 in its entirety and substitute with the following:

2.2.5 The Architect will furnish the Contractors, without charge, the following number of sets of drawings and specifications. Additional copies will be furnished at the Architect's reproduction costs.

<b>General Construction Work</b>	<b>3 Sets</b>
<b>Structural &amp; Miscellaneous Steel</b>	<b>3 Sets</b>
<b>Plumbing, Drainage &amp; Sprinkler System Work</b>	<b>3 Sets</b>
<b>Heating, Ventilating &amp; Air Conditioning Work</b>	<b>3 Sets</b>
<b>Electrical Work</b>	<b>3 Sets</b>
<b>Single Overall Contract</b>	<b>6 Sets</b>

**1.9 PARAGRAPH 2.3 - OWNER'S RIGHT TO STOP THE WORK**

- A. Edit paragraph 2.3 as follows:

Line 1; after "Documents" add:

"or fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to be able to complete the Work within the Contract Time or fails to remove and discharge (within ten days) any lien filed upon Owner's property by anyone claiming by, through, or under Contractor(s), or disregard the instructions of Architect, Construction Manager or Owner when based on the requirements of the Contract Documents,".

**1.10 PARAGRAPH 2.4 - OWNER'S RIGHT TO CARRY OUT THE WORK**

- A. Edit paragraph 2.4 as follows:

In the second line, change "within a ten-day period", to read "within a seven-day period".

- B. Delete the last line and substitute with the following:

"each Contractor, and/or his/her surety shall pay the difference to the Owner."

**1.11 PARAGRAPH 3.1 - GENERAL**

- A. Supplement Paragraph 3.1, as follows:

3.1.5 Contractor(s) shall maintain all documentation related to products, transactions or services under this contract for a period of five years from the date of final payment. Such records shall be made available to the New Jersey Office of the State Comptroller upon request.

## 1.12 PARAGRAPH 3.2 - REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

- A. Delete the second sentence in paragraph 3.2.2 in its entirety and substitute with the following:

“If any errors, inconsistencies or omissions appear in the drawings, specifications or other Contract Documents, which should reasonably have been discovered and concerning which interpretation had not been obtained from the Architect during the Bidding Period, the Contractor(s) shall within ten days after receiving written ‘Notice of Award’ notify the Architect in writing of such error, inconsistency or omission. In the event the Contractor(s) fails to give such notice, he/she will be held responsible for the results of any such errors, inconsistencies or omissions and the cost of rectifying same. Interpretation of this procedure after the ten-day period will be made by the Architect and his/her decision will be final”.

## 1.13 LAYOUT OF WORK

- A. Supplement Paragraph 3.3 "Supervision and Construction Procedures" as follows:

3.3.4 Each Contractor shall lay out his/her own work and be responsible for all lines, elevations and measurements of the building, and other work executed by him/her under the Contract. He/She must exercise proper precaution to verify the figures shown on the drawings before laying out the work and will be held responsible for any errors resulting from his/her failure to exercise such precaution.

3.3.5 Each Contractor shall coordinate his/her operations with those of all his/her Subcontractor(s).

3.3.6 Each Contractor, and including each of his/her subcontractors, shall keep fully informed of the progress and the details of the work of all subcontractors, and shall notify the CM immediately of lack of progress or defective workmanship on the part of any subcontractors.

3.3.7 Failure of any Contractor to keep informed of the work progressing on or off the site, and his/her failure to give notice of lack of progress or defective workmanship by others, will be construed by Owner and by the CM as acceptance by the Contractor of the status of the work as being satisfactory for proper coordination with the Contractor's own work and with the work of all his/her Subcontractor(s).

## 1.14 WARRANTY

- A. Supplement Paragraph 3.5 "Warranty", as follows:

3.5.1 The warranty period for all work of the HVAC Contractor shall be **two (2) years** from the date of substantial completion and acceptance by the Owner unless otherwise specified for HVACR related work.

3.5.2 The warranty period for all work of each Contractor(s) shall be **one (1) year** from the date of substantial completion and acceptance by the Owner unless otherwise specified for all other work.

#### **1.15 PARAGRAPH 3.7 - PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS**

- A. 3.7.3 In line 3, delete "the costs attributable to correction" and replace with "all costs attributable to the correction thereof or related thereto, including all fines and penalties."

#### **1.16 PARAGRAPH 3.9 - SUPERINTENDENT**

- A. Supplement Paragraph 3.9 "Superintendent", as follows:

3.9.4 Qualifications of superintendent proposed to be used shall be submitted to the Construction Manager and Owner's approval obtained before proceeding with work.

3.9.5 The superintendent shall be assigned to the project on a full-time basis from the inception of construction until the completion of all corrective and punch list work.

#### **1.17 PROGRESS SCHEDULE**

- A. Supplement Paragraph 3.10 "Contractor's Construction Schedule", as follows:

3.10.1.1 Within fifteen (15) days after the date of the notice to proceed each Contractor shall submit to the Architect, on forms supplied by the Architect, a bar-graph Progress Schedule upon which shall be indicated the dates for starting and the dates for completion of all contracts and all divisions of the work in a manner which will coincide with Time For Completion and other project milestone dates.

Schedule "CPM" Requirements:

- .1 General Construction Work Contractor shall include in his/her price the cost of the outsourcing CPM scheduling for entire project and all Prime Contractors. Utilize "Primavera-Project Planner - version 3.0 Software by Primavera Systems Inc."
- .2 CPM consultant to be approved by Architect and the Construction Manager. Initial GC Schedule to be provided to all Prime Contractors within 15 days of Notice to Proceed.
- .3 Monthly updates will be required during construction with each payment application.
- .4 Interim Progress Updates will be required for each Job Progress Meeting.
- .5 Comply with all recommendations and instructions of the Construction Manager for preparation of Project Schedule and associated periodic reports.

3.10.1.2 This schedule will be distributed to the Prime GC Contractor and to the Contractors for Structural Steel, Plumbing, Heating, Ventilating and Air Conditioning

and Electrical Work. When approved by the Contractors and agreed upon by the Architect, this schedule will become one of the Contract Documents, and shall be altered thereafter only in accordance with duly authorized change orders for extensions of time in accordance with Paragraph 8.3, "Delays and Extensions of Time".

## **1.18 SUBMITTALS**

A. Supplement Paragraph 3.12 "Shop Drawings, Product Data and Samples", as follows:

3.12.11 All fabricated work shall require shop drawings.

3.12.12 The Architect may request samples of any or all materials to be used in the work. When requested, samples shall be submitted promptly.

3.12.13 Shop drawings and other data where possible shall be submitted in the form of reproducible transparency. Catalogs and other printed matter shall be submitted in six (6) copies.

- .1 Additional prints for file, distribution and for coordination of the work with other Contractors shall be provided as directed or as required.

3.12.14 Submittal Procedures: The Contractor(s) failure to follow proper procedures for submittals constitutes grounds for withholding of payments until such time as the Contractor(s) are in compliance. Proper submittal procedures include all of those set forth elsewhere in this specification including the following:

- .1 All submittals shall be separate for each Project. Contractors must indicate on each transmittal the reference to the Architect's Project Number.
- .2 Failure to adhere to deadlines for completion of submittals and record/resubmittals.
- .3 Failure to provide submittals in good order as required by the Contract Documents.
- .4 Failure to provide submittals in relationship to the progress of the work.
- .5 Performance of work or part of the work, without complete approved submittals.

3.12.15 Architect / Engineer's actions for submittals shall be as follows:

- .1 Submittals returned to the Contractor marked "Approved" allow the Contractor(s) to proceed with the work.
- .2 Submittals returned to the Contractors "Approved As Noted"; "Resubmit For Record":
  - .1 The Contractor(s) may proceed with work, however noted items by the Architect / Engineer (or any affected portion of the submittal), must be corrected and resubmitted to the Architect's office within ten (10) working days of contractor's receipt of the original submittal. Final acceptance of all work is subject to the Contractor's compliance with requirements of the Contract Documents.

- .3 Submittals returned marked "Returned for Corrections" require the Contractor(s) to resubmit corrected or alternate data in accordance with the corrections indicated.
  - .1 The originals of the reproducible transparencies marked "Returned for Corrections" shall be corrected until approval is obtained. The Contractor(s) shall provide such number of prints of transparencies marked "Approved" as required for the expeditious execution of the work.
- .4 Submittals returned marked "No Action Taken":
  - .1 Each Contractor may not proceed with the work. The Architect / Engineer will not review submittals so marked until the Contractor(s) have properly completed the submittal or corrected the reasons stated thereon.
  - .2 Reasons for "No Action Taken" on a submittal include, but are not limited to the Contractor's failure to:
    - .1 Submit an approved sub-contractor or supplier.
    - .2 Indicate job specific product data such as catalog number, size, type or material on each submittal.
    - .3 Submit complete data, test reports or similar information as required by the Contract Documents.
    - .4 Obtain prior approval for substitution.
    - .5 Submit documents in a legible or orderly fashion.
    - .6 Adhere to any submittal requirements set forth in the Contract Document.
    - .7 Submit only submittals which are called for in the Contract Documents, other submittals will not be reviewed by the Architect / Engineer.

3.12.16 The following submittal schedule will be mandatory; time is from date of the notice to proceed, in consecutive calendar days and also in accordance with requirements of Specification Section 01800.

All Contracts and Trades: 30 days

3.12.17 Request for Substitutions:

- .1 Substitutions may be considered Only within thirty (30) calendar days after the award of contracts. Subsequent requests will be considered Only when, through no fault of the contractor, none of the specified products are available.
- .2 Submission of request for substitution shall constitute a representation by the Contractor(s) that he/she:
  - .1 Has investigated the proposed product and determined that it is equal to or better than the specified product.
  - .2 Will provide the same variety for the proposed product as for the specified product.
  - .3 Will coordinate the installation and make other changes which may be required for the work to be complete in all respects, including:
    - .1 Re-design.

- .2 Additional components and capacity required by other work affected by the change.
- .3 Waives all claims for additional costs and time extensions which subsequently may become apparent and which are caused by the change.
- .4 Will reimburse the Owner for additional costs for evaluation of the substitution request, re-design if required, and re-approval by authorities having jurisdiction if required.
- .3 Substitutions will not be considered when acceptance would require substantial revision of the contract documents.
- .4 Substitutions will not be considered when they are indicated or implied on shop drawings or product data submittals without separate written request.
- .5 Substitution requests will not be considered when submitted directly by Subcontractor or supplier.
- .6 When the proposed substitution is not accepted, Contractor(s) must provide the product (or one of the products, as the case may be) specified.
- .7 Each Contractor will be notified in writing within a reasonable time, verbal acceptance will not be valid.
- .8 Acceptable substitutions will be added to the contract documents by appropriate modifications.
- .9 Requests for substitution will be reviewed by the Architect upon receipt of all the information requested in the following paragraph. Failure to provide the required information shall be cause for rejection of substitution request.
- .10 Submittal for Substitutions:
  - .1 Submit 3 copies of requests for substitutions, fully identified for product, material or method being replaced by substitution, including related specification section and drawing number(s), and fully documented to show compliance with requirements for substitutions. Submit the following:
    - .1 Complete product data, drawings, and descriptions of materials and methods where applicable. Provide manufacturer's name and address, trade name, and model number of product (if applicable), and name of fabricator or supplier (if applicable).
    - .2 Samples where applicable or requested.
    - .3 Detailed comparison of significant qualities (size, weight, durability, performance and similar characteristics, and including visual effect where applicable) for proposed substitution in comparison with original requirements.
    - .4 List, with addresses, of 3 projects where proposed substitution has been used previously and successfully in a similar application.
    - .5 Coordination information, indicating every required change in every other element of the work which is affected by substitution, extended to include work by Owner and separate contractors.
    - .6 A complete statement of effect substitution will have upon schedule of the work, including its effect (if any) on Contract

Time (in comparison with compliance with requirements without approval of proposed substitution).

- .7 Cost information, including a proposal of net change in Contract Sum (if any).
- .8 Certification by each Contractor to the effect that, in his/her opinion and after his/her thorough evaluation, proposed substitution will result in total work which is equal to or better than the work originally required by contract documents, in every respect of significance except as specifically stated in certification; and that it will perform adequately in application indicated, regardless of equality and exceptions thereto.
- .9 Include in certification, Contractor's waiver of rights to additional payment and time which may subsequently be necessitated, by failure of substitution to perform adequately and for required work to make corrections thereof.

#### 3.12.18 Approval of Substitutions:

- .1 Requests for substitutions will be reviewed for compliance with the specifications based upon the data provided by the Contractor(s). Approval or rejection will be based on samples, technical data and other items submitted and will be reviewed once and only once for each such request.
- .2 Change Order Form: Submit requests for substitutions which propose a change in either the Contract Sum or Contract Time by procedures required for change order proposals.

### **1.19 LONG LEAD ITEMS**

- A. Supplement Paragraph 3.12 "Shop Drawings, Product Data and Samples", as follows:

3.12.19 In addition to and concurrent with the submission of the "Schedule of Values" as provided under Paragraph 9.2, Contractor(s) shall submit a list of all materials, equipment or components which are anticipated to require more than four weeks delivery, together with scheduled ordering and delivery time table. This will be discussed and reviewed regularly at the job site meetings. Upon request by the Architect, the Contractors shall be prepared to produce evidence of having placed orders for specific materials, equipment and components.

### **1.20 PARAGRAPH 3.13 - USE OF SITE**

- A. Supplement Paragraph 3.13 "Use of Site", as follows:

3.13.3 Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor(s). After equipment is no longer required for the Work, it shall be promptly removed from the project site. Protection of construction materials and equipment stored at the project site from weather, theft, damage and all other adversity is solely the responsibility of the Contractor(s).

3.13.4 The Contractor(s) and any entity for whom the Contractor(s) is responsible shall not erect any sign on the project site without the prior written consent of the Owner.

## **1.21 CLEANING UP**

- A. 3.15.1 Line 4, insert "promptly" before "remove." Last line, add "In addition, the Contractor shall comply with 3.15.4."
- B. 3.15.2 Last line, add "and withheld from any remaining payments."
- C. Supplement Paragraph 3.15 "Cleaning Up", as follows:

3.15.3 Each Contractor shall perform all daily clean up all refuse, rubbish, scrap, cartons, materials and debris caused by construction operations including that of his/her Subcontractors to the end that the site of the Work shall at all times present a neat, orderly and workmanlike appearance. This includes, without exception, the debris created by the work of all trades engaged under the Contract. The Prime General Contractor shall remove the debris from the site and premises and dispose of it by legal means at its own expense for collecting, loading, hauling and dumping. The Prime General Contractor shall maintain an adequate supply of laborers and dumpsters to accomplish daily clean up and removal of debris from the site. The building must be maintained free of litter and debris. No accumulation of flammable material is permitted.

3.15.4 The Prime Contractors shall also perform or have performed the following immediately prior to the Architect's inspection for Substantial Completion:

- .1 Removal of all manufacturer's temporary labels from materials, equipment and fixtures.
- .2 Removal of all stains from glass and mirrors; wash, polish, inside and outside.
- .3 Removal of marks, stains, fingerprints, other soil, dust, dirt, from painted, decorated or stained woodwork, plaster or plasterboard, metal, acoustic tile, and equipment surfaces.
- .4 Removal of spots, plant, soil from resilient flooring.
- .5 Removal of temporary floor protections, clean, wax or otherwise treat as directed, polish all finished floors. Final vacuum all carpet.
- .6 Clean all interior finished surfaces, including doors and window frames and hardware required to have a polished finish, of oil, stains, dust, dirt, paint and the like; leave without fingerprints, blemishes.
- .7 Final site clean-up shall extend beyond the Contract Limit Lines as reasonable required to insure the complete removal of all construction debris from the entire site, including staging areas.



## **1.22 PARAGRAPH 3.16 - ACCESS TO WORK**

- A. Supplement Paragraph 3.16 "Access to Work", as follows:

3.16.1 Each Contractor shall promptly notify the Architect and Construction Manager and Owner of the presence of hazardous conditions at the site, including the start of hazardous operations or the discovery or exposure of hazardous substances.

3.16.2 General Contractor shall be responsible for snow plowing and snow removal as required to maintain parking area, access/egress to the building and site for all Contractor(s), Subcontractors, Owner, Architect and Construction Manager.

## **1.23 PARAGRAPH 3.18 - INDEMNIFICATION**

- A. Supplement Paragraph 3.18.1, "Indemnification", as follows:

- .1 Contractor(s), for itself, its successors and assigns, agrees to indemnify and save Owner, the individual members (past, present and future), its successors, assigns, employees, agent, architects, engineers, and the construction manager, harmless from, and against any and all claims, demands, damages, actions or causes of action together with any and all losses, costs or expenses in connection therewith or related thereto, including, but not limited to, attorney fees and costs of suit, for bodily injuries, death or property damage arising in or in any manner growing out of the work performed, or to be performed under this Contract. Contractor(s) and its successors and assigns agree to indemnify the Owner, its individual members (past, present and future), its successors, assigns, employees, agents, architects, engineers and/or construction manager against all fines, penalties or losses incurred for, including, but not limited to, attorney fees and costs of suit, or by reason of the violation by Contractor(s) in the performance of this Contract, or any ordinance, regulation, rule of law of any political subdivision or duly constituted public authority. Without limiting the foregoing, the Contractor(s), at the request of Owner, its individual members (past and present), its successors, assigns, employees, agents, architects, or engineers and construction manager, agrees to defend at the Contractor's expense any suit or proceeding brought against Owner, its individual members (past, present and future), its successors, assigns, employees, agents, architect, engineers and/or construction manager, due to, or arising out of the work performed by the Contractor(s).
  - .1 Contractor(s) acknowledges and agrees that obligations and duties of the Construction Manager under the Construction Manager's agreement with the Owner are solely for the benefit of the Owner, that notwithstanding any action of the Construction Manager in connection with the Project.
  - .2 The Construction Manager shall not in any respect be deemed to have assumed any duties or obligations in favor of the Contractor(s), and that Construction Manager is acting as an agent to the Owner to the extent provided herein.

## **1.24 RE-DESIGN**

- A. Supplement Article 3 "Contractor", as follows:

### **3.19 RE-DESIGN**

If the Contractor(s) makes, or causes to be made, due to approval of substitute equipment or otherwise, any substantial change in the form, type, system and details of construction from those shown on the Drawings, he/she shall pay for all costs arising from such changes. The Contractor(s) shall pay all Architectural and Engineering fees required to check the adequacy of such changes. Any changes or departures from the construction and details shown shall be made only after written approval from the Architect.

## **1.25 PARAGRAPH 4.2 - ADMINISTRATION OF THE CONTRACT**

- A. Change Paragraph 4.2.1, to read as follows:

4.2.1 The Architect and NEW ROAD Construction Management will provide administration of the Contract as described in the Contract Documents, and will be the Owner's Representatives (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the warranty period for correction of Work described in Paragraph 12.2. The Architect and NEW ROAD Construction Management will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract. The Owner has hired New Road Construction Management to provide on site Project Management services. NEW ROAD will be the Owner's Representative for this Project. NEW ROAD and the Architect will share administration duties, which will be delineated at the Pre-construction meeting. NEW ROAD will essentially be the single point of contact, defer to the Contractors for means and methods and will defer to the Architect for final clarifications and determinations of disputes, design issues, and aesthetics.

- B. Supplement paragraph 4.2.1 (above) as follows:

.1 New Road Construction Management address is: 1876 Greentree Road, Cherry Hill, NJ 08003.

- C. 4.2.3 In lines 2 and 3, delete "determine in general" and replace with "endeavor to determine".
- D. 4.2.4 In the 1st line, change "Construction Manager" to "General Contractor".
- E. 4.2.9 In this paragraph, change all references "Construction Manager" to read "Architect" and change "Architect" to read "Construction Manager".
- F. 4.2.12 After "Construction Manager" add words "and the Architect".

G. Supplement Paragraph 4.2 "Administration of the Contract", as follows:

4.2.21 Reference in the technical provisions of the specifications to standard specifications and test methods, including those of the American Society for Testing and Materials, the American Iron and Steel Institute, the American National Standards Institute, the American Society of Mechanical Engineers, the American Society of Heating, Refrigeration and Air Conditioning Engineers, the Factory Mutual System, the National Fire Protection Association, Federal Specifications, and other similar nationally recognized technical societies and agencies shall refer to the editions and revisions current with the date of the Contract Documents.

"Any claim, dispute or other matter in question between the Contractor(s) and the Owner referred to the Architect through the Construction Manager, except those relating to the artistic effects as provided in subparagraph 4.6.20 and those which have been waived by the making or acceptance of final payment as provided in subparagraph 9.10, inclusive, may proceed to litigation, but not before the earlier of (1) the date on which the Architect has rendered a written decision, or (2) the tenth day after the parties have presented their evidence to the Architect or have been given a reasonable opportunity to do so, if the Architect has not rendered a written decision by that date. No such claim may proceed to arbitration."

4.2.22 The Architect's decision, after consultation with Owner and Construction Manager with respect to proposed substitutions of material or equipment specified by trade name, shall be final. The Architect reserves the right, after consultation with Owner and Construction Manager, to waive specifications and to accept a proposed substitution which in his/her opinion is superior to the material or product specified, or to limit the specification to the product specified.

4.2.23 Where three or more trade names or manufacturers' names are specified, the Contractor(s) shall furnish one of the brands specified. Where only one brand or name is specified, the Contractor(s) may submit other brands for consideration; however, it shall be the Contractor's responsibility to prove equality.

4.2.24 Approval of substitutions shall not relieve the Contractor(s) of responsibility for adequate fulfillment of all the various parts of the work, nor from specified guarantees and maintenance. Modification of adjacent or connecting work required due to any substitution approval shall be provided as part of the substitution.

4.2.25 Insofar as practicable, except as otherwise specified or shown, the material or product of one manufacturer shall be used throughout the work for each specified purpose.

4.2.26 Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in strict accordance with the manufacturer's directions. Should such directions conflict with the Specifications, the Contractor(s) shall request clarification from the Architect before proceeding.

## **1.26 SUBCONTRACTORS AND MATERIALMEN**

- A. Delete Paragraph 5.2.3 and substitute with the following:

5.2.3 The names of all subcontractors and material suppliers shall be submitted for approval not later than thirty (30) calendar days after the date of the notice to proceed. The list of proposed Subcontractors shall include a description of the materials and equipment each proposes to furnish and install in the work. The description shall be in sufficient detail to allow the Architect to determine general conformance to Contract requirements. Approval of the submittals required under this Article shall not relieve the Contractor(s) from conformance to Contract requirements.

- B. Supplement Paragraph 5.2.3, as follows:

.1 Written confirmation of award of each major subcontract shall be submitted to the Architect, in form subject to his/her approval, within seven (7) calendar days after receipt of Architect's approval of proposed subcontractor list as provided under Paragraph 5.2.3 above.

## **1.27 PARAGRAPH 5.3 - SUBCONTRACTUAL RELATIONS**

- A. 5.3 Line 1, insert "written" between "appropriate" and "agreement." Delete "written where legally required for validity."
- B. 5.3 At lines 5, 10, 12, and 14, insert "written" before the word "agreement" or "agreements"
- C. Supplement Paragraph 5.3, as follows:

5.3.1 The Contractor(s) shall obligate each Subcontractor specifically to comply with the New Jersey Plan of Affirmative Action to avoid discriminatory practice in employment.

5.3.2 The Contractor(s) shall obligate each Subcontractor to comply with the applicable prevailing wage schedule of the Department of Labor of the State of New Jersey.

5.3.3 The Contractor(s) agrees that all of its contracts with Subcontractors shall have provisions requiring that the Subcontractors comply with the provisions of the New Jersey Prevailing Wage Act, N.J.S.A. 34:11-56.25 et seq.

## **1.28 PARAGRAPH 6.1 - OWNER'S RIGHT TO PERFORM CONSTRUCTION WITH OWN FORCES AND TO AWARD OTHER CONTRACTS**

- A. Delete Paragraph 6.1.2 in its entirety and substitute with the following:

6.1.2 Each Prime Contractor shall provide for the coordination of the work of his/her own forces and of each of his/her separate Subcontractors with work of the other Contractors, who shall cooperate therewith as provided in Paragraph 6.2.

## **1.29 PARAGRAPH 6.2 - MUTUAL RESPONSIBILITY**

- A. 6.2.3 Deleted the last sentence in its entirety.
- B. Change Paragraph 6.2.4 to read as follows:

6.2.4 Each Contractor shall promptly remedy damage the Contractor(s) causes to completed or partially completed construction or to property of the Owner, separate contractors as provided in Section 10.2.5. or to other completed or partially completed construction or property on the site or to property of any adjoining Owner or other party.

- C. Supplement Paragraph 6.2.4, as follows:

- .1 Should the Contractor(s) cause damage to the work or property of any separate Contractor(s) on the project, the Contractor(s) shall, upon due notice, promptly settle with such other contractor by agreement or otherwise resolve the dispute. If such separate Contractor(s) sues or institutes an arbitration proceeding against the Owner on account of any damage alleged to have been so sustained, the Contractor(s) shall defend such proceeding at his/her own expense, and if any judgment against the Owner arises therefrom, the Contractor(s) shall pay or satisfy it and shall reimburse the Owner for any attorney's fees and court costs which the Owner has incurred.

## **1.30 ARTICLE 7 - CHANGES IN THE WORK**

- A. Supplement Paragraph 7.1 "General", as follows:

7.1.1 A field directive or field order shall not be recognized as having any impact upon the Contract Sum or the Contract Time and the Contractor(s) shall have no claim in regard thereto unless it shall, prior to complying with same and in no event no later than 10 business days from the date such direction or order was given, submit to the Owner for the Owner's approval its change proposal.

7.1.2 When submitting its change proposal, the Contractor(s) shall include and set forth in clear and precise detail breakdowns of labor and materials for all trades involved and the estimated impact on the construction schedule. The Contractor(s) shall furnish spread sheets from which the breakdowns were prepared, plus spread sheets, if requested, of any subcontractors.

- B. 7.1.2 Add to the end of Paragraph 7.1.2, "Neither this Contract nor the Work to be performed hereunder can be changed by oral agreement. No course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claims that the Owner has been unjustly enriched by any alteration or addition to the Work, whether there is, in fact, any unjust enrichment to the Work, shall be the basis for any alleged implied agreement by the Owner to the change or any increase in any amounts due under the Contract or a change in any time period provided for in the Contract Documents."

C. Supplement Paragraph 7.1, as follows:

7.1.4 A directive or order from the Owner, Architect or Construction Manager, other than a Change Order, a Construction Change Directive or any Order for a minor change pursuant to this Article 7, shall not be recognized as having any impact on the Contract Sum or the Contract Time and the Contractor shall have no claim therefor. If the Contractor believes that a directive or order would require to perform work not required by the Contract Documents, the Contractor shall so inform the Owner, Architect or Construction Manager in writing prior to complying with the same and in no event any later than five (5) business days from the day such direction or order was given, and shall submit to the Owner, Architect or Construction Manager for their approval its change proposal.

**1.31 ALLOWANCE FOR CHANGE ORDER OVERHEAD AND PROFIT**

A. Supplement Paragraph 7.2 "Change Orders" as follows:

7.2.4 For any extra work or portion thereof performed by each Prime Contractor, the cost to the Owner shall include the cost of the extra work plus a maximum allowance of fifteen percent (15%) for overhead and profit.

- .1 For any extra work or portion thereof performed by a Subcontractor(s), the cost to the Owner shall include the cost of the extra work to the Subcontractor plus a maximum allowance of ten percent (10%) for overhead and profit, plus the Prime Contractor's overhead and profit not to exceed five percent (5%) of the Subcontractor's cost.

7.2.5 Change Order shall include all costs, including cost of preparation of the change order, all impact and ripple costs associated with modifications or delays to the work, and all costs associated with modifications to other work.

- .1 Each Prime Contractor shall furnish all necessary documentation to support the additional cost, including but not limited to the following:
  - .1 Copy of subcontractor's proposal.
  - .2 Complete breakdown for all costs for labor and material.
  - .3 Complete breakdown of related costs.
  - .4 Other information as may be requested by the Architect/ Construction Manager.

7.2.6 The overall cost of the Change Order shall be inclusive and once accepted by the Owner it shall be considered full and final.

7.2.7 No additional time will be granted to the Contractor for minor change orders unless each individual change order totals more than \$100,000.

**1.32 PARAGRAPH 7.3 - CONSTRUCTION CHANGE DIRECTIVES**

A. Supplement Paragraph 7.3, as follows:

7.3.11 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the initial Work which is the subject to the Change Order, including, but not limited to, all direct, indirect and impact costs associated with such change and any and all adjustment to the Contract Sum and the Construction Schedule. The Contractor(s) will not be entitled to any compensation for additional work, impact costs or delays in the Construction Schedule not included in the Change Order.

### **1.33 PARAGRAPH 8.2 - PROGRESS AND COMPLETION**

- A. 8.2.2 Delete "knowingly" in line 1.

### **1.34 TIME OF COMMENCEMENT**

- A. Supplement Paragraph 8.2 "Progress and Completion", as follows:

8.2.4 Work shall commence within ten (10) business days from the date of the Notice to Proceed (NTP).

### **1.35 EXTENSION OF TIME**

- A. Supplement Paragraph 8.3 "Delays and Extensions of Time", as follows:

8.3.4 Where the cause of delay is due to weather conditions, extension of time shall be granted only for unusually severe weather, as determined by reference to historical data. The term "historical data" as used in the preceding sentence shall be construed according to this formula: Average rainfall (or snow or low temperature) for the past five (5) years for the month in question, plus 10 percent. In other words, weather is not deemed to be unusually severe unless it is more than 10 percent worse than the average for that month over the last five years.

8.3.5 If the Contractor(s) are delayed in completion of the work by any act or neglect of the Owner, Architect, or of any other Contractor employed by the Owner, or by changes ordered in the work, or by strikes, lockouts, fire, unusual delay by common carriers, unavoidable casualties, or any cause beyond the Contractor's control or by any cause which the Architect / Construction Manager shall decide to justify the delay, then for all such delays and suspensions the Contractor shall be allowed one day additional to the time limitations herein stated for each and every day of such delay so caused in the completion of the work, the same to be ascertained solely by the Architect / Construction Manager, and a similar allowance of extra time will be made for such delays as the Architect / Construction Manager may find to have been caused by the Owner.

- .1 No such extensions of time shall be made for any one or more delays unless within ten (10) business days after the beginning of such delays a written request for additional time shall be filed with the Architect / Construction Manager. In case of a continuing cause of delay, only one request is necessary.

8.3.6 Each Contractor agrees that the Owner can deduct from the Contract Price, any wages paid by the Owner to any Inspector or Inspectors necessarily employed by the Owner for any number of days in excess of the number of days allowed in specifications section 01800, for completion of the work.

### **1.36 PARAGRAPH 9.2 - SCHEDULE OF VALUES**

A. Supplement Paragraph 9.2 "Schedule of Values", as follows:

9.2.1 The Schedule of Values shall include bonds and insurance and shall include copies of invoices and / or cancelled checks from bonding and insurance agents for the additional cost of the coverage for the project being billed.

- .1 Each Prime Contractor must provide draft copies of the Schedule of Values, within fifteen (15) business days from Notice to Proceed. Submit two (2) copies to the Architect.
  - .1 Schedule of Values shall include separate costs for work at the School Project referenced with Architect's Project Number.
  - .2 Schedule of Values shall also include each type of work, materials and installation, in accordance with each specification sections, as listed in the Index and / or as shown on drawings.
  - .3 Each Prime Contractor shall include separate line items for the following:
    - .1 Bonds,
    - .2 Insurance,
    - .3 Mobilization,
    - .4 General Conditions,
    - .5 Submittals,
    - .6 Coordination Drawings,
    - .7 Daily Clean and Final Clean,
    - .8 Safety Protections,
    - .9 As-Built drawings, as per Section 01700,
    - .10 Punch list items,
    - .11 CPM Schedule and Monthly Updates,
    - .12 Equipment Start-Up,
    - .13 Owner's Stock,
    - .14 Closeout Documents.

### **1.37 STORED MATERIALS**

A. Supplement Paragraph 9.3.2, as follows:

- .1 To encourage early purchase, Owner will pay for stored materials and equipment. The following procedures must be followed in order to obtain payment.
  - .1 A certificate of insurance naming the Owner as loss beneficiary for the full dollar amount representing the materials stored.
  - .2 A consent of surety in the amount being requisitioned, said surety



- being the bonding company of each Prime Contractor.
- .3 Materials to be stored in warehouse must be inspected by the Construction Manager and Contractor(s) will not receive extra compensation for storage costs.
  - .4 Any time and traveling expenses for the Construction Manager to visit and inspect equipment stored will be borne by the Contractor(s) making the off-site storage request.
  - .5 Payment invoices for materials stored off site shall be so noted.
  - .6 After the receipt of the above, the Construction Manager will endorse same and forward to the Owner for their approval.
  - .7 Payment invoices not following the above format will be rejected in total.
  - .8 There will be no storage space available in existing buildings. Space in new building may be used for storage only if approved in writing by Construction Manager and all contractors having work in the area.
  - .9 Each Contractor will be paid for stored materials no more than the actual or replacement value of the materials. Each Contractor will furnish vendors price lists, priced inventories or other documentation to support claims for payment of materials stored on or off site.

### **1.38 PARAGRAPH 9.3 - APPLICATIONS FOR PAYMENT**

- A. Supplement Paragraph 9.3 "Applications for Payment", as follows:

9.3.4 Applications for payment which include billing for bonds and insurance shall enclose copies of invoices or cancelled checks from bonding and insurance agents for the additional cost of the coverage for the project being billed.

### **1.39 PARAGRAPH 9.5 - DECISIONS TO WITHHOLD CERTIFICATION**

- A. 9.5.1.6 In the first line, delete "and" and substitute "or".
- B. 9.5.1.7 Delete "repeated".
- C. Supplement Paragraph 9.5.1, as follows:
  - .8 Deliberate delay in the submission for approval of names of subcontractors, materialmen, sources of supply, shop drawings and samples.
  - .9 Failure to maintain the site in a safe and satisfactory condition in accordance with good construction practices.
  - .10 Failure of mechanical trades or electrical trades subcontractors to comply with mandatory requirements for maintaining record drawings. Each Contractor shall be required to check record drawings each month. Written confirmation that the record drawings are up-to-date shall be required by the Architect before approval of the Contractor's monthly payment requisition will be considered.

#### **1.40 PARAGRAPH 9.6 - PROGRESS PAYMENTS**

- A. Supplement Paragraph 9.6 "Progress Payments", as follows:

9.6.8 In making progress payments, on Contracts totaling more than \$100,000 dollars there shall be retained two percent (2%) of the approved amount when the outstanding balance of the contract exceeds \$500,000, and five percent (5%) of the amount due on each partial payment when the outstanding balance of the contract is \$500,000 or less, until final completion and acceptance of all work covered by the Contract, including the completion of all corrective or punch list items.

9.6.9 In making progress payments, on Contracts totaling less than \$100,000 dollars there shall be retained ten percent (10%) of the approved amount until seventy-five percent (75%) of the Contract Price has been paid at which time the retainage for that seventy-five percent (75%) will be reduced to five percent (5%) if in the judgment of the Architect the work is progressing satisfactorily, and on progress payments thereafter there shall be retained ten percent (10%) of the approved amounts until final completion and acceptance of all work covered by the Contract, including the completion of all corrective or punch list items. The Contractor will be required to provide a Consent of Surety to Reduction in or Partial Release of Retainage (AIA Document G707A), before reduction in retainage will be considered.

9.6.10 Final payment will be made provided the work has been completed, the contract fully performed and a final certificate for payment has been reviewed and approved by Architect and Construction Manager.

#### **1.41 PARAGRAPH 9.7 - FAILURE OF PAYMENT**

- A. In the fourth / fifth lines, delete "or awarded by binding dispute resolution".

#### **1.42 PARAGRAPH 9.8 - SUBSTANTIAL COMPLETION**

- A. 9.8.1 Modify as follows:

Add at the end of the Paragraph: "The Work will not be considered substantially complete until all project systems included in the Work are operational as designed and scheduled, all designated or required inspections, certifications, permits, approvals, licenses and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial use and occupancy Project are received, designated instruction of Owner's personnel has been completed, and all final finished within the Contract are in place. In general, the only remaining Work shall be minor in nature so that the Owner can occupy the building on that date and the completion of the Work by the Contractor(s) would not materially interfere or hamper the Owner's (or those claiming by, through or under the Owner) normal operations. Contractor(s) recognize that normal operations require the use and occupancy of the Work by students and faculty without interruption and that any punchlist or corrective work shall be done at times when the Work is not so occupied. As a further condition of substantial completion acceptance, the Contractor(s) shall certify that all remaining Work will be completed within thirty (30)

consecutive calendar days or as agreed upon following the date of substantial completion.

B. Supplement Paragraph 9.8.2, as follows:

- .1 The Architect's Certificate of Substantial Completion shall be subject to the Owner's final approval.

C. Supplement Paragraph 9.8.3, as follows:

- .1 Each Contractor shall complete all items attached to the "Certificate of Substantial Completion" within thirty (30) calendar days of issuance of same. If not completed, the Owner may proceed to carry out the work in accordance with Paragraph 2.4 of the General Conditions. The Owner will suffer financial loss if the project is not substantially complete on the date set forth in the Contract Documents. Each Contractor (and the Contractor's Surety) shall be liable for and pay to the Owner the sums hereinafter stipulated and fixed, agreed as liquidated damages for each calendar day of delay until the work is substantially complete.

#### **1.43 PARAGRAPH 9.10 - FINAL COMPLETION AND FINAL PAYMENT**

A. 9.10.1 Add the following at the end of the Paragraph:

All warranties and guarantees required pursuant to the Contract Documents shall be assembled and delivered by the Contractor(s) to the Owner as part of the final application for payment. The final Certificate for Payment will not be issued by the Architect until all warranties and guaranties have been received and accepted by the Owner.

B. Supplement Paragraph 9.10.1, as follows:

- .1 The Architect's Certificate of Final Completion shall be subject to the Owner's final approval.

#### **1.44 GENERAL CONTRACTOR AS OWNER'S SAFETY REPRESENTATIVE**

A. Supplement Paragraph 10.1 "Safety Precautions and Programs", as follows:

10.1.1 The Prime General Contractor shall provide all necessary temporary enclosures, guard rails, barricades etc. to adequately protect all workmen and public from possible injury.

10.1.2 The Prime Steel Contractor shall provide and install 2 rows of 1/2" diameter steel cable around perimeter of all floors above first floor, mounted and marked in accordance with OSHA safety. Steel columns shall be punched for installation of cable. The Steel Contractor shall remove cables after enclosing walls have been installed.

10.1.3 The General Contractor shall be responsible for the general safeguarding of the Project, for gaining compliance with the safety requirements from all other Contractors and parties engaged in operations at the site, and shall act as the Owner's representative with regard to all safety inspections required and shall perform all necessary functions for this purpose. The Contractor shall designate a "Site Safety Officer".

#### **1.45 PARAGRAPH 10.2 - SAFETY OF PERSONS AND PROPERTY**

A. Supplement Paragraph 10.2.8, as follows:

- .1 The Contractor(s) shall promptly report in writing to the Owner, Architect and Construction Manager all accidents arising out of or in connection with the Work which caused death, personal injury or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injury or serious property damage is caused, the accident shall be reported immediately by telephone or messenger to the Owner, Architect and Construction Manager.

B. Supplement Paragraph 10.2 "Safety of Persons and Property", as follows:

10.2.9 Contractor(s) are required to follow and enforce the work rules set forth below. Failure to comply with or enforce any of these rules will be grounds for suspension and / or termination of the Contractor(s):

- .1 No use of alcoholic beverages prior to or during working hours. Anyone found impaired will be escorted from the Project site.
- .2 No use of illegal drugs or prescription medications which could induce drowsiness or otherwise impair perception or performance. Use of illegal drugs may result in prosecution to the fullest extent of the law. Any warning associated with use of prescription drugs must comply with, particularly warning against operation of machinery and equipment.
- .3 No horseplay or rough-housing will be allowed.
- .4 No sexual, racial, ethnic harassment, or similar conduct will be tolerated.
- .5 All employees shall use proper sanitation habits, including use of toilet facilities and garbage cans.
- .6 All employees shall dress in clothing appropriate for the work they are to perform. All personnel are to wear hardhats, safety shoes, glasses, gloves, masks or respirators, noise protection devices, and other protective clothing and equipment as required by OSHA standards.
- .7 All equipment is to be properly stored and / or secured at the end of the work day if it is to remain idle for greater than one hour.
- .8 All personnel are to be made aware of the availability of Safety Data Sheets (SDS) for materials used at the Project site. This information is available from the Contractor(s) using the product. Each Contractor shall maintain a copy of all SDS forms at the construction site office for all personnel to review.

## **1.46 LOST OR STOLEN ITEMS**

- A. Supplement Article 10 "Protection of Persons and Property", as follows:

### **10.5 Lost or Stolen Materials**

Each Contractor shall protect all materials and equipment for which he/she is responsible, which is stored at the Project Site for incorporation in the work, or which has been incorporated into the work. He/She shall replace all such materials and equipment which may be lost, stolen or damaged at his/her expense, whether or not such materials or equipment have been entirely or partially paid for by the Owner.

## **1.47 ARTICLE 11 - INSURANCE AND BONDS**

- A. Delete Paragraph 11.1.1 and replace with the following:

11.1.1 Contractor(s) shall, without in any way altering Contractor's liability under the Contract or applicable law, obtain, pay for and maintain insurance for the coverages and amounts of coverage not less than those set forth below and shall provide to the Owner certificates issued by insurance companies satisfactorily to Owner evidence of such coverages no later than 7 days of the date of execution of this Contract and prior to any personnel or equipment being brought onto and/or before any work commences at the job site. The coverages afforded under this provision shall be primary to any valid insurance carried separately by the Owner and/or additional insureds and or indemnitees under the Contract.

- B. Supplement Paragraph 11.1.1, as follows:

- .1 Contractor(s) shall require its subcontractors/ subconsultants to procure and maintain for the life of the project identical insurance coverages and Endorsements as required by Article 11.
- .2 In the event of any failure by Contractor(s) to comply with the provisions of Article 11, the Owner may at its discretion and upon notice to the Contractor(s), suspend the Contract for cause and/or terminate. Owner may also have the right to charge back the Contractor(s) to obtain valid insurance coverages. In the event Owner purchases insurance addition or takes over policy, Contractor(s) is not relieved of obligations under Section 11, Insurance.

- C. Supplement Paragraph 11.1.3 as follows:

- .1 All Insurance Certificates shall provide (via Endorsement by the Carrier) that there shall be no cancellation, non-renewal or material change of such coverage without thirty (30) day written notice to the Owner.
- .2 The coverage maintained by the Contractor(s) shall be written by companies licensed to do business in the State of New Jersey and maintaining and AM BEST rating of A- or better with a financial size rating of Class IX or larger.

D. Supplement Paragraph 11.1.4, as follows:

- .1 Certificate of Insurance shall be submitted within ten (10) business days upon notification of award of Contract.

E. Supplement Paragraph 11.1 "Contractor's Liability Insurance", as follows:

11.1.5 Contractor's liability insurance must be maintained until the final Certificate of Payment is issued pursuant to Paragraph 9.10.1 and Completed Operations Insurance is in effect.

11.1.6 Insurance specified to be provided by the Contractor under Paragraph 11.1 shall be on an occurrence basis, as follows:

- .1 Contractual liability insurance as applicable to the Contractor's obligations under Paragraph 3.18 of the AIA General Conditions.
- .2 Certificates of insurance must be submitted on the ACORD Form, Certificate of Insurance. Contractor's ACORD Certificate of Insurance must state "Contractual Liability Included" or it will be rejected.
- .3 The Contractor shall either:
  - .1 require each of his / her subcontractors to procure and to maintain during the life of their subcontracts, Subcontractor's Public Liability and Property Damage, of the type and in the same amounts as specified in the preceding paragraph, or
  - .2 insure the activities of their subcontractors under their respective policies.
- .4 Commercial General Liability Insurance written on an occurrence form including independent contractor liability, products/completed operations liability, contractual liability, covering but not limited to the liability assumed under the indemnification provisions of this contract. Coverage for bodily injury and property damage claims arising out of the professional acts of the general contractor and subcontractors shall also be included. The policy shall not include any endorsement that restricts or reduces coverage as provided by the ISO CG0001 form without the approval of the District. The minimum limits of liability shall not be less than a combined single limit of one million dollars (\$1,000,000) per occurrence, two million dollars (\$2,000,000) general aggregate, three million dollars (\$3,000,000) product/completed operations aggregate. The Products and Completed Operations insurance shall be maintained for five (5) years after final payment or the then current applicable statute of repose. A "per project endorsement" shall be included, so that the general aggregate limit applies solely to the project that is the subject of this contract.
- .5 Comprehensive Automobile Liability Insurance covering owned, non-owned, and hired vehicles. The limits of liability shall not be less than a combined single limit of one million dollars (\$1,000,000) per occurrence.
- .6 Worker's Compensation Insurance applicable to the laws of the State of New Jersey and other State or Federal jurisdiction required to protect the employees of the Contractor and any Subcontractor who will be engaged

in the performance of this Contract. The certificate must so indicate that no proprietor, partner, executive officer or member is excluded. This insurance shall include Employers' Liability Protection with a limit of liability not less than one million dollars (\$1,000,000) bodily injury, each occurrence, one million dollars (\$1,000,000) disease, each employer, and two million dollars (\$2,000,000) disease, aggregate limit. Including the employer's liability insurance under the umbrella insurance can satisfy the limit requirements.

- .7 The Contractor shall obtain and maintain a separate Owners and Contractor's Protective Liability Insurance Policy for the same limits of liability as specified for the Commercial General Liability Insurance in the name of the Owner, Northern Burlington County Regional School District, Architect / Engineers, the State of New Jersey, the State of New Jersey Department of Education, New Jersey Schools Development Authority. The Architect/Engineer, and the Construction Manager are to be the named as additional insured. The policy shall be maintained in force for the term of the Project or one year, whichever is longer.
- .8 Excess Liability, Umbrella Insurance form, applying excess of primary to the commercial general liability, commercial automobile liability and employer's liability insurance shall be provided with minimum limits of twenty million dollars (\$20,000,000) per occurrence, twenty million dollars (\$20,000,000) general aggregate and twenty million dollars (\$20,000,000) products/completed operations.
- .9 The General Liability Insurance General Aggregate and Umbrella Excess Liability limits shall apply and be written exclusively, in total, to this Project only. A per project endorsement for all coverage's and limits must be included in each policy. Bodily Injury and Property Damage Insurance policies shall be so written as to provide coverage for special hazards where such hazards will be incidental to subcontractors' work.
- .10 The Contractor shall obtain and maintain Pollution Legal Liability Insurance for all work associated with the project written on an occurrence or claims-made form with minimum limits of \$5 million per occurrence and \$5 million in the annual aggregate. This policy will include, but not be limited to, coverage for mold and will provide coverage for the cost of clean-up, remediation, and defense costs associated with a spill from any permanent or temporary storage tank. If the policy is written on a claims made basis, Contractor agrees that upon termination of the policy a retroactive reporting policy (tail policy) will be purchased extending coverage for 5 years or the then current applicable statute of repose.

#### **1.48 PARAGRAPH 11.3 - PROPERTY INSURANCE**

A. Supplement Paragraph 11.3.1.1, as follows:

- .1 Builder's Risk Insurance. The Contractor(s) shall provide Builder's Risk Insurance for all of the physical loss or damage of the property described hereunder in an amount equal to the Total Project Value (full value of all funding) inclusive of all Contract sums for the Project. Builders Risk shall comply with all provisions of Section 11 and shall include coverages for:

windstorm, equipment breakdown, earthquake, flood, fire, and theft. This policy is to include all subcontractors, and vendors as well as the above-listed additional insureds.

- .2 All insurance policies shall contain a waiver of subrogation against the Owner, Northern Burlington County Regional School District, the Northern Burlington County Regional School District Board of Education, Architect / Engineers, the State of New Jersey, the State of New Jersey Department of Education, New Jersey Schools Development Authority.

B. 11.3.3 "Loss of Use Insurance", delete the second sentence.

C. Delete Paragraph 11.3.9 and substitute the following:

11.3.9 Owner as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of the Owner's duties. The Owner shall deposit in a separate account, any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate change order."

D. Delete Paragraph 11.3.10 and substitute the following:

11.3.10 The Owner, as trustee, shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within five (5) business days after the occurrence of loss to the Owner's exercise of this power.

E. Supplement Paragraph 11.3 "Property Insurance", as follows:

11.3.11 The Property Insurance obtained by the Owner shall include coverage for risks specified in Subparagraph 11.3.1, including collapse and water damage, to the extent covered by the Owner's "All Risk" insurance.

11.3.12 The Owner agrees to be responsible for losses not covered by property insurance due to statutory deductible provisions.

11.3.13 The fact that the Owner is furnishing Property Insurance shall not be interpreted to relieve the Contractor(s) of his/her obligation to complete the work without additional cost to the Owner beyond the Contract amount, except as provided in Subparagraph 11.3.1.5.

11.3.14 The Contractor(s) may carry whatever additional insurance he/she deems necessary to protect himself/herself against hazards not covered by the Owner's Property Insurance, including coverage for theft, collapse, water damage, materials and equipment stored on the site, and for materials and equipment stored off site, and against loss of owned or rented capital equipment and tools owned by mechanics or any tools, equipment, scaffolding, staging, towers and forms owned or rented by the Contractor, the capital value of which is not included in the cost of the work. Owner's "All Risk" Insurance does not cover theft of material unless installed and made an integral part of the building. This loss must be assumed by the Contractor(s).



## 1.49 PERFORMANCE BOND AND PAYMENT BOND

- A. 11.4.1 Delete Paragraph 11.4.1 in its entirety and substitute the following:

11.4.1 Contractor(s) shall furnish each of the performance bond and payment bond meeting all statutory requirements of the State of New Jersey in form and substance satisfactory to the Owner and, without limitation, complying with the following specific requirements:

- .1 Except as otherwise required by statute, the form and substance of such bonds shall be satisfactory to the Owner in the Owner's sole judgment;
- .2 The bonds shall be executed by an approved surety company authorized to do business in the State of New Jersey and in accordance P.L. 1995, c.384 (amending N.J.S.A. 2A:44-143 and 2A:44-144, effective January 10, 1996) and with the three highest rating categories of rating companies nationally recognized and listed as per Appendix A. and shall remain in effect for a period of not less than two years following the date of substantial completion or the time required to resolve any items of incomplete or inadequate work and the payment of any disputed amounts, whichever time period is longer;
- .3 The performance bond and the labor and material payment bond shall each be in an amount equal to the Contract Sum;
- .4 The Contractor(s) shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his / her power of attorney indicating the monetary limit of such power;
- .5 Any bond under Paragraph 11.4.1 must display the surety's bond number. A rider including the following provisions shall be attached to each bond:
  - .1 Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change or other modification of the Contract Documents which singularly or in the aggregate equals or is less than 20% of the Contract Sum. Except as to increases in the Contract Sum in excess of the percentage set forth in this clause 11.4.1.5(1). Any other alterations, change, extension of time or other modification of the Contract Documents or a forbearance on the part of either the Owner or the Contractor to the other shall not release the surety of its obligations hereunder and notice to surety of such matter is hereby waived.
  - .2 Surety further agrees that in the event of any default by the Owner in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor(s) or surety shall cause written notice of such default (specifying said default in writing) to be given to the Owner, and the Owner shall have thirty (30) calendar days after receipt of such notice within which to cure such default or such additional reasonable time as may be required if the nature of such default is such that it cannot be cured within thirty (30) calendar days. Such notice of default shall be sent by certified or registered U.S. mail, return receipt requested, first class postage, prepaid to the Owner.

## **1.50 UNCOVERING OF WORK**

- A. 12.1.1 Add "or Contract Sum" at the end of the Paragraph.

## **1.51 CORRECTION OF WORK**

- A. 12.2.1 Add the following at the end of the Paragraph:

If prior to the date of Substantial Completion, the Contractor(s), a Subcontractor or anyone for whom either is responsible, uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing and other building systems, machinery, equipment or other mechanical device, the Contractor(s) shall cause each such item to be restored to "like new condition" at no expense to the Owner.

- B. 12.2.2.1 Add the following to the end of the Paragraph:

"If payments then or thereafter due to the Contractor(s) are not sufficient to cover such amount, the Contractor(s) , or his/her Surety, shall pay the difference to the Owner. The appropriate reduction shall be an amount equal to the entire cost of replacing the work performed with work originally specified and intended."

## **1.52 PARAGRAPH 12.3 - ACCEPTANCE OF NONCONFORMING WORK**

- A. 12.3.1: Add the following sentence to the end of the Paragraph:

"This Subparagraph relates exclusively to the knowing acceptance of nonconforming work by the Owner. It has no applicability to work accepted by the Owner, Architect or Construction Manager without the knowledge that such work fails to conform to the requirements of the Contract Documents."

## **1.53 PARAGRAPH 13.1 - GOVERNING LAW**

- A. In the first line, delete all everything after "located".

- B. Supplement 13.1 "Governing Law", as follows:

13.1.2 Contractor(s) must comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities, utility companies, National Board of Fire Underwriters, and others which bear on performance of Work. Deliver to the Owner certificates and other required legal evidence and proof of compliance with the above.

## **1.54 PARAGRAPH 13.5 - TESTS AND INSPECTIONS**

- A. 13.5.1 Delete the last sentence in its entirety.

- B. 13.5.2 After the word "Architect" add "and Owner" in lines 5 and 6.

- C. 13.5.3 Add the following at the end of the Paragraph:

The Contractor(s) also agree that the cost of testing services required for the convenience of the Contractor in his/her scheduling and performance of the Work and the cost of testing services related to remedial operations performed to correct deficiencies in the Work shall be borne by the Contractor(s).

**1.55 PARAGRAPH 13.6 - INTEREST**

- A. Delete Paragraph 13.6 "Interest" in its entirety.

**1.56 PARAGRAPH 14.1 - TERMINATION BY CONTRACTOR**

- A. Delete Paragraph 14.1.2 in its entirety and substitute the following:

14.1.2 If one of the above reasons exist, the Contractor(s) may, upon fourteen (14) calendar days written notice to the Owner, Construction Manager and Architect, terminate the Contract, unless this reason is cured prior to the expiration of the notice, and recover from the Owner payment of work properly executed in accordance with the Contract Documents (the basis for such payment shall be as provided in the Contract) and for payment for cost directly related to work thereafter performed by Contractor(s) in terminating such work, including reasonable demobilization and cancellation charges provided said work is authorized in advance by Construction Manager, Architect and Owner.

**1.57 PARAGRAPH 14.2 - TERMINATION BY THE OWNER FOR CAUSE**

- A. Delete Paragraph 14.2 in its entirety and substitute the following:

**14.2 TERMINATION OF CONTRACT**

14.2.1 Owner May Suspend Work:

- .1 Owner may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety (90) calendar days by notice in writing to Contractor(s) and Architect which shall fix the date on which Work shall be resumed. Contractor(s) shall resume the Work on the date so fixed. Contractor(s) will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if he/she makes a claim therefor as provided in Articles 11 and 12.

14.2.2 Owner May Terminate:

- .1 Upon the occurrence of any one or more of the following events:
- .2 If Contractor is adjudged a bankrupt or insolvent, "subject to the provision of the National Bankruptcy Act and specifically 11 U.S.C., Paragraph 365.
- .3 If Contractor(s) make a general assignment for the benefit of creditors.
- .4 If a trustee or receiver is appointed for Contractor or for any of

- Contractor's property.
- .5 If Contractor(s) files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or similar laws.
  - .6 If Contractor(s) repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment.
  - .7 If Contractor(s) repeatedly fails to make prompt payments to Subcontractors for labor, materials or equipment.
  - .8 If Contractor(s) disregards laws, ordinances, rules regulations or orders of any public body having jurisdiction.
  - .9 If Contractor(s) disregards the authority of Architect.
  - .10 If Contractor(s) otherwise violates in any substantial way any provisions of the Contract Documents, Owner may after giving Contractor(s) and his/her Surety seven days' written notice, terminate the services of Contractor(s), exclude Contractor(s) from the site and take possession of the Work and of all Contractor's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by Contractor(s) (without liability to Contractor(s) for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which Owner has paid Contractor(s) but which are stored elsewhere, and finish the Work as Owner may deem expedient. In such case Contractor(s) shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the Work, including compensation for additional professional services, such excess shall be paid to Contractor(s). If such costs exceed such unpaid balance, Contractor(s) shall pay the difference to Owner. Such costs incurred by Owner shall be verified by Architect and incorporated in a Change Order, but in finishing the Work, Owner shall not be required to obtain the lowest figure for the Work performed.
  - .11 Where Contractor's services have been so terminated by Owner, the termination shall not affect any rights of Owner against Contractor(s) then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor(s) by Owner will not release Contractor(s) from liability.
  - .12 Upon seven days' written notice to Contractor(s) and Architect, Owner may without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement. In such case, Contractor(s) shall be paid for all Work executed and any expense sustained plus reasonable termination expenses.

#### **1.58 PARAGRAPH 15.1 - CLAIMS**

- A. 15.1.4 After the first sentence, add "Said notice shall itemize all claims and shall contain sufficient detail and substantiating data to permit evaluation of same by Owner, Architect and Construction Manager. No such claim shall be valid unless so made." At the end of the Subparagraph, add, "Any change in the Contract Sum resulting from such claim shall be authorized only by Change Order or Construction Change Directive, as the case may be."

**1.59 RESOLUTION OF CLAIMS AND DISPUTES**

- A. Delete the last sentence in Paragraph 15.2.5.
- B. Delete Paragraph 15.2.6 in its entirety.
- C. Delete Paragraph 15.2.6.1 in its entirety.

**1.60 PARAGRAPH 15.3 - MEDIATION**

- A. Delete Paragraph 15.3 "Mediation", in its entirety.

**1.61 PARAGRAPH 15.4 - ARBITRATION**

- A. Delete Paragraph 15.4 "Arbitration" in its entirety and substitute the following:

**15.4 LITIGATION**

15.4.1 The Owner and Contractor(s) agree that all claims, disputes and other matters in question between the parties arising out of or relating to the Project or this contract or breaches thereof, shall be heard in a Court of competent jurisdiction venued in the project's County, New Jersey.

**END OF SECTION 00800**

## **SECTION 00850 - CONTRACT DRAWINGS**

- 1.1 All Drawings listed on drawing No. G001, "Title Sheet" dated July 12, 2019, unless otherwise revised or amended (via Addenda, Bulletin, etc.), shall form a part of the Contract Documents.

**END OF SECTION 00850**

## SECTION 00860 - LAWS GOVERNING PUBLIC WORK

### PART 1 - GENERAL

#### 1.1 GENERAL CONDITIONS

- A. The paragraphs below supplement the General Conditions. Attention is called, but not limited, to the following Laws Governing Public Work.

#### 1.2 STATE SALES AND USE TAX EXEMPTION

- A. Supplement paragraph 3.6 "Taxes" as follows:

3.6.2 In accordance with Section 9 (a) (1) of the New Jersey Sales and Use Tax Act, The Owner is an exempt organization. Bidders and their subcontractors and material suppliers shall not include in their bids New Jersey State Sales and Use Taxes relative to the performance of the work.

#### 1.3 MUNICIPAL REQUIREMENTS

- A. Supplement paragraph 3.7 "Permits, Fees and Notices" as follows:

3.7.1.1 N.J.S.A. 52:27D-123.1 (P.L. 1983, c.496) (formerly S-1934) effective April 17, 1984, provides that local Municipal Construction Enforcing Agency issue required construction permit, perform required inspections during construction, and issue required certificate of occupancy upon completion of Project.

3.7.1.2 N.J.S.A. 52:27D-126C (P.L. 1985, c.409), effective January 13, 1986, amended 1989. "No county, municipality, or any agency or instrumentality thereof shall be required to pay any municipal fee or charge in order to secure a construction permit for the erection or alteration of any public building or part thereof from the municipality wherein the building may be located. No erection or alteration of any public building or part thereof by a county, municipality, school board, or any agency or instrumentality thereof shall be subject to any fee, including any surcharge or training fee, imposed by an department or agency of State government pursuant to any law, or rule or regulation, except that nothing contained in this section shall be interpreted as preventing the imposition of a fee upon a board of education by either the Department of Education for plan review or by a municipality for the review of plans submitted to it pursuant to the provisions of section 12 of N.J.S.A. 52:27D-130 (P.L. 1975, c.217) (C.52:27D-130)".

3.7.1.3 N.J.S.A. 40:55D-3 (P.L. 1975, c.291, Section 4), amended, effective July 2, 1988. A municipality shall exempt a board of education from the payment of any fee.

3.7.1.4 N.J.S.A. § 52:27d-126e (effective 2013) - Waiving of Construction Permit, Enforcing Agency Fees for Certain Construction Projects To Benefit Disabled Persons.

1. a. Notwithstanding the provisions of the "State Uniform Construction Code Act," P.L. 1975, c.217 (C.52:27D-1 19 et seq.), or any rules, regulations or standards adopted pursuant thereto, to the contrary, the governing body of any municipality which has appointed an enforcing agency pursuant to the

provisions of section 8 of P.L.1975, c.217 (C.52:27D-126) may, by ordinance, provide that no person shall be charged a construction permit surcharge fee or enforcing agency fee for any construction, reconstruction, alteration or improvement designed and undertaken solely to promote accessibility by disabled persons to an existing public or private structure or any of the facilities contained therein.

The ordinance may further provide that a disabled person, or a parent or sibling of a disabled person, shall not be required to pay any municipal fee or charge in order to secure a construction permit for any construction, reconstruction, alteration or improvement which promotes accessibility to his own living unit.

For the purposes of this subsection, "disabled person" means a person who has the total and permanent inability to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment, including blindness, and shall include, but not be limited to, any resident of this State who is disabled pursuant to the federal Social Security Act (42 U.S.C.416), or the federal Railroad Retirement Act of 1974 (45 U.S.C.231 et seq.), or is rated as having a 60% disability or higher pursuant to any federal law administered by the United States Veterans' Act. For purposes of this paragraph "blindness" means central visual acuity of 20/200 or less in the better eye with the use of a correcting lens. An eye which is accompanied by a limitation in the fields of vision such that the widest diameter of the visual field subtends an angle no greater than 20 degrees shall be considered as having a central visual acuity of 20/200 or less.

b. (1) Notwithstanding the provisions of the "State Uniform Construction Code Act," P.L. 1975, c.217 (C.52:27D-119 et seq.) or any rules, regulations or standards adopted pursuant thereto to the contrary, the governing body of any municipality which has appointed an enforcing agency pursuant to the provisions of section 8 of P.L. 1975, c.217 (C.52:27D-126) shall not charge a person who has a service-connected disability declared by the United States Department of Veterans Affairs, or its successor, to be a total or 100% permanent disability that would entitle them to a property tax exemption under section 1 of P.L.1948, c.259 (C.54:4-3.30) or a spouse, parent sibling, or guardian of the disabled veteran, a construction permit surcharge fee or enforcing agency fee for any construction, reconstruction, alteration, or improvement designed and undertaken solely to promote accessibility by the disabled veteran to his own living unit.

(2) A municipality that has granted an exemption from a construction permit surcharge fee or enforcing agency fee pursuant to paragraph (1) of this subsection may apply to the Department of Community Affairs, in accordance with rules and regulations promulgated by the Commissioner of Community Affairs for this purpose, for reimbursement of those exempt fees.

- B. Utility Connection Fees: Contractors shall pay utility connection fees and shall be reimbursed by Owner upon presentation of receipt for same.



- C. Certificates of Occupancy: Contractors shall be responsible for obtaining of all Certificates of Occupancy.

#### **1.4 TIME INCLUDING COMPLETION**

- A. Supplement Article 8 "Time" as follows:

8.1.7 The term "completed" in N.J.S.A. 18A:18A-19 shall mean substantial completion as defined in this Article 8.

8.1.8 The term "Working Days" as used to compute the time of completion shall mean Mondays through Fridays, exclusive of the twelve major yearly holidays, as listed on the official State of New Jersey website, [www.state.nj.us/about/facts/holidays/](http://www.state.nj.us/about/facts/holidays/).

- B. Supplement Article 8.3 "Delays and Extension of Time" as follows:

8.3.4 The Contractor agrees that the Owner can deduct from the Contract Price, any wages paid by the Owner to any Inspector or Inspectors necessarily employed by the Owner for any number of days in excess of the number of days allowed in the specifications for completion of the work.

#### **1.5 NONDISCRIMINATION AND MISCELLANEOUS LABOR PROVISIONS**

- A. Attention is called to the following which supplement paragraph 13.1 "Governing Law" as follows:

13.1.3 N.J.S.A. 10:2-1 through 10:2-4 Every contract for or on behalf of the State or any county or municipality or other political subdivision of the State, or any agency or authority created by any of the foregoing, for the construction, alteration or repair of any public building or public work or for the acquisition of materials, equipment, supplies or services shall contain provisions by which the contractor agrees that:

- .1 In the hiring of persons for the performance of work under this contract or any subcontract hereunder, or for the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under this contract, no contractor, nor any person acting on behalf of such contractor or subcontractor, shall, by reason of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex, discriminate against any person who is qualified and available to perform the work to which the employment relates;
- .2 No contractor, subcontractor, nor any person on his/her behalf shall, in any manner, discriminate against or intimidate any employee engaged in the performance of work under this contract or any subcontract hereunder, or engaged in the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under such contract, on account of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex;

- .3 There may be deducted from the amount payable to the contractor by the contracting public agency, under this contract, a penalty of \$50.00 for each person for each calendar day during which such person is discriminated against or intimidated in violation of the provisions of the contract; and
- .4 This contract may be canceled or terminated by the contracting public agency, and all money due or to become due hereunder may be forfeited, for any violation of this section of the contract occurring after notice to the contractor from the contracting public agency of any prior violation of this section of the contract.

No provision in this section shall be construed to prevent a board of education from designating that a contract, subcontract or other means of procurement of goods, services, equipment or construction shall be awarded to a small business enterprise, minority business enterprise or a women's business enterprise pursuant to N.J.S.A. 18A:18A-51 et. seq. (P.L.1985, c. 490).

Pursuant to N.J.A.C. 17:27 (P.L. 1975, c.127), as amended and supplemented, the following Affirmative Action Against Discrimination on the Project will be a condition of the Contract. An Initial Project Work Report will be required form (AA-201).

During the performance of this contract, the contractor agrees to Mandatory Equal Employment Opportunity Language as shown Exhibit B.

13.1.3 N.J.S.A. 34:11-56.25 et seq., in accordance with which the Contractor(s) and subcontractor(s) are required to do the following:

- .1 Pay to all workers engaged in the performance of services directly upon the work not less than the prevailing rate of wages. In the event that it is found that any worker employed by the Contractor(s) or any subcontractor(s) has been paid a rate of wage less than the prevailing wage required to be paid by such contract, the Owner may terminate the contractor's right to proceed with the work or such part of the work as to which there has been a failure to pay required wages and to prosecute the work to completion or otherwise.
- .2 Before final payment, furnish Owner with an Affidavit stating that all workers have been paid in accordance with the New Jersey Prevailing Wage Act.
- .3 Keep an accurate record showing the name, craft or trade and actual hourly rate of wages paid to each workman employed by him/her in connection with his/her work. Preserve records for 2 years from date of payment.
- .4 Upon request, the Contractor(s) and each Subcontractor shall file written statements certifying to the amounts then due and owing to any and all workers for wages due on account of the work. The statement shall set forth the names of the persons whose wages are unpaid and the amount due to each. These statements shall be verified by the oaths of the Contractor(s) or subcontractor(s), as the case may be.
- .5 Post the prevailing wage rates for each craft and classification involved in the work, including the effective date of any changes thereof in prominent and easily accessible places at the site of the work and at such place or places as are used to

pay workers their wages. The prevailing wage rates as determined by the State Department of Labor and Industry shall apply, and shall be deemed incorporated by reference as part of the contract. A copy of the current prevailing wage rates as applicable for this Project are on file at the Architect's office.

## **1.6 DOMESTIC MATERIALS**

- A. Supplement Paragraph 13.1 "Governing Law" as follows:

13.1.5 N.J.S.A. 18A:18A-20 et seq. providing as a condition of the Contract that only domestic materials and manufactured and farm products of the United States will be used wherever available.

## **1.7 REQUIREMENTS FOR PUBLIC SCHOOLS**

- A. Supplement Paragraph 13.1 "Governing Law" as follows:

13.1.6 N.J.S.A.18A:18A et seq., providing for certain requirements concerning contracts, plans, specifications, etc., for public schoolhouse construction.

## **1.8 PAYMENTS TO LISTED SUBCONTRACTORS UNDER SINGLE OVERALL CONTRACT**

- A. Supplement Paragraph 13.1 "Governing Law" as follows:

13.1.6 N.J.S.A. 18A:18A-18, providing that under a single overall contract, all payment required to be made for work and materials supplied by the various subcontractors shall, upon certification by the Prime Contractor of the amount due to the subcontractor(s), be paid directly to the subcontractor(s).

## **1.9 POLITICAL CONTRIBUTION DISCLOSURE FORM**

- A. In accordance with N.J.S.A. 19:44A-20.1(3) "pay to play," Contracts exceeding \$17,500.00 are not to be entered into with business entities unless certain disclosures are made about political contributions.

1. In accordance with N.J.S.A 19:44A-20.26 Contractor shall be required to disclose political contributions made, if any, ten (10) days before entering into Contract in accordance with C.271 form. All bidders must complete this form and submitted with Bid Proposal Forms.

## **1.10 PROMPT PAYMENT ACT**

- A. The Owner will issue timely payments to Contractors in accordance with the requirements of the Prompt Payment Act, N.J.S.A. 2A:30A-1, et seq. The bidders are hereby notified that the Owner as a public entity requires all payments to be approved at scheduled public board meetings. The vote on authorization for payments will be made at the first public meeting of the Board following the Board's

receipt of the architect's authorization for payment and paid during the subsequent payment cycle.

#### **1.11 COMPREHENSIVE IRAN SANCTIONS, ACCOUNTABILITY, AND DIVESTMENT ACT OF 2010**

- A. In accordance with N.J.S.A. 52:32-57 (P.L. 2012, c.25), as amended and supplemented, the following Comprehensive Iran Sanctions, Accountability, and Divestment Act of 2010 will be a condition of the Contract as follows:
  - 1. 3.a. A person or entity that, at the time of bid or proposal for a new contract or renewal of an existing contract, is identified on a list created pursuant to subsection b. of this section as a person or entity engaging in investment activities in Iran as described in subsection f. of section 2 of this act, shall be ineligible to, and shall not, bid on, submit a proposal for, or enter into or renew, a contract with a State agency for goods or services.
  
- B. In accordance with P.L.2012, Chapter 25, C.52:32-58, as amended and supplemented, the following Comprehensive Iran Sanctions, Accountability, and Divestment Act of 2010 will be a condition of the Contract as follows:
  - 1. 4.a. A State agency shall require a person or entity that submits a bid or proposal or otherwise proposes to enter into or renew a contract to certify, at the time the bid is submitted or the contract renewed, that the person or entity is not identified on a list created pursuant to subsection b. of section 3 of this act as a person or entity engaging in investment activities in Iran described in subsection f. of this act.
  
- C. N.J.S.A. 18A:18A-49.4 Civil action brought on behalf of board of education.
  - 1. 8.a. A board of education as defined in and subject to the provisions of the "Public Schools Contracts Law," N.J.S.A. 18A:18A-1 et seq. (P.L. 1977, c.114), shall implement and comply with the provisions of N.J.S.A. 52:32-55 et seq. (P.L. 2012, c.25), except that the board shall rely on the list developed by the State Department of the Treasury pursuant to section 3 of N.J.S.A. 52:32-57 (P.L. 2012, c.25).
  - 2. 8.b. If the board determines that a person or entity has submitted a false certification concerning its engagement in investment activities in Iran under section 4 of N.J.S.A. 52:32- (P.L. 2012, c.25), the board shall report to the New Jersey Attorney General the name of that person or entity, and the Attorney General shall determine whether to bring a civil action against the person to collect the penalty prescribed in paragraph (1) of subsection a. of section 5 of N.J.S.A. 52:32-59 (P.L. 2012, c.25). The board may also report to the board's attorney the name of that person, together with its information as to false certification, and the board's attorney may determine to bring such civil action against the person to collect such penalty.

## 1.12 EQUAL EMPLOYMENT OPPORTUNITIES AND AFFIRMATIVE ACTION

- A. Bidders are required to comply with the requirements of N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27 et seq.
- B. Initial Project Workforce Report - Construction (AA201)
  - 1. In accordance with the requirements of the New Jersey Department of Labor & Workforce Development Construction EEO Compliance Monitoring Unit, the Initial Project Workforce Report-Construction(AA201)document, must be submitted to the Public Agency that awards the contract and the Department of Labor & Workforce Development Construction EEO Compliance Monitoring Program after notification of award, but prior to signing the contract.  
[www.state.nj.us/treasury/contract\\_compliance/pdf/aa201.pdf](http://www.state.nj.us/treasury/contract_compliance/pdf/aa201.pdf)

## 1.13 OFFICE OF THE STATE COMPTROLLER

- A. N.J.A.C 17:44-2.2: Authority to Audit or Review Contract Records
  - 1. Relevant records of private vendors or other persons entering into contracts with covered entities are subject to audit or review by the Office of the State Comptroller (OSC) pursuant to N.J.S.A. 52:15C-14(d).
    - a. (The contract partner) shall maintain all documentation related to products, transactions or services under this contract for a period of **five (5) years** from the date of final payment. Such records shall be made available to the New Jersey Office of the State Comptroller upon request.

## 1.14 ANTI-BULLYING BILL OF RIGHTS ACT (P.L. 2010.C.122)

- A. Section 4 of P.L.2002, c.83 (C.18A:37-16) is amended to read as follows:
  - 1. C.18A:37-16 Reprisal, retaliation, false accusation prohibited.
    - 4.a. A member of a board of education, school employee, student or volunteer shall not engage in reprisal, retaliation or false accusation against a victim, witness or one with reliable information about an act of harassment, intimidation or bullying.
    - b. A member of a board of education, school employee, contracted service provider, student or volunteer who has witnessed, or has reliable information that a student has been subject to, harassment, intimidation or bullying shall report the incident to the appropriate school official designated by the school district's policy, or to any school administrator or safe schools resource officer, who shall immediately initiate the school district's procedures concerning school bullying.
    - c. A member of a board of education or a school employee who promptly reports an incident of harassment, intimidation or bullying, to the appropriate school official designated by the school district's policy, or to any school

administrator or safe schools resource officer, and who makes this report in compliance with the procedures in the district's policy, is immune from a cause of action for damages arising from any failure to remedy the reported incident.

d. A school administrator who receives a report of harassment, intimidation, or bullying from a district employee, and fails to initiate or conduct an investigation, or who should have known of an incident of harassment, intimidation, or bullying and fails to take sufficient action to minimize or eliminate the harassment, intimidation, or bullying, may be subject to disciplinary action.

## **1.15 CONTROLLING SILICA EXPOSURES IN CONSTRUCTION**

### **A. Occupational Safety and Health Administration (OSHA) - U.S. Department of Labor: OSHA 3362-05, 2009**

1. The above referenced guidance document is not a standard or regulation, and it creates no new legal obligations. The document is advisory in nature, informational in content, and is intended to assist employers in providing a safe and healthful workplace. The Occupational Safety and Health Act requires employers to comply with safety and health standards promulgated by OSHA or by a state with an OSHA approved state plan. In addition, pursuant to Section 5(a)(1), the General Duty Clause of the Act, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take reasonable steps to prevent or abate the hazard. However, failure to implement any specific recommendations contained within this document is not, in itself, a violation of the General Duty Clause. Citations can only be based on standards, regulations, and the General Duty Clause.
  - a. This guidance document addresses the control of employee exposures to respirable dust containing crystalline silica, which is known to cause silicosis, a serious lung disease, as well as increase the risk of lung cancer and other systemic diseases.
  - b. This document provides information on the effectiveness of various engineering control approaches for several kinds of construction operations and equipment, and contains recommendations for work practices and respiratory protection, as appropriate.
  - c. OSHA encourages employers to conduct periodic exposure monitoring to confirm that engineering and work practice controls are effective and that appropriate respiratory protection is being used where necessary.
2. The above referenced document can be found at:  
[osha.gov/Publications/3362silica-exposures.pdf](https://www.osha.gov/Publications/3362silica-exposures.pdf)

**END OF SECTION 00860**

## **SECTION 00870 - MISCELLANEOUS REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 JOB SITE MEETINGS**

- A. Regularly scheduled job meetings shall be held at a location and time convenient to the Owner's representatives, the Architect and the Contractors. Each Prime Contractor shall attend such meetings, or be represented by a person in authority who can speak for and/or make decisions for the Contractor(s).
- B. Attendance by all Prime Contractors is mandatory, whether the meetings are weekly, bi-weekly or at whatever interval is determined by the Architect.
  - 1. Unless given prior approval by the Architect / Construction Manager, each Prime Contractor will be fined \$250.00 for each regularly scheduled meeting for which he/she is not presented by a person in authority who can speak for and/or make decisions for the Contractor. Fine amounts shall be withheld and deducted from the Contract Sum.

#### **1.2 STRUCTURAL SAFETY STANDARDS AND CODES**

- A. The standards, codes and design data referred to in the New Jersey "State Uniform Construction Code", apply to the work of the Contract, where applicable.
- B. Contractor shall comply with all applicable requirements of the Uniform Fire Safety Act (P.L. 1983, c. 383).

#### **1.3 OWNER'S RIGHT TO OCCUPY**

- A. The Owner reserves the right to occupy any portion of the Project which is ready for occupancy prior to completion and acceptance of the Project, after Local Municipal Construction Enforcing Agency approval.
- B. The occupancy of any portion of the Project does not constitute an acceptance of any work nor does it waive the Owner's right to liquidated damages or constitute an acceptance of any work as the Project will be accepted as a whole and not in units. Prior to such occupancy, however, the Architect, a representative of the Owner, and the Contractor shall fully inspect the portions of the Project to be occupied, preparing a complete list of omissions of materials, faulty workmanship, or any items to be repaired, torn out or replaced. The Owner will assume responsibility for damage to premises so occupied of any items not on this list when such damage is due to greater than normal wear and tear, but does not assume responsibility for improper or defective workmanship or materials.

#### **1.4 OWNER'S GENERAL REQUIREMENTS**

- A. The Owner requires Contractor(s) demonstrate a safety and health program/plan, which includes, but is not limited to first aid, fire protection, housekeeping, illumination, sanitation, personal protective equipment, medical, exit, emergency action plans and all other issues required by government agencies having jurisdiction over the work of this project.
- B. The following Owner's General Requirements shall be enforced during construction and until final completion of the work:
  - 1. No deliveries of construction materials or equipment is to take place during the arrival and departure of students from the school. Verify and coordinate student arrival and departure times with the School's Principal.
  - 2. All construction materials and equipment shall be stored behind the construction fence.
  - 3. No smoking on any of the School's Property.
  - 4. All workmen must wear shirts at all time.
  - 5. Use of profanity will not be tolerated.
  - 6. Each Prime Contractor shall provide identification cards for their subcontractors, employees, etc.
  - 7. All Contractors shall comply with the requirements of all local ordinances.

#### **1.5 ENVIRONMENTAL PROTECTION**

- A. Conform to New Jersey Department of Environmental Protection regulations N.J.A.C. 7:27, sub-chapters 5 and 7 and all other applicable standards.
- B. Conform to New Jersey Statute N.J.S.A. 26.2C-9.2 which requires that no person shall construct, install, alter or operate any equipment capable of causing the emission of air contaminants into the open air or control apparatus which prevents or controls the emission of air contaminants until an application has been filed with and approved by the Department of Environmental Protection.

#### **1.6 SOIL EROSION AND SEDIMENT CONTROL**

- A. Compliance with soil erosion and sediment control will be strictly enforced. Failure to conform to specified sequence of soil erosion and sediment control will result in imposition of penalties as levied by local soil conservation district, and withholding of payments for work not performed in accordance with soil erosion sequence.



## 1.7 RELATIONSHIP OF ARCHITECT AND CONSTRUCTION MANAGER

- A. Where reference is made to "Architect" in these specifications it will in some cases be interpreted as meaning "Construction Manager". Spheres of influence are defined in general as follows:

### **Architect**

Interpretation of Contract Documents.

Decisions relative to artistic effect.

Review and approval of shop drawings, product data, samples.

Review, recommendation and preparation of change orders.

Receipt of record drawings, operating and maintenance manuals.

Assistance with start-up, adjusting, operating and maintenance.

Review and recommendation of bid breakdown.

Review and approval of applications for progress payments.

Preparation of Punch Lists.

Close-out of contracts and determination of final completion.

Exclusions: Construction means, methods, techniques, sequences or procedures, safety precautions, acts or omissions of contractors, subcontractors, or any other persons.

### **Construction Manager**

Project meetings.

Monitoring of Contractors' work.

Review and approval of bid breakdown (Schedule of Values).

Review and forwarding of applications for progress payments.

Review and recommendations regarding proposed changes.

Administration of Progress Schedule and construction time schedules.

Assist in Preparation of Punch Lists.

Assist in Close-out of contracts and determination of final completion.

Exclusions: Construction means, methods, techniques, sequences or procedures, safety precautions, acts or omissions of contractors, subcontractors, or any other persons.

## 1.8 SEPARATE CONTRACT COORDINATION

- A. The Contractor for General Construction shall install the access doors, sleeves and inserts furnished to him/her, in the manner, and in the locations designated by the Contractor furnishing sleeves and inserts.
- B. The Contractor for General Construction shall provide chases, recesses, and unsleeved openings in new construction work as required to accommodate the work of other contractors, provided contractors requiring the chases, recesses, and other openings furnish the necessary information regarding size and location in the construction promptly, and in accordance with the established construction schedule, so that the chases, recesses, and other openings can be built-in by the Contractor for General Construction as the General Construction Work progresses.

- C. The Contractor for General Construction shall set anchor bolts and other accessories furnished to him/her, in the manner, and in the locations directed by the Contractor furnishing the anchor bolts and other accessories.
- D. The Contractor for General Construction shall provide foundations and supports for equipment furnished under the General Construction Contract, and foundations and supports shown on the General Construction Contract, drawings for equipment furnished by other Contractors. All other foundations and supports shall be provided by the other Contractor(s) requiring the foundations and supports to accommodate their work.

## **1.9 CERTIFIED PAYROLLS**

- A. Contractor shall furnish to the Owner certified payroll records each payroll period within 10 days of the payment of wages, indicating name, craft, social security number and actual hourly rate of wages paid to each workman employed on the project. A certified payroll record is defined as "a payroll record which is attested to by the employer, or a corporate officer of such company, or an authorized agent of the employer."

## **1.10 BUSINESS REGISTRATIONS FOR CONTRACTORS, SUBCONTRACTORS AND SUPPLIERS**

- A. Contractors and all subcontractors that knowingly provide goods or perform services for a Contractor fulfilling this contract must comply with all requirements under N.J.S.A. 52:32-44.

A contractor shall provide the contracting agency with the business registration of the contractor and that of any named subcontractor prior to the time a contract, purchase order, or other contracting document is awarded or authorized. At the sole option of the contracting agency, the requirement that a contractor provide proof of business registration may be fulfilled by the contractor providing the contracting agency sufficient information for the contracting agency to verify proof of registration of the contractor, or named subcontractors, through a computerized system maintained by the State.

c. A subcontractor named in a bid or other proposal made by a contractor to a contracting agency shall provide a copy of its business registration to any contractor who shall provide it to the contracting agency pursuant to the provisions of subsection b. of this section. No contract with a subcontractor shall be entered into by any contractor under any contract with a contracting agency unless the subcontractor first provides the contractor with proof of a valid business registration. For bids and requests for proposals, the contracting agency must retain the proof of business registration in the file where documents relating to the contract are maintained. For all other contracts, proofs of business registration shall be maintained in an alphabetical file.

d. The contractor shall maintain and submit to the contracting agency a list of subcontractors and their addresses that may be updated from time to time during the

course of the contract performance. A complete and accurate list shall be submitted before final payment is made for goods provided or services rendered or for construction of a construction project under the contract. A contracting agency shall not be responsible for a contractor's failure to comply with this subsection.

e. The Department of the Treasury shall provide each contracting agency with appropriate language reflecting the obligations of contractors and subcontractors under this section that the contracting agency shall include in any contract document, bid specification, requests for proposals, or other documents notifying potential contractors of contract opportunities with a contracting agency.

f. Nothing in this section shall in any way alter the provisions or change the responsibilities or obligations of casino industry licensees as set forth in section 92 of N.J.S.A. 5:12-92 (P.L. 1977, c.110).

g. (1) A contractor or a contractor with a subcontractor that has entered into a contract with a contracting agency, and each of their affiliates, shall collect and remit to the Director of the Division of Taxation in the Department of the Treasury the use tax due pursuant to the "Sales and Use Tax Act," N.J.S.A. 54:32B-1 et seq. (P.L. 1966, c.30), on all their taxable sales of tangible personal property delivered into this State.

(2) A contracting agency entering into a contract with a contractor, or a contractor with a subcontractor, shall include in its contract with that contractor, or a contractor with a subcontractor, for the term of the contract, a requirement that the contractor or subcontractor and each of their affiliates shall collect and remit to the Director of the Division of Taxation in the Department of the Treasury the use tax due pursuant to the "Sales and Use Tax Act," N.J.S.A. 54:32B-1 et seq. (P.L. 1966, c.30), on all their sales of tangible personal property delivered into this State.

(3) For the purposes of this subsection, "affiliate" means any entity that (1) directly, indirectly, or constructively controls another entity, (2) is directly, indirectly, or constructively controlled by another entity, or (3) is subject to the control of a common entity. For purposes of this subsection an entity controls another entity if it owns, directly or individually, more than 50% of the ownership interest in that entity.

h. The State Treasurer may adopt regulations pursuant to the "Administrative Procedure Act", N.J.S.A. 52:14B-1 et seq. (P.L. 1968, c.410), as are necessary to administer the provisions of this act.

i. If a contractor fails to provide proof of business registration upon request by the contracting agency for a contract that does not require bidding or a request for proposals, and the contracting agency determines that the purpose of that contract is of a proprietary nature with a contractor that does not have a business presence in New Jersey, the contracting agency shall provide the Division of Revenue, within 10 days of executing the contract, a copy of the contract, evidence of the contractor's taxpayer identification number, and a signed certification attesting to the proprietary nature of the contract and representing that the contracting agency made a diligent effort to obtain proof of a business registration from the contractor.

j. When a contracting agency enters into a contract with a contractor under a contract issued by the State of New Jersey Cooperative Purchasing Program, or any other authorized cooperative purchasing system, the contracting agency awarding the initial contract shall receive and file the proof of business registration. Contract documents issued under a cooperative purchasing agreement shall identify the contract and the contracting agency awarding the contract.

k. In situations of an emergent nature, a contracting agency may enter into a contract

with a business organization, provided that the contractor agrees to provide a business registration within two weeks of the execution of the contract. The contracting agency shall not pay the business organization for goods or services provided until such time as the organization provides proof of business registration as set forth in this section. Failure to pay the business organization until proof of business registration is received shall not be grounds for the agency being liable for payment. N.J.S.A. 52:32-44

- B. A Contractor, subcontractor or a supplier who fails to provide proof of business registration or provides false business registration information shall be liable to a penalty of \$25 for each day of violation, not to exceed \$50,000 for each business registration copy not properly provided or maintained under a contract with a contracting agency. Information on the law and its requirements are available by calling (609) 292-9292.

**END OF SECTION 00870**

## SECTION 01010 - SUMMARY OF WORK

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Project description.
  - 2. Contract(s) scope description.
  - 3. Contractor's use of the premises.
  - 4. Preconstruction meeting.
  - 5. Security procedures.

#### 1.3 PROJECT DESCRIPTION

- A. The project consists of the Additions, Alterations and Renovations (Phase 1) at the Northern Burlington County Regional High School for the Northern Burlington County Regional School District, Board of Education, Burlington County, New Jersey.
- B. Contract Documents prepared by Fraytak Veisz Hopkins Duthie, P.C. Architects/Planners, (Project Number: FVHD-5086.3A), 1515 Lower Ferry Road, Trenton, NJ 08618 and their Consulting Engineers:
  - 1. Consulting Civil Engineer: Van Cleef Engineering Associates, 4 AAA Drive, Suite 103, Hamilton, NJ 08691.
  - 2. Consulting Structural Engineer: Harrison-Hamnett, P.C., 40 Knowles St., Pennington, NJ 08534.
  - 3. Consulting Mechanical/Electrical Engineer: Sharpe Engineering, Inc., 555 Second Avenue, Collegeville, PA 19426.

#### 1.4 CONTRACT(S) SCOPE DESCRIPTION

- A. The **Base Bid** work consists of but is not limited to the following:
  - 1. All Site Work including indicated stabilized construction entrance, dewatering sump, roof drain / roof drain collector trench, storm inlets / manholes, concrete sidewalks and utility services.

2. Additions:

a. Fitness Center and Training Suite.

Please be advised that the Work of this Contract will be funded primarily by Bond referendum funds, and partially funded from other sources. Specifically, the following components are not part of the referendum-funded Work:

b. Fitness Center and Training Suite (Subparagraph A, 2.a above).

The billing and accounting for the referendum and non-referendum components of this Project will be kept separate to the greatest extent possible. By submitting a bid, Bidders warrant that they will use their best efforts to keep billing and related record-keeping for the referendum-funded aspects of the Project separate from the non-referendum components of the Project."

3. Alterations to existing building at the connections of the new addition(s) and indicated renovations .

a. Alterations and renovations to existing JROTC 306 (A175), and old Fitness Rooms A103 and A104.

b. Environmental / hazardous material abatement work.

4. All plumbing, mechanical and electrical system Work as indicated on the MEP drawings.

5. Fire safing of any penetration(s) or modification(s) made to fire rated walls or other assemblies.

6. All indicated casework and equipment.

7. All other indicated work.

B. The **Alternate Bid** work consists of but is not limited to the following:

1. All Site Work including indicated dewatering sump, roof drain / roof drain collector trench, and utility services.

2. Additions:

a. World Classroom & JROTC (Rooms A177 & A178).

Please be advised that the Work of this Contract will be funded primarily by Bond referendum funds, and partially funded from other sources. Specifically, the following components are not part of the referendum-funded Work:

1) World Classroom & JROTC (Subparagraph B, 2.a above).

The billing and accounting for the referendum and non-referendum components of this Project will be kept separate to the greatest extent possible. By submitting a bid, Bidders warrant that they will use their best efforts to keep billing and related record-keeping for the referendum-funded aspects of the Project separate from the non-referendum components of the Project."

3. Alterations to existing building at the connections of the new addition(s) and indicated renovations.
  - a. Alterations and renovations to existing Classroom 303 (A168).
  - b. Environmental / hazardous material abatement work.
4. All plumbing, mechanical and electrical system Work as indicated on the MEP drawings.
5. Fire safing of any penetration(s) or modification(s) made to fire rated walls or other assemblies.
6. All indicated casework and equipment.
7. All other indicated work.

#### C. SEPARATE PRIME CONTRACTS

1. General Construction Work: This Contract includes:
  - a. Work that is primarily architectural and civil in nature plus work traditionally recognized as general construction in accordance with drawings and as listed as a part of Part 2 specification sections, unless otherwise indicated below:
    - 1) Also includes both administrative and coordination responsibilities.
      - a) General Construction Contractor is responsible for all coordination between his work and work of all other Prime Contractors.
    - 2) All initial excavation inside the building, and the preparation of the subbase under the concrete slab.
    - 3) All earthwork, site utility work outside the building (storm drainage, water service) as specified in Part 2 specification sections.
      - a) **Site utility work shall be from 5' outside the building line, unless indicated otherwise in the Contract Documents, and include final utility connections and obtaining permits from all authorities having jurisdiction.**
    - 4) All Concrete work in accordance with Part 2 specification sections excluding concrete pads shown on mechanical and electrical drawings for mechanical and electrical work.
    - 5) Provide and install the metal fabrications in accordance with Division 2 Sections.
    - 6) Perform all existing roof cutting, alterations, repair, replacement and flashing work associated with General Construction Work, where indicated or required.

- a) Roofing work shall be performed in accordance with requirements of existing roofing system warranty and in accordance with the Contract Documents.
- b) Coordination of all required structural framing and supports for mechanical and electrical work whether shown or not.
- 7) Furnishing stainless steel sinks, fixtures, accessories, and all items supplied by the casework and equipment subcontractor in accordance with drawings and specification sections in Division 11, for installation by the Plumbing Work Contractor.
- 9) Furnishing all electrical devices and items supplied by the casework and equipment subcontractor in accordance with drawings and specification sections in Division 11 for installation by the Electrical Work Contractor.
- 10) Asbestos abatement/removal of all hazardous materials identified in the Owner's Consultant documents and in accordance with Federal, State and Local Regulations.

2. Structural and Miscellaneous Steel Work: This Contract includes:

- a. Fabrication and erection of structural steel, framing, metal deck, and miscellaneous metal fabrications in accordance with Part-3 specification sections.

3. Plumbing, Drainage System Work: This Contract includes:

- a. Piping servicing domestic water piping, gas piping, and drainage systems and connection of equipment tied into the above types of systems and including all work in accordance with drawings and Part-4 specification sections.
  - 1) Work shall include demolition and removals as indicated or required to allow for new construction.
  - 2) Work shall include reinstallation, cutting, patching, finishing and repair work associated with Plumbing, and Drainage System Work and as indicated or required including work at existing roofs; cutting, alterations, replacement and flashing work where indicated or required.
    - a) Roofing work shall be performed in accordance with requirements of existing roofing system's warranty and the Contract Documents.
- b. Subsequent excavation, backfill and compaction of trenches after the work of the General Construction Work and as required by the installation of plumbing utilities inside the building. Work shall be performed in accordance with requirements of Part-2 Specification sections.
- c. Concrete pads shown on mechanical drawings for mechanical work. Work shall be performed in accordance with requirements of Section 03300.
- d. **Work shall be up to 5' outside the building line, unless indicated otherwise in the Contract Documents, and include final utility connections and obtaining permits from all authorities having jurisdiction.**



4. Heating, Ventilating, Air Conditioning and Refrigeration Work: This Contract includes:
  - a. Heating, ventilating, and air conditioning systems as well as the temperature control systems and including all work in accordance with drawings and Part-5 specification sections.
    - 1) Work shall include demolition and removals as indicated or required to allow for new construction.
    - 2) Work shall include reinstallation, cutting, patching, finishing and repair work associated with HVACR work, as indicated or required including performing work at existing roofs; cutting existing roof decking, provide and install structural steel support, and all other roof flashing work where indicated or required.
      - a) Furnishing and installing all required structural framing and supports for roof top mechanical equipment at existing buildings whether shown or not.
      - b) Structural framing shall be as per typical roof framing conditions as shown on structural drawings and/or as per approved shop drawings by the Architect / Structural Engineer.
      - c) Roofing work shall be performed in accordance with requirements of existing roofing system's warranty and the Contract Documents.
  - b. Subsequent excavation, backfill and compaction of trenches after the work of the General Construction above, as required by the installation of mechanical utilities inside the building. Work shall be performed in accordance with requirements of Part-2 Specification sections.
  - c. Concrete pads shown on mechanical drawings for mechanical work. Work shall be performed in accordance with requirements of Section 03300.
5. Electrical Work: This contract includes:
  - a. The work necessary for electrical power distribution, lighting, and the connections to equipment tied into such systems and including all work in accordance with drawings and Part-6 specification sections.
    - 1) **Work shall include power distribution and wiring for all indicated electrically operated equipment and fixtures, (in Parts 2, 4, 5 and 6), whether shown or not on drawings.**
    - 2) Work shall include demolition and removals as indicated or required to allow for new construction.
    - 3) Work shall include reinstallation, cutting, patching, finishing and repair work associate with Electrical work and as indicated or required including performing work at existing roof(s); cutting existing roof decking, and all other roof flashing work:
      - a) Roofing work shall be performed in accordance with requirements of existing roofing system's warranty and the Contract Documents.

- b. Subsequent excavation, backfill and compaction of trenches after the work of the General Construction, above, as required by the installation of electrical utilities inside the building. Work shall be performed in accordance with requirements of Part-2 Specification sections.
  - c. Concrete pads shown on electrical drawings for electrical work. Work shall be performed in accordance with requirements of Section 03300.
  - d. **Work shall be up to 5' outside the building line, unless indicated otherwise in the Contract Documents, and include final utility connections and obtaining permits from all authorities having jurisdiction.**
6. Single Overall Contract: This contract includes:
- a. All work in accordance with drawings, Parts 2, 3, 4, 5 and 6 Specification Sections and in accordance with Contract Documents.

### **1.5 CONTRACTOR'S USE OF THE PREMISES**

- A. The space available to the Contractor for the performance of the work, either exclusively or in conjunction with others performing other construction as part of the project, is shown on the drawings.
  - 1. Other areas are off limits to all construction personnel.
- B. The following building facilities may not be used by construction personnel:
  - 1. Toilet facilities.
  - 2. Food service facilities, including dining areas.
- C. The Owner will occupy the building during the construction period.
  - 1. The Owner will endeavor to cooperate with the Contractor's operations when the Contractor(s) have notified the Owner in advance of need for changes in operations in order to accommodate construction operations.
  - 2. Conduct the work so as to cause the least interference with the Owner's operations.
- D. Coordinate with Local Authorities as to which routes are capable of handling heavy truck traffic.
- E. Signs: Provide signs adequate to direct visitors.
  - 1. Do not install, or allow to be installed, signs other than specified sign(s) and signs identifying the principal entities involved in the project.
- F. All deliveries by the Contractor(s) shall be coordinated with the Owner's Representative / Construction Manager, prior to the delivery date.

## **1.6 PRECONSTRUCTION MEETING**

- A. A preconstruction meeting will be held at a time and place designated by the Architect/ Construction Manager for the purpose of identifying responsibilities of the Owner's/ Architect's/ Construction Manager's personnel and explanation of administrative procedures.
- B. The Contractor(s) shall also use this meeting for the following minimum agenda:
  - 1. Construction schedule.
  - 2. Use of areas of the site.
  - 3. Delivery and storage.
  - 4. Safety.
  - 5. Security.
  - 6. Cleaning up.
  - 7. Subcontractor procedures relating to:
    - a. Submittals.
    - b. Change orders.
    - c. Applications for payment.
    - d. Record documents.
- C. Attendees shall include:
  - 1. The Owner / Owner's Representative.
  - 2. The Architect, and any Consultants.
  - 3. Construction Manager.
  - 4. Each Prime Contractor and his/her superintendent.
  - 5. Major subcontractors, suppliers, and fabricators.
  - 6. Others interested in the work.

## **1.7 SECURITY PROCEDURES**

- A. Limit access to the site and building(s) to persons involved in the work.
- B. Provide secure storage for materials for which the Owner has made payment and which are stored on site.
- C. Secure completed work as required to prevent loss.
- D. All Contractor(s), their employees and Subcontractor(s), will be required to be registered with the Owner's Representative / School's Main Office / Construction Manager's Office.
  - 1. The Contractor's personnel and Subcontractors will be required to wear identification badges at all times on the site.

**END OF SECTION 01010**

## SECTION 01020 - ALLOWANCES

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF REQUIREMENTS

- A. Definitions and Explanations: Certain requirements of the work related to each allowance are shown and specified in the contract documents. The allowance has been established in lieu of additional requirements for that work, and further requirements thereof (if any) will be issued by change order.
- B. The type of allowances scheduled herein for the work includes the following:
  - 1. Unit cost allowances.
  - 2. Lump sum allowances.
- C. Selection and Purchase: At the earliest feasible date after the award of the Contract, advise the Architect of the scheduled date when the final selection and purchase of each product or system described by each Allowance must be accomplished in order to avoid delays in the performance of the work. Obtain and submit proposals for the work of each Allowance, as required by the Architect for use in making the final selections; include whatever recommendations for selection may be relevant to the proper performance of the work. Purchase products and systems as specifically selected (in writing) by the Architect.
  - 1. Submit proposals and recommendations, for the purchase of the products or systems of Allowances, in the form specified for change orders.
- D. Change Order Data: Where applicable, include in each change order proposal both the quantity of the products being purchased and the unit cost, along with the total amount of the purchase to be made. Where requested, furnish survey-of-requirements data to substantiate the quantity. Indicate applicable taxes, delivery charges, and amounts of applicable trade discounts.
  - 1. For unit cost type allowances, submit (and revise where necessary) a substantiated survey of quantities of materials.
- E. Unit Cost Allowances: Each change order amount for unit cost type allowance shall be based solely upon the difference between the unit purchase amount and the unit allowance; multiplied by the final measure or count of work-in-place, with reasonable allowances, where applicable, for cutting losses, tolerances, mixing wastes, normal product imperfections and similar margins. Include installation costs in purchase amount only where indicated as included in the allowance. When requested, prepare explanations and documentation to substantiate margins as claimed. Prepare and submit separate substantiation of change in scope of work (if any) claimed in the change orders related to unit cost type allowance.
  - 1. The Owner reserves the right to establish the actual quantity of work-in-place, by independent quantity survey, measure or count.

- F. Lump-Sum Allowances: The amounts herein specified are the net amounts available for purchase of the materials specified, including taxes (if any), and each change order amount shall be based thereon. **All other costs associated with the performance of the work under the Allowance, including but not limited to insurance, storage, handling, overhead, profit, etc., are not a part of the allowance, and shall be included in the lump sum bid / or base bid Contract amount.**
  - 1. In the event the actual purchase amount of materials, plus taxes (if any) exceeds the specified allowance, the Owner will pay the excess; should the actual purchase amount, plus taxes (if any) be less than the specified Allowance, the Contractor shall credit the Owner with the difference.
  - 2. The actual purchase amount, plus taxes (if any) shall be substantiated by certified bills of sale to be submitted with the change order.
- G. Change Order Mark-Up: Except as otherwise indicated, comply with the provisions of the General Conditions and the Supplementary General Conditions.
- H. Excess Materials: Submit invoices or delivery slips to indicate the actual quantities of materials delivered to the site for use in fulfillment of each allowance. Where economically feasible, and so requested by the Architect, return unused materials to the manufacturer/supplier for credit to the Owner, after the installation has been completed and accepted. Where not economically feasible to return for credit, and so requested by the Architect, prepare unused materials for the Owner's storage, and delivery to the Owner's storage space as directed. Otherwise, disposal of excess materials is the Contractor's responsibility.

**1.2 SCHEDULE OF ALLOWANCES**

- A. General: The following allowance amounts are included in the Contract Sum, for the corresponding units of work as described.
  - 1. General Construction Work
    - a. A Unit cost allowance for brick delivered and stored at project site, as follows:
      - 1) Modular Face Brick (incl. special shapes) . . . . . **\$800.00 per 1,000.**
      - 2) Norman (Scored) Face Brick . . . . . **\$1,000.00 per 1,000.**
    - b. A sum of **\$30,000.00** for work not specifically shown on the drawings, the work shall be performed as directed in the field.
    - c. A sum of **\$10,000.00** for asbestos abatement work at the renovation areas as shown on the drawings and indicated in the specification section(s) prepared by the Owner's Hazardous Material Abatement Consultant.

2. Structural Steel Work
  - a. A sum of **\$4,000.00** (1 ton of steel @ \$4,000.00 per ton) for additional fabricated and erected steel as defined by and specified in Section 05120, Structural Steel.
3. Plumbing, Drainage and Sprinkler Work
  - a. A sum of **\$6,000.00** for work not specifically shown on the drawings, the work shall be performed as directed in the field.
4. Heating Ventilating and Air Conditioning Work
  - a. A sum of **\$20,000.00** for work not specifically shown on the drawings, the work shall be performed as directed in the field.
5. Electrical Work
  - a. A sum of **\$10,000.00** for work not specifically shown on the drawings, the work shall be performed as directed in the field.
  - b. Additional outlets:
    - 1) Allow a sum of money in the Base Bid for 5 additional outlets, location to be selected by the Architect. Work will include the following:
      - a) Conduit from closest panelboard, outlet box of size and type required, wire and connection to branch circuit protective device in panelboards.
      - b) An outlet shall be as defined in the National Electric Code or American Standard with the addition of a local light control switch for lighting fixtures, which shall also be defined as an outlet.
      - c) Include a unit price for one outlet, reflecting all of the above, in the proposal to be used in computing additions to or deductions from the contract price.
  - c. Moving outlets:
    1. The Owner, through the Architect, reserves the right to move any outlet a distance of 10 feet before roughing in without additional expense to the Owner.

**END OF SECTION 01020**

## **SECTION 01030 - ALTERNATE BIDS**

### **PART 1 - GENERAL**

#### **1.1 PROCEDURE FOR ALTERNATE BIDS**

- A. Each Bidder shall submit on the Proposal Form, all Alternate Bids applicable to the work under his/her bid. Alternate Bids shall state the difference in price as "additions to" or "deductions from" the Base Bid, unless otherwise noted, for the substitution, omission, or addition of the following materials, items or construction from that shown and specified.
- B. The Alternate Bids, when accepted, become part of the Contract.
- C. Each Bidder shall carefully check the Drawings and Specifications to determine the extent of each Alternate Bid required.
- D. Alternate Bids shall include all overhead and profit applicable thereto.
- E. Alternate Bids shall reflect the increase or decrease in cost of all work of every name and nature which may be affected thereby and no subsequent claims for extras by reason of the Contractor's failure to observe this requirement will be considered.
- F. The description herein for each Alternate Bid is recognized to be incomplete and abbreviated, but implies that each change must be complete for the scope of work affected. Refer to applicable specification sections and to applicable drawings, for specific requirements of the work, regardless of whether references are so noted in description of each Alternate Bid. Coordinate related work and modify surrounding work as required to properly integrate with the work of each Alternate Bid. It is recognized that descriptions of Alternate Bids are primarily scope definitions, and do not necessarily detail full range of materials and processes needed to complete the work as required.
- G. Except as otherwise described or approved, materials and workmanship of the Alternate Bids shall conform to the requirements specified under the various sections of the Specifications for similar items of work.
- H. Where methods of construction, materials, finishes or details of installation required by the various Alternate Bids differ from the requirements shown on the drawings or specified for corresponding items, the alternate construction, materials, etc. will be subject to approval by the Architect.
- I. The Contractor shall submit shop drawings and samples for the work under each accepted Alternate Bid for approval in conformance with requirements specified for submittals in both Part 1, AIA Document A232 and Section 00800 - Supplementary General Conditions.
- J. The following Alternate Bids shall apply to separate and single overall bids, and must be included in the Bidder's Proposal(s).

## **1.2 ALTERNATE BIDS - GENERAL CONSTRUCTION WORK**

### **A. Alternate Bid No. G-1: World Language Classroom / JROTC Additions and Classroom 303 Alterations**

State the amount to be added to the base bid to construct the World Language Classroom (A177) / JROTC (A178) Additions, Alterations to Classroom 303 (A168) and all associated Work, as shown on various drawings and as indicated in various specification sections.

## **1.3 ALTERNATE BIDS - STRUCTURAL AND MISCELLANEOUS STEEL WORK**

### **A. Alternate Bid No. S-1: World Language Classroom/ JROTC Additions**

State the amount to be added to the base bid to provide and install the structural and miscellaneous steel work for the World Language Classroom (A177) / JROTC (A178) Additions, and all associated Work, as shown on various drawings and as indicated in various specification sections.

## **1.4 ALTERNATE BIDS - PLUMBING, DRAINAGE AND GAS FITTINGS WORK**

### **A. Alternate Bid No. P-1: World Language Classroom/ JROTC Additions**

State the amount to be added to the base bid to provide and install the plumbing and drainage related work for the World Language Classroom (A177) / JROTC (A178) Additions, and all associated Work, as shown on various drawings and as indicated in various specification sections.

## **1.5 ALTERNATE BIDS - HEATING, VENTILATING, AIR CONDITIONING & REFRIGERATION WORK**

### **B. Alternate Bid No. H-1: World Language Classroom/ JROTC Additions and Classroom 303 Alterations**

State the amount to be added to the base bid to provide and install the HVACR related work for the World Language Classroom (A177) / JROTC (A178) Additions, Alterations to Classroom 303 (A168) and all associated Work, as shown on various drawings and as indicated in various specification sections.

## **1.5 ALTERNATE BIDS - ELECTRICAL WORK**

### **A. Alternate Bid No. E-1: World Language Classroom/ JROTC Additions and Classroom 303 Alterations**

State the amount to be added to the base bid to provide and install the Electrical related work for the World Language Classroom (A177) / JROTC (A178) Additions, Alterations to Classroom 303 (A168) and all associated Work, as shown on various drawings and as indicated in various specification sections.

**END OF SECTION 01030**



## **SECTION 01040 - COORDINATION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections included in Part-2 through Part-6.

#### **1.2 REQUIREMENTS INCLUDED**

- A. Coordination of submittals.
- B. Coordination meetings.
- C. Coordination drawings.
- D. Coordination of project closeout.
- E. Administrative/supervisory personnel.
- F. Coordination of trades.
- G. Coordination of space.
- H. Coordination of field measurements and field conditions.

#### **1.3 GENERAL REQUIREMENTS**

- A. Each Prime Contractor shall coordinate his/her activities with the activities of other (Sub)Contractors and work performed by others.
  - 1. All requirements not specifically assigned to the General Construction Work Contractor shall apply to all Prime Contractors.
- B. If necessary, inform each party involved, in writing, of procedures required for coordination; include requirements for giving notice, submitting reports, and attending meetings.
  - 1. Inform the Architect when coordination of his/her work is required.

#### **1.4 COORDINATION OF SUBMITTALS**

- A. Coordinate and correlate the submittals on each work item and on interrelated work items to ensure their timeliness, completeness, consistency, compatibility and compliance with the Contract Documents.

- B. Prepare and submit special coordination drawings where close and careful coordination of information is required for proper fabrication or installation of materials, products or equipment by separate entities. Coordination drawings may also be required where limited space availability necessitates close and careful coordination for efficient and proper installation of different components.
  - 1. Show interrelationships of components shown on separate shop drawings.
  - 2. Indicate required installation sequences.
  - 3. (See also the requirements for the general coordination drawings under paragraph 1.7 below).
- C. Coordinate any request for substitution to ensure compatibility of its space requirements, its operating characteristics and elements and its effects on other work. Prior to proposing a substitution for any item, verify that its size, configuration, supports and connections will coordinate with all other work and that it will fit within the allotted space while allowing for proper operating, maintenance and circulation space.
- D. Comply with requirements for requests for submittal of substitution indicated in AIA A232 and Section 00800.

#### **1.5 COORDINATION MEETINGS**

- A. The General Construction Work Contractor shall hold additional coordination meetings and conferences with Prime Work Contractors, and others involved in the Work as needed to ensure coordination of work.
  - 1. Notify the Architect and Construction Manager of such coordination meetings.
- B. Regular project site meetings shall be in accordance with Sections 00870 and 01200.

#### **1.6 COORDINATION OF TRADES**

- A. Coordinate construction activities included under various sections of these Specifications to ensure efficient and orderly installation of each part of the Work and to prevent interferences among parts of the Work. Coordinate work items and construction operations included under different sections of the Specifications that are dependent upon one another for proper installation, connection and operation.
  - 1. Where installation of one part of the Work is interrelated with installation of other components, schedule construction activities in the sequence required to obtain the best results.
  - 2. Where availability of space is limited, coordinate installation of different components to prevent interferences and to ensure proper accessibility for required maintenance, service and repair.

3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda outlining special procedures required for coordination. Include such items as required notices, reports and attendance at meetings. Distribute these coordination memoranda to all parties involved in the work being coordinated.
1. Prepare similar memoranda for the Owner and other Contractor(s) where coordination with construction or operations by them is required.
  2. Provide copies of such coordination memoranda to the Architect.
- C. Coordinate the scheduling and timing of required administrative activities with other construction activities to avoid conflicts and ensure orderly progress of the Work. Administrative activities include:
1. Preparation and updating of schedules.
  2. Preparation and processing of submittals.
  3. Preparation and processing of requests for information.
  4. Project meetings.
  5. Testing and inspection activities.
  6. Project close-out activities.

## **1.7 COORDINATION DRAWINGS**

- A. General Requirements: Prepare coordination drawings where limited space available may cause conflicts in the locations of installed products, and where required to coordinate installation of products.
1. In preparing the coordination drawings, large scale details as well as cross and longitudinal sections shall be developed as required to fully delineate all conditions. Particular attention shall be given to the locations, size and clearance dimensions of equipment items, shafts and similar features.
  2. In preparing the coordination drawings, minor changes in duct, pipe or conduit routing that do not affect the intended functions may be made as required to avoid space conflicts, when mutually agreed, but items may not be resized or exposed items relocated or other features affecting the function or aesthetic effect of the building changed without the Architect's prior review and acceptance. It should be assumed that no changes shall be made in any wall or chase locations, ceiling heights, door swings or locations, or window or other openings. If conflicts or interferences cannot be satisfactorily resolved, then the Architect shall be notified and their determinations obtained. Any conflicts or design deviations shall be specifically identified on drawings submitted to them.
  3. The coordination drawings shall be submitted, in all cases, in ample time to avoid construction delay. The coordination drawings submitted may lack

complete data in certain instances pending receipt of shop drawings, but sufficient space shall be allotted for the items missing, as evidenced by the sign-off of the party responsible for the missing items. When the missing information is available, it shall be promptly incorporated in the composite drawings.

4. Cost and time impacts of relocating any duct, pipe, conduit, or other material that has been installed without proper coordination between all trades involved will be charged to the responsible party. If any improperly coordinated work or work installed that is not in conformance with the approved coordination composites necessitates additional work, the cost and time impacts of all such additional work shall likewise be the responsibility of the affective party. The Architect shall be the sole judge in determining all responsibilities.
  5. All changes in the scope of work due to revisions formally issued and approved shall be shown on the composite drawings.
  6. All work on the coordination drawings shall be performed by a competent draftsmen and shall be clear and fully legible. The Architect shall be the judge of the legibility of the composite drawings.
  7. In particular, prepare the following coordination drawings:
    - a. Drawings showing all piping, duct, cabletrays, electrical ductbanks, and similar items, but not electrical conduit less than 4 inches in diameter.
    - b. Complete architectural, mechanical and electrical reflected ceiling layouts, (including ductwork, conduits, piping, lighting, etc.).
    - c. Special coordination drawings are to be provided for the following:
      - 1) Where space is limited, show plan and cross-section dimensions of space available, including structural obstructions and ceilings as applicable.
- B. Each Prime Contractor shall prepare the coordination drawings required for his/her work.
- C. Where more than one Prime Contractor will be performing the work to be shown, and one is the Contractor for General Construction Work, that contractor (General Construction Work Contractor) shall prepare the coordination drawings.
- D. Where more than one Prime Subcontractor will be performing the work to be shown, and the Contractor for General Construction Work is not involved in preparing the drawings, the Architect will designate the Prime Contractor who is to initiate the preparation and pass the drawings on to the other Prime Contractors for their input; conflicts which arise shall be resolved between the Contractors involved.

- E. Layout Drawings: As soon as practical, but in no case starting later than thirty (30) days after the HVACR Work Contractor has received the notice to proceed, the HVACR Work Contractor shall prepare layout drawings of all duct work and piping at not less than 3/8" scale.
1. These drawings shall show registers, grilles, diffusers and similar features, as well as locations of all units, valves, dampers and other items requiring access for service and maintenance.
  2. The drawings shall also show roof, floor and wall openings, reflected ceiling layouts, structural beams, framing and miscellaneous structural steel supports, ceiling heights, walls, floor to floor dimensions, structural columns, doors and other major architectural and structural features as shown on the architectural and structural drawings and as per approved shop drawings.
- F. Composite Drawings:
1. The HVACR Work Contractor shall, as scheduled by the General Contractor, produce a mylar, two (2) prints and one (1) sepia of each layout drawing as described.
  2. The sepia will be retained for his/her records while the mylar and two (2) prints will be formally transmitted to the Plumbing Contractor, with copies of the transmittal to the Architect.
  3. These drawings must be hand delivered or sent via a reliable mailing service that provides receipts and guarantees 24-48 hour delivery.
    - a. Common carrier mailing will not be acceptable.
  4. The Plumbing Work Contractor, upon receipt of these mylars, will transfer the work from his/her shop drawings to the mylars, at the same time indicating where conflicts exist between his/her work and the work already shown on the mylars.
    - a. The Plumbing Work Contractor will utilize a green colored pencil for the layout of his/her work.
    - b. After completion, the Plumbing Contractor will forward the mylars and two (2) prints to the Electrical Contractor while retaining a sepia for his/her records.
    - c. The same mailing procedures will pertain.
  5. The Electrical Work Contractor will duplicate the procedure outlined above, utilizing orange colored pencil for his/her layout.

- a. After completion the Electrical Contractor will forward the drawings as specified above to the Fire Protection Work Subcontractor, (Plumbing Work Contractor), if applicable, who will layout his/her work with a red pencil and, after completion, forward the drawings to the General Contractor, retaining a sepia for his/her records.
6. The General Construction Work Contractor shall then have the HVACR's instrumentation (ATC) Work Subcontractor review the completed composite drawings and attest to his/her concurrence that his/her work can be installed without conflict.
7. The General Construction Work Contractor will schedule coordination meetings on the job site to review the coordination drawings.
  - a. These meetings will be attended by a representative from each of the Subcontractors or Prime Contractors involved in the coordination process
  - b. At these meetings, these Subcontractors or Prime Contractor will indicate where conflicts exist and resolve the conflicts through mutual agreement.
  - c. Should an impasse occur, the Architect will determine the resolution.
8. When all conflicts are resolved, the Subcontractors or Prime Contractor will indicate their agreement by signing these final composite drawings.
9. The drawings shall be signed-off by each of the involved Subcontractors, or Prime Contractors indicating their awareness of and agreement with the indicated routings and layouts and their interrelationship with the adjoining or contiguous work. The General Contractor shall then sign these final composite drawings.
10. The final composite drawings shall be completed and signed-off by all parties no later than ninety (90) calendar days after the General Construction Work Contractor has received the Notice to Proceed.
  - a. After the final composite drawings have been agreed upon and signed by the Subcontractors or Prime Contractors and by the General Construction Work Contractor, the General Construction Work Contractor shall provide and distribute prints to each of the (Sub)Contractors, and four (4) sets of prints to the Architect for reference and record purposes.
  - b. The record copies of the signed-off final composite drawings shall be retained by the General Construction Work Contractor and each Prime Subcontractor or Prime Contractors as working reference documents.
  - c. All shop drawings, prior to their submittal to the Architect / Construction Manager, shall be compared with these composite drawings and developed accordingly.

- 1) Any revisions to the composite drawings which may become necessary during the progress of the work shall be noted by the General Construction Work Contractor and by each affected (Sub)Contractor and shall be neatly and accurately recorded on their record copies.
11. The General Construction Work Contractor and each (Sub)Contractor shall be responsible for the up-to-date maintenance of his/her record copies of the composite drawings and for having one up-to-date copy available at the site.
12. The composite drawings, incorporating any subsequent changes thereto, shall be utilized by the General Construction Work Contractor or each (Sub)Contractor in the development of his/her record drawings.
13. Following sign-off of the final composite drawings, no deviations will be permitted without prior review and acceptance by the Architect.
  - a. Unauthorized deviations will be subject to removal and correction at no additional cost to the Owner.
14. In areas where no HVAC work occurs, but where other mechanical and electrical installations are required, each involved Subcontractor or Prime Contractor shall be responsible for his/her own work and shall cooperate, as directed by the General Construction Work Contractor, in preparing similar layout and composite drawings.

## **1.8 COORDINATION OF PROJECT CLOSEOUT**

- A. Coordinate completion and clean-up work and administrative activities in preparation for Substantial Completion and occupancy of the Work or of designated portions of the Work.
- B. After Owner occupancy, coordinate access for completion or correction of the work not in conformance with the Contract Documents to minimize disruption of Owner's activities.
- C. Assemble and coordinate closeout submittals specified in Section 01700.

## **1.9 REQUIRED ADMINISTRATIVE / SUPERVISORY PERSONNEL**

- A. General: In addition to the other administrative and supervisory personnel required for the performance of the Work, each Prime Contractor shall provide specific coordinating personnel as specified herein.
- B. Project Manager / Superintendent: A full time on site Project Manager, with a recommended minimum of eight (8) years experience, including project management experience on a similar type of projects.

1. The Contractor for General Construction Work shall provide a full-time staff member or members, (Project Manager/Superintendent), experienced in coordination of mechanical and electrical work on projects of this type and scale, including administration and supervision.
  - a. Responsibilities:
    - 1) Coordinate all mechanical, plumbing, and electrical work, and coordinate that work with the other work of the project.
    - 2) Where space is limited, coordinate arrangement of mechanical, electrical, and other work to fit.
    - 3) Coordinate cutting and patching activities and sequencing.
    - 4) Coordinate use of temporary facilities.
  - b. Prepare coordination drawings where required and where indicated.
  - c. Provide information to the entity preparing the progress schedule.
  - d. Participate in progress meetings; report progress, changes required in schedules, and unresolved problems.
  - e. Review submittals for compliance with the contract documents and for coordination with other work.
  - f. Check field dimensions, clearances, relationships to available space, and anchors.
  - g. Check compatibility with equipment, other work, electrical characteristics, and operational control requirements.
  - h. Check motor voltages and control characteristics.
  - i. Coordinate controls, interlocks, wiring of switches, and relays.
  - j. Coordinate wiring and control diagrams.
  - k. Review the effect of changes on other work.
  - l. Obtain and distribute installation data on each item of equipment requiring mechanical or electrical connections; include:
    - 1) Electrical power characteristics.
    - 2) Control wiring requirements.
  - m. Observe and maintain record of tests and inspections.
  - n. Observe work for compliance with contract documents and notify the applicable contractor in writing of observed defects in the work.



- o. Coordinate and observe startup and demonstration of equipment and systems.
  - p. Coordinate maintenance of record documents.
  - q. Assist the Architect / Construction Manager with final inspections.
2. Other Prime Contractor(s) / Subcontractor(s) shall provide staff for coordination between trades. Staff requirements noted above represent the minimum full-time on site staff required.
  3. Staffing is subject to Owner / Architect / Construction Manager's approvals.
  4. Staff members may not be removed or replaced without Owner/Architect's approvals.
  5. Staff name(s), duties and resumes are to be submitted to the Architect for approval within fifteen (15) days of the Notice to Proceed.

#### **1.10 COORDINATION OF TRADES**

- A. Coordinate work with other trades to eliminate any possible interference before any piping, conduit, equipment, devices, controls, supports, ductwork and fixtures are installed.
- B. Where multiple items of mechanical and electrical equipment, devices, piping, conduits, supporting metal work, hangers, pull boxes, outlets, ductwork or controls are shown on any of the Contract Documents of the various trades in the same location, coordinate and adjust items to fit within designated location(s).
- C. Provide and install necessary offsets, bends, turns and modifications in piping, ductwork, conduit and devices required to install the work without interference with that of other trades or structure, without additional cost to the Owner.
- D. For products specified to be furnished by one Contractor and installed by another Contractor:
  1. Contractor specified to furnish (or remove) product shall be responsible for delivery to (or return from) the project site, and shall pay transportation costs.
  2. Contractor specified to install product shall be responsible for coordinating product delivery, loading or unloading, storing, protecting and installing product as required.

#### **1.11 COORDINATION OF SPACE**

- A. Coordinate use of available space and sequence of installation for work (e.g., mechanical and electrical work) which is indicated diagrammatically or schematically

on the drawings. Prevent physical interference of components. Follow routing shown for pipes, ducts and conduits, taking into account the limitations of available space; make runs parallel with lines of building. Utilize space efficiently to ensure proper installations (including installation of other work) and accessibility for maintenance, service and repairs.

- B. Detailed drawings of proposed departures from spatial arrangements or locations indicated in the Contract Documents, due to field conditions or other causes, shall be submitted to the Architect for review. No such departures shall be made without prior review by the Architect.
- C. Where required for coordination, the Architect will have the authority to order, as changes in the Work, changes in locations and sizes of piping, ductwork conduit, raceways and ducts. Such changes shall be made without adjustment to the Contract Sum or Contract Time.
- D. Field verify measurements of existing items and work which precedes each sequence. Ensure proper fit and location.
- E. In finished areas, conceal pipes, ducts and wiring in the construction.
- F. Coordinate locations of fixtures and outlets with finish elements.

#### **1.12 COORDINATION OF FIELD MEASUREMENTS AND FIELD CONDITIONS**

- A. Prior to ordering materials or equipment or performing work, the Contractors and/or Subcontractors shall verify Contract Document and submittal of dimensions and weights affecting their work and other Prime Contractor's work associated with field measurements and field conditions at the project site, (for site and building work), and shall be responsible for their accuracy and correctness.
- B. Differences discovered from dimensions or weights indicated in the Contract Documents or submittals shall be submitted in writing to the Architect for review, before proceeding with the work.
- C. Commencing work implies acceptance of surfaces, areas, preceding work and other field conditions, and verification of dimensions, by the Contractor.
- D. No Change Order will be issued in cases where discrepancies in dimensions are discovered after work has been commenced or where the Contractor has failed to properly investigate and take into account field measurements and existing field conditions.
- E. Inspection of Conditions: Require the Installer of each major component to inspect both substrate and conditions under which his/her work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

- F. Recheck measurements and dimensions, before starting each installation.
  - 1. Submit to the Architect for review any change in dimensions shown on the Contract Documents or submittals affecting physical size, shape or location of any part of the work, whether due to field conditions or other causes.
  
- G. Passage of equipment:
  - 1. Establish passage clearances required to deliver, install and erect mechanical and electrical equipment. Wherever necessary, provide equipment in sections or knocked down in order to allow passage of equipment through available openings.
  - 2. Where there is not sufficient clearance for passage of mechanical or electric equipment, deliver, install and protect such equipment before confining walls, floors, slabs and steel work are erected. Schedule and coordinate this work with the work of other trades.
  - 3. If any structure, equipment or system must be altered to allow passage of equipment, the person or entity responsible for providing that structure, equipment, or system shall restore it to its original condition, without additional cost to the Owner.
  - 4. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
  
- H. Verify the size of shafts and chases, the adequacy of partition thickness and the clearance in double partitions and hung ceilings for proper installation of work.
  - 1. (Sub)Contractors shall cooperate in arranging their work with other (Sub)Contractors whose work is in the same spaces.
  - 2. The amount of space occupied by each trade's work shall be kept to the minimum required.
  - 3. Arrange for chases, slots and openings in other building components during progress of construction, to allow for timely installation of work.
  
- I. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
  
- J. Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.

- K. Provide all appropriate structural supports, hangers, wires for roof, floor and wall and associated assemblies which include but are not limited to materials, finishes, equipment, fixtures, piping, raceways, mechanical and electrical components. This work shall be in conformance with requirements of the Contract Documents whether or not indicated by a reference in specification or as may be in detail shown on drawings and schedules.
- L. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- M. Install each component during weather conditions and construction status that will ensure best possible results. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.
- N. Coordinate temporary enclosures with required inspections and tests, to minimize necessity of uncovering completed construction for that purpose.
- O. Where mounting heights are not indicated:
  - 1. Install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.
  - 2. Install mechanical and electrical systems, materials and equipment to provide maximum possible headroom. Maintain maximum headroom and space conditions. Where headroom or space conditions (less than 8'-0") appear inadequate, the Architect shall be notified before proceeding with the work.

**END OF SECTION 01040**

## **SECTION 01050 - ALTERATIONS, CUTTING, PATCHING AND REFINISHING WORK**

### **PART 1 - PRODUCTS**

#### **1.1 RELATED DOCUMENTS**

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections included in Part-2 through Part-6.

#### **1.2 DESCRIPTION**

- A. Work included: Alterations, removals and demolition required for this work include, but are not necessarily limited to:
  - 1. Alterations, cutting, patching, removal and preparation work to be done as noted on drawings and as required to complete construction.
  - 2. Patching and refinishing of existing surfaces damaged or left unfinished as a result of this work, including site work and existing ground surfaces; concrete surfaces, bituminous paving surfaces, etc.
  - 3. Protection.
  - 4. Asbestos.
    - a. The project involves performing asbestos abatement under this contract. No work may commence until the area of abatement has been cleared by the Owner's Environmental Consultant:
      - 1) Briggs Associates, A Division of H & R Environmental Services, Inc.  
3 Crosswicks Street, Bordentown, NJ 08505  
Tel.# 609.298.5520
    - b. The/Each Prime Contractor shall review and familiarize themselves with the Owners Asbestos Hazard Emergency Response Act (AHERA) report prior to the commencement of any demolition activity. Also, the/all Prime Contractor(s) will be provided with an inventory of all ACM (Asbestos Containing Materials) in the buildings where they are working, and will be required to sign a form (provided by the Owner) that they are in receipt of the inventory.
    - c. Contractor(s) is/are herein cautioned that asbestos may be within concealed spaces where work will be taking place. The Contractor shall immediately notify the Owner if any concerns or conditions arise in regards to potential asbestos containing building materials (ACBM's) in order that the owner may verify same and take appropriate action. The Contractor shall not proceed with the work until the material has been

abated and air sampling clearance levels have been achieved as set forth by the Owner's Environmental Consultant.

- d. The Contractor shall employ personnel who are trained in accordance with OSHA workplace standards as they pertain to asbestos.
  - e. **The Architect / Engineer has no authority or professional involvement relative to the hazardous material/asbestos removal or disposal phase for this project and are not available for questions and/or direction in this regard. The hazardous material/ asbestos reference is included as a convenience for the Owner, and the Architect accepts no responsibility nor liability for the accuracy of information, bidders conclusions, methods to be used, nor for any aspect of approvals required by the Contractor in undertaking and completing this project insofar as hazardous material/asbestos is concerned. The Contractor shall direct any/all questions and concerns to the Owners Hazardous Material Abatement Consultant.**
  - f. Worker and Community Right to Know Act Requirements
    - 1) It is required that the Contractor and/or Subcontractors comply with all of the requirements of HAZCOM 2012 and New Jersey Right To Know (RTK) program. General Contractor is responsible for ensuring that containers of substances belonging to the Contractor and/or Subcontractors that are stored at the Owner's facility are properly RTK labeled. Refer to N.J.A.C. 8:59-5.10.
    - 2) Surveys of hazardous substances stored at the Owner's facility by the Contractor and/or Subcontractor are to be provided to the Owner of the facility. Refer to N.J.A.C. 8:59-2.2(h).
    - 3) Material Safety Data Sheets (MSDS) and/or Safety Data Sheets (SDS) from manufacturers must be provided to the Owner for all products present at, purchased for, and brought on site by Contractors and/or Subcontractors to the Owner's facility. Refer to N.J.A.C. 8:59-2.2(1).
    - 4) Contractor and/or all Subcontractors must submit, prior to starting any work, a copy of their approved Hazard Communication Plan - 29 CFR 1910.1200.
5. This project shall be subject to the requirements of the EPA "Renovation, Repair and Painting" rule including the following:
- a. Each Prime Contractor must be lead safe trained and certified. Each Prime Contractor will be required to submit a copy of their EPA certificate prior to the start of the work.
  - b. Each Prime Contractor shall provide the Owner with a copy of the EPA's Lead Hazard Management information pamphlet "Renovate Right-

Important Lead hazard Information for Families, Child Care Providers and Schools” prior to the start of any renovation work. The Contractor shall have the Owner sign a pre-renovation disclosure form confirming receipt of the pamphlet.

- c. Each Prime Contractor shall at all times employ lead safe practices as identified in the rules.
6. This project shall be subject to the requirements of the EPA rules on diesel exhaust and off-site particulate dust, including the following:
- a. Diesel exhaust contributes the highest cancer risk of all air toxics in New Jersey and is a major source of NOx within the state. Therefore, per NJ DEP recommendations, construction projects involving non-road diesel construction equipment operating in a small geographic area over an extended period of time shall implement the following measures to minimize the impact of diesel exhaust:
    - 1) All on-road vehicles and non-road construction equipment operating at, or visiting, the construction site shall comply with the three minute idling limit, pursuant to N.J.A.C. 7:27-14 and N.J.A.C. 7:27-15. Contractor shall purchase "No Idling" signs to post at the site to remind subcontractors to comply with the idling limits. Signs are available for purchase from the Bureau of Mobile Sources at 609/292-7953 or <http://www.stophesoot.org/sts-no-idle-sign.htm>.
    - 2) All non-road diesel construction equipment greater than 100 horsepower used on the project for more than ten days shall have engines that meet the USEPA Tier 4 non-road emission standards, or the best available emission control technology that is technologically feasible for that application and is verified by the USEPA or the CARB as a diesel emission control strategy for reducing particulate matter and/or NOx emissions.
    - 3) All on-road diesel vehicles used to haul materials or traveling to and from the construction site shall use designated truck routes that are designed to minimize impacts on residential areas and sensitive receptors such as hospitals, schools, daycare facilities, senior citizen housing, and convalescent facilities.
  - b. Prime Contractors will be liable for the effects of off-site particulate dust and/or odors during construction and shall take steps to minimize the impact of air pollution from these activities.

B. Related Documents / Sections:

1. Asbestos Abatement Report, as prepared by Briggs Associates, dated 12/7/18.

2. Section 00870 - Miscellaneous Requirements.
3. Section 01010 - Summary of the Work.
4. Section 01040 - Coordination.
5. Section 02070 - Selective Demolition.
6. Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
  - a. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 15 and 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

### **1.3 SUBMITTALS**

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
  1. Location and Extent of Work: Submit key plan indicating room location where work to take place. Describe cutting and patching, indicate methods and show how they will be performed.
  2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
  3. Products: List products to be used and firms or entities that will perform the Work. Provide samples and field mock-up as indicated or requested by the Architect.
    - a. Samples and field mock-up shall match existing surfaces and colors.
    - b. Obtain Architect's approval prior to proceeding with work.
  4. Schedule and Dates: Provide work schedule, indicate when cutting and patching will be performed.
  5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
  6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.



## **1.4 QUALITY ASSURANCE**

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Coordinate cutting of operating elements with other plumbing, HVAC, electrical or other trades.
- C. Miscellaneous Building Elements: Do not cut and patch any building elements or related components in a manner that could change their operation, load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
  - 1. Engage experienced installers or fabricators for all work.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- F. Mock-Ups: Provide mock-ups for Architect / Construction Manager approval for each proposed patching method. Do not proceed with patching work until obtaining of approvals from the Architect / Construction Manager.

## **1.5 WARRANTY**

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties. Confirm existing warranties with Owner prior to starting of work.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
  1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.
- B. Inspection:
  1. Prior to start of any work the General Construction Work Contractor shall verify all existing work area conditions; building lines, lengths, corners and all other dimensions.
    - a. General Construction Work Contractor shall engage a Licensed Professional Land Surveyor (PLS) to perform layout of the building and site elements. In addition, for building addition(s), the PLS shall verify all existing wall dimensions, angles, center lines, alignment points and other information which affect building closure. He shall also confirm floor to floor heights, where applicable, as well as any other vertical dimensions required for the execution of the work. Copies of all surveys performed by the General Contractor shall be submitted to the Architect in two copies and shall include layout drawings and data sheets.
    - b. All survey work must be done immediately in order to facilitate preparation of steel shop drawings by Steel Work Subcontractor.
  2. The General Construction Work Contractor shall submit information and survey to other Prime Work (Sub)Contractor(s), the Architect / Construction Manager for all required coordination of new construction and all other related site work.
  3. The Structural Steel Work Contractor shall verify and confirm floor to floor elevations and building dimensions with the General Construction Work Contractor prior to start of preparation of shop drawings for steel work.
  4. Prior to work of this section, verify information and survey submitted by the General Construction Work Contractor, carefully inspect the existing conditions and verify that materials and surfaces to be altered or removed are the same as noted on the drawings.

C. Discrepancies:

1. In the event of discrepancy of existing conditions, surfaces, etc., immediately notify the Architect and the Construction Manager.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

**3.2 PREPARATION**

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

**3.3 PERFORMANCE**

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  1. The/Each Prime Contractor shall provide cutting, patching, relocations, and or re-installations of existing construction to provide for installation of other components or performance of other construction associated with his/her work, and subsequently patch and finish as required to restore surfaces to their original condition. Work shall be performed whether or not shown on drawings.
  2. The General Construction Work Contractor shall provide all required and necessary pockets in concrete and masonry walls and in new roof assemblies including all required cutting, and preparation work to allow for installation of new structural steel framing, supports, lintels, bearing plates, dunnage, etc. The General Construction Work Contractor shall subsequently patch as required to restore and prepare surfaces to receive new finishes.
    - a. Cutting roof decking, roof flashing, patching and associated roofing work in additions shall be performed by the General Construction Work Contractor.
    - b. Cutting roof decking, roof flashing, patching and associated roofing work in existing building, where no roofing replacement is indicated or required, shall be performed by the Subcontractor for work included under the work of his/her contracted work.

3. All repairing, patching, piecing out, filling in, restoring and refinishing shall be neatly done by craftsmen skilled in their respective trades and completed in proper manner to leave same in condition satisfactory to the Architect.
4. All new work shall be installed plumb, level, true, and shall be shimmed as required to cover any irregularities in substrates.

B. Cutting:

1. Before cutting is started in any location the Contractors shall carefully investigate conditions as to human and structural safety, existing piping, wiring and items concealed, and wherever same interfere with the work they shall be properly relocated, rerouted or removed as the case may be, at no increase to contract price.
2. Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
3. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
4. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
5. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
6. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
7. Do not disturb any structural work, plumbing, steam, gas, or electric work without approval of Architect.
8. Mechanical and Electrical Services:
  - a. Cut off pipe or conduit in walls or partitions to be removed shall be performed by respective trade.
  - b. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting shall be performed by respective trade.
9. Proceed with patching after construction operations requiring cutting are complete.

- a. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work.
10. Existing work disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled or replaced with new work, and refinished and left in as good condition as existing before commencing work.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
  2. Field Mock-up: Prepare field mock-up of proposed restoration method as requested or required by the Architect. Obtain Architect's approval prior proceeding with actual work.
  3. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate or minimize evidence of patching and refinishing.
  4. Floors and Walls: Where walls, partitions and/or built-in cabinets that are removed extend one finished area into another, patch and repair floor and wall surfaces in the existing and new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  5. Ceilings: Cut, remove, patch, repair, install new including hanging assemblies and finish ceilings as necessary to provide an even-plane surface of uniform appearance.
  6. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

### **3.4 CLEAN-UP**

- A. Areas where demolition is in progress within or adjacent to Owner occupied areas shall be broom cleaned at the end of each working day.
- B. Do not burn materials or debris on premises.

- C. Do not allow demolished materials to accumulate inside or outside of existing building.
- D. Remove from the site all rubbish and debris resulting from work of this section.
- E. If the Contractor(s) fails to clean-up their debris within 24 hours, the Owner has the right to clean-up the debris left by the Contractor(s). All associated clean-up costs, incurred by the Owner, will be back-charged to the Contractor(s) who left the debris.

### **3.5 PROTECTION**

- A. Contractors shall provide all other necessary temporary enclosures, guard rails, barricades, etc. to adequately protect all workers and public from possible injury. Provide all necessary temporary partitions, enclosures, coverings of approved materials and construction for the exclusion of weather and for confining dust and debris.
- B. Contractors shall be responsible for the protection of the existing building, facilities and improvements within the areas where work is being done. Any disturbance or damage to the work, the existing building, and improvements, equipment or any impairments of facilities resulting from his/her work, shall be promptly restored, repaired, or replaced by the responsible Contractor at no extra cost to the Owner.
- C. Adequate protection of persons and property shall be provided at all times, including Saturdays, Sundays and holidays, and during time work is being performed and after working hours. Protection shall include barricade fencing, traffic control, dust partitions, weather protection and other means as required.
- D. Preserve and protect all existing vegetation such as trees, shrubs, and grass on or adjacent to the site and along access to the site. Be responsible for all unauthorized cutting or damaging of trees and shrubs, including damage due to careless operation of equipment, stock-piling of materials or tracking of grass areas by equipment.

### **3.6 SALVAGE**

- A. Partial Removal: Items of salvable value to Contractors may be removed from structure as work progresses. Salvage items must be transported from site as they are removed.
  - 1. Storage or sale of removed items on site will not be permitted.
- B. Items designated on drawings or in specifications to remain the property of the Owner, or to be reused, shall be removed, and securely stored with care to prevent damage. Repair or replace such items damaged in removal.
- C. Before transporting non-designated, removed items from the site, contact Architect/ Construction Manager for decision as to what items if any are to remain the property of the Owner. Items retained by the Owner will be transported by him to his/her storage area.

### **3.7 STANDARDS**

- A. All demolition work shall be performed in accordance with the applicable rules and regulations and the Codes and Ordinances of local, State and Federal authorities, and in accordance with the requirements of public utility corporations.
- B. Work shall satisfy requirements of the Occupational Safety and Health Act of 1970 with amendments.
- C. Work not affected by more stringent requirements of regulatory agencies shall satisfy the provisions of ANSI-A10.6-2006 - American National Standard Safety Requirements for Demolition.
- D. Confine the movement and storage of vehicles, equipment and materials to such routes and locations as may be designated by the Owner and Architect.
- E. The building and grounds will be maintained in a clean and orderly manner so as to conform with all local fire safety regulations and in accordance with the latest editions of the Safety Code of the National and State Board of Fire Underwriters.

### **3.8 INGRESS, EGRESS AND CIRCULATION**

- A. Each Prime Contractor and Prime Subcontractors shall be responsible for performing his/her construction activities in such manner to maintain ingress and egress for visitors and occupants of Owner-occupied areas and to continuously maintain all required emergency exits from and circulation between existing facilities. Passageways for emergency exits shall be kept continuously free from debris, construction equipment, tools, stockpiles or materials, and other hazards to speedy evacuation. Each Prime Contractor shall provide all necessary temporary work as prudence and good practice may dictate and in accordance with Applicable Law and Authorities having jurisdiction to obtain and maintain all such ingress, egress and circulation requirements. Each Prime Contractor and Prime Subcontractors shall be responsible for providing coordination of this temporary work between Prime Contractors and Subcontractor(s), as directed by the Architect. All temporary work shall be removed when no longer required.

### **3.9 NON-INTERFERENCE WITH OWNER'S OPERATIONS**

- A. Work under this Contract will be performed when the existing building is occupied. Coordinate with Owner's schedule and operation, obtain Owner's / Construction Manager's approval prior to proceeding with work.
- B. Contractor shall acquaint himself with the general character of the Owner's operations prior to commencing work and shall schedule his/her work to avoid interference therewith. The sequence of alteration operations shall be in accordance with a schedule of contract operations approved by the Owner and Architect.

- C. Each Contractor shall not start work until the schedule has been approved in writing by the Architect and the Owner. Each Contractor shall not perform work in occupied areas without giving the Owner 72 hours written notice of his/her intention to work in occupied areas.
- D. Each Contractor shall expedite placing orders and submission of shop drawings for equipment required to complete work under this Contract to ensure delivery of all equipment with adequate time allowed to complete the installations to conform to the project completion date.

### **3.10 REMOVAL AND DISPOSAL OF DEBRIS, RUBBLE, TRASH, ETC.**

- A. Each Prime Contractor shall be responsible for collection and disposal of own debris of all kinds, unsanitary, rubble, trash, combustible materials, etc. created by and in the execution of his/her contract and operations, on a daily basis. Provide clean up in accordance with Article 3.4 above.
  - 1. Disposal shall be to trash receptacles, hoppers, containers, dumpsters, etc. provided by each Prime Contractor.
  - 2. Disposal shall include all debris created by or connected with the operations of the Contractor and his/her Subcontractors and material suppliers.
  - 3. Each Prime Contractor shall pay all costs, fees and permits attendant to the loading, unloading, cartage, dumping and off-site disposal of all indicated materials, rubbish and/or debris. The complete removal and disposal shall be performed with such frequency as to maintain the grounds around the building free from debris.
    - a. Areas designated as "Loading Area" will be the only place that this Contractor will be allowed to load and off load usable materials and/or debris.
    - b. He/She shall, at no time, block the fire exits of the building.
    - c. He/She will erect a snow fence around the area at the start of the job; remove same at completion of the work.
    - d. He/She will further repair any damage done to sidewalks, pavements and lawn areas upon completion of the work at no additional cost to the Owner.

**END OF SECTION 01050**



## **SECTION 01151 - UNIT PRICES**

### **PART 1 GENERAL**

#### **1.1 PROCEDURE**

- A. Bidder shall insert on the Proposal Form, all Unit Prices applicable to the work under his/her bid. Unit Prices will be used as the basis for computing "additions to" or "deductions from" the Contract Price for extra work and for work countermanded, reduced or omitted.
- B. Except as otherwise provided in the General Conditions, the Unit Prices when accepted, adjusted or established by the Contract shall remain binding and irrevocable for the entire period of the Contract, regardless of the quantities of work ordered or required under such Unit Prices.
- C. The acceptance of the Unit Price is on condition that the general character of the material and workmanship required for any work related thereto shall be equivalent to corresponding work as shown and specified, and that all costs, overhead and profit, as well as all incidental work required in connection therewith, has been included in the Unit Price.

#### **1.2 RULES OF MEASUREMENT: EARTHWORK**

- A. Except as provision is made hereinafter for arbitrary measurement, the quantity of excavation shall be its in-place volume before removal.
- B. The reference point for computing changes in depth shall be the plan grade at which the change starts.
- C. No allowance will be made for excavating additional material of any nature taken out for the convenience of the Contractor beyond the quantity computed under these Rules of Measurement.
- D. General excavation for buildings shall arbitrarily be assumed to extend to vertical planes 2 feet outside of the outside wall lines and to the elevation of the plan subgrade.
- E. Excavations shall be in accordance with OSHA requirements and that excavations should be shored and braced, as needed, to avoid encroaching into existing site improvements that are noted to remain undisturbed.
- F. Excavation for a footing (the pad) under a wall shall be measured as the neat plan width and depth of the footing
- G. Rock excavation shall arbitrarily be assumed to extend to vertical planes one foot beyond wall lines, pipe, etc., and to 6 inches below the established elevations.
- H. Excavation for footings for columns or piers shall be computed as vertical shafts, each with a horizontal cross section identical in shape and size with the bottom of the footing.

- I. Excavation for sump and other pits shall be computed as vertical shafts, each with a horizontal cross section identical in shape and size with the plan of the bottom of the construction installed (out to out of pit walls).
- J. The volume of backfill shall be the volume of excavation computed under these Rules of Measurement, less the volume of actual displacement by walls, beams, columns, piers, footings or other construction installed.
- K. Concrete quantities shall be computed from plan size, or if there are no drawings, from actual measurement of the work ordered and placed.

**1.3 UNIT PRICES - GENERAL CONSTRUCTION, PLUMBING & DRAINAGE, HEATING, VENTILATING & AIR CONDITIONING, AND ELECTRICAL: EARTHWORK**

- A. Bulk Rock and Trench or Pit Rock Excavation requiring blasting or jackhammering - Per Cubic Yard. Price shall include the breaking up of the rock by blasting or other means as directed by the Architect and its removal from the site, specified for other excavated material, and shall be the price over and above the price for earth excavation.

The Unit Price for bulk rock shall be \$ 300.00 per cu. yd.  
 and trench or pit rock excavation shall be \$ 400.00 per cu. yd.

If the Contractor cannot perform the work at the given unit price, he/she shall accept for consideration subcontractor's price suggested by the Owner and/or the Architect.

**1.4 UNIT PRICES - GENERAL CONSTRUCTION: Materials in Place.**

Excavation (unsuitable soil)	\$ _____ per cu. yd.
Compacted Select Fill	\$ _____ per cu. yd.
6"x8"x18" 4500 PSI Concrete Curb	\$ _____ per lin. ft.
4" Thick 4500 PSI Concrete Sidewalk (including subbase)	\$ _____ per sq. ft.
Mirafi HP370 Geotextile Fabric	\$ _____ per sq. yd.
Compacted HMA19M64 Base Course	\$ _____ per Ton
Compacted HMA9.5M64 Surface Course	\$ _____ per Ton
8" Comp. Dense Graded Aggregate Subbase	\$ _____ per sq. yd.
1-1/2" Quarry Blend Subgrade	\$ _____ per cu. yd.
3/4" Clean Crushed Stone Bedding	\$ _____ per cu. yd.
Comp. Dense Graded Aggregate Pipe Backfill	\$ _____ per sq. yd.
Flowable Fill	\$ _____ per cu. yd.
Storm Sewer Manhole 4'-6' Deep	\$ _____ per Unit

Type "E" Inlet 4'-6' Deep	\$ _____ per Unit
Sanitary Sewer Manhole 4'-6' Deep	\$ _____ per Unit
6" PVC Schedule 40 Pipe	\$ _____ per lin. ft.
8" PVC Schedule 40 Pipe	\$ _____ per lin. ft.
12" PVC Schedule 40 Pipe	\$ _____ per lin. ft.
8" PVC SDR 26 Pipe	\$ _____ per lin. ft.
12" PVC SDR Pipe	\$ _____ per lin. ft.
15" PVC SDR Pipe	\$ _____ per lin. ft.
Utility Test Pit Excavation	\$ _____ per cu. yd.
Cast Iron Downspout Boot	\$ _____ per Unit
Flowable Fill	\$ _____ per cu. yd.
Replacement of existing damaged or deteriorated metal decking	\$ _____ per sq. ft.
Replacement of existing wet or deteriorated roof insulation board	\$ _____ per sq. ft.
Replacement of existing damaged or deteriorated wood nailers/blocking or framing, including removal of existing deteriorated wood, furnishing and installing new galvanized anchor bolts, expansion bolts at 4'-0" o.c. or nails through existing construction to remain:	\$ <b>2.90</b> per board ft.
a. 2x4 for the above work	\$ _____ per lin. ft.
b. 2x6 for the above work	\$ _____ per lin. ft.
c. 2x8 for the above work	\$ _____ per lin. ft.
d. 2x10 for the above work	\$ _____ per lin. ft.
e. 2x12 for the above work	\$ _____ per lin. ft.

**1.5 UNIT PRICES - PLUMBING & DRAINAGE: Materials in Place.**

1-1/2" cast iron pipe above grade	\$ _____ per lin. ft.
2" cast iron pipe above grade	\$ _____ per lin. ft.
2-1/2" cast iron pipe above grade	\$ _____ per lin. ft.
3" cast iron pipe above grade	\$ _____ per lin. ft.
4" cast iron pipe above grade	\$ _____ per lin. ft.
5" cast iron pipe above grade	\$ _____ per lin. ft.

6" cast iron pipe above grade	\$ _____ per lin. ft.
2" cast iron pipe below grade	\$ _____ per lin. ft.
3" cast iron pipe below grade	\$ _____ per lin. ft.
4" cast iron pipe below grade	\$ _____ per lin. ft.
5" cast iron pipe below grade	\$ _____ per lin. ft.
6" cast iron pipe below grade	\$ _____ per lin. ft.
8" cast iron pipe below grade	\$ _____ per lin. ft.
10" cast iron pipe below grade	\$ _____ per lin. ft.
1/2" Type "L" copper tubing	\$ _____ per lin. ft.
3/4" Type "L" copper tubing	\$ _____ per lin. ft.
1" Type "L" copper tubing	\$ _____ per lin. ft.
2" Type "L" copper tubing	\$ _____ per lin. ft.
2" piping insulation	\$ _____ per lin. ft.
3/4" black steel schedule 40 pipe	\$ _____ per lin. ft.
1" black steel schedule 40 pipe	\$ _____ per lin. ft.
1-1/4" black steel schedule 40 pipe	\$ _____ per lin. ft.
2-1/2" black steel schedule 40 pipe	\$ _____ per lin. ft.
Ball Valve, under 1"	\$ _____ per unit
Ball Valve, 1"	\$ _____ per unit
Ball Valve, 1-1/2"	\$ _____ per unit
Ball Valve, 2"	\$ _____ per unit

**1.6 UNIT PRICES - HEATING AND VENTILATING: Materials in Place.**

Galvanized steel ductwork	\$ _____ per lb.
Duct batt insulation	\$ _____ per sq. ft.
Duct rigid insulation	\$ _____ per sq. ft.
Duct acoustical internal liner	\$ _____ per sq. ft.
3" heating hot water piping	\$ _____ per lin. ft.

2" heating hot water piping	\$ _____ per lin. ft.
1-1/2" heating hot water piping	\$ _____ per lin. ft.
1-1/4" heating hot water piping	\$ _____ per lin. ft.
1" heating hot water piping	\$ _____ per lin. ft.
3/4" heating hot water piping	\$ _____ per lin. ft.
3" heating hot water piping insulation	\$ _____ per lin. ft.
2" heating hot water piping insulation	\$ _____ per lin. ft.
1-1/2" heating hot water piping insulation	\$ _____ per lin. ft.
1-1/4" heating hot water piping insulation	\$ _____ per lin. ft.
1" heating hot water piping insulation	\$ _____ per lin. ft.
3/4" heating hot water piping insulation	\$ _____ per lin. ft.
Ball Valve, under 1"	\$ _____ per unit
Ball Valve, 1"	\$ _____ per unit
Ball Valve, 1-1/4"	\$ _____ per unit
Ball Valve, 1-1/2"	\$ _____ per unit
Ball Valve, 2"	\$ _____ per unit
Isolation Valve, 3"	\$ _____ per unit
Balancing Valve, 1-1/2"	\$ _____ per unit
Balancing Valve, 1-1/4"	\$ _____ per unit
Balancing Valve, 1"	\$ _____ per unit
Balancing Valve, 3/4"	\$ _____ per unit

**1.7 UNIT PRICES - ELECTRICAL WORK: Materials in Place.**

Outlet, including outlet boxes and wiring. Receptacles will generally be connected to adjacent receptacle circuits \$ \_\_\_\_\_ per unit

Fully recessed outlet box, 3-1/2" deep with coverplate and 1-1/2" conduit extending from the box to above ceiling and terminated with a bushing \$ \_\_\_\_\_ per unit

Fully recessed single gang outlet box with coverplate and 3/4" conduit extending from the box to above ceiling and terminated with a bushing	\$_____ per unit
Dual Channel Surface Raceway	\$_____ per lin. ft.
Single Channel Surface Raceway	\$_____ per lin. ft.
Wall mounted occupancy sensor, including wall box and wiring	\$_____ per unit
Ceiling mounted occupancy sensor, including wiring at locations	\$_____ per unit
Corner mounted occupancy sensor, including wiring	\$_____ per unit
Daylight harvesting ceiling mounted sensor, including wiring	\$_____ per unit
Fire Alarm Pull Device, including outlet box and wiring	\$_____ per unit
Smoke Detector Device, including outlet box and wiring	\$_____ per unit
Heat Detector Device, including outlet box and wiring	\$_____ per unit
Duct Mounted Smoke Detector, including outlet box and wiring	\$_____ per unit
Wall mounted fire alarm strobe device.	\$_____ per unit
Wall mounted fire alarm horn / strobe device.	\$_____ per unit

**END OF SECTION 01151**

## **SECTION 01200 - PROJECT MEETINGS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplemental Conditions and other Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
  - 1. Pre-Construction Conference
  - 2. Pre-Installation Conferences
  - 3. Coordination Meetings
  - 4. Progress Meetings
- B. Construction Schedule requirements is specified in Section - 01380.

#### **1.3 PRE-CONSTRUCTION CONFERENCE**

- A. The Architect will schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: The Owner, Architect, Construction Manager and their consultants, all Prime Contractors and superintendents, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work.
- C. Agenda: Discuss items of significance that could effect progress including such topics as:
  - 1. Tentative construction schedule
  - 2. Critical work sequencing
  - 3. Designation of responsible personnel
  - 4. Procedures for processing field decisions and Change Orders
  - 5. Procedures for processing Applications for Payment
  - 6. Distribution of Contract Documents
  - 7. Submittal of Shop Drawings, Product Data, and Samples
  - 8. Preparation of record documents
  - 9. Use of the premises
  - 10. Office, Work, and storage areas
  - 11. Equipment deliveries and priorities
  - 12. Safety Procedures

- 13. First Aid
- 14. Security
- 15. Housekeeping
- 16. Working hours

#### **1.4 PRE-INSTALLATION CONFERENCES**

- A. The Prime GC Contractor to conduct a pre-installation conference at the site with all other Prime Contractors before each construction activity that requires coordination with other construction. The installer and representative of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect and Construction Manager of scheduled meeting dates.
  - 1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:
    - a. Contract Documents
    - b. Options
    - c. Related change orders
    - d. Purchases
    - e. Deliveries
    - f. Shop Drawings, product data and quality control samples
    - g. Possible conflicts
    - h. Compatibility problems
    - i. Time schedules
    - j. Weather limitations
    - k. Manufacturer's recommendations
    - l. Compatibility of materials
    - m. Acceptability of substrates
    - n. Temporary facilities
    - o. Space and access limitations
    - p. Governing regulations
    - q. Safety
    - r. Inspection and testing requirements
    - s. Required performance results
    - t. Recording requirements
    - u. Protection
  - 2. Record significant discussions and agreements and disagreements of each conference along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner, the Architect and the Construction Manager.
  - 3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of work and reconvene the conference at the earliest feasible date.



## **1.5 COORDINATION MEETINGS**

- A. The Prime Contractor for General Construction will conduct project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

## **1.6 PROGRESS MEETINGS**

- A. Regular Progress Meetings: The Construction Manager will schedule and conduct regular progress meetings as follows:
  - 1. Weekly meetings with the Prime Contractors and Subcontractors
  - 2. Bi-weekly meeting with the Owner, Architect, Prime Contractors and Subcontractors.
- B. Special Meetings will be conducted as required by the progress of the work
- C. Location of the meetings: Meetings shall be conducted at the field office of the Owner's Representative.
- D. Attendance: Attendance at Construction Meetings shall be as follows:
  - 1. The Owner shall be in attendance at bi-weekly meetings and at any special meetings as appropriate to the agenda.
  - 2. The Construction Manager, Architect and his professional consultants as needed at bi-weekly meetings and at any special meetings an appropriate to the agenda.
  - 3. The Prime Contractors at all construction meetings.
  - 4. Subcontractors as appropriate to the agenda.
  - 5. Suppliers as appropriate to the agenda.
  - 6. The Owner's Representative at all construction meetings.
- E. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the project.
- F. Contractor's Construction Schedule:

1. Review the present and future needs of each entity present, including such items as:
  - a. Interface requirements
  - b. Time
  - c. Sequences
  - d. Deliveries
  - e. Off-site fabrication problems
  - f. Access
  - g. Site utilization
  - h. Temporary facilities and services
  - i. Hours of work
  - j. Hazards and risks
  - k. Housekeeping
  - l. Quality and work standards
  - m. Change orders
  - n. Documentation of information for payment requests
  
- G. Reporting: No later than 3 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
  
- H. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.
  
- I. Attendance by all Prime Contractors is mandatory, whether the meetings are weekly, bi-weekly or at whatever interval is determined by the Architect and the Construction Manager.
  1. Unless given prior approval by the Construction Manager not to attend meetings, the Prime Contractor(s) will be fined \$250.00 for each regularly scheduled meeting for which he is not represented by a person in authority who can speak for and/or make decisions for the Contractor.
  
  2. Fine amounts shall be withheld and deducted from the Contract Sum.

**END OF SECTION 01200**

## SECTION 01380 - CPM SCHEDULE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. The General Contractor shall prepare and submit a construction schedule based upon input from the other Prime Contractors as set forth in Section 00800.
- B. The schedule shall include line items for the following information broken down by trade:
  - 1. Contractual milestone dates as set forth in Section 01800.
  - 2. Critical and long-lead item delivery dates
  - 3. Owner activities including move-in/occupancy time
  - 4. Critical inspections or testing
  - 5. Other critical activities appropriate to project
  - 6. Separate activity lines for new building areas and renovation areas
  - 7. Punch list and final completion period
- C. The Construction Schedule shall be completed within thirty(30) days of the notice to proceed. The General Contractor shall distribute copies to the Owner, Architect, Construction Manager and Contractors. The General Contractor shall provide a sign-off block for signature by all contractors indicating their acceptance of the schedule. All Contractors shall sign off on the schedule at the job meeting closest to the date of distribution. Failure to submit a monthly schedule update will be grounds for the withholding of payments
- D. Schedule updates shall be provided at least monthly but more often if requested by the Owner or Architect. The monthly update shall be distributed by the General Contractor to all Contractors for purposes of providing input. Each monthly update shall include a progress bar for each activity. The monthly update shall be submitted to the Architect, Construction Manager and Owner each month prior to the requisition cut-off date. Failure to submit a monthly schedule update will be grounds for the withholding of payments.
- E. The project will be scheduled and monitored using a construction schedule; Critical Path method (CPM) techniques. The Contractor for General Construction Work will prepare all schedules and all periodic updates based upon information furnished by the Prime Contractors and observations of the work in progress. Revisions of the schedule to reflect changes in the Contractors' plan of performance or modifications of the contract documents will be prepared by the Contractor for General Construction Work.
- F. This section describes the CPM Progress Schedule requirements. Each Prime Contractor shall provide all necessary information in connection with their work to enable the Contractor for General Construction Work to comply with these requirements. Further, each Prime Contractor shall provide such information in a

timely manner to permit the Contractor for General Construction Work to comply with the time requirements stated herein.

- G. Monthly update conferences will be held with all concerned. At these update conferences, the attendees will review actual progress, planned progress, planned progress for the next period, change orders, job issues, and any schedule changes since the previous update. Attendance is mandatory. Contractor current estimate payments are contingent upon attendance and the provision of satisfactory CPM base schedule and update information. The monthly update conference may be scheduled more frequently when required, at the direction of the Contractor for General Construction.
- H. The Contractor for General Construction Work shall prepare, based upon information obtained from the Contractors, and maintain a detailed Progress Schedule as described below. The schedule shall reflect the Contractor's working schedule and be used to plan, organize and execute the work, record and report actual performance and progress, and show how the Contractor plans to complete all remaining work. The schedule shall be in the form of an activity oriented network diagram (Critical Path Method) I-J format. The principles and definition of the terms used herein shall be as set forth in the Associated General Contractors of America (AGC) publication "The Use of CPM in Construction", Copyright 1976. In the event of discrepancies, this section shall govern the development and utilization of the Progress Schedule.
- I. The completed schedule shall be distributed to all Prime Contractors. When the schedule is approved by each Prime Contractor, the Owner, Architect, Construction Manager or their agents will review the schedule for conformance with the contract requirements, and it shall become one of the Contract Documents.
  - 1. This schedule may be revised to show changes in the Contractor's method of their agreement that the Progress Schedule represents their intentions and interpretations of the requirements of the contract.

## **1.2 PRE-BID SCHEDULE**

- A. The Pre-bid Schedule outlined in Section 01800 indicates a general sequence of activities leading towards the completion of the contract work within the milestones noted.
- B. The sequence of operations, and the time estimated for activities on the Pre-bid Schedule are shown for information only and are not to be considered binding. Means, Methods, and Procedures are at the discretion of each Prime Contractor. Specific interfaces between Contractors will be planned in the Progress Schedule process described below. However, the contract completion date and any milestone dates for substantial completion are binding. The actual date when written Notice to Proceed is issued will be used in the CPM Logic Diagrams to calculate the milestone dates for those dates contingent on the Notice to Proceed date, and will be used to prepare the Official Construction Schedule, using the Contractor's proposed sequence of work and duration of activities.

### **1.3 PRELIMINARY SCHEDULE**

- A. Within (10) working days of Notice to Proceed (NTP), all Prime Contractors shall participate in an initial scheduling conference. Attendance is mandatory for all Contractors. Each Contractor will submit as a minimum, a detailed ninety (90) day work plan in arrow/activity format for approval together with a generalized project schedule network, in summary form, meeting the contractual milestone dates. During this meeting the schedule will be developed from input furnished by each Prime Contractor. Until the formal schedule has been developed and is approved by the Architect and Construction Manager, the ninety (90) day work plan will serve as the official construction schedule after the review and coordination with each Prime Contractor.
- B. In the case of Multiple Prime Contracts, Contractor No. 1's schedule will govern the detailed work of other Prime Contractors where coordination is required, unless otherwise approved by the Architect and Construction Manager. Where such coordinated work is required, Contractor No. 1, (or Single Overall Contract), shall schedule reasonable durations and provide proper advance notice for the work of other Prime (Sub)Contractors to the extent that normal time work is accommodated without the need for overtime or shift work.
- C. The Contractor for General Construction shall develop a 90-day Schedule within ten (10) working days after the initial scheduling conference, utilizing input from Prime Contractors. This schedule will be in arrow network form, with each node calendar date based on "early start, early finish" of each work activity. The 90-day Schedule will contain work activities over the first ninety (90) days, estimated duration for each work activity will be fifteen (15) work days or will show the key procurement items which will occur during the first ninety (90) days of the project in addition to the field work.

### **1.4 DETAILED SCHEDULE**

- A. Within thirty (30) calendar days of Notice to Proceed (NTP), all Prime Contractors shall participate in a detailed scheduling conference. Attendance is mandatory. Each Prime Contractor shall submit network based coordinated CPM Schedule information to the Contractor for General Construction for review. Each Contractor shall work with the Contractor for General Construction Work to prepare the CPM network in a sketch format and, unless otherwise approved by the Owner's Representative, shall meet each consecutive day for eight (8) hours minimum until a useable, logical CPM schedule network, responsive to the project requirements, has been developed as determined by the Owner's Representative. Non-critical path activities shall be scheduled to reflect the float status shown on the Preliminary Construction Schedule unless otherwise approved by the Construction Manager and the Architect.
- B. In the case of Multiple Prime Contracts, Contractor No. 1's Schedule will govern the detailed work of other Prime Contractors where coordination is required, unless otherwise approved by the Construction Manager and the Architect and the Owner.

Where such coordinated work is required, Contractor No. 1 shall schedule reasonable durations and proper advance notice for the work of other Prime Contractors to the extent that normal time work is accommodated without the need for overtime or shift work.

- C. Based upon CPM Schedule information submitted, the Contractor for General Construction will draft and computerize the schedule and issue it for review and comment. In the event the milestone dates indicated by the Progress Schedule exceed the contractual dates, each Contractor shall review and revise the logic and time estimates and resubmit to the Contractor for General Construction for review within one (1) week of notification. This procedure shall be followed for all schedule revisions. After changes in the logic and/or time estimated have been agreed upon, another computerized schedule will be generated and referred to the Contractor.
- D. The Detailed Network Diagram shall provide sufficient detail and clarity of form and technique so that the Contractor can plan, schedule and control his work properly and the Construction Manager can readily monitor and follow the progress for all portions of work. The Detailed Network Diagram shall comply with the various limits imposed by the Scope of Work and by any contractually specified intermediate milestone dates and completion dates included in the contract. The degree of detail shall be to the satisfaction of the Construction Manager, but the following factors shall have a bearing on the required depth of activity detail:
  - 1. The structural breakdown of the project.
  - 2. The type of work to be performed and the labor trades involved.
  - 3. All purchase, manufacture and delivery activities for all major materials and equipment.
  - 4. Deliveries of Owner furnished equipment.
  - 5. Submittal and approval of shop drawings and material samples.
  - 6. Plans for all key trades and subcontract work.
  - 7. Assignment or responsibility for performing all activities.
  - 8. Access and availability to work areas.
  - 9. Identification of interfaces and dependencies with preceding, concurrent and follow-on contractors.
  - 10. Testing of systems.
  - 11. Planning for phased or total takeover by Owner.
- E. The Progress Schedule will not include every item of work necessary to complete the project. However, each Contractor shall accept responsibility to schedule and complete all items of work within the contractual limits.
- F. The durations as outlined in the Progress Schedule shall be analyzed in detail to determine activity time durations in units of whole working days. Activities shown will have maximum duration of twenty (20) working days, except in the case of the non-construction activities such as procurement of materials and delivery of equipment. All durations shall be the result of definitive manpower and resource planning by the Prime Contractors.

## **1.5 AUTOMATED DATA PROCESSING (ADP)**

- A. The mathematical analysis of the Detailed Network Diagram shall be made by computer and a tabulation for each activity shall include as a minimum, the following:
  - 1. Preceding and following event numbers.
  - 2. Activity description.
  - 3. Durations in work days for each activity.
  - 4. Earliest start date (by calendar date).
  - 5. Earliest finish date (by calendar date).
  - 6. Latest start date (by calendar date).
  - 7. Latest finish date (by calendar date).

## **1.6 SUMMARY SCHEDULE**

- A. The Contractor for General Construction shall also prepare and submit on the Initial and all updated schedules, a time-scaled Summary Schedule on a single sheet showing the total project in approximately fifty to one hundred (50) - (100) activities. This schedule will accurately summarize the Detailed Schedule. Each activity will indicate and I and J note that corresponds to the Detailed Schedule. The Summary Schedule shall be updated monthly showing the original as-planned schedule denoted and the current update information denoted.

## **1.7 COMPLETION REQUIREMENT**

- A. The Preliminary Schedule will be completed within thirty (30) calendar days of the Notice to Proceed.
- B. The Progress Schedule (logic diagrams and computer computations) and the Summary Schedule shall be prepared for review within sixty (60) calendar days after Notice to Proceed. The Prime Contractor(s) shall review the schedule and note any corrections required as a condition of approval within ten (10) days of the receipt of the schedule. The Contractor for General Construction will prepare a final Progress Schedule for approval of the Prime Contractors within twelve (12) calendar days following receipt of the Prime Contractor's comments.
- C. When the Progress Schedule is completed and is within contractual limits, each Prime Contractor shall certify in writing on the face of the computer printout and submit it to the Architect and Construction Manger for approval no later than seventy-five (75) calendar days after Notice to Proceed, unless otherwise approved by the Architect and Construction Manager.
- D. The Contractor for General Construction will furnish the Prime Contractor two (2) copies of Computer Printouts (computations).
- E. If the Contractor fails to submit the required monthly update material as indicated in this section within ten (10) calendar days, or revisions thereof within the requested time, the Architect may withhold approval of progress payment estimates until such time as the Contractor submits the required information.

- F. Notwithstanding the implementation of the CPM, it shall be the sole responsibility of the Prime Contractors to complete the Work within the time of completion and milestone required by the Contract.

## **1.8 UPDATINGS**

- A. The first update shall take place thirty (30) calendar days after the Notice to Proceed with subsequent updates performed monthly at the job site for the duration of the contract.
- B. The Preliminary Schedule will be updated until the Progress Schedule is reviewed and approved by the Contractors.
- C. All update information contained on the 90-day Schedule will be incorporated into the Progress Schedule once the Progress Schedule is accepted.
- D. Each Prime Contractor is required to attend and participate in update meetings with the Contractor for General Construction Work and present data prepared in advance, updated as of the end of the updating period, a complete and accurate report of updated procurement items, and construction progress. Each Prime Contractor shall show how it will make up the time list due to non-excused Contractor delays. The following will also be presented and made part of the CPM update:
  - 1. Actual start dates.
  - 2. Actual completion dates.
  - 3. Revised logic and changes in activity durations.
- E. Should the projected completion time for any significant work activity as determined by the latest CPM printout of the Progress Schedule indicate more than a critical ten (10) day delay to the project, the Contractor shall submit a revised plan to the Contractor for General Construction, within five (5) calendar days, to recover all lost time and maintain the project schedule. This revised plan is to include a re-sequencing of work activities and/or revisions to the performance time for the affected activities so that remaining milestone completion dates are met.
- F. Each Prime Contractor shall be responsible to coordinate its work with the work of other Prime Contractors. Each Prime Contractor shall not delay and/or interfere with the work of others. Each Prime Contractor shall pay all costs for damages and/or delays to other Contractors caused by lack of coordination and/or interference with their work which could not be reasonably avoided.

## **1.9 CHANGE ORDERS, DELAYS AND EXTENSIONS OF TIME**

- A. Extensions of time will only be considered for justifiable delays that are on the critical path and impact milestone dates by exceeding the amount of positive float shown on the approved CPM Schedule. A justifiable delay is delay due to a cause that the Architect, in their discretion, determines is unforeseeable, beyond the Contractor's control, and not due to any fault, negligence, act, or omission on the part of the



Contractor. Positive float is the number of calendar days an activity can be delayed without causing a delay to the critical path or milestone completion dates. The Contractor shall plan construction activities to start on "early start dates" to maintain positive float and shall be responsible for any delays which could have been avoided by starting work on the "early start dates" by lack of continuous effort, and/or by inadequate planning, and coordination of the work. Such delays will not be the basis of an extension of time to any milestone date or additional costs.

- B. When change orders or delays are experienced, the Contractor shall submit to the Architect, a written Time Impact Analysis illustrating the influence of each change or delay on the current Progress Schedule completion date. Each Time Impact Analysis shall include a network analysis demonstrating how the Contractor proposed to incorporate the change order or delay into the Progress Schedule. Additionally, the analysis shall demonstrate the time impact based on the date the change is given to the Contractor, the status of construction at that point in time, and the event time computation of all effected activities. The event times used in the analysis shall be those included in the latest updated copy of the Progress Schedule, closest to the time of delay or as adjusted by mutual agreement. Each time Impact Analysis shall be submitted within seven (7) calendar days after a delay occurs or notice of direction for a change is given to the Contractor. In cases where the Contractor does not submit a time Impact Analysis for a specific change order of delay within the specified period of time, then it is mutually agreed that the particular change order or delay has no time impact on the Contract completion date and no time extension is required. Approval or rejection of each Time Impact Analysis by the Construction Manager and the Architect shall be made within fourteen (14) calendar days after receipt of each Time Impact Analysis unless subsequent meetings and negotiations are necessary.

**END OF SECTION 01380**

## SECTION 01400 - MATERIAL TESTING / QUALITY CONTROL SERVICES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for material testing and quality control services.
  - 1. **International Construction Code (ICC) requires Special Inspections - Material Testing shall be engaged and performed through Owner's Testing Inspection Agency.**
  - 2. **Testing and inspecting services other than the Special Inspections - Material Testing are required to verify compliance with requirements specified or indicated and are the responsibility of the Contractors. These services do not relieve Contractors of responsibility for compliance with the Contract Document requirements.**
- B. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 1. Quality Control Services is the responsibility of the Contractors.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractors to provide quality-control services required by Architect, and the Owner or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
  - 1. Division 1 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections in AIA Document A232 and Section 01200.
  - 2. Division 1 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
  - 3. Division 2 through 16 Sections for specific test and inspection requirements.

### **1.3 DEFINITIONS**

- A. Quality Control Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect
- C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.
  - 1. Mockups establish the standard by which the Work will be judged.
- D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

### **1.4 DELEGATED DESIGN**

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

### **1.5 REGULATORY REQUIREMENTS**

- A. Copies of Regulations: Obtain copies of referenced regulations which also available in Local Public Libraries.

### **1.6 SUBMITTALS**

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Delegated-Design Submittal: When requirement is indicated in specific technical section and/or when requested by the Architect, in addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor(s) to be designed or certified by a design professional,

indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

D. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Ambient conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

E. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

## **1.7 QUALITY ASSURANCE**

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to

inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.
- G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.
  - 1. Preconstruction Testing: Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.
  - 2. Contractor responsibilities include the following:
    - a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Fabricate and install test assemblies using installers who will perform the same tasks for Project.
    - d. When testing is complete, remove assemblies; do not reuse materials on Project.

3. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and the Owner with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- H. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect .
  2. Notify Architect seven (7) days in advance of dates and times when mockups will be constructed.
  3. Demonstrate the proposed range of aesthetic effects and workmanship.
  4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
  5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  6. Demolish and remove mockups when directed, unless otherwise indicated.

## **1.8 QUALITY CONTROL**

- A. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
  2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  4. Testing and inspecting requested by Contractor(s) and not required by the Contract Documents are Contractor's responsibility.
    - a. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

- B. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- C. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
  - 1. **Testing Agency Responsibilities:** Cooperate with Architect and Contractor(s) in performance of duties. Provide qualified personnel to perform required tests and inspections.
    - a. Notify Architect and Contractor(s) promptly of irregularities or deficiencies observed in the Work during performance of its services.
    - b. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
    - c. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor(s).
    - d. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
    - e. Do not perform any duties of Contractor.
  - 2. **Associated Services:** Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
    - a. Access to the Work.
    - b. Incidental labor and facilities necessary to facilitate tests and inspections.
    - c. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
    - d. Facilities for storage and field-curing of test samples.
    - e. Delivery of samples to testing agencies.
    - f. Preliminary design mix proposed for use for material mixes that require control by testing agency.
    - g. Security and protection for samples and for testing and inspecting equipment at Project site.

3. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - a. Schedule times for tests, inspections, obtaining samples, and similar activities.
4. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for commencement of the Work.
  - a. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 ACCEPTABLE TESTING AGENCIES**

- A. For **Class I Buildings** (only), Testing Agencies / Special Inspector shall be established and recognized agency or design professional acting as the approved agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved. Special inspectors shall be certified in accordance with administrative provisions of the Uniform Construction Code (NJ UCC), N.J.A.C. 5:23-1.1 (2013), N.J.A.C. 5:23-3.14, N.J.A.C. 5:23-2.20(b), NJ DCA Bulletin No. 03-5 (Rev. November 2008) and applicable requirements of International Building Code (ICC), Chapter 17 as indicated below:
  1. Steel Construction (ICC, Section 1705.2 and Table 1705.2.3),
  2. Concrete (ICC, Section 1705.3 and Table 1705.3),
  3. Soils (ICC Section 1705.6 and Table 1705.6),
  4. Fabrication Process of Structural, Load-Bearing or Lateral Load-Bearing Members or Assemblies (ICC, Section 1705.10)
  5. Fire-Resistant Penetrations and Joints in High-Rise Buildings or Building assigned to Risk Categories III or IV (ICC, Section 1705.17)
- C. Statement of Special Inspections: Where special inspection(s) or testing is required as indicated in ICC, Section 17, the registered design professional shall prepare a statement of special inspections in accordance with ICC, Section 1704.3 for submittal by the applicant.
- D. Records of each inspection must be submitted to the building official so as to compile legal record of the project. These records must include all inspections made, violations and discrepancies.



1. Before a certificate of occupancy is issued, a final report must be submitted indicating that all special inspections have been made and all discrepancies have been resolved or removed in order to show compliance with the applicable code requirements.

### **3.2 REPAIR AND PROTECTION**

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
  2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
  3. Protect construction exposed by or for quality-control service activities.
  4. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

**END OF SECTION 01400**

## SECTION 01410 - REFERENCES AND INDUSTRY STANDARDS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications Sections included in Part-2 through Part-6.

#### 1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved:" The term "approved," when used to convey Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities.
- C. "Directed:" Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.
- D. "Indicated:" The term "indicated" refers to graphic representations, notes, or schedules on Drawings or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- E. "Regulations:" The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish:" The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install:" The term "install" describes operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide:" The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer:" An installer is the Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
- J. The term "experienced," when used with an entity, means having successfully completed a minimum of five previous projects similar in size and scope to this

Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction, subject to verification by and approval of the Architect.

1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- K. "Project site(s)" is the space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

### **1.3 INDUSTRY STANDARDS**

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
  1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available on request.

- E. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S." .

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01410**

## **SECTION 01455 - CONCRETE IN-SITU RELATIVE HUMIDITY AND pH TESTING**

### **PART 1 - GENERAL REQUIREMENTS**

#### **1.1 SUMMARY**

- A. The General Construction Work Contractor shall engage and pay for a testing agency to provide in-situ concrete relative humidity and surface pH testing to all concrete specified to be covered with floor coverings or resinous coatings. Testing Agency shall be approved by the Architect / Owner. Includes concrete placed below, on and above grade.
- B. Testing shall take place after allowing concrete to dry for a minimum of 28 days.
- C. Testing to be scheduled no less than 1 nor more than 3 weeks prior to scheduled flooring installation.

#### **1.2 RELATED SECTIONS:**

- A. Section 03300 - Cast in Place Concrete slabs
- B. Section 09650 - Resilient Flooring
- C. Section 09775 - Interlocking Rubber Flooring

#### **1.3 REFERENCES**

- A. ASTM F-2170-11- Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes
- B. ASTM F-710-11 - Standard Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
- C. ASTM F-1869-11 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

#### **1.4 SUBMITTALS**

- A. Report all test results in chart form listing test dates, time, depth of test well, in-situ temperature, relative humidity and pH levels.
- B. List test locations on floor plans and show same on 8-1/2 x 11 Table and Location maps. Deliver results in duplicate for distribution to Architect and General Contractor.

#### **1.5 QUALITY ASSURANCE**

- A. Independent Testing Agency

1. Certified by Test Apparatus Manufacturer for product use.
  2. I.C.R.I. (International Concrete Repair Institute) certified, or other agency with verifiable experience.
- B. Flooring Installers
1. Certified and /or approved by Test Apparatus Manufacturer for product use.
- C. Digital "Reader" and calibrated relative humidity sensors.
1. Factory-calibrated "Smart Sensors" using Touch-n-Sense™ technology.
  2. NIST-traceable factory calibration
- D. Wide range pH paper, and distilled or de-ionized water.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURES**

- A. Rapid RH® relative humidity and temperature sensor kit as manufactured by Wagner Meters, Tel.# 800.634-9961, [www.wagnermeters.com](http://www.wagnermeters.com); or approved equal.
- B. pH test paper as manufactured by Micro Essential Laboratory, or approved equal.

## **PART 3 - EXECUTION**

### **3.1 QUANTIFICATION OF RELATIVE HUMIDITY AT 40% OF CONCRETE THICKNESS**

- A. The test site should be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels should be maintained for 48 hours prior and during test period. If meeting this criteria is not possible, then minimum conditions should be  $75 \pm 10^{\circ}\text{F}$  and  $50 \pm 10\%$  relative humidity. When a building is not under HVAC control, a recording hygrometer or data logger shall be in place recording conditions during the test period. A transcript of this information must be included with the test report.
- B. The number of in-situ relative humidity test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 in the first 1,000 sq. ft. and 1 per each additional 1,000 square feet.
- C. Determine the thickness of the concrete slab, typically from construction documents.

- D. Utilizing a roto-hammer drill test holes to a depth equal to 40% of the concrete thickness\*. (i.e.: 2" deep for a 5" thick slab, or 1½" deep for a 4" thick slab). Hole diameter shall not exceed outside diameter of the probe by more than 0.04". Drilling operation must be dry.
- E. Vacuum and brush all concrete dust from test hole.
- F. Insert a relative humidity probe (sensor) to the full depth of test hole. Place cap over probe.
- G. Permit the test site to acclimate, or equilibrate, for 1 to 2 hours prior to taking relative humidity readings.
- H. Remove the cap, insert the cylindrical reading device, and press button on the device to obtain reading from the in-situ probe.
- I. Read and record temperature and relative humidity at the test site.

\* Elevated structural slab (not poured in pans) should be tested at a depth equal to 20% of its thickness.

### **3.2 QUANTIFYING pH LEVEL**

- A. At or near the relative humidity test site perform pH test.
  - 1. Place several drops of water onto the concrete surface to form a puddle approximately 1" in diameter.
  - 2. Allow the water to set for approximately 60 seconds.
  - 3. Dip the pH paper into the water and remove immediately, compare color to chart provided by paper supplier to determine pH reading
- B. Record and report results to the Construction Manager, Architect and the General Contractor.

**END OF SECTION 01455**

## **SECTION 01505 - TEMPORARY FACILITIES**

### **PART 1 - GENERAL**

#### **1.1 DEFINITIONS**

- A. Each Prime Contractor for the school project shall be responsible for the following temporary facilities and services:
1. Installation, operation, maintenance and removal of each temporary facility usually considered as its own normal construction activity.
  2. Plug in electric cords, extensions cords, supplementary plug in task lighting and special lighting necessary exclusively for their own activities.
  3. Their own field office, complete with necessary furniture, utilities and telephone service.
  4. Their own storage and fabrication sheds.
  5. All hoisting requirements for their work.
  6. Collection and disposal of their own debris, hazardous, unsanitary or other harmful waste material from their operations, on a daily basis to trash receptacles, hoppers, containers, etc. provided by the Prime General Contractor. Do not allow waste to accumulate inside building or on site.
  7. The secure lockup of their own tools, materials and equipment.
  8. Construction aids and miscellaneous services and facilities necessary exclusively for their own construction activities.
  9. Temporary storage provisions for their work, including offsite provisions, if required.
  10. Containerized bottled drinking water units for their personnel.
  11. Fire protection provisions related to their work.
  12. All personnel safety equipment and provisions for their personnel.
- B. The Prime General Construction Work Contractor shall provide complete temporary safety programs for review and approval by the Construction Manager, the Architect and the Owner.
- C. The General Construction Work Contractor shall be responsible for the following temporary facilities:



1. Telephone: Provide telephone service for all personnel engaged in construction activities, throughout the construction period. Install telephone on a separate line in accordance with local utility requirements adjacent to the General Construction Work Contractor's field office.
2. Temporary access roads and paths to building, including access ways for cranes and trucks.
3. Temporary toilets in sufficient quantity to suit project needs and including disposable supplies.
4. Temporary insulated enclosure of the building, if required.
5. Project identification signs.
6. Rodent and pest control services.
7. Barricades, warning lights, safety signage.
8. Site enclosure fence, including maintenance and any gates needed. Provide fence relocations as needed during construction.
9. Temporary grading to facilitate drainage from site.
10. Environmental protections and erosion control, except for the truck wheel wash station.
11. Snow and ice removal.
12. Dewatering facilities.
13. Dust and fume control
14. Temporary storm sewer, if required.
15. Tree and plant protection.
16. Temporary partitions whether or not shown on drawings.
17. Temporary covering for all openings in roof deck upon completion of erection of metal deck work.
18. Temporary egress precautions routes for use when building is partially occupied, include but not limited to the following:
  - a. Temporary doors and hardware.
  - b. Sidewalks
  - c. Fencing.
  - d. Signage whether shown or not on drawings.

- D. The Structural Steel Subcontractor is responsible for the following temporary facilities and services:
  - 1. Perimeter protection of elevated areas as set forth in this Section.
  - 2. Other temporary facilities and services stated as their responsibility elsewhere in the Project Documents.
- E. The Plumbing Work Subcontractor shall be responsible for the following temporary facilities and services:
  - 1. Temporary facilities and services stated as their responsibility elsewhere in the Project Documents.
- F. The Heating Ventilation and Air Conditioning (HVAC) Subcontractor shall be responsible for the following temporary facilities and services:
  - 1. Temporary HVAC system after enclosure of the building, in accordance with the requirements of the activity milestone schedule.
  - 2. Other temporary facilities and services stated as their responsibility elsewhere in the Project Documents.
- G. The Electrical Subcontractor shall be responsible for the following temporary facilities and services:
  - 1. Temporary power service to the Administrative Facilities for the Owner, Architect and Construction Manager.
  - 2. Electric service for security lighting, if required.
  - 3. Other temporary facilities and services stated as his/her responsibility elsewhere in the Project Documents.

## **1.2 OFFICE AND STORAGE FACILITIES**

- A. Each Contractor shall provide temporary office and storage facilities for their own use.

## **1.3 TEMPORARY RAILINGS AND PERIMETER PROTECTION**

- A. For all areas, the General Construction Work Contractor shall furnish, install, maintain and remove all initial safety protection work in full compliance with OSHA standards.
- B. Each Prime Contractor is responsible for the removal and immediate replacement, at the conclusion of their work, of all temporary protection measures as required in order to facilitate their work.

- C. No fall or opening protection shall be removed until the progress of the permanent work is installed in a manner that results in no hazard to any party.
- D. The installation of all barricades, enclosure, temporary partitions and other protective measures shall be performed in full compliance with the requirements of the New Jersey State Department of Labor, OSHA regulations and all other applicable Federal, State and Local laws.

#### **1.4 TEMPORARY CONSTRUCTION FENCE**

- A. Site Fence: Chain link fence.
  - 1. General Construction Work Contractor shall design and install to prevent easy access to site by people and animals.
  - 2. The entire construction site shall be enclosed with a 8' high chain link fence modesty slats as indicated on drawings and as directed by the Construction Manager.
    - a. Provide gates as required for access.
    - b. Do not remove until other security facilities, either temporary or permanent, are in place and in operation.
    - c. Relocate as needed.
    - d. Furnish padlocks with keys for all personal.

#### **1.5 COMPRESSED AIR**

- A. Each Contractor shall furnish their own equipment and energy source to provide compressed air required for the completion of work under their contract.

#### **1.6 TEMPORARY HEAT**

- A. Prior to the building being enclosed by walls and roof, if the outside temperature shall fall below 40°F at any time during the day or night, and the work in progress requires heat for execution and protection, the General Construction Work Contractor shall furnish acceptable means to provide sufficient heat to maintain a temperature of 40°F for that portion of the work for all areas requiring heat.
  - 1. Heating of field office, storage spaces, concrete and masonry shall be provided by each contractor under respective specification headings affected.
- B. As soon as the building is generally enclosed by walls and roof, the responsibility for supplying working area heat shall rest with the General Construction Work Contractor. The GC shall furnish sufficient heat by the use and maintenance of LP gas heaters to maintain a minimum temperature of 40°F within the enclosed area of the building at all times, and remove same when no longer required. The GC will be held responsible for freeze-ups for the duration of the forty (40) working day period following enclosure of the building. He shall remove soot smudges and other

deposits from walls, ceilings, and all exposed surfaces, which are the result of the use of heating equipment. He shall not do any finish work until the areas are properly cleaned. The GC shall provide or arrange at his expense supervision of the LP gas heaters at all times prior to start of the permanent heating contractor's obligation, which shall be forty (40) working days after the acknowledged enclosure of the building or buildings. The GC shall furnish and pay for all fuel.

1. All heating equipment shall be NBFU approved and connected to approved flues to the atmosphere. Gas cylinders within the building shall not exceed 100 lb. capacity, shall have Interstate Commerce Commission approval and shall be fitted with a permanent cap to protect the valve when not in use. Heaters shall be approved by a recognized testing laboratory and must be equipped with a positive shut-off safety valve. Cylinders and heaters shall stand at least six feet (6'-0") apart and be connected with two braid neoprene hoses that will withstand 400 psi test pressure.
  2. When cylinders and heaters are on the same floor, not more than one cylinder shall feed 400 sq.ft. of heated floor space. If cylinders feed heaters installed on a floor above, the area of heated floor may be increased to 600 sq. ft. Storage of cylinders within the building will not be permitted at any time. Fire extinguishers shall be provided on each floor where heaters are used, and the area must be ventilated.
  3. Contractors shall train at least two dependable persons to supervise heating installation at construction site.
- C. If the Heating and Ventilating Contractor does not provide operation of the permanent heating system within the 40 working day period, he will be liable for liquidated damages.
1. In like manner, if the Electrical and Plumbing Contractors do not provide the necessary electrical and plumbing work for operation of the permanent heating system, in sufficient time so that the 40 working day date can be met, they will be liable for the same Liquidated Damages.
- D. The GC shall continue to provide acceptable means of heat until the obligation of the permanent heating contractor shall become effective as herein stated. If the permanent heating system is not acceptable to the Construction Manager for providing temporary heat, the General Construction Work Contractor shall continue to provide temporary heat as described above, at the expense of the HVAC or Electrical Contractor(s) responsible for the delay in operating the permanent heating system.
- E. At the termination of the 40 working day interval after notice has been given that the building is enclosed, the HVAC Contractor shall operate and maintain the heating system throughout the period that heat is required. The permanent heating system shall provide such heat to a minimum temperature of 55°F, or to such higher temperature not exceeding 75°F, as may be directed by the Architect, for the proper

conduct and protection of the work until such time as work is completed and accepted. Accepting Heating system for use during the construction period shall not constitute acceptance of the complete system but merely acceptance of those components listed hereafter, which components will be covered by a one-year guarantee, unless otherwise indicated in Part -5 specification sections. Warranty shall be starting on the date of take-over.

- F. When the permanent heating system is used for temporary heat, the cost of electric power and fuel will be paid for by the General Construction Work Contractor. At the time of substantial completion for the entire project, Heating and Ventilating Contractor will clean or change all filters.
- G. Valves, traps and other parts of the heating system which are permanently installed by the Heating Contractor and used for supplying heat during the construction period need not be replaced, providing the system was in acceptable condition prior to its use, and further, that the system is properly cleaned and adjusted to operate after the permanent system is in use and to the satisfaction of the Construction Manager.
- H. If plastering or parging or finishing of any surfaces is necessary to enable the Heating Contractor to install the heating system in a manner to permit its use for supplying heat during the construction period, the finishing, plastering and parging of such surfaces shall be done by the GC so as not to delay the installation of the permanent system. In the event this plastering or parging work is not completed in ample time to make possible the installation of permanent piping and heating units in a particular area, the permanent Heating Contractor shall install temporary piping and the heating units and cost of such temporary installation shall be paid by the GC.
- I. If additional heat is required beyond that specified herein, the Contractor requiring such additional heat shall pay for additional costs at no expense to the Owner.

#### **1.7 TEMPORARY WATER**

- A. The Plumbing Contractor shall provide, protect and maintain an adequate water supply for the use of all contractors on the project during the period of construction, either by means of the permanent water supply line, or by the installation of a temporary water supply line. This water supply line shall be made available within fifteen (15) days after written request has been made to the Plumbing Contractor by any contractor requiring this service, with copies to the Architect/Engineer.
  - 1. If the Plumbing Contractor fails to carry out his responsibility in the supplying of the water, as set forth herein, he shall be held responsible for such failure and the Construction Manager/Architect shall have the right to take such action as he deems proper for the protection and conduct of the work and shall deduct the cost involved from the amount due the Plumbing Contractor.

#### **1.8 TEMPORARY LIGHT AND POWER**

- A. Electrical Work Contractor - "EC." shall extend electrical service to the building or

buildings, including temporary field offices, at locations approved by the Construction Manager. Initial temporary service shall be three phase or single phase, depending upon which phase is closest to the project. This service shall be installed within fifteen (15) days after written request has been made to the EC by any Prime Contractor requiring such service with copies to the Architect/Engineer. When the contract calls for 3-phase permanent service, the EC shall install same within six (6) months to permit use by other Prime Contractors. Electrical characteristics shall be provided to meet all temporary light and power requirements as herein and hereinafter specified or as included under Supplementary General Conditions. The EC shall provide the necessary distributing facilities and meter.

- B. The Electrical Work Contractor shall extend the service into the building and shall provide receptacles and lighting as described herein and one (1) 5 HP 208 V. or 220 or 230 volts power outlet and one separate power outlet for each contractor for the proper conduct of his work. Power outlets shall be fed independently of the temporary lighting system. Where service of a type other than herein mentioned is required, the contractor requiring same shall install and pay all costs of such special services. The size and the incoming service and main distribution switch and panel shall be sized as any service by NEC requirements.
- C. The Electrical Work Contractor shall provide double sockets at a maximum of thirty feet (30') on centers in large areas. One socket shall contain a 150 watt lamp and the other socket shall be a grounding type to accept a receptacle plug for small single phase loads to be used for short periods of time. The Electrical Contractor shall provide double sockets of the type described above in all individual rooms, one double socket for each 500 sq. ft. or fraction thereof of room area (for example: a room 30' x 30' - 900 sq. ft. would require two double sockets).
- D. Temporary power and lighting services and maintenance shall be provided by the Electrical Work Contractor, including power required for temporary construction trailers, security and protection specified under other sections.
  - 1. The General Construction Work Contractor shall be responsible and pay all costs for electrical consumption.
  - 2. On the date when the heating system is taken over by the Owner, the Electrical Work Contractor shall have the permanent service and distribution system in operation; this shall include service entrance and distribution equipment and power circuits to heating equipment. This will not, however, constitute acceptance of the electrical system.
- E. When the temporary electrical lines are no longer required they shall be removed by the Electrical Work Contractor and he shall restore to their original condition any part, or parts, of the ground or building, disturbed or damaged.
- F. Any contractor who fails to carry out his responsibility in the supplying of uninterrupted light and power, as set forth in this contract, shall be held responsible for such failure and the Architect shall have the right to take such action as he deems

proper for the protection and conduct of the work and shall deduct the costs involved from the amount due the contractor at fault.

- G. There shall be no additional cost to the Owner or other prime contractors because of standby requirements due to conflict in the normal working hours of the various trades.
1. Electrical Contractor shall provide temporary light and power required to meet all working days and hours of all trades and such light and power shall be available fifteen (15) minutes before the start of the earliest scheduled work and will continue until fifteen (15) minutes after the end of the latest scheduled work on each and every day.
  2. Any additional Cost associated with any temporary light and power required during additional shifts, weekends or holidays shall be the responsibility of each Prime Contractor, and shall be paid directly to the Electrical Contractor.
  3. Contractor(s) causing delay shall be liable for same Liquidated Damages amount per day in accordance with the Contract Documents.
- H. The Electrical Work Contractor shall observe the requirements of the Federal Occupational Safety and Health Act of 1970 with regard to temporary light and power.
- I. Electric Welding Equipment, Terrazzo Grinders, Pipe Threading Equipment, Floor Sanders: The Electrical Work Contractor shall provide at locations acceptable to prime contractors involved two (2) outlets - 208, 220, 230 volts 60 cycle - three phase (single phase if 3-phase not available), 7-1/2 HP maximum capacity for each of the prime contractors using the referenced equipment. Should any contractor desire additional outlets or service of this type beyond the specified two outlets or service of a greater capacity or of different characteristics or for any other power equipment, he shall arrange with the Electrical Work Contractor for the installation and pay all costs involved.
1. Each Prime Contractor who is obligated to employ standby personnel by trade agreement to which he is a party shall determine and include all such costs thereof in his bid proposal.
  2. Any conflict arising between the Prime Contractors with regard to financial obligations for standby personnel or standby supervisory employees when the maximum number of units are provided, shall be resolved between the parties involved in direct proportion to the number of units on the site by the respective contractors.
  3. No Contractor shall at any time set up claim for an extra relating to costs of standby maintenance or standby supervision for electric motor driven equipment. The Owner under no conditions will entertain or consider an extra in this regard.

- a. Contractor(s) causing delay shall be liable for same Liquidated Damages amount per day in accordance with the Contract Documents.

## **1.9 TOILET FACILITIES**

- A. The General Construction Work Contractor shall provide and maintain in a neat and sanitary condition temporary toilet facilities for the use of all Contractors and persons employed on the work or connected therewith.
  - 1. Such facilities shall comply with the regulations of the local Department of Health and other bodies having jurisdiction.
  - 2. Such facilities shall be in sufficient quantity to suit manpower working on site.
  - 3. Place units in a flat and easily accessible location.
  - 4. Provide servicing for units once per week as a minimum requirements.

## **1.10 TEMPORARY ROADWAYS**

- A. The Prime General Construction Work Contractor shall provide and maintain temporary roads, parking areas and paths as may be necessary for the work. The GC shall construct temporary roads and ramps as may be required by other Prime Contractors for crane and truck access. The roadways shall be suitable for large trucks to deliver items to the buildings. Other contractors shall be allowed to use the temporary roadways. In location, the temporary roads and parking areas may coincide with the permanent roadways and parking areas. Stone used in the construction of temporary roadways and parking areas may be left in place only if it occurs below the subgrade elevation for the permanent work.

## **1.11 PROJECT IDENTIFICATION AND TEMPORARY SIGNS**

- A. The General Construction Work Contractor shall prepare Project Identification Sign in sizes indicated. Provide signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.
  - 1. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details and colors as indicated or as directed by the Architect / Owner.
- B. Prepare temporary signs to provide directional information to construction personnel and visitors.
- C. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.

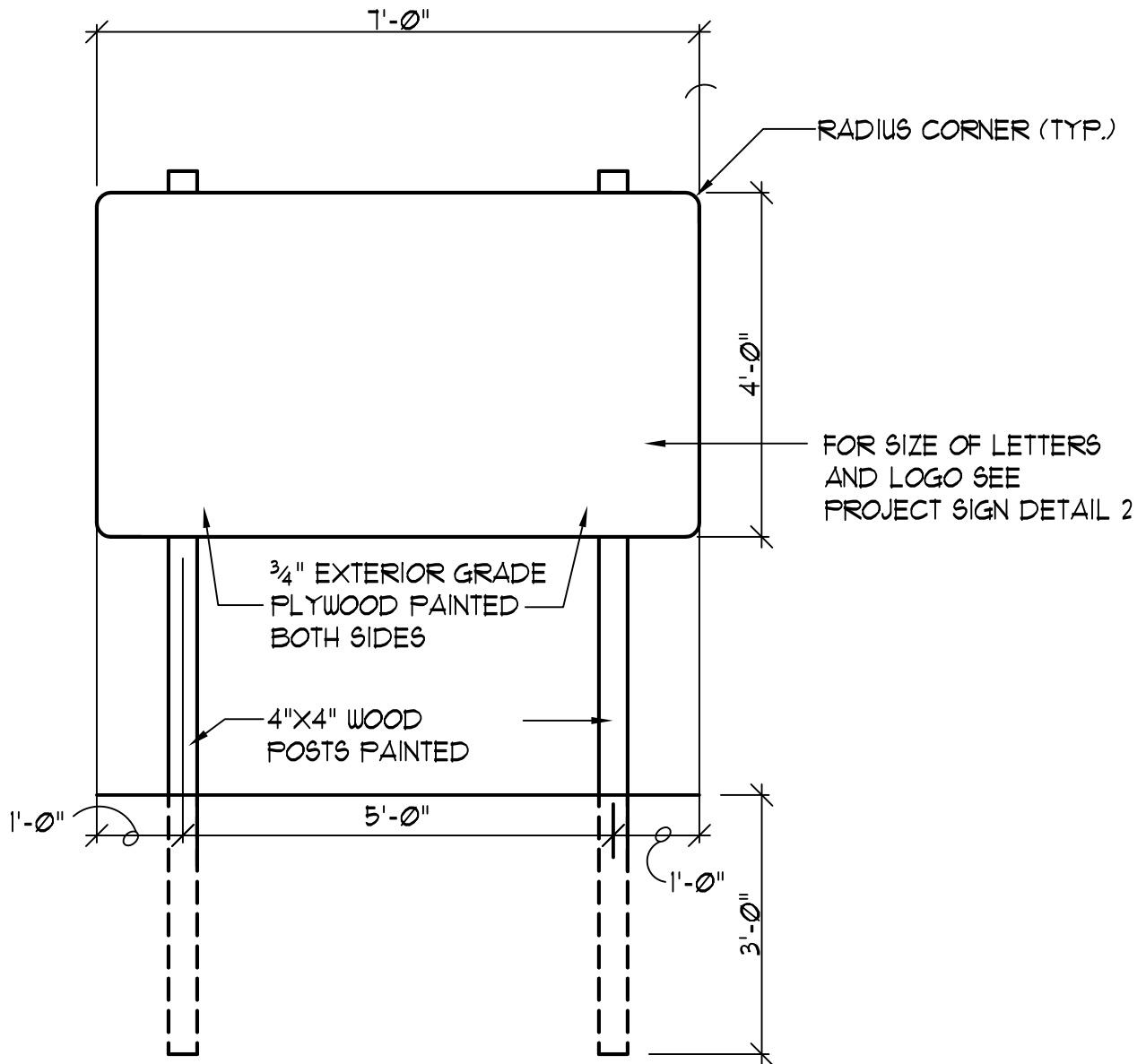


- D. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.
- E. No other signs will be allowed without Architect's approval.

**1.12 REMOVAL AND RESTORATION**

- A. Prior to acceptance of the Project, each Contractor shall remove the temporary work for which he has been responsible.
- B. Each Contractor shall restore all areas affected by temporary facilities which he has been responsible.

**END OF SECTION 01505**



PROJECT SIGN DETAIL 1

7'-0"

"SWOOSH" COLOR: GRIZZLE GRAY #SW T068 FADING TO REDBAY #SW 632 BY SHERWIN WILLIAMS AS INDICATED

ICON COLOR: REDBAY #SW 632 BY SHERWIN WILLIAMS

WINDOW COLOR: PASSIVE #SW T064 BY SHERWIN WILLIAMS

"PROJECT NAME"  
"CLIENT NAME"

**FVH D** architects planners  
**Fraytak Veisz Hopkins Duthie PC**  
 New Jersey - 609.883.7101 | Pennsylvania - 610.933.6289

CONSULTING ENGINEER      STRUCTURAL ENGINEER

"GENERAL CONTRACTOR"

"STEEL CONTRACTOR"

"HVAC CONTRACTOR"

"CONSTRUCTION MANAGER"

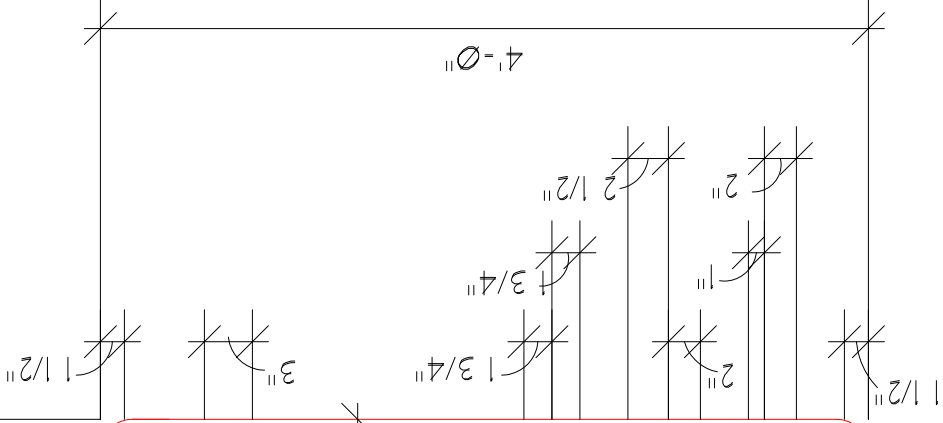
"PLUMBING CONTRACTOR"

"ELECTRICAL CONTRACTOR"

TEXT COLOR: BLACK EXCEPT AS NOTED

PLYWOOD BACKGROUND, SIGN BACK, SIDES & POST COLOR: PASSIVE #SW T064 BY SHERWIN WILLIAMS

BACKGROUND COLOR: GRAY MATTERS #SW T066 BY SHERWIN WILLIAMS



## **SECTION 01524 - CONSTRUCTION WASTE MANAGEMENT**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous demolition and construction waste.
  - 2. Recycling nonhazardous demolition and construction waste.
  - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections include the following:
  - 1. All of Division 1 and attached specifications and drawings that make a part of this contract.

#### **1.3 DEFINITIONS**

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

#### **1.4 SUBMITTALS**

- A. Waste Management Plan: Submit 4 copies of plan within 30 days of date established for the Notice to Proceed.

- B. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- C. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- D. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- E. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Qualification Data: For refrigerant recovery technician.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

## **1.5 QUALITY ASSURANCE**

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 1. Review methods and procedures related to waste management including, but not limited to, the following:
  - 1. Review and discuss waste management plan.
  - 2. Review requirements for documenting quantities of each type of waste and its disposition.
  - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
  - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
  - 5. Review waste management requirements for each trade.

## **1.6 WASTE MANAGEMENT PLAN**

- A. General: Develop plan consisting of waste identification, and waste reduction work plan. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
  - 1. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 2. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 3. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
  - 4. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
  - 5. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION**

### **3.1 PLAN IMPLEMENTATION**

- A. General: Implement waste management plan as approved by Owner / Architect. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  - 1. Comply with Division 1 Section "Temporary Facilities" for operation, termination, and removal requirements.
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
  - 1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
  - 2. Comply with Division 1 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### **3.2 SALVAGING DEMOLITION WASTE**

- A. Salvaged Items for Sale and Donation: Not permitted on Project site.

### **3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL**

- A. General: Recycle beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
  - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 3. Stockpile materials away from construction area.
  - 4. Store components off the ground and protect from the weather.
  - 5. Remove recyclable waste off Owner's property and transport to recycling receiving or processor.

### **3.4 RECYCLING CONSTRUCTION WASTE**

- A. Packaging:
  - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.

2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.

### **3.5 DISPOSAL OF WASTE**

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
  2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials on site.
- C. Burying: Do not bury waste materials on site.
- D. Disposal: Transport waste materials off Owner's property and legally dispose of them.
- E. Washing waste materials into sewers or drains is not permitted.

**END OF SECTION 01524**



## **SECTION 01600 - PRODUCT REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The work of this Section applies to all Construction Contract Documents including drawings, Division 1 - Miscellaneous Requirements Sections, and Specifications sections included in Part-2 through Part-6.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. General product requirements, including:
    - a. General specification requirements for all products.
    - b. General requirements and procedures for maintenance materials and tools.
  - 2. General requirements for product documentation, including:
    - a. Requirements and procedures for schedule of products.
    - b. General requirements for operation and maintenance data.
  - 3. General procedures for products including:
    - a. Procedures for transportation and handling.
    - b. Procedures for delivery and receiving.
    - c. Procedures for storage.

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL**

- A. Components required to be supplied in quantity within a specification section shall be identical, interchangeable, and made by the same manufacturer.
- B. Do not use products removed from existing construction.

#### **2.2 MAINTENANCE MATERIALS AND TOOLS**

- A. Maintenance Materials: Parts and materials for repair and maintenance; specific items required are specified in product sections.
  - 1. Provide products and tools which are identical to those used in the work; if necessary to obtain identical items, order at the same time as products to be installed or tools to be used in the work.

- B. Package appropriately and label to show type and quantity of contents.
- C. Deliver, handle, and store in the same manner as products to be installed.
- D. Do not turn over to the Owner until date of substantial completion, unless otherwise approved by the Owner.
- E. Deliver to the Owner; unload.
- F. Obtain receipt prior to final payment.

## **PART 3 - EXECUTION**

### **3.1 PRODUCTS**

- A. It is the Contractor's responsibility to select products which comply with the contract documents and which are compatible with one another, with existing work, and with products selected by other Contractors.
  - 1. Verify that electrical characteristics of products are compatible with electrical systems; notify architect of all discrepancies.
  - 2. Where visual matching to an established physical sample is required, the Architect's decision will be final.
- B. Do not use any substitute products which have not been approved in accordance with the requirements of the contract documents.
- C. Where the specification is silent on whether substitutions will be considered, substitutions will be considered only when submitted in accordance with AIA A232 and Section 00800.
- D. Products Specified by Reference Standard: Use any product meeting the specification. Provisions of reference standards shall not modify the responsibilities of the Owner or Architect as defined in the contract documents.
- E. Products Specified by Performance Requirements: Use any product meeting the specification.
- F. Products Specified to Match a Physical Sample: Use any product that matches; obtain the Architect's approval.
- G. Products Specified by Listing a Brand Name Product(s) made by listed Manufacturer(s) as the "Basis of Design":
  - 1. Pursuant to N.J.A.C. 5:34-9.2(c), when a specification uses "brand name or equivalent," the listed brand name shall serve as a reference or point of comparison for the functional or operational characteristic desired for the good

or service being requested. Where a bidder submits an equivalent, it shall be the responsibility of the bidder to document the equivalence claim. Failure to submit such documentation shall be grounds for rejection of the claim of equivalence."

- H. Products Specified by Listing Brand Name Product(s) Accompanied by Language Indicating that Substitutions Are Allowed: Provide a product meeting the specification; submit substitution request for any brand-name product, that is not listed, in accordance with AIA A232 and Section 00800.
- I. Products Specified by Listing Manufacturer(s): Provide a product meeting the specification and made by one of the manufacturers listed. Approval of substitutions will be in accordance with AIA A232 and Section 00800.

### **3.2 SCHEDULE OF PRODUCTS**

- A. Prepare a complete schedule of products used, including the following for each product:
  - 1. Manufacturer's name.
  - 2. Brand or trade name.
  - 3. Model number, if applicable.
  - 4. Reference standard, if more than one is applicable.
  - 5. Arrange products in the schedule by specification sections; indicate paragraph where specified.
- B. Prepare and submit a preliminary schedule within 15 working days after award of contract; resubmit when revised; submit final schedule prior to final payment. See additional requirements and milestone dates in Section 01800.
- C. Schedule of products shall not be used to obtain approval of substitute products; make separate request for substitution.

### **3.3 OPERATION AND MAINTENANCE DATA**

- A. Provide operation and maintenance data as specified in individual product sections.
  - 1. Provide data sufficient for operation and maintenance by Owner without further assistance from the manufacturer.
  - 2. Provide completed data in time for use during Owner instruction.
- B. Data Required For Products - General:
  - 1. Name of manufacturer and product.
  - 2. Name, address, and telephone number of subcontractor or supplier.
  - 3. Local source of replacements.
  - 4. Local source of replaceable parts and supplies.

- C. Product Data: Where product data is specified for inclusion in operation and maintenance data, provide manufacturer's data sheets marked to indicate specific product and product options actually installed; delete inapplicable data.
- D. Project Record Documents: Provide an additional copy of applicable record documents for inclusion with the operation and maintenance data.
- E. Coordination Drawings: When coordination drawings are prepared, include a copy with the operating and maintenance data.
- F. Custom Manufactured Products: Provide all information needed for reordering.
- G. Finish Materials: Manufacturer's product data, color/texture designations, and manufacturer's instructions for care, cleaning, and maintenance.
- H. Products Exposed to Weather and Products for Moisture Protection: Manufacturer's product data, recommended inspection schedule and procedures, maintenance and repair procedures, and maintenance materials required.
- I. Equipment: Provide at least the following information:
  - 1. Product data giving equipment and function description, with normal operating characteristics and limiting conditions.
  - 2. Starting, operating, and troubleshooting procedures.
  - 3. Cleaning and maintenance requirements and procedures.
  - 4. External finish maintenance requirements.
  - 5. List of maintenance materials required.
  - 6. List of special tools required.
  - 7. Parts list: List all replaceable parts, with ordering data.
  - 8. Recommended quantity of spare parts to be maintained in storage.
- J. Systems: Provide overall function description, with diagrams, prepared especially for this project.
- K. Form of Data: Prepare data in the form of an instructional manual.
  - 1. Arrange contents logically, using section numbers and sequence of sections indicated on the table of contents of this project manual.
  - 2. When multiple volumes are used, arrange by related subjects; identify contents in cover title.
  - 3. Assemble into 3-ring binders with maximum 2-inch ring size.
    - a. Hardback, cleanable plastic covers.
    - b. Identify each book with title "Operation and Maintenance Instructions" and project name.
    - c. Page size 8-1/2 by 11 inches, maximum.
    - d. Prepare special typewritten data on minimum 20-pound paper.
    - e. Provide tabbed divider for each product and system.

- f. Drawings: Bind in with other data; provide reinforced binding edge; fold larger drawings to size of pages.
  - 1) Do not use pockets or loose drawings.
- 4. Provide table of contents for each volume listing:
  - a. Name of the project.
  - b. Name, address, telephone number, and contact name of:
    - 1) Architect.
    - 2) Contractor.
  - c. Index of products and systems included in volume.

### **3.4 TRANSPORTATION AND HANDLING**

- A. Require supplier to package finished products in a manner which will protect from damage during shipping, handling, and storage.
- B. Transport products by methods which avoid damage.
- C. Deliver in dry, undamaged condition in manufacturer's unopened packaging.
- D. Provide equipment and personnel adequate to handle products by methods which prevent damage.
- E. Provide additional protection during handling where necessary to prevent damage to products and packaging.
- F. Lift large and heavy components at designated lift points only.

### **3.5 DELIVERY AND RECEIVING**

- A. Arrange deliveries of products to allow time for inspection prior to installation.
- B. Coordinate delivery to avoid conflict with the work and to take into account both the conditions at the site and the availability of personnel, handling equipment, and storage space.
- C. Clearly mark partial deliveries to identify contents, to permit easy accumulation of entire delivery, and to facilitate assembly.
- D. Promptly inspect shipments and remedy damage, incorrect quantity, incompleteness, improper or illegible labeling, and noncompliance with requirements of contract documents and approved submittals.

### **3.6 STORAGE**

- A. No indoor storage areas are available on site.

B. General Storage Procedures:

1. Store products immediately on delivery.
2. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.
3. Store in a manner to prevent damage to the stored products and to the work.
4. Store moisture-sensitive products in weathertight enclosures.
5. Store indoors if necessary to keep temperature and humidity within ranges required by manufacturer.
6. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.
7. Arrange storage to provide access for inspection and inventory.
8. Periodically inspect and remedy damage and noncompliance with required conditions.

C. Loose Granular Materials: Store on solid surfaces in well-drained area; prevent mixing with foreign materials.

D. Exterior Storage:

1. Cover products subject to weather damage with impervious sheet covering; provide ventilation to avoid condensation.
2. Provide surface drainage to prevent runoff or ponded water from damaging stored products.
3. Prevent damage and contamination from refuse and chemically injurious materials and liquids.
4. Store fabricated products on substantial platforms, blocking, or skids above the ground, sloped to drain.

**END OF SECTION 01600**

## **SECTION 01700 - PROJECT CLOSEOUT DOCUMENTS AND PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The work of this Section applies to all Construction Contract Documents including drawings, Specifications, Division 1 - Miscellaneous Requirements Sections, and Specification Sections included in Part-2 through Part-6.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Maintenance of Project Record Documents,
  - 2. Record drawings, including As-Built drawings,
  - 3. Record project manual (specifications),
  - 4. Operation and Maintenance Manuals,
  - 5. Warranties,
  - 6. Extra Materials,
  - 7. Submittals required prior to requesting for determining dates of substantial and final completion, and also prior to release of final payment(s),
  - 8. Transmittal of Closeout Project Documents to the Owner,
  - 9. Instructions of Owner's personnel,
  - 10. Final Cleaning.
- B. GENERAL REQUIREMENTS
  - 1. All submittals shall indicate reference to the appropriate Architect's Project Number.
- C. As-Built Drawings:
  - 1. Full-size paper set.
  - 2. Two (2) CD-Roms.

#### **1.3 MAINTENANCE OF PROJECT RECORD DOCUMENTS**

- A. Do not use record documents of any type for construction purposes.
- B. Maintain record documents in a secure location at the site while providing for access by the Contractor and the Architect during normal working hours; store in a fire-resistive room or container outside of normal working hours.
- C. Record information as soon as possible after it is obtained.
- D. Assign a person or persons responsible for maintaining record documents.

E. Record the following types of information on all applicable record documents:

1. Dimensional changes.
2. New and revised details.
3. Actual routing of piping and conduit.
4. Revisions to electrical circuits.
5. Actual equipment locations.
6. Sizes and routing of ducts.
7. Locations of utilities concealed in construction.
8. Particulars on concealed products which will not be easy to identify later.
9. Changes made by modifications to the contract; note identification numbers if applicable.
10. New information which may be useful to the Owner, but which was not shown in either the contract documents or submittals.

#### **1.4 RECORD AND AS-BUILT DRAWINGS**

A. During the progress of the installation, each Prime Contractor shall keep a careful record of all changes and variations in the arrangement of his/her work from the layout shown on the Contract Drawings in order that the Owner may be provided with a complete set of all plans (As-Builts) showing the work as actually installed.

1. Each Prime Contractor shall maintain complete two (2) sets of opaque prints of the contract drawings, marked to show changes which occur due to his/her work.
2. Where the actual work differs from that shown on the drawings, mark this set to show the actual work.
3. Mark location of concealed items before they are covered by other work.
4. Mark either record contract drawings or shop drawings, whichever are best suited to show the change.
5. Where changes are marked on record shop drawings, mark cross-reference on the applicable contract drawing.
6. When the Contractor is required by a provision of a modification to prepare a new drawing, rather than to revise existing drawings, obtain instructions from the Architect as to the drawing scale and information required.
7. Keep drawings in labeled, bound sets.
  - a. Mark with red pencil.
  - b. Mark work of separate contracts with different colors of pencils.
8. Incorporate new drawings into existing sets, as they are issued.



9. Where record drawings are also required as part of operation and maintenance data submittals, make copies from the original record drawing set.
  10. As-Built Drawing Format to be submitted to the Architect:
    - a. One (1) complete, legible full-size paper (hard copy) As-Built drawing set with the following information on each page:
      - 1) Note: "As-Built" drawing,
      - 2) Contractor's Firm name,
      - 3) Date.
    - b. Two (2) copies, pdf format CD-Rom, scanned As-Built drawings of the hard copy furnished to the Owner (indicated above) shall be furnished to the Owner and the Architect and as directed by the Architect.
  11. Mechanical/ Electrical As-Built drawings must be submitted to the Engineer with a copy of the transmittal to the Architect. Approval must be obtained before issuing Final Certificate of Payment.
- B. Record drawings shall be provided for **all work** including but not limited to the following:
1. General Construction Work
  2. Structural Steel Work
  3. Plumbing, Drainage, Gas Fittings & Sprinkler Work
  4. HVACR Work
  5. Electrical Work

## **1.5 PROJECT SPECIFICATION MANUAL**

- A. Each Prime Contractor shall maintain a complete copy of the project specification manual, marked to show changes which occur due to his/her work.
- B. Where the actual work differs from that shown in the project manual, mark the record copy to show the actual work.
  1. Include a copy of each addendum and modification to the contract.
  2. In addition to the types of information required on all record documents, record the following types of information:
    - a. Product options taken, when the specification allows more than one.
    - b. Product substitutions.
    - c. Proprietary name and model number of actual products furnished, for each product, material, and item of equipment specified.
    - d. Name of the supplier and installer, for each product for which neither a product data submittal nor a maintenance data submittal was specified.

## **1.6 OPERATION AND MAINTENANCE MANUALS**

- A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data:
    - a. Emergency instructions and procedures.
    - b. System, subsystem, and equipment descriptions, including operating standards.
    - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
    - d. Description of controls and sequence of operations.
    - e. Piping diagrams.
  2. Maintenance Data:
    - a. Manufacturer's information, including list of spare parts.
    - b. Name, address, and telephone number of Installer or supplier.
    - c. Maintenance procedures.
    - d. Maintenance and service schedules for preventive and routine maintenance.
    - e. Maintenance record forms.
    - f. Sources of spare parts and maintenance materials.
    - g. Copies of maintenance service agreements.
    - h. Copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.
- C. Operation and Maintenance Manuals must be submitted to the appropriate Engineer with a copy of the transmittal to the Architect. Approval must be obtained before issuing Final Certificate of Payment.

## **1.7 WARRANTIES**

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
  4. Warranty manual must be submitted to the Architect for review. Architect's approval must be obtained before issuing final payment.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

## **1.8 SUBMITTAL REQUIREMENTS - SUBSTANTIAL COMPLETION**

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  2. Advise Owner of pending insurance changeover requirements.
  3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and digital images on CD Rom, damage or settlement surveys, and similar final record information.
  6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
  7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  8. Complete startup testing of systems.

9. Submit test/adjust/balance records.
  10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  11. Advise Owner of changeover in heat and other utilities.
  12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
  13. Complete final cleaning requirements, including touch-up painting.
  14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify each Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify each Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for Final Completion.

## **1.9 SUBMITTAL REQUIREMENTS - FINAL COMPLETION**

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to the requirements of the Contract Documents.
  2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and signed by each Prime Contractor.
  3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report and warranty.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Provide statement signed by Owner's representatives stating that they have received required training.

- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify each Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify each Contractor of construction that must be completed or corrected before certificate will be issued.
  - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected. The cost of additional inspections required by the Architect or his/her consultants or the Construction Manager due to Contractor's failure to complete the punch list will be paid by the Contractor and will be deducted from the Contractor's final payment.
- C. Each Prime Contractor is required to obtain all final releases from governmental and regulatory agencies having jurisdiction over the project with the assistance from the Architect / Engineer and Owner (if required).

#### **1.10 LIST OF INCOMPLETE ITEMS (PUNCH LIST)**

- A. Preparation: Submit three copies of list to the Architect and Construction Manager. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  - 1. Organize list of spaces in sequential order, **starting with exterior areas first and proceeding indoors**, as applicable.
  - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  - 3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect and Construction Manager.
    - d. Name of Contractor.
    - e. Page number.

#### **1.11 PROJECT RECORD DOCUMENTS**

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's and Construction Manager's reference during normal working hours.
- B. Record Drawings: Maintain and submit one set of blue - or black-line white prints of Contract Drawings and Shop Drawings.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
    - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
    - b. Accurately record information in an understandable drawing technique.
    - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
    - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
  2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
  3. Mark important additional information that was either shown schematically or omitted from original Drawings.
  4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
  5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Note related Change Orders, Record Drawings and Product Data, where applicable.
- D. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  3. Note related Change Orders, Record Drawings, and Record Specifications, where applicable.
- E. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

### **1.12 DEMONSTRATION AND TRAINING**

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
1. Provide instructors experienced in operation and maintenance procedures.
  2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
  3. Schedule training with Owner, through Architect and Construction Manager, with at least seven calendar days advance notice.
  4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
1. System design and operational philosophy.
  2. Review of documentation.
  3. Operations.
  4. Adjustments.
  5. Troubleshooting.
  6. Maintenance.
  7. Repair.

### **1.13 FINAL CLEANING**

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

1. Refer to other Division 1 - specification sections for additional cleaning as required and where applicable.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - j. Remove labels that are not permanent.
    - k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.



- (1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
- l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- m. Replace parts subject to unusual operating conditions.
- n. Plumbing Work Contractor shall clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- p. Heating, Ventilating Air Conditioning Work and Refrigeration Contractor shall replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - 1) Clean ducts, blowers, and coils if units were operated without filters during construction.
- q. Electrical Work Contractor shall clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
- r. Leave Project clean and ready for occupancy.
- s. The General Construction Work Contractor, prior to Owner's occupancy, shall engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report and submit to the Owner. The General Construction Work Contractor shall also perform or have performed the following immediately prior to the Architect / Construction Manager's inspection for Substantial Completion:
  - 1) Removal of all manufacturer's temporary labels from materials, equipment and fixtures.
  - 2) Removal of all stains from glass and mirrors; wash, polish, inside and outside.
  - 3) Removal of marks, stains, fingerprints, other soil, dust, dirt, from painted, decorated or stained woodwork, plaster or plasterboard, metal, acoustic tile, and equipment surfaces.
  - 4) Removal of spots, paint, soil from resilient flooring.
  - 5) Removal of temporary floor protections, clean, wax or otherwise treat as directed, polish all finished floors. Final vacuum all carpet.
  - 6) Clean all interior finished surfaces, including doors and window frames and hardware required to have a polished finish, of oil, stains, dust, dirt, paint and the like; leave without fingerprints, blemishes.
  - 7) Final site clean-up shall extend beyond the Contract Limit Lines as

reasonable required to insure the complete removal of all construction debris from the entire site, including staging areas and shall be in accordance with requirements of the Contract Documents.

- t. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

#### **1.14 TRANSMITTAL TO OWNER**

- A. Collect, organize, label, and package ready for reference.
  - 1. Provide cardboard file boxes for submittals.
  - 2. Provide cardboard drawing tubes with end caps for transparencies.
  - 3. Bind print sets with durable paper covers.
  - 4. Label each document (and each sheet of drawings) with "PROJECT RECORD DOCUMENTS - This document has been prepared using information furnished by \_\_\_\_\_" [insert the contractor's name], and the date of preparation.
- B. Submit to the Architect for transmittal to the Owner, unless otherwise indicated.

#### **1.15 REMOVE TEMPORARY FACILITIES**

- A. At the completion of the work prior to final payment, remove all temporary facilities entirely from the site, including, but not limited to, the following:
  - 1. Field offices, trailers, job telephone, temporary toilets, temporary enclosures, dust barriers and other temporary protection devices.

#### **1.16 SUBMITTALS REQUIRED PRIOR TO FINAL PAYMENT**

- A. Contractors must satisfy all requirements of Sections 01700 and 01900 prior to submitting for Final Payment.
- B. A closeout checklist will be provided to each Contractor when he/she is substantially complete. Each Contractor is instructed to mark each submittal with the corresponding item number on the checklist. All warranties must have the Owner Name, Project Name, Architect Project Number and Warranty Periods. If all documents are not received in this format, the submittal will be rejected and the Contractor will be instructed to pick these documents up at the Architect's office for correction.
- C. Submittals required prior to final payment shall be in accordance with "Checklist" include, but are not limited to, the following items:

1. Completed Operations Insurance Certificate - ACORD Form.
2. Affidavit of Payment of Debts and Claims - AIA Document G706.
3. Affidavit of Release of Liens - AIA Document G706A.
4. Consent of Surety Company to Final Payment - AIA Document G707.
5. Certification of Wages in accordance with New Jersey Prevailing Wage Act, N.J.S.A. 34:11-56.25.
6. Maintenance Bond on the form provided in this specification.
  - a. 10% two year Maintenance Bond on HVAC Work
  - b. 10% one year Maintenance Bond on all other work.
7. Manufacturers' product warranties, Special written guarantees and warranties, maintenance warranty, etc. in accordance with Section 01900, various specification sections and the table of contents of the Project Manual. This is in addition to the Maintenance Bond and in addition to the Contractor's guarantee.
  - a. Guarantee shall be signed and sealed by Officer of the Contracting Firm and shall be notarized.
  - b. Roofing Warranty: Manufacturer's Roofing Warranty must be accompanied by Contractor's proof of all payments to the Roofing System Manufacturer.**
8. Project Record Drawings, (As-Built Drawings), Record Specifications, Record Product Data, and Miscellaneous Record Submittals.
  - a. Note: As-Built Drawings shall be submitted to the appropriate Engineer(s)/ Architect.
9. Operation and Maintenance Manuals and Instructions.
  - a. Note: Operation and Maintenance Manuals shall be submitted to the appropriate Engineer(s) / Architect.
10. Balancing Reports for Heating, Ventilating, Air Conditioning and Refrigeration systems.
11. Certificate of Occupancy / Copies of all Building Department inspection approvals.
12. In accordance with requirements of N.J.S.A. 52:32-44. Each Prime Contractor must submit accurate list of all subcontractors and suppliers. Contractor must provide a certification that all proofs of business registration for all subcontractors and suppliers are maintained on his/her file.

13. **Roofing Projects:** The Contractor must submit the following documents:
  - a. Copy of the paid statement from the roofing manufacturer for all materials including cost of the roofing warranty.
  - b. Original signed and notarized letter from the roofing manufacturer (on their letterhead) which certifies that the Contractor has paid the roofing manufacturer in full including cost of the roofing warranty.
14. All approvals and final releases from governmental and regulatory agencies have jurisdiction including, but not limited to: NJDCA, Local Construction Department, NJDEP, etc., as required.

**END OF SECTION 01700**

## CLOSEOUT CHECKLIST

<b>Owner</b>		
<b>Title</b>		
<b>Project #</b>		<b>Contract:</b>
<b>Contractor</b>		
<b>Substantial Completion Date:</b>		<b>Updated:</b>
<p><b>Refer to Specification Sections 01700 and 01900 for closeout requirements.</b>  <b>All Warranties must have the Owner Name, Project Name, Project Number and Warranty Periods.</b>  <b>As-built drawings, O&amp;M manuals, reports, certifications, warranties, punch list must be submitted to Engineer for review.</b></p>		
<b>Item No.</b>	<b>Documents &amp; Warranties Required For Closeout</b>	<b>Status</b>
1	Completed Operations Insurance Certificate - ACORD Form	
2	Completed Operation Insurance Statement (Sample Enclosed)	
3	AIA Document G704 Certificate of Substantial Completion	
4	AIA Document G706 Affidavit of Payment of Debts & Claims	
5	AIA Document G706A Affidavit of Release of Liens	
6	AIA Document G707 Consent of Surety to Final Payment	
7	Certification that all wages have been paid - NJ Prevailing Wage Act, N.J.S.A. 34:11-56.25	
8	10% - two year Maintenance Bond - must be on form provided in spec book - sample attached	
9	Record Project Manual indicating changes or company letter stating no changes.	
10	One Year Contractor's Guarantee Covered by Maintenance Bond - Sample Attached	
11	Operation Instructions & Maintenance Manuals <b>(2 each in 3-ring binder)</b>	
12	Record Drawings. Indicate ACP drawings with company name, address and date <b>(1 Paper Set &amp; 2 CD's)</b>	
13	Final Payment Requisition & Board Voucher/Invoice (3) Contractor will not be closed out until all paperwork is submitted	
14	Certificate of Approval/Acceptance	
15	Confirmation that FVHD has received "hard copies" (not electronic) of all shop drawing submittals.	
16	Copies of all outstanding certified payroll reports or letter on Contractor's letterhead stating all outstanding certified payroll sheet and manning reports have been sent to the Owner.	
17	Letter on Contractor's letterhead stating date of substantial completion and requesting punch list review to Architect & Engineer	
18	Final Punch list signed and dated indicating completion of all work	
19	Accurate list of all subcontractors and suppliers	
20	Balancing & Testing Reports (HVAC)	
21	Fire Alarm Certification (ELECTRICAL)	
22	Warranties - Refer to Specification Section 01900 for required warranties for each trade	
23	Receipt of Approval from NJDEP for Projects including Boilers	

## SECTION 01800 - TIME OF COMPLETION AND LIQUIDATED DAMAGES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This section describes the requirements for completion of interim milestone events and final completion of all work required by the contract documents.
- B. Related Sections:
  - 1. Items of Work attached to the "Certificate of Substantial Completion" and establishing "Final Completion Time" as per Section 00800.
- C. This section also establishes the relation of liquidated damages for failure to complete the interim milestone events or final completion requirements within the time requirements stated herein.

#### 1.2 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

- A. It is understood that each Contractor has mutual responsibility to complete its work in sequence with the work of the other Contractor and to allow the other Contractor access to the work site so that it may complete its work within the times established.
- B. Completion of the Contract Work by the Contractor shall be time of the essence.
- C. The Contractor shall work overtime, additional shifts, weekends or holidays to complete the work on time with no additional cost to the Owner.
  - 1. Scarce resources will be no excuse for not completing the work on time.
  - 2. Additions related Work may take place during regular shift and second shift (7:00 AM - 10:00 PM) after September 30, 2019 until August 14, 2020; however, the Contractor is required to review and coordinate all work activities with the Architect and School Facilities Director prior to commencing with the work.
    - a. Contractor to review permitted work hours to comply with the local "Noise Ordinance".
  - 3. **Contractor is required to include the cost of any premium time, second shift and weekend work which may be required in their bid to complete the work within the indicated milestone dates.**
- D. Substantial and final completion of the Work shall include, but is not limited to, final inspection and acceptance by the Local Building Officials.

E. **Milestone No. 1**

1. Sign Contract, no later than **seven (7) calendar days** from **Notice of Award**; on or about **September 17, 2019**.
2. Contractor submits Bonds and Insurance **ten (10) calendar days** from **Notice of Award**.
3. **Notice to Proceed** shall be within **three (3) business days** of date of signing Contract; on or about **September 26, 2019**.

F. **Milestone No. 2**

1. **Time Critical submittals** for special equipment, fixtures, etc. shall be submitted within **thirty (30) calendar days from Notice to Proceed**.

G. **Milestone No. 3**

1. Submission of all remaining technical shop drawing submittals shall be submitted within **forty-five (45) calendar days from Notice to Proceed**.

H. **Milestone No. 4**

1. Complete Mobilization shall be within **thirty (30) calendar days from Notice to Proceed**.

I. **Milestone No. 5A - Additions**

1. Physical Work shall commence on or about **September 30, 2019**.
2. Substantial Completion of Milestone 5A shall be on or before **324 Calendar Days from the Notice to Proceed, August 14, 2020**.

J. **Milestone No. 5B - Additions**

1. Final Completion of all Work at the Additions including punch list items and closeout documents, no later than **31 Calendar Days from Substantial Completion, September 14, 2020**.
2. Liquidated Damages - \$500.00 / Calendar day of delay.

K. **Milestone No. 6A - Alterations / Renovations**

(Rooms #A101, A102, A103, A104, A134, A154, A168, A169, A174, A175, D137, D150, Guidance Offices #G6 through #G11)

1. Physical Work shall commence on or about **June 22, 2020**.
2. Substantial Completion of Milestone 6A shall be on or before **331 Calendar Days from the Notice to Proceed, August 21, 2020**.

L. **Milestone No. 6B - Alterations / Renovations**

1. Final Completion of all Work at the Alterations and Renovations including punch list items and closeout documents, no later than **31 Calendar Days from Substantial Completion of Milestone 6A, September 21, 2020.**

2. Liquidated Damages - \$500.00 / Calendar day of delay.

M. In accordance with N.J.S.A. 18A:18A-19, the Owner shall deduct from the Contract Price, for any wages paid by the Owner to any inspector or inspectors necessarily employed by for the work of this project, for any number of days in excess of the number of days or indicated dates allowed in milestones above. Such sums shall be part of the Liquidated Damages indicated herein after.

N. The Liquidated Damages set for above shall be in addition to other consequential losses or damages the Owner may incur by reason of such delay, such as, but not limited to, the cost of additional architectural and engineering services resulting from the delay, additional costs to the Owner for payments to other Contractors resulting from delay, including acceleration costs by other contractors to recover the defaulting contractor's delay.

O. The said Liquidated Damages are fixed and agreed upon by and between the Contractor and the Owner because of the impracticality and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amounts shall be retained from time to time by the Owner for the current periodical payments.

1. The Liquidated Damages set for above are intended to compensate Owner for loss of use during the period of delay, for other delay during construction which may result further delay in substantial and/or final completion dates and for any acceleration costs by other contractors to recover the defaulting contractor's delay.

2. In no way shall costs of Liquidated Damages be construed as a penalty to the Contractor.

P. The Owner shall have the right to deduct the total amount any Liquidated Damages for which the Contractor may be liable from any monies otherwise due the Contractor, including any retainage under control of the Owner.

Q. The surety upon the Performance Bond furnished by the Contractor shall be liable for any such Liquidated Damages for the Contractor may be liable, to the extent that the Contractor shall not make settlement therefor with the Owner.

**END OF SECTION 01800**



## SECTION 01900 - GUARANTEES AND WARRANTIES

### PART 1 - GENERAL

#### 1.1 THE CONTRACT

- A. Period for all guarantees and warranties shall commence at date of substantial completion for the entire project, as determined by the Architect.
- B. The Contractor's guarantee on all work, covered by Maintenance Bond.
  - 1. The Maintenance Bond shall represent a continuing obligation of all Prime Contractors and their Subcontractor(s) to repair/replace defective materials and/or labor of products installed in the project for the following:
    - a. **Two (2) year** from the date of Substantial Completion for HVAC Work.
    - b. **One (1) year** from the date of Substantial Completion for all other Work.
- C. Provide all required warranties indicated in specification sections which include but not limited to the following:

#### 1.2 GENERAL CONSTRUCTION WORK

- A. Self-Drying Finishing Underlayment as specified in Section 03450.
  - 1. Special Project Warranty: Submit a written warranty signed by the manufacturer, the contractor, and the installer, guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributable to abnormal aging, without reducing or otherwise limiting any other rights to correction which the Owner may have under the contract documents.
    - a. The warranty shall include responsibility for removing and replacing other work as necessary to accomplish repairs or replacement of materials covered by the warranty.
      - 1) Warranty period: Minimum **two (2) years** after date of substantial completion.
- B. Unit Masonry Work as specified in Section 04200. . . . . **Five (5) Yrs.**
  - 1. The Contractor shall warrant the exterior walls to be free from leakage due to any natural cause for a period of **five (5) years** from date of final acceptance of the building and he shall, within such period at his own expense, upon written notification from the Owner, pursue such remedial measures as may be necessary to correct any condition of leakage and damage incidental thereto that may develop. The Contractor in signing this Contract accepts the above conditions. In so doing, he also agrees either that the materials and methods specified herein are such as to insure the results required or that he will, at no additional expense, furnish such additional or alternative items of labor and materials (or both) as may be necessary to accomplish the stated intent of the Contract.

- 2. Flexible Copper Flashing:
  - a. Special warranty:
    - 1) Manufacturer shall warrant flexible flashing material for **life of the wall**.
    - 2) Begin warranty from the Date of Substantial Completion.
  
- C. Solid Polymer Fabrications as specified in Section 06650 . . . . . **Ten (10) Yrs.**
  - 1. Provide manufacturer's warranty against defects in materials, fabrication and installation, excluding damages caused by physical or chemical abuse or excessive heat. Warranty shall provide for replacement or repair of material and labor for a period of **ten (10) years**, beginning at Date of Substantial Completion.
    - a. For fabrications with installed warranty coverage, identify by affixing manufacturer's fabrication/installation source plate.
  
- D. Exterior Insulation and Finish System as specified in Section 07241 . . . . . **Ten (10) Yrs.**
  - 1. Special Project Warranty: Provide warranty signed by manufacturer's authorized representative/ installer/ contractor to warranty work of this section for period of **ten (10) years** which starts at the approved date of substantial completion.
  
- E. Fluid Applied Air / Vapor Barriers as specified in Section 07270.
  - 1. Manufacturer's Single Source Warranty:
    - a. Fluid Applied Air and Vapor Barrier:
      - 1) Product Warranty:
        - a) Manufacturer must warrant the material against product defect for a period of **one (1) year** from date of purchase.
      - 2) Assembly Warranty:
        - a) Manufacturer must warrant the assembly against product defect for a period of **ten (10) years** from the date of substantial completion.
  
- F. Sheet Applied Air Barriers as specified in Section 07275.
  - 1. Manufacturer's Single Source Warranty:
    - a. Sheet Applied Air Barrier:
      - 1) Product Warranty:
        - a) Manufacturer must warrant the material against product defect for a period of **one (1) year** from date of purchase.
      - 2) Assembly Warranty:
        - a) Manufacturer must warrant the assembly against product defect for a period of **ten (10) years** from the date of substantial completion.
  
- G. Sheet Applied Air Barriers as specified in Section 07275.
  - 1. Manufacturer's Single Source Warranty:
    - a. Sheet Applied Air Barrier:

- 1) Product Warranty:
  - a) Manufacturer must warrant the material against product defect for a period of **one (1) year** from date of purchase.
- 2) Assembly Warranty:
  - a) Manufacturer must warrant the assembly against product defect for a period of **ten (10) years** from the date of substantial completion.

H. Agreement to Maintain Roofing

1. Roofing Contractor shall agree to maintain the roof systems and related roof sheet metal work in a weathertight and watertight condition for a period of **two (2) years** starting from the date of Owner's acceptance in accordance with special Maintenance Contract outlined herein.
2. During the Maintenance Period, the Roofing Contractor agrees that within 24 hours of receipt of notice from the Owner he will inspect and make immediate emergency repairs to defects or to leaks in the roof systems and related flashing work. He further agrees that within a reasonable time, he will restore the affected items to the standard of the original specifications. All emergency and permanent work during the life of the agreements to maintain the roof systems will be done without cost to the Owner, except in the event it is determined that such leaks were caused by abuse, lightning, hurricanes, tornado, hailstorm, other unusual climatic phenomena of the elements, or failure of related work (except related roof sheet metal work included under the Agreement) installed by other parties.
3. Agreement to maintain roofing system shall be in a written form acceptable to the Owner.

I. Flashing, Sheetmetal and Roof Accessories as specified in Section 07600.

1. Warrant Fluoropolymer coating to remain free, under various atmospheric conditions, from peeling, checking, or cracking, and chalking in excess of numerical rating of 8 when measured in accordance with ASTM D659-86, or fading in excess of 5 N.B.S. units during warranty period.
  - a. The Warranty period shall be **twenty (20) years** which starts on the approved date of Substantial Completion.

J. Roof Specialties and Accessories as specified in Section 07800.

1. Thermally Broken Roof Hatch
  - a. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of **five (5) years** from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

K. Joint Sealer Assemblies as specified in Section 07900.

1. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
    - a. Warranty Period: **Five (5) years** from date of Substantial Completion.
  2. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
    - a. Warranty Period: **Five (5) years** from date of Substantial Completion.
    - b. Submit two (2) copies of written guarantee for all sealant work of this section signed by the Contractor and the sealant manufacturer for a period of **five (5) years** from the date of acceptance by the Owner.
    - c. Guarantee shall further state that all exterior sealant will be guaranteed against:
      - 1) Adhesive or cohesive failure in joints where movement is under maximum 25% extension or compression.
      - 2) Any crazing greater than 3 mils in depth developing on surface of material.
- L. Wood Doors as specified in Section 08211 ..... **Life of Installation.**
1. Submit written agreement in door manufacturer's standard form signed by the manufacturer and contractor, agreeing to repair or replace defective doors which have warped (bow, cup or twist) or which show photographing of construction below its face veneers, or do not conform to tolerance limitations of NWMA.
  2. The warrant shall also include refinishing and reinstallation as may be required due to repair or replacement of defective doors.
- M. Alum./FRP Doors as specified in Section 08410.
1. Provide written warranty signed by Manufacturer and Contractor, agreeing to replace aluminum / frp doors which fail in materials or workmanship within **ten (10) years** of acceptance. Failure of materials or workmanship includes excessive leakage or air infiltration, excessive deflections, faulty operation of entrances, deterioration of finish or construction in excess of normal weathering, and defects of components of the work.
- N. Aluminum Storefronts as specified in Section 08415 ..... **Ten (10) Yrs.**
1. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of entrance and storefront systems that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Adhesive sealant failures.

- c. Cohesive sealant failures.
  - d. Failure of system to meet performance requirements.
  - e. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - f. Failure of operating components to function normally.
  - g. Water leakage through fixed glazing and frame areas.
- O. Windows as specified in Section 08520 . . . . . **Ten (10) Yrs.**
- 1. Submit two (2) copies of written guarantee, signed by the Contractor, Installer and Manufacturer, agreeing to replace window work which fails in materials or workmanship within **ten (10) years** of the date of acceptance. Failure of materials or workmanship shall include but not be limited to excess air infiltration, excessive deflections, delamination of panels, deterioration of finish of metal in excess of normal weathering and defects in accessories, weatherstripping and other components of the work.
- P. Finish Hardware as specified in Section 08700.
- 1. Guarantee workmanship and material provided against defective manufacture. Repair or replace defective workmanship and material appearing within period of **one (1) year** after substantial completion.
  - 2. Provide **ten (10) year** factory warranty on manual surface door closers against defects in material and workmanship from date of occupancy of project.
  - 3. Provide **twenty-five (25) year** factory warranty on exit hardware against defects in material and workmanship from date of occupancy of project.
- Q. Glass and Glazing as specified in Section 08800.
- 1. Manufacturer's Special Warranty on Coated-Glass Products: Written warranty, made out to Owner and signed by coated-glass manufacturer agreeing to furnish replacements for those coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
    - a. Warranty Period: **Ten (10) years** from date of Substantial Completion.
  - 2. Fabricator's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass fabricator agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
    - a. Warranty Period: **Ten (10) years** from date of Substantial Completion.
  - 3. Manufacturer's Limited Warranty on Fire-Rated / Impact Glazing: Written warranty, made out to the Owner and signed by manufacturer, warrants only that the product will be free of manufacturing defects resulting in material obstruction through the glass area and/or edge separation and changes in properties of the interlayer for a period of

**five (5) years** from the date of purchase, provided the Products have been properly shipped, stored, handled, installed and maintained.

- a. Limitation of Remedy - Inspection: The remedy for product proved to be defective under the terms of this warranty is limited to shipment of replacement product. With respect to all claims under this warranty, the Manufacturer shall have the right to inspect any and all products alleged to be defective.

R. Tile as specified in Section 09300.

1. Limited Warranty:

- a. Manufacturer warrants that manufactured products will be free from defect for a period of **one (1) year** from date of purchase.
  - 1) Defect is defined as a shortfall in the product to perform to manufacturer's specifications as disclosed in product literature, within industry allowable tolerances as set forth in standard, national industry protocols.
  - 2) Manufacturer provides detailed information in its product literature regarding appropriate tile and stone applications. Failure to comply with recommended applications voids this warranty.

S. Acoustical Ceilings as specified in Section 09510.

1. Provide manufacturer's special project warranty against sagging or warping of acoustic ceiling boards for a period of **thirty (30) years** which starts on approved date of substantial completion.

T. Resilient Flooring as specified in Section 09650.

1. Vinyl Composition Tile:

- a. Special Warranty - Manufacturer warrants its regular (first quality) commercial floor products to be free from manufacturing defects for **five (5) years** from date of purchase.
  - 1) **Within One Year:** If a defect covered by this warranty is reported to the manufacturer in writing within one year of purchase, Manufacturer will supply new material of the same or similar grade sufficient to repair or replace the defective material. Manufacturer will also pay reasonable labor costs.
  - 2) **Within Two Years:** If a defect covered by this warranty is reported to the manufacturer in writing after one year but within two years of purchase, Manufacturer will supply new material of the same or similar grade sufficient to repair or replace the defective material. Manufacturer will also pay fifty (50%) percent of reasonable labor costs.
  - 3) **After Two Years:** If a defect covered by this warranty is reported to the manufacturer in writing after two years but within five years of purchase, Manufacturer will supply new material of the same or similar grade sufficient to repair or replace the defective material. Manufacturer will not pay for labor costs.
  - 4) Manufacturer does not warrant the installers' workmanship. Workmanship errors should be addressed to the contractor who installed the floor.

- U. Dry Marker Boards / Exhibition Boards as specified in Section 10100. . . . **Fifty (50) Yrs.**
1. Submit a “**Life of Building**” warranty, stating that under normal usage and maintenance, and when installed in accordance with manufacturer’s instructions and recommendations, porcelain enamel steel markerboard and chalkboard writing surfaces are guaranteed for the Life of the Building. Guarantee covers replacement of defective boards, but does not include cost of removal or reinstallation.
  2. Submit a standard warranty, stating that when installed in accordance with manufacturer’s instructions and recommendations, exhibition boards are guaranteed for **one (1) year** against defects in materials and workmanship. Guarantee does not cover normal wear and tear, improper handling, any misuse, or any defects caused by vandalism or subsequent abuse. Guarantee covers replacement of defective material, but does not include cost of removal or reinstallation.
  3. Writing Surface Warranty Period: Lifetime of the building commencing on the Date of Substantial Completion.
- V. Toilet and Bath Accessories as specified in Section 10800.
1. Washroom Accessories: Warranty is limited to replacing or repairing, at the manufacturer’s option, transportation charges prepaid by the purchaser, any washroom accessory unit or part thereof which their inspection shall show to have been defective within the limitation of the warranty. Period of warranty is measured from the date of their invoice as follows:
    - a. Complete unit (except mirrors) - **One (1) year**.
    - b. Stainless Steel Mirror Frames - **Fifteen (15) years** - against corrosion.
    - c. Tempered Glass Mirrors - **Five (5) years** - against silver spoilage.
    - d. Polished #8 Architectural Grade Finish on 304 Series Stainless Steel - **One (1) year** against corrosion.
    - e. Bright Annealed Finish on 430 Series Stainless Steel - **One (1) year** against corrosion.

\* Warranty does not cover installation labor charges and does not apply to any units which have been damaged by accident, abuse, improper installation, improper maintenance, or altered in any way.
  2. Hand Dryer: Manufacturer’s standard limited warranty to be free from defects for a period of **five (5) years**. Warranty shall include labor performed at factory as well as the repair or exchange of defective parts, at manufacturer’s option.
- 1.3 CASEWORK AND EQUIPMENT WORK**
- A. Premanufactured Plastic Laminate Casework as specified in Section 11010.
1. Special Project Warranty: Submit a written warranty signed by the manufacturer, the contractor, and the installer, guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributable to

abnormal aging, without reducing or otherwise limiting any other rights to correction which the owner may have under the contract documents.

- a. The Manufacturer, shall warrant the casework to be free from defects in materials and workmanship, under normal use and service, for **three (3) years** from date of substantial completion. Within the warranty period, the Manufacturer, shall, at its option, repair, replace, or refund the purchase price of defective casework.
- b. The warranty with respect to products of another manufacturer sold by the casework manufacturer, is limited to the warranty extended by that manufacturer to the case work manufacturer. The warranty shall include responsibility for removing and replacing other work as necessary to accomplish repairs or replacement of materials covered by the warranty.

B. Casework (Solid Wood) as specified in Section 11011.

1. Manufacturer shall warrant the casework to be free from defects in materials and workmanship, under normal use and service, for **three (3) years** from date of delivery.
  - a. Within the warranty period, manufacturer shall repair, replace, or refund the purchase price of defective casework.

#### 1.4 PLUMBING & DRAINAGE WORK

A. General Requirements Plumbing and Fire Protection as specified in Section 15015.

1. Unconditional guarantee, in writing, all materials, equipment and workmanship for a period of **one (1) year** from date of acceptance.

B. Plumbing Fixtures as specified in Section 15410.

1. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace components of whirlpools that fail in materials or workmanship within specified warranty period.
  - a. Failures include, but are not limited to, the following:
    - 1) Structural failures of unit shell.
    - 2) Faulty operation of controls, blowers, pumps, heaters, and timers.
    - 3) Deterioration of metals, metal finishes, and other materials beyond normal use.
  - b. Warranty Period for Commercial Applications: **Three (3) years** from date of Substantial Completion.

#### 1.5 HEATING, VENTILATING, AIR CONDITIONING AND REFRIGERATION WORK

A. Duct Insulation as specified in Section 15081.

1. Jacketing system to be high performance zero permeability absolute vapor barrier jacket that operates to temperature of -30 deg. F and can be applied at -10 deg. F. Jacket to comply with UL 723 (25/50 frame/smoke rating). Jacket to have mold



inhibiting agents. Jacket system to include a minimum one year materials and labor, and **ten (10) year** materials warranty.

B. Packaged Air Conditioning Units as specified in Section 15732.

1. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
2. Warranty Period: **Two (2) years** from date of Substantial Completion for parts and labor, and **five (5) years** on the compressor.

C. Fan-Coil Units as specified in Section 15763.

1. Manufacturer **two (2) year** warranty on materials and labor after substantial completion.

D. Energy Recovery Classroom Unit Ventilators as specified in Section 15769.

1. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
2. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components that fail in materials or workmanship within specified warranty period.
3. Warranty Period: **Five (5) years** from date of Substantial Completion.

E. Testing, Adjusting, and Balancing as specified in section 15950.

1. Agent Qualifications: Engage a testing, adjusting, and balancing agent certified by either AABC or NEBB.
2. Testing, Adjusting, and Balancing Conference: Meet with the Owner on approval of the testing, adjusting, and balancing strategies and procedures plan to develop a mutual understanding of the details. Ensure the participation of testing, adjusting, and balancing team members, equipment manufacturers' authorized service representatives, HVAC controls Installer, and other support personnel. Provide 7 days' advance notice of scheduled meeting time and location.
  - a. Agenda Items: Include at least the following:
    - 1) Submittal distribution requirements.
    - 2) Contract Documents examination report.
    - 3) Testing, adjusting, balancing, and measurement plan.
    - 4) Work schedule and Project site access requirements.
    - 5) Coordination and cooperation of trades and subcontractors.
    - 6) Coordination of documentation and communication flow.

3. Certification of Testing, Adjusting, and Balancing Reports: Certify the testing, adjusting, and balancing field data reports. This certification includes the following:
  - a. Review field data reports to validate accuracy of data and to prepare certified testing, adjusting, and balancing reports.
  - b. Certify that the testing, adjusting, and balancing team complied with the approved testing, adjusting, and balancing plan and the procedures specified and referenced in this Specification.
  
- F. Control Systems Equipment as specified in Section 15975.
  1. Warrant labor and materials for specified control system free from defects for a period of **two (2) years** after project substantial completion. Control system failures during warranty period shall be adjusted, repaired, or replaced at no additional cost or reduction in service to the Owner. Respond during normal business hours within 24 hours of the warranty service request.
  2. Work shall have a single warranty date, even if Owner received beneficial use due to early system start-up. If specified work is split into multiple contracts or a multi-phase contract, each contract or phase shall have a separate warranty start date and period.

## 1.6 ELECTRICAL WORK

- A. Enclosed Switches and Circuit Breakers as specified in Section 16410.
  1. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.
    - a. Warranty Period: **One (1) year** from date of Substantial Completion.
  
- B. Panelboards as specified in Section 16442.
  1. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.
    - a. Panelboard Warranty Period: **Eighteen (18) months** from date of Substantial Completion.
  2. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace SPD that fails in materials or workmanship within specified warranty period.
    - a. SPD Warranty Period: **Five (5) years** from date of Substantial Completion.
  
- C. LED Interior Lighting as specified in Section 16511.
  1. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
  2. Warranty Period: **Five (5) years** from date of Substantial Completion.

D. Addressable Fire-Alarm Systems as specified in Section 16721.

1. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.
  - a. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
  - b. Warranty Period: **Five (5) years** from date of Substantial Completion.

**END OF SECTION 01900**

## **SECTION 01950 - SUBSOIL**

### **1. GENERAL**

- A. The attached subsurface investigation was developed by Professional Engineers at the request of the Owner.
- B. Additional surveys, test borings and other exploratory operations may be made by Contractor at no cost to Owner.
- C. The Architect and Owner assume no liability or responsibility for the accuracy of this report and for conclusions drawn therefrom.
- D. See Report for Test Boring Location Plan.

**END OF SECTION 01950**



## **GEOTECHNICAL ENGINEERING REPORT**

**NORTH BURLINGTON REGIONAL HIGH SCHOOL**

**PROPOSED ADDITIONS & IMPROVEMENTS**

**MANSFIELD TWP., BURLINGTON CO., NEW JERSEY**

**PREPARED FOR:**

**MR. DANIEL FRYER, E.I.T.  
VAN CLEEF ENGINEERING ASSOCIATES, LLC  
4 AAA DRIVE, SUITE 103  
HAMILTON, NJ 08691**

**JANUARY 24, 2019**

A handwritten signature in black ink that reads "William F. Mercurio". The signature is written in a cursive style and is positioned above a horizontal line.

**WILLIAM F. MERCURIO, P.E.  
NEW JERSEY PROFESSIONAL ENGINEER  
LICENSE NUMBER GE29247**

**VCEA PROJECT NUMBER: 18-05-MFD**

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**TABLE OF CONTENTS**

<b><u>SECTION</u></b>	<b><u>PAGE</u></b>
<b>EXECUTIVE SUMMARY.....</b>	<b>1</b>
<b>1.0 INTRODUCTION .....</b>	<b>2</b>
<b>2.0 SUBSURFACE INVESTIGATION PROGRAM .....</b>	<b>2</b>
<b>3.0 SOILS LABORATORY TESTING.....</b>	<b>3</b>
<b>4.0 GENERAL SITE GEOLOGY .....</b>	<b>3</b>
<b>5.0 DESCRIPTION OF SUBSURFACE CONDITIONS.....</b>	<b>3</b>
<b>6.0 GROUNDWATER CONDITION.....</b>	<b>3</b>
<b>7.0 FOUNDATION RECOMMENDATIONS .....</b>	<b>4</b>
7.1 SUBGRADE PREPARATION PROCEDURES .....	4
7.2 SHALLOW FOOTING FOUNDATION .....	4
7.3 AT-GRADE FLOOR SLABS .....	5
7.4 SETTLEMENT .....	6
7.5 LATERAL EARTH PRESSURES .....	6
7.6 SEISMIC COEFFICIENTS .....	7
<b>8.0 SITE DEVELOPMENT CONSIDERATIONS.....</b>	<b>7</b>
8.1 EXCAVATION AND BACKFILL.....	7
8.2 SITE DRAINAGE AND SURFACE WATER CONTROL .....	7
8.3 EXISTING UTILITIES.....	7
8.4 COMPACTED STRUCTURAL FILL.....	8
8.5 EXCAVATION SUPPORT CONSIDERATIONS .....	8
8.6 CONSTRUCTION DEWATERING .....	9
<b>9.0 PAVEMENT DESIGN .....</b>	<b>9</b>
<b>10.0 CONSTRUCTION OBSERVATION AND TESTING .....</b>	<b>10</b>
<b>11.0 GENERAL .....</b>	<b>10</b>
<b><u>Appendix</u></b>	<b><u>Appendix No.</u></b>
Site Location Plan (Figure 1) .....	A
Test Boring Location (Figure 2) .....	A
Test Boring Logs (B-1, B-2 and B-101 through B-108) .....	B
Modified Method for Identification of Soils (Modified Burmister).....	B
Unified Soil Classification System (USCS) .....	B
General Notes for Test Boring Logs .....	B
Pavement Design Calculations .....	C
Limitations .....	D

## **EXECUTIVE SUMMARY**

The following is a summary of the geotechnical engineering conclusions and recommendations based on the results of the subsurface investigations for the proposed Additions & Improvements to the North Burlington Regional High School site. The proposed improvements include multiple additions, additional parking and access drive. The school site is located at 160 Mansfield Road East, Mansfield Township, Burlington County, New Jersey. This summary should be read in complete context with the accompanying report for proper interpretation.

### **Subsurface Conditions**

- A subsurface exploration program was conducted on January 23, 2018 in the area of the proposed improvements. The subsurface exploration program consisted of two (2) test borings advanced to a depth of 20 feet.
- An additional subsurface exploration program was conducted on November 8, 2018 in the area of the proposed improvements. The subsurface exploration program consisted of eight (8) test borings advanced to depths between 10 and 20 feet.
- The test borings encountered either 4 inches of asphalt with 2 inches DGA, 4 inches of gravel or 2 to 4 inches of topsoil at the ground surface. Very loose to medium marine sand was encountered below the ground surface material to a depth of 13 to 20 feet below existing grades. In borings B-1 and B-105 soft to stiff marine clay was encountered at a depth of 13 feet and extended to a depth of 20 feet, the maximum depth explored.
- Groundwater was not encountered in test borings B-1, B-2, B-105 and B-107. Groundwater was encountered in the remaining test borings at depths between 10 to 19.5 feet below existing grades.

### **Foundation & Slab On-Grade**

- Shallow and spread footings bearing on proofrolled natural soils of Stratum A, Stratum B or on compacted structural fill may be considered suitable for foundation support after approval by the Geotechnical Engineer.
- Shallow and spread footings can be designed with a maximum net allowable soil bearing capacity of 2,500 psf (1.25 tsf) for Stratum A, Stratum B or on compacted structural fill.
- A modulus of subgrade reaction of 150 pci, based on a 1-foot square steel plate, may be used for design of concrete floor slabs.
- In accordance with the provisions of the 2015 International Building Code, New Jersey Edition Section 1613.3.2 Seismic Requirements, the design is subject to the seismic design requirements of ASCE 7 Table 20.3-1 (Site Class Definitions). The site can be classified as Class D, dense soil profile.

## **1.0 INTRODUCTION**

This report presents the results of a geotechnical subsurface investigation conducted by Van Cleef Engineering Associates (VCEA) Geotechnical Department for the proposed Additions & Improvements to the North Burlington Regional High School site. The proposed improvements include multiple additions, additional parking and access drive/bus loop. The school site is located at 160 Mansfield Road East, Mansfield Township, Burlington County, New Jersey. The site location is shown on the attached Site Location Plan – Figure 1, Appendix A

The purpose of this study was to determine the subsurface soil conditions beneath the site of the proposed improvements in order to provide geotechnical recommendations for foundation support and site development. General comments and other limitations relative to the contents of this report are presented in the Limitations Section of this report, Appendix D.

No construction or loading information was provided at the time this report was prepared.

## **2.0 SUBSURFACE INVESTIGATION PROGRAM**

In order to determine the subsurface conditions at the proposed site, VCEA's subcontractor, Sano Drilling, Inc. of Sewell, New Jersey, performed a subsurface investigation on January 23, 2018 using a truck mounted drill rig. The investigation included advancing two (2) Standard Penetration Test (SPT) borings. These borings are identified as B-1 and B-2. The borings were drilled to a maximum depth of 20 feet below the existing ground surface utilizing the hollow stem auger drilling method. The boring locations are shown on the attached Test Boring Location – Figure 2, Appendix A.

An additional subsurface investigation was performed on November 8, 2018 by VCEA's subcontractor, Soil Borings, Inc. of Hammonton, New Jersey, using a truck mounted drill rig. The investigation included advancing eight (8) Standard Penetration Test (SPT) borings. These borings are identified as B-101 through B-108. The borings were drilled to a maximum depth of 20 feet below the existing ground surface utilizing the hollow stem auger drilling method. The boring locations are shown on the attached Test Boring Location – Figure 2, Appendix A.

During the execution of the soil boring work, a field engineer from VCEA was present to monitor the drilling work, receive samples, prepare boring logs, and record all pertinent data. Detailed logs are presented in Appendix B of this report.

Soil samples were obtained from all the borings by the Standard Penetration Test (SPT) method with a 1½ inch inside diameter split spoon sampler, driven with a 140 lb. drop hammer free falling 30 inches (ASTM D-1586). The number of blows required to drive the split spoon every 6 inches into the soil were recorded and are shown on the logs. The sum of blows for the middle one-foot is the N value. The SPT N-value indicates the soil resistance encountered at each particular layer. Soil samples were obtained continuously. General notes for the test boring logs are included in Appendix B.



### 3.0 SOILS LABORATORY TESTING

All soil samples obtained were delivered to the VCEA's office in Freehold, New Jersey for further identification and classification. Visual identification of the soil samples obtained from the borings is in accordance with procedures of the Modified Method of Identification of Soils as described by Prof. Donald M. Burmister (Modified Burmister) and Unified Soil Classification System (USCS). A summary of the Burmister Soil Identification System and USCS are included in Appendix B.

VCEA will dispose of the soil samples 60 days (January 31, 2019) after the issue of this report. Further storage or transfer of samples can be made at the Client's expense upon timely written request.

### 4.0 GENERAL SITE GEOLOGY

The general site geology information was obtained from the "Engineering Soil Survey of New Jersey, Report Number 34, Burlington County," prepared by Rutgers, The State University of New Jersey, May 1955.

The soils at this site are mapped with the symbol "M-24" designating stratified deposits of predominantly marine origin. The soils consist of silty sand with interbedded, irregular layers of sandy silt. The depth to bedrock is greater than 100 feet.

### 5.0 DESCRIPTION OF SUBSURFACE CONDITIONS

The test borings encountered either 4 inches of asphalt with 2 inches DGA, 4 inches of gravel or 2 to 4 inches of topsoil at the ground surface. The generalized subsurface conditions at this site may be described as follows, in order of depth:

**Stratum A –Marine Sand:** Stratum A was encountered directly below the ground surface material. The soils of this stratum consist of very loose to medium dense, various browns to greenish gray sand (SP, SM and SC material per USCS) with varying amounts of clay, silt and gravel. The SPT N-values of this stratum range from 2 to 18 with an average value of 10, indicating an overall medium density. The stratum extends to a depth of 20 feet below the existing ground surface, the maximum depth explored. Stratum B in turn underlies this Stratum in borings B-1 and B-105.

**Stratum B –Marine Clay:** Stratum B was encountered directly below Stratum A in borings B-1 and B-105. The soils of this stratum consist of soft to stiff, dark brown to greenish gray clayey silt (CL-ML material per USCS) with varying amounts of sand. The SPT N-values of this stratum range from 4 to 10 with an average value of 7, indicating an overall medium consistency. The stratum extends to a depth of 20 feet below the existing ground surface, the maximum depth explored.

### 6.0 GROUNDWATER CONDITION

Groundwater was not encountered in test borings B-1, B-2, B-105 and B-107. Groundwater was encountered in the remaining test borings at depths between 10 to 19.5 feet below

existing grades. No long-term water level readings were obtained, as the test borings were backfilled upon completion.

Soil moisture and groundwater conditions should be expected to fluctuate with season, precipitation amounts, and other on-site and off-site factors including site utilization. Groundwater seepage may be encountered during earthwork excavation, utility installation or other deep excavations.

## **7.0 FOUNDATION RECOMMENDATIONS**

Test boring data revealed that the subsurface conditions are favorable for the proposed construction.

### **7.1 SUBGRADE PREPARATION PROCEDURES**

The subgrade preparation procedures will include:

- Remove vegetation and strip topsoil within the area of the proposed addition and 5 feet beyond the proposed footprint;
- Grade site to proposed subgrade elevation(s). Use only track-mounted equipment on the native soils, as they will soften under vehicle traffic and exposure to weather. Do not leave the soil subgrade exposed to wet weather for extended periods;
- The exposed subgrade soils should be proofrolled and compacted using a heavy duty 10-ton roller;
- Any areas which exhibit signs of instability during the compaction operations or contain excessive unsuitable materials, as determined by the Geotechnical Engineer, should be selectively over-excavated to suitable bearing material and backfilled with approved compacted structural fill;
- The excavated soil may be reused as the structural fill following removal of any oversized material, if encountered. Upon completion of proofrolling, structural fill can be placed and compacted to the design subgrade;
- All structural fill should be compacted to 95% of the Modified Proctor Density (ASTM D 1557); and
- The subgrade preparation procedures should be under the supervision of a Geotechnical Engineer.

### **7.2 SHALLOW FOOTING FOUNDATION**

Conventional spread and strip footings may be designed for a maximum net allowable soil bearing pressure of 2,500 psf (1.25 tsf) for the natural soils Stratum A, Stratum B or compacted structural fill. Loose soil is not considered suitable for foundation support

and if encountered, should be excavated and replaced with structural fill. See Section 8.4 - Compacted Structural Fill of this report for further details.

Footings may be stepped up or down at 2H: 1V to achieve any necessary grade changes. Actual footing grades should be evaluated in the field based on observation and probing by the Geotechnical Engineer.

Wall and column footing widths should not be less than 1.5 and 3.0 feet, respectively, or less than applicable code requirements, whichever is greater. Exterior footings should be founded at a minimum depth of 3.0 feet beneath the outside finished grades for frost protection. All footing subgrades should be compacted using a "Jumping Jack" or similar compactor upon completion of footing excavation.

The bottom of the excavation will consist predominantly of granular material, and if the excavation is to be left open overnight, a work mat should be used to protect the foundation subgrade at the bottom of footing excavations. Installation of the work mat should be as directed by the Geotechnical Engineer. A work mat may consist of a 2-inch lean concrete mud mat, or 6 inches clean crushed stone, which will serve to level the footing subgrade, as well as to prevent subgrade softening if the subgrade is exposed to the elements for prolonged periods.

New footings for the proposed addition should be founded at the same depth as the existing footings so as not to exert additional pressure on the existing foundation.

To confirm the design allowable soil bearing pressure, a Geotechnical Engineer, prior to the placement of concrete, must inspect the footing subgrade. The contractor should exercise extreme caution not to disturb the subgrade soils. Should the footing subgrade be disturbed, the loosened soil should be compacted in-place. Backfilling against footings and under floor slabs should be accomplished using structural fill placed and compacted under engineering inspection. Any water that accumulates in the bottom of the excavation should be removed within 24 hours.

### **7.3 AT-GRADE FLOOR SLABS**

The at-grade floor slabs of the proposed addition may be supported on the firm soils of Stratum A or on new compacted structural fill following subgrade preparation as specified in Section 7.1 of this report.

Saw joints or construction joints should isolate each bay to control shrinkage cracks. A minimum of 6 inches of  $\frac{3}{4}$ -inch clean, crushed stone or a 12-inch thick layer (minimum) of well-graded sand and gravel with no more than 10% non-plastic fines is recommended below the slab-on-grade to assure uniform curing conditions. A 6-mil PVC vapor retarder may be placed between the slab and base course to minimize moisture migration to the surface.

All structural fill supporting the floor slab should be compacted to 95% of the Modified Proctor Density (ASTM D 1557). A modulus of subgrade reaction of 150 pci, based on a 1-foot square steel plate, may be used for design of concrete floor slabs.

#### 7.4 SETTLEMENT

VCEA estimates that post construction settlement for foundations supported on natural soils or compacted structural fill and constructed in accordance with VCEA's recommendations will be 1/2-inch or less, and estimated post construction differential settlement will be minimal.

#### 7.5 LATERAL EARTH PRESSURES

The following soil parameters can be used to determine lateral earth pressure for design of below grade and retaining walls assuming a SM or better quality material in accordance with ASTM D2487 is utilized as backfill. At-rest earth pressure ( $K_o$ ) should be used for design of non-yielding walls.

<b>Soil Parameters</b>
Total unit weight $\gamma_T = 130$ pcf
Angle of internal friction $\phi = 32^\circ$
Active earth pressure $K_a = 0.31$
Passive earth pressure $K_p = 1.6$ *
At rest earth pressure $K_o = 0.47$
Base friction coefficient = 0.30

Note: \* Includes a factor of safety equal to 2.0

Base friction can be increased to 0.4 if a layer of crushed stone, 6 inches in thickness, is placed between the concrete footing and soil subgrade.

The Geotechnical Engineer predicates the use of the above parameters upon the assumption that backfill within 5 feet of the wall will consist of structural type fill and/or predominantly granular on-site blended material, as approved. Fill placed within this 5-foot zone should be compacted with hand or plate tampers. No heavy rollers should be allowed within 5 feet of any structure.

The recommended lateral pressure does not include hydrostatic pressure since the water table is below the recommended footing elevation. To prevent water development behind any retaining walls, a permanent subdrain should be provided behind the perimeter of below grade retaining walls in accordance with the manufacturers requirements. The drain should be a continuous perforated 4-inch diameter pipe surrounded on all sides by a minimum of 6 inches of clean crushed stone wrapped in filter fabric. The pipe should be sloped to drain by gravity to the storm sewer system.

Furthermore, no surcharge loads adjacent to the walls or at the ground surface were considered in the recommended lateral pressures above. VCEA recommends adding a uniform (i.e., rectangular) lateral pressure distribution of 0.40 times the surcharge load

to the lateral earth pressure distribution. The factor of 0.40 takes into account the increase in lateral force due to dynamic loading. The Structural Engineer should determine the magnitude of the surcharge loads (i.e., live loads).

## **7.6 SEISMIC COEFFICIENTS**

In accordance with the provisions of the 2015 International Building Code, New Jersey Edition Section 1613.3.2 Seismic Requirements, the design is subject to the seismic design requirements of ASCE 7 Table 20.3-1 (Site Class Definitions). The site can be classified as Class D, dense soil profile.

## **8.0 SITE DEVELOPMENT CONSIDERATIONS**

### **8.1 EXCAVATION AND BACKFILL**

A Geotechnical Engineer shall inspect the footing subgrade prior to the placement of concrete to confirm the design allowable soil bearing pressure, verify that the existing soil is suitable, and any soft soil conditions encountered are stabilized. Once excavated, the exposed footing subgrade should be thoroughly compacted utilizing a mechanical compactor such as a "jumping jack" or similar device as specified by the Geotechnical Engineer. The contractor should exercise extreme caution not to disturb the subgrade soils. Should the footing subgrade be disturbed or soft soils encountered, the unsuitable soil should be over-excavated to firm soils and replaced with appropriate compacted structural fill.

Backfilling against footings and under floor slabs should be accomplished using structural fill placed and compacted under geotechnical engineering inspection. Any water that accumulates in the bottom of the excavation should be removed within 24 hours.

All excavation operations and backfill requirements shall be performed in accordance with requirements discussed in Section 8.0 – Site Development Considerations.

### **8.2 SITE DRAINAGE AND SURFACE WATER CONTROL**

Adequate temporary and permanent control of surface water runoff will be required in order to allow site access, grading, and construction to proceed. Excavation, filling, subgrade and grade preparation should be performed in a manner and sequence that will provide drainage at all times as well as proper control of erosion. Surface water shall be pumped or drained to provide a suitable working platform. Any water accumulating in the open excavation shall be removed within 24 hours.

### **8.3 EXISTING UTILITIES**

All existing underground utilities should be relocated within the proposed addition construction area because it is not practical to perform corrective actions on these utilities once the addition is constructed. In particular large diameter piping (greater than 4 inches in diameter) provide a possible means for soil movement beneath the

building. Those utilities, which are not to be reused, should be removed from and within 5 feet beyond the proposed construction area.

The utility trenches that are in the influence zone of new construction should be backfilled with compacted structural fill. A structural engineer should evaluate underground utilities, which are to be reused. A Geotechnical Engineer should evaluate the suitability of the utility backfill for support of the planned construction. Existing utilities that are to be preserved shall require grading operations to be performed in a manner so as not to disturb or damage the existing utility.

#### **8.4 COMPACTED STRUCTURAL FILL**

Before placement of new fills, or construction of foundations, all vegetation and any miscellaneous debris shall be removed. Any unsuitable soils thus detected should be excavated and replaced with compacted granular fill (SM or better).

The on-site excavated soils are generally considered suitable for use as structural fill. It should be anticipated that some drying and reworking of the on-site soils will be necessary to achieve the required compaction as outlined below. Controlling the moisture of the on-site excavated is vital to success of using this material as structural fill. Controlled structural fill shall consist of inorganic, readily compactable, predominantly well graded, granular soils with no more than 15% fines (material passing through the No. 200 sieve). Off-site borrow, if required, should meet Unified Soil Classification System (USCS) designation SM, SP, GP, GM, GW and be approved by the Geotechnical Engineer prior to use.

It is recommended that fragments having a maximum dimension greater than 3 inches be excluded from the fill. The moisture content of the fill materials should be controlled to within 3% of the optimum by wetting, aeration or blending to facilitate compaction.

All load-bearing fill should be controlled fill. Controlled fill should be placed in loose horizontal lifts with a maximum thickness of 8 inches. It is recommended that controlled fill within the construction area be compacted with a heavy duty 10-ton roller to at least 95% of the maximum dry density as determined by the Modified Proctor Test (ASTM D 1557). In addition, VCEA recommends that all fills be stable without significant movement under construction traffic, as judged by the Geotechnical Engineer. Quality control testing of in-place fill densities should be conducted throughout the entire earthwork operation.

Compaction within 5 feet from the existing facilities should be conducted using a light compactor such as a "Jumping Jack" in order not to cause any damage. The soil should be compacted to the same criteria described above.

#### **8.5 EXCAVATION SUPPORT CONSIDERATIONS**

It should be stated in the contract document that the contractor is responsible for maintaining the integrity of the existing above-grade and below-grade structures and/or

dewatering operations. All construction excavations should be performed in conformance with applicable local, state and federal OSHA safety regulations.

The design of all temporary excavation support systems should be the responsibility of a licensed New Jersey Professional Engineer retained by the foundation contractor. All excavations of temporary support systems should conform to pertinent OSHA and local safety regulations. The Owner's geotechnical engineer prior to construction of the temporary support structures should review the design of soil loads.

Movement of workmen and construction machinery across the bottom of the excavation (footing subgrade) could disturb the subgrade soil. If the subgrade soil is disturbed, the disturbed soil should be removed and backfilled with gravel as directed by the engineer.

Regardless of the excavation option chosen, excavated soils should not be stockpiled adjacent to the sides of the excavations to avoid the imposition of additional loads, unless temporary shoring or side slopes are designed for such a surcharge load.

## **8.6 CONSTRUCTION DEWATERING**

Groundwater was not encountered at either of the test boring locations. Groundwater and/or perched water levels may however be encountered during excavation and construction due to soil conditions, seasonal variations, and/or climatic conditions. Due to the possibility of encountering perched water or groundwater during construction, a dewatering system using sump pits and sump pumps may be necessary. Dewatering specifications shall be of the performance type requiring the contractor to lower the water level a minimum of two (2) feet below prevailing depths of excavations. Any water accumulating in the bottom of excavations shall be removed within 24 hours.

## **9.0 PAVEMENT DESIGN**

### **Pavement Subgrade**

Based on the test boring results, no unusual conditions that would affect the support of the proposed access drive/Bus Loop were encountered. No anticipated overexcavation for support of the pavement is anticipated provided the contractor prepares the subgrade in accordance with Section 7.1 – Subgrade Preparation Procedures. A value of 4,500 psi was used for the subgrade Resilient Modulus ( $M_r$ ) based on the test borings and existing soil types.

### **Traffic Data**

Traffic data was obtained from Dynamic Traffic's Traffic Assessment for Northern Burlington County High School Expansion updated March 9, 2015 and used for calculating the ESAL (Equivalent Single Axil Load) value. Additional traffic data was provided by VCEA.

## **Pavement Design Input**

Asphalt pavement design procedures are based on the 1993 AASHTO Empirical Equation for Flexible Pavements. The following is a summary of pavement design criteria based on AASHTO specifications. Our analysis was based on these design criteria.

### Standard-Duty Pavement Design Criteria:

A design life of 20 years based on a minimum ESAL (18 kip) load = 313,777, reliability = 90 %, standard deviation = 0.45, initial serviceability = 4.2, and terminal serviceability = 2.0 for flexible pavements.

Based on the design criteria and calculated data, a pavement section with a Structural Number (SN) of 3.34 or greater is required to achieve the 20 year design life. Pavement design calculations are attached in Appendix C.

## **Pavement Section**

Based on the provided traffic data and soils encountered in the test borings, the following pavement section is recommended for the proposed Bus Loop:

Material	Material Thickness
	20-year design (inches)
Asphalt Concrete Surface Course	2.0
Asphalt Concrete Base Course	5.0
DGA or Base Course	6.0

The pavement section above produces a SN of 3.44, which is greater than the required SN of 3.34 and is therefore adequate.

## **10.0 CONSTRUCTION OBSERVATION AND TESTING**

Regardless of the thoroughness of a geotechnical engineering exploration, there is always a possibility that conditions between the borings and below the depths explored may be different from those encountered in the borings, that conditions are not as anticipated by the designers, or that the construction process has altered the subsurface conditions. Therefore, geotechnical engineering construction observation on a full time basis should be performed under the supervision of a Geotechnical Engineer who is familiar with the intent of the recommendations presented herein. This observation is recommended to evaluate whether the conditions anticipated in the design actually exist or whether the recommendations presented herein should be modified where necessary.

## **11.0 GENERAL**

The conclusions and recommendations of this report are based on the information revealed by this exploration. An attempt has been made to provide for normal contingencies, but the possibility remains that unexpected conditions may be encountered during construction. An allowance should be established to account for possible additional costs that may be required



to construct foundations and earthwork as recommended herein. Additional costs may be incurred for various reasons including undercutting of unsuitable soils, inability to use on-site soils due to the weather conditions during the period earthwork proceeds, and variation of soil between borings.

This study should be made available to prospective bidders for informational purposes. VCEA recommends that the project specifications contain the following statement:

"A geotechnical engineering report has been prepared for this project by VCEA. This report is for informational purposes only and should not be considered part of the contract documents. The opinions expressed in this report are those of the Geotechnical Engineer and represent VCEA's interpretation of the subsoil conditions, and the results of analyses, which have been conducted. Should the data contained in this report not be adequate for the Contractor's purposes, the Contractor may make their own investigation, tests, and analyses at their own cost prior to bidding. This report may be examined by bidders."

VCEA strongly advises that the Subsurface Exploration Data of all Appendices should be included in the contract documents.

# APPENDIX

## A



**FIGURE 1**

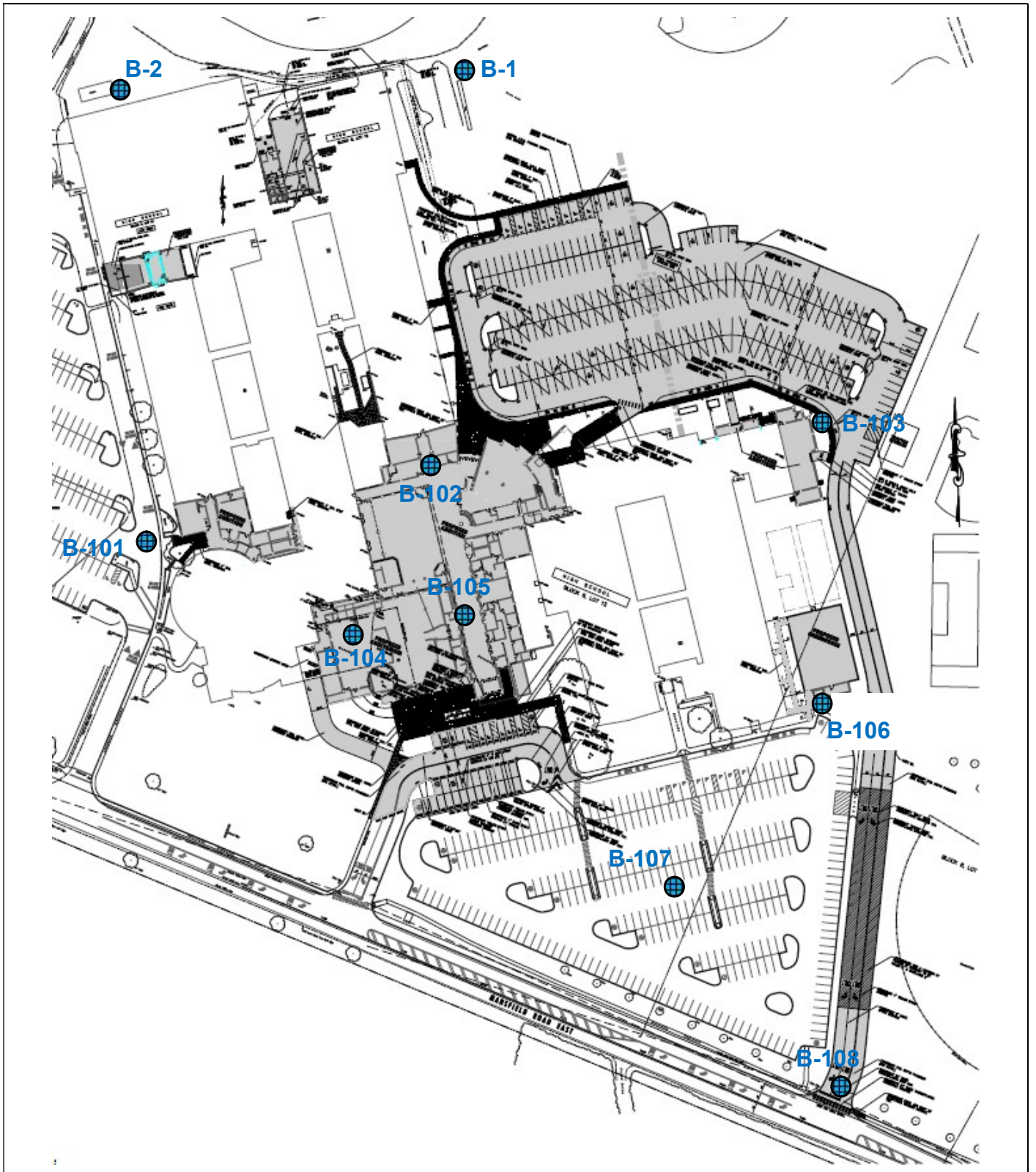
**Site Location Plan**

**North Burlington Regional High School  
Proposed Additions & Improvements  
Mansfield Township, Burlington County, NJ**



SCALE	DATE	DRAWN BY	FILE NO.
Not to Scale	November 2018	ETD	18-05-MFD





**FIGURE 2**

**Test Boring Location Plan**

**North Burlington Regional High School  
Proposed Additions & Improvements  
Mansfield Twp., Burlington Co., New Jersey**



**LEGEND**


-  B-1 = Test Boring Location (January 2018)
-  B-101 = Test Boring Location (November 2018)

SCALE	DATE	DRAWN BY	FILE NO.
Not to Scale	November 2018	ETD	18-05-MFD

# APPENDIX B

# BORING LOG


# Boring # B-101

<b>Drilling Contractor:</b> Soil Boring Inc <b>Drilling Rig Operator:</b> C. Blemings <b>Drilling Method:</b> 3 1/4 inch HSA <b>Casing Size/Type:</b> / <b>Drilling Equipment:</b> Mobile B-37 <b>CW Representative:</b> J. Letinski <b>Dates: Started:</b> 11/8/2018 <b>Completed:</b> 11/8/2018 <b>Ground Surface Elevation (ft): ±</b> 85	 <p><b>Project:</b> N. Burlington Regional H.S.  <b>Project Number:</b> 18-05-MFD  <b>Project Location:</b> Proposed Additions &amp; Improvements                  Mansfield Twp., Burlington Co., NJ  <b>Boring Location:</b> See Test Boring Location Plan</p>	
<b>GROUNDWATER OBSERVATIONS</b>		<b>DEPTH (FEET)</b>
▽ <b>Encountered:</b> 11/8/2018		13
▼ <b>Completion:</b>		
▽ <b>24 Hour Reading:</b>		

Depth (ft)	Soil Samples				Rock Core			Graphic Symbol	STRATUM	MATERIAL DESCRIPTION	Elevation	Water Cont. (%)	REMARKS
	Sample No.	Recovery (ft)	Pen. Resist. (blows / 6 in.)	N Value	Run No.	Rec (%)	RQD (%)						
0	S1		1-1-5-6	6				A	2 inches TOPSOIL. Orange brown medium to fine SAND, some fine Gravel, little Silt. (SM)			MARINE SANDS	
5	S2		5-6-7-7	13					Orange brown medium to coarse SAND, little Silt. (SM)				
5	S3		5-4-3-4	7					Same.	80			
10	S4		4-3-4-5	7					Greenish to orange brown medium to fine SAND, little Silt. (SM)				
10	S5		3-2-2-2	4					Greenish gray medium to fine SAND, some Silt (SM)	75			
15	S6		2-4-4-6	8					Tan to orange brown coarse to fine SAND, trace Silt. (SP)	70	▽		
15	S7		4-6-7-13	13					Same.				
20	Bottom of Boring at 20'									65			

# BORING LOG

# Boring # B-102


<b>Drilling Contractor:</b> Soil Boring Inc <b>Drilling Rig Operator:</b> C. Blemings <b>Drilling Method:</b> 3 1/4 inch HSA <b>Casing Size/Type:</b> / <b>Drilling Equipment:</b> Mobile B-37 <b>CW Representative:</b> J. Letinski <b>Dates: Started:</b> 11/8/2018 <b>Completed:</b> 11/8/2018 <b>Ground Surface Elevation (ft): ±</b> 89	 <b>Project:</b> N. Burlington Regional H.S. <b>Project Number:</b> 18-05-MFD <b>Project Location:</b> Proposed Additions & Improvements Mansfield Twp., Burlington Co., NJ <b>Boring Location:</b> See Test Boring Location Plan	
<b>GROUNDWATER OBSERVATIONS</b>		<b>DEPTH (FEET)</b>
▽ <b>Encountered:</b> 11/8/2018		18
▼ <b>Completion:</b>		
▽ <b>24 Hour Reading:</b>		

Depth (ft)	Soil Samples				Rock Core			Graphic Symbol	STRATUM	MATERIAL DESCRIPTION	Elevation	Water Cont. (%)	REMARKS
	Sample No.	Recovery (ft)	Pen. Resist. (blows / 6 in.)	N Value	Run No.	Rec (%)	RQD (%)						
										4 inches ASPHALT and 2 inches DGA.			
	S1		11-9-9	18					A	Light to greenish brown medium to fine SAND, little Silt. (SM)			MARINE SANDS
	S2		6-9-9-7	18						Orange brown fine to medium SAND, trace Silt. (SP)	85		MARINE SANDS
5	S3		6-5-5-6	10						Same.			
	S4		3-3-3-3	6					A	Same.			
	S5		8-8-7-10	15						Same.	80		
10	S6		4-6-9-10	15						Orange to greenish brown coarse to fine SAND, little fine Gravel, trace Silt. (SP)			
	S7		2-1-3-3	4					A	Dark brown medium to fine SAND, some Silt. (SM)	75		MARINE SANDS
15	S8		3-2-4-6	6						Orange brown coarse to fine SAND, little Silt. (SM)	70	▽	
20	Bottom of Boring at 20'												

# BORING LOG

# Boring # B-103

Page 1 of 1


<b>Drilling Contractor:</b> Soil Boring Inc <b>Drilling Rig Operator:</b> C. Blemings <b>Drilling Method:</b> 3 1/4 inch HSA <b>Casing Size/Type:</b> / <b>Drilling Equipment:</b> Mobile B-37 <b>CW Representative:</b> J. Letinski <b>Dates: Started:</b> 11/8/2018 <b>Completed:</b> 11/8/2018 <b>Ground Surface Elevation (ft): ±</b> 88	 <p><b>Project:</b> N. Burlington Regional H.S.  <b>Project Number:</b> 18-05-MFD  <b>Project Location:</b> Proposed Additions &amp; Improvements                  Mansfield Twp., Burlington Co., NJ  <b>Boring Location:</b> See Test Boring Location Plan</p>	
<b>GROUNDWATER OBSERVATIONS</b>		<b>DEPTH (FEET)</b>
▽ <b>Encountered:</b> 11/8/2018		18
▼ <b>Completion:</b>		
▽ <b>24 Hour Reading:</b>		

Depth (ft)	Soil Samples				Rock Core			Graphic Symbol	STRATUM	MATERIAL DESCRIPTION	Elevation	Water Cont. (%)	REMARKS
	Sample No.	Recovery (ft)	Pen. Resist. (blows / 6 in.)	N Value	Run No.	Rec (%)	RQD (%)						
0	S1		2-3-4-5	7				A	2 inches TOPSOIL. Light to Orange brown coarse to fine SAND, little Silt. (SM)			MARINE SANDS	
5	S2		3-5-4-4	9					Same.	85			
5	S3		3-3-3-5	6					Light to orange brown medium to fine SAND, little Silt. (SM)				
5	S4		5-4-4-6	8					Same.	80			
10	S5		8-10-8-4	18					Reddish to orange brown coarse to medium SAND, some medium to fine Gravel, trace Silt. (SP)				
15	S6		2-3-5-7	8					Greenish to orange brown coarse to fine SAND, little Silt. (SM)	75			
20	S7		5-7-9-14	16				A	Tan to orange brown medium to fine SAND, trace Silt. (SP)	70	▽	MARINE SANDS	
20	Bottom of Boring at 20'												



# BORING LOG


# Boring # B-104

<b>Drilling Contractor:</b> Soil Boring Inc <b>Drilling Rig Operator:</b> C. Blemings <b>Drilling Method:</b> 3 1/4 inch HSA <b>Casing Size/Type:</b> / <b>Drilling Equipment:</b> Mobile B-37 <b>CW Representative:</b> J. Letinski <b>Dates: Started:</b> 11/8/2018 <b>Completed:</b> 11/8/2018 <b>Ground Surface Elevation (ft): ±</b> 87	 <p><b>Project:</b> N. Burlington Regional H.S.  <b>Project Number:</b> 18-05-MFD  <b>Project Location:</b> Proposed Additions &amp; Improvements          Mansfield Twp., Burlington Co., NJ  <b>Boring Location:</b> See Test Boring Location Plan</p>	
<b>GROUNDWATER OBSERVATIONS</b>		<b>DEPTH (FEET)</b>
▽ <b>Encountered:</b> 11/8/2018		18.5
▼ <b>Completion:</b>		
▼ <b>24 Hour Reading:</b>		

Depth (ft)	Soil Samples				Rock Core			Graphic Symbol	STRATUM	MATERIAL DESCRIPTION	Elevation	Water Cont. (%)	REMARKS
	Sample No.	Recovery (ft)	Pen. Resist. (blows / 6 in.)	N Value	Run No.	Rec (%)	RQD (%)						
85	S1		7-5-4-4	9				A	2 inches TOPSOIL. Tan coarse to fine SAND, little Silt. (SM)	85		MARINE SANDS	
	S2		3-2-3-2	5			Same.						
5	S3		3-2-2-2	4			Tan to light brown coarse to fine SAND, little Silt, trace fine Gravel. (SM)						
	S4		2-2-3-3	5			Orange brown coarse to fine SAND, little Silt. (SM)						
10	S5		5-5-6-3	11			A	Brown to orange brown coarse to fine SAND, little medium to fine Gravel, little Clay. (SC)	75		MARINE SANDS		
	S6		3-4-5-9	9				Dark brown fine SAND, some Clay. (SC)					
15							A		70				
	S7		2-2-2-5	4				Dark to orange brown coarse to fine SAND, trace Silt. (SP)					
20	Bottom of Boring at 20'												

# BORING LOG

# Boring # B-105


<b>Drilling Contractor:</b> Soil Boring Inc <b>Drilling Rig Operator:</b> C. Blemings <b>Drilling Method:</b> 3 1/4 inch HSA <b>Casing Size/Type:</b> / <b>Drilling Equipment:</b> Mobile B-37 <b>CW Representative:</b> J. Letinski <b>Dates: Started:</b> 11/8/2018 <b>Completed:</b> 11/8/2018 <b>Ground Surface Elevation (ft): ±</b> 87		 <b>Project:</b> N. Burlington Regional H.S. <b>Project Number:</b> 18-05-MFD <b>Project Location:</b> Proposed Additions & Improvements Mansfield Twp., Burlington Co., NJ <b>Boring Location:</b> See Test Boring Location Plan	
		<b>GROUNDWATER OBSERVATIONS</b>	
▽ <b>Encountered:</b> N/E		<b>DEPTH (FEET)</b>	
		▽ <b>Completion:</b> ▽ <b>24 Hour Reading:</b>	

Depth (ft)	Soil Samples				Rock Core			Graphic Symbol	STRATUM	MATERIAL DESCRIPTION	Elevation	Water Cont. (%)	REMARKS
	Sample No.	Recovery (ft)	Pen. Resist. (blows / 6 in.)	N Value	Run No.	Rec (%)	RQD (%)						
										4 inches ASPHALT and 2 inches DGA.			
	S1		10-7-7	14				A		Dark brown coarse to fine SAND, trace Silt. (SP)	85		MARINE SANDS
	S2		4-4-5-5	9						Orange brown medium to fine SAND, trace Silt. (SP)			
5	S3		6-6-8-7	14						Orange brown to tan medium to fine SAND, trace Silt. (SP)			
	S4		5-3-4-4	7						Same.	80		
	S5		3-3-3-5	6						Same.			
10											75		
	S6		1-1-3-5	4				B		Greenish gray Clayey SILT and fine Sand. (CL-ML)			MARINE CLAYS
15												70	
	S7		2-4-5-12	9						Same.			
20										Bottom of Boring at 20'			

# BORING LOG

# Boring # B-106

Page 1 of 1

<b>Drilling Contractor:</b> Soil Boring Inc <b>Drilling Rig Operator:</b> C. Blemings <b>Drilling Method:</b> 3 1/4 inch HSA <b>Casing Size/Type:</b> / <b>Drilling Equipment:</b> Mobile B-37 <b>CW Representative:</b> J. Letinski <b>Dates: Started:</b> 11/8/2018 <b>Completed:</b> 11/8/2018 <b>Ground Surface Elevation (ft): ±</b> 87	 <p><b>Project:</b> N. Burlington Regional H.S.  <b>Project Number:</b> 18-05-MFD  <b>Project Location:</b> Proposed Additions &amp; Improvements                  Mansfield Twp., Burlington Co., NJ  <b>Boring Location:</b> See Test Boring Location Plan</p>	
<b>GROUNDWATER OBSERVATIONS</b>		<b>DEPTH (FEET)</b>
▽ <b>Encountered:</b> 11/8/2018		19.5
▼ <b>Completion:</b>		
▽ <b>24 Hour Reading:</b>		

Depth (ft)	Soil Samples				Rock Core			Graphic Symbol	STRATUM	MATERIAL DESCRIPTION	Elevation	Water Cont. (%)	REMARKS
	Sample No.	Recovery (ft)	Pen. Resist. (blows / 6 in.)	N Value	Run No.	Rec (%)	RQD (%)						
4	S1		1-1-1-1	2				A	4 inches TOPSOIL. Light to orange brown medium to fine SAND, trace Silt. (SP)	85		MARINE SANDS	
5	S2		1-1-1-1	2				A	Greenish to orange brown fine SAND, some Clayey Silt. (SM)			MARINE SANDS	
5	S3		2-3-4-5	7				A	Light brown medium to fine SAND, little Silt. (SM)			MARINE SANDS	
6	S4		4-6-7-7	13				A	Orange brown medium to fine SAND, trace Silt. (SP)	80		MARINE SANDS	
10	S5		3-6-7-3	13				A	Orange brown coarse to fine SAND, some Silt. (SM)	75		MARINE SANDS	
15	S6		2-1-3-4	4				A	Greenish to orange brown medium to fine SAND, little Silt. (SM)	70		MARINE SANDS	
20	S7		3-3-4-7	7				A	Greenish to dark brown coarse to fine SAND, little medium to fine Gravel, little Silt. (SM)			MARINE SANDS	
20	Bottom of Boring at 20'												





**MODIFIED METHOD  
FOR  
IDENTIFICATION OF SOILS  
AFTER  
DR. D.M. BURMISTER**

Soil Component	Descriptive Terms As Written on Log	Range of Proportions
PRINCIPAL COMPONENT (All Letters Capitalized)	--	35% of more
MINOR COMPONENTS (First Letter Capitalized)	and (a.) some (s.) little (l.) trace (tr.)	35% to 50% 20% to 35% 10% to 20% 1% to 10%

**Gradation of Components**

Coarse to fine	Coarse to fine	cf	All sizes
Coarse to medium	Coarse to medium	cm	Less than 10% fine
Medium to fine	Medium to fine	mf	Less than 10% coarse
Coarse	Coarse	c	Less than 10% medium & fine
Medium	Medium	m	Less than 10% coarse & fine
Fine	Fine	f	Less than 10% coarse & medium

Component	U.S. Standard Sieve Range
Boulders	9" and larger
Cobbles	3" to 9"
Gravel	
Coarse	3" to 1"
Medium	1" to 3/8"
Fine	3/8" to #10
Sand	
Coarse	#10 to #30
Medium	#30 to #60
Fine	#60 to #200
Silt	< #200

**Fine Grained Soils-Plasticity of Components**

Component	Symbol	Overall Plasticity	Plasticity Index
SILT	S	Non-Plastic	0
Clayey Silt	CyS	Slight	1 to 5
SILT & CLAY	S & C	Low	5 to 10
CLAY & SILT	C & S	Medium	10 to 20
Silty Clay	SyC	High	20 to 40
CLAY	C	Very High	Over 40

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FILES.
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT <u>LESS</u> THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDS CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
		SILTS AND CLAYS	LIQUID LIMIT <u>GREATER</u> THAN 50	MH
	CH			INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
	OH			ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	PT			PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
	HIGH ORGANIC SOILS			

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

GRADATION\*

COMPACTNESS\*  
SAND AND/OR GRAVEL

CONSISTENCY\*  
CLAY AND/OR SILT

% FINER BY WEIGHT

RELATIVE DENSITY

RANGE OF SHEARING STRENGTH  
IN POUNDS PER SQUARE FOOT

TRACE..... 0% TO 10%  
LITTLE ..... 10% TO 20%  
SOME ..... 20% TO 35%  
AND ..... 35% TO 50%

LOOSE..... 0% TO 40%  
MEDIUM DENSE ..... 40% TO 70%  
DENSE..... 70% TO 90%  
VERY DENSE ..... 90% TO 100%



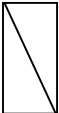
VERY SOFT ..... LESS THAN 250  
SOFT ..... 250 TO 500  
MEDIUM ..... 500 TO 1000  
STIFF ..... 1000 TO 2000  
VERY STIFF ..... 2000 TO 4000  
HARD..... GREATER THAN 4000

\* VALUES ARE FROM LABORATORY OR FILED TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.

**UNIFIED SOIL CLASSIFICATION SYSTEM**  
SOIL CLASSIFICATION CHART

## GENERAL NOTES FOR TEST BORING LOGS

1. NUMBERS IN SAMPLING DATA COLUMN (3+6+27) INDICATE BLOWS REQUIRED TO DRIVE A 2 INCH O.D., 1 3/8 INCH I.D. SAMPLING SPOON 6 INCHES USING A 140 POUND HAMMER FALLING 30 INCHES ACCORDING TO ASTM D1586.
2. VISUAL CLASSIFICATION OF SOILS IS IN ACCORDANCE WITH TERMINOLOGY SET FORTH IN "IDENTIFICATION OF SOIL." THE GROUP CLASSIFICATION SYMBOLS SHOWN IN THE CLASSIFICATION COLUMN ARE BASED ON VISUAL INSPECTION AND AVAILABLE LABORATORY DATA.
3. GROUNDWATER OBSERVATIONS: THE DEPTH OF WATER BELOW GRADE WAS MEASURED AT THE TIMES INDICATES. THE DEPTHS MAY VARY WITH PRECIPITATION, POROSITY OF THE SOIL, SITE TOPOGRAPHY, ETC.
4. REFUSAL AT THE SURFACE OF ROCK, BOULDER, OR OBSTRUCTION IS DEFINED AS A RESISTANCE OF 100 BLOWS FOR 2 INCHES PENETRATION OR LESS.
5. THE BORING LOGS AND RELATED INFORMATION DEPICT SUBSURFACE CONDITIONS ONLY AT THE SPECIFIC LOCATIONS AND AT THE PARTICULAR TIME WHEN DRILLED. SOIL CONDITIONS AT OTHER LOCATIONS MAY DIFFER FROM CONDITIONS OCCURRING AT THESE BORING LOCATIONS. ALSO, THE PASSAGE OF TIME MAY RESULT IN A CHANGE IN THE SUBSURFACE SOIL AND GROUNDWATER CONDITIONS AT THESE BORING LOCATIONS.
6. THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL AND ROCK TYPES AS DETERMINED FROM THE DRILLING AND SAMPLING OPERATION. SOME VARIATION MAY ALSO BE EXPECTED VERTICALLY BETWEEN SAMPLES TAKEN. THE SOIL PROFILE, WATER LEVEL OBSERVATIONS, AND PENETRATION RESISTANCES PRESENTED ON THESE BORING LOGS HAVE BEEN MADE WITH REASONABLE CARE AND ACCURACY AND MUST BE CONSIDERED ONLY AS AN APPROXIMATE REPRESENTATION OF SUBSURFACE CONDITIONS TO BE ENCOUNTERED AT THE PARTICULAR LOCATION.
7. TEST BORINGS DRILLED BY SANO DRILLING, INC. OF SEWELL, NEW JERSEY AND SOIL BORINGS, INC. OF HAMMONTON, NEW JERSEY, UNDER THE INSPECTION OF **CHERRY, WEBBER & ASSOCIATES**.
8. KEY TO SYMBOLS AND ABBREVIATIONS:

	3 + 6 + 27	STANDARD PENETRATION TEST, ASTM D1586 DESIGNATION	DO =	DITTO
	3T 24/18	2" OR 3" UNDISTURBED TUBE SAMPLE, ASTM D1587 (LENGTH SAMPLED INCHES/SAMPLE RECOVERED INCHES)	RQD =	ROCK QUALITY DESIGNATION
	REC RQD	NQ2, NX OR 2 INCH O.D. ROCK CORE RUN, ASTM D2113 (RECOVERY AND RQD AS SHOWN)	REC =	RECOVERY (%) (LENGTH RECOVERED/ LENGTH SAMPLED)
			w =	NATURAL MOISTURE CONTENT (%)
			*	= NO SAMPLE RECOVERY



# APPENDIX C



## ESAL Calculator for Flexible Pavements

Project Name:	North Burlington Regional High School	
Project Number:	18-02-MFD	
Description:	Buss Loop Pavement Design	
Prepared By:	ETD	Date: 01/21/19
Checked By:		Date:
Reference:	ASHTO	

Vehicle Description	Gross Weight (pounds)	Median ESAL's per Vehicle	Quantity in the Design Lane, ADT	Days per Year	Design Life, L (years)	ESAL's
Automobile	4,000	0.01	60	313	1	190
2-Axle Truck or A1 Bus	14,000	0.15	32	313	1	1,500
2-Axle Truck or B-C-D Bus	26,000	0.7	50	313	1	11,270
2-Axle Single Unit Truck	40,000	1.8				0
3-Axle Single Unit Truck-Snow	42,000	0.9	4	90	1	320
3-Axle Single Unit Truck	46,000	1.3				0
3-Axle Single Unit Truck-Trash	50,000	1.7	1	313	1	530
3-Axle Single Unit Truck	90,000	40.0				0
4-Axle Single Unit Truck	66,000	1.4				0
4-Axle Single Unit Truck	70,000	1.8				0
4-Axle Single Unit Truck	74,000	2.8				0
4-Axle Single Unit Truck	100,000	9.5				0
3-Axle Semi-Trailer Combination Truck	48,000	2.6				0
3-Axle Semi-Trailer Combination Truck	56,000	2.9				0
4-Axle Semi-Trailer Combination Truck	60,000	1.8				0
4-Axle Semi-Trailer Combination Truck	64,000	2.3				0
4-Axle Semi-Trailer Combination Truck	70,000	3.1				0
5-Axle Semi-Trailer Combination Truck	80,000	2.0	2	313	1	1,250
5-Axle Semi-Trailer Combination Truck	100,000	2.2				0
5-Axle Semi-Trailer Combination Truck	120,000	12.0				0
6-Axle Semi-Trailer Combination Truck	80,000	1.5				0
6-Axle Semi-Trailer Combination Truck	100,000	3.5				0
7-Axle Semi-Trailer Combination Truck	120,000	4.4				0

<b>Summary:</b>	Total ESAL's	15,060
	Total ESAL's 1% Growth for 15 Years	313,777

Estimated traffic data provided by Dynamic Traffic & VCEA



Project Name: Bus Loop - N. Burlington Regional H.S.  
Project Number: 18-02-MFD  
Description: 15 Year Pavement Design  
Prepared By: ETD  
Date: 1/21/2018

**Design Inputs**

W18 =	313,777	ESALs Over 15 Yr Design Period	Calculated
R =	90 %	Reliability	Typ. Range 80 to 95%
So =	0.45	Standard Deviation	Typ. Range 0.3 to 0.5
MR =	4,500 psi	Subgrade Resilient Modulus	Typ. Range 3000 to 9000 psi
Pi =	4.2	Initial Serviceability	Typ. Range 4.4 to 4.8
Pt =	2.0	Terminal Serviceability	Typ. Range 2.0 to 3.0

**DESIGN SN = 3.34**



Project Name: Bus Loop - N. Burlington Regional H.S.  
Project Number: 18-02-MFD  
Description: 15 Year Pavement Design  
Prepared By: ETD  
Date: January 21, 2019

Pavement Design based on 1993 AASHTO Empirical Equation for Flexible Pavements

<b>1. W18 [Accumulated ESALs]</b>	313,777				
Z <sub>r</sub>	-1.28	ZR			
Std Dev	0.45	S			
ΔPSI	2.20	DPSI			
<b>2. Subgrade M[r]</b>	4500	psi			
	Surface mix	Base mix	P.A.B.	subbase	
a[i]	0.44	0.38	0.14	0.11	
D[i], inches	2.00	5.00	0.00	6.00	inches
m[i]		1.00	1.00	1.00	
<b>3. Reliability, %</b>	90	R			
<b>4. Initial and terminal serviceability</b>	P <sub>o</sub>	P <sub>t</sub>			
ΔPSI	4.20	2.00			
Design SN	3.44				
Required SN	<b>3.34</b>	Adequate			

**KEYS: Fill in cells in light blue. (D[i] cells aren't necessary but they can help see the adequacy of a design)**

- The W18 value is the value obtained in the bright yellow cell in the ESAL calculator.
- Subgrade resilient modulus. Value obtained from VCEA soil borings
- Reliability should be 95% for Interstates & Expwys 90% elsewhere.
- Terminal serviceability should be 2.5, but collectors and local roads may use 2.0. The remaining inputs, Std Dev and Z<sub>r</sub> should not be varied from defaults.

D[i] Section thickness provided by VCEA

# APPENDIX D

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## **LIMITATIONS**

This report has been prepared in accordance with generally accepted geotechnical design practices for specific application to this project. This report has been based on assumed conditions and characteristics of the proposed development where specific information was not available.

The conclusions and recommendations contained in this report are based upon the subsurface data obtained during this investigation and on details stated in this report. The validity of the projections, conclusions, and recommendations contained in this report is necessarily limited by the scope of field investigation and by the number of borings that were performed. Should conditions arise which differ from those described in this report, Van Cleef Engineering Associates should be notified immediately and provided with all information when available regarding subsurface conditions.

Van Cleef Engineering Associates' recommendations are based upon the assumption that the services of a qualified geotechnical engineer will be retained for the observation of stripping operations, proofrolling, structural fill placement, and all critical earthwork operations.

The scope of this investigation was limited to the evaluation of the load-carrying capabilities and load stability of the subsurface soils. Oil, hazardous/contaminated waste, radioactivity, irritants, pollutants, radon or other dangerous substances and conditions were not the subject of this study. Their presence and/or absence are not implied, inferred or suggested by this report or results of this study.

**PART 2 - GENERAL CONSTRUCTION WORK**

## **SECTION 02070 - SELECTIVE DEMOLITION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of selective demolition work is indicated on drawings.
- B. Types of Selective Demolition Work: Demolition requires the selective removal and subsequent offsite disposal of the following:
  - 1. Portion(s) of building structure, as indicated on drawings and as required, to accommodate new construction.
  - 2. Partial removal of exterior wall, as indicated on drawings.
  - 3. Removal of doors, frames and hardware, as indicated on drawings.
  - 4. Removal of windows, as indicated on drawings.
  - 5. Removal of exterior concrete pad / foundation, as indicated on drawings.
  - 6. Removal of exterior columns and canopy, as indicated on drawings.
  - 7. Removal of recessed entrance mat(s), as indicated on drawings.
  - 8. Removal of metal fascia and aluminum clad wood fascia board, as indicated on drawings.
  - 9. Removal of the suspended ceiling system and temporary removal of ceiling boards to facilitate the new construction, as indicated on drawings.
  - 10. All other indicated work.
  - 11. Removal and protection of existing fixtures and equipment items indicated as "salvage".
- C. Removal Work Specified Elsewhere:
  - 1. Section 07070 - Selective Roof Demolition.
  - 2. Divisions 15 and 16 - Cutting non-structural concrete floors and masonry walls for underground piping, conduit, ducts, and for above grade piping, conduit, and ducts, is included with the work of the respective mechanical and electrical.
- D. Related Work Specified Elsewhere:
  - 1. Remodeling construction work and patching is included within the respective sections of specifications, including removal of materials for re-use and incorporated into remodeling or new construction.



- E. Contact Utility Companies, Mark-Out Service or Concrete Scanning Service to locate all interior and exterior utilities prior to start of demolition work.

### **1.3 SUBMITTALS**

- A. Proposed Demolition Activities: Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Construction Manager for review prior to commencement of work. Provide starting and ending dates for each activity as appropriate.
  - 1. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection.
  - 2. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
  - 3. Sequence construction so as to minimize obstruction of exits and provide temporary alternate exits, as required by authorities having jurisdiction.
  - 4. Coordinate with Owner's continuing occupation of portions of existing building, with Owner's partial occupancy of completed new addition, and with Owner's reduced usage during summer months.
- B. Photographs: Photograph existing conditions of structure, surfaces, equipment or surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Construction Manager prior to starting work.
- C. Project Record Documents:
  - 1. Indicate unanticipated structural, electrical, or mechanical conditions.

### **1.4 JOB CONDITIONS**

- A. Occupancy: Owner will be continuously occupying areas of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities which will severely impact Owner's normal operations.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
  - 1. Conditions existing at time of commencement of contract will be maintained by Owner insofar as practicable. However, variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.
- C. Protections: Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.
  - 1. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of building.
  - 2. Erect temporary covered passageways, as required by authorities having jurisdiction.

3. Protect existing finish work, from being damaged during the project, which is to remain in place and becomes exposed during demolition operations.
  4. Protect floors with suitable coverings so as to leave the flooring in same condition at end of job.
  5. Construct temporary insulated solid dustproof partitions, where required, to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks, if required.
  6. Remove protections at completion of work.
  7. Install temporary construction fencing around all demolition areas of the site.
- D. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner, including but not limited to concealed interior and exterior utility lines not properly investigated by the contractor, prior to commencement of demolition work..
- E. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
1. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- F. Explosives: Use of explosives will not be permitted.
- G. Utility Services: Maintain existing interior and exterior utilities indicated to remain, keep in service, and protect against damage during demolition operations.
1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
- H. Environmental Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.
1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
- I. Land Disturbances: Install required Soil Erosion and Sediment Control measures and notify the local Soil Conservation District in advance of any land disturbance in which a project is proposing more than 5,000 square feet of soil disturbance.

**PART 2 - PRODUCTS (Not Applicable).**

## PART 3 - EXECUTION

### 3.1 INSPECTION

- A. Prior to commencement of selective demolition work, inspect areas in which work will be performed.
  - 1. **Photograph existing conditions of structure, surfaces, equipment or surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Owner's Representative prior to starting work.**
  - 2. Commencement of work shall constitute acceptance of conditions. Any necessary remedial work required to correct any unsatisfactory conditions, found after the start of installation, will be provided at no cost to the Owner.
  - 3. Prior to the commencement of work review the demolition activities with the Construction Manager and Owner's representative to identify additional salvage items requested by the Owner.

### 3.2 PREPARATION

- A. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.
  - 1. Cease operations and notify the Construction Manager immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
- B. Cover and protect furniture, equipment and fixtures to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.
- C. Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.
  - 1. Where selective demolition occurs immediately adjacent to occupied portions of the building, construct dust-proof partitions of minimum 4" studs, 5/8" drywall (joints taped) on occupied side, 1/2" fire-retardant plywood on demolition side, and fill partition cavity with sound-deadening insulation.
  - 2. Provide weatherproof closures for exterior openings resulting from demolition work.
- D. Locate, identify, stub off and disconnect utility services that are not indicated to remain.
  - 1. Provide by-pass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shut-down of service is necessary during change-over.
- E. Prior to any land disturbance or demolition of exterior amenities, install all required Soil Erosion and Sediment Control measures.
- F. Furnish and install temporary construction fencing around exterior features being demolished.

### **3.3 DEMOLITION**

- A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.
  - 1. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
    - a. The Contractor shall use caution when cutting into existing masonry construction (eg.: concrete slabs, single wythe and cavity wall construction) as there may be undocumented utilities within the cavity or built into the cores of cmu wall construction or under the floor slab. The contractor shall perform all necessary investigation prior to demolition work to determine the presence of existing utilities within construction to be demolished, including but not limited to radar, thermal, impact echo, etc. The Contractor shall pay for restoring / repairing the existing construction if utilities are cut and proper selective demolition investigation work was not performed. Refer to Section 01050.
  - 2. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.
  - 3. Provide services for effective air and water pollution controls as required by authorities having jurisdiction.
  - 4. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.
  - 5. Completely fill below-grade areas and voids resulting from demolition work. Provide fill consisting of approved earth, gravel or sand, free of trash and debris, stones over 6" diameter, roots or other organic matter.
- B. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Construction Manager / Architect in written, accurate detail. Pending receipt of directive from Construction Manager / Architect rearrange selective demolition schedule as necessary to continue overall job progress without delay.

### **3.4 SALVAGE MATERIALS**

- A. Salvage Items: Where indicated on Drawings as "Salvage-Deliver to Owner", carefully remove indicated items, clean, store and turn over to Owner and obtain receipt.
  - 1. Unless otherwise indicated all materials, items, equipment, etc. resulting from demolition work shall be removed from the site at the Contractor's expense.
- B. Historic artifacts, including cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance remain the property of the Owner. Notify Construction Manager if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

### **3.5 DISPOSAL OF DEMOLISHED MATERIALS**

- A. Remove debris, rubbish and other materials resulting from demolition operations from building site. Transport and legally dispose of materials off site.
- B. If hazardous materials are encountered during demolition operations, notify the Owner's Representative / Construction Manager immediately, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.
- C. Burning of removed materials is not permitted on project site.

### **3.6 CLEAN-UP AND REPAIR**

- A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.
- B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

**END OF SECTION 02070**



*Briggs Associates*  
*A Division of H & R Environmental Services, Inc.*

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**PROJECT SPECIFICATIONS**

**For**

**ASBESTOS ABATEMENT**

**NORTHERN BURLINGTON COUNTY REGIONAL  
SCHOOL DISTRICT**

**Columbus, New Jersey 08022**

**At**

**NORTHERN BURLINGTON COUNTY REGIONAL  
HIGH SCHOOL**

**Reviewed and Released by**

**Michael Hoodak, EPA Project Designer**

**BRIGGS PROJECT NO. 18051**

**December 7, 2018**



*Briggs Associates*

*A Division of H & R Environmental Services, Inc.*

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**PROJECT DIRECTORY**

**OWNER:** Northern Burlington Regional School District  
160 Mansfield Road East  
Columbus, NJ 08022  
Attention: Mr. William Mckee, Facilities Director  
Phone: 609-298-3900

**PROJECT LOCATION:** Northern Burlington Regional High School  
160 Mansfield Road East  
Columbus, NJ 08022

**PROJECT DESIGNER:** Briggs Associates  
3 Crosswicks Street  
Bordentown, New Jersey 08505  
(609) 298-5520  
(609) 298-5477 fax  
Michael Hoodak, Project Manager

**TABLE OF CONTENTS**

<u>DIVISION 0</u>		<u>PAGE</u>
Section 00001	Project Directory	00002-1
Section 00005	Table of Contents	00005-1
<u>DIVISION 1</u>	<u>GENERAL REQUIREMENTS</u>	
Section 01013	Summary of the Work	01013-1 to 01013-6
Section 01097	Reference Standards and Definitions	01097-1 to 01097-13
Section 01098	Codes, Regulations and Standards	01098-1 to 01098-5
Section 01410	Air Monitoring – Test Laboratory Services	01410-1 to 01410-6
Section 01513	Temporary Pressure Differential	01513-1 to 01513-7
Section 01526	Temporary Enclosures	01526-1 to 01526-8
Section 01560	Worker Protection	01560-1 to 01560-6
Section 01563	Decontamination Units	01563-1 to 01563-8
Section 01711	Project Decontamination	01711-1 to 01711-6
Section 01714	Work Area Clearance	01714-1 to 01714-4
<u>DIVISION 2</u>	<u>SITE WORK</u>	
Section 02081	Removal of Asbestos Containing Materials	02081-1 to 02081-6
Section 02084	Disposal of Regulated Asbestos Containing Materials	02084-1 to 02084-4
Section 02085		02085-1 to 02085-16
Drawings:		
- High School Elbows		
- East Building Elbows		
- High School Door Panels		
- High School Non-Friable Materials		



**SECTION 01013 - SUMMARY OF WORK**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to work of this section.

1.2 RELATED SECTIONS SPECIFIED ELSEWHERE:

- A. Asbestos abatement project requirements to be completed prior to start of the work of this section are set forth in the following sections:
  - 1. 01513 Temporary Pressure Differential & Air Circulation System
  - 2. 01563 Decontamination Units
- B. Asbestos abatement project requirements to be completed at completion of the work of this section are set forth in the following sections:
  - 1. 01711 Project Decontamination
- C. Amended water and removal encapsulant are specified in Section 02081 Removal of Asbestos-Containing Materials.

1.3 SUMMARY:

- A. Contractor's Duties: The Contractor's duties shall include the following:
  - 1. Unless specifically noted, provide and pay for labor, materials and equipment, tools, construction equipment and machinery, utilities required for Abatement, other facilities and services necessary for proper execution and completion of work.
  - 2. Legally required sales, consumer and use taxes.
  - 3. Secure and pay for required permits, fees and licenses necessary for proper execution and completion of work, as applicable at time of receipt of bids.
  - 4. Give required notices.
  - 5. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities, which bear on performance of work.
  - 6. Promptly submit written notice to Consultant of observed variance of contract documents from legal requirements. Assume responsibility for work known to be contrary to such requirements without notice. Any required procedural variances will be obtained by the abatement contractor prior to the commencement of asbestos abatement activities.
  - 7. Enforce strict discipline and good order among employees. Do not employ on work any persons not skilled in assigned task.

**Northern Burlington County Regional High School**

- B. Description of work: The Contractor shall supply all labor, materials, services and equipment required to perform all of the work as herein described.

Scope of Work: Removal and disposal of asbestos containing materials from the Northern Burlington County Regional High School

1. The following is a detailed scope of work:

<b>ASBESTOS ABATEMENT SCOPE OF WORK</b>			
<u>LOCATION</u>	<u>MATERIALS</u>	<u>QUANTITY</u>	<u>ABATEMENT METHOD</u>
<b>LIBRARY/AUDITORIUM ADDITION</b>			
Cafeteria/Kitchen Roof	Roof Overhang	300 sf	Non-Friable Procedures
<b>RENOVATION (9)</b>			
Telephone Closet	Elbows off FG Pipe	4	Wrap and Cut Procedure
Wood Shop 108	Elbows off FG Pipe	35	Wrap and Cut Procedure
Room 110	Elbows off FG Pipe	40	Wrap and Cut Procedure
Room 110 Loft	Elbows off FG Pipe	20	Wrap and Cut Procedure
Room 113	Elbows off FG Pipe	20	Wrap and Cut Procedure
Room 112C	Elbows off FG Pipe	10	Wrap and Cut Procedure
Custodian Closet	Elbows off FG Pipe	12	Wrap and Cut Procedure
Room 106	Transite Door Panel	6 sf	Non-Friable Procedures
Room 104	Transite Door Panel	6 sf	Non-Friable Procedures
Board Office	Transite Door Panel	6 sf	Non-Friable Procedures
Room 213	Transite Door Panel	6 sf	Non-Friable Procedures
Room 213	9x9 Floor Tile/Masic under carpet	672 sf	Non-Friable Procedures
Room 211	Transite Door Panel	6 sf	Non-Friable Procedures
Custodian Closet 200C	Elbows off FG Pipe	12	Wrap and Cut Procedure
Pipe Chase in 200C	Elbows off FG Pipe	12	Wrap and Cut Procedure
Room 209	Transite Door Panel	10 sf	Non-Friable Procedure
Room 207	Transite Door Panel	6 sf	Non-Friable Procedure
Room 207	9x9 FloorTile/Mastic	4 sf	Non-Friable Procedure
Room 207A Storage	Elbows off FG Pipe	12	Wrap and Cut Procedure
Room 203	Transite Door Panel	6 sf	Non-Friable Procedure

**Northern Burlington County Regional High School**

<b>RENOVATION (9)</b>			
Room 205	Transite Door Panel	6 sf	Non-Friable Procedure
Room 204	Transite Hood	160 sf	Non-Friable Procedure
Room 204	Composite Lab Tables	540 sf	Non-Friable Procedures
Room 204 Preroom	Elbows off FG Pipe	3	Wrap and Cut Procedure
Maintenance/Receiving/Storage	Elbows off FG Pipe	20	Wrap and Cut Procedure
Room 506 Offices	Elbows off FG Pipe	8	Wrap and Cut Procedure
<b>East Building</b>			
Faculty Room	Elbows off FG Pipe	4	Wrap and Cut Procedure
Faculty Restrooms	Elbows off FG Pipe	10	Wrap and Cut Procedure
<b>HVAC (2019)</b>			
400 Wing – Rooms 400 to 419	Transite Door Panels	114 sf	Non-Friable Procedure
300 Wing – Rooms 300 to 303	Transite Door Panels	24 sf	Non-Friable Procedures
<b>HVAC (2020)</b>			
Boys Room by Gym	Elbows off FG Pipe	15	Wrap and Cut Procedure
Girls Room by Gym	Elbows off FG Pipe	15	Wrap and Cut Procedure
Room 201	Transite Door Panel	6 sf	Non-Friable Procedure
Room 200	Transite Door Panel	6 sf	Non-Friable Procedure
Room 200 Storage	Elbows off FG Pipe	16	Wrap and Cut Procedure
Room 200 Preroom	Elbows off FG Pipe	8	Wrap and Cut Procedure
Room 202	Transite Door Panel	6 sf	Non-Friable Procedure
Room 202 Preroom	Elbows off FG Pipe	3	Wrap and Cut Procedure
Room 206	Transite Door Panel	6 sf	Non-Friable Procedure
Room 208	Transite Door Panel	6 sf	Non-Friable Procedure
Main Office	Transite Door Panel	6 sf	Non-Friable Procedure
Faculty Restroom	Elbows off FG Pipe	2	Wrap and Cut Procedure
Telephone Closet	Elbows off FG Pipe	7	Wrap and Cut Procedure
Kitchen	Elbow off FG Pipe	12	Wrap and Cut Procedure
Kitchen	Transite Door Panel	32 sf	Non-Friable Procedure

**Northern Burlington County Regional High School**

<b>HVAC (2020)</b>			
Kitchen Bathroom	Elbow off FG Pipe	4	Wrap and Cut Procedure
Stage	Elbows off FG Pipe	2	Wrap and Cut Procedure
Storage 500B	Elbows off FG Pipe	6	Wrap and Cut Procedure
Boys Room	Elbows off FG Pipe	12	Wrap and Cut Procedure
Boys Room Storage	Elbows off FG Pipe	4	Wrap and Cut Procedure
Boys Room Pipe Chase	Elbows off FG Pipe	4	Wrap and Cut Procedure
Girls Room	Elbows off FG Pipe	12	Wrap and Cut Procedure
100 Wing – Rooms 100, 101,102, 103, 105, 107, 111	Transite Door Panel	42 sf	Non-Friable Procedure
<b>East Building</b>			
Main Office	Elbows off FG Pipe	12	Wrap and Cut Procedure
Guidance	Elbows off FG Pipe	6	Wrap and Cut Procedure
Guidance Restroom	Elbows off FG Pipe	2	Wrap and Cut Procedure
Conference Room	Elbows off FG Pipe	6	Wrap and Cut Procedure
Cafeteria	Elbows off FG Pipe	4	Wrap and Cut Procedure
HVAC Unit in Cafeteria	Elbows off FG Pipe	12	Wrap and Cut Procedure
Room 601	Elbows off FG Pipe	20	Wrap and Cut Procedure
<b>500 ADDITION</b>			
Main Entrance Roof	Roof Overhang	60 sf	Non-Friable Procedures
<b>HALLWAYS</b>			
100 Wing Hallway	Elbows off FG Pipe	20	Wrap and Cut Procedure
200 Wing Hallway	Elbows off FG Pipe	24	Wrap and Cut Procedure
300 Wing Hallway	Elbows off FG Pipe	20	Wrap and Cut Procedure
400 Wing Hallway	Elbows off FG Pipe	40	Wrap and Cut Procedure
500 Wing Hallway	Elbows off FG Pipe	12	Wrap and Cut Procedure
<b>East Building</b>			
600 Wing Hallway	Elbows off FG Pipe	32	Wrap and Cut Procedure
700 Wing Hallway	Elbows off FG Pipe	40	Wrap and Cut Procedure
800 Wing Hallway	Elbows off FG Pipe	12	Wrap and Cut Procedure

## Northern Burlington County Regional High School

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2. Preparation: The Contractor shall prepare the work areas in the following manner:
  - a. The pipe elbow insulation shall be abated utilizing wrap and cut procedures as per project specifications. This shall include, but not be limited to performing the following procedures:
    1. Each wrap and cut abatement work area shall be sealed with the construction of tent enclosures. The tent enclosures shall be constructed utilizing a minimum of one layer of six mil polyethylene plastic.
    2. One air exchange every 15 minutes shall be provided in each tent enclosure.
    3. A centralized decontamination unit shall be constructed for all personnel entering/exiting the wrap and cut enclosures. A one-stage change room shall be attached to each wrap and cut tent enclosure.
    4. Pipe elbows shall be wrapped in two layers of six mil polyethylene plastic. The plastic shall be sealed with duct tape extending out two inches on both sides of the pipe section to be cut.
    5. The connecting pipe shall be sawed to completely free the wrapped pipe elbows to be removed. Cut pipe elbows shall be properly labeled for disposal.
    6. Each wrap and cut enclosure shall be cleared with Phase Contrast Microscopy.
  - b. Removal of non-friable materials shall be accomplished by utilizing non-friable procedures in accordance with project specifications. This shall include, but not be limited to the following procedures:
    - 1) Non friable abatement areas shall be isolated by applying critical barriers to all openings inside the work area and/or by isolating the abatement area with tent enclosures consisting of one layer of six mil polyethylene plastic. The critical barriers shall consist of two layers of six-mil fire retardant polyethylene plastic.
    - 2) Negative Air Filtration Devices shall be installed into the work area to maintain a constant negative air flow. The Negative Air Filtration Devices shall be equipped with High Efficiency Particulate Air (HEPA) filters capable of 99.97% efficiency down to 0.3 microns.
    - 3) A centralized shower facility shall be constructed for worker decontamination. Workers shall wear two tyvek suits inside the work area. Prior to exiting the work area and proceeding to the shower, the workers shall remove the exterior suit and dispose of it as contaminated.
    - 4) Floor Tile Abatement shall be conducted using non-friable procedures in accordance with Section 02085 of project specifications. This shall consist of utilizing a heating appliance prior to scraping the tiles. The contractor shall insure the tiles are completely loose prior to scraping to insure breakage is limited to a minimum.

## Northern Burlington County Regional High School

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- 5) Mastic shall be removed utilizing chemicals and scrape methods. The chemicals MSDS sheets shall be submitted to the project supervisor for approval prior to the start of the project. Negative air filtration devices shall remain in operation until all residue odors are exhausted from the work area.

### C. General Notes for Work Area

1. Contractor shall install critical barriers on doorways and entrances to hallways, classrooms, offices, and maintenance rooms to seal the work area(s).
2. Contractor shall apply a tinted, approved encapsulant to all surfaces from which asbestos-containing material has been removed.
3. Electrical connections for power shall be made by a licensed electrical contractor subcontracted by the Contractor.
4. Contractor shall be responsible for requesting that the Owner deactivate the fire/heat detection system, if any, and the electrical systems in each work area and the confirmation of same prior to the start of this work.
5. Contractor shall provide proper negative pressure engineering controls in accordance with Section 01513 – Temporary Pressure Systems.

### D. Related Work

1. OSHA compliance personnel air monitoring is required during all asbestos abatement work.
2. Contractor shall comply with applicable federal, state and local fire protection codes. Only fire-rated construction materials shall be used for all isolation/enclosure work on this project.
3. Contractor shall repair or replace all wall, floor, ceiling or other existing finishes and fixtures damaged as a result of abatement activities.
4. Contractor shall be responsible for the security of all materials, equipment, etc. left at the site during the course of the project.
5. Contractor shall provide fire extinguishers for use throughout the active work area. Fire extinguishers shall be of the appropriate class for materials present in the work area.
6. Contractor shall comply with all rules, directives, and requirements of the Northern Burlington County Regional School District.
7. The Owner and the Owner's security personnel and representatives shall have the right to investigate theft or allegations of theft and search the Contractor, and the Contractor's employees, subcontractors, equipment, and vehicles as deemed necessary.

### 1.4 ASBESTOS-CONTAINING MATERIALS:

- A. The Work of this contract involves activities that will disturb asbestos-containing materials (ACM). The location and type of ACM known to be present at the worksite is set forth in the Schedule of Asbestos-Containing Materials at the end of this section. If any other ACM or PACM is found, notify the owner, other employers and employees about the location and quantity of the ACM or PACM within 24 hours of the discovery.

1.5 ASBESTOS HEALTH RISK:

- A. The disturbance or dislocation of ACM may cause asbestos fibers to be released into the building's atmosphere, thereby creating a potential health risk to workers and building occupants. Apprise all workers, supervisory personnel, subcontractors and consultants who will be at the job site of the seriousness of the risk and of proper work procedures which must be followed.
- B. Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified ACM, take appropriate continuous measures as necessary to protect all building occupants from the risk of exposure to airborne asbestos. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

1.6 QUALITY ASSURANCE:

- A. Use adequate number of skilled workmen who are thoroughly trained and experienced in asbestos abatement and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section. All workers must have a valid asbestos worker permit issued by the New Jersey Department of Labor.
- B. All work shall be performed as described herein and as indicated on the accompanying drawings. All work shall be performed in strict accordance with all applicable federal, state and local regulations, including the New Jersey Asbestos Hazard Abatement Subcode N.J.A.C. 5:23-8 (Subchapter 8), as revised. Work area isolation shall be as specified in Section 01526, and as indicated on the accompanying drawings. Worker protection, asbestos removal, work area decontamination and waste disposal are as specified herein. Work area clearance is as specified in Section 01714 and N.J.A.C. 5:23-8.21.

1.7 CONTRACTOR USE OF PREMISES

- A. General: During the construction period the Contractor shall have full use of the premises for construction operations, including use of the site. The Contractor's use of the premises is limited only by the Owner's right to perform work or to retain other contractors on portions of the Project.
- B. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.
- C. Use of the Existing Building: Maintain the existing building in a weather tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.
  - 1. Smoking: Smoking or open fires will not be permitted within the building enclosure or on the premises.
  - 2. Toilet Rooms: Except for toilet rooms designated for use by the Contractor's personnel, use of existing toilets within the building, will not be permitted.

END OF SECTION - 01013

**SECTION 01097 - REFERENCE STANDARDS AND DEFINITIONS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic contract definitions are included in the Conditions of the Contract.
1. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited.
  2. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Designer, requested by the Designer, and similar phrases.
  3. "Approved": The term "approved," when used in conjunction with the Designer's action on the Contractor's submittals, applications, and requests, is limited to the Designer's duties and responsibilities as stated in the Conditions of the Contract.
  4. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
  5. "Furnish": The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
  6. "Install": The term "install" describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
  7. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
  8. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
    - a. The term "experienced," when used with the term "installer," means having a minimum of 5 previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of authorities having jurisdiction.
    - b. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades persons of the corresponding generic name.



- c. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.  
This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
  
- 9. "Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
  
- 10. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.
  
- 11. "Designer": This is the entity described as the "Architect" in AIA Document A201 "General Conditions of the Contract for Construction," or is the entity described as "Engineer" in Engineers Joint Contract Document Committee (EJCDC) Document 1910-8 "Standard General Conditions of the Construction Contract." All references to Architect or Engineer in the Contract Documents in all cases refer to the Designer. The Designer will represent the Owner during construction and until final payment is due. The Designer will advise and consult with the Owner. The Owner's instructions to the Contractor will be forwarded through the Designer.
  
- 12. "Stop Work Order": is a written order to cease asbestos removal, encapsulation or enclosure activities. The Contractor must maintain work area enclosure, pressure differential isolation and ventilation of the work area, and decontamination units during the period that a Stop Work Order is in affect.
  
- 13. "General Superintendent": This is the Contractor's Representative at the work site. This person must be a Competent Person as defined by OSHA in 29 CFR 1926.
  
- B. Definitions Relative to Asbestos Abatement:
  - 1. "Abatement": Procedures to control fiber release from asbestos-containing materials. Includes removal, encapsulation, enclosure, repair, demolition and renovation activities.
  
  - 2. "Adequately Wet": means to sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from the asbestos-containing material (ACM), then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wetted.
  
  - 3. "Aerosol": A system consisting of particles, solid or liquid, suspended in air.
  
  - 4. "Aggressive Method": Means removal or disturbance of building material by sanding, abrading, grinding or other methods that breaks, crumbles, or disintegrates intact ACM.
  
  - 5. "Air Cell": Insulation normally used on pipes and ductwork that is comprised of corrugated cardboard, which is made asbestos, combined with cellulose or refractory binders.

## Northern Burlington County Regional High School

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6. “Airlock”: A serial arrangement of rooms whose doors are spaced a minimum of four (4) feet apart so as to permit ingress or egress through one (1) room without interfering with the next and constructed in such a manner as to prevent or restrict the free flow of air in either direction.
7. “Air Monitoring”: The process of measuring the fiber content of a known volume of air collected during a specific period of time. The procedure utilized for asbestos follows the NIOSH Method 7400. For clearance air monitoring, electron microscopy methods may be utilized for lower detectability and specific fiber identification.
8. “Amended Water”: Water to which a surfactant has been added.
9. "Asbestos": The asbestiform varieties of chrysotile (serpentine), amosite (cummingtonite-grunerite), crocidolite (riebeckite), tremolite, anthophyllite, actinolite, and any of these minerals that has been chemically treated and/or altered. For purposes of the contract documents materials described in the contract documents as asbestos are to be considered as asbestos.
10. "Asbestos-Containing Material (ACM)": Any material containing more than 1% asbestos as determined using the methods specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy.
11. "Asbestos-Containing Waste Material": any waste that contains asbestos. This term includes filters or other materials contaminated with asbestos. This term also includes regulated asbestos-containing material waste and materials contaminated with asbestos including disposable equipment and clothing.
12. "Asbestos debris": pieces of ACM that can be identified by color, texture, or composition, or dust, if the dust is determined by an accredited inspector to be ACM.
13. “Asbestos Hazard Abatement Project”: The removal, enclosure, or encapsulation of more than 25 square feet of asbestos-containing materials used on any equipment or surface area such as wall, or ceiling area; or the removal or encapsulation, of more than 10 linear feet of asbestos-containing material on covered piping.
14. “Asbestos Safety Control Monitor (ASCM)”: A business entity authorized pursuant to N.J.A.C. 5:23-8 to ensure compliance with the Asbestos Hazard Abatement Subcode (Subchapter 8).
15. “Asbestos Safety Technician (AST)”: Person certified by New Jersey Department of Community Affairs, hired by the Asbestos Safety Control Monitor who continuously monitors and inspects the asbestos abatement work pursuant to Subchapter 8. This person shall be required to be on the job site during the time the asbestos abatement work is taking place and perform all duties and responsibilities established by Subchapter 8.
16. “Authorized Personnel”: The Owner, the Owner’s representative, asbestos abatement contractor personnel, asbestos safety control monitor personnel, emergency personnel, or a representative of any Federal, State or local regulatory agency or other personnel under contract for or having jurisdiction over the project.
17. “Barrier”: Any surface that seals off the work area to inhibit the movement of fibers.
18. “Breathing Zone”: A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches.
19. “Category I Non-Friable Asbestos-Containing Material (ACM)”: Asbestos-containing packings, gaskets, resilient floor covering and asphalt roofing products containing more than 1 percent

asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy.

20. "Category II Non-Friable ACM": Any material, excluding Category I non-friable ACM, containing more than 1 percent asbestos as determined using the methods specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.
21. "Certificate of Completion": The certificate issued by the asbestos safety control monitor signifying that the asbestos hazard abatement work has been completed in conformance with N.J.A.C. 5:23-8.
22. "Certified Industrial Hygienist (C.I.H.)": one certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.
23. "Class I Asbestos Work": Means activities involving the removal of TSI and surfacing ACM and PACM.
24. "Class II Asbestos Work": Means activities involving the removal of ACM, which is not thermal system insulation, or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.
25. "Class III Asbestos Work": Means repair and maintenance operations, where "ACM", including thermal system insulation and surfacing material, is likely to be disturbed.
26. "Class IV Asbestos Work": Means maintenance and custodial activities during which employees contact ACM and PACM and activities to clean up waste and debris containing ACM and PACM.
27. "Clean Room": An uncontaminated area or room that is a part of the worker decontamination enclosure system with provisions for storage of worker's street clothes and clean protective equipment.
28. "Competent person": an individual who meets the requirements of OSHA as a "competent person" for the specific activity involved in the work. The "competent person" must meet the requirements of 29 CFR 1926.32(f), and 29 CFR 1926.1101.
29. "Critical Barrier": two individual layers of nominal six (6) mil polyethylene sheeting that completely seal off the work area to prevent the distribution of fibers to the surrounding area, such as the opening between the top of a wall and the underside of ceiling construction, electrical outlets, non-removable lights, HVAC systems, windows, doorways, entranceways, ducts, grilles, grates, diffusers, wall clocks, speaker grilles, floor drains, sink drains, etc.
30. "Curtained Doorway": A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms, typically constructed by placing three (3) weighted overlapping sheets of plastic over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of the two outer sheets along one vertical side of the doorway and securing the vertical edge of the middle sheet along the opposite vertical side of the doorway.
31. "Decontamination Enclosure System": A series of connected rooms, separated from the work area and from each other by air locks, for the decontamination of workers and equipment.
32. "Disposal Bag": 6 mil thick leak-tight plastic bags used for transporting asbestos waste from work and to disposal site. Each is labeled as follows:

DANGER  
CONTAINS ASBESTOS FIBERS  
AVOID CREATING DUCT  
CANCER AND LUNG DISEASE HAZARD  
AVOID BREATHING AIRBORNE ASBESTOS FIBERS  
AND  
ASBESTOS NA 2212, RQ

Each bag shall contain the U.S. DOT Class 9 (miscellaneous) hazardous material label. Contractor shall label all disposal bags and/or containers with the name of the waste generator (Owner) and the location from which the waste was generated; all in accordance with the EPA NESHAPS regulation – 40 CFR Part 61, Subpart M.

33. “Encapsulant”: A liquid material which can be applied to asbestos containing material which controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).
34. “Enclosure”: The application of an encapsulant, to asbestos-containing materials, to control the release of asbestos fibers into the air.
35. “Equipment Room”: A contaminated area or room that is part of the worker decontamination enclosure system with provisions for storage of contaminated clothing and equipment.
36. "Filter": A media component used to remove solid or liquid particles from air and water.
37. “Flame-Resistant Polyethylene Sheeting”: A single polyethylene film in the largest sheet size possible to minimize seams, nominal six (6) mil thick, conforming to requirements set forth by the National Fire Protection Association Standard 701, Small scale Fire Test for Flame-Resistant Textiles and Films.
38. "Friable Asbestos": any asbestos-containing material that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.
39. “Glove-bag Technique”: A method with limited applications for removing small amounts of friable asbestos-containing material from HVAC ducts, short piping runs, valves, joints, elbows, and other non-planar surfaces in a non-contained (plasticized) work area. The glove-bag assembly is a manufactured or fabricated device consisting of a glove-bag (typically constructed of 6-mil transparent polyethylene plastic), two inward projecting sleeves, an internal tool pouch, and an attached, labeled receptacle for asbestos waste. The glove-bag is constructed and installed in such a manner that it surrounds the object or material to be removed and contains all asbestos fibers released during the process. All workers who are permitted to use the glove-bag technique must be highly trained, experienced and skilled in this method.
40. "Grinding": to reduce to powder or small fragments and includes manual or mechanical chipping or drilling.
41. "HEPA Filter": A High Efficiency Particulate Air (HEPA) filter capable of trapping and retaining 99.97% of all mono-dispersed particles of 0.3 microns in diameter.
42. "HEPA Filter Vacuum Collection Equipment (or vacuum cleaner)": High efficiency particulate air filtered vacuum collection equipment with a HEPA filter.

43. "High-Efficiency Filter": A filter which removes from air 99.97% or more of monodisperse dioctyl phthalate (DOP) particles having a mean particle diameter of 0.3 micrometer.
44. "Intact": that the ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.
45. "Leak-tight": that solids or liquids cannot escape or spill out. It also means dust-tight.
46. "Negative Pressure": Air pressure lower than surrounding areas, generally caused by exhausting air from a sealed space (work area).
47. "Negative Pressure Enclosure (NPE) ": A pressure differential and ventilation system where the work area is maintained at a negative pressure relative to air pressure outside the work area.
48. "Negative Pressure Respirator": A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.
49. "Negative Pressure Ventilation System": A local exhaust system, utilizing HEPA filtration capable of maintaining a negative pressure inside the work area and a constant air flow from adjacent areas into the work area and exhausting that air outside the work area.
50. "Nonfriable Material": any material that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure and has not been rendered friable.
51. "Occupied Building": A building or structure where occupancy is permitted in certain areas outside of the required containment during an asbestos hazard abatement project.
52. "Operations and Maintenance Activity": Corrective action not intended as asbestos abatement. The amount of friable asbestos containing material that can be abated per year per project is 25 square feet or less or, if covering piping, 10 linear feet or less.
53. "Outside Air": the air outside buildings and structures.
54. "Personal Monitoring": Sampling of the asbestos fiber concentrations within the breathing zone of an employee.
55. "Plasticize": To cover floors and walls with plastic sheeting as herein specified.
56. "Protection Factor": The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.
57. "Personal Monitoring": Sampling of the asbestos fiber concentrations within the breathing zone of an employee.
58. "Regulated Asbestos-Containing Materials (RACM)": (a) Friable asbestos material, (b) Category I non-friable ACM that has become friable, Category I non-friable ACM that will be subjected to sanding, grinding, cutting, or abrading, or (d) Category II non-friable ACM that has a probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.
59. "Removal": The stripping of any asbestos containing material from surfaces or components of a facility.

60. "Removal Encapsulant": a penetrating encapsulant specifically designed for removal of asbestos-containing materials rather than for enclosing encapsulation.
61. "Renovation": Alternating in any way one or more facility components. Operations in which load-supporting structural members are wrecked or taken out are excluded.
62. "Repair": Means overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structure or substrates.
63. "Respirator": A device designed to protect the wearer from the inhalation of harmful atmospheres.
64. "Separation Barrier": A solid wall constructed to isolate the clean and/or occupied areas of a building from the work area and to support the polyethylene sheeting. Separation Barriers are of rigid construction consisting of normal 2"x4" wood or metal studs spaced 16" on center and covered with a minimum of 1/2" plywood or gypsum board.
65. "Shower Room": A room between the clean room and the equipment room in the worker decontamination enclosure with running hot and cold water controllable at the tap and suitably arranged for complete showering during decontamination.
66. "Staging Area": Either the holding area or some area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the work area.
67. "Surfacing material": material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes).
68. "Surfactant": A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.
69. "Thermal system insulation (TSI)": insulation applied to pipes, fittings, boilers, breeching, tanks, ducts or other components to prevent heat loss or gain.
70. "Time Weighted Average (TWA)": The average concentration of a contaminant in air during a specific time period as determined by the method prescribed in Appendix A of 29 CFR part 1926.1101.
71. "Visible Emissions": Any emissions containing particulate material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.
72. "Waste Shipment Record": Waste handling and disposal record, or manifest, which documents the proper handling and disposal of asbestos containing waste materials. Documents shall be in compliance with EPA Regulation 40 CFR, Part 61, Subpart M (NESHAPS).
73. "Water Column (W.C.)": A unit of measurement for pressure differential.
74. "Wet Cleaning": The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with amended water or diluted removal encapsulant and afterwards thoroughly decontaminated or disposed of as asbestos contaminated waste.

75. "Work Area": Designated rooms, spaces, or areas of the project in which asbestos abatement actions are to be undertaken or which may become contaminated as a result of such abatement actions. A contained work area is a work area, which has been sealed, plasticized, and equipped with a decontamination enclosure system.
76. "Worker Decontamination Enclosure": A decontamination system consisting of a clean room, a shower room, and an equipment room separated from each other and from the work area by airlocks and curtained doorways. This system is used for all worker entrances and exists to and from the work area and for equipment pass out for small jobs.
77. "Working Day": Monday through Friday and includes holidays that fall on any of the days Monday through Friday as indicated in the notification requirements.

### 1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on CSRF's 16-Division format and MasterFormat's numbering system.
- B. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
  1. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
  2. Streamlined Language: The Specifications generally use the imperative mood and streamlined language. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.

### 1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.
- C. Conflicting Requirements: Where compliance with 2 or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer to the Designer before proceeding for a decision on requirements that are different but apparently equal, and where it is uncertain which requirement is the most stringent.
  1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum acceptable. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Designer for a decision before proceeding.

## Northern Burlington County Regional High School

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- D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.
- E. Standards: which apply to asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:
1. American National Standards Institute (ANSI)  
1430 Broadway  
New York, New York 10018  
(212) 354-3300
    - a. Fundamentals Governing the Design and Operation of Local Exhaust Systems Publication Z9.2
    - b. Practices for Respiratory Protection Publication Z88.2
  2. American Society for Testing and Materials (ASTM)  
100 Bar Harbor Drive  
West Conshocken, PA 19428-2959  
(610) 832-9585
    - a. Safety and Health Requirements Relating to Occupational Exposure to Asbestos E 849
    - b. ASTM Standard Practice for Encapsulants for Spray-or-Trowel-Applied Friable Asbestos-Containing Building Materials E1494
    - c. ASTM Standard Practice for Visual Inspection of Asbestos Abatement Projects E1368
- F. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in the Contract Documents, are defined to mean the associated names. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.
1. ACI American Concrete Institute  
P.O. Box 19150  
Detroit, MI 48219 (313) 532-2600
  2. ACIL American Council of Independent Laboratories  
1629 K St., NW  
Washington, DC 20006 (202) 887-5872
  3. ACPA American Concrete Pipe Assoc.  
8300 Boone Blvd., Suite 400  
Vienna, VA 22182 (703) 821-1990
  4. ACGIH American Conference of Governmental Industrial Hygienists  
1330 Kemper Meadow Dr.  
Cincinnati, OH 45240 (513) 742-2020
  5. AIA The American Institute of Architects  
1735 New York Ave., NW  
Washington, DC 20006 (202) 626-7300
  6. AIHA American Industrial Hygiene Assoc.



- 2700 Prosperity Ave., Suite 250  
Fairfax, VA 22031 (703) 849-8888
7. ANSI American National Standards Institute  
11 West 42nd St., 13th Floor  
New York, NY 10036 (212) 642-4900
  8. ASHRAE American Society of Heating,  
Refrigerating and Air-Conditioning Engineers  
1791 Tullie Circle, NE  
Atlanta, GA 30329 (404) 636-8400
  9. ASME American Society of Mechanical Engineers  
345 East 47th St.  
New York, NY 10017 (212) 705-7722
  10. ASPE American Society of Plumbing Engineers  
3617 Thousand Oaks Blvd., Suite 210  
Westlake, CA 91362 (805) 495-7120
  11. ASTM American Society for Testing and Materials  
100 Barr Harbor Drive  
West Conshohocken, PA 19428-2959 (610) 832-9585
  12. CGA Compressed Gas Assoc.  
1725 Jefferson Davis Highway, Suite 1004  
Arlington, VA 22202-4100 (703) 412-0900
  13. FM Factory Mutual Systems  
1151 Boston-Providence Turnpike  
P.O. Box 9102  
Norwood, MA 02062(617) 762-4300
  14. GA Gypsum Association  
810 First St., NE, Suite 510  
Washington, DC 20002 (202) 289-5440
  15. IEEE Institute of Electrical and Electronic Engineers  
345 E. 47th St.  
New York, NY 10017 (212) 705-7900
  16. IETA International Electrical Testing Assoc.  
P.O. Box 687  
Morrison, CO 80465 (303) 697-8441
  17. IRI Industrial Risk Insurers  
P.O. Box 5010  
85 Woodland St.  
Hartford, CT 06102-5010 (203) 520-7300
  18. ISA Instrument Society of America  
P.O. Box 12277  
67 Alexander Dr.  
Research Triangle Park, NC 27709 (919) 549-8411

19. ISO International Standards Organization
  20. NEC National Electrical Code (from NFPA)
  21. NECA National Electrical Contractors Assoc.  
3 Bethesda Metro Center, Suite 1100  
Bethesda, MD 20814(301) 657-3110
  22. NEMA National Electrical Manufacturers Assoc.  
2101 L St., NW, Suite 300  
Washington, DC 20037 (202) 457-8400
  23. NESHAPS The National Emission Standards for  
Hazardous Air Pollutants (40 CFR Part 61)
  24. NFPA National Fire Protection Assoc.  
One Batterymarch Park  
P.O. Box 9101  
Quincy, MA 02269-9101 (617) 770-3000 (800) 344-3555
  25. NRCA National Roofing Contractors Assoc.  
10255 W. Higgins Rd., Suite 600  
Rosemont, IL 60018-5607 (708) 299-9070
  26. NVLAP National Voluntary Laboratory Accreditation Program  
100 Bureau Drive, Stop 2140  
Gaithersburg, MD 20899-2140 (301) 975-4016
  27. RFCI Resilient Floor Covering Institute  
966 Hungerford Dr., Suite 12-B  
Rockville, MD 20805 (301) 340-8580
  28. UL Underwriters Laboratories  
333 Pfingsten Rd.  
Northbrook, IL 60062 (708) 272-8800
  29. White Lung Association  
PO Box 1483  
Baltimore, MD 21203
- G. Federal Government Agencies: Names and titles of federal government standard- or Specification-producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard- or Specification-producing agencies of the federal government. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.
1. CE Corps of Engineers  
(U.S. Department of the Army)  
Chief of Engineers - Referral  
Washington, DC 20314 (202) 272-0660
  2. CFR Code of Federal Regulations  
(Available from the Government Printing Office)

N. Capitol St. between G and H St., NW  
Washington, DC 20402 (202) 783-3238  
(Material is usually first published in the "Federal Register")

3. CPSC Consumer Product Safety Commission  
5401 Westbard Ave.  
Bethesda, MD 20207 (800) 638-2772
4. CS Commercial Standard  
(U.S. Department of Commerce)  
Government Printing Office  
Washington, DC 20402 (202) 783-3238
5. DOC Department of Commerce  
14th St. and Constitution Ave., NW  
Washington, DC 20230 (202) 482-2000
6. DOT Department of Transportation  
400 Seventh St., SW  
Washington, DC 20590 (202) 366-4000
7. EPA Environmental Protection Agency  
401 M St., SW  
Washington, DC 20460 (202) 260-2090
8. FS Federal Specification (from GSA)  
Specifications Unit (WFSIS)  
7th and D St., SW  
Washington, DC 20407 (202) 708-9205
9. GSA General Services Administration  
F St. and 18th St., NW  
Washington, DC 20405 (202) 708-5082
10. MIL Military Standardization Documents  
(U.S. Department of Defense)  
Naval Publications and Forms Center  
5801 Tabor Ave.  
Philadelphia, PA 19120
11. NIOSH The National Institute for Occupational Safety and Health  
Building J.N.E. Room 3007  
Atlanta, GA 30333
12. NIST National Institute of Standards and Technology  
(U.S. Department of Commerce)  
Gaithersburg, MD 20899 (301) 975-2000
13. OSHA Occupational Safety and Health Administration  
(U.S. Department of Labor)  
200 Constitution Ave., NW  
Washington, DC 20210 (202) 219-6091

**Northern Burlington County Regional High School**

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- 14 PS            Product Standard of NBS  
(U.S. Department of Commerce)  
Government Printing Office  
Washington, DC 20402    (202) 783-3238
  
- 15 USPS        U.S. Postal Service  
475 L'Enfant Plaza, SW  
Washington, DC 20260-0010    (202) 268-2000

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01097

**SECTION 01098 - CODES, REGULATIONS AND STANDARDS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this section.

1.2 SUMMARY

- A. This section sets forth governmental regulations, which are included and incorporated herein by reference and made a part of the specification. This section also sets forth those notices and permits, which are known to the Owner and which either must be applied for and received, or which must be given to governmental agencies before start of work.
  - 1. Requirements include adherence to work practices and procedures set forth in applicable codes, regulations and standards.
  - 2. Requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with codes, regulations, and standards.

1.3 CODES, REGULATIONS AND STANDARDS

- A. General Applicability of Codes, Regulations and Standards: Except to the extent that more explicit or more stringent requirements are written directly into the Contract Documents, all applicable codes and regulations have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the Contract Documents, or as if published copies are bound herewith.
- B. Contractor Responsibility: The Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State, and local regulations. The Contractor shall hold the Owner and Designer harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of the contractor, the contractor's employees, or subcontractors.
- C. Federal Requirements: which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:
  - 1. OSHA: U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA), including but not limited to:
    - a. Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite;  
Final Rules Title 29, Part 1910, Section 1001 of the Code of Federal Regulations  
Final Rules Title 29, Part 1926, Section 1101 of the Code of Federal Regulations
    - b. Respiratory Protection  
Title 29, Part 1910, Section 134 of the Code of Federal Regulations  
Title 29, Part 1926, Section 103 of the Code of Federal Regulations
    - c. Personal Protective Equipment for General Industry  
Title 29, Part 1910, Section 132 of the Code of Federal Regulations

- Title 29, Part 1926, Sections 95 - 107 of the Code of Federal Regulations
- d. Access to Employee Exposure and Medical Records  
Title 29, Part 1926, Section 33 of the Code of Federal Regulations
  - e. Hazard Communication  
Title 29, Part 1926, Section 59 of the Code of Federal Regulations
  - f. Specifications for Accident Prevention Signs and Tags  
Title 29, Part 1910, Section 145 of the Code of Federal Regulations
  - g. Permit Required Confined Space  
Title 29, Part 1910, Section 146 of the Code of Federal Regulations
  - h. Construction Industry  
Title 29, Part 1910, Section 1001 of the Code of Federal Regulations  
Title 29, Part 1926, Section 1101 of the Code of Federal Regulations
  - i. Construction Industry - General Duty Standards  
Title 29, Part 1926, Sections 20 through 35 of the Code of Federal Regulations
2. DOT: U. S. Department of Transportation, including but not limited to:
- a. Hazardous Substances  
Title 49, Part 171 and 172 of the Code of Federal Regulations
  - b. Hazardous Material Regulations  
General Awareness and Training Requirements for Handlers, Loaders and Drivers  
Title 49, Parts 171-180 of the Code of Federal Regulations
  - c. Hazardous Material Regulations  
Editorial and Technical Revisions  
Title 49, Parts 171-180 of the Code of Federal Regulations
3. EPA: U. S. Environmental Protection Agency (EPA), including but not limited to:
- a. Asbestos Hazard Emergency Response Act (AHERA) Regulation  
Title 40, Part 763, Sub-part E of the Code of Federal Regulations
  - b. EPA Model Accreditation Plan - Asbestos Containing Materials Final Rule & Notice  
Title 40, Part 763, Sub-part E, Appendix C of the Code of Federal Regulations
  - c. National Emission Standard for Hazardous Air Pollutants (NESHAP)  
National Emission Standard for Asbestos  
Title 40, Part 61, Sub-part A, and Sub-part M (Revised Sub-part B) of the Code of Federal Regulations
- D. State Requirements: which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:
- 1. State of New Jersey, including but not limited to:
    - a. N.J.A.C. 5:23-8 – Asbestos Hazard Abatement Subcode, latest revision

- b. N.J.A.C. 5:16 and 8:60 – Asbestos Licenses & Permits
  - c. N.J.A.C. 12:120 – Department of Labor
  - d. New Jersey Department of Environmental Protection regulation 7:26.
- E. Local Requirements: which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:
- 1. Abide by all local requirements, which govern asbestos abatement work or hauling and disposal of asbestos waste materials.

1.4 NOTICES:

- A. Contractor shall postmark or hand deliver written notification as required by USEPA National Emission Standards for Hazardous Air Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M) to the regional Asbestos NESHAP Contact at least 10 working days prior to beginning any work on asbestos-containing materials (ACM). Send notification to the following address:

U.S. ENVIRONMENTAL PROTECTION AGENCY  
REGION II:  
Asbestos NESHAP Contact  
Air & Waste Management Division  
USEPA  
26 Federal Plaza  
New York, NY 10007  
(212) 264-9627

- 1. Written notification sent to NESHAPS contact shall include the following:
  - a. Indication whether the notification is the original or revised notification.
  - b. Name, address, and telephone number of owner or operator.
  - c. Name, address, and telephone number of contractor.
  - d. Type of Operation (demolition or renovation).
  - e. Description of the facility or affected part of the facility being demolished or renovated, including the size (square feet [square meters], number of floors), age, present and prior use of the facility.
  - f. Estimate of the approximate amount of RACM to be removed from the facility in terms of linear meters [linear feet] of pipe, and surface area in square meters [square feet] of other facility components. Also estimate the approximate amount of Category I and Category II nonfriable ACM in the affected part of the facility that will not be removed before demolition.
  - g. For facilities in which the amount of friable asbestos materials less than 80 linear meters (260 linear feet) on pipes and less than 15 square meters (160 square feet) or 1 cubic meter (35 cubic feet) if the length and width could not be measured. On other facility components, explain techniques of estimation.
  - h. Location and street address (including building number or name and floor or room number, if appropriate), city, county, and state, of the facility being demolished or renovated.
  - i. Scheduled starting and completion dates of asbestos removal work (or any other activity, such as site preparation that would break up, dislodge, or similarly disturb asbestos material) in a demolition or renovation; planned renovation operations involving individual nonscheduled operations shall only include the beginning and ending dates of the report period as described in paragraph (a)(4)(iii) of 40 CFR 61.145.
  - j. Scheduled starting and completion dates of demolition or renovation.

- k. Nature of planned demolition or renovation and method(s) to be used, including demolition or renovation techniques to be used and description of affected facility components.
- l. Procedures to be used to comply with the requirements of USEPA National Emission Standards for Hazardous Air Pollutants (NESHAP) Asbestos Regulations (40 CFR 61 Subpart M).
- m. Name and location of the waste disposal site where the asbestos containing waste material will be deposited.
- n. A certification that at least one person trained as required by paragraph (c)(8) of 40 CFR 61.145 will supervise the stripping and removal described by this notification.
- o. For facilities being demolished under an order of a State or local governmental agency, issued because the facility is structurally unsound and in danger of imminent collapse, the name, title, and authority of the State or local governmental representative who has ordered the demolition. A copy of the order shall be attached to the notification
- p. For emergency renovations described in paragraph (a)(4)(iv) of 40 CFR 61.145, the date and hour that the emergency occurred, a description of the sudden, unexpected event, and an explanation of how the event caused an unsafe condition, or would cause equipment damage or an unreasonable financial burden.
- q. Description of procedures to be followed in the event that the unexpected RACM is found or Category II nonfriable ACM becomes crumbled, pulverized, or reduced to powder.
- r. Name, address, and telephone number of the waste transporter.

B. STATE AND LOCAL AGENCIES:

- 1. Send written notification as required by state and local regulations prior to beginning any work on ACM. These agencies may include, but are not limited to the following:
  - a. New Jersey Department of Health & Senior Services  
Consumer & Environmental Health Services  
Lead & Asbestos Program  
PO Box 360, 210 South Broad Street  
Trenton, New Jersey 08625-0360
  - b. New Jersey Department of Labor  
Asbestos Control & Licensing Section  
1 John Fitch Plaza, 3<sup>rd</sup> Floor  
PO Box 949  
Trenton, NJ 08625-0949
  - c. New Jersey Department of Environmental Protection  
Division of Solid and Hazardous Waste  
PO Box 414, 401 East State Street  
Trenton, New Jersey 08625-0414
  - d. New Jersey Department of Community Affairs  
Asbestos Control Unit  
PO Box 816, 101 South Broad Street, 4<sup>th</sup> Floor  
Trenton, New Jersey 08625-0816

1.5 PERMITS:

- A. Permit: All asbestos containing waste is to be transported by an entity maintaining a current "industrial waste hauler permit" specifically for ACM, as required for transporting of waste ACM to a disposal site.



- B. Contractor is responsible for obtaining any demolition, building, renovation or other permits, and for paying application fees, if any, where required by State or Local jurisdiction.

1.6 LICENSES:

- A. Licenses: Maintain current licenses as required by applicable state or local jurisdictions for the removal, transporting, disposal or other regulated activity relative to the work of this contract. Contractor shall maintain a valid New Jersey asbestos abatement license for the duration of this project. An original, or certified, gold seal duplicate shall be posted prominently at the site.

1.7 POSTING AND FILING OF REGULATIONS

- A. Posting and Filing of Regulations: Post all notices required by applicable federal, state and local regulations. Maintain two (2) copies of applicable federal, state and local regulations and standards. Maintain one copy of each at job site. Keep on file in Contractor's office one copy of each.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION – 01098

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**SECTION 01410 - AIR MONITORING - ASBESTOS SAFETY CONTROL MONITOR (ASCM)**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

- A. Air monitoring carried out by the ASCM to verify that the building beyond the work area and the outside environment remain uncontaminated.
- B. Establishing airborne fiber levels both inside and outside the work area as action levels.
- C. Action required by the Contractor if an action level is met or exceeded.

1.3 WORK BY OTHERS:

Air monitoring required by OSHA to be conducted by the employer is the Contractor's responsibility and is not covered in this section.

1.4 RELATED SECTIONS:

Section 01714 - Work Area Clearance: air monitoring required.

1.5 AIR MONITORING:

- A. The Owner has contracted with an ASCM for air monitoring. Air monitoring may be conducted both outside and inside of the work area during the work, and for clearance sampling at the end of the project.
  - 1. Outside of the Work Area: The AST may sample air outside of the work area to detect faults in the work area isolation such as:
    - a. Contamination of the building outside of the work area with airborne asbestos fibers.
    - b. Failure of filtration or rupture in the differential pressure system.
    - c. Contamination of air outside the building envelop with airborne asbestos fibers.
  - 2. Inside the Work Area: The AST may monitor airborne fiber counts in the Work Area. The purpose of this air monitoring is to detect airborne asbestos concentrations which may challenge the ability of the Work Area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.
- B. Should any of the above occur the Contractor shall immediately cease asbestos abatement activities until the fault is corrected. Work shall not recommence until authorized by the Asbestos Safety Technician (AST).
- C. Work area clearance: Clearance air sampling by the AST at the completion of asbestos abatement work is described in Section 01711 Project Decontamination.

D. Air monitoring required by OSHA is work of the Contractor and is not covered in this section.

1.6 SCHEDULE OF AIR SAMPLES BY AST:

A. Sample cassettes: Samples will be collected on 25 mm. cassettes as follows:

1. PCM: 0.8 micrometer mixed cellulose ester.
2. TEM: 0.45 micrometer mixed cellulose ester or 0.40 micrometer polycarbonate, with 5.0 micron mixed cellulose ester backing filter.

B. Number and Volume of Samples: The number and volume of air samples given in the schedules is approximate. The exact number and volume of samples collected by the AST may vary depending upon job conditions and the analytical method used.

C. Sample Volume and Sensitivity:

1. PCM: The sample volumes collected by the AST will be determined by the following formula:

$$\text{Volume} = \frac{(\text{Number of Fibers} \times \text{Total Filter Area})}{\text{Area of 100 Fields} \times (\text{Limit Value})}$$

Where:

Number of fibers = 5 fibers/100 fields  
Area of 100 fields = 0.785mm<sup>2</sup>  
Total Filter Area = 385mm<sup>2</sup>  
Limit Value = as specified in the schedules of samples below

- a. For purposes of this specification, the sample volume calculated above will be considered to be of sufficient size so that there is a 95% level of confidence that the value measured by each individual sample at the limit of detection (LOD) is less than or equal to the limit values specified below.
  - b. For purposes of this specification, the Limit of Detection (LOD) is defined as 7 fibers/mm<sup>2</sup> on the filter or 5 fibers/100 fields.
  - c. For purposes of this specification overloaded samples will be considered as exceeding the applicable limit value.
2. TEM: Analytical Sensitivity of 0.05 structures/cc as set forth in the AHERA regulation.

D. Base Line:

1. Before Start of Work: The AST will secure air samples to establish a base line.

**Northern Burlington County Regional High School**

2. PCM Samples

Location Sampled	Number of Samples	Limit Value (Fibers/cc)	Approx. Volume (Liters)	Rate (Liters/Minute)
Each Work Area	5	0.01	<1,000>	1-10
Work Area Perimeter	5	0.01	<1,000>	1-10
Outside Building	5	0.01	<1,000>	1-10

3. TEM Samples:

Location Sampled	Number of Samples	Analytical Sensitivity (Struct./cc.)	Approx. Volume (Liters)	Rate (Liters/Minute)
Each Work Area	1	0.005	1,300	1-10
Work Area Perimeter	1	0.005	1,300	1-10
Outside Building	1	0.005	1,300	1-10

4. Base Line: a level expressed in fibers per cubic centimeter which is twenty-five percent greater than the largest of the following:

- a. Average of the PCM samples collected outside each Work Area.
- b. Average of the PCM samples collected outside the building.
- c. 0.01 fibers per cubic centimeter.

E. Daily:

1. From start of work of Section 01526 Temporary Enclosures through the work of Section 01711 Project Decontamination, the AST may take samples.
2. Sample volume and sensitivity: inside the work area may vary depending upon conditions in the work area. If samples are overloaded at the sample volume required for a limit value equal to the Stop Action Levels or Immediate Stop Action Levels given later in this section, the level is considered to have been exceeded.
3. PCM Samples:

Location Sampled	Number of Samples	Limit Value (Fibers/cc)	Approx. Volume (Liters)	Rate (LPM)
Each Work Area	2	<0.1>	<100>	1-10
Work Area Perimeter	1	0.01	<1,000>	1-10
Clean Room	1	0.01	<1,000>	1-10
Equipment Decon	1	0.01	<1,000>	1-10
Outside Building	1	0.01	<1,000>	1-10
Output of AFD	1	0.01	<1,000>	1-10

## Northern Burlington County Regional High School

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- F. Additional samples may be taken at Owner's or Designer's discretion. If airborne fiber counts exceed allowed limits additional samples may be taken as necessary to monitor fiber levels.
- G. The AST will conduct air monitoring throughout the course of the project.
- H. Air sampling shall be performed in occupied buildings as follows:
  1. At a minimum, one (1) sample at the beginning of each work shift, one (1) every four (4) hours thereafter, and one (1) at the end of the Contractors work day/shift for every 10,000 square feet of occupied space adjacent to the work area shall be collected and analyzed. Air samples shall be taken in areas where the greatest potential for fiber migration exists. In addition to the requirements noted above, air samples shall be taken at the entrance(s) to the work area and any other interior spaces from which make-up air is drawn. Additional samples shall be taken for all areas such as stairwells, communicating shafts, elevators, plenums, ducts that pass through the work area and which are in service, and unusual room and building configurations. If air levels exceed the permitted fiber count, the applicable requirements of the contingency plan shall be followed.
  2. At least one (1) air sample shall be collected and analyzed during the work shift inside the work area. The results of this test will not, however, trigger the requirements of the contingency plan.
  3. A representative number of air samples shall be collected and analyzed along the entire waste removal route through the building if the route of travel is to be used by building occupants following waste removal activities. Acceptable air levels shall be achieved prior to allowing building occupants use of this area. If air levels exceed the permitted fiber count, the applicable requirements of the contingency plan shall be followed.

### 1.7 STOP ACTION LEVELS:

- A. Inside Work Area: Maintain an average airborne count in the work area of less than the Stop Action Level given below for the type of respiratory protection in use. If the fiber counts rise above this figure for any sample taken, revise work procedures to lower fiber counts. If the Time Weighted Average (TWA) fiber count for any work shift or 8-hour period exceeds the Stop Action Level, stop all work except corrective action, leave pressure differential and air circulation system in operation and notify Designer. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by Designer.

STOP ACTION LEVEL (f/cc)	IMMEDIATELY STOP LEVEL (f/cc)	MINIMUM RESPIRATOR REQUIRED	PROTECTION FACTOR
0.1	0.5	Half face	10
0.5	2.5	PAPR	50
1.0	5.0	Supplied Air Pressure Demand	100

1. If airborne fiber counts exceed Immediate Stop Level given above for type of respiratory protection in use for any period of time cease all work except corrective action. Notify Designer. Do not recommence work until fiber counts fall below Stop Action Level given above for the type of respiratory protection in use. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by Designer.

## Northern Burlington County Regional High School

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- B. Outside Work Area: If any air sample taken outside of the Work Area exceeds the base line established in Part 1 of this section, immediately and automatically stop all work except corrective action. The Designer will determine the source of the high reading and so notify the Contractor in writing.
1. If the high reading was the result of a failure of Work Area isolation measures initiate the following actions:
    - a. Immediately erect new critical barriers as set forth in Section 01526 Temporary Enclosures to isolate the affected area from the balance of the building. Erect Critical Barriers at the next existing structural isolation of the involved space.
    - b. Decontaminate the affected area in accordance with Section 01711 Project Decontamination.
    - c. Require that respiratory protection as set forth in Section 01562 Respiratory Protection be worn in affected area until area is cleared for re-occupancy in accordance with Section 01711 Project Decontamination.
    - d. Leave Critical Barriers in place until completion of work and insure that the operation of the pressure differential system in the Work Area results in a flow of air from the balance of the building into the affected area.
    - e. If the exit from the clean room of the personnel decontamination unit enters the affected area, establish a decontamination facility consisting of a Shower Room and Changing Room as set forth in Section 01563 Decontamination Units at entry point to affected area.
    - f. After Certification of Visual Inspection in the Work Area remove critical barriers separating the work area from the affected area. Final air samples will be taken within the entire area as set forth in Section 01711 Project Decontamination.
- C. Effect on Contract Sum: Complete corrective work with no change in the Contract Sum if high airborne fiber counts were caused by Contractor's activities. The Contract Sum and schedule will be adjusted for additional work caused by high airborne fiber counts beyond the Contractor's control.

### 1.8 STOP WORK:

- A. If the Owner, Designer, AST presents a written stop work order, immediately and automatically conform to that stop work order, while maintaining temporary enclosures and pressure differential. Do not recommence abatement work until authorized in writing by Owner, Designer or AST.
- B. Immediately initiate the following actions: After being presented with a stop work order immediately:
1. Cease all asbestos removal activities, or any other activities that disturbs ACM.
  2. Repair any fallen, ripped or otherwise failed work area isolation measures.
  3. Maintain in operation all work area isolation measures including those required by Sections 01526 "Temporary Enclosures," 01513 "Pressure Differential & Air Circulation System," 01563 "Decontamination Units."
  4. Maintain all worker protections including those required by Sections 01560 "Worker Protection - Asbestos Abatement," and 01562 "Respiratory Protection."
  5. Fog the air in the work area with a mist of amended water to reduce airborne fiber levels.

C. Do not recommence work until authorized in writing by the Owner, Designer or AST.

1.9 FIBERS COUNTED:

- A. The following procedure will be used to resolve any disputes regarding fiber types when a project has been stopped due to excessive airborne fiber counts. "Airborne Fibers" referred to above include all fibers regardless of composition as counted in the NIOSH 7400A Procedures.
- B. If elevated fiber concentrations are detected outside the work area, these results may also be confirmed via TEM analysis. In the event that TEM analysis results confirm that the asbestos fiber concentration has exceeded the limits stated above, the contractor shall be responsible for the cost of the TEM testing as well.
- C. Transmission Electron Microscopy which may be utilized for this purpose will be performed using the analysis method set forth in the AHERA regulation 40 CFR Part 763 Appendix A.

1.10 AIR SAMPLES

- A. The number and volume of air samples taken by AST will be as required to document acceptable execution of the work and to ensure compliance with Federal, State and local regulations. Sample volumes collected may vary depending upon site conditions and the analytical method used.
- B. Additional samples may be taken at the discretion of the AST or his designee. If airborne fiber counts exceed allowed limits additional samples will be taken as necessary to monitor fiber levels.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PERSONAL MONITORING

The Contractor Shall Provide For Air Monitoring As Required To Meet OSHA Requirements For Maintenance Of Time Weighted Average (TWA) Fiber Counts For Types Of Respiratory Protection Provided.

END OF SECTION 01410



**SECTION 01513 - PRESSURE DIFFERENTIAL AND AIR CIRCULATION SYSTEM**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

1.2 SUMMARY

- A. This section covers the set-up and operation of negative air filtration equipment required during asbestos abatement. The primary function of negative air filtration equipment is to create negative air pressure inside the work area to prohibit the spread of contamination to uncontaminated areas.

1.3 QUALITY ASSURANCE:

- A. Monitor pressure differential at Personnel and Equipment Decontamination Units with a differential pressure meter equipped with a continuous recorder. Meter shall be equipped with a warning buzzer, which will sound if pressure differential drops below 0.03 inch of water.
- B. Provide HEPA filtered fan units, which pass visual inspection by the Owner's Consultant for all parameters defined in this section and which pass a quantitative challenge test at the work site. Use portable velometer to determine air-moving capacity of each unit. Any unit showing more than 0.3% of the intake reading at the exhaust side shall be considered defective and shall not be approved for use until the problem is corrected.

PART 2 - PRODUCTS

2.1 HEPA FILTERED FAN UNITS:

- A. General: Supply the required number of HEPA filtered fan units to the site in accordance with these specifications.
- B. Cabinet: Constructed of durable materials able to withstand damage from rough handling and transportation. The width of the cabinet should be less than 30 inches [ 0.76 meters ] to fit through standard-size doorways. Provide units whose cabinets are:
  - 1. Factory-sealed to prevent asbestos-containing dust from being released during use, transport, or maintenance.
  - 2. Arranged to provide access to and replacement of all air filters from intake end.
  - 3. Mounted on casters or wheels.
- C. Fans: Rate capacity of fan according to usable air-moving capacity under actual operating conditions.
- D. HEPA Filters: Provide units whose final filter is the HEPA type with the filter media (folded into closely pleated panels) completely sealed on all edges with a structurally rigid frame.
  - 1. Provide units with a continuous rubber gasket located between the filter and the filter housing to form a tight seal.
  - 2. Provide HEPA filters that are individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 um dioctylphthalate (DOP)

particles when tested in accordance with Military Standard Number 282 and Army Instruction Manual 136-300-175A. Provide filters that bear a UL586 label to indicate ability to perform under specified conditions.

3. Provide filters that are marked with: the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.
  4. Pre-filters, which protect the final filter by removing the larger particles, are required to prolong the operating life of the HEPA filter. Two stages of pre-filtration are required. Provide units with the following pre-filters:
    - a. First-stage pre-filter: low-efficiency type (e.g., for particles 100 um and larger).
    - b. Second-stage (or intermediate) filter: medium efficiency (eg. effective for particles down to 5 um).
    - c. Provide units with pre-filters and intermediate filters installed either on or in the intake grid of the unit and held in place with special housings or clamps.
- E. Instrumentation: Provide units equipped with:
1. Magnehelic gauge or manometer to measure the pressure drop across filters and indicate when filters have become loaded and need to be changed.
  2. A table indicating the usable air-handling capacity for various static pressure readings on the Magnehelic gauge affixed near the gauge for reference, or the Magnehelic reading indicating at what point the filters should be changed, noting Cubic Feet per Minute (CFM) (Liters / Second (LPS)) air delivery at that point.
  3. Elapsed time meter to show the total accumulated hours of operation.
- F. Safety and Warning Devices: Provide units with the following safety and warning devices:
1. Electrical (or mechanical) lockout to prevent fan from operating without a HEPA filter.
  2. Automatic shutdown system to stop fan in the event of a rupture in the HEPA filter or blocked air discharge.
  3. Warning lights to indicate normal operation (green), too high a pressure drop across the filters (i.e., filter overloading) (yellow), and too low of a pressure drop (i.e., rupture in HEPA filter or obstructed discharge) (red).
  4. Audible alarm if unit shuts down due to operation of safety systems.
- G. Electrical components: Provide units with electrical components approved by the National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL). Each unit is to be equipped with overload protection sized for the equipment. The motor, fan, fan housing, and cabinet are to be grounded.
- H. Manufacturer: Subject to compliance with requirements, provide products of the following:
1. HEPA filtered Fan Units: The following machines are standard 2000 CFM machines used in typical asbestos abatement jobs.

Aerospace America, Inc. "Aero-Clean 2000"  
900 Truman Parkway  
P.O. Box 189  
Bay City, Michigan 48707  
(517) 684-2121

Abatement Technologies "HEPA-AIRE 1990 and HEPA-AIRE 2000"  
3305 Breckinridge Blvd. #118  
Deluth, GA 30136  
(800) 634-9091 or (404) 925-2761

Global Consumer Services, Inc.  
4615-1U E. Industrial St.  
Sims Valley, CA 93063  
(805) 579-0230

M-Tec Corp. Micro-Trap  
1300 W. Steel Rd. Alumina II  
Unit #2  
Morrisville, PA 19067  
(215) 295-8208

2. Large Capacity: The following are large capacity 5000-6000 CFM machines used on large asbestos abatement jobs.

Abatement Technologies "HEPA-AIRE 5000"  
3305 Breckinridge Blvd. #118 model H5000C  
Deluth, GA 30136  
(800) 634-9091 or (404) 925-2761

3. Hazardous Locations: The following are pneumatically powered machines for use in asbestos abatement jobs in hazardous locations where electric motors are prohibited.

Abatement Technologies "HEPA-AIRE PNEUMATIC"  
3305 Breckinridge Blvd. #118 model H2000P  
Deluth, GA 30136  
(800) 634-9091 or (404) 925-2761

## 2.2 PRESSURE DIFFERENTIAL METER:

- A. General: Provide a pressure differential meter, which is recommended by its manufacturer for the intended purpose and has sufficient accuracy and resolution (minimum 0.005" H<sub>2</sub>O) to perform as specified herein.
- B. Integral Recording Device: Provide a meter, which has an integral recording device, which has equal accuracy and resolution to the meter.
- C. Calibration: Meter shall have initial and periodic calibrations in accordance with the manufacturer's recommendations. Record of such shall be with the meter at all times.
- D. Zero Adjustment: Meter shall be equipped with zero adjustment for both the meter and chart recorder.

PART 3 - EXECUTION

3.1 PRESSURE DIFFERENTIAL ISOLATION

- A. Isolate the Work Area from all adjacent areas or systems of the building with a Pressure Differential that will cause a movement of air from outside to inside at any breach in the physical isolation of the Work Area.
- B. Relative Pressure in Work Area: Continuously maintain the work area at an air pressure that is lower than that in any surrounding space in the building, or at any location in the immediate proximity outside of the building envelope. This pressure differential when measured across any physical or critical barrier must equal or exceed a static pressure of:
  - 1. 0.03 inches (0.75 mm) of water.
- C. Accomplish the pressure differential by exhausting a sufficient number of HEPA filtered fan units from the work area. The number of units required will depend on machine characteristics, the seal at barriers, and required air circulation. The number of units will increase with increased make-up air or leaks into the Work Area. Determine the number of units required for pressure isolation by the following procedure:
  - 1. Establish required air circulation in the work area, personnel and equipment decontamination units.
  - 2. Establish isolation by increased pressure in adjacent areas or as part of seals where required.
  - 3. Exhaust a sufficient number of units from the work area to develop the required pressure differential.
  - 4. The required number of units is the number determined above plus one additional unit.
  - 5. Vent HEPA filtered fan units to outside of building unless authorized in writing by Designer.
  - 6. Mount units to exhaust directly or through disposable ductwork.
  - 7. Use only new ductwork except for sheet metal connections and elbows.
  - 8. Use ductwork and fittings of same diameter or larger than discharge connection on fan unit.
  - 9. Use inflatable, disposable plastic ductwork in lengths not greater than 100 feet (30 meters).
  - 10. Use spiral wire-reinforced flex duct in lengths not greater than 50 feet (15 meters).
  - 11. Arrange exhaust as required to inflate duct to a rigidity sufficient to prevent flapping.
  - 12. If direction of discharge from fan unit is not aligned with duct use sheet metal elbow to change direction. Use six feet (2 meters) of spiral wire reinforced flex duct after direction change.
- D. Isolation of elevators, stair towers, and return air intakes: Erect seals with an air space at doors to elevators and stair towers. Pressurize this space with HEPA-filtered air so that it is at a pressure greater than either the Work Area elevator shaft or stair tower.
  - 1. Fabricate seal by first sealing door with duct tape and 6 mil (0.15 mm) polyethylene. Construct a barrier from 2" (13mm) CDX plywood supported by 2" X 4" (51 mm x 102 mm) wood studs at 16" (410 mm) on centers. Space face of barrier a minimum of 3" (76 mm) from face of door. Seal barrier with 6 mil (0.15 mm) sheet plastic and duct tape.
  - 2. Use plywood and framing lumber that is treated to be fire resistant.
  - 3. Pressurize space with exhaust from HEPA filtered fan unit. Continuously maintain a pressure differential with this space a minimum of 0.03 inches of water higher in static pressure than any adjacent space.
  - 4. Locate HEPA filtered fan unit outside of work area. Fabricate a manifold as required to distribute air to individual spaces to be isolated. Provide relief venting at unit as required to prevent shut down due to low air flow while still maintaining required air pressure.

- E. Isolation of chases and enclosed stairs: Pressurize chases and enclosed stairs with HEPA filtered air so that it is at a pressure greater than any adjacent work area.
  - 1. Pressurize space with exhaust from HEPA filtered fan unit. Continuously maintain a pressure differential with this space a minimum of 0.03 inches of water higher in static pressure than any adjacent work area.
- F. Isolation of return air ductwork: Return air ductwork, which must be kept operating, is located in the Work Area. This ductwork is to be isolated from the Work Area by an enclosure forming an annular space around the duct which is positively pressurized with HEPA filtered air.
  - 1. Wrap the duct with 6 mil (0.15 mm) polyethylene. Seal all polyethylene seams with spray glue and duct tape.
  - 2. Enclose wrapped duct with two layers of polyethylene. Fabricate inner layer from 6 mil (0.15 mm) polyethylene with all seams sealed with spray glue and duct tape. Arrange outer layer to support inner layer. Fabricate out of reinforced sheet plastic with seams sealed with spray glue and duct tape and reinforced with staples. Support outer layer with a frame work fabricated from 2" x 4"s (51 mm x 102 mm) at 24" (610 mm) on center. Enclosures less than 2'-6" in diameter may be reinforced with box strapping in lieu of wood framing.

3.2 AIR CIRCULATION IN THE WORK AREA:

- A. Air Circulation: For purposes of this section air circulation refers to either the introduction of outside air to the Work Area or the circulation and cleaning of air within the Work Area.
- B. Air circulation in the Work Area is a minimum requirement intended to help maintain airborne fiber counts at a level that does not significantly challenge the work area isolation measures. The Contractor may also use this air circulation as part of the engineering controls in the worker protection program.
- C. Determining the Air Circulation Requirements: The air flow volume (cubic meters per minute) exhausted (removed) from the workplace must exceed the amount of makeup air supplied to the enclosure. Provide a fully operational air circulation system supplying a minimum of the following air circulation rate:
  - 1. 8 air changes per hour.
- D. Determine Number of Units needed to achieve required air circulation according to the following procedure:
  - 1. Determine the volume in cubic feet of the work area by multiplying floor area by ceiling height. Determine total air circulation requirement in cubic feet per minute (CFM) for the work area by dividing this volume by 60 and multiplying by the air change rate.
  - 2. Air Circulation Required in Cubic Feet of Air per Minute (CFM) =
$$\frac{\text{Volume of work area (cu. ft.)}}{60 \text{ (minutes per hour)}} \times \text{Number of air changes per hour}$$
  - 3. Divide the air circulation requirement (CFM) above by capacity of HEPA filtered fan unit(s) used. Capacity of a unit for purposes of this section is the capacity in cubic feet per minute with fully loaded filters (pressure differential which causes loaded filter warning light to come on) in the machine's labeled operating characteristics.
  - 4. Number of Units Needed =
$$\frac{\text{Air circulation Requirement (CFM)}}{\text{Capacity of HEPA filtered fan unit(s)}}$$

Capacity of Unit with Loaded Filters (CFM)

5. Add one (1) additional unit as a backup in case of equipment failure or machine shutdown for filter changing.

3.3 AIR CIRCULATION IN DECONTAMINATION UNITS:

- A. Pressure Differential Isolation: Continuously maintain the pressure differential required for the work area in the following:
  1. Personnel Decontamination Unit: across the Shower Room with the Equipment Room at a lower pressure than the Clean room.
  2. Equipment Decontamination Unit: Across the Holding Room with the Wash Room at a lower pressure than the Clean Room.
- B. Air Circulation: Continuously maintain air circulation in Decontamination Units at same level as required for Work Area.
- C. Air Movement: Arrange air circulation through the Personnel Decontamination Unit so that it produces a movement of air from the Clean Room through the Shower Room into the Equipment Room. At each opening, the airflow velocity must be sufficient to provide visible indications of air movement into the work area. The velocity of airflow within the enclosure must be adequate to remove airborne contamination from each worker's breathing zone without disturbing the asbestos-containing material on surfaces.

3.4 USE OF THE PRESSURE DIFFERENTIAL AND AIR CIRCULATION SYSTEM:

- A. General: Each unit shall be serviced by a dedicated minimum 115V-20A circuit with ground fault circuit interrupter (GFCI) supplied from temporary power supply installed under requirements of Section 01503 "Temporary Facilities." Do not use existing branch circuits to power fan units.
- B. Air Flow Tests: Airflow patterns will be checked before removal operations begin, at least once per operating shift and any time there is a question regarding the integrity of the enclosure. The primary test for airflow is to trace air currents with smoke tubes or other visual methods. Flow checks are made at each opening and at each doorway to demonstrate that air is being drawn into the enclosure and at each worker's position to show that air is being drawn away from the workers location and toward the HEPA filtration unit.
- C. Demonstrate Condition of Equipment for each HEPA filtered fan unit and pressure differential monitoring equipment including proper operation of the following:
  1. Squareness of HEPA Filter.
  2. Condition of Seals.
  3. Proper operation of all lights.
  4. Proper operation of automatic shut down if exhaust is blocked.
  5. Proper operation of alarms.
  6. Proper operation of Magnehelic gauge.
  7. Proper operation and calibration on pressure monitoring equipment.
- D. Demonstrate Operation of the pressure differential system to the Designer will include, but not be limited to, the following:
  1. Plastic barriers and sheeting move lightly in toward Work Area.
  2. Curtain of decontamination units move lightly in toward Work Area.
  3. There is a noticeable movement of air through the Decontamination Unit.

4. Use smoke tube to demonstrate air movement from Clean Room through Shower Room to Equipment Room.
  5. Use smoke tubes to demonstrate a definite motion of air across all areas in which work is to be performed.
  6. Use a differential pressure meter or manometer to demonstrate the required pressure differential at every barrier separating the Work Area from the balance of the building, equipment, ductwork or outside.
  7. Modify the Pressure Differential System as necessary to demonstrate successfully the above.
- E. Use of System During Abatement Operations:
1. Start fan units before beginning work (before any asbestos-containing material is disturbed). After abatement work has begun, run units continuously to maintain a constant pressure differential and air circulation until decontamination of the work area is complete. Do not turn off units at the end of the work shift or when abatement operations temporarily stop.
  2. Monitoring Pressure Within the Enclosure: After the initial airflow patterns have been checked, the static pressure must be monitored within the enclosure. Monitoring may be made using manometers, pressure gauges, or combinations of these devices. It is recommended that they be attached to alarms and strip chart recorders
  3. Do not shut down air pressure differential system during encapsulating procedures, unless authorized by the Designer in writing. Supply sufficient pre-filters to allow frequent changes.
  4. Start abatement work at a location farthest from the fan units and proceed toward them. If an electric power failure occurs, immediately stop all abatement work and do not resume until power is restored and fan units are operating again.
  5. Corrective Actions: If the manometers or pressure gauges demonstrate a reduction in pressure differential below the required level, work should cease and the reason for the change investigated and appropriate changes made. The airflow patterns should be retested before work begins again.
  6. At completion of abatement work, allow fan units to run as specified under section 01711, to remove airborne fibers that may have been generated during abatement work and cleanup and to purge the Work Area with clean makeup air. The units may be required to run for a longer time after decontamination, if dry or only partially wetted asbestos material was encountered during any abatement work.
- F. Dismantling the System:
1. When a final inspection and the results of final air tests indicate that the area has been decontaminated, fan units may be removed from the Work Area. Before removal from the Work Area, remove and properly dispose of pre-filter, decontaminate exterior of machine and seal intake to the machine with 6 mil (0.15 mm) polyethylene to prevent environmental contamination from the filters.

END OF SECTION - 01513

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**SECTION 01526 - TEMPORARY ENCLOSURES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this section.

1.2 SUMMARY:

- A. This section covers the furnishing of all labor and materials necessary to construct temporary enclosures for asbestos abatement. ***Before work area preparation proceeds, the Contractor and Asbestos Safety Technician shall document existing damage to finishes, equipment and/or fixtures in area of the work.***
- B. After completion of all work area preparation activities, the Contractor shall request a pre-commencement inspection by the Asbestos Safety Technician. No asbestos removal work shall begin until the AST and a representative of the New Jersey Department of Community Affairs (DCA) has completed the pre-commencement inspection.

PART 2 - PRODUCTS

2.1 SHEET PLASTIC:

- A. Polyethylene Sheet: A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil (0.15 mm) thick, clear, frosted, or black as indicated.
- B. Polyethylene Sheet: Provide flame-resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-Resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick frosted or black as indicated.

2.2 MISCELLANEOUS MATERIALS:

- A. Duct Tape: Provide duct tape in 2 inch or 3 inch (50 mm or 75 mm) widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene and the surface it is applied.
  - 1. Damages to building finishes caused by application or removal of the duct tape must be repaired and refinished to the satisfaction of the Owner and at no additional cost to the Owner.
- B. Spray Adhesive: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.
  - 1. Damages to building finishes caused by application or removal of the spray adhesive must be repaired and refinished to the satisfaction of the Owner and at no additional cost to the Owner

2.3 LUMBER

- A. Lumber: Provide fire-resistant dried lumber, any grade, 2"x4" wood stud framing in lengths appropriate for wall construction.
- B. Plywood Sheathing: Provide fire-resistant plywood sheathing (1/2" thick) shall be used at all locations called for in the project manual and indicated on the contract drawings. This may include, but not limited to, separation barriers, occupancy separation barriers, exhaust manifolds and personnel and waste/equipment decontamination units.

PART 3 - EXECUTION

3.1 SEQUENCE OF WORK:

- A. Carry out work of this section sequentially. Complete each of the following activities in accordance with requirements before proceeding to the next.
  - 1. Provide emergency exits and emergency lighting.
  - 2. Control access.
  - 3. Provide respiratory and worker protection.
  - 4. Provide Critical Barriers.
  - 5. Prepare Area.
  - 6. Provide Primary Barriers.
  - 7. Provide Isolation Areas as required.
  - 8. Provide Secondary Barrier.

3.2 GENERAL:

- A. Work Area: The location where asbestos abatement work occurs. The Work Area is a variable of the extent of work of the Contract. It may be a portion of a room, a single room, or a complex of rooms. A "Work Area" is considered contaminated during the work, and must be isolated from the balance of the building, and decontaminated at the completion of the asbestos control work.
- B. Completely isolate the Work Area from other parts of the building so as to prevent asbestos-containing dust or debris from passing beyond the isolated area. Should the area beyond the Work Area(s) become contaminated with asbestos-containing dust or debris as a consequence of the work, clean those areas in accordance with the procedures indicated in Section 01711. Perform all such required cleaning or decontamination at no additional cost to owner. Isolation conditions for an occupied building abatement project require that the work area be physically separated from occupied areas by separation barriers and/or Occupancy Separation Barrier of rigid construction consisting of nominal two inch by four inch (2"x4") studs spaced 16 inches on center and covered with a minimum of one half inch (1/2") gypsum board covering. All seams shall be caulked to render the barrier air tight before two (2) individual layers of 6-mil polyethylene sheeting are applied to both sides. The polyethylene shall overlap at the seams. All penetrations around conduits, pipes, ducts or other openings between the work area and adjacent spaces shall be sealed, using materials determined to be suitable in accordance with the applicable subcode.
- C. Construct enclosures to provide an air-tight seal around ducts and openings into existing ventilation systems and around penetrations for electrical conduits, telephone wires, water lines, drain pipes, etc. Construct enclosures to be both airtight and watertight except for those openings designed to provide entry and/or air flow control.
- D. Size: Construct enclosure with sufficient volume to encompass all of the working surfaces yet allow unencumbered movement by the worker(s), provide unrestricted air flow past the worker(s), and ensure walking surfaces can be kept free of tripping hazards.
- E. Shape: The enclosure may be any shape that optimizes the flow of ventilation air past the worker(s).
- F. Structural Integrity: The walls, ceilings and floors must be supported in such a manner that portions of the enclosure will not fall down during normal use.
- G. Barrier Supports: Provide frames as necessary to support all unsupported spans of sheeting.
- H. Openings: It is not necessary that the structure be airtight; openings may be designed to direct air flow. Such openings are to be located at a distance from active removal operations. They are to be designed to

draw air into the enclosure under all anticipated circumstances. In the event that negative pressure is lost, they are to be fitted with either HEPA filters to trap dust or automatic trap doors that prevent dust from escaping the enclosure. Openings for exits are to be controlled by an airlock or a vestibule.

- I. Place all tools, scaffolding, staging, etc. necessary for the work in the area to be isolated prior to completion of Work Area isolation.
- J. Areas Within an Enclosure: Each enclosure consists of a work area, a decontamination area, and waste storage area. The work area where the asbestos removal operations occur are to be separated from both the waste storage area and the contamination control area by physical curtains, doors, and/or airflow patterns that force any airborne contamination back into the work area.
- K. Removing Mobile Objects: Clean movable objects and remove them from the work area before an enclosure is constructed unless moving the objects creates a hazard. Mobile objects will be assumed to be asbestos contaminated and are to be either cleaned with amended water and a HEPA vacuum and then removed from the area or wrapped and then disposed of as asbestos-contaminated waste.
- L. Disabling HVAC Systems: The power to the heating, ventilation, and air conditioning systems that service the regulated area must be deactivated and locked out. All ducts, grills, access ports, windows and vents must be sealed off with two layers of plastic to prevent entrainment of contaminated air.
- M. Operating HVAC Systems in the regulated Area: If components of a HVAC system located in the regulated area are connected to a system that will service another zone during the project, the portion of the duct in the regulated area must be sealed and pressurized. Necessary precautions include caulking the duct joints, covering all cracks and openings with two layers of sheeting, and pressurizing the duct throughout the duration of the project by restricting the return air flow. The power to the fan supplying the positive pressure should be locked "on" to prevent pressure loss.
  - 1. If fan providing positive pressure fails for any reason, immediately stop asbestos removal work, mist the area to reduce airborne fiber levels. Notify the Project Administrator. Do not re-start asbestos removal work until authorized by the Designer.
- N. Lockout power to Work Area by switching off all breakers serving power or lighting circuits in work area. A lock and tag shall be placed on each breaker used to de-energize circuits and equipment with notation "DANGER circuit being worked on". Lock panel and have all keys under control of authorized person who has applied the locks.
- O. Lockout power to circuits running through work area wherever possible by switching off all breakers or removing fuses serving these circuits. Label breakers with tape over breaker with notation "DANGER circuit being worked on". Lock panel and have all keys under control of authorized person who applied locks. If circuits cannot be shut down for any reason, label at intervals 4 feet (1.22 m) on center with signs reading, "DANGER live electric circuit. Electrocution hazard." Label circuits in hidden locations but which may be affected by the work in a similar manner.
- P. Inspection Windows: Install inspection windows in locations shown on the plans or as directed by the Designer. Each inspection window is to have a 24 inch X 24 inch (610 X 610 mm) viewing area fabricated from 1/4 inch (6.35 mm) acrylic or polycarbonate sheet. Install window with top at 6 feet-6 inches (1.98 m) above floor height in a manner that provides unobstructed vision from outside to inside of the Work Area. Protect window from damage from scratching, dirt or any coatings used during the work. A sufficient number of windows are to be installed to provide observation of all portions of the Work Area that can be made visible from adjacent areas. Inspection windows that open into uncontrolled area are to be covered with a removable plywood hatch secured by lock and key. Provide keys to Designer for all such locks.

### 3.3 EMERGENCY EXITS:

- A. Provide emergency exits and emergency lighting as set forth below:
  - 1. Arrange exit door so that it is secure from outside the Work area but permits exiting from the Work Area.
  - 2. Mark outline of door on Primary and Critical Barriers with luminescent paint at least 1 inch (25.4 mm) wide. Hang a razor knife on a string beside outline. Arrange Critical and Primary barriers so that they can be easily cut with one pass of razor knife. Paint words "EMERGENCY EXIT" inside outline with luminescent paint in letters at least one foot high and 2 inches (50.8 mm) wide.
  - 3. Utilize existing emergency lighting signs, if this can be accomplished in keeping with OSHA lockout requirements and is approved by the Contractor's licensed electrician.

### 3.4 CONTROL ACCESS:

- A. Isolate the Work Area to prevent entry by building occupants into Work Area or surrounding controlled areas. Accomplish isolation by the following:
  - 1. Lock all doors into Work Area, or, if doors cannot be locked, chain shut. Cover any signs that direct emergency exiting, either outside or inside of Work Area, to locked doors. Do not obstruct doors required for emergency exits from Work Area or from building.
  - 2. Construct partitions or closures across any opening into Work Area.
  - 3. Modify elevator controls to prevent elevators from stopping at doors in Work Areas. This work is to be performed by a qualified elevator technician.
  - 4. Replace passage sets on doors required for exiting from Work Area with temporary locksets for duration of the project. Use entry type locksets that are key lockable from one side and always operable from inside. Install locksets with key side in stair tower and escape side on Work Area side. Provide one key to Owner and maintain one key in clean room of decontamination unit. After meeting Contractor release criteria set forth in Section 01711 Project Decontamination, reinstall original passage sets and adjust for proper operation.
- B. Locked Access: Arrange Work Area so that the only access into Work Area is through lockable doors to personnel and equipment decontamination units.
  - 1. If necessary, install temporary doors with entrance type locksets that are key lockable from the outside and always unlocked and operable from the inside. Do not use deadbolts or padlocks.
  - 2. If able, replace locksets or passage sets on doors leading to decontamination units with temporary locksets for duration of the project. Remove any deadbolts or padlocks. Use entry type locksets that are key lockable from outside and always unlocked and operable from inside. After meeting contractor release criteria set forth in Section 01711 Project Decontamination reinstall original locks, passage sets and locksets and adjust for proper operation.
  - 3. Provide one key for each door to Owner, and Designer and maintain one key in clean room of decontamination unit (3 total).
- C. Visual Barrier: Where the Work Area is immediately adjacent to or within view of occupied areas, provide a visual barrier of opaque polyethylene sheeting at least 6 mil (0.15 mm) in thickness so that the work procedures are not visible to building occupants. Where this visual barrier would block natural light, substitute frosted or woven rip-stop sheet plastic in locations approved by the Designer.

- D. Demarcation. Demarcate the regulated area in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne concentrations of asbestos. Where critical barriers or negative pressure enclosures are used, they may demarcate the regulated area.
- E. Access. Limit access to regulated areas to authorized persons as defined by OSHA, and to the Owner, Designer, Project Administrator or a representative authorized by one of these entities.
- F. Provide Warning Signs at each locked door leading to Work Area meeting the requirements of OSHA 29 CFR 1926.1101 (k) (6) at any location and approaches to a location where airborne concentrations of asbestos exceed or may likely exceed the permissible exposure level (PEL) as per OSHA or ambient background levels as per Subchapter 8. Signs shall be posted at a distance sufficiently far enough away from the work area to permit an employee to read the sign and take the necessary protective measures.

### 3.5 WORKER PROTECTION:

- A.. Before proceeding beyond this point in providing Temporary Enclosures:
  - 1. Provide Worker Protection per Section 01560.
  - 2. Provide Personnel Decontamination Unit per Section 01563.
  - 3. Provide Pressure Differential and Air Circulation System per Section 01513.

### 3.6 CRITICAL BARRIERS:

- A. Completely Separate the Work Area from other portions of the building, and the outside by closing all openings with sheet plastic barriers of at least two securely attached individual sheets of 6 mil (0.15 mm) in thickness, or by sealing cracks leading out of Work Area with duct tape.
- B. Individually seal all ventilation openings (supply and exhaust), lighting fixtures, clocks, doorways, windows, convectors and speakers, and other openings into the Work Area with duct tape alone or with two (2) independently attached layers polyethylene sheeting at least 6 mil (0.15 mm) in thickness, taped securely in place with duct tape. Maintain seal until all work including Project Decontamination is completed. Take care in sealing of lighting fixtures to avoid melting or burning of sheeting.
- C. Provide Sheet Plastic barriers at least 6 mil (0.15 mm) in thickness as required to seal openings completely from the Work Area into adjacent areas. Seal the perimeter of all sheet plastic barriers with duct tape or spray cement.
- D. Mechanically Support sheet plastic independently of duct tape or spray cement seals so that seals do not support the weight of the plastic. Following are acceptable methods of supporting sheet plastic barriers. Alternative support methods may be used if approved in writing by the Designer.
  - 1. Plywood squares 6 inch x 6 inch x 3/8 inch (152 mm x 152 mm x 9.53mm ) held in place with one smooth masonry nail or electro-galvanized common nail driven through center of the plywood and duct tape on plastic so that plywood clamps plastic to the wall. Locate plywood squares at each end, corner and at maximum 4 feet (1.22 m) on centers.
  - 2. Nylon or polypropylene rope or wire with a maximum unsupported span of 10 feet (3.05 m), minimum 1/4 inch (6.35 mm) in diameter suspended between supports securely fastened on either side of opening at maximum 1 foot (304.8 mm) below ceiling. Tighten rope so that it has 2 inches (50.8 mm) maximum dip. Drape plastic over rope from outside Work Area so that a two foot long flap of plastic extends over rope into Work Area. Staple or wire plastic to itself 1 inch (25.4 mm) below rope at maximum 6 inches (152 mm) on centers to form a sheath over rope. Lift flap and seal to ceiling with duct tape or spray cement. Seal loop at

bottom of flap with duct tape. Erect entire assembly so that it hangs vertically without a "shelf" upon which debris could collect.

- E. Thoroughly pre-clean all surfaces to which critical barriers or other seals are applied. Where required to properly isolate the work area or if specified in Section 01013, perform surgical removal of asbestos from any surface covered with ACM to which a barrier is to be applied.

### 3.7 PREPARE AREA:

- A. Scaffolding: If fixed scaffolding is to be used to provide access HEPA vacuum and wet clean area prior to scaffolding installation.
- B. Remove all electrical and mechanical items, such as lighting fixtures, clocks, diffusers, registers, escutcheon plates, etc. which cover any part of the surface to be worked on with the work.
- C. Remove all general construction items such as cabinets, casework, door and window trim, moldings, ceilings, trim, etc., which cover the surface of the work as required to prevent interference with the work. Clean, decontaminate and reinstall all such materials, upon completion of all removal work with materials, finishes, and workmanship to match existing installations before start of work.
- D. Clean all contaminated furniture, equipment, and or supplies with a HEPA filtered vacuum cleaner or by wet cleaning, as specified in Section 01712 Cleaning and Decontamination Procedures, prior to being moved or covered. All equipment furniture, etc. is to be deemed contaminated unless specifically declared as uncontaminated on the drawings or in writing by the Designer.
- E. Clean All Surfaces In Work Area with a HEPA filtered vacuum or by wet wiping prior to the installation of primary barrier (Initial Cleaning).
- F. Cleaning and Sealing Surfaces: After cleaning with water and a HEPA vacuum, surfaces of stationary objects should be covered with two layers of plastic sheeting. The sheeting should be secured with duct tape or an equivalent method to provide a tight seal around the object.

### 3.8 PRIMARY BARRIER:

- A. Protect building and other surfaces in the Work Area from damage from water and high humidity or from contamination from asbestos-containing debris, slurry or high airborne fiber levels by covering with a primary barrier as described below.
  - 1. Sheet Plastic: Protect surfaces in the Work Area with two (2) layers of plastic sheeting on floor and walls, or as otherwise directed on the Contract Drawings or in writing by the Designer. Perform work in the following sequence.
    - a. All seams in the sheeting should overlap, be staggered and not be located at corners or wall-to-floor joints.
    - b. Cover Floor of Work Area with 2 individual layers of clear polyethylene sheeting, each at least 6 mil (0.15 mm) in thickness, turned up walls at least 12 inches (305 mm). Form a sharp right angle bend at junction of floor and wall so that there is no radius, which could be stepped on causing the wall attachment to be pulled loose. Both spray-glue and duct tape all seams in floor covering. Locate seams in top layer six feet from, or at right angles to, seams in bottom layer. Install sheeting so that top layer can be removed independently of bottom layer.
    - c. Cover all walls and *ceilings* in Work Area including "Critical Barrier" sheet plastic barriers with one layer of polyethylene sheeting, at least 6 mil (0.15 mm) in thickness, mechanically

supported and sealed with duct tape or spray-glue in the same manner as "Critical Barrier" sheet plastic barriers. Tape all joints including the joining with the floor covering with duct tape or as otherwise indicated on the Contract Documents or in writing by the Designer.

- d. Stairs and Ramps: Do not cover stairs or ramps with unsecured sheet plastic. Where stairs or ramps are covered with plastic, provide 3/4 inch (19.1 mm) exterior grade plywood treads securely held in place, over plastic. Do not cover rungs or rails with any type of protective materials.
- e. Repair of Damaged Polyethylene Sheeting: Remove and replace plastic sheeting, which has been damaged by removal operations or where seal has failed allowing water to seep between layers. Remove affected sheeting and wipe down entire area. Install new sheet plastic only when area is completely dry.

### 3.9 STOP WORK:

- A. If the Critical or Primary barrier falls or is breached in any manner stop asbestos removal work immediately and comply with "Stop Work" requirements of Section 01013 "Summary of Work". Do not start work until authorized in writing by the Designer.

### 3.10 EXTENSION OF WORK AREA:

- A. Extension of Work Area: If the Critical Barrier is breached in any manner that could allow the passage of asbestos debris or airborne fibers, then add affected area to the Work Area, enclose it as required by this Section of the specification and decontaminate it as described in Section 01711 Project Decontamination.

### 3.11 SECONDARY BARRIER:

- A. Secondary layer of plastic as a drop cloth to protect the primary layer from debris generated by the asbestos abatement work is specified in the appropriate work sections.

### 3.12 EXTERIOR ENCLOSURES:

- A. Construct exterior enclosures as a Critical Barrier as necessary to completely enclose the work. Fabricate from reinforced polyethylene sheeting and 2 inch x 4 inch (51mm X 102 mm) wood framework. Attach to existing building components or brace as necessary for lateral stability. Construct walls to meet all state and local regulations for construction of temporary buildings. Construct to resist a wind of 30 MPH (13.41 m/s), slope ceiling to permit drainage of rain water.

END OF SECTION – 01526





**SECTION 01560 - WORKER PROTECTION**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. This section describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection.

1.3 WORKER TRAINING:

- A. AHERA Accreditation: All workers are to be accredited as Abatement Workers as required by the EPA Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).
- B. State and Local License: All workers are to be trained, certified and accredited as required by state or local code or regulation.
- C. Training - Class I: Train in accordance with 29 CFR 1926.1101. Provide training for all workers who will perform Class I operations that is the equivalent in curriculum, training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).
- D. Training - Class II Intact (Non-Friable): Provide training for workers who will be performing Class II work involving only the removal and/or disturbance of one generic category of building material, such as roofing materials, flooring materials, siding materials or cement asbestos panels; which includes as a minimum the specific work practices and engineering controls which specifically relate to that category. Provide a course that includes "hands-on" training and takes at least 8 hours. Provide training that includes the elements set forth in 29 CFR 1926.1101(k) and the Compliance Directive CPL 2-2.63.
- E. Training - Class II Non-Intact (Friable): Provide training for workers who will be performing Class II work on materials that are friable, or will become friable during the work that is the equivalent in curriculum, training method and length to the EPA Interim Final Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).

1.4 MEDICAL SURVEILLANCE:

- A. Provide a medical surveillance program for all employees who are:
  - 1. engaged in Class I, II and III work for a combined total of 30 or more days per year or,
    - a. For the purposes of this paragraph, any day in which a worker engages in Class II or Class III work or a combination thereof for one hour or less (taking into account the entire time spent on the removal operation, including cleanup) and, while doing so, adheres fully to the work practices specified in the OSHA standard (29 CFR 1926.1101) is not counted.
  - 2. are exposed at or above the permissible exposure limit or excursion limit or,

3. before an employee can be assigned to work requiring use of a respirator.
- B. Provide a medical surveillance program and physician's opinion before a respirator is assigned as required by 29 CFR 1910.134 and 29 CFR 1926.103(e)(10).
- C. Provide medical examination that as a minimum meets OSHA requirements as set forth in 29 CFR 1926.1101. In addition, require that the physician provide an evaluation of the individual's ability to work in environments capable of producing heat stress in the worker.

1.5 SUBMITTALS:

- A. Before Start of Work: Submit the following to the Designer for review. Do not start work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use.
  1. AHERA Accreditation: Submit copies of certificates from an EPA-approved AHERA Abatement Workers course for each worker as evidence that each asbestos Abatement Worker is accredited as required by the EPA Interim Final Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).
  2. State and Local License: Submit evidence that all workers have been trained, certified and accredited as required by state or local code or regulation.
  3. Certificate Worker Acknowledgment: Submit an original signed copy of the Certificate of Worker's Acknowledgment found at the end of this section, for each worker who is to be at the job site or enter the Work Area.
  4. Report from Medical Examination: conducted within last 12 months as part of compliance with OSHA medical surveillance requirements for each worker who is to enter the Work Area. Submit, at a minimum, for each worker the following:
    - a. Name and Social Security Number
    - b. The physician's written opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk of material health impairment from exposure to asbestos;
    - c. Any recommended limitations on the employee or on the use of personal protective equipment such as respirators; and
    - d. A statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.
    - e. A statement that the employee has been informed by the physician of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure (29 CFR 1926.1101(m)).
    - f. A legible typed version of the physician's name, the physician's signature, and date of examination.

PART 2 - EQUIPMENT

2.1 PROTECTIVE CLOTHING:

- A. General. Provide and require the use of protective clothing, such as coveralls or similar whole-body clothing, head coverings, gloves, and foot coverings for any employee exposed to airborne concentrations of asbestos that exceed the TWA and/or excursion limit prescribed by 29 CFR 1926.1101 or for which a required negative exposure assessment is not produced, and for any employee performing Class I operations which involve the removal of over 25 linear or 10 square feet (7.5 linear meters or 3 square meters ) of TSI or surfacing ACM or PACM.
- B. Coveralls: Provide disposable full-body coveralls and disposable head covers, and require that they be worn by all workers in the Work Area. Provide a sufficient number for all required changes, for all workers in the Work Area.
- C. Additional Protective Clothing: Provide each worker with the protective clothing as required by Federal State and local regulations. This includes, but is not necessary limited by Hardhats, Cold weather gear, Glove, boots and goggles.
- D. Boots: Provide work boots with non-skid soles, and where required by OSHA, foot protectives, for all workers. Provide boots at no cost to workers. Paint uppers of all boots red with waterproof enamel. Do not allow boots to be removed from the Work Area for any reason, after being contaminated with ACM. Dispose of boots as asbestos-contaminated waste at the end of the work.
- E. Hard Hats: Provide head protectives (hard hats) as required by OSHA for all workers, and provide 4 spares for use by Designer, Project Administrator, and Owner. Label hats with same warning labels as used on disposal bags. Require hard hats to be worn at all times that work is in progress that may potentially cause head injury. Provide hard hats of type with plastic strap type suspension. Require hats to remain in the Work Area throughout the work. Thoroughly clean, decontaminate and bag hats before removing them from Work Area at the end of the work.
- F. Goggles: Provide eye protection (goggles) as required by OSHA for all workers involved in scraping, spraying, or any other activity which may potentially cause eye injury. Thoroughly clean, decontaminate and bag goggles before removing them from Work Area at the end of the work.
- G. Gloves: Provide work gloves to all workers and require that they be worn at all times in the Work Area. Do not remove gloves from Work Area and dispose of as asbestos-contaminated waste at the end of the work.

## 2.2 ADDITIONAL PROTECTIVE EQUIPMENT:

- A. Disposable coveralls, head covers, and footwear covers shall be provided by the Contractor for the Owner, Designer, Project Administrator, and other authorized representatives who may inspect the job site. Provide six (6) complete coveralls per day.

## PART 3 - EXECUTION

### 3.1 GENERAL:

- A. Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work. The following procedures are minimums to be adhered to regardless of fiber count in the Work Area.
- B. Each time Work Area is entered remove all street clothes in the Changing Room of the Personnel Decontamination Unit and put on new disposable coverall, new head cover, and a clean respirator. Proceed through shower room to equipment room and put on work boots.

3.2 DECONTAMINATION PROCEDURES:

- A. Require all workers to adhere to the following personal decontamination procedures whenever they leave the Work Area:
1. Type C Supplied Air or Powered Air-Purifying Respirators: Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the Work Area:
    - a. When exiting area, remove disposable coveralls, disposable head covers, and disposable footwear covers or boots in the equipment room.
    - b. Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:
    - c. Thoroughly wet body including hair and face. If using a Powered Air-Purifying Respirator (PAPR) hold blower unit above head to keep canisters dry.
    - d. With respirator still in place thoroughly wash body, hair, respirator face piece, and all parts of the respirator except the blower unit and battery pack on a PAPR. Pay particular attention to seal between face and respirator and under straps.
    - e. Take a deep breath, hold it and/or exhale slowly, completely wet hair, face, and respirator. While still holding breath, remove respirator and hold it away from face before starting to breath.
    - f. Carefully wash facepiece of respirator inside and out.
  2. If using PAPR: shut down in the following sequence, first cap inlets to filter cartridges, then turn off blower unit (this sequence will help keep debris which has collected on the inlet side of filter from dislodging and contaminating the outside of the unit). Thoroughly wash blower unit and hoses. Carefully wash battery pack with wet rag. Be extremely cautious of getting water in battery pack as this will short out and destroy battery.
    - a. Shower completely with soap and water.
    - b. Rinse thoroughly.
    - c. Rinse shower room walls and floor prior to exit.
    - d. Proceed from shower to Changing Room and change into street clothes or into new disposable work items.
  3. Air Purifying-Negative Pressure Respirators: Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the Work Area with a half or full face cartridge type respirator:
    - a. When exiting area, remove disposable coveralls, disposable headcovers, and disposable footwear covers or boots in the Equipment Room.
    - b. Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator and filters to avoid asbestos fibers while showering. The following procedure is required as a minimum:

- c. Thoroughly wet body from neck down.
  - d. Wet hair as thoroughly as possible without wetting the respirator filter if using an air purifying type respirator.
  - e. Take a deep breath, hold it and/or exhale slowly, complete wetting of hair, thoroughly wetting face, respirator and filter (air purifying respirator). While still holding breath, remove respirator and hold it away from face before starting to breath.
  - f. Dispose of wet filters from air purifying respirator.
  - g. Carefully wash facepiece of respirator inside and out.
  - h. Shower completely with soap and water.
  - i. Rinse thoroughly.
  - j. Rinse shower room walls and floor prior to exit.
  - k. Proceed from shower to Changing Room and change into street clothes or into new disposable work items.
- B. Remote Shower: The procedures above are to be used if the decontamination facility is used as a remote shower. If a worker cannot gain direct access to the Equipment Room require that he enter Decontamination Unit and proceed directly through Shower Room to Equipment Room. Decontamination procedure is then completed as required above.
- C. Within Work Area:
1. Require that workers NOT eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the Work Area. To eat, chew, drink or smoke, workers shall follow the procedure described above, then dress in street clothes before entering the non-Work Areas of the building.

### 3.3 CERTIFICATE OF WORKER'S ACKNOWLEDGEMENT:

Following this section is a Certificate of Worker Training. After each worker has been included in the Contractor's Respiratory Protection Program, completed the training program and medical examination, secure a fully executed copy of this form.

END OF SECTION - 01560

CERTIFICATE OF WORKER'S ACKNOWLEDGEMENT

PROJECT NAME \_\_\_\_\_ DATE \_\_\_\_\_

PROJECT ADDRESS \_\_\_\_\_

CONTRACTOR'S NAME \_\_\_\_\_

WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCER. IF YOU SMOKE AND INHALE ASBESTOS FIBERS THE CHANCE THAT YOU WILL DEVELOP LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.

Your employer's contract with the Owner for the above project requires that: You be supplied with the proper respirator and be trained in its use. You be trained in safe work practices and in the use of the equipment found on the job. You receive a medical examination. These things are to have been done at no cost to you.

RESPIRATORY PROTECTION: You must have been trained in the proper use of respirators, and informed of the type respirator to be used on the above referenced project. You must be given a copy of the written respiratory protection manual issued by your employer. You must be equipped at no cost with the respirator to be used on the above project.

TRAINING COURSE: You must have been trained in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures. This training must have been the equivalent in curriculum, training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).

MEDICAL EXAMINATION: You must have had a medical examination within the past 12 months at no cost to you. This examination must have included: health history, pulmonary function tests and may have included an evaluation of a chest x-ray.

By signing this document you are acknowledging only that the Owner of the building you are about to work in has advised you of your rights to training and protection relative to your employer.

Signature \_\_\_\_\_ Social Security No \_\_\_\_\_

Printed Name \_\_\_\_\_ Witness \_\_\_\_\_

**SECTION 01563 - DECONTAMINATION UNITS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. Provide separate Personnel and Equipment Decontamination facilities. Require that the Personnel Decontamination Unit be the only means of ingress and egress for the Work Area. Require that all materials exit the Work Area through the Equipment Decontamination Unit.

1.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Refer to Section 01503 Temporary Facilities - Asbestos Abatement for electrical requirements and requirements relative to connection of decontamination facilities to building systems such as water, sewer, and electrical.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Polyethylene Sheet: Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick, frosted or black as indicated.
- B. Reinforced Polyethylene Sheet: Where plastic sheet is the only separation between the Work Area and building exterior, provide translucent, nylon reinforced, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick, frosted or black as indicated.
- C. Duct Tape: Provide duct tape in 2 inch or 3 inch (51mm or 76 mm) widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.
- D. Spray Adhesive: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.
- E. Shower Pan: Provide one-piece waterproof shower pan 4 feet x 8 feet x 6 inches deep (1210 mm X 243 mm x 152 mm deep). Fabricate from seamless fiberglass minimum 1/16 inch (1.59 mm) thick reinforced with wood, 18 ga. stainless or galvanized steel with welded seams, copper or lead with soldered seams, or a seamless liner of minimum 60 mil (1.5 mm) thick elastomeric membrane.
- F. Shower Walls: Provide 8 feet (2.44 m) long by approximately 7 feet (2.13 m) high walls fabricated from rigid, impervious, waterproof material, either corrugated fiberglass roofing or equivalent. Structurally support as necessary for stability.
- G. Shower Head and Controls: Provide a factory-made shower head producing a spray of water, which can be adjusted for spray size and intensity. Feed shower with water mixed from hot and cold supply lines. Arrange so that control of water temperature, flow rate, and shut off is from inside shower without outside aid.

- H. Filters: Provide cascaded filter units on drain lines from showers or any other water source carrying asbestos-contaminated water from the Work Area. Provide units with disposable filter elements as indicated below. Connect so that discharged water passes primary filter and output of primary filter passes through secondary filter.
  - 1. Primary Filter - Passes particles 20 microns and smaller
  - 2. Secondary Filter - Passes particles 5 microns and smaller
- I. Hose Bib: Provide heavy bronze angle type with wheel handle, vacuum breaker, and 3/4 inch (19.05 mm) National Standard male hose outlet.
- J. Shower Stall: For Wash Down Station provide leak tight shower enclosure with integrated drain pan fabricated from fiberglass or other durable waterproof material, approximately 3 feet x 3 feet (0.91m x 0.91 m) square with minimum 6 feet (1.83 m) high sides and back. Structurally support as necessary for stability. Equip with hose bib, as specified in this section, mounted at approximately 4 feet (1.22 m) above drain pan. Connect drain to a reservoir, pump water from reservoir through filters to a drain or store and use for amended water. Mount filters inside shower stall on back wall beneath hose bib.
- K. Lumber: Provide kiln dried lumber of any grade or species.
- L. Sump Pump: Provide totally submersible waterproof sump pump with integral float switch. Provide unit sized to pump 2 times the flow capacity of all showers or hoses supplying water to the sump, through the filters specified herein when they are loaded to the extent that replacement is required. Provide unit capable of pumping debris, sand, plaster or other materials washed off during decontamination procedures without damage to mechanism of pump. Adjust float switch so that a minimum of 3 inch (76 mm) remains between top of liquid and top of sump pan.

### PART 3 - EXECUTION

#### 3.1 PERSONNEL DECONTAMINATION UNIT:

- A. Provide a Personnel Decontamination Unit consisting of a serial arrangement of connected rooms or spaces, Changing Room, Drying Room, Shower Room, and Equipment Room. Require all persons without exception to pass through this Decontamination Unit for entry into and exiting from the Work Area for any purpose. Do not allow parallel routes for entry or exit. Do not remove equipment or materials through Personnel Decontamination Unit. Provide temporary lighting within Decontamination Units as necessary to reach a lighting level of 100 foot candles (1076 lumens / sq meter).
- B. Changing Room (clean room): Provide a room that is physically and visually separated from the rest of the building for the purpose of changing into protective clothing.
  - 1. Construct using polyethylene sheeting, at least 6 mil (0.15 mm) in thickness, to provide an airtight seal between the Changing Room and the rest of the building.
  - 2. Locate so that access to Work Area from Changing Room is through Shower Room.
  - 3. Separate Changing Room from the building by a sheet plastic flapped doorway.
  - 4. Require workers to remove all street clothes in this room, dress in clean, disposable coveralls, and don respiratory protection equipment. Do not allow asbestos-contaminated items to enter this room. Require Workers to enter this room either from outside the structure dressed in street clothes, or naked from the showers.



5. An existing room may be utilized as the Changing Room if it is suitably located and of a configuration whereby workers may enter the Changing Room directly from the Shower Room. Protect all surfaces of room with sheet plastic as set forth in Section 01526 Temporary Enclosures. Authorization for this must be obtained from the Designer in writing prior to start of construction. Submit written request in accordance with Section 01632 "Substitutions" detailing layout and protective measures proposed.
  6. Maintain floor of changing room dry and clean at all times. Do not allow overflow water from shower to wet floor in changing room.
  7. Damp wipe all surfaces twice after each shift change with a disinfectant solution.
  8. Provide posted information for all emergency phone numbers and procedures.
  9. Provide 1 storage locker per employee.
- C. Shower Room: Provide a completely watertight operational shower to be used for transit by cleanly dressed workers heading for the Work Area from the Changing Room, or for showering by workers headed out of the Work Area after undressing in the Equipment Room.
1. Construct room by providing a shower pan and 2 shower walls in a configuration that will cause water running down walls to drip into pan. Install a freely draining wooden floor in shower pan at elevation of top of pan.
  2. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
  3. Separate this room from the Drying Room and Airlock with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
  4. Provide splash proof entrances to Drying Room and Airlock with doors arranged in the following configuration:
    - a. At each entrance to the Shower Room construct a doorframe out of nominal 2 inch x 4 inch (51 mm X 102 mm) lumber with 1-1/2 inch (39 mm) jambs (sides) and 1-1/2 inch (39 mm) head (top) and sill (bottom). Attach to this doorframe two overlapping flaps of elastomeric membrane material, fastened at the head (top) and jambs (sides) (by clamping between a 1-1/2 inch (39 mm) x 3/4 inch (19mm) batten and frame). Overlap the flaps a minimum of 6 inch (152 mm) in a direction that presents a shingle-like configuration to the water stream from the shower. Overlap sill (bottom) by 1-1/2 inch (39 mm) minimum. Arrange so that any air movement out of the Work Area will cause the flaps to seal against the doorframe.
  5. Provide showerhead and controls.
  6. Provide temporary extensions of existing hot and cold water and drainage, as necessary for a complete and operable shower.
  7. Provide a soap dish and a continuously adequate supply of soap and maintain in sanitary condition.
  8. Arrange so that water from showering does not splash into the Changing or Equipment Rooms.
  9. Arrange water shut off and drain pump operation controls so that a single individual can shower without assistance from either inside or outside of the Work Area.

10. Provide flexible hose shower head.
  11. Pump wastewater to drain or to storage for use in amended water. If pumped to drain, provide 20 micron and 5 micron wastewater filters in line to drain or waste water storage. Change filters daily or more often if necessary. Locate filters inside shower unit so that water lost during filter changes is caught by shower pan.
  12. Provide hose bib.
- D. Equipment Room (contaminated area): Require work equipment, footwear and additional contaminated work clothing to be left here. This is a change and transit area for workers.
1. Separate this room from the Work Area by a 6 mil (0.15 mm) polyethylene flapped doorway.
  2. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
  3. Separate this room from the Shower Room and Work Area with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
  4. Provide a drop cloth layer of sheet plastic on floor in the Equipment Room for every shift change expected. Roll drop cloth layer of plastic from Equipment Room into Work Area after each shift change. Replace before next shift change. Provide a minimum of two (2) layers of plastic at all times. Use only clear plastic to cover floors.
- E. Work Area: Separate Work Area from the Equipment Room by polyethylene barriers. If the airborne asbestos level in the Work Area is expected to be high, as in dry removal, add an intermediate cleaning space between the Equipment Room and the Work Area. Damp wipe clean all surfaces after each shift change. Provide one additional floor layer of 6 mil (0.15 mm) polyethylene per shift change and remove contaminated layer after each shift.
- F. Decontamination Sequence: Require that all workers adhere to the following sequence when entering or leaving the Work Area.
1. Entering Work Area: Worker enters Changing Room and removes street clothing, puts on clean disposable overalls and respirator, and passes through the Shower Room into the Equipment Room.
  2. Any additional clothing and equipment left in Equipment Room needed by the worker are put on in the Equipment Room.
  3. Worker proceeds to Work Area.
- G. Exiting Work Area:
1. Before leaving the Work Area, require the worker to remove all gross contamination and debris from overalls and feet.
  2. The worker then proceeds to the Equipment Room and removes all clothing except respiratory protection equipment.
  3. Extra work clothing such as boots, hard hats, goggles, gloves are to be stored in contaminated end of the Equipment Room.

4. Disposable coveralls are placed in a bag for disposal with other material.
5. Require that Decontamination procedures found in Section 01560 be followed by all individuals leaving the Work Area.
6. After showering, the worker moves to the Changing Room and dresses in either new coveralls for another entry or street clothes if leaving.

**3.2 EQUIPMENT DECONTAMINATION UNIT:**

- A. Provide an Equipment Decontamination Unit consisting of a serial arrangement of rooms, Clean Room, Holding Room, Wash Room for removal of equipment and material from Work Area. Do not allow personnel to enter or exit Work Area through Equipment Decontamination Unit.
- B. Arrange with airlocks between rooms as required below.
- C. Wash Down Station: Provide an enclosed Shower Unit located in Work Area just outside Wash Room as an equipment, bag and container cleaning station.
  1. Fabricate waterproof floor extending 6 feet (1.83 m) beyond Wash Down station in all directions. Install seamless waterproof membrane over area and extend over curbs on all four sides. Form curbs from 2 inch x 4 inch (51 X 102 mm) lumber laid on the flat.
  2. Waterproof membrane is to be fabricated from minimum 10 mil (.254 mm) polyethylene.
  3. Do not allow water to collect on waterproof membrane. Remove continuously with a wet vacuum or mops.
- D. Wash Room: Provide wash room for cleaning of bagged or containerized asbestos-containing waste materials passed from the Work Area.
  1. Construct washroom of nominal 2 inch x 4 inch (51 X 102 mm) wood framing and polyethylene sheeting, at least 6 mil (0.15 mm) in thickness and located so that packaged materials, after being wiped clean, can be passed to the Holding Room.
  2. Separate this room from the Work Area by a single flapped door of 6 mil (0.15 mm) polyethylene sheeting.
  3. Provide a drop cloth layer of plastic on floor in the Wash Room for every load-out operation. Roll this drop cloth layer of plastic from Wash Room into Work Area after each load-out. Provide a minimum of two (2) layers of plastic at all times. Use only clear plastic to cover floors.
- E. Holding Room: Provide Holding Room as a drop location for bagged asbestos-containing materials passed from the Wash Room. Construct Holding Room of nominal 2 inch x 4 inch (51 X 102 mm) wood framing and polyethylene sheeting, at least 6 mil (0.15 mm) in thickness and located so that bagged materials cannot be passed from the Wash Room through the Holding Room to the Clean Room.
  1. Separate this room from the adjacent rooms by flap doors fabricated from 6 mil (0.15 mm) sheet plastic.
- F. Clean Room: Provide Clean Room to isolate the Holding Room from the building exterior.

1. Erect Critical and Primary Barriers as described in Section 01526 "Temporary Enclosures" in an existing space. If no space exists construct Clean Room of 2 x 4 (51 X 102 mm) wood framing and polyethylene sheeting, at least 6 mil (0.15 mm) in thickness.
  2. Separate this room from the exterior by a single flap door of 6 mil (0.15 mm) polyethylene sheeting.
- G. Load-out Area: The load-out area is the transfer area from the building to a truck or dumpster. It may be the Clean Room of the Equipment Decontamination unit or a separate room or loading dock area. Erect Critical and Primary barriers as described in Section 01526 "Temporary Enclosures" in load-out area.
1. During transfer of material from load-out area erect primary barriers as described in Section 01526 "Temporary Enclosures" as necessary to seal path from load-out area to truck or dumpster.
- H. Decontamination Sequence: Take all equipment or material from the Work Area through the Equipment Decontamination Unit according to the following procedure:
1. At washdown station, thoroughly wet clean contaminated equipment or sealed polyethylene bags and pass into Wash Room.
  2. When passing equipment or containers into the Wash Room, close all doorways of the Equipment Decontamination Unit, other than the doorway between the Washdown Station and the Wash Room. Keep all outside personnel clear of the Equipment Decontamination Unit.
  3. Once inside the washroom, wet clean the bags and/or equipment.
  4. When cleaning is complete pass items into Holding Room. Close all doorways except the doorway between the Holding room and the Clean Room.
  5. Workers from the building exterior enter Holding Area and remove decontaminated equipment and/or containers for disposal.
  6. Require these workers to wear full protective clothing and appropriate respiratory protection.
  7. At no time is a worker from an uncontaminated area to enter the enclosure when a removal worker is inside.

### 3.3 CONSTRUCTION OF THE DECONTAMINATION UNITS:

- A. Walls and Ceiling: Construct airtight walls and ceiling using polyethylene sheeting, at least 6 mil (0.15 mm) in thickness. Attach to existing building components or a temporary framework.
- B. Floors: Use 2 layers (minimum) of 6 mil (0.15 mm) polyethylene sheeting to cover floors in all areas of the Decontamination Units. Use only clear plastic to cover floors.
- C. Flap Doors: Fabricated from three (3) overlapping sheets with openings a minimum of three feet (3') (0.91 meters) wide. Configure so that sheeting overlaps adjacent surfaces. Weights at bottom of sheets as required so that they quickly close after being released. Put arrows on sheets to indicate direction of overlap and/or travel. Provide a minimum of six feet (6') (1.22 meters) between entrance and exit of any room. Provide a minimum of three feet (3') (0.91 meters) between doors to airlocks.
- D. If the Decontamination area is located within an area containing friable asbestos on overhead ceilings, ducts, piping, etc., provide the area with a minimum 1/4 inch (6.4 mm) hardboard or 1/2 inch (12.7 mm)

plywood "ceiling" with polyethylene sheeting, at least 6 mil (0.15 mm) in thickness covering the top of the "ceiling".

- E. Visual Barrier: Where the Decontamination area is immediately adjacent to and within view of occupied areas, provide a visual barrier of opaque polyethylene sheeting at least 6 mil (0.15 mm) in thickness so that worker privacy is maintained and work procedures are not visible to building occupants. Where the area adjacent to the Decontamination area is accessible to the public, construct a solid barrier on the public side of the sheeting to protect the sheeting. Construct barrier with wood or metal studs covered with minimum 1/4 inch (6.4 mm) thick hardboard or 1/2 inch (12.7 mm) plywood. Where the solid barrier is provided, sheeting need not be opaque.
- F. Alternate methods of providing Decontamination facilities may be submitted to the Designer for approval. Do not proceed with any such method(s) without written authorization of the Designer.
- G. Electrical: Provide subpanel at Changing Room to accommodate all removal equipment. Power subpanel directly from a building electrical panel.
  - 1. Connect all electrical branch circuits in Decontamination unit and particularly any pumps in shower room to a ground-fault circuit protection device.

3.4 CLEANING OF DECONTAMINATION UNITS:

- A. Clean debris and residue from inside of Decontamination Units on a daily basis or as otherwise indicated on Contract Drawings. Damp wipe or hose down all surfaces after each shift change. Clean debris from shower pans on a daily basis.
- B. If the Changing Room of the Personnel Decontamination Unit becomes contaminated with asbestos-containing debris, abandon the entire Decontamination Unit and erect a new Decontamination Unit. Use the former Changing Room as an inner section of the new Equipment Room.

3.5 SIGNS:

- A. Post an approximately 20 inch by 14 inch (508 mm x 356 mm) manufactured caution sign at each entrance to the Work Area displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926:
  - 1. Provide signs in both English and Spanish.
  - 2. Legend:

DANGER

ASBESTOS

CANCER AND LUNG DISEASE HAZARD

AUTHORIZED PERSONNEL ONLY

RESPIRATORS AND PROTECTIVE CLOTHING  
ARE REQUIRED IN THIS AREA

- 3. Provide spacing between respective lines at least equal to the height of the respective upper line.

**Northern Burlington County Regional High School**

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B. Post an approximately 10 inch by 14 (254 mm x 356 mm) inch manufactured sign at each entrance to each Work Area displaying the following legend with letter sizes and styles of a visibility at least equal to the following:

1. Provide signs in both English and Spanish.

Legend	Notation
NO FOOD, BEVERAGES OR TOBACCO PERMITTED	3/4 inch (19 mm) Block
ALL PERSONS SHALL DON PROTECTIVE CLOTHING (COVERINGS) BEFORE ENTERING THE WORK AREA	3/4 inch (19 mm) Block
ALL PERSONS SHALL SHOWER IMMEDIATELY AFTER LEAVING WORK AREA AND BEFORE ENTERING THE CHANGING AREA	3/4 inch (19 mm) Block

END OF SECTION - 01563

**SECTION 01711 - PROJECT DECONTAMINATION**

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of This Section includes the decontamination of air in the Work Area which has been, or may have been, contaminated by the elevated airborne asbestos fiber levels generated during abatement activities, or which may previously have had elevated fiber levels due to friable asbestos-containing materials (ACM) in the space.
- B. Work of This Section includes the cleaning, decontamination, and removal of temporary facilities installed prior to abatement work, including:
  - 1. Primary and Critical Barriers erected by work of Section 01526.
  - 2. Decontamination Unit erected by work of Section 01563.
  - 3. Pressure Differential System installed by work of Section 01513.
- C. Work of This Section includes the cleaning, and decontamination of all surfaces (ceiling, walls, floor) of the Work Area, and all furniture or equipment in the Work Area.

1.2 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this section.

1.3 DESCRIPTION OF REQUIREMENTS:

- A. General: Decontamination of the Work Area following asbestos abatement.
- B. If the asbestos abatement work is on damaged or friable materials the work is a four step procedure with two cleanings of the Primary Barrier plastic prior to its removal and two cleanings of the room surfaces to remove any new or existing contamination. Unless specifically indicated otherwise all materials are considered damaged or friable for purposes of this section.
- C. If the asbestos abatement work is on undamaged and non-friable materials the decontamination procedure is a two step procedure with two cleanings of the Primary Barrier plastic to remove contamination, thus preventing contamination of the building when the Work Area isolation barriers are removed.
- D. In both cases operation of the pressure differential system is used to remove airborne fibers generated by the abatement work.

1.4 RELATED WORK SPECIFIED ELSEWHERE:

- A. Removal of Gross Debris is integral with the performance of abatement work and as such is specified in the appropriate work section(s) of these specifications:
  - 1. Section 02081 Removal of Asbestos-Containing Materials
  - 2. Section 01714 Work Area Clearance

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Sealant to be applied after removal of all visible asbestos containing material shall be a separate and distinct color from the surfaces to which it is applied when dry. Sealant shall be Foster 32-60 as manufactured by H.B. Fuller or Serpiflex Shield as manufactured by International Protective Coatings Corp. or approved equal.

PART 3 - EXECUTION

3.1 START OF WORK:

- A. Previous Work: During completion of the asbestos abatement work specified in other sections, the Secondary Barrier of polyethylene sheeting will have been removed and disposed of along with any gross debris generated by the asbestos abatement work.
- B. Visual inspection: Perform visual inspections of the work area along with the Project Administrator at each step of the decontamination process.
  - 1. Follow inspection procedures in EPA Purple Book.
- C. Start of Work: Work of this section begins with the cleaning of the Primary Barrier. At start of work the following will be in place:
  - 1. Primary Barrier: Two layers of polyethylene sheeting on floor and one layer on walls.
  - 2. Critical Barrier: An airtight barrier between the Work Area and other portions of the building or the outside.
  - 3. Critical Barrier Sheeting: Over lighting fixtures and clocks, ventilation openings, doorways, convectors, speakers and other openings.
  - 4. Decontamination Units: For personnel and equipment in operating condition.
  - 5. Pressure Differential System: In operation.
  - 6. Separation barriers and/or Occupancy Separation Barriers which form the sole barrier between the work area and occupied portions of the building or outside.

3.2 FIRST CLEANING:

- A. First Cleaning: Carry out a first cleaning of all surfaces of the work area including items of remaining sheeting, tools, scaffolding and/or staging by use of damp-cleaning and mopping, and/or a High Efficiency Particulate Air (HEPA) filtered vacuum. (Note: A HEPA vacuum may fail if used with wet material.) Do not perform dry dusting or dry sweeping. Use each surface of a cleaning cloth one time only and then dispose of as contaminated waste. Continue this cleaning until there is no visible debris from removed materials or residue on plastic sheeting or other surfaces.
  - 1. Remove All Filters in Air Handling System(s) and dispose of as asbestos-containing waste in accordance with requirements of Section 02084 Disposal of Regulated Asbestos-Containing Material.



2. After the surfaces have passed a visual inspection verifying that all debris and residue has been removed from the sheet plastic, allow a waiting period that is long enough for the HEPA-filtered fan units operating in the work area to provide 96 air changes to clean air of airborne asbestos fibers. Use oscillating fans as necessary to assure circulation of air in all parts of work areas during this period. Maintain Pressure Differential System in operation for the entire 96 air change period.

### 3.3 SECOND CLEANING:

- A. Second Cleaning: Carry out a second cleaning of all surfaces in the work area in the same manner as the first cleaning.
- B. Visual inspection: Before the application of any sealer to abated surfaces as a lock-back, perform a visual inspection to determine if all ACM including debris and residue has been removed. Perform visual inspections along with Project Administrator. When the area is visually clean, and if after sweeping of all surfaces with leaf blower, ***no debris, residue, dust or other material is found***, complete the certification at the end of this section. Visual inspection is not complete until confirmed in writing, on the certification, by Project Administrator. After this visual inspection is passed, lock-back sealants can be applied and the work area decontamination process can be initiated.
- C. Sealing of substrate: Perform sealing of substrate or installation of spray-applied finishes or fireproofing, where required, at this time. Maintain Pressure Differential System in operation during encapsulation work. Perform work only after meeting the following requirements:
  1. Surfaces to be covered with sealer have met the requirements for a visual inspection in this section.
  2. Airborne fiber counts in the Work Area are at or below 0.01 fibers per cubic centimeter as measured by phase contrast microscopy.
- D. Removal of Primary Barriers:
  1. Immediately following the second cleaning of the Primary plastic, remove all Primary Barrier sheeting and Material Decontamination Unit, if there is one, leaving only:
    - a. Critical Barrier: Which forms the sole barrier between the Work Area and other portions of the building or the outside.
    - b. Critical Barrier Sheeting: Over lighting fixtures and clocks, ventilation openings, doorways, convectors, speakers, and other openings.
    - c. Decontamination Unit: For personnel, in operating condition.
    - d. Pressure Differential System: Maintain in continuous operation.

### 3.4 FINAL CLEANING:

- A. Final Cleaning: Carry out a final cleaning of all surfaces in the Work Area in the same manner as the previous cleaning.

### 3.5 VISUAL INSPECTION:

- A. After Final Cleaning Perform a Complete Visual Inspection of the entire Work Area including: all surfaces, ceiling, walls, floor, decontamination unit, all plastic sheeting, seals over ventilation openings, doorways, windows, and other openings; look for debris from any source, residue on surfaces, dust or other matter.

During visual inspection sweep entire work area including walls, ceilings, ledges, floors, and other surfaces in the room with exhaust from forced air equipment (leaf blower with approximately 1 horsepower electric motor or equivalent). If any debris, residue, dust or other matter is found repeat final cleaning and continue decontamination procedure from that point. When the area is visually clean, and if after sweeping of all surfaces with leaf blower, ***no debris, residue, dust or other material is found***, complete the certification at the end of this section. Visual inspection is not complete until confirmed in writing, on the certification, by Project Administrator.

- B. Temporary lighting: Provide a minimum of 100 foot candles (1075 Lumens / sq meter ) of lighting on all surfaces in the areas to be subjected to visual inspection. Provide hand held lights providing 150 foot candles (1600 lumens / sq meter ) at 4 feet ( 1.25 meter) capable of reaching all locations in work area.
- C. Lifts: Provide ladders, scaffolding, and lifts as required to provide access to all surfaces in the area to be subjected to visual inspection. Access is to allow touching of all surfaces.

### 3.6 CLEARANCE AIR SAMPLING BY OWNER

- A. After the work area is found to be visually clean and ***all surfaces are fully dry***, air sampling shall be collected and analyzed by the AST in accordance with the procedure for Phase Contrast Microscopy (PCM) or Transmission Electron Microscopy (TEM) set forth in section 01714.
  - 1. If Release Criteria are not met, repeat Final Cleaning and continue Decontamination procedure from that point.
  - 2. If Release Criteria are met, remove work area isolation in accordance with requirements of this section.

### 3.7 REMOVAL OF WORK AREA ISOLATION:

- A. After all requirements of this section and Section 01714 Work Area Clearance have been met:
  - 1. Shut down and remove the Pressure Differential System. Seal HEPA filtered fan units, HEPA vacuums and similar equipment with 6 mil (0.15 mm) polyethylene sheet and duct tape to form a tight seal at intake end before being moved from Work Area.
  - 2. Remove Personnel Decontamination Unit.
  - 3. Remove the Critical Barriers separating the Work Area from the rest of the building. Remove any small quantities of residual material found upon removal of the plastic sheeting with wet wiping, HEPA filtered vacuum cleaners and local area protection. If significant quantities, as determined by the Designer, are found then the entire area affected shall be decontaminated as directed by the Designer.
  - 4. Remove all equipment, materials, debris from the work site.
  - 5. Dispose of all asbestos-containing waste material as specified in Section 02084 Disposal of Regulated Asbestos Containing Material.

### 3.8 SUBSTANTIAL COMPLETION OF ABATEMENT WORK:

- A. Asbestos Abatement Work is Substantially Complete upon meeting the requirements of this section including submission of:
  - 1. Certificate of Visual Inspection

2. Receipts documenting proper disposal as required by Section 02084 Disposal of Regulated Asbestos-Containing Material.
3. Punch list detailing repairs to be made and incomplete items.

3.9 CERTIFICATE OF VISUAL INSPECTION:

- A. Following this section is a "Certificate of Visual Inspection". This certification is to be completed by the Contractor and certified by the Project Administrator. Submit completed Certificate with Application for Final Payment. Final payment will not be made until this Certification is executed.

END OF SECTION - 01711

CERTIFICATION OF VISUAL INSPECTION

In accordance with Section 01711 "Project Decontamination" the Contractor hereby certifies that he has visually inspected the Work Area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, Decontamination Unit, sheet plastic, etc.) and has found no dust, debris or residue.

by: (Signature) \_\_\_\_\_ Date \_\_\_\_\_

(Print Name) \_\_\_\_\_

(Print Title) \_\_\_\_\_

PROJECT ADMINISTRATOR CERTIFICATION

The Project Administrator hereby certifies that he has accompanied the Contractor on the Contractor's visual inspection and verifies that this inspection has been thorough and to the best of their knowledge and belief, the Contractor's Certification above is a true and honest one.

by: (Signature) \_\_\_\_\_ Date \_\_\_\_\_

(Print Name) \_\_\_\_\_

(Print Title) \_\_\_\_\_

**SECTION 01714 - WORK AREA CLEARANCE**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this section.

1.2 SUMMARY:

- A. This section describes work performed by the AST to measure post-abatement fiber levels.

1.3 CONTRACTOR RELEASE CRITERIA:

- A. The Work is Complete when the work area has passed Visual Inspection and airborne fiber levels have been reduced to the level specified in items 1.7 or 1.8 of this Section.

1.4 AIR MONITORING:

- A. To determine if the elevated airborne fiber counts encountered during abatement operations have been reduced to the specified level, AST will secure samples and analyze them according to the following procedures.
- B. Fibers Counted: Fibers' referred to in this section shall be either all fibers as counted in accordance with NIOSH Method 7400A, or asbestos fibers of any size as counted using a Transmission Electron Microscope as specified in Appendix A of 40 CFR 763.

1.5 AGGRESSIVE SAMPLING:

- A. Before sampling pumps are started the exhaust from forced air equipment (such as a leaf blower with at least 1 horsepower electric motor) will be swept against all walls, ceilings, floors, ledges and other surfaces in the room. This procedure will be continued for 5 minutes per 10,000 cubic feet of work area volume. The Contractor shall supply the forced air equipment (leaf blower).
- B. One fan capable of creating a minimum air velocity of 500 feet per minute shall be utilized for each 10,000 cubic feet of work area. Stationary fans shall be placed in locations, which will not interfere with air monitoring equipment. Fans shall be directed toward the ceiling and shall operate continuously for the entire sampling period. The Contractor shall supply all required fans.
- C. Air samples will be collected in areas subject to normal air circulation away from room corners, obstructed locations, and sites near windows, doors or vents.
- D. After air-sampling pumps have been shut off, fans will be shut off.
- E. The use of leaf blowers and fans shall be restricted to general occupancy areas that are contained, and they shall not be used in any space with an open dirt, sand or gravel floor.

1.6 SCHEDULE OF AIR SAMPLES BY OWNER:

- A. Number and Volume of Samples: The number and volume of air samples taken and analytical methods used by the AST will be in accordance with one of the following schedules in compliance with state and federal regulations. Sample volumes utilized may vary depending upon job conditions and the analytical method used.

1.7 PHASE CONTRAST MICROSCOPY (PCM)

A. In each homogenous work area to be cleared by PCM, after completion of all cleaning work, a minimum of 5 samples will be taken analyzed as follows:

1. PCM Samples: collected on 0.8 u MCE, 25 mm filters

Location Sampled	Number of Samples	Limit Value (Fibers/cc)	Minimum Volume (Liters)	Rate (LPM)
Each Work Area	5	0.010	1,200	2-12
Field Blank	1	3 fibers/ 100 fields	N/A	N/A

B. Fibers on each filter will be counted and measured using the NIOSH Method 7400A procedures. If analyzed in the field, the microscopist shall be rated "Approved" in the Asbestos Analysts Registry (AAR) program, administered by the American Industrial Hygiene Association (AIHA). If counted in a laboratory, the analyst shall also be AAR "Approved" and the laboratory shall be accredited for asbestos by AIHA.

C. Decontamination of the work site is complete when every work area sample is less than or equal to the applicable Acceptance Level (0.010 f/cc). If any sample is above the Acceptance Level (0.010 f/cc), then the decontamination is incomplete and re-cleaning is required.

1.8 TRANSMISSION ELECTRON MICROSCOPY (TEM)

A. In each homogenous work area to be cleared by TEM, after completion of all cleaning work, a minimum of 13 samples will be taken and analyzed as follows:

1. TEM Samples: collected on 0.45 u MCE, 25 mm filters

Location Sampled	Number of Samples	Analytical Sensitivity (Struct./mm <sup>2</sup> .)	Approx. Volume (Liters)	Rate (Liters/Minute)
Each Work Area	5 <sup>1</sup>	< 70 (average of 5 samples)	1,200	2-12
Outside Each Work Area	5 <sup>2</sup>	Z-test	1,200	2-12
Work Area Blank	1	< 70 (average of blanks)	N/A	N/A
Outside Blank	1	< 70 (average of blanks)	N/A	N/A
Lab Blank	1	< 70 (average of blanks)	N/A	N/A

## Northern Burlington County Regional High School

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- 1) or 1 sample per 1,000 ft<sup>2</sup> of contained floor area (except 1 per 2,000 ft<sup>2</sup> in rooms > 5,000 ft<sup>2</sup>), whichever requires more samples.
  - 2) outside work area samples shall be taken as follows: 1) two at the entrance to the decontamination chamber, representing make-up air, 2) two outside the building, and 3) one at another location inside the building, determined by the Owner's Industrial Hygiene services contractor. Prior to taking these samples, the AST shall inspect the vicinity to ensure that neither the activities of the abatement contractor, nor other ACM in the building, are expected to create ambient fiber levels that would be detected on these samples.
- B. Analysis will be performed using the method set forth in the AHERA Regulation 40 CFR Part 763 Appendix A. The laboratory performing the analyses shall have current Accreditation for Airborne Asbestos Fiber Analysis through the National Voluntary Laboratory Accreditation Program (NVLAP), administered by the National Institute of Standards and Technology (NIST).
- C. Asbestos structures referred to in this Section include asbestos fibers, bundles, clusters or matrices, as defined by method of analysis.
- D. Release Criteria: Decontamination of the work site is complete when one of the following two sets of conditions are met. Utilization of condition 2 (Z-test) will be only if, in the written judgment of the ASCM, it is necessary due to knowledge or reasonable suspicion that ambient air entering the work area through the decontamination chamber is > 0.010 s/cc for reasons unrelated to the actions of the abatement contractor.
1. Work Area Samples meet acceptance criteria below the filter background levels.
    - a. Minimum volume of all Work Area samples is 1,200 liters for a 25 mm filter.
    - b. The average concentration of asbestos on the five Work Area Samples does not exceed the acceptance criteria of 70 structures per square millimeter of filter area.
  2. Work Area Samples are not statistically different from outside samples.
    - a. All sample volumes except for blanks are greater than 1,200 liters for a 25 mm filter.
    - b. The average asbestos concentration of the three blanks is below the filter background level of 70 structures per square millimeter of filter area.
    - c. The ASCM has determined that neither abatement contractor activities nor remaining ACM in other portions of the building are expected to be detected on the outside work area samples and average asbestos concentrations in Work Area Samples are not statistically different from Outside samples, as determined by the Z-test calculation found in 40 CFR Part 763, Subpart E, Appendix A (Z is less than or equal to 1.65)
- E. If the arithmetic mean (average) asbestos concentration on the blank filters exceeds 70 structures per square millimeter of filter area, the analysis will cease, the cause of the problem shall be corrected and new samples will be collected.

1.9 FAILED CLEARANCE TESTING

- A. If the Release Criteria conditions are not achieved, decontamination is incomplete and the cleaning procedures of Section 01711 shall be repeated at no additional cost to the Owner.
- B. The Contractor will be financially responsible for all subsequent analysis costs (daily and clearance) and related technician costs required as a result of failed clearance testing.

1.10 PHASE CONTRAST MICROSCOPY

- A. The services of a testing laboratory will be employed by the Owner to perform laboratory analysis of the air samples. A technician will be at the job site with a microscope so that verbal reports on air samples can be obtained within four (4) hours.
- B. A complete record, certified by the testing laboratory, of all air monitoring tests and results will be furnished to the Owner.

1.11 TRANSMISSION ELECTRON MICROSCOPY

- A. The services of a testing laboratory will be employed by the Owner to perform laboratory analysis of the air samples.
- B. Verbal results will be available within 24 hours after submitting the sample to the laboratory.
- C. A complete record, certified by the testing laboratory, of all Transmission Electron Microscopy results will be furnished to the Owner.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01714



**SECTION 02081 - REMOVAL OF ASBESTOS-CONTAINING MATERIALS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to work of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Worker Protection requirements are set forth in Section 01560 Worker Protection - Asbestos abatement.
- B. Installation of Critical and Primary Barriers, and Work Area Isolation Procedures are set forth in Section 01526 Temporary Enclosures.
- C. Project Decontamination procedures after removal of the Secondary Barrier are specified in Section 01711 Project Decontamination.
- D. Disposal of asbestos-containing waste is specified in Section 02084 Disposal of Regulated Asbestos-Containing Materials.

1.3 SUBMITTALS:

- A. Before Start of Work: Submit the following to the Designer for review. Do not start work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use.
  - 1. Surfactant: Submit product data, use instructions and recommendations from manufacturer of surfactant intended for use. Include data substantiating that material complies with requirements.
  - 2. Removal Encapsulant: Submit product data, use instructions and recommendations from manufacturer of removal encapsulant intended for use. Include data substantiating that material complies with requirements.
  - 3. NESHAP Certification: Submit certification from manufacturer of surfactant or removal encapsulant that, to the extent required by this specification, the material, if used in accordance with manufacturer's instructions, will wet Asbestos-Containing Materials (ACM) to which it is applied as required by the National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M).
- B. Before Start of Work submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal has been "Received and Reviewed".
  - 1. Material Safety Data Sheet: Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for the following:
    - a. Surfactants.
    - b. Encapsulants.
    - c. Solvents.

PART 2 - PRODUCTS:

2.1 MATERIALS

- A. Wetting Materials: For wetting prior to disturbance of ACM use either amended water or a removal encapsulant.
- B. Amended Water: Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons (19 liters) of water.
- C. Removal Encapsulant: Provide a penetrating type encapsulant designed specifically for removal of ACM. Use a material which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of a mixture of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether in five gallons (19 liters) of water.
- D. Polyethylene Sheet: A single polyethylene film in the largest sheet size practicable to minimize seams, 6.0 mil (0.15 mm) thick, clear, frosted, or black as indicated.
- E. Polyethylene Sheet: Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick, frosted or black as indicated.
- F. Duct Tape: Provide duct tape in 2 inch or 3 inch (50mm or 75 mm) widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.
- G. Spray Cement: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.
- H. Disposal Bags: Provide 6 mil (0.15 mm) thick leak-tight polyethylene bags labeled as required by Section 02084 Disposal of Regulated Asbestos Containing Material.
- I. Fiberboard Drums: Provide heavy-duty leak tight fiberboard drums with tight sealing locking metal tops.
- J. Paper Board Boxes: Provide heavy-duty corrugated paper board boxes coated with plastic or wax to retard deterioration from moisture. Provide in sizes that will easily fit in disposal bags.
- K. Felt: Standard felt approximately 1/16 inch (1.6 mm) thick and 36 inches (900 mm) to 72 inches (1800 mm) in width.

PART 3 - EXECUTION

3.1 SECONDARY BARRIER:

- A. Secondary Barrier: Over the Primary Barrier, install as a drop cloth a clear, 6 mil (0.15 mm) sheet plastic in all areas where asbestos removal work is to be carried out. Completely cover floor with sheet plastic. Where the work is within 10 feet (3 m) of a wall extend the Secondary Barrier up wall to ceiling. Support sheet plastic on wall with duct tape, seal top of Secondary plastic to Primary Barrier with duct tape so that debris is unable to get behind it. Provide cross strips of duct tape at wall support as necessary to support sheet plastic and prevent its falling during removal operations.

1. Install Secondary Barrier at the beginning of each work shift. Install only sufficient plastic for work of that shift.
2. Remove Secondary Barrier at end of each work shift or as work in an area is completed. Fold plastic toward center of sheet and pack in disposal bags. Keep material on sheet continuously wet until bagged.
3. Install Walkways of black 6 mil (0.15 mm) plastic between active removal areas and decontamination units to protect Primary Layer from tracked material. Install walkways at the beginning of, and remove at the end of, each work shift.

### 3.2 PRE-COMMENCEMENT INSPECTION:

- A. Each work area shall be prepared for abatement by isolating the area from the balance of the building, establishing a negative pressure enclosure, complete with decontamination units, temporary electrical and water connections and other temporary facilities as specified in each of the other sections of this specification.
- B. Upon completion of preparation, Contractor shall request the AST to perform an inspection of the work area to verify that all isolation and engineering controls are in place and functioning as specified.
- C. Repair, install or otherwise correct any deficiencies noted during the inspection and obtain written notification from the AST that the area has been found acceptable for abatement.

### 3.3 WORKER PROTECTION:

- A. Before beginning work with any material for which a Material Safety Data Sheet has been submitted provide workers with the required protective equipment. Require that appropriate protective equipment be used at all times.

### 3.4 WET REMOVAL:

- A. Thoroughly wet to satisfaction of Designer ACM to be removed prior to stripping and/or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for amended water or removal encapsulant to penetrate material thoroughly. If amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions. Perforate outer covering of any installation which has been painted and/or jacketed in order to allow penetration of amended water or removal encapsulant, or use injection equipment to wet material under the covering. Where necessary, carefully strip away while simultaneously spraying amended water or removal encapsulant on the installation to minimize dispersal of asbestos fibers into the air.
  1. Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.
  2. Remove saturated ACM in small sections from all areas. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Twist neck of bags, bend over and seal with minimum three wraps of duct tape. Clean outside and move to Wash Down Station adjacent to Material Decontamination Unit.
  3. Evacuate air from disposal bags with a HEPA filtered vacuum cleaner before sealing.

- B. Fireproofing or Architectural Finish on Scratch Coat: Spray asbestos-containing fireproofing or architectural acoustic finish with a fine mist of amended water or removal encapsulant. Allow time for amended water or removal encapsulant to saturate materials to substrate. Do not over-saturate to cause excess dripping. Scrape materials from substrate. Remove materials in manageable quantities and control the descent to staging or floor below, if over 20 feet (6000 mm) use drop chute to contain material during descent. If using amended water, spray mist surface continuously during work process. If using removal encapsulant follow manufacturer's written instructions. Remove residue remaining on scratch coat after scraping using stiff nylon bristled hand brush. Use high pressure washer only with written authorization of Designer. If a removal encapsulant is used remove residue completely before encapsulant dries. If substrate dries before complete removal of residue re-wet with amended water or removal encapsulant.
- C. Fireproofing or Architectural Finish on Wire Lath: Spray asbestos-containing fireproofing or architectural acoustic finish with a fine mist of amended water or removal encapsulant. Allow time for amended water or removal encapsulant to saturate material completely. Do not over-saturate to cause excess dripping. If surface of material has been painted or otherwise coated cut small holes as required and apply amended water or removal encapsulant from above. Cut wire lath into manageable sections and cut hanger wires. Roll or fold up complete with ACM and hand place in container. Do not drop on floor. After removal of lath and ACM remove any overspray on decking and structure above using stiff nylon bristled brush. Use high pressure washer only with written authorization from Designer. Use one of the following methods for containing waste.
1. Deposit material in corrugated paperboard box. When box is full duct tape closed and place in disposal bag.
  2. Wrap material in felt and place in fiberboard drum lined with two disposal bags. Use caution to insure that all edges of wire lath that could cut plastic are covered with felt.
  3. Place material directly in a steel drum. Seal drums when full with leak tight seal. Drum is to be leak tight in any orientation.
- D. Pipe Insulation: Spray with a mist of amended water or removal encapsulant. Allow amended water or removal encapsulant to saturate material to substrate. If a removal encapsulant is used, use in strict accordance with manufacturer's instructions. Cut bands holding preformed pipe insulation, slit jackets at seams, remove and hand-place in a disposal bag. Remove job-molded fitting insulation in chunks and hand place in a disposal bag. Do not drop to floor. Remove any residue on pipe or fitting with stiff bristle nylon hand brush. In locations where pipe fitting insulation is removed from pipe with straight runs insulated with fibrous glass or other non-asbestos-containing fibrous material, remove fibrous material 6" (150 mm) from the point where it contacts the asbestos-containing insulation.
- E. Vinyl Floor Tile & Mastic: Spray with a mist of amended water or removal encapsulant. Allow amended water or removal encapsulant to saturate material to substrate. If a removal encapsulant is used, use in strict accordance with manufacturer's instructions. Remove floor tile by mechanical means utilizing hand scrapers. Remove floor tile adhesive mastic by mechanical means (scraping and bead blaster machinery) and/or low odor chemical solvents. All visible residue of the mastic shall be removed. Utilize hand razor scrapers, if necessary, to access the work area edges or other hard to reach areas. Petroleum staining and traces of mastic embedded in concrete pores will not be acceptable.

### 3.5 LOCALIZED CONTROL OF MATERIAL RELEASE:

- A. Pipe Insulation: HEPA vacuum surface of pipe insulation. Cut bands holding preformed pipe insulation, slit jackets at seams while holding HEPA vacuum under cut, remove and hand-place in a disposal bag. Remove job-molded fitting insulation in chunks, using nozzle of HEPA vacuum to collect debris generated, and hand-place in a disposal bag. Do not drop to floor. Remove any residue on pipe or fitting with wire brush. Brushing toward the nozzle of a HEPA vacuum. In locations where pipe fitting insulation is

removed from pipe with straight runs insulated with fibrous glass or other non-asbestos-containing fibrous material, remove fibrous material 6 inches (150 mm) from the point where it contacts the asbestos-containing insulation. Use a two worker crew for work, with one worker removing material and one worker holding the nozzle of a HEPA vacuum in the location of disturbance.

- B. Material sprayed on wire lath: Hold the nozzle from an operating HEPA filtered vacuum cleaner in the immediate vicinity of and below the work while cutting the wire lath or otherwise disturbing the ACM. Use a two-worker crew for cutting, with one worker cutting and one worker holding the HEPA vacuum nozzle.

### 3.6 SURGICAL REMOVAL METHODS

- A. Removal by these procedures shall be limited to a maximum of a six (6) inch wide strip of material running the length and/or height of the separation barrier and is allowed only to facilitate the erection of the separation barrier. Surgical removal activities shall not be permitted until all full isolation and engineering controls including, but not limited to, Occupancy Separation Barriers, critical barriers, wall, ceiling and floor polyethylene, AFD units, decontamination unit, temporary electrical, lighting and water are in place and functioning as specified and inspected by the AST.
  - 1. Remove the first row or two of ceiling tiles along the entire running length of the separation barrier to be installed to allow complete access for removal of the asbestos containing fireproofing from the structural deck and/or beams. The interior field of ceiling tiles shall remain in place throughout these procedures.
  - 2. Remove asbestos containing fireproofing material utilizing either wet removal methods as outlined in Section 3.4 of this section or the suction from a HEPA filter equipped vacuum to remove the asbestos material directly from the structural deck and/or beams.
  - 3. Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.
  - 4. Remove saturated ACM in small sections from all areas. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Twist neck of bags, bend over and seal with minimum three wraps of duct tape. Clean outside and move to Wash Down Station adjacent to Material Decontamination Unit.
  - 5. Evacuate air from disposal bags with a HEPA filtered vacuum cleaner before sealing.
  - 6. Asbestos-containing material shall be disposed of as specified in Section 02084.

### 3.7 LOCK-DOWN ENCAPSULATION

- A. Upon completion of removal and cleaning of surfaces, have surfaces visually inspected by the AST. When surfaces have passed the visual inspection, they shall be sprayed with an approved lock-down encapsulant.

### 3.8 LOCAL VENTILATION AND COLLECTION SYSTEM:

- A. If necessary in order to meet work area fiber level specified in Section 01410 provide local ventilation and collection systems as described below for each area where ACM is being removed or otherwise disturbed:
  - 1. Provide HEPA filtered fan units in addition to those required by section 01513, in the vicinity of the work. Arrange so that the units exhaust into the Work Area oriented in a direction away from the work. Extend a 12 inch (300 mm) diameter flexible non-collapsing duct from the intake end to a point no more than 4 feet (1200 mm) from any scraping or wire brushing activity.

2. Locate intake of duct so that air flow is horizontally and slightly downward into intake. Replace primary filters on HEPA filtered fan units at an interval of no greater than 30 minutes. Allow no more than one scraping or wire brushing activity per fan unit.
3. Attach a job-built 4 feet X 4 feet (1200 mm x 1200 mm) flared end piece on intake end of duct. Support end piece horizontally at a point 4 feet (1200 mm) below the work, so that airflow is directed downward into intake.

### 3.9 AIRBORNE FIBER COUNTS

- A. Use work procedures that result in an 8-hour Time Weighted Average (TWA) airborne fiber count less than that indicated in Section 01410.
- B. If airborne fiber counts exceed this level immediately mist the area with amended water to lower fiber counts and revise work procedures to maintain airborne fiber levels within the required limit.

END OF SECTION – 02081

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**SECTION 02084 - DISPOSAL OF REGULATED ASBESTOS-CONTAINING MATERIAL**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Worker protection requirements are set forth in Sections 01560 Worker Protection - Asbestos abatement
- B. Section 01098 Codes, Regulations and Standards - Asbestos Abatement describes applicable federal, state and local regulations.

1.3 DESCRIPTION OF THE WORK:

- A. This section describes the disposal of Regulated Asbestos-Containing Materials (RACM). Disposal includes packaging of Regulated Asbestos-Containing Materials. Disposal may be accomplished either by land filling or converting Regulated Asbestos Containing Materials to non-Asbestos waste.

1.4 SUBMITTALS:

- A. Before Start of Work: Submit the following to the Designer for review. Do not start work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use.
  - 1. Copy of state or local license for waste hauler.
  - 2. Name and address of landfill where Regulated Asbestos Containing Materials are to be buried. Include contact person and telephone number.
  - 3. Name and address of processor where Regulated Asbestos-Containing Materials are to be processed into non-asbestos waste. Include contact person and telephone number. Also provide the following information about the process and operation used by the processor:
    - a. Results of start-up performance testing and performance testing for last 90 days including operating parameters, feed characteristics, and analysis of output materials.
    - b. Results of composite analysis required during initial 90 days of operation and results of composite analysis of monthly product composite samples for last 90 days.
    - c. Results of continuous monitoring and logs of process operating parameters for the initial 90 days and last 90 days of operation.
    - d. A description of any deviation from the operating parameters established during performance testing, the duration of the deviation, and steps taken to correct the deviation.
    - e. Product data on process to be used.
  - 4. Chain of Custody form and form of waste manifest proposed.



5. Sample of disposal bag and any added labels to be used.
- B. On a weekly basis submit copies of all manifests and disposal site receipts to Designer.
- C. Waste Shipment Record: Maintain a waste shipment record as required by the NESHAP regulation which indicates the waste generator, transporter, and disposal site, and which describes the nature, size, type of container, and form of asbestos waste. Submit to Designer within 35 days of departure from building.

PART 2 - PRODUCTS:

2.1 MATERIALS

- A. Disposal Bags: Provide 6 mil (0.15 mm) thick leak-tight polyethylene bags labeled with three labels with text as follows:

1. First Label: Provide in accordance with 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard:

DANGER  
CONTAINS ASBESTOS FIBERS  
AVOID CREATING DUST  
CANCER AND LUNG DISEASE HAZARD  
BREATHING AIRBORNE FIBERS IS  
HAZARDOUS TO YOUR HEALTH

2. Second Label: Provide in accordance with U. S. Department of Transportation regulation on hazardous waste marking. 49 CFR parts 171 and 172. Hazardous Substances

RQ-ASBESTOS WASTE  
CLASS 9  
NA2212-PG III

3. Third Label: Provide the name of the waste generator (Owner's name), the location from which the waste was generated and the names and addresses of the contractor and transporter. This label must be durable, able to repel dirt and moisture (e.g., permanent marker). Label must be placed directly on disposal bag(s) in a legible format.
- B. Burlap bags, nylon-reinforced bags or cardboard boxes: Provide labels in accordance with paragraph 2.1, A, 1-3 of this section.
- C. Fiberboard drums or 6-mil (0.15 mm) polyethylene sheeting: Provide labels in accordance with paragraph 2.1, A, 1-3 of this section.

PART 3 - EXECUTION

3.1 SEQUENCE

- A. Comply with the following sections during all phases of this work:
  1. Section 01560 Worker Protection - Asbestos Abatement
  2. Section 01562 Respiratory Protection

3.2 GENERAL:

- A. All waste is to be hauled by a waste hauler with all required licenses from all state and local authority with jurisdiction.
- B. Liquid waste: Mix all liquid asbestos-containing waste or asbestos contaminated waste with a bladeable material so that it forms a bladeable (non-liquid) form, and have the concurrence of the landfill operator prior to disposal.
- C. Load all adequately wetted Regulated Asbestos-Containing Material in disposal bags or leak-tight containers. All materials are to be contained in one of the following
  - 1. Two (2) 6 mil (0.15 mm) disposal bags or;
  - 2. Two 6 mil (0.15 mm) disposal bags and a fiberboard drum or;
  - 3. Wrapped with two (2) layers of 6 mil (0.15 mm) polyethylene.
- D. Protect interior of truck or dumpster with Critical and Primary Barriers as described in Section 01526 Temporary Enclosures.
- E. Carefully load containerized waste in fully enclosed dumpsters, trucks or other appropriate vehicles for transport. Exercise care before and during transport, to insure that no unauthorized persons have access to the material.
- F. Warning Signs: During loading and unloading mark dumpsters, receptacles and vehicles with a sign complying with requirements of the EPA NESHAP regulation (40 CFR Part 61), in a manner and location that a person can read the following legend:

DANGER  
ASBESTOS DUST HAZARD  
CANCER AND LUNG DISEASE HAZARD  
Authorized Personnel Only
- G. Do not store containerized materials outside of the Work Area. Take containers from the Work Area directly to a sealed truck or lockable dumpster. ***When transporting bagged material through building, it must be done in enclosed utility type carts with lids.***
- H. Do not transport disposal-bagged materials on open trucks. Label drums with same warning labels as bags. Uncontaminated drums may be reused. Treat drums that have been contaminated as Regulated Asbestos-Containing Material and dispose of in accordance with this specification.
- I. Advise the landfill operator or processor, at least ten days in advance of transport, of the quantity of material to be delivered.
- J. At disposal site unload containerized waste:
  - 1. At a disposal site, sealed plastic bags may be carefully unloaded from the truck. If bags are broken or damaged, return to work site for rebagging. Clean entire truck and contents using procedures set forth in section 01711 Project Decontamination.

- 2. At a processing site truck and loading dock are arranged as a controlled work area and containerized waste is transferred to storage area by site personnel. All bags including broken ones will be transferred. Clean truck, using procedures set forth in section 01711 Project Decontamination.
- K. Retain receipts from landfill or processor for materials disposed of.
- L. At completion of hauling and disposal of each load submit copy of waste manifest, chain of custody form, and landfill receipt to Designer.

END OF SECTION - 02084

**SECTION 02085 - RESILIENT FLOORING REMOVAL - RESILIENT FLOOR COVERING  
MANUFACTURERS' RECOMMENDED WORK PRACTICES:**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Work described by this section relates to work practices as currently set forth in "Recommended Work Practices for the Removal of Resilient Floor Coverings", revised August, 1995, published by:
  - 1. Resilient Floor Covering Institute  
966 Hungerford Drive  
Suite 12-B  
Rockville, MD 20850
  - 2. Armstrong World Industries, Inc.  
P.O. Box 3001  
Lancaster, PA 17604

1.2 SUMMARY

- A. This Section includes work practices for removal of resilient floor covering materials which are intact, and are likely to remain intact during the removal, and can be removed under a negative exposure assessment in compliance with the OSHA standard by appropriately trained workers using the Recommended Work Practices.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 2 Section 02084 "Disposal of Regulated Asbestos-Containing Material" for disposal of friable asbestos-containing waste. Note, that resilient floor covering is defined by the EPA NESHAP regulation as Category 1 non-friable ACM and as such is not covered by Section 02084. Resilient floor covering materials should be disposed of in accordance with any applicable state and local regulations.

1.3 DEFINITIONS

- A. Compliant Work Practices: Work practices for the removal of flooring material which OSHA has determined will consistently result in exposures below the TWA and excursion limit established by 29 CFR 1926.1101. Recommended Work Practices described in this Section have been recognized by OSHA as Compliant Work Practices.
- B. Recommended Work Practices: "Recommended Work Practices for the Removal of Resilient Floor Coverings," revised August, 1995, published by the Resilient Floor Covering Institute (RFCI) and Armstrong World Industries, Inc.
- C. Friable: Material that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.
- D. Intact: means that ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix. The incidental breakage of flooring materials, or slicing of sheet vinyl floor covering with a sharp edged instrument, during removal operations conducted in

accordance with the Recommended Work Practices does not mean that the materials are not removed in intact conditions. Intact resilient floor covering materials will be rendered friable if subjected to sanding, sawing or other aggressive operations.

- E. Competent Person: An individual with the training and experience required by OSHA for a Competent Person involved in removal of intact flooring material using compliant work practices (12 hours of training). The competent person will supervise the work of this section, and is responsible for the health and safety of workers at the flooring material removal job site. The competent person must have authority to stop work, and take corrective action.
- F. Initial Exposure Assessment: An inspection made by a Competent Person of the job site prior to the start of removal operations for the purpose of determining if the requirements of a negative exposure assessment are met.
- G. Negative Exposure Assessment: Based on data in the rulemaking record, OSHA has determined that worker exposures will consistently be below the TWA and excursion limit during removal of intact flooring material when compliant work practices are used. As such, a Competent Person may make a negative exposure assessment when:
  - 1. Recommended Work Practices will be used.
  - 2. Workers are properly trained.
  - 3. The resilient flooring is intact and is likely to remain intact throughout the removal process.

#### 1.4 WORKER PROTECTION

- A. Worker Training: Workers using the Recommended Work Practices for the intact removal of resilient floor covering materials must have completed an 8-hour training program as required by the OSHA regulation 29 CFR 1926.1101(k) and the Compliance Directive CPL 2-2.63 Appendix D, covering asbestos subjects as well as training in the Recommended Work Practices. Workers with this amount of training only are not permitted to continue working if the material becomes non-intact.
- B. Competent Person: Engage a person experienced in the use of the Recommended Work Practices who has completed an 8-hour worker training program and additional 4 hours of training as required by the OSHA regulation 29 CFR 1926.1101(k) and the Compliance Directive CPL 2-2.63 Appendix D, for a Competent Person involved in removal of intact flooring material using compliant work practices. Competent Persons with this amount of training only are not permitted to continue working if the material becomes non-intact.
- C. State and Local Requirements: All workers are to be trained, certified and accredited as required by state or local regulation.
- D. Medical Surveillance: Workers who engage in the removal of asbestos-containing flooring materials for more than 30 days per year (one hour or more per day) must receive medical surveillance. This requires a medical examination within 10 working days following the 30th day of exposure.
- E. Prohibitions in work area: Require that workers NOT eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the Work Area.
- F. Certificate of Worker Acknowledgment: Have each worker who is at the job site or who will enter the work area, fill out and sign a copy of the Certificate of Worker's Acknowledgment found at the end of this section.

#### 1.5 QUALITY ASSURANCE

- A. Notifications: Before the start of Work notify the following of the presence and location of ACM and of the planned removal activity:
  - 1. Employees performing the work.
  - 2. Employers of employees working in the area (not separated from the work area by either a wall, closed door or window or other impermeable barrier).
  - 3. The building owner.
  
- B. Regulatory Compliance: Comply with provisions of the following:
  - 1. OSHA Construction Standard for Asbestos 29 CFR 1926.1101
  - 2. OSHA Compliance Directive CPL 2-2.63 November 3, 1995, Inspection Procedures for Occupational Exposures to Asbestos Final Rule 29 CFR Parts 1910.1001, 1926.1101, and 1915.1001. .
  - 3. OSHA 29 CFR 1926.2 through 35
  - 4. AHERA Regulation 40 CFR 763 Sub-Part E
  - 5. Applicable state and local regulations.
  
- C. Non-Intact Material: If the resilient flooring materials become non-intact during the work, stop work until the job can be evaluated by a competent person. Do not resume work until:
  - 1. The job can be evaluated and supervised by a competent person who has completed a training course meeting the criteria of EPA's Model Accreditation Plan for supervisors, and
  - 2. The work will be carried out by workers who have completed training meeting the criteria of the EPA's Model Accreditation Plan for asbestos abatement workers.
  - 3. The work will be carried out in accordance with worker and area protection specified in Section 02087.

#### 1.6 SUBMITTALS

- A. Negative Exposure Assessment: Before starting any work submit a Negative Exposure Assessment certified by a Competent Person to the Owner. If a Negative Exposure Assessment cannot be made, report the reasons and any corrective action that would result in a Negative Exposure Assessment. The certification must be signed and dated by a Competent Person and be based on an Initial Assessment of the work of this contract. A copy of the negative exposure assessment should be retained by the employer of the Competent Person. The certification must include:
  - 1. The name and signature of the Competent Person making the Assessment.
  - 2. Certification that the Competent Person has been trained as required by OSHA for work on intact resilient flooring.
  - 3. A description of the work including:
    - a. Name and address of facility where the work is to occur.
    - b. Description of location within the facility where work is to occur.

4. Certification that:
  - a. Recommended Work Practices will be used.
  - b. Workers will be properly trained as required by OSHA for work on intact resilient flooring.
  - c. The resilient flooring is intact and is likely to remain intact throughout the removal process.
5. Complete and submit to the Owner the job form from Using Compliant Work Practices to Remove Resilient Floor Covering published by the Resilient Floor Covering Institute (RFCI) and Armstrong World Industries, Inc. This form is to be signed by a Competent Person. Retain a copy of the form.
6. Certificate of Worker Acknowledgment: Submit an original signed copy of the Certificate of Worker's Acknowledgment found at the end of this section, for each worker who is to be at the job site or who will enter the work area.

PART 2 - PRODUCTS:

2.1 MATERIALS

- A. Wetting Materials: For wetting prior to disturbance of asbestos-containing sheet flooring or asphaltic adhesive, use liquid dishwashing detergent that contains anionic, nonionic, and amphoteric surfactants.
- B. Waste Bag: Large size heavy-duty impermeable trash bag made from 6 mil (0.15 mm) thick polyethylene. Identify with a label stating "DANGER, CONTAINS ASBESTOS FIBERS, AVOID CREATING DUST, CANCER AND LUNG DISEASE HAZARD."
- C. Waste Container: Closed leak-tight container. Identify with a label stating "DANGER, CONTAINS ASBESTOS FIBERS, AVOID CREATING DUST, CANCER AND LUNG DISEASE HAZARD."
- D. Scrapers: Broad stiff-bladed wall or floor scrapers. Heavy-duty short or long handled scraper.
- E. Cutting Sand: No. 1 sandblasting sand (clean, sharp, coarse cutting sand).
- F. Terrazzo Floor Machine: Terrazzo or low-speed floor machine fitted with a floor plate attachment (similar to Clark Assembly 500202-6).
- G. Removal Solution: Solution used to remove adhesive residue. e.g. Mop on, mop off, no machine scrub - wax stripping solution.
- H. Floor Pad: Black floor scrubbing pad.
- I. HEPA Filter Vacuum Cleaners: Use wet/dry tank-type vacuum cleaner equipped with a filter and metal floor attachment (no brush).
- J. Thermal Equipment with Automatic Control:
  1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
    - a. Enviromethods, Inc. "Delta T" series  
P.O. Box 6151  
Wolcott, CT 06716  
203-879-5527
    - b. UAS Automation Systems, Inc. "ATR" (Automated Tile Removal) series  
4524 Parkway Commerce Blvd.  
Orlando, FL 32808

407-294-8551 or 800-969-8837

- K. Miscellaneous Equipment: Provide as needed the following equipment: utility or hook knife, ground fault circuit interrupter, hand sprayer, hammer or mallet, commercial-type, hand-held, hot-air gun or radiant heat source, hand-held rubbing stones, slip resistant shoes or boots, chisel, heavy gloves, duct tape, safety glasses.
- L. Use a Ground Fault Circuit Interrupter (GFCI) for any electrical connections in a wet environment.

### PART 3 - EXECUTION

#### 3.1 GENERAL:

- A. Assume an asbestos content: Unless indicated in the contract documents that a flooring material is a non-asbestos product, assume it contains asbestos and treat it in the manner prescribed by the following procedures which are based on the "Recommended Work Practices for the Removal of Resilient Floor Coverings," published by the Resilient Floor Covering Institute and Armstrong World Industries. Do not sand, dry sweep, dry scrape, drill, saw, beadblast, or mechanically chip or pulverize existing resilient flooring, backing, lining, felt or asphaltic adhesives.
- B. Before beginning removal of any resilient flooring materials complete the following

- 2. Negative Exposure Assessment: Before starting any work require that a Competent Person make an Initial Exposure Assessment of the resilient flooring to be removed. Begin work only if the Competent Person makes a Negative Exposure Assessment. Based on data in the rulemaking record, OSHA has determined that worker exposures will consistently be below the TWA and excursion limit during removal of intact flooring material when compliant work practices are used. As such, a Competent Person may make a negative exposure assessment when:
  - a. Recommended Work Practices will be used.
  - b. Workers are properly trained.
  - c. The resilient flooring is intact and is likely to remain intact throughout the removal process.

If a Negative Exposure Assessment cannot be made, report the reasons and any corrective action that would result in a Negative Exposure Assessment.

- 3. Notifications: Before the start of Work notify the following of the presence and location of ACM and of the planned removal activity:
  - a. Employees performing the work.
  - b. Employers of employees working in the area (not separated from the work area by either a wall, closed door or window or other impermeable barrier).
  - c. The building owner.
- 4. Demarcation: The work area must be demarcated or access must be limited to workers performing the removal. Post warning signs that read:

DANGER  
ASBESTOS  
CANCER AND LUNG DISEASE HAZARD  
AUTHORIZED PERSONNEL ONLY

- 5. Preparation: Prior to beginning the removal of resilient floor covering complete the following:



- a. Remove appliances and furniture from the work area.
  - b. Remove binding strips or other restrictive molding from doorways, walls, etc.
  - c. Mix a detergent solution (16 ounces (0.473 liters) of liquid dishwashing detergent to 1 gallon (3.79 liters) of water) and pour into a garden sprayer.
  - d. Clean the entire floor using a wet/dry vacuum cleaner equipped with a HEPA filtration system with disposable bag and metal floor attachment (no brush). Do not dry sweep; do not create dust.
  - e. Precaution: Resilient flooring becomes slippery when wet with a detergent solution. Use caution to contain the solution in the immediate work area. Stand on a sheet of plywood or non-slip surface while working on wet surfaces.
  - f. After vacuuming, used HEPA filters and cleaner bags should be removed according to manufacturer's instructions and place in a waste bag or waste container.
- C. Disposal of materials: Dispose of friable materials in accordance with Section 02084 Disposal of Regulated Asbestos Containing Materials. Dispose of Category I non-friable waste in accordance with State and Local Regulations.

### 3.2 REMOVAL OF PERIPHERALLY-ADHERED RESILIENT SHEET VINYL FLOORING:

- A. Use the following procedures to remove adhered portions of the sheet vinyl floor covering:
1. The manufacturers recommend that two workers be utilized to perform sheet flooring removal. The Contractor should consider the particular circumstances of the project and determine the advisability of requiring a minimum of two workers as a quality assurance measure.
  2. Make a slice with a sharp knife into the adhered floor covering 4 to 8 inches (102 to 203 mm) wide, parallel with the walls, around the perimeter of the room.
  3. Starting on either side of the entrance door, pry up the corner of the first strip, separating the backing layer. As the strip is being removed, spray a constant mist of the detergent solution into the delamination nip point to minimize any airborne dust particles. When done properly, any felt remaining on the floor and on the back of the strip will be thoroughly wet. Peel the strip either by pulling upward at an angle that permits the best separation or by rolling around a core.
  4. Roll the strip tightly as it is removed. Tie or tape securely and immediately place in a waste bag or waste container for disposal.
  5. Remove all of the exposed residual felt by wet scraping, using the procedures under, "Wet Scraping Residual Felt," in this section, before proceeding with removal of the unadhered portion of the floor covering. Residual felt must be removed by wet scraping. Do not sand or dry scrape in any way. Do not dry sweep. Avoid creating dust.
  6. Remove additional strips, following the above procedure, as necessary to expose unadhered subfloor area.
  7. Continue around the room completely removing the adhered flooring along the perimeter, one strip at a time following the procedures above. Do not remove the flooring at the entrance doorway until all other flooring has been completely removed.
  8. Vacuum up any residue of wet felt scrapings immediately with a wet/dry vacuum equipped with a HEPA filter and metal floor attachment (no brush).
  9. After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturers' instructions and placed in a waste bag or waste container.

10. Remove the unadhered flooring as detailed in the article in this Section on Removal of Unadhered Resilient Floor Covering.

B. Disposal of materials: Dispose of friable materials in accordance with Section 02084 Disposal of Regulated Asbestos Containing Materials. Dispose of Category I non-friable waste in accordance with State and Local Regulations.

### 3.3 REMOVAL OF UNADHERED RESILIENT FLOOR COVERING:

A. Use the following procedure to remove loose laid or the unadhered portion of peripherally adhered sheet resilient floor covering:

1. The manufacturer's recommend that two workers be utilized to perform sheet flooring removal. The Contractor should consider the particular circumstances of the project and determine the advisability of requiring a minimum of two workers as a quality assurance measure.

2. Start at the end of the room farthest from the entrance doorway and slice a strip 18 inches (0.46m) wide in the unadhered flooring.

3. Remove the sliced strips while spraying the detergent solution into the separation nip point. Do not stand or kneel on the exposed subfloor during the removal process.

4. Roll the wet strip tightly and tie or tape to secure. Continue working toward the doorway, slicing each strip and removing it while spraying the separation nip point with the detergent solution. Place the strips while still wet into a waste bag or waste container.

5. After removing three strips of flooring, vacuum the exposed floor using a wet/dry vacuum equipped with a HEPA filter with metal floor attachment (no brush).

6. Seams and other adhered areas should be removed as they are encountered. Strip the wear surface while spraying the detergent solution into the delamination nip point. Wet scrape the residual felt as described under, "Wet Scraping Residual Felt" in this section.

7. Continue removing flooring, doing only one three-strip area at a time, until the entire floor has been completely removed.

8. When the whole floor has been completely removed, let it dry. Vacuum up any dust using a vacuum with a HEPA filtration system and a metal floor attachment (no brush). Stand only in vacuumed areas as work proceeds across the floor. Position the vacuum cleaner so that discharge air does not blow on the floor being cleaned. Do not dry sweep. Avoid creating dust.

9. After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturers' instructions and placed in a waste bag or waste container.

10. When floor is dry, install new resilient floor covering following manufacturer's installation recommendations.

B. Disposal of materials: Dispose of friable materials in accordance with Section 02084 Disposal of Regulated Asbestos Containing Materials. Dispose of Category I non-friable waste in accordance with State and Local Regulations.

3.4 REMOVAL OF ADHERED RESILIENT SHEET VINYL FLOORING:

- A. Use the following procedure to completely remove adhered resilient sheet flooring.
1. The manufacturer's recommend that two workers be utilized to perform sheet flooring removal. The Contractor should consider the particular circumstances of the project and determine the advisability of requiring a minimum of two workers as a quality assurance measure.
  2. Make a series of parallel slices, with a knife, 4 to 8 inches (102 to 203 mm) apart parallel to a wall.
  3. Start at the end of the room farthest from the entrance door. Pry up the corner of the first strip, separating the backing layer. As the strip is being removed, spray a constant mist of the detergent solution into the delamination nip point to minimize any airborne dust particles. When done properly, any felt remaining on the floor and on the back of the strip will be thoroughly wet. Peel the strip either by pulling upward at an angle that permits the best separation or by rolling around a core.
  4. Roll the strip tightly as it is removed. Tie or tape securely and immediately place in a waste bag or waste container for disposal.
  5. If parts of the foam inner-layer remain stuck to the backing, attempt to eliminate this condition by pulling the strips loose from the opposite end. Peel the foam inner-layer from the floor while spraying the detergent solution into the delamination nip point.
  6. Some resilient flooring is not readily strippable by hand. When these conditions are encountered, a sharp stiff blade scraper may be used to assist cleavage of the wear layer from felt. If this procedure is used the distance between slices must be narrowed to a width of 3 to 5 inches (76 to 127 mm).
  7. Regardless of whether stripping of the wear surface is accomplished by hand peeling alone or with the assistance of a stiff blade scraper, detergent solution must be sprayed into the delamination nip point to minimize any airborne dust particles.
  8. After removing three strips of the wear surface, remove the remaining residual felt by wet scraping using the procedures "Wet Scraping Residual Felt," in this section. During the stripping process, do not stand or walk on the exposed felt.
  9. After removing the three strips of flooring and residual felt vacuum the exposed floor using a wet/dry vacuum equipped with a HEPA filter and metal floor attachment (no brush).
  10. Repeat the operation (wetting the delamination nip point while removing the next three strips, then wet scrape the residual felt, then vacuum the exposed floor). Do only one three-strip area at a time until the entire floor has been completely removed.
  11. Place all flooring strips and felt scrapings immediately while wet into waste bags or waste containers. Close full bags and containers tightly and seal securely for disposal.
  12. Do not dry sweep. Avoid creating dust.
  13. When all floor covering has been completely removed, let the floor dry. Vacuum up any dirt using a vacuum with a HEPA filtration system and a metal floor attachment (no brush). Stand only in the

vacuumed area as the work proceeds across the floor. Position the vacuum cleaner so the discharge air does not blow on the floor being cleaned.

14. After vacuuming, used HEPA filters and cleaner bags should be removed according to manufacturer's instructions and place in a waste bag or waste container.
  15. When the floor is dry, it is ready to have a new resilient floor covering installed. Follow the floor covering manufacturer's instructions.
- B. Disposal of materials: Dispose of friable materials in accordance with Section 02084 Disposal of Regulated Asbestos Containing Materials. Dispose of Category I non-friable waste in accordance with State and Local Regulations.

### 3.5 WET SCRAPING RESIDUAL FELT:

- A. Remove any residual felt remaining on the floor after removal of the wear layer of adhered vinyl sheet flooring by using the following procedure:
1. Thoroughly wet residual felt with detergent solution. Avoid excessive wetting or standing water. Wait a few minutes to allow solution to soak into felt.
  2. Stand on the remaining floor covering (not the felt) and use a stiff-bladed scraper or a floor scraper with a replaceable blade to remove the wet felt.
  3. Re-wet the felt if the solution has not completely penetrated, if drying occurs or if dry felt is exposed during scraping. Scrape all felt from each three-strip area before proceeding further. Pick up the scrapings as they are removed from the floor and place in a waste bag or waste container.
  4. Wet residual felt as above but do not excessively soak or flood wood floors with detergent solution. Excessive water can damage wood floors to the extent that new underlayment could be required. A floor that has been wet scraped must be allowed to dry thoroughly before new resilient flooring is installed.
  5. As removal progresses, vacuum the area using a vacuum cleaner equipped with a HEPA filter and metal floor attachment (no brush).
  6. After removal is complete and the entire floor has dried, vacuum using a HEPA vacuum with a metal floor attachment (no brush).
  7. After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a waste bag or waste container.
- B. Disposal of materials: Dispose of friable materials in accordance with Section 02084 Disposal of Regulated Asbestos Containing Materials. Dispose of Category I non-friable waste in accordance with State and Local Regulations.

### 3.6 REMOVAL OF RESILIENT TILE FLOOR COVERING:

- A. Use the following procedure to remove resilient tile floor covering:
1. Begin removal in an area that receives the minimum foot traffic.
  2. Floor tiles must be wetted (misted with a garden sprayer) before actual removal begins, unless heat will be used to remove tiles.

3. Start removal by carefully wedging a wall scraper in the seam of two adjoining tiles and gradually forcing the edge of one of the tiles up and away from the floor. Continue to force the balance of the tile up by working the scraper beneath the tile. Exert both a forward pressure and a twisting action on the blade to promote release of the tile from the adhesive and the floor.
  4. When the first tile is removed place it, without breaking it further into smaller pieces, in a waste bag or waste container.
  5. After the first tile is removed and accessibility to other tiles is improved, force the wall scraper under the exposed edge of another tile. Continue to exert a prying twisting force to the scraper as it is moved under the tile until the tile releases from the floor. Again, dispose of the tile, and succeeding tiles, by placing in a waste bag or waste container without additional breaking.
  6. Force the scraper through tightly-adhered areas by striking the scraper handle with a hammer using blows of moderate force while maintaining the scraper at a 25 to 30 degree angle to the floor. The resilient floor covering manufacturer's work practices recommend use of safety goggles during this work.
  7. Continue to wet (mist) the tiles throughout the procedure
  8. It should be the goal to remove individual tiles as a complete unit, although breakage of tiles is unavoidable.
  9. If the procedure above is inadequate to loosen tiles use heat to soften adhesive, or alternatively, without first prying up floor tiles using a scraper, thoroughly heat the tile(s) with a hot air gun or radiant heat source until the heat penetrates through the tile and softens the adhesive, and remove tiles by hand or by using a scraper. The resilient floor covering manufacturers work practices recommend that the hot air gun or radiant heat source, tiles and adhesive be carefully handled to avoid burns, and that heated tiles and adhesive be handled only with suitable glove protection for hands. Caution: Over-heating resilient tile might produce harmful vapors, and a respirator with organic cartridges might be needed.
  10. Deposit tiles in a waste bag or leak-tight container. Do not attempt to break tiles after they are in bag.
- B. Wet Scrape Residual Adhesive: As small areas of subfloor are cleared of tile, wet scrape residual asphaltic adhesive so that no ridges or puddles are evident and what remains is a thin, smooth film.
1. Start in the corner of the room farthest from the entrance door and moisten an area of the adhesive (approximately 3 by 10 feet) (0.91m by 3.05m) with water mixed with liquid dishwashing detergent (to aid in wetting the adhesive). Wet scrape with a stiff-bladed wall or floor scraper removing ridges and any loose adhesives.
  2. Place loosened adhesive residues into a waste bag or waste container
  3. Wet vacuum standing water with HEPA wet/dry vacuum.
  4. Continue the above steps until what remains of the residual asphaltic adhesive is a thin, smooth film.
- C. Wet Remove residue of adhesive from Concrete: Completely remove residue of adhesive left after removal of resilient floor tile using the following procedure:
1. Place cutting sand (enough to cover an area of approximately 6 by 6 foot (1.83 by 1.83 m) into a container, add water mixed with liquid detergent (1 ounce (30 ml) of liquid dishwashing detergent to

- 1 gallon (3.79 liters) of water) to dampen the sand (20 pounds (9.07 kg ) of sand to 2 gallon (1.89 liters) of solution).
  2. Place sand over a 6 by 6 foot (1.83 by 1.83 m) area and wet remove the existing adhesive residue using a terrazzo floor machine. Keep sand under rubbing stones when operating the machine. The sand and subfloor must be continuously kept wet.
  3. Occasionally push away cutting sand from the subfloor with a wall or floor scraper to check for complete removal.
  4. Remove adhesive around the edge of the room and missed areas with dampened, clean, sharp, cutting sand and a hand held rubbing stone.
  5. Wet-scrape sand into a pile using a stiff-bladed floor or wall scraper and place sand and adhesive residue in a waste bag or waste container.
  6. Rinse area with clear clean water using a hand sprayer. Workers boots should also be rinsed and cleaned.
  7. Wet-vacuum standing water with HEPA wet/dry vacuum with a metal floor attachment (no brush).
  8. Continue with the above steps until the entire room is complete.
  9. Allow subfloor to dry and vacuum up any remaining dirt or sand using a vacuum equipped with a HEPA filter and metal floor attachment (no brush).
  10. After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a waste bag or waste container.
  11. Wet-wipe and/or wash down all equipment used during the work.
- D. Wet Remove residue of adhesive from Concrete: Completely remove residue of adhesive left after removal of resilient floor tile using the following procedure:
1. Start in the corner of the room farthest from the entrance door. Put the removal solution onto the residual adhesive with a hand sprayer or mop over a 6' X 6' (1.82m X 1.82m) Put enough removal solution to ensure that the area is thoroughly wet. Allow the area to soak for 5-10 minutes. Remove the adhesive using a floor machine equipped with a black floor pad (or equivalent). The subfloor must be kept continuously wet.
  2. Occasionally push away the adhesive slurry from the subfloor with a wall or floor scraper to check for complete removal. Continue to use the floor machine, equipped with the black pad, in the same area until the concrete subfloor is cleaned to the desired degree.
  3. Remove adhesive around the edge of the room, from missed areas, and from areas difficult to reach with the machine with a hand held piece of the black floor pad using the above procedure.
  4. Wet HEPA vacuum the adhesive slurry. When the HEPA vacuum is full, place a commercially suitable water absorbent into the HEPA container until the adhesive slurry is absorbed. Place adhesive waste in a waste bag or waste container.
  5. Rinse area with clear clean water using a hand sprayer or mop. Worker's boots should also be rinsed and cleaned.
  6. Wet-vacuum standing water with HEPA wet/dry vacuum with a metal floor attachment (no brush).

7. Continue with the above steps until the entire room is complete.
  8. Allow subfloor to dry and vacuum using a vacuum equipped with a HEPA filter and metal floor attachment (no brush).
  9. After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a waste bag or waste container.
  10. Wet-wipe and/or wash down all equipment used during the work.
- E. Disposal of materials: Dispose of friable materials in accordance with Section 02084 Disposal of Regulated Asbestos Containing Materials. Dispose of Category I non-friable waste in accordance with State and Local Regulations.

### 3.7 REMOVAL OF THIN WOOD UNDERLAYMENT:

- A. Thin wood underlayment covered with existing sheet vinyl. Remove thin wood underlayment covered with existing sheet-vinyl-resilient flooring, with the flooring adhered. Use the following procedure:
1. Locate the joints of the underlayment panel farthest from the entrance door.
  2. Slice a strip of the flooring 4 to 8 inches (102 to 203 mm) wide centered over the underlayment joint in the panel being removed.
  3. Pry up the corner of the strip separating the backing layer. As the strip is being removed, spray a constant mist of the detergent solution into the delamination nip point to minimize any airborne dust particles. When done properly, any felt remaining on the floor and on the back of the strip will be thoroughly wet. Peel the strip either by pulling upward at an angle that permits the best separation or by rolling around a core.
  4. Roll the strip tightly as it is removed. Tie or tape securely and place in a waste bag or waste container for disposal.
  5. Remove all of the exposed residual felt by wet scraping using the procedures of, "Wet Scraping Residual Felt," in this section before proceeding.
  6. Drive a cold chisel using a hammer or mallet into the joint at a corner of the panel. Now use the chisel to pry the panel up far enough to insert a pry bar. Continue working around the panel, lifting all edges slowly. Use one or two pry bars to pry up the underlayment panel a little at a time until the panel is completely loose and can be removed. Attempt to remove the panel in one piece.
  7. If the panel breaks, slice the resilient flooring at the break and spray the detergent solution onto the exposed felt. Allow the solution to penetrate for a few minutes, then continue lifting the broken underlayment.
  8. Remove each underlayment panel or piece from the work areas as it is lifted. The resilient floor covering manufacturers work practices recommend that workers wear heavy gloves when handling removed panels, and be very careful of wood splinters and protruding fasteners. Flatten the fasteners with a hammer and stack the panels back to back on pallets or place in dumpster. Identify panels with a label stating, "DANGER, CONTAINS ASBESTOS FIBERS, AVOID CREATING DUST, CANCER AND LUNG DISEASE HAZARD." Dispose of in an approved landfill only.
  9. Place any small wood or flooring scrapes in a waste bag or waste container.

10. If the underlayment extends under cabinets or wall partitions, slice through the flooring with a knife as close to the vertical surface as possible, deeply scoring the panel.
  11. After each panel has been lifted and removed from the work area, pull up any remaining nails or fasteners in the subfloor.
  12. Continue removing each underlayment panel in sequence following the above procedures.
  13. When the underlayment / resilient flooring removal is complete, vacuum with a HEPA filter and metal floor Attachment (no brush).
  14. After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a waste bag or waste container.
- B. Removal of thin wood underlayment covered with existing tile. Remove the underlayment with the tile adhered using the following procedure:
1. Floor tiles must be wetted (misted with a garden sprayer) before actual removal begins, unless heat will be used to remove tiles.
  2. Starting at the doorway or a floor ventilation vent, locate a joint in an underlayment board.
  3. Start removal by carefully wedging a wall scraper in the seam of two adjoining tiles and gradually force the edge of one of the tiles up and away from the floor. Continue to force the balance of the tile up by working the scraper beneath the tile. Exert both a forward pressure and a twisting action on the blade to promote release of the tile from the adhesive and the floor.
  4. When the first tile is removed place it, without breaking it further into smaller pieces, in a waste bag or waste container.
  5. After the first tile is removed and accessibility to other tiles is improved, force the wall scraper under the exposed edge of another tile. Continue to exert a prying twisting force to the scraper as it is moved under the tile until the tile releases from the floor. Again, dispose of the tile, and succeeding tiles, by placing in a waste bag or waste container, without additional breaking.
  6. Force the scraper through tightly adhered areas by striking the scraper handle with a hammer using blows of moderate force while maintaining the scraper at a 25 to 30 degree angle to the floor. Use eye protectives and other protective equipment required for the work.
  7. Continue to wet (mist) the tiles throughout the procedure.
  8. It should be the goal to remove individual tiles as a complete unit, although breakage of tiles is unavoidable.
  9. If the procedure above is inadequate to loosen tiles use heat to soften adhesive. Thoroughly heat the tile(s) with a hot air gun or radiant heat source until the heat penetrates through the tile and softens the adhesive. The resilient floor covering manufacturers work practices recommend that the hot air gun or radiant heat source, tiles and adhesive be carefully handled to avoid burns, and that heated tiles and adhesive be handled only with suitable glove protection for hands.
  10. After all tiles have been removed from the underlayment joints, drive a chisel, using a hammer or a mallet, between the underlayment board and the subfloor. Use the chisel to pry up the underlayment



enough to insert a pry bar and remove the chisel. Slowly and carefully use pry bars to pry up the underlayment board a little at a time until the board is completely loose and can be removed.

11. Use caution to avoid breaking the underlayment board. The underlayment board should be removed in one piece. If the underlayment board breaks, heat and slice the tile at the break, then continue to remove broken underlayment.
  12. The Resilient floor covering manufacturers work practices recommend that workers wear heavy gloves and be careful of wood splinter and fasteners sticking out the back of the underlayment. Remove each underlayment board (or piece of board) from the work area as soon as it has been pried up to avoid injuries (such as stepping on a nail). Flatten with a hammer fasteners protruding from a removed board. Place removed underlayment boards on skids with the nails pointing downward. Wrap skid with 6 mil (0.15 mm) polyethylene sheet plastic and secure with duct tape. Label panels in the same manner as waste bags.
  13. After each board has been removed, pull out any nails or fasteners still in the subfloor. Dispose of these and any other nails or fasteners which have been removed but are still lying in the work area.
  14. After the first board has been removed a chisel is not needed to start removal of boards. Work pry board under the exposed edge of the next board.
  15. When removal of underlayment/existing tile floor is complete, thoroughly check the exposed subfloor. Re-nail loose areas and reset "popped" nails and fasteners.
  16. Vacuum up any dirt in the area using a vacuum cleaner equipped with a HEPA filter and metal floor attachment (no brush).
  17. After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a waste bag or waste container.
- C. Disposal of materials: Dispose of friable materials in accordance with Section 02084 Disposal of Regulated Asbestos Containing Materials. Dispose of Category I non-friable waste in accordance with State and Local Regulations.

END OF SECTION - 02085

**Northern Burlington County Regional High School**

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CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

PROJECT NAME \_\_\_\_\_ DATE \_\_\_\_\_

PROJECT ADDRESS \_\_\_\_\_

CONTRACTOR'S NAME \_\_\_\_\_

WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCER. IF YOU SMOKE AND INHALE ASBESTOS FIBERS THE CHANCE THAT YOU WILL DEVELOP LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.

Your employer's contract with the Owner for the above project requires that: You be trained in safe work practices and in the use of the equipment found on the job. If you do OSHA Class II work (such as removing asbestos-containing resilient flooring) you may be required to receive a medical examination. These things are to have been done at no cost to you.

TRAINING COURSE: You must have completed an 8-hour training course that covers asbestos subjects as well as use of the Manufacturer's Recommended Work Practices (Compliant Work Practices) for removing resilient flooring. This training is adequate for the removal of intact resilient flooring. If this is the only training you have had then you are not allowed to remove resilient flooring that is not intact, or has become non-intact (as defined by OSHA) during removal.

MEDICAL EXAMINATION: Removal of asbestos-containing resilient flooring is OSHA Class II work. If you perform OSHA Class I, II and III work (including removal of resilient flooring) for more than one hour per day (taking into account the entire time spent on the removal operation including cleanup) for 30 or more days per year, then a medical examination must be made available to you by your employer at no cost to you., within 10 working days following the thirtieth day of such work. This examination must include: health history, pulmonary function tests and may include an evaluation of a chest x-ray.

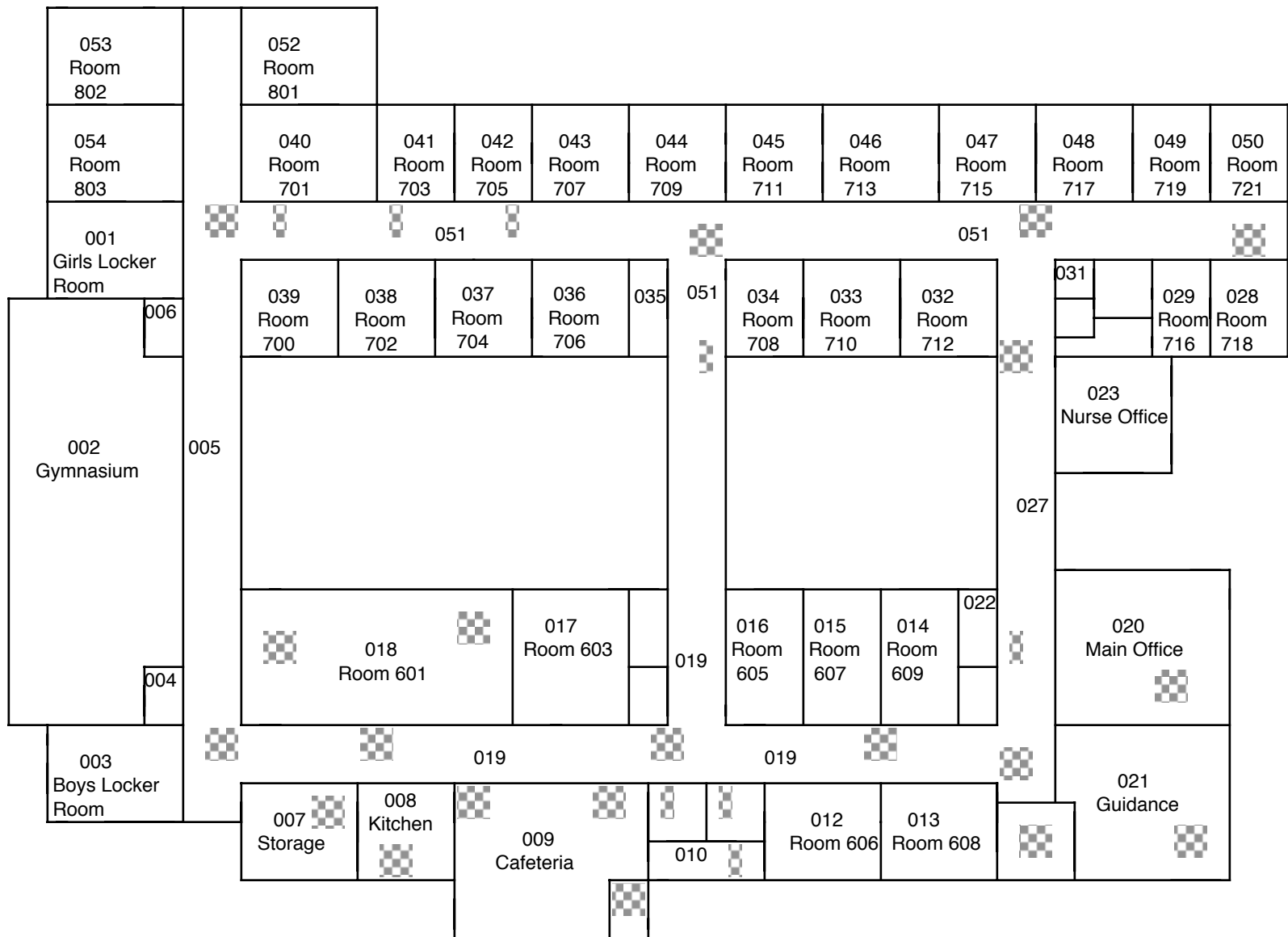
YOUR TRAINING ALLOWS YOU TO REMOVE ONLY INTACT RESILIENT FLOORING THAT REMAINS INTACT DURING REMOVAL. IF YOU ENCOUNTER NON-INTACT RESILIENT FLOORING OR IF THE FLOORING BECOMES NOT-INTACT (AS DEFINED BY OSHA) DURING REMOVAL THEN STOP WORK AND REPORT TO YOUR SUPERVISOR.

By signing this document you are acknowledging only that the Owner of the building you are about to work in has advised you of your rights to training and protection relative to your employer.

Signature \_\_\_\_\_ Social Security No \_\_\_\_\_

Printed

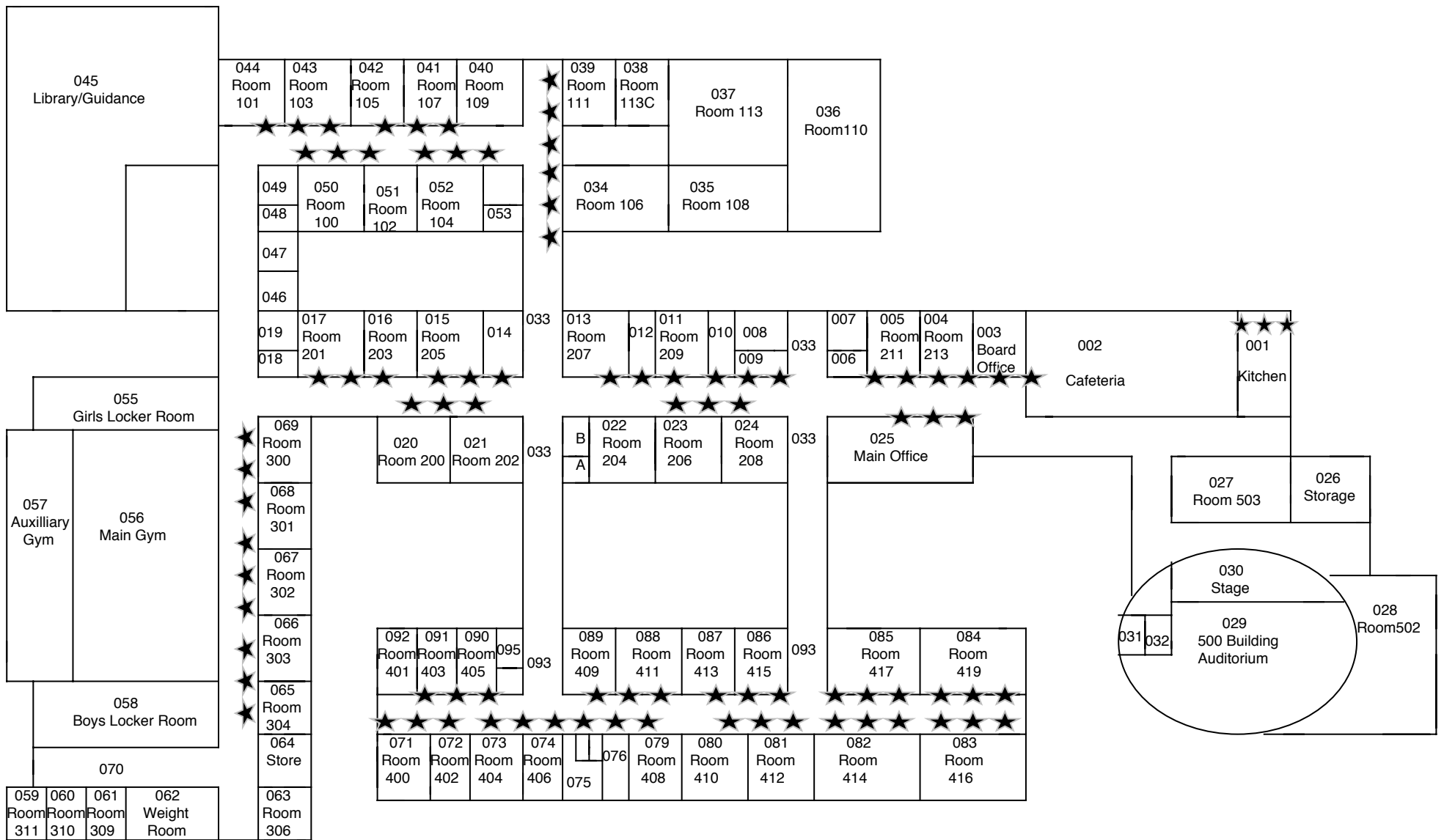
Name \_\_\_\_\_ Witness \_\_\_\_\_



 - Elbows off FG Pipe

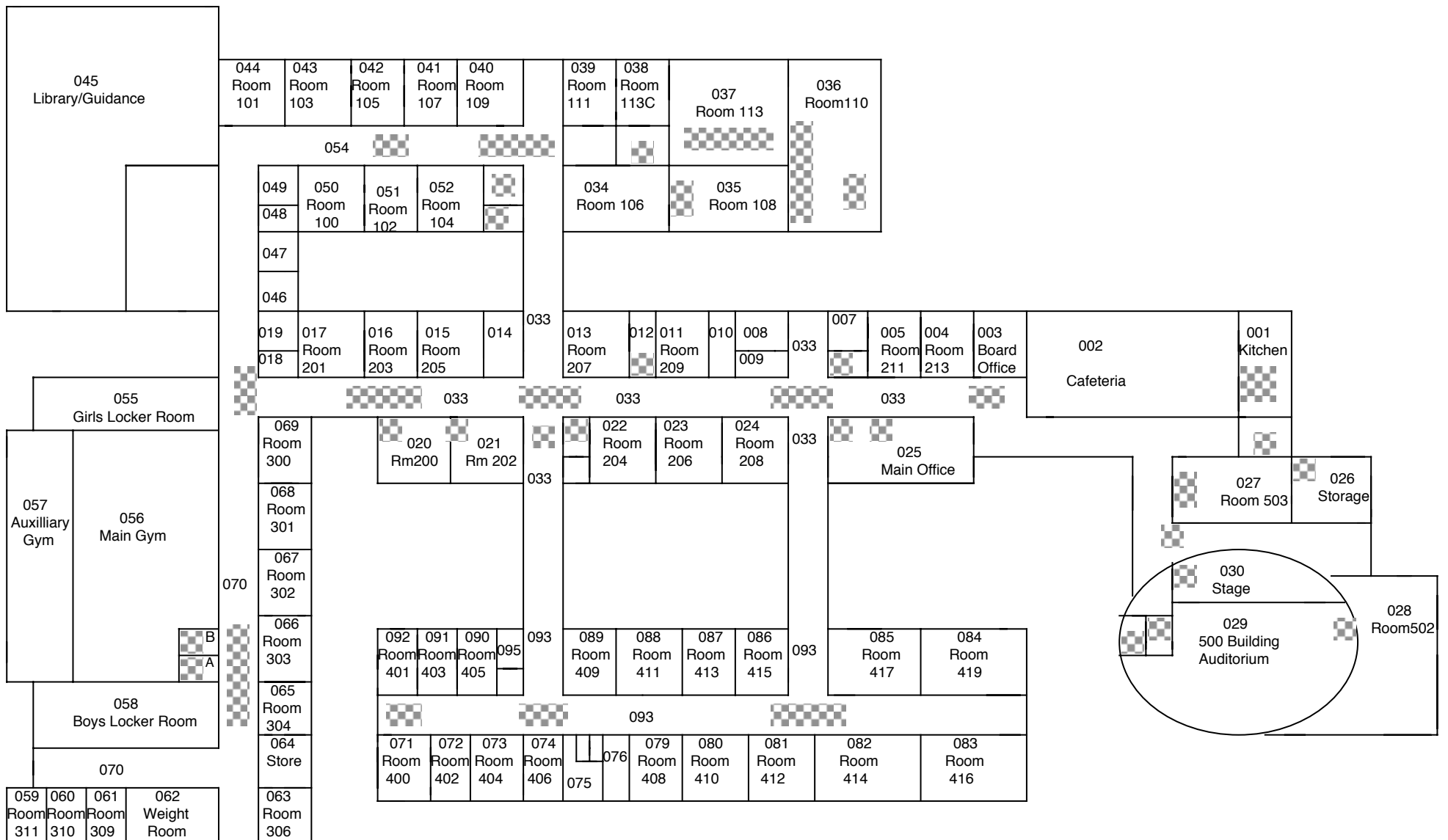
1. Asbestos containing elbows to be removed by wrap and cut procedure.
2. Wrap and cut containment shall consist of one layer six mil polyethylene tent enclosure with negative pressure and change room at entrance of enclosure.
3. Contractor shall construct fully operational centralized decontamination unit


December 7, 2018  
 Northern Burlington Regional School District  
 East Building  
 Elbows off FG Pipe



1. Transite Door Panels shall be removed by non-friable procedures in accordance with project specifications.

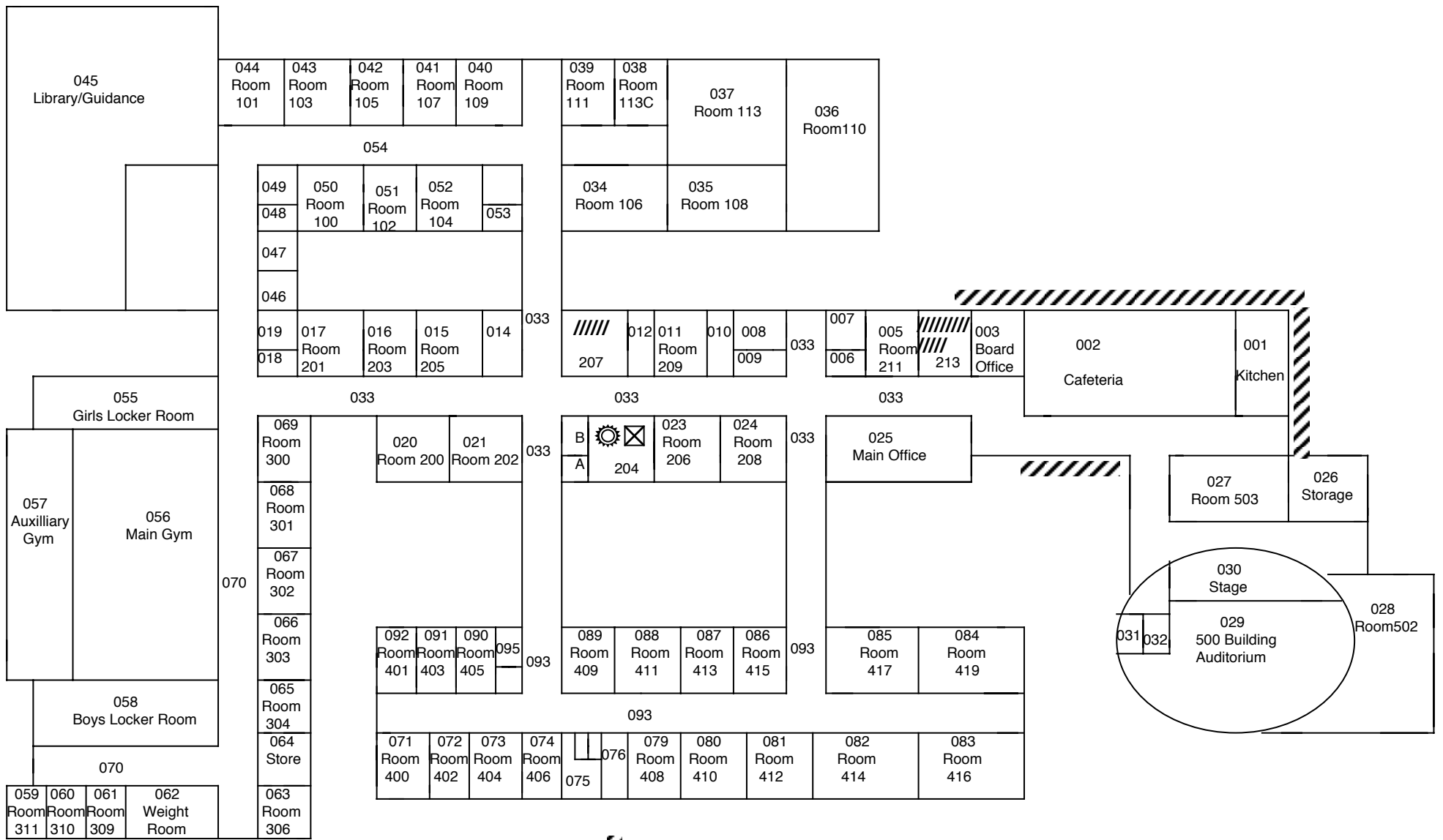
★★★ - Transite Door Panels



 - Elbows off FG Pipe

1. Asbestos containing elbows to be removed by wrap and cut procedure.
2. Wrap and cut containment shall consist of one layer six mil polyethylene tent enclosure with negative pressure and change room at entrance of enclosure.
3. Contractor shall construct fully operational centralized decontamination unit

December 7, 2018  
 Northern Burlington County Regional High School  
 Elbows off FG Pipe



1. Asbestos containing materials shall be removed by non-friable procedures in accordance with project specifications.



- Transite Roof Overhang



- Transite Hood



- Composite Lab Tables



- 9x9 Floor Tile/Mastic

December 7, 2018  
Northern Burlington County Regional High School  
Non-Friable Materials

## **SECTION 02071 - SELECTIVE SITE DEMOLITION**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK**

- A. Extent of selective demolition work is indicated on drawings.
- B. Types of Selective Demolition Work: Demolition requires the selective removal and subsequent off-site disposal of the following:
  - 1. Removal of existing bituminous pavement, concrete walks and concrete curbing, where indicated or required to allow for new construction work.
  - 2. Other removal work as shown on the contract drawings.
  - 3. Removal and protection of existing fixtures and equipment items indicated "salvage".
  - 4. Sealing of irrigation and monitoring wells.
  - 5. Removal of any underground material, such as rocks, tree stumps, concrete or bituminous pavement encountered during site excavation work.
- C. Related Work Specified Elsewhere:
  - 1. Remodeling construction work and patching is included within the respective sections of specifications, including removal of materials for re-use and incorporated into remodeling or new construction.
- D. Contact utility companies mark-out service, Garden State Underground Plant Location Service, Inc., 1-800-272-1000, to locate all utilities prior to start of demolition work.

#### **1.2 SUBMITTALS**

- A. Proposed Demolition Activities: Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Owner's Representative for review prior to commencement of work. Provide starting and ending dates for each activity as appropriate.
  - 1. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection.
  - 2. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
  - 3. Sequence construction so as to minimize obstruction of exits, both pedestrian and vehicular, and provide temporary alternate exits as required by authorities having jurisdiction.
  - 4. Coordinate with Owner's continuing occupation and use of the project site, to maximize the Owner's reduced usage during summer months.

- B. Photographs: Before starting work, file with the Architect photographs documenting existing conditions that later could be mistaken for damage caused by demolition operations.
- C. Project Record Documents:
  - 1. Indicate unanticipated structural, electrical, or mechanical conditions.
  - 2. Record the condition of areas and objects to remain that are adjacent to disturbed areas.

### **1.3 JOB CONDITIONS**

- A. Occupancy: Owner will be continuously occupying areas of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of seventy-two (72) hours advance notice to Owner of demolition activities which will severely impact Owner's normal operations.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
  - 1. Conditions existing at time of commencement of contract will be maintained by Owner insofar as practicable. However, variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.
- C. Protections: Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.
  - 1. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of the site.
  - 2. Erect temporary covered passageways if and where required by authorities having jurisdiction.
  - 3. Protect from damage existing utilities that are to remain in place and become exposed during demolition operations.
  - 4. Remove protections at completion of work.
  - 5. Install temporary construction fencing around all demolition areas of the site. As a minimum, the temporary construction fence should encompass the "Limit of Disturbance", identified on the Soil Erosion & Sediment Control Plan if fence limits are not otherwise indicated.



- D. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.
- E. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, driveways and other adjacent occupied or used facilities.
  - 1. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
  - 2. If demolition work takes place within the public right of way, the Contractor is to coordinate with the local Police, Fire and Emergency Service Officials at least seventy-two (72) hours prior to the scheduled work. Contractor to provide traffic control measures and devices designed in accordance with the Manual on Uniform Traffic Control Devices. See also Section 02100 – Traffic Control.
  - 3. Provide a smooth edge along demolished surfaces, especially in traffic areas, to avoid abrupt elevation changes that jar vehicles.
- F. Explosives: Use of explosives will not be permitted.
- G. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.
  - 1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
- H. Environmental Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.
  - 1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
- I. Land Disturbances: Install required Soil Erosion and Sediment Control measures as detailed on the Contract drawings, and notify the local Soil Conservation District in advance of any land disturbance in accordance with the District's regulations.

## **PART 2 - PRODUCTS (Not Applicable).**

## **PART 3 - EXECUTION**

### **3.1 INSPECTION**

- A. Prior to commencement of selective demolition work request utility mark-out and inspect areas in which work will be performed.
  - 1. Document existing conditions of structure, surfaces, equipment or surrounding properties which could be misconstrued as damage resulting from selective demolition work with high resolution photographs and/or video; file with Owner's Representative prior to starting work.
  - 2. Commencement of work shall constitute acceptance of conditions. Any necessary remedial work required to correct any unsatisfactory conditions, found after the start of installation, will be provided at no cost to the owner.

### **3.2 PREPARATION**

- A. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.
  - 1. Cease operations and notify the Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
- B. Locate, identify, stub off and disconnect utility services that are not indicated to remain.
  - 1. Provide by-pass connections as necessary to maintain continuity of service to occupied areas of building and grounds. Provide minimum of seventy-two (72) hours advance notice to Owner if shut-down of service is necessary during change-over.
- C. Prior to any land disturbance or demolition of exterior amenities, install all required Soil Erosion and Sediment Control measures, and provide minimum required notice to local Soil Conservation District.
- D. Furnish and install temporary construction fencing around exterior features being demolished. If limits of fencing are not shown, the Contractor shall plan on fencing the perimeter of the entire area of disturbance as a minimum. The Owner's Construction Manager reserves the right to request construction fence be installed wherever deemed necessary to improve public safety and site security at any time.

### **3.3 DEMOLITION**

- A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

1. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
  2. Locate demolition equipment and promptly remove debris to avoid imposing excessive loads on subsurface utilities and surrounding infrastructure.
  3. Provide services for effective air and water pollution controls as required by authorities having jurisdiction.
  4. Completely fill below-grade areas and voids resulting from demolition work. Provide fill as specified on contract drawings and Specification Section 02200 - Earthwork. Where not specified, provide fill consisting of approved, clean earth, gravel or sand, which is free of topsoil, trash and debris, stones over 6" diameter, roots or other organic matter.
- B. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative rearrange selective demolition schedule as necessary to continue overall job progress without delay.
- C. The edge of all hard surfaces along the limits of demolition shall be left in a safe condition. Edges along demolished pavement sections in traffic areas (pedestrian and vehicular) shall be left in a smooth condition between demolished and un-demolished surfaces. To accomplish the transition it may be necessary to install temporary bituminous pavement material in a tapered manner along the edge.
- D. Sealing Wells –
1. This work shall consist of abandoning and sealing the existing wells, as noted on the plans, in accordance with N.J.A.C. 7:9D et seq. and any of the Township of Mansfield Health Department requirements. In the absence of any existing well records the licensed well driller is required to request an authorization from the New Jersey Department of Environmental Protection to abandon an existing well. The general procedure to be followed by the licensed well driller to obtain authorization to abandon and seal the existing well is the following:
    - Submit a well search questionnaire to the NJDEP
    - Mobilize to the location of the well and remove the pump equipment and any obstructions in the well.
    - Measure the total depth, diameter and length of casing.
    - Provide measurements to the NJDEP and request authorization to abandon the undocumented well.
    - Once authorization is obtained from the NJDEP abandon well by sealing with pressure tremie grout, or other NJDEP approved method.

- Once the well is abandoned, the well driller shall provide the Township Health Department with the NJDEP Abandonment Certification.

### **3.4 SALVAGE MATERIALS**

- A. Salvage Items: Where indicated on Drawings as "Salvage-Deliver to Owner", or similar language, carefully remove indicated items, clean, store and turn over to Owner and obtain receipt.
- B. Historic artifacts, including cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance remain the property of the Owner. Notify Owner's Representative if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

### **3.5 DISPOSAL OF DEMOLISHED MATERIALS**

- A. Remove debris, rubbish and other materials resulting from demolition operations from building site. Transport and legally dispose of materials off-site according to law.
- B. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.
- C. Burning and/or burial of removed materials is not permitted on project site.

### **3.6 CLEAN-UP AND REPAIR**

- A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave areas broom clean.
- B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

### **3.7 PAYMENT**

- A. There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

**END OF SECTION 02071**

## **SECTION 02100 – TRAFFIC CONTROL**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. This work shall consist of the installation, maintenance and removal of traffic control and pedestrian control devices and flagmen to assure the safety of all public traffic and pedestrians on and about the construction site.

#### **1.3 SUBMITTALS**

- A. Not applicable this section unless substitutions in specified materials or methods are proposed. The degree of applicability of this item shall be determined by the Engineer upon receipt of the specified alternate or substitution proposed by the Contractor.

#### **1.4 PAYMENT**

- A. There is no separate payment for work under this section. The lump sum price bid shall include all labor, material and equipment necessary to erect and maintain traffic control and provide pedestrian safety in accordance with the contract documents and as may be required to safely complete the project.

### **PART 2 - PRODUCTS**

- A. All signs, fences, barricades, lights, cones, drums and incidentals thereto shall be in conformance with the drawings, the Manual on Uniform Traffic Control Devices and the NJDOT Standard Specification for Road and Bridge Construction as amended or supplemented. All materials shall be of good quality, shall be legible, reflective, self-supporting and functional for the duration of the project.

### **PART 3 – EXECUTION**

- A. All signs, fences, barricades, drums, cones and lights shall be installed and located as shown on the drawings and accordance with the Manual on Uniform Traffic Control Devices.
- B. The contractor shall inspect all traffic control devices as needed and shall maintain all devices for the duration of the project.

### **END OF SECTION**

## **SECTION 02110 - SITE CLEARING**

### **PART 1 - GENERAL**

#### **0.1 DESCRIPTION OF WORK**

- A. Extent of site clearing is shown on drawings.
- B. Site clearing work includes, but is not limited to:
  - 1. Topsoil stripping.
  - 2. Clearing and grubbing.
  - 3. Protection of existing trees and vegetation.
  - 4. Removal of trees and other vegetation.
  - 5. Removing above - grade improvements.
  - 6. Disconnecting, capping or sealing, abandoning in place, and/or removing below - grade improvements.

#### **0.2 QUALITY ASSURANCE**

- A. Governing Regulations: Comply with applicable requirements of "Standards for Soil Erosion and Sediment Control, in New Jersey", latest edition. Compliance with the certified Soil Erosion and Sediment Control Plan and Details is mandatory and considered the minimum standards to be met.

#### **0.3 SUBMITTALS**

- A. Document existing conditions of structure, surfaces, trees and plantings, adjoining construction equipment or surrounding properties which could be misconstrued as damage resulting from selective demolition work with high resolution photographs and/or video; file with Owner's Representative prior to starting work.
- B. Record Drawings:
  - 1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.

#### **0.4 JOB CONDITIONS**

- A. The Contractor shall accept the site with the conditions of the same existing at the time of bidding.
- B. Contractor shall verify that the existing topographical conditions and elevations are correct prior to any site work being done. Starting of site work shall be construed as acceptance of given topographical elevations.
- C. Contractor shall be responsible for providing temporary drainage facilities to maintain the entire site in a well-drained, dry condition during all phases of construction.

- D. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.
  - 1. Protect improvements on adjoining properties and on Owner's property.
  - 2. Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.
  
- E. Protection of Existing Trees and Vegetation: Install temporary tree protection fencing to protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Where required, provide supplemental temporary guards to protect trees and vegetation to be left standing.
  - 1. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.
  - 2. Provide protection for roots over one-inch (1") diameter cut or damaged during construction operations. Root prune damaged roots by providing a clean cut at limit of damage. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues.
    - a. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; and maintain dampness of burlap at all times until re-covering with earth is performed, which is to be as soon as possible.
  - 3. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Architect. Employ licensed arborist to repair damages to trees and shrubs, at no expense to the Owner.

## **PART 2 - PRODUCTS**

- A. Flowable fill as may be required under conditions of subsection 3.3 shall be a Ready-mix Controlled Low Strength Material used as an alternative to compacted soil, and is also known as controlled density fill, and several other names, some of which are trademark names of material suppliers. For each type of material required for the work of this Section, materials shall comply with recommendations of ACI 229, "Controlled Low Strength Materials."

## **PART 3 - EXECUTION**

### **0.1 SITE CLEARING**

- A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions interfering with installation of new construction. Removal includes

digging out stumps and roots.

1. Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction.

## **0.2 STRIPPING TOPSOIL**

- A. Remove all topsoil from existing lawn areas that are within new building area or new paved areas and where finished grades are to be changed. Store within the contract area for future use in the finished grading work surround with silt control fence per the Soil Erosion and Sediment Control Plan.
- B. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 5". The Owner's "Geotechnical Investigation Report" is to be referenced for a preliminary indication of existing topsoil depths encountered on-site at each test location only. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other object over 1" in diameter, and without weeds, roots, and other objectionable material.
- C. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.
- D. Stockpile topsoil in storage piles in areas shown, or where directed. Construct storage piles to freely drain surface water. Immediately seed stockpile with temporary seeding in accordance with soil erosion and sediment control standards, and surround piles with Silt Fence per plan details.

## **0.3 REMOVAL OF SITE IMPROVEMENTS**

- A. Remove existing above - and below - grade improvements as indicated or as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, aggregate base and other materials as indicated.
  1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw - cut faces vertically and along the entire length of pavement to remain.
- C. Abandonment or removal of certain underground pipe or conduits may be shown on mechanical or electrical drawings, and is included under work of those sections. Removal of abandoned underground piping or conduit interfering with construction is included under this section.
- D. All underground pipe or conduit 8" in diameter or larger to remain abandoned within the building limits shall be filled with flowable fill, controlled low strength material with a designed ultimate compressive strength of 125 psi. Material tested in accordance with ASTM D6103 shall have a flow of 6 to 8 inches.



**0.4 CLEARING AND GRUBBING**

- A. In all areas within the Contract Limit Lines, including areas receiving paving and seeding, except as otherwise specified or indicated, grubbing shall consist of removal and disposal of all trees, stumps and roots larger than 1" in diameter, and all matted vegetation, to a depth of 18" below new finish grade in cut areas and 18" below existing finish grade at fill areas.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
  - 1. Place fill material in horizontal layers not exceeding 6" loose depth, and thoroughly compact to a density equal to adjacent original ground.

**0.5 DISPOSAL OF WASTE MATERIALS**

- A. Burning is not permitted on Owner's property.
- B. Remove waste materials, and unsuitable and/or excess subsoil from the Owner's property and dispose of off-site in legal manner.

**END OF SECTION 02110**

## **SECTION 02150 - SHORING AND BRACING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Extent of shoring and bracing work includes, but is not limited to, the following:
  - 1. Shoring and bracing necessary to protect existing building(s), walkways, utilities, and other improvements and excavation against loss of ground or caving embankments.
  - 2. Maintenance of shoring and bracing.
  - 3. Removal of shoring and bracing, as required.
- B. Types of shoring and bracing system includes, but is not limited to, the following:
  - 1. Soldier piles. (Earthwork)
  - 2. Lagging. (Earthwork)
  - 3. Trench shoring. (Earthwork)
  - 4. Sheet Pile Shoring. (Earthwork)
  - 5. Column shoring. (Building Structure)
  - 6. Scaffolding shoring. (Building Structure)
  - 7. Cantilever shoring. (Building Structure)

#### **1.3 SUBMITTALS**

- A. Layout Drawings: Provide layout drawings for shoring and bracing system and other data prepared and sealed by a registered Professional Engineer licensed in the State of the project. System design and calculations must be acceptable to local authorities having jurisdiction.

#### **1.4 QUALITY ASSURANCE**

- A. Supervision: Engage and assign supervision of shoring and bracing work to a qualified consultant.
- B. Submit name of engaged consultant and qualifying technical experience.
- C. Regulations: Comply with local codes and ordinances of governing authorities having jurisdiction.

#### **1.5 JOB CONDITIONS**

- A. Before starting work, check and verify governing dimensions and elevations. Survey condition of adjoining properties. Take photographs to record any prior settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified by dated photographs, and signed by Contractor and others conducting investigation.

- B. Survey adjacent structures and improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations. Locate datum level used to establish benchmark elevations sufficiently distant so as not to be affected by movement resulting from excavation operations.
- C. During excavation, resurvey benchmarks weekly, employing a licensed Land Surveyor or registered Professional Engineer, licensed in the State of the project. Maintain accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags or other damage is evident.

## **1.6 EXISTING UTILITIES**

- A. Protect existing active sewer, water, gas, electricity and other utility services and structures.
- B. Notify municipal agencies and service utility companies having jurisdiction. Comply with requirements of governing authorities and agencies for protection, relocation, removal and discontinuing of services, as affected by this work.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. General: Provide suitable shoring and bracing materials which will support loads imposed. Materials need not be new, but should be in serviceable condition.
- B. If wood is part of shoring system near existing structures, use pressure preservative treated materials or remove before placement of backfill.

## **PART 3 - EXECUTION**

### **3.1 SHORING**

- A. Wherever shoring is required, locate the system to clear permanent construction and to permit forming and finishing of concrete surfaces and all other materials. Provide shoring system adequately anchored and braced to resist earth and hydrostatic pressures.
- B. Shoring systems retaining earth on which the support or stability of existing structures is dependent must be left in place at completion of work.

### **3.2 BRACING**

- A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.
- B. Do not place bracing where it will be cast into or included in permanent work, except as otherwise acceptable to Architect.
- C. Install internal bracing, if required, to prevent spreading or distortion to braced frames.
- D. Maintain bracing until structural elements are rebraced by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

- E. Remove sheeting, shoring and bracing in stages to avoid disturbance to underlying soils and damage to structures, pavements, facilities, and utilities.
- F. Repair or replace, as acceptable to Architect, adjacent work damaged or displaced through installation or removal of shoring and bracing work.

**END OF SECTION 02150**

## **SECTION 02200 - EARTHWORK**

### **PART 1 – GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **0.2 DESCRIPTION OF WORK**

- A. Extent of earthwork is indicated on drawings.
  - 1. Rough grading.
  - 2. Unclassified Excavation
  - 2. Preparation of subgrade for building slabs, pads, pavements, and lawns is included as part of this work.
- B. Conform to the requirements of "Standards for Soil Erosion and Sediment Control in New Jersey," latest edition.

#### **0.3 QUALITY ASSURANCE**

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction, and in accordance with all recommendations of Section 01950, and the Soils and Foundation Engineering Report.
- B. Governing Regulations: Comply with applicable requirements of "Standards for Soil Erosion and Sediment Control, in New Jersey", latest edition.
- C. Testing and Inspection Service:
  - 1. Employ, at Contractor's expense, an independent testing laboratory acceptable to the Architect to perform soil testing and inspection service for quality control testing during earthwork operations. Include the services of a qualified Licensed Soils Engineer as herein specified.

#### **0.4 SUBMITTALS**

- A. Test Reports: Testing service will submit following reports directly to Architect with copy to Contractor:
  - 1. Test reports on borrow material as outlined herein.
  - 2. Field density test reports.

3. One optimum moisture-maximum density curve for each type of soil encountered, including borrow soils.
4. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

## **0.5 JOB CONDITIONS**

- A. Test pits and other common exploratory operations may be required by the Architect/Engineer to be made by Contractor at no cost to Owner.
- B. Existing Utilities
  1. Locate existing underground utilities in areas of work. Contact utility companies mark-out service, Garden State Underground Plant Location Service, Inc. at 1-800-272-1000, as required by law, to locate all utilities prior to start of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.
  2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
  3. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Architect/Engineer and then only after acceptable temporary utility services have been provided.
- C. Use of Explosives
  1. Do not bring explosives onto site, or use in work, without prior written permission from authorities having jurisdiction and from the Owner.
  2. Contractor is solely responsible for handling, storage, and use of explosive materials if and when their use is permitted. Comply with applicable requirements of NFPA 495, "Explosive Material Code".
- D. Protection of Persons and Property
  1. Install barricades and operate warning lights as recommended by authorities and agencies having jurisdiction.
  2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

**1.6 PAYMENT**

- A. There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

**1.7 RELATED SECTIONS**

- A. Section 02110 – Site Clearing
- B. Section 02236 – Soil Erosion and Sediment Control
- C. Section 02241 – Dewatering
- D. Section 02248 – Shoring and Bracing
- E. Section 02485 – Finished Grading
- F. AIA A232 & Section 00800 - Submittals

**PART 2 - PRODUCTS**

**0.1 SOIL MATERIALS**

- A. Allowable Gradational Envelope, Type "S" Fill (Structural Fill):

U.S. Standard Sieve Size	Percent Finer by Weight
1"	100
3/8"	65-100
No. 10	40-85
No. 30	20-65
No. 60	10-45
No. 200	5-12

- B. Allowable Gradational Envelope, Type "G" Fill (Granular Fill):

U.S. Standard Sieve Size	Percent Finer by Weight
2"	100
1"	80-100
3/8"	70-100
No. 10	50-100
No. 30	30-85
No. 60	15-65
No. 200	5-15

- C. NJDOT Paving and Subgrade Materials: All materials shall meet or exceed the NJDOT Standard Specifications for Road and Bridge Construction, as amended or supplemented.
- D. Porous Fill: Coarse Aggregate, crushed stone or gravel, poorly graded with 100% passing a 1-½" sieve and not more than 10 percent of material that passes through No. 4 sieve.
- E. Impervious Fill: All materials shall be fine grained inorganic silts and clays,

meeting class ML/CL specification of the Unified Classification System.

- F. Prior to importation activities, all soil materials proposed to be imported to the site shall be certified by an independent testing agency to be free from contamination, in accordance with the standards of the N.J.D.E.P., and the U.S. Environmental Protection Agency. Written certification to be received prior to any importation activity. See also subsection 3.3E.3 below.

## **PART 3 - EXECUTION**

### **0.1 EXCAVATION**

- A. All excavation shall be Unclassified and shall include all excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.
  - 1. Earth excavation includes removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and to be removed, material of any classification indicated in data on subsurface conditions, and other materials encountered that are not classified as rock excavation or unauthorized excavation.
- B. Excavation Classifications: The following classifications of excavation will be made when rock excavation is encountered in work:
  - 1. Rock Excavation
    - a. Footing Rock Excavation: All boulders or rock above the bottom of the footing elevations which can be removed by a 1 cubic yard power shovel or backhoe using a prime mover equal in size to a Bucyrus Erie 30B Series 3, or a pneumatic hammer using a pavement breaker shall be classified as earth excavation.
    - b. General Rock Excavation: Removal of boulders or rock encountered in the excavation by a 1 cubic yard power shovel or backhoe using a prime mover equal in size to a Caterpillar 325, or a hydraulic hammer using a pavement breaker, or a D-8N bulldozer, or equivalent, equipped with ripper teeth, shall be classified as earth excavation. All boulders and rock which cannot be removed by the foregoing equipment and require blasting for their removal, shall be classified as general rock excavation.
    - c. All three of the aforementioned methods of excavation must be tried and proven unsatisfactory in the presence of the Engineer, before removal by blasting will be authorized.
    - d. Intermittent drilling or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.



- C. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect/Engineer. Unauthorized excavation, as well as remedial work directed by Architect/Engineer, shall be at Contractor's expense.
1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Architect/Engineer.
  2. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Architect/Engineer.
- D. Additional Excavation: When excavation has reached required sub-grade elevations, notify Architect/Engineer who will make an inspection of conditions.
1. If unsuitable bearing materials are encountered at required sub-grade elevations, Contractor must notify the Architect/ Soil Engineer.
    - a. In pavement areas, proof roll prepared sub-grade surface to check for unstable areas and areas requiring additional compaction. Proof rolling shall be accomplished by the application of a three (3) wheel, ten (10) ton roller over the subgrade. Proof rolling shall be performed in the presence of the Engineer, or his representative, to locate unstable areas and to achieve uniform compaction immediately prior to placement of base paving materials. Proof rolling will not be used as a substitute for field moisture and density tests, if required. Finish grade sub-grade to required slope at proper distance below finish surface. Unsuitable soils shall be over excavated to a depth required by the Soils Engineer and replaced with borrow excavation as specified by NJDOT. In certain instances, replacement material may require larger stone aggregate per NJDOT specifications, at the discretion of the Soils Engineer.
  2. Contractor shall carry excavations deeper to elevations as directed by the Soil Engineer, replace excavated material with Type "S" structural fill as described herein.
  3. Additional fill shall be provided, placed and compacted to required elevations.
  4. Additional excavation and compacted fill work, when authorized by the Architect/Engineer, shall be in the form of change order(s) using Unit Prices, when accepted, adjusted or established by the Contract.
- E. Excavation for Structures:
1. Prior to foundation construction, all superficial materials including asphalt

and topsoil shall be stripped from the limits of construction.

2. All excavations within the building area shall be backfilled with a clean bankrun sand and gravel conforming to the gradational requirements for Structural (Type S) Fill, unless Soils Report indicates on site materials may be used as structural fill. The Type S fill shall also be used for filling within the building limits to attain proposed porous fill subgrade elevation. All imported fill materials and on-site material shall be placed in a controlled manner, utilizing maximum lift thickness of twelve (12) inches and be compacted with vibratory compaction equipment. All Type S fill shall be compacted to a minimum of 95% of their Modified Proctor Density. On-site materials placed as backfill outside the building limits shall be compacted to 90% of its Modified Proctor Density. The compaction levels shall be confirmed in the field in accordance with ASTM Designation D-1557. Moisture-density relationships shall be established in accordance with ASTM Designation D-1556 and be observed in the field during placement procedures.
- F. Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
1. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- G. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
1. It will be the Contractor's responsibility to provide sheet piling and other shoring as required to protect existing facilities from damage during excavation. Such work shall be designed by a professional engineer licensed in New Jersey, and shop drawings submitted to Architect for information purposes. Damage to existing structures or pavement caused by earthwork operations shall be repaired to Architect's satisfaction.
  2. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
  3. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
- H. All existing construction debris, old foundations, floors and any other old construction encountered shall be removed entirely from the building and paved areas; replaced with Type S structural fill.
- I. Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. Contractor to provide all necessary material and labor to dewater construction excavations.

1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
  2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
  3. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
    - a. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
- J. Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown. Also see paragraph D.1.a. above.
- K. Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room and per typical trench detail where shown.
- L. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees.
- M. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
  2. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

## **0.2 COMPACTION**

- A. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.

- B. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D 1557.
1. Structures, Building Slabs and Steps, Pavements: Compact top 12" of subgrade and each layer of backfill or fill material at 95% Modified Proctor in accordance with ASTM D-1557.
  2. Foundation, Utility trenches: Compact top 6" of subgrade and each layer of backfill or fill material at 95% Modified Proctor in accordance with ASTM D-1557.
  3. Infiltration Basin / Bioretention Basin / Rain garden / Porous Pavement: No compaction of native subgrade soils is permitted.
  4. Lawn and Grass Recreation Area: Compact top 12" of subgrade and each layer of backfill or fill material at 85% Modified Proctor in accordance with ASTM D-1557.
  5. Landscape Planting Areas: Compact top 12" of subgrade and each layer of backfill or fill material at 70% Modified Proctor in accordance with ASTM D-1557.
  6. Walkways: Compact top 6" of subgrade and each layer of backfill or fill material at 95% Modified Proctor in accordance with specification section ASTM D-1557.
  7. In Detention Basin Embankments: Compact top 6" of subgrade and each layer of backfill or fill material at 95% Modified Proctor in accordance with ASTM D-1557.
- C. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
  2. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

### **0.3 BACKFILL AND FILL**

- A. General: Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.
  - 1. Under grassed areas, use satisfactory excavated or borrow material.
  - 2. Under steps and building slabs, use compacted structural fill or on site materials permitted for use as structural fill as recommended in Soils Report.
  - 3. Under pavements use borrow excavation as specified by NJDOT.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
  - 1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
  - 2. Inspection, testing, approval, and recording locations of underground utilities.
  - 3. Removal of concrete formwork.
  - 4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
  - 5. Removal of trash and debris.
  - 6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
  - 7. Maintain carefully all bench marks, monuments and other reference points; if disturbed or destroyed, replace as directed.
- C. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
  - 1. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.
- D. Placement and Compaction: Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers and /or in confined areas.

1. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density per ASTM D-1557 test procedure or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
2. Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.
3. Proof rolling of soils within 10 feet of existing building shall be performed with vibrator disengaged.

E. Additional material required for filling, backfilling and grading:

1. The on-site soils removed during excavation are suitable for reuse as fill outside the building and other pavement areas when placed in a controlled manner.
2. Material which may be required in addition to that obtained from excavations, shall be provided by the contractor. Such material shall be as specified hereinbefore. Such material shall be provided at no additional cost to the Owner, in sufficient quantity to compensate for the "fluff factor", to provide compacted grade at the elevations shown.
3. Imported fill material must include a written certification from the supplier stating that the fill is virgin material, and if it is from an agricultural, commercial or non-commercial source. The material shall also be tested and be certified free of contamination or hazardous materials. Testing shall be based on the source of the material. The Architect/Engineer may require supplemental testing by Contractor prior to importation at no cost to the Owner.

#### **0.4 GRADING**

- A. Areas which will receive the floor slabs or pavement shall be graded and proof-rolled with vibratory compaction equipment to densify the soil surface and delineate potential soft areas.
1. Any soft areas encountered during the proof-rolling operations shall be removed and replaced with structural fill in a controlled manner, compacted as specified by the Soils Engineer.
- B. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified

tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

- C. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.
  - 1. Finish surfaces free from irregular surface changes, and as follows:
    - a. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations. Plan grades and spot elevations are to final surface.
    - b. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation.
    - c. In addition to the above tolerances, slope between any two points shall not vary more than 1.5 inches in 100 feet from the slope indicated.
- D. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2" when tested with a 10' straightedge.
- E. The cutting, filling and grading within the building area, together with sufficient area outside of the filled areas of the building to provide a slope of 1 vertically to 4 horizontally beyond the building walls, shall be done before excavations are made for footings and foundation walls.

## **0.5 QUALITY CONTROL TESTING DURING CONSTRUCTION**

- A. All work within the above section shall be performed as approved by the Soils Engineer. The Contractor shall cooperate in every way with the Soils Engineer as required for the performance of this work and shall give not less than 48 hours notice to schedule operations requiring sampling, inspection certification and testing.
- B. The Soils Engineer shall provide direction and all equipment and apparatus necessary for laboratory and field testing, sampling, inspection and reports on soil inspection. He will identify and document the removal of unsuitable material which may remain within the bottom of excavation after limits of the excavated area have been reached.
  - 1. Field density testing and soil analysis at the rate of one compaction test per 2,500 square feet minimum for each lift of compacted fill within building areas.
  - 2. Laboratory compaction tests for each type of on-site soil and/or borrow material to be used throughout the site.

3. Field C.B.R. testing in pavement areas at the rate of one per 500 square yard of pavement.
  4. Field inspection control and certification of bottom of footings, trenches, subgrades or under slabs, parking area, athletic areas and landscaped areas, as applicable.
  5. When required, soil materials and rock-definition testing to be performed in accordance with ASTM E 329 and documented according to ASTM D 3740 and ASTM E 548.
- C. The Soils Engineer shall provide a signed and certified written report at the completion of each phase of construction, verifying that all soils operations have been completed within the design parameters as noted in the contract documents and in accordance with accepted engineering practices.
- D. The Soil Engineering Firm must show adequate credentials as approved by the Owner, but as a minimum, shall be as follows:
1. Must have as a principal a Professional Engineer registered in New Jersey, with 10 years responsible experience in Soils Engineering.
  2. Provide certificates of professional liability insurance of \$750,000.00 minimum.
  3. All technical staff personnel performing services on the project are to be under the direct supervision of the Soils Engineer.

## **0.6 MAINTENANCE**

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
1. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.
  2. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.



## **0.7 DISPOSAL OF WASTE MATERIALS**

- A. Removal from Owner's Property: Remove waste materials, including excess excavated material, trash and debris, and dispose of it off Owner's property in a legal manner.

## **0.8 RECORD DRAWING**

- A. As the work progresses, record on one set of grading drawings all changes and deviations from the Contract Drawings in line and finished grade.
- B. All record drawing verifications must be executed by a NJ licensed professional land surveyor.
- C. Record Drawings shall be submitted to Architect when all parking lots, sidewalks and rough grading are complete. Contractor shall not spread topsoil until written notice to proceed is issued by Architect.
- D. At the completion of the work, transfer accurately all such records in waterproof ink on mylar reproducibles of the grading drawings, have them certified by the NJ licensed Professional Land Surveyor and deliver same to Architect.

**END OF SECTION 02200**

## **SECTION 02241 - DEWATERING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Dewatering system.
  - 2. Surface water control system.
  - 3. Monitoring wells.
  - 4. System operation and maintenance.
  - 5. Water disposal.

#### **1.2 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. Temporarily lower water table within areas of excavation to below bottom of excavation.

#### **1.4 SUBMITTALS**

- A. Submit shop drawing of proposed dewatering system to the Engineer.

#### **1.5 RELATED SECTIONS**

- A. Section 02236 – Soil Erosion and Sediment Control
- B. AIA A232 & Section 00800 - Submittals

#### **1.6 PAYMENT**

- A. There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

## **PART 2 - PRODUCTS**

### **2.1 DEWATERING EQUIPMENT**

- A. Dewatering Pumps: Portable or Skid mounted centrifugal type, diesel engine driven shall be used during daytime operations.
- B. Dewatering Pumps: Submersible type, electric pumps shall be used during night time operations.
- C. Surface Water Pumps: Self priming, centrifugal semi-open clog resistant impeller; engine driven type.
- D. Riser Pipe: Shall be PVC.
- E. Discharge Header Pipe: Shall be PVC.
- F. Discharge Pipe: Shall be PVC or other flexible hose.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Conduct additional borings/test pits and investigations to complete dewatering system design.

### **3.2 DEWATERING SYSTEM**

- A. Install dewatering system in accordance with shop drawings.

### **3.3 SURFACE WATER CONTROL SYSTEM**

- A. Divert surface water and seepage water into sumps and pump water into drainage channels, storm drains or settling basins.

### **3.4 SYSTEM OPERATION AND MAINTENANCE**

- A. Operate dewatering system continuously until backfill is minimum of 2 feet above normal ground water table elevation.
- B. Diesel or gas powered pumps shall only be used between the hours of 8:00 am and 9:00 pm. Electric pumps shall be used between 9:00 pm and 8:00am to minimize noise.

### **3.5 WATER DISPOSAL**

- A. Discharge water into existing storm sewer or settling basin.

### **3.6 SYSTEM REMOVAL**

- A. Remove dewatering and surface water control systems after dewatering operations are discontinued.

### **3.7 FIELD QUALITY CONTROL**

- A. Monitor and record the following:
  - 1. Ground water elevation.
- B. Monitor ground water discharge for contamination and sediment load.

**END OF SECTION 02241**

## **SECTION 02248 - SHORING AND BRACING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Extent of shoring and bracing work includes, but is not limited to, the following:
  - 1. Shoring and bracing necessary to protect existing buildings, streets, walkways, utilities, and other improvements and excavation against loss of ground or caving embankments.
  - 2. Maintenance of shoring and bracing.
  - 3. Removal of shoring and bracing, as required.
- B. Types of shoring and bracing system includes, but is not limited to, the following:
  - 1. Soldier piles.
  - 2. Lagging.

#### **1.3 SUBMITTALS**

- A. Layout Drawings: Provide layout drawings for shoring and bracing system and other data prepared and sealed by a registered Professional Engineer licensed in the State of New Jersey. System design and calculations must be acceptable to local authorities having jurisdiction.

#### **1.4 QUALITY ASSURANCE**

- A. Regulations: Comply with local codes and ordinances of governing authorities having jurisdiction.

#### **1.5 JOB CONDITIONS**

- A. Before starting work, check and verify governing dimensions and elevations. Survey condition of adjoining properties. Take photographs to record any prior

settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified by dated photographs, and signed by Contractor and others conducting investigation.

- B. Survey adjacent structures and improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations. Locate datum level used to establish benchmark elevations sufficiently distant so as not to be affected by movement resulting from excavation operations.
- C. During excavation, resurvey benchmarks weekly, employing a licensed Land Surveyor or registered Professional Engineer, licensed in the State of New Jersey. Maintain accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags or other damage is evident.

## **1.6 EXISTING UTILITIES**

- A. Protect existing active sewer, water, gas, electricity and other utility services and structures.
- B. Notify municipal agencies and service utility companies having jurisdiction. Comply with requirements of governing authorities and agencies for protection, relocation, removal and discontinuing of services, as affected by this work.

## **1.7 PAYMENT**

- A. There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

## **1.6 RELATED SECTIONS**

- A. Section 02110 – Site Clearing
- B. Section 02236 – Soil Erosion and Sediment Control
- C. Section 02241 – Dewatering
- D. Section 02200 – Earthwork
- E. Section 02071 – Selective Site Demolition
- F. AIA A232 & Section 00800 - Submittals

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. General: Provide suitable shoring and bracing materials which will support loads imposed. Materials need not be new, but should be in serviceable condition.
- B. If wood is part of shoring system near existing structures, use pressure preservative treated materials or remove before placement of backfill.

### **PART 3 - EXECUTION**

#### **3.1 SHORING**

- A. Wherever shoring is required, locate the system to clear permanent construction and to permit forming and finishing of concrete surfaces. Provide shoring system adequately anchored and braced to resist earth and hydrostatic pressures.
- B. Shoring systems retaining earth on which the support or stability of existing structures is dependent must be left in place at completion of work.

#### **3.2 BRACING**

- A. Locate bracing to clear permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.
- B. Do not place bracing where it will be cast into or included in permanent concrete work, except as otherwise acceptable to Architect.
- C. Install internal bracing, if required, to prevent spreading or distortion to braced frames.
- D. Maintain bracing until structural elements are rebraced by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.
- E. Remove sheeting, shoring and bracing in stages to avoid disturbance to underlying soils and damage to structures, pavements, facilities, and utilities.
- F. Repair or replace, as acceptable to Architect, adjacent work damaged or displaced through installation or removal of shoring and bracing work.

**END OF SECTION 02248**

## **SECTION 02450 - RADON MITIGATION SYSTEM**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of radon mitigation system work is shown on drawings.
  - 1. Under slab - on grade piping and fittings.
  - 2. Above ceilings piping and fittings.
- B. Provide inverts, instructions, supervision, and inspection to insure that work of other related work by other trades on the project, (executing earthwork, masonry chases, roof flashings, electrical work, etc.), will conform to the requirements for radon mitigation system work. Report any deficiencies to the Architect.
- C. Other Related Work by Other Trades:
  - 1. Section 02200 - Earthwork, for excavation, backfill and under slab aggregate covered under General Construction Work .
  - 2. Section 03300 - Cast in Place Concrete for concrete slab on grade and continuous vapor barrier covered under General Construction Work.
  - 3. Section 04200 - Unit Masonry for pipe chase covered under General Construction Work.
  - 4. Division 7 for Roofing System work for roof flashings covered under General Construction Work.
  - 5. Refer to Section 15420 - Radon Mitigation System for radon piping requirements covered under General Construction Work.
  - 6. Refer to Part 6 - Specification Sections for electrical boxes, wiring, etc., covered under Electrical Work.

#### **1.3 QUALITY ASSURANCE**

- A. Codes and Standards: Perform work in compliance with applicable requirements of governing authorities having jurisdiction.
  - 1. All work shall be in compliance with requirements of the N.J. UCC. Act, P.L. 1975, c. 217, as amended or supplemented and New Jersey Department of Environmental Protection.

#### **1.4 REFERENCES**

- A. ANSI/ASTM D2729 - Poly Vinyl Chloride (PVC) pipe and fittings.



## **1.5 SUBMITTALS**

- A. Submit product data on materials proposed for use.
- B. Certification: Submit certification signed by Contractor that installed materials conform to specified requirements and system was successfully checked and tested prior to covering with fill.

## **PART 2 - PRODUCTS**

### **2.1 PIPE AND FITTINGS**

- A. Furnish under slab on grade vent pipe system complete with bends, adapters, couplings, T-pipe fittings and joint materials.
  - 1. Polyvinyl Chloride Pipe (PVC): ASTM D 2729.
- B. Furnish above ceilings vent piping system complete with fittings and joints material.
  - 1. Cast-iron pipe and fittings: ASTM A 888.
    - a. Provide hangers supports and clamps.
- C. Pipe Accessories:
  - 1. Fittings: Same material as pipe, molded or formed to suit pipe size and end design, if required, tees, bends, elbows, reducers, and other configurations required.
  - 2. Sealant, tapes, etc. for joints: Provide appropriate sealants, adhesives, tapes, connectors for approved connection of piping system. All materials shall be compatible and approved to satisfy installation requirements.

## **PART 3 - EXECUTION**

### **3.1 GENERAL REQUIREMENTS**

- A. Install piping systems and accessories in accordance with the best practices of the various trades and the requirements specified herein. Install specialty products in conformance with the manufacturer's recommendations and approved shop drawings.
- B. Comply with all applicable requirements of the "N.J. UCC. Act, P.L. 1975, c. 217, as amended or supplemented and New Jersey Department of Environmental Protection" and applicable requirements of governing authorities having jurisdiction.

### **3.2 EXCAVATING, TRENCHING, BACKFILLING, AND UNDER SLAB AGGREGATE**

- A. Coordinate work of this section with work specified in Section 02200.

### **3.3 PIPING**

- A. Test pipe for soundness and clean interior and joint surfaces before lowering the pipe into the trench.

- B. Lay pipe in straight lines and on uniform grades between points where changes in alignment or grade are shown.
- C. Bed the pipe barrel firmly and uniformly. Check the line and invert grade of each pipe from a top line carried on batter boards not over 25 feet apart.
- D. Fit the pipes to form close concentric joints.
- E. Keep a stopper in the pipe mouth when pipe laying is not in progress.
- F. Testing Lines: Test or check lines before backfilling to assure free flow. Remove obstructions, replace damaged components, and retest system until satisfactory.

### **3.4 PROTECTION**

- A. Protect incomplete open ends of pipe runs from infiltration of water and debris by installing a row of straw bales across the open mouth of the pipe. Alternate protection may be provided using filter fabric secured to open end of pipe.
- B. Remove all obstructions and correct all defects which are discovered.

### **3.5 FINAL INSPECTION**

- A. At the time of final inspection, the piping system covered by this section shall be completed in every aspect and in perfect operating conditions.
- B. All surplus materials of every character resulting from the work of this section shall have been removed. Any defects discovered in the work subsequent to this inspection shall have been corrected.
- C. Apply and pay for all required permits and arrange for inspections by all governing authorities having jurisdiction. Obtain approvals and certificates which to be submitted in accordance with section 01700 - Project Closeout Document.

### **3.6 RECORD DRAWINGS**

- A. As the work progresses, record on one set of drawings all changes and deviations from the Contract Drawings in sizes, line and grade.
- B. Record the exact final location of lines by offset distances to surface improvements such buildings lines.
- C. Make sufficient measurements to locate definitely all lines. Reference underground bends, etc., by offset distances to establish bench marks.
- D. At completion of work, transfer accurately all such records to a set of record prints of the drawings as specified in Section 01700, and deliver to the Architect.

**END OF SECTION 02450**

## **SECTION 02480 - LANDSCAPE WORK**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK**

- A. Extent of landscape development work is shown on drawings and in schedules.
- B. Subgrade Elevations: Excavation, filling and grading required to establish elevations shown on drawings are not specified in this section. Refer to Earthwork Section 02200.
- C. Work Included:
  - 1. The work of this Section includes providing and installing or performing all work and equipment, complete as indicated on the Drawings or specified herein, or both, necessary for completion of planting. Any and all work related to tree transplantation must be performed under the supervision of a New Jersey Certified Tree Expert.
  - 2. The Contractor shall provide all topsoil, and it shall be tested, and if necessary, shall be made to conform to the pH and acidity range and percentage of organic matter as specified herein.
- D. The Contractor shall be liable for any damages to property caused by planting operations and shall, at his own expense, restore all disturbed or damaged areas to their original condition.
- E. Plant materials shall be free of damage as the result of handling and transportation.
- F. Balls of trees shall be in one solid piece properly shaped and shall be at least as large as the ball size recommended by the American Association of Nurserymen.

#### **1.2 QUALITY ASSURANCE**

- A. Standards
  - 1. ANSI Z60.1 - "American Standard for Nursery Stock" as amended.
  - 2. Plant material shall have a habit of growth that is normal for the species and that equals or exceeds the measurements specified in the plant list, which are the minimum acceptable sizes. Provide trees, shrubs and plants of quantity, size, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock". Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae and defects

such as knots, sun-scald, injuries, abrasions or disfigurement. They shall be measured before pruning with branches in normal position. Any necessary pruning shall be done at the time of planting under direction of the Landscape Architect. Requirements for measurements, branching, grading, quality, balling and burlapping of plants in the plant list shall follow the code of standard currently recommended by the American Association of Nurserymen, Inc., the American Standard for Nursery Stock. Plants that meet the requirements specified, but do not have the normal balance of height and spread typical for the respective plant, shall not be accepted.

**B. Inspection and Selection of Plant Material**

1. The plant material shall be located by the Contractor from sources within the local area. At the direction of the Architect, the Contractor shall proceed as follows:
  - a. When all plant material has been selected by the Contractor, the Landscape Architect will make his inspection upon 72 hours notice during normal business hours. The Contractor shall have located sufficient alternative choices to prevent loss of time in the event that some plant fails to meet with the approval of the Landscape Architect. The Contractor or a member of his firm shall be present when the Landscape Architect inspects the plant material at the nursery.
  - b. Trees selected should be well matched as to height, spread and general conformation. All trees must be approved and tagged by the Landscape Architect in the field before digging. Trees delivered without tags will be rejected.
  - c. Label each tree and shrub with securely attached waterproof tag bearing legible designation of botanical and common name.
2. Substitution: Substitution will be permitted only upon submission of proof that any plant is not obtainable and written authorization by the Landscape Architect for the use of the nearest equivalent obtainable; size and variety of the plant having the same essential characteristics with an equitable adjustment of contract price. Should the Landscape Architect deem it appropriate and substitute plant material other than that specified, it shall be accomplished as long as the price of the substituted item does not exceed the bid item being replaced.
3. Plant material is to be delivered to the site in quantities and at dates established in consultation with the Landscape Architect in order that the Landscape Architect shall have a minimum of a full day's work in supervising placement of specimen material.

**C. Delivery, Storage and Handling**

1. Balled and Burlapped Plants: Plants designated "B & B" in the plant list shall

be balled and burlapped. They shall be dug with firm natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Balls shall be firmly wrapped with burlap of similar materials and bound with twine, cord, or wire mesh. All collected plants shall be balled and burlapped. Do not bend or bind-tie trees or shrubs in such a manner as to damage bark, break branches or destroy the natural shape. Provide protective covering during delivery.

2. Container Grown Plants: Plants grown in containers will be accepted as "B & B" providing that the plant has been growing in the container for one full growing season prior to delivery. Do not remove container grown stock from containers until planting time.
3. Protection After Delivery: Plants which cannot be planted immediately on delivery to the site shall be covered with moist soil, mulch, or other protection from the drying of wind and sun. All plants shall be watered as necessary until planted. Trees moved by winch or crane shall be thoroughly protected from chain marks, girdling, or bark slippage by means of burlap wood battens or other approved method.

### **1.3 SUBMITTALS**

- A. Certified analysis of a recognized laboratory shall be submitted for topsoil; analysis shall be made to determine compliance with requirements for topsoil as hereinbefore specified under Section 02485 Finish Grading and Seeding sections. The costs of the tests shall be borne by the Contractor. Reports of the tests shall be submitted to the Engineer in writing.
- B. Furnish, in duplicate, copies of manufacturer's specifications as well as invoices for all soil amendments, including fertilizer, used on the project. Quantities of each material shall be clearly indicated on supplier's invoicing.
- C. Planting Schedule: Submit proposed planting schedule, indicating dates for each type of landscape work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of substantial completion. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.

### **1.4 MAINTENANCE INSTRUCTIONS:**

- A. Submit typewritten instructions recommending procedures to be established by Owner for maintenance of landscape work for one full year. Submit prior to expiration of required maintenance period(s).

## **PART 2 - PRODUCTS**

### **2.1 TOPSOIL**

- A. Topsoil as specified under Section 02485, Finish Grading and Seeding.

1. The topsoil mixture materials shall be thoroughly mixed by hand or rotary mixer to the satisfaction of the Landscape Architect.
2. Deciduous Plants: Topsoil mixture for backfilling planted areas shall consist of two parts each by volume of topsoil and native soil thoroughly mixed with 1 part of composted cow manure, or stable manure, and 5 pounds of bone meal per cubic yard.
3. Evergreen Plants: Topsoil mixture for backfilling planted areas shall consist of two parts each by volume of topsoil and native soil thoroughly mixed with 1 part of peat moss or humus.

## **2.2 SOIL AMENDMENTS**

- A. Peat Humus: FS Q-P-166 decomposed peat with no identifiable fibers and with pH range suitable for intended use.
- B. Wood Mulch: Twice Ground Hardwood, Ground or Shredded Bark, Wood Chips: Shall have no leaves, young green growth, wood shavings, sawdust, or foreign materials of any nature mixed with the bark. Size shall be 1-1/2" maximum and 3/4" minimum in greatest dimension. Samples shall be submitted to the Engineer for approval before purchase or delivery.
- C. Commercial Fertilizer: Time released packets shall be a complete fertilizer, part of the elements of which are derived from organic sources. It shall be delivered to the site in the original unopened packages each bearing the manufacturer's guaranteed analysis and installation instructions. For trees and shrubs, provide fertilizer with not less than 5% total nitrogen, 10% available phosphoric acid and 5% soluble potash.
- D. For lawns, provide fertilizer with percentage of nitrogen required to provide not less than 1 lb. of actual nitrogen per 1000 sq. ft. of lawn area and not less than 4% phosphoric acid and 2% potassium. Provide nitrogen in a form that will be available to lawn during initial period of growth; at least 50% of nitrogen to be organic form.
- E. Anti-Desiccant Spray: Shall be an emulsion which provides a protective film over plant surfaces, permeable enough to permit transpiration. The Anti-desiccant shall be delivered in manufacturer's containers and shall be mixed according to manufacturer's directions.
- F. Water: Shall be furnished by the Contractor until the maintenance phase and will be suitable for irrigation and free from ingredients harmful to plant life. Hose and other watering equipment shall be furnished by the Contractor. Self-watering system, where required, shall be Tree Gator 20-gallon capacity refillable watering system, by Spectrum Products, Raleigh, NC, 919-878-8911 or approved equal.
- G. Guying, Staking and Wrapping Materials

1. Wire for tree guys shall be 3/16" - 1 x 7 stainless black steel leftlay strand Type 304 cable as manufactured by U.S. Steel or approved equal.
2. Turnbuckles shall be stainless steel and 4-1/2" lengthwise openings, threaded ends, 5/16" diameter, filled with screw eyes.
3. Hose shall be new black two-ply, reinforced, fiber-bearing garden hose not less than 1/2 inch inside diameter.
4. Stakes for vertical staking shall be white cedar milled 3 inches diameter, as manufactured by L. J. Taylor and Sons, Vincentown, NJ or approved equal.
5. Stakes for guying trees 3 inch caliber or less, shall be of 2" x 4" x 40", one end pointed, wolmanized wood.

### **2.3 PLANT MATERIALS**

- A. Quality: Provide trees, shrubs, and other plants of quantity, size, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock".
- B. All plants shall be freshly dug and neither heeled-in plants nor plants from cold storage will be accepted. Balled and burlapped plants shall come from soil which will hold a firm ball.
- C. Deciduous Trees: Provide trees of height and caliper scheduled or shown and with branching configuration recommended by ANSI Z60.1 for type and species required. Provide single stem trees except where special forms are shown or listed.
- D. Deciduous Shrubs: Provide shrubs of the height shown or listed and with not less than minimum number of canes required by ANSI Z60.1 for type and height of shrub required.
- E. Coniferous and Broadleafed Evergreens: Provide evergreens of sizes shown or listed. Dimensions indicate minimum spread for spreading and semi-spreading type evergreens and height for other types, such as globe, dwarf, cone, pyramidal, broad up-right, and columnar. Provide normal quality evergreens with well-balanced form complying with requirements for other size relationships to the primary dimension shown.
- F. Ground Cover: Provide plants established and well rooted in removable containers or integral peat pots with not less than minimum number and length of runners required by ANSI Z60.1 for the pot size shown or listed.
- G. Container Grown Plants: Container grown plants may be supplied in lieu of balled

and burlapped plants if all other specified requirements are met. These plants shall have been grown in the container for a minimum of one full growing season and a maximum of two years and when delivered, shall have sufficient root growth to hold earth intact when removed from container. They shall not be root bound. Remove container in a way to prevent damage to plant or root system.

## **2.4 GROUND COVER**

- A. Provide plants established and well-rooted in removable containers or integral peat pots and with not less than minimum number and length of runners required by ANSI Z60.1 for the pot size shown or listed.

## **2.5 MISCELLANEOUS LANDSCAPE MATERIALS**

- A. Wood Headers and Edging: Of sizes shown and following wood species.
  - 1. Southern Pine, pressure treated with water borne preservatives for ground contact use complying with AWPB LP-22.
  - 2. Provide wood stakes of the same species, 2" x 2" x 24" long and galvanized nails for anchoring headers and edging.
- B. Steel Edging: Commercial steel edging of size shown on drawings fabricated in sections at 2'-6" o.c. to receive stakes. Provide tapered steel stakes 16" long. Finish edging sections and stakes with manufacturers standard green-black paint.
- C. Tree grates: Campbell pattern 9188 1484 or approved equal, measuring 48" by 48" square. To be ADA compliant, constructed of grey cast iron and free from holes, cracks, cold shuts, etc. and coated with coal tar varnish. Work includes furnishing and placing of grates, and all labor incidental to placement.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Planting Operations
  - 1. The Engineer / Landscape Architect shall be notified 72 hours in advance of the delivery of any plant material to the site. Delivery slips covering all plant material transported to the site shall be furnished to the Engineer / Landscape Architect.
  - 2. Following the signing of the Contract and prior to the commencement of planting, the Contractor shall contact the Engineer / Landscape Architect to work out a schedule for plant material inspection and for planting dates.
  - 3. Upon delivery of plant material to the site, and prior to planting, the Engineer / Landscape Architect shall inspect the delivered plant material in the presence of the Contractor or his designated representative. Any and all plant materials which fail to comply with the Contract drawings and/or



American Association of Nurserymen Standards due to health, form or damage shall be rejected and replaced with conforming materials.

4. Plant pits shall not be pre-dug. **The location of plants, as shown on the drawings is intended only as a guide.** Plants shall be delivered to the site and set on the ground in the location shown. The Engineer / Landscape Architect shall then determine the specific location of each plant in the field prior to planting.
- B. Prior to any digging, the Contractor shall ascertain the location of all utilities in the areas including tanks or other subsurface encumbrances within the contract limit line. Precaution must be taken not to disturb or damage these items. In the event of a conflict with planting, the Contractor shall notify the Engineer / Landscape Architect.
- C. Preparation of Planting Soils
1. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful or toxic to plant growth.
  2. Contractor shall prepare soil mixture as outlined under Section 2.1.
  3. For nursery plantings, use timed release fertilizer packets for all trees and shrubs as per planting details, making sure the packets do not come in direct contact with root ball. Apply as per manufacturer's instructions.
- D. Preparation of Planting Beds:
1. Loosen subgrade of planting bed areas to a minimum depth of 6" using a cultimulcher or similar equipment. Remove stones over 1-1/2" in any dimension, and sticks, stones, rubbish and other extraneous matter.
  2. Spread planting soil mixture to minimum depth required to meet lines, grades and elevations shown, after light rolling and natural settlement. Place approximately 1/2 of total amount of planting soil required. Work into top of loosened subgrade to create a transition layer, then place remainder of the planting soil.
  3. Planters: Place not less than 4" layer of gravel in bottom of planters, install filtration/separation fabric and fill with planting soil mixture consisting of 1 part topsoil, 1 part coarse sand, 1 part peat humus, and 3 lbs. dolomitic limestone per cubic yard of mix. Place soil in lightly compacted layers to an elevation 1-1/2" below top of planter allowing for natural settlement.
- E. Excavation for Trees and Shrubs:
1. Excavate pits, beds and trenches with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage. Loosen hard or compacted subsoil in bottom of excavation. This is particularly important in pits excavated by machine due to compaction and smearing of soils which

can occur, which prevents proper development of root systems.

2. For bare root trees and shrubs, make excavations at least 1'-0" wider than root spread and deep enough to allow for setting of roots on a layer of compacted backfill and with collar set at same grade as in nursery, but 1" below finished grade at site.
3. For balled and burlapped (B&B) trees and shrubs, make excavations at least half again as wide as the ball diameter and equal to the ball depth, plus following allowance for setting of ball on a layer of compacted backfill:
4. For container grown stock, excavate as specified for balled and burlapped stock, adjusted to size of container width and depth.
5. Fill excavations for trees and shrubs with water and allow to percolate out before planting.

## **3.2 PLANTING**

### **A. Planting Trees and Shrubs:**

1. Set balled and burlapped (B&B) stock on layer of compacted planting soil mixture, plumb and in center of pit or trench with top of ball at same elevation as adjacent finished landscape grades. Remove burlap from sides of balls; retain on bottoms. If wire baskets have been used, cut wire baskets at top half and fold down so as to be a minimum of 3" below final grade, prior to any mulching. When set, place additional backfill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3-full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill.
2. Set transplanted trees plumb and in center of pit with top of root ball flush with adjacent finish grades. Orient each tree in the pit so that marked north side of tree aligns with north direction of pit. Backfill around base and sides of ball with planting soil as specified, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3rds full, water thoroughly before placing remaining backfill. Amend top 8-10 inches of planting pit soil as specified in Section 2.2. Repeat watering until no more water is absorbed. Dish top to allow for mulching. Install according to manufacturers specification two (2) 20-gallon Tree Gators, zipped together, for trees 4-12" in caliper. Fill bags with potable water.
3. Set bare root stock on cushion of planting soil mixture. Spread roots and carefully work backfill around roots by hand and puddle with water until backfill layers are completely saturated. Plumb before backfilling and maintain plumb while working backfill around roots and placing layers of soil mixture above roots. Set collar 1" below adjacent finish landscape grades. Spread out roots without tangling or turning up to surface. Cut injured roots

clean; do not break.

4. Set container grown stock as specified for balled burlapped stock, except cut cans on 2 sides with an approved can cutter; remove bottoms of wooden boxes after partial backfilling so as not to damage root balls. Backfill soil shall comply with the Topsoil specified in Section 2.1.
- B. Dish top of backfill to allow for mulching.
- C. Mulch pits, trenches and planted areas. Provide not less than following thickness of mulch and work into top of backfill and finish level with adjacent finish grades.
1. Provide 3" thickness of shredded hardwood mulch at trees.
  2. Provide 2" thickness of shredded hardwood mulch at shrubs and ground covers.
- D. For ground cover planting, space plants as shown on schedule; dig holes large enough to allow for spreading of roots, apply fertilizer at a rate of one (1) pound per twenty (20) square feet, backfill with planting soil. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plant to hold water. Water after planting and mulch as specified.
- E. Tree and Shrub Pruning
1. Prune, thin, and shape trees and shrubs as directed by Engineer / Landscape Architect.
  2. Prune, thin, and shape trees and shrubs according to standard horticultural practice. Prune trees to retain height and spread. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured or dead branches from flowering trees. Prune shrubs to retain natural character. Shrub sizes indicated are sizes after pruning.
- F. All trees and shrubs shall be sprayed with anti-desiccant material immediately after pruning. After pruning, all trees and shrubs shall also be sprayed with insecticide and fungicide. Transplanted trees to be sprayed only upon approval of Landscape Architect.
- G. As indicated in the Drawings, trees shall be guyed, immediately after planting. Pieces of rubber hose or tree tie shall be used under the wires where they are attached to the trees. This work shall be performed only when necessary to stake or guy in areas subject to high winds or on slopes.
- H. Miscellaneous Landscape Work:
1. Install wood headers and edgings where shown. Anchor with wood stakes spaced not more than 3' o.c., and driven at least 1" below top elevation of header or edging. Use 2 galvanized nails per stake to fasten headers and

edging, and clinch point of each nail.

2. Install steel edging where shown. Anchor with steel stakes spaced not more than 3' o.c., and driven at least 1" below top elevation of edging.

### **3.3 MAINTENANCE**

- A. Begin maintenance immediately after planting. Maintain trees, shrubs and other plants until final acceptance but in no case less than one (1) year after substantial completion of planting.
- B. Maintain trees, shrubs and other plants by pruning, cultivating and weeding as required for healthy growth. Restore planting saucers. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required. Spray as required to keep trees and shrubs free of insects and disease. All tree stakes and guys must be removed within 2 growing seasons of the initial planting.
- C. Maintenance to be performed by the Contractor shall include the following:
  1. Watering of plant material as required for each plant type and current weather conditions, but in no case less than once a week for the period between June 15th to September 15th.
  2. Also cultivation, weeding, seasonal spraying, pruning of plant material, and adjusting of stakes, guys, and wrapping, repairs of minor washouts and gullies, and other horticultural operations necessary for the proper growth of all plants.

### **PART 4 – PAYMENT**

- 4.1 There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

### **END OF SECTION 02480**

## **SECTION 02485 - FINISH GRADING, SEEDING AND AMENITIES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of work is shown on drawings and in schedules.
- B. The work includes, but is not limited to, the following.
  - 1. Soil erosion and sediment control.
  - 2. Fine grading of topsoil.
  - 3. Application of lime and fertilizer.
  - 4. Seeding.
  - 5. Sodding.
  - 6. The task items specified above must be applied to all disturbed areas, whether or not indicated on the drawings. Include adjacent property wherever grass is disturbed in execution of this contract.
- C. See notes on drawings for additional requirements relating to work of this section, including the Soil Erosion and Sediment Control Plan and Notes and Details.
- D. Subgrade Elevations: Excavation, filling and grading required to establish the elevations shown on drawings are not specified in this section. Refer to Earthwork, Section 02200.
- E. Refer to Earthwork Section 02200 for as-built drawings required prior to finish grading and seeding work.
- F. Refer to Section 02514 – Site work Concrete for concrete work.

#### **1.3 QUALITY ASSURANCE**

- A. Conform to the requirements of "Standards for Soil Erosion and Sediment Control in New Jersey", current edition, promulgated by the NJ State Soil Conservation Committee, hereinafter referred to as "standards". Compliance with the certified Soil Erosion and Sediment Control Plans and Details is mandatory.

- B. Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

#### **1.4 SUBMITTALS**

- A. Certification: Submit certificates of inspection as required by governmental authorities, and manufacturer's or vendors certified analysis for soil amendments and fertilizer materials. Submit other data substantiating that materials comply with specified requirements.
- B. Submit certified analysis from a recognized laboratory shall be submitted for site topsoil stockpile for re-use as required in this specification. Certified analysis shall be made to determine compliance with requirements for topsoil stockpiled on-site as hereinafter specified under "Materials". Additional topsoil may be required to be imported from off-site in order to comply with these specifications. Certified analysis for an imported topsoil material shall also be provided to verify compliance with these Specifications. See also subsection C below. The costs of the tests shall be borne by the Contractor. Reports of the tests shall be submitted to the Architect in writing.
- C. Imported materials must include a written certification from the supplier stating that the fill is virgin material, and if it is from an agricultural, commercial or non-commercial source. The material shall also be tested and be certified free of contamination or hazardous materials. Testing parameters shall be based on the source of the material, which shall be declared to Architect/Engineer in writing. The Architect/Engineer may require supplemental testing by Contractor prior to importation at no cost to the Owner.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Materials imported for use as topsoil, and for detention basin infiltration sand, shall be segregated and protected from contamination prior to use. Topsoil shall be stockpiled and temporarily stabilized in accordance with the Erosion Control Standards.
- B. Lawn Seed: Furnish in duplicate, signed copies of a statement from the vendor, certifying that each container of seed delivered is fully labeled in accordance with the Federal Seed Act. This certification shall appear on or with all copies of invoices for seed.
- C. Furnish in duplicate copies of invoices for all fertilizer used on the project.

#### **1.6 JOB CONDITIONS**

- A. Utilities: Determine location of underground utilities and perform work in a

manner that will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal.

- B. Obtain copies of and abide by all conditions of the approvals and permits issued by the local Soil Conservation District.
- C. Special Project Warranty: See Part 1, Section 01900, Guarantees and Warranties.

## **1.7 PAYMENT**

- A. The lump sum price bid shall include all material, equipment and labor necessary to perform final grading and stabilization and maintain the same until final acceptance.

## **1.8 RELATED SECTIONS**

- A. Section 02200 – Earthwork
- B. Section 02485 – Finished Grading
- C. Section 02236 – Soil Erosion and Sediment Control
- D. AIA A232 & Section 00800 - Submittals

## **PART 2 - PRODUCTS**

### **2.1 TOPSOIL**

- A. The existing topsoil shall be tested and, if necessary, shall be made to conform to the pH acidity range and percentage of organic matter, and other requirements as listed below. Additional topsoil may be required; it shall be furnished by the Contractor at no additional expense, and shall be tested and made to meet the requirements listed below. Tests shall be made by the Contractor at his expense.
- B. All topsoil (new and existing) shall be of uniform quality, free from hard clods, roots, sods, stiff clay, hard pan, stones larger than 1 inch, lime cement, ashes, slag, concrete, tar residues, tarred paper, boards, chips, sticks, or any undesirable material.
- C. Topsoil shall contain a minimum of 2.75% organic matter in accordance with the current method of the Local Soil Conservation District. The acidity range shall be Ph 5.0 to Ph 7.0, inclusive. Soluble salts, as determined by electrical conductivity testing, shall not exceed 0.5 milliohms per centimeter.

D. The mechanical analysis of the soil shall be:

Quantity Percent oven dry weight	Size Fraction	Range of Particle Diameter in Inches
Less than 2%	Gravel	Larger than 1
Less than 3%	Gravel	1/4 to 1
Less than 10%	Gravel	2/25 to 1/4
40% to 65 %	Sand	1/500 to 2/25
25% to 40 %	Silt	1/12,500 to 1/500
Less than 12%	Clay	Smaller than 1/12,500

Passing	Retained On	Percent
1" Screen		100%
1" Screen	½" Screen (gravel not more than)	3%
1/4" Screen	#100USS Sieve (coarse, medium & fine sand)	40-60%
#100USS Sieve	(Very fine sand, silt & clay)	12-40%

E. Sufficient native topsoil is to be retained and stockpiled on-site to adequately restore the site in accordance with these specifications. If topsoil is required to be imported to the project, obtain topsoil from local sources or from areas having similar soil characteristics to that found at project site. Obtain topsoil only from naturally, well-drained sites where topsoil occurs in a depth of not less than 5 inches; do not obtain from bogs or marshes. The source of imported topsoil is to be inspected and approved by the Architect prior to approval of its use and importation.

F. All soil materials proposed to be imported to the site shall be certified by an independent testing agency to be free from contamination, in accordance with the standards of the N.J.D.E.P., and the U.S. Environmental Protection Agency. Written certification to be received, and approval by Owner issued prior to any importation activity.

## 2.2 SOIL AMENDMENTS

A. **Provide the following as recommended by the Local Soil Conservation District or, if not required by the District, provide as indicated below. In the case of conflicting standards, the standards of the Soil Conservation District govern.**

B. Lime: Natural limestone containing not less than 85% of total carbonates, ground so that not less than 90% passes a 10-mesh sieve and not less than 50% passes a 100-mesh sieve.

1. Agriculture Pulverized Limestone: 50% calcium availability.

2. Commercial Fertilizer: Complete fertilizer of neutral character with some



elements derived from organic sources and containing following percentages of available plant nutrients.

3. Provide fertilizer with not less than 4% phosphoric acid and not less than 2% potassium, and percentage of nitrogen required to provide not less than 1 pound of actual nitrogen per 1000 square feet of lawn area. Provide nitrogen in a form that will be available to lawn during initial period of growth.
  - a. Refer to permanent Seeding Requirements shown on drawings for fertilizer specifications.
- C. Weed Killer: Type selected by the Seeding Subcontractor and approved by the local authorities having jurisdiction. Apply to planting and ground cover areas, in strict accordance with the manufacturer's recommendations.
- D. Grass seed shall be fresh, re-cleaned seed of the latest crop mixed in the following proportions by weight and meeting the following standards of pure live seed content. The tolerance for P.L.S. (purity x germination) shall be those called official and tabulated on page 5, Department of Agriculture Bulletin No. 480.
  1. Lawn Materials: Refer to "Seed Mix" on turf seeding and application specifications on Soil Erosion and Sediment Control drawings.
  2. All seed shall be fresh and clean and shall be "new crop" seed. All seed shall be delivered in the original packages, unopened, which shall bear the manufacturer's guaranteed analysis. No packages shall be opened or seed labels removed until inspected by the Architect.
- E. Water: Water used in the work will be suitable for irrigation and free from ingredients harmful to plant life. Hoses, sprinklers and other water equipment required for the work shall be furnished by the Contractor at no additional cost or expense.

### **2.3 EROSION CONTROL**

- A. Silt Fence: Material to conform with the requirements of the Standards for Soil Erosion and Sediment Control in New Jersey, as amended, and New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, as amended.
- B. Erosion Control Fabric: Where required, is to conform with the requirements of a Flexible Channel Liner as outlined in the Standards for Soil Erosion and Sediment Control in New Jersey, as amended and New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, as amended. Shall be a minimum of Type E as defined therein, as manufactured by American Excelsior, BonTerra, North American Green, or approved equal.

## **PART 3 - EXECUTION**

### **3.1 GENERAL REQUIREMENTS**

- A. Perform all work to reasonably control soil erosion resulting from construction operations, including the work of other contractors on the project, and to prevent excessive flow of sediment from the construction site.
- B. The Contractor shall adhere to the requirements of the Soil Erosion and Sediment Control Plan. When no work will be performed on critical areas for more than 30 days, they shall be protected by temporary seeding, and mulching in accordance with drawings. Earth berms or diversions shall be constructed to intercept and divert runoff water away from critical areas.
  - 1. Diversion outlets shall be stable or shall be stabilized by paving or other means acceptable to Architects.
- C. Permanent restoration of vegetative cover on all areas shall be accomplished within 10 days after final grading operations have been completed. Time extensions beyond the 10 days requirement may be requested in writing and are subject to written approval by the Architect.
- D. Excavated soil materials shall not be placed adjacent to wetlands streams and bodies of water.
- E. Pollutants such as chemicals, fuels, lubricants and other harmful waste shall not be discharged into or alongside of streams, wetlands, impoundments or into natural or man-made channels leading thereto.

### **3.2 PROTECTION FOR CRITICAL AREAS**

- A. Except as otherwise directed by the local Soil Conservation District, or as outlined and details on the Plans, the type of protection for critical areas shall be optional with the Contractor.
- B. Protection shall be by means of straw mulch, hydro seeding or matting, applied in conformance with referenced standards.
- C. Critical areas shall be those areas subject to excessive erosion due to highly erodible soils, slope length and steepness or water concentrations, including overflow spillways.

### **3.3 PREPARATION OF SUBGRADE AND SPREADING OF TOPSOIL**

- A. The subgrade soil shall be loosened to a depth of 6 inches and graded to remove all ridges and depressions so that it will be everywhere parallel to proposed finished grade. All stones over 2 inches in any dimension, sticks, rubbish and other extraneous matter shall be removed during this operation. No heavy equipment shall be moved over lawn areas after the subgrade soil has been

prepared before topsoil is spread. This scarification must be done and approved before topsoil is spread.

- B. After the subgrade soil has been prepared, topsoil shall be spread evenly thereon and the area then rolled with a 200 lb. roller so as to produce a minimum compact depth of five (5) inches of topsoil. No topsoil shall be spread in frozen or muddy conditions. In all lawn areas, the finished surface of the topsoil shall conform and shall be free from hollows or other inequalities, stones over 1 inch every dimension, sticks, and other extraneous matter.

### **3.4 SEEDBED PREPARATION, FERTILIZING AND SEEDING (LAWN AREAS)**

- A. Before any seed is sown, the topsoil shall be cultivated (raked) to a depth of 3" - 4" to produce an even, friable surface or moderately coarse particles. Do not work soil into dusty powder. No fertilizer shall be applied or seed sown on any area which has not been so prepared.
- B. Fertilizer and limestone shall be applied to lawn areas at the rate as indicated on drawings. Fertilizer and limestone shall be spread evenly on the newly prepared soil prior to seeding and incorporated into the topsoil as stated in the Permanent Seeding Requirements shown on drawings.
- C. Ground limestone shall be evenly distributed in an amount related to the pH and worked into the top three (3) inches of soil at least 5 days before applying commercial fertilizer. Commercial fertilizer shall be worked lightly into the top 3 inches of the soil of new areas.
- D. Lawn shall be seeded with the seed mixes and rates as specified in the Permanent Seeding Requirements shown on drawings. The seed shall be sown in a uniform application by the use of an accurate spreader, properly calibrated, in the opposite direction of fertilization. The spreader shall be set at the specified rate. After the seed has been applied lightly, mix into surface by pulling a short section of chain link fence (or an alternate method if approved by the Architect) over the seeded area. Do not roll seed bed unless specifically ordered by the Architect. If rolling is deemed to be necessary by the Architect, it shall be done with 100 lb. roller or less and under his direction.

### **3.5 MULCHING**

- A. Mulching is required on all seeding. Mulch will insure against erosion before grass is established and will promote faster and earlier establishment. (The existence of vegetation sufficient to control soil erosion shall be deemed compliance with this mulching requirement.)
  - 1. Mulch materials should be unrotted small grain straw, hay free of seeds, or salt hay to be applied at the rate of 1-1/2 to 2 tons per acre (70 to 90 pounds per 1,000 square feet), except that where a crimper is used instead of a liquid mulch-binder (tacking or adhesive agent), the rate of application must

be double the lower rate. Mulch chopper-blowers must not grind the material.

2. Spread uniformly by hand or mechanically so that approximately 85% of the soil surface will be covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 square feet sections and distribute 70 to 90 pounds within each section.
3. Mulch anchoring should be accomplished immediately after placement to minimize loss by wind or water. This may be done by one of the following methods, depending upon the size of the area, steepness of slopes, and costs.
  - a. Peg and Twine - Drive 8 to 10 inch wooden pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine between pegs in a criss-cross and a square pattern. Secure twine around each peg with two or more round turns.
  - b. Mulch Nettings - Staple paper, jute, cotton, or plastic nettings to the soil surface. Use a degradable netting in areas to be mowed.
  - c. Crimper (mulch anchoring tool) - A tractor-drawn implement, somewhat like a disc harrow, especially designed to push or cut some of the broadcast long fiber mulch 3 to 4 inches into the soil so as to anchor it and leave part standing upright. This technique is limited to areas traversable by a tractor, which must operate on the contour of slopes. Straw mulch rate must be 3 tons per acre. No tacking or adhesive agent is required.
4. Liquid Mulch-Binders - May be used to anchor salt hay or straw mulches.
  - a. Applications should be heavier at edges where wind catches the mulch, in valleys, and at crests of banks. Remainder of area should be uniform in appearance.
  - b. Use of the following:

Synthetic or Organic binders - binders such as Curasol, DCA-70, Petro-set, and Terra-Tack may be used at rates recommended by the manufacturer to anchor mulch materials.

NOTE: All names given above are registered trade names. This does not constitute a recommendation of these products to the exclusion of other products.
5. Wood-fiber or paper-fiber mulch at the rate of 1,500 pounds per acre may be applied by a hydro seeder. Use is limited to flatter slopes and during

optimum seeding periods in spring and fall.

### **3.6 SEEDING PERIOD**

- A. Permanent seeding shall be executed according to the following schedule: From 1 March to 15 May or 15 August to 1 October. This period may be extended or reduced according to prevailing weather conditions at the time, as directed by the Architect.

### **3.7 LAWN PROTECTION**

- A. Adequate protection shall be provided at all times for lawn areas against trespassing by any individuals and damage of any kind during planting or other operations. Such protection shall be maintained from the completion of seeding to the completion of the Contract Work.

### **3.8 MAINTENANCE OF LAWNS**

- A. The Contractor shall be responsible for all areas during the period when the grass is becoming established and until all work under this Contract is completed and accepted.
- B. Maintenance shall include but not be limited to reseeding, watering, mowing and reworking as follows:
  - 1. Reseeding of any bare areas.
  - 2. Proper and adequate watering.
    - a. The lawn area shall be watered daily and as may additionally be required until germination.
    - b. Upon germination, the lawn area shall be watered twice a week with an accumulation of ½ inch of water at each watering.
    - c. The above watering schedule is a minimum and shall be changed at the discretion of the Architect according to climatic conditions, etc.
  - 3. If any portion of the surface becomes eroded, washed out, gullied or otherwise damaged following seeding, the affected portion shall be repaired to re-establish the conditions and grade of the soil prior to seeding and shall then be reseeded as specified herein.
- C. Mowing: The grass shall be properly mowed to a height of 2 inches when the grass attains a height of 3 inches. It is essential that at all times the mower blades are kept sharp.
- D. Reworking and reseeding of any areas which fail to show a uniform stand of grass

shall be done at the Contractor's expense with the same seed mixture applied at the rate originally used and repeated until all areas are covered with a satisfactory stand of grass.

- E. It is the Contractor's responsibility to carry out the above operations on a continuing basis until a uniform, thick stand of specified grasses is established and until acceptance by the Architect.

### **3.9 INSPECTION AND ACCEPTANCE**

- A. Inspection of the seeding and related work to determine completion of Contract work will be made by the Architect upon notice requesting such an inspection by the Contractor several days prior to the anticipated date. The conditions of the planting and lawns will be noted and determination made by the Architect whether maintenance shall be continued in any part.
- B. After inspection, the Contractor will be notified in writing by the Architect of acceptance of the work or, if there are any deficiencies, the requirements for completion of the work. Remaining work to be done shall be subject to inspection before acceptance. Maintenance shall become the responsibility of the Owner immediately upon acceptance.

### **3.10 CLEAN UP**

- A. The Contractor shall dispose of excess materials and debris including but not limited to branches, paper, and rubbish resulting from this work off-site and in a legal manner.
- B. All areas shall be left neat and clean; and, upon completion of the work, the site shall be left in an orderly condition satisfactory to the Architect.

## **PART 4 - PAYMENT**

- 1.1 There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

## **END OF SECTION 02485**

## **SECTION 02506 - HOT MIX ASPHALT PAVEMENT**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. This work shall consist of the construction of new bituminous stabilized base course, bituminous concrete surface course, and bituminous concrete surface course overlays.

#### **1.3 SUBMITTALS**

- A. An NJDOT design mix shall be submitted to and approved by the Engineer prior to the installation of any paving materials.

#### **1.4 JOB CONDITIONS**

- A. Utilities - Prior to placement of any bituminous stabilized base paving or bituminous concrete surface course, all utilities onsite --manholes, water valves, gas valves, drainage structures, utility poles and similar items - shall be relocated or adjusted to and set at final elevations. All inlets and other structures shall be set to the final elevation. All utilities so set shall be clearly and conspicuously denoted by placing and firmly embedding a piece of lumber two inches (2") by four inches (4"), adjacent to the item, protruding a minimum of three feet (3') above the subgrade elevation. The cost of all necessary relocation and adjustment shall be borne by the Contractor, unless:

(1) The Owner of the utility, or his agents, perform and bear the cost of, or reimburse the Contractor for, such operations; or

(2) There are specific items pertaining to these operations in the Contractor's Proposal.

#### **1.5 PAYMENT**

- A. There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

#### **1.6 RELATED SECTIONS**

- A. Section 02485 – Finished Grading

- B. Section 02100 – Traffic Control
- C. AIA A232 & Section 00800 - Submittals

## **PART 2 - PRODUCTS**

- A. All bituminous concrete and bituminous materials shall be in accordance with NJDOT Standard Specifications for Road and Bridge Construction as amended or supplemented. Subbase shall consist of dense graded aggregate (DGA), base shall consist of bituminous stabilized base stone mix HMA19M64, surface course shall consist of bituminous concrete surface course mix HMA9.5M64, tack oil shall be SS-1 Asphalt Emulsion when ambient temperature is above 32 degrees Fahrenheit or RC-70 cutback asphalt when ambient temperature is below 32 degrees Fahrenheit, joint sealer shall consist of rubberized asphalt meeting Federal Specification No. SS-5-1401C and ASTM D-3405.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION**

- A. If required by the Engineer, the construction plans or the supplementary specifications, samples of all materials to be employed shall be taken by the Contractor and tested by an independent skilled laboratory, at the Contractor's expense, the cost of which is to be included in the lump sum price of the various bid items. Certified copies of all test results shall be sent to the Engineer by the laboratory. If any or all samples fail to pass the requirements of these specifications and yet are within tolerable limits that can be justified and approved by the Engineer for the use intended, then payment will be made to the Contractor, providing that the Maintenance Bond period is extended one (1) year beyond that specified elsewhere in these specifications, in an amount equal to one hundred percent (100%) of the value, as bid in the Contractor's proposal, of the non-passing material.

### **3.2 PREPARATION OF ASPHALTIC BASES**

- A. All asphaltic surfaces shall be swept clean of all stones, rubble and other foreign material, to the satisfaction of the Engineer, prior to the placement of the tack coat or pavement. The surface shall be clean and dry prior to tack coat.

### **3.3 PREPARATION OF VERTICAL SURFACES**

- A. Prior to placement of pavement, the vertical face of curbs, gutters, drainage structures, manholes and other contact surfaces shall be sprayed or painted with a uniform coating of tack oil to provide closely bonded, watertight joints. This procedure will also be employed to continue placement of new asphaltic material when it is to abut or meet a previously placed pavement. The previously placed pavement shall be prepared in accordance with the above specifications if, in the opinion of the Engineer, the previously laid pavement



has cooled to air temperature, or if the exposed face required cleaning prior to the placement of the new pavement or base. The work described above shall be done in such a way that all surfaces, which shall remain exposed, will not be stained or discolored.

### **3.4 BITUMINOUS LEVELING COURSE**

- A. Prior to resurfacing or placement of final surface course, the Contractor shall construct a leveling course where designated by the Engineer. The leveling course shall be utilized to insure proper drainage of the pavement and crown. The material shall be either bituminous stabilized base or bituminous surface course, Type FABC, as directed by the Engineer as the situation warrants. Where tack coat is necessary, it shall be applied prior to the placement of the leveling course. The bituminous leveling course shall be constructed at variable thickness as directed by the Engineer.

### **3.5 TACK COAT**

- A. Tack Coat shall be applied on the Bituminous Stabilized Base Course and/or existing pavement in uniform spray to achieve full cover. If field conditions warrant, the Engineer may eliminate the tack coat.
- B. The rate of application shall be approximately 0.10 gallons per square yard or the amount deemed necessary by the Engineer. Application rate for milled surfaces shall be increased as required based on surface condition. Placement methods shall conform with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, Section 904, as amended or supplemented. Tack coat shall be applied so as to coat the existing surface uniformly with no excess ponding. "Dribbling" of tack coat is strictly prohibited. The coverage must be uniform.

### **3.6 BITUMINOUS SURFACE COURSE**

- A. All equipment, tools, machinery and other appliances used in handling materials and executing any part of the work shall be subject to the approval of the Engineer. All bituminous surface courses shall be placed to a true line and grade. The finished surface shall not vary more than three-sixteenths (3/16) of an inch in ten feet (10') from the true profile and cross-section. The test for surface smoothness shall be made by the Contractor, in the presence of the Engineer, immediately after initial compaction, so that variations can be corrected. The outside edges of all pavement, not confined within curbs, shall be trimmed neatly to line while the course is being finished. Within twenty-four (24) hours, all edges shall be confined and protected by the placement and compaction of dense graded aggregate, topsoil or other similar material, unless otherwise shown on the construction plans. The appearance of the final finished surface shall be uniform in texture and appearance.
- B. If indentations occur in the final surface, due to settlement of the subgrade, improper compaction or any other reason, and the amount of change in the

surface is greater than three-sixteenths (3/16) of an inch in ten feet (10') from the true profile and cross section, or if areas of distress occur in the pavement, they shall be corrected by the Contractor, by completely removing the affected area, as designated by the Engineer, and replacing the removed defective pavement with materials similar to those removed. All defective pavement shall be neatly cut at the edges and replaced, in accordance with these specifications, with no additional compensation or payment to the Contractor.

C. Prior to the placement of the surface course, an inspection shall be made by the Engineer, or his representative. No surface course shall be placed if any of the following items are applicable and found at the time of inspection:

- (1) Curb sections which require repair or replacement;
- (2) Areas of distress in the base course;
- (3) The surface of the base course is inadequately cleaned and prepared, if required;
- (4) The tack coat is applied in excess;
- (5) All utilities and underground construction is not completed or accepted;
- (6) All inlets, valves and other items are not at the required elevation;
- (7) The base course grade does not conform to true grade, cross section and crown.

### **3.7 JOINT CONSTRUCTION**

#### **(1) TRANSVERSE JOINTS**

- A. Transverse joints in the base course, if required, and the surface course shall be carefully constructed and thoroughly compacted to provide a smooth riding surface. Joints shall be straight edged or string lined to assure smoothness and true alignment.
- B. The transverse joints in the surface course shall be constructed and formed with a bulkhead, such as a board of the proper thickness, with a tapered ramp for operation of the roller. The ramp is to be discarded when the bulkhead is removed. If the bulkhead slips, the pavement is improperly placed, or if the roller is permitted to roll over the edge of the newly placed material, the line of the joint shall be located a sufficient distance back of the rounded edge, as indicated by a straight edge, to provide a true surface and cross section. When the material must be trimmed, it shall be done with a pavement power saw.
- C. All joint faces shall be painted or sprayed with a thin coating of asphalt before placing new material. The screen of the paver shall be well heated before spreading operations commence. If the new material is flush or nearly flush

with the older pavement, it may be too low after compaction. If so, the fresh material shall be loosened with rakes to a depth of approximately one-half inch (1/2") and the desired amount of material added and butted smooth. If the new material is too high after the pass with the tandem roller, it shall be loosened with rakes and the excess removed and wasted before rolling operations continue.

- D. Where a transverse joint is to be made next to an adjoining lane, the first pass of the roller shall be made with the roller moving along the longitudinal joint for several feet. The surface shall then be straight-edged and corrected, if necessary. The joint shall then be rolled transversely, with the roller on the previously placed material, except for a six inch (6") projection of the wheel(s). This operation shall be repeated with successive passes, each covering six inches (6") to eight inches (8") of fresh material, until the entire width of a drive roll is on the new material. Transverse joints shall be offset at least twenty-four inches (24") from the preceding or following joints.

## (2) LONGITUDINAL JOINTS

- A. The width of spread shall be planned by the Contractor to provide for the offsetting of the longitudinal joints in succeeding layers of pavement. The minimum offset shall be at least six inches (6").
- B. Unless paving in echelon, the maximum length of a single pass shall be 1500 feet or a length that will allow for a minimum joint temperature of 150 degrees Fahrenheit. If the joint temperature drops below 150 degrees Fahrenheit the joint shall be tacked prior to placement of successive pass.
- C. Longitudinal joints shall be rolled directly behind the spreading operation. The first lane placed shall be true to line and grade within the tolerances of these specifications. Before compaction, all material along unsupported edges shall be butted and slightly elevated in such a way that the full weight of the roller will bear on the material to the extreme edges of the mat. The material being placed in the adjacent lane shall then be tightly crowded against the vertical face of the preceding lane. There shall be an overlap of one inch (1") to two inches (2") of material over the preceding lane. The loose material shall be sufficiently high to allow for compaction to the depth of the previously rolled lane. Prior to compaction and immediately following spreading operations, the joint shall be groomed.
- D. To assure a true line, the paver shall follow a line or markings placed along the joint for alignment purposes. The width and depth of the overlapped material shall be kept uniform. If the edge of the preceding lane is distorted by traffic or any other means, or if it is not placed the same day, the edge shall be carefully trimmed to line with a pavement power saw and painted or sprayed with a thin coating of asphalt before the abutting lane is placed.
- E. Longitudinal joints shall be rolled directly behind the paving operation. If a three (3) wheel roller is being used, it shall be shifted over onto the previously

placed lane so that not more than six inches (6") of the rear roller wheel rides on the edge of the fine material left by brooming. The roller shall continue to operate along this line, shifting position gradually across the joint, until a neat, thoroughly compacted joint is obtained.

### **3.8 ROLLING OR COMPACTION PROCEDURE**

When paving in a single width, the first lane placed shall be rolled in the following order:

- (1) Transverse joints;
- (2) Outside edge;
- (3) Initial or breakdown rolling, beginning on the low side and progressing to the high side;
- (4) Second rolling - same procedure as (3) above;
- (5) Finish rolling.

When paving is in echelon or abutting a previously placed lane, the mix shall be rolled in the following order:

- (1) Transverse joints;
  - (2) Longitudinally 6" from cold joint on hot mat;
  - (3) Longitudinal joints;
  - (4) Outside edge;
  - (5) Initial or breakdown rolling, beginning on the low side and progressing to the high side;
  - (6) Second rolling - same procedure as (4) above;
  - (7) Finish rolling.
- A. When paving in echelon, three inches (3") of the edge which the second paver is following shall be left unrolled and rolled when the joint between the lane is rolled. Edges of the pavement shall not be exposed more than fifteen (15) minutes without being rolled. At least two (2) rollers are required at all times, except on small jobs, as determined by the Engineer.
- B. Extreme care shall be used by the roller operator to not operate the roller directly on the crown of the driveway and cause a decreased crown. When the roller must pass from one side of the driveway to other over the crown, the

roller should be moved to a location where the mix has cooled and compaction is complete so as to not remove the crown of the newly placed mat.

- C. Vibratory roller operators should set and/or adjust driving speed to control amplitude and frequency to prevent crushing and segregation of aggregate based on mat thickness.

### **3.9 INACCESSIBLE AREAS FOR ROLLERS**

- A. Compaction shall be obtained by hand tampers, mechanical tampers or small vibrating plated compactors in all areas inaccessible for rollers. The equipment to be used shall be on the construction site and approved by the Engineer before any paving commences.

### **3.10 JOINT SEALING**

- A. All joints between newly placed hot mix asphalt and existing pavement shall be sealed with rubberized asphalt. This includes but is not limited to intersections, driveways and cold longitudinal joints. The joint shall be in accordance with the detail shown on the plans and shall be contracted to a uniform width of 6".

**END OF SECTION 02506**

## **SECTION 02514 - SITEWORK CONCRETE**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK**

- A. Extent of concrete work is shown on drawings.
  - 1. Curbs, concrete walks, and concrete driveway aprons where shown, including detectible/tactile warning surface.

#### **1.2 RELATED SECTIONS**

- A. Section 02100 – Traffic Control
- B. Section 02110 – Site Clearing
- C. Section 02248 – Shoring and Bracing
- D. Section 02200 - Earthwork
- E. Section 02485 – Final Grading and Seeding

#### **1.3 QUALITY ASSURANCE**

- A. Codes and Standards
  - 1. Comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.
    - ACI 301 "Specifications for Structural Concrete for Buildings."
    - ACI 311 "Recommended Practice for Concrete Inspection."
    - ACI 318 "Building Code Requirements for Reinforced Concrete."
    - ACI 347 "Recommended Practice for Concrete Formwork."
    - ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete."
    - Concrete Reinforcing Steel Institute, "Manual of Standard Practice."
    - Non-Slip Finish for Walkways: Provide finish in accordance with International Building Code, latest NJ Edition, CABO/ANSI A117.1, for non-slip finish.
- B. Concrete Testing Service: Employ, at the Contractor's expense, a testing laboratory acceptable to the Architect to perform material evaluation tests and to design concrete mixes.

#### **1.4 SUBMITTALS**

- A. Submit all test reports to Architect. Submit copies of all delivery receipt tickets to Architect.
- B. Submit manufacturer's product data with application and installation instructions

for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems and others as requested by the Architect.

- C. Submit samples of materials as specified and as otherwise may be requested by the Architect/Engineer, including names, sources and descriptions as required.

## **1.5 JOB CONDITIONS**

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities, for facility operation and for public use in accordance with Section 02100 – Traffic Control.

## **PART 2 - PRODUCTS**

### **2.1 FORM MATERIALS**

- A. Construct formwork for exposed concrete surfaces with plywood, metal, or other acceptable materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.
- B. Provide commercial formulation form-coating compounds that will not bond with, stain or adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces to be cured with water or curing compound. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

### **2.2 REINFORCING MATERIALS**

- A. Welded Wire Fabric (WWF): ASTM A 185, welded steel wire fabric.

### **2.3 CONCRETE MATERIALS**

- A. Portland Cement: ASTM C 150, Type 1, unless otherwise acceptable to the Architect.
- B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for all exposed concrete.
  - 1. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances.
  - 2. Coarse Aggregate: Clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter as follows:
    - a. Maximum Aggregate Size: Not larger than one-fifth of the narrowest

dimension between sides of forms, one-third of the depth of slabs.

- C. Water: Clean, fresh, drinkable.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Water-Reducing Admixture: ASTM C 494, Type A.
- F. Set-Control Admixtures: ASTM C 494.
- G. Anti-Spalling Compound: 50 percent (by volume) boiled linseed oil and 50 percent (by volume) commercial grade kerosene or mineral spirits.
- H. Calcium Chloride will not be permitted in concrete, unless specifically authorized in writing by the Architect.

## **2.4 RELATED MATERIALS**

- A. Preformed Expansion Joint Fillers: Specified in Section 07900.
- B. Curing Compounds: Exterior slabs shall be cured with a compound that shall conform to Federal Specification TT-C-800A, with 30 percent solids, minimum, such as "Masterseal" as manufactured by Master Builders, or approved equal.
- C. Detectable / Tactile Warning Surface for handicap ramps: Preformed surface tile with raised bumps of truncated domes, of a high visibility color, designed to be cast in place, meeting all Federal, State and local code regulations for handicap accessibility, including Americans with Disabilities Act, such as "Armor-Tile" manufactured by Engineered Plastics, inc. Tel: 800-682-2525, or approved equal.

## **2.5 PROPORTIONING AND DESIGN OF MIXES**

- A. Prepare design mixes in accordance with applicable provisions of ASTM C 94. Use an independent testing facility acceptable to the Architect for preparing and reporting proposed mix designs.
- B. Submit written reports to the Architect of proposed mix at least fifteen (15) days prior to the start of the work. Do not begin concrete production until mixes have been reviewed by the Architect.
- C. Design mix to provide normal weight concrete with the following properties.
  - 1. 4500 psi 28-day compressive strength.
- D. Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant at no additional cost to the Owner and as accepted by the Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Architect before using in the work.



E. Admixtures

1. Use air-entraining admixture in exterior exposed concrete. Add air-entraining admixture at the manufacturer's prescribed rate to result in concrete at the point of placement having air content within the following limits.
  - a. Concrete exposed to freezing and thawing or subjected to hydraulic pressure:  
  
5 percent for maximum 2-inch aggregate.  
6 percent for maximum  $\frac{3}{4}$ -inch aggregate.
  - b. Maximum water cement ratio: 0.40.
2. Use admixtures for water-reducing and set-control in strict compliance with the manufacturer's directions.

F. Slump Limits including Ready-Mix Concrete

1. Ramps and Sloping Surfaces: Not more than 3 inches.
2. All Other Concrete: Not less than 1 inch and not more than 4 inches.

G. Ready-Mix Concrete: Comply with the requirements of ASTM C 94 and as herein specified.

**PART 3 - EXECUTION**

**3.1 FORMS**

- A. Construct forms complying with ACI 347, to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work.
- B. Form Ties: Factory-fabricated, adjustable length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete surfaces upon removal. Provide form ties that will not leave holes larger than 1 inch in diameter in concrete surface.
- C. Check completed formwork for grade and alignment to the following tolerances:
  1. Top of forms not more than  $\frac{1}{8}$  inch in 10 feet.
  2. Vertical face on longitudinal axis or radius, not more than  $\frac{1}{4}$  inch in 10 feet.
- D. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

- E. Depressed curb shall be installed one and one-half (1-1/2) inch above the adjacent existing or proposed pavement grade. Depressed curb at handicapped ramps shall be flush with the existing or proposed finished pavement grade. Excavation for depressed curb shall be full depth in accordance with the plan details. For granite block installations, it will not be permitted to install the curb blocks in any location such that they are not properly positioned as detailed on the plans.

### **3.2 REINFORCEMENT**

- A. Reinforce walks with welded wire mesh, as indicated on Contract Drawings.
- B. Comply with the specified codes and standards, and Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
- C. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one (1) full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

### **3.3 JOINTS AND SCREEDS**

- A. Provide expansion joints between new and existing curbs and concrete paving, between new curbs or concrete paving and vertical surfaces, and where required by the plan notes and details, but not exceeding 20 feet o.c. in all directions. Extend joint fillers full width and depth of joint, and not less than 1/2 inch or more than 1 inch below finished surface. Fill flush with sealer, as specified in Section 07900. Concrete shall be allowed to expand in not less than 2 directions.
- B. Weakened-Plane (Contraction) Joints: Provide weakened-plane joints, sectioning concrete into areas as shown on drawings. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:
  - 1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
  - 2. Provide tooled joints on 5 foot centers each way for paving and walks or as shown on the drawings.
- C. Set edge forms or bulkheads and intermediate screed strips for slabs to obtain the required elevations and contours in the finished slab surface. Provide and secure units sufficiently strong to support the types of screed strips by the use of strike-off templates or accepted compacting type screeds.
- D. Granite Block: The joints shall be not more than one-quarter (1/4) inch wide for dressed block, and three-eighths (3/8) inch wide for quarry split block. The joints shall be pointed with 1:1 cement-sand mortar mix and neatly tool finished.

### **3.4 PREPARATION OF FORM SURFACE**

- A. Coat the contact surfaces of forms with a form coating compound before reinforcement is placed.
- B. Do not allow excess form coating material to accumulate in the forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with the manufacturer's instructions.

### **3.5 CONCRETE PLACEMENT**

- A. Before placing concrete, inspect and complete the formwork installation and reinforcing steel.
- B. Comply with ACI 304, and as herein specified.
- C. Request inspection by Engineer/Architect prior to placing and concrete.
- D. Deposit concrete paving in a continuous operation, as nearly as practicable to its final location to avoid segregation due to rehandling or flowing.
- E. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping, and use equipment and procedures for consolidation of concrete in accordance with the recommended practices of ACI 309, to suit the type of concrete and project conditions.
- F. Bring slab surfaces to the correct level with a straightedge and strikeoff. Use bull floats or darbies to smooth the surface, leaving it free of humps or hollows. Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations.
- G. Maintain reinforcing in the proper position during concrete placement operations.
- H. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306.
- I. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305.

### **3.6 DETECTABLE / TACTILE SURFACE INSTALLATION**

- A. Installation of detectable / tactile warning surface system shall be performed in accordance with the manufacturer's specifications.
- B. Prior to and during the placement of detectable / tactile warning surface system, Contractor shall verify slopes of handicap ramp area do not exceed the maximum permissible slopes as indicated on the Contract Drawings.

### **3.7 FINISH**

- A. Smooth Form Finish: For formed concrete surfaces exposed to view. This is the as-cast concrete surface as obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with all fins or other projections completely removed and smoothed.
- B. Float Finish: Apply float finish to monolithic slab surfaces that are to receive other finishes as hereinafter specified. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance not exceeding 1/8 inch in 10 feet when tested with a 10-foot straightedge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float surface to a uniform, smooth, granular texture.
- C. After smooth form finishing or floating and when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
  - 1. Walks
    - a. Broom finish by drawing a fine hair broom across concrete surfaces, perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to Architect and meet indicated code for non-slip finish. Provide a smooth border at all joints and edges.
    - b. On inclined slab surfaces, provide a coarse, non-slip finish by scoring surface with a stiff bristled broom, perpendicular to line of traffic.
  - 2. Curbs and other exposed formed surfaces: Smooth rubbed finish; grout cleaned finish will not be permitted. Match sample of finish approved by Architect for entire project.

### **3.8 CURING**

- A. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 72 hours.
- B. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures.
- C. Cure formed concrete surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods as approved by Architect.
- D. Cure unformed surfaces, such as slabs, and other flat surfaces by application of the appropriate approved curing compound.

### **3.9 ANTI-SPALLING TREATMENT**

- A. Apply compound approved compound to concrete surfaces no sooner than 28 days after placement. Apply to clean, dry concrete free of oil, dirt, and other foreign materials, in 2-sprayed applications. First application at rate of 40 square yards per gallon; second application, 60 square yards per gallon. Allow complete drying between applications.

### **3.10 REMOVAL OF FORMS**

- A. Formwork may be removed after cumulatively curing at not less than 50 degrees F. for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

### **3.11 QUALITY CONTROL TESTING DURING CONSTRUCTION**

- A. Sampling Fresh Concrete: ASTM C 172, except modified or slump to comply with ASTM C 94. Sampling shall be performed by Owner's Testing Lab, and Contractor shall provide complete cooperation with obtaining required samples for testing.
  - 1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
  - 2. Slump: ASTM C 143; one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.
  - 3. Compression Test Specimens: ASTM C 31; provide tests as specified in Section 03300 - Concrete Work.
- B. Request inspection of forms and subgrade by Engineer/Architect prior to placing concrete.

## **PART 4 – PAYMENT**

- 4.1 There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

## **END OF SECTION 02514**

## **SECTION 02516 – STORM SEWER**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. The contractor shall furnish all necessary labor, equipment, tools, implements and materials required to construct storm sewer or other storm water drainage facilities and structures herein.

#### **1.3 SUBMITTALS**

- A. Upon delivery of materials, the Contractor shall require the Manufacturer or Supplier to furnish to the Engineer a Certification of Compliance that the delivered materials, components and manufactured items are acceptable. Certificates of Compliance shall contain the following information:

- (1) Project to which material is consigned.
- (2) Name of the Contractor to which the material is supplied.
- (3) Kind of material supplied.
- (4) Quantity of material represented by the Certificate.
- (5) Means of identifying and consignment.
- (6) Date and method of shipment.
- (7) That the material has been tested and found in conformity with the pertinent specification(s) stated in the Certificate.
- (8) Signature of person having legal authority to bind the supplier.
- (9) Signature attested to by a notary public.

- B. An NJDOT mix design shall be submitted and approved by the engineer prior to the placing of any Portland Cement Concrete.
- C. Shop drawings of all pre-cast manholes, inlets, bases and trench drains shall be submitted to and approved by the Engineer prior to installation.

#### **1.4 PAYMENT**

- A. There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

## **1.5 RELATED SECTIONS**

- A. Section 02210 – Site Clearing
- B. Section 02236 – Soil Erosion and Sediment Control
- C. Section 02241 – Dewatering
- D. Section 02248 – Shoring and Bracing
- E. Section 02200 – Earthwork
- F. Section 02485 – Finished Grading
- G. Section 02071 – Selective Site Demolition
- H. Section 02100 – Traffic Control
- I. Section 02514 – Site Work Concrete
- J. AIA A232 & Section 00800 - Submittals

## **PART 2 – MATERIALS**

### **2.1 PORTLAND CEMENT**

- A. Cement shall be either Standard or High Early Strength Portland Cement, conforming to the requirements of Serial Designation: C150, Type I and Type III, respectively, of the Standards of the American Society for Testing Materials; unless otherwise specified, all cement shall be Type I.
- B. Only one brand of cement shall be used on the project, except when written permission is obtained from the Engineer for the use of more than one brand.
- C. Cement shall be in either cloth or paper bags containing ninety-four (94) pounds.
- D. At the site of the project, the cement shall be stored in a suitable weatherproof building, or other acceptable enclosure, with the floor raised above the ground.
- E. Bags of cement which for any reason have become partially set on the outside or which contain lumps or partly set cement, shall be rejected.

### **2.2 CRUSHED STONE**

- A. Crushed stone shall be either trap rock or dolomite. Only one type of stone shall be used, unless otherwise approved by the Engineer.
- B. When a coating of bitumen is to be applied to the stone or when the stone is to be used in concrete, it shall be free from pieces coated with clay, caked store dust, and other foreign materials.
- C. Stone shall contain not more than five percent (5%) of weathered or decomposed rock, not more than three percent (3%) of flat pieces and pieces with a length less than half the width, not more than five percent (5%) of other types of stone, and the total of the above shall not be more than ten percent (10%).
- D. Crushed stone shall be graded in accordance with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, Section 901 as amended or supplemented.
- E. When two (2) or more sizes of stone are mixed to secure any particular size, the mixing must be so executed that the resulting product shall be uniform throughout.

## **2.3 FOUNDATION MATERIAL**

- A. Foundation material shall be clean 3/4" stone. It shall be free of all dirt, dust, vegetation and other foreign matter. The stone shall be leveled and compacted to the required depth and graded by approved means.

## **2.4 FINE AGGREGATE FOR CONCRETE AND MORTAR**

- A. Sand for concrete and mortar shall be particles of quartz or other hard, durable rock, moderately sharp and free from soft particles, clay, loam, cemented particles, mica, salt and organic and other foreign matter. The surfaces of the particles shall be clean, and the sand shall contain not more than four percent (4%) of elutriable materials. The sand shall further conform to the requirements of the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, as amended or supplemented.
- B. When the sand is mixed with cement and water, the resulting mortar shall have compressive and tensile strengths at the age of seven (7) and twenty-eight (28) days, which are not less than those of mortar similarly prepared with standard Otowa sand.

## **2.5 WATER**

- A. Water shall be subject to the approval of the Engineer and shall be clean, fresh and free from oil, acid, injurious alkali and vegetable matter. It may be tested in accordance with Method T-26 of the American Association of State Highway and Transportation Officials. If the test indicates that mortar made with the water being tested in unsound or slow setting, or of less strength than mortar made with water of satisfactory quality, the water shall not be used for concrete mixtures.

## **2.6 BRICK**

- A. Brick, for use in construction of manholes and catch basins, shall be new, whole, first-quality concrete brick, of a standard brand or make. The brick shall comply with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, as amended or supplemented.

## **2.7 CONCRETE BLOCK**

- A. Concrete block, for use in construction of manholes, inlets and catch basins, shall comply with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, as amended or supplemented.

## **2.8 PIPE**

- A. Reinforced Concrete Pipe - Reinforced concrete pipe shall conform to the requirements of current A.A.S.H.T.O. Designation M170, as amended by the



New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction.

- B. PVC Pipe - All polyvinyl chloride (PVC) pipe shall be schedule 40 unless otherwise noted on the plans with rubber gasket joints except 3", 4", 6" and 8" diameters which shall have solvent welded joints. Pipes shall be labeled by the manufacturer on the pipe to indicate size and schedule.
- C. Ductile Iron Pipe - Ductile Iron Pipe shall be centrifugally cast in conformance with ANSI/AWWA C151/A21.51 (Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids). Ductile Iron Pipe, shall, as a minimum, be of the thickness required for laying condition Type 1 (Flat-bottom trench, loose backfill) in accordance with ANSI/AWWA C150/A21.50). In no case shall Ductile Iron Pipe be installed with a thickness class less than Class 52, regardless of laying condition, depth of cover, or surcharge loading. Push-on joints or mechanical joints shall be used for all buried piping. Gaskets for ductile iron push-on and mechanical joints shall be in conformance with ANSI/AWWA C111/A21.11 (Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings), and shall be vulcanized natural rubber or vulcanized synthetic rubber.

## **2.9 CASTINGS**

- A. All castings shall be made of clean, even grain, tough gray cast iron. The castings shall be smooth, conform in all respects to the plans and be free from sand holes, projections, blow holes, cold shuts, cracks, warp and other defects which would interfere with the use of, or impair the serviceability of the castings.
- B. Castings shall not be repaired, plugged or welded without permission from the Engineer, and such permission will be given only for small defects.
- C. All manhole castings shall be machined, as required by the plans. After machining, it shall not be possible to rock any cover after it has been seated in any position in its associated frame.

## **2.10 SELECT FILL**

- A. The select fill under this item shall consist of bank run sand and gravel or other permitted materials. The fill shall contain no stone larger than two inches (2") in its largest diameter and shall meet the specifications for Borrow Excavation Embankment of the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, as amended or supplemented.

## **2.11 DENSE GRADED AGGREGATE**

- A. All dense graded aggregate shall conform to the NJDOT Standard Specifications for Road and Bridge Construction as amended or supplemented except that

recycled concrete shall not be substituted for quarry grade dense graded aggregate.

## **2.12 MANHOLE BOOT**

- A. A manufacturer's product data for Link-Seal or approved equal.

## **2.13 PORTLAND CEMENT CONCRETE**

- A. All Portland Cement Concrete shall conform to the NJDOT Standard Specifications for Road and Bridge Construction as amended or supplemented.

## **2.14 FILTER FABRIC**

- A. Filter fabric shall be Mirafi 140N or approved equal as shown on the plans and details.

## **2.15 TRENCH DRAIN**

- A. Trench drain shall be ACO Group model S300K with Type F slotted iron grate or approved equal set in concrete as shown on the plans and details.

# **PART 3 – EXECUTION**

## **3.1 GENERAL**

- A. All drainage structures and facilities shall be constructed by capable, skilled workman, according to the Construction Details in the locations shown on the Construction Plans. All grubbing, stripping and stockpiling of topsoil, unclassified excavation, stripping and stockpiling of topsoil, unclassified excavation, furnishing of all materials, labor and equipment, pumping and/or bailing, compaction and backfill of excavation and all other items incidental to completion, shall be included in the lump sum price bid for the structure, except those items specifically set forth as pay item.
- B. All backfilling operations shall be conducted, at the direction of the Engineer, in such a manner that uniform ground pressures will result. Compaction of backfill in areas adjacent to drainage structures shall be by hand tamping.

## **3.2 INLETS**

- A. Wherever inlets are mentioned in these specifications, they shall be construed to also mean catch basins.
- B. All concrete block and brick shall be laid with broken joints, and all vertical and horizontal joints shall be filled with 1:2 cement-sand mortar. Joints shall not be more than 3/8" wide. The masonry shall be carried to such a height that a mortar joint not more than one-half inch (1/2") thick is needed for setting the head

casting, without using split blocks or bricks. The outside wall shall be plastered with a one-half inch (1/2") thick coat of 1:2 cement-sand mortar, troweled to a smooth finish. The portions of inlets below a depth of eight feet (8') from the top of the inlet grate, shall be constructed with double walls.

- C. The concrete base shall be poured on a firm and level bearing. If excavation is carried too deep, it shall be brought to grade, using three-quarter inch (3/4") compacted crushed stone. The concrete for inlet bases shall be 2500 psi concrete.
- D. Steps shall be installed as the masonry work progresses. The steps shall be an aluminum ladder rung, extruded from 6061-T6 Aluminum.
- E. Channels shall be installed in all inlets in accordance with the Construction Details, using 2500 psi, concrete. The channels shall be smooth and semi-circular in shape and shall conform to the size of the adjacent storm drainage pipe. Changes in direction shall be made with as large a radius as possible. The base of the inlet shall fall to the invert channel. No drainage pipe shall extend further into the manhole than is required for proper bond.

### **3.3 CONNECTION TO EXISTING INLETS**

- A. The connection to an existing inlet must be made by means of coring machine. The Contractor must have experience in the operation of this equipment or subcontract to a company who has experience in the operation of a coring machine.
- B. The new connection in the inlet must be sealed by means of a manhole boot. Contractor shall follow manufacturer's instructions when installing the manhole boot.

### **3.4 HEADWALLS**

- A. All headwalls shall be constructed in accordance with size and dimensions shown on the Construction Details; 3500 psi concrete, shall be used for headwalls. Concrete may be prepared with or without air entrainment. All reinforcing steel shall be Grade 40. All reinforcing steel shall be placed in accordance with the dimensions shown on the Construction Details. All exposed concrete edges shall be finished with a 1 inch 45 degree chamfer. All exposed concrete surfaces shall be smoothly finished by workmen skilled in this work.
- B. Headwalls will not be accepted or paid for, if the following conditions exist:
  - (1) Improper placement of concrete, resulting in honeycombing or voids in the concrete.
  - (2) Exposed concrete edges and surface are not finished, as specified.

- (3) The face of the headwall is not plumb.
- (4) Backfill and clean-up operations are incomplete.
- (5) Base of headwall is not carried to depth specified.
- (6) Concrete apron or rip-rap, if required by the Engineer, is not in place.
- (7) Drainage runoff is improper, due to improper grade and/or alignment of the headwall.
- (8) Improper placement of reinforcing steel.

### **3.5 MANHOLES**

- A. Concrete and Brick Masonry - Concrete block manholes shall conform to the requirements of these specifications, except:

- (1) The words "Storm Sewer" shall be cast into all manhole covers.

- B. Base

- (1) If precast manhole bases are allowed by the Engineer, a solid, stabilized and level sub-foundation will be furnished. The manhole shall have a minimum of six inches (6") between the low invert of the manhole and the inside base to allow ample room for the construction of the channel. All riser sections and the top cone will be placed before grouting the pipe in place.

- C. Steps shall be as specified heretofore.

- D. Invert channels shall be as specified heretofore.

- E. Frame and cover shall be as specified heretofore.

### **3.6 FLARED END SECTIONS**

- A. Flared end sections shall be installed in accordance with the size, dimensions, grades, and cutoffs as shown on the construction details. The Contractor shall furnish all materials, labor, equipment, excavation and grading to assure drainage to or from the flared end section at the lump sum price bid for the same.

### **3.7 STORM DRAINAGE PIPE**

- A. All excavations shall be made in such a manner and to such width as will give ample room for building the required structures or laying and jointing the pipe and for such sheeting, pumping and drainage incidental thereto. Trenches of excessive width, greater than pipe I.D. + 2' measured 1 foot above the pipe

crown, may require pipe of increased strength class, special bedding, or other corrective measure directed by the Engineer and such corrective work is to be completed without extra compensation.

- B. All excavation shall be unclassified and shall include the removal of all materials, including, but not limited to pavements, curbs, earth, loam, shale, clay and rock of any kind, including boulders and abandoned foundations.
- C. Stripping and Stockpiling of Topsoil - Topsoil shall be stripped from the construction area before excavating the trench and shall be stockpiled. Soil erosion protection and temporary vegetative cover shall be provided in accordance with "Standards for Soil Erosion and Sediment Control in New Jersey" prepared by New Jersey State Soil Conservation Committee, latest edition, acceptable to the Engineer.
- D. The trench in which storm sewers and appurtenances are to be constructed shall be opened in accordance with the grades designed by the Engineer. All excavation shall be by open cut from the surface, except where otherwise directed, and shall be excavated to a width not less than twelve inches (12") or more than twenty-four inches (24") greater than the outside diameter of the pipe as will give suitable room for laying and properly joining the pipes, sheeting and bracing, pumping and bailing. When rock is encountered, the trench depth shall be carried to at least four inches (4") lower than the invert of the pipe to provide a suitable bedding for the pipe. The trench width at the ground surface may vary with and depend upon its depth and the nature of the ground encountered. The maximum clear width of unsheeted or sheeted trench, measured at the top of the pipe, shall be not more than the outside of the barrel, plus two feet (2'). Greater widths may be allowed, with the written permission of the Engineer.
- E. The extent of excavation opened or the area unrestored at any one time will be controlled by existing conditions, but shall always be confined to the limits prescribed by the Engineer, with regard to expeditious construction and to the safety and convenience of the public. Without the written permission of the Engineer, not more than two hundred feet (200') of trench shall be opened in advance of the completed storm sewer. In rock, the completed excavation must be at least fifty feet (50') in advance of the pipe laying. Without the written permission of the Engineer, all excavations and trenches shall not remain open when construction activity is suspended for any reason, including but not limited to cessation of operations over weekends, nights and holidays.
- F. If the Contractor excavates below the grade given by the Engineer, the bottom of the trench shall be filled and compacted to the required grade with a material satisfactory to the Engineer at the expense of the Contractor.
- G. If, in the opinion of the Engineer, the material at or below the grade for which excavation would normally be carried is unsuitable for pipe foundation, it shall be removed to such depths and widths as he may direct and be replaced with the type of foundation material as ordered.

- H. The Contractor shall furnish sufficient pumping equipment and shall provide at his own expense satisfactory methods for pumping or bailing whenever needed in the trench and other excavations during the progress of the work and at its completion for final inspection. The use of foundation material to provide drainage will not be an allowable pay item. No structure of sewers shall be laid in water and water shall not be allowed to flow over or rise upon any concrete, masonry, or pipe until the work has been inspected and the mortar or concrete has properly set. All water pumped or bailed from the trench or other excavation shall be conveyed in a proper manner to a suitable point of discharge by the Contractor at his own expense.
- I. The Contractor shall be responsible for properly supporting the sides of all excavations with timber, metal, or other supports.
- J. Prior to any excavation the Contractor shall locate and mark all services, mains, conduits and drains, etc., in the vicinity of, or crossing over, the storm sewers included in the project. All costs for crossing subsurface utilities, whether shown on the plans or not, shall be included under the prices bid for storm sewers.
- K. Prior to any excavation, the Contractor shall cut all pavement to a neat line, by using pneumatic hammers or mechanical pavement cutters, saws or other approved methods or devices.
- L. Drainage pipe to be abandoned shall be sealed by mortaring (bricking) the end of the pipe for a distance of 18 inches minimum, or one-half the diameter of the pipe, whichever is larger. The pipe shall be sealed with solid concrete block or brick and acceptable cement grout to form a solid waterproof plug completely bonded to the pipe, unless otherwise specified.

### **3.8 ALIGNMENT AND GRADE**

- A. The Contractor shall lay the pipe lines in the location and exactly to the lines and grades established and as staked by the Engineer. No deviation shall be made from the required line or grade without the written consent of the Engineer. The Engineer shall have the power to order the removal or relaying of any pipe laid contrary to his instructions.
- B. Where the grade or alignment of the pipe is obstructed by existing utility structures, such as conduits, ducts, pipes, service connections to water mains, or sanitary sewers, the obstruction shall be permanently supported, relocated, removed, or reconstructed by the Contractor in cooperation with the Owners of such utility structures. Temporary support, adequate protection and maintenance of all underground and surface utility structures, drains, water mains and other obstructions encountered in the progress of the work, shall be furnished by the Contractor at his own expense under the direction of the Engineer.

- C. Except in rock, water bearing earth, or where excavated material is not suitable for proper foundation, mechanical excavation of trenches shall be stopped above the final invert grade elevation so that the pipe may be laid on a solid, dry foundation free from any rocks, wood block, etc., along its entire length except at joints. This part of the work shall be done manually by men skilled in this type of work. Depressions for joints shall be made after the trench bottom has been aligned and properly graded.

### **3.9 HANDLING MATERIALS**

- A. All pipe shall be carefully examined for dents, cracks and other defects, and no pipe known to be defective shall be laid. Those pipes not meeting the specifications shall be rejected and either destroyed or removed from the work within twenty-four (24) hours. If any pipe is found to be broken or defective after being laid, it shall be removed and replaced by sound pipe without any further payment. Pipe shall be thoroughly cleaned and ample precautions shall be taken to prevent entrance of dirt and debris into the pipe after laying.
- B. Equipment - Proper implements, tools and facilities satisfactory to the Engineer shall be provided for the safe and efficient execution of the work. All pipes, fittings and accessories shall be carefully lowered into the trench by means of crane, ropes, or other suitable equipment in such manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

### **3.10 PIPE JOINTING**

- A. All pipe ends shall be thoroughly cleaned prior to and kept clean during the jointing operations. Joints for rigid pipe shall be made with mortar, grout, 2 step solvent weld, or gaskets. Other types of joints recommended by the pipe manufacturer may be permitted. Corrugated pipe shall be joined by coupling bands. For mortar joints, the pipe ends shall be cleaned and wetted with water before the joint is made. Stiff mortar shall be placed in the lower half of the bell or groove of the pipe section already laid and on the upper half of the spigot or tongue of the section to be laid. The two pipe sections shall then be tightly joined with their inner surfaces flush and even. Any voids occurring in the outside of the joint shall be filled. Lifting holes shall be filled with stiff mortar. For pipes 36 inches and larger, the inside of the joint shall be finished smooth. For pipes smaller than 36 inches, the joint shall be cleared of protruding mortar. The completed mortar joints shall be protected against rapid drying if not immediately backfilled with earth. Gaskets, where required, shall be installed to form a flexible watertight seal. Rubber and flexible plastic gaskets shall be installed in accordance with recommendations of the manufacturer. All lift holes shall be fully mortared with a 1:2 cement sand mortar.

### **3.11 BACKFILLING**

- A. The backfilling of trenches or other excavations shall not begin until the storm sewer or structure has been inspected and approved, except as otherwise provided in these specifications.

### **3.12 BACKFILL AROUND STRUCTURES**

- A. As soon as practicable after the masonry has been placed and concrete has acquired a suitable degree of hardness and all installations have been made, backfilling shall begin. Select fill or dense graded aggregates as shown on the plans shall be used in backfilling within two feet (2') of the structure. Unequal distribution of soil pressures shall be avoided by carrying the fill up evenly. The Contractor shall be responsible for proper compaction to prevent settlement. If the backfill is compacted by tamping, rolling or ramming, the fill shall be deposited in suitable layers to give optimum compaction.

### **3.13 BACKFILLING OPEN TRENCHES**

- A. One-half (1/2) the diameter of the pipe above the invert shall be placed by hand. The materials shall be free from large lumps and stones having any dimension greater than two inches (2"). If the material excavated from the trench is not suitable for backfill, select material will be ordered by the Engineer. The backfill shall be deposited in layers not to exceed six inches (6") and shall be thoroughly compacted by hand tamping or other vibratory soil compacting equipment approved by the Engineer. Tamping will proceed to a point two feet (2') above the crown of the pipe. Backfilling shall proceed evenly on both sides of the pipe and be compacted to two feet (2') above the crown of the pipe. Care will be taken not to displace the pipe from its correct grade and alignment.
- B. When the storm sewer is in a street or driveway area which is to be replaced as part of the work under the contract, the trench shall be compacted to grade by approved method of compaction. The backfill material shall be Dense Graded Aggregate only.

### **3.14 BACKFILL PROCEDURE**

- A. Compaction--The backfill shall be deposited and spread in horizontal layers not exceeding thickness allowed by the Engineer. Each layer shall be thoroughly compacted before additional layers are placed.
- B. Puddling--The excavated material or select fill shall be deposited in water when this method of backfilling is employed.
- C. Water Jetting--When water jetting is employed, the Contractor shall provide a suitable length of pipe not less than 1¼" in diameter fitted with a quick-acting valve and sufficient hose to connect to a hydrant or pump having adequate pressure and capacity. The full depth of the backfill material shall then be



thoroughly saturated by thrusting the pipe into the soil with the valve open at frequent intervals along the trench until all slumping ceases.

- D. All methods of compacting the backfill shall avoid stones and lumps that become nested and result in voids. No large masses of backfill or stones weighing over fifty pounds (50 lbs.) shall be dropped into the trench.

### **3.15 RIP-RAP OUTLET PROTECTION**

- A. The Contractor shall furnish, handle, excavate for, grade and place rip-rap as shown on the plans and details.

### **3.16 SOIL EROSION AND SEDIMENTATION CONTROL**

- A. Soil erosion and sedimentation control shall be provided and maintained in accordance with the details delineated on the construction plans and the "Standards for Soil Erosion and Sedimentation Control in New Jersey".

**END OF SECTION 02516**

## **SECTION 02600 – SOIL EROSION AND SEDIMENT CONTROL**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Soil Erosion and Sediment Control measures shall be constructed and installed in accordance with the Soil Erosion and Sediment Control notes, details and plans. The contractor shall be responsible for excavating for, placing and maintaining Soil Erosion and Sediment Control measures until final acceptance of the project. Soil Erosion and Sediment Control measures include but are not limited to, silt fence installation, tracking pad installation, tree protection, inlet protection, hay bale sediment barrier construction, pavement sweeping, dust control, topsoil stockpiling and temporary seeding and mulching.

#### **1.3 SUBMITTALS**

- A. Not applicable this section unless substitutions in specified materials or methods are proposed. The degree of applicability of this item shall be determined by the Engineer upon receipt of the specified alternate or substitution proposed by the Contractor.

#### **1.4 PAYMENT**

- A. There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

#### **1.5 RELATED SECTIONS**

- A. Section 02485 – Finished Grading

### **PART 2 – PRODUCTS**

- A. All materials used for soil erosion control measures shall conform to the standards for Soil Erosion and Sediment Control in New Jersey latest revision. Temporary and permanent seed shall conform to the seed mixture shown on the drawings.

### **PART 3 - EXECUTION**

- A. Notify local SCD of tentative start date for qualifying projects in accordance with their requirements

### **3.1 STABILIZED CONSTRUCTION ENTRANCE**

- A. Install Work in accordance with Contract Drawings and Certified Plan when applicable.
- B. Maintain construction driveway entrance for duration of project or until base course paving work has been completed. Regrade or add stone to construction entrance as necessary and as required by SCD. Any material tracked onto a public roadway shall be removed immediately.

### **3.2 SEDIMENT BARRIERS**

- A. Install Work in accordance with the Contract Drawings and Certified Plan when applicable.
- B. The silt fence material shall be new and undamaged. Install at locations indicated on Contract Drawings or Certified Plan, top of installed fence to be 2 feet above ground, bury bottom 12 inches of fence in soil as per Certified Plan, overlap ends of adjacent fence a minimum 1-1/2 feet.
- C. The silt fence shall be maintained for the duration of the project, replace damaged fence and remove accumulated sediment as necessary and as required by the SCD.
- D. Remove silt fence when all disturbed areas have been permanently stabilized, restore remaining disturbed area.

### **3.3 INLET PROTECTION**

- A. Install Work in accordance with the Contract Drawings or Certified Plan.
- B. Install proper protection for inlet type and site conditions.
- C. Inspect and clean protection after each rain event and as required by the NJSCD.
- D. Maintain protection until all disturbed areas have been properly stabilized or just prior to top course paving. Replace protection if disturbed areas not stabilized.
- E. SEDIMENT TRAP
- F. The Contractor shall take appropriate measures to prevent erosion and discharge of silt when dewatering excavations or trenches. Devices to trap silt and mitigate erosion shall be utilized for all dewatering operations, as indicated by the certified plan or approved by the Engineer. Sediment laden water may not be discharged into storm sewers or existing waterways without proper protection.
- G. The type and size of device will be dictated by the nature and volume of water being discharged, as approved by the Engineer.

### **3.4 PAVEMENT CLEANING**

- A. The Contractor shall be responsible for maintaining roadways, sidewalks and driveways within the project limits free of dirt, debris or other material resulting from his work operations.
- B. The project areas are to be inspected on a regular basis and cleaned as necessary. At no time shall any material be washed or swept into a storm drain

inlet or natural waterway. The cleaning operation shall be conducted so as to minimize creating dust.

- C. The Contractor shall employ the services of a street sweeper service on a routine basis as required to meet the intent of this section.

### **3.5 DUST CONTROL**

- A. The Contractor shall conduct his work operations to minimize the creation and dispersion of dust. If dust becomes a problem within the project or adjacent areas the Contractor shall provide for the application of water to those areas, or other approved measures as outlined on the Certified Plan, as necessary during and after the work hours to control the problem. The use of calcium chloride or other chemicals will not be permitted.

### **3.6 SITE STABILIZATION**

- A. Incorporate erosion control devices indicated on the Contact Drawings into the Project at the earliest practicable time.
- B. Construct, stabilize and activate erosion controls before site disturbance within the tributary ("drainage") areas of those controls.
- C. Stockpile heights for topsoil shall be reasonable and subject to approval of Engineer. Slope stockpile sides at 3:1 or flatter. Provide erosion control at lower end and sides of pile, stabilize surface as necessary with temporary vegetative cover.
- D. Stabilize any disturbed area on which activity has ceased and which will remain with soils exposed for more than fourteen (14) days which are not being graded, or under active construction.
- E. During non-germinating periods, apply mulch at recommended rates.
- F. Temporary Stabilization: Stabilize disturbed areas which are not at finished grade and which will be disturbed within one year in accordance with Contract Drawings, use proper temporary seed mixture with no topsoil.
- G. Stabilize disturbed areas which are not at finished grade and will not be disturbed within one year in accordance with Contract Drawings permanent seeding specifications.
- H. Stabilize disturbed lawn and turf areas at finished grade in accordance with Section 02485 Finish Grade.
- I. Stabilize diversion channels, sediment traps and sediment basins, and stockpiles immediately.
- J. Stabilize steep slopes where required by the Contract Drawings, and where greater than 3:1, with an erosion control blanket. Use "Curlex 111" or approved equal. Installation shall include all required trenching, overlap, staples or pins as required by manufacturer's specifications.

### **3.7 FIELD QUALITY CONTROL**

- A. Quality Requirements, Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing in accordance with Contract Documents.

- B. Inspect erosion control devices on a weekly basis and after each runoff event. Make necessary repairs to ensure erosion and sediment controls are in good working order.

### **3.8 CLEANING**

- A. Requirements for cleaning in accordance with the Contract Documents as directed by the Engineer.
- B. When sediment accumulation in sedimentation structures or devices has reached a point one-third depth of sediment structure or device, remove and dispose of sediment.
- C. Do not damage structure or device during cleaning operations.
- D. Do not permit sediment to erode into construction or site areas or natural waterways.
- E. Clean channels when depth of sediment reaches approximately one half channel depth.
- F. Properly dispose of sediment bags after use.

### **3.9 PROTECTION**

- A. Execution and Closeout Requirements: Requirements for protecting finished Work in accordance with the Contract Documents.

**END OF SECTION 02600**

## **SECTION 02730 - SANITARY SEWERS AND MANHOLES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Sanitary sewer piping, fittings and accessories.
- B. Sanitary sewer manholes and cleanouts.

#### **1.3 REFERENCES**

- A. ANSI/ASTM D2321 - Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.
- B. ANSI/ASTM D2729 - Poly Vinyl Chloride (PVC) sewer pipe and fittings.
- C. ASTM A377 - Cement lined ductile iron pipe.
- D. ASTM C479 - Precast reinforced concrete manhole sections.

#### **1.4 REGULATORY REQUIREMENTS**

- A. Conform to applicable codes for the work of this section.

#### **1.5 SUBMITTALS**

- A. Submit shop drawings for precast reinforced concrete manholes.
- B. Submit product data for pipe and pipe accessories.
- C. Submit product data for manhole frames and covers.

#### **1.6 PROJECT RECORD DRAWINGS**

- A. Accurately record location of pipe runs, connections, manholes, cleanouts and rim and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

## **1.7 PAYMENT**

- A. There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

## **1.8 RELATED SECTIONS**

- A. Section 02110 – Site Clearing
- B. Section 02236 – Soil Erosion and Sediment Control
- C. Section 02241 – Dewatering
- D. Section 02248 – Shoring and Bracing
- E. Section 02071 – Selective Site Demolition
- F. Section 02100 – Traffic Control
- G. Section 02514 – Site Work Concrete
- H. AIA A232 & Section 00800 - Submittals

## **PART 2 - PRODUCTS**

### **2.1 PVC GRAVITY SEWER PIPE**

- A. PVC gravity sewer pipe shall conform to A.S.T.M. D-3034 (SDR35) A.S.T.M. D2241 (SDR26), Type P.S.M. Polyvinyl Chloride (PVC) sewer pipe and fittings. The maximum laying length of twenty feet (20 ft.) shall be permitted.
- B. All pipe and fittings shall be made from PVC compounds as defined and described in A.S.T.M. D-1784 for rigid polyvinyl chloride compounds (chlorinated polyvinyl chloride compounds).
- C. Joints shall be rubber gasketed of the bell and spigot type. Gaskets shall meet the requirements of A.S.T.M. F-477. All joints shall comply to A.S.T.M. D-3212.
- D. Pipe and fittings shall be installed in accordance with A.S.T.M. D-2321. Pipe performance is directly related to the haunching material and its placement. The material should be placed and consolidated under the pipe, haunch to provide adequate side support to the pipe, while avoiding both vertical and lateral movement of the pipe from proper alignment. Haunching is placed up to the pipe spring line.

## **2.2 DUCTILE IRON SEWER MAIN PIPE**

### **A. Pipe**

Ductile Iron Pipe shall be centrifugally cast in conformance with ANSI/AWWA C151/A21.51 (Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids). Ductile Iron Pipe, shall, as a minimum, be of the thickness required for laying condition Type 1 (Flat-bottom trench, loose backfill) in accordance with ANSI/AWWA C150/A21.50). In no case shall Ductile Iron Pipe be installed with a thickness class less than Class 52, regardless of laying condition, depth of cover, or surcharge loading.

### **B. Joints**

Push-on joints or mechanical joints shall be used for all buried piping. Gaskets for ductile iron push-on and mechanical joints shall be in conformance with ANSI/AWWA C111/A21.11 (Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings), and shall be vulcanized natural rubber or vulcanized synthetic rubber. Natural rubber gaskets shall be considered unsuitable for wastewater pipelines.

### **C. Fittings**

Push-on and mechanical joint fittings shall be in conformance with ANSI/AWWA C110/A21.10 (Ductile-Iron and Gray-Iron Fittings, 3 In. through 48 In. for Water and Other Liquids). All joints shall be assembled in accordance with the manufacturer's recommendations. Pressure rating of fittings shall be as follows: 4" - 12" fittings - 350 psi; 14" - 24" fittings - 350 psi; 30" - 36" fittings - 250 psi.

### **D. Linings and Coatings**

The interior of all Ductile Iron Pipe and Fittings shall be cement-lined in conformance with ANSI/AWWA C104/A21.4 (Cement-Mortar Lining for Ductile Iron and Gray-Iron Pipe and Fittings for Water).

The outside of all buried Ductile Iron Pipe and Fittings shall be coated with a bituminous coating approximately one (1) mil thick, in conformance with ANSI/AWWA C151/A21.51 for pipe and ANSI/AWWA C110/A21.10 for fittings.

## **2.3 PRECAST MANHOLES**

### **A. General**

Precast reinforced concrete manhole sections shall be manufactured in accordance with A.S.T.M. Specification C-478-68, or the latest revision thereof.



The minimum compressive strength of the concrete for all sections shall be 4,000 psi. The circumferential steel reinforcement for riser pipe, cone sections and base walls shall be a minimum of 0.12 square inches per linear foot in forty-eight (48) inch diameter sections and 0.17 square inches per linear foot for sixty (60) inch diameter sections. The reinforcing in both layers of steel in the flat slat top sections shall be 0.12 square inches per linear foot in both directions.

Joints of the manhole sections shall be formed entirely of concrete employing a round rubber gasket and when assembled, shall be self-centering and make a uniform watertight joint. Except for those surfaces within the gasket groove, all inside surfaces of the bell or outside surfaces of the spigot, or both, on which the rubber gasket may bear during the closure of the joint at any degree of partial closure shall be parallel within 1 degree and have an angle of not more than 2 degrees with the longitudinal axis of the pipe. In joints formed entirely of concrete, the distance from either side of the gasket to the end of the bell or spigot shall be not less than  $\frac{3}{4}$  inch. The gasket spaces between the bell and spigot shall be so shaped as to provide grooves that will prevent the gasket from disengaging from its compression surface its own compression surface or being blown out by hydrostatic pressures.

The manhole shall be designed for an H-20 loading. A minimum period of ten (10) days shall have elapsed from manufacture of the manhole to shipping. The precast sections shall be steam cured for at least thirty-six (36) hours. The date of manufacture shall be stamped upon each manhole section when removed from the forms.

**B. Base**

Precast manhole bases will be furnished with a solid stabilized, and level sub-foundation. A minimum of six (6) inches of foundation material is to be placed under the base of each manhole. If The Engineer deems it necessary, six (6") inches of concrete shall be placed to insure adequate bearing. The manhole shall have a minimum of five (5) inches between the low invert of the manhole and the inside base to allow ample room for the construction of the channel. All riser sections and cone top will be placed before grouting the pipe in place.

### C. Manhole Steps

Shall be of the design known as safety step as shown on the plans. They shall be 16" wide and the legs at least 12" long. Steps to be of extruded aluminum Alcoa 6061-16 drop front design, steel reinforced polypropylene step #PS4B by MA Industries, or approved equal.

### D. Invert Channel

1. The channels shall be smooth and semicircular in shape and form to the size of the adjacent sewer section as shown on the detail sheet of the plans. Changes in directions shall be made with as large a radius as possible. The height of the channel will be three-fourths ( $\frac{3}{4}$ ) the size of the adjacent pipe. The base of the manhole shall slope toward the invert channel. Adjacent sewer pipes will extend to the manhole only as far as necessary to make a proper watertight bond between the pipe and the manhole. The pipe shall be cut evenly in a workmanlike manner and mortared smoothly.
2. The vitrified brick for the channel and invert construction shall be Red Brick Paver, nominal size 2"x 4"x 8", as manufactured by Anchor Concrete or approved equal.
3. The mortar used in the channel and benching construction shall be Type 3 cement, with a 1:2 cement/sand ratio and no lime is to be used in this application.

### E. Joints

Joints shall be mortared on the exterior and interior surface of the manhole. Lifting holes shall be plugged with rubber stoppers or mortar after installation. Prior to parging, the area to be parged shall be coated with a latex binder (blue) or approved equal.

### F. Coatings

#### 1. Exterior Coating

All precast sections shall receive two (2) coats of bituminous waterproofing material, Koppers 300M Epoxy, Pennsbury 32-B-4 Epoxy, or approved equal. The first coat of waterproofing material may be pre-applied leaving three (3) inches uncovered adjacent to each joint. Upon the completion of

grouting the joints and lifting holes and allowing a proper drying time, the second coat of waterproofing shall be applied. The second coat must cover all sections of the manhole prior to backfilling.

## 2. Interior Coating

The interior of the manhole shall receive two coats of a factory applied 2 part epoxy coating 10 mil. DFT each coat.

### G. Rubber Gasket

Pipe to manhole seal shall be an A-Lok Gasket or approved equal - A.S.T.M. C923 and shall be cast integrally in manhole wall and located as required.

### H. Manholes shall be manufactured by Atlantic Precast Concrete, Inc. or approved equal.

### I. Frames and Covers

The frame and cover shall be as manufactured by Campbell Foundry, Pattern as indicated on the plan and detail, or approved equal, and the covers permanently cast with the words "Sanitary Sewer". Covers shall be of grey cast iron and shall be free from holes, cracks, cold shuts, etc. All castings shall be coated with coal tar varnish. All manhole covers shall have the plan manhole number painted on the underside. The work shall include furnishing and placing, and all other labor incidental to placement.

## 2.4 FOUNDATION MATERIAL

- A. The foundation material shall be  $\frac{3}{4}$ " clean crushed stone or gravel. It shall be free of all dirt, dust, vegetation and other foreign matter. The stone shall be leveled and compacted to the required depth and graded by approved means.

## PART 3 - EXECUTION

### 0.1 EXAMINATION AND COORDINATION

- A. Verify that trench cut is ready to receive work, and excavations, dimensions and elevations are as indicated on the Contract Drawings.
- B. Beginning of installation means acceptance of existing conditions. Any necessary

remedial work required to correct any unsatisfactory conditions, found after the start of installation, will be provided at no cost to the owner.

- C. All work related to connection into the existing system shall be coordinated with utility owner. Do not proceed with work until utility owner has been contacted and connection work has been coordinated.

## **0.2 PREPARATION**

- A. Hand trim excavations to required elevations. Correct over excavation with fill material.
- B. Remove large stones or other hard matter which could damage drainage pipe or impede consistent backfilling or compaction.
- C. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. Contractor to provide all necessary material and labor to dewater construction excavations.
  - 1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations. Where necessary, the Contractor shall employ the services of an independent Soils Engineer to design and implement an effective dewatering system, at no additional cost to the Owner, should the Contractor's standard dewatering practices prove ineffective.
  - 2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
- D. Contractor to maintain flow of sewage at all times. Bypass pumps may be used, providing that they shall be operable prior to temporary disconnection of gravity flow system. Contractor to provide pump capacity data and test same prior to start of work.

## **0.3 INSTALLATION - PIPE**

- A. Install pipe, fittings and accessories in accordance with ANSI/ASTM D2321 and manufacturer's instructions. Seal joints watertight.
- B. Place pipe on minimum 6 inch deep bed of quarry pressed stone.

- C. Lay pipe to slope gradient noted on Contract Drawings.
- D. Install quarry processed stone next to the top of pipe as specified in Section 02200 - Earthwork.
- E. Place approved backfill material in maximum 8 inch lifts, compacting each lift.
- F. Increase compaction of each successive lift. Refer to Section 02200 for compaction requirements. Do not displace or damage pipe when compacting.
- G. Connect to existing building sewer outlet as necessary to maintain adequate flow conditions. Provide new connections as required by the Engineer.

#### **0.4 INSTALLATION - MANHOLES AND CLEANOUTS**

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. Place precast concrete base pad on depth and type of stone as indicated in the details with provision for sanitary sewer pipe and sections.
- C. Establish elevations and pipe inverts for inlets and outlets as indicated on the Contract Drawings.
- D. Mount lid and frame level in grout, secure to top cone section to elevation indicated on the Contract Drawings.

#### **0.5 FIELD QUALITY CONTROL**

- A. Testing: Perform testing of completed piping in accordance with local authorities having jurisdiction. The entire sewer system, including piping and appurtenances shall be tested for leakage. System may be tested by the use of either water or low pressure air.
- B. General Test Requirements
  - 1. Piping shall be adequately restrained against movement before testing.
  - 2. Piping system shall be flushed clean and sediment, scale, dirt and debris removed before piping is tested.
  - 3. Adequate provisions shall be made for carrying off flushing water without causing erosion or other damage.
  - 4. Structures and piping shall be tested before joints are concealed or made

inaccessible.

5. Tests shall be made in the presence of an inspector of the authority having jurisdiction and the design engineer.
- C. Notice of tests shall be made in writing to the Architect and Owner and received by them not less than five days before the date of the test.
- D. Gravity Flow System Test
1. When the groundwater is more than one foot above the crown of the pipe at the upper end of the section to be tested, an infiltration test shall be made. The upper end of the section to be tested shall be plugged, and a V-notch weir of appropriate size shall be fitted into the lower end. There shall be no leakage around the weir plate. Commercially manufactured weirs made and calibrated for the purpose may be used.
  2. When the groundwater is less than one foot above the crown of the pipe at the upper end of the section to be tested, an exfiltration test shall be made. The sewer shall be plugged at the inlet pipes of both upper and lower structures. The line shall then be filled with water to a level two feet above the crown of the pipe in the upper manhole. Before any measurements are made, a period of two hours shall be permitted to allow for absorption and escape of trapped air. Following this period, a test period of at least four hours shall begin. At the end of the test period, loss of water shall be measured and leakage computed.
  3. Air testing shall be performed in accordance with the procedures described in ASTM C828, except as otherwise noted. For making the low pressure air test, the Contractor shall use equipment specifically designed and manufactured for the purpose of testing sewer pipelines using low pressure air. The equipment shall be provided with an air regulator valve or air safety valve set so that the internal air pressure in the pipe cannot exceed 8 psi.
    - a. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be tested. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
    - b. All air used for testing shall pass through a single control panel.
    - c. Low pressure air shall be introduced in the sealed line until the internal air pressure reaches a value 4 psig greater than the maximum pressure exerted by groundwater that may be above the invert of the pipe at the time of the test. However, the internal air pressure in the sealed line shall not be allowed to exceed 8 psig. When the maximum pressure

exerted by the groundwater is greater than 4 psig, the Contractor shall conduct only a infiltration test.

- d. At least two minutes shall be allowed for the air pressure to stabilize in the section under test. After the stabilization period, the low pressure air supply hose shall be quickly disconnected from the control panel. The time required in minutes for the pressure in the section under test to decrease from 3.5 to 2.5 psig (greater than the maximum pressure exerted by groundwater that may be above the invert of the pipe) shall not be less than that shown in the following table:

MINIMUM HOLDING TIME REQUIRED FOR PRESSURE TO DROP FROM 3½ TO 2½ PSI

Pipe Diameter (inches)	Minimum Time (min:sec)	Length for Minimum Time (feet)	Time for Long Length (sec)	Minimum Time for Length Shown (min:sec)		
				100 ft.	150 ft.	200 ft.
4	3:46	597	0.380 L	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40
8	7:34	298	1.520 L	7:34	7:34	7:34
10	9:26	239	2.374 L	9:26	9:26	9:53
12	11:20	199	3.418 L	11:20	11:20	11:24

4. Rate of infiltration and exfiltration shall not exceed 100 gallons/inch of pipe diameter per mile of pipe per 24 hours. Each section of pipe tested shall meet the above criteria.
- E. Following completion of the backfill over the PVC pipe installation, the pipe shall be tested for deflection using a "go-no-go" deflection mandrel. The mandrel shall be passed through all sections of the pipe. The test may not be performed prior to 7 days after installation, and in the presence of the Township Engineer.
1. Pipe deflections shall be measured and converted to a percent deflection. Deflections shall be recorded with a copy of the results submitted to the Engineer. Test results shall be mailed or delivered to the Engineer not later than the day following the day on which the test was made.
  2. Sections of pipe deflection greater than 7.5% shall be replaced.
- F. Video Record
- A closed circuit television inspection shall be made of the newly installed line. A permanent video tape record, and one copy, of a color VHS format shall be supplied to the Engineer upon completion of the TV inspection.
1. The TV camera shall be specifically designed for sewer inspection, with its own light source suitable to provide a clear picture of the entire periphery of the pipe. The camera shall not be pulled by means of a water jetting nozzle.
  2. Copies of video recordings shall be submitted to the Engineer in duplicate at no cost, and shall be accompanied by a typewritten log. The videotapes and case shall be labeled clearly, indicating the project name, date and sewers inspected. The label shall correspond to the log sheet.



3. The audio log and written log shall contain the following information (as a minimum): Firm and crew chief's name; date; manhole to manhole designations or station or station; direction of camera; type of pipe; type of joints; joint spacing; cleanliness; manhole conditions; pipe conditions; section length; pipe size; depth of pipe; clarity of flow; continuous distance measurement; and location of all connections to the sewer main.
4. All TV inspection work shall be witnessed by a representative of the Engineer. Photographs of the television picture shall be provided, at no expense, of any portion of the inspection where requested by the Engineer.
5. TV inspection work shall follow sewer cleaning operations, such that the highest quality inspection can be made.

G. Manholes

Manholes shall be tested in accordance with methods approved by the Engineer for both exfiltration and infiltration.

**END OF SECTION 02730**

## **SECTION 02750 – Cleaning and Televising of Sewer Lines**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. The work of this section includes the furnishing of all labor, materials and equipment required to clean, televise, and video tape sewer lines both before and after rehabilitation. In addition, the work of this section includes furnishing all labor, materials, tools and equipment required to measure flow in the sewer lines before and after rehabilitation.
- B. The work covered by this specification shall be in accordance with the best practice of the industry. The specifications call attention to certain features but do not purport to cover all details entering into the required work.

#### **1.2 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. Final acceptance of the sewer line cleaning shall be made upon completion of the television inspection and shall be to the entire satisfaction of the Owner. The Contractor, upon reviewing the television inspection video tape, shall make the determination that the sewer is clean enough to ensure an effective rehabilitation lining. The Contractor shall submit a letter to Engineer confirming that he has reviewed the video tape and that the sewer is clean enough to line. Final acceptance is based on the inspection of the video tapes, and the rendering of the sewer, clean enough to ensure an effective rehabilitation lining of the sewer.

#### **1.4 SUBMITTALS**

- A. The Contractor shall submit cleaning and television inspection logs for each section of sewer line to be rehabilitated and three copies of color videotapes (for Owner, Engineer and Lining Contractor) for all work performed. These logs shall include as a minimum: stationing and location of house services, wyes or tees, clock references, pipe joints, infiltration/inflow defects, cracks, leaks, offset joints, and any other information required by the Contractor in assessing the condition of the sewer.

## **1.5 RELATED SECTIONS**

- A. Section 02730 – Sanitary Sewer
- B. Section 02526 Storm Sewer
- B. AIA A232 & Section 00800 - Submittals

## **1.6 PAYMENT**

- A. There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

## **PART 2 - PRODUCTS**

- A. Not applicable in this section.

## **PART 3 – EXECUTION**

### **3.1 Cleaning**

The cleaning shall be accomplished with high velocity jet hydro cleaning equipment. No mechanical bucket machinery will be acceptable for the cleaning process. The term "clean, as used in these specifications, shall be defined as removing sufficient material to ensure an effective rehabilitation lining of the sewer and shall be to the satisfaction of the Owner's Representative. The sewer line shall be free from roots or other agents which will prohibit an effective lining. A written report shall be made of the results of cleaning and televising. Photographic pictures shall be taken of the television monitor when ordered by the Engineer.

- A. Equipment shall be constructed for ease and safety of operation.
- B. High velocity jet hydro cleaning equipment shall be capable of producing flows from a fine spray to a solid stream and shall have a selection of two or more high pressure nozzles (Approximately 2,000 psi). The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size lines designated to be cleaned. Equipment shall also include a high velocity gun for washing and scouring manhole walls and floor. The equipment shall carry its own water tank, auxiliary engines, pumps and hydraulically driven hose reel.

- C. Satisfactory precautions shall be taken to protect the sewer lines at all times. Precautions shall be taken so that the water pressure created does not damage or cause flooding of public or private property being served by the sewer. All workmen shall be experienced and skilled in the use of the equipment used.
- D. The designated sewer manhole sections shall be cleaned using high velocity jet hydro cleaning equipment. The equipment and methods selected shall be in accordance with the National Association of Sewer Service Companies (NASSCO) Recommendations. The equipment shall be capable of removing dirt, grease, roots, rocks, sand, and other materials and obstructions from the sewer lines and manholes. If cleaning of an entire section cannot be successfully performed from one manhole, the equipment shall be set up on the other manhole and cleaning again attempted. If, again, successful cleaning cannot be performed or the equipment fails to traverse the entire manhole section, the equipment should be checked for performance. If the equipment is found to perform to standards, it will be assumed that a major blockage exists and the cleaning effort shall be abandoned.
- E. All sludge, dirt, sand, rocks, grease, roots, and other solid or semisolid material resulting from the cleaning and preparation operation shall be removed at the downstream manhole of the section being cleaned. Passing material from manhole section to manhole section, which would cause line stoppages, shall not be permitted.
- F. All sludge, dirt, sand, gravel, roots, grease and other debris resulting from the cleaning and preparation operation shall be placed in a suitable container and disposed of by the Contractor at a location approved by the Owner.
  - a. No sewage shall be dumped or pumped into the streets or into water courses ditches, catch basins or other drains or storm sewers.
  - b. The Contractor shall use suitable vacuum equipment so that no solids are permitted to go downstream.
  - c. All materials shall be removed from the site no less often than the end of each work day. Under no circumstances will the Contractor be allowed to accumulate debris, etc., on the site of work beyond the stated time.

- G. Acceptance of sewer line cleaning shall be made upon the successful completion of the television inspection and shall be defined as removing sufficient material to ensure an effective rehabilitation lining of the sewer and to the satisfaction of the Owner's representative. If TV inspection shows the cleaning to be unsatisfactory, the Contractor shall be required to re-clean and re-inspect the sewer line until the cleaning is shown to be satisfactory.

### **3.2 Television Inspection**

The inspection shall be done one section at a time and the section being inspected shall be suitably isolated from the remainder of the sewer line as required.

The television camera used for the inspection shall be one specifically designed and constructed for sewer inspection. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in 100 percent humidity conditions and have a minimum of 600 line-resolutions. Picture quality and definition shall be to the complete satisfaction of the Engineer and if unsatisfactory, the equipment shall be removed and replaced with equipment of satisfactory quality.

The camera shall be moved through the line in either direction at a uniform slow rate.

A suitable means of communications shall be set up between the two winches and the monitor control.

If camera should tip over during the inspection, it shall be taken out and realigned, and the line section shall be re-televised.

### **3.3 Flow Control**

Cleaning shall be performed periodically only when the depth of flow in the sewer line is at or below 1/3 of the pipe diameter. When the depth of flow in the sewer line is above 1/3 of the pipe diameter, flow control methods shall be utilized as set forth in these specifications, before cleaning is performed.

Flow measurement shall be performed only when the sewer line is not surcharged. When the sewer line is surcharged, the base flow is too great to do the required work, or when directed by the Engineer, flow control methods shall be utilized as set forth in these specifications, to eliminate

surcharging and/or reduce the flow.

### **3.4 Flow Measurement**

The Contractor shall obtain minimum period flow measurements between (1AM and 7 AM) to quantify the infiltration in the line segments being rehabilitated. Measurement will be obtained within (2) days before cleaning, and within two (2) days after lining and/or testing and sealing of sewer lines. The "after" readings shall be obtained at approximately the same time of night as the "before" readings. The Contractor shall obtain these readings with a V-notch weir or other approved method such as depth-velocity readings.

Flow measurement shall only be obtained when the flow over the weir, or the velocity reading, in the sewer line being tested has stabilized for a minimum of 5 minutes at which time the flow shall be measured at 1 minute intervals until duplicate readings are obtained.

A flow measurement log shall be submitted to the Engineer indicating at least the following: date, time, location and flow readings before and after.

### **3.5 Reports**

Based on the cleaning of the sewer lines, cleaning logs shall be furnished to the Engineer.

Television inspection of the entire line both before and after rehabilitation shall be color video taped. Where deficiencies and leaks are noted, the camera shall be stopped to observe the condition, record the information and photographs taken as ordered by the Engineer.

Based on the television inspection of the sewer line, television logs shall be prepared and shall include identification of the section of pipe and pipe size. Records shall also include location of reference points, point of entry of service connections via a clock system, observed running leaks, observed continuously running service connections, bad joints, dips in pipes, and other evidence of potential problems.

### **3.6 Clean-Up**

The Contractor shall be responsible for the disposal of excess material and general clean-up of the work area which will be subject to the approval of the Owner and Engineer.

**END OF SECTION 02750**

## **SECTION 02957 – Cured-In-Place Pipe (CIPP)**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

The reconstruction of pipelines and conduits by the installation of a resin-impregnated flexible tube, which is tightly formed to the original conduit. The resin is cured using either hot water under hydrostatic pressure or steam pressure within the tube. The Cured-In-Place Pipe (CIPP) will be continuous and tight fitting. Systems that use ultraviolet light for curing will also be acceptable. Manufacturers of these systems shall submit appropriate data and engineering calculations to show that the system is equivalent to the requirements established within this specification, as appropriate, for the technology proposed.

#### **1.2 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.3 REFERENCES**

- A. ASTM F1216 - Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
- B. ASTM F1743 - Rehabilitation of Existing Pipelines and Conduits by Pull-in-Place Installation of Cured-In-Place Thermosetting resin Pipe (CIPP)
- C. ASTM D1743 - Cured-In-Place Thermosetting Resin Sewer Pipe
- D. ASTM D790 - Test Methods for Flexural Properties of Un-reinforced and Reinforced Plastics and Electrical Insulating Materials
- E. ASTM D2990 - Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. Temporarily lower water table within areas of excavation to below bottom of excavation.

## **1.5 SUBMITTALS**

- A. Submit test reports, certifications, manufacturer's technical data, installation instructions, and shop drawings for approval prior to installation to the Engineer.

## **1.6 RELATED SECTIONS**

- A. Section 02516 – Storm Sewer
- B. Section 02730 – Sanitary Sewer
- C. AIA A232 & Section 00800 - Submittals

## **1.7 PAYMENT**

- A. There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

## **PART 2 – PRODUCTS**

**2.1 TUBE** - The sewn Tube shall consist of one or more layers of absorbent non-woven felt fabric and shall meet the requirements of ASTM F1216, Section S.I or ASTM F1743 Section 5.2.1 or ASTM D5813 Section 5 and 6. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe, and stretch to fit irregular pipe sections.

- A. The wet out Tube shall have a relatively uniform thickness that when compressed at installation pressures will equal or exceed the calculated minimum design CIPP wall thickness.
- B. The Tube shall be manufactured to a size that when installed will tightly fit the internal circumference and length of the original pipe. Allowance should be made for circumferential stretching during installation.
- C. The outside layer of the Tube shall be coated with an impermeable, flexible membrane that will contain the resin and allow the resin impregnation (wet out) procedure to be monitored.
- D. The Tube shall contain no intermediate or encapsulated elastomeric layers. No material shall be included in the Tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident.



E. The wall color of the interior pipe surface of CIPP after installation shall be a relatively light reflective color so that a clear detailed examination with closed circuit television inspection equipment maybe made.

F. Seams in the Tube shall be stronger than the non-seamed felt material.

G. The Tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 ft. Such markings shall include the Manufacturers name or identifying symbol. The tubes shall be manufactured in the USA.

**2.02 RESIN** - The resin system shall be a corrosion resistant polyester or vinyl ester system including all required catalysts, initiators that when cured within the tube create a composite that satisfies the requirements of ASTM F1216, ASTM D5813 and ASTM F1743, the physical properties herein, and those which are to be utilized in the submitted and approved design of the CIPP for this project. The resin shall produce a CIPP that will comply with the structural and chemical resistance requirements of' this specification.

### **2.03 STRUCTURAL REQUIREMENTS**

A. The CIPP shall be designed as per ASTM F1216, Appendix X.1. The CIPP design shall assume no bonding to the original pipe wall.

B. The Contractor shall have performed long-term testing for flexural creep of the CIPP pipe material installed by their company. Such testing results are to be used to determine the long-term, time dependent flexural modulus to be utilized in the product design. This is the performance test of the materials (Tube and Resin) and general workmanship of the installation and curing as defined within the relevant ASTM standard. A percentage of the instantaneous flexural modulus value (as measured by ASTM D790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. Retention values exceeding 50% of the short-term test results shall not be applied unless substantiated by qualified third party test data to the Engineer's satisfaction. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in the CIPP design.

C. The Enhancement Factor 'K' to be used in 'Partially Deteriorated' Design conditions shall be assigned a value of 7.

D. The layers of' the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the

layers. If the layers separate during the field sample testing new samples will be required to be obtained from the installed pipe. Any reoccurrence may cause rejection of the work.

E. The cured pipe material (CIPP) shall conform to the structural properties, as listed below.

**MINIMUM CIPP PHYSICAL PROPERTIES**

<u>Property</u>	<u>Test Method</u>	<u>Cured Polyester Composite</u>	
		<u>Min. per ASTM F1216</u>	<u>Enhanced Resin</u>
Modulus of Elasticity	ASTM D790	250,000 psi	400,000 psi
Flexural Stress	ASTM D790	4,500 psi	4,500 psi

F. The required structural CIPP wall thickness shall be based as a minimum, on the physical properties in Section 2.03E or greater values if substantiated by independent lab testing and in accordance with the design equations in the Appendix XI. Design Considerations of ASTM F1216, and consideration for ovality, groundwater depth and soil depth shall be provided for areas with partially or fully deteriorated pipe. In addition, the following design criteria will be provided with all calculations.

Design Safety Factor (Typical valve) = 2.0

Retention Factor for Long-Term Flexural Modulus = 50%-75%  
(Determined by long-term tests described in section 5.2 and approved by Owner)

Soil Modulus\* = psi  
Soil Density\* = pcf  
Live Load\* = H20 Highway

\* Denotes information that will be required by the Contractor for fully deteriorated design conditions.

G. Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the structural CIPP wall thickness computation.

**2.04 TESTING REQUIREMENTS**

A. Chemical Resistance – The CIPP shall meet the chemical resistance requirements of ASTM F1216, Appendix X2. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical-testing requirements.

B. Hydraulic Capacity - Overall, the hydraulic cross-section shall be maintained as large as possible. The CIPP shall have a minimum of the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using a commonly accepted roughness coefficient for the existing pipe material taking into consideration its age and condition.

C. CIPP Field Samples - When requested by Owner, the Contractor shall submit test results from field installations of the same resin system and tube materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified in Section 2.03E have been achieved in previous field applications. Samples for this project shall be made and tested as described in Section 3.04A.

## **PART 3 – EXECUTION**

### **3.01 INSTALLATION RESPONSIBILITIES FOR INCIDENTAL ITEMS**

A. The Owner shall provide free access to water hydrants for cleaning, installation, and other process related work items requiring water.

B. Cleaning of Sewer Lines – The Contractor shall remove all internal debris out of the sewer line prior to the installation of CIPP.

C. Bypassing Sewage – The Contractor shall provide for the flow of sewage around the section or sections of pipe designated for repair, Plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system shall make the bypass. The pump(s) and bypass line(s) shall be of adequate capacity to accommodate the sewage flow. The Contractor shall submit a detailed bypass plan prior to the installation of the CIPP.

D. Inspection of Pipelines - Inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles, and service connections using close circuit television (CCTV) inspection techniques. The pipeline interior shall be carefully inspected to determine the location of any conditions that may prevent proper installation of CIPP. These shall be noted and corrected.

E. Line Obstructions – The Contractor shall be responsible for clearing the line of obstructions such as solid sand roots that will prevent the insertion of CIPP. If pre-installation inspection reveals an obstruction such as dropped joint, or a collapse that will prevent the installation process, that cannot be removed by conventional sewer cleaning equipment, then the Contractor shall make a point repair excavation to uncover and remove/repair the obstruction. Such excavation shall be approved in writing by the Engineer prior to the commencement of the work. Protruding service connections shall be cut from within the pipe without excavation, utilizing a remotely controlled cutting device monitored by a CCTV. This work will be paid under a separate pay item.

F. Public Notification – The Contractor shall make every effort to maintain sewer service usage throughout the duration of the project. In the event that a connection shall be out of service, the longest period of no service shall be 8 hours, A public notification program shall be implemented, and shall as a minimum, require the Contractor to be responsible for contacting each home or business connected to the sanitary sewer and informing them of work to be conducted, and when the sewer will be off-line. The Contractor shall also provide the following:

1. Written notice to be delivered to each home or business 48 hours prior to the beginning of work being conducted on the section, and a local telephone number of the Contractor they can call to discuss the project or any potential problems.
2. Personal contact with any home or business, which cannot be reconnected within the time stated in the written notice.

G. The Contractor shall be responsible for confirming the locations of all branch service connections prior to installing the CIPP.

### 3.02 INSTALLATION

A. CIPP installation shall be in accordance with ASTM 1"1216, Section 7, or ASTM F1743, Section 6, with the following modifications:

1. Resin Impregnation - The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the potential loss of resin during installation through cracks and irregularities in the original pipe wall, as applicable.
2. Tube Insertion – The wet out tube shall be positioned in the pipeline using either inversion or a pull-in method as defined within relevant

ASTM standards previously stipulated. If pulled into place, a power winch or its equivalent should be utilized and care should be exercised not to damage the tube as a result of pull-in friction. The tube should be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.

3. Temperature gauges shall be placed between the tube and the host pipe's invert position to monitor the temperatures during the cure cycle.
4. Curing shall be accomplished by utilizing hot water under hydrostatic pressure or steam pressure in accordance with the manufacturer's recommended cure schedule. A cool down process shall be conducted that complies with the resin manufacturer's specification.

### 3.03 REINSTATEMENT OF BRANCH CONNECTIONS

- A. The Contractor shall be responsible for re-opening all branch connections without excavation, utilizing a remotely controlled cutting device, monitored by a CCTV. The Contractor shall certify a minimum of two complete functional cutters plus key spare components are on the jobsite before each installation or are in the immediate area of the jobsite and can be quickly obtained. Unless otherwise directed by the Engineer, all laterals will be reinstated. No additional payment will be made for excavations for the purpose of re-opening connections and the Contractor will be responsible for all cost and liability associated with such excavation and restoration work.

### 3.04 INSPECTION

- A. CIPP samples shall be prepared for each installation designated by the Engineer or approximately 20 % of the project's installations. Pipe physical properties will be tested in accordance with ASTM F1216 or ASTM F1743, Section 8, using either method proposed. The flexural properties must meet or exceed the values listed in the table on page 4 of this specification, Table I of ASTM F1216 or the values submitted to the Engineer by the contractor for this project's CIPP wall design, whichever is greater.
- B. Wall thickness samples shall be determined as described in paragraph 8.1.6 of ASTM F1743. The minimum wall thickness at any point shall not be less than 87.5% of the submitted minimum design wall thickness as calculated in paragraph 2.03F of this document.

- C. Visual inspection of the CIPP shall be in accordance with ASTM F1743. Section 8.6.

### 3.05 CLEAN UP

- A. Upon acceptance of the installation work and testing, the Contractor shall restore the project area affected by the operations to a condition at least equal to that existing prior to the work.

END OF SECTION

**END OF SECTION 02957**

## **SECTION 03300 – CAST-IN-PLACE CONCRETE**

### **PART 1 – GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

#### **1.2 SUMMARY**

- A. Extent of concrete work is shown on drawings.
- B. Concrete paving and walks are specified in Division 2.

#### **1.3 SUBMITTALS**

- A. Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds and others as required by Architect.
- B. Samples: Submit samples of materials as requested by Architect, including names, sources and descriptions.
- C. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test.
- D. Materials Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Architect. Materials certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- E. Shop Drawings: Reinforcement: Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing diagrams of bent bars, arrangement of concrete reinforcement.
- F. LEED Submittals:
  - 1. Product Data for Credit MR 2.2: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
    - a. Include statement indicating costs for each product having recycled content.
  - 2. Design Mixtures for Credit MR 2.2: For each concrete mixture containing slag as a replacement for portland cement or other portland cement replacements and for equivalent concrete mixtures that do not contain

portland cement replacements.

#### 1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
  - 1. ACI 301 "Specifications for Structural Concrete for Buildings".
  - 2. ACI 318 "Building Code Requirements for Reinforced Concrete".
  - 3. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice".
- B. Concrete Testing Service: Engage a testing laboratory acceptable to Architect to perform material evaluation tests and to design concrete mixes.
- C. Materials and installed work may require testing and retesting at anytime during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.
- D. Preinstallation Conference: Conduct conference at a Project site to comply with requirements in Division 01 Section "Project Management and Coordination".
  - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
    - a. Contractor's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Ready-mix concrete manufacturer.
    - d. Concrete subcontractor.
  - i. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold and hot weather concreting procedures, curing procedures, construction contraction and isolation joints and joint filler strips, semirigid joint fillers, forms and form removal limitations, vapor retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures and concrete protection.
  - ii. Specifically review curing and finishing procedure affected by LEED slag requirement that may retard the curing of the concrete and the timing of final finish installation.



## **PART 2 - PRODUCTS**

### **2.1 FORM MATERIALS**

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

### **2.2 REINFORCING MATERIALS**

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- D. Welded Deformed Steel Wire Fabric: ASTM A 497.
- E. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.

### **2.3 CONCRETE MATERIALS**

- A. Portland Cement: ASTM C 150, Type I or Type II.
  - 1. Use one brand of cement throughout project, unless otherwise acceptable to Architect.
- B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.
- C. Light Weight Aggregates: ASTM C 330 and as herein specified, coarse shale, slate or slag aggregate, free from expanded clay
- D. Water: Drinkable.
- E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "Air-Mix"; Euclid Chemical Co.
    - b. "Sika Aer"; Sika Corp.

- c. "MB-VR or MB-AE"; Master Builders.
  - d. "Darex AEA" or "Daravair"; W.R. Grace.
  - e. Or approved equal.
- F. Water-Reducing Admixture: ASTM C 494, Type A, and containing not more than 0.05 percent chloride ions.
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "WRDA" Hycol"; W.R. Grace.
    - b. "Eucon WR-75" or "Eucon WR-89"; Euclid Chemical Co.
    - c. "Pozzolith 322N"; Master Builders.
    - d. Or approved equal.
- G. High-Range Water-Reducing Admixture (Super Plasticizer) ASTM C 494, Type F or Type G and containing not more than 0.05 percent chloride ions.
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "Daracem 100" or "WRDA-19"; W.R. Grace.
    - b. "Eucon 37"; Euclid Chemical Co.
    - c. "Rheobuild 1000"; Master Builders.
    - d. "Sika 86"; Sika Corporation.
    - e. Or approved equal.
- H. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E, and containing not more than 0.024 percent chloride ions.
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "Accelguard 80"; Euclid Chemical Co.
    - b. "Daraset"; W.R. Grace
    - c. "Plastocrete 161FL" or "SikeSet NC"; Sika Corporation
    - d. Or approved equal.
- I. Water-Reducing, Retarding Admixture: ASTM C 494, Type D and containing not more than 0.05 percent chloride ions.
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "Pozzolith Retarder"; Master Builders.
    - b. "Eucon Retarder 75"; Euclid Chemical Co.
    - c. "Daratard 17"; W.R. Grace.
    - d. "Plastocrete 161R"; Sika Corporation.
    - e. Or approved equal.
- J. Prohibited Admixtures: Calcium chloride thycyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.

## 2.4 RELATED MATERIALS

- A. Extruded Polystyrene Board Insulation: Rigid closed-cell extruded, expanded polystyrene insulation board with integral high-density skin, complying with ASTM C-578 Type IV: min. 25 psi compressive strength ASTM D 1621: k value of 0.20 ASTM C 518: 0.30% maximum water absorption ASTM C272: 1.1 perm/inch max watervapor transmission: manufacturer's standard length and widths.
1. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
    - a. Dow Chemical Co: Midland MI
    - b. VC Industries/V.5 Gypsum: Chicago, IL.
    - c. GreenGuard XPS: Pactive LLC: Austin, TX
    - d. Or approved equal.
- B. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.
1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
  2. Products: Subject to compliance with requirements provide one of the following:
  3. Non-metallic
    - a. "Euco-NS"; Euclid Chemical Co.
    - b. "Duragrout"; L&M Construction Chemicals, Inc.
    - c. "Masterflow 713"; Master Builders
    - d. "Five Star Grout"; U.S. Grout Corporation.
    - e. Or approved equal.
- C. Absorptive Cover: Burlap cloth made from jute or kenaf weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- D. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
1. Waterproof paper.
  2. Polyethylene film.
  3. Polyethylene-coated burlap.
- E. Clear curing and sealing compound (VOC Compliant): The compound shall have 30% solids content minimum, and will not yellow under ultraviolet light after 500 hours of test in accordance with ASTM C-1315 and will have test data from an independent testing laboratory indicating a maximum moisture loss of 0.039 grams per sq. cm. when applied at a rate of 300 sq. ft. per gallon. Sodium silicate compounds are not permitted.
1. Product: "Super Aqua-Cure VOX" by Euclid Chemical Co.
  2. Product: "Dress & Seal WB30" by L&M Construction Chemicals, Inc
  3. Product: "Kure-n-Seal 30 VOC" by Sonneborne
  4. Or approved equal.

- F. Vapor Barrier: Provide vapor barrier which conforms to ASTM E1745, Class A. The membrane shall have a water-vapor transmission rate no greater than 0.01 gr./ft<sup>2</sup>/hr/inch Hg when tested in accordance with ASTM E96. The vapor barrier shall be placed over prepared base material where indicated below slabs on grade. Vapor barrier shall be no less than 15 mil thick. Installation of vapor barrier to comply with ASTM E1643.
1. Product: Stego Wrap (15 mil) Vapor Barrier by Stego Industries LLC
  2. Product: VaporBlock (15 mil) by Raven Industries
  3. Product: Zero Perm by Alumiseal
  4. Product: Premoulded Membrane with PLASMATIC CORE by W.R. Meadows.
  5. Or approved equal.

## 2.5 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.
- B. Submit written reports to Architect and Structural Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.
- C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:
- D. For normal weight aggregate mixes: 3000 psi 28-day compressive strength; W/C ratio, 0.51 maximum, 3500 psi 28-day compressive strength W/C ratio, 0.47 maximum.
- E. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results or other circumstances warrant; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be admitted to and accepted by Architect before using in work.
- F. Admixtures:
1. Use water-reducing admixture or high range water-reducing admixture (super plasticizer) in concrete as required for placement and workability.
  2. Use high-range water-reducing admixture in pumped concrete, concrete for industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight and concrete with water/cement ratios below 0.50.
  3. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
  4. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within following limits.

- a. 5% for maximum 2" aggregate
  - b. 6% for maximum 3/4" aggregate
  - c. 7% for maximum 1/2" aggregate
- G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
- 1. Ramps, slabs and sloping surfaces: Not more than 3".
  - 2. Reinforced foundation systems: Not less than 1" and not more than 3".
  - 3. Concrete containing HRWR admixture (super-plasticizer): Not more than 8" after addition of HRWR to site-verified 2"-3" slump concrete.
  - 4. Other concrete: Not less than 1" nor more than 4"

## **2.6 CONCRETE MIXING**

- A. Ready-Mix Concrete: Comply with requirements of ASTM C94, and as herein specified.
- B. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

## **PART 3 - EXECUTION**

### **3.1 FORMS**

- A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structure are of correct size, shape, alignment, elevations and position.
- B. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keywarp, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features, required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

### **3.2 PLACING REINFORCEMENT**

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
  - 1. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations.
- B. Clean reinforcement of loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete.

- C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
- D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

### **3.3 JOINTS**

- A. Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate at a maximum spacing of 90 feet, so as not to impair strength and appearance of the structure, as acceptable to Architect.
- B. Control Joints: Locate and install control joints as indicated or at a maximum spacing of 30 feet. Locate at a spacing which does not impair appearance of the structure as acceptable to Architect. Use "SOFFCUT" saw to cut joints in slab. Joint to be cut the same day as the pour.
- C. Joint filler and sealant materials are specified in Division-7 sections of these specifications.

### **3.4 INSTALLATION OF EMBEDDED ITEMS**

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms, or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

### **3.5 CONCRETE PLACEMENT**

- A. Preplacement inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
  - 1. Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.

- B. General: Comply with ACI 304R "Guide for Measuring, Mixing, Transporting and Placing Concrete", and as herein specified.
- C. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- D. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- E. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- F. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- G. Maintain reinforcing in proper position during concrete placement operations.
- H. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which would be caused by frost, freezing actions or low temperatures, in compliance with ACI 306R.
- I. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
- J. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305R.

### **3.6 MONOLITHIC SLABFINISHES**

- A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.
- B. After screeding, consolidating and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to tolerances of Ff18 - F115. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.

- D. After floating, begin first trowel finish operation using a power driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of Ff20 - F17. Grind smooth surface defects which would telegraph through supplied floor covering system.
- E. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps and elsewhere as indicated.

### **3.7 CONCRETE CURING AND PROTECTION**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
- D. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing and by combinations thereof, as herein specified.
- E. Provide moisture curing by following methods.
  - 1. Keep concrete surface continuously wet by covering with water.
  - 2. Continuous water-fog spray.
  - 3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
- F. Provide moisture-cover curing as follows:
  - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, place in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- G. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting and other coatings and finish materials, unless otherwise acceptable to Architect.
- H. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.



- I. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture retaining cover, unless otherwise directed.

### **3.8 MISCELLANEOUS CONCRETE ITEMS**

- A. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- B. Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.

### **3.9 CONCRETE SURFACE REPAIRS**

- A. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
- B. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets and other objectionable conditions.
- C. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- D. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.
- E. Underlayment Application: Leveling of floors for subsequent finishes may be achieved by use of specified underlayment material.

### **3.10 QUALITY CONTROL TESTING DURING CONSTRUCTION**

- A. The owner will employ a testing laboratory to perform the following tests, inspect formwork and reinforcement placement and to submit test reports.
- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.
- C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
  2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
- D. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
- E. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
- F. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
- G. Test results will be reported in writing to Architect, Structural Engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- H. Nondestructive Testing: Impact hammer, sonoscope or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- I. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

**END OF SECTION 03300**

## **SECTION 03450 - SELF-DRYING FINISHING UNDERLAYMENT**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Extent of Self Drying Cement - Based Finishing Underlayment for flooring work as indicated on drawings.
- B. Related Sections:
  - 1. Section 09300 - Tile
  - 2. Section 09650 - Resilient Flooring

#### **1.3 DEFINITIONS**

- A. Self-Drying Finishing Underlayment for flooring includes systems which consist of materials specially formulated, portland cement self-smoothing, rapid hardening compound to level and repair existing interior concrete slabs.

#### **1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer's specifications, installation instructions, and general recommendations for each major product required. Include data substantiating that products to be furnished comply with requirements of the contract documents.
- B. Test Reports: Submit results of testing specified.
  - 1. Certificates: Submit manufacturer's test data certifying compliance with specified performance requirements.
  - 2. Test reports: Submit test data for moisture content and hydrostatic pressure of existing concrete slab.
- C. Certificates: Submit manufacturer's certification that products comply with requirements of the contract documents.

#### **1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Obtain required products from a single manufacturer.
- B. Manufacturer Experience: Provide products of this section by companies which have successfully specialized in production of this type of work for a recommended 5 years.
- C. Installer's Qualifications: All work of this section shall be performed by an experienced applicators, licensed by the manufacturer of the system and successfully completed this type of work for a recommended 2 years.

- D. Codes and Standards: Comply with requirements of the contract documents or of governing codes and authorities having jurisdiction.
- E. Mock-up: Prior to installation of work of this section, erect sample at location directed by or acceptable to the Architect, using specified materials and workmanship to be expected in the completed work. Once mock-up has been approved by the Architect, retain until the work has been completed and accepted.
  - 1. Configuration: Approximately 4 feet by 4 feet.
  - 2. Mock-up may not be incorporated into the final work; demolish and remove from site when directed by the Architect.
- F. Pre-installation Conference: Prior to installation of work of this section, conduct a meeting at the project site to discuss quality assurance requirements. In addition to the contractor and the installer, arrange for attendance of the following:
  - 1. Other installers affected by the work of this section.
  - 2. The Owner's representative.
  - 3. The Architect.
  - 4. Manufacturer's representative.
  - 5. Supplier.
- G. Allowable Tolerances:
  - 1. Variation from Level: Do not exceed 1/4 inch in any bay or 10 feet in distance.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Keep materials dry at all times. Protect against exposure to weather and against contact with damp or wet surfaces.
- B. Store materials on one site to maintain proper separation and grading integrity. Cover materials to prevent excessive accumulation of moisture.
- C. Protect materials from excessive moisture in shipment, storage, and handling. Deliver materials in manufacturer's unopened packages, and store in dry place with adequate air circulation.
- D. Storage: Stack products of this section carefully to provide air circulation within stacks.

## **1.7 PROJECT CONDITIONS**

- A. Environmental Requirements: Do not proceed with installation when air temperatures are below 40°F , or above 95°F, unless protective measures acceptable to the manufacturer are taken.
- B. Do not proceed with installation until temperature and relative humidity have been stabilized and will be maintained within values established by the manufacturer for optimum quality control.
- C. Provide adequate ventilation to prevent accumulation of hazardous fumes during application of components in enclosed spaces, and maintain ventilation until materials have thoroughly cured.

## 1.8 SEQUENCING AND SCHEDULING

- A. Coordinate work of this section with other trades and installation of special construction and equipment.

## 1.9 WARRANTY

- A. Special Project Warranty: Submit a written warranty signed by the manufacturer, the contractor, and the installer, guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributable to abnormal aging, without reducing or otherwise limiting any other rights to correction which the Owner may have under the contract documents.
  - 1. The warranty shall include responsibility for removing and replacing other work as necessary to accomplish repairs or replacement of materials covered by the warranty.
    - a. Warranty period: Minimum **two (2) years** after date of substantial completion.

## PART 2 - PRODUCTS

### 2.1 MIXES

- A. Basis of Design: "Ardex Feather Finish" Self-Drying, Cement-Based Finishing Underlayment, as manufactured by ARDEX Engineered Cements, Aliquippa, PA, Tel.# 888.512.7339, [www.ardex.com](http://www.ardex.com); or approved equal.
- B. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
  - 1. Mapei, South River, NJ, Tel.# 732.254.8001.
  - 2. CMP Specialty Products, Horsham, PA, Tel.# 215.672.6384.
  - 3. Or approved equal.
- C. Follow the manufacturer's printed instructions, procedures and recommended equipment for mixing the components.
  - 1. Mixing Ratio: 2½ quarts of water per 10 lbs. bag at 70°F.
    - a. For smaller batches, use 2 parts powder to 1 part water by volume.
- D. Compressive Strength: ASTM C 109, 4200 psi, minimum.
- E. VOC: 0

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Inspect substrates and conditions under which the work of this section will be performed, and verify that installation properly may commence. Do not proceed with the work until unsatisfactory conditions have been resolved fully.

1. Commencement of work shall constitute acceptance of conditions. Any necessary remedial work required to correct any unsatisfactory conditions, found after the start of installation, will be provided at no cost to the Owner.
  2. If asbestos abatement of flooring products was performed (by others), review product information on the product(s) used (by others) to remove the adhesive(s) to ensure compatibility.
- B. Testing: Perform required testing of existing concrete slab, for hydrostatic pressure and moisture content. Follow manufacturer's recommended procedures for testing slab. Do not proceed with the work until unsatisfactory conditions have been resolved fully.

### **3.2 PREPARATION**

- A. Clean substrate, removing projections, all loose material and substances detrimental to the work; comply with recommendations of manufacturer of products to be installed for proper preparation procedures.
- B. Prepare substrate in accordance with recommendations of manufacturer for optimum installed performance.
- C. Mask off or otherwise protect adjacent surfaces not scheduled to receive products of this section.
- D. Coordinate installation with other trades, report conditions in writing to the Owner/Architect. Do not proceed with application work until any unsatisfactory conditions have been corrected.

### **3.3 APPLICATION**

- A. General: Comply with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
  1. Apply materials to the substrate with flat side of a steel trowel to obtain a solid mechanical bond. Apply sufficient pressure to fill all defects and to feather the product into the subfloor surface and to suit existing substrate conditions.

### **3.4 CLEANING**

- A. Upon completion, clean all surfaces which have become soiled or coated as a result of work of this section, using proper methods which will not scratch or otherwise damage finished surfaces.
- B. For cleaning, use only products and techniques acceptable to manufacturer of products being cleaned.

### **3.5 PROTECTION**

- A. General: Institute protective procedures and install protective materials as required to ensure that work of this section will be without damage or deterioration.

**END OF SECTION 03450**

## **SECTION 03480 - PRECAST CONCRETE VALVE VAULTS AND METER BOXES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

A. Related Sections:

1. Section 02666 – Potable Water
2. Section 02514 – Site work Concrete

#### **1.2 REFERENCES**

A. ASTM International:

1. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
2. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
3. ASTM C33 - Standard Specification for Concrete Aggregates.
4. ASTM C150 - Standard Specification for Portland Cement.
5. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
6. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
7. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
8. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
9. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joints Sealants.
10. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
11. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
12. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
13. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
14. ASTM D4104 - Standard Test Method (Analytical Procedure) for Determining Transmissivity of Nonleaky Confined Aquifers by

Overdamped Well Response to Instantaneous Change in Head  
(Slug Test)

**1.3 DESIGN REQUIREMENTS**

- A. Design Criteria:
  - 1. Watertight precast reinforced air-entrained concrete structures designed to AASHTO HS20 - 16 kip wheel loading and installation conditions, and manufactured to conform to ASTM C913.
  - 2. Minimum 28-day Compressive Strength: 5,000 psi.
  - 3. Honeycombed or re-tempered concrete is not permitted.

**1.4 SUBMITTALS**

- A. Shop Drawing: Indicate plan, location and inverts of connecting piping.
- B. Product Data: Submit data on all vaults, meter boxes and appurtenances.
- C. Manufacturer's Certificates: Submit Statement of Compliance, supporting data, from materials suppliers attesting that precast concrete valve vaults and meter boxes provided meet or exceed ASTM Standards and specification requirements.
- D. Manufacturer's Installation Instructions: Submit special procedures for precast concrete valve vaults and meter boxes installation.

**1.5 DELIVERY, STORAGE AND HANDLING**

- A. Transport and handle precast concrete units with equipment designed to protect units from damage.
- B. Do not place concrete units in position to cause overstress, warp or twist.

**1.6 COORDINATION**

- A. Coordinate work with utilities within construction area and local water provider.

**PART 2 - PRODUCTS**

**2.1 PRECAST CONCRETE VALVES AND METER BOXES**

- A. Furnish materials in accordance with New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction



and ACI 318-14 load factor design. Design shall be for AASHTO HS20 loading.

**B. Materials:**

1. Portland Cement: ASTM C150, Type II.
2. Coarse Aggregates: ASTM C33; Graded 1 inch (25 mm) to No. 4 (4.75 mm) Sieve.
3. Sand: ASTM C33; 2.35 fineness modulus.
4. Water: Potable; clean and free of injurious amounts of acids, alkalis, salts, organic materials, and substances incompatible with concrete or steel.
5. Air-Entraining Admixtures: ASTM C260.
6. Reinforcing Steel:
  - a. Deformed Bars: ASTM A615/A615M, Grade 40.
  - b. Welded Wire Fabric: ASTM A185.
7. Joint Sealant:
  - a. ASTM C990.

**C. Mixes:**

1. Design concrete mix to produce required concrete strength, air-entrainment, watertight properties, and loading requirements.

**D. Valve Vault and Meter Box Frames and Covers:**

1. Frames and covers shall be Bilco Type PCM-4 single leaf sidewalk door or approved equal. Size as shown on the plans and details.

**E. Access Ladder:**

1. Aluminum: ASTM B221 (ASTM B221M), Alloy 6061-T6. Size and dimensions as shown on the plans and details. Ladder shall include Bilco Ladder Up safety post or approved equal.

## **2.2 FABRICATION AND MANUFACTURE**

- A. Fabricate precast reinforced concrete structures in accordance with ASTM C913, to dimensions indicated on Drawings, and to specified design criteria.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verification of existing conditions before starting work.
- B. Verify piping connection, size, location and invert are as indicated on Drawings.

### **3.2 PREPARATION**

- A. Ream pipe ends and remove burrs.
- B. Remove scale and dirt from components before assembly.
- C. Establish invert elevations for each component in system.
- D. Hand trim excavation to suit valve vaults and meter boxes. Remove stones, roots or other obstructions.

### **3.3 EXCAVATION AND BEDDING**

- A. Excavate in accordance with Section 02200. Hand trim excavation for accurate placement of vaults and meter boxes to elevations indicated.
- B. Place bedding material level in one continuous layer not exceeding 6 inches compacted depth.
- C. Backfill around sides of vaults and meter boxes, tamped in place and compacted to 95 percent.
- D. Maintain optimum moisture content of bedding material to attain required compaction density.
- E. Install vaults and meter boxes and related components on bedding.

### **3.4 CONNECTING PIPING**

- A. Connect piping.

### **3.5 PROTECTION OF FINISHED WORK**

- A. Protecting finished work until final acceptance.

## **PART 4 – PAYMENT**

- A. There is no separate payment for work under this section. The lump sum price bid shall include all costs of labor, equipment and materials necessary to perform this work in accordance with the contract documents.

**END OF SECTION 03480**

## **SECTION 04200 - UNIT MASONRY**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of each type of masonry work is indicated on drawings and schedule.
- B. Type of masonry work required includes:
  - 1. Concrete unit masonry.
  - 2. Brick masonry.
  - 3. Ground Face Architectural CMU
  - 4. Cast Stone.
  - 5. Masonry bond beams.
  - 6. Mortar and grout.
  - 7. Reinforcement, anchorage, and accessories.
  - 8. Concealed Flashing
  - 9. Installation of miscellaneous loose steel lintels, plates and other steel fabrications.
- C. Related Work:
  - 1. Section 05120 - Structural Steel.
  - 2. Section 05400 - Miscellaneous Structural Steel.
  - 3. Section 07200 - Cavity Insulation.
  - 4. Section 07270 - Fluid Applied Membrane Air / Vapor Barrier.
  - 5. Section 07900 - Joint Sealer Assemblies.
  - 6. Section 09900 - Painting of exposed to view CMU surfaces.

#### **1.3 QUALITY ASSURANCE**

- A. Fire Performance Characteristics: Where indicated, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with ASTM E 119 by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.
- B. Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.
- C. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- D. Field Constructed Mock-Ups: Prior to installation of masonry work, erect sample wall panels to further verify selections made for color and textural characteristics, under sample submittals of masonry units and mortar, and to represent completed masonry work for qualities of appearance, materials and construction.

- E. Build mock-ups for the following types of masonry in sizes of approximately 4 feet long by 6 feet high by full thickness, including provisions for 16" wide by 24" high opening with appropriate steel or masonry lintels, face and back-up wythes, cavity, insulation, horizontal reinforcement, ties, through wall flashing, weep holes, spray applied air/vapor barrier, mortar net and spandrel steel beam / lintel flashing as well as any other wall components and accessories in accordance with attached sketch and as directed by the Architect in Field. **See sketch of sample Mock-Up Panel at the end of this Section.**
1. Each type of exposed unit masonry work.
  2. Each type of exterior face brick.
  3. Typical interior brick wall.
  4. Where masonry is to match existing, erect panels parallel to existing surface.
- F. Engineered Masonry for Seismic Requirements: Where indicated, provide masonry material and construction for engineered masonry work to conform to the requirements of ACI 530/ASCE 5/TMS 402, the International Building Code, and in compliance with requirements for Seismic Performance Category assigned to the construction documents for this project.
- G. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
- H. Masonry Pre-Installation Meeting: Prior to installation of any above-grade masonry work, there shall be a Masonry Pre-Installation Meeting between the General Construction Work Contractor, all masonry Subcontractors (if any), Construction Manager and the Architect. At this meeting, all masonry construction products and procedures shall be reviewed.

#### **1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements.
- B. Samples for Verification Purposes: Submit the following samples:
1. Unit masonry samples for each type of exposed masonry unit required; include in each set the full range of exposed color and texture to be expected in completed work.
  2. For selection of bricks, submit products of all local manufacturers that the manufacturers consider to be their closest match. Resubmit until match meets approval of Architect.
  3. Cast Stone samples not less than 12 inch square showing full range of exposed color and texture to be expected in finish work.
  4. Colored masonry mortar samples for each color required showing the full range of color which can be expected in the finished work. Label samples to indicate type and amount of colorant used.

- C. Shop Drawings: Submit shop drawings for the following:
  - 1. All locations of Vertical Control Joints for interior concrete masonry unit walls including control joints shown.
  - 2. Cast Stone Sills.
- D. Cast Stone Standards:
  - 1. Cast stone mix and certification of compliance with standard ASTM C 1364 testing requirements. Include testing for freezing and thawing resistance.
  - 2. Cast Stone Institute Standard Specification (latest edition).

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver masonry materials to project in undamaged condition.
- B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes.
- C. Limit moisture absorption of concrete masonry units during delivery and until time of installation to the maximum percentage specified for Type I units for the average annual relative humidity as reported by the U.S. Weather Bureau Station nearest project site.
- D. Store cementitious materials off the ground, under cover and in dry location.
- E. Store aggregates where grading and other required characteristics can be maintained.
- F. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.
- G. Coordinate delivery and application of air barrier with the delivery and application of the cavity insulation to ensure the installation of these products are completed within the same construction phase.
- H. Deliver air barrier membranes, adhesives and primers to the jobsite in undamaged and original packaging indicating the name of the manufacturer and product. Store roll materials on end in original packaging. Protect rolls from direct sunlight until ready for use. Store air barrier membranes, adhesives and primers at temperature of 40°F. and rising. Keep solvent away from open flame and excessive heat.

## **1.6 REFERENCE STANDARDS**

- A. Comply with the current applicable provisions of all codes, regulations, industry standards and specifications referenced in this section, unless otherwise modified by the requirements of the Contract Documents, including but not limited to the following:
  - 1. ACI 531 Building Code Requirements for Masonry Structures.
  - 2. ACI 531 Commentary on Building Code Requirements for Masonry Structures.
  - 3. ACI 530.1 Specification for Masonry Construction.
  - 4. ASTM C-90 Load Bearing Masonry Units.
  - 5. ASTM C-129 Non-Load Bearing Masonry Units.
  - 6. ASTM C 140 Testing Concrete Masonry Units.
  - 7. ASTM C 216 Testing Facing Brick (Solid Masonry Units Made from Clay or Shale).

8. ASTM C 270 Standard Specification for Mortar for Unit Masonry
9. ASTM C 780 Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
10. ASTM C 1586 Standard Guide for Quality Assurance of Mortars.
11. ASTM E - 119 Fire Tests with Building Construction and Materials.
12. BIA Technical Notes on Brick Construction.
13. BIA Technical Notes on Brick Construction: Technical Note #46 "Maintenance of Brick Masonry.
14. NCMA TEK Bulletins.
15. ASTM 1364 Cast Stone Masonry
16. ASTM E2178 Standard Test Method for Air Permeance of Building Materials
17. ASTM E2357 Standard Test Method for Determining the Air Leakage of Air Barrier Assemblies.
18. ASTM E96 Water Vapor Transmission of Materials.
19. NFPA 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

## **1.7 PROJECT CONDITIONS**

- A. Protection of Work: During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
  1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- B. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.
- C. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.
- D. Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry.
- E. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
- F. Protect sills, ledges and projections from droppings of mortar.
- G. Cold Weather Protection:
  1. Do not lay masonry units which are wet or frozen.
  2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
  3. Remove masonry damaged by freezing conditions.
  4. For clay masonry units with initial rates of absorption (suction) which require them to be wetted before laying, comply with the following requirements:
    - a. For units with surface temperatures above 32°F (0°C), wet with water heated to above 70°F.
    - b. For units with surface temperature below 32°F (0°C), wet with water heated to above 130°F.

- H. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout.
- I. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10°F.
1. 40 degrees F to 32 degrees F:
    - a. Mortar: Heat mixing water to produce mortar temperature between 40°F and 120°F. Setting time will be limited to 60 minutes from initial mixing.
    - b. Grout: Follow normal masonry procedures.
  2. 32 degrees F to 25 degrees F:
    - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F and 120°F; maintain temperature of mortar on boards above freezing.
    - b. Grout: Heat grout materials to 90°F to produce in-place grout temperature of 70°F at end of work day.
  3. 25 degrees F to 20 degrees F:
    - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F and 120°F; maintain temperature of mortar on boards above freezing.
    - b. Grout: Heat grout materials to 90°F to produce in-place grout temperature of 70°F at end of work day.
    - c. Heat both sides of walls under construction using salamanders or other heat sources.
    - d. Use windbreaks or enclosures when wind is in excess of 15 mph.
  4. 20 degrees F and below:
    - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F and 120°F.
    - b. Grout: Heat grout materials to 90°F to produce in-place grout temperature of 70°F at end of work day.
    - c. Masonry Units: Heat masonry units so that they are above 20°F at time of laying.
    - d. Provide enclosure and auxiliary heat to maintain an air temperature of at least 40°F for 24 hours after laying units.
    - e. Do not heat water for mortar and grout to above 160°F.
- J. Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry, temperature ranges apply to anticipated minimum night temperatures.
1. 40 degrees F to 32 degrees F:
    - a. Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.
  2. 32 degrees F to 25 degrees F:
    - a. Completely cover masonry with weather-resistive membrane for at least 24 hours.
  3. 25 degrees F to 20 degrees F:
    - a. Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.

4. 20 degrees F and below:
  - a. Except as otherwise indicated, maintain masonry temperature above 32°F (0°C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40°F (4°C) for 48 hours.

## 1.8 WARRANTY

- A. The Contractor shall warrant the exterior walls to be free from leakage due to any natural cause for a period of **five (5) years** from date of final acceptance of the building and he shall, within such period at his own expense, upon written notification from the Owner, pursue such remedial measures as may be necessary to correct any condition of leakage and damage incidental thereto that may develop. The Contractor in signing this Contract accepts the above conditions. In so doing, he also agrees either that the materials and methods specified herein are such as to insure the results required or that he will, at no additional expense, furnish such additional or alternative items of labor and materials (or both) as may be necessary to accomplish the stated intent of the Contract.
- B. Flexible Copper Flashing:
  1. Special warranty:
    - a. Manufacturer shall warrant flexible flashing material for **life of the wall**.
    - b. Begin warranty from the Date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Manufacturer: Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.
  1. Brick: Subject to compliance with requirements, manufacturers of brick units which may be incorporated in the work include, but are not limited to, the following:
    - a. Church Brick Company.
    - b. Consolidated Brick.
    - c. Diener Brick Company.
    - d. Tri-State Brick & Building Materials, Inc.
    - e. The Belden Brick Company.
    - f. Or approved equal.
  2. Concrete and Architectural Masonry Units: Subject to compliance with requirements, manufacturers of concrete masonry units which may be incorporated in the work include, but are not limited to, the following:
    - a. Anchor Concrete Products Inc.
    - b. Clayton Block Co., Inc.
    - c. EP Henry Corporation.
    - d. Or approved equal.
  3. Masonry Anchors, Joint Reinforcing, Accessories, etc.: Subject to compliance with requirements, manufacturers of masonry anchors, joint reinforcing, accessories which may be incorporated in the work include, but are not limited to, the following:
    - a. Heckman Building Products, Inc.
    - b. Hohmann & Barnard, Inc.
    - c. Or approved equal.



## **2.2 BRICK MADE FROM CLAY OR SHALE**

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of brick required.
- B. Size: Provide bricks manufactured to the following actual dimensions:
  - 1. Standard Modular: 2-1/4 inch x 3-5/8 inch x 7-5/8 inch.
  - 2. Norman Scored: 2-1/4 inch x 3-5/8 inch x 11-5/8 inch with 3/8 inch score (to simulate a 4"/8" nom. brick width), as detailed.
- C. Provide special molded shapes where indicated and for application requiring brick of form, size and finish on exposed surfaces which cannot be produced from standard brick sizes by sawing.
- D. For sills, caps and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncored or unfrogged units with all exposed surfaces finished.
- E. Facing Brick: ASTM C 216, and as follows.
  - 1. Grade SW.
  - 2. Type: FBS.
  - 3. Compressive Strength: 8,000 psi, average, per ASTM C 67.
  - 4. Application: Use where brick is exposed, unless otherwise indicated.
  - 5. Texture and Color: As selected by the Architect.
- F. Efflorescence: Provide brick tested and rated in compliance with ASTM C67.

## **2.3 CONCRETE MASONRY UNITS**

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of concrete masonry unit required.
- B. Provide special shapes where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.
  - 1. Provide bullnose units for outside corners unless otherwise indicated.
- C. Concrete Block: Provide units complying with characteristics indicated below for face size, exposed face and under each form of block included, for weight classification.
- D. Size: Manufacturer's standard units with nominal face dimensions of 16" long x 8" high (15-5/8" x 7-5/8" actual) x thicknesses indicated.
- E. Where special patterns are indicated, provide units with exposed faces matching color, texture and pattern of Architect's sample.
- F. Hollow Loadbearing Block: ASTM C 90 and as follows:
  - 1. Weight Classification: Lightweight.

- G. Solid Loadbearing Block: ASTM C 90 and as follows: (Below grade and wherever else solid CMU is indicated).
  - 1. Weight Classification: Lightweight.
- H. Solid 4" and 6" CMU (2 and 3 Hour Fire Resistance Rated) Loadbearing Block: Standard Method for Determining Fire Resistance of Concrete and Masonry Assemblies - ANSI/ACI 216.1-97, TMS-0216-97 and as follows:
  - 1. Construction and material requirements of concrete masonry including units, mortar, grout, control joint materials and reinforcement shall comply with ACI 530/ASCE 5/TMS 402.
  - 2. Concrete masonry units shall comply with ASTM C 55, C 73, C 90 or C 129.
  - 3. Weight Classification: Lightweight.
  - 4. Aggregate Type: Expanded clay, expanded shale or expanded slate with a minimum required equivalent thickness of 3.6 inches for 4" CMU.

#### **2.4 GROUND FACE BLOCK**

- A. Provide smooth textured concrete masonry units, ASTM C-90, in sizes indicated as manufactured by E.P. Henry Company; or approved equal.
- B. Provide units with integral liquid polymeric water repellent admixture, mixed with concrete during production of masonry units
  - 1. Basis of Design: "Dry-Block Integral Water Repellent System" as manufactured by W. R. Grace & Co., or approved equal.
  - 2. Units shall be capable of attaining Class E Rating under ASTM E 514-74, and no decrease in flexural strength or compressive strength of prisms when compared to "control", under ASTM E 72-74.
  - 3. Special shapes: Provide special block types where required for corners, control joints, headers, lintels, and other special conditions, whether or not specifically indicated on the drawings as special.
  - 4. Provide indicated number of colors, to be selected from manufacturer's available full range of colors.

#### **2.5 CAST STONE SILLS**

- A. Basis of Design: Provide cast stone as manufactured by Continental Cast Stone East, by Russell Inc.; or approved equal.
  - 1. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:
    - a. Custom Cast Stone.
    - b. Reading Rock, Inc.
    - c. Or approved equal

2. Other acceptable manufacturers shall have a recommended minimum of ten (10) years of continuous operation and adequate facilities for producing and curing machine-made Cast Stone units as described herein.
  3. Manufacturer shall be a member of the Cast Stone Institute.
- B. Provide cast stone of size, shape and thickness indicated.
- C. Physical Properties:
1. Compressive Strength: ASTM C 1364.
  2. Absorption, Cold Water: ASTM C 1364.
  3. Linear Shrinkage: ASTM C 1364.
  4. Surface Texture: ASTM C 1364.
  5. Cast Stone Materials:
    - a. Portland Cement: ASTM C 150, Type I, white/or gray as required to match specified color,
    - b. Coarse Aggregate: ASTM C 1364, Granite, quartz, or limestone,
    - c. Fine Aggregate: ASTM C 1364, Natural or manufactured sands,
    - d. Coloring Pigments: ASTM C 1364, Inorganic iron oxides,
    - e. Chemical Admixtures: ASTM C 1364.
    - f. Water: Potable.
- E. Color and finish: To be selected by the Architect from manufacturer's available full range of standard colors and finishes.
1. Exposed surfaces shall exhibit a fine grained texture similar to natural stone. No bugholes or air voids will be permitted.
  2. Variation:
    - a. Must match color and finish of approved sample when viewed in direct light at a 10 foot distance.
    - b. Permissible Variation in Color:
      - 1) Hue Difference - ASTM C 1364, 2 units.
      - 2) Total Color Difference - ASTM C 1364, 6 units..
- F. Anchors: Non-corrosive type, sized for conditions:
1. Provide Stainless steel type 304 anchors, pins, dowels and clip angles as indicated or if not indicated as required for each cast stone units and panels.
  2. Shelf angles and other similar structural items shall be galvanized steel.
- G. Reinforcement: Where required by ASTM C 1364, Epoxy coated or galvanized.
- H. Fiber Reinforcement: ASTM C 1116, fibrous nylon
- I. Mortar: Cast Stone Institute Standard Specification.
- J. Curing, Finishing and Cleaning: Provide methods and products which had been approved or recommended by manufacturer of the cast stone units.

K. Cleaner:

1. Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces.
2. Approved for intended use by cast stone manufacturer and approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.

## 2.6 MASONRY LINTELS

A. General: Provide one of the following:

1. Masonry Lintels: Built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Temporarily support built-in-place lintels until cured.

## 2.7 MORTAR AND GROUT MATERIALS

A. General: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

B. Limit cementitious materials in mortar to portland cement-lime.

C. Portland Cement: ASTM C 150, Type 1, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.

D. For colored aggregate mortars use masonry cement, ASTM C 91, of natural color or white as required to produce mortar colors required.

E. Hydrated Lime: ASTM C 207, Type S.

F. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4 inch use aggregate graded with 100% passing the No. 16 sieve.

1. White Mortar Aggregates: Natural white sand or ground white stone.
2. Colored Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in masonry mortars.

G. Mortar: ASTM C387, Type N. Provide mortar for face brick and accessories to match original mortar in color, texture, strength and hardness (density and porosity). Determine existing mortar mix constituents and ratios by analysis. Review laboratory evaluations with Architect before proceeding with the work. Match color of existing mortar by use of aggregates matching original aggregate color where possible. Use inorganic coloring pigments if satisfactory color match cannot be attained with natural materials.

1. Use Type M mortar for masonry below grade and in contact with earth, and where indicated.
  2. Use Type S mortar for exterior, above-grade loadbearing and non-loadbearing CMU walls; for interior loadbearing CMU walls; and for other applications where another type is not indicated.
- H. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated.
- I. Grout for Unit Masonry: Comply with ASTM C 476.
1. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.
- J. The proper use of ASTM C 270 and Test Method ASTM C 780 for evaluating masonry mortars produced in the laboratory and the construction site is in accordance with ASTM C 1586.
- K. Aggregate for Grout: ASTM C 404.
- L. Water: Clean and potable.
- M. Colored Aggregate Mortar: Produce mortar of color required by use of colored aggregates in combination with selected cementitious materials.
1. Colors as selected by the Architect from manufacturer's available full range of colors.
- N. Water Repellant Admixture:
1. Basis of Design: "Dry-Block Integral Water Repellant System" as manufactured by W. R. Grace & Co.; or approved equal.
  2. Provide water repellant mortar admixture to be added to mortar and grout during mixing, and capable of attaining Class E Rating under ASTM E 514-74. Tested walls, containing integral water repellant admixture and with mortar containing water repellant admixture, shall exhibit no decrease in flexural strength or compressive strength of prisms when compared to "control", under ASTM E 72-74.
  3. Provide water repellant mortar admixture for use with Architectural Concrete Masonry Units, (Ground face, Rock face, TMU, etc.) and where concrete masonry units used in areas with high exposure to water, (Basements, exposed painted exterior application, etc.).

## **2.8 JOINT REINFORCEMENT, TIES AND ANCHORING DEVICES**

- A. Materials: Comply with requirements indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics:
- B. Hot-Dip Galvanized Steel Wire: ASTM A 82 for uncoated wire and with ASTM A 153, Class B-2 (1.5 oz. per sq. ft. of wire surface) for zinc coating applied after prefabrication into units.

- C. Joint Reinforcement: Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with prefabricated corner and tee units, and complying with requirements indicated below:
1. Width: Fabricate joint reinforcement in units with widths of approximately 2 inch less than nominal width of walls and partitions as required to provide mortar coverage of not less than 5/8 inch on joint faces exposed to exterior and 1/2 inch elsewhere.
    - a. Wire Size for Side Rods: 9 gauge.
    - b. Wire Size for Cross Rods: 9 gauge.
  2. Truss design with continuous diagonal cross rods spaced not more than 16 inch o.c.
  3. Number of Side Rods: One side rod for each face shell of concrete masonry back-up and one rod for brick wythe.
  4. Configuration:
    - a. Applications of Single Wythe Wall width: Truss design, diagonal cross rods at not more than 16 inches on center.
      - 1) Basis of Design: Provide Hohmann & Barnard, Inc., No.# 120, Truss-Mesh; or approved equal.
    - b. Applications of more than one unit width (Composite Wall): Truss design, diagonal cross rods at not more than 16 inches on center:
      - 1) Basis of Design: Provide Hohmann & Barnard, Inc., No.# 140, Truss-Twin-Mesh; or approved equal.
    - c. Applications of more than one unit width, exterior cavity walls (Masonry back-up), Seismic design:
      - 1) Basis of Design: Provide Hohmann & Barnard, Inc., No.# 170-ML (Mighty-LOK®); or approved equal.
- D. Flexible Anchors: Where flexible anchors are indicated for connecting masonry to structural framework, provide 2-piece anchors as described below which permit vertical or horizontal differential movement between wall and framework parallel to, but resist tension and compression forces perpendicular to, plane of wall.
1. For anchorage to steel framework provide manufacturer's standard anchors with triangular-shaped wire tie section sized to extend within 1inch of masonry face. Coordinate with Steel Contractor for type and size required. Provide 3/16 inch diameter, hot-dip galvanized steel.
  2. Provide Hohmann & Barnard, Inc., Slip-Set Stabilizer to anchor new brick end caps to existing masonry wall(s); or approved equal.
- E. Unit Type Masonry Inserts in Concrete: Furnish cast iron or malleable iron inserts of type and size indicated.
- F. Dovetail Slots: Furnish dovetail slots, with filler strips, of slot size indicated, fabricated from 0.0336 inch (22 gage) sheet metal.

- G. Anchor Bolts: Provide steel bolts with hex nuts and flat washers complying with ASTM A 307, Grade A, hot-dip galvanized to comply with ASTM C 153, Class C, in sizes and configurations indicated.
- H. Pencil rods at construction joints as shown: Dowels dipped in tar for ½ of length.
- I. Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60 for bars No. 3 to No. 18.

## 2.9 CONCEALED FLASHING MATERIALS

- A. **Type 1:** Through Wall Mechanically Keyed Flashing; (At ledges and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior and/or where indicated). Provide end dams where shown or required.
  - 1. Basis of Design: Provide 0.018" (26 gauge) thick 302/304 dead soft stainless steel, as manufactured by Keystone Flashing Co., Philadelphia, PA, Tel.# 215.329.8500; or approved equal.
    - a. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:
      - 1) Cheney Flashing Co., Trenton, NJ, Tel.# 609.394.8175 or 800.322.2873.
      - 2) Or approved equal.
  - 2. Type: Provide three way bond interlocking type, factory formed, 3/16" high undercut sawtooth ribs at 3" intervals to provide a three way mechanical bond in the mortar bed.
  - 3. Extend bottom horizontal leg of flashing out from the outer face of the masonry wall ½" at 30 degree from horizontal, and hem.
  - 4. Provide specially fabricated units and exterior and interior corner conditions. Lap flashing a minimum of 4-inches and seal laps with mastic or as recommended by manufacturer.
- B. **Type 2:** Thru-Wall Copper Fabric Flashing (Asphalt-Free): (At the head of window, door and unit ventilator masonry openings, existing columns in masonry cavity wall or where indicated). Provide end dams where shown, or as required.
  - 1. Basis of Design: "Multi Flash 500 Series", as manufactured by York Manufacturing, Inc., Sanford, ME, Tel.# 800.551.2828 / [www.yorkmfg.com](http://www.yorkmfg.com); or approved equal.
    - a. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
      - 1) "Copper Sealtite 2000®", as manufactured by Advanced Building Products Inc., Tel.# 800.252.2306.
      - 2) "Copper-Fabric™ NA Copper Fabric Flashing", as manufactured by Sandell Manufacturing Company, Inc., (a Hohmann & Barnard, Inc. Co.) , Tel.# 800.283.3888 or 518.357.9757.
      - 3) "Gorilla Flash GF-500, as manufactured by STS Coatings, Inc., Tel.# 830.995.5177.
      - 4) "Copper Seal", as manufactured by Wire-Bond, Inc., Tel.# 800.849.6722.
      - 5) Or approved equal.

2. Type: Copper sheet bonded with rubber based adhesive, between two layers of fiberglass fabric weighing not less than 0.3 oz./layer with a minimum of 10 x 20 threads per inch.
    - a. Copper Type: CDA Alloy 110, 060 temper in accordance with ASTM B370.
    - b. Copper Weight: 5 oz. per square foot.
  3. Fabric: Fiberglass fabric; laminated to each face of copper core with core weight manufacturer identified on product with color coded laminate.
  4. Adhesive: Non-asphalt for laminating adhesive.
  5. Size: Manufacturer's standard roll width and length.
  6. Mastic/Sealant: Manufacturer's standard for specified flashing.
    - a. Type: One part 100% solids, solvent-free formulated silyl-terminated polyester (STPE), ASTM C920-11, Type S, Grade NS, Class 50.
  7. Termination Bar: Where indicated, or required, provide manufacturer's standard 1" wide, minimum by 1/8" thick, minimum by continuous length pre-punched stainless-steel bar or composite material bar complete with stainless-steel fasteners.
    - a. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
      - 1) Heckmann Building Products, Inc., Melrose Park, IL, Tel.# 800.621.4140 / [www.heckmannbuildingprods.com](http://www.heckmannbuildingprods.com)
      - 2) Hohmann & Barnard, Inc., Hauppauge, NY, Tel.# 800.645.0616 or 631.234.0600 / [www.h-b.com](http://www.h-b.com)
      - 3) Or approved equal.
  8. Provide specially fabricated units and interior corner conditions. Lap flashing a minimum of 6-inches and seal laps with mastic, or as recommended by manufacturer.
- C. **Type 3:** Thru-Wall Spandrel Steel Beam / Lintel Flashing: (At spandrel steel beams, steel lintels above doors and windows, at steel columns and/or where indicated).
1. Basis of Design: "Perm-A-Barrier Wall Flashing", as manufactured by W.R. Grace & Co., Grace Construction Products, Cambridge, MA, Tel.# 866.333.3726, [www.graceconstruction.com](http://www.graceconstruction.com), or approved equal.
    - a. 40 mil (1 mm) total thickness self-adhesive, cold applied tape consisting of 32 mils (0.8 MM) of rubberized asphalt integrally bonded to a 8 mil (0.2 mm) high density, cross laminated polyethylene film. Rolls are interwound with disposable silicone-coated release sheet.
    - b. Provide specially premolded units at exterior and interior corner conditions. Lap flashing a minimum of 4-inches and seal laps with Bituthene mastic or as recommended by manufacturer.



- c. Conditioning and Priming: Use "Perma-A-Barrier WB Primer" to enhance adhesion on dusty cementitious substrates.
    - 1) Use "Bituthene Primer B2" to prime green concrete or damp substrates.
  - 2. Subject to compliance with requirements of the Contract Documents, manufacturers offering products which may be incorporated in work include the following:
    - a. W.R. Meadows.
    - b. Hohmann & Barnard, Inc., Hauppauge, NY, Tel.# 800.645.0616 / 631.234.0600, [www.h-b.com](http://www.h-b.com).
    - c. Or approved equal.
  - 3. Provide "FTSA" stainless steel drip plate as manufactured by Hohmann & Barnard, Inc., Polyguard Products Inc., Masonpro Inc., Mortar Net USA Ltd., or approved equal, adhered to the Perm-A-Barrier Wall Flashing, between the steel lintel and the exterior finish masonry.
    - a. Provide factory fabricated stainless-steel drip plate from ASTM A240, Type 304, 26 gauge continuous, Type FTS with 1/8" thick compressible filler adhered to bottom of drip plate.
      - 1) Extend horizontal leg flashing not less than 3-inches into masonry wall and bend down from outer edge of wall or steel lintel for 1/2" at 30 degree from horizontal, and hem.
      - 2) Fabricate in 8 to 12 feet lengths and provide stainless-steel splice plates at joints between lengths.
      - 3) Provide factory fabricated outside and inside corner pieces.
- D. **Type 4:** Thru-Wall Two Piece Mechanically Keyed Cap Flashing; (At rising walls above roofs and/or where indicated).
- 1. Basis of Design: Provide 0.018" (26 gauge) thick 302/304 dead soft stainless steel, as manufactured by Keystone Flashing Co., Philadelphia, PA, Tel.# 215.329.8500; or approved equal.
    - a. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:
      - 1) Cheney Flashing Co., Trenton, NJ, Tel.# 609.394.8175 / 800.322.2873.
      - 2) Or approved equal.
  - 2. Type: Provide three way bond interlocking type, factory formed thru-wall flashing, 3/16" high undercut sawtooth ribs at 3" intervals to provide a three way mechanical bond in the mortar bed, with counterflashing where roof abuts rising wall.
  - 3. Provide specially fabricated units and exterior and interior corner conditions. Lap flashing a minimum of 4-inches and seal laps with mastic or as recommended by manufacturer.

## **2.10 MISCELLANEOUS MASONRY ACCESSORIES**

- A. Non-Metallic Expansion Joint Strips: Premolded, flexible cellular neoprene rubber filler strips complying with ASTM D 1056, Grade 2A1, capable of compression up to 35%, of width and thickness indicated.
- B. Compressible Insulation at Top of Walls: A high-density mineral fiber insulation rated non-combustible as tested per ASTM E136.
  - 1. Basis of Design: Provide "TopStop - Head-of Wall"; Thermafiber with 3M "Firedam" fire rated sealant; or approved equal. Refer to Section 07840 for Fire-Resistive Joint Systems.
  - 2. Insulation shall sustain temperature above 2,000°F in accordance with ASTM E119 and comply with ASTM E84 for the following:
    - a. Flame Spread: 0
    - b. Smoke Developed: 0
  - 3. Provide size and shape to suit indicated conditions.
- C. Fire Rated Control and Expansion Joints, Joint Filler and Sealant:
  - 1. Provide fire-rated sealant in accordance with UL Listed design for fire-rated joint assemblies.
  - 2. For expansion and control joint filler and sealant as specified in Section 07900.
- D. Weepholes: Provide the following for weepholes:
  - 1. Plastic, Rectangular with screen: Item # 342 W/S; Hohmann & Barnard, Inc.; or approved equal
    - a. Medium density polyethylene 3/8 inch x 1-1/2 inch x 3-1/2 inch clear color plastic with stainless steel screens and cotton wicks.
- E. Mortar Net: Basis of Design: Provide Mortar Net as manufactured by Mortar Net USA, Ltd., Tel. # 800 664-6638; or approved equal.
  - 1. Size: 10 inches high x 1 inch thick x 5 feet long.
  - 2. Provide mortar net inside masonry cavity walls to keep weepholes open. Install in accordance with manufacturer's printed instructions.
- F. Waterstops: Provide 16 oz. copper waterstops at indicated expansion joints; Catalog # 94-V with Type "A" flange as manufactured by Heckmann Building Products Inc.; or approved equal.
- G. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D226, Type I (No. 15 asphalt felt).

## **2.11 CAVITY INSULATION: Refer to Section 07200.**

## **2.12 AIR / VAPOR BARRIER: Refer to Section 07270.**

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION, GENERAL**

- A. Wetting Clay Brick: Wet brick made from clay or shale which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which ensure each clay masonry unit being nearly saturated but surface dry when laid.
- B. Do not wet concrete masonry units.
- C. Cleaning Reinforcing: Before placing, remove loose rust, ice and other coatings from reinforcing.
- D. Thickness: Build cavity and composite walls, floors and other masonry construction to the full thickness shown. Build single-wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness indicated.
- E. Build chases and recesses as shown or required for the work of other trades. Provide not less than 8 inch of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses.
- F. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
- G. Cut masonry units using motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining work. Use full-size units without cutting where possible. No discoloration of units caused by cutting will be acceptable.
- H. Pattern Bond:
  - 1. Brick: Running bond, unless otherwise shown.
  - 2. Concrete masonry units:
    - a. Running bond, unless otherwise shown.
    - b. Stack bond, for walls where indicated on the drawings.
    - c. For UL rated CMU wall construction, Contractor shall provide running bond with staggered vertical joints.
  - 3. Lay concealed masonry with all units in a wythe bonded by lapping not less than 2 inches.
- I. All concrete masonry units and courses below grade shall be filled solid with grout.

#### **3.2 CONSTRUCTION TOLERANCES**

- A. Variation from Plumb: For vertical lines and surfaces of columns, walls and arises do not exceed 1/4 inch in 10 feet, or 3/8 inch in a story height not to exceed 20 feet, nor 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints and other

conspicuous lines, do not exceed 1/4 inch in any story or 20 feet maximum, nor 1/2 inch in 40 feet or more. For vertical alignment of head joints do not exceed plus or minus 1/4 inch in 10 feet, 1/2 inch maximum.

- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4 inch in any bay or 20 feet maximum, nor 1/2 inch in 40 feet or more. For top surface of bearing walls do not exceed 1/8 inch between adjacent floor elements in 10 feet or 1/16 inch within width of a single unit.
- C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2 inch in any bay or 20 feet maximum, nor 3/4 inch in 40 feet or more.
- D. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4 inch nor plus 1/2 inch.
- E. Variation in Mortar Joint Thickness: Do not exceed bed joint thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not exceed head joint thickness indicated by more than plus or minus 1/8 inch.

### **3.3 LAYING MASONRY WALLS**

- A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half-size units at corners, jambs and wherever possible at other locations.
- B. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.
- C. Stopping and Resuming Work: Rack back 1/2-unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.
- D. Built-in Work: As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.
  - 1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
  - 2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
  - 3. Fill cores in hollow concrete masonry units with grout 3 courses (24 inches) under bearing plates, beams, lintels, posts and similar items, unless otherwise indicated.
- E. Extend all interior walls full height to underside of structure of deck, unless otherwise indicated. Include compressible insulation at top to completely close space between wall and structure above.
- F. Support and protect masonry, indicated to remain, which surrounds removal area.
  - 1. Refer to BIA, Technical Note #46: "Maintenance of Brick Masonry", [www.gobrick.com/Portals/25/docs/Technical%20Notes/TN46.pdf](http://www.gobrick.com/Portals/25/docs/Technical%20Notes/TN46.pdf), for two

recommended methods to properly support existing brickwork when installing new mechanically keyed through wall flashing, and as indicated below:

- a. Method 1: Remove alternate sections of masonry in 2'-0" to 5'-0" (610 mm to 1.52m) lengths.
- b. Method 2: Temporary braces can be installed to permit the removal of longer sections of masonry.

Note: The replaced masonry should be properly cured (5 to 7 days) before the intermediate masonry sections or supports are removed.

### **3.4 INSTALLATION OF REINFORCED CONCRETE UNIT MASONRY:**

- A. Do not wet concrete masonry units (CMU).
- B. Lay CMU units with full-face shell mortar beds. Fill vertical head joints (end joints between units) solidly with mortar from face of unit to a distance behind face equal to not less than the thickness of longitudinal face shells. Solidly bed cross-webs of starting courses in mortar. Maintain head and bed joint widths shown, or if not shown, provide 3/8 inch joints.
- C. Where solid CMU units are shown, lay with full mortar head and bed joints.
- D. Walls:
  1. For running bond lay CMU wall units in 1/2-running bond with vertical joints in each course centered on units in courses above and below, unless otherwise indicated. Bond and interlock each course at corners and intersections. Use special-shaped units where shown, and as required for corners, jambs, sash, control joints, lintels, bond beams and other special conditions.
    - a. For walls intersecting and/or abutting firewalls, provide control joints with fire-rated sealant as indicated in Section 07900.
  2. Maintain vertical continuity of core or cell cavities, which are to be reinforced and grouted, to provide minimum clear dimension indicated and to provide minimum clearance and grout coverage for vertical reinforcement bars. Keep cavities free of mortar. Solidly bed webs in mortar where adjacent to reinforced cores or cells.
  3. Where horizontal reinforced beams (bond beams) are shown, use special units or modify regular units to allow for placement of continuous horizontal reinforcement bars. Place small mesh expanded metal lath or wire screening in mortar joints under bond beam courses over cores or cells of non-reinforced vertical cells, or provide units with solid bottoms.
  4. Option: Where all vertical cores are not shown to be grouted, Contractor may elect to fill all vertical cores with grout. In which case, requirements for mortar bedding of cross-webs and closing of core spaces below bond beams do not apply.
- E. Grouting:
  1. Use "Fine Grout" per ASTM C 476 for filling spaces less than 4" in one or both horizontal directions.

2. Use "Coarse Grout" per ASTM C 476 for filling 4 inch spaces or larger in both horizontal directions.
3. Grouting Technique: At the Contractor's option, use either low-lift or high-lift grouting techniques subject to requirements which follow.

F. Low-Lift Grouting:

1. Provide minimum clear dimension of 2inch and clear area of 8 sq. in. in vertical cores to be grouted.
2. Place vertical reinforcement prior to laying of CMU. Extend above elevation of maximum pour height as required for splicing. Support in position at vertical intervals not exceeding 192 bar diameters nor 10 ft.
3. Lay CMU to maximum pour height. Do not exceed 5' height, or if bond beam occurs below 5' height stop pour at course below bond beam.
4. Pour grout using chute or container with spout. Rod or vibrate grout during placing. Place grout continuously; do not interrupt pouring of grout for more than one hour. Terminate grout pours 1-1/2 inch below top course of pour.
5. Bond Beams: Stop grout in vertical cells 1-1/2 inch below bond beam course. Place horizontal reinforcement in bond beams; lap at corners and intersections as shown. Place grout in bond beam course before filling vertical cores above bond beam.

G. High-Lift Grouting:

1. Do not use high-lift grouting technique for grouting of CMU unless minimum cavity dimension and area is 3 inch and 10 sq. inch, respectively.
2. Provide cleanout holes in first course at all vertical cells which are to be filled with grout.
3. Use units with one face shell removed and provide temporary supports for units above, or use header units with concrete brick supports, or cut openings in one face shell.
4. Construct masonry to full height of maximum grout pour specified, prior to placing grout.
5. Limit grout lifts to a maximum height of 5 feet and grout pour to a maximum height of 24 feet, for single wythe hollow concrete masonry walls, unless otherwise indicated.
6. Place vertical reinforcement before grouting. Place before or after laying masonry units, as required by job conditions. Tie vertical reinforcement to dowels at base of masonry where shown and thread CMU over or around reinforcement. Support vertical reinforcement at intervals not exceeding 192 bar diameters nor 10 feet.
7. Where individual bars are placed after laying masonry, place wire loops extending into cells as masonry is laid and loosen before mortar sets. After insertion of reinforcement bar, pull loops and bar to proper position and tie free ends.

8. Where reinforcement is prefabricated into cage units before placing, fabricate units with vertical reinforcement bars and lateral ties of the size and spacing indicated.
9. Place horizontal beam reinforcement as the masonry units are laid.
10. Embed lateral tie reinforcement in mortar joints where indicated. Place as masonry units are laid, at vertical spacing shown.
11. Where lateral ties are shown in contact with vertical reinforcement bars, embed additional lateral tie reinforcement in mortar joints. Place as shown, or if not shown, provide as required to prevent grout blowout or rupture of CMU face shells, but provide not less than No. 2 bars or 8-gage wire ties spaced 16 inches o.c. for members with 20 inches or less side dimensions, and 8 inches o.c. for members with side dimensions exceeding 20 inches.
12. Preparation of Grout Spaces: Prior to grouting, inspect and clean grout spaces. Remove dust, dirt, mortar droppings, loose pieces of masonry and other foreign materials from grout spaces. Clean reinforcement and adjust to proper position. Clean top surface of structural members supporting masonry to ensure bond. After final cleaning and inspection, close cleanout holes and brace closures to resist grout pressures.
13. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist displacement of masonry units and breaking of mortar bond. Install shores and bracing, if required, before starting grouting operations.
14. Place grout by pumping into grout spaces unless alternate methods are acceptable to the Architect.
15. Limit grout pours to sections which can be completed in one working day with not more than one hour interruption of pouring operation. Place grout in lifts which do not exceed 5 feet. Allow not less than 30 minutes, nor more than one hour between lifts of a given pour. Rod or vibrate each grout lift during pouring operation.
16. Place grout in lintels or beams over openings in one continuous pour.
17. Where bond beam occurs more than one course below top of pour, fill bond beam course to within 1 inch of vertically reinforced cavities, during construction of masonry.
18. When more than one pour is required to complete a given section of masonry, extend reinforcement beyond masonry as required for splicing. Pour grout to within 1-1/2 inch of top course of first pour. After grouted masonry is cured, lay masonry units and place reinforcement for second pour section before grouting. Repeat sequence if more pours are required.

### **3.5 MORTAR BEDDING AND JOINTING**

- A. Lay solid brick size masonry units with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.
- B. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete

or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.

- C. Set stone units in full bed of mortar with all vertical joints slushed full. Fill dowel, anchor and similar holes solid. Wet stone joint surface thoroughly before setting; for stone surfaces which are soiled, clean bedding and exposed surfaces with fiber brush and soap powder followed by thorough rinsing with clear water.
- D. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8 inch joints.
- E. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise indicated.
- F. Tool exposed joints slightly concave using a jointer larger than joint thickness, unless otherwise indicated.
- G. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

### **3.6 CAVITY WALLS**

- A. Keep cavity clean of mortar droppings and other materials during construction. Strike joints facing cavity flush.
- B. Tie exterior wythe to back-up with continuous horizontal joint reinforcing, installed in mortar joints at not more than 16" o.c. vertically.
- C. Provide weep holes in exterior wythe of cavity wall located immediately above ledges and flashing, spaced 2'-0" o.c., unless otherwise indicated.
- D. Provide concealed flashing in cavity walls at all required locations and as indicated herein after.
- E. On units of plastic insulation, install small pads of mastic spaced approximately 1'-0" o.c. both ways on inside face, as recommended by manufacturer. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

### **3.7 AIR / VAPOR BARRIER: Refer to Section 07270.**

### **3.8 HORIZONTAL JOINT REINFORCEMENT**

- A. Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcing a minimum of 6 inches.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.



- C. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
  - 1. Space continuous horizontal reinforcement as follows:
    - a. For multi-wythe walls (solid or cavity) where continuous horizontal reinforcement acts as structural bond or tie between wythes, space reinforcement as required by code but not more than 16 inches o.c. vertically.
    - b. For single-wythe walls, space reinforcement at 16" o.c. vertically, unless otherwise indicated.
  - 2. Cut reinforcement units at walls intersecting and/or abutting firewalls. Provide control joints with fire-rated sealant as indicated in Section 07900.
- D. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcement placed in 2 horizontal joints approximately 8" apart, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints.

### **3.9 ANCHORING MASONRY WORK**

- A. Provide anchoring devices of the type indicated. If not indicated, provide standard type for facing and back-up involved.
  - 1. Strap anchors for masonry at existing walls.
  - 2. Do not anchor fire walls to Structural Steel, intersecting and/or abutting walls.

### **3.10 CONTROL AND EXPANSION JOINTS**

- A. General: Provide vertical and horizontal expansion, control and isolation joints in masonry maximum 30 feet on center. Build-in related items as the masonry work progresses.
  - 1. Coordinate location of all control and expansion joints in the field with Architect prior to commencement of work.
- B. Build in joint fillers where shown: See Section 07900, Joint Sealers. Joint width for sealants: 3/8 inch unless otherwise indicated. Include straight joints at vertical recessed brick detail.

### **3.11 LINTELS**

- A. Install loose lintels weighing 200 lbs. or less of steel and other materials where shown. Steel lintels weighing more than 200 lbs. will be installed by Structural Steel (Sub)Contractor.
- B. Provide masonry lintels where shown and wherever openings of more than 1'-0" are shown without structural steel or other supporting lintels. Provide precast or formed-in-place masonry lintels. Temporarily support formed-in-place lintels.
- C. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

### 3.12 FLASHING OF MASONRY WORK

- A. **NOTE: When Contractor must remove a portion of the existing masonry wall veneer in order to install through wall flashing or other work, the Contractor MUST follow the Brick Industry Association (Technical Note #46) and the Concrete Masonry Industry methodology to support and protect the existing adjacent masonry, indicated to remain, which surrounds removal area. The Contractor shall remove the proper length of masonry and leave adjacent masonry in place to support existing masonry above the work in lengths indicated below.**
1. Refer to BIA, Technical Note #46: "Maintenance of Brick Masonry", [www.gobrick.com/Portals/25/docs/Technical%20Notes/TN46.pdf](http://www.gobrick.com/Portals/25/docs/Technical%20Notes/TN46.pdf), for two recommended methods to properly support existing brickwork when installing new mechanically keyed through wall flashing, and as indicated below:
    - a. **Method 1:** Remove alternate sections of masonry in 2'-0" to 5'-0" (610 mm to 1.52m) lengths.
    - b. **Method 2:** Temporary braces can be installed to permit the removal of longer sections of masonry.
- Note: The replaced masonry should be properly cured (5 to 7 days) before the intermediate masonry sections or supports are removed.
- B. General: Provide concealed flashing in masonry work at, or above, shelf angles, lintels, ledges and the base of perimeter cavity walls and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior. Prepare masonry surfaces smooth and free from projections which could puncture flashing. Place through-wall flashing in wall and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar. Extend flashings through exterior face of masonry and turn down to form drip.
1. **Contractor shall provide concealed flashing in masonry at all required conditions, whether shown or not, and shall be typical and/or similar for all building conditions when details and notes are shown on drawings.**
  2. **Contractor shall provide spandrel beam membrane flashings for all steel beams exposed to cavity, whether shown or not, and shall be typical and/or similar for all building conditions when details and notes are shown on drawings.**
  3. **Contractor shall provide mechanically keyed through wall flashings at rising walls above roof conditions and or where indicated in cavity wall construction, whether shown or not. Flashings shall be typical and/or similar for all building conditions when details and notes are shown on drawings.**
    - a. Set mechanically keyed through wall flashing in thin layer of mortar. Set masonry course above flashing in light layer of mortar.
- C. Extend flashing the full length of ledges. Lap all flashing a minimum of 4 inches and seal laps with mastic or as recommended by manufacturer. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 8 inches, and through the inner wythe to within third of width of the inner wythe as indicated on drawings.

- D. Extend flashing the full length of lintels and shelf angles and minimum of 4 inches into masonry each end. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 8 inches, and through the inner wythe to within 1/2" of the interior face of the wall in exposed work. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2 inches.
  - 1. At heads and sills flashing shall extend 6 inches beyond each side of the opening and to be turned up at the sides/ends not less than 2 inches to form a pan, (end dam). All corners shall be folded, not cut.
- E. Lap all flashing a minimum of 4 inches and seal laps with mastic or as recommended by manufacturer.
- F. Provide weep holes in the head joints of the same course of masonry bedder in the flashing mortar. Space 24 inches o.c., unless otherwise indicated.
- G. Install reglets and nailers for flashing and other related work where shown to be built into masonry work.

### **3.13 CAST STONE SILLS**

#### **A. EXAMINATION**

- 1. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of cast stone.
- 2. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **B. INSTALLATION**

- 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
- 2. Drench units with clear water just before setting.
- 3. Set units in full bed of mortar with full head joints, unless otherwise indicated. Build anchors and ties into mortar joints as units are set.
- 4. Fill dowel holes and anchor slots with mortar.
- 5. Fill collar joint solid as units are set.
- 6. Leave head joints open in coping and other units with exposed horizontal surfaces. Keep joints clear of mortar, and rake out to receive sealant.
- 7. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

8. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
9. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
10. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated, or as recommended by units manufacturer.
11. Sealing joints is specified in Division 7 Section "Joint Sealants."
12. Keep joints free of mortar and other rigid materials.

#### C. INSTALLATION TOLERANCES

1. Variation from Plumb: Do not exceed 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
2. Variation from Level: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet.
3. Variation in Plane between Adjacent Surfaces (Lipping): Do not exceed 1/16-inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

#### D. ADJUSTING AND CLEANING

1. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
2. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
3. In-Progress Cleaning: Clean cast stone as work progresses. Remove mortar fins and smears before tooling joints.
4. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
  - a. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - b. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

### 3.14 QUALITY CONTROL TESTING

- A. Engage an independent testing and inspection agency to inspect engineered masonry and to perform tests and prepare test reports.
  1. Perform tests for condition, size, location and spacing of reinforcement and anchorage of engineered masonry assemblies.

- B. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with design requirements and indicated standards, and specifically state any deviations therefrom.
  - 1. Provide access for testing agency to places where structural steel reinforcement and anchorage work is being fabricated or produced so that required inspection and testing can be accomplished.
  - 2. Testing agency may inspect structural steel reinforcement and anchorage work at plant before shipment; however, Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.
- C. Correct deficiencies in structural steel reinforcement and anchorage work which inspections and laboratory test reports have indicated to be not in compliance with requirements.
  - 1. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.

### **3.15 REPAIR, POINTING AND CLEANING**

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings and adjacent work to provide a neat, uniform appearance, prepared for application of sealants.
- C. Clean exposed brick masonry surfaces by the bucket and brush hand cleaning method or by high pressure water method. Comply with requirements of BIA Technical Notes No. 20 "Cleaning Brick Masonry".
  - 1. Use commercial cleaning agents in accordance with manufacturer's instructions.
- D. Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings. Comply with recommendations in NCMA TEK Bulletin No. 28.
  - 1. Prepare exposed to view CMU surfaces to receive paint coatings in accordance with Section 09900.

**END OF SECTION 04200**

## **SECTION 05450 - COLD-FORMED METAL FRAMING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes Exterior Non load-bearing steel-stud walls.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. AISI "Specifications": Calculate structural characteristics of cold-formed metal framing according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members" and the following:
  - 1. Allowable stress design, AISI CFSD-ASD
  - 2. AISI Load and Resistance Factor, AISI CFSD-LRFD
  - 3. Seismic requirements AISI CFSC-LRFD and ASCE 8-SSD-LRFD, for the design based on the load resistance factor design method, and the AISI CFSD-ASD and ASCE 8-SSD-ASD, for the design based on the allowable stress design method which shall meet the design modifications indicated in the International Building Code.
- B. Structural Performance: Engineer, fabricate, and erect cold-formed metal framing to withstand design loads within limits and under conditions required.
  - 1. Design framing systems to withstand design loads without deflections greater than the following:
    - a. Non Load-Bearing: Lateral deflection of 1/600 of the wall height.
  - 2. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change (range) of 120°F (67°C).
  - 3. Design framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings.
- C. Delegated Design:
  - 1. Engineering Responsibility: Engage a fabricator who assumes undivided responsibility for engineering cold-formed metal framing and anchors / fasteners by employing a qualified structural engineer licensed in the State of New Jersey, to prepare design calculations, signed and sealed shop drawings, and all other structural data.

#### **1.4 SUBMITTALS**

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

- B. Product data for each type of cold-formed metal framing, accessory, and product specified.
- C. Shop drawings showing layout, spacings, sizes, thicknesses, and types of cold-formed metal framing, fabrication, fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachments to other units of Work.
  - 1. For cold-formed metal framing indicated to comply with certain design loadings, include structural analysis data sealed and signed by the a structural engineer licensed in the State of New Jersey. Provide shop drawings prepared by cold-formed metal framing manufacturer.
- D. Mill certificates by manufacturers of cold-formed metal framing or data from a qualified independent testing agency, or in-house testing with calibrated test equipment indicating steel sheet complies with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, and galvanized-coating thickness.
- E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.
- F. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- G. Product test reports from a qualified independent testing agency evidencing compliance with requirements of the following based on comprehensive testing:
  - 1 Expansion anchors.
  - 2. Powder-actuated anchors.
  - 3. Mechanical fasteners.

## **1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced Installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Testing Agency Qualifications: To qualify for acceptance, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
  - 1. ASTM E329 can be used for on-site construction projects.
- C. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code-Steel" and AWS D1.3 "Structural Welding Code-Sheet Steel."
  - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.

- D. Structural Engineer Qualifications: A professional engineer legally authorized to practice in the State of New Jersey and experienced in providing engineering services of the kind indicated that have resulted in the installation of cold-formed metal framing similar to this Project in material, design, and extent and that have a record of successful in-service performance.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling, as required in AISI's "Code of Standard Practice".
- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation, as required in AISI's "Code of Standard Practice".

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:
  - 1. Clark Dietrich Building Systems
  - 2. Marino\WARE; a Div. of WARE Industries, Inc.
  - 3. Super Stud Building Products, Inc.
  - 4. Or approved equal.

### **2.2 MATERIALS**

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
  - 1. Coating Designation: G60 (Z180).
  - 2. Grade: As required by structural performance.
- B. Steel Sheet for Vertical Deflection & Drift Clips: ASTM A 1003/A 1003M, ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
  - 1. Grade: As required by structural performance.
  - 2. Coating: G90 (Z275).

### **2.3 WALL FRAMING**

- A. Steel Studs: Manufacturer's standard C-shaped steel studs of web depths indicated, with lipped flanges, and complying with the following:
  - 1. Design Uncoated-Steel Thickness: To meet structural performance requirements.
- B. Slotted Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; punched with vertical slots in both legs. Studs should be positively attached to deep-leg track using vertical slots while allowing free vertical movement. Legs designed to support horizontal and lateral loads and transfer them to the primary structure, as follows:
  - 1. Product: ClarkDietrich Building Systems; MaxTrak Slotted Deflection Track, or a comparable product.



- C. Vertical Deflection Clips: Manufacturer's standard [bypass] [head] clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web and capable of resisting forces imposed by the wall system.
1. Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; [FCSC] [FCEC] [FTSC] [FTC3] [FTC5] [FS12] [FS15] [FS24] [QC], or a comparable product by one of the members of the SFIA.
  2. Minimum Uncoated-Steel Thickness: [Fast Clip Slide Clip; 0.0677 inch (1.72 mm)] [Extended FastClip Slide Clip; 0.0677 inch (1.72 mm)] [Flat Tail Slide Clip; 0.1180 inch (3 mm)] [Fast Top Clip; 0.0677 inch (1.72 mm)] [Fast Strut Clip; 0.0677 inch (1.72 mm)] [Quick Clip; 0.1180 inch (3 mm)].
- D. Headers and Jambs - Heavy-Duty Stud: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:
1. Product: ClarkDietrich Building Systems; [Heavy Duty Stud (HDS)] [and] [Header Bracket (HDSC)], or approved equal.
- E. U-Channel Assembly: Manufacturer's standard length U-Channel for lateral bracing for exterior curtain wall framing, loadbearing walls, or high interior partitions constructed of structural studs.
1. Product: ClarkDietrich Building Systems; U-Channel and FastBridge Clip [FB43] [FB68]; or approved equal.
  2. U-Channel Size: 1-1/2 inches (38.1 mm).
  3. U-Channel Minimum Uncoated-Steel Thickness: 0.0538 inch (1.37 mm).
- F. Bridging and Spacer Bar:
1. Product: ClarkDietrich Building Systems; TradeReady Spazzer 5400 (SPZS) [Spazzer Bar Guard (SPBG)]; or approved equal. .
  2. Minimum Uncoated-Steel Thickness: 0.0538 inch (1.37 mm).
  3. Size: 1-1/4 by 1-1/4 by 50 inches (32 by 32 by 1270 mm) long, pre-notched at 12, 16 and 24 inches (305, 406, and 610 mm) centers.

## **2.4 FRAMING ACCESSORIES**

- A. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi (230 MPa).
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
1. Supplementary framing.
  2. Bracing, bridging, and solid blocking.
  3. Web stiffeners.
  4. Gusset plates.
  5. Deflection track and vertical slide clips.
  6. Stud kickers and girts.
  7. Reinforcement plates.

## **2.5 ANCHORS, CLIPS, AND FASTENERS**

- A. Steel Shapes and Clips: ASTM A 36 (ASTM A 36M), zinc coated by the hot-dip process according to ASTM A 123.
- B. Cast-in-Place Anchor Bolts and Studs: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); carbon-steel hex-head bolts and studs; carbon-steel nuts; and flat, unhardened-steel washers. Zinc coated by the hot-dip process according to ASTM A 153.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times the design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
- D. Powder-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times the design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- E. Mechanical Fasteners: Corrosion-resistant coated, self-drilling, self-threading steel drill screws.
  - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

## **2.6 MISCELLANEOUS MATERIALS**

- A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.
- B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and a 30-minute working time.

## **2.7 FABRICATION**

- A. Fabricate cold-formed metal framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and the requirements of this Section.
  - 1. Fabricate framing assemblies in jig templates.
  - 2. Cut framing members by sawing or shearing; do not torch cut.
  - 3. Fasten cold-formed metal framing members by welding. Wire tying of framing members is not permitted.
  - 4. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

- b. Locate mechanical fasteners and install according to cold-formed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
5. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to manufacturer's recommendations.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or distortion.
- C. Fabrication Tolerances: Fabricate assemblies to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960) and as follows:
  1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine supporting substrates and abutting structural framing for compliance with requirements, including installation tolerances and other conditions affecting performance of cold-formed metal framing. Do not proceed with installation until unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction.

### **3.3 INSTALLATION, GENERAL**

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing and accessories plumb, square, true to line, and with connections securely fastened, according to ASTM C1007, AISI S200 "North American Standard for Cold-Formed Steel Framing - General Provisions", and to manufacturer's recommendations and the requirements of this Section.
  1. Cut framing members by sawing or shearing; do not torch cut.
  2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

- b. Locate mechanical fasteners and install according to cold-framed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
- C. Install framing members in one-piece lengths, unless splice connections are indicated for track or tension members.
- D. Provide temporary bracing and leave in place until framing is permanently stabilized.
- E. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
- F. Install insulation in built-up exterior framing members, such as headers, sills, boxed joists, and double studs, inaccessible upon completion of framing work.
- G. Fasten reinforcement plate over web penetrations that exceed size of manufacturer's standard punched openings.
- H. Erection Tolerances: Install cold-formed metal framing to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960) and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

#### **3.4 NONLOAD-BEARING INSTALLATION**

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Squarely seat studs against webs of top and bottom tracks. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs as indicated or if not indicated to meet structural performance requirements.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate steel framing from building structure at locations indicated to prevent transfer of vertical loads while providing lateral support.
  - 1. Install deflection track and anchor to building structure.
  - 2. Connect studs with vertical slide clips to continuous angles or supplementary framing anchored to building structure.
- E. Install horizontal bridging in curtainwall studs, spaced in rows not more than 48 inches (1219 mm) apart. Fasten at each stud intersection.
  - 1. Install additional row of horizontal bridging in curtainwall stud beneath deflection track when curtainwall studs are not fastened to an additional top track.
  - 2. Bridging: Combination of flat, steel-sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness matching studs. Fasten flat straps to

stud flanges and secure solid blocking to stud webs or flanges.

- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable curtainwall-framing system.

### **3.5 FIELD QUALITY CONTROL**

- A. Testing Agency: A qualified independent testing agency employed and paid by the Contractor will perform field quality-control testing.
- B. Field and shop welds will be subject to inspection and testing.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace Work that does not comply with specified requirements.
- E. Additional testing will be performed to determine compliance of corrected Work with specified requirements.

### **3.6 REPAIRS AND PROTECTION**

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanizing repair paint according to ASTM A 780 and the manufacturer's instructions.
- B. Touchup Painting: Wire brush, clean, and paint scarred areas, welds, and rust spots on fabricated and installed prime-painted, cold-formed metal framing.
  - 1. Touchup painted surfaces with same type of shop paint used on adjacent surfaces.
- C. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer to ensure that cold-formed metal framing is without damage or deterioration at the time of Substantial Completion.

**END OF SECTION 05450**

## **SECTION 05500 - METAL FABRICATIONS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Definition: Metal fabrications include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere and non-ferrous items listed herein.
- B. Type of work in this section includes metal fabrications for assemblies which include but are not limited to the following:
  - 1. Rough hardware.
  - 2. Expansion joint covers and column covers.
  - 3. Ladders.
  - 4. Exterior roof ladder.
  - 5. Exterior roof ladder with safety cage.
  - 6. Access ladder roof supports.
  - 7. Miscellaneous structural shapes.
- C. Related Work:
  - 1. Structural Steel, including loose lintels, specified in Sections 05120 and 05400 (Part 3).
  - 2. Steel Joists are specified in Section 05210 (Part 3).
  - 3. Metal Decking is specified in Section 05300 (Part 3).
  - 4. Miscellaneous Structural Steel is specified in Section 05400 (Part 3).
  - 5. Concrete work: Section 03300.
  - 6. Masonry work: Section 04200.
  - 7. Painting: Section 09900.

#### **1.3 QUALITY ASSURANCE**

- A. Codes and Standards:

ASTM A108-99 - Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality.

ASTM A123 - Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.

ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

ASTM A563-00 - Standard Specification for Carbon and Alloy Steel Nuts.

ASTM A569/A569M-91a - Standard Specification for Steel, Carbon (.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality (superseded by A1011).

ASTM A780-01 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

ASTM A1011/A1011M-03 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

ASTM F844-00 - Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.

NAAMM Standard AMP 510-92 - Metal Stairs Manual 5<sup>th</sup> Edition.

AWS D1.1/D1.1M: Structural Welding Code - Steel, Welding qualification procedures and personnel.

- B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrications might delay work.
- C. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- D. Furnish joint cover assemblies and accessories manufactured by one firm for each type of joint cover required.

#### **1.4 REFERENCES**

- A. OSHA 29 CFR 1926.500-503: (For Exterior roof ladder with safety cage).
- B. OSHA 29 CFR 1910.23: (For Exterior roof ladder with safety cage).

#### **1.5 SUBMITTALS**

- A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.
- C. Where materials or fabrications are indicated to comply with certain requirements for design loadings, include structural computations, material properties and other information needed for structural analysis.
- D. Samples: Submit 2 sets of representative samples of materials and finished products as may be requested by Architect.
- E. Mill test reports: Reports indicating metals to be furnished comply with project requirements.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
- B. Aluminum: Comply with the following standards for the forms and types of aluminum for the required items of work.
  - 1. Alloy and Temper: Provide alloy and temper as recommended by the aluminum producer or finisher, with not less than the strength and durability properties specified in ASTM B 632/B 632 M, alloy 6061-T6.
  - 2. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of the metal to be welded, and as required for color match, strength and compatibility in the fabricated items.
  - 3. Fasteners: Finish of basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise indicated. Unless otherwise shown, provide Phillips flat-head screws for exposed fasteners.
  - 4. Bituminous Paint: SSPC-Paint (cold-applied asphalt mastic).
  - 5. Protective Lacquer: Clear non-yellowing, of type recommended by metal producer for protection of the finished metal surfaces.
  - 6. Aluminum Pipe and Tube: ASTM B 429, Alloy 6063-T6.
  - 7. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
  - 8. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
  - 9. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- C. Steel
  - 1. Steel Plates, Shapes and Bars: ASTM A 36/A 36M.
  - 2. Steel Tubing: Cold-formed, ASTM A 500; or hot-rolled, ASTM A 501.
  - 3. Structural Steel Sheet: Hot-rolled, ASTM A 570; or cold-rolled ASTM A 611, Class 1; of grade required for design loading.
  - 4. Galvanized Structural Steel Sheet: ASTM A 446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.
  - 5. Steel Pipe: ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.
- D. Gray Iron Castings: ASTM A 48, Class 30.



- E. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
- F. Stainless Steel Sheet, Strip, Plate and Flat Bars: ASTM A 666, Type 304, unless otherwise indicated.
  - 1. Stainless Bars and Shapes: ASTM A 276, Type 304.
- G. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
- H. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.
- I. Grout:
  - 1. Non-Shrink, Metallic Grout: Pre-mixed, factory-packaged, ferrous-aggregate grout complying with CE CRD-C588, Type M, and ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications and not to be used in wet areas or on exterior applications.
  - 2. Non-Shrink, Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C621, and ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
- J. Fasteners:
  - 1. General: Provide zinc-plated fasteners complying with ASTM B 633, Class Fe/Zn 5, for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
  - 2. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A, with hex nuts, ASTM A 563; and where needed, flat washers.
  - 3. Weathering Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3, with hex nuts, ASTM A 563, Grade C3; and where needed, flat washers.
  - 4. Lag Screws: Square head type, ASME B18.2.1.
  - 5. Machine Screws: Cadmium plated steel, ASME B18.6.3.
  - 6. Wood Screws: Flat head, carbon steel, ASME B18.6.1.
  - 7. Plain Washers: Round, carbon steel, ASME B18.22.1.
  - 8. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
  - 9. Expansion Anchors: Anchor bolt and sleeve assembly; Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 10. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as needed.

11. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1.
  12. Eyebolts: ASTM A 489.
  13. Anchor Bolts: ASTM F 1554, Grade 36, of dimension indicated; with nuts, ASTM A 563; and where indicated, flat washers.
- K. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- L. Cast-in-Place in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- M. Post-Installed Anchors:
1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5, unless otherwise indicated.
  2. Material for Exterior Locations and Where Stainless Steel is indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 and nuts, ASTM F 594.
- N. Paint:
1. Metal Primer Paint: Red lead mixed pigment, alkyd varnish, linseed oil paint, FS TT-P-86l, Type II; or red lead iron oxide, raw linseed oil, alkyd paint, Steel Structures Painting Council (SSPC) Paint 2-64; or basic lead silico chromate base iron oxide, linseed oil, alkyd paint, FS TT-P-615, Type II.
  2. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Section 09900.
  3. Galvanizing Repair Paint: High-zinc-dust content paint for regalvanizing welds in galvanized steel, complying with the Military Specifications MIL-P-21035 (Ships) or SSPC-Paint-20 and compatible with paints specified to be used over it.

## **2.2 FABRICATION, GENERAL**

- A. Workmanship
1. Use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.
  2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

3. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
  4. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts.
  5. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
  6. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
- B. Galvanizing:
1. Provide a zinc coating for exterior steel items and those items indicated or specified to be galvanized, as follows:
    - a. ASTM A 153 for galvanizing iron and steel hardware.
    - b. ASTM A 123 for galvanized rolled, pressed and forged steel angles, corner guards, other indicated shapes, plates, bars, bollards and strip 1/8" thick and heavier.
    - c. ASTM A 386 for galvanizing assembled steel products.
- C. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- D. Shop Painting
1. Shop paint miscellaneous metal work, except members of portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise indicated.
  2. Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 "Hand Tool Cleaning", or SSPC SP-3 "Power Tool Cleaning", or SSPC SP-7 "Brush-Off Blast Cleaning".
  3. Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning".
  4. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions, and at a rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.
  5. Apply one shop coat to fabricated metal items, except apply two (2) coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

## 2.3 MISCELLANEOUS METAL FABRICATIONS

### A. Rough Hardware

1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items as specified in Division-6 sections.
2. Fabricate items to sizes, shapes and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

### B. Steel Ladders:

1. Fabricate ladders from galvanized steel for the locations shown, with dimensions, spacings, details and anchorages as indicated. Comply with requirements of ANSI A14.3, unless otherwise indicated.
2. Unless otherwise indicated, provide 1/2" x 2-1/2" continuous structural steel flat bar side rails with eased edges, spaced 18" apart.
3. Provide 3/4" diameter solid structural steel bar rungs, spaced 12" o.c.
4. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
5. Support each ladder at top and bottom as shown.
6. Provide non-slip surface on top of each rung, by coating the rung with abrasive material metallurgically bonded to rung by a proprietary process.
  - a. Basis of Design: Subject to compliance with requirements, provide one of the following:
    - 1) IKG Industries, a Division of Harsco Corp.: Mebac;
    - 2) SlipNOT Metal Safety Flooring, a W.S. Molnar Company.
    - 3) or approved equal.

### C. Exterior Roof Access Ladder:

1. Fixed Wall Ladder(s): Galvanized steel; serrated rungs 3/4" inches in diameter, connected to 2 1/2-inch continuous galvanized structural steel flat bar side rails with eased edges, each secured to rails by means of four (min.) solid aircraft rivets.
  - a. Provide 3/4" diameter solid galvanized structural steel bar rungs, spaced 12" o.c.
  - b. Provide roof ladder support for ladder as per paragraph E below.
  - c. Ladder Security Cage (OSHA requires safety cages for ladders longer than 20 ft, unless a ladder safety system is provided):
    - 1) Provide ANSI A14.3 & OSHA approved fixed steel safety cage with flared bottom opening. Cage begins at 6'-9" from bottom rung of ladder. Provide factory painted finished in color selected from manufacturer's standard colors.

D. Access Ladder Roof Support:

1. Basis of Design: Provide "ARS-500" access ladder roof support as manufactured by Thaler Metal Industries - Tel. # 800.576.1200 / [www.thalermetal.com](http://www.thalermetal.com); SBC Industries; or approved equal.
  - a. Product consists of a urethane insulated, epoxy primed, hollow steel support and mounting plate, adjustable height steel cap and rail post base.
  - b. Provide stainless steel stack jack flashing with urethane insulation and EPDM Base seal.
  - c. Provide units complete with manufacturer's standard and optional hardware, accessories, adhesive, etc. to suit indicated application.
  - d. Provide manufacturer's standard **twenty (20) year warranty** against leaks, condensation and defects in materials and other manufacture when installed in accordance with the manufacturer's instructions.
  - e. Comply with manufacturer's instructions and recommendations for installation methods.

E. Miscellaneous Structural Shapes, Framing and Supports, Etc.

1. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.
2. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise indicated, fabricated from structural steel shapes, plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
3. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
4. Galvanize exterior miscellaneous frames and supports.

F. Expansion Joint Covers and Control Joint Covers:

1. Basis of Design: Provide extruded aluminum expansion and control joint covers as manufactured by Balco Inc., Wichita, Kansas, Tel. # 800.767.0082 / 316.945.9328; [www.balcousa.com](http://www.balcousa.com); or approved equal.
  - a. Other acceptable manufacturers:
    - 1) CS Construction Specialties, Muncy, PA, Tel.# 800.233.8493, [www.c-sgroup.com](http://www.c-sgroup.com)
    - 2) MM Systems, Pendergrass, GA, Tel.# 800.241.3460, [www.mmsystemscorp.com](http://www.mmsystemscorp.com)
    - 3) Gordon Interior Specialties Division, Bossier, LA, Tel. # 800.747.8954, [www.gordon-inc.com](http://www.gordon-inc.com)
    - 4) Or approved equal.
  - b. Aluminum Finish: Provide clear anodized finish.

2. Provide type and size where shown on drawings, or as required at all building areas to receive expansion joint and column covers. Where used in rated construction, provide fire rated units.
  - a. Submit to the Architect a complete layout drawing indicating all locations of expansion joint and column covers, type, size and detailed construction conditions.
3. Do not proceed with fabrication and/or installation until you receive Architect's approval.
4. Provide assemblies including manufacturer's available anchors, hardware and accessories.

## **2.4 MISCELLANEOUS MATERIALS**

A. Injectable Mortar: Provide and install injectable mortar at all post-installed anchors, as follows:

1. Except where indicated on the drawings, post-installed anchors shall consist of the following anchor types as provided by Hilti, Inc., (800) 879-8000; or approved equal.
  - a. Anchorage to Concrete
    - 1) Adhesive anchors for cracked and uncracked concrete:
      - a) Hilti HIT-HY 200 Safe Set System with Hilti HIT-Z ROD per ICC ESR-3187.
      - b) Hilti HIT-HY 200 Safe Set System with Hilti Hollow Drill Bit System with HAS-E threaded rod per ESR-3187.
      - c) Hilti HIT-RE 500-SD Epoxy Adhesive Anchoring System with HAS-E Threaded Rod per ICC ESR-2322 for slow cure applications.
    - 2) Medium duty mechanical anchors for cracked and uncracked concrete:
      - a) Hilti KWIK HUS-EZ and KWIK HUS EZ-I Screw Anchors per ICC ESR-3027.
      - b) Hilti KWIK BOLT-TZ Expansion Anchors per ICC ESR-1917.
      - c) Hilti KWIK BOLT 3 Expansion Anchors (uncracked concrete only) per ICC ESR-2302.
    - 3) Heavy Duty mechanical anchors for cracked and uncracked concrete:
      - a) Hilti HDA Undercut Anchors per ICC ESR 1546.
      - b) Hilti HSL-3 Expansion Anchors per ICC ESR 1545.
  - b. Rebar Doweling into Concrete
    - 1) Adhesive anchors for cracked and uncracked concrete use:
      - a) Hilti HIT-HY 200 Safe Set System with Hilti Hollow Drill Bit System with continuously deformed rebar per ICC ESR-3187.
      - b) Hilti HIT-RE 500-SD Epoxy Adhesive Anchoring System with continuously deformed rebar per ICC ESR-2322.
  - c. Anchorage to Solid Grouted Masonry
    - 1) Adhesive Anchors:
      - a) Hilti HIT-HY 70 Masonry Adhesive Anchoring System (ICC pending).
      - b) Steel anchor element shall be Hilti HAS-E Continuously Threaded Rod or continuously deformed steel rebar.
    - 2) Mechanical Anchors:
      - a) Hilti KWIK HUS-EZ Screw Anchor per ICC ESR-3056.
      - b) Hilti KWIK BOLT-3 Expansion Anchors per ICC ESR-1385.

- d. Anchorage to Hollow/Multi-Wythe Masonry
  - 1) Adhesive Anchors:
    - a) Hilti HIT-HY 70 Masonry Adhesive Anchoring System per ICC ESR-3342.
    - b) Steel anchor element shall be Hilti HAS-E Continuously Threaded Rod or continuously deformed steel rebar.
    - c) The appropriate size screen tube shall be used per adhesive Manufacturer's recommendation.
  2. Anchor capacity used in design shall be based on the technical data published by Hilti or such other method as approved by the Architect/Structural Engineer. Substitution requests for alternate products must be approved in writing by the Architect/Structural Engineer. Contractor shall provide calculations demonstrating that the substituted product is capable of achieving the performance values of the specified product. Substitutions will be evaluated by their having an ICC ESR showing compliance with the relevant building code for seismic uses, load resistance, installation category, and availability of comprehensive installation instructions. Adhesive anchor evaluation will also consider creep, in-service temperature and installation temperature.
  3. Install anchors per the manufacturer instructions, as included in the anchor packaging.
  4. Overhead adhesive anchors must be installed using the Hilti Profi System.
  5. The Contractor shall arrange an anchor manufacturer's representative to provide onsite installation training for all of their anchoring products specified. The Architect/Structural Engineer must receive documented confirmation that all of the Contractor's personnel who install anchors are trained prior to the commencement of installing anchors.
  6. Anchor capacity is dependant upon spacing between adjacent anchors and proximity of anchors to edge of concrete. Install anchors in accordance with spacing and edge clearances indicated on the drawings.
  7. Existing reinforcing bars in the concrete structure may conflict with specific anchor locations. Unless noted on the drawings that the bars can be cut, the Contractor shall review the existing structural drawings (if available) and shall undertake to locate the position of the reinforcing bars at the locations of the concrete anchors, by Hilti Ferrosan, GPR, X-Ray, chipping or other means.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

### **3.2 INSTALLATION**

- A. General
  1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction;

including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plus, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.
3. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
4. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

B. Setting Loose Lintels and Plates:

1. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
2. Set Loose Lintels, leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.
3. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### **3.3 ADJUST AND CLEAN**

- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.8 mils.
- B. For galvanize surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint.

**END OF SECTION 05500**



## **SECTION 06100 - CARPENTRY**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Type of work in this section includes rough carpentry for:
  - 1. Dimensional lumber,
  - 2. Wood nailers and blocking.
  - 3. Rough hardware.
  - 4. Construction panels.

#### **1.3 SUBMITTALS**

- A. Material Certificates: Where dimensional lumber is provided to comply with minimum allowable unit stresses, submit listing of species and grade selected for each use, and submit evidence of compliance with specified requirements. Compliance may be in form of a signed copy of applicable portion of lumber producer's grading rules showing design values for selected species and grade. Design values shall be as approved by the Board of Review of American Lumber Standards Committee.
- B. Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, installation and finishing of treated material.
- C. Fire-Retardant Treatment: Include certification by treating plant that treated material complies with specified standard and other requirements.

#### **1.4 PRODUCT HANDLING**

- A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.
- B. Do not deliver finish carpentry materials, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, finish carpentry materials must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

#### **1.5 PROJECT CONDITIONS**

- A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow attachment of other work.

- B. Maintain temperature and humidity in installation areas as required to maintain moisture content of installed finish carpentry within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. The fabricator of woodwork shall determine optimum moisture content and required temperature and humidity conditions.

## **PART 2 - PRODUCTS**

### **2.1 LUMBER, GENERAL**

- A. Lumber Standards: Manufacture lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- B. Inspection Agencies: Inspection agencies and the abbreviations used to reference with lumber grades and species include the following:
  - WWPA - Western Wood Products Association.
- C. Factory-mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
- D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.
- E. Provide dressed lumber, S4S, unless otherwise indicated.
- F. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing.

### **2.2 DIMENSION LUMBER**

- A. For light framing (2" to 4" thick, 2" to 4" wide) provide the following grade and species:
  - 1. Construction grade.
    - a. Any species of specified grade.
- B. For exposed framing lumber provide material complying with the following requirements:
  - 1. Definition: Exposed framing refers to dimension lumber which is not concealed by other work and is indicated to receive a stained or natural finish.
  - 2. Grading: Hand select material at factory from lumber of species and grade indicated below for compliance with "Appearance" grade requirements of ALSC National Grading Rule; issue inspection certificate of inspection agency for selected material.
  - 3. Same species and grade as indicated for structural framing.

### **2.3 MISCELLANEOUS LUMBER**

- A. Provide wood for support or attachment of other work including cant strips, nailers, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes indicated, worked into shapes shown, and as follows:

1. Moisture content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.
2. Grade: Construction Grade light framing size lumber of any species or board size lumber as required. Provide construction grade boards or No. 2 Boards.

## **2.4 CONSTRUCTION PANELS**

- A. Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood panels and, for products not manufactured under PS 1 provisions, with American Plywood Association (APA) "Performance Standard and Policies for Structural-Use Panels", Form No. E445.
- B. Trademark: Factory-mark each construction panel with APA trademark evidencing compliance with grade requirements.
- C. Concealed APA Performance-Rated Panels: Where construction panels will be used for the following concealed types of applications, provide APA Performance-Rated Panels complying with requirements indicated for grade designation, span rating, exposure durability classification, edge detail (where applicable) and thickness.
- D. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
  1. Treatment shall not promote corrosion of metal fasteners.
  2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
  4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.
    - a. For enclosed roof framing, framing in attic spaces, and where high temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.
- E. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant treated plywood panels with grade designation, APA C-D PLUGGED INT with exterior glue, in thickness indicated, or, if not otherwise indicated, not less than 15/32".

## **2.5 MISCELLANEOUS MATERIALS**

- A. Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for

nails, staples, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails.

- B. Where rough carpentry work is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating (ASTM A 153).
- C. Building Paper: ASTM D 226, Type I; asphalt saturated felt, non-perforated, 15-lb. type.

## **2.6 WOOD TREATMENT BY PRESSURE PROCESS**

- A. Fire-Retardant Treatment: Where fire-retardant treated wood ("FRT") is indicated or required, pressure impregnate lumber and plywood with fire-retardant chemicals to comply with AWWPA C20 and C27, respectively, identify "FRT" lumber with appropriate classification marking of Underwriters Laboratories, Inc., U.S. Testing, Timber Products Inspection or other testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire treated wood shall have a flame spread of 25 or less and shall be dried to 19% moisture content for lumber and 15% for plywood. Exposed wood or wood subject to high humidity conditions shall be identified that the moisture content shall not exceed 28% when tested at 92% relative humidity in accordance with ASTM D3201.
  - 2. Treatment products: The following products, provided they comply with requirements of the contract documents will be among those considered acceptable:
    - a. "Dricon"; Hickson Corporation.
    - b. "Flame Proof LHC"; Osмосе Wood Preserving, Inc.
    - c. "Pyro-Guard"; Hoover Treated Wood Products, Inc.
    - d. Or approved equal.
  - 3. Treat members shown on drawings and/or as required to meet the code requirements.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Foretop concealed spaces of wood framed walls and partitions at each floor level and at the ceiling line of the top story. Where foretops are not automatically provided by the framing system used, use close-fitted wood blocks of nominal 2" thick lumber of the same width as framing members.
- B. Discard units of material with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.
- C. Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.
- D. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards.
- E. Countersink nail heads on exposed carpentry work and fill holes.

- F. Use common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

### **3.2 WOOD NAILERS AND BLOCKING**

- A. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
- C. Height of nailers shall be matched to that of the insulation being used. Nailers shall be firmly anchored to the deck to resist a force of seventy-five pounds per lineal foot. The type of anchors shall be as recommended by the roofing manufacturer and shall be secured at intervals required to ascertain a resistance force of seventy-five pounds per lineal foot.

### **3.3 INSTALLATION OF CONSTRUCTION PANELS**

- A. General: Comply with applicable recommendations contained in Form No. E 30F, "APA Design/Construction Guide - Residential & Commercial," for types of construction panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Sheathing: Screw to framing or substrates.

**END OF SECTION 06100**

## SECTION 06650 - SOLID POLYMER FABRICATIONS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Plastic window stools.
  - 2. Countertops.
  - 3. Wall caps.

#### 1.3 SUBMITTALS

- A. Product Data: Written technical information for unit specified. Indicate product description, fabrication information and compliance with specified performance requirements.
- B. Shop Drawings:
  - 1. Submit rough-in drawings. Include the following details and all other information necessary to demonstrate compliance with contract documents:
    - a. Dimensions.
    - b. Required clearances.
    - c. Methods of assembling components.
    - d. Anchorages.
    - e. Coordination requirements with adjacent work.
- C. Samples: Submit minimum 2 inch by 2 inch samples. Indicate full range of color and pattern variation. Approved samples will be retained as a standard for work.
- D. Certificates: Submit certification that work complies with requirements of contract documents.
- E. Manufacturer's Instructions: Submit for each product specified in this section.
  - 1. Include installation instructions and instructions for examination, preparation, and protection of adjacent work.
- F. Maintenance Data: Submit manufacturer's care and maintenance data, including care, repair and cleaning instructions and maintenance video.
  - 1. **Provide maintenance kit for indicated finishes. Include in project close-out documents.**

#### 1.4 DELIVERY, STORAGE AND HANDLING:

- A. Deliver no components to project site until areas are ready for installation. Store indoors.

- B. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

**1.5 QUALITY ASSURANCE:**

- A. Allowable Tolerances: Variation in component size:  $\pm 1/8$  inch.

**1.6 WARRANTY:**

- A. Provide manufacturer's warranty against defects in materials, fabrication and installation, excluding damages caused by physical or chemical abuse or excessive heat. Warranty shall provide for replacement or repair of material and labor for a period of **ten (10) years**, beginning at Date of Substantial Completion.
  - 1. For fabrications with installed warranty coverage, identify by affixing manufacturer's fabrication/installation source plate.

**PART 2 - PRODUCTS**

**2.1 SOLID POLYMER FABRICATIONS:**

- A. Basis of Design: Corian Surfaces as manufactured by Du Pont De Nemours & Co., Inc., Tel.# 800.426.7426; or approved equal.
- B. Subject to compliance with indicated requirements manufacturers offering products which may be incorporated in the work include the following:
  - 1. Meganite Inc., Fessenden Hall Inc., Tel.# 800.220.2233.
  - 2. LG Solid Surfaces, Tel.# 609 495-4081.
  - 3. Wilsonart, Tel.# 800.433.3222.
  - 4. Avonite Surfaces, Tel.# 800.428.6648.
  - 5. Or approved equal.
- C. Material: Cast, filled, acrylic; not coated, laminated or of composite construction, meeting ANSI Z124 1980, Type Six, and FS WW-P-541E/GEN dated August 1, 1980.

**2.2 PERFORMANCE CHARACTERISTICS:**

<u>PROPERTY</u>	<u>REQUIREMENT</u> (min/max)	<u>TEST PROCEDURE</u>
Tensile Strength	5000 psi min	ASTM D638
Tensile Modulus	$1.0 \times 10^6$ psi min	ASTM D638
Flexural Strength	7000 psi min	ASTM D790
Flexural Modulus	$1.0 \times 10^6$	ASTM D790
Elongation	0.3% min.	ASTM D638
Strain at Break	0.8% min.	ASTM D638
Hardness	90-Rockwell "M" scale 52-Barcol Impressor min.	ASTM D758

Thermal Expansion	3.5 x 10 <sup>-6</sup> in/in/deg C max 1.95 x 10 <sup>-6</sup> in/in/deg F max	ASTM D696	
Color Stability	No change, min. 100 hours	NEMA LD3-3.10	
Wear and Cleanability	Passes	ANSI Z124.3	
Abrasion Resistance	No loss of pattern Weight loss (1000 cycles)=0.9 g. max.	NEMA LD3-3.01 ANSI Z124.3	
Boiling water Surface Resistance	No Change	NEMA LD3-3.05	
High Temperature Resistance	No Change	NEMA LD3-3.06	
Conductive Heat Resistance	No Change	NEMA LD3-3.08	
Impact Resistance Notched Izod	0.24 ft.-lbs./in. of notch min.	ASTM D256, Method A	
Gardner	9.0 ft-lbs min.	ASTM D3029	
Ball drop 1/4" sheet	36" min. with 1/2 lb ball, no failure	NEMA LD3-303	
1/2" sheet	140" min. with 1/2 lb ball, no failure		
3/4" sheet	200" min. with 1/2 lb ball, no failure		
Stain Resistance	Passes	ANSI Z124.3	
Weatherability	No change, min. 1000 hours	ASTM D1499-84	
Fungi and Bacteria	No Attack	ASTM G21, ASTM G22	
Specific Gravity	1.6 min.		
Water Absorption Weight (% max.)	<b>24 hrs.</b> 0.05 (1/4") max. 0.10 (3/4") max.	<b>Long Term</b> 0.50 (1/4") max. 0.90 (3/4") max.	ASTM D570
Flammability		ASTM E84	



	<b>Solid Colors</b>		
	<b>1/4"</b>	<b>1/2"</b>	<b>3/4"</b>
Flame spread	25 max	25 max	25 max
Smoke Developed	30 max	30 max	30 max
Class	1	1	1

	<b>Particulate Patterns</b>		
	<b>1/4"</b>	<b>1/2"</b>	<b>3/4"</b>
Flame spread	25 max	25 max	25 max
Smoke Developed	30 max	30 max	30 max
Class	1	1	1

Pittsburgh Protocol Toxicity (as used by NY state)	solids-80 grams min. particulate patterns-65 grams min.	"LC50" Test
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### 2.3 ACCESSORY PRODUCTS

- A. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints by chemical bond.
- B. Panel Adhesive: Manufacturer's standard neoprene-based panel adhesive complying with ANSI A136.1-1967, UL listed.
- C. Sealant: Manufacturer's standard mildew-resistant, FDA, UL listed silicone sealant in colors matching components.

### 2.4 FABRICATION:

- A. Factory fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed Instructions and technical bulletins.
- B. Form joints between components using manufacturer's standard joint adhesive; without conspicuous joints. Reinforce with strip of solid polymer material, 2" wide.

- C. Rout and finish component edges with clean, sharp returns. Rout cutouts, radii and contours to template. Smooth edges. Repair or reject defective and inaccurate work.
- D. Window Stools: 1/2 inch thick solid polymer material, adhesively joined with inconspicuous seams, having round edge, 1" thick minimum and with 1" minimum projection from face of wall, unless otherwise shown on the Drawings.
  - 1. Provide surfaces with a uniform finish, Matte, Gloss range of 5-20. Color to be selected from manufacturer's Color Group: 1 - 5.
- E. Countertops: 1/2-inch thick solid polymer material, adhesively joined with inconspicuous seams, edge as indicated on the drawings, unless otherwise shown on the Drawings.
  - 1. Provide surfaces with a uniform finish, Matte, Gloss range of 5-20. Color to be selected from manufacturer's Color Group: 1 - 5.
- F. Wall Caps: 1-inch thick solid polymer material, adhesively joined with inconspicuous seams, edge as indicated on the drawings, unless otherwise shown on the Drawings.
  - 1. Provide surfaces with a uniform finish, Matte, Gloss range of 5-20. Color to be selected from manufacturer's Color Group: 1 - 5.

### **PART 3 - EXECUTION**

#### **3.1 GENERAL REQUIREMENTS**

- A. Prior to final approval of shop drawings, erect at project site one full size mock-up of each component required, for Architect's review.
- B. Should mock-up not be approved, re-fabricate and reinstall until approval is secured. Remove rejected units from project site.
- C. Approved mock-ups may remain as part of finished work.

#### **3.2 INSTALLATION**

- A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
- B. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work. Reinforce joints as required.
- C. Perform installation in accordance with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.

#### **3.3 CLEANING**

- A. Clean shop finished surfaces, touch-up as required, and remove or refinish damaged or soiled areas, as acceptable to Architect.

### **3.4 PROTECTION**

- A. Contractor to take all precautions as recommended by the manufacturer for protection of installed window stools and other solid plastic products from damage by work of other trades.

**END OF SECTION 06650**

## **SECTION 07070 - SELECTIVE ROOF DEMOLITION**

### **PART 1- GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 GENERAL**

- A. The Contractor will be responsible for the selective removal and disposal of all materials generated from work of this contract.
- B. Provide all labor, material equipment, and tools as required to prepare the existing roof section for selective demolition work and installation of new work, etc. as specified in this Section and other Division 7 Sections and as shown on the drawings.
- C. Provide for the proper disposal of all existing materials designated to be removed. Use approved trash receptacles in areas designated by the Owner's representative.
- D. Coordinate work, in such a manner as to keep the new insulation and roofing materials, building, and building interior absolutely clean, dry and watertight.
- E. Contractor is to maintain the building roof in a watertight condition at the completion of each day's work and ensure that no water enters into the building. Roof areas are to be "watertight at night" at all times during the job. Failure to do so is grounds for dismissal. Contractor will reimburse Owner the cost to repair interior damages resulting from roof leaks during construction.
- F. Contractor is to maintain the building and site in a neat and orderly fashion at all times. Completely remove all scrap and debris on a daily basis. Failure to do so is grounds for dismissal.

#### **1.3 SUBMITTALS**

- A. Proposed Selective Demolition Activities:
  - 1. Submit proposed schedule of demolition activities. Indicate:
    - a. Starting and ending dates for each activity as appropriate.
    - b. Interruption and restoration of utility services.
  - 2. Submit proposed methods of operations.
- B. Project Record Documents:
  - 1. Indicate unanticipated structural, electrical, or mechanical conditions.
- C. Photographs: Before starting work, file with the Architect photographs documenting existing conditions that later could be mistaken for damage caused by demolition operations.

## **1.4 PROJECT CONDITIONS**

- A. Occupancy:
  - 1. The Owner will continue to occupy portions of the existing building.
- B. Unforeseen Conditions:
  - 1. Should unforeseen conditions be encountered that affect design or function of project, investigate fully and submit an accurate, detailed, written report to the Owner / Architect. While awaiting the Owner / Architect's response, reschedule operations if necessary to avoid delay of overall project.

## **PART 2**

### **2.1 EQUIPMENT**

- A. Demolition equipment and materials are provided by the Contractor.

## **PART 3**

### **3.1 EXECUTION**

- A. Contractor shall take all necessary precautions during roof preparation work to protect the building exterior, building interior, and adjacent surfaces from being soiled or damaged.
- B. When weather threatens, cease work under this Section and return roof to a watertight condition.
- C. Contractor shall restore to original condition any damages caused during work on this project. Damages found on this project prior to start of work must be documented by contractor and brought to Owner's attention prior to start of work.
- D. All roof drains are assumed to be in good operating condition. Contractor is to verify good operating condition of roof drains prior to start of work on this project. Damaged, clogged or partially clogged drains must be documented by Contractor and brought to Owner's attention prior to start of work on this project.
- E. Return all roof drains to operating condition at the end of each working day.
- F. Immediately prior to insulation attachment, sweep the deck surface. Do not allow foreign objects to become trapped under the insulation board by being left on the deck surface.
- G. If, during observation of the prepared surface, the Architect or the manufacturer's representative determined the deck surface was not prepared properly, Contractor shall re-prepare the surface to the satisfaction of the Architect or manufacturer's representative.
- H. Properly dispose of all debris from roof preparation on a daily basis.
- I. Do not store debris on roof. Contractor shall take care not to over stress roof deck.
- J. Provide closed trash chutes or other approved means for removal of debris.

- K. Construct all necessary bridges, barricades, fencing, warning sign, scaffolding, etc., required to protect personnel and property.
- L. Prior to the completion of the work, remove from the job site all tools, equipment, debris and waste.

**END OF SECTION 07070**

## **SECTION 07200 - BUILDING INSULATION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Work included in this Contract: Contractor shall include all labor, materials, services, installation, equipment, etc., necessary to complete all building insulation (except roof insulation) to achieve complete and tight building thermal barrier to prevent the passage of exterior air into conditioned spaces and prohibit the formation of condensation.
  - 1. Provide indicated types of insulation as shown on drawings, as specified herein, and/or as required by all job conditions and building assemblies, whether clearly shown or not to achieve included work.
  - 2. Insulation types include but are not limited to the following:
    - a. Blanket type building insulation with foil facing-faced for concealed application and unfaced for exposed application,
    - b. Rigid board type perimeter insulation,
    - c. Rigid board type cavity wall insulation,
    - d. Fire safing insulation with UL approved coating,
  - 3. Related Work:
    - a. Section 03300 - Concrete Work,
    - b. Section 04200 - Unit Masonry,
    - c. Section 07600 - Roof Accessories,
    - d. Section 07840 - Through-Penetration Firestop Systems.

#### **1.3 QUALITY ASSURANCE**

- A. Thermal Conductivity: Thicknesses shown are for thermal conductivity (k-value at 75°F) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide appropriate thicknesses.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - 1. Surface-Burning Characteristics: ASTM E 84.
  - 2. Fire-Resistance Ratings: ASTM E 119.
  - 3. Combustion Characteristics: ASTM E 136.
- C. Fire and Insurance Ratings: Comply with fire-resistance, flammability and insurance ratings indicated, and comply with governing regulations as interpreted by authorities.

## **1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer's product literature and installation instructions for each type of insulation required. Include data substantiating that materials comply with specified requirements.
- B. Samples: Submit triplicate samples of the following listed items, in accordance with Contract Documents. Obtain Architect's approval before proceeding with ordering or fabrication of items of this section:
  - 1. Each type of insulation specified - 12 inches square.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. General Protection and Handling: Protection from Deterioration: Do not allow insulation materials to become wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Extruded-Polystyrene Board Insulation:
    - a. DiversiFoam Products.
    - b. Dow Chemical Company.
    - c. Owens Corning.
    - d. Tenneco Building Products.
    - e. Or approved equal.
  - 2. Glass-Fiber Insulation:
    - a. CertainTeed Corporation.
    - b. Johns Manville.
    - c. Owens Corning.
    - d. Guardian Building Products, Inc.
    - e. Knauf Insulation.
    - f. Or approved equal.
  - 3. Fire Safing Insulation:
    - a. Industrial Insulation Group, LLC
    - b. Fibrex Insulations.
    - c. Isolatek International.
    - d. Owens Corning.
    - e. Roxul USA Inc.
    - f. Or approved equal.



B. Mineral/Glass Fiber Blanket/Batt Insulation

1. Inorganic fibers formed into flexible resilient blankets or semi-rigid resilient sheets:
  - a. Reinforced-Foil-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

C. Mineral-Wool Board Insulation:

1. Semi-Refractory Fiber Board Fire Safing Insulation: Semi-rigid boards designed for use as a fire stop at openings between edge of slab and exterior wall panels, at top of masonry and wallboard walls/deck interface, and shall be produced by combining semi-refractory mineral fiber manufactured from slag with thermosetting resin binders.
2. Unfaced, Mineral-Wool Board Insulation: ASTM C 612; with a flame-spread index of 15 and a smoke-developed index of zero, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
  - a. Nominal density of 8 lb/cu. ft., Type III, thermal resistivity of  $4.35^{\circ}\text{F} \times \text{h} \times \text{sq. ft.}/\text{Btu} \times \text{in.}$  at  $75^{\circ}\text{F}$ .
3. At all rated masonry and wallboard walls and partitions, rated slabs and exterior wall panels, the fire safing insulation shall be coated with 3M Firedam products, or approved equal, to achieve indicated UL design requirements.

D. Rigid, closed-cell polystyrene insulation board; ASTM C578-87A, Type IV, 25 psi compressive strength; 1.1 perm-inch maximum vapor transmission; 0.1% maximum water absorption; manufacturer's standard lengths and widths. Provide insulation complying with a flame spread rating of 5 when tested in accordance with ASTM E84.

1. Basis of Design: Provide "Styrofoam Square Edge", by Dow Chemical U.S.A.
  - a. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work includes, but are not limited to, the following:
    - 1) DiversiFoam Products.
    - 2) Owens Corning.
    - 3) Tenneco Building Products.
    - 4) Or approved equal.
  - b. k-value of 0.20 per inch and an R value of 5.0 per inch.

E. Rigid Insulation (cavity wall insulation)

1. Rigid, moisture resistant, closed-cell extruded polystyrene insulation board; ASTM C578, Type IV, 25 psi compressive strength; 1.1 perm-inch maximum vapor transmission; 0.1% maximum water absorption; manufacturer's standard lengths and widths. Provide insulation complying with a flame spread rating of 10 and smoke developed of 160, when tested in accordance with ASTM E84.

- a. Basis of Design: Provide "Cavitymate Ultra", by Dow Chemical U.S.A.; or approved equal.
  - 1) Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a) DiversiFoam Products.
    - b) Owens Corning.
    - c) Tenneco Building Products.
    - d) Or approved equal.
- b. R value of 5.6 per inch; ASTM C518.
- c. Thickness: 1-3/4", unless indicated otherwise.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
- B. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
  - 1. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.
  - 2. Provide complete and tight building thermal barrier, to prevent the passage of exterior air into conditioned spaces and prohibit the formation of condensation.
  - 3. Provide indicated types of insulation as shown on drawings, as specified herein, and/or as required by all job conditions, building assemblies, and whether clearly shown or not.
  - 4. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
    - a. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
  - 5. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
- C. Batt Insulation
  - 1. General:
    - a. Set vapor barrier faced units with vapor barrier to warm side of construction.

- b. Tape joints and ruptures in vapor barriers, and seal each continuous area of insulation to surrounding construction to ensure vapor-tight installation.
    - c. Insert and secure insulation to fill voids to create barrier to prevent the pass of air and moisture.
  - 2. Exterior Wall Stud Framing, (Exposed Application):
    - a. Install properly size unfaced fiberglass insulation tight to stud construction. Install vapor retarder and seal all joints closed to prevent passage of vapor.
- D. Cavity Wall Insulation
  - 1. On units of plastic insulation, install small pads of mortar or mastic spaced approximately 1'-0" on center both ways on inside face, as recommended by manufacturer. Press courses of insulation between wall ties and other confining obstructions in the cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
    - a. Wedge insulation from outside wythe of construction with small fragments of masonry materials spaced 2'-0" on center both ways.
- E. Perimeter Insulation
  - 1. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type of adhesive recommended by manufacturer of insulation.
- F. Fire Safing Insulation
  - 1. Install fire safing insulation at all indicated locations, as required by authorities having jurisdiction and in accordance with manufacturer's instructions.
  - 2. Provide sealant material and type required for indicated applications. Provide fire rated type at rated assemblies.
  - 3. Provide coating materials at indicated UL. Rated assemblies.
- G. All installations of insulation and work of this section shall meet approval of Architect and all code authorities having jurisdiction at no additional cost to the Owner.

**END OF SECTION 07200**

## **SECTION 07214 - CLOSED CELL SPRAY FOAM INSULATION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SECTION INCLUDES**

- A. Closed Cell Spray Foam Insulation.

#### **1.3 RELATED SECTIONS**

- A. Section 05450 - Cold-Formed Metal Framing.
- B. Section 07275 - Sheet Applied Air Barriers.
- C. Section 09250 - Gypsum Drywall.

#### **1.4 REFERENCES**

- A. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- B. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- C. ASTM C 1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
- F. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- G. ASTM D 1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- H. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- I. ASTM D 1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
- J. ASTM D 2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
- K. ASTM D 2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics.

## **1.5 PERFORMANCE REQUIREMENTS**

- A. Conform to applicable code for flame and smoke, concealment, and over coat requirements.

## **1.6 SUBMITTALS**

- A. Submit under provisions of AIA A232 and Section 00800.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

## **1.7 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Manufacturer with a recommended minimum of ten years experience manufacturing products in this section shall provide all products listed.
- B. Installer Qualifications: Products listed in this section shall be installed by a single organization with at recommended five years experience successfully installing insulation on projects of similar type and scope as specified in this section.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Finish areas designated by Architect.
  - 2. Do not proceed with remaining work until workmanship is approved by Architect.
  - 3. Refinish mock-up area as required to produce acceptable work.

## **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Storage: Store materials in dry locations with adequate ventilation, protected from freezing rain, direct sunlight and excess heat and in such a manner to permit easy access for inspection and handling. Store at temperature between 55 and 80°F (12.7 to 26.6°C).
- C. Handling: Handle materials to avoid damage.

## **1.9 PRE-APPLICATION MEETINGS**

- A. Convene minimum two weeks prior to starting work of this section.

## **1.10 SEQUENCING**

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

## 1.11 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Do not apply insulation when substrate temperatures are under 40°F (4.4°C) prior to installation.
- C. Surfaces must be dry prior to application of spray foam. Excess humidity may cause poor adhesion, and result in product failure.
- D. To avoid overspray, product should not be applied when conditions are windy.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: CertainTeed Corp., Insulation Group, Valley Forge, PA; Tel: 800-233-8990; [www.certainteed.com/Insulation](http://www.certainteed.com/Insulation); or approved equal.
  - 1. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:
    - a. NCFI Polyurethanes, Div. of BMC, Tel. 800.346.8229.
    - b. Or approved equal.
- B. Requests for substitutions will be considered in accordance with provisions of AIA A232 and Section 00800.

### 2.2 SPRAY FOAM INSULATION

- A. Insulation: HFC-blown type Closed Cell Foam: CertainTeed CertaSpray Closed Cell Foam is a medium-density, MDI-based polyurethane thermoset rigid foam. When CertaSpray A-side closed cell is mixed with CertaSpray B-side closed cell under pressure in a 1:1 volumetric ratio, they react and expand into a medium-density closed cell foam with an in-place core density of 1.9- 2.2 pcf:
  - 1. Physical and Mechanical Properties:
    - a. Core Density: 1.9-2.4 pcf when tested in accordance with ASTM D 1622.
    - b. Thermal Resistance (aged): 5.8 less than or equal to 2-1/2 inches / 6.4 when greater than 2-1/2 inches when tested in accordance with ASTM C 518 at 75°F, (h-ft<sup>2</sup>- degrees F)/Btu.
    - c. Thermal Resistance (initial): 6.4 when tested in accordance with ASTM C 518 at 75°F, (h-ft<sup>2</sup>- degrees F)/Btu.
    - d. Closed Cell Content: 88-95 percent when tested in accordance with ASTM D 2842.
    - e. Compressive Strength: Greater than 25 psi when tested in accordance with ASTM D 1621.

- f. Tensile Strength: 23 psi when tested in accordance with ASTM D 1623.
  - g. Water Absorption: Less than 2 percent by volume when tested in accordance with ASTM D 2842.
  - h. Dimensional Stability: Less than 9 percent by volume when tested in accordance with ASTM D 2126 at 75°F/95 percent RH, 28 Day.
  - i. Water Vapor Transmission: 1.3 perm/inch when tested in accordance with ASTM E 96.
  - j. Air Permeability: 0.013 when tested in accordance with ASTM E 283 at 1 inch thickness, L/s/m<sup>2</sup>.
  - k. Fungi Resistance: Pass, with no growth when tested in accordance with ASTM C 1338.
2. Fire performance
- a. Flame Spread: Less than 25 when tested in accordance with ASTM E 84.
  - b. Smoke: Less than 450 when tested in accordance with ASTM E 84.
3. Thermal Performance (aged): Tested in accordance with ASTM C 518 and/or ASTM C 177 at 75°F (24°C) mean temperature.
- a. Thickness 1 inch (25 mm), R-Value 5.8 (h-ft<sup>2</sup>-degreesF)/Btu (1.0 (m<sup>2</sup>-degreesC)/W).
  - b. Thickness 1-12 inches (38 mm), R-Value 8.7 (h-ft<sup>2</sup>-degreesF)/Btu (1.5 (m<sup>2</sup>-degreesC)/W).
  - c. Thickness 2 inches (51 mm), R-Value 11.6 (h-ft<sup>2</sup>-degreesF)/Btu (2.0 (m<sup>2</sup>-degreesC)/W).
  - d. Thickness 2-12 inches (64 mm), R-Value 16.0 (h-ft<sup>2</sup>-degreesF)/Btu (2.8 (m<sup>2</sup>-degreesC)/W).
  - e. Thickness 3 inches (76 mm), R-Value 19.2 (h-ft<sup>2</sup>-degreesF)/Btu (3.4 (m<sup>2</sup>-degreesC)/W).
  - f. Thickness 3-12 inches (89 mm), R-Value 22.4 (h-ft<sup>2</sup>-degreesF)/Btu (3.9 (m<sup>2</sup>-degreesC)/W).
  - g. Thickness 4 inches (102 mm), R-Value 25.6 (h-ft<sup>2</sup>-degreesF)/Btu (4.5 (m<sup>2</sup>-degreesC)/W).
  - h. Thickness 4-12 inches (114 mm), R-Value 28.8 (h-ft<sup>2</sup>-degreesF)/Btu (5.1 (m<sup>2</sup>-degreesC)/W).
  - i. Thickness 5 inches (127 mm), R-Value 32.0 (h-ft<sup>2</sup>-degreesF)/Btu (5.6 (m<sup>2</sup>-degreesC)/W).

- j. Thickness 5-12 inches (140 mm), R-Value 35.2 (h-ft<sup>2</sup>-degreesF)/Btu (6.2 (m<sup>2</sup>-degreesC)/W).
- k. Thickness 6 inches (152 mm), R-Value 38.4 (h-ft<sup>2</sup>-degreesF)/Btu (6.8 (m<sup>2</sup>-degreesC)/W).

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that all exterior and interior wall, partition, and floor/ceiling assembly construction have been completed to the point where the insulation may correctly be installed.
- C. Verify that substrate and cavities are dry and free of any foreign material that will impede application.
- D. Verify that mechanical and electrical services in walls have been installed and tested and, if appropriate, verify that adjacent materials are dry and ready to receive insulation.
- E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.2 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Mask and protect adjacent surfaces from overspray or dusting.

### **3.3 INSTALLATION**

- A. Install in accordance with manufacturer's instructions. Product must be installed according to local code, and must be applied by a qualified applicator.
- B. Apply insulation by spray method, to uniform monolithic density without voids.
- C. Apply to minimum cured thickness as indicated on the Drawings or as scheduled at the end of this Section.
- D. Apply to minimum cured thickness of **6-inches**.
- E. Apply to achieve thermal resistance **R-Value of 38.4**.
- F. Apply insulation to fill voids around doors and windows. Apply insulation to fill voids around accessible service and equipment penetrations.
- G. Do not install spray foam insulation in areas where it will be in contact with equipment or materials with operating temperatures of 180°F (82°C) or greater.



H. Where building is designed to meet the specific air tightness standards of the Energy Star Program, apply insulation as recommended by manufacturer to provide airtight construction. Apply sealant to joints between structural assemblies as specified in Division 7.

I. Coordinate installation of protective covering specified in Section 09250.

J. Patch damaged areas.

### **3.4 FIELD QUALITY CONTROL**

A. Inspection will include verification of insulation and density.

### **3.5 PROTECTION**

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

### **3.6 SCHEDULES**

A. For the following location(s), apply the average cured thickness indicated.

1. Thermal insulation within exterior walls: 6-inches.

**END OF SECTION 07214**

## **SECTION 07241 – WATER MANAGED EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)**

### **PART 1 GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawing and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

#### **1.2 SUMMARY**

- A. Provide air and moisture barrier, and compatible EIFS for vertical above grade exterior walls
- B. Related Sections:
  - 1. Section 04200 – Unit Masonry
  - 2. Section 06100 – Carpentry (Sheathing)
  - 3. Section 07270 – Fluid Applied Membrane Air Barrier
  - 4. Section 07600 – Flashing, Sheet Metal and Roof Accessories
  - 5. Section 07900 – Joint Sealer Assemblies
  - 6. Section 08415 – Aluminum Framed Entrances and Storefronts
  - 7. Section 08520 – Aluminum Windows

#### **1.3 SUBMITTALS**

- A. Manufacturer's specifications, details, installation instructions and product data.
- B. Manufacturer's code compliance report.
- C. Manufacturer's standard warranty.
- D. Applicator's industry training credentials.
- E. Samples for approval, as directed by Architect.
- F. Sealant manufacturer's certificate of compliance with ASTM C 1382.
- G. Prepare and submit project-specific details (where indicated or required).

#### **1.4 REFERENCES**

- A. ASTM Standards:
  - B 117 Test Method for Salt Spray (Fog) Testing
  - C 297 Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions
  - C 578 Specification for Preformed, Cellular Polystyrene Thermal Insulation
  - C 1177 Specification for Glass Mat Gypsum for Use as Sheathing

- C 1382 Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish Systems (EIFS) Joints
  - D 968 Test Method for Abrasion Resistance of Organic Coatings by Falling Abrasive
  - D 1784 Specification for Rigid Poly (Vinyl Chloride) (PVC) and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
  - D 2247 Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
  - D 3273 Test for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
  - E 72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
  - E 84 Test Method for Surface Burning Characteristics of Building Materials
  - E 96 Test Methods for Water Vapor Transmission of Materials
  - E 119 Method for Fire Tests of Building Construction and Materials
  - E 330 Test Method for Structural Performance of Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
  - E 331 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
  - E 1233 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Difference
  - E 2098 Test Method for Determining Tensile Breaking Strength of Glass Fiber Reinforcing Mesh for Use in Class PB Exterior Insulation and Finish System after Exposure to a Sodium Hydroxide Solution
  - E 2134 Test Method for Evaluating the Tensile-Adhesion Performance of an Exterior Insulation and Finish System (EIFS)
  - E 2178 Test Method for Air Permeance of Building Materials
  - E 2273 Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish System (EIFS) Clad Wall Assemblies
  - E 2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
  - E 2485 Standard Test Method for Freeze/Thaw Resistance of Exterior Insulation and Finish Systems (EIFS) and Water Resistive Barrier Coatings
  - E 2486 Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS)
  - E 2568 Standard Specification for PB Exterior Insulation and Finish Systems
  - E 2570 Test Method for Water-Resistive (WRB) Coatings used Under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage
  - G 153 Recommended Practice for Operating Light-and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Nonmetallic Materials
  - G 154 Recommended Practice for Operating Light-and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials
- B. Building Code Standards
- AC 235 Acceptance Criteria for EIFS Clad Drainage Wall Assemblies (November, 2009)
- C. National Fire Protection Association (NFPA) Standards

- NFPA 268 Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source
- NFPA 285 Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies containing Combustible Components Using the Intermediate-Scale, Multistory Test Apparatus

D. Other Referenced Documents

1. American Association of Textile Chemists and Colorists AATCC-127 Water Resistance: Hydrostatic Pressure Test
2. APA Engineered Wood Association E 30, Engineered Wood Construction Guide
3. ICC-ES ESR-1233, StoGuard with Gold Coat, StoGuard with EmeraldCoat, and StoGuard VaporSeal Water-Resistive Barriers and StoEnergy Guard
4. ICC-ES ESR-1748, StoTherm<sup>®</sup> ci

## 1.5 DESIGN REQUIREMENTS

A. Wind Load

1. Design for maximum allowable system deflection, normal to the plane of the wall, of L/240.
2. Design for wind load in conformance with code requirements.
3. Maximum wind load resistance:  $\pm 188$  psf (9.00 kPa), provided structural supports and sheathing/sheathing attachment are adequate to resist these pressures.

B. Moisture Control

1. Prevent the accumulation of water behind the EIFS or into the wall assembly, either by condensation or leakage through the wall construction, in the design and detailing of the wall assembly:
  - a. Provide flashing to direct water to the exterior where it is likely to penetrate components in the wall assembly, including, above window and door heads, beneath window and door sills, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, at floor lines, and at the base of the wall.
  - b. Air Leakage Prevention: Provide continuity of the air barrier system at foundation, roof, windows, doors, and other penetrations through the wall with connecting and compatible air barrier components to minimize condensation and leakage caused by air movement.
  - c. Vapor Diffusion and Condensation: Perform a dew point analysis and/or dynamic hygrothermal modeling of the wall assembly to determine the potential for accumulation of moisture in the wall assembly by diffusion. Adjust insulation thickness and/or other wall assembly components accordingly to minimize risk. Avoid the use of vapor retarders on the interior side of the wall in warm, humid climates.

C. Impact Resistance

1. Provide ultra-high impact resistance of the EIFS to a minimum height of 6'-0" (1.8 m) above finished grade at all areas accessible to pedestrian traffic and other areas exposed

to abnormal stress or impact. Indicate the areas with impact resistance other than "Standard" on contract drawings.

#### D. Color Selection

1. Select finish coat with a light reflectance value of 20 or greater. (The use of dark colors is not recommended over expanded polystyrene [EPS]. EPS has a service temperature limitation of approximately 165° F [74°C]).

#### E. Joints

1. Provide minimum 3/4 inch (19 mm) wide joints in the EIFS where they exist in the substrate or supporting construction, where the cladding adjoins dissimilar construction or materials, at changes in building height, at expansion, control, and cold joints in construction, and at floor lines in multi-level wood frame construction. Size joints to correspond with anticipated movement. Align terminating edges of EIFS with joint edges of through wall expansion joints and similar joints in construction. Refer to Manufacturer's details.
2. Provide minimum 1/2 inch (13 mm) wide perimeter sealant joints at all penetrations through the EIFS (windows, doors, mechanical, electrical, and plumbing penetrations, etc.).
3. Specify compatible backer rod and sealant that has been evaluated in accordance with ASTM C 1382, and that meets minimum 50% elongation after conditioning.
4. Provide joints so that air barrier continuity is maintained across the joint, and drain joints to the exterior, or provide other means to prevent or control water infiltration at joints.

#### F. Grade Condition

1. Do not specify the EIFS below grade (unless designed for use below grade and permitted by code) or for use on surfaces subject to continuous or intermittent water immersion or hydrostatic pressure. Provide a minimum 6-inch (152 mm) clearance above grade or as required by code.

#### G. Trim, Projecting Architectural Features and Reveals

1. All trim and projecting architectural features must have a minimum 1:2 [27°] slope along their top surface. All reveals must have minimum 3/4 inch (19 mm) insulation thickness at the bottom of the reveal. All horizontal reveals must have a minimum 1:2 [27°] slope along their bottom surface. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface. Where trim/feature or bottom surface of reveal projects more than 2 inches (51 mm) from the face of the EIFS wall plane, protect the top surface with waterproof base coat. Periodic inspections and increased maintenance may be required to maintain surface integrity of the EIFS finish on weather exposed sloped surfaces. Limit projecting features to easily accessible areas and limit total area to facilitate and minimize maintenance. Refer to Manufacturer's details.
2. Do not use the EIFS on weather exposed projecting ledges, sills, or other projecting features unless supported by framing or other structural support and protected with metal coping or flashing. Refer to Sto Detail: 10.61.

#### H. Insulation Thickness

1. Minimum EPS insulation thickness is 1 inch (25 mm).

2. Maximum EPS insulation thickness is 12 inches (305 mm), except as noted below for fire-resistance rated wall assemblies.

I. Fire Protection

1. Do not use EPS foam plastic in excess of 12 inches (305 mm) thick on types I, II, III, or IV construction unless approved by the code official.
2. Where a fire-resistance rating is required by code, use the EIFS over a rated concrete or concrete masonry assembly. Limit use over rated frame assemblies to non-load bearing assemblies (the EIFS is considered not to add or detract from the fire-resistance of the rated assembly). Maximum allowable EPS thickness: 4 inches (102 mm).
3. Refer to manufacturer’s testing or applicable code compliance report for other limitations that may apply.

**1.6 PERFORMANCE REQUIREMENTS**

- A. Comply with ASTM E 2570 (Air/Moisture Barrier) and ASTM E 2568 (EIFS)

**Table 1 Air/Moisture Barrier Performance**

TEST	METHOD	CRITERIA	RESULT
1. Weathering	AATCC 127 (Water Column)	No cracking, bond failure or water penetration after 210 hours UV exposure, 25 wet/dry cycles, and 21.6 in (55 cm) water column	Pass
2. Durability	ASTM E 1233/ ASTM E 72 / ASTM E 331	No cracking or water penetration at sheathing joints after 10 cycles transverse loading, 1 cycle racking, 5 cycles environmental conditioning, and 15 minutes water spray at 2.86 psf (137 kPa) pressure differential	No water penetration
3. Water Resistance	ASTM D 2247	Absence of deleterious effects after 14 day exposure	No deleterious effects
4. Water Vapor Transmission	ASTM E 96 Method B (Water Method)	Measure	Sto Gold Coat: > 10 perms [574 ng/(Pa·s·m <sup>2</sup> )] Sto AirSeal; >12 perms [689 ng/(Pa s m <sup>2</sup> )]
5. Air Leakage (material)	ASTM E 2178	≤ 0.004 cfm/ft <sup>2</sup> at 1.57 psf (0.02 L/s·m <sup>2</sup> at 75 Pa)	Pass
6. Air Leakage (assembly)	ASTM E 2357	≤ 0.04 cfm/ft <sup>2</sup> (0.2 L/s·m <sup>2</sup> )	Pass <sup>1</sup>
7. Freeze-Thaw	ASTM E 2485	No delamination or surface changes after 10 cycles when viewed under 5X magnification	No delamination or surface changes
8. Surface Burning	ASTM E 84	Flame Spread less than or equal to 25 Smoke developed less than or equal to 450	Flame Spread: < 25 Smoke Density: < 450

TEST	METHOD	CRITERIA	RESULT
9. Tensile Bond	ASTM C 297	Greater than 15 psi (103 kPa)	Pass over Plywood, OSB, Glass Mat Faced Gypsum sheathings, CMU

1. Based on testing of air barrier joint treatment material at sheathing joints and no top coat

**Table 2 EIFS Weather Resistance and Durability Performance\***

TEST	METHOD	CRITERIA	RESULTS
1. Accelerated Weathering	ASTM G 153 (Formerly ASTM G 23)	No deleterious effects* at 2000 hours when viewed under 5x magnification	Pass
2. Accelerated Weathering	ASTM G 154 (Formerly ASTM G 53)	No deleterious effects* at 2000 hours	Pass
3. Freeze/Thaw Resistance	ASTM E 2485	No deleterious effects* at 10 cycles when viewed under 5x magnification	Pass
4. Water Penetration	ASTM E 331 (modified per ICC-ES AC 235)	No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes at 6.24 psf (299 Pa) or 20% of design wind pressure, whichever is greater	Pass at 12.0 psf (575 Pa) after 30 minutes
5. Drainage Efficiency	ASTM E 2273	90% minimum	> 90%
6. Tensile Adhesion	ASTM E 2134	Minimum 15 psi (103kPa) tensile strength	Pass
7. Water Resistance	ASTM D 2247	No deleterious effects*at 14 day exposure	Pass @ 28 days
8. Salt Spray	ASTM B 117	No deleterious effects* at 300 hours	Pass @ 300 hrs
9. Abrasion Resistance	ASTM D 968	No cracking or loss of film integrity at 528 quarts (500 L) of sand	Pass @ 528 quarts (1000 L)
10. Mildew Resistance	ASTM D 3273	No growth supported during 28 day exposure period	Pass @ 28 days
11. Impact Resistance	ASTM E 2486	Standard: 25-49 in-lbs (2.83-5.54J) Medium: 50-89 in-lbs (5.65-10.1J) High: 90-150 in-lbs (10.2-17J) Ultra-High: >150 in-lbs (>17J)	Pass with one layer Sto Mesh Pass with two layers Sto Mesh Pass with one layer Sto Intermediate Mesh Pass with one layer Sto Armor Mat and one layer Sto Mesh

\* No deleterious effects: no cracking, checking, crazing, erosion, rusting, blistering, peeling or delamination

**Table 3 Air/Moisture Barrier and EIFS Fire Performance**

TEST	METHOD	CRITERIA	RESULT
1. Fire Endurance	ASTM E 119	Maintain fire resistance of existing rated assembly	Pass (4 inch [102 mm] maximum allowable insulation thickness)
2. Intermediate Scale Multi-Story Fire Test	NFPA 285 (formerly UBC Standard 26-9)	1. Resistance to vertical spread of flame within the core of the panel from one story to the next 2. Resistance to flame propagation over the exterior surface 3. Resistance to vertical spread of flame over the interior surface from one story to the next 4. Resistance to significant lateral spread of flame from the compartment of fire origin to adjacent spaces	Pass with 12 inches (305 mm) insulation
3. Radiant Heat Ignition	NFPA 268	No ignition @ 20 minutes	Pass with 1 and 12 inches (25 and 305 mm) insulation
4. Surface Burning (individual components)	ASTM E 84	Individual components shall each have a flame spread of 25 or less, and smoke developed of 450 or less	Flame Spread: < 25 Smoke Developed: < 450

**Table 4 EIFS Component Performance**

TEST	METHOD	CRITERIA	RESULT
1. Alkali Resistance of Reinforcing Mesh	ASTM E 2098	Greater than 120 pli (21 dN/cm) retained tensile strength	Pass
2. Requirements for Rigid PVC Accessories	ASTM D 1784	Meets cell classification 13244C	Pass

## 1.7 QUALITY ASSURANCE

### A. Manufacturer Requirements

1. Member in good standing of the EIFS Industry Members Association (EIMA).
2. Air/moisture barrier and EIFS manufacturer for a recommended minimum of thirty (30) years.



3. Manufacturing facilities ISO 9001:2008 Certified Quality System and ISO 14001:2004 Certified Environmental Management System.

B. Contractor Requirements

1. Engaged in application of similar systems for a recommended minimum of three (3) years.
2. Knowledgeable in the proper use and handling of the manufacturer's materials.
3. Employ skilled mechanics who are experienced and knowledgeable in air/moisture barrier and EIFS application, and familiar with the requirements of the specified work.
4. Successful completion of recommended minimum of three (3) projects of similar size and complexity to the specified project.
5. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with Sto's published specifications and details and the project plans and specifications.

C. Insulation Board Manufacturer Requirements

1. EPS board listed by an approved agency.
2. EPS board manufactured under manufacturer's licensing agreement and recognized by the manufacturer as being capable of producing EPS insulation board to meet EIFS requirements.
3. EPS board labeled with information required by the manufacturer, the approved listing agency, and the applicable building code.

D. Mock-up Testing

1. Construct full-scale mock-up of typical air/moisture barrier and EIFS/window wall assembly with specified tools and materials and test air and water infiltration and structural performance in accordance with ASTM E 283, ASTM E 331 and ASTM E 330, respectively, through independent laboratory. Mock-up shall comply with requirements of project specifications. Where mock-up is tested at job site maintain approved mock-up at site as reference standard. If tested off-site accurately record construction detailing and sequencing of approved mock-up for replication during construction.

E. Inspections

1. Provide independent third-party inspection, where required by code or contract documents.
2. Conduct inspections in accordance with code requirements and contract documents.

**1.8 DELIVERY, STORAGE AND HANDLING**

- A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.
- B. Protect coatings (pail products) from freezing and temperatures in excess of 90°F (32° C). Store away from direct sunlight.
- C. Protect Portland cement-based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

## **1.9 PROJECT/SITE CONDITIONS**

- A. Maintain ambient and surface temperatures above 40°F (4°C) during application and drying period, minimum 24 hours after application of Air/Moisture barrier and EIFS products.
- B. Provide supplementary heat for installation in temperatures less than 40°F (4°C).
- C. Provide protection of surrounding areas and adjacent surfaces from application of products.

## **1.10 COORDINATION/SCHEDULING**

- A. Provide site grading such that the EIFS terminates above grade a minimum of 6 inches (150 mm) or as required by code.
- B. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuously connected air and moisture barrier.
- C. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall.
- D. Install window and door head flashing immediately after windows and doors are installed.
- E. Install diverter flashings wherever water can enter the wall assembly to direct water to the exterior.
- F. Install splices or tie-ins from air/moisture barrier over back leg of flashings, starter tracks, and similar details to form a shingle lap that directs incidental water to the exterior.
- G. Install copings and sealant immediately after installation of the EIFS when coatings are dry, and such that, where sealant is applied against the EIFS surface, it is applied against the base coat or primed base coat surface.
- H. Schedule work such that air/moisture barrier is exposed to weather no longer than 30 days if Sto Gold Coat is used, 90 days if Sto AirSeal is used.
- I. Attach penetrations through the EIFS to structural support and provide water tight seal at penetrations.

## **1.11 WARRANTY**

- A. Provide manufacturer's standard warranty.
  - 1. Minimum of a **Fifteen (15) year** Limited Warranty.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Provide Air/Moisture Barrier and EIFS coatings and accessories from single source manufacturer or approved supplier.
- B. The following are the Basis of Design manufacturers:
  - 1. Sto Corp. – Air/Moisture Barrier, EIFS.

2. Plastic Components, Inc. – EIFS Accessories.
- C. Comparable products of the following manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements and other design attributes listed above.
1. Dryvit Systems, Inc.
  2. Master Wall Inc.
  3. Senergy - BASF Wall Systems.
  4. Or approved equal.

## **2.2 AIR/MOISTURE BARRIER**

### **A. StoGuard®**

1. Joint Treatment, Rough Opening Protection, and Detail Components:
  - a. Sto Gold Fill® – ready mixed coating applied by trowel or knife for rough opening protection of frame walls and joint treatment of sheathing when used with StoGuard Mesh. Also used as a detail component with StoGuard Mesh to splice over back flange of starter track, flashing, and similar ship lap details.
  - b. Sto Gold Coat® - ready mixed coating applied by brush, roller or spray for rough opening protection of frame walls and joint treatment of sheathing when used with StoGuard Fabric. Also used as a detail component with StoGuard Fabric to splice over back flange of starter track, flashing, and similar ship lap details.
  - c. Sto AirSeal™ - ready mixed medium-high build coating applied by brush, roller or spray for rough opening protection of frame walls and joint treatment of sheathing when used with StoGuard Fabric. Also used as a detail component with StoGuard Fabric to splice over back flange of starter track, flashing, and similar ship lap details.
  - d. Sto RapidGuard™ - one component STPE rapid drying gun-applied treatment for sheathing joints, rough openings, seams, cracks, penetrations and other transitions in above grade wall construction.
  - e. StoGuard RapidFill™ – one component rapid drying gun-applied joint treatment for sheathing. Also used at static transition joints or seams in construction and to seal fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air barrier materials. Also used as a detail component to splice over back flange of starter track, flashing, and similar ship lap details.
  - f. StoGuard RapidSeal™ – one component rapid drying gun-applied rough opening protection for frame and CMU walls without mesh or fabric reinforcement. Also use as a joint treatment for sheathing when used with StoGuard Mesh. Also used to seal fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air barrier materials.
2. Waterproof Coating:
  - a. Sto AirSeal™ - ready mixed medium-high build waterproof coating for concrete, concrete masonry, wood-based sheathing, and glass mat gypsum sheathing.
3. Transition Detail Components:

- a. StoGuard Transition Membrane: Flexible air barrier membrane for continuity at static transitions such as sheathing to foundation, dissimilar materials (CMU to frame wall), wall to balcony floor slab or ceiling, and shingle lap transitions to flashing. Also used for dynamic joints: floor line deflection joints, masonry control joints, and through wall joints in masonry or frame construction.
- b. Sto RapidGuard: One component STPE rapid drying gun-applied treatment for sheathing joints, rough openings, seams, cracks, penetrations and other static transitions in above grade wall construction such as: shingle lap transitions to flashing, wall to balcony floor slab or ceilings, and through wall penetrations – pipes, electrical boxes, and scupper penetrations.

### **2.3 ADHESIVE**

- A. Sto BTS Plus – factory blended one-component polymer-modified portland cement based high build adhesive.

### **2.4 INSULATION BOARD**

- A. Sto EPS Insulation Board: Nominal 1.0 lb/ft<sup>3</sup> (16 kg/m<sup>3</sup>) Expanded Polystyrene (EPS) insulation board in compliance with ASTM E 2430 and ASTM C 578 Type I requirements and listed, labeled, and furnished in accordance with Section 1.6C.

### **2.5 BASE COAT**

- A. Cementitious Base Coat
  1. Sto BTS Plus – factory blended one component polymer modified portland cement based high build base coat. Also used as a leveler for concrete and masonry surfaces.
- B. Non-Cementitious Base Coat
  1. Sto RFP – ready mixed acrylic based plaster base coat material.
- C. Waterproof Base Coat
  1. Sto Flexyl – fiber reinforced acrylic based waterproof base coat mixed with portland cement (for use as a waterproof base coat over Sto BTS Plus or BTS Xtra for foundations, parapets, splash areas, trim and other projecting architectural features)

### **2.6 REINFORCING MESHES**

- A. Standard Mesh:
  1. Sto Mesh: Nominal 4.5 oz/yd<sup>2</sup> (153 g/m<sup>2</sup>), symmetrical, interlaced open-weave glass fiber fabric made with alkaline resistant coating for compatibility with Sto materials (achieves Standard Impact Classification).
- B. High Impact Mesh:
  1. Sto Intermediate Mesh: Nominal 11.2 oz./yd<sup>2</sup> (380 g/m<sup>2</sup>), high impact, interwoven, open weave glass fiber fabric with alkaline resistant coating for compatibility with Sto materials (achieves High Impact Classification).
- C. Specialty Meshes:

1. Sto Detail Mesh: Nominal 4.2 oz/yd<sup>2</sup> (143 g/m<sup>2</sup>), flexible, symmetrical, interlaced glass fiber fabric, with alkaline resistant coating for compatibility with Sto materials (used for standard back wrapping, aesthetic detailing, and reinforcement of sheathing joints and protection of rough openings with trowel applied air/moisture barrier).

## **2.7 PRIMER**

- A. StoPrime – acrylic based tintable primer for spray application.

## **2.8 FINISH COAT**

- A. Stolit® Lotusan® – acrylic based textured wall finish with graded marble aggregate and self-cleaning properties.
- B. Color(s) as selected by the Architect.

## **2.9 JOB MIXED INGREDIENTS**

- A. Water – clean and potable.
- B. Portland cement – Type I, Type II, or Type I-II in conformance with ASTM C 150.

## **2.10 ACCESSORIES**

- A. Starter Track: Rigid PVC (polyvinyl chloride) plastic track Part No. STDE as furnished by Plastic Components, Inc., Terrace, Miami, FL; Tel.# 800.327.7077; or approved equal.
- B. Sto-Mesh Corner Bead Standard: One component PVC (polyvinyl chloride) accessory with integral reinforcing mesh for outside corner reinforcement.
- C. Sto Drip Edge Profile - one component PVC (polyvinyl chloride) accessory with integral reinforcing mesh that creates a drip edge and plaster return.

## **2.11 MIXING**

- A. Sto Gold Fill – mix with a clean, rust-free high-speed mixer to a uniform consistency.
- B. Sto Gold Coat – mix with a clean, rust-free high-speed mixer to a uniform consistency.
- C. Sto AirSeal – mix with a clean, rust-free high-speed mixer to a uniform consistency.
- D. Sto BTS Plus – mix ratio with water: 5-6.5 quarts (4.7-6.2 L) of water per 47 pound (21.3 kg) bag of Sto BTS Plus. Pour water into a clean mixing pail. Add Sto BTS Plus, mix to a uniform consistency and allow to set for approximately 5 minutes. Adjust mix, if necessary, with additional Sto BTS Plus or water and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent. Do not exceed maximum water amount in mix ratio.
- E. Sto Flexyl – mix ratio with portland cement: 1:1 ratio by weight. Pour Sto Flexyl into a clean mixing pail. Add portland cement, mix to a uniform consistency and allow to set for approximately five minutes. Adjust mix, if necessary, with additional Sto Flexyl and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent.
- F. Sto Watertight Coat – pour liquid component into a clean mixing pail. Add dry component, mix to a uniform consistency and allow to set for approximately five minutes. Adjust mix if

necessary and remix to a uniform trowel consistency. Avoid re-tempering. Keep mix ratio consistent.

- G. Sto Primer – mix with a clean, rust-free high-speed mixer to a uniform consistency.
- H. Stolit Lotusan – mix with a clean, rust-free high-speed mixer to a uniform consistency. A small amount of water may be added to adjust workability. Limit addition of water to amount needed to achieve the finish texture.
- I. Mix only as much material as can readily be used.
- J. Do not use anti-freeze compounds or other additives.

## **PART 3 EXECUTION**

### **3.1 ACCEPTABLE INSTALLERS**

- A. Prequalify under Quality Assurance requirements of this specification (Subparagraph 1.06 B)

### **3.2 EXAMINATION**

- A. Inspect concrete and masonry substrates prior to start of application for:
  - 1. Contamination: Algae, chalkiness, dirt, dust, efflorescence, form oil, fungus, grease, laitance, mildew or other foreign substances.
  - 2. Surface absorption and chalkiness.
  - 3. Cracks: Measure crack width and record location of cracks.
  - 4. Damage and deterioration such as voids, honeycombs and spalls.
  - 5. Moisture content and moisture damage: Use a moisture meter to determine if the surface is dry enough to receive the products and record any areas of moisture damage.
  - 6. Compliance with specification tolerances: Record areas that are out of tolerance (greater than ¼ inch in 8-0 feet [6mm in 2438 mm] deviation in plane).
- B. Inspect sheathing application for compliance with applicable requirement and installation in conformance with specification and manufacturer requirements:
  - 1. Glass Mat Faced gypsum sheathing compliant with ASTM C 1177.
  - 2. Exterior Grade and Exposure I wood based sheathing: APA Engineered Wood Association E 30.
  - 3. Cementitious sheathing: Consult manufacturer.
  - 4. Attachment into structural supports with adjoining sheets abutted (gapped if wood-based sheathing) and fasteners at required spacing to resist design wind pressures as determined by design professional.
  - 5. Fasteners seated flush with sheathing surface and not over-driven.
- C. Report deviations from the requirements of project specifications or other conditions that might adversely affect the Air/Moisture Barrier and the EIFS installation to the General Contractor. Do not start work until deviations are corrected.

### 3.3 SURFACE PREPARATION

- A. Remove surface contaminants on concrete, concrete masonry, gypsum sheathing, or coated gypsum sheathing surfaces.
- B. Repair cracks, spalls or damage in concrete and concrete masonry surfaces and level concrete and masonry surfaces to comply with required tolerances.
- C. Apply conditioner (consult Sto) by spray or roller to chalking or excessively absorptive surfaces or pressure wash to remove surface chalkiness.
- D. Remove fasteners that are not anchored into supporting construction and seal holes with air barrier material.
- E. Seal over-driven fasteners with air barrier material and install additional fasteners as needed to comply with fastener spacing requirement.
- F. Fill large gaps between sheathing or voids around pipe, conduit, scupper, and similar penetrations with spray foam and shave flush with surface (refer to Sto details).
- G. Replace weather-damaged sheathing and repair or replace damaged or cracked sheathing.

### 3.4 INSTALLATION

#### 3.4.1 Air/Moisture Barrier Installation over Exterior or Exposure I Glass Mat Faced Gypsum Sheathing in Compliance with ASTM C 1177, and Concrete, or Concrete Masonry (CMU) Wall Construction

- A. Transition Detailing
  - 1. Detail transition areas with Sto RapidGuard or StoGuard Transition Membrane to achieve air barrier continuity. For illustrations of installation, refer to Sto guide Details and Sto RapidGuard Installation Guide or StoGuard Transition Membrane Installation Guide ([www.stocorp.com](http://www.stocorp.com)).
- B. Rough Opening Protection
  - 1. Sto Gold Fill with StoGuard Mesh: Apply 9 inch (229 mm) wide StoGuard Mesh at rough openings. Immediately apply Sto Gold Fill by spray or trowel over the mesh and spread with a trowel to create a smooth surface that completely covers the mesh (refer to Sto detail 20.20M).
- C. Sheathing Joint Treatment
  - 1. Sto Gold Coat or Sto AirSeal with StoGuard Fabric: Apply coating liberally by spray or roller along sheathing joints and immediately place 4 inch (102 mm) wide fabric centered over the joints into the wet coating, and 6 inch (152 mm) wide fabric centered and folded at inside and outside corners into the wet coating. Smooth any wrinkles with a brush or roller and apply additional coating to completely embed the fabric. Overlap seams minimum 2 inches (51 mm).
- D. Air/Moisture Barrier Coating Installation
  - 1. Gypsum Sheathing: Apply waterproof coating by spray or roller over sheathing surface, including the dry joint treatment, rough opening protection, and transition areas, to a

uniform wet mil thickness of 10 mils in one coat (Sto Gold Coat) or 20 mils in one coat (Sto AirSeal). Use ½ inch (13 mm) nap roller for plywood. Use ¾ inch (19 mm) nap roller for glass mat faced gypsum sheathing. Protect from weather until dry.

2. CMU Surfaces:
  - a. Repair static cracks up to 1/2 inch (13 mm) wide with Sto RapidGuard or StoGuard RapidFill. Rake the crack with a sharp tool to remove loose or friable material and blow clean with oil-free compressed air. Apply the crack filler with a trowel or putty knife over the crack and tool the surface smooth. (Note: For moving cracks or cracks larger than ½ inch [13mm]), consult with a structural engineer for repair method). Protect repair from weather until dry.
  - b. Liberally apply coating to the surface with a ¾ inch nap roller or spray equipment to a minimum wet thickness of 10–30 mils (Sto Gold Coat) or 20-40 wet mils (Sto AirSeal), depending on surface condition. Apply to a uniform thickness. Additional coats may be necessary to provide a void and pinhole free surface. Protect from weather until dry.

E. Air /Moisture Barrier Connections and Shingle Laps

1. Coordinate installation of connecting air barrier components with other trades to provide a continuous air tight membrane.
2. Coordinate installation of flashing and other moisture protection components with other trades to achieve complete moisture protection such that water is directed to the exterior, not into the wall assembly, and drained to the exterior at sources of leaks (windows, doors and similar penetrations through the wall assembly).
3. Splice-in head flashings above windows, doors, floor lines, roof/sidewall step flashing, and similar locations with StoGuard detail component to achieve shingle lap of the air/moisture barrier such that water is directed to the exterior.

### 3.4.2 EIFS Installation

A. Starter Track

1. Strike a level line at the base of the wall to mark where the top of the starter track terminates.
2. Attach the starter track even with the line into structural supports with the proper fastener: Type S-12 corrosion resistant screws for steel framing with minimum 3/8 inch (9 mm) and three thread penetration, galvanized or zinc coated nails for wood framing with minimum 3/4 inch (19 mm) penetration, and corrosion resistant concrete or masonry screws with minimum 1 inch (25 mm) penetration for concrete or CMU. Attach between studs into blocking as needed to secure the track flat against the wall surface. Attach at maximum 16 inches (406 mm) on center into framing. For solid wood sheathing or concrete/masonry surfaces, attach directly at 12 inches (305 mm) on center maximum.
3. Butt sections of starter track together. Miter cut outside corners and abut. Snip front flange of one inside corner piece (to allow EPS insulation board to be seated inside of track) and abut.
4. Install Starter Track at other EIFS terminations as designated on detail drawings: above roof along dormers or gable end walls, and beneath window sills with concealed flashing (refer to Sto details).



- B. Detail Splice Strips for Starter Track, Flashing at Floor Lines, Head of Windows and Doors
1. Starter Track, Window/Door Head Flashing, Floor Line Flashing, and Roof/Side Wall Step Flashing: Install minimum 4 inch (100 mm) wide detail component over back flange of starter track, floor line flashing, head flashing, and roof/side wall step flashing. Center the detail component so it spans evenly between the back leg of flashing (or accessory) and the coated sheathing. Make a smooth transition to the coated sheathing with a trowel, knife, or roller, depending on the detail component material being used. When Sto Gold Fill with StoGuard Mesh is the detail component apply another coat of the waterproof coating over the detail area. Do not leave detail components exposed for more than 30 days.
- C. Backwrapping
1. Apply a strip of detail mesh to the dry air/moisture barrier at all system terminations (windows, doors, expansion joints, etc.) except where the Starter Track is installed. The mesh must be wide enough to adhere approximately 4 inches (100 mm) of mesh onto the wall, be able to wrap around the insulation board edge and cover a minimum of 2½ inches (64 mm) on the outside surface of the insulation board. Attach mesh strips to the air/moisture barrier and allow them to dangle until the backwrap procedure is completed (Subparagraph 3.04, G.1). Alternatively, pre-wrap terminating edges of insulation board.
- D. Adhesive Application and Installation of Insulation Board
1. Ensure the air/moisture barrier surface (Sto Gold Coat) is free of surface contamination. Install the insulation board within 30 days of the application of the air/moisture barrier coating (Sto Gold Coat) or clean the surface and recoat with Sto Gold Coat.
  2. Rasp the interior lower face of insulation boards to provide a snug friction fit into the Starter Track. (Note: rasping prevents an outward bow at the Starter Track).
  3. Use either polyurethane cementitious adhesive (Sto BTS Plus):
    - a. Cementitious Adhesive (Sto BTS Plus): apply adhesive to the back of the insulation board with the proper size (1/2 x 1/2 x 2 inch [13 x 13 x 51 mm]) stainless steel notched trowel. Apply uniform ribbons of adhesive parallel with the SHORT dimension of the board so that when boards are placed on the wall the ribbons will be VERTICAL. Apply adhesive uniformly so ribbons of adhesive do not converge. Immediately place insulation boards in a running bond pattern on the wall with the long dimension horizontal. Start by inserting the lower edge of the boards inside the starter track at the base of the wall until they contact the bottom of the track. Apply firm pressure over the entire surface of the boards to ensure uniform contact of adhesive. IMPORTANT: Do not delay installation once adhesive is applied. If adhesive “skins” remove it and apply fresh adhesive.
  4. Bridge sheathing joints by a minimum of 6 inches (152 mm). Interlock inside and outside corners.
  5. Butt all board joints tightly together to eliminate any thermal breaks. Care must be taken to prevent any adhesive from getting between the joints of the boards.
  6. Cut insulation board in an L-shaped pattern to fit around openings. Do not align board joints with corners of openings.
  7. Check for satisfactory contact of the insulation board with the substrate. If any boards have loose areas use the spray foam adhesive dispensing pistol to create a hole through

the board and inject adhesive to attach the loose area. Allow the adhesive to expand to the outer face of the board while withdrawing the pistol. Cut excess adhesive flush with the surface of the insulation. Do not use nails, screws, or any other type of non-thermal mechanical fastener.

#### E. Slivering and Rasping of Insulation Board Surface

1. Make sure insulation boards are fully adhered to the substrate before proceeding to steps 3.04 E2 and 3.04 E3 below.
2. Fill any open joints in the insulation board layer with slivers of insulation or the spray foam adhesive.
3. Rasp the insulation board surface to achieve a smooth, even surface and to remove any ultraviolet ray damage.

#### F. Trim, Reveals and Projecting Aesthetic Features

1. Attach features and trim where designated on drawings with adhesive to a base layer of insulation board or to the coated sheathing surface. Fill any gaps between the trim and base layer of insulation with spray foam adhesive and rasp flush with the trim surface. Slope the top surface of all trim/features minimum 1:2 (27°) and the bottom of all horizontal reveals minimum 1:2 (27°).
2. Cut reveals/aesthetic grooves with a hot-knife, router or groove-tool in locations indicated on drawings.
3. Offset reveals/aesthetic grooves minimum 3 inches (75 mm) from insulation board joints.
4. Do not locate reveals/aesthetic grooves at high stress areas.
5. Ensure minimum  $\frac{3}{4}$  inch (19 mm) thickness of insulation board at the bottom of the reveals/aesthetic grooves.

#### G. Completion of Backwrapping

1. Complete the backwrapping procedure by applying base coat to exposed edges of insulation board and approximately 4 inches (100 mm) onto the face of the insulation board. Pull mesh tight around the board and embed it in the base coat with a stainless steel trowel. Use a corner trowel for clean, straight lines. Smooth any wrinkles or gaps in the mesh.

#### H. Accessory Installation

1. Corner Bead: cut the corner bead accessory to proper length as needed. Use full pieces wherever possible and avoid using short filler pieces. Offset accessory butt joints from substrate joints. Apply base coat with a stainless-steel trowel to an approximate thickness of  $\frac{1}{8}$  inch (3 mm) to the outside corner area that will receive the accessory. Immediately place the accessory directly into the wet base coat material. Do not slide into place. Press the accessory into place. A corner trowel is best for this purpose. Embed and completely cover the mesh and PVC by troweling from the corner to the edge of the mesh so that no mesh or PVC color is visible. Avoid excess build-up of base coat and feather along mesh edges. Adjoin separate pieces by abutting PVC to PVC and overlapping the mesh "tail" from one piece onto the next piece. Fully embed the accessory and mesh "tail" in base coat material. When installing field mesh reinforcement overlap accessory mesh and PVC. Remove any excess base coat from the outside corner.

2. Drip Edge: install the drip edge accessory prior to application of field mesh (paragraph 3.4.2 I5 below). Install with arrow on mesh pointing UP. Cut the accessory to proper length as needed. Use full pieces wherever possible and avoid using short filler pieces. Offset accessory butt joints from substrate joints. Apply base coat with a stainless-steel trowel to an approximate thickness of 1/8 inch (3 mm) to the area that will receive the accessory. Immediately place the accessory directly into the wet base coat material and press into place. Do not slide into place. Embed and completely cover the mesh and PVC by troweling from the drip edge screed rail to the edge of the mesh. Avoid excess build-up of base coat, feather along mesh edges, and remove any excess base coat from the drip edge nosing. Abut adjoining pieces and install as described above. When installing field mesh reinforcement overlap accessory mesh 4 inches (10 cm) on both vertical and horizontal faces so the PVC is overlapped and remove any excess base coat from the drip edge nosing. On vertical and horizontal faces of the accessory install finish to the drip edge lines and remove any protruding finish from the drip edge nosing.

I. Base Coat and Reinforcing Mesh Application

1. Ensure the insulation board is firmly adhered and free of surface contamination or UV degradation, and is thoroughly rasped before commencing the base coat application.
2. Apply minimum 9x12 inch (225x300 mm) diagonal strips of detail mesh at corners of windows, doors, and all penetrations through the system. Embed the strips in wet base coat and trowel from the center to the edges of the mesh to avoid wrinkles.
3. Apply detail mesh at trim, reveals and projecting architectural features. Embed the mesh in the wet base coat. Trowel from the base of reveals to the edges of the mesh.
4. Ultra-High impact mesh application (recommended to a minimum height of 6'-0" [1.8 m] above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact, and where indicated on contract drawings): apply base coat over the insulation board with a stainless-steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016 mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Butt ultra-high impact mesh at seams. Allow the base coat to dry.
5. Standard mesh application: Apply base coat over the insulation board, including areas with Ultra-High impact mesh, with a stainless-steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Overlap mesh not less than 2-1/2 inches (64 mm) at mesh seams and at overlaps of detail mesh. Feather seams and edges. Double wrap all inside and outside corners with minimum 6 inch (152 mm) overlap in each direction (optional if corner bead accessory is used – see NOTE in Subparagraph 3.4.2, H.1 above). Avoid wrinkles in the mesh. The mesh must be fully embedded so that no mesh color shows through the base coat when it is dry. Re-skim with additional base coat if mesh color is visible.
6. Sloped Surfaces: for trim, reveals, aesthetic bands, cornice profiles, sills or other architectural features that project beyond the vertical wall plane more than 2 inches (51 mm) apply waterproof base coat with a stainless steel trowel to the sloped surface and minimum four inches (100 mm) above and below it. Embed standard mesh or detail mesh in the waterproof base coat and overlap mesh seams a minimum of 2-1/2 inches (65 mm).

7. Allow base coat to thoroughly dry before applying primer or finish.

J. Primer Application

1. Ensure the base coat surface is free of surface contamination before commencing the primer application.
2. Apply primer evenly with brush, roller or proper spray equipment over the clean, dry base coat and allow to dry thoroughly before applying finish.

K. Finish Coat Application

1. Ensure the base coat surface or primed base coat is free of surface contamination before commencing the finish application.
2. Apply finish directly over the base coat or primed base coat when dry. Apply finish by spray or stainless-steel trowel, depending on the finish specified. Follow these general rules for application of finish:
  - a. Avoid application in direct sunlight.
  - b. Apply finish in a continuous application, and work to an architectural break in the wall.
  - c. Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying. Adjustments in the scheduling of work may be required to achieve desired results. Cool or damp conditions extend working time and retard drying and may require added measures of protection against wind, dust, dirt, rain and freezing. Adjust work schedule and provide protection.
  - d. Do not install separate batches of finish side-by-side.
  - e. Do not apply finish into or over sealant joints. Apply finish to outside face of wall only.
  - f. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.

### 3.5 PROTECTION

- A. Provide protection of installed materials from water infiltration into or behind them
- B. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry

### 3.6 CLEANING, REPAIR AND MAINTENANCE

- A. Clean and maintain the EIFS for a fresh appearance and to prevent water entry into and behind the system. Repair cracks, impact damage, spalls or delamination promptly.
- B. Maintain adjacent components of construction such as sealants, windows, doors, and flashing, to prevent water entry into or behind the EIFS and anywhere into the wall assembly
- C. Refer to Sto reStore Repair and Maintenance Guide ([reStore Program](#)) for detailed information on restoration – cleaning, repairs, recoating, resurfacing and refinishing, or re-cladding

**END OF SECTION 07241**

## **SECTION 07250 - SPRAYED-ON FIREPROOFING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Sprayed-on fireproofing, for use where indicated.
- B. Other Related Sections:
  - 1. Section 01400 - Special Testing and Inspections
  - 2. Section 05120 - Structural Steel
  - 3. Section 05310 - Metal Decking
  - 4. Section 09900 - Painting

#### **1.3 SUBMITTALS**

- A. Product data for each sprayed-on fireproofing product indicated.
- B. Test reports containing the following information:
- C. Test results from an independent testing laboratory indicating compliance of sprayed-on fireproofing products with performance requirements indicated, including asbestos content where applicable.
- D. Test results of in-place performance as required under Part 3 of this section for field quality control.
- E. Certificates from fireproofing manufacturer, for each fireproofing product required, indicating that:
- F. Primers applied to steel in shop or field are compatible with sprayed-on fireproofing and will not impair its performance under fire exposure for applications indicated, as proved by ASTM E 119 test. Include test and other data as evidence.
- G. Each fireproofing product required complies with specified product requirements and is suitable for the use indicated.

#### **1.4 QUALITY ASSURANCE**

- A. Testing Laboratory Qualifications: To qualify for acceptance, an Independent Testing Laboratory must demonstrate to Architect's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct satisfactorily the testing indicated without delaying the progress of the Work.

- B. Single Source Responsibility: Obtain sprayed-on fireproofing materials from a single manufacturer for each different product required.
- C. Fire Performance Characteristics: Provide materials and construction which are identical to those tested for the following fire performance characteristics, per test method indicated, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction.
- D. Fire Resistance Ratings: As indicated by reference to design designation in UL "Fire Resistance Directory" for fire-resistance-rated assemblies in which sprayed-on fireproofing serves as direct-applied protection, tested per ASTM E 119.
- E. Surface Burning Characteristics: As indicated for each sprayed-on fireproofing product required, tested per ASTM E 84 and listed in UL "Building Materials Directory".
- F. Field-Constructed Mock-Up: Prior to installation of exposed sprayed-on fireproofing, apply each product indicated for exposed applications, in locations indicated or selected by Architect, to represent completed work for qualities of appearance, materials and application.

### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to project site in original, unopened packages with manufacturers' labels identifying products legible and intact. Include on labels names of products and manufacturers, date of manufacture and shelf life, where applicable. Also include UL labels for fire-resistance ratings applicable to project.
- B. Use materials with limited shelf life within period indicated. Remove from project site and discard any materials whose shelf life has expired.
- C. Store materials inside, under cover, above ground and in a manner to keep them dry until ready to use. Remove from project site and discard any materials that have been exposed to moisture or have otherwise deteriorated.

### **1.6 PROJECT CONDITIONS**

- A. Environmental Conditions: Do not install sprayed-on fireproofing when ambient or substrate temperatures are 40°F (4.4°C) and falling, unless temporary protection and heat can be provided to maintain temperatures of both at or above this temperature level for 24 hours before, during, and for 24 hours after application of sprayed fireproofing.
- B. Ventilation: Ventilate spray fireproofing by means of natural or, where this is inadequate, of forced air circulation during and after application until it dries thoroughly.

### **1.7 SEQUENCING**

- A. Sequence and coordinate application of sprayed-on fireproofing with other, related work specified in other sections to comply with the following requirements.
- B. Provide temporary enclosures to prevent deterioration of sprayed-on fireproofing for interior applications due to exposure to unfavorable environmental conditions.
- C. Avoid unnecessary exposure of sprayed-on fireproofing to abrasion and other damage likely to occur during construction operations subsequent to its application.

- D. Do not apply fireproofing to metal roof decking substrates until application of roofing has been completed; prohibit roof traffic during application and drying of fireproofing.
- E. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, tested, and corrections made to any defective fireproofing.

## **PART 2 - PRODUCTS**

### **2.1 SPRAYED-ON FIREPROOFING MATERIALS**

- A. Basis of Design: Provide Cementitious Fireproofing on structural steel framing and metal decking, as manufactured by one of the following:
  - 1. "Monokote MK-6"; Grace Construction Products Div., W.R. Grace & Co., NJ Rep. - Tel.# 800.354.5414, ext 5424.
  - 2. "Caftco 300", Isolatek International, Stanhope, NJ, Tel.# 973.347.1200, [www.caftco.com](http://www.caftco.com).
  - 3. "Carbonline Type 15", Carbonline Protective Coatings and Linings, St. Louis, MO, Tel.# 800.848.4645 or 314.644.1000, [www.carbonline.com](http://www.carbonline.com).
  - 4. "SWV Type 5", Southwest Fireproofing Co., Eastern Sales Office - Manasquan, NJ, Tel.# 908.528.6858.
  - 5. Or approved equal.
- B. Material Composition:
  - 1. Cementitious Fireproofing: Factory-mixed dry formulation of inorganic binders and lightweight mineral aggregates mixed with water at project site to form a slurry for pumping and for dispersal by compressed air introduced at spray nozzle.
    - a. Mineral fiber products will not be accepted for this project.
  - 2. Dry Density (ASTM E605): 15 pcf. minimum average density regardless of density indicated in referenced fire-resistive design, or greater if required to attain fire-resistive rated indicated and as determined per ASTM E 605.
  - 3. Deflection: Material shall not crack or delaminate from the surface from the surface to which it is applied when tested in accordance with ASTM E759.
  - 4. Bond Impact: Material subject to impact tests in accordance with ASTM E760; shall not crack or delaminate.
  - 5. Bond Strength (ASTM E736): Minimum average bond strength of 200 psf, minimum individual bond strength of 150 psf.
  - 6. Air Erosion (ASTM E859): Maximum allowable weight loss of material shall be 0.005 gm/sf.
  - 7. Compressive Strength (ASTM E761): Shall not deform more than 10% when subjected to compressive forces of 1000 psf.

8. Noncorrosive, as determined by ASTM E937.
  9. Abrasion Resistance: No more than 15 cc (cubic centimeters) shall be abraded or removed from the fireproofing substrate when tested by the methods of the City of San Francisco, Bureau of Building Inspection.
  10. Impact Penetration: Material shall not show a loss of more than 6 cc when subjected to testing methods developed by the City of San Francisco, Bureau of Building Inspection.
  11. Maximum flame spread (ASTM E84): 0.
  12. Maximum Smoke developed (ASTM E84): 0.
  13. Resistance to Mold: Add mix formulated at the time of manufacturing with mold inhibitor to comply with ASTM G21 testing procedure and shall show resistance to mold for 21 days for general use and 60 days for materials to be installed in plenums.
- C. Fireproofing material shall have been tested and reported by Underwriters Laboratories, Inc. in accordance with the procedures of UL 263 (ASTM E119).
  - D. Mixing water shall be clean, fresh and suitable for domestic consumption and free from such amounts of mineral or organic substances as would affect the set of the fireproofing material.

### **2.3 HIGH DENSITY SPRAYED-ON FIREPROOFING - INTERIOR EXPOSED APPLICATION**

- A. Basis of Design: Provide one of the following:
  - a. "Monokote Type Z-146;" Grace Construction Products Div., W. R. Grace Corp.
  - b. "Cafco 300;" Isolatek International.
  - c. Or approved equal.
- B. Coordinate manufacturer's requirements with Structural Steel and Metal Deck surface preparations.
- C. Installation shall be for trowel grade material, "Trowel Finished" in accordance with manufacturer's instructions and recommendations.

### **2.4 AUXILIARY FIREPROOFING MATERIALS**

- A. General: Provide auxiliary fireproofing materials that are compatible with sprayed-on fireproofing products and substrates, are approved for use indicated by manufacturer of sprayed-on fireproofing, and are approved by UL or other testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance rated designs indicated.
- B. Substrate Primers: Type approved by manufacturer of sprayed-on fireproofing for substrate and for conditions of exposure indicated.
- C. Adhesive for Bonding Fireproofing: Type recommended and approved by manufacturer of sprayed-on fireproofing.



## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, with Installer present, to determine if they are in satisfactory condition to receive sprayed-on fireproofing. A substrate is in satisfactory condition if it complies with the following:
  - 1. Substrate complies with requirements of the section in which the substrate and related work is specified and is free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt or other foreign substances capable of impairing bond of fireproofing with substrate under conditions of normal use or fire exposure.
  - 2. Objects which will penetrate fireproofing, including clips, hangers, support sleeves and similar items have been securely attached to substrates.
  - 3. Substrates are not obstructed by ducts, piping, equipment and other suspended construction that could interfere with application of fireproofing.
- B. For steel, sheet metal and other substrates suspected of being coated with oil, rolling compounds or other substances not readily identifiable but potentially capable of impairing bond, conduct tests recommended by fireproofing manufacturer to determine their presence and effect on adhesion of fireproofing.
- C. Do not proceed with installation of fireproofing until unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Clean substrates of substances which could impair bond of fireproofing, including oil, grease, rolling compounds, incompatible primers, and loose mill scale.
- B. Do not prime substrates unless recommended by fireproofing manufacturer, and except where compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.
- C. Cover other work which might be damaged by fall-out or overspray of fireproofing materials during application. Provide temporary enclosure as required to confine spraying operations, protect the environment, and to ensure adequate ambient conditions for temperature and ventilation.

### **3.3 INSTALLATION, GENERAL**

- A. General: Comply with fireproofing manufacturer's instructions for mixing materials, for application procedures and for types of equipment used to convey and spray-on fireproofing materials; as applicable to the particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- B. Coat substrates with adhesive prior to application of fireproofing where required to achieve fire-resistance rating or recommended by fireproofing manufacturer for material and application indicated.

- C. Extend fireproofing full thickness over entire area of each substrate to be protected. Unless otherwise recommended by fireproofing manufacturer, install body of fireproof covering in a single course.
- D. Apply fireproofing in thicknesses and densities not less than that required to achieve fire resistance ratings designated for each condition, unless greater thicknesses and densities are indicated.
- E. Apply fireproofing materials by sprayed-on method to maximum extent possible. Following spraying operation in each area, complete the coverage by trowel application or other placement method acceptable to manufacturer.
- F. Painted topcoat finish shall be the type recommended and approved by the manufacturer of each spray-applied fire resistive material required for the application indicated.
  - 1. Contractor shall spray apply painted finish of paint with a flame spread of less than 200, in area(s) as indicated on the drawings.

### **3.4 FIELD QUALITY CONTROL**

- A. Testing Laboratory: The Owner shall employ and pay a qualified Independent Testing Laboratory to perform field quality control testing and shall be paid for out the a project Allowance (refer to Section 01020).
- B. Extent and Testing Methodology: Arrange for testing of completed fireproofing in successive stages in areas of extent described below; do not proceed with fireproofing of next area until test results for previously completed work evidence compliance with requirements.
  - 1. Within each area, testing laboratory shall randomly select one typical structural element of each type and test fireproofing for cohesion/adhesion per ASTM E 736.
  - 2. Thickness for Structural Frame Members: Form a sample of 25 percent of structural members per floor, taking 9 measurements at a single cross section for structural frame beams or girders, 7 measurements of a single section for joists and trusses and 12 measurement of a single cross section for columns per ASTM E 605.
- C. Testing Laboratory shall report test results promptly and in writing to Contractor and Architect.
- D. Repair or replace fireproofing within areas where test results indicate fireproofing does not comply with requirements.

### **3.5 PATCHING AND REPAIR WORK**

- A. Coordinate installation of fireproofing with other work in order to minimize the need for other trades to cut or remove fireproofing. As other trades successively complete installation of their work, maintain protection of structure afforded by fireproofing by patching any areas which have been removed or damaged prior to concealment of fireproofing by other work.
  - 1. All patching and repairing of sprayed-on applied fireproofing, including damage which occurs during work by other trades, shall be performed with same materials under this section, without any additional cost to the Owner.

### **3.6 CLEANING AND PROTECTION**

- A. Cleaning: Immediately upon completion of spraying operations in each containable area of project, remove over-spray and fall-out of materials from surfaces of other work and clean exposed surfaces to remove evidence of soiling.
- B. Cure exposed cementitious fireproofing materials in compliance with fireproofing manufacturers recommendations to prevent premature drying.
- C. Protect fireproofing according to advice of fireproofing manufacturer and Installer from damage resulting from construction operations or other causes so that fireproofing will be without damage or deterioration at time of Substantial Completion.
- D. Repair or replace work which has not been successfully protected.

**END OF SECTION 07250**

## **SECTION 07270 - FLUID APPLIED AIR / VAPOR BARRIERS**

### **PART 1 - GENERAL**

#### **1.01 GENERAL REQUIREMENTS**

- A. The General Conditions, Supplementary Conditions, Instructions to Bidders, and Division 01- General Requirements shall be read in conjunction with and govern this section.
- B. The Specification shall be read as a whole by all parties concerned. Each Section may contain more or less than the complete Work of any trade. The Contractor is solely responsible to make clear to the installing Subcontractor the extent of their Work.

#### **1.02 SUMMARY**

- A. This Section includes requirements for supplying labor, materials, tools, and equipment to complete the Work as shown on the Drawings and as specified herein including, but not limited to, the following:
  - 1. Adhesive/Primer
  - 2. Fluid Applied Impermeable Air and Vapor Barrier
  - 3. Air Barrier/Thru-wall Flashing
  - 4. Sealant
  - 5. Insulation Adhesive

#### **1.03 RELATED SECTIONS**

- A. Section 04200 – Unit Masonry
- B. Section 07200 - Building Insulation
- C. Section 07241 – Water managed Exterior Insulation and Finish System (EIFS)
- D. Section 07600 - Flashing, Sheet Metal and Roofing Accessories
- E. Section 07900 - Joint Sealer Assemblies
- F. Section 08410 - Aluminum/FRP Doors and Aluminum Framing Systems
- G. Section 08415 – Aluminum Storefronts
- H. Section 08520 - Aluminum Windows

#### **1.04 SUBSTITUTIONS**

- A. Submit requests for substitutions in accordance with AIA A232 and Section 00800.
- B. Substitution submission format to include:
  - 1. Evidence that alternate materials meet or exceed performance characteristics of product requirements and documentation from an approved independent testing laboratory certifying that the performance of the system including auxiliary components exceed the requirements of the local building code.

2. References clearly indicating that the Air / Vapor Barrier Manufacturer has successfully completed projects of similar scope and nature on an annual basis for a recommended minimum of ten (10) years.
  3. Air Barrier Manufacturer's guide specification.
  4. Air Barrier Manufacturer's complete set of technical data sheets for assembly.
  5. Air Barrier Manufacturer's complete set of details for assembly.
  6. Product certification confirming assembly components are supplied and warranted by a single source Air Barrier Manufacturer.
  7. Air Barrier Manufacturer statement that anticipated wall assembly compliance with NFPA 285.
  9. Sample warranty, as specified.
- C. Submit requests for substitutions to this specification within fourteen (14) days following award date. Recommended to include a list of twenty (20) projects executed over the past five (5) years.
- D. Substitute materials not approved in writing shall not be permitted for use on this project.

#### **1.05 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
1. AAMA 711-13 - Voluntary Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products
  2. AAMA 2400-02 - Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction
- B. American Society for Testing and Materials (ASTM):
1. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting
  2. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
  3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
  4. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials
  5. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
  6. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference
  7. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials
  8. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- C. National Fire and Protection Agency (NFPA):
1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing

## Combustible Components

### 1.06 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation meetings:
  - 1. When required, and with prior notice, an Air / Vapor Barrier Manufacturer representative will meet with the necessary parties at the jobsite to review and discuss project conditions as it relates to the integrity of the assembly.

### 1.07 SUBMITTALS

- A. Provide the following requested information in accordance with AIA A232 and Section 00800 for submittal procedures.
- B. Action Submittals:
  - 1. Product Data:
    - a. Air Barrier Manufacturer's guide specification.
    - b. Air Barrier Manufacturer's complete set of technical data sheets for assembly.
    - c. Air Barrier Manufacturer's complete set of guide details for assembly.
  - 2. Certificates:
    - a. Product certification confirming assembly components are supplied and warranted by a single source Air Barrier Manufacturer.
  - 3. Tests and Evaluation Reports:
    - a. NFPA 285 wall assembly compliance:
      - 1) Air Barrier Manufacturer statement that anticipated wall assembly complies with NFPA 285.
  - 4. Warranty: Sample warranty, as specified.

### 1.08 QUALITY ASSURANCE

- A. Single Source Responsibility:
  - 1. Obtain air barrier and auxiliary materials including adhesive/primer, air barrier, flashings, and sealants from a single Air Barrier Manufacturer regularly engaged in the manufacturing and supply of the specified products.
  - 2. Contactor to verify product compliance with Federal, State, and Local regulations controlling use of Volatile Organic Compounds (VOC).
- B. Manufacturer Qualifications:
  - 1. Air Barrier Manufacturer shall demonstrate qualifications to supply materials of this section by certifying the following:
    - a. Air Barrier Manufacturer must not issue warranties for terms longer than they have been manufacturing and supplying specified products for similar scope of Work.
- C. Installer Qualifications:
  - 1. Perform Work in accordance with the Air Barrier Manufacturer's published literature and as specified in this section.
  - 2. Maintain one (1) copy of the Air Barrier Manufacturer's installation instructions on site.
  - 3. At all times during the execution of the Work allow access to site by the Air Barrier Manufacturer representative.
  - 4. If meeting with the Air Barrier Manufacturer during project construction, contact the Air Barrier Manufacturer a minimum of two weeks prior to schedule meeting.

## **1.09 MOCK-UPS**

- A. Mock-ups: Construct mock-ups to verify selections made under submittals and to set quality standards for materials and execution in accordance with Section 04200, 07241 and 07415 for mock-ups and as follows:
  - 1. Where directed by Architect, construct typical exterior wall section, incorporating substrate materials, and adjacent materials including flashing, typical wall opening (door / window), attachment of insulation; showing vapor impermeable water resistive air barrier application details.
- B. Notify Architect a minimum seven (7) days prior to mock-up construction.
- C. Review and acceptance of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Architect specifically notes such deviations in writing.
- D. Once reviewed by Architect, acceptable mock-up can form a permanent part of the Work and will form the basis for acceptance for the remainder of the project.
- E. Remove and replace materials found unacceptable at no additional cost to Owner.

## **1.10 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery of Materials:
  - 1. Materials shall be delivered to the jobsite in undamaged and clearly marked containers indicating the name of the Air Barrier Manufacturer and product.
- B. Storage of Materials:
  - 1. Store materials as recommended by the Air Barrier Manufacturer and conforming to applicable safety regulatory agencies. Refer to all applicable data including, but not limited to, SDS information, Product Data sheets, product labels, and specific instructions for personal protection.
  - 2. Keep solvents away from open flame or excessive heat.
  - 3. Store materials in original packaging.
  - 4. Protect rolls from direct sunlight until ready for use.
  - 5. Refer to Air Barrier Manufacturer's published literature.
- C. Handling:
  - 1. Refer to Air Barrier Manufacturer's published literature.

## **1.11 SITE CONDITIONS**

- A. Environmental Requirements:
  - 1. No Work shall be performed during rain or inclement weather.
  - 2. No Work shall be performed on frost covered or wet surfaces.
- B. Protection:
  - 1. It is the responsibility of the installing Subcontractor to protect all surfaces not included in scope of Work from overspray including, but not limited to, windows, doors, adjacent areas, and vehicles.
  - 2. Cap and protect exposed back-up walls against wet weather conditions during and

after application of membrane. Do not proceed with the application of the field air barrier until the roof has been installed

- C. Ensure all preparation Work is completed prior to installing air barrier.
- D. All equipment shall be grounded during operations.

## 1.12 WARRANTY

- A. Manufacturer's Single Source Warranty:
  - 1. Fluid Applied Air and Vapor Barrier:
    - a. Product Warranty:
      - 1) Manufacturer warrants the material against product defect for a period of **five (5) year** from date of purchase.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Air / Vapor Barrier and auxiliary materials must be obtained as a single-source from the Air / Vapor Barrier Manufacturer to ensure total system compatibility and integrity.
- B. Basis of Design: Henry® Co., El Segundo, CA, Tel.# 800.486.1278, [www.henry.com](http://www.henry.com); or approved equal.

### 2.02 MATERIALS

- A. Air and Vapor Barrier Primary Fluid-Applied, Air and Vapor Barrier - Basis of Design: Henry® Air-Bloc® 16MR:
  - 1. Fluid-applied vapor impermeable air and water barrier consisting of a single component water-based elastomeric formulation that cures to a tough monolithic rubber-like membrane; having the following typical physical properties:
    - a. Color: Gray
    - b. Water Vapor Permeance (ASTM E96 Method A): 0.03 perms
    - c. Air Leakage of Air Barrier Assemblies (ASTM E2357): Pass
    - d. Air Permeance (ASTM E2178): Pass
    - e. Elongation (ASTM D412): 270%
    - f. Tensile Strength (ASTM D412): 100 psi (689 kPa)
    - g. Surface Burning Characteristics (ASTM E84):
      - 1) Flame Spread: Class A
      - 2) Smoke Development: Class A
    - h. Minimum Application Temperature: 20F (-6C)
    - i. Water Penetration Resistance Around Nails (ASTM D1970): Pass
    - j. Maximum VOC:100 g/l
  - 2. Assembly Auxiliary Materials:
    - a. Adhesives/Primers[ST1]:
      - 1) Low VOC adhesive:
        - a) Synthetic rubber based quick setting adhesive with low VOC content; having the following typical physical properties:
          - (1) Basis of Design: Henry® Blueskin® LVC Adhesive
          - (2) Color: Blue



- (3) Maximum VOC: <240 g/L
  - (4) Drying time (initial set): 30 minutes
  - (5) Low Application Temperature: 10°F (-12°C)
- 2) Aerosol spray adhesive (over raw gypsum sheathing edges for Air-Bloc Liquid Flash applications):
- a) Quick drying spray adhesive used to prepare construction surfaces for the application of flashings; having the following typical physical properties:
    - (1) Basis of Design: Henry® Blueskin® Spray Prep Adhesive
    - (2) Color: Clear amber
    - (3) Solids by weight: 35%
    - (4) Drying time (initial set): 3 minutes
    - (5) Low Application Temperature: -10°F (-23°C)
- 3[ST2]) Quick setting primers:
- a) Synthetic rubber based quick setting adhesive with low VOC content; having the following typical physical properties:
    - (1) Basis of Design: Henry® Blueskin® LVC Spray Primer
    - (2) Color: Blue
    - (3) Maximum VOC: 250 g/L
    - (4) Dry time: 1-3 minutes
    - (5) Low Application Temperature: 40°F (4.4°C[ST3][ST4])
  - b) Polymer emulsion water based quick setting adhesive with low VOC content; having the following typical physical properties:
    - (1) Basis of Design: Henry® Aquatac™ Primer
    - (2) Color: Aqua
    - (3) Maximum VOC: 50 g/L
    - (4) Drying time (initial set): 30 minutes
    - (5) Low Application Temperature: 25°F (-4°C)
- b. Liquid-Applied Flashing:
- 1) Moisture-curing single component elastomeric liquid-applied flashing using a highly advanced Silyl-Terminated Polyether (STPE) polymer curing to a monolithic membrane; having the following typical physical properties:
    - a) Basis of Design: Henry® Air-Bloc® LF Liquid-Applied Flashing
    - b) Color: Blue
    - c) Air Permeance (ASTM E2178): Pass
    - d) Water Vapor Permeance (ASTM E96): 21.8 perms @ 25 mils
    - e) Air Leakage of Air Barrier Assemblies (ASTM E2357): Pass
    - f) Water Resistance (AC212/ASTM D2247): Pass
    - g) Nail Sealability (AAMA 711): Pass
    - h) Surface Burning Characteristics (ASTM E84):
      - (1) Flame Spread: Class A
      - (2) Smoke Development: Class A
    - i) Elongation (D412): 264%
    - j) Low Application Temperature: 20°F (-7°C)
- c. Self-Adhered Flashing:
- 1) Non-vapor permeable, self-adhered water resistive air and vapor barrier

consisting of a synthetic butyl compound integrally laminated to a white engineered polypropylene film surface; having the following typical physical properties:

- a) Basis of Design: Henry® Blueskin® Butyl Flash
  - b) Color: White
  - c) Thickness: 14 mils (0.36 mm)
  - d) Water Vapor Permeance (ASTM E96): 0.14 perms
  - e) Nail Sealability (ASTM D1970): Pass
  - f) Elongation (ASTM D412): 825% minimum
  - g) Low Application Temperature: 25F (-4C)
- 2) Non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of an SBS rubberized asphalt compound integrally laminated to a high strength polyethylene with surface layer of metallic aluminum film; having the following typical physical properties:
- a) Basis of Design: Henry® Metal Clad® Self-Adhered Water Resistive Air Barrier
  - b) Color: Metallic Aluminum
  - c) Thickness: 45 mils (1.14 mm)
  - d) Water Vapor Permeance (ASTM E96): 0.014 perms
  - e) Nail Sealability (ASTM D1970): Pass
  - f) Elongation (ASTM D412): 85%
  - g) Low Application Temperature: 20F (-7C)
- 3) Non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of an SBS rubberized asphalt compound integrally laminated to a blue engineered thermoplastic film surface; having the following typical physical properties:
- a) Basis of Design: Henry® Blueskin® SA Self-Adhered Water Resistive Air Barrier
  - b) Color: Blue
  - c) Thickness: 40 mils (1 mm)
  - d) Water Vapor Permeance (ASTM E96): 0.86 perms
  - e) Nail Sealability (ASTM D1970): Pass
  - f) Elongation (ASTM D412-modified): 200% minimum
  - g) Low Application Temperature: 41F (5C)
- 4) Low temperature non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of an SBS rubberized asphalt compound integrally laminated to a blue engineered thermoplastic film surface; having the following typical physical properties:
- a) Basis of Design: Henry® Blueskin® SA LT Low Temp Self-Adhered Water Resistive Air Barrier
  - b) Color: Blue
  - c) Thickness: 40 mils (1 mm)
  - d) Water Vapor Permeance (ASTM E96): 0.86 perms
  - e) Nail Sealability (ASTM D1970): Pass
  - f) Elongation (ASTM D412-modified): 200% minimum
  - g) Low Application Temperature: 10F (-12C)

d. Sealants:

- 1) Building Envelope Sealant:

- a) Moisture cure, medium modulus polymer modified sealing compound; having the following typical physical properties:
      - (1) Basis of Design: Henry® 925 BES Sealant
      - (2) Color: Varies
      - (3) Elongation: 450 - 550%.
  - e. Joint Treatment Mesh:
    - 1) Open weave glass fabric yarn saturated with synthetic resins, having the following typical physical properties:
      - a) Basis of Design: Henry® 183 Repair Fabric Yellow Fiberglass
- 3. Additional Materials:
  - a. Through-Wall Flashing:
    - 1) Non-vapor permeable self-adhered through-wall flashing consisting of an SBS rubberized asphalt compound integrally laminated to a yellow engineered thermoplastic film surface; having the following typical physical properties:
      - a) Basis of design: Henry® Blueskin® TWF Thru-Wall Flashing
      - b) Color: Yellow
      - c) Thickness: 40 mils (1.0 mm)
      - d) Water Vapor Permeance (ASTM E96): 0.03 perms
      - e) High Temperature Stability - Flow Resistance (ASTM D5147): Pass
      - f) Low Application Temperature: 20F (-7C)
  - b. Insulation Adhesive:
    - 1) Trowel grade solvent-type, synthetic rubber-based insulation contact adhesive; having the following typical physical properties:
      - a) Basis of Design: Henry® Air-Bloc® 21 Air and Vapor Barrier & Insulation Adhesive
      - b) Color: Cream
      - c) Water Vapor Permeance (ASTM E96): 0.03 perms
      - d) Maximum VOC: < 250 g/L

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Verification of Conditions:
  - 1. Verify substrates to receive Work and surrounding adjacent surfaces are in accordance with Air / vapor Barrier Manufacturer published literature prior to installation of self-adhered air barrier assembly.
  - 2. Existing substrate must be continuous and secured prior to application of air barrier.
  - 3. Sheathing panels must be securely fastened and installed flush to ensure a continuous substrate in accordance with Air / Vapor Barrier Manufacturer published literature.
  - 4. Fastener penetrations must be set flush with sheathing and fastened into solid backing.
  - 5. Strike masonry joints full and flush.
  - 6. Concrete surfaces shall be smooth and without large voids, spalled areas or sharp protrusions.
  - 7. New concrete should be cured for a minimum of sixteen (16) hours after forms are removed.

8. Curing compounds or release agents used in concrete construction must be resin based without oil, wax or pigments.
  9. Do not install air barrier over saturated substrates.
- B. Notify General Contractor in writing of any conditions that are not acceptable.
  - C. The installing contractor shall examine and determine that surfaces and conditions are ready to accept the Work of this section in accordance with published literature. Commencement of Work or any parts thereof shall mean installer's acceptance of the substrate.
  - D. Do not apply air barrier until substrate and environmental conditions are in accordance with Air Barrier Manufacturer's published literature.

### **3.02 PREPARATION**

- A. All surfaces must be sound, dry, clean, and free of oil, grease, dirt, excess mortar, frost, laitance, loose and flaking particles, or other contaminants.
- B. Protect adjacent surfaces not included in scope of Work to prevent spillage and overspray.
- C. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane.
- D. Hot weather or direct-sun applications over porous substrates, such as concrete, promote rapid surface drying and can form blisters in the fluid applied membrane air barrier during curing. To aid in blister prevention prepare substrate in accordance with one of the following optional procedures:
  1. Prime coat:
    - a. Apply a thin prime coat of air barrier to substrate.
    - b. Allow air barrier to fully cure prior to subsequent application.
    - c. Install air barrier to Air Barrier Manufacturer minimum recommended mil thickness.
  2. Two coat:
    - a. Apply air barrier to achieve one-half (1/2) of Air Barrier Manufacturer minimum recommended mil thickness.
    - b. Allow air barrier to fully cure prior to subsequent application.
    - c. Apply air barrier to achieve one-half (1/2) of Air Barrier Manufacturer minimum recommended mil thickness.
    - d. Overall dry mil thickness shall be in accordance with Air Barrier Air Barrier Manufacturer published literature.

### **3.03 INSTALLATION**

- A. Ensure substrate is ready to receive air barrier in accordance with Air Barrier Manufacturer's published literature.
- B. Temperature limitation:
  1. Primary air barrier:
    - a. Substrate temperature must be above 20F (-6°C) and rising.
  2. Auxiliary products:

- a. Temperature limitations may vary. Refer to Air Barrier Manufacturer published literature.
- C. Application of Flashing:
- 1. Self-adhered Flashing:
    - a. Where required install adhesive/primer recommended by Air Barrier Manufacturer continuously at rate recommended ensuring complete substrate coverage of anticipated flashing installation area.
      - 1) Allow adhesive/primer to cure to a tacky film prior to application of flashing.
      - 2) Only apply adhesive/primer to surfaces which will be covered during the same working day. Primed areas not covered by end of day must be re-primed prior to installation of flashing.
    - b. Measure and cut self-adhered flashing to ensure adequate length to achieve continuous coverage of desired installation.
    - c. Peel protective film from self-adhered flashing and align top of membrane verifying proper positioning prior to complete film removal and flashing placement.
    - d. Press self-adhered flashing firmly into place by applying hand pressure to the middle of the membrane and working the pressure to the edges eliminating wrinkles and air bubbles.
    - e. Install self-adhered flashings in shingle fashion to eliminate reverse laps.
    - f. Where required, prime laps at rate recommended by air barrier manufacture to ensure complete coverage of anticipated lap installation.
    - g. Lap adjoining edges a minimum of two (2) inches.
    - h. Roll flashing and laps with countertop roller to obtain thorough adhesion.
    - i. Seal end of day exposed reverse laps of self-adhered flashing with building envelope sealant.
  - 2. Liquid-applied Flashing:
    - a. Apply a uniform film of aerosol spray adhesive to raw edges of gypsum sheathing at rate recommended by air barrier manufacturer to completely encapsulate cut edge of gypsum sheathing.
    - b. Allow adhesive to cure to a tacky film prior to application of liquid-applied flashing.
    - c. Apply flashing in accordance with and at rate recommended by air barrier manufacturer.
    - d. Spread flashing to achieve a monolithic membrane over substrate requiring flashing.
    - e. Allow flashing to cure prior to subsequent installations.
- D. Detailing/Flashing:
- 1. Complete detailing and flashing installations per Air Barrier Manufacturer's published literature.
  - 2. Refer to Air Barrier Manufacturer guide details for further clarification and installation procedures including, but not limited to, the following:
    - a. Inside corners
    - b. Outside corners
    - c. Pipe penetrations
    - d. Shelf angles
    - e. Wall to foundation transitions
    - f. Rough openings:

- 1) Install rough opening details per Window Manufacturer's published literature and in accordance with ASTM E2112.
- 2) Wall assemblies containing a vapor retarder on the interior wall assembly:
  - a) Extend flashing into rough opening to ensure sufficient membrane for connection with vapor retarder and provide a continuous air barrier assembly.
- 3) Reverse laps:
  - a) Seal permanently exposed reverse laps with sealant:
    - (1) Building envelope sealant
    - (2) Liquid flashing
- 4) Moving Joints:
  - a) Contact Air / Vapor Barrier Manufacturer.
- 5) Transitions:
  - a) Contact Air / Vapor Barrier Manufacturer to coordinate transition of self-adhered air / vapor barrier to adjacent areas including, but not limited to, the following:
    - (1) Roof to air / vapor barrier
    - (2) Air / vapor barrier to waterproofing
    - (3) Fastener penetrations

E. Thru-Wall Flashing: Coordinate with Section 07600.

F. Application of Primary Fluid-Applied, Air / Vapor Barrier:

1. Apply air / vapor barrier in continuous, monolithic application without sags, runs, or voids, transitioning onto flashing membrane and overlapping one (1) inch, to create uniform drainage plane and air barrier.
2. Install air / vapor barrier so that subsequent membrane installation laps one (1) inch onto flashing ensuring an air and air barrier assembly.
3. Allow air / vapor barrier to fully cure prior to placement of insulation.
4. Total Dry Film Thickness (DFT):
  - a. Coverage rates may vary due to surface texture or porosity. Refer to Air / Vapor Barrier Manufacturer Technical Data Sheet for recommended coverage rates.

G. Insulation Adhesive:

1. Coordinate with Section 07200 for insulating materials.
2. Upon curing of the air barrier apply insulation adhesive in a serpentine pattern.
3. Immediately embed insulation into the adhesive and press firmly into place to ensure full contact. Apply additional adhesive if allowed to skin over.
4. Fully butter all joints of insulation panels with adhesive during installation, with the exception of expansion joints.

H. Fastener Penetrations Through Primary Air / Vapor Barrier:

1. It is the responsibility of the installer penetrating the air barrier assembly to properly install fasteners and components in accordance with the Air / Vapor Barrier Manufacturer's published literature.
2. Installation requirements:
  - a. Drill fasteners and components with sufficient compression to maintain continuity in the air barrier assembly.
  - b. Refer to "Self-tapping fasteners" and/or "Pre-drilled fasteners".
3. Supplemental sealant:
  - a. Penetrations that do not meet installation requirements require the addition of

- sealant at point of insertion through the air / vapor barrier membrane to maintain continuity in the air barrier assembly.
4. Self-tapping fasteners:
    - a. Fastener head must be larger in diameter than the shank.
    - b. Drill fasteners perpendicular to the substrate until flush with the air / vapor barrier.
    - c[ST5]. Drill fasteners to provide a continuous compression firmly against the air / vapor barrier membrane creating a gasketing seal without damaging the membrane.
    - d. Do not install fasteners through air barrier over unsupported areas of the substrate such as sheathing joints.
    - e. Overdriven fasteners, improperly installed fasteners, defective/broken fasteners, or fasteners not properly fastened into the building structure beyond the air / vapor barrier membrane should be removed and the vacated hole sealed with sealant prior to the installation of the cladding or veneer system.
  5. Pre-drilled fastening assemblies:
    - a. Fastening head or assembly component must be larger in diameter than pre-drilled hole.
    - b. Fastening head or assembly component must be mounted flush with the air / vapor barrier.
    - c. Fastening head or assembly component must provide a continuous compression firmly against the air barrier creating a gasketing seal without damaging the integrity of the air / vapor barrier.
    - d. Do not install fastening components through air / vapor barrier over unsupported areas of the substrate such as sheathing joints.
    - e. Seal improperly drilled and/or vacated holes with sealant prior to the installation of the cladding or veneer system.

### **3.04 FIELD QUALITY CONTROL**

- A. Damage to surface by other trades shall not be the responsibility of the installing Subcontractor.
- B. Final Observation and Verification:
  1. Final inspection of air / vapor barrier assembly shall be carried out by the Owner's representative, the Contractor, or Air / Vapor Barrier Manufacturer as required by warranty.
  2. Contact Air / Vapor Barrier Manufacturer for warranty issuance requirements.
- C. Air barrier assembly is not designed for permanent UV exposure. Refer to Air / Vapor Barrier Manufacturer published literature for product limitations.

### **3.05 CLEANING**

- A. Promptly as the Work proceeds, and upon completion, clean up and remove from the premises all rubbish and surplus materials resulting from the foregoing Work.
- B. Clean soiled surfaces, spatters, and damage caused by Work of this Section.
- C. Check area to ensure cleanliness and remove debris, equipment, and excess material from the site.

**END OF SECTION 07270**

## **SECTION 07275 - SHEET APPLIED AIR BARRIERS**

### **PART 1 - GENERAL**

#### **1.01 GENERAL REQUIREMENTS**

- A. The General Conditions, Supplementary Conditions, Instructions to Bidders, and Division 01- General Requirements shall be read in conjunction with and govern this section.
- B. The Specification shall be read as a whole by all parties concerned. Each Section may contain more or less than the complete Work of any trade. The Contractor is solely responsible to make clear to the installing Subcontractor the extent of their Work.

#### **1.02 SUMMARY**

- A. This Section includes requirements for supplying labor, materials, tools, and equipment to complete the Work as shown on the Drawings and as specified herein including, but not limited to, the following:
  - 1. Adhesive/Primer
  - 2. Self-Adhered Water Resistive Permeable Air Barrier
  - 3. Air Barrier/Thru-wall Flashing
  - 4. Sealant

#### **1.03 RELATED SECTIONS**

- A. Section 04200 – Unit Masonry
- B. Section 05450 – Cold-Formed Metal Framing
- C. Section 07214 – Closed Cell Spray Foam Insulation
- D. Section 07241 – Water managed Exterior Insulation and Finish System (EIFS)
- E. Section 07415 – Aluminum Composite Material Facade / Cladding
- F. Section 07500 - Roofing, General
- G. Section 07600 - Flashing, Sheet Metal and Roofing Accessories
- H. Section 07900 - Joint Sealer Assemblies

#### **1.04 SUBSTITUTIONS**

- A. Submit requests for substitutions in accordance with AIA A232 and Section 00800.
- B. Substitution submission format to include:
  - 1. Evidence that alternate materials meet or exceed performance characteristics of product requirements and documentation from an approved independent testing laboratory certifying that the performance of the system including auxiliary components exceed the requirements of the local building code.
  - 2. References clearly indicating that the Air Barrier Manufacturer has successfully completed projects of similar scope and nature on an annual basis for a recommended minimum of ten (10) years.



3. Air Barrier Manufacturer's guide specification.
  4. Air Barrier Manufacturer's complete set of technical data sheets for assembly.
  5. Air Barrier Manufacturer's complete set of details for assembly.
  6. Product certification confirming assembly components are supplied and warranted by a single source Air Barrier Manufacturer.
  7. Air Barrier Manufacturer statement that anticipated wall assembly compliance with NFPA 285.
  8. Sample warranty, as specified.
- C. Submit requests for substitutions to this specification within fourteen (14) days following award date. Recommend to include a list of twenty (20) projects executed over the past five (5) years.
- D. Substitute materials not approved in writing shall not be permitted for use on this project.

#### **1.05 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
1. AAMA 711-13 - Voluntary Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products
- B. American Society for Testing and Materials (ASTM):
1. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting
  2. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
  3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
  4. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials
  5. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
  6. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference
  7. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
  8. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials
  9. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- C. National Fire and Protection Agency (NFPA):
1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

#### **1.06 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-installation meetings:

1. When required, and with prior notice, an Air Barrier Manufacturer representative will meet with the necessary parties at the jobsite to review and discuss project conditions as it relates to the integrity of the assembly.

## **1.07 SUBMITTALS**

- A. Provide the following requested information in accordance with AIA A232 and Section 00800 Submittal Procedures.
- B. Action Submittals:
  1. Product Data:
    - a. Air Barrier Manufacturer's guide specification.
    - b. Air Barrier Manufacturer's complete set of technical data sheets for assembly.
    - c. Air Barrier Manufacturer's complete set of guide details for assembly.
  2. Certificates:
    - a. Product certification confirming assembly components are supplied and warranted by a single source Air Barrier Manufacturer.
  3. Tests and Evaluation Reports:
    - a. NFPA 285 wall assembly compliance:
      - 1) Air Barrier Manufacturer statement that anticipated wall assembly complies with NFPA 285.
  4. Warranty:
    - a. Sample warranty, as specified.

## **1.08 QUALITY ASSURANCE**

- A. Single Source Responsibility:
  1. Obtain air barrier and auxiliary materials including adhesive/primer, air barrier, flashings, and sealants from a single Air Barrier Manufacturer regularly engaged in the manufacturing and supply of the specified products.
  2. Contractor to verify product compliance with Federal, State, and Local regulations controlling use of Volatile Organic Compounds (VOC).
- B. Manufacturer Qualifications:
  1. Air Barrier Manufacturer shall demonstrate qualifications to supply materials of this section by certifying the following:
    - a. Air Barrier Manufacturer must not issue warranties for terms longer than they have been manufacturing and supplying specified products for similar scope of Work.
- C. Installer Qualifications:
  1. Perform Work in accordance with the Air Barrier Manufacturer's published literature and as specified in this section.
  2. Maintain one (1) copy of the Air Barrier Manufacturer's installation instructions on site.
  3. At all times during the execution of the Work allow access to site by the Air Barrier Manufacturer representative.
  4. If meeting with the Air Barrier Manufacturer during project construction, contact the Air Barrier Manufacturer a minimum of two weeks prior to schedule meeting.

## **1.09 MOCK-UPS**

- A. Mock-ups: Construct mock-ups to verify selections made under submittals and to set quality standards for materials and execution in accordance with Section 04200 for mock-ups and as follows:
  - 1. Where directed by Architect, construct typical exterior wall section, incorporating substrate materials, and adjacent materials including flashing, attachment of insulation; showing vapor permeable water resistive air barrier application details.
- B. Notify Architect a minimum seven (7) days prior to mock-up construction.
- C. Review and acceptance of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Architect specifically notes such deviations in writing.
- D. Once reviewed by Architect, acceptable mock-up can form a permanent part of the Work and will form the basis for acceptance for the remainder of the project.
- E. Remove and replace materials found unacceptable at no additional cost to Owner.

## **1.10 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery of Materials:
  - 1. Materials shall be delivered to the jobsite in undamaged and clearly marked containers indicating the name of the Air Barrier Manufacturer and product.
- B. Storage of Materials:
  - 1. Store materials as recommended by the Air Barrier Manufacturer and conforming to applicable safety regulatory agencies. Refer to all applicable data including, but not limited to, SDS information, Product Data sheets, product labels, and specific instructions for personal protection.
  - 2. Keep solvents away from open flame or excessive heat.
  - 3. Store materials in original packaging.
  - 4. Protect rolls from direct sunlight until ready for use.
  - 5. Refer to Air Barrier Manufacturer's published literature.
- C. Handling:
  - 1. Refer to Air Barrier Manufacturer's published literature.

## **1.11 SITE CONDITIONS**

- A. Environmental Requirements:
  - 1. No Work shall be performed during rain or inclement weather.
  - 2. No Work shall be performed on frost covered or wet surfaces.
- B. Protection:
  - 1. It is the responsibility of the installing Subcontractor to protect all surfaces not included in scope of Work from overspray including, but not limited to, windows, doors, adjacent areas, and vehicles.
  - 2. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane.
- C. Ensure all preparation Work is completed prior to installing air barrier.

- D. All equipment shall be grounded during operations.

## 1.12 WARRANTY

- A. Manufacturer's Single Source Warranty:
  - 1. Sheet Applied Permeable Air Barrier:
    - a. Product Warranty:
      - 1) Manufacturer must warrant the material against product defect for a period of **twelve (12) year** from date of purchase.
    - b. Assembly Warranty.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Air Barrier and auxiliary materials must be obtained as a single-source from the Air Barrier Manufacturer to ensure total system compatibility and integrity.
- B. Basis of Design: Henry® Co., El Segundo, CA, Tel.# 800.486.1278, [www.henry.com](http://www.henry.com); or approved equal.

### 2.02 MATERIALS

- A. Basis of Design: Henry® Blueskin® VP160 Self-Adhered Water Resistive Air Barrier, Primary Sheet-Applied, Vapor Permeable Water Resistive Air Barrier.
  - 1. Self-adhered vapor permeable, water resistive air barrier consisting of a reinforced, modified polyolefin tri-laminate film surface and patented permeable adhesive technology with split-back poly-release film; having the following typical physical properties:
    - a. Color: Blue
    - b. Thickness: 23 mils (0.58 mm)
    - c. Water Vapor Permeance (ASTM E96): 29 perms
    - d. Air Leakage of Air Barrier Assemblies (ASTM E2357): Pass
    - e. Air Permeance (ASTM E2178): Pass
    - f. Nail Sealability (ASTM D1970): Pass
    - g. Dry Tensile Strength (ASTM D882):
      - 1) 41 lbf /182N MD
      - 2) 29 lbf /129N CD
    - h. Surface Burning Characteristics (ASTM E84):
      - 1) Flame Spread: Class A
      - 2) Smoke Development: Class A
    - i. Low Application Temperature: 20F (-7°C)
- B. Assembly Auxiliary Materials:
  - 1. Adhesives/Primers<sup>[S11]</sup>
    - a. Low VOC adhesive:
      - 1) Synthetic rubber based quick setting adhesive with low VOC content; having the following typical physical properties:
        - a) Basis of Design: Henry® Blueskin® LVC Adhesive
        - b) Color: Blue
        - c) Maximum VOC: <240 g/L
        - d) Drying time (initial set): 30 minutes

- e) Low Application Temperature: 10F (-12°C)
- b. Quick setting primers:
- 1) Synthetic rubber based quick setting adhesive with low VOC content; having the following typical physical properties:
    - a) Basis of Design: Henry® Blueskin® LVC Spray Primer
    - b) Color: Blue
    - c) Maximum VOC: 250 g/L
    - d) Dry time: 1-3 minutes
    - e) Low Application Temperature: 40F (4.4°C)
  - 2) Polymer emulsion water based quick setting adhesive with low VOC content; having the following typical physical properties:
    - a) Basis of Design: Henry® Aquatac™ Primer
    - b) Color: Aqua
    - c) Maximum VOC: 50 g/L
    - d) Drying time (initial set): 30 minutes
    - e) Low Application Temperature: 25F (-4°C)
2. Liquid-Applied Flashing:
- a. Moisture-curing single component elastomeric liquid-applied flashing using a highly advanced Silyl-Terminated Polyether (STPE) polymer curing to a monolithic membrane; having the following typical physical properties:
    - 1) Basis of Design: Henry® Air-Bloc® LF Liquid-Applied Flashing
    - 2) Color: Blue
    - 3) Air Permeance (ASTM E2178): Pass
    - 4) Water Vapor Permeance (ASTM E96): 21.8 perms @ 25 mils
    - 5) Air Leakage of Air Barrier Assemblies (ASTM E2357): Pass
    - 6) Water Resistance (AC212/ASTM D2247): Pass
    - 7) Nail Sealability (AAMA 711): Pass
    - 8) Surface Burning Characteristics (ASTM E84):
      - a) Flame Spread: Class A
      - b) Smoke Development: Class A
    - 9) Elongation (D412): 264%
    - 10) Low Application Temperature: 20F (-7°C)
3. Self-Adhered Flashing:
- a. Non-Vapor Permeable Flashing:
    - 1) Non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of a synthetic butyl compound integrally laminated to a white engineered polypropylene film surface; having the following typical physical properties:
      - a) Basis of Design: Henry® Blueskin® Butyl Flash
      - b) Color: White
      - c) Thickness: 14 mils (0.36 mm)
      - d) Water Vapor Permeance (ASTM E96): 0.14 perms
      - e) Nail Sealability (ASTM D1970): Pass
      - f) Elongation (ASTM D412): 825% minimum
      - g) Low Application Temperature: 25F (-4°C)
    - 2) Non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of an SBS rubberized asphalt compound integrally laminated to a high strength polyethylene with surface layer of metallic aluminum film;

having the following typical physical properties:

- a) Basis of Design: Henry® Metal Clad® Self-Adhered Water Resistive Air Barrier
  - b) Color: Metallic Aluminum
  - c) Thickness: 45 mils (1.14 mm)
  - d) Water Vapor Permeance (ASTM E96): 0.014 perms
  - e) Nail Sealability (ASTM D1970): Pass
  - f) Elongation (ASTM D412): 85%
  - g) Low Application Temperature: 20°F (-7°C)
- 3) Non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of an SBS rubberized asphalt compound integrally laminated to a blue engineered thermoplastic film surface; having the following typical physical properties:
- a) Basis of Design: Henry® Blueskin® SA Self-Adhered Water Resistive Air Barrier
  - b) Color: Blue
  - c) Thickness: 40 mils (1 mm)
  - d) Water Vapor Permeance (ASTM E96): 0.86 perms
  - e) Nail Sealability (ASTM D1970): Pass
  - f) Elongation (ASTM D412-modified): 200% minimum
  - g) Low Application Temperature: 41°F (5°C)
- b. Vapor Permeable Flashing<sup>[S72]</sup>:
- 1) Self-adhered water resistive vapor permeable air barrier consisting of a reinforced modified polyolefin tri-laminate film surface and patented adhesive technology with split-back poly-release film; having the following typical physical properties:
    - a) Basis of Design: Henry® Blueskin® VP160 Self-Adhered Water Resistive Air Barrier
    - b) Color: Blue
    - c) Thickness: 23 mils (0.58 mm)
    - d) Water Vapor Permeance (ASTM E96): 29 perms
    - e) Nail Sealability (ASTM D1970): Pass
    - f) Low Application Temperature: 20 degrees F (-7 degrees C)
  - 2) Low temperature non-vapor permeable, self-adhered water resistive air and vapor barrier consisting of an SBS rubberized asphalt compound integrally laminated to a blue engineered thermoplastic film surface; having the following typical physical properties:
    - a) Basis of Design: Henry® Blueskin® SALT Low Temp Self-Adhered Water Resistive Air Barrier
    - b) Color: Blue
    - c) Thickness: 40 mils (1 mm)
    - d) Water Vapor Permeance (ASTM E96): 0.86 perms
    - e) Nail Sealability (ASTM D1970): Pass
    - f) Elongation (ASTM D412-modified): 200% minimum
    - g) Low Application Temperature: 10°F (-12°C)
4. Sealants:
- a. Building Envelope Sealant:
    - 1) Moisture cure, medium modulus polymer modified sealing compound;

- having the following typical physical properties:
  - a) Basis of Design: Henry® 925 BES Sealant
  - b) Color: Varies
  - c) Elongation: 450 - 550%.
- b. Termination Sealant:
  - 1) One-part high performance synthetic rubber sealant; having the following typical physical properties:
    - a) Basis of Design: Henry® 212 All Purpose Crystal Clear Sealant
    - b) Color: Clear
    - c) Elongation: 200% minimum
- C. Additional Materials:
  - 1. Thru-Wall Flashing:
    - a. Non-vapor permeable self-adhered through-wall flashing consisting of an SBS rubberized asphalt compound integrally laminated to a yellow engineered thermoplastic film surface; having the following typical physical properties:
      - 1) Basis of Design: Henry® Blueskin® TWF Thru-Wall Flashing
      - 2) Color: Yellow
      - 3) Thickness: 40 mils (1.0 mm)
      - 4) Water Vapor Permeance (ASTM E96): 0.03 perms
      - 5) High Temperature Stability - Flow Resistance (ASTM D5147): Pass
      - 6) Low Application Temperature: 20F (-7C)

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Verification of Conditions:
  - 1. Verify substrates to receive Work and surrounding adjacent surfaces are in accordance with Air Barrier Manufacturer published literature prior to installation of self-adhered air barrier assembly.
  - 2. Existing substrate must be continuous and secured prior to application of air barrier.
  - 3. Sheathing panels must be securely fastened and installed flush to ensure a continuous substrate in accordance with Air Barrier Manufacturer published literature.
  - 4. Fastener penetrations must be set flush with sheathing and fastened into solid backing.
  - 5. Do not install air barrier over saturated substrates.
- B. Notify Contractor in writing of any conditions that are not acceptable.
- C. The installing contractor shall examine and determine that surfaces and conditions are ready to accept the Work of this section in accordance with published literature. Commencement of Work or any parts thereof shall mean installer's acceptance of the substrate.
- D. Do not apply air barrier until substrate and environmental conditions are in accordance with Air Barrier Manufacturer's published literature.

### **3.02 PREPARATION**

- A. All surfaces must be sound, dry, clean, and free of oil, grease, dirt, frost, laitance, loose and flaking particles, or other contaminants.

- B. Protect adjacent surfaces not included in scope of Work to prevent spillage and overspray.
- C. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane.

### **3.03 INSTALLATION**

- A. Ensure substrate is ready to receive air barrier in accordance with Air Barrier Manufacturer's published literature.
- B. Temperature limitation:
  - 1. Primary air barrier:
    - a. Substrate temperature must be above 20F (-7°C) and rising.
  - 2. Auxiliary products:
    - a. Temperature limitations may vary. Refer to Air Barrier Manufacturer published literature.
- C. Application of Flashing:
  - 1. Self-adhered Flashing:
    - a. Where required install adhesive/primer recommended by Air Barrier Manufacturer continuously at rate recommended ensuring complete substrate coverage of anticipated flashing installation area.
      - 1) Allow adhesive/primer to cure to a tacky film prior to application of flashing.
      - 2) Only apply adhesive/primer to surfaces which will be covered during the same working day. Primed areas not covered by end of day must be re-primed prior to installation of flashing.
    - b. Measure and cut self-adhered flashing to ensure adequate length to achieve continuous coverage of desired installation.
    - c. Peel protective film from self-adhered flashing and align top of membrane verifying proper positioning prior to complete film removal and flashing placement.
    - d. Press self-adhered flashing firmly into place by applying hand pressure to the middle of the membrane and working the pressure to the edges eliminating wrinkles and air bubbles.
    - e. Install self-adhered flashings in shingle fashion to eliminate reverse laps.
    - f. Where required, prime laps at rate recommended by air barrier manufacture to ensure complete coverage of anticipated lap installation.
    - g. Lap adjoining edges a minimum of two (2) inches.
    - h. Roll flashing and laps with countertop roller to obtain thorough adhesion.
    - i. Where flashing is installed prior to Blueskin® VP160, seal end of day exposed reverse laps of self-adhered flashing with building envelope sealant.
  - 2. Detailing/Flashing:
    - 1. Complete detailing and flashing installations per Air Barrier Manufacturer's published literature.
    - 2. Refer to Air Barrier Manufacturer guide details for further clarification and installation procedures including, but not limited to, the following:
      - a. Inside corners
      - b. Outside corners



- c. Pipe penetrations
  - d. Shelf angles
  - e. Wall to foundation transitions
  - f. Rough openings:
    - 1) Install rough opening details per Window Manufacturer's published literature and in accordance with ASTM E2112.
    - 2) Wall assemblies containing a vapor retarder on the interior wall assembly:
      - a) Extend flashing into rough opening to ensure sufficient membrane for connection with vapor retarder and provide a continuous air barrier assembly.
  - 3. Reverse laps:
    - a. Seal permanently exposed reverse laps with sealant:
      - 1) Primary air barrier:
        - a) Termination sealant
  - 4. Non-vapor permeable self-adhered flashing; choose from the following:
    - a. Building envelope sealant
    - b. Termination sealant
  - 5. Vapor permeable self-adhered flashing:
    - a. Termination sealant
  - 6. Moving Joints:
    - a. Contact Air Barrier Manufacturer.
  - 7. Transitions:
    - a. Contact Air Barrier Manufacturer to coordinate transition of self-adhered air barrier to adjacent areas including, but not limited to, the following:
      - 1) Roof to air barrier
      - 2) Air barrier to waterproofing
      - 3) Fastener penetrations
- E. Thru-Wall Flashing:
1. Coordinate with Sections 04200, 05450, 07214, 07241 & 07415.
- F. Application of Primary Sheet-Applied Vapor Permeable Water Resistive Air Barrier:
1. Where required, install adhesive/primer recommended by Air Barrier Manufacturer continuously and at rate recommended by air barrier manufacturer to ensure complete substrate coverage of anticipated flashing installation area.
    - a. Allow adhesive/primer to cure to a tacky film prior to application of air barrier.
    - b. Only apply adhesive/primer to surfaces which will be covered during the same working day. Primed areas not covered by end of day must be re-primed prior to installation of air barrier membrane.
  2. Peel protective film from primary air barrier and align top of membrane verifying proper positioning prior to complete film removal and placement.
  3. Press primary air barrier firmly into place by applying hand pressure to the middle of the membrane and working the pressure to the edges eliminating wrinkles and air bubbles.
  4. Install primary air barrier in shingle fashion to eliminate reverse laps.
  5. Where lap adhesion is less than desired, install low VOC adhesive continuously at rate recommended by air barrier manufacturer to ensure complete substrate coverage of anticipated flashing installation area.
    - a. Allow adhesive/primer to cure to a tacky film prior to subsequent primary air barrier installation.
  6. Lap adjoining edges:
    - a. Horizontal seams: Two (2) inch minimum.

- b. Vertical seams: Three (3) inch minimum.
  - 7. Roll primary air barrier and laps with countertop roller to obtain thorough adhesion.
  - 8. Seal permanently exposed reverse laps of primary air barrier with termination sealant.
- G. Fastener Penetrations Through Primary Air Barrier:
- 1. It is the responsibility of the installer penetrating the air barrier assembly to properly install fasteners and components in accordance with the Air Barrier Manufacturer's published literature.
  - 2. Installation requirements:
    - a. Drill fasteners and components with sufficient compression to maintain continuity in the air barrier assembly.
    - b. Refer to "Self-tapping fasteners" and/or "Pre-drilled fasteners".
  - 3. Supplemental sealant:
    - a. Penetrations that do not meet installation requirements require the addition of termination sealant at point of insertion through the air barrier membrane to maintain continuity in the air barrier assembly.
  - 4. Self-tapping fasteners:
    - a. Fastener head must be larger in diameter than the shank.
    - b. Drill fasteners perpendicular to the substrate until flush with the air barrier.
    - c. Drill fasteners to provide a continuous compression firmly against the air barrier membrane creating a gasketing seal without damaging the membrane.
    - d. Do not install fasteners through air barrier over unsupported areas of the substrate such as sheathing joints.
    - e. Overdriven fasteners, improperly installed fasteners, defective/broken fasteners, or fasteners not properly fastened into the building structure beyond the air barrier membrane should be removed and the vacated hole sealed with termination sealant prior to the installation of the cladding or veneer system.
  - 5. Pre-drilled fastening assemblies:
    - a. Fastening head or assembly component must be larger in diameter than pre-drilled hole.
    - b. Fastening head or assembly component must be mounted flush with the air barrier.
    - c. Fastening head or assembly component must provide a continuous compression firmly against the air barrier creating a gasketing seal without damaging the integrity of the air barrier.
    - d. Do not install fastening components through air barrier over unsupported areas of the substrate such as sheathing joints.
    - e. Seal improperly drilled and/or vacated holes with termination sealant prior to the installation of the cladding or veneer system.

### **3.04 FIELD QUALITY CONTROL**

- A. Damage to surface by other trades shall not be the responsibility of the installing Subcontractor.
- B. Final Observation and Verification:
  - 1. Final inspection of sheet applied vapor permeable air barrier assembly shall be carried out by the Owner's representative, the contractor, or Air Barrier Manufacturer as required by warranty.
  - 2. Contact Air Barrier Manufacturer for warranty issuance requirements.

- C. Sheet-applied vapor permeable water resistive air barrier assembly is not designed for permanent UV exposure. Refer to Air Barrier Manufacturer published literature for product limitations.

### **3.05 CLEANING**

- A. Promptly as the Work proceeds, and upon completion, clean up and remove from the premises all rubbish and surplus materials resulting from the foregoing Work.
- B. Clean soiled surfaces, spatters, and damage caused by Work of this Section.
- B. Check area to ensure cleanliness and remove debris, equipment, and excess material from the site.

**END OF SECTION 07275**

## **SECTION 07415 – ALUMINUM COMPOSITE MATERIAL FACADE / CLADDING**

### **PART 1 - GENERAL**

#### **1.01 SCOPE OF WORK**

##### **A. SECTION INCLUDES**

1. The extent of panel system work is indicated on the drawings and in these specifications.
2. Panel system requirements include the following components:
  - a. Aluminum faced composite panels with mounting system. Panel mounting system including anchorages, shims, furring, fasteners, gaskets and sealants, related flashing adapters, and masking (as required) for a complete installation.
  - b. Parapet coping, soffits, sills, border, and filler items indicated as integral components of the panel system or as designed.

##### **B. RELATED DOCUMENTS**

Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Technical Specification Divisions.

##### **C. RELATED WORK SPECIFIED ELSEWHERE**

1. Section 05120: Structural Steel
2. Section 05450: Cold-Formed Metal Framing
3. Section 07200: Insulation
4. Section 07270: Fluid Applied Air / Vapor Barriers
5. Section 07600: Flashing, Sheet Metal and Roof Accessories
6. Section 07900: Joint Sealer Assemblies

#### **1.02 QUALITY ASSURANCE**

1. Composite Panel Manufacturer shall have a recommended minimum of 20 years' experience in the manufacturing of this product.
2. Composite Panel Manufacturer shall be solely responsible for panel manufacture and application of the finish.
3. Fabricator/installer shall be acceptable to the composite panel manufacturer.
4. Fabricator/Installer shall have a recommended minimum 5 years' experience of metal panel work similar in scope and size to this project.
5. Field measurements should be taken prior to the completion of shop fabrication whenever possible. However, coordinate fabrication schedule with construction progress as directed by the Contractor to avoid delay of work. Field fabrication may be allowed to ensure proper fit. However, field fabrication shall be kept to an absolute minimum with the majority of the fabrication being done under controlled shop conditions.

6. Shop drawings shall show the preferred joint details providing a structurally sound wall panel system that allows no uncontrolled water penetration on the inside face of the panel system as determined by ASTM E 331.
7. Maximum deviation from vertical and horizontal alignment of erected panels: 6mm (1/4") in 6m (20') non-accumulative.
8. Panel fabricator/installer shall assume undivided responsibility for all components of the exterior panel system including, but not limited to attachment to sub-construction, panel to panel joinery, panel to dissimilar material joinery, and joint seal associated with the panel system.
9. Composite panel manufacturer shall have established a Certification Program acceptable to the local Code Authorities.

### **1.03 REFERENCES**

#### **A. ALUMINUM ASSOCIATION**

1. AA-M12C22A41: Anodized - Clear Coating
2. AA-M12C22A44: Anodized - Color Coating

#### **B. AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION**

1. AAMA 508-05: Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems

#### **C. AMERICAN SOCIETY FOR TESTING AND MATERIALS**

1. E 330 Structural Performance of Exterior Windows, Curtain Walls, and Doors Under the Influence of Wind Loads
2. E 283 Rate of Leakage through Exterior Windows, Curtain Walls, and Doors
3. D 1781 Climbing Drum Peel Test for Adhesives
4. E 84 Surface Burning Characteristics of Building Materials
5. D 1929 Standard Test for Ignition Properties of Plastics
6. D 3363 Method for Film Hardness by Pencil Test
7. D 2794 Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
8. D 3359 Methods for Measuring Adhesion by Tape Test
9. D 2247 Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
10. B 117 Method of Salt Spray (Fog) Testing
11. D 2244 Calculation of Color Differences from Instrumentally Measured Color Coordinates
12. D 4214 Evaluating the Degree of Chalking of Exterior Paint Films
13. D 822 Practice for Operating Light and Water Exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer, and Related Products

14. D 1308 Effect of Household Chemicals on Clear and Pigmented Organic Finishes

D. INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS

1. NFPA 285 Intermediate Scale Multi Story Test

**1.04 SUBMITTALS**

A. Submittals shall be in conformance with AIA A232 and Section 00800.

B. SAMPLES

1. Panel System Assembly: Two samples of each type of assembly. 304mm (12") x 304mm (12") minimum.
2. Two samples of each color or finish selected, 76mm (3") x 102mm (4") minimum.

C. SHOP DRAWINGS

1. Submit shop drawings showing project layout and elevations; fastening and anchoring methods; detail and location of joints, sealants, and gaskets, including joints necessary to accommodate thermal movement; trim; flashing; and accessories.

D. Affidavit certifying material meets requirements specified.

E. Two copies of manufacturer's literature for panel material.

F. CODE COMPLIANCE

Documents showing product compliance with the national and local building code shall be submitted prior to the bid. These documents shall include, but not be limited to, appropriate Evaluation Reports and/or test reports supporting the use of the product.

**1.05 DELIVERY, STORAGE AND HANDLING**

1. Protect finish and edges in accordance with panel manufacturer's recommendations.
2. Store material in accordance with panel manufacturer's recommendations.

**PART 2 - PRODUCTS**

**2.01 PANELS**

A. COMPOSITE PANELS

1. Basis of Design: "Alucobond Plus" as manufactured by 3A Composites USA, Inc., Benton, KY; Tel.# 800-626-3365 / 270-527-4200; or approved equal.

2. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to the following:
    - a. Reynobond Aluminum Composite Material, as manufactured by Alcoa Architectural Products, Tel.# 478.374.4746.
    - b. Or approved equal.
- B. THICKNESS: 4MM (0.157")
- C. PRODUCT PERFORMANCE
1. Bond Integrity  
When tested for bond integrity, in accordance with ASTM D 1781 (simulating resistance to panel delamination), there shall be no adhesive failure of the bond a) between the core and the skin nor b) cohesive failure of the core itself below the following values:  
  
Peel Strength: 100 N-mm/mm (22.5 in lb/in) as manufactured  
100 N-mm/mm (22.5 in lb/in) after 21 days soaking in water at 70°F (21°C)
  2. Fire Performance  
ASTM E 84 Max. Flame Spread 25, Max. Smoke Developed 450  
NFPA 285 Panels shall meet requirements of the Intermediate Scale Multi Story Test
- D. FINISHES
1. Coil Coated HYLAR® 5000 based Polyvinylidene Fluoride (PVDF) in conformance with the following general requirements of AAMA 2605.
    - a. Color:
      - 1) Color as selected by the Architect from manufacturer's PVDF - 2 or PVDF - 2 or 3 Coats Mica/Pearlescent colors.
    - b. Coating Thickness:
      - 1) Colors: 1.0 mil (±0.2 mil)
    - c. Hardness: ASTM D 3363; HB minimum using Eagle Turquoise Pencil.
    - d. Impact:
      - 1) Test method: ASTM D 2794; Gardner Variable Impact Tester with 5/8" (15.9mm) mandrel.
      - 2) Coating shall withstand reverse impact of 1.5 in-lb per mil substrate thickness (0.681 m-kg per mm substrate).
      - 3) Coating shall adhere tightly to metal when subjected to #600 Scotch Tape pick-off test. Slight minute cracking permissible. No removal of film to substrate.
    - e. Adhesion:
      - 1) Test Method: ASTM D 3359.

- 2) Coating shall not pick off when subjected to a grid of 11 cuts x 11 cuts, 1/16" apart, and taped with #600 Scotch Tape.
- f. Humidity Resistance
    - 1) Test Method: ASTM D 2247.
    - 2) No formation of blisters when subjected to condensing water fog at 100% relative humidity and 100°F (37.8°C) for 4000 hours.
  - g. Salt Spray Resistance:
    - 1) Test Method: ASTM B 117; Expose coating system to 4000 hours, using 5% NaCl solution.
    - 2) Corrosion creepage from scribe line: 1/16" max. (1.6mm).
    - 3) Minimum blister rating of 8 within the test specimen field.
  - h. Weather Exposure
    - 1) Outdoor:
      - a. Ten-year exposure at 45° angle facing south Florida exposure.
      - b. Maximum color change of 5 Delta E units as calculated in accordance with ASTM D 2244.
      - c. Maximum chalk rating of 8 in accordance with ASTM D 4214.
      - d. No checking, crazing, adhesion loss.
  - i. Chemical Resistance:
    - 1) ASTM D 1308 utilizing 10% Muriatic Acid for an exposure time of 15 minutes. No loss of film adhesion or visual change when viewed by the unaided eye.
    - 2) ASTM D 1308 utilizing 20% Sulfuric Acid for an exposure time of 18 hours. No loss of film adhesion or visual change when viewed by the unaided eye.
    - 3) AAMA 2605 utilizing 70% reagent grade Nitric Acid vapor for an exposure time of 30 minutes. Maximum color change of 5 Delta E units as calculated in accordance with ASTM D 2244.

## 2.02 PANEL FABRICATION

### A. COMPOSITION:

Two sheets of aluminum sandwiching a solid core of extruded thermoplastic material formed in a continuous process with no glues or adhesives between dissimilar materials. The core material shall be free of voids and/or air spaces and not contain foamed insulation material. Products laminated sheet by sheet in a batch process using glues or adhesives between materials shall not be acceptable.

### B. ALUMINUM FACE SHEETS:

Thickness: 0.5mm (0.0197") (nominal)  
 Alloy: AA3000 Series (Painted material)

### C. PANEL WEIGHT:

4mm (0.157"): 7.57 kg/m<sup>2</sup> (1.55 lb/ft<sup>2</sup>)



D. TOLERANCES

1. Panel Bow: Maximum 0.8% of any 1828mm (72") panel dimension.
2. Panel Dimensions: Field fabrication shall be allowed where necessary, but shall be kept to an absolute minimum. All fabrication shall be done under controlled shop conditions when possible.
3. Panel lines, breaks, and angles shall be sharp, true, and surfaces free from warp and buckle.
4. Maximum deviation from panel flatness shall be 1/8" (3.2mm) in 5'0" (1.52m) on panel in any direction for assembled units. (Non-accumulative - No Oil Canning)

E. SYSTEM CHARACTERISTICS

1. Plans, elevations, details, characteristics, and other requirements indicated are based upon standards by one manufacturer. It is intended that other manufacturers, receiving prior approval, may be acceptable, provided their details and characteristics comply with size and profile requirements, and material/performance standards.
2. System must not generally have any visible fasteners, telegraphing or fastening on the panel faces or any other compromise of a neat and flat appearance.
3. System shall comply with the applicable provisions of the "Metal Curtain Wall, Window, Storefront, and Entrance Guide Specifications Manual" by AAMA and ANSI/AAMA 302.9 requirements for aluminum windows.
4. Fabricate panel system to dimension, size, and profile indicated on the drawings based on a design temperature of 70°F (21°C).
5. Fabricate panel system so that no restraints can be placed on the panel, which might result in compressive skin stresses. The installation detailing shall be such that the panels remain flat regardless of temperature change and at all times remain air and water tight.
6. The finish side of the panel shall have a removable plastic masking applied prior to fabrication, which shall remain on the panel during fabrication, shipping, and erection to protect the surface from damage.

F. SYSTEM TYPE

1. Rout and Return Wet:  
System must provide a wet seal (caulked) reveal joint as detailed on drawings. The sealant type shall be as specified in Section 07900 and with foamed type backer rod as indicated on architectural drawings.

G. SYSTEM PERFORMANCE

1. Composite panels shall be capable of withstanding building movements and weather exposures based on the following test standards required by the Architect and/or the local building code.
  - a. Wind Load

If system tests are not available, mock-ups shall be constructed and tests performed under the direction of an independent third-party laboratory, which show compliance to the following minimum standards:

Panels shall be designed to withstand the Design Wind Load based upon the local building code, but in no case less than 20 lb/ft<sup>2</sup> (959 N/m<sup>2</sup>) and 30 lb/ft<sup>2</sup> (1438 N/m<sup>2</sup>) on parapet and corner panels. Wind load testing shall be conducted in accordance with ASTM E 330 to obtain the following results.

Normal to the plane of the wall between supports, deflection of the secured perimeter-framing members shall not exceed L/175 or 3/4" (19mm), whichever is less.

Normal to the plane of the wall, the maximum panel deflection shall not exceed L/60 of the full span.

Maximum anchor deflection shall not exceed 1/16" (1.6mm).

At 1-1/2 times design pressure, permanent deflections of framing members shall not exceed L/100 of span length and components shall not experience failure or gross permanent distortion. At connection points of framing members to anchors, permanent set shall not exceed 1/16" (1.6mm).

b. Air/Water System Test

If system tests are not available, mock-ups shall be constructed and tests performed under the direction of an independent third-party laboratory, which show compliance to the following minimum standards:

Air Infiltration - When tested in accordance with ASTM E 283, air infiltration at 1.57 lb/ft<sup>2</sup> (75 Pa) must not exceed 0.06 ft<sup>3</sup>/min. per ft<sup>2</sup> of wall area (305 cm<sup>3</sup>/s per m<sup>2</sup> of wall area).

Water Infiltration - Water infiltration is defined as uncontrolled water leakage through the exterior face of the assembly.

## 2.03 ACCESSORIES

- A. Extrusions, formed members, sheet, and plate shall conform with ASTM B 209 and the recommendations of the manufacturer.
- B. Panel stiffeners, if required, shall be structurally fastened or restrained at the ends and shall be secured to the rear face of the composite panel with silicone of sufficient size and strength to maintain panel flatness. Stiffener material and/or finish shall be compatible with the silicone.
- C. Sealants and gaskets within the panel system shall be as per manufacturer's standards to meet performance requirements.
- D. Fabricate flashing materials from 0.030" (0.76mm) minimum thickness aluminum sheet painted to match the adjacent curtain wall / panel system where exposed. Provide a lap strap under the flashing at abutted conditions and seal lapped surfaces with a full bed of non-hardening sealant.

- E. Fasteners (concealed/non-corrosive): Fasteners as recommended by panel manufacturer. Do not expose fasteners except where unavoidable and then match finish of adjoining metal.

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION**

- A. Surfaces to receive panels shall be even, smooth, sound, clean, dry and free from defects detrimental to work. Notify contractor in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with erection until unsatisfactory conditions have been corrected.
- B. Surfaces to receive panels shall be structurally sound as determined by a registered Architect/Engineer.

#### **3.02 INSTALLATION**

- A. Erect panels plumb, level, and true.
- B. Attachment system shall allow for the free and noiseless vertical and horizontal thermal movement due to expansion and contraction for a material temperature range of -20°F to +180°F (-29°C to +82°C). Buckling of panels, opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement will not be permitted. Fabrication, assembly, and erection procedure shall account for the ambient temperature at the time of the respective operation.
- C. Panels shall be erected in accordance with an approved set of shop drawings.
- D. Anchor panels securely per engineering recommendations and in accordance with approved shop drawings to allow for necessary thermal movement and structural support.
- E. Conform to panel fabricator's instructions for installation of concealed fasteners.
- F. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded, and broken members.
- G. Do not cut, trim, weld, or braze component parts during erection in a manner which would damage the finish, decrease strength, or result in visual imperfection or a failure in performance. Return component parts which require alteration to shop for refabrication, if possible, or for replacement with new parts.
- H. Separate dissimilar metals and use gasketed fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.

#### **3.03 ADJUSTING AND CLEANING**

- 1. Remove and replace panels damaged beyond repair as a direct result of the panel installation. After installation, panel repair and replacement shall become the responsibility of the General Contractor.
- 2. Repair panels with minor damage.
- 3. Remove masking (if used) as soon as possible after installation. Masking intentionally left in place after panel installation on an elevation, shall become the responsibility of the General Contractor.

4. Any additional protection, after installation, shall be the responsibility of the General Contractor.
5. Make sure weep holes and drainage channels are unobstructed and free of dirt and sealants.
6. Final cleaning shall not be part of the work of this section.

**END OF SECTION 07415**

## SECTION 07500 - ROOFING, GENERAL

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK

- A. The requirements of this section apply to the work specified in the following sections:
  - 1. Section 05300 - Metal Decking,
  - 2. Section 06100 - Carpentry,
  - 3. Section 07530 - Single-Ply Roofing Membrane System
  - 4. Section 07600 - Flashing and Sheet Metal,
  - 5. Section 07800 - Roof Specialties and Accessories,
  - 6. Division 15 - Mechanical Work,
  - 7. Division 16 - Electrical Work.
  
- B. This section includes alterations and tie-ins to existing roofing systems and as shown on the drawings.

#### 1.2 QUALITY ASSURANCE

- A. Roofing and associated work, including work of all sections listed in 1.1 above, must be included in a single subcontract, so that there will be undivided responsibility for the specified performance of all component parts.
  
- B. Installer Prequalification: Installer must be a recognized Roofing Contractor, skilled and experienced in the types of work required, and equipped to perform workmanship in accordance with recognized standards.
  - 1. Minimum Experience: Not less than a recommended five (5) years experience in applications for indicated roofing systems, and in roofing projects of magnitude equivalent to the required work.
  
  - 2. Maintenance Proximity: Recommended location of not more than two hours normal travel time from Installer's maintenance plant to project site.
    - a. Optional Proximity: At Contractor's option, and with Owner's prior acceptance of Installer's certification that work of the Maintenance Agreement will be performed by a designated roofing contractor whose plant is located not more than two hours normal travel time from project site, the above requirements will be waived.
  
- C. Product Bid: The product bid must have past performance of installation on a roof in the state where project is located for a recommended minimum of five (5) years, under the same name of manufacturer as bid.
  
- D. Alterations to existing roofs: Contractor shall make necessary tie ins and alterations to existing roofs in accordance with details indicated and "Basis of Design" product requirements so as to maintain original warranty on existing roofs and/or achieve complete weather tight conditions.
  
- E. **Independent Roof Inspection Services:** The **Contractor** shall engage and pay for the services of a qualified independent Roofing Inspection Firm (RIF) to monitor and record all construction activities during the Work and provide written reports of same to the Architect.

1. A Qualified (RIF) is required to be a licensed business in the State of New Jersey and offer the services of a Registered Roof Observer (RRO) certified by the Roof Consultants Institute. The RRO is observe on-site roof construction. Qualifications and sample report format of the RIF are to be submitted to and approved by the Architect. Provide project experience and references noted below.
2. The RIF is required to be an independent competent consultant and shall provide services meeting the standard of care of a qualified roof consultant operating in the jurisdiction of this Project. The RIF will be held responsible for the accuracy of all reporting prepared by the RIF.
3. The RIF must not be affiliated with, have relation with, nor engage directly or indirectly in the manufacturing, installation or sales of any roofing or building materials used on this Project. The RIF shall not be or have been previously been an employee of the Contractor and/or Roof Subcontractor / Installer.
4. The RIF must provide on-site observation services not less than three (3) days per week during the times of all roof removal and replacement activities are in progress including all associated sheet metal, counter flashing and waterproofing Work and shall document same in a written daily report form acceptable to the Architect.
  - a. Roofing projects of less than 10,000 sq. ft.: RIF must provide daily on site observations of all roofing and associated Work when in progress.
  - b. **The RIF firm must be on-site and monitor all roofing replacement and restoration work while the Roofing Contractor is performing their work.**
5. RIF and its assigned RRO inspector(s) for the Work of this Project must have a recommended minimum of three (3) years of experience in monitoring and observing roofing reconstruction with roof systems similar to specified system. Note: Past project references including project name, roof contractor and design professional and contact phone numbers for the project are required to be submitted along with the RIF's qualifications.
6. A computer generated daily field report must be submitted to the Architect's office by E-mail (in PDF file format) and facsimile within three (3) days of visit. Hard copy of all reports are required to be submitted with the Contractor's final closeout documents.
  - a. Field reports shall include all roofing Work as indicated in this sections, other related roofing work sections, but not be limited to the following:
    - 1) Date of visit;
    - 2) Contractor's company name;
    - 3) Contractor's subcontractor's name(s);
    - 4) Foreman's name;
    - 5) Extent of roofing contractor's work force, including subcontractors, and all tasks that have been performed during the visit (number of workers);
    - 6) Weather conditions including range of day temperatures;
    - 7) Record of overnight rain events and presence of moisture upon arrival;
    - 8) Documentation of materials delivered and/or used by Workers during the RIF presence on site;
    - 9) For projects with use of hot bitumen products: record the type of materials, required EVT temperature and record the temperature at the kettle/tanker

- source and at the point of application on the Roof;
- 10) Roof area and locations of roof areas where work in progress is taken place (Roof Key Plan to be Provided by Architect);
  - 11) Percent of roofing work completed;
  - 12) Documentation of all fastener type, size, coating and number used by the Contractor prior to allowing concealment of same by other Work. Note: Provide digital photographs to document Contract compliance.
  - 13) Status of Project Schedule;
  - 14) Punch list items one week before substantial completion date of work and in accordance with Contract Documents;
  - 15) Items which are deficient and/or not in compliance with Contract Documents;
  - 16) Status of prior reported deficiencies;
  - 17) Summary of visual work completed between visits;
  - 18) Inspector's name and report writer's name if different.
7. The RIF is required to provide regular communications through out the project. The RIF is to contact the Architect immediately from the project site upon observation of deviations of all the requirements of the Contract Documents by the Contractor and/or other Work forces.

### **1.3 SUBMITTALS**

- A. Submit certification that the roof materials furnished for roof alterations and tie-ins is Tested and Approved by Factory Mutual as a Class 1-SH roof system with 1-90 Wind Uplift Requirements, or Listed by Underwriters Laboratories or Warnock Hersey for external fire tests of ASTM E - 108 Class A.
- B. Product Data for each type of product specified include manufacturer's technical product data, installation instructions, and recommendations for each type of roofing product required. Include data substantiating that materials comply with specified requirements.
- C. Shop Drawings: Submit roofing membrane layout drawings showing the outline of existing roof and locations of flashings and tie-ins, specific roofing details illustrating relationships with adjacent construction, and flashing details at indicated tie-in conditions.
  1. Submit shop drawings of manufactured and/or fabricated sheetmetal work.
  2. Contract Drawing Detail Approval: If the roofing manufacturer takes exception to the contract document details, the manufacturer shall provide the roofing contractor with acceptable details to be submitted to the Architect for approval. This Project must receive Architect's approval through this process prior to shipment of materials to the project site. All roofing work required by the roofing system manufacturer shall be included in the contract at no additional cost to the Owner.
- D. Samples: Samples of each material specified, properly labeled.
  1. Roof membrane: For project records, submit 8- by 10-inch samples of membrane cut from rolls of each type of material used on the project.
  2. Flashing membrane: Submit 12-inch-square samples of sheet material to be used for base flashings.

3. Fasteners: Submit (2) of each type.
4. Adhesives: Submit samples for each type to be used.

#### **1.4 JOB CONDITIONS**

- A. Roofing Conference: Prior to the installation of the roofing and associated work, meet at the project site with the Installer, the Installers of each component of associated work, and the Architect and other representatives directly concerned with performance of the work, including, where applicable, product manufacturers and the Owner. Record (by Contractor) the discussions of the conference and the decisions and agreements, or disagreements reached, and furnish a copy of the record to each party attending. Review foreseeable methods and procedures related to the roofing work including, but not necessarily limited to, the following:
1. Review Project requirements (drawings, specifications and other contract documents).
  2. Review status of existing conditions and substrate (by the Roofing Installer), including extent of moisture penetration in existing work, drying and similar considerations.
  3. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
  4. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
  5. Review regulations concerning Code compliance, environmental protection, health, safety, fire and similar considerations.
  6. Establish units of work, including preparation, such that each unit may be completed prior to end of each day's work.
- B. Weather Condition Limitations:
1. During periods of inclement weather, Contractor shall use wet power vacuums, on the day following each rain, to remove standing water so as not to delay his operations.
  2. Proceed with roofing and associated work only when weather conditions will permit unrestricted use of materials and quality control of the work being installed, complying with the requirements and the recommendations of the roofing materials manufacturers.
  3. Proceed only when the Contractor is willing to guarantee the work as required and without additional reservations and restrictions.
  4. Protect existing work and property from damage during the course of the work. Be prepared for all weather and other contingencies as prudence may dictate. Maintain on the site at all times sufficient and proper materials for temporary roofing and other protection when weather conditions prevent continuance of work and do not permit completion of each unit of work prior to the end of each working day. Temporary protection and roofing work must be provided at no additional cost to the Owner.
  5. Remove and discard materials which have been used for temporary roofs, protection, water seals, and related work. Do not incorporate used materials into the work.



- C. Storage of Materials and Property: Do not overstress roof decks and supporting structures. Avoid placing loads at midspans of framing. All superimposed loads shall be well distributed. Do not store more material on roofs than can be installed in one and one-half working days. Store materials, except membrane, in dry area and protect from water and direct sunlight. Damaged materials shall be replaced at Contractor's expense. Protect adjacent work from damage due to roofing operations and related work. Provide temporary protection against walls adjacent to roofing work; remove protection upon completion.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL ROOFING MATERIALS**

- A. Refer to other sections for new roofing work and all requirements of roofing materials, products and systems.
- B. Alterations and Tie-ins to Existing Roofs**
  - 1. Provide Roofing materials, flashings, primers, adhesives and all other required accessories to meet or exceed the following "Basis of Design" minimum performance requirements. All roofing materials shall be UL Class A, FM Class 1-SH listed and shall comply with the International Building Code, and CGSB 37-GP-56M standards.
  - 2. Wood Cants and Curbs: Lumber; #2 grade free from warping and visible decay; fire retardant treated, and marked.
  - 3. Mechanical Fasteners: Manufacturer's standard FM approved fasteners for this type of application.
  - 4. Other Materials and Accessories: Manufacturer's standard and/or approved products for indicated applications.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Contractor shall prepare a plan and submit it to the Architect for which identifies how the roofing repairs and all associated work will be performed so as to prevent foot traffic on the newly installed roofing system.
- B. Coordinate the installation of roofing materials and associated work so as to provide a complete system complying with the combined recommendations of manufacturers and installers involved in the work.
- C. Protect other work from spillage of roofing materials, and prevent materials from entering and clogging drains and conductors. Replace or restore other work which is soiled or otherwise damaged by the performance of the roofing and associated work.

### **3.2 PERFORMANCE REQUIREMENTS**

- A. Initial Weather Resistance: It is required that the roofing and associated work be durable in normal weather exposure and not leak water during rainstorms. After completion of the roofing and associated work, and either during or immediately after a rainstorm, (and just

before final acceptance of the work) the Installer shall meet with the Contractor at the project and inspect the building for evidence of leaks in the roofing and associated work. Prepare a written report without delay (by Contractor) covering the inspection, and submit to Owner (with copy to Architect). Should no rain occur between the time the roof is completed and when all punch list items have been corrected, this requirement shall be waived.

B. Repair or replace roofing and associated work as required to eliminate leaks or other inability of roofing to initially withstand normal weather exposure.

1. Abnormal weather exposure is recognized to include hailstorms, lightning strikes, hurricane and tornadic winds, and other unusual phenomena of the weather as frequently covered by building insurance.

**C. Alterations and Tie-ins to Existing Roofs**

1. Examine substrate surfaces to receive roofing system and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

2. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane.

3. Cooperate with inspection and test agencies engaged or required to perform services in connection with roofing system installation.

4. Insurance/Code Compliance: Install roofing and flashing work (and test where required to show) compliance with governing regulations.

5. Coordinate the installation of roofing sheets, flashings, stripping, coatings and surfacing, so that felts are not exposed to precipitation nor exposed overnights. Provide cut-offs at the end of each day's work, to cover exposed felts and insulation with a course of coated felt with joints and edges sealed with roofing cement. Remove cut-offs immediately before resuming work. Glaze coats installed ply-sheet courses at the end of each day's work where final surfacing has not been installed.

6. Substrate Joint Penetrations: Do not allow adhesive to penetrate substrate joints and enter building or damage existing or new insulation, vapor barriers (retarders) or other construction.

7. General Requirements: Apply roofing membrane in accordance with roofing material manufacturer's instructions. Application of roofing shall immediately follow application of base sheet and/or insulation as a continuous operation.

D. Agreement to Maintain Roofing: See Part 1, Section 01900, Guarantees and Warranties.

**END OF SECTION 07500**

## PRE-APPROVED INDEPENDENT ROOFING INSPECTION FIRMS

### **Precision Construction Consulting, LLC**

524 Sunset Avenue  
Maple Shade, NJ 08502  
Phone: 609-560-1361  
Contact: John Hoffner

### **James D. Cummins & Co.**

35 Broad Street, Suite 4  
Keyport, NJ 07735  
Phone: 732-203-2008  
Fax: 732-203-2009  
Contact: Henry Vitale, RRO

### **Roof Maintenance Systems**

5118 Highway 33-34  
Farmingdale, NJ 07727  
Phone: 732-938-7373  
Fax: 732-938-9646  
Contact: Bill Tipton, RRC

### **H.J. Cannon Group**

520 Fellowship Road - Suite A-111  
Mount Laurel, NJ 08054  
Phone: 856-914-0900/800-233-6986  
Fax: 856-914-0600  
Contact: Chris Cifone, RRO

### **Sharp Roofing Associates, Inc.**

P.O. Box 219  
Ironia, NJ 07845  
Phone: 973-895-7330  
Fax: 973-895-7332  
Contact: Steven Sharp

### **System Design & Analysis, Inc.**

640 Herman Road, Suite 4  
Jackson, NJ 08527  
Phone: 732-833-9766  
Fax: 732-833-9733  
Contact: Jan Chrostowski

## SECTION 07530 - SINGLE PLY EPDM ROOFING MEMBRANE SYSTEM

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. The extent of the single-ply membrane roofing system is shown on the drawings.
- B. System Type: Fully Adhered System.
- C. Section Includes:
  - 1. Substrate preparation;
  - 2. Roof insulation board;
  - 3. Roof recovery board;
  - 4. Roof membrane;
  - 5. Flashings;
  - 6. Manufactured metal edge/ gravel stop and copings;
  - 7. Walkways.
- D. Related Sections:
  - 1. Section 06100 - Carpentry - wood blocking and nailers,
  - 2. Section 07600 - Flashing, Sheet Metal and Roof Accessories,
  - 3. Section 07800 - Roof Accessories,
  - 4. Section 15000 - Mechanical Work,
  - 5. Section 16000 - Electrical Work.
- E. Furnish all labor, materials and incidentals required to complete insulation, roofing, flashing, and all other roofing components supplied by the roofing membrane manufacturer and as shown on the drawings and/or specified herein.

#### 1.3 SUBMITTALS

- A. **Product Data:** Submit technical product information and installation instructions for each major roofing product or system required as necessary to demonstrate products comply with project requirements. Transmit a copy to the installer.
- B. **Shop Drawings:** Submit roofing membrane layout drawings showing outline of roof and roofing size, seam locations, specific roofing details illustrating relationships with adjacent construction, and flashing details at roof perimeter and roof penetrations.
  - 1. Shop drawings must be submitted to the roofing manufacturer and the Architect for review and obtaining approvals. The Architect shall not provide final review on shop drawings, unless manufacturer's review and stamped approval are indicated. Contractor to allow sufficient time required for shop drawings reviews.

2. Shop drawings shall include, but not limited to the following:
    - a. Completely executed Notice of Awards roofing work from the roofing membrane manufacturer.
    - b. Outline of roof and size.
    - c. Roof deck type.
    - d. Roof slope and designated direction of slope.
    - e. Location and type of all penetrations.
    - f. Roof perimeter condition.
    - g. All roofing items which will be supplied by the roofing membrane manufacturer.
    - h. Fastener manufacturer; include brand name and thickness.
    - i. Insulation manufacturer; include brand name and thickness.
    - j. Manufacturer's warranty type and period.
  3. Submit installation diagrams and instructions for installation of roofing system.
  4. Submit shop drawings of manufactured and/or fabricated sheet metal work.
- C. Submit Installer Certification that Installer is franchised and/or approved by the roofing material manufacturer for installation of a fully guaranteed roof.
1. The installer certification shall be submitted on the manufacturer's letterhead.
- D. Samples:
1. Roof membrane sheet: Submit 12-inch-square samples.
  2. Insulation: Submit 12-inch-square samples.
  3. Thermal barrier board (If applicable): Submit 12-inch-square samples.
- E. Warranty:
1. Submit manufacturer's sample of unexecuted warranty for review and approval by the Architect.
  2. Refer to Section 15000 for Roofing Manufacturer's requirement to include warranty information for the inclusion of the new and/or retro-fit roof drains into the overall roof system warranty.
- F. Agreement to Maintain Roofing:
1. Submit Roofing Subcontractor's sample of unexecuted agreement to maintain the roof system and related roof sheet metal work in accordance with indicated requirements.
- G. Certifications: The Contractor / Installer / Manufacturer (grantor) shall submit certifications to the Architect that the contract documents including the materials, methods and details of work provided for therein, are adequate to accomplish the specified results.
1. Contractor shall provide manufacturer's "Roof Assembly Letter" confirming each proposed roof system and decking description as follows:
    - a. Assembly,
    - b. Construction Type,
    - c. Maximum Slope,

- d. Deck Type,
  - e. Insulation - Layer (1),
  - f. Insulation Fastening,
  - g. Insulation Attachment Requirements; Field, Perimeter, Corners,
  - h. Insulation - Layer (2),
  - i. Insulation Attachment; Adhesive,
  - j. Membrane.
2. **The roofing membrane manufacturer shall submit a letter to the Architect, on the company letterhead, certifying that the roofing manufacturer's representative has inspected all cleats, chairs and anchors plates and they have been installed in accordance with the manufacturer's printed installation recommendations.**

#### 1.4 REFERENCE STANDARDS

- A. References in these specifications to standards, test methods, codes etc., are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.
- 1. ASTM American Society for Testing and Materials, Philadelphia, PA
  - 2. FM Factory Mutual Engineering and Research, Norwood, MA
  - 3. NRCA National Roofing Contractors Association, Rosemont, IL
  - 4. OSHA Occupational Safety and Health Administration, Washington, DC
  - 5. SMACNA Sheet Metal and Air Conditioning Contractors National Association, Chantilly, VA
  - 6. UL Underwriters Laboratories, Northbrook, IL

#### 1.5 QUALITY ASSURANCE

- A. Roofing and associated work must be performed by a single firm, called the "Installer" in this section, so that there will be undivided responsibility for the specified performance of all component parts, including the following (even though some parts may be sub-contracted to others).
- 1. Roof insulation.
  - 2. Roof recovery board, if applicable.
  - 3. Elastic roofing and base flashing.
  - 4. Sealant.
  - 5. Related sheet metal work.
- B. Installer: The roofing contract shall be carried out only by an installer who is franchised or otherwise accepted in writing by the roofing materials manufacturer for installation of a fully guaranteed roof in accordance with the manufacturer of the roofing membrane system requirements.
- C. Roofing Contractor: The roofing contractor shall have a recommended minimum of five (5) years experience in the installation of the specified roofing system, with roofing projects of magnitude equivalent to the required work. Foreman employed for this project must submit evidence of having been trained by the roofing manufacturer.
- 1. Minimum experience: Not less than a recommended five (5) years experience with roofing projects of magnitude equivalent to the required work.

2. Maintenance Proximity: Recommended location of not more than two hours normal travel time from Installer's maintenance plant to project site.
3. Optional Proximity: At contractor's option, and with Owner's prior acceptance of installer's certification that work of the maintenance agreement will be performed by a designated roofing contractor whose plant is located not more than two (2) hours normal travel time from project site, the above requirement will be waived.

D. Definitions:

1. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
2. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered Systems", before multiplication by a safety factor.
3. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered Roofing Systems", after multiplication by a safety factor.

E. Performance Requirements

1. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
2. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
3. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.
4. FM Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FM 4450 and FM 4470 as part of a membrane roofing system and that are listed in FM's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM markings.
  - a. Fire/Windstorm Classification: Class 1A-90.
5. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FM, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
  - a. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
  - b. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

6. Initial Weather Resistance: It is required that the roofing and associated work be durable in normal weather exposure and not leak water. After completion of the roofing and associated work, and either during or immediately after a rain storm, (and before final acceptance of the work) the installer shall inspect the building for evidence of leaks in the roofing and associated work. Prepare a written report, within five (5) working days, covering the inspection, and submit to Owner (with a copy to the Architect).
  - a. The installer shall repair or replace roofing and associated work as required to eliminate leaks or other inability of roofing to initially withstand normal weather exposure.
  - b. Abnormal weather is recognized to include hailstorms, lightning strikes, hurricanes and tornadic winds and other unusual phenomena of the weather as frequently covered by the buildings insurance.
  
- F. Manufacturer of Roofing Materials: Obtain primary roofing materials from a single manufacturer, who has published complete information on the required roofing system, and offers to guarantee the completed roofing installation as required. Obtain secondary materials from sources acceptable to the manufacturer of the primary roofing materials.
  1. **Special attention is called to the manufacturer's specified twenty (20) Years Total Roofing System Warranty.**
    - a. Warranty must be a **NDL (no dollar limit)**.
  2. Manufacturer of Roofing System is further limited to one who will fulfill the following requirements:
    - a. Participates in a pre-roofing conference.
    - b. Shows a record of continued production of the specified materials for a recommended twenty (20) years.
    - c. Provides a list of executed projects in the State of New Jersey.
    - d. Provides complete manufacturer's produced printed manuals describing the roofing membrane and accessory materials, technical specifications, method of installation, including manufacturer's standard detailed drawings.
    - e. Furnishes guarantee as hereinafter specified.
  3. Inspection: Upon completion of the installation, an inspection shall be made by a technical representative of the roofing manufacturer to ascertain that the roofing system has been installed according to roofing manufacturer's latest published specifications and details.
    - a. There shall be no deviation made from this specification without prior written approval by the manufacturer and the Architect.
  
- G. **Independent Roof Inspection Services:** The **Contractor** shall engage and pay for the services of a qualified independent Roofing Inspection Firm (RIF) to monitor and record all construction activities during the Work and provide written reports of same to the Architect.



1. Roofing Inspection Firm to be approved by the Architect / Owner.
2. Inspection firm must be utilized not less than three (3) days per week of roofing activities including all associated metal and waterproofing work and shall provide written report of same.
  - a. Roofing projects of less than 10,000 sq. ft., Roofing Inspection Firm must be utilized every day of roofing and associated work is performed.
3. Roofing Inspection Firm must not be affiliated with, have relation with, nor engage directly or indirectly in the manufacturing, installation, sales of any roofing or building materials.
4. Roofing Inspection Firm and its assigned inspector(s) for the work of this project must have a recommended minimum of five (5) years of experience in monitoring roofing systems similar to specified system.
5. A computer generated daily field report must be submitted to the Architect's office by FAX within three (3) days of visit. Hard copy of reports shall be submitted with closeout documents.
  - a. Field reports shall include all roofing work as indicated in this sections, other related roofing work sections, and include but not limited to the following:
    1. Date of visit;
    2. Contractor's company name;
    3. Contractor's subcontractor's name(s);
    4. Foreman's name;
    5. Extent of roofing contractor's work force, including subcontractors, and all tasks that have been performed during the visit;
    6. Weather conditions including day temperatures;
    7. Roof area and locations of roof areas where work in progress is taken place;
    8. Percent of roofing work completed;
    9. Status of Project Schedule;
    10. Punch list items one week before substantial completion date of work and in accordance with Contract Documents;
    11. Items which are deficient and/or not in compliance with Contract Documents;
    12. Status of prior reported deficiencies;
    13. Summary of visual work completed between visits;
    14. Inspector's name and report writer's name if different.

H. Roof Code Requirements:

1. Roofing System Design to meet roof covering wind resistance and wind test standards as described in Section 1504 of the IBC and shall be tested in accordance FM 4474, UL 580 or UL 1897.
  - a. Basic wind speed for this project as per the IBC and must be used to determine the basic Velocity Pressure (Pv) and the building minimum design wind and wind resistance standards required by code (and comply with Table 1504.8).
2. Roofing membrane system shall comply with Rubber Manufacturers Association (RMA), RP-1, or ASTM D4637, or CGSB 37-GP-52M.
3. Roofing Insulation. Above-deck thermal insulation board shall comply with the standards in Table 1508.2, Polyisocyanurate board ASTM C 1289, Type I or Type II.

I. Contract Drawing Detail Approval: If the roofing manufacturer takes exception to the contract document details, the manufacturer shall provide the roofing contractor with acceptable details to be submitted to the Architect for review and approval.

1. This Project must receive Architect's approval through this process prior to shipment of materials to the project site.
2. All roofing work required by the roofing system manufacturer shall be included in the contract at no additional cost to the Owner.
3. Any unusual conditions or requirements must be brought to the attention of the manufacturer of the roofing membrane system.
4. When field conditions necessitate modifications to originally approved shop drawings, a copy of the shop drawings which include outlining all modifications shall be submitted to the manufacturer for revisions and obtaining his approval.

J. Final Inspection:

1. Approved Applicators must supply the roofing manufacturer with an as-built shop drawing for final inspection.
2. As-Built shop drawings must be approved and given a shop drawing number by the roofing manufacturer's construction materials department.

K. Warranty:

1. Submit manufacturer's sample of unexecuted warranty for review and approval by the Architect.
2. Provide manufacturer's guarantee on the work for indicated period **twenty (20) years**, extending to flashings, metal edge copings, gravel stops, insulation and including all other materials for a single source warranty, (i.e.: Total System Warranty) signed by an authorized representative of the sheet manufacturer, guaranteeing the roofing materials against failures resulting from normal roof exposure.

3. Special Manufacturer's Warranty Wind Speed.
  - a. Warranty Wind Speed, (Maximum Peak Gusts), for this project for fully adhered roofing system shall be a minimum of 90 mph (With 1/2" Securerock Gypsum-Fiber Roof Board); or approved equal..

L. Agreement to Maintain Roofing:

1. Provide Roofing subcontractor's agreement to maintain the roof systems and related roof sheet metal work in a weathertight and watertight condition for a period of **two (2) years** starting from the date of approved substantial completion date and in accordance with special Maintenance Contract outlined herein.
  - a. During the Maintenance Period, the Roofing subcontractor agrees that within 24 hours of receipt of notice from the Owner he will inspect and make immediate emergency repairs to defects or to leaks in the roof systems and related flashing work. He further agrees that within a reasonable time, he will restore the affected items to the standard of the original specifications and without voiding the Manufacturer guarantee. All emergency and permanent work during the life of the agreements to maintain the roof systems will be done without cost to the Owner, except in the event it is determined that such leaks were caused by abuse, lightning, hurricanes, tornado, hailstorm, other unusual climatic phenomena of the elements, or failure of related work (except related roof sheet metal work included under the Agreement) installed by other parties.
  - b. Agreement to maintain roofing system shall be in a written form acceptable to the Architect/Owner and before final payment is released for the project.
  - c. If, 48 hours after notification of roof leakage, Contractor has not responded, Owner shall have the right, without invalidating his warranties and at the expense of the Contractor, to make any emergency temporary repairs that are required in order to protect the building and its contents from damage due to roof leakage.

## **1.6 PROJECT CONDITIONS**

- A. Begin roofing installation when weather conditions are within acceptable limits according to manufacturer's installation instructions.

## **1.7 PRODUCT HANDLING**

- A. Deliver materials to project site in manufacturer's unopened sealed containers or unopened packages, with manufacturer's labels intact.
- B. Store materials in weather-protected environment, clear of ground and moisture.
  1. Storage of Materials will not be permitted on the roof, unless guaranteed, in writing, by the contractor, not to damage.

## **1.8 JOB CONDITIONS**

- A. Proceed with roofing work only after substrate and penetrating work and repair of any damage, have been completed.

B. Pre-Roofing Installation Conference:

1. Prior to the installation of the roofing and associated work, meet at the project site with the installer, the installer of each component of associated work, the Architect, the Construction Manager, Roofing Inspection Firm and other representatives directly concerned with performance of the work including, the roofing membrane system manufacturer and the Owner.
2. Provide Record of the discussions of the conference and the decisions and agreements (or disagreements) reached, and furnish a copy for the record, to each party attending.
3. Provide at least 48 hours advance notice to participants prior to convening pre-roofing conference.
4. Review foreseeable methods and procedures related to the roofing work, including but not limited to the following;
  - a. Review Project requirements (Drawings, Specification and other Contract Documents).
  - b. Review status of conditions and substrates (by the roofing installer), including extent of moisture penetration in existing work, drying and similar considerations.
  - c. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
  - d. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions.
  - e. Review regulations concerning code compliance environmental protection, health, safety, fire and similar considerations.
  - f. Establish units of work, including scheduling removals, preparation and replacement, such that each unit may be completed prior to end of each day's work.
  - g. Review the schedule for the work.

C. Weather Conditions: Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations and when conditions will permit the work to proceed in accordance with requirements and the manufacturer's recommendations.

D. Certification: The roofing contractor (guarantor) shall submit a certification to the Architect that the contract documents including the materials, methods and details of work provided for therein, are adequate to accomplish the specified results. In so doing, the Guarantor also agrees either that the materials and methods specified herein are such as to insure the result required or he will, at no additional expense, furnish such additional or alternative items of labor and materials (or both) as may be necessary to accomplish the stated intent of the contract documents.

E. Conditions not as Anticipated: The contractor shall immediately notify the Architect of upon discovery of conditions which may jeopardize successful accomplishment of and prevent execution of the work as intended by the Architect, as provided in, or not anticipated by the Contract.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

#### A. "Basis of Design":

1. Alternate Bid: Fully Adhered System: Provide Carlisle Syntec Inc., Sure Seal - Black, Design "A" Fully Adhered System, Tel.# 800.479.6832, [www.carlisle-syntec.com](http://www.carlisle-syntec.com); or approved equal.
  - a. Subject to compliance with requirements of the "Basis of Design", products by the following manufacturer may be incorporated in the work include:
    - 1) "RubberGuard™ LS-FR PT" by Firestone Building Products Company
    - 2) "EPDM Fit" by John Mansville
    - 3) "VersiGuard EPDM with QAT" by Versico Inc.
    - 4) Or approved equal.

#### B. All Components of the Roofing System shall be products indicated in manufacturer's product data for the Roofing Systems or to be approved materials and components by the indicated manufacturer(s).

### 2.2 ROOFING MEMBRANE

- #### A. Black Membrane: **.060 inches thick (60 mil)**, non-reinforced, minimum ten (10) feet wide, length to be determined by job conditions, 6" wide Factory-Applied Tape (FAT), UL Class A, EPDM (Ethylene Propylene Diene Monomer) compound elastomer conforming to the following minimum physical properties:
1. Color: Black
  2. Tolerance on Nominal Thickness: ASTM D412; +/- 10%.
  3. Elongation, Ultimate: ASTM D412; 300% pass.
  4. Tearing Strength: ASTM D624 (Die C); 150 lbf./in.
  5. Brittleness Point: ASTM D746; - 49°F.
  6. Resistance to Heat Aging, Properties after four (4) weeks at 240°F; ASTM D 573:
    - a. Tensile Strength: ASTM D412; 1,205 min. psi.
    - b. Tear Strength: ASTM D624; 125 lbf/in.
    - c. Elongation, Ultimate: ASTM D412; 200% min.
    - d. Linear Dimensional Change: ASTM D1204; +/- 1.0% max.
  7. Ozone Resistance:
    - a. Condition after exposure to 100 pphm, Ozone in air for 168 hours at 104°F, Specimen is at 50% strain; ASTM D1149; No Cracks.
  8. Resistance to Water Absorption after seven (7) days immersion at 158°F, Change in mass; ASTM D471; +8% / -2%.

9. Factory Seam Strength; ASTM D816 - Modified; Membrane Rupture.
10. Resistance to Outdoor (Ultraviolet) Weathering:
  - a. Weathering Xenon-Arc, 7,560 kL/m<sup>2</sup> total radiant exposure at 0.70 W/m<sup>2</sup> irradiance, 80°C black panel temp., ASTM G155; No Cracks and No Crazing.
11. Water Vapor Permeance, ASTM E 96 (Proc. B or BW); 0.10 perms max.

### **2.3 ROOF RECOVERY BOARD**

- A. Basis of Design: Where shown, provide "SecurShield HD Plus Polyiso Board"; Carlisle Syntec Inc., or approved equal.
  1. R-Value: 2.5
  2. Board Size: 4' x 4' only.
  3. Thickness (Uniform): 1/2" and as recommended by the roofing membrane manufacturer for a specific application.
  4. FM approved for Wind Uplift, tested for 90 psf.
  5. Codes and Compliances
    - a. ASTM C1289, Type II, Class 4, Grade 1 (109 psi max.)
    - b. IBC, Section 2603
    - c. UL Standard 790, 263 and 1256: Component of Class A Roof Systems
    - d. FM Standards 4450/4470: Class 1 approval for steel roof deck
  6. Properties and Characteristics:
 

a.	ASTM D1621	Compressive Strength	109 psi max
b.	ASTM D2126	Dimensional Stability	<0.5% linear change (7 days)
c.	ASTM C209	Water Absorption	<1% volume
d.	ASTM D3273	Resistance to Mold	Passed

### **2.4 INSULATION BOARD**

- A. Basis of Design: "SecurShield" Polyisocyanurate Board for Uniform and/or Tapered Insulation (and Tapered Saddles), as manufactured by Versico; or approved equal.
  1. A foam core insulation board covered on both sides with a moisture resistant coated glass fiber mat facer.
  2. Board Size: 4' x 4' only.
  3. Thickness (Uniform): As necessary to achieve the required "R" value. See also minimum thickness and required slopes indicated on drawings.
    - a. See roof assemblies for insulation thicknesses and attachment methods. Bottom layer shall be a minimum of 1½" thick, with staggered joints plus ½" minimum of tapered insulation at the low point, as indicated.

- 1) Tapered insulation; 1/4" to the foot slope for the roof area; and 1/2" to the foot slope for gussets/crickets. Stagger all joints between layers.
  4. R-Value (Uniform): Minimum of R=30.0, per 3 1/2" thick, min. two layers [R-5.7. per 1"; R-11.4 per 2"; R-17.4 per 3"; R-23.6 per 4"].
  5. Density: 1.5 pcf.
  6. Surface - Burning Characteristics: Tested in accordance with ASTM E 84 and IBC 719.2;
    - a. Flame Spread: Not more than 25
    - b. Smoke - developed: Not more than 450
  7. Insulation boards must pass the tests of:
    - a. ASTM C1289-06, Type II, Class 2, Grade 3 (25 psi).
    - b. FM Class 1 approval for steel roof deck construction: FM 4450 or UL1256.
    - c. FM 4470 (subject to the conditions of approval described in [www.Roofnav.com](http://www.Roofnav.com)).
- \* No substitution will be allowed.

## 2.5 RELATED MATERIALS

- A. Manufactured roof metal edge / gravel stop and copings: Furnished or approved by the membrane manufacturer, to meet FM requirements for I-90, and included in manufacturer's warranty.
  1. Basis of Design: "SecureEdge 200" Gravel Stop and Coping Systems, Carlisle; or approved equal.
    - a. Pre-finished Aluminum Sheet: ASTM B 209, .050 inch thick, manufacturer's standard alloy and temper for indicated applications.
    - b. Face heights: As indicated.
    - c. Finish: 70 percent "Kynar 500" or "Hylar 5000" resin finish over epoxy primer; minimum system thickness 1.0 mil. Provide manufacturer's standard prime coat on underside.
    - d. Color(s): Will be selected by Architect, after contract award, from manufacturer's standard color selection, unless otherwise indicated.
      1. Provide manufacturer's standard **twenty (20) year** warranty for color.
    - e. Provide shop-mitered and welded corners. See Section 07600 for additional requirements.
- B. Flashing: Elastoform clean cured EPDM flashing furnished by membrane manufacturer.
- C. Bonding Adhesive: Compatible with materials to which the membrane is to be bonded, furnished by membrane manufacturer.
- D. In Seam Sealant: Furnished by membrane manufacturer.

- E. Splicing Tape: Furnished by the membrane manufacturer, 3" and 6" wide splicing tape for indicated applications and as per manufacturer's requirements for each indicated warranty.
- F. Splicing Cement: Furnished by membrane manufacturer.
- G. Lap Sealant: Compatible with materials with which it is used, shall be trowel or gun consistency furnished by membrane manufacturer.
- H. Water Cut-Off Mastic: Compatible with materials with which it is used, furnished by membrane manufacturer.
- I. Pourable Sealer: Compatible with materials with which it is used, furnished by membrane manufacturer.
- J. Insulation Fasteners: Furnished by membrane manufacturer.
  - 1. Contractor to provide manufacturer's recommended roof fasteners in required fastening patterns for each of the actual encountered roof deck materials.
- K. Insulation Adhesive: Furnished by the membrane manufacturer.
  - 1. Contractor to provide manufacturer's recommended adhesives for required application.
    - a. DASH Adhesive: A spray or extruded applied, two-component polyurethane, low-rise expanding foam adhesive used for attaching approved insulations to compatible substrates (concrete, cellular lightweight insulating concrete, gypsum, cementitious wood fiber, wood or steel) or existing smooth or gravel surfaced BUR, modified bitumen or cap sheets.
    - b. DASH Catalyst: Added to DASH Adhesive (Part B Side) to quicken adhesive reaction time.
    - c. DASH DC or Bag in a Box Adhesive: A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates using a portable applicator.
    - d. OlyBond 500 BA - A two-component, polyurethane, low-rise expanding adhesive used to bond insulation to various substrates using a mechanical dispenser system.
    - e. OlyBond Spot Shot - A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates using a portable applicator.
    - f. One-Step: A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates using a portable applicator.
  - 2. See roof assembly drawing for insulation adhesive bead spacing.
- L. Wood Nailers: Fire-Retardant Treatment: Where fire-retardant treated wood ("FRT") is indicated or required, pressure impregnate lumber and plywood with fire-retardant chemicals to comply with AWWPA C20 and C27, respectively, identify "FRT" lumber with appropriate classification marking of Underwriters Laboratories, Inc., U.S. Testing, Timber Products



Inspection or other testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire treated wood shall have a flame spread of 25 or less and shall be dried to 19% moisture content for lumber and 15% for plywood. Exposed wood or wood subject to high humidity conditions shall be identified that the moisture content shall not exceed 28% when tested at 92% relative humidity in accordance with ASTM D3201.
  2. Treatment products: The following products, provided they comply with requirements of the contract documents will be among those considered acceptable:
    - a. "Dricon"; Hickson Corporation.
    - b. "Flame Proof LHC"; Osmose Wood Preserving, Inc.
    - c. Or approved equal.\* Treat members indicated on drawings and/or as required to meet the code requirements.
  3. Lumber treated with any of the wood preservatives such as, Creosote, Pentachlorophenol, Copper Naphthenate and Copper 8-quinolinolate will adversely effect the EPDM membrane when in direct contact and are, therefore, unacceptable.
- M. Splice Cleaner or Primer: Furnished by membrane manufacturer.
- N. Expansion Joints: Sure-Seal joint supports as indicated.
- O. Walkways:
1. Preformed Walkway Boards: Molded reprocessed rubber, manufactured or recommended by the membrane manufacturer, 30 x 30 x 3/4 inch size.
    - a. Walkway Board Adhesive: as recommended by the membrane manufacturer.
- P. Reinforced Securement Strips : Manufacturer's standard 6 inch or 9 inch wide by 100 feet long reinforced membrane perimeter fastening strip.
- Q. Seam Fastening Plates: 2 inch diameter FM approved metal plates used in conjunction with reinforced securement strip.
- R. All other related roofing materials and accessories supplied by the roofing membrane manufacturer for inclusion under the Twenty (20) Years "Total System Roofing Warranty."
1. Seam splice tape, prime, seam joint cover and seam flashing: Manufacturer's standard.

## **2.6 MANUFACTURED FLASHING MATERIALS:**

- A. Manufacturer's standard in accordance with his detailed drawings and printed specifications and instructions for installation.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. Install all work in conformance with the manufacturers printed specifications and as shown on approved shop drawings.

B. Cautionary Requirements:

1. Do not use oil base or plastic roof cement.
2. Do not allow waste products (petroleum, grease, oil, solvents, vegetable or mineral oil, animal fat) or direct steam venting to come in contact with EPDM roofing system.
3. Do not expose membrane and accessories to a constant temperature in excess of 180°F.
4. Cement and bonding adhesives contain petroleum distillates and are extremely flammable. Do not breath vapors or use near fire.
5. Splice wash: Furnish by membrane manufacturer.
6. Splicing and bonding surfaces shall be dry and clean.
7. Roofing system may be installed during cold weather. Follow specified precautions for storage of materials and expose only enough cement and adhesives to be used within a four (4) hour period.
8. Roof surface shall be free of ponded water, ice, or snow to eliminate future condensation problems.
9. Seal Splice Wash used in the splicing procedure is extremely flammable; do not use near fire or flame or in a confined or unventilated area. Dispense only from a UL listed or approved safety can.

C. Delivery, Storage and Handling:

1. Deliver materials in original unopened containers.
2. Containers labeled with manufacturer's name, brand name, installations, instructions and identification of various items.
3. Store materials, except membrane, between 60°F and 80°F. If exposed to lower temperature, restore to proper temperature before using.
4. Store materials, except membrane in a dry area and protect. Do not install damaged material. Damaged materials shall be replaced at contractor's expense.

### 3.2 INSPECTION

- A. Installer must examine substrates and conditions under which roofing work is to be performed and must notify contractor in writing of unsatisfactory conditions. Do not proceed with roofing work until unsatisfactory conditions have been corrected in a manner acceptable to installer.
- B. **The roofing membrane manufacturer shall submit a letter to the Architect, on the company letterhead, certifying that the roofing manufacturer's representative has inspected all cleats, chairs and anchors plates and they have been installed in accordance with the manufacturer's printed installation recommendations.**

1. The Roofing Contractor can start snapping on the manufacturer's pre-finished metal edge, coping, fascia only after the cleats, chairs and anchor plates are inspected and approved by the manufacturer.

### **3.3 PREPARATION OF SUBSTRATES**

- A. Roof substrate shall be dry and free of foreign materials. Remove nails, nail heads and other protrusions from existing deck.
  1. Roof substrate shall be free of ponded water, ice, or snow to eliminate future condensation problems.

### **3.4 INSTALLATION (GENERAL)**

- A. Comply with instructions of the primary roofing materials manufacturer, and comply with the requirements for **twenty (20) Year Total Roofing System Warranty**.
- B. Coordinate with all roof mounted items to facilitate roofing installation.
- C. Coordinate with the installation of all metal flashing.
- D. Confinement of Materials: Do not allow fluid and plastic to spill or migrate beyond surfaces of intended application.
  1. Contractor to clean all migrated materials exposed to view.
- E. Performance: It is required that roofing work be water-tight for normal weather exposure and not deteriorate in excess of normal weathering.
- F. Clean site of all debris and contractor materials; restore damaged site work, (i.e.; shrubs, turf, curbs, etc.) to conditions prior to start of this work.
- G. Install accessories as shown and as recommended by the prime materials manufacturer.
- H. Insulation Under Roofing: Do not advance the installation of new roof insulation excessively ahead of roofing. Do not install roofing or new insulation over wet insulation; remove and replace with dry insulation before proceeding.
- I. Coordinate Roofing with flashing and other adjoining work to ensure proper sequencing of entire work.

### **3.5 PROTECTION**

- A. Contractor shall provide protection for roofing during construction period, so that the work will be without damage or deterioration except for normal weathering at time of acceptance.

### **3.6 INSTALLATION OF ROOFING INSULATION BOARDS**

- A. Install roofing insulation boards in accordance with instructions of the prime materials manufacturer, use fasteners and accessories approved or supplied by the thermal board manufacturer and approved by the roofing membrane manufacturer.

- B. Exposure: Do not install roofing insulation boards each day than will be covered by new roofing by the end of same day. Provide water cut-off as required each day.
- C. Provisions shall be made by the contractor for the completion of roofing and on the area of roofing undertaken each day. No roofing area may be left uncompleted overnight. Contractor shall construct, where necessary, watertight waterstops at the completion of each day's work. Waterstops shall be entirely removed before continuing with the roofing operation.
- D. Apply a layer of insulation of the required thickness, unless otherwise shown or required to make up the total thickness. Stagger joints in one direction as recommended by the manufacturer.
- E. Place roof insulation on substrates as recommended by the roofing systems manufacturers. Ensure that the top surface of all insulation panels are uniformly abutted and without "steps".
- F. Fully Adhered Roofing System:
  - 1. Mechanically fasten lower layer of insulation to roof deck with manufacturer's approved insulation fasteners. Pattern of fasteners as per manufacturer's recommendations to achieve the required FM approvals. Quantity shall be a minimum of one (1) fastener for every two (2) square feet of insulation unless otherwise specified by the roofing manufacturer.
  - 2. Secure top layers of insulation and recovery board with manufacturer's approved adhesives and in compliance with manufacturer's instructions and recommended rates for application. Stagger all joints between layers.

### **3.7 INSTALLATION, MEMBRANE**

- A. Position Roofing Membrane over approved substrate without stretching.
- B. Allow membrane to relax approximately (1/2) hour prior to bonding.
- C. Fold sheet back so (1/2) of underside of the sheet is exposed. Sheet fold shall be smooth, with no wrinkles or buckles.
- D. Apply bonding adhesive evenly, no globs or puddles, with nine (9) inch plastic core paint roller. Adhesive shall be applied to both sheet and substrate. One (1) gallon of bonding adhesive applied correctly will cover approximately 60 square feet of finished surface. Allow adhesive to dry until tacky but not stringy or sticky to a dry finger touch.
  - 1. Roll coat membrane into adhesive; avoid wrinkles.
  - 2. Brush down bonded half of the sheet with push broom to achieve maximum contact.
  - 3. Fold back the unbonded half of the sheet and repeat bonding procedure.
  - 4. Apply adjoining sheets in same manner lapping edges a minimum of three (6) inches. Do not apply bonding adhesive to the splice area.
- E. Join sheets together using 6" Factory – Applied Tape (FAT) whenever possible to properly prepared surfaces following manufacturers' instructions.
  - 1. Set tape in place and roll with 2" seam roller to bond to the seam area of each sheet.

### **3.8 MISCELLANEOUS**

- A. Wood nailer treated with fire-retardant treatment, shall be installed at the gravel stop perimeter of each roof.
  - 1. Anchor wood nailers in accordance with minimum criteria established by FM Loss Prevention Data Sheet 1-49 and to resist a minimum lateral force of 75 pounds per lineal foot.
- B. Daily Seal: Care should be exercised to ensure that water does not flow beneath any complete sections of roof. Temporarily seal loose edge of membrane when weather is threatening.
- C. Roof Metal Edge, Coping and Other Roof Accessories: Install in accordance with requirements indicated in other Division 7 - Specification Sections.
- D. Walkway Pads (Fully Adhered System):
  - 1. Walkway pads to be adhered to the EPDM membrane with Splicing Cement.
  - 2. Provide Walkway Pads about the entire perimeter of each and every rooftop mechanical equipment item, and where else shown on the contract drawings.

**END OF SECTION 07530**

## **SECTION 07600 - FLASHING, SHEET METAL AND ROOF ACCESSORIES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Pre-manufactured/pre-engineered fascia / metal edge / coping systems.
  - 2. Pre-manufactured metal flashing and counterflashing.
  - 3. Pre-manufactured roof expansion joint covers.
  - 4. Miscellaneous sheet metal accessories.
  - 5. Roof expansion joint covers.
  - 6. Exposed metal field and shop fabricated sheet trim and fascia units, where indicated.
  - 7. Pipe curb assembly.
  - 8. Pipe-Penetration Flashing.
- B. Related Sections:
  - 1. Wood nailers and blocking: Section 06100.
  - 2. Roofing Materials: Elsewhere in Division 7.
  - 3. Roofing Manufacturer's furnished metal edge: Section 07530.
  - 4. Roof Specialties and Accessories: Section 07800.
  - 5. Joint Sealer Assemblies: Section 07900.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. Structural Requirements: Design and install work of this section, including attachment to the structure, to safely withstand dead, live and wind loads prescribed by the International Building Code.
- B. Environmental Requirements: Provide for expansion and contraction of system components due to air temperature and solar heat gain. Provide systems which will accommodate movement due to temperature change without buckling, failure of seals, undue stress on structural elements, reduction of performance, or other detrimental effects.
  - 1. Anticipated air temperature range: Minus 10°F to +105°F.

#### **1.4 REFERENCES**

- A. Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).
- B. ASTM B 32; Standard Specification for Solder Metal.
- C. ASTM B 209; Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- D. Aluminum Association, Design System for Aluminum Finishes (AA).

- E. American Architectural Manufacturers Association (AMMA), standards as referenced herein.
- F. ANSI/SPRI ES-1 Wind Design Standard for Edge Systems Used with Low Slope Roof Systems.

## 1.5 SUBMITTALS

- A. Product Data: Manufacturer's specifications, standard details, and installation recommendations.
- B. Shop Drawings: Submit manufacturer's shop drawings showing material types, thickness, sizes, shapes, connections, layout, joining, profiles and anchorage of fabricated work and relation to adjacent work. edited product data or shop drawings, or a combination thereof, as required to accurately describe products to be provided. Show elevations, field measurements, reinforcement, expansion provisions, installation accessories, and detail sections of composite members. Draw layouts at scale of 1/4 inch per foot, details at scale of 3 inches per foot.
  - 1. **Provide shop drawings for, but not limited to, the following:**
    - a. Covering on minor flat, pitched or curved surfaces.
    - b. Building control and expansion joints.
    - c. Metal edge, fascia, area divider, coping.
    - d. Base flashing and counterflashing.
    - e. Flashing for roof drains and roof penetrations.
    - f. All other sheet metal work requiring fabrication.
    - g. Details of all joints for above.
    - h. Reglets and wedges.
  - 2. Sheet metal shop drawings shall be prepared to reflect SMACNA detail standards and in accordance with ANSI/SPRI ES-1 Test Protocols.
- C. Samples for Color Selection of Coated Finishes: Coating manufacturer's color selection data.
- D. Samples for Color Verification of Coated Finishes: For each type and color of coated finish submit 12-inch-long sections of extrusions and formed sections and 6-inch-square sheets.
- E. Pre-engineered fabricated and pre-finished sheet metal manufacturer's product literature, finish specification and sample finish warranty.
- F. Sheet metal fabricators and installers qualifications.

## 1.6 QUALITY ASSURANCE

- A. Listing - Roof Perimeter Flashing System: Provide system listed in Factory Mutual System's "Approval Guide," classified for Zone 2 (I-90 windstorm resistance).
- B. Fabricator / Installer: A firm having a recommended minimum of 5 years of successful experience in fabrication and installation of sheet metal work of type and scope equivalent, to work of this section.

**NOTE: Metal Coping, Metal Edging, and Area Divider Cover shop fabricated by Contractor is unacceptable and will not be approved by Architect. These metals shall be**

**pre-engineered, fabricated and furnished by the roofing manufacturer and or approved manufacturers below.**

**1. Pre-engineered shop drawing must be submitted to the Architect before payment is authorized by the Architect for the work.**

- C. Pre-engineered and Contractor: Fabricate and install sheet metal work in accordance with indicated reference standards.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Store materials off ground, under cover. Protect from damage and deterioration.
- B. Handle materials to prevent damage to surfaces, edges and ends of sheet metal items. Damaged material shall be rejected and removed from the site.

**1.8 WARRANTY**

- A. Warrant fascia, coping system work to be free of defects in materials and workmanship, to resist blow-off and to be leak tight, due to conditions within stated design limits.
- B. Warrant Fluoropolymer coating to remain free, under normal atmospheric conditions, from peeling, checking, or cracking, and chalking in excess of numerical rating of 8 when measured in accordance with ASTM D659-86, or fading in excess of 5 N.B.S. units during warranty period.
  - 1. The Warranty period shall be **twenty (20) years** which starts the approved date of Substantial Completion.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide pre-engineered manufactured products approved by the roofing system manufacturer(s) which may include but not limited to the following:
  - 1. Formed-Aluminum Metal Edging, Copings and Fascia:
    - a. Hickman: W.P. Hickman Co., Tel.# 828.676.1700, [www.wph.com](http://www.wph.com).
    - b. Imetco, an ESOP Company.
    - c. Metal-Era, Inc., Tel.# 800.558.2162, [www.metalera.com](http://www.metalera.com).
    - d. Southern Aluminum Finishing Co., Tel.# 800.241.7429, [www.saf.com](http://www.saf.com).
    - e. or approved equal.
  - 2. Aluminum Reglets:
    - a. Fry Reglet Corporation, Tel.# 800.237.9773, [www.fryreglet.com](http://www.fryreglet.com).
    - b. Hickman: W.P. Hickman Co., Tel.# 828.676.1700, [www.wph.com](http://www.wph.com).
    - c. Keystone Flashing Company, Tel.# 800.526.8348, [www.keystoneflashing.com](http://www.keystoneflashing.com)
    - d. or approved equal.



3. Stainless-Steel Reglets:

- a. Cheney Flashing Company, Tel.# 609.394.8175 / 800.322.2873, [www.cheneyflashing.com](http://www.cheneyflashing.com).
- b. Fry Reglet Corporation, Tel.# 800.237.9773, [www.fryreglet.com](http://www.fryreglet.com).
- c. Keystone Flashing Company, Tel.# 800.526.8348, [www.keystoneflashing.com](http://www.keystoneflashing.com)

## 2.2 METALS

- A. Type "C"; Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper designated below:
1. Type "C-4"; Factory-Painted Aluminum Sheet: ASTM B 209, 3003-H14, with a minimum thickness of 0.040 inch, unless otherwise indicated.
- B. Type "D"; Stainless-Steel Sheet: ASTM A 167, Type 304, soft annealed, with No. 2D finish, except where harder temper is required for forming or performance; minimum 0.0187 inch thick, unless otherwise indicated.

## 2.3 COPINGS, FASCIA, ROOF EDGE & AREA DIVIDER COVER

- A. Provide pre-engineered manufactured exposed coping components fabricated from the following metal:
1. Formed-aluminum sheet in thickness indicated. Refer to Architectural drawings for thickness / height requirement(s).
  2. **Pre-engineered shop drawing must be submitted to the Architect before payment is authorized by the Architect for the work.**
- B. Provide fascia in shapes and sizes indicated, with shop-mitered and -welded corners.
1. Include water dams formed from at least 0.028-inch- thick, galvanized steel sheet; anchor plates; cleats or other attachment devices; concealed splice plates; and trim and other accessories indicated or required for complete installation, with no exposed fasteners.

## 2.4 REGLETS

- A. General: Provide reglets of type, material, and profile indicated, compatible with flashing. Form to securely interlock with counterflashing.
1. Type - 1: Surface-Mounted Type: Provide "SM" springlok surface Mounted Reglet by Fry Reglet Corp.; or approved equal.
    - a. Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
    - b. Aluminum: 3003-H14 alloy, meeting ASTM B209-95, 0.040" thick aluminum, color as selected by Architect from manufacturer's standard colors.
    - c. Stainless Steel: Type 304 alloy, meeting ASTM A666-96a, 0.020" thick, 2B finish.

- d. Provide silicone sealant and manufacturer's factory supplied stainless steel fasteners and neoprene backed stainless steel washers.
  - e. Provide 3" minimum lap joints.
2. Type - 3: Masonry Type: Provide "MA-1.5" (Brick) and "MA-4" (CMU) springlok Reglet by Fry Reglet Corp.; or approved equal.
- a. Aluminum: 3003-H14 alloy, meeting ASTM B209-95, 0.040" thick aluminum, color as selected by Architect from manufacturer's standard colors.
  - b. Stainless Steel: Type 304 alloy, meeting ASTM A666-96a, 0.020" thick, 2B finish.
  - c. Provide 3" minimum lap joints.
  - d. Sawcut joint to receive reglet to a depth of approximately 1/4" greater than the depth of the horizontal back leg of reglet.
  - e. Insert reglet into sawcut and wedge in place using lead wedges installed at 12" o.c., minimum. Hammer wedges to a depth that will not interfere with sealant or backer rod.
  - f. Install sealant exterior sealant to form fillet bead minimizing holding of water.
3. Type - 5: Roof Top Equipment Curb: Provide "MA" springlok Reglet by Fry Reglet Corp.; or approved equal.
- a. 0.040" thick aluminum, with 1-1/2" top flange, color as selected by Architect.
  - b. Provide 3" minimum lap joints.
4. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of the counterflashing's lower edge.

## **2.5 COUNTERFLASHING**

- A. Provide springlok counterflashing by Fry Reglet Corp.; Metal-Era; Xtreme Trim; or approved equal.
  - 1. 0.040" thick aluminum, as indicated on the drawings.
  - 2. 0.020" thick, type 304 stainless steel, as indicated on the drawings.
  - 3. Provide inside and outside corners including special angle where required.
- B. At rising walls above roofs where through wall mechanically keyed flashing, provide 2-piece type 302/304 stainless steel, 0.018" thick counter flashing as manufactured by Keystone Flashing Company, Inc.; or approved equal.

## **2.6 MISCELLANEOUS MATERIALS AND ACCESSORIES**

- A. GENERAL REQUIREMENTS:
  - 1. All miscellaneous materials, accessories or other items essential to the completion of sheet metal installation, though not specifically shown or specified, must be provided.

2. All such items, unless otherwise indicated on drawings or specified herein, shall be applied using sheet metal gauges which conform to recognized industry standards of sheet metal practices and without additional cost to the Owner. For sheet metal and pre-manufactured units, provide type of solder, ASTM B23, and corrosion-resistant metal as recommended by the producer of the metal sheets for fabrication and installation.
  3. Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size and gauge required for performance.
- B. Fasteners: Same metal as flashing/sheet metal, as indicated or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
  - C. Bituminous Coating: FS TT-C-494 or SSPC - Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
  - D. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.
  - E. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed; comply with FS TT-S-00227, TT-S-00230, or TT-S-001543.
  - F. Epoxy Seam Sealer: 2-part non-corrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior non-moving joints including riveted joints.
  - G. Paper Slip Sheet: 15-lb. rosin-sized building paper.
  - H. Polyethylene Underlayment: 6-mil carbonated polyethylene film; FS L-P-512.
  - I. Prefabricated Accessories: Provide prefabricated accessories by Metal-Era, Roof Edge Systems, or approved equal.
    1. Exposed Termination Bar: 0.05 x 1/2" x 1 1/2" x 1/2" aluminum channel or 1" x 3/16" aluminum bar as manufactured by Metal-Era Inc.; or approved equal. Provide fastening at 8" o.c.
  - J. Pipe Curb Assembly:
    1. Manufacturer: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
      - a. Pipe Portal Systems as manufactured by Portals Plus, Inc., Tel.# 800.624.8642.
      - b. The Pate Company, Tel.# 800.243.3018 or 630.705.1920.
      - c. ThyCurb, Tel.# 216.762.0061.
      - d. Or approved equal.

## **2.7 FABRICATION, GENERAL**

- A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

- B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.
  - 1. Seams (Metal other than Aluminum): Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
  - 2. Seams (Aluminum): Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
  - 3. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
  - 4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
  - 5. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.
  - 6. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
  - 7. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.
    - a. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.
- D. SHEET METAL FABRICATIONS
  - 1. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements.

## **2.8 ALUMINUM FINISHES**

- A. General: Comply with Aluminum Association's (AA) "Designation System for Aluminum Finishes" for finish designations and application recommendations.
- B. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.

1. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
  - a. Color(s): As selected by the Architect from manufacturer's available full range of colors including custom colors.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence.
- B. Verify that substrates and openings are rigidly set, at proper lines and elevation, properly sized, and ready to receive units.
- C. Do not proceed with installation until conditions detrimental to proper installation have been corrected.
- D. Coordinate installation with roofing work and other adjacent elements of building envelope to ensure watertight construction.

### **3.2 PREPARATION**

- A. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- B. Isolate all dissimilar metals by means of a heavy bituminous coating, approved paint coating, approved paint coating, adhered polyethylene sheet, or other means recommended by SMACNA.

### **3.3 INSTALLATION**

- A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by methods indicated, providing for thermal expansion in metal units. Set units true to line and level indicated. Install work with laps, joints, and seams permanently weatherproof and watertight.
- B. Sealed Joints: Form minimum 1-inch hooked joints and embed flange into sealant or adhesive. Form metal to completely conceal sealant or adhesive.
  1. Use joint adhesive for nonmoving joints specified not to be soldered.
  2. Moving Joints: When ambient temperature is moderate (40-70°F) at time of installation, set joined members for 50% movement either way. Adjust setting position of joined members proportionally for temperatures above 70°F. Do not install sealant at temperatures below 40°F. Refer to section on sealants elsewhere in Division 7 for handling and installation requirements for joint sealers.
- C. Workmanship: Install sheet metal work with lines, arises, and angles sharp and true. Exposed surfaces shall be free from visible waive, warp, buckle, and tool marks. Exposed edges shall

be folded back neatly to form a 1/2-inch hem on the concealed side. Sheet metal exposed to the weather shall be watertight with provisions for expansion and contraction.

- D. Nailing: Nailing of sheet metal shall be confined generally to sheet metal having a maximum width of 18 inches. Nailing of flashings shall be confined to one edge only. Nails shall be evenly spaced not over 3 inches on centers and approximately 1/2-inch from edge unless otherwise specified or indicated. Face nailing will not be permitted. Where sheet metal is applied to other than wood surfaces, detailed shop drawings shall include locations for sleepers and nailing strips required to properly secure the work.
- E. Cleats: Provide cleats for sheet metal 18 inches and over in width. Space cleats evenly not over 12 inches on centers unless otherwise specified or indicated. Unless otherwise specified, cleats shall be not less than 2 inches wide by 3 inches long, and of the same material and thickness as the sheet metal being installed. One end of the cleat shall be secured with two nails and the cleat folded back over the nailheads. The other end shall be folded back over the nailheads. The other end shall be locked into the seam. Cleats for soldered seams shall be pretinned.
- F. Bolts, Rivets and Screws: Install bolts, rivets, and screws where indicated or required. Provide compatible washers where required to protect surface of sheet metal and to provide a watertight connection.
- G. Seams; General: Comply with SMACNA, Figures 3-2 & 3-3, Tables 2-1 & 3-1R, and other applicable designs to specific installation.
  - 1. Seams: straight and uniform in width and height with no solder showing on the face.
  - 2. Flat-lock Seams for All Non-Moving Seams; Finish not less than 3/4-inch wide.
  - 3. Loose-lock Expansion Seams: Not less than 3 inches wide, and shall provide minimum one-inch movement within the joint. Joint shall be completely filled with the specified sealant, applied at no less than 1/8 inch thick bed. Sealants are specified in Section 07900 - Joint Sealer Assemblies and shall be completely concealed.
  - 4. Flat Seams: Make seams in the direction of the flow.
- H. Soldering, Welding, and Mechanical Fastening: Where soldering is specified herein, it shall apply to copper and lead coated copper and galvanized metal items.
  - 1. Soldering: Cretin edges of sheet metals, except lead coated material, before soldering is begun. Soldering shall be done slowly with well heated soldering irons, so as to thoroughly heat the seams and completely sweat the solder through the full width of the seam. Edges of lead-coated material to be soldered shall be scraped or wire-brushes to produce a bright surface, and seams shall have a liberal amount of flux brushed in before soldering is begun.
- I. Counterflashing: Except where indicated or specified otherwise, insert counterflashing receiver in horizontal saw cut joints locations as indicated. Snap counterflashing in receiver and extend down vertical surfaces over upturned vertical leg or base flashings not less than 4 inches. Exposed edges of counterflashing shall be folded 1/2-inch. End laps in counterflashings shall be overlapped 6", and shall be made weathertight with sealant.

1. Lengths of metal counterflashings shall not exceed 10 feet. The flashings shall be formed to the required shapes before installation. Corners shall be factory-formed with joints not less than 24 inches from the angle.
  2. Flashing receivers shall be secured in the horizontal joint with lead wedges spaced not to exceed 12 inches apart; on short runs, wedges shall be placed closer together.
  3. Counterflashing receiver joints shall be filled with caulking compound. Caulking is covered in Section 07900 - Joint Sealer Assemblies.
- J. Cap Fascia Coping: Prefabricate in the shapes and sizes indicated and in lengths not less than 8 feet. Provide prefabricated mitered corners for internal and external corners.
1. Conceal Splice Plates: 6" wide with vertical legs as required to match coping. Install a continuous bead of sealant on both sides of joint before installing coping to form a watertight gutter.
  2. Hook Strips: The lower edge of fascias shall be hooked at least 3/4 inch over a continuous hook strip of the same material bent outward at an angle of 45° to form a drip. Nail hook strip to a wood nailer at 6 inches maximum on centers.
  3. Where fastening is made to concrete or masonry, screws spaced 12 inches o.c. shall be used and shall be driven in expansion shields set in the concrete or masonry. Where necessary, install hook strips over 1/16 inch thick compatible spacers or washers.
  4. Mechanically fasten fascia at roof side with a stainless steel fastener with a neoprene washer at 2'-0" o.c.

### **3.4 PROTECTION FROM CONTACT OF DISSIMILAR MATERIAL**

- A. Copper or Copper-Bearing Alloys: Surfaces in contact with dissimilar metal shall be painted with heavy bodied bituminous paint, or shall be separated by means of moisture-proof building felts.
- B. Aluminum: Surfaces shall not contact other metals except stainless steel, zinc, or zinc coating. Where aluminum contacts another metal, the dissimilar metal shall be painted with a primer followed by two coats of aluminum paint.
- C. All Metal: Surfaces in contact with mortar, concrete, or other masonry materials shall be painted with alkali-resistant coatings such as heavy-bodied bituminous paint.
- D. Wood or Other Absorptive Materials: Surfaces that may become repeatedly wet and in contact with metal shall be painted with two coats of aluminum paint or a coat of heavy-bodied bituminous paint. or a coat of heavy-bodied bituminous paint.
- E. Dissimilar Metal: Paint with a non-lead pigmented paint if drainage from it passes over aluminum.
- F. All fasteners shall be compatible with the metal with which it is connected.

### **3.5 PROTECTION OF ROOFING**

- A. Protection of Applied Insulation: Completely cover each day's installation with finished roofing specified. Protect open spaces between insulation and parapets or other walls and spaces at curbs, scuttles, and expansion joints, until permanent roofing and flashing is applied. Storing, walking, wheeling, or trucking will not be permitted directly on insulation or on roofed surfaces. Provide smooth, clean board or plank walkways, runways, and platforms near supports, as necessary to distribute weight to conform to indicated live load limits of roof construction.
- B. Upon completion of roofing work (including associated work) Installer shall advise Contractor of recommended procedures for surveillance and protection of roofing during remainder of construction period. At end of construction period, or at a time when remaining construction work will in no way affect or endanger roofing (at Contractor's option), Installer shall make a final inspection of roofing and prepare a written report to Contractor with copy to Owner) describing nature and extend of deterioration or damage found in the work.
- C. Installer shall repair or replace (as required) deteriorated or defective work found at time of final inspection. Installer shall be engaged by Contractor to repair damages to roofing which occurred subsequent to roofing installation and prior to final inspection.
- D. Repair or replace the roofing and associated work to a condition free of damage and deterioration at time of substantial completion.

### **3.6 CLEAN-UP**

- A. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.
- B. Upon completion of the specified work, remove all waste, debris, unused material and equipment from the site. Remove all misplaced material from nearby surfaces. Leave the job in a clean condition, acceptable to Owner.
- C. Advise Contractors of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

**END OF SECTION 07600**



## **SECTION 07800 - ROOF SPECIALTIES AND ACCESSORIES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent and locations of roof accessories is indicated on the drawings and by provisions of this section.
- B. Type of units specified in this section includes the following:
  - 1. Roof hatches.
  - 2. Ladder up safety post.
  - 3. Prefabricated curb and support units.
  - 4. Pipe and conduit supports.
- C. Related Sections:
  - 1. Refer to roofing system sections, for roofing accessories to be built into roofing system (not work of this section).
  - 2. Section 06100 - Carpentry.
  - 3. Section 07600 - Flashing, Sheet Metal and Roof Accessories.
  - 4. Section 07900 - Joint Sealer Assemblies.
  - 5. Division 15 - Mechanical related work.

#### **1.3 SUBMITTALS**

- A. Product Data; Roof Accessories: Submit manufacturer's technical product data, rough-in diagrams, details, installation instructions and general product recommendations.
- B. Samples; Roof Accessories: Submit 2 samples, min. 8" square, of each exposed metal and plastic sheet materials, and 2 samples, min. 24" long, of formed or extruded exposed metal member; color and finish as specified.
- C. Coordination Drawings: Submit coordination drawings for items interfacing with or supporting mechanical or electrical equipment, ductwork, piping, or conduit. Indicate dimensions and locations of items provided under this section, together with relationships and methods of attachment to adjacent construction and to mechanical/electrical items.

#### **1.4 QUALITY ASSURANCE**

- A. Standards: Comply with SMACNA "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap-flashing to coordinate with type of roofing indicated. Comply with "NRCA Roofing and Waterproofing Manual" details for installation of units.
- B. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL PRODUCT REQUIREMENTS**

- A. Provide manufacturers' standard units, modified as necessary to comply with requirements. Shop fabricate each unit to greatest extent possible.

### **2.2 MATERIALS, GENERAL**

- A. Zinc-Coated Steel: Commercial quality with 0.20 percent copper, ASTM A 525, G90 hot-dip galvanized, mill phosphatized.
- B. Stainless Steel: AISI TYPE 302/304, ASTM A 167, 2D annealed finish except as otherwise indicated, temper as required for forming and performance.
- C. Aluminum Sheet: ASTM B 209, alloy 3003, temper as required for forming and performance; anodized finish, except mill finish prepared for painting where indicated for field painting.
- D. Extruded Aluminum: Manufacturers standard extrusions of sizes and general profiles indicated, alloy 6063 T6, architectural grade aluminum; 0.078 inch minimum thickness for primary framing and curb member legs and 0.062 inch for dome retaining angle.
- E. Insulation: Manufacturer's standard rigid polyisocyanurate or semi-rigid board of glass fiber of thicknesses indicated.
- F. Wood Nailers: Softwood lumber, fire retardant treated wood, not less than 1-1/2" thick. Refer to Specification Section 06100.
- G. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
  - 1. Where removal of exterior exposed fasteners affords access to building, provide non-removable fastener heads.
- H. Gaskets: Tubular or fingered design of neoprene or polyvinyl chloride, or block design of sponge neoprene.
- I. Bituminous Coating: FS TT-C-494A or SSPC-Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coating.
- J. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.
- K. Elastomeric Sealant: Generic type recommended by unit manufacturer, which is compatible with joint surfaces; comply with FS TT-S-00227E, TT-S-00230C, or TT-S-001543A.
- L. Roofing Cement: ASTM D 2822, asphaltic.

### **2.3 PREFABRICATED ROOF HATCH**

- A. Basis of Design: "Type F" thermally broken roof hatch units as manufactured by Bilco Co.; or approved equal, of size(s) shown, single-leaf type unless otherwise indicated, for 40 lbs. per sq. ft. external loading and 20 lbs. per sq. ft. internal loading pressure.

1. Cover: Shall be 11 gauge (2.3mm) aluminum with a 5" (127mm) beaded flange with formed reinforcing members. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. Cover shall have a heavy extruded EPDM rubber gasket bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb. Cover insulation: 3" (75mm) thick polyisocyanurate with an R-value = 18 ( $U=0.315 \text{ W/m}^2\text{K}$ ), fully covered and protected by an 18 gauge (1mm) aluminum liner.
2. Curb: Shall be 12" (305mm) in height and of 11 gauge (2.3mm) aluminum. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. The curb shall be formed with a 5-1/2" (140mm) flange with 7/16" (11mm) holes provided for securing to the roof deck. The curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip® flashing system, including stamped tabs, 6" (153mm) on center, to be bent inward to hold single ply roofing membrane securely in place. Curb insulation: 3" (75mm) thick polyisocyanurate with an R-value = 18 ( $U=0.315 \text{ W/m}^2\text{K}$ ).
3. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.
4. Hardware:
  - a. Heavy stainless steel pintle hinges.
  - b. Cover shall be equipped with a spring latch with interior and exterior turn handles
  - c. Roof hatch shall be equipped with interior and exterior padlock hasps.
  - d. The latch strike shall be a stamped component bolted to the curb assembly.
  - e. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" (25mm) diameter red vinyl grip handle to permit easy release for closing.
  - f. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed. [For installation in highly corrosive environments or when prolonged exposure to hot water or steam is anticipated, specify Type 316 stainless steel hardware].
  - g. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.
5. Finishes: Factory finish shall be mill finish aluminum.
  - a. Available with an optional factory-applied powder coat paint finish.

6. Warranty

- a. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of **five (5) years** from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.
- B. Sloping Roofs: Where slope or roof deck exceeds 1/4" per ft., fabricate hatch curbs with height tapered to match slope, to result in level installation of tops of units.
- C. Manufacturers: Subject to compliance with requirements, manufacturers offering prefabricated roof hatch units which may be incorporated in the work include the following:
  1. The Bilco Co.; New Haven CT, Tel.# 800.366.6530 / [www.bilco.com](http://www.bilco.com).
  2. Bristol Fiberlite Industries; Santa Anna, CA, Tel.# 800.854.8618 / [www.bristolite.com](http://www.bristolite.com).
  3. Or approved equal.
- D. Ladder-Up Safety Post: Provide manufacturer's standard for all new roof hatch ladders.
  1. Telescoping post permanently mounts to the top two rungs of any fixed ladder.
    - a. Adjustable mounting hardware accommodates virtually any ladder rung size or spacing.
  2. Automatically locks into the fully raised position.
  3. Release lever allows the post to be lowered to its retracted position.
  4. Provide steel safety post with yellow powder coat finish.

**2.4 PREFABRICATED CURBS / EQUIPMENT SUPPORTS**

- A. Comply with loading and strength requirements as indicated where units support other work. Coordinate dimensions with rough-in sheets or shop drawings of equipment to be supported. Fabricate of structural quality sheet steel (ASTM A 570, Grade as required) which has been prepared for painting and factory-primed and painted with 2-mil thickness of baked-on synthetic enamel, after fabrication.
  1. Fabricate with welded or sealed mechanical corner joints. Provide complete with cant strips and base profile coordinated with roof insulation thickness. Provide preservative-treated wood nailers at tops of curbs, coordinate with thickness of insulation and roof flashing as indicated, tapered as necessary to compensate for roof deck slopes of 1/4" per ft. and less.
  2. Except as otherwise indicated or required for strength, fabricate units of minimum 14-gauge (0.0747") metal, and to minimum height of 12".
  3. Sloping Roofs: Where slope of roof deck exceeds 1/4" per ft., fabricate curb/support units with height tapered to match slope, to result in level installation of tops of units.
- B. Manufacturers: Subject to compliance with requirements, manufacturers offering prefabricated thermally broken curbs/equipment supports which may be incorporated in the work include the following:

1. Custom Curb, Inc.; Chattanooga, TN
2. The Pate Company; Broadview, IL
3. ThyCurb Div./ThyBar Corp.; Addison, IL
4. Or approved equal.

## **2.5 PIPE AND CONDUIT SUPPORTS**

- A. Comply with loading and strength requirements as indicated where units support other work.
- B. Basis of Design: Pillow Block Pipe stand as manufactured by Miro Industries, Inc., Tel.# 800-768-6978; or approved equal.
  1. Roller bearing pipe support designed to absorb thermal expansion and contraction of pipes and conduits. Pipes and conduits rest on self-lubricating roller which is a 304 stainless steel rod and a polycarbonate resin roller. Support base is polycarbonate resin.
  2. Load weight may not exceed manufacturer's stated capacity. Spacing of supports may not exceed manufacturer's stated maximum. Adjust all pipe stands so that each unit bears equal weight.
  3. For up to 3" I.D. (3.75" O.D.) pipe: Model 3-RAH-12.
  4. For 3" I.D. (3.75" O.D.) to 4" I.D. (5" O.D.) pipe: Model 4-RAH-12.
  5. For 4" I.D. (5" O.D.) to 6" I.D. (8.5" O.D.) pipe: Model 6-RAH-12.

## **2.6 ALUMINUM FINISH**

- A. General: Comply with Aluminum Association's (AA) "Designation System for Aluminum Finishes" for finish designations and application recommendations.
- B. Skylight: Glazing Frame and Dome Retainer: Class I Clear Anodic Finish AA-C22A41 (Chemical Finish: etched, medium matte Anodic Coating: Architectural Class 1, clear coating 0.018 mm or thicker) complying with AAMA 607.1.
- C. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.
  1. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
    - a. Color and Gloss: As selected by Architect from manufacturer's full range of choices for color and gloss.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and vapor barriers, roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.
- B. Except as otherwise indicated install roof accessory items in accordance with construction details of "NRCA Roofing and waterproofing Manual".
- C. Isolation: Where metal surfaces of units are to be installed in contact with non-compatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.
- D. Flange Seals: Except as otherwise indicated, set flanges of accessory units in a thick bed of roofing cement, to form a seal.
- E. Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counter-flashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.
- F. Operational Units: Test operation of units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

### **3.2 CLEANING AND PROTECTION**

- A. Clean exposed metal surfaces in accordance with manufacturer's instructions. Touch up damaged metal coatings.

**END OF SECTION 07800**

## **SECTION 07840 - THROUGH-PENETRATION FIRESTOP SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
  - 1. Walls and partitions.
  - 2. Smoke barriers.
  - 3. Construction enclosing compartmentalized areas.
- B. Related Sections include the following:
  - 1. Division 7 Section "Building Insulation" for safing insulation and accessories.
  - 2. Division 7 Section "Sprayed Fire-Resistive Materials."
  - 3. Division 15 Sections specifying duct and piping penetrations and firestop systems to be performed by the Plumbing and HVAC work (Sub)Contractors.
  - 4. Division 16 Sections specifying cable and conduit penetrations and firestop systems to be performed by the Electrical (Sub)Contractor.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
  - 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
  - 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:

1. Penetrations located outside wall cavities.
  2. Penetrations located outside fire-resistive shaft enclosures.
  3. Penetrations located in construction containing fire-protection-rated openings.
  4. Penetrating items larger than 4-inch-diameter nominal pipe or 16 sq. in. in overall cross-sectional area.
- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
1. For piping penetrations for plumbing systems, provide moisture-resistant through-penetration firestop systems.
  2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
  3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

#### **1.4 SUBMITTALS**

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
  2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architect and Owner, and other information specified.
- D. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.



## **1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Installer Qualifications: An experienced installer who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to an installer engaged by Contractor does not in itself confer qualification on buyer.
- C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- D. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
  - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
  - 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
    - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
    - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
      - 1) UL in "Fire Resistance Directory."
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi component materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

## **1.7 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

## **1.8 COORDINATION**

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Contractor's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Contractor's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

## **PART 2 - PRODUCTS**

### **2.1 PRODUCTS / MANUFACTURERS**

- A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application in the Through-Penetration Firestop System Schedule at the end of Part 3 and as shown on drawings and as produced by one of the following manufacturers:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hilti Construction Chemicals, Inc.
  - 2. Isolatek International.
  - 3. Nelson Firestop Products.
  - 4. 3M Fire Protection Products.
  - 5. Or approved equal.

### **2.2 FIRESTOPPING, GENERAL**

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:
  - a. Slag-/rock-wool-fiber insulation.
  - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
  - c. Fire-rated form board.
  - d. Fillers for sealants.
2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

### **2.3 FILL MATERIALS**

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- I. Silicone Foams: Multi component, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
  1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.

2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

## **2.4 MIXING**

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
  1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
  2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

### **3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION**

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### **3.4 FIELD QUALITY CONTROL**

- A. Inspecting Agency: The Owner will engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
  - 1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

### **3.5 IDENTIFICATION**

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
  - 1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
  - 2. Contractor's name, address, and phone number.
  - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
  - 4. Date of installation.
  - 5. Through-penetration firestop system manufacturer's name.
  - 6. Installer's name.

### **3.6 CLEANING AND PROTECTION**

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

### **3.7 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE**

- A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.
  - 1. Firestop Systems with No Penetrating Items: Comply with the following:
    - a. Latex sealant.
    - b. Silicone sealant.
    - c. Intumescent putty.
    - d. Mortar.

**END OF SECTION 07840**

## **SECTION 07900 - JOINT SEALER ASSEMBLIES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Part 1 through Part 6 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes joint sealant assemblies for the following applications which include performances of materials, installation requirements, as indicated herein in this specification and as specified by cross references in other Parts 1 through 6 specification sections.
- B. Exterior joints in the following vertical surfaces and nontraffic horizontal surfaces:
  - 1. Control and expansion joints in unit masonry.
  - 2. Joints in exterior insulation and finish systems.
  - 3. Joints between metal panels.
  - 4. Joints between different materials listed above.
  - 5. Perimeter joints between materials listed above and frames of doors, windows, and storefront systems, as applicable.
  - 6. Control and expansion joints in ceiling, soffits and overhead surfaces.
  - 7. Other joints, as indicated.
- C. Exterior joints in the following horizontal traffic surfaces:
  - 1. Control, expansion, and isolation joints in cast-in-place concrete slabs.
  - 2. Tile control and expansion joints.
  - 3. Joints between different materials, listed above.
  - 4. Other joints, as indicated.
- D. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
  - 1. Control and expansion joints on exposed interior surfaces of exterior walls.
  - 2. Perimeter joints of exterior openings, where indicated.
  - 3. Tile control and expansion joints.
  - 4. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
    - a. Perimeter joints between interior wall surfaces and frames of interior doors, windows, storefront systems.
    - b. Joints between plumbing fixtures and adjoining walls, and floors.
    - c. Other joints, as indicated.
  - 5. Interior joints in the following horizontal traffic surfaces:
    - a. Control and expansion joints in cast-in-place concrete slabs.
    - b. Control and expansion joints in terrazzo flooring.
    - c. Control and expansion joints in tile flooring.
    - d. Other joints, as indicated.
- E. Preparation of all joints to be sealed.

F. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:

1. Cutting out as needed to give proper depth.
2. Installation of proper back up material for each joint.
3. Cleaning to remove all dust, dirt, oil films, loose material etc.
4. Masking of adjacent surfaces.
5. Priming of joint surfaces.

### **1.3 QUALITY ASSURANCE**

A. VOC Content of Interior Sealants and Sealant Primers: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: Not more than 250 g/L.
2. Sealant Primers for Nonporous Substrates: Not more than 250 g/L.
3. Sealant Primers for Porous Substrates: Not more than 775 g/L.

B. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

1. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
2. Preconstruction Compatibility and Adhesion Testing: Submit to joint sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
  - a. Use manufacturers standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
  - b. Testing will not be required if joint sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
  - c. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates as follows:
    - (1) Locate test joints where indicated or, if not indicated, as directed by Architect.
    - (2) Conduct field tests for each application indicated below:
      - (a) Each type of elastomeric sealant and joint substrate indicated.
      - (b) Each type of nonelastomeric sealant and joint substrate indicated.
    - (3) Notify Architect seven days in advance of dates and times when test joints will be erected.
    - (4) Sealant Manufacturer Responsibility:
      - (a) Manufacturer shall provide Technical Representative to perform Sealant Joint Field Pull Test. Manufacturer Sales representative is not acceptable to perform Field Pull Test.
      - (b) Technical Representative performing Field Pull Test must be an employee of the Sealant Manufacturer. Outside Sales Agent or



Contract Technical Representative is not acceptable to perform Field Pull Test.

- (5) Test Method: Test joint sealants by hand-pull method described below:
    - (a) Install joint sealants in 60-inch long joints using same materials and methods for joint preparation and joint-sealant installation required for the completed Work. Allow sealants to cure fully before testing.
    - (b) Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2-inch piece.
    - (c) Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
    - (d) For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
  - (6) Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
  - (7) Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
3. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution:
- a. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.
  - b. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."
4. PROJECT CONDITIONS
- a. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
    - (1) When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
    - (2) When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40°F.
    - (3) When joint substrates are wet.
  - b. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

- c. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

C. Special Project Warrantee and Guarantee:

1. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - a. Warranty Period: **Five (5) years** from approved date of Substantial Completion.
2. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - a. Warranty Period: **Five (5) years** from approved date of Substantial Completion.
3. Guarantee shall further state that all exterior sealant will be guaranteed against:
  - a. Adhesive or cohesive failure in joints where movement is under maximum 25% extension or compression.
  - b. Any crazing greater than 3 mils in depth developing on surface of material.

#### 1.4 SUBMITTALS

- A. Product Data from manufacturers for each joint sealer product required, including instructions for joint preparation and joint sealer application, include color samples showing full range of colors available, for each product exposed to view.
  1. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.
- B. Product Test Reports: From a qualified testing agency indicating sealants comply with requirements, based on comprehensive testing of current product formulations.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturers' recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

#### 1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturers.
  2. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturer or below 40°F (4.4°C).
  3. When joint substrates are wet due to rain, frost, condensation, or other causes.
- B. Joint Width Conditions: Do not proceed with installation of joint sealers where joint widths are less than allowed by joint sealer manufacturer for application indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS, GENERAL**

- A. Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors: Provide color of exposed joint sealers indicated or, if not otherwise indicated, as selected by Architect from manufacturer's available full range of standard and optional colors.
- C. Grade of Sealant: For each application, provide the grade of sealant (nonsag, self-leveling, no track, knife grade, etc.) as recommended by the manufacturer for the particular condition of installation (location, joint shape, ambient temperature, and similar conditions) to achieve the best possible overall performance. Grades specified herein are for normal condition of installation.

### **2.2 MISCELLANEOUS MATERIALS**

- A. Joint Primer/Sealer: Provide the type of joint primer/sealer recommended by the sealant manufacturer of the joint surfaces to be primed or sealed.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.
- C. Sealant Backer Rod: Provide materials which are in compliance with ASTM D 1056; compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended for compatibility with sealant by the sealant manufacturer.
1. Materials shall be capable of remaining resilient at temperatures down to minus 26°F.
- D. Joint Fillers:
1. Joint Fillers for Concrete Sidewalks: Provide Isomeric polymer foam, W.R. Meadows Sealtight Ceramar; or approved equal.

- a. Plastic Foam Joint Fillers: Preformed, compressible, resilient, non-waxing, non-extruding strips of plastic foam of material indicated below, and of size, shape and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
  - b. Closed-cell isomeric foam, flexible.
  - c. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
    - 1) "Expansion Joint", as manufactured by Construction Foam Products, Tel.# 919.380.6640, [www.cfoamproducts.com](http://www.cfoamproducts.com).
    - 2) Or approved equal.
2. Joint Fillers for Concrete Slab on Grade: Provide "Fiber", as manufactured by WR. Meadows Sealtight Ceramar; or approved equal.
- a. Nonextruding bituminous type: ASTM D 1751.
3. Joint Fillers for Interior Concrete Slabs: Provide "Ceramar" flexible foam expansion joint, as manufactured by W.R. Meadows, Inc., Tel.# 800.342.5976, [www.wrmeadows.com](http://www.wrmeadows.com); or approved equal.
- a. Flexible foam expansion joint filler composed of a unique synthetic foam of isomeric polymers in a very small, closed-cell structure. Gray in color, Ceramar is a lightweight, flexible, highly resilient material offering recovery qualities of over 99%. The compact, closed-cell structure will absorb almost no water.
  - b. Non-impregnated and will not stain or bleed.
  - c. Non-gassing.
  - d. Complies with:
    - (1) ASTM D 5249, Type 2,
    - (2) ASTM D 1752, Sections 5.1 - 5.4, with compression requirement modified to 10 psi minimum and 25 psi maximum,
    - (3) ASTM D 7174-05.

### 2.3 SEALANTS

- A. **Sealant Type 1:** For all control and expansion joints in concrete sidewalks and slabs on grade, two-part, self leveling polyurethane traffic grade sealant, complying with, and ASTM C 920 and ASTM D 1850.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "NR-200 Urexpan"; Pecora Corporation.
    - b. "THC 900/901"; Tremco, an RPM Co.
    - c. "Sikaflex-2c SL"; Sika Corporation.
    - d. Or approved equal.
  2. Color to be selected by the Architect.

- B. **Sealant Type 2:** For sealing exterior joints, provide a Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "Spectrum 1 / Spectrum 800"; Tremco, an RPM Co.
    - b. "SikaSil - WS290"; Sika Corporation
    - c. "Dowsil 790 Silicone Building Sealant; Dow Corning Corporation
    - d. Or approved equal.
- C. **Sealant Type 3:** For all interior joints, provide a one-part, non-sag, moisture-curing polyurethane rubber sealant, complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, A, O and as recommended by manufacturer for general use as an interior exposed building construction conditions sealant including floor tiles in Toilets and Kitchens - Section 09300.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "Dynatrol I-XL"; Pecora Corporation.
    - b. "Dymonic or Dymonic FC for cold weather"; Tremco, an RPM Co.
    - c. "Chem-Calk 900 /915/945"; Bostik Inc.
    - d. "Sikaflex 1a or Sikaflex 15LM"; Sika Corporation.
    - e. Or approved equal.
- D. **Sealant Type 4:** For all joints at plumbing fixtures, provide one-part, neutral-curing, silicone rubber sanitary sealant, complying with ASTM C920; and containing fungicide for mildew resistance recommended by manufacturer for use at joints for plumbing fixtures; and sinks countertops, appliances, etc.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "898 Silicone"; Pecora Corporation.
    - b. "Tremsil 200"; Tremco, an RPM Co.
    - c. "786 Mildew Resistant"; Dow Corning.
    - d. "Sikasil N-Plus"; Sika Corporation.
    - e. Or approved equal.
- E. **Sealant Type 5:** For all interior joints between drywall partitions, CMU walls, hollow metal framing, cabinet heater, other metal mechanical or electrical assemblies, (sealant work performed by other trades and cross-referenced to the work of this section), etc., where all adjacent surfaces will receive paint:
1. Latex Sealant: Non-elastomeric, one part, non-sag, paintable latex sealant recommended for exposed joints applications, complying with ASTM C 834, Type P (opaque sealants), Grade NF.
  2. Products: Subject to compliance with requirements, provide one of the following:
    - a. "AC-20 Plus Silicone"; Pecora Corporation.
    - b. "Tremflex 834"; Tremco, an RPM Co.
    - c. "Sonolastic Sonolac"; Sonneborn Building Products Div., ChemRex, Inc.
    - d. Or approved equal.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine joints indicated to receive joint sealers, with Installer present, compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer-performance. Do not proceed with installation of joint sealers until unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:
- B. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; old joint sealers; oil; grease; waterproofing; water repellants; water; surface dirt; and frost.
- C. Clean concrete, masonry, unglazed surfaces of ceramic tile and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
- D. Remove laitance and form release agents from concrete.
- E. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile; and other nonporous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.
- F. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.
- G. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
- H. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of joint fillers.
  - 2. Do not stretch, twist, puncture, or tear joint fillers.
  - 3. Remove absorbent joint fillers which have become wet prior to sealant application and replace with dry material.
- I. Install bond breaker tape between sealants and joint fillers, compression seals, or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.

- J. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint fillers.
- K. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

### **3.3 CLEANING**

- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

**END OF SECTION 07900**

## **SECTION 08110 - HOLLOW METALWORK**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of hollow metalwork for doors, frames, side lites, transoms, and borrow lites is indicated and scheduled on drawings.
- B. Related Sections:
  - 1. Section 04200 - Masonry Work.
  - 2. Section 08211 - Wood Doors.
  - 3. Section 08700 - Finish Hardware.
  - 4. Section 08800 - Glazing.
  - 6. Section 08872 - Security Glazing Film
  - 7. Section 09250 - Gypsum Drywall
  - 8. Section 09900 - Painting.

#### **1.3 QUALITY ASSURANCE**

- A. Provide doors and frames complying with the following:
  - 1. Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.
  - 2. American National Standard Institute:
    - a. ANSI Standards A156 Series for Hardware.
    - b. ANSI A115 Steel Door Preparation Standards.
- B. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies that have been tested, listed, and labeled in accordance with ASTM E 152 "Standard Methods of Fire Tests of Door Assemblies" by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction, (i.e., UL, Warnock Hersey).

#### **1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements.
- B. Shop Drawings: Submit for fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
  - 1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.



- C. Samples: Full range of color samples for Architect selection; 2 samples, 6" square min., of each color and texture as selected for factory-finished doors and frames.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery: Before shipping, label each frame with metal or plastic tags to show its location, size, door swing, and other pertinent information. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory-finished doors.
- B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.

## **PART 2 - PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering steel doors and frames which may be incorporated in the work include; but are not limited to, the following:
  1. Steelcraft/Div. American Standard Co.
  2. Republic Builders Products Corp./Subs. Republic Steel.
  3. Curries Company, Mason City, Iowa
  4. Or approved equal.

### **2.2 MATERIALS**

- A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.
- B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A1008 and ASTM A 568.
- C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, with ASTM A 525, G60 zinc coating, mill phosphatized.
- D. Supports and Anchors: Fabricate of not less than 18-gauge galvanized sheet steel.
- E. Inserts, Bolts, and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.
- F. Shop Applied Paint:
  1. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, capable of passing a 100 hours salt spray and 250 hours humidity test in accordance with ASTM test methods B 117 and D 3322 and shall be suitable as a base for specified finish paints indicated in specification section 09900.

### 2.3 ACCESSORIES

- A. Inserts: For required anchorage into concrete work, furnish inserts of cast iron, malleable iron or 12 gauge steel hot-dip galvanized after fabrication.
- B. Expansion Anchor Devices: Lead-shield or toothed-steel, drilled in, expansion bolt anchors.

### 2.4 FABRICATION, GENERAL

- A. Fabricate frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site.
- B. Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from only cold rolled steel.
- C. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).
- D. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.
- E. Finish Hardware Preparation: Prepare doors and frames to receive finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.
- F. For concealed overhead door closers, provide space, cutouts, reinforcing and provisions for fastening in top rail of doors or head of frames, as applicable.
- G. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
- H. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware", published by Door and Hardware Institute.

### 2.5 STANDARD STEEL DOORS

- A. Provide metal doors of type and styles indicated on drawings or schedules.
  - 1. Interior Doors: SDI-100, Grade II, heavy-duty, Model 2, minimum 18 gauge faces.
    - a. **90 minute fire-rated doors in Corridors shall be SDI-100, Grade III, extra heavy-duty, Model 3, minimum 16 gauge faces.**

### 2.6 STANDARD STEEL FRAMES

- A. Provide metal frames for doors, transoms, sidelights, borrowed lights, transom windows and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated.

1. Fabricate frames of minimum 16-gauge cold-rolled furniture steel at interior locations and 14 gauge galvanized cold-rolled furniture steel at exterior locations.
    - a. **Frames for 90 minute fire-rated doors in Corridors shall be 14-gauge cold-rolled furniture steel.**
  2. Fabricate frames with mitered and welded corners, unless otherwise noted.
  3. Fabricate "Knock-Down" frames, where indicated.
- B. Hardware reinforcing shall be as follows:
1. All frames are to be mortised reinforced, drilled and tapped in factory for all template mortise hardware, in accordance with "Approved" Finish Hardware Schedule and templates as provided by the Hardware Supplier. Where surface mounted hardware is to be applied, all frames shall have reinforcing plates.
  2. Reinforcement plates shall be as follows:
    - a. Hinge Preps:
      - 1) Masonry: For "F" Series: 7 gauge, minimum.
      - 2) Metal Stud/Drywall: For "DW" Series: 7 gauge, minimum.
    - b. Strike Preps:
      - 1) Masonry: For "F" Series: 12 gauge, minimum.
      - 2) Metal Stud/Drywall: For "DW" Series: 12 gauge, minimum.
    - c. Closure Reinforcement: All Series - 12 gauge, minimum.
    - d. Surface mounted hardware: All Series - 12 gauge, minimum.
  3. Base anchors for frames to be installed in masonry and drywall wall and partition assemblies, shall be adjustable type, shipped loose and to be 14 gauge, minimum.
  4. Jamb Anchors:
    - a. For "F" Series frames in masonry walls provide adjustable wire type anchors (0.156" dia.), or strap type anchors (16 gauge), and "DW" Series frames in metal stud / drywall walls field adjustable compression anchors, provide quantities as follows:
      - 1) Frames up to 7'-6" in height: 3 per jamb.
      - 2) Frames over 7'-6" to 12'-0" in height: 4 per jamb.
      - 3) and one (1) adjustable base anchor per jamb.
    - b. At existing masonry wall opening to remain, provide "Butterfly Existing Wall Anchors", 18 gauge galvanized steel, provide quantities as follows:
      - 1) Frames up to 7'-6" in height: 3 per jamb.
      - 2) Frames over 7'-6" to 12'-0" in height: 4 per jamb.
      - 3) and one (1) adjustable base anchor per jamb.

5. Reinforce heads and jambs where indicated on drawings with 10 gauge channel, continuously welded to frame.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames", unless otherwise indicated.
- C. **Place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position so that the head and jambs of the frame are square, plumb, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.**
- D. In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels.
- E. At in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.
- F. Install fire-rated frames in accordance with NFPA Std. No. 80.
- G. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels, or as indicated. In open steel stud partitions, place studs in wall anchor notches and wire tie. In closed steel stud partitions, attach wall anchors to studs with tapping screws. Use indicated anchors and as per manufacturer's recommendations.
- H. Door Installation:
  1. Fit hollow metal doors accurately in frames within clearances specified in SDI-100.
  2. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

### **3.2 ADJUST AND CLEAN**

- A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Check and re-adjust operating Finish Hardware items, without causing any damage to frames. Provide complete work for doors and frames, leave clean and in proper operating conditions.

**END OF SECTION 08110**

## **SECTION 08211 - WOOD DOORS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections:
  - 1. Section 01800 - Time of Completion and Liquidated Damages
  - 2. Section 04200 - Unit Masonry
  - 3. Section 08110 - Hollow Metalwork
  - 4. Section 08700 - Finish Hardware
  - 5. Section 08800 - Glass and Glazing
  - 6. Section 08872 - Security Glazing Films
  - 7. Section 09250 - Gypsum Drywall
  - 8. Section 09900 - Field Painting of metal lites

#### **1.2 SUMMARY**

- A. Extent and location of each type of flush wood door is indicated on drawings and in the door schedule.
- B. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering. Assembly of face veneer and crossband to core in accordance with WDMA.
  - 1. Solid core wood doors with solid hardwood edging.
  - 2. Solid core 20 min. labeled flush wood doors with solid hardwood edging.
  - 3. Mineral core 90 min. labeled flush wood doors with hardwood edging.
- C. Shop-priming of wood doors is included in this Section.
- D. Factory-finishing of wood doors is included in this Section.
- E. Factory-prefitting to frames and factory-premachining for hardware for wood doors is included in this Section.

#### **1.3 QUALITY ASSURANCE**

- A. Construction per WDMA I.S. 1A - 11.
- B. Fire-Rated Wood Doors: Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies per ASTM 2074-00 Fire Test (Category A Positive Pressure). For mineral core doors, provide composite blocking with improved screw holding capability as needed to eliminate through-bolting of hardware. They are to be labeled and listed for ratings indicated by UL, Warnock Hersey or other testing and inspection agency acceptable to authorities having jurisdiction. Fire labels shall be affixed at the factory of the door manufacturer, and shall be from the Underwriter's or Warnock Hersey Testing Laboratories. Each label shall show the testing time of the label, and no approval will be given to "Construction Type" labels.

1. All "Category A" doors shall have concealed intumescent seals.
- C. Door Construction Field Examination: Upon direction of the Architect, the Contractor may be instructed to destroy a randomly selected wood door or panel by sawing it in half, vertically and horizontally, to verify conformance of the contract requirements. If the door(s) do not meet the specifications, all of the doors delivered for the project will be rejected, and the doors shall be replaced at the Contractor' expense. Further door inspection, to insure conformity to specifications, shall also be at the expense of the Contractor.
1. All such delays as a result of the fabrication and delivery of non-compliant doors which vary from the processed shop drawing submittal will be the responsibility of the Contractor (refer to Section 01800 for Liquidated Damages).

#### 1.4 REFERENCE STANDARDS

- A. Comply with the applicable requirements of the following standards unless otherwise indicated.
1. Window & Door Manufacturers Association (WDMA)
    - a. I.S. 1A - 11 Architectural Wood Flush Doors (WDMA).
    - b. Standard Procedures and Recommendations for Factory Machining Flush Wood Doors for Hardware.
  2. American National Standards Institute
    - a. ANSI A115. W Series, Wood Door Hardware Standards.
  3. Underwriter's Laboratories, Inc. (UL)
    - a. UL 10C Fire Test
  4. American Society for Testing and Materials:
    - a. ASTM 2074-00 (Category A Positive Pressure) Fire Tests of Door Assemblies.

#### 1.5 SUBMITTALS

- A. **The shop drawing submittal will not be reviewed by the Architect unless a complete shop drawing submittal (technical data, details of core and edge construction, location and extent of hardware blocking, fire ratings, factory finish samples, 8" x 10" minimum for finish and 4" x 5" minimum for construction assembly) are made as one complete submittal, by the Contractor, and will be returned to the Contractor if incomplete.**
1. **Subsequent delays as a result of an incomplete submittal will be the responsibility of the Contractor (refer to Section 01800 for Liquidated Damages).**
- B. Product Data: Door manufacturer's technical data for each type of door, including details of core and edge construction, trim for openings, and factory-finishing specifications.
1. Include certifications as may be required to show compliance with specifications.
  2. **The door manufacturer's shop drawing literature which may include language for the substitution of door construction at the option of the manufacturer is not permitted. Doors which are switched will be rejected and all costs associated with the manufacturing of the door type(s) specified will be by the Contractor/Manufacturer.**

- C. Shop Drawings: Submit shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for factory finishing and other pertinent data.
  - 1. For factory-premachined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light openings.
- D. Samples: Submit samples, 8" x 10" minimum for finish and 4" x 5" minimum for construction assembly, for the following:
  - 1. Doors for Transparent Finish: Flat samples illustrating finish and color of wood grain for each species of veneer and solid hardwood lumber required.
  - 2. Factory-Finished Doors: Each type of factory finish required.
  - 3. Metal Frames for Light Openings: Manufacturers product samples or product cut sheets for light frames and color selector guide for each material and finish required.
- E. Warranties and Certification Markings: Furnish with shop drawings:
  - 1. Door supplier must attest, in writing addressed to Architect, that the order has been placed in conformance with specification requirements in all respects.
  - 2. All doors shall carry a "Lifetime" guarantee, including rehang and finish for all door(s) which do not comply with the manufacturer's warranty.
  - 3. Copy of Warranty shall be given to the Architect and Owner prior to the completion of the project.
  - 4. All doors shall be factory marked, on the top of the door, showing the order number, item number on the order, size of finished door, material, and core construction, for future information should replacement of the door be necessary.
- F. The Wood Door Supplier shall provide a letter indicating all of the following:
  - 1. The wood door supplier has completely reviewed the contract documents (drawings, specifications and addenda) and has worked with the distributor in the preparation and submission of a complete shop drawing submittal to the Architect.
  - 2. The wood door supplier shall attest that the order has been placed in accordance with the contract document drawings, specifications and addenda,
  - 3. The wood doors ordered and delivered to the job site are in conformance with the requirements of the job and per the approved shop drawings.

## **1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Protect doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations in WDMA pamphlet "How to Store, Handle, Finish, Install, and Maintain Wood Doors", as well as with manufacturer's instructions.

- B. Protect all doors from damage and moisture under cover. Use wood blocking under horizontally stored doors. At no time will doors be allowed to come in contact with floor or water.
  - 1. The location where the doors are being stored on the job site shall be between 25 - 55% relative humidity. The Contractor shall forward independent certified testing that confirms compliance.
- C. All doors not finished at factory must be sealed on all surfaces within one (1) week after arrival at jobsite.
- D. Remove all damaged doors from jobsite prior to completion of project.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis of Design: Provide "Aspiro™ Series I Marshfield-Algoma™" wood doors as manufactured by Masonite Architectural, Tel.# 877.332.4484, [www.masonitearchitectural.com](http://www.masonitearchitectural.com); or approved equal.
  - 1. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
  - 2. Comparable products from other manufacturers will be considered if it can be clearly shown that their products are tested, equal to or will exceed the construction quality requirements, intended performances and all other design attributes listed above and provided that deviations in dimensions and profiles are minor and do not materially detract from the design concept or intended performances as judged solely by the Architect.
    - a. Eggers Industries; Architectural Flush Doors Division, Tel.# 920.722.6444, [www.eggersindustries.com](http://www.eggersindustries.com).
    - b. VT Industries, Architectural Wood Doors, Tel.# 800.827.1615, [www.vtindustries.com/doors](http://www.vtindustries.com/doors).
    - c. Graham Wood Doors, Tel.# 641.423.2444, [www.grahamdoors.com](http://www.grahamdoors.com).
    - d. Or approved equal.
  - 3. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications are not intended to preclude the use of other manufacturer's products or procedures which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
  - 4. **Substitutions: Substitution of products will only be considered when the Contractor/ Door Supplier have submitted, to the Architect, all appropriate documents and in the time frame as outlined in the requirements indicated in Specification Section 00800.**

### 2.2 MATERIALS AND COMPONENTS

- A. General: Provide wood doors complying with applicable requirements of referenced standards for kinds and types of doors indicated and as specified.



- B. Solid Core Doors for Transparent Finish: Comply with the following requirements:
1. Faces: Veneer leaves shall be Slip Match and veneers assembled in Running Match, Grade 'A', maple for transparent finish; CS-171, Type II.
    - a. **At existing buildings, provide veneer faces to match the species of the existing veneer or as directed by the Architect.**
  2. Construction: Premium Construction Grade, SCLC-5 Bonded (5-ply, with no added urea-formaldehyde glues).
- C. Edges
1. Vertical stiles of same species to the face veneer, with a minimum of 1/4 inch solid hardwood after trimming.
    - a. Manufacturers standard construction with hardwood outer.
- D. Core: Structural Composite Lumber Core consisting of an engineered wood product that is made by fusing a network of wood strands together with a water-resistant adhesive to produce a strong, solid and stable product that has true structural properties with excellent screw holding properties and very high split resistance.
1. Core Edge Interface: Vertical and horizontal edges of solid core doors must be securely bonded to the core with waterproof glue containing no added urea formaldehyde resin.
- E. Fire-Rated Solid Core Doors
1. Faces and WDMA Grade: Provide species and grade to match non-rated doors in same area of building, unless otherwise indicated.
  2. Core Construction
    - a. 20 Min. Doors: Single Leaf - Same Structural Composite Lumber Core as noted above.
    - b. 20 Min. Doors: Double Leaf - Structural Composite Lumber Core which utilizes an engineered hardwood strand board that is oriented and resin bonded to provide physical properties that equal or exceed solid lumber.
    - c. 90 Min. Doors: Mineral core composite, tested and approved by the Underwriter's or Warnock Hersey Testing Laboratories, for various levels of fire retardation within a total door assembly.
  3. Edge Construction
    - a. 20 Min. Doors: Single Leaf - Same Structural Composite Lumber edge construction noted above.
    - b. 20 Min. Doors: Double Leaf - Stiles to match face veneer, with minimum of 1/4 inch solid hardwood (after factory trimming).
      - 1) Manufacturers standard core construction with hardwood outer.

- c. 90 Min. Doors: WDMA Extra Heavy Duty Construction. Stiles and rails to be made of special laminated material matching the face veneer, and tested for the following tests for performance.
  - 1) Split Resistance: Not less than 950 load pounds when tested in accordance with ASTM D 143 test specimen, modified to having a 3/4 inch hole in center.
  - 2) Direct Screw Withdrawal: Not less than 650 load pounds when tested in accordance with ASTM 1037 modified to use a #12 x 1-3/4" steel screw threaded to head with wood threads.
  - 3) Cycle/Slam: 200,000 cycles with no loosening of hinge screws or other visible signs of failure when tested in accordance with requirements of ANSI A 151.1, Section 2.5.
    - a) Stile Thickness: Hinge stile minimum 5/8". Lock stile minimum 3/4 inch.
    - b) Rail Thickness: Top: 1/4" (except where required for hardware; reinforcing then to be 5"). Bottom: 1-1/16" minimum.
    - c) Provide hardware reinforcing as needed and shall be indicated on the shop drawings to the attachment of surface applied hardware without thru bolts.
- d. All "Category A" doors shall have concealed intumescent seals.

F. Glazing of Wood Doors:

- 1. Glazing shall be by the wood door manufacturer.
- 2. Glass shall be in accordance with requirements of Section 08800 and 08872. Refer to the Door Schedule on the drawings.

### 2.3 LOUVERS AND LITE FRAMES

A. Metal Lite Frames:

- 1. Standard Metal Vision Frames:
  - a. Basis of Design: Model "LoPro™" as manufactured by Anemostat Door Products, San Antonio, TX; Tel.# 210.662.6300; or approved equal.
  - b. Material: 20 ga. (1mm) Cold Rolled Steel.
  - c. Finish: Grey Primer, Beige or Bronze Baked Enamel.
  - d. Glazing: Should be 1/4" (6mm), 3/16" (5mm) or 5/16" (8mm) fire and/or safety rated with U.L. and/or W.H.I classification markings. Nominal glazing space of 3/8" (10mm) allows for glazing tape to be used on both sides of the glass.
  - e. Fire Ratings with U.L. & W.H.I Classification markings:
    - 1) 20\* Minute: Approved listing at 3204 sq.in. visible lite, max. width 36", max. height 89".
    - 2) 90\* Minute: Approved listing at 1296 sq.in. visible lite, max. width 36", max. height 54".

Note: \*Must be used with Firelite Plus or NT and fire listed glazing tape, or another manufacturer's equivalent product. Glazing combination must be used in appropriately tested door assembly.

- f. **Refer to Section 08872 - Security Glazing Film pertaining to the application of the film on the glazing and lite frame.**

## 2.4 GENERAL FABRICATION REQUIREMENTS

- A. Fabricate wood doors to produce doors complying with following requirements:
- B. In sizes indicated for job-site fitting.
- C. Factory-prefit and premachine doors to fit frame opening sizes indicated with the following uniform clearances and bevels:
1. Comply with tolerance requirements of WDMA for prefitting. Comply with final hardware schedules and door frame shop drawings and with hardware templates.
  2. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory premachining.
  3. Pre-fit and pre-machine wood doors at factory. Machining shall be in accordance with necessary templates supplied by the Builders Hardware supplier, in accordance with the approved Finish Hardware Schedule for this project. Each door shall be machined for all necessary mortise hardware (ie, locks, hinges, closers, etc.) but face or thru bolt holes shall be done in the field, if such machining is not called for on templates, or is not normally machined at factory. No field preparation will be allowed.
  4. Sizing of single doors to be undersized for nominal 1/4 inch, with edges beveled on two edges, as required by the frame manufacturer. Pairs of doors will be undersized 3/16 inch to permit no more than 1/8 inch gap between door leaves. Beveling same as single doors. Door edges beveled 1/8 inch in 2 inch thickness of door.
  5. Door clearances are to be 1/8 inch at top and the bottom shall be a maximum of 1/2 inch, or as required by job condition or labeling requirements.
- D. Metal Astragals: Metal astragals **will not** be accepted, unless otherwise indicated in Section 08700. Pairs of doors shall be equipped with formed steel edges where required for pairs of fire-rated doors.
- E. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of doors required.
- F. Factory Finish and Uniform Range of Veneers
1. Prefinish wood doors at factory only.
  2. All face veneer shall have uniform range of colors, as specified by Architect, in selection of the range of color of the veneer.
  3. Pairs of doors are to have matching grain pattern and color.
  4. Comply with recommendations of WDMA for factory finishing of doors, including final sanding, immediately before application of finishing materials.

5. Provide finish WDMA, #TR-6, transparent water-based stain and ultraviolet (UV) cured water based polyurethane sealer and topcoat material, color as selected by Architect.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install doors using finish hardware in accordance with approved hardware schedule. Protect doors from damage until completion of Project. Except where through bolting is required to meet Code for "A" or "B" label doors, install surface applied hardware on metal or wood doors using all thread screws inserted in pilot drilled holes filled with white acrylic glue.
- B. Manufacturer's Instructions: Install wood doors to comply with manufacturer's printed instructions and of referenced WDMA standard and indicated in the printed instructions provided by the manufacturer.
- C. Install fire-rated doors in corresponding fire-rated frames in accordance with requirements of NFPA No. 80.
- D. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors.
  1. Machine doors for hardware. Seal cut surfaces after fitting and machining.
- E. Fitting Clearances for Non-Rated Doors: Provide 1/8" at jambs and heads; 1/16" per leaf at meeting stiles for pairs of doors; and 1/8" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" clearance from bottom of door to top of threshold.
- F. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.
  1. Bevel non-rated doors 1/8" in 2" at lock and hinge edges.
  2. Bevel fire-rated doors 1/8" in 2" in lock edge; trim stiles and rails only to extent permitted by labeling agency.
  3. Prefit Doors: Fit to frames for uniform clearance at each edge.
- G. Factory-Finished Doors: Restore finish before installation, if fitting or machining is required at the job site.
- H. Manufacturer of wood doors shall install glass in wood doors.

### **3.2 ADJUSTING AND PROTECTION**

- A. Operation: Rehang or replace doors which do not swing or operate freely.
- B. Finished Doors: Refinish or replace doors damaged during installation.
  1. Protect doors, as recommended by door manufacturer, to ensure that wood doors will be without damage or deterioration at time of Substantial Completion.

**END OF SECTION 08211**

## **SECTION 08305 - ACCESS DOORS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Wall access doors.
  - 2. Fire-rated wall access doors.
  - 3. Ceiling access doors.
  - 4. Fire-rated ceiling access doors.
- B. Type of construction in which access doors are installed includes:
  - 1. Masonry.
  - 2. Gypsum board.
- C. Exact locations and sizes of access doors may not be indicated on the drawings. Obtain specific locations and sizes for access doors from trades requiring access to concealed equipment.
- D. Products Furnished and Installed under This Section:
  - 1. Installation of anchors for access doors placed in masonry: Division 4.
- E. Related Sections:
  - 1. Unit masonry: Section 04200
  - 2. Gypsum Drywall: Section 09250.
  - 3. Painting of access doors: Division 9.
  - 4. General requirements for access doors: Division 15.
  - 5. General requirements for access doors: Division 16.

#### **1.3 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions and directions for installation of anchorage devices.
  - 1. Include complete schedule, including types, general locations, sizes, wall, and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.
- B. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and indicate on submittal schedule.
- C. Special Size Access Doors: Use where required or requested; indicate on schedule.

- D. Shop Drawings: Submit shop drawings for fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage and accessory items.
- E. Samples: 3" x 5" minimum size, of each panel face material showing factory-finished color and texture.

#### **1.4 QUALITY ASSURANCE**

- A. Fire-Resistance Ratings: Wherever a fire-resistance classification is indicated, provide access door assembly with panel door, frame, hinge, and latch from manufacturer listed in Underwriters Laboratories, Inc.; "Building Materials Directory" for rating shown.
  - 1. Attach UL Label on each fire-rated access door.
  - 2. For fire-rated ceiling access doors, provide door assembly from manufacturer whose products have been tested by independent testing agency acceptable to the building official and have been found acceptable for fire ratings indicated.
    - a. Provide testing agency label on each fire-rated access door.
- B. Test Reports: Submit manufacturer's test reports which demonstrate that products comply with required fire ratings.
- C. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units which are different than actual opening size necessary for access.
- D. Coordination: Furnish inserts and anchoring devices which must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering access doors which may be incorporated in the work include, but are not limited to, the following:
  - 1. Bilco Company.
  - 2. J. L. Industries.
  - 3. Milcor/Lima Register.
  - 4. Bar-Co., Inc.
  - 5. Or approved equal.

#### **2.2 MANUFACTURED UNITS**

- A. Access Door Assembly 2:
  - 1. Location: Wall.
  - 2. Type: Flush door panel with exposed frame.
  - 3. Substrate: Masonry.
  - 4. Fire rating: 1-1/2 HR (B).
  - 5. Frame: 16 gauge steel.

6. Door: 20 gauge steel flush panel.
  7. Hinge: Continuous type hinge with stainless steel pin.
  8. Locking device: Keyed cylinder lock.
  9. Finish: Baked-on rust-inhibitive prime coat.
- B. Access Door Assembly 3:
1. Location: Wall.
  2. Type: Flush door panel with exposed frame.
  3. Substrate: Masonry.
  4. Frame: 16 gauge steel.
  5. Doors: 14 gauge steel flush panel.
  6. Hinge: Continuous type hinge with stainless steel pin.
  7. Locking Device: Keyed cylinder lock.
  8. Finish: Baked-on rust-inhibitive prime coat.
- C. Access Door Assembly 4:
1. Location: Wall.
  2. Type: Flush door panel with concealed frame.
  3. Substrate: Gypsum board.
  4. Frame: 16 gage steel.
  5. Door: 14 gauge steel flush panel.
  6. Hinge: Double-acting concealed spring hinges allowing door to open a minimum of 165 degrees.
  7. Locking device: Keyed cylinder lock.
  8. Finish: Baked-on rust-inhibitive prime coat.
- D. Access Door Assembly 5:
1. Location: Ceiling.
  2. Type: Flush door panel with concealed frame.
  3. Substrate: Gypsum board.
  4. Fire rating: 1 HR (B).
  5. Frame: 16 gauge steel.
  6. Door: 18 gauge steel recessed panel.
  7. Hinge: Continuous type hinge with stainless steel pin.
  8. Locking device: Keyed cylinder lock.
- E. Access Door Assembly 6:
1. Location: Ceiling.
  2. Type: Flush door panel with concealed frame.
  3. Substrate: Gypsum board.
  4. Frame: 16 gauge steel.
  5. Door: 14 gauge steel flush panel.
  6. Hinge: Double-acting concealed spring hinges allowing door to open a minimum of 165 degrees.
  7. Locking device: Keyed cylinder lock.
  8. Finish: Baked-on rust-inhibitive prime coat.

- F. Access Door Assembly 8:
1. Location: Ceiling.
  2. Type: Flush door panel with concealed frame.
  3. Substrate: Plaster.
  4. Frame: 16 gauge steel.
  5. Door: 14 gauge steel flush panel.
  6. Hinge: Double-acting concealed spring hinges allowing door to open a minimum of 165 degrees.
  7. Locking device: Keyed cylinder lock.
  8. Finish: Baked-on rust-inhibitive prime coat.

### **2.3 ACCESSORIES**

- A. Locking Devices:
1. Where locking devices are indicated or required for security reasons, provide one lock per access door.
  2. Supply four (4) keys with each lock.
  3. Key access door locks alike.

### **2.4 MATERIALS AND FABRICATION**

- A. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.
- B. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.
- C. Frames: Fabricate from 16 gauge steel.
- D. Fabricate frame with exposed flange nominal 1" wide around perimeter of frame for units installed in the following construction:
1. Exposed masonry.
  2. Exposed concrete.
  3. Drywall finish.
  4. Ceramic tile finish.
  5. Wood paneling.
- E. For gypsum drywall, furnish perforated frames with drywall bead.
- F. For installation in masonry construction, furnish frames with adjustable metal masonry anchors.
- G. Flush Panel Doors: Fabricate from not less than 14 gauge sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees. Finish with manufacturer's factory-applied prime paint.
- H. Flush Panel Doors: Fabricate from not less than 14 gauge stainless steel sheet, with concealed spring hinges or concealed piano hinge set to open 175 degrees. Buff exposed surfaces to #4 satin finish.



- I. For fire-rated units, provide manufacturer's standard insulated flush panel/doors, with continuous piano hinge and self-closing mechanism.
- J. Recessed Panel Doors: Fabricate from not less than 18 gauge sheet steel with face of panel formed to provide recess below surface of applied finish. Reinforce panel as required to prevent buckling. Finish with manufacturer's factory-applied prime paint.
- K. Furnish recessed panels for concealed installation in acoustic tile ceiling systems.
- L. Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed, unless key operated locking device is required.
- M. Provide one cylinder lock per access door. Furnish four (4) keys per lock. Key all locks alike, unless otherwise scheduled.
- N. Where shown or scheduled, provide one cylinder lock per access door. Furnish four (4) keys per lock. Key all locks alike, unless otherwise indicated.
- O. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Comply with manufacturer's instructions for installation of access doors.
- B. Coordinate installation with work of other trades.
- C. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

#### **3.2 ADJUST AND CLEAN**

- A. Adjust hardware and panels after installation for proper operation.
- B. Remove and replace panels or frames which are warped, bowed or otherwise damaged.

**END OF SECTION 08305**

## **SECTION 08410 - ALUMINUM / FRP DOORS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. The contractor shall furnish all labor, tools, equipment, and services required to remove existing frames, doors and hardware as required to install new frames, doors, hardware, glazing, etc. In general, the work under this section includes the following:
  - 1. The removal of all necessary portions of existing frames, doors, hardware and related entrance material to permit the installation of new material as specified hereafter. Material removed shall be disposed of by contractor or salvaged as directed by the architect and/or owner.
  - 2. New masonry opening construction will not require removal of existing doors and frames
  - 3. The furnishing and installation of doors, hardware, glazing and caulking, as required, for installation including all necessary cleaning and adjustments.
- B. The following type of doors and accessories are required:
  - 1. Fiberglass Reinforced Polyester (FRP) Doors.
  - 2. Glazing.
  - 3. Hardware.
  - 4. Sealants.
  - 5. Security Glazing Films.
- C. Related Sections
  - 1. Section 04200 - Unit Masonry.
  - 2. Section 07900 - Joint Sealer Assemblies.
  - 3. Section 08410 - Aluminum Storefronts.
  - 4. Section 08700 - Finish Hardware.
  - 5. Section 08800 - Glass and Glazing.
  - 6. Section 08872 - Security Glazing Films.

#### **1.3 REFERENCES**

- A. Fiberglass Reinforced Polyester (FRP) Flush Doors and Monumental Stile and Rail Door
  - 1. AAMA 1503-98 - Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
  - 2. ANSI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.
  - 3. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.
  - 4. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.
  - 5. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 6. ASTM D 256 - Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.

7. ASTM D 543 - Evaluating the Resistance of Plastics to Chemical Reagents.
8. ASTM D 570 - Water Absorption of Plastics.
9. ASTM D 638 - Tensile Properties of Plastics.
10. ASTM D 790 - Flexural Properties of Non-reinforced and Reinforced Plastics and Electrical Insulating Materials.
11. ASTM D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
12. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
13. ASTM D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
14. ASTM D 2126 - Response of Rigid Cellular Plastics to Thermal and Humid Aging.
15. ASTM D 2583 - Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
16. ASTM D 5420 - Impact Resistance of Flat Rigid Plastic Specimens by Means of a Falling Weight.
17. ASTM D 6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.
18. ASTM E 84 - Surface Burning Characteristics of Building Materials.
19. ASTM E 90 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
20. ASTM E 283 - Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
21. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
22. ASTM E 331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
23. ASTM F 476 - Security of Swinging Door Assemblies.
24. ASTM F 1642-04 - Standard Test Method for Glazing Systems Subject to Air blast loading.
25. NWWDA T.M. 7-90 - Cycle Slam Test Method
26. SFBC PA 201 - Impact Test Procedures.
27. SFBC PA 203 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
28. SFBC 3603.2 (b) (5) - Forced Entry Resistance Test.

#### **1.4 PERFORMANCE REQUIREMENTS**

##### **A. Fiberglass Reinforced Polyester (FRP) Flush Doors**

1. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.

2. Air Infiltration: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.24 psf. Door shall not exceed 0.90 cfm per linear foot of perimeter crack.
3. Water Resistance: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 331 at pressure differential of 7.50 psf. Door shall not have water leakage.
4. Indoor air quality testing per ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.
5. Swinging Door Cycle Test, Doors and Frames, ANSI A250.4: Minimum of 25,000,000 cycles.
6. Cycle Slam Test Method, NWWDA T.M. 7-90: Minimum 5,000,000 Cycles.
7. Swinging Security Door Assembly, Doors and Frames, ASTM F 476: Grade 40.
8. Salt Spray, Exterior Doors and Frames, ASTM B 117: Minimum of 500 hours.
9. Sound Transmission, Exterior Doors, STC, ASTM E 90: Minimum of 25.
10. Thermal Transmission, Exterior Doors, U-Value, AAMA 1503-98: Maximum of 0.29 BTU/hr x sf x degrees F. Maximum of R-Value 3.4 Minimum of 55 CRF value.
11. Surface Burning Characteristics, FRP Doors, ASTM E 84:
  - a. Flame Spread: Maximum of 200. (Class C).
  - b. Smoke Developed: Maximum of 450. (Class C).
12. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
  - a. Flame Spread: Maximum of 25.
  - b. Smoke Developed: Maximum of 450.
13. Impact Strength, FRP Doors, Nominal Value, ASTM D 256: 15.0 foot-lbs per inch of notch.
14. Tensile Strength, FRP Doors, Nominal Value, ASTM D 638: 14,000 psi.
15. Flexural Strength, FRP Doors, Nominal Value, ASTM D 790: 21,000 psi.
16. Water Absorption, FRP Doors, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.
17. Indentation Hardness, FRP Doors, Nominal Value, ASTM D 2583: 55.
18. Gardner Impact Strength, FRP Doors, Nominal Value, ASTM D 5420: 120 in-lb.
19. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentage.
20. Stain Resistance, ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to crayon and crankcase oil.
21. Chemical Resistance, ASTM D 543. Excellent rating.
  - a. Acetic acid, Concentrated.
  - b. Ammonium Hydroxide, Concentrated.
  - c. Citric Acid, 10%.
  - d. Formaldehyde.
  - e. Hydrochloric Acid, 10%
  - f. Sodium hypochlorite, 4 to 6 percent solution.

22. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi.
23. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 370 psi.
24. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi.
25. Thermal and Humid Aging, Foam Core, Nominal Value, 158°F and 100 % Humidity for 14 Days, ASTM D 2126: Minus 5.14 percent volume change.
26. Compliance with the International Building Code® (IBC), latest NJ Edition.

## **1.5 SUBMITTALS**

- A. Comply with AIA A232 and Section 00800 - Submittal Procedures.
- B. Product Data: Submit door manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.
- C. Submit six sets of factory shop drawings for the fabrication and installation of the Fiberglass Reinforced Polyester (FRP) Doors and associated components of the work. Include wall elevations at 1/2" scale, and half-sized detail sections of every typical composite member. Show anchors, joint system, expansion provisions, and other components not included in the manufacturer's standard data. Include field-verified dimensions and glazing details, and include Catalog cuts for all Finish Hardware.
- D. Samples:
  1. FRP Door: Submit corner samples of manufacturer's door showing face sheets, core, internal framing, finish, glazing, hardware, options, and accessories.
    - a. The Architect reserves the right to require samples of typical fabricated sections, showing joints, exposing fastenings, (if any) quality of workmanship, hardware and accessory items, before fabrication of the work proceeds.
  2. Color: Submit manufacturer's color chip samples of Standard and Classic FRP Door and Panel Skins and either Standard or Optional Anodized finish at the Door Stiles and Rails, Door Perimeter and Storefront Framing.
- E. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.
- F. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.
- G. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.
- H. Warranty: Submit manufacturer's standard warranty.

## **1.6 QUALITY ASSURANCE**

- A. Standards: Comply with the requirements and recommendations in applicable specifications and standards by NAAMM, AAMA and AA, including the terminology definitions and specifically including the "Entrance Manual" by NAAMM, except to the extent more stringent requirements are indicated.
- B. Code Compliance and Regulations: All materials supplied shall be in accordance with the International Building Code, State of New Jersey "Barrier-Free" Subcode, and all applicable State or Local Codes.
- C. Manufacturer shall have produced Fiberglass Reinforced Polyester (FRP) Doors, Panels and Aluminum Frames for a recommended ten (10) years, and shall have completed projects

similar to this building in type and size.

1. Door and frame components from same manufacturer.
- D. Bidders are expected to visit the jobsite to make a complete survey of project requirements prior to bid. All dimensions, quantities and conditions relating to the installation shall be fully understood. Failure to visit the site will not relieve the successful bidder from the responsibility of furnishing all materials and services required to comply with the true intent and meaning of the specifications without any additional costs to the Owner.
- E. Instructions: The manufacturer or representatives will be available for consultation to all parties engaged in the project, including instruction to installation personnel.
- F. An examination of product will include cutting and/or disassembly of the entrance to reveal the construction of the particular component. If the door, frame or component fails, replacement of the project's material will be required. This process will assure the owner of proper adherence to the bid documents.

### **1.7 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. All materials supplied shall be delivered to the jobsite in their original, unopened packages, with labels intact. Materials shall be inspected for damage, and the manufacturer shall be advised immediately of any discrepancies. Unsatisfactory materials are not to be used.
- B. All materials supplied shall be packaged in individual corrugated cartons. Doors and panels shall be "floated" within cartons, with no portion of the door having contact with the outer shell of the container.
- C. Handling: Protect materials and finish from damage during handling and installation.

### **1.8 SPECIAL PROJECT WARRANTY**

- A. Provide a written warranty, signed by Manufacturer, Installer and Contractor, agreeing to replace, at no cost to the Owner, any doors, frames or panels that fail in materials or workmanship, within the time period of acceptance, as indicated below.
1. Failure of materials or workmanship includes excessive deflection, faulty operation of entrances, deterioration of finish, or construction, in excess of normal weathering and defects in hardware, weather-stripping and other components of the work.
- B. Warranty Period: **Ten (10) years** from approved date of Substantial Completion as determined by the Architect.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. **FRP Doors:** Basis-of-Design: Special-Lite Inc., Tel.# 800.821.6531, [www.special-lite.com](http://www.special-lite.com); or approved equal.
1. Subject to compliance with requirements, provide either the named product or product by one of the following manufacturers:
    - a. Kawneer Co.
    - b. Curries, an Assa Abloy Co.
    - c. FRP Architectural Doors Inc.
    - d. Or approved equal.

### **2.2 FIBERGLASS REINFORCED POLYESTER (FRP) FLUSH DOORS**

- A. Model: **SL-17** Flush Doors with SpecLite3 fiberglass reinforced polyester (FRP) face sheets.

- B. Door Opening Size: As indicated on the drawings.
- C. Door Construction:
  - 1. Doors are to be 1-3/4" thick Special-Lite, Series SL-17. (FRP).
  - 2. Stiles and Rails: Constructed of aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T5 alloy recovered from industrial processes, minimum/maximum 2-5/16-inch depth, joined with steel tie rods.
  - 3. Stiles to be tubular shape to accept hardware as specified.
  - 4. Top and bottom rails to be extruded with legs for interlocking "rigidity weather bar."
  - 5. Corners: Mitered or butted mortise and tenon joints.
  - 6. Joinery to be 3/8" tie rods, top and bottom, bolted through an extruded spline, in both top and bottom rails with 3/16" mechanically fastened (screwed) reinforcing angles, and secured with hex type nuts. Welds, glue, or other methods are not acceptable.
  - 7. All doors shall be pre-machined in accordance with templates from the hardware manufacturer. For surface applied hardware, doors shall have necessary reinforcement, including the attachment of RIVNUT blind bolt fasteners. With the exception of door closers and holders, which require field applications, doors are to be shipped with hardware attached.
  - 8. Vision Lites: Provide glazed openings in doors as indicated, with manufacturer's standard aluminum moldings and stops, with removable stops on inside only. Glass to be "factory installed" for warranty purposes. Refer to Section 08800 - Glass and Glazing for type.
  - 9. Face sheets to be locked in with extruded interlocking edges, which are the integral reglets of the Vertical and Horizontal rails permitting a flush appearance.
  - 10. Core is to be of **foamed in place Urethane foam** minimum of 5 lbs. per cubic foot density. **Minimum R Value of 9.**
    - a. All doors are to be properly reinforced for hardware prior to urethane core foaming in door.
  - 11. Face sheets for Fiberglass Reinforced Polyester (FRP) Doors are to be Kemlite SpecLite3®, 120" thick (pebble like texture) with color throughout. Color: Standard and or Classic as approved by the Architect.

### 2.3 MATERIALS AND ACCESSORIES - Fiberglass Reinforced Polyester (FRP) Flush Doors

- A. Aluminum Members: Provide alloy and temper as recommended by manufacturer for strength, corrosion resistance, and application of required finish and control of color; ASTM B 221 for extrusions, ASTM B 209 for sheet/plate, with a minimum wall thickness of 0.125"
- B. All materials shall be of the same manufacturer. No splitting of Door, Frame or components will be permitted.
- C. Fasteners: Provide aluminum, non-magnetic stainless steel or other non-corrosive metal fasteners, guaranteed by the manufacturer to be compatible with the doors, frames, stops, panels, hardware, anchors, and other items being fastened. For exposed fastener (if any), provide Vandal-proof flat head screws with finish matching the item to be fastened.
  - 1. Do not use exposed fasteners, except where unavoidable for the assembly of units, or unavoidable for the fastening of hardware. Provide only concealed screws in glazing stops.

- D. Reinforcement and Brackets: Manufacturer's standard formed or fabricated steel units, of shapes, plates, or bars, with 2.0 ounce hot-dip zinc coating, complying with ASTM A 123, applied after fabrication.
- E. Expansion Anchor Devices: Lead shield or toothed steel, drill-in, expansion bolt anchors.
- F. Bituminous Coating: Cold applied asphalt mastic complying with SPC-PS 12, compounded for 30-mil thickness per coat.
- G. Sealants and Gaskets: Provide sealants and gaskets in the fabrication, assembly and installation of the work, which are recommended by the manufacturer to remain permanently elastic, non-shrinking, non-migrating and weatherproof.
- H. Glazing Gaskets: For glazing factory-installed glass, and for gaskets, which are factory-installed in "captive" assembly of glazing stops, provide manufacturer's standard stripping of molded neoprene, complying with ASTM D 2000 (Designation 2BC415 to 3 BC620), or molded PVC complying with ASTM C 509, Grade 4.

## **2.4 FABRICATION**

- A. Sizes and Profiles: The required sizes for door and profiles requirements are to be "field verified".
- B. Co-ordination of Fabrication: Check the actual frame or door openings in the construction work by accurate field measurements before fabrication, and show recorded measurements on final shop drawings.
- C. Assembly:
  - 1. Complete the cutting, fitting, forming, drilling and grinding of all metal work prior to the cleaning, finishing, treatment and application for coatings.
  - 2. Remove burrs from cut edges, and ease edges and corners to a radius of approximately 1/64".
- D. Welding: No Welding of any Door or Frame joints will be accepted.
- E. Fasteners: Conceal fasteners, wherever possible, except as otherwise noted.
- F. Fit:
  - 1. Maintain continuity of line and accurate relation of planes and angles.
  - 2. Provide secure attachments and support at mechanical joints, with hairline fit at contacting members.
- G. Reinforce the work as necessary for performance requirements and as required for support to the structure. Separate dissimilar metals and bituminous paint or performed separators, which will prevent corrosion. Separate metal surfaces at moving joints with non-metallic separators to prevent "freeze-up" of joints.
- H. Sealant for Heavy Wall Tube-Aluminum Frame, use silicone sealant as specified in Section 07900.

## **2.5 HARDWARE**

- A. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
- B. Hardware Schedule: As indicated on the drawings and as specified in Section 08700.



## **2.6 GLAZING AND VISION LITES**

- A. Provide glazing system for doors and frames to receive lites. Design system for replacement of glass, but for non-removal of glass from the exterior.
  - 1. For frames, provide manufacturer's standard "surface glazing" system of channels and captive glazing gaskets.
  - 2. Provide anchorage and alignment brackets for concealed support of assembly from the building structure. Allow for thermal expansion on exterior units.
  - 3. All glass in doors is to be factory installed.
  - 4. Glass for exterior doors and aluminum frames to be as detailed on drawings. Refer to Door Schedules for glazing type and the associated specification section.
- B. Factory Glazing: 1-inch glass insulating units.
- C. Lites in Exterior Doors: Allow for thermal expansion
- D. Rectangular Lites:
  - 1. Size: As indicated on drawings.
  - 2. Factory glazed with screw-applied aluminum stops anodized to match perimeter door stile and rails.

## **2.7 ALUMINUM FINISH**

- A. Anodized Finish: Clear 215 R1, AA-M10C12C22A41, Class I, 0.7 mils thick.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

### **3.2 INSTALLATION (Fiberglass Reinforced Polyester (FRP))**

- A. Install doors in accordance with manufacturer's instructions.
- B. Install doors plumb, level, square, true to line, and without warp or rack.
- C. Anchor frames securely in place.
- D. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by Architect.
- E. Set thresholds in bed of mastic and backseal.
- F. Install exterior doors to be weathertight in closed position.
- G. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- H. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

### **3.3 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

### **3.4 ADJUSTING**

- A. Adjust doors, hinges, and locksets for smooth operation without binding.

### **3.5 CLEANING**

- A. Clean doors promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that would damage finish or glazing.

### **3.6 PROTECTION**

- A. Protect installed doors to ensure that, except for normal weathering, doors/framing systems will be without damage or deterioration at time of substantial completion.

**END OF SECTION 08410**

## **SECTION 08415 - ALUMINUM FRAMED ENTRANCES AND STOREFRONTS**

### **PART 1 - GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.02 WORK INCLUDED**

- A. Furnish and install aluminum architectural storefront system complete with hardware and related components as shown on the drawings and specified in this Section.
- B. Single Source Requirement
  - 1. All products listed in paragraph 2.01 shall be by the same manufacturer.

#### **1.03 RELATED SECTIONS**

- A. Section 04200 – Unit Masonry.
- B. Section 07600 – Flashing, Sheet Metal and Roof Accessories.
- C. Section 07900 – Joint Sealer Assemblies.
- D. Section 08410 – Aluminum / FRP Doors.
- E. Section 08800 – Glass & Glazing.
- F. Section 08872 – Security Glazing Films.

#### **1.04 SYSTEM DESCRIPTION**

- A. General: Provide aluminum entrance and storefront systems capable of withstanding loads and thermal and structural movement requirements indicated without failure, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project. Failure includes the following:
  - 1. Air infiltration and water penetration exceeding specified limits.
  - 2. Framing members transferring stresses, including those caused by thermal and structural movement, to glazing units.
- B. Glazing: Physically and thermally isolate glazing from framing members.
- C. Glazing-to-Glazing Joints: Provide glazing-to-glazing joints that accommodate thermal and mechanical movements of glazing and system, prevent glazing-to-glazing contact, and maintain required edge clearances.
- D. Structural Silicone-Sealant Joints: Provide systems with structural silicone-sealant joints complying with the following requirements:

1. Tensile or shear stress in joints is less than 20 psi.
  2. Structural sealant withstands tensile and shear stresses imposed by storefront systems without failing adhesively or cohesively. When tested for adhesive compatibility with each substrate and condition required, provide sealant that fails cohesively before it fails adhesively. Adhesive and cohesive failure are defined as follows:
    - a. Adhesive failure occurs when sealant pulls away from a substrate cleanly, leaving no sealant material behind.
    - b. Cohesive failure occurs when sealant breaks or tears within a joint but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.
- E. Thermally Broken Construction: Provide systems that isolate aluminum exposed to exterior from aluminum exposed to interior with a material of low thermal conductance.
1. Poured and debridged urethane thermal barriers shall not be permitted.
- F. Wind Loads: Provide storefront systems, including anchorage, capable of withstanding wind-load design pressures calculated according to requirements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent.
1. Deflection of framing members in a direction normal to wall plane is limited to 1/175 of clear span or 3/4 inch, whichever is smaller, unless otherwise indicated.
  2. Static-Pressure Test Performance: Provide entrance and storefront systems that do not evidence material failures, structural distress, failure of operating components to function normally, or permanent deformation of main framing members exceeding 0.2 percent of clear span when tested according to ASTM E 330.
    - a. Test Pressure: 150% of inward and outward wind-load design pressures.
    - b. Duration: As required by design wind velocity; fastest 1 mile of wind for relevant exposure category.
- G. Dead Loads: Provide entrance- and storefront-system members that do not deflect an amount which will reduce glazing bite below 75 percent of design dimension when carrying full dead load.
1. Provide a minimum 1/8-inch clearance between members and top of glazing or other fixed part immediately below.
  2. Provide a minimum 1/16-inch clearance between members and operable and doors.
- H. Live Loads: Provide entrance and storefront systems, including anchorage, that accommodate the supporting structures' deflection from uniformly distributed and concentrated live loads indicated without failure of materials or permanent deformation.
- I. Air Infiltration: Provide entrance and storefront systems with permanent resistance to air leakage through fixed glazing and frame areas of not more than 0.06 cfm/sq. ft. of fixed wall

area when tested according to ASTM E 283 at a static-air-pressure difference of 6.24 lbf/sq. ft.

- J. Water Penetration: Provide entrance and storefront systems that do not evidence water leakage through fixed glazing and frame areas when tested according to ASTM E 331 at minimum differential pressure of 20 percent of inward-acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 12.0 lbf/sq. ft. Water leakage is defined as follows:
  - 1. Uncontrolled water infiltrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.
- K. Thermal Movements: Provide entrance and storefront systems, including anchorage, that accommodate thermal movements of systems and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, failure of doors or other operating units to function properly, and other detrimental effects.
  - 1. Temperature Change (Range): 120 degree F, ambient; 180 degree F material surfaces.
- L. Structural-Support Movement: Provide entrance and storefront systems that accommodate structural movements including, but not limited to, sway and deflection.
- M. Condensation Resistance: Provide storefront systems with condensation resistance factor (CRF) of not less than 45 when tested according to AAMA 1503.1.
- N. Average Thermal Conductance: Provide storefront systems with average U-values of not more than 0.63 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.1.
- O. Dimensional Tolerances: Provide entrance and storefront systems that accommodate dimensional tolerances of building frame and other adjacent construction.

## 1.05 QUALITY ASSURANCE

- A. Delegated Design:
  - 1. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated. Designated Design includes, but is not limited to:
    - a. Aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by a qualified professional engineer responsible for their preparation in the State of New Jersey.
  - 2. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing

- entrance and storefront systems similar to those required for this Project and who is acceptable to manufacturer.
- a. Engineering Responsibility: Prepare data for entrance and storefront systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Testing Agency Qualifications: Demonstrate to Architect's satisfaction, based on Architect's evaluation of criteria conforming to ASTM E 699, that the independent testing agency has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
- C. Source Limitations: Obtain each type of entrance and storefront system through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of entrance and storefront systems and are based on the specific systems indicated. Other manufacturers' systems with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."
1. Do not modify intended aesthetic effect, as judged solely by Architect, except with Architect's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Preconstruction Sealant Testing: Perform sealant manufacturers' standard tests for compatibility and adhesion of sealants with each material that will come in contact with sealants and each condition required by system.
1. Test a minimum of 8 samples of each metal, glazing, and other material.
  2. Prepare samples using techniques and primers required for installed systems.
  3. Perform tests under environmental conditions that duplicate those under which systems will be installed.
  4. For materials that fail tests, determine corrective measures required to prepare each material to ensure compatibility with and adhesion of sealants, including, but not limited to, specially formulated primers. After performing these corrective measures on the minimum number of samples required for each material, retest materials.
- F. Welding Standards: Comply with applicable provisions of AWS D1.2, "Structural Welding Code–Aluminum."
- G. Mockups: Before installing entrance and storefront systems, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for completed Work.

1. Locate mockups in the location and of the size indicated or, if not indicated, as directed by the Architect.
2. Notify Architect 7 calendar days in advance of the dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before proceeding with installation of systems.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  - a. When directed, demolish and remove mockups from Project site.
  - b. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

#### **1.06 FIELD TESTING AND PERFORMANCE REQUIREMENTS**

- A. Test in accordance with AAMA 501.2 for spray test only or AAMA 503.92 for pressurized test.

#### **1.07 QUALITY ASSURANCE**

- A. Provide test reports from AAMA accredited laboratories certifying the performance as specified in paragraph 1.06.
- B. Test reports shall be accompanied by the storefront manufacturer's letter of certification stating that the tested storefront meets or exceeds the referenced criteria for the appropriate storefront type.

#### **1.08 SUBMITTALS**

- A. Contractor shall submit shop drawings; finish samples, test reports, and warranties.
  1. Samples of materials as may be requested without cost to owner, i.e., metal, glass, fasteners, anchors, frame sections, mullion section, corner section, etc.
- B. An NFRC Component Modeling Approach (CMA) generated label certificate shall be provided by the manufacturer. The label certificate shall be project specific and will contain the thermal performance ratings of the manufacturer's framing combined with the specified glass, and the glass spacer used in the fabrication of the glass, at NFRC standard test size as defined in table 4-3 in NFRC 100-2010.

#### **1.09 WARRANTIES**

- A. Total Storefront Installation
  1. The responsible contractor shall assume full responsibility and warrant for **one (1) year** the satisfactory performance of the total storefront installation. This includes the glass

- (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc., as it relates to air, water and structural adequacy as called for in the specifications and approved shop drawings.
2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at their expense during the warranty period.
- B. Window Material and Workmanship
1. Provide written guarantee against defects in material and workmanship for **ten (10) years** from the date of final shipment.
- B. Glass
1. Provide written warranty for insulated glass units that they will be free from obstruction of vision as a result of dust or film formation on the internal glass surfaces caused by failure of the hermetic seal due to defects in material and workmanship.
  2. Warranty period shall be for **ten (10) years**.
- D. Finish: Warranty period shall be for **ten (10) years** from the date of final shipment.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Basis of Design: Provide "Series 406 - Thermal Flush-Glazed Screw Spline Storefront", as manufactured by EFCO Corporation; or approved equal.
- B. Manufacturers of products which may be incorporated in the work include, but are not limited to, the following:
1. Kawneer Company, Inc.
  2. Vistawall, Architectural Products,
  3. Tubelite
  4. or approved equal

### **2.02 MATERIALS**

- A. Aluminum: Extruded aluminum shall be 6063-T6 alloy and temper.
- B. Glass
1. Ship open for 1" insulated glass. Refer to Section 08800.
- C. Thermal Barrier
1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite action between the exterior and interior extrusions.



2. Barrier material shall be poured-in-place, two-part polyurethane. A nonstructural thermal barrier is unacceptable.

## 2.03 FABRICATION

### A. General

1. All aluminum frame extrusions shall have a minimum wall thickness of .080" (2 mm).
2. All exposed work shall be carefully matched to produce continuity of line and design with all joints. System design shall be such that raw edges will not be visible at joints.

### B. Frame

1. Depth of frame shall not be less than 6-1/2" (165 mm).
2. Face dimension shall not be less than 2" (50 mm).
3. Frame components shall be screw spline construction.
4. Door frame shall have shear blocked horizontals between the door jambs with screw spline sidelights.

- C. Glazing: All units shall be "dry glazed" with gaskets on both exterior and interior of the glass.

## 2.04 FINISH

### 1. Anodic

- a. Finish all exposed areas of aluminum windows and components with electrolytically deposited color in accordance with Aluminum Association Designation AA-M10-C22-A41, Color shall be **Clear**.

AA Description	Description	Arch. Class	AAMA Guide Spec.
AA-M10-C22-A41	Clear Anodized	1	611-98

## PART 3 EXECUTION

### 3.01 INSPECTION

#### A. Job Conditions

1. All openings shall be prepared by others to the proper size and shall be plumb, level and in the proper location and alignment as shown on the architect's drawings.
2. Provide for manufacturer representation to conduct pre-installation site meeting.

### 3.02 INSTALLATION

- A. Use only skilled tradesmen with work done in accordance with approved shop drawings and specifications.
- B. Storefront system shall be erected plumb and true, in proper alignment and relation to established lines and grades.

- C. Entrance doors shall be securely anchored in place to a straight, plumb and level condition, without distortion. Weather stripping contact and hardware movement shall be checked and final adjustments made for proper operation and performance of units.
- D. Furnish and apply sealing materials to provide a weather tight installation at all joints and intersections and at opening perimeters.
- E. Sealing materials specified shall be used in strict accordance with the manufacturer's printed instructions, and shall be applied only by mechanics specially trained or experienced in their use. All surfaces must be clean and free of foreign matter before applying sealing materials. Sealing compounds shall be tooled to fill the joint and provide a smooth finished surface.

### **3.03 ANCHORAGE**

- A. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.

### **3.04 PROTECTION AND CLEANING**

- A. The General Contractor shall protect the aluminum materials and finish against damage from construction activities and harmful substances. The General Contractor shall remove any protective coatings as directed by the Architect, and shall clean the aluminum surfaces as recommended for the type of finish applied.

**END OF SECTION 08415**

## SECTION 08520 - ALUMINUM WINDOWS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Extent of each type, grade and performance class of aluminum window units required is indicated on the drawings and schedules.
  - 1. Aluminum window units required are heavy commercial and architectural window grades of the performance class indicated.
- B. Types of aluminum window units required include the following:
  - 1. Aluminum Horizontal Sliding Type Windows.
  - 2. Aluminum Fixed Type Windows.
  - 3. Exterior and interior aluminum trim, closures, angles, etc.
  - 4. All hardware and weatherstripping for windows.
  - 5. Anchors, supports, weeps, brackets and similar elements.
  - 6. All metal to metal sealants.
  - 7. Metal Screens.
  - 8. Insulating and non-insulating panels.
- C. Work of this section shall include field verification of existing dimensions, conditions and installation of windows.
- D. Related Sections:
  - 1. Joint Sealer Assemblies - Section 07900.
  - 2. Glass and Glazing - Section 08800.
  - 3. Security Glazing Film - Section 08872.

#### 1.3 SYSTEM DESCRIPTION

- A. Design Requirements: Comply with air infiltration, water penetration and structural performance requirements indicated in AAMA/WDMA/CSA 101/I.S.2/A440-08 for the type, grade and performance class of window units required.
- B. Testing Requirements: Meet or exceed performance requirements for specified window classification as described in AAMA/WDMA/CSA 101/I.S.2/A440-08 and at the following minimum test sizes and without the use of any applied parts intended to enhance performance (Tests performed at smaller sizes than listed below shall not be acceptable):
  - 1. Horizontal Sliding- Single Slider: 8'0" x 6'8"
  - 2. Fixed: 6'0" x 6'0"

- C. Uniform Structural Performance: Provide window units which have been tested in accordance with ASTM E330, with no failure or permanent deflection for a positive (inward) and negative (outward) test pressure as follows:
1. Horizontal Siding- Single Slider: 75 lbs./sq.ft.
  2. Fixed: 150 lbs./sq.ft.
- D. Uniform Load Deflection: No more than L/175 when tested per ASTM E 330-90 at:
1. Horizontal Sliding - Single Slider: 75 lbs./sq.ft.
  2. Fixed: Not Applicable
- E. Air Infiltration: Provide units with an air infiltration rate and inward test pressure indicated when tested in accordance with ASTM E283:
1. Air infiltration not more than 0.30 cfm / ft. of perimeter crack length with unit closed and locked. Test unit at a static air pressure difference of 6.24 lb./sq.ft.
- F. Water Penetration: Provide window units which have been tested in accordance with ASTM E331/ASTM E547 at a static air pressure difference of 12 lbs./sq.ft. With ventilator closed and locked.
1. There shall be no uncontrolled water leakage.
- G. Condensation Resistance: Provide window units which have been tested in accordance with AAMA 1503-1-88 at the prescribed test size and shall meet or exceed the following requirements:
1. CRF factor shall be a minimum of 50 for all window types.
  2. Conductive Thermal Transmittance (U-Value) shall not be more than the following at 15 mph. Perpendicular dynamic wind.
    - a. Horizontal Sliding -Single Sliders: .62 Btu/sq.ft.x h x deg F.
    - b. Fixed: .55 Btu/sq.ft.x h x deg F.

#### 1.4 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for each type of window including information not fully detailed in the manufacturer's standard product data and the following:
1. Submit four copies of shop drawings for the assembly and erection of the window system.
  2. Indicate clearly on all shop drawings any deviations from the Contract Drawings.
  3. Include wall elevations at 1/4" scale, typical unit elevations at 1" scale and full size detail sections of every typical composite member.
  4. Show anchors, elements not included in manufacturer's standard data, including glazing details.

5. It is understood that the dimensions of all materials shall be the Contractor's responsibility. Neither the Owner nor any representative thereof will be in any way responsible for the sizes shown nor will any such sizes be approved before production.
  6. The materials shown are expected to fit the job conditions, and the Contractor shall be fully responsible.
- B. Product Data: Submit manufacturer's product specifications, technical product data, recommendations and standard details for each type of aluminum window unit required.
1. Test Reports indicating compliance with ANSI/AAMA performance and thermal test requirements for type, grade and glazing requirements listed in specifications.
- C. Samples: Submit samples of the specified finish on 12" lengths of window members to the Architect for his approval. Such sample window shall be submitted within ten (10) days of the Architect's request.
1. The Architect reserves the right to require additional samples, which show fabrication techniques and workmanship, and design of hardware and accessories.
- D. Certification: Provide certification by the manufacturer showing that each type, grade and size of window unit complies with requirements where the manufacturer's standard window units have been tested in accordance with specified tests and meet performance requirements specified.
1. Where such testing has not been accomplished, perform required tests through a recognized testing laboratory or agency and provide certified test results.
  2. Certificates of Conformance: Submit written certification forms signed and notarized by authorized representatives of the Contractor / Installer / Manufacturer of the window system attesting that:
    - a. The referenced window systems have been furnished, inspected, and installed for this project in complete conformance with requirements of the Contract Documents,
    - b. The referenced window systems, covered under the work of this Contract, meet or exceed the requirements of the "Basis of Design", Project Specification requirements, without any reduction in the quality and performance
- E. Warranty:
1. Submit two (2) copies of written guarantee, signed by the Contractor, Installer and Manufacturer, agreeing to replace window work which fails in materials or workmanship within **ten (10) years** of the date of acceptance. Failure of materials or workmanship shall include but not be limited to excess air infiltration, excessive deflections, delamination of panels, deterioration of finish of metal in excess of normal weathering and defects in accessories, weatherstripping and other components of the work.

## 1.5 QUALITY ASSURANCE

- A. Standards: Requirements for aluminum windows, terminology and standards of performance, and fabrication workmanship are those specified and recommended in AAMA/WDMA/CSA 101/I.S.2/A440-08 and applicable general recommendation published by AAMA.
- B. Single Source Responsibility: Provide aluminum windows produced by a single manufacturer capable of showing prior production of units similar to those required. The firm engaged must be able to show successful experience in window work including a recommended ten years experience in the fabrication and erection of systems of scope and type similar to the required work.
- C. For the actual fabrication and installation of the windows, use only mechanics who are thoroughly trained and experienced in the skills required and who are completely familiar with the manufacturer's recommended methods of installation plus the requirements of this work.
- D. Engineering: Provide all materials fully processed, prefitted, prepunched, etc. and assure that the unit, when assembled, shall fit the openings so as not to require a cutting, ripping, or fitting on job site by the installing crews.
- E. Special Project Warrantees: Provide special project warrantees and written guarantees, signed by the Contractor, Installer and Manufacturer, agreeing to replace window work which fails in materials or workmanship within **ten (10) years** of the date of acceptance.
  - 1. Failure of materials or workmanship shall include but not be limited to excess air infiltration, excessive deflections, delamination of panels, deterioration of finish of metal in excess of normal weathering and defects in accessories, weatherstripping and other components of the work.

## 1.6 PRODUCT HANDLING

- A. Use all means necessary to protect the materials of this section before, during and after installation and to protect the installed work and materials of all other trades.
- B. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

## 1.7 STANDARDS

- A. Comply with the applicable standards and recommendations published by NAAMM, AAMA and AA, including definitions of terms and designations not otherwise defined herein. For aluminum windows, comply with specifications and recommendations in ANSI A 302.9, unless more stringent requirements are listed in the following specifications.
- B. All tests referred to in these specifications shall be conducted by the recognized independent testing laboratory as approved by Architectural Aluminum Manufacturers Association.
  - 1. All tests must meet or exceed the values as set by the Architectural Aluminum Manufacturers Association, or contained herein, whichever standard is higher.

## **PART 2 – PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Basis of Design: Provide windows as manufactured by Architectural Window Manufacturing Corporation; or approved equal as follows:
  - 1. Horizontal Sliding - Single Slider: Series 6000i (HS-AW75)
  - 2. Fixed: Series 3050i (F-AW100)
- B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
  - 1. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of other products by other manufacturer's or which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
- C. Comparable products of the following manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements, intended performances and all other design attributes listed above and provided that deviations in dimensions and profiles are minor and do not materially detract from the design concept or intended performances as judged solely by the Architect/Owner:
  - 1. EFCO Corporation.
  - 2. Graham Corporation
  - 3. Or approved equal.

### **2.2 MATERIALS**

- A. Frame Depths: All windows shall have minimum frame depth as shown on drawings and in accordance with Basis of Design window units indicated in Paragraph 2.1 above.
- B. Aluminum Extrusions: Provide alloy and temper recommended by the window manufacturer for the strength, corrosion-resistance, and application of required finish, but not less than 22,000 psi ultimate tensile strength, a yield of 16000 psi in compliance with ASTM B 221, and not less than 0.080" thickness at any location for main frame and sash members, and not less than .0125" for aluminum frame sills (except projected windows which shall be .125" for all frame and sash members).
- C. Fasteners: Provide aluminum, non-magnetic stainless steel, epoxy adhesive, or other materials warranted by the manufacturer to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors and other components of window units.
  - 1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125" thick, reinforce the interior with aluminum or non-magnetic stainless steel to receive screw threads, or provide standard non-corrosive pressed-in splined grommet nuts.
  - 2. Exposed Fasteners: Except where unavoidable for application of hardware, do not use exposed fasteners. For application of hardware, use fasteners that match the finish of the member or hardware being fastened, as appropriate.

- D. Anchors, Clips and Window Accessories: Fabricate anchors, clips and window accessories of aluminum, non-magnetic stainless steel or hot-dip zinc coated steel or iron complying with the requirements of ASTM A 386; provide sufficient strength to withstand design pressure indicated.
- E. Sliding Type Weatherstripping: Provide woven pile weatherstripping of wool, polypropylene or nylon pile and resin-impregnated backing fabric, and aluminum backing strip. Comply with AAMA 701.2.
  - 1. Provide stripping with integral center-line barrier fin of semi-rigid plastic sheet of polypropylene.
- F. Sealant: For sealants required within fabricated window units, provide type recommended by the manufacturer for joint size and movement. Sealant shall remain permanently elastic, non-shrinking, and non-migrating. Comply with Division-7 "Joint Sealants" section of these specifications for selection and installation of sealants.
- G. Insect Screens: Provide insect screen units for each operable exterior sash or vent. Provide half screens for horizontal sliding window units only.
  - 1. Fabricate screen frames of extruded aluminum tubular-shaped members of 0.050" minimum wall thickness, with mitered or coped joints and concealed mechanical fasteners. Provide removable PVC spline-anchor concealing the edge of the screen frame. Finish frames to match window units, unless otherwise indicated.
  - 2. Wire Fabric Insect Screen: Provide 18 x 18, 18 x 16, or 18 x 14 mesh of 0.013" diameter coated aluminum wire, complying with FS RR-W-365, Type VII. Color of aluminum wire to match aluminum framing.

### **2.3 WINDOW GRADES AND PERFORMANCE CLASSIFICATION**

- A. Architectural Windows: Provide window units complying with requirements of AAMA Grade and Performance Class indicated for each window type, as indicated in Paragraph 2.1 above.

### **2.4 WINDOW TYPES**

- A. General: The following paragraphs define the operating arrangement for the types of sash required in window units and specify minimum provisions for each type. Unless otherwise noted, the drawings indicate which panels of each window unit are operable sash and which are fixed.
- B. Horizontal-sliding windows are window units containing at least two horizontally-operable sash in a weathering frame. Provide window units with sash that can be removed from the inside for cleaning.
- C. Fixed windows are window units containing at least one fixed lite of glass in a weathering frame.

### **2.5 HARDWARE**

- A. General: Except to the extent that more specific or stringent requirements are indicated, provide the manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum and of sufficient strength to perform the function for which it is intended.



B. Window Types:

1. Horizontal-Sliding Windows: Two roller assemblies with stainless steel ball bearings; roller assemblies ride on stainless steel track covers for maximum durability and smooth operation; one black zinc die cast automatic plunger lock with black anodized aluminum keeper at meeting stiles plus one aluminum snap lock at end jamb of the exterior sash.
2. Fixed Windows: Not Applicable.

## 2.6 ACCESSORIES

- A. General: Except to the extent that more specific or stringent requirements are indicated, provide the manufacturer's standard accessories that comply with indicated standards.
- B. Weatherstripping: Provide sliding-type weatherstripping at locations where sash rails slide horizontally or vertically along the unit frame. Unless otherwise indicated, provide double compression-type weatherstripping at the perimeter of each operating sash where sliding-type weatherstripping is not appropriate.
  1. Provide weatherstripping locked-in to extruded grooves in the sash.
- C. Poles: Provide one extruded aluminum window pole and hanger at every room receiving new windows with pole-operated hardware.
- D. Glazing Stops: Aluminum to match windows, screwed or snapped on.
- E. Window Sills: New aluminum window sills shall be minimum 0.125" extruded aluminum profile as indicated on drawings or as selected by the Architect from manufacturer's available profiles to suit existing conditions. Drip leg shall lap down over masonry and upper leg shall project up behind window frame leg for watertight assembly without the need for caulk or sealant. Window sills shall be one piece and continuous without piecing. With Architects approval extensive lengths will be allowed to have joints accomplished with under sill splice minimum of 4" with same profile as sill with all required sealants to achieve watertight seal. No over top sill splices will be allowed.

## 2.7 FABRICATION

- A. General: Except to the extent that more specific or stringent requirements are indicated, provide manufacturer's standard fabrication that complies with indicated standards and that produces units that are reglazable without dismantling sash framing. Include a complete system for assembly of components and anchorage of window units, and prepare sash for glazing except where preglazing at the factory is indicated.
- B. Sizes and Profiles: Required sizes for window units and profile requirements are indicated on the drawings. Variable dimensions are indicated along with maximum and minimum dimensions as required to achieve design requirements and coordination with other work.
  1. Details shown are based upon standard details by one or more manufacturers. Similar details by other manufacturers will be acceptable, provided they comply with size requirements, minimum/maximum profile requirements, and performance standards as indicated or specified.

- C. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed (products with exposed thermal barriers will not be acceptable), conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.
  - 1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite action between the exterior and interior extrusions.
  - 2. No thermal short circuits shall occur between the exterior and interior.
  - 3. The thermal barrier shall be Ensigner's INSULBAR or approved equal, and consist of two glass reinforced polyamide nylon 6/6 struts mechanically crimped in raceways extruded in the exterior and interior extrusions.
  - 4. Poured and debridged urethane thermal barriers shall not be permitted.
- D. Provide weepholes and internal water passages to conduct infiltrating water to the exterior.
- E. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.
- F. Provide subframes, receptors, with anchors for window units of extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units.
- G. Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, in the manner indicated.
- H. Glazing Stops: Provide snap-on glazing stops, coordinated with glass selection and glazing system indicated. Finish glazing stops to match window units. Marine glazed windows will not be accepted.
- I. Preglazed Fabrication: Preglaze window units at the factory where possible and practical for applications indicated. Comply with glass and glazing requirements of the "Glass and Glazing" sections of these specifications, and AAMA standards.
- J. Glazing: Windows shall be glazed with glazing types and systems as shown on drawings and in accordance with Section 08800.
- K. Insect Screens:
  - 1. Locate screen units on either the inside or outside of the sash.
  - 2. Where possible, design window units and hardware to accommodate screens in a tight-fitting removable arrangement, with a minimum of exposed fasteners and latches.
  - 3. Provide color to match window framing.

## **2.8 FINISHES AND COLORS**

- A. Class I, Color Anodic Finish: AA-M12C22A42/A44 etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker complying with AAMA 611.
  - 1. Color: Clear.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION**

- A. Inspect openings before beginning installation. Verify that rough or masonry opening is correct and the sill plate is level.
- B. Masonry surfaces shall be visibly dry and free of excess mortar, sand and other construction debris.
- C. Metal surfaces shall be dry, clean, free of grease, oil, dirt, rust and corrosion, and welding slag, without sharp edges or offsets at joints.
- D. Inspect windows furnished by the manufacturer, verify existing dimensions and conditions, and provide all required additional aluminum trim and accessories to complete the installation.

### **3.2 INSTALLATION**

- A. Comply with manufacturer's specifications and recommendations for installation of window units, hardware, operators, and other components of the work.
- B. Set units plumb, level and true to line, without warp or rack of frames or sash. Provide proper support and anchor securely in place.
- C. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with the requirements specified under paragraph "Dissimilar Materials" in the Appendix to AAMA 101-85.
- D. Set sill members and other members in a bed of compound or with joint fillers or gaskets, as shown, to provide weathertight construction. Refer to the "Joint Sealer" sections of Division-7 for compounds, fillers, and gaskets to be installed concurrently with window units. Coordinate installation with wall flashings and other components of the work.
- E. Compounds, joint fillers and gaskets to be installed after installation of window units are specified as work in another section in Division-7.

### **3.3 ADJUSTING**

- A. Adjust operating sash and hardware to provide a tight fit at contact points and at weatherstripping, for smooth operation and a weathertight closure.

### **3.4 CLEANING**

- A. Clean aluminum surfaces promptly after installation of windows. Exercise care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt and other substances. Lubricate hardware and other moving parts.
- B. Clean glass of pre-glazed units promptly after installation of windows; comply with requirements of the "Glass and Glazing" section for cleaning and maintenance.

### **3.5 PROTECTION**

- A. Initiate and maintain protection and other precautions required through the remainder of the construction period, to ensure that, except for normal weathering, window units will be free of damage or deterioration at the time of substantial completion.

**END OF SECTION 08520**

## **SECTION 08700 - FINISH HARDWARE**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section

#### **1.2 DESCRIPTION OF WORK**

- A. The work in this section includes providing all labor, materials, appliances, and services required to completely furnish and deliver all finish hardware and related work, complete in accordance with the Architect's drawings and specifications, including, but not limited to the following:
  - 1. All finish hardware for aluminum/FRP, hollow metal and wood doors in aluminum and hollow metal frames.
  - 2. All keying and cylinders.
  - 3. Furnish all finish hardware necessary to complete the project, whether particularly mentioned or not, and match in quality and finish the material specified.

#### **1.3 WORK NOT INCLUDED**

- A. Furnish finish hardware, except for certain noted items, under other sections for the following items:
  - 1. Toilet partitions
  - 2. Windows
  - 3. Washroom accessories
  - 4. Millwork
  - 5. Factory fabricated mechanical or electrical equipment.

#### **1.4 RELATED WORK IN OTHER SECTIONS**

- A. Refer to the following sections for these related items:
  - 1. Wood Doors - Section 08211
  - 2. Hollow Doors and Metal Frames - Section 08110
  - 3. Aluminum/FRP Doors and Frames - Section 08410
  - 4. Electrical - Section 16000

#### **1.5 QUALITY ASSURANCE**

- A. Manufacturer: Obtain each kind of material (latch and locksets, hinges, closers, etc.) from only one manufacturer of the respective item, although several may be indicated as offering products complying with requirements.
- B. Supplier: A recognized supplier, who has been furnishing Builders Hardware, in the project's vicinity, for a recommended period of not less than 3 years, and who is, or employs an experienced Architectural Hardware Consultant who is a recognized member of the Door and Hardware Institute, available at reasonable times during the course of the work, for consultation about the project's material requirements to the Owner, Architect, and Contractor. All hardware is to be supplied by one dealer.

- C. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA 80. Provide only material which has been tested and listed by Underwriter's Laboratories, or other approved Testing Laboratories, for the types and sizes of doors required, and complies with requirements of Door and Frame labels.
- D. Where applicable, all hardware shall be in conformance with the State of New Jersey "Barrier-Free" sub code and ICC - ANSI A117.1

## **1.6 SUBMITTALS**

- A. Submittals shall conform to the requirements specified in Part 1.
- B. The hardware dealer shall submit to the Architect and/or Owner, at least six (6) copies of a detailed Hardware Schedule and Catalog Cut Sheets. These schedules shall be complete and describe in detail the finish hardware for all door openings, or occurrences of finish hardware. These schedules are to be checked and approved by the Contractor and Architect. No hardware is to be ordered nor templates issued, prior to the receipt, by the Hardware Dealer, of these approved schedules. Upon approval of the schedules, the Contractor shall supply the Architect with six (6) final copies.
- C. The finish hardware schedules submitted shall include information as indicated below. These schedules are intended for coordination of the work.
- D. Final finish hardware content: Based on materials indicated, organize schedule into "Hardware Sets", indicating complete destinations of every item required for each door or opening. Include the following information:
  - 1. Type, style, function, size and finish of each item.
  - 2. Name and manufacturer of each item including catalog cuts of each item.
  - 3. Fastenings and other pertinent information.
  - 4. Location of Hardware Set, cross-referenced to indications on drawings, both on floor plan and in door and frame schedule.
  - 5. Explanation of all abbreviations, symbols, codes, etc., contained in the schedule.
  - 6. Mounting locations for hardware.
  - 7. Wiring diagrams and electrical data.
- E. Submittal Sequence: Submit detailed finish hardware scheduled within 30 days of award of contract.

## **1.7 DELIVERY AND PACKAGING**

- A. All items of finish hardware shall be delivered to the project site or applicable fabricators of doors and frames.
- B. Package each item of hardware and each lockset, separately in individual containers, complete with necessary screws, keys, instructions, and installation template for spotting mortising tools. Mark each container with item number corresponding to the number shown on the hardware schedule.
- C. Furnish wrapping for all knobs, handles, and pulls for protection during construction.

## 1.8 WARRANTY

- A. Guarantee workmanship and material provided against defective manufacture. Repair or replace defective workmanship and material appearing within period of **one (1) year** after substantial completion.
- B. Provide **twenty-five (25) year** factory warranty on door closers against defects in material and workmanship from date of occupancy of project.
- C. Provide **five (5) year** factory warranty on exit devices, locksets and overhead stops against defects in material and workmanship from date of occupancy of project.
- D. Provide **ten (10) year** factory warranty on locksets against defects in material and workmanship from date of occupancy of project.

## 1.9 JOB CONDITIONS

- A. Field Service: Hardware Supplier: Assign a competent representative, acceptable to the Architect to be at the jobsite each time a major shipment of finish hardware is received. Such representative shall assist in "checking in" these shipments and shall secure a receipt covering the contents of each shipment. In addition, such representative shall be available for immediate call to the jobsite when, in the opinion of the Architect, their presence is necessary.
- B. Templates: Following approval of the Hardware Schedule by the Architect, furnish and deliver template information to the fabricators of items to which finish hardware is to be applied in ample time to avoid delays in such work of said fabricators. Provide drawings, schedules and detailed information to other trades as necessary for them to accommodate and prepare their work to receive the finish hardware.
- C. Cooperation and Coordination:
  - 1. Cooperate and coordinate work with that of other trades supplying materials or performing work in contact with, connecting to, underlying, or overlaying the work of this Section.
  - 2. Provide complete data of requirements for work of this Section to those other trades whose work is affected by or dependent upon the work of this Section.
  - 3. Furnish all items to be built into other work in ample time to avoid delaying the progress of such work.
  - 4. Examine all drawings covering the work of this Section and refer to all other drawings, including mechanical and electrical drawings, which may affect the work of this Section or require coordination by this trade.
- D. Existing Conditions: Hardware supplier: Verify all existing conditions in the field to ensure compatibility with finish hardware specified in Hardware Sets herein, prior to submission. Any discrepancies between the existing field conditions and finish hardware specified shall be brought to the attention of the Architect immediately. Hardware supplier shall not order any finish hardware until all discrepancies are rectified and the Architect grants written approval.

## **1.10 GENERAL**

- A. The material called for under this section shall provide for all of the hardware required, whether the same is particularly specified or not. If the hardware for any particular location is not described herein, it should be provided and shall be like that specified for similar locations so far as practicable. If no similar locations are specified, such hardware must be of a suitable type approved by the Architect.
- B. Provide screws of proper type and compatible material, with shields, anchors, plugs, toggle nuts, etc., as required for the attachment of all items of hardware herein specified. All exposed screws shall have flat head, Phillips-type heads and shall be finished to match the item of hardware for which it is intended.

## **1.11 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final **hardware and keying** schedule.

## **1.12 MAINTENANCE SERVICE**

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

## **PART 2 – PRODUCTS**

### **2.1 SCHEDULED DOOR HARDWARE**

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
  - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.
  - 1. Permanent cylinders, cores, and keys to be installed by Owner.
- D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.



## 2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity:
    - a. Two Hinges: For doors with heights up to 60 inches.
    - b. Three Hinges: For doors with heights 61 to 90 inches.
    - c. Four Hinges: For doors with heights 91 to 120 inches.
    - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
  2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
    - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
    - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
  3. Hinge Options: Comply with the following:
    - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
  4. Manufacturers:
    - a. Hager Companies (HA).
    - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
    - c. Stanley Hardware (ST).
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
1. Manufacturers:
    - a. Hager Companies (HA).
    - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
    - c. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
- C. Pin and Barrel Continuous Hinges: ANSI/BHMA A156.26 Grade 1-600 certified pin and barrel continuous hinges with minimum 14 gauge Type 304 stainless steel hinge leaves, concealed teflon coated stainless pin, and twin self lubricated nylon bearings at each knuckle separation. Factory trim hinges to suit door height and prepare for electrical cut-outs.
1. Manufacturers:
    - a. Markar Products; ASSA ABLOY Architectural Door Accessories (MR).
    - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
    - c. Stanley Hardware (ST).

## 2.3 POWER TRANSFER DEVICES

- A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
1. Manufacturers:
    - a. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE) – EL-CEPT Series.

- b. Securitron (SU) - EL-CEPT Series.
  - c. Stanley Hardware (ST) EPT-12C Series.
  
- B. Concealed Quick Connect Electric Data Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified access control door hardware. Furnish with Molex™ or RJ-45 standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
  - 1. Manufacturers:
    - a. Securitron (SU) - CEPT-C5E Series.
    - b. Or equal.
  
- C. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
  - 1. Provide one each of the following tools as part of the base bid contract:
    - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Electrical Connecting Kit: QC-R001.
    - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Connector Hand Tool: QC-R003.
  - 2. Manufacturers:
    - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) – QC-C Series.
    - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) – PoE Series.
    - c. Stanley Hardware (ST) – WH Series.

## **2.4 DOOR OPERATING TRIM**

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
  - 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
  - 2. Furnish dust proof strikes for bottom bolts.
  - 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
  - 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
  - 5. Manufacturers:
    - a. Door Controls International (DC).
    - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
    - c. Trimco (TC).
  
- B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.
  - 1. Manufacturers:
    - a. Door Controls International (DC).
    - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

- c. Trimco (TC).
- C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
  - 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
  - 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
  - 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
  - 4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
  - 5. Manufacturers:
    - a. Hiawatha, Inc. (HI).
    - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
    - c. Trimco (TC).

## 2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- C. Cylinders: Original manufacturer cylinders complying with the following:
  - 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
  - 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  - 3. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
  - 4. Keyway: Match Facility Standard.
- D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
  - 1. Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware. Provide removable core (small or large format) as specified in Hardware Sets.
- E. Security Cylinders: ANSI/BHMA A156.5, Grade 1, patterned security cylinders and keys able to be used together under the same facility master or grandmaster key system. Cylinders are to be factory keyed.
  - 1. Manufacturers:
    - a. Schlage Lock (SC) - Primus Everest.
    - b. No Substitution.
- F. Keying System: Each type of lock and cylinders to be factory keyed.
  - 1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
  - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.

3. Existing System: Key locks to Owner's existing system.
- G. Key Quantity: Provide the following minimum number of keys:
1. Change Keys per Cylinder: Two (2)
  2. Master Keys (per Master Key Level/Group): Five (5).
  3. Construction Keys (where required): Ten (10).
  4. Construction Control Keys (where required): Two (2).
- H. Construction Keying: Provide temporary keyed construction cores.
- I. Key Registration List (Bitting List):
1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
  2. Provide transcript list in writing or electronic file as directed by the Owner.
- J. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.
1. Manufacturers:
    - a. Lund Equipment (LU).
    - b. MMF Industries (MM).
    - c. Telkee (TK).

## **2.6 MECHANICAL LOCKS AND LATCHING DEVICES**

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) – ML2000 Series.
    - b. Sargent Manufacturing (SA) – 8200 Series.
    - c. Or equal.

## **2.7 ELECTROMECHANICAL LOCKING DEVICES**

- A. Electromechanical Mortise Locksets, Grade 1 (Heavy Duty): Subject to same compliance standards and requirements as mechanical mortise locksets, electrified locksets to be of type and design as specified below.
1. Electrified Lock Options: Where indicated in the Hardware Sets, provide electrified options including: outside door lock/unlock trim control, latchbolt and lock/unlock status monitoring, deadbolt monitoring, and request-to-exit signaling. Support end-of-line resistors contained within the lock case. Unless otherwise indicated, provide electrified locksets standard as fail secure.
  2. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
  3. High Security Monitoring: Provide lock bodies which have built-in request to exit monitoring and are provided with accompanying door position switches. Provide a resistor configuration which is compatible with the access control system.
  4. Manufacturers:
    - a. Corbin Russwin Hardware (RU) - ML20900 Series.

- b. Sargent Manufacturing (SA) - 8200 Series.
- c. Or equal.

## 2.8 NOT USED.

## 2.9 AUXILIARY LOCKS

- A Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.
  - 1 Manufacturers:
    - d. Corbin Russwin Hardware (RU) - DL4100 Series.
    - e. Sargent Manufacturing (SA) - 4870 Series.
    - f. Or equal.

## 2.10 LOCK AND LATCH STRIKES

- A Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
  - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
  - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
  - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
  - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B Standards: Comply with the following:
  - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
  - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
  - 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
  - 4. Dustproof Strikes: BHMA A156.16.

## 2.11 ELECTRIC STRIKES

- A Surface Mounted Rim Electric Strikes: Surface mounted rim exit device electric strikes conforming to ANSI/BHMA A156.31, Grade 1, and UL Listed for both Burglary Resistance and for use on fire rated door assemblies. Construction includes internally mounted solenoid with two heavy-duty, stainless steel locking mechanisms operating independently to provide tamper resistance. Strikes tested for a minimum of 500,000 operating cycles. Provide strikes with 12 or 24 VDC capability supplied standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike. Strike requires no cutting to the jamb prior to installation.
  - 1. Manufacturers:
    - a. HES (HS) - 9400 Series
    - b. HES (HS) - 9500/9600 Series.
    - c. Or equal.

- B Provide electric strikes with in-line power controller and surge suppressor by the same manufacturer as the strike with the combined products having a five year warranty.

## 2.12 CONVENTIONAL EXIT DEVICES

- A General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
  1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
  2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
  3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
  4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
  5. Electromechanical Options: Subject to same compliance standards and requirements as mechanical exit devices, electrified devices to be of type and design as specified in hardware sets. Include any specific controllers when conventional power supplies are not sufficient to provide the proper inrush current.
  6. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
  7. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy-duty escutcheon trim with threaded studs for thru-bolts.
    - a Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    - b Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
  5. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
  6. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
  7. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
  8. Extended cycle test: Devices to have been cycle tested in ordinance with ANSI/BHMA 156.3 requirements to 9 million cycles.
  9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
  10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
  - 1 Manufacturers:
    - a Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
    - b Sargent Manufacturing (SA) - 80 Series.

- B. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.
  - 1. Provide keyed removable feature where specified in the Hardware Sets.
  - 2. Provide stabilizers and mounting brackets as required.
  - 3. Provide electrical quick connection wiring options as specified in the hardware sets.
  - 4. Manufacturers:
    - a. Corbin Russwin Hardware (RU) - 700/900 Series.
    - b. Sargent Manufacturing (SA) - 980S Series.

## **2.13 ELECTROMECHANICAL CONVENTIONAL EXIT DEVICES**

- A. Electrified Conventional Push Rail Devices (Heavy Duty): Subject to same compliance standards and requirements as mechanical exit devices, electrified devices to be of type and design as specified below.
  - 1 Manufacturers:
    - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
    - b. Sargent Manufacturing (SA) - 80 Series.
- B. Electrified Options: As indicated in hardware sets, provide electrified exit device options including: electric latch retraction, electric dogging, outside door trim control, exit alarm, delayed egress, latchbolt monitoring, lock/unlock status monitoring, touchbar monitoring and request-to-exit signaling. Unless otherwise indicated, provide electrified exit devices standard as fail secure.

## **2.14 NOT USED.**

## **2.15 NOT USED.**

## **2.16 DOOR CLOSERS**

- A. All door closers specified herein shall meet or exceed the following criteria:
  - 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
  - 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
  - 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
  - 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
  - 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
    1. Manufacturers:
      - a. Corbin Russwin Hardware (RU) - DC6000 Series.
      - b. Sargent Manufacturing (SA) - 351 Series.
      - c. Norton Door Controls (NO) - 7500 Series.
  - C. Door Closers, Surface Mounted (Cam Action): ANSI/BHMA 156.4, Grade 1 certified surface mounted, high efficiency door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be of the cam and roller design, one piece cast aluminum silicon alloy body with adjustable backcheck and independently controlled valves for closing sweep and latch speed.
    1. Manufacturers:
      - a. Corbin Russwin (RU) - DC5000 Series.
      - b. Norton Door Controls (NO) - 2800ST Series.
      - c. Sargent Manufacturing (SA) - 422 Series.

## **2.17 SURFACE MOUNTED CLOSER HOLDERS**

- A. Electromagnetic Door Holders: Certified ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate 12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.
  1. Manufacturers:
    - a. LCN Door Closers (LC) - SEM7800 Series.
    - b. Rixson (RF) - 980/990 Series.
    - c. Sargent Manufacturing (SA) - 1560 Series.

## **2.18 ARCHITECTURAL TRIM**

- A. Door Protective Trim
  1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
  2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
  3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.



4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
  - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
  - a. Burns Manufacturing (BU).
  - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
  - c. Trimco (TC).

## **2.19 DOOR STOPS AND HOLDERS**

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
  1. Manufacturers:
    - a. Burns Manufacturing (BU).
    - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
    - c. Trimco (TC).
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
  1. Manufacturers:
    - a. Glynn Johnson (GJ).
    - b. Rixson Door Controls (RF).
    - c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

## **2.20 ARCHITECTURAL SEALS**

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
  1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
  1. National Guard Products (NG).
  2. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
  3. Reese Enterprises, Inc. (RE).

## 2.21 ELECTRONIC ACCESSORIES

- A. Request-to-Exit Motion Sensor: Request-to-Exit Sensors motion detectors specifically designed for detecting exiting through a door from the secure area to a non-secure area. Include built-in timers (up to 60 second adjustable timing), door monitor with sounder alert, internal vertical pointability coverage, 12VDC or 24VDC power and selectable relay trigger with fail safe/fail secure modes.
  1. Manufacturers:
    - a. Security Door Controls (SD) - MD-31D Series.
    - b. Securitron (SU) - XMS Series.
- B. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
  1. Manufacturers:
    - a. Sargent Manufacturing (SA) - 3280 Series.
    - b. Security Door Controls (SD) - DPS Series.
    - c. Securitron (SU) - DPS Series.
- C. Wiegand Test Unit: Test unit verifies proper Wiegand output integrated card reader lock installation in the field by testing for proper wiring, card reader data integrity, and lock functionality including lock/unlock, door position, and request-to-exit status. 12 or 24VDC voltage adjustable operating as Fail Safe or Fail Secure.
  1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) - WT2 Wiegand Test Unit.
    - b. Sargent Manufacturing (SA) - WT2 Wiegand Test Unit.
- D. Power Supplies: Provide Nationally Recognized Testing Laboratory Listed 12VDC or 24VDC (field selectable) filtered and regulated power supplies. Include battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
  1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) - BPS Series.
    - b. Sargent Manufacturing (SA) - 3500 Series.

- c. Securitron (SU) - BPS Series.

## **2.22 FABRICATION**

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## **2.23 FINISHES**

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

## **2.24 DOOR HARDWARE SETS**

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.
- C. Manufacturer's Abbreviations:
  - 1. MK - McKinney
  - 2. PE - Pemko
  - 3. MR - Markar
  - 4. RO - Rockwood
  - 5. SA - Sargent
  - 6. SC - Schlage
  - 7. KA - Kaba Ilco
  - 8. HS - HES
  - 9. RF - Rixson
  - 10. SU - Securitron
  - 11. OT - OTHER

## HARDWARE SETS

**Set: 1.0 – Not Used.**

**Set: 2.0 – Not Used.**

**Set: 3.0 – Not Used.**

**Set: 4.0 – Not Used.**

**Set: 5.0 – Not Used.**

**Set: 6.0 – Not Used.**

### **Set: 7.0**

Doors: D138.3

2 Continuous Hinge	CFM__SLF-HD1 PT - DOOR HEIGHT	PE
1 Removable Mullion	L980A	US28 SA
1 Exit Device (pull)	LC 16 55 AD8510 862	US32D SA
1 Exit Device (storeroom)	LC 16 55 56 AD8504 862	US32D SA
1 Cylinder (rim)	20-079	626 SC
3 Cylinder (mortise)	26-064 - LENGTH/CAM TO SUIT	626 SC
4 Construction Core	23-030-ICX	SC
4 Cylinder Core	20-740	626 SC
2 Door Closer	351 CPS	EN SA
1 Threshold	272A MSES25SS	PE
1 Rain Guard	346C	PE
1 Gasketing (mullion)	5110BL	PE
2 Sweep (w/drip edge)	3452CNB	PE
2 Frame Harness	QC-C1500P	MK
2 Door Harness	QC-C___ - LENGTH TO SUIT	MK
2 Electric Power Transfer	EL-CEPT	SU
2 Door Position Switch	DPS2-M-BK	SU
1 Power Supply	BPS-24-1	SU

Notes: Perimeter/meeting stile seals by frame/door supplier.

Card reader by security integrator.

Electronic Operation: Valid card or key retracts latchbolt. Free egress at all times. In case of power loss, door remains locked and latched.

**Set: 8.0 – Not Used.**

**Set: 9.0 – Not Used.**

**Set: 10.0 – Not Used.**

**Set: 11.0 – Not Used.**

**Set: 12.0 – Not Used.**

**Set: 13.0 – Not Used.**

**Set: 14.0 – Not Used.**

**Set: 15.0 – Not Used.**

**Set 16.0 – Not Used,**

**Set: 16.1**

Doors: D150

1	Continuous Hinge	CFM__SLF-HD1 - DOOR HEIGHT		PE
1	Exit Device (exit only)	AD8510	US32D	SA
1	Door Closer	351 CPS	EN	SA
1	Kick Plate	K1050 10" HVBEV	US32D	RO
1	Threshold	279x224AFGT MSES25SS		PE
1	Rain Guard	346C		PE
1	Sweep (w/drip edge)	3452CNB		PE
1	Door Position Switch	3287		SA

Notes: Perimeter/meeting stile seals by frame/door supplier.

**Set: 17.0 – Not Used.**

**Set: 18.0**

Doors: A154

1	Continuous Hinge	CFM__SLF-HD1 - DOOR HEIGHT		PE
1	Exit Device (classroom)	CPC LC AD8413 ETL	US32D	SA
1	Cylinder (mortise)	26-064 - LENGTH/CAM TO SUIT	626	SC
1	Construction Core	23-030-ICX		SC
1	Cylinder Core	20-740	626	SC
1	Door Closer	422 CTB2	EN	SA
1	Threshold	166A MSES10SS		PE
1	Rain Guard	346C		PE
1	Sweep	315CN		PE
1	Door Position Switch	3287		SA

Notes: Perimeter/meeting stile seals by frame/door supplier.

**Set: 19.0 – Not Used.**

**Set: 20.0**

Doors: D139

1	Continuous Hinge	CFM__SLF-HD1 PT - DOOR HEIGHT		PE
1	Fail Secure Lock	LC NAC-82271-24v LNL	US26D	SA
1	Cylinder (mortise)	26-064 - LENGTH/CAM TO SUIT	626	SC
1	Construction Core	23-030-ICX		SC
1	Cylinder Core	20-740	626	SC
1	Door Closer	351 O (or) 351 P10	EN	SA
1	Kick Plate	K1050 10" HVBEV	US32D	RO
1	Door Stop (HD floor)	471	US26D	RO
1	Threshold	279x224AFGT MSES25SS		PE
1	Rain Guard	346C		PE
1	Sweep (w/drip edge)	3452CNB		PE
1	Frame Harness	QC-C1500P		MK
1	Door Harness	QC-C___ - LENGTH TO SUIT		MK
1	Door Position Switch	3287		SA
1	Electric Power Transfer	EL-CEPT		SU
1	Power Supply	BPS-24-1		SU

Notes: Perimeter/meeting stile seals by frame/door supplier.

Card reader by security integrator.

Electronic Operation: Valid card unlocks outside lever or key retracts latchbolt. Free egress at all times. In case of power loss, door remains locked and latched.

**Set: 21.0**

Doors: D141

1	Continuous Hinge	CFM__SLF-HD1 PT - DOOR HEIGHT		PE
1	Fail Secure Lock	LC NAC-82271-24v LNL	US26D	SA
1	Cylinder (mortise)	26-064 - LENGTH/CAM TO SUIT	626	SC
1	Construction Core	23-030-ICX		SC
1	Cylinder Core	20-740	626	SC
1	Door Closer	351 O (or) 351 P10	EN	SA
1	Kick Plate	K1050 10" HVBEV	US32D	RO
1	Door Stop (HD floor)	471	US26D	RO
1	Threshold	279x224AFGT MSES25SS		PE
1	Rain Guard	346C		PE
1	Sweep (w/drip edge)	3452CNB		PE
1	Frame Harness	QC-C1500P		MK
1	Door Harness	QC-C___ - LENGTH TO SUIT		MK
1	Door Position Switch	3287		SA
1	Electric Power Transfer	EL-CEPT		SU
1	Power Supply	BPS-24-1		SU

Notes: Perimeter/meeting stile seals by frame/door supplier.

Card reader by security integrator.

Electronic Operation: Valid card unlocks outside lever or key retracts latchbolt. Free egress at all times. In case of power loss, door remains locked and latched.

**Set: 22.0 – Not Used.**

**Set: 23.0 – Not Used.**

**Set: 24.0 – Not Used.**

**Set: 25.0 – Not Used.**

**Set: 26.0 – Not Used.**

**Set: 27.0 – Not Used.**

**Set: 28.0 – Not Used.**

**Set: 29.0 – Not Used.**

**Set: 30.0 - Not Used.**

**Set: 31.0 – Not Used.**

**Set: 32.0 – Not Used.**

**Set: 33.0 – Not Used.**

**Set: 34.0 – Not Used.**

**Set: 35.0 – Not Used.**

**Set: 36.0**

Doors: D138

6	Hinge (heavy weight)	T4A3786	US26D	MK
1	Removable Mullion	12-L980	PC	SA
1	Exit Device (exit only)	12 8810	US32D	SA
1	Exit Device (intruder)	12 LC 8816 ETL	US32D	SA
1	Cylinder (rim)	20-079	626	SC
1	Cylinder (mortise)	26-064 - LENGTH/CAM TO SUIT	626	SC
2	Construction Core	23-030-ICX		SC
2	Cylinder Core	20-740	626	SC
1	Thumbturn Cylinder	ADA7181	32D	KA
2	Door Closer	351 CPS	EN	SA
2	Kick Plate	K1050 10" HVBEV	US32D	RO
1	Gasketing (head/jamb)	S88BL		PE
1	Gasketing (mullion)	5110BL		PE

**Set: 37.0 – Not Used.**

**Set: 38.0 – Not Used.**

**Set: 39.0**

Doors: D137

2	Continuous Hinge	HG315 - DOOR HEIGHT	630	MR
2	Exit Device (exit only)	12 NB MD8610	US32D	SA
2	Door Closer	351 O (or) 351 P10	EN	SA
2	Kick Plate	K1050 10" HVBEV	US32D	RO
2	Electromagnetic Holder	998M - VOLT/CURRENT TO SUIT	689	RF
1	Gasketing (head/jamb)	S88BL		PE
1	Astragal	357SP		PE
1	Astragal	S771C		PE

Notes: Connect holder to fire alarm system to release upon fire alarm.

**Set: 40.0 – Not Used.**

**Set: 41.0 – Not Used.**

**Set: 42.0 – Not Used.**

**Set: 43.0**

Doors: D145, D147

3	Hinge	TA2714	US26D	MK
1	Storeroom Lock	LC 8204 LNL	US26D	SA
1	Cylinder (mortise)	26-064 - LENGTH/CAM TO SUIT	626	SC
1	Construction Core	23-030-ICX		SC
1	Cylinder Core	20-740	626	SC
1	Door Stop	403 (or) 441CU	US26D	RO
3	Silencer	608 (or) 609		RO

**Set: 44.0 – Not Used.**

**Set: 45.0 – Not Used.**

**Set: 46.0 – Not Used.**

**Set: 47.0 – Not Used.**

**Set: 48.0 – Not Used.**

**Set: 49.0 – Not Used.**

**Set: 50.0 – Not Used.**

**Set: 51.0 – Not Used.**

**Set: 52.0 – Not Used.**



**Set: 53.0**

Doors: D144

3 Hinge	TA2714	US26D MK
1 Classroom Lock	LC 8237 LNL	US26D SA
1 Cylinder (mortise)	26-064 - LENGTH/CAM TO SUIT	626 SC
1 Construction Core	23-030-ICX	SC
1 Cylinder Core	20-740	626 SC
1 Door Stop	403 (or) 441CU	US26D RO
3 Silencer	608 (or) 609	RO

**Set: 54.0- Not Used**

**Set: 55.0**

Doors: D139.1

3 Hinge	TA2714	US26D MK
1 Classroom Lock	LC 8237 LNL	US26D SA
1 Cylinder (mortise)	26-064 - LENGTH/CAM TO SUIT	626 SC
1 Construction Core	23-030-ICX	SC
1 Cylinder Core	20-740	626 SC
1 Door Closer	351 O (or) 351 P10	EN SA
1 Kick Plate	K1050 10" HVBEV	US32D RO
1 Door Stop	403 (or) 441CU	US26D RO
3 Silencer	608 (or) 609	RO

**Set: 56.0**

Doors: A171, D138.2

3 Hinge	TA2714	US26D MK
1 Classroom Lock	LC 8237 LNL	US26D SA
1 Cylinder (mortise)	26-064 - LENGTH/CAM TO SUIT	626 SC
1 Construction Core	23-030-ICX	SC
1 Cylinder Core	20-740	626 SC
1 Door Closer	351 PS	EN SA
1 Kick Plate	K1050 10" HVBEV	US32D RO
3 Silencer	608 (or) 609	RO

**Set: 57.0 – Not Used**

**Set: 58.0 – Not Used.**

**Set: 59.0**

Doors: D146

3 Hinge	TA2714	US26D MK
1 Privacy Set	49 8265 LNL	US26D SA
1 Door Closer	351 O (or) 351 P10	EN SA
1 Mop Plate	K1050 4" HVBEV	US32D RO
1 Kick Plate	K1050 10" HVBEV	US32D RO
1 Door Stop	403 (or) 441CU	US26D RO
3 Silencer	608 (or) 609	RO

**Set: 60.0**

Doors: D148, D149

3 Hinge	TA2714	US26D MK
1 Privacy Set	49 8265 LNL	US26D SA
1 Door Closer	351 O (or) 351 P10	EN SA
1 Mop Plate	K1050 4" HVBEV	US32D RO
1 Kick Plate	K1050 10" HVBEV	US32D RO
1 Door Stop	403 (or) 441CU	US26D RO
1 Gasketing (head/jamb)	S88BL	PE

**Set: 61.0 – Not Used.**

**Set: 62.0 – Not Used.**

**Set: 63.0 – Not Used.**

**Set: 64.0 – Not Used.**

**Set: 65.0 – Not Used.**

**Set: 66.0 – Not Used.**

**Set: 67.0 – Not Used.**

**Set: 68.0 – Not Used.**

**Set: 69.0**

Doors: D138.1

3 Hinge (heavy weight)	T4A3786	US26D MK
1 Door Pull	BF Y110 Mtg-Type 1	US32D RO
1 Push Plate	70G (4 x 20)	US32D RO
1 Door Closer	422 CTB2	EN SA
1 Kick Plate	K1050 10" HVBEV	US32D RO
3 Silencer	608 (or) 609	RO

**Set: 70.0 – Not Used.**

**Set: 71.0 – Not Used.**

**Set: 72.0 – Not Used.**

**Set: 73.0 – Not Used.**

**Set: 74.0 – Not Used.**

**Set: 75.0 – Not Used.**

**Set: 76.0 – Not Used.**

**Set: 77.0 – Not Used.**

**Set: 78.0 – Not Used.**

**Set: 79.0**

Doors: A177, A178

3	Hinge (heavy weight)	T4A3786	US26D	MK
1	Classroom Security Lock	LC 8238 LNL	US26D	SA
1	Cylinder (mortise)	26-064 - LENGTH/CAM TO SUIT	626	SC
1	Construction Core	23-030-ICX		SC
1	Cylinder Core	20-740	626	SC
1	Thumbturn Cylinder	ADA7181	32D	KA
1	Door Closer	351 O (or) 351 P10	EN	SA
1	Kick Plate	K1050 10" HVBEV	US32D	RO
1	Door Stop	403 (or) 441CU	US26D	RO
1	Gasketing (head/jamb)	S88BL		PE
1	Frame Harness	PoE-C1500P		MK
1	Door Harness	PoE-C___ - LENGTH TO SUIT		MK
1	Electric Power Transfer	CEPT-C5E		SU

**Set: 80.0**

Doors: D143

3	Hinge (heavy weight)	T4A3786	US26D	MK
1	Classroom Security Lock	LC 8238 LNL	US26D	SA
1	Cylinder (mortise)	26-064 - LENGTH/CAM TO SUIT	626	SC
1	Construction Core	23-030-ICX		SC
1	Cylinder Core	20-740	626	SC
1	Thumbturn Cylinder	ADA7181	32D	KA
1	Door Closer	351 CPS	EN	SA
1	Kick Plate	K1050 10" HVBEV	US32D	RO
1	Gasketing (head/jamb)	S88BL		PE
1	Frame Harness	PoE-C1500P		MK
1	Door Harness	PoE-C___ - LENGTH TO SUIT		MK
1	Electric Power Transfer	CEPT-C5E		SU

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Mount Hardware units at heights indicated in “recommended locations for Builders Hardware for Standard Steel Doors and Frames”, by the Door and Hardware Institute, except as specifically indicated, required to comply with governing regulations, or may be otherwise directed by the Architect.
- B. Install each hardware item in compliance with the manufacturer’s instruction and recommendations. Wherever cutting and fitting is required to install finish hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protection with finishing work specified in the Division 9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.
- C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

### **3.2 ADJUST AND CLEAN**

- A. Adjust and check each operating item of finish hardware and each door to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
- B. Final adjustment: Wherever finish hardware installation is made more than one month prior to acceptance of occupancy of a space or area, return to the work site during the week prior to acceptance or occupancy, and make final check and adjustment of all finish hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of finish hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- C. Instruct Owner’s personnel in proper adjustment and maintenance of finish hardware finishes during the final adjustment of finish hardware.
- D. Continued Maintenance Service: Approximately six months after the acceptance of finish hardware in each area, the installer, accompanied by the representative of the lock and latch manufacturer shall return to the project and re-adjust every item of finish hardware to restore proper function of doors and finish hardware. Consult with and instruct Owner’s personnel in recommended additions to the maintenance procedures. Replace finish hardware items that have deteriorated or failed due to faulty design, materials or installation of finish hardware units.

**END OF SECTION 08700**

## **SECTION 08800 - GLASS AND GLAZING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections:
  - 1. Section 08110 - Hollow Metalwork
  - 2. Section 08211 - Wood Doors
  - 3. Section 08410 - Aluminum/FRP Doors and Aluminum Framing
  - 4. Section 08415 - Aluminum Storefronts
  - 5. Section 08520 - Aluminum Windows
  - 6. Section 08872 - Security Glazing Films

#### **1.2 SUMMARY**

- A. Extent of glass and glazing work is indicated on drawings and schedules.
- B. Extent of application of window film is indicated on drawings and schedule.
- C. Types of work or locations requiring glass and glazing include, but are not limited to, glass types scheduled herein and on the drawings.
  - 1. Windows.
  - 2. Doors and side lites.
  - 3. Interior borrowed lites.
  - 4. Storefronts.

#### **1.3 QUALITY ASSURANCE**

- A. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
- C. Safety Glass: Categories I and II materials complying with testing requirements in CPSC 16CFR1201 and permanently marked with label of:
  - 1. Safety Glazing Certification Council (SGCC).
- D. Insulating Glass Seal Standard: Comply with ASTM E 774, Class C.
  - 1. Comply with International Building Code for insulated tempered glass.
  - 2. Label each unit permanently on spacer or on one pane.
  - 3. Certification agency:

- a. Insulating Glass Certification Council (IGCC).
  - b. Associated Laboratories, Inc. (ALI).
- E. Single Source Responsibility for Glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator with a recommended 5 years of successful experience in the production of each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.
- F. Installer (Glazier): A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program
- 1. Firm with a recommended 5 years of successful experience in glazing work similar to required work.
- G. All glass shall bear the Label of the manufacturer.
- H. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with an appropriate certification label of IGCC.

#### **1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical data for each glazing material and fabricated glass product required, including documentation of compliance with requirements and instructions for handling, storing, installing, cleaning and protecting each type of glass and glazing material, and installation and maintenance instructions.
- B. Before any glass is delivered to the job site, submit sections and details of glass installation at framing members.
- C. Samples: Submit for verification purposes, 12" square samples of each type of glass indicated except for clear single pane units, and 12" long samples of each color required (except black) for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative of adjoining framing system in color.
- 1. Submit insulating glass samples with completed edge-seal construction, but hermetic seal need not be maintained.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.
- B. Protect window film, glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

## 1.6 PROJECT CONDITIONS

- A. Examine framing and substrate work to receive glass and glazing materials, and condition under which glass is to be installed. Do not proceed with glazing until unsatisfactory conditions have been corrected.
- B. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.
  - 1. Install liquid sealants at ambient and substrate temperatures above 40°F.

## 1.7 WARRANTY

- A. Manufacturer's Special Warranty on Coated-Glass Products: Written warranty, made out to Owner and signed by coated-glass manufacturer agreeing to furnish replacements for those coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
  - 1. Warranty Period: **Ten (10) years** from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass manufacturer agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
  - 1. Warranty Period: **Ten (10) years** from date of Substantial Completion.
- C. Manufacturer's Limited Warranty on Fire-Rated / Impact Glazing: Written warranty, made out to the Owner and signed by manufacturer, warrants only that the product will be free of manufacturing defects resulting in material obstruction through the glass area and/or edge separation and changes in properties of the interlayer for a period of **five (5) years** from the date of purchase, provided the Products have been properly shipped, stored, handled, installed and maintained.
  - 1. Limitation of Remedy - Inspection: The remedy for product proved to be defective under the terms of this warranty is limited to shipment of replacement product. With respect to all claims under this warranty, the Manufacturer shall have the right to inspect any and all products alleged to be defective.
- D. Manufacturer's warranty of glazing film to replace defected material for a period of **fifteen (15) years** for film installed on glazing.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include; but are not limited to, the following:
  - 1. Standard Glass, and Insulating Glass Products:
    - a. Pilkington, Libbey-Owens-Ford, (LOF)
    - b. Vitro Architectural Glass (formally PPG Glass)

- c. Guardian Industries Corp.
  - d. Or approved equal
2. Fire Rated Glass Assemblies:
- a. SuperLite II-XL by Safli First, a Division of O'Keeffe's Inc.
  - b. Pyran® Platinum by Schott Glass Products
  - c. Or approved equal.

## 2.2 PRIMARY GLASS PRODUCTS

- A. Clear Float Glass: ASTM C 1036, Type I (transparent glass, flat), Class 1 (clear), Quality-Q3 (glazing select).
- B. Heat Treated Float Glass (Tempered Glass): ASTM C 1048; Type I; Quality-Q3; Class I (clear)
  - 1. Provide prime glass of color and type indicated, which has been heat treated to strengthen glass in bending to not less than 4.5 times annealed strength.
- C. Uncoated Tinted Float Glass: Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality-Q3 (glazing select), and as follows:
  - 1. Manufacturer's standard **gray** tint, with visible light transmittance of 33% and shading coefficient of 0.31 for 1/4" thick glass.
- D. Energy Advantage Low-E Glass: Manufacturer's standard clear color Low-E glass, coated on third surface with light transmittance:
  - 1. Gray Tint: 33% and shading coefficient of .28 for 1/4" thick glass.
  - 2. Clear: 33% and shading coefficient of .44 for 1/4" thick glass.

## 2.3 INSULATING GLAZING:

- A. Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
- B. Provide insulating glass for applications in exterior doors, side lites, storefront units, curtain wall systems, aluminum windows and as follows:
  - 1. Exterior pane shall 1/4-inch thick tinted glass to meet indicated requirements.
  - 2. Interior pane shall be 1/4-inch thick "Low-E" coating on the third surface.
  - 3. Units shall be tempered where within 6 feet of a door or where "tempered" or "safety" glass is required by Code.
  - 4. Double Glass Performance Data:
    - a. Clear:
      - 1) Visible light transmittance of 70%,
      - 2) Solar Energy Transmittance of 33%,
      - 3) U-Factor: Summer (Air) of 0.27,
      - 4) U-Factor: Winter (Air) of 0.29,



- 5) Solar Heat Gain Coefficient of 0.38,
  - 6) Shading coefficient of 0.44.
- b. Gray Tint (2<sup>nd</sup> surface):
- 1) Visible light transmittance of 33%,
  - 2) Solar Energy Transmittance of 18%,
  - 3) U-Factor: Summer (Air) of 0.28,
  - 4) U-Factor: Winter (Air) of 0.29,
  - 5) Solar Heat Gain Coefficient of 0.25,
  - 6) Shading coefficient of 0.28.

## 2.4 FIRE-RATED / IMPACT GLAZING AND FRAMING ASSEMBLIES

- A. Provide fire/impact safety-rated glass ceramic laminated clear glazing and fire rated framing assemblies which include the following:
- 1. Fire / impact glazing and fire rated framing assemblies installed as borrowed lites in fire rated hollow metal frames.
  - 2. Units are tested listed and labeled by the Underwriters Laboratories Inc. , UL., for 60/90/120 minute fire rated assemblies:
    - a. UL 10C: Positive Pressure Fire Tests of Window and Door Assemblies.
  - 3. Units meet Categories I & II materials complying with testing requirements in CPSC 16CFR1201.
  - 4. Units are tested in accordance with ANSI Z97.1.
  - 5. Units meet NFPA 80 for Fire Doors and Windows, NFPA 252 and 257.
  - 6. Premium (polished) finish appearance. No amber tint or visual distortion in the glass.
- B. Subject to compliance with requirements, provide the following:
- 1. FRIG -1: Fire-Rated / Impact Glazing; Provide “**Pyran® Platinum L**”, as manufactured by Schott Glass Products; or approved equal.
    - a. Door lites, transoms or sidelites, and windows with fire rating requirements up to 90 minutes.
    - b. Doors up to 3 hours.

## 2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for category II materials, for kinds of laminated glass indicated and other requirements specified as following:
- 1. Interlayer: Interlayer material as indicated below, clear or in colors, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
    - a. Interlayer Material: Polyvinyl butyral sheets.

2. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets as follows:
  - a. Laminate lites with polyvinyl butyral interlayer in autoclave with heat plus pressure.
3. Inner Lite: Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality q3 (glazing select).
  - a. Class 2 (tinted).
  - b. Thickness: 1/4"
4. Outer Lite: Tempered glass type.
  - a. Thickness: 1/4".
5. Plastic Interlayer: 0.060 inch thick.

## **2.6 ELASTOMERIC GLAZING SEALANTS AND PREFORMED GLAZING TAPES**

- A. General: Provide color of exposed glazing sealant compound as selected by Architect from manufacturer's standard colors, or black if no color is so selected. Comply with manufacturer's recommendations for selection of hardness, depending upon the location of each application, conditions at time of installation, and performance requirements as indicated. Select materials, and variations or modifications, carefully for compatibility with surfaces contacted in the installation.
- B. 1 Part Silicone Rubber Glazing Sealant: Elastomeric silicone sealant complying with FS TT-D-001543, Class A, non-sag. Provide acid type recommended by manufacturer where only non-porous bond surfaces are contacted; provide non-acid type recommended by manufacturer where one or more porous bond surfaces are contacted.
- C. Butyl Rubber Glazing Tape: Partly-vulcanized, self-adhesive, non-staining, elastomeric butyl rubber tape. 98% solids, intended for 35% compression, no appreciable deterioration for 3000 hour test in Atlas Weatherometer; either plain or pre-shimmed as required for proper installation of glass.

## **2.7 GLAZING COMPOUND FOR FIRE-RATED GLAZING MATERIALS**

- A. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent. Glass panels that exceed 1,393 sq. inches for 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer.
  1. Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.
    - a. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

## **2.8 MISCELLANEOUS GLAZING MATERIALS**

- A. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.

- C. Spacers: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.
- D. Edge Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.
- E. Compressible Filler Rods: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25 percent deflection.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Require Glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

### **3.2 STANDARDS AND PERFORMANCE**

- A. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.
- B. Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.
- C. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Inspect each piece of glass immediately before installation, and discard pieces which have significant edge damage or face imperfections.
- F. Unify appearance of each series of lites by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw and bow oriented in the same direction as other piece.
- G. Install insulating glass units to comply with recommendations by Sealed Insulating Glass Manufacturers Association, except as otherwise specifically indicated or recommended by glass and sealant manufacturers.

### **3.3 PREPARATION FOR GLAZING**

- A. Clean glazing channel and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrate. Remove lacquer from metal surfaces where elastomeric sealants are used.
- B. Apply primer or sealer to joint surfaces where recommended by sealant manufacturer.

### **3.4 GLAZING**

- A. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from corner, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.
- B. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- C. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- D. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- E. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.
- F. Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- G. Tool exposed surfaces of sealants to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.
- H. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.
- I. Miter cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

### **3.5 PROTECTION AND CLEANING**

- A. Cure glazing sealants and compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.

- B. Protect glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.
- C. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.
- D. Maintain glass in a reasonably clean condition during construction, so that it will not be damaged by corrosive action and will not contribute (by wash-off) to deterioration of glazing materials and other work. Comply with manufacturer's instructions.
- E. Wash and polish glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Comply with glass manufacturer's recommendations for final cleaning.

**END OF SECTION 08800**

## SECTION 08872 - SECURITY GLAZING FILMS

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Glazing film applied to existing and new glazing assemblies.
- B. Related Section(s):
  - 1. Section 08211 – Wood Doors
  - 2. Section 08410 – Aluminum/FRP Doors
  - 3. Section 08415 – Aluminum Storefronts
  - 4. Section 08520 – Aluminum Windows
  - 5. Section 08800 – Glass & Glazing

#### 1.2 REFERENCE STANDARDS

- A. WEY-SA-C1 – Standard for shooter/attack certification and forced entry.
- B. GSA Level C – General Services Administration Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings.
- C. ASTM F1642 – Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings.
- D. UL972 – Standard for Burglary Resisting Glazing.
- E. EN356 P4 – Testing and Classification of Resistance Against Manual Attack.
- F. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- G. 16 CFR 1201 - **Safety** Standard for Architectural Glazing **Materials; Consumer** Products Safety **Commission; current edition.**
- H. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2010.
- I. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 2013a

#### 1.3 SUBMITTALS

- A. See AIAA232 and Section 00800 for submittal procedures.
- B. Test Reports: Detailed reports of full-scale chamber tests to specified criteria, using assemblies identical to those required for this project.
- C. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Record of product certification for safety requirements.
  - 2. Preparation instructions and recommendations.
  - 3. Storage and handling requirements and recommendations.
  - 4. Installation methods.
- D. Samples: For each film product to be used, minimum size 4 inches by 6 inches, representing actual product, color, and patterns.
- E. Specimen warranty.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Glazing film manufacturer specializing in manufacture of security glazing films with recommended minimum 10 years successful experience.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufactures unopened packaging until ready for installation.

- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of authorities having jurisdiction.

## 1.6 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Armoured One LLC: [www.ArmouredOne.com](http://www.ArmouredOne.com); or approved equal.
  - 1. Tactical Security Film 21mil applied to recommended areas.

### 2.2 SECURITY GLAZING FILM

- A. **Security Glazing** Film: For new and existing glazing assemblies to provide impact resistance and forced/attack resistance complying with WEY-SA-C1, ANSI Z97. I and CPSC 16 CFR 1201 Category II, ASTM E330, UL972, EN356 P4A, and GSA Level C, as specified:
  - 1. Applied to 1/4 inch thick clear tempered plate glass.
  - 2. Surface applied film.
  - 3. Provide supplemental anchoring system as required to meet forced entry resistance requirements.

### 2.3 MATERIALS

- A. Glazing Film: Transparent polyester film for permanent bonding to glass.
  - 1. Thickness: 0.021 inch, minimum
  - 2. Color: Clear.
  - 3. Construction: Multi-ply **laminated**.
  - 4. Adhesive Type: Pressure sensitive.
  - 5. Tensile Strength: 28,500 psi minimum.
  - 6. Breaking Strength: 615 lbs / inch.
  - 7. Elongation at Break: 230%
  - 8. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with **ASTM E84** (Class A).
  - 9. Provide 12 Year manufacturers replacement warranty to cover film against peeling, cracking, discoloration, and deterioration.
  - 10. Light Transmission of Film Applied on 1/4 inch thick Clear Annealed Glass:
    - a. Visible light Transmittance: 86 percent.
- B. Anchoring System: DOW 995 or GE SCS2000 SilPruf Structural Sealant with high impact styrene trim.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Field Applied Film: Verify that existing conditions are adequate for proper application and performance of film.
- B. Examine glass and frames. Send that existing conditions are adequate for proper application and performance of film.
- C. Verify glass is not cracked, chipped, broken, or damaged.
- D. Verify that frames are securely anchored and free of defects.

### **3.2 PREPARATION**

- A. Clean glass of dust, dirt, paint, oil, grease, mildew, mold, and other contaminants that would inhibit adhesion.
- B. Immediately prior to applying film, thoroughly wash glass with neutral cleaning solution.
- C. Protect adjacent surfaces.
- D. Do not begin installation until substrates have been properly prepared.

### **3.3 INSTALLATION**

- A. Install in accordance with manufacturer's instructions, without air bubbles, wrinkles, streaks, bands, thin spots, pinholes, or gaps, as required to achieve specified performance.
- B. Accurately cut film with straight edges to required sizes allowing 1/16-inch to 1/8-inch gap at perimeter of glazed panel unless otherwise required by anchorage method.
- C. Seams. Seam film only as required to accommodate material sizes; seam without overlaps.
- D. Clean glass prior to film installation with neutral cleaning solution.
- E. Peel back release liner and apply film to glass. Using squeegees, push out solution between film and glass.
- F. Once film is installed, anchor the edges of the film by applying approved structural sealant and high impact styrene to the edges of the frames and film.
- G. Clean glass and excess structural sealants from finished surfaces
- H. Remove any labels or protective covers.

### **3.4 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION 08872**



## **SECTION 09250 - GYPSUM DRYWALL**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Extent of each type of gypsum drywall construction required is indicated on the drawings.
- B. This Section includes the following types of gypsum board construction:
  - 1. Gypsum drywall including screw-type metal support system
  - 2. Sound Insulation
  - 3. Drywall finishing (joint tape and compound treatment)
  - 4. Vinyl trim and accessories
- C. Related Sections:
  - 1. Section 07900 - Joint Sealer Assemblies.
  - 2. Section 08110 - Hollow Metalwork.
  - 3. Section 09900 - Painting.

#### **1.3 QUALITY ASSURANCE**

- A. Manufacturer: Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.
- B. Single Source Responsibility: Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.
- C. Fireblocking and Draftstopping: Comply with the International Building Code requirements for installation of fireblocking and / or draftstopping, to prevent the fire passage of flame and product of combustion through concealed spaces or openings in gypsum board systems, in the event of fire.
- D. Provide self extinguishing vinyl trim accessories which do not support combustion once flame source is removed.

#### **1.4 REFERENCES**

- A. ANSI/ASTM C 840 Gypsum Board Standard - Comply with applicable requirements for application and finishing of gypsum board, unless otherwise indicated.
- B. ASTM C 1396 Gypsum Wallboard Standard:
- C. ASTM C 754 Steel Framing Standard - Comply with applicable requirements for installation of steel framing for gypsum board.
- D. ASTM C11: Gypsum Board Terminology Standard:

- E. ASTM D 1784 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPCV) Compounds
- F. ASTM D 3678 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Interior-Profile Extrusions.
- G. Application and Finishing of Gypsum Panel Products: GA-216.

### **1.5 SUBMITTALS**

- A. Product Data: Submit manufacturer's product specifications and installation instructions for each gypsum drywall component, including other data as may be required to show compliance with these specifications.
- B. Shop drawings: Submit shop drawings for wall metal stud framing for structural heavy gauge wall studs supporting other equipment, items, cabinets, etc.
  - 1. Show layout, spacings, sizes, thicknesses, and types of metal framing, fabrication, fastening and anchorage details, including mechanical fasteners.
  - 2. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachments to other units of Work.
  - 3. Indicate manufacturer's design thickness to meet structural performance requirements for each wall mounted item, equipment, cabinet, etc.
- C. Samples: For the following products:
  - 1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.
- C. Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

### **1.7 PROJECT CONDITIONS**

- A. Environmental Conditions, General: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.
  - 1. Minimum Room Temperatures: When ambient outdoor temperatures are below 55°F maintain continuous, comfortable building working temperature of not less than 55°F for 48 hours prior to application and continuously thereafter until drying is complete.

2. Ventilate building spaces as required to remove water in excess of that required for drying joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.
3. The gypsum drywall shall be installed only when the exterior walls have been erected, windows installed and the permanent roof is installed and in watertight condition to prevent the growth of mold. The contractor shall not install gypsum drywall panels that are wet, have the indication of mold, including but not limited to: fuzzy or splotchy surface contamination and discoloration.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
- B. Metal Support Systems:
  1. Allied Structural Industries
  2. Clark-Dietrich Building Systems
  3. National Gypsum Company
  4. Marino\WARE; a Div. of WARE Industries, Inc.
  5. United States Gypsum Co. (USG)
  6. Or approved equal
- C. Gypsum Boards and Related Products:
  1. CertainTeed Gypsum.
  2. Georgia-Pacific Corp.
  3. Gold Bond Building Products Div., National Gypsum Co.
  4. United States Gypsum Co.
  5. Continental Building Products
  6. Or approved equal

### **2.2 METAL SUPPORT MATERIALS**

- A. General: Provide components which comply with ASTM C754 for materials and sizes, unless otherwise indicated.
- B. Wall/Partition Support Materials
  1. Studs ASTM C645, 25 gauge unless otherwise indicated. 20 gauge minimum at door jambs and wherever structural or other gauge studs are called for, for use with impact resistant type gypsum wallboard, and to comply with applicable published instructions and recommendations of gypsum board manufacturer or, if not available, of "Gypsum Construction Handbook" published by United States Gypsum Company.
    - a. Depth of Section: 3-5/8 inch, unless indicated otherwise.
    - b. Runners: Match studs; type recommended by stud manufacturer for floor and ceiling support of studs, and for vertical abutment of drywall work at other work.

- c. Provide structural heavy gauge studs and bracing to support loads of wall mounted items, equipment, cabinets, etc. coordinate with other trades for weight requirements and mounting locations.
2. Furring Members: ASTM C645, 25 gauge hat-shaped.
3. Fasteners for Stud Members: Provide fasteners of type, material, size, recommended by furring manufacturer for the substrate and application indicated.

### **2.3 GYPSUM BOARD**

- A. General: ASTM C1396, in maximum lengths available to minimize end to end joints.
  1. Type: Regular, unless otherwise indicated.
  2. Edges: Tapered.
  3. Thickness: 5/8 inch, unless otherwise indicated.

### **2.4 TRIM ACCESSORIES**

- A. General: Provide manufacturer's standard trim accessories of types indicated for drywall work, formed of galvanized steel unless otherwise indicated, with either knurled and perforated or expanded flanges for nailing or stapling, and beaded for concealment of flanges in joint compound. Provide corner beads, L-type edge trim beads, J-type edge trim beads, special L-kerf type edge trim beads, and one-piece control joint beads.
- B. Semi-Finishing Type: Manufacturer's standard trim units which are not to be finished with joint compound (non-beaded), where indicated.

### **2.5 JOINT TREATMENT MATERIALS (GYPSUM BOARD APPLICATION)**

- A. General: Provide materials complying with ASTM C475, ASTM C840, and recommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.
- B. Joint Tape: Manufacturer's recommended types for indicated applications. Use types compatible with joint compounds.
- C. Joint Compounds: Provide manufacturer's recommended types for indicated applications.
  1. For interior repair and patching work, provide chemical-hardening-type for bedding and filling, ready-mixed vinyl type or vinyl type powder type for topping.

### **2.6 MISCELLANEOUS MATERIALS**

- A. General: Provide auxiliary materials for gypsum drywall construction which comply with referenced standards and the recommendations of the manufacturer of the gypsum board.
- B. Gypsum Board Screws: ASTM C954 or ASTM C1002.
- C. Acoustical Sealant: Water base type, non-drying, non-bleeding, non-staining type; permanently elastic, as recommended by gypsum board manufacturer.

1. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, [with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.
2. Acoustical Sealant for Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), recommended for sealing interior concealed joints to reduce airborne sound transmission.

## **2.7 SOUND ATTENUATION BLANKETS**

- A. Products shall be in accordance with ASTM C665-84, Type I semi-rigid unfaced mineral fiber blanket, Class 25 flame spread, thickness as indicated, and/or to achieve a minimum of STC 50 rating for indicated assemblies.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates to which drywall construction attaches or abuts, preset hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION OF METAL SUPPORT SYSTEMS**

- A. Do not bridge building expansion and control joints with steel framing or furring members; independently frame both sides of joints with framing or furring members or as indicated.
- B. Provide furring and shims as required to install new work over existing substrates so that new work will be installed plumb, level and true.
- C. Wall-Partition Support Systems:
  1. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, furnishings, and similar work to comply with details indicated or, if not otherwise indicated, to comply with applicable published recommendations of gypsum board manufacturer or, if not available, of "Gypsum Construction Handbook" published by United States Gypsum Company.
  2. Isolate non-load bearing steel stud system from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support and avoid axial loading.
    - a. Install single deep-leg deflection tracks and anchor to building structure.
    - b. Connect drift clips to cold-formed metal framing and anchor to building structure.
  3. Install runners tracks at floors, ceilings and structural walls and columns where gypsum drywall stud system abuts other work, except as otherwise indicated. Ramset to precast plank.

4. Extend partition stud system through acoustical ceilings and elsewhere as indicated to the structural support and substrate above the ceiling.
5. Frame door openings with vertical studs securely attached by screws at each jamb either directly to frames or to jamb anchor clips on door frame; install runner track sections (for jack studs) at head and secure to jamb studs.
6. Space studs 16 inches o.c. except as otherwise indicated.
7. Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
8. Frame openings other than door openings in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.
9. Provide runner tracks of same gauge as jamb studs. Space jack studs same as partition studs.
10. Cut studs 1/2" short of full height to provide perimeter relief.
11. Do not fasten studs to top track to allow independent movement of studs and track.
12. Door jambs:
  - a. Install double 20 gauge studs at each jamb for all doors.
  - b. Space wall furring members 16 inches o.c. except as otherwise indicated.

### **3.3 APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL**

- A. Preinstallation Conference: Meet at the project site with the installers of related work and review the coordination and sequencing of work to ensure that everything to be concealed by gypsum drywall has been accomplished, and that chases, access panels, openings, supplementary framing and blocking and similar provisions have been completed.
- B. Install sound attenuation blankets at all partitions prior to gypsum board unless readily installed after board has been installed.
- C. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
- D. Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible.
- E. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16 inch open space between boards. Do not force into place.
- F. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

- G. Attach gypsum board to framing and blocking provided for additional support at openings and cutouts.
- H. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.)
- I. Form control joints and expansion joints at locations indicated (@ 30'-0" o.c. or 900 sf), with space between edges of boards, prepared to receive trim accessories.
- J. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to 1/2 inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.
- K. Floating Construction: Where feasible, including where recommended by manufacturer, install gypsum board over wood framing, with "floating" internal corner construction.
- L. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

### **3.4 METHODS OF GYPSUM BOARD APPLICATION**

- A. Single-Layer Application: Install gypsum wallboard on partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated, and provide sheet lengths which will minimize end joints.

### **3.5 INSTALLATION OF DRYWALL TRIM ACCESSORIES**

- A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.
- B. Install corner beads at external corners.
- C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound. Install "L" type trim where drywall construction is tightly abutted to other construction and install special kerfed type where other work is kerfed to receive long leg of "L" type trim. Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).
  - 1. Install J-type semi-finishing trim where indicated, and where exterior gypsum board edges are not covered by applied moldings.
- D. Install metal control joint (beaded type) where indicated or required.

### **3.6 FINISHING OF DRYWALL**

- A. General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.
- B. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.

- C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
- D. Apply joint compounds in 3 coats (not including prefill of openings in base), and sand between last 2 coats and after last coat.
- E. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840 and GA-214-07:
  - 1. **Level 1:** In plenum areas above the ceiling, attics, areas concealed in the building (does not typically meet fire-resistant assembly requirements).
  - 2. **Level 5:** Finish is recommended on surfaces to receive gloss, semi-gloss, enamel or non-textured flat paints.

### **3.7 CLEANING AND PROTECTION**

- A. Remove temporary coverings used to protect other work.
- B. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction being without damage or deterioration at time of Substantial Completion.

**END OF SECTION 09250**



## **SECTION 09300 - TILE**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Definition: Tile includes ceramic surfacing units made from clay or other ceramic materials.
- B. Extent of tile work is indicated on the drawings and schedules.
- C. Type of tile work in this section includes the following:
  - 1. Porcelain Tile.
  - 2. Marble thresholds.
- D. Related Work:
  - 1. Preparations for concrete slabs and slab depressions: Section 03300.

#### **1.3 QUALITY ASSURANCE**

- A. Tile manufacturing standard: ANSI 137.1. Furnish tile complying with Standard Grade requirements unless indicated otherwise.
- B. Proprietary Materials: Handle, store, mix and apply proprietary setting and grouting materials in compliance with manufacturer's instructions.
- C. Source of Materials: Provide materials obtained from one source for each type and color of tile, grout, and setting materials.
- D. Flooring shall comply with ANSI A137.1 American National Standard Specifications for Ceramic Tile—2012.

#### **1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical information and installation instructions for materials required, except bulk materials.
- B. Samples for Initial Selection Purposes: Submit manufacturer's color charts consisting of actual tiles or sections of tile showing full range of colors, textures and patterns available for each type of tile indicated. Include samples of grout and accessories involving color selection.
- C. Samples for Verification Purposes: Submit the following:
  - 1. Samples for each type of tile and for each color and texture required, not less than 12" square, on plywood or hardboard backing and grouted.

2. Full size samples for each type of trim, accessory and for each color.
  3. 6" long samples of stone thresholds.
  4. Samples of metal edge strip.
- D. Certification: Furnish Master Grade Certificates for each shipment and type of tile, signed by manufacturer.
- E. Slip-Resistant Tile:
1. ASTM E303, Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester, and has been endorsed by the Ceramic Tile Institute of America (CTIOA) for all types of flooring since 2001
  2. Submit manufacturer's test data for slip-resistant tile. Tests shall be in conformance with indicated applicable codes and regulations.

### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.

### **1.6 PROJECT CONDITIONS**

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Maintain temperatures at not less than 50°F (10°C) in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

### **1.7 MAINTENANCE MATERIALS**

- A. Furnish extra materials that match and are from the same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Tile and Trim Units: Furnish quantity of full-size units equal to 3% of amount installed for each type, composition, color, pattern and size indicated.
  2. Grout: Furnish quantity of grout equal to 3% of amount installed for each type, composition, color indicated.

### **1.8 WARRANTY**

- A. Limited Warranty:
1. Manufacturer warrants that manufactured products will be free from defect for a period of **one (1) year** from date of purchase.

- a. Defect is defined as a shortfall in the product to perform to manufacturer's specifications as disclosed in product literature, within industry allowable tolerances as set forth in standard, national industry protocols.
- b. Manufacturer provides detailed information in its product literature regarding appropriate tile and stone applications. Failure to comply with recommended applications voids this warranty.
- c. This one-year express warranty is the sole warranty extended and replaces any statutory warranties to the maximum extent allowable by law.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
  1. Manufacturers of Porcelain Tile:
    - a. Revigres.
    - b. Or approved equal.

### **2.2 TILE PRODUCTS**

- A. Porcelain Tile:
  1. Basis of Design: Provide "Chromatic Cromatica Collection" as manufactured by Revigres and distributed by Garden State Tile, or approved equal, complying with the following:
    - a. Floor / Wall Tile: Provide 4x4 (Floor); 12" x 12" & 12" x 24" (Wall) nominal.
    - b. Colors:
      - 1) Cromatica ARG Prata,
      - 2) Cromatica Lava,
      - 3) Cromatica Lazuli.
    - c. Finishes:
      - 1) Floor: Antislip Cromatica.
      - 2) Wall: Mixture of both Natural and Gloss Cromatica.
      - 3) Refer to drawings for additional information.

### **2.3 THRESHOLDS**

- A. Stone Thresholds: Provide sound Group "A" marble threshold of profile indicated with an abrasive hardness of not less than 10.0 when tested in accordance with ASTM C 241. Maximum height 1/2" above finished floor. Furnish white marble for thresholds, unless otherwise indicated.

### **2.4 COLOR AND PATTERN**

- A. As selected by Architect from manufacturer's full color line (including premium colors - Groups 2 through 5) and patterns of each type tile specified. Patterns shall be defined as using not more than 3 different colors of tile in any given area, applied in stripes, diagonals,

checkerboard pattern or 45 degree layouts and other designs as determined by the Architect. All selections shall be made from manufacturer's full product lines (including premium colors).

## **2.5 SETTING AND GROUTING MATERIALS**

- A. Portland Cement Mortar Installation Materials: Provide materials to comply with ANSI Standards as required for installation method designated, unless otherwise indicated.
- B. Latex-Portland Cement Grout: Proprietary compound composed of portland cement with latex additive for a more flexible and less permeable grout. Color as selected by Architect from manufacturer's standard.
  - 1. Provide product with latex additive which is compatible with latex additive in latex Portland cement mortar.
  - 2. Products offered by manufacturers to comply with requirements include the following:
    - a. Latex Modified Floor Grout: Mapei Corporation.
    - b. Laticrete Dry Bond: Laticrete International, Inc.
    - c. Or approved equal.
  - 3. Basis of Design: "255 Multimax™" thinset for porcelain tile as manufactured by Laticrete International, Inc.; or approved equal.
- C. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.
  - 1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F (60 and 100 deg C), respectively, and certified by manufacturer for intended use.
    - a. Ardex Americas.
    - b. Mapei Corporation.
    - c. Laticrete International, Inc.
    - d. Or approved equal.

## **2.6 MISCELLANEOUS MATERIALS**

- A. Tile Cleaner: Product specifically acceptable to manufacturer of tile and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation, 112 North Alfred St., Alexandria, VA 22134 or Ceramic Tile Institute, 700 N. Virgil Ave., Los Angeles, CA 90029. Provide a neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- B. Grout and Tile Sealer: Manufacturer's standard product for sealing tile and grout joints that does not change color or appearance of grout.
  - 1. Provide colorless and stain resistant penetrating sealer with Ph factor between 7 and 10, that does not affect color or physical properties of tile surfaces.
  - 2. Products:
    - a. Custom Building Products; Surfaceguard Tile and Grout Sealer.
    - b. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
    - c. Or approved equal.

3. Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- C. WATERPROOFING MATERIALS:
1. Sheet Membrane: 0.030 inch thick chlorinated polyethylene (CPE) sheet with nonwoven polyester laminated to both sides, 60 inches wide.
  2. Products: The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
    - a. "Dal-Seal TS"; by Dal-Tile Corporation; or approved equal.
- D. Waterproofing / Crack Isolation Membrane at Porcelain Tile installation:
1. Basis of Design: "Hydroban®" as manufactured Laticrete International, Inc.; or approved equal.
  2. Single component self-curing liquid rubber polymer that forms a flexible, seamless waterproofing membrane.
    - a. Exceeds ANSI A118.10 and A118.12.
    - b. Contains antimicrobial product protection.
- E. Leveling and Patching Compounds: Latex types as recommended by flooring manufacturer.
- F. Finishing & Edge Protection Profiles:
1. Basis of Design: "Quadec, Q 60 AE" as manufactured by Schluter Systems; or approved equal.
    - a. Satin anodized aluminum finishing and edge-protection profile for tiled edges.

## **PART 3 - EXECUTION**

### **3.1 TILE INSTALLATION STANDARDS**

- A. ANSI Tile Installation Standard: Comply with applicable parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for installation of ceramic tile.
- B. TCNA Installation Guidelines: TCNA "Handbook for Ceramic Tile Installation (latest edition)"; comply with TCNA installation methods indicated or, if not otherwise indicated, as applicable to installation conditions shown.
- C. Comply with manufacturer's instructions for mixing and installation of proprietary materials.

### **3.2 INSTALLATION**

- A. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.
- B. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for

straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars, or covers overlap tile.

- C. Set marble thresholds in same type of setting bed as field tile, unless otherwise indicated.
- D. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise shown.
- E. Expansion Joints: Locate expansion joints and other sealant filled joints, including control, contraction and isolation joints, where indicated or where joints occur in substrate. Do not saw cut joints.
- F. Grout tile to comply with the referenced standards, using grout material as indicated.

### **3.3 FLOOR INSTALLATION METHODS**

- A. Porcelain Tile: Install tile to comply with requirements indicated below for setting bed method, TCNA installation method related to type of subfloor construction, and grout type and in accordance with applicable ANSI installation specifications:
  - 1. Concrete Subfloor, Interior, slab on grade or above-ground: TCNA F112 (bonded).
    - a. Mortar: Latex portland cement; ANSI A118.4 or better or ISO C2 or better.
    - b. Grout: Epoxy; ANSI A118.3 or ISO RG.
  - 2. Elevated concrete slabs or where indicated: TCNA F122A, thin set, with membrane.
    - a. Mortar: Latex portland cement; ANSI A118.4 or better or ISO C2S1 or better unless ANSI A118.1 or ISO C1 is recommended by membrane manufacturer. Must also be recommended by manufacturer for above-ground use.
    - b. Grout: Epoxy; ANSI A118.3 or ISO RG.
    - c. Waterproof Membrane: ANSI A108.13 or manufacturer's directions. Comply with plumbing and building codes.

### **3.4 WALL TILE INSTALLATION METHODS**

- A. Install types of tile designated for wall application to comply with requirements indicated below for setting bed methods, TCNA installation methods related to subsurface wall conditions, and grout types and in accordance with applicable ANSI installation specifications:
  - 1. Masonry, Interior: TCNA W202I.
    - a. Mortar: Latex portland cement; ANSI 118.4 or better or ISO C2 or better.
    - b. Grout: Latex portland cement; ANSI 118.6 or better or ISO CG1 or better..

### **3.5 CLEANING AND PROTECTION**

- A. Cleaning: Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.
- C. Protection: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage and wear.
  - 1. Prohibit foot and wheel traffic from using tiled floors for at least 7 days after grouting is completed.
  - 2. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

**END OF SECTION 09300**

## **SECTION 09400 - TERRAZZO**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Type of terrazzo includes:
  - 1. Sand cushion terrazzo.
  - 2. Integral terrazzo base.
- B. Related Sections:
  - 1. Section 09650 - Resilient Flooring for rubber base.

#### **1.3 SUBMITTALS**

- A. Product Data: Manufacturer's technical information and installation instructions for each type of terrazzo, accessory item, and materials.
- B. Certification: Submit suppliers/manufacturers written certification that terrazzo materials meet or exceed specified NTMA properties.
- C. Samples: Submit 6" square samples of each pattern, color and type of terrazzo required; minimum 6" long samples of each type accessory item.
- D. Shop Drawings: Include terrazzo fabrication and installation requirements. Include plans, elevations, sections, component details, and attachments to other Work. Show layout of the following:
  - 1. Divider and control- and expansion-joint strips.
  - 2. Base and border strips.
  - 3. Precast terrazzo jointing and edge configurations.
  - 4. Terrazzo patterns and colors.
- E. Samples for Verification: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify matrix color and aggregate types, sizes, and proportions. Prepare samples of same thickness and from same material to be used for the Work in size indicated below:
  - 1. Terrazzo: 6-inch square samples.
- F. Qualification Data: For Installer.
- G. Maintenance Data: For each terrazzo type to include in maintenance manuals.



## **1.4 QUALITY ASSURANCE**

- A. NTMA Standards: Comply with specified provisions and recommendations of National Terrazzo and Mosaic Association, Inc. (NTMA).
- B. Manufacturer's Instructions: In addition to specified requirements, comply with resin manufacturer's instructions and recommendations for substrate preparation, materials storage, mixing and application, finishing, and curing.
- C. Installer Qualification: NTMA authorized member and has a track record of a recommended minimum of ten (10) successful installations, similar in size of this project.
- D. Pre-installation Conference: Prior to installation of work of this section, conduct a meeting at the project site to discuss quality assurance requirements. In addition to the contractor and the installer, arrange for attendance of the following:
  - 1. Other installers affected by the work of this section.
  - 2. The Owner's Representative.
  - 3. The Architect.
  - 4. Installer.
- E. Slip and Skid Resistance (Coefficient of Friction, COF): Terrazzo walking surfaces shall conform to the following criteria:
  - 1. COF, Measured by the James Machine (ASTM D 2047), for laboratory testing of product samples:
    - a. Level Surfaces with Polished Finish: 0.60, minimum.
    - b. Inclined Surfaces with Rustic (medium sandblast) Finish: Both ascending and descending, 0.70, minimum.
  - 2. COF, Measured Using a Portable Inclineable Articulated Strut Slip Tester (ASTM F 1677), for in-situ testing of installed products:
    - a. Level Surfaces with Polished Finish: 0.60, minimum (dry and wet).
    - b. Inclined Surfaces with Rustic (medium sandblast) Finish: Both ascending and descending, 0.70, minimum (dry and wet).

## **PART 2 - PRODUCTS**

### **2.1 CEMENTITIOUS TERRAZZO MATERIALS**

- A. Portland Cement: ASTM C 150, Type I, except as modified to comply with NTMA requirements for compressive strength. Obtain cement from a single source for each required color.
  - 1. Provide non-staining white or gray cement for terrazzo matrix, or as required to match existing.
- B. Sand: ASTM C33.
- C. Water: Clean, free of oil, soluble salts or other deleterious substances.
- D. Aggregate: Natural, sound, crushed marble chips without excessive flats or flakes, complying with NTMA requirements.

1. Hardness: Ha-10 minimum per ASTM C 241.
  2. 24-Hour Absorption Rate: Less than 0.75%.
  3. Dust Content: Less than 1% by weight.
  4. Colors and gradation of aggregate sizes as selected by Architect.
- E. Matrix Pigments: Pure mineral or synthetic pigments, resistant to alkalies and non-fading. Mix pigments with matrix to provide required colors.
- F. Underbed Reinforcement: Galvanized welded wire fabric, 2" x 2" - W0.3 x W0.3 (16 ASW gage or 0.0625" diam.); comply with ASTM A 185 and ASTM A 82 except for minimum wire size.
- G. Isolation Membrane: Polyethylene film, complying with ASTM D 4397, not less than 4.0 mils thick.
- H. Curing Compound: Liquid-membrane-forming compound, ASTM C 309, Type 1.

## **2.2 COLOR AND PATTERN**

- A. Allow for as many colors and patterns as selected by Architect. Patterns shall be defined as using not more than 5 different colors in any given area, applied in stripes, diagonals, checkerboard pattern and other designs as determined by the Architect. All selections shall be made from manufacturer's full product lines (including premium colors).
1. Match existing adjacent color / pattern.

## **2.3 TERRAZZO ACCESSORIES**

- A. Divider Strips: Depth and style required for terrazzo type and thickness. Width, material and color as indicated. Provide "T"-type 1-1/4" deep x 1/8" heavy top.
1. Unless otherwise indicated, use divider strips as follows: White zinc alloy.
- B. Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material, thickness and color of divider strip and in depth required for topping thickness indicated.
- C. Cleaner: Liquid, neutral chemical cleaner, with Ph factor between 7 and 10, of formulation recommended by sealer manufacturer for type of terrazzo used, and complying with NTMA requirements.
- D. Interior Floor Sealer: Colorless, slip and stain resistant penetrating sealer with Ph factor between 7 and 10, that does not affect color or physical properties of terrazzo surface. Provide sealer that meets ASTM D2047 which provides a coefficient of friction of a minimum of 0.6 for flat flooring surfaces and 0.8 for ramps.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Clean and prepare substrate to comply with NTMA specifications for type of terrazzo application indicated. Clean substrate of loose chips and foreign matter. Prepare concrete

substrate to provide surfaces within tolerances required by NTMA for type of terrazzo application.

### **3.2 INSTALLATION, GENERAL**

- A. Comply with NTMA recommendations for proportioning mixes, installation of strips, and for placing, curing, grinding, grouting and finishing.
- B. Install divider and accessory strips in adhesive setting bed, in accordance with manufacturer's instructions, without voids below strips. Provide mechanical anchorage as required for adequate attachment of strips to substrate.
  - 1. Provide strips to match existing.

### **3.3 CLEANING, SEALING, AND PROTECTION**

- A. Clean terrazzo after installation and finishing operations are completed, complying with sealer manufacturer's instructions.
- B. Apply sealer to cleaned terrazzo surfaces to comply with sealer manufacturer's instructions.
- C. Protect terrazzo from damage and wear during construction operation.

### **3.4 FINAL CLEANING**

- A. Clean terrazzo as recommended by manufacturer of sealer and machine buff if required when building is ready for occupancy.

**END OF SECTION 09400**

## SECTION 09510 - ACOUSTICAL CEILINGS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Extent of each type of acoustical ceiling is shown and scheduled on the drawings.
- B. Type of acoustical ceilings specified in this section includes lay in acoustical ceiling board, exposed suspension system.

#### 1.3 QUALITY ASSURANCE

- A. Installer: Firm with a recommended three years of successful experience in installation of acoustical ceilings similar to requirements for this project and which is acceptable to manufacturer of acoustical units, as shown by current written statement from manufacturer.
- B. Fire Resistance Ratings: As indicated by reference to design designation in UL "Fire Resistance Directory" for floor, roof or beam assemblies in which acoustical ceilings function as a fire protective membrane; tested per ASTM E 119. Provide protection materials for lighting fixtures and air ducts to comply with requirements indicated for rated assembly.
- C. Surface Burning Characteristics: As follows, tested per ASTM E 84.
  - 1. Flame Spread: 25 or less.
  - 2. Smoke Developed: 50 or less.
- D. All acoustical ceilings shall be installed to conform to the requirements of International Building Code for Category C and the recommendation of the Ceiling and Interior Systems Construction Association (CISCA) for Zone 2 seismic design and comply with installation requirements for areas subject to light to moderate seismic activity.
- E. General Contractor shall provide adequate ventilation and humidity control before, during and after ceiling installation to prevent damage (sagging, etc.) to ceilings prior to Owner's acceptance of building.
- F. Warranty:
  - 1. Provide manufacturer's special project warranty against sagging or warping of acoustic ceiling boards for a period of **thirty (30) years** which starts on approved date of substantial completion.
- G. Unless otherwise approved by the Architect, all Acoustical Ceiling Board types and Suspended Grid System types shall be by a single manufacturer.

## 1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required including certified test reports to show compliance with requirements of these specifications.
  - 1. Include manufacturer's recommendations for cleaning and refinishing acoustical units, including precautions against materials and methods which may be detrimental to finishes and acoustical performance.
- B. Samples: Submit manufacturer's standard size samples of acoustical units, but not less than 6" square, and of exposed ceiling suspension members including wall and special moldings. Provide samples showing full range of colors, textures and patterns available for each type of component required.
- C. Shop Drawings: Submit shop drawings for acoustical ceilings, including layout of system components and details of connections between elements of system and between system and other building components.
  - 1. **Contractor must provide shop drawings certifying that attachment devices meet specified loads. Contractor must coordinate with all other Prime Contractors / Subcontractors for fixture loads, etc.**
- D. Certificates: Submit certificates from manufacturers of acoustical ceiling units and suspension systems attesting that their products comply with specification requirements.
- E. Testing Reports: Submit testing reports which indicate compliance with indicated requirements.
- F. Deliver extra materials to Owner. Furnish extra materials described below matching products installed, packaged with protective covering for storage and identified with appropriate labels.
  - 1. Acoustical Ceiling Units: Furnish quantity of full size units equal to 2.0% of each type of acoustical unit and suspension system installed.
  - 2. Exposed Suspension System Components: Furnish quantity of each exposed component equal to 2.0% of amount installed.

## 1.5 PROJECT CONDITIONS

- A. Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis of Design: Provide Acoustical Ceiling Board (ACB and AACB) and Metal Suspension System as manufactured by Armstrong World Industries; United States Gypsum Co.; or approved equal.

- B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
1. Comparable products of the following manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements and other design attributes listed as performance of the "Basis of Design" Systems.
    - a. Armstrong World Industries,
    - b. USG Corporation,
    - c. CertainTeed Ceilings.
    - d. Rockfon, LLC,
    - e. Or approved equal.
  2. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of other manufacturer's products or procedures which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
- C. Substitute products will be considered for substitution only when submitted to the Architect as per the requirements of AIA A201 and Section 00800.

## 2.2 ACOUSTICAL CEILING BOARDS

- A. Refer to reflected ceiling plans for sizes and locations.
- B. Where **ACB-1** is indicated: 24" x 48" x 3/4" thick, square edge, NRC .70; CAC 40 light reflectance 85%, sag resistance; Humiguard Plus Performance. Armstrong Fine Fissured (Item# 1714); USG Radar ClimaPlus - High NRC/High CAC (Item# 22441), or approved equal.
- C. Where **ACB-3** is indicated: 48" x 48" x 1" thick, square edge, NRC .95; light reflectance 90%, sag resistance; Humiguard Plus Performance. Armstrong Fine Fissured (Item# 3256); or approved equal.
- D. Where **AACB** is indicated: 24" x 48" x 5/8" thick, square edge, NRC.55; CAC 40; Class 25; Sag Resistance; Humiguard Max Performance, mineral fiber composition with ceramic binders. Armstrong Fine Fissured Ceramaguard (Item# 608) white finish; USG Radar Ceramic ClimaPlus (Item# 56645), or approved equal.

## 2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Standard for Metal Suspension Systems: Provide metal suspension systems of type, structural classification and finish indicated which comply with applicable ASTM C 635 requirements.
- B. Finishes and Colors: Provide manufacturer's standard factory-applied finish for type of system indicated. For exposed suspension members and accessories with painted finish, provide color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's full range of standard colors.

- C. Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung.
- D. Concrete Inserts: Inserts formed from hot-dipped galvanized sheet steel and designed for attachment to concrete forms and for embedment in concrete, with holes or loops for attachment at hanger wires.
- E. Hanger Wire: Galvanized carbon steel wire, ASTM A 641, soft temper, prestretched, Class 1 coating, sized so that stress at 3-times hanger design load (ASTM C 635, Table 1, Direct Hung), will be less than yield stress of wire, but provide not less than 12gage (0.106").
- F. Type of System: Either direct-hung or indirect-hung suspension system, at Contractor's option.
  - 1. Carrying Channels: 1-1/2 inch steel channels, hot-rolled or cold-rolled, not less than 0.475 lbs. per lineal foot.
- G. Edge Moldings and Trim: Metal types and profiles indicated or, if not indicated, provide manufacturer's standard molding for edges and penetrations of ceiling which fits with type of edge detail and suspension system indicated. Provide 7/8" edge at wall angle and reveal edges.
- H. Hold-Down Clips: For interior ceilings composed of lay-in panels weighing less than 1 lb. per sq. ft., or where indicated, provide hold-down clips spaced 2'-0" o.c. on all cross tees.

## **2.4 EXPOSED METAL SUSPENSION SYSTEMS**

- A. Double Web Steel Suspension System: For use where ACB ceilings are indicated. Manufacturer's standard system roll-formed from prefinished hot dipped galvanized steel with 15/16" wide exposed faces on flanges of structural members; other characteristics as follows:
  - 1. Structural Classification: Intermediate-Duty System.
  - 2. Finish: Painted in color as selected by Architect.
  - 3. Basis of Design: Armstrong World Industries "Prelude XL Exposed Tee System"; USG "Donn Brand DX", or approved equal.
- B. Double Web Suspension System: For use where AACB ceilings are indicated. Manufacturer's standard system fabricated from roll-formed prefinished hot dipped galvanized steel with 15/16" wide exposed faces of aluminum cap on flanges of structural members cap and other characteristics as follows:
  - 1. Structural Classification: Intermediate-Duty System.
  - 2. Finish: Painted, in colors as selected from manufacturer's full line of colors. Provide white color unless indicated otherwise.
  - 3. Basis of Design: Armstrong World Industries "Prelude Plus XL Fire Guard"; USG "Donn Brand DXA/DXLA", or approved equal.

## **2.5 MISCELLANEOUS MATERIALS**

- A Acoustical Sealant: Resilient, non-staining, non-shrinking, non-hardening, non-skinning, non-drying, non-sag sealant intended for interior sealing of concealed construction joints.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION**

- A. Examine conditions under which acoustical ceiling work is to be performed and notify Architect in writing of unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected in an acceptable manner.

### **3.2 PREPARATION**

- A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings.
- B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.

### **3.3 INSTALLATION**

- A. General: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire-resistance rating requirements as indicated, and CISCA standards applicable to work.
- B. Arrange acoustical units and orient directionally-patterned units (if any) in manner shown by reflected ceiling plans.
  - 1. Install tile with pattern running in one direction, unless otherwise indicated.
- C. Install suspension systems to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers not less than 6" from each end and spaced 4'-0" along each carrying channel or direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8" in 12'-0".
  - 1. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.
- D. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.
  - 1. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing moldings.
  - 2. Screw-attach moldings to substrate at intervals not over 16" o.c. and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0". Miter corners accurately and connect securely.
  - 3. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.
  - 4. Install hold-down clips in areas indicated, and in areas where required by governing regulations or for fire-resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.



- E. Cooperate with other trades and Contractors for installation of their materials and equipment, particularly with those installing the ductwork, ceiling diffusers and lighting fixtures so that diffusers, lighting fixtures and other items are located on center lines of tile or on centers of joints as shown on approved shop drawings.
  - 1. Provide additional hanger wires to support cubicle curtain tracks, and other superimposed loads. Locate the supplemental hangers within 6 inches of each corner of the item being supported.
  - 2. Where light fixtures, or other recessed items occur in ceilings, frame acoustical material properly to permit installation of such recessed items and do all necessary cutting and fitting of acoustical materials and suspension systems to accommodate same. Cut neatly around all pipes passing through ceilings. Build in fixture frames and yokes in cooperation with Electrical Contractor.

### **3.4 CLEANING**

- A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage. General Contractor is responsible for cleaning or replacement of all damaged tile, regardless of how the damage was caused and regardless of by which Contractor.

**END OF SECTION 09510**

## **SECTION 09650 - RESILIENT FLOORING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of resilient flooring and accessories is shown on drawings and room finish schedule.
  - 1. Vinyl composition tile (VCT).
  - 2. Rubber resilient wall base.
  - 3. Resilient edge strips.

#### **1.3 RELATED SECTIONS**

- A. Section 01455 - Concrete In-situ Relative Humidity and pH Testing.
- B. Section 03300 - Cast in Place Concrete Slabs on Grade.
- C. Section 07900 - Joint Sealer Assemblies.
- D. Section 09775 - Interlocking Rubber Flooring.

#### **1.4 QUALITY ASSURANCE**

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
  - 1. ASTM F 2170-02 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
  - 2. ASTM F 1869-98 Standard Test Method Using Anhydrous Calcium Chloride.
  - 3. ASTM F 1861 Type TS, Group 1 Performance Requirements for Resilient Rubber Wall Base.
  - 4. ASTM F 137 Standard Test Method for Flexibility of Resilient Flooring Materials protocol for Resilient Rubber Wall Base.
  - 5. ASTM F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring protocols for Resilient Rubber Wall Base.
- B. Moisture vapor emission testing in accordance with ASTM F 1869-11. Test results should not exceed 3 pounds per 1,000 square feet per 24 hours, unless otherwise specified by the flooring or adhesive manufacturer.
  - 1. ASTM Standard also states that relative humidity inside of the concrete slab should not exceed 75%, per ASTM F2170-11, unless otherwise specified by the flooring or adhesive manufacturer.

- C. Manufacturer: Provide type of resilient flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.
  - 1. Wherever possible, provide type of required resilient flooring and accessories produced by a single manufacturer.
- D. Fire Test Performance: Provide resilient flooring which complies with the following fire test performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.
  - 1. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials, Class A, Smoke <450.
  - 2. ASTM E648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm<sup>2</sup> or greater, Class 1.
- E. Coefficient of Friction: The Federal and industry standard for testing coefficient of friction or the slip resistance of a surface is tested to the requirements, as outlined, in ASTM D-2047, which utilizes a friction measurement machine, commonly referred to as the James Machine.

## **1.5 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical data for type of resilient flooring and accessory.
- B. Samples for Verification Purposes: Submit the following samples in triplicate of each type, color, and pattern of resilient flooring required, showing full-range of color and pattern variations.
  - 1. Full size tile samples.
  - 2. For initial selection of colors and patterns submit, prior to above, samples in form of actual sections of resilient flooring, including accessories, showing full range of colors and patterns available, for each type of resilient flooring required.
- C. Certification for Fire Test Performance: Submit certification from an independent testing laboratory acceptable to authorities having jurisdiction that resilient flooring complies with fire test performance requirements.
- D. Testing of Substrate:
  - 1. Submit test reports of testing the concrete or other floor substrate, indicating compliance with manufacturer's requirements for moisture and alkalinity percentage of contents. Tests shall be performed in accordance with requirements of Section 01455.
- E. Maintenance Instructions: Submit 2 copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.
- F. Replacement Material: After completion of work, deliver to project site replacement materials from same manufactured lot as materials installed, and as follows:
  - 1. Tile flooring, not less than one box for each 50 boxes or fraction thereof, for each type, size and color installed.

## 1.6 PROJECT CONDITIONS

- A. Maintain minimum temperature of 65°F (18°C) or more than 85°F (29°C) in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation.
  - 1. Store resilient flooring materials in spaces where they will be installed for at least 48 hours before beginning installation.
- B. Maintain the ambient relative humidity between 40% and 60% during installation.
- C. Install resilient flooring and accessories after other finishing operations, including painting, have been completed.
- D. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55°F (13°C) or more than 85°F (29°C).
- E. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by resilient flooring manufacturers and their recommendation for bond and maximum levels of moisture and pH per testing as performed under requirements of Section 01455.

## 1.7 WARRANTY

- A. Vinyl Composition Tile:
  - 1. Manufacturer warrants its regular (first quality) commercial floor products to be free from manufacturing defects for **five (5) years** from date of purchase.
    - a) Within One Year: If a defect covered by this warranty is reported to the manufacturer in writing within one year of purchase, Manufacturer will supply new material of the same or similar grade sufficient to repair or replace the defective material. Manufacturer will also pay reasonable labor costs.
    - b) Within Two Years: If a defect covered by this warranty is reported to the manufacturer in writing after one year but within two years of purchase, Manufacturer will supply new material of the same or similar grade sufficient to repair or replace the defective material. Manufacturer will also pay fifty (50%) percent of reasonable labor costs.
    - c) After Two Years: If a defect covered by this warranty is reported to the manufacturer in writing after two (2) years but within five (5) years of purchase, Manufacturer will supply new material of the same or similar grade sufficient to repair or replace the defective material. Manufacturer will not pay for labor costs.
    - d) Manufacturer does not warrant the installers' workmanship. Workmanship errors should be addressed to the contractor who installed the floor.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but not limited to the following:
  - 1. Vinyl Composition Tile (VCT); provide the following:
    - a. "Standard Excelon Imperial Texture" and "Standard Excelon MultiColor", as manufactured by Armstrong World Industries;
    - b. "Essentials, Designer Essential and Inspiration", as manufactured by Mannington Commercial;
    - c. "Cortina Classics", as manufactured by Johnsonite (a Tarkett Co., Azrock Collection);
    - d. Or approved equal.
  - 2. Rubber Resilient Wall Base and Accessories:
    - a. "Pinnacle", as manufactured by Roppe Corporation;
    - b. "BaseWorks Thermoset Rubber Wall Base", as manufactured by Johnsonite,
    - c. "RubberMyte" as manufactured by Burke Mercer Flooring Product,
    - d. Or approved equal.
- B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
  - 1. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of other products by other manufacturer's or which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
- C. Comparable products of other manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements, intended performances and all other design attributes listed above and provided that deviations in dimensions and profiles are minor and do not materially detract from the design concept or intended performances as judged solely by the Architect/Owner.

### **2.2 VINYL COMPOSITION TILE FLOORING**

- A. Vinyl Composition Tile: ASTM F 1066, Class 2, through pattern, 12" x 12" unless otherwise indicated, and as follows:
  - 1. Asbestos-free.
  - 2. Gauge: 1/8 inch.
- B. Provide vinyl composition tile to meet indicated "Basis of Design" products and quality assurance requirements indicated in Articles 1.2 and 2.1 of this specifications.

## 2.3 ACCESSORIES

- A. Wall Base: Provide rubber base complying with ASTM F-1861, Type TS, Group 1. Vulcanized SBR rubber with matching preformed corner units, and as follows:
1. Height: 4-inches, unless otherwise indicated on the drawings.
  2. Thickness: 1/8 inch gauge.
  3. Style: Standard top-set cove.
  4. Finish / Colors: Matte finishes in colors as selected by Architect from manufacturer's available full range of colors. Allow for more than one color in any given area.
  5. Color Stability: Meets or exceeds ASTM F 1861 requirements for color stability when tested to ASTM F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring protocols.
  6. Phthalate, chlorine and halogen free.
- B. Resilient Edge Strips: 1/8" thick, homogeneous vinyl or rubber composition, tapered or bullnose edge, color to match flooring, or as selected by Architect from manufacturer's available full range of colors; not less than 1" wide.
- C. Adhesives (Cements): Water resistant, stabilized type as recommended by flooring manufacturer to suit material and substrate conditions.
1. Adhesives to be used for resilient floor applications shall not generate any odor or unpleasant smell.
- D. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.
- E. Leveling and Patching Compounds: Latex types as recommended by flooring manufacturer.
- F. Slip Retardant Polish: Provide slip-retardant polish as recommended by resilient tile manufacturer.
1. POLISH FOR RESILIENT FLOORING
    - a. Floor Polish: Contractor shall provide floor polish to achieve the Static Coefficient of Friction; per ASTM D 2047, of 0.5 or better for level surfaces and as per requirements of state and local codes having jurisdictions.

## 2.4 COLORS, TEXTURES AND PATTERNS

- A. Colors, textures and patterns shall be as selected and directed by the Architect. Patterns shall be defined as using not more than five (5) different colors of tile in any given area, applied in borders, stripes, diagonals, checkerboard patterns and other designs as indicated, or if not indicated, shall be as directed by the Architect.
1. All selections shall be made from manufacturer's full product lines, for all products and accessories, (including premium textures and colors).

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. General: Inspect substrates and conditions of installation to verify that work may properly commence. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Concrete Substrates: Perform concrete relative humidity and pH testing and to comply with manufacturer's recommended moisture tests before beginning installation, to verify that concrete surfaces have cured sufficiently to allow adhesive bond to resilient flooring.
  - 1. Commencement of work shall constitute acceptance of conditions. Any necessary remedial work required to correct any unsatisfactory conditions, found after the start of installation, will be provided at no cost to the Owner.

### **3.2 PREPARATION**

- A. Perform moisture content testing as required by manufacturer's instructions to ensure pH readings and moisture transmission are acceptable. Perform testing in accordance with requirements of Section 01455.
  - 1. If values exceed this level, follow manufacturer's recommendations for moisture transmission mitigation. Do not proceed until unsatisfactory conditions have been corrected.
- B. Broom clean or vacuum surfaces to be covered, and inspect subfloor.
  - 1. Use leveling and patching compounds as recommended by resilient flooring manufacturer for filling small cracks, holes and depressions in subfloors.
  - 2. Apply concrete slab primer and/or sealer, as recommended by flooring manufacturer, prior to application of adhesive. Apply in compliance with manufacturer's directions.
  - 3. Remove paint, curing compounds, and other materials that could interfere with adhesion of resilient products.

### **3.3 GENERAL INSTALLATION REQUIREMENTS**

- A. Comply with manufacturer's published recommendations for installation in each area, extending resilient flooring into spaces which are partially concealed. Cut and fit tightly to fixtures, pipes, and other obstructions, as well as to walls and partitions.
- B. Access Covers: Install resilient flooring tightly to removable access covers in field of flooring, taking care that pattern will match when covers are in closed position.
- C. Tightly adhere resilient flooring to substrate with no open joints or cracks, and without raised or blistered areas. Spread adhesive evenly, so that final installation will be without telegraphed markings from adhesive or substrate.
- D. Extend resilient flooring into toe spaces, door reveals, and into closets and similar openings.

- E. Scribe, cut, and fit resilient flooring to permanent fixtures, built-in furniture and cabinets, pipes, outlets and permanent columns, walls and partitions.
- F. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent marking device.
- G. Install resilient flooring on covers for telephone and electrical ducts, and similar items occurring within finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers. Tightly cement edges to perimeter of floor around covers and to covers.
- H. Tightly cement resilient flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections. Hand roll resilient flooring at perimeter of each covered area to assure adhesion.

### **3.4 INSTALLATION OF TILE FLOORS**

- A. Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room area of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown.
- B. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged if so numbered. Cut tile neatly around all fixtures. Broken, cracked, chipped, or deformed tiles are not acceptable.
  - 1. Lay tile in pattern shown or as directed by Architect.
- C. Adhere tile flooring to substrates using full spread of adhesive applied in compliance with flooring manufacturer's directions.
- D. Expansion Joints: Locate expansion joints and other sealant filled joints, including control, contraction and isolation joints, where indicated or where joints occur in substrate. Do not saw cut joints.

### **3.5 INSTALLATION OF ACCESSORIES**

- A. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with preformed corner units, or fabricated from base materials with mitered or coped inside corners. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.
  - 1. Job-formed Corners:
    - a. Outside Corners: Form by bending without producing discoloration (whitening) at bends.
    - b. Inside Corners: Butt one piece to corner, then scribe next piece to fit.
- B. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
- C. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed.



### **3.6 CLEANING AND PROTECTION**

- A. Perform following operations immediately upon completion of resilient flooring:
  - 1. Sweep or vacuum floor thoroughly.
  - 2. Do not wash floor until time period recommended by resilient flooring manufacturer has elapsed to allow resilient flooring to become well-sealed in adhesive.
  - 3. Damp-mop floor being careful to remove black marks and excessive soil.
  - 4. Remove any excess adhesive or other surface blemishes, using appropriate cleaner recommended by resilient flooring manufacturers.
- B. Protect flooring against damage during construction period to comply with resilient flooring manufacturer's directions.
  - 1. Apply protective floor polish to resilient flooring surfaces free from soil, excess adhesive or surface blemishes. Use commercially available metal cross-linked acrylic product acceptable to resilient flooring manufacturer.
  - 2. Protect resilient flooring against damage from rolling loads for initial period following installation by covering with plywood or hardboard. Use dollies to move stationary equipment or furnishings across floors.
  - 3. Cover resilient flooring with undyed, untreated building paper until inspection for substantial completion.
- C. Clean resilient flooring not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Clean resilient flooring by method recommended by resilient flooring manufacturer.
- D. Strip protective floor polish, which was applied after completion of installation, prior to cleaning.
  - 1. Reapply floor polish after cleaning.

### **3.7 EXTRA STOCK**

- A. Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
  - 1. Tile Flooring: Furnish not less than one box for each 50 boxes or fraction thereof, for each type, color, pattern and size selected and installed.
  - 2. Accessories: Furnish not less than 2% of each type, size and color selected and installed.

**END OF SECTION 09650**

## **SECTION 09775 - INTERLOCKING RUBBER FLOORING**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK**

- A. Extent of interlocking rubber flooring and accessories is shown on the drawings and in schedules.
  - 1. Interlocking Rubber Tile Flooring.
- B. Related Sections:
  - 1. Section 01455 - Concrete In-Situ relative Humidity and pH Testing.
  - 2. Section 09650 - Resilient Flooring.

#### **1.2 QUALITY ASSURANCE**

- A. Moisture vapor emission testing in accordance with ASTM F 1869-11. Test results should not exceed 3 pounds per 1,000 square feet per 24 hours, unless otherwise specified by the flooring or adhesive manufacturer.
  - 1. ASTM Standard also states that relative humidity inside of the concrete slab should not exceed 75%, per ASTM F2170-11, unless otherwise specified by the flooring or adhesive manufacturer.
- B. Manufacturer: Provide indicated type of interlocking rubber flooring and accessories as produced by a single manufacturer.
- C. Fire Test Performance: Provide interlocking rubber flooring which complies with the following fire test performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.
  - 1. Class I, ASTM E 648 or NFPA 235; minimum value of 0.45 watt per square centimeter.

#### **1.3 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical data for required type of interlocking rubber tile flooring and accessory.
- B. Samples for Verification Purposes: Submit the following samples in triplicate of each type, color, and pattern of resilient flooring required, showing full-range of color and pattern variations.
  - 1. Full size tile samples.
  - 2. For initial selection of colors submit, prior to above, samples in form of actual sections of flooring, including accessories, showing full range of colors and patterns available, for flooring required.
- C. Certification for Fire Test Performance: Submit certification from an independent testing laboratory acceptable to authorities having jurisdiction that interlocking rubber tile flooring complies with fire test performance requirements.

- D. Maintenance Instructions: Submit 2 copies of manufacturer's recommended maintenance practices for indicated flooring and accessories required.
- E. Replacement Material: After completion of work, deliver to project site extra stock replacement materials from same manufactured lot as materials installed.

#### **1.4 PROJECT CONDITIONS**

- A. Maintain minimum temperature of 65°F (18°C) in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. Store resilient flooring materials in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 55°F in areas where work is completed.
- B. Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by resilient flooring manufacturer's recommended bond and moisture test.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
  - 1. Basis of Design: "HL-155 - HID-N-LOK II", as manufactured by Pawling Corp., Wassaic, NY, Tel.# 800.431.3456; or approved equal.

#### **2.2 MATERIAL**

- A. Tile: Fed. Spec.; MIL-M-15562, 24" x 24", 3/8 inch thick, 12 lbs. each. Provide manufacturer's tapered and corner units, where required.
  - 1. Colors: to be selected by the Architect from manufacturer's full range of available colors. Allow for indicated number of colors.
- B. Tile Edge Guard: Manufacturer's standard, style, color to match flooring, or as selected by Architect from standard colors.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Broom clean or vacuum surfaces to be covered, and inspect subfloor. Start of flooring installation indicates acceptance of subfloor conditions and full responsibility for completed work.
  - 1. Use leveling and patching compounds as recommended by resilient flooring manufacturer for filling small cracks, holes and depressions in subfloors.
  - 2. Broom clean or vacuum surfaces to be covered, and inspect subfloor.

### **3.2 INSTALLATION, GENERAL**

- A. Install rubber flooring using method indicated in strict compliance with manufacturer's printed instructions.

### **3.3 INSTALLATION OF TILE FLOORS**

- A. Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room area of equal width. Lay tile square to room axis, unless otherwise shown.

### **3.4 INSTALLATION OF ACCESSORIES**

- A. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed.

### **3.5 CLEANING AND PROTECTION**

- A. Perform following operations immediately upon completion of resilient flooring:
  - 1. Sweep or vacuum floor thoroughly.
  - 2. Damp-mop floor being careful to remove black marks and excessive soil.
- B. Protect flooring against damage during construction period to comply with resilient flooring manufacturer's directions.
  - 1. Cover resilient flooring with undyed, untreated building paper until inspection for substantial completion.

### **3.6 EXTRA STOCK**

- A. Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
  - 1. Tile Flooring: Furnish not less than one box for each 50 boxes or fraction thereof, for each type, color, pattern and size installed.

**END OF SECTION 09775**

## SECTION 09900 - PAINTING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Section(s):
  - 1. Section 04200 - Unit Masonry.
  - 2. Section 05120 - Structural Steel.
  - 3. Section 05210 - Steel Joists.
  - 4. Section 05300 - Metal Decking.
  - 5. Section 05400 - Miscellaneous Structural Steel.
  - 6. Section 05500 - Metal Fabrications.
  - 7. Section 08305 - Access Doors.
  - 8. Section 09250 - Gypsum Drywall.
  - 9. Division 15 - Mechanical Work.
  - 10. Division 16 - Electrical Work.

#### 1.2 DESCRIPTION OF WORK

- A. Extent of painting work is indicated on drawings and schedules, and as herein specified.
- B. Work includes painting and finishing of interior and exterior exposed items and surfaces throughout project, except as otherwise indicated.
  - 1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.
- C. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
- D. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these from standard colors or finishes available.
- E. Following categories of work are not included as part of field-applied finish work.
  - 1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, steel windows, miscellaneous metal, hollow metal work, and similar items. Also, for fabricated components such as architectural woodwork, wood casework, and shop fabricated or factory built mechanical and electrical equipment or accessories. This is in addition to the prime coat specified herein.
  - 2. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to)

metal toilet enclosures, prefinished partition systems, acoustic materials, architectural woodwork and casework, and shop fabricated or factory built mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.

3. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.
  4. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.
  5. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting.
  6. Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment, identification, performance rating, name, or nomenclature plates.
- F. Mechanical and Electrical Work: Painting of mechanical and electrical work is specified herein.
1. Painting of mechanical and electrical work is limited to those items exposed to view.
  2. Mechanical items to be painted include, but are not limited to, the following:
    - a. Piping, pipe hangers and supports.
    - b. Ductwork, insulation.
    - c. Access doors and service panels.
  3. Electrical items to be painted include, but are not limited to, the following:
    - a. Conduit and fittings.
    - b. Backboxes.
    - c. Junction boxes.

### **1.3 QUALITY ASSURANCE**

- A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
- B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.
- C. Industry Standards: Comply with industry standard established by the Painting and Decorating Contractors of America PDCA for applications, methods and recommendations and use of tools and equipment for paint and stain coatings, primers and block fillers.
- D. Lead and Chromate Contents:
  1. All paint products must be free of any lead or chromate contents.

- E. Volatile Organic Compound Compliant (VOC.):
1. All paint products must meet the State VOC environmental regulations (OTC Regulation compliant) and the following:
    - a. Chemical Components of Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions:
      - (1) Primer, Sealer and Undercoater: VOC content of not more than 200 g/L.
      - (2) Specialty Primer, Sealer and Undercoater: VOC content of not more than 350 g/L.
      - (3) Rust Preventative Coating: VOC content of not more than 400 g/L.
      - (4) Flat Paints and Coatings: VOC content of not more than 100 g/L.
      - (5) Non-Flat Paints and Coatings: VOC content of not more than 150 g/L.
      - (6) Nonflat High Gloss Coatings: VOC content of not more than 250 g/L.
      - (7) Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
- F. Paint Coordination: Provide finish coats which are compatible with prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information on characteristics of finish materials proposed for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.
1. At galvanized surfaces, primer shall be a zinc dust-zinc oxide coating.

#### **1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.
- B. Samples: Prior to beginning work, Contractor shall furnish color chips (2 fan decks) for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples for Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.
1. On 12" x 12" hardboard, provide two samples of each color and material, with texture to simulate actual conditions. Resubmit samples as requested by Architect until acceptable sheen, color, and texture is achieved.
- C. Acknowledgment of Contract Documents: Contractor / Installer shall submit to the Architect certifications signed by each of the Contractor and Installer attesting acknowledgment of requirements of the Contract Documents for specific project requirements indicated in this specifications.
1. Installer shall submit proof of evidence, (this project specification section) with his letter of certificate.

2. Contractor / Installer shall not proceed with painting work of this section until submittal of required certifications are completed.
  3. Any work performed prior to completion of this submittal shall be subject to total rejection by the Architect. All rejected work shall be rectified without any additional cost to the Owner.
- D. Coating Maintenance Manual: Upon conclusion of the project, the contractor in conjunction with the coating manufacturer shall furnish a coating maintenance manual such as the Sherwin-Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an area summary with finish schedule, area detail designating where each product/color/finish was used, product data pages, SDS pages, care and cleaning instructions, touch up procedures and color samples of each color and finish used.

## **1.5 DELIVERY AND STORAGE**

- A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

Name or title of material.

Fed. Spec. number, if applicable.

Manufacturer's stock number and date of manufacturer.

Manufacturer's name.

Contents by volume, for major pigment and vehicle constituents.

Thinning instructions.

Application instructions.

Color name and number.

## **1.6 JOB CONDITIONS**

- A. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45°F (7°C) and 95°F (35°C), unless otherwise permitted by paint manufacturer's printed instructions.
- B. Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.
- C. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.
- D. Provide sufficient temporary illumination producing overall space/room minimum illumination level of 50 ft. candles while preparing or painting of surfaces and to assure the production of quality finishes.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:



1. M A B
2. Benjamin Moore
3. PPG Architectural Coatings
4. The Sherwin-Williams Company

## **2.2 COLORS AND FINISHES**

- A. Prior to beginning work, Contractor shall furnish color chips for surfaces to be painted from manufacturers full line of products. This shall include custom colors.
1. Contractor shall allow for a total of 20 different colors of each type of paint, (excluding graphics and /or art work as indicated) with change of color within a room or space occurring either on a horizontal or vertical line, [allow for multiple (6) colors at each room unless otherwise shown]. Where roof structure is exposed, steel beams, steel joists and metal decking will be painted with different colors, as selected by the Architect.
  2. Contractor shall allow for split frames at all new and existing hollow metal door frames to be painted.
  3. Final acceptance of colors will be from samples supplied on the job.
- B. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

## **2.3 MATERIALS**

- A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.
- B. Provide undercoat paint recommended and produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only within recommended limits.

## **2.4 EXTERIOR PAINT SCHEDULE**

- A. Basis of Design: Provide the following paint systems for the various substrates. Other equal paint products by indicated manufacturers will be acceptable:
- B. High-Gloss Enamel (Water-base Polyester Urethane Finish)
1. 1st Coat: Sherwin-Williams, Pro Industrial Pro-Cryl Universal Primer, B66W310.
  2. 2nd Coat: Sherwin-Williams, Hydrogloss 1K Water-based Urethane, B65-180.
  3. 3rd Coat: Sherwin-Williams, Hydrogloss 1K Water-based Urethane, B65-180.
  4. Apply to the following exterior surfaces: Lintels, ferrous metal and other exterior assemblies to receive paint.
  5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

## 2.5 INTERIOR PAINT SCHEDULE

### A. Semi-Gloss (Satin) Enamel:

1. 1st Coat: Sherwin-Williams, Pro Industrial Pro-Cryl Universal Primer, B66W310.
2. 2nd Coat: Acrylic Enamel, Sherwin-Williams, Pro Industrial HP Acrylic, B66-650.
3. 3rd Coat: Acrylic Enamel, Sherwin-Williams, Pro Industrial HP Acrylic, B66-650.
4. Apply to following interior surfaces: Hollow metal work, metal lites for wood doors, miscellaneous steel and ferrous metal fabrications.
5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

### B. Semi-Gloss (Satin) Enamel:

1. 1st Coat: Sherwin-Williams, Pro Industrial Pro-Cryl Universal Primer, B66W310.
2. 2nd Coat: Acrylic Enamel, Sherwin-Williams, Pro Industrial DTM Acrylic.
3. 3rd Coat: Acrylic Enamel, Sherwin-Williams, Pro Industrial DTM Acrylic.
4. Apply to following interior surfaces: Exposed metal ductwork.
5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

### C. Egg-Shell / Satin Enamel - Acrylic Latex:

1. Base Coats: Enamel Undercoat; Primer-Sealer to suit substrate or Loxon Block Surfacer, A24 for Concrete Masonry/CMU Block.
  - \* Block Filler shall be Level 3 - Premium Fill; one or multiple coats for high performance block filler in accordance with PDCA industry standards. Apply mock-up to confirm appearance before application of finish coats.
2. 2nd Coat: Sherwin-Williams, ProMar 200 Zero VOC Eg-Shel, B20-2600 Series.
3. 3rd Coat: Sherwin-Williams, ProMar 200 Zero VOC Eg-Shel, B20-2600 Series.
4. Apply to the following interior surfaces: Concrete masonry units, gypsum drywall and other interior assemblies to receive paint.
5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

### D. Flat - Acrylic Latex:

1. 1st Coat: Sherwin Williams ProMar 200 Zero VOC Interior Latex Primer, B28W02600.

2. 2nd Coat: Sherwin Williams, ProMar 200 Zero VOC Flat Interior Latex Flat, B30-2600.
  3. 3rd Coat: Sherwin Williams, ProMar 200 Zero VOC Flat Interior Latex Flat, B30-2600.
  4. Apply to following interior surfaces: Interior surfaces of ducts, where visible through registers or grilles, etc.
  5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.
- E. Egg-Shell - Dryfall Acrylic Latex:
1. 1st Coat: Galvanized steel or ferrous metal primer to suit substrate.
  2. 2nd Coat: Sherwin Williams, Low VOC Waterborne Acrylic Eg-Shel Dryfall Flat, B42-80 Series.
  3. 3rd Coat: Sherwin Williams, Low VOC Waterborne Acrylic Eg-Shel Dryfall Flat, B42-80 Series.
  4. Apply to following interior surfaces: Overhead exposed structural steel, steel joists, underside of steel deck, etc.
  5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.
- F. Water-Based Acrylic Epoxy:
1. Base Coats: Block fillers (Sherwin-Williams Loxon Block Surfacer, A24) and/or Primers recommended by manufacturer.
    - \* Block Filler shall Level 3 - Premium Fill; one or multiple coats for high performance block filler in accordance with PDCA industry standards. Apply mock-up to confirm appearance and before finish coat applications.
  2. 2nd Coat: Sherwin Williams, Pro Industrial Water-based Catalyzed Epoxy, B73-300.
  3. 3rd Coat: Sherwin Williams, Pro Industrial Water-based Catalyzed Epoxy, B73-300.
  4. Apply to following surfaces: CMU and other surfaces where indicated or required.
  5. Apply as many coats as necessary to produce a uniform substrate and finish appearance.

## 2.6 EXTRA STOCK

- A. Contractor shall provide one gallon of extra stock for each color/type selected for use on the project. Provide unopened containers clearly marked with manufacturers color number and name.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION**

- A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions, included rotted or otherwise defective materials, have been observed by all concerned and corrected in a manner acceptable to Applicator.
- B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.
- C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

### **3.2 SURFACE PREPARATION**

- A. General:
  - 1. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.
  - 2. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems in using the specified coating systems with substrates primed by others.
  - 3. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
  - 4. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.
  - 5. Painting of materials shall commence only when the moisture content of the materials complies with manufacturer's recommendations as follows:
    - a. Concrete and masonry - 22% maximum.
    - b. Gypsum drywall - 12% maximum.
- B. Cementitious Materials:
  - 1. Prepare cementitious surfaces of concrete, concrete block, cement plaster and gypsum drywall board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.
  - 2. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

- C. Ferrous Metals:
  - 1. Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
  - 2. Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these specifications. Clean and touch-up with same type shop primer.
  - 3. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

### 3.3 MATERIALS PREPARATION

- A. Mix and prepare painting materials in accordance with manufacturer's directions.
- B. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.
- C. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
- D. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

### 3.4 APPLICATION

- A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
- B. Where finish schedule calls for walls or ceilings to be painted, paint all new and existing surfaces in same area. Paint from corner to corner on walls or ceilings, or to a major change in direction of surface to be painted. Provide crisp, clean, sharp lines where new painted surfaces abut existing painted surfaces.
- C. **Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.**
- D. **Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.**
- E. Sand lightly between each succeeding enamel or varnish coat.
- F. Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

- G. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- H. **Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as recommended by coating manufacturer and an acceptable finished appearance in finish, color and appearance as determined by the Architect.**
- I. Primer Coat: Apply primer coat of material which is required to be painted or finished, and which has not been prime coated by others.
  - 1. **Re-coat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.**
- J. **Block Fillers: Apply block fillers using manufacturer's recommended application techniques with sufficient material and coats to achieve a pinhole-free, "Level 3 - Premium Fill Surface", and in accordance with PDCA 's industry standards.**
- K. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.
- L. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

### **3.5 CLEAN-UP AND PROTECTION**

- A. Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.
- B. Upon completion of painting work, clean all paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- C. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.
  - 1. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
  - 2. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

**END OF SECTION 09900**

## **SECTION 10100 - DRY MARKERBOARDS AND EXHIBITION BOARDS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of dry markerboards and exhibition boards are indicated on the drawings.
- B. Type of dry markerboards and exhibition boards specified in this section includes the following:
  - 1. Porcelain enamel steel dry marker boards.
  - 2. Fabriccork fabric faced cork exhibition boards.
  - 3. Factory applied trim.
  - 4. Field applied trim.

#### **1.3 REFERENCES**

- A. ASTM E84 Standard Test Method for Surface Burning Characteristics for Building Materials.
- B. ASTM C540 Gloss for ceramic materials.
- C. ASTM C614 for alkali resistance.
- D. ASTM D2244 evaluation of color differences.
- E. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wires, Profiles and Tubes.
- F. ASTM C208-72 for cellulosic fiberboard.
- G. ANSI A208.1-79 for particleboard.
- H. ANSI H35.1-82 for aluminum temper and alloy.
- I. HNSI A424-80 for steel for porcelain enameling.
- J. FS LLL-B-810 for tempered hardboard.
- K. PEI-1002 Manual and Performance Specification for Porcelain Enamel Writing Surfaces.
- L. BYK-Gardner Surface Distortion.
- M. GREENGUARD Indoor Air Quality Certified.
- N. GREENGUARD Children and Schools Indoor Air Quality Certified.

## 1.4 QUALITY ASSURANCE

- A. Manufacturer: Furnish all dry markerboards and exhibition boards by a single manufacturer for the entire project.
- B. Surface Burning Characteristics: Provide exhibition board surfaces which are identical in composition to those with surface burning characteristics indicated below, as determined by testing in compliance with ASTM E84. Use only exhibition boards which are certified to meet the following standards:
  - 1. Flame Spread: Not more than 25.
  - 2. Smoke Developed: Not more than 40.
- C. Uniformity of color, corrosion, temperature, alkali, water, range of gloss test, uniform texture, light reflectance and cleanability are requirements for all groups and have specific ranges for each.
- D. Product Certifications: Provide GREENGUARD Indoor Air Quality Certified and GREENGUARD Children and Schools Indoor Air Quality Certificates for markerboards.
- E. Reflectivity of LCSII ceramicsteel Markerboard writing surfaces shall not exceed the following:
  - 1. Gloss Range / 60° Gloss meter GU (Gloss Units)
    - a. LCSII ceramicsteel for Markerboard 68 -76% (low gloss surface).
    - b. LCSII ceramicsteel for writing surfaces - Surface Distortion reduction and the optimum improvement to performance characteristics.
  - 2. Contrast/waviness for Markerboards (light and dark effects) shall be no greater than 15 [Scale 0 – 30] when tested with BYK – Gardner Wave Scan 5+ Measuring device showing visual acuity (contrast sensitivity) to the human eye at distances greater than 3 meters (10'- 0").
  - 3. Resolution (visual acuity) shall be based on 3 lines per degree and be visibly maintained beyond the current standard of 3 meters. [Byk-Gardner Wave Scan 5+ Measuring device].
  - 4. Surface distortion ("orange peel"/surface peaks and valleys) as tested by the BYK-Gardner Wave Scan 5+ Measuring device [Scale 0 – 60]. Values are established by the difference in the highpoint/low point of the Markerboard test surfaces. P 3 ceramicsteel shall establish the lowest range of distortion from 11.7 – 16.02.

## 1.5 SUBMITTALS

- A. Samples and colors for each:
  - 1. Face sheet materials
  - 2. Cork materials
  - 3. Vinyl materials
  - 4. Aluminum trim or wood trim types and profiles.



- B. Shop Drawings: Submit shop drawings for each type of drymarker and exhibition board. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, layout and installation details.
  - 1. Drawings shall indicate location and actual material lengths of each unit. Room elevations shall indicate joint locations and include dimension from floor and adjacent side walls, cross-sections for trim, backing, face and core materials, fastener spacing and types of units provided.
- C. Product Data: Submit manufacturer's technical data and installation instructions for each material and component part, including data substantiating that materials comply with requirements.
- D. Certification: Submit the manufacturer's certification that materials furnished for the project comply with the specified requirements.
- E. Manufacturer's Product Warranty: Submit manufacturer's product and accessories warranty and certificate of authenticity from manufacturer.
- F. Product use, regular cleaning, stain removal and precautions information in the operation and maintenance instructions.

#### **1.6 SPECIAL PRODUCT WARRANTY**

- A. Submit a "**Life of Building**" warranty, stating that under normal usage and maintenance, and when installed in accordance with manufacturer's instructions and recommendations, porcelain enamel steel markerboard writing surfaces are guaranteed for the Life of the Building. Guarantee covers replacement of defective boards, but does not include cost of removal or reinstallation.
- B. Submit a standard warranty, stating that when installed in accordance with manufacturer's instructions and recommendations, exhibition boards are guaranteed for **one (1) year** against defects in materials and workmanship. Guarantee does not cover normal wear and tear, improper handling, any misuse, or any defects caused by vandalism or subsequent abuse. Guarantee covers replacement of defective material, but does not include cost of removal or reinstallation.
- C. Writing Surface Warranty Period: **Lifetime of the building** commencing on the Date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Basis of Design: "Series 1", as manufactured by Claridge Products and Equipment, Inc., Tel.# 800.434.4610; or approved equal.
  - 1. Finishes and Colors: Shall be selected by the Architect from manufacturer's available full range of finishes and colors including painted aluminum colors.
- B. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Manufacturers of Porcelain Enamel Dry Markerboards and Exhibition Boards:
  - a. Educational Equipment.
  - b. Platinum Visual Systems
  - c. Or approved equal

## 2.2 MARKERBOARD MATERIALS

- A. Porcelain Enamel: Provide balanced, high pressure laminated porcelain enamel markerboards of 3-ply construction consisting of facing sheet, core material and backing.
  1. Face Sheet: LCS-II Porcelain Enamel grade cold rolled steel for markerboard, as indicated on drawings..
    - a. Coat the exposed face with a 3-coat process consisting of primer, ground coat and color cover coat, and the concealed face with a 2-coat process consisting of primer and ground coat.
      - 1) Bottom Ground Coat - 1.5 to 2.2 mils
      - 2) Top Ground Coat - 2.0 to 2.8 mils
      - 3) Top Cover (Color) Coat - 3.0 to 4.0 mils
    - b. Fuse cover and ground coats to the steel at the manufacturer's firing temperatures, but not less than 1,200 deg.F (649°C).
    - c. LCS-II Porcelain Enamel for markerboard with improved writing and erasing surface (3 colors low gloss and 3 colors high gloss)
    - d. Facing sheet construction:
      - 1) 1.7-2.5 mils enameled ground coat on face minimum thickness.
      - 2) 3.0 - 4.0 mils enameled cover (color) coat for markerboard.
      - 3) 1.7-2.5 mils enameled minimum ground coat on back of facing.
      - 4) Firing temperatures shall be a minimum of 1200°F for LCSII markerboard.
  2. Writing Surface Core: 7/16" Medium Density Fiberboard (MDF) composed of approximately 90% post-industrial waste.
    - a. Units over 12'-0" in length and longer will require H-bar at center.
  3. Moisture backer shall be factory laminated to core material. A 0.005" thick aluminum backer shall be provided standard on all markerboards.
  4. Perimeter trim shall be as indicated on the architectural drawings.
  5. Factory Built Trim: Markerboard tray shall be 2-3/4" with 3/4" radius corners and include box tray.
  6. Maprail: shall be provided on all markerboards and will be either 1" or 2", as indicated on the architectural drawings/details.
    - a. Cork insert to be Claridge Cork, color as selected by Architect.

7. Accessories (1" or 2"):
  - a. Maphooks (minimum two per 4' maprail).
  - b. Flag holder (one per room).
    - 1) Provide separate wall mount flagholder, as required. Coordinate locations with locations of projection screens.
  - c. Map roller brackets (one pair per markerboard).
  - d. Maprail end stops (one pair per display rail).
8. Lamination:
  - a. Factory machine type only.
  - b. Specially formulated adhesives.

### **2.3 EXHIBITION BOARD MATERIALS**

- A. Fabricork: #1380 Vinyl fabric on natural cork underlay with Duracore backing.
- B. Thickness: Total laminated thickness of core and covering is 1/2". All thicknesses are nominal.
- C. Vinyl Fabric: 15 oz/ln yd.
- D. Lamination: Factory machine type with specially formulated adhesive.
- E. Metal Trim and Accessories: Factory fabricated frames and trim of not less than 0.062" thick aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single length units wherever possible; keep joints to a minimum. Miter corners to a neat, hairline closure. Plastic accessories will not be accepted.

### **2.4 FABRICATION**

- A. Assembly: Provide factory assembled dry markerboard and exhibition board units, except where field assembled units are required.
- B. Make joints only where the total length exceeds the maximum manufactured length. Fabricate with the minimum number of joints, balanced around the center of the board, as acceptable to the Architect.
  1. Provide the manufacturer's standard vertical joint system between abutting sections of dry markerboard.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Field Measurements: Take field measurements prior to the preparation of shop drawings and fabrication where possible, to ensure proper fitting of the work. Allow for trimming and fitting wherever taking of field measurements before fabrication might delay work.

- B. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

### **3.2 INSTALLATION**

- A. Deliver factory-built dry markerboard and exhibition board units completely assembled in one piece without joints, wherever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to the Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.
- B. Install units in locations and at mounting heights indicated and in accordance with the manufacturer's instructions. Keep perimeter lines straight, plumb and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories necessary for a complete installation.
  - 1. Anchor all components securely using tamperproof fasteners, where accessible.
  - 2. Install all dry markerboards and exhibition boards with completely concealed continuous hangers.
  - 3. Where wall mount flagholders are required install units where directed by the Architect/ Owner.
- C. Provide factory-trained installers.
- D. Apply manufacturers' adhesive behind each board using roughly ¼ cup @ 16" on center.
- E. Mounting heights from the floor for each room shall be as follows:
  - 1. Consult with the Architect/Owner before start of installation: Tenth and up grades 36".
- F. Provide covering for H-moldings to match vinyl-covered boards.
- G. Clean boards using manufacturers' recommended procedures and install cleaning labels for each room.
- H. Locate accessories on each board as specified.
- I. Provide mitered and wrapped hairline joints for all trims.
- J. Provide fasteners at perimeter trims 16" - 24" and 12" - 16" on trays.

### **3.3 ADJUST AND CLEAN**

- A. Verify that accessories required for each unit have been properly installed and that operating units function properly.
- B. Clean units in accordance with the manufacturer's instructions. Break-in markerboards only as recommended by the manufacturer.

- C. Repair or replace all damaged units and surfaces to the approval of the Architect at no additional cost to Owner.

**END OF SECTION 10100**

## **SECTION 10440 - SPECIALTY SIGNS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of specialty signs is shown on the drawings.
- B. Forms of specialty signs required include the following:
  - 1. Panel signs (Room Identification Signs).
  - 2. Exterior signs.
  - 3. Installation of all specialty signs.

#### **1.3 QUALITY ASSURANCE**

- A. Uniformity of Manufacturer: For each sign form and graphic image process indicated furnish products of a single manufacturer.
- B. All signs shall conform to the International Building Code and ICC/ANSI A117.1 - 2009 requirements for accessible building elements.
  - 1. All signs to permanent rooms and spaces shall include Braille in accordance with N.J.A.C. 5:23-7.11 (j).

#### **1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.
- B. Samples: Submit samples of each sign form and material showing finishes, colors, surface textures and qualities of manufacturer and design of each sign component including graphics.
  - 1. Submit full-size sample units, if requested by the Architect. Acceptable units may be installed as part of the work.
- C. Shop Drawings: Submit shop drawings for fabrication and erection of specialty signs. Include plans, elevations, and large scale details of sign wording and lettering layout. Show anchorages and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Americraft Inc.
2. Architectural Graphics Inc.
3. ASI Sign Systems, Inc.
4. Bayuk Graphic Systems, Inc.
5. Brandon Signage Co.
6. Designer Sign Company.
7. Gemini
8. Mohawk Sign Systems.
9. Or approved equal.

## **2.2 MATERIALS**

- A. GENERAL: Provide manufacturer's standard plastic signage which comply with the requirements established in the International Building Code and ICC/ANSI 117.1 - 2009 Barrier Free Standards. All signs to permanent rooms and spaces shall include Braille in accordance with N.J.A.C. 5:23-7.11 (j).
  1. Acrylic sheet material to be cut to the desired sizes with radius or square corners as indicated, or as per approved shop drawings.
  2. Manufacturer's standard acrylic material, as indicated, for Barrier Free Accessible signage indicating International Symbol of Accessibility.
  3. "Helvetica Regular" letter style, Domed Grade II Braille and other pictograms as described herein.
  4. Colors: As selected by the Architect from manufacturer's standards after award of contract, or as specified herein.
- B. Fasteners: Unless otherwise indicated, used concealed fasteners fabricated from metals that are non-corrosive to either the sign material or the mounting surface.
- C. Anchors and Inserts: Use non-ferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

## **2.3 FABRICATION**

- A. Unframed Panel Signs: Fabricate unframed panel signs with edges mechanically and smoothly finished to conform with the following requirements:
  1. Edge Condition: Square cut.
  2. Corner Condition: Provide radius corners for each sign type.

## **2.4 SIGNAGE**

- A. GENERAL: ALL signage MUST comply with the requirements established in the International Building Code and ICC/ANSI 117.1 - 2009. All signs to permanent rooms and spaces shall include Braille in accordance with N.J.A.C. 5:23-7.11 (j).

B. INTERIOR SIGNAGE:

1. Room Names and Numbers Signage:

- a. Provide Room Name and Numbers plastic signs for all rooms with name and room number, as shown on drawings and schedules.
  - 1) Types "7 & 9" Signs - Classrooms and Offices:
    - a) As directed by the Owner / Architect provide 1/4" thick non-combustible, self extinguishing solid composite plastic sign signs with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face. Provide window insert with non-glare clear plastic cover
    - b) Basis of Design; provide "Series 200A Sand Carved process with window insert Series 400 Vinyl Copy" as manufactured by Mohawk Sign Systems Inc., or approved equal, by Brandon Signage Co., Tel.# 717.582.5161.
  - 2) Type "8" Signs - Multi-Purpose Room, Stage, Cafeteria, Auditorium, Faculty Dining, Main Offices, Media Center, Kitchen, etc. :
    - a) Provide sand-carved process, 1/8" thick non-combustible, self-extinguishing solid composite plastic with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face.
  - 3) Informational Signage:
    - a) Provide informational plastic signs at selected doors, as shown on drawings and schedules.
      - i) Signs - "THIS IS NOT AN EXIT", "EXIT", etc.:
        - (1) Provide sand-carved process, 1/8" thick non-combustible, self-extinguishing solid composite plastic with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face.
  - 4) Sizes:
    - a) As indicated or as directed by the Architect / Owner.
  - 5) All room signs shall have radius corners.

2. Room Numbers Signage:

- a. Provide Room Numbers plastic signs for all rooms with room number, as shown on drawings and schedules.
  - 1) Type "10" Signs - Boiler Room, Elevator Machine, Storage, Janitor, Electrical, Mechanical, etc.:
    - a) Provide sand-carved process, 1/8" thick non-combustible, self-extinguishing solid composite plastic with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face.

3. Room Occupant Capacity Signs:

- a. Provide room occupant capacity signs for room capacity more than 50 persons and as indicated.
  - 1) Provide sand-carved process, 1/8" thick non-combustible, self-extinguishing solid composite plastic with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face.



4. Barrier Free Accessibility Signs:

- a. Basis of Design; "Vandal-resistant signs" as manufactured by Americraft Inc. Tel.# 800.237.3984.
  - 1) Provide injection molded process, 1/8" thick acrylic with non-glare clear front surface, graphics and colors on second surface (Back surface), with radius corners and stepped edging. Provide mounting holes with stainless steel screws. Colors to be selected by the Architect from manufacturer's available full range of colors.
  - 2) Provide tactile plastic signs displaying international symbol of accessibility in tactile form and accompanied by Grade II Braille.
  - 3) Provide signage at the following locations and as indicated on the Contract Drawings:
    - a) Accessible toilet units including stalls.

5. Area Refuge Signage:

- a. Provide where area refuge is shown on the Contract Drawings. Locate at interior and exterior of doors accessing the area refuge.
  - 1) Provide sand-carved process, 1/8" thick non-combustible, self-extinguishing solid composite plastic with integral tactile letters, numbers and symbols raised a minimum of 1/32" from sign face.

6. Special Signage:

- a. Fire Protection System (Sprinkler) Control Valves Location Signage:
  - 1) Provide signage where indicated or required by Code, of silk screened copy, on baked enamel aluminum sheet material 0.063 thick, in two colors; with 4" high letters in white on red colors, or as otherwise required by authorities having jurisdiction and indicating "Sprinkler Control Valves".
- b. Solar Photovoltaic Signage, etc.:
  - 1) Provide signage where indicated or required by Code, of silk screened copy, on baked enamel aluminum sheet material 0.063 thick, in two colors; with 1-1/4" high and have a stroke width of 1/4" red Roman or Latin letters on white reflective background, as otherwise required by authorities having jurisdiction.

7. Signage Locations:

- a. Along the door on the latch side and shall be mounted as follows:
  - 1) 48" minimum to the lowest tactile character on the sign measured from the finish floor.
  - 2) 60" maximum to baseline of highest tactile character on the sign measured from the finish floor.
- b. For locations having double doors, mounting shall be to the right of the right hand door.

- c. Where there is no wall space on the latch side of the door, including double leaf doors, signs shall be placed on the nearest adjacent wall.
8. Graphic Content and Style: Provide sign copy to comply with the requirements indicated for sizes, styles, spacing, content, positions, materials, finishes and colors of letters, numbers, symbols and other graphic devices.
  - a. Raised Copy Thickness: Not less than 1/32" from the sign face.
  - b. Raised characters shall be in different color and meets the Barrier Free requirements for a 70% contrast ratio of colors. Colors shall be selected from manufacturer's available full range of colors.
  - c. Raised characters and symbols for tactile signs shall be 5/8" high minimum and 2" high maximum. Sign size shall suit the required letters and numbers.
9. Braille Copy: Braille Copy shall be Grade II and shall conform to Specification 800, National Library Service, Library of Congress. Braille shall be raised integral .0625 diameter.
  - a. Braille shall be separated 1/2" minimum from the corresponding raised characters or symbols.
10. Mounting: As directed by the Architect using required fasteners.

C. EXTERIOR SIGNS:

1. Accessible parking signs, directional signs to accessible entrances, barrier free loading zone signs and traffic control signs to be located as shown on drawings or as indicated herein.
  - a. Provide silk screened copy, on baked enamel aluminum, colors as indicated or as otherwise required by authorities having jurisdiction, (Manual on Uniform Traffic Control Devices latest edition) with aluminum post embedded in concrete.
  - b. Accessible Entrance Sign: Provide aluminum entrance signs at each indicated entrance, displaying international symbol of accessibility. Provide silk screened copy, blue on white baked enamel.
2. Fasteners and Anchors: Use manufacturer's recommended type, size and quantity of fasteners for indicated signs. Provide concealed mounting and predrilled holes for setting wall anchors.
3. Mounting Posts: 2 7/8" diameter, aluminum pipe, finish and color to be selected by the Architect from manufacturer's standard.
  - a. Provide aluminum interlocking brackets and bolt/nut sets.
4. Signage for identifying emblem for Structure with Truss Construction:
  - a. Provide emblem signage of bright and reflective backed enamel aluminum color, isoscales triangle shape, 12" horizontally by 6" vertically with the

following letters, of size and color to make them conspicuous, printed on the emblem:

- 1) "R" to signify a roof with truss construction; or
- b. The emblem shall be permanently affixed to the left of the main entrance door at a height between four and six feet above the ground, and as directed by the Architect.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. General: Locate sign units and accessories where shown or scheduled, using mounting methods of the type described and in compliance with the applicable Codes and regulation.
- B. Install sign units level, plumb and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
- C. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using the methods indicated below:
  1. Silicone Adhesive Mounting: Use liquid silicone adhesive recommended by the sign manufacturer to attach sign units to irregular, porous or vinyl-covered surfaces.
    - a. Use double-sided vinyl tape where recommended by the sign manufacturer to hold the sign in place until the adhesive has fully cured.
    - b. Fasteners and Anchors: Manufacturer recommended concealed types for indicated signage and substrate materials.

#### **3.2 CLEANING AND PROTECTION**

- A. At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

**END OF SECTION 10440**

## **SECTION 10522 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of fire extinguishers, cabinets and accessories is indicated on the drawings.
- B. Definition: "Fire Extinguishers" as used in this section refers to units which can be hand-carried as opposed to those which are equipped with wheels or to fixed fire extinguishing systems.
- C. Type of products required include:
  - 1. Fire extinguishers.
  - 2. Fire extinguisher cabinets.

#### **1.3 QUALITY ASSURANCE**

- A. Single Source Responsibility: Obtain products in this section from one manufacturer.
- B. Coordination: Verify that fire extinguisher cabinets are sized to accommodate fire extinguishers of type and capacity indicated.
- C. UL-Listed Products: Provide new portable fire extinguishers which are UL-listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher indicated.

#### **1.4 SUBMITTALS**

- A. Product Data: Submit product data for each type of product included in this section. For fire extinguisher cabinets include roughing-in dimensions and details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, and panel style and materials.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
  - 1. J.L. Industries.
  - 2. Larsen's Mfg. Co.
  - 3. Potter Roemer
  - 4. Or approved equal.

## **2.2 FIRE EXTINGUISHERS**

- A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard which comply with requirements of governing authorities.
- B. Fill and service extinguishers to comply with requirements of governing authorities and manufacturer's requirements.
- C. Multi-Purpose Dry Chemical Type: UL-rated 2-A:10:B:C, 5 lbs. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires.

## **2.3 FIRE EXTINGUISHER CABINETS**

- A. General: Provide fire extinguisher cabinets where indicated, of suitable size for housing fire extinguishers of types and capacities indicated.
- B. Construction: Manufacturer's standard enameled steel box, with trim, frame, door and hardware to suit cabinet type, trim style, and door style indicated. Weld all joints and grind smooth. Miter and weld perimeter door frames.
- C. Cabinet Type: Suitable for mounting conditions indicated, of the following types:
  - 1. Semi-Recessed: Cabinet box (tub) partially recessed in walls of shallow depth.
- D. Trim Style: Fabricate trim in one piece with corners mitered, welded and ground smooth.
- E. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
  - 1. Square-Edge Trim: Square edges with backbend depths as follows: 1/4" to 5/16".
  - 2. Trim Metal: Of same metal as door.
- F. Door Material and Construction: Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.
  - 1. Enameled Steel: Manufacturer's standard finish, hollow steel door construction with tubular stiles and rails.
- G. Door Glazing: Tempered float glass complying with FS DD-G-1403, grade B, style I, type I, quality q3, class as indicated below:
  - 1. Clear glass, class 1 (transparent).
- H. Door Style: Manufacturer's standard design as indicated below and on drawing.
  - 1. Vertical Duo-Panel: Tempered glass, 1/8" thick.
- I. Door Hardware: Provide manufacturer's standard door operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam action latch, or door pull, exposed or concealed, and friction latch. Provide concealed or continuous type hinge permitting door to open 180 degrees.

## **2.4 FACTORY FINISHING OF FIRE EXTINGUISHER CABINETS**

- A. General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations except as otherwise indicated. Apply finishes in factory after products are assembled. Protect cabinets with plastic or paper covering, prior to shipment.
- B. Painted Finishes: Provide painted finish to comply with requirements indicated below for extent, preparation and type:
- C. Extent of Painted Finish: Apply painted finish to both concealed and exposed surfaces of cabinet components except where other than a painted finish is indicated.
- D. Color: Provide color or color matches indicated, or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
- E. Preparation: Clean surfaces of dirt, grease, and loose rust or mill scale.
- F. Baked Enamel Finish: Immediately after cleaning and pretreatment, apply cabinet manufacturer's standard baked enamel finish system to the following surfaces:
  - 1. Interior of cabinet.
  - 2. Exterior of cabinet except for those surfaces indicated to receive another finish.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.
- B. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
- C. Where exact location of surface-mounted cabinets is not indicated, locate as directed by Architect.

### **3.2 IDENTIFICATION**

- A. Identify existence of fire extinguisher in cabinet with die cut vertical lettering spelling "FIRE EXTINGUISHER" applied to door. Provide lettering to comply with requirements indicated for letter style, color, size, spacing and location or, if not otherwise indicated, as selected by Architect from manufacturer's standard vertical arrangements.

**END OF SECTION 10522**

## **SECTION 10670 - METAL SHELVING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of work included is shown on drawings: Storage Room shelving.

#### **1.3 QUALITY ASSURANCE**

- A. Uniformity: Provide each type of metal shelving as produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.

#### **1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical data and installation instructions.
- B. Samples: Submit color samples for Architect's selection.
- C. Shop Drawings: Submit shop drawings verifying dimensions affecting installations. Show in detail, method of installation and accessories.

#### **1.5 JOB CONDITIONS**

- A. Protect from damage during delivery, handling, storage and installation.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Basis of Design: Clip shelving as manufactured by Republic Storage Products, LLC, Uniontown, OH, Tel.# 800.477.1255; or approved equal.
- B. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
  - 1. Provide "Clipper Conventional Flange Shelving" as manufactured by Penco Products Inc., or approved equal.
    - a. Capacity: Provide metal shelving which shall meet or exceed the Basis of Design indicated load capacity Class.

#### **2.2 STORAGE ROOM SHELVING**

- A. Shelving System:
  - 1. Single angle end posts, double angle intermediate posts, 7'-7" high (or as shown on the drawings).

2. Number and sizes as shown, 36 inches wide or as required, 18 gauge, with reinforcing bar, front and rear (Class 2B). For shelves 18 inches deep and deeper, provide Class 3 shelves.
3. Include sway braces at rear and at end uprights. Include also a label holder for each shelf.
4. Baked enamel finish, colors as selected by Architect from manufacturer's available full range of standard and optional colors.
5. Provide metal bracket, lead anchor and screws for fastening shelving units to wall. Provide anchors for each shelving unit.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install metal shelving at locations shown in accordance with manufacturer's instructions for plumb, level, rigid, and flush installation.
- B. Anchor shelving to walls and floors.

#### **3.2 ADJUST AND CLEAN**

- A. Touch up marred finishes, but replace units which cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by shelving manufacturer.

**END OF SECTION 10670**



## SECTION 10800 - TOILET AND BATH ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 DESCRIPTION OF WORK

- A. Extent of each type of toilet accessory is indicated on the drawings and schedules.
- B. Type of toilet accessories required includes but are not limited to the following:
  - 1. Mirrors
  - 2. Grab bars
  - 3. Napkin disposals
  - 4. Mop and broom holder
  - 5. Hand dryers

#### 1.3 QUALITY ASSURANCE

- A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.
- B. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.
- C. Products: Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, unless otherwise acceptable to Architect.

#### 1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each toilet accessory.
- B. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices and cut-out requirements in other work.

#### 1.5 WARRANTY

- A. Bradley Washroom Accessories: Warranty is limited to replacing or repairing, at the manufacturer's option, transportation charges prepaid by the purchaser, any washroom accessory unit or part thereof which their inspection shall show to have been defective within the limitation of the warranty. Period of warranty is measured from the date of their invoice as follows:
  - 1. Complete unit (except mirrors) - **One (1) year**.
  - 2. Stainless Steel Mirror Frames - **Fifteen (15) years** - against corrosion.
  - 3. Tempered Glass Mirrors - **Five (5) years** - against silver spoilage.
  - 4. Polished #8 Architectural Grade Finish on 304 Series Stainless Steel - **One (1) year** against corrosion.
  - 5. Bright Annealed Finish on 430 Series Stainless Steel - **One (1) year** against corrosion.

Note: Warranty does not cover installation labor charges and does not apply to any units which have been damaged by accident, abuse, improper installation, improper maintenance, or altered in any way.

- B. Hand Dryer - Xlerator by Excel Dryer Inc: Manufacturer's standard limited warranty to be free from defects for a period of **five (5) years**. Warranty shall include labor performed at factory as well as the repair or exchange of defective parts, at manufacturer's option.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Basis of Design: Catalog numbers used herein are Bradley Washroom Accessories, or approved equal. Refer to drawings for schedule and additional information. Similar products for other indicated manufacturers will be acceptable.
- B. Subject to compliance with requirements, manufacturers offering toilet accessories which may be incorporated in the work include one of the following:
  - 1. American Specialties, Inc.
  - 2. Bobrick Washroom Equipment, Inc.
  - 3. Or approved equal

### **2.2 MATERIALS, GENERAL**

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gauge (.034") minimum, unless otherwise indicated.
- B. Brass: Leaded and unleaded, flat products, FS QQ-B-613; Rods, shapes, forgings, and flat products with finished edges, FS QQ-B-626.
- C. Sheet Steel: Cold-rolled, commercial quality ASTM A 366, 20-gauge (.040") minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A 527, G60.
- E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.
- F. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.
- G. Mirror Glass: ASTM C-1048, Type I, Class 1, Quality q2, 1/4" thick, with silver coating, copper protective coating, and non-metallic paint coating complying with FS DD-M-411. Provide tempered safety glass for all mirrors.
- H. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.
- I. Fasteners: Screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed.

## 2.3 PRODUCT DESCRIPTIONS

- A. Mirror Units: #780 Series, Mirror plates shall be of No. 1 quality 1/4" polished safety glass, silvered and electrolytically copper backed.
  - 1. Frames shall be 3/4" x 3/4", type 304, 18 gauge satin finish stainless steel angle with mitered corners, welded and polished smooth, with 20 gauge angle stiffeners welded to frame, 20 gauge galvanized steel back with formed edges secured to frame with concealed screws and equipped with integral 18 gauge cold rolled steel all welded construction wall hangers.
  - 2. Mirror units shall guaranteed by the manufacturer for a period of **fifteen (15) years** which starts on approved date of installation.
  - 3. Sizes as indicated on drawings and schedules.
- B. Grab Bars: ( Provide quantity and types indicated)
  - 1. Stainless Steel Type: Provide grab bars with wall thickness not less than 18 (.050") gauge and as follows:
    - a. Mounting: Concealed, manufacturer's standard flanges and anchorages.
    - b. Clearance: 1-1/2" clearance between wall surface and inside face of bar.
    - c. Gripping Surfaces: Manufacturer's non-slip texture.
    - d. Heavy-Duty Size: Outside diameter of 1-1/2".
- C. Soap Dispensers: (Provided by Owner / Installed by GC)
- D. Toilet Tissue Dispensers: (Provided by Owner / Installed by GC)
- E. Napkin Disposals: Surface mounted, Model 4722-15, one toilet compartment, fabricated of type 304, 22 gauge stainless steel with exposed surfaces in satin finish. Self-closing push flap door and stainless steel removable receptacle with tumbler lock. Overall dimensions - 10-3/4" w x 15-1/8" h x 4" d.

## 2.4 MISCELLANEOUS ACCESSORIES

- A. Mop and Broom Holder: No. 9953, Type 304 stainless steel-wall mounted unit with three (3) spring-loaded rubber cam type mop/broom holders, 24" long.
- B. Hand Dryer: Model No. XL-W, Xlerator, as manufactured by Excel Dryer Inc., surface mounted, heavy duty, die-cast zinc alloy, rib reinforced, lightweight, rustproof, with infrared optical sensor. Color shall be electrostatically applied epoxy paint - white.

## 2.5 FABRICATION

- A. General: No names or labels are permitted on exposed faces of toilet and bath accessory units. On either the interior surface of the accessory or on the back surface, the manufacturer shall indicate the manufacturer's information, model number on a printed waterproof label or a stamped nameplate attached to the accessory.

- B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

### **PART 3 - EXECUTION**

#### **3.1 INSPECTION**

- A. Examine the areas and conditions under which work is to be installed and notify the Architect in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

#### **3.2 INSTALLATION**

- A. Install toilet accessory units in accordance with manufacturers' instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated.
- B. Use all metal type fasteners such as anchors, plates, screws, bolts and expansion shields, type as required by the construction to which accessories are to be secured. Exposed hardware shall match finish of the accessory.

#### **3.3 ADJUSTING AND CLEANING**

- A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean and polish all exposed surfaces after removing temporary labels and protective coatings.

**END OF SECTION 10800**

## **SECTION 10830 - INFANT CHANGING TABLE**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of type of infant changing tables is indicated on drawings and schedule.
- B. Type of infant changing tables required include the following:
  - 1. Surface mounted horizontal design changing station.
- C. Related Section:
  - 1. Section 04200: Unit Masonry.

#### **1.3 QUALITY ASSURANCE**

- A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry or metal stud framing; coordinate delivery with other work to avoid delay.
- B. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.
- C. Products: Provide products of same manufacturer for each type of unit and for units exposed in same areas, unless otherwise acceptable to Architect.

#### **1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical data and installation instructions for each infant changing table.
- B. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices and cut-out requirements in other work.
- C. Warranty: Submit manufacturer's standard warranty on all parts and installation.
  - 1. Limited Warranty for materials and workmanship for a period of five (5) years from date of approved substantial completion date.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Basis of Design: "KB110-SSWM", horizontal surface mounted baby changing station, as manufactured by Koala Care Products, Centennial, CO, Tel.# 888.733.3456, [www.koalabear.com](http://www.koalabear.com); or approved equal.

1. Comparable products of other manufacturers will only be considered if it can be clearly shown that the substituted products are equal to or exceed the construction quality requirements stated in the "Basis of Design" manufacturer's standard product data. Substitution shall be in accordance with AIA A232 and Section 00800.
- B. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
  1. Foundations Children's Products,
  2. Or approved equal.

## **2.2 MATERIALS, GENERAL**

- A. 18 gauge, type 304 satin stainless steel exterior finish with FDA approved blow molded high-density grey polyethylene with Microban® antimicrobial interior. Reinforced full-length steel-on-steel hinge mechanism, with 11-gauge steel mounting plates and mounting hardware included. Molded in graphics and safety messages in six (6) languages. Contoured changing area is 442 sq. in. (2852 sq. cm) and comes complete with nylon safety straps and bag hooks.
- B. Concealed pneumatic cylinder and hinge structure provides controlled, slow opening and closing of bed.
- C. High-density polyethylene is easy to clean and resists odors and bacterial growth.
- D. Complies with ASTM static load performance requirements when properly installed.
- E. Built-in liner dispenser holds approximately twenty-five (25) KB150-99 sanitary liners.
- F. Unit shall conform to:
  1. ICC A117.1-2003, Accessible and Usable Buildings and Facilities,
  2. ASTM F 2285-04, Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use,
  3. ANSI Z535.4, Product Safety Signs and Labels,
  4. ASTM G21, Antifungal Standards or local code if more stringent installation requirements are applicable for barrier-free accessibility.
- G. Designed to lift door from open position and brake to prevent the trapping of hands or fingers.
- H. Unit is engineered to withstand loads of up to 250 pounds.
- I. Size: 23" high, 37" wide, 4" deep (Closed position).
- J. Fasteners: Use four (4) 1/4" x 3" wood screws through side holes in unit for securing to indicated substrates.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION**

- A. Examine the areas and conditions under which work is to be installed and notify the Architect in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

### **3.2 INSTALLATION**

- A. Install infant changing table units in accordance with manufacturers' instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated.
- B. Use all metal type fasteners such as anchors, plates, screws, bolts and expansion shields, type as required by the construction to which accessories are to be secured.

### **3.3 ADJUSTING AND CLEANING**

- A. Adjust infant changing table units for proper operation and verify that mechanisms function smoothly. Replace damaged or defective units or accessories.
- B. Clean and polish all exposed surfaces after removing temporary labels and protective coatings.

**END OF SECTION 10830**

## **SECTION 11000 - GENERAL REQUIREMENTS - CASEWORK AND EQUIPMENT WORK**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Part 1 through Part 6 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Casework and Equipment Work includes all items listed on schedules. All general requirements of this section apply to all equipment Contracts.

#### **1.3 QUALITY ASSURANCE**

- A. Products of individual manufacturers are scheduled to establish type and standard of quality. Products of other manufacturers proposed to be used shall meet the published specifications of the specified product as to materials, finishes, design and fabrication, to the satisfaction of the Architect.
- B. Compatibility: Provide each type of equipment by a single manufacturer, including accessories. It is of the utmost importance that a stability of design and interchangeability of parts and pieces be provided, and it shall be specifically understood that a miscellaneous assortment of equipment assembled by dealers or agents will not be considered as meeting requirements of the specification.
- C. Casework and/or Equipment Work specified herein and other Division 11 specification sections have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
  - 1. Comparable products of other manufacturers will be considered only if it can be clearly shown that their products are equal to or will exceed the construction quality requirements and other design attributes listed by manufacturers for indicated model numbers.
  - 2. The General Contractor will not award subcontract for Casework or Equipment supplier unless the Architect has approved that supplier's samples, certificates, individual product drawings, and proof of ability to perform.

#### **1.4 SUBMITTALS**

- A. Submit manufacturer's technical data, catalog cuts and installation instructions for each type of furniture and equipment.
- B. Samples: Submit, for verification purposes, samples of each exposed material from which equipment units and accessories are composed, in each color, finish, pattern and texture indicated. If these qualities are not indicated, submit, for initial selection, manufacturer's color charts or samples of actual materials showing full range of standard colors, finishes, patterns, and textures available. Include samples of the following:
  - 1. Plastic laminate
  - 2. Baked enamel finishes for metal components



3. Wood and plywood materials and finishes
  4. Molded plastic and fiberglass
  5. Exposed fasteners
- C. Submit full-size samples of finished units when complete with hardware, doors, adjustable shelves, etc., when requested by Architect. Acceptable sample units will be used for comparison inspection at project. Unless otherwise directed, acceptable sample units may be incorporated in the work. Notify Architect of their exact locations. If not incorporated in the work, retain acceptable sample units in the building until completion and acceptance of the work. Remove sample units from the premises when directed by Architect.
- D. Shop Drawings
1. Submit shop drawings showing plans, elevations, ends cross-sections. Show details and location of anchorages and fitting to floors, walls and base. Include layout of units with relation to surrounding walls, doors, windows, and other building components.
  2. Coordinate shop drawings with other work involved.

## **1.5 PRODUCT HANDLING**

- A. Deliver casework only after wet operations in building are complete.
- B. Store completed equipment in ventilated place, protected from the weather, with relative humidity therein of 50% or less at 70°F.
- C. Protect sanded and finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective coating.

## **1.6 JOB CONDITIONS**

- A. Advise Architect of requirements for maintaining heating, cooling and ventilation in installation areas as required to reach relative humidity necessary to maintain optimum moisture content.
- B. Examination of Substrate and Conditions
  1. Field measurements shall be taken to verify that the equipment will fit into the designated space. Entry ways, corridors and door openings shall be verified to ensure that the equipment be manufactured in a matter to permit it to be moved through properly into place.
  2. Examine the substrate and the conditions under which the work under this section is to be performed, including condition of substrate to which equipment is to be attached, and notify the Architect, in writing, of unsatisfactory conditions. Do not proceed with work under this section until satisfactory conditions have been corrected in an acceptable manner.

## **1.7 QUALIFICATION OF SUPPLIERS OF CASEWORK AND EQUIPMENT**

- A. That it owns and operates a factory or factories adequate for and devoted to the manufacture of casework, equipment or material which is proposed to furnish and maintains strict inspection and quality control over the various manufacturing operations performed to produce a satisfactory end product of the standard and quality set forth in the detailed specification.

1. That is at the time of submitting products and equipment and had been engaged in the manufacturing of casework or equipment for a recommended 10 consecutive years and has maintained during this time a published catalog of such specialized equipment, including a line similar to the specified.
2. That the manufacturer or his franchised representative shall have a major installation of equipment delivered and installed over a recommended 10 years conforming to the design and quality specified herein.

#### **1.8 VARIATION FROM MATERIALS, PRODUCTS AND EQUIPMENT SPECIFIED**

- A. The designs, materials, finishes, functions and upholsteries have been selected by the Owner on the advise of the Architect with intention of creating an integrated building design. For this reason, no variations from the plans, specifications and design guide will be permitted except as noted below.
  1. Whenever and wherever in any of the contract documents an article, material or equipment is defined by describing a proprietary product or by using the statement, "as manufactured by", it is the intent that this shall describe by reference the materials desired; craftsmanship and method of manufacture, as well as the size and dimensions rather than detailing all of these requirements herein. It is not the intention to limit the bidding on such items, but merely to indicate that the item must conform to these standards.
  2. Any Bidder submitting a quotation on casework or equipment at variance with the specifications shall enclose, in writing, an explanation, describing fully and in detail all particulars in which his standards vary from those specified. Such deviations shall not affect the quality, character, appearance, performance or operation requirements specified.
    - a. The acceptance of such deviation by the Owner shall not be mandatory for any reason.
  3. **Any Laboratory Casework manufacturer requesting equivalence must submit test report from a Scientific Equipment and Furniture Association (SEFA) approved independent testing facility showing compliance with SEFA-8 standards. Failure to provide the required information is cause for rejection.**

#### **PART 2 - PRODUCTS**

**2.1 See Schedules on Drawings.**

#### **2.2 GENERAL REQUIREMENTS (As applicable for each Contract)**

- A. BASIS OF DESIGN: CATALOG NUMBERS REFER TO CAMPBELL-RHEA CASEWORK CATALOG; OR APPROVED EQUAL, UNLESS OTHERWISE SHOWN, SEE PARAGRAPH 1.2 ABOVE.
- B. ALL CASEWORK DOORS AND DRAWERS TO HAVE LOCKS KEYED ALIKE PER ROOM AND MASTER KEYED.
  1. The Contractor shall package keys for each room separately and identify the room number on the package and deliver to the Owner's Representative.

- C. ALL TOPS SHALL BE 1-1/2" PLYWOOD WITH PLASTIC LAMINATE COVERING ON ALL EXPOSED SURFACES (UNLESS NOTED OTHERWISE).
- D. ALL BACKSPASHES SHALL BE 3/4" PLYWOOD WITH PLASTIC LAMINATE COVERING ON ALL EXPOSED SURFACES (UNLESS NOTED OTHERWISE).
- E. ALL FURNITURE, CASEWORK AND EQUIPMENT SHOWN DOTTED AND/OR IS INDICATED AS (N.I.C.) IS NOT IN CONTRACT.
- F. UNLESS OTHERWISE SHOWN, THE CASEWORK AND EQUIPMENT WORK SUBCONTRACTOR SHALL SUPPLY AND DELIVER ALL SINKS, TAILPIECES, FAUCETS, STRAINERS, IN CASEWORK TO THE PLUMBING AND DRAINAGE WORK CONTRACTOR.
  - 1. PLUMBING CONTRACTOR SHALL SUPPLY AND INSTALL ALL TRAPS, VALVES ETC AND SHALL MAKE FINAL CONNECTIONS TO ALL WASTE/VENTS, WATER LINES, ETC. AS REQUIRED TO MAKE SYSTEMS FULLY FUNCTIONAL.
  - 2. PLUMBING CONTRACTOR, UNLESS OTHERWISE SHOWN, SHALL MAKE FINAL CONNECTIONS TO ALL WASTE/VENTS, WATER LINES, ETC. AS REQUIRED TO MAKE SYSTEM FULLY FUNCTIONAL
  - 3. UNLESS OTHERWISE SHOWN, CASEWORK AND EQUIPMENT SUBCONTRACTOR SHALL MAKE SINK CUT-OUTS.
  - 4. SINK CABINETS TO BE INSTALLED BEFORE THE INSTALLATION OF ADJACENT CABINETS.
- G. ALL CONTRACTORS TO FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION AND NOTIFY ARCHITECT IN WRITTEN FORM OF ANY DISCREPANCIES.
- H. PROVIDE ALL FILLERS AS REQUIRED. FINISH TO MATCH CASEWORK.
- I. UNLESS OTHERWISE SHOWN, RUBBER BASE ON ALL CASEWORK BY G.C.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Condition casework and furniture to average prevailing humidity conditions in installation areas prior to installing.

#### **3.2 INSTALLATION**

- A. Deliver, uncrate, set in place and install plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where casework abuts other finished work, scribe and cut for accurate fit. Before making cutouts, drill pilot holes in corners.
- B. Trim and Moldings: Install in single, unjointed lengths for openings and for runs less than maximum length of lumber available. For longer runs, use only one piece less than maximum length available in any straight run. Stagger joints in adjacent members.
- C. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

- D. Adjust shelving, tables and chair heights (if applicable), as required and as directed by the Architect/Owner.
- E. Inspect for dents, scratches, stains, holes, etc. Replace any items showing damage, loose joints or other defects.

### **3.3 CLEANING AND PROTECTION**

- A. Clean and polish all items, remove packing cases and debris from the site.
- B. Protection: Perform all procedures and precautions for protection of materials and installed casework from damage by the work of other trades until acceptance of the work by the Owner.
- C. Cover casework with 4-mil polyethylene film for protection against soiling and deterioration during remainder of construction period.

**END OF SECTION 11000**

## SECTION 11010 - PREMANUFACTURED PLASTIC LAMINATE CASEWORK

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK

- A. The extent of Casework is shown on the drawings and is hereby defined to include plastic laminate cabinets constructed with particleboard cores.
- B. Work included in Casework Contract:
  - 1. Furnish all items of equipment as listed in the specifications, equipment schedule and/or as shown on the drawings, including delivery to the building, unpacking, setting in place, leveling, and scribing to walls and floors as required.
  - 2. **Furnishing** Equipment subcontractor shall make cutouts, holes and openings in countertops so as to be ready for installation of fixtures by the Plumbing Work Contractor.
    - a. The Casework and Equipment Subcontractor(s) shall turn over to the Plumbing Contractor in a package, all sinks, fixtures, faucets, tailpieces, strainers, etc., and nipples and locknuts, etc., for installation and final connection by the Plumbing Contractor.
  - 3. The Casework and Equipment Subcontractor shall provide an itemized lists and a designated site location for the transfer of the above referenced materials to the Plumbing Contractor. The list shall have a description of the items and quantity along with a sign-off line for the Plumbing Contractor.
    - a. **A copy of the signed list is to be submitted to the Architect/Owner prior to billing for this equipment.**
  - 4. All debris, dirt and rubbish accumulated as a result of this installation shall be removed and the premises left clean and orderly.
  - 5. All Contractors shall familiarize themselves with the job conditions and building measurements in order to coordinate the planning, design, connections, delivery and erection of the fixed casework and related equipment furnished under these specifications with other related and associated work during the term of this contract.
- C. Work included in other contracts:
  - 1. The **connection** of sinks, tailpieces, traps, service lines, drainlines, and piping within the equipment and through, under or along the backs of working surfaces as required by the specifications and/or as shown on the drawing shall be by the Plumbing and Drainage Work Contractor in accordance with Part-4 Sections.
  - 2. The furnishing of any framing or reinforcements for walls, floors, or ceilings to support any equipment, General Construction Contract, specified in Part 2.

#### 1.2 QUALITY ASSURANCE

- A. Provide all casework (for integration with tops, sinks, and service fixtures, as required) manufactured or furnished by the same company for single responsibility.

- B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
1. **Basis of Design:** "Plastic Laminate Institutional Casework", as manufactured by Wood-Metal Industries; or approved equal.
  2. All core materials shall be a blended bio fiber composition with non-formaldehyde binders. Boards shall exceed performance requirements for ANSI A208.1-1999 M3 Standards.
  3. Casework manufacturer shall provide documentation and certification indicating compliance with the above requirements.
- C. Manufacturers requesting approval shall submit evidence of a recommended 5 years experience and installations for similar type of project. Manufacturers shall also show evidence of financial stability, plant facilities, catalogs, and specifications. Full-sized samples, catalogs, and specifications shall be submitted with written request along with detailed list of compliance and deviations from these documents for approval. Samples may be impounded by Owner and retained until completion of job for verification and compliance of specifications.
- D. In addition to the above requirements, manufacturers requesting approval shall, at the same time, submit certified product test data in accordance with ANSI A161.1-1980, NEMA LD3-1991, and general static load testing performed and certified by an independent testing agency, covering the following areas of product performance, with these minimum results:
- |  |            |
|--|------------|
| 1. Base cabinet construction/racking test:                   | 800 lbs.   |
| 2. Cabinet front joint loading test:                         | 425 lbs.   |
| 3. Wall cabinet static load test:                            | 2,200 lbs. |
| 4. Drawer front joint loading test:                          | 600 lbs.   |
| 5. Drawer construction/static load test:                     | 600 lbs.   |
| 6. Cabinet adjustable shelf support device/static load test: | 300 lbs.   |
| 7. Particleboard screw holding power:                        | 350 lbs.   |
- E. The following performance details are project requirements. Deviations will not be allowed.
1. Barrier Free Subcode Requirements: Casework and equipment work shall meet requirements of the Barrier-Free Subcode of the New Jersey Uniform Construction Code, for barrier-free access.
  2. Lamination System: Doors, finished end panels, and other decorative exterior laminate surfaces shall be composed of minimum 3/4 inch core, laminated exterior with .030 inch high pressure plastic laminate, and interior with .020 inch high pressure cabinet liner. Lamination with hybrid P.V.A. Type III water resistant adhesives. Total thickness 13/16 inch. No exceptions.
  3. Structural Cabinet Body: Cabinet backs shall be minimum 3/8 inch thick, inset from rear of body, fully housed four sides, and back-shimmed. Provide 3/4 inch thick stiffeners glued and fastened to back/body as specified herein. Back perimeter and stiffeners to be fully sealed with hot melt adhesive.

4. Interior Space: All cabinets shall have clear span interiors. No vertical dividers allowed unless by specified architectural design.
5. Heavy Components: Wall cabinet tops and bottoms, and all bookstack shelves shall be minimum 1 inch thick, for additional load support. Shelves in door cabinets 30 inches wide and over shall be 1 inch thick. Shelves in open cabinets, regardless of width, shall be 1 inch thick.
6. Structural Drawer Body: Drawer body material shall be multi-directional fiberboard with bottom recessed, captured all four sides and sealed with hot melt adhesive. Provide under body stiffener as specified herein. Particleboard bodies and/or surface applied bottoms are not acceptable.
7. Drawer Suspension: Drawer slides shall be self-closing design, epoxy power coated, with positive instop, outstop, and out-keeper. Dynamic (operational) load rating to be minimum 100 lbs. and minimum 150 lb. static load rating.
8. Structural Cabinet Support: Cabinet sub base shall be of a separate and continuous ladder-type platform design leveled and floor mounted prior to cabinet body placement. Material to be exterior grade plywood. No cabinet sides-to-floor will be allowed.

### **1.3 SUBMITTALS**

- A. Submit two copies of manufacturer's data and installation instructions for each type of equipment.
- B. Samples
  1. Submit samples of available laminated plastic patterns and colors for Architect's selection.
  2. Submit one full-size sample of finished base cabinet unit complete with hardware, doors and drawers, without finish top.
  3. Submit one full-size sample of finished wall-mounted cabinet unit complete with hardware, doors and adjustable shelves.
  4. Acceptable sample units will be used for comparison inspections at project. Unless otherwise directed acceptable sample units may be incorporated in the work. Notify Architect of their exact locations. If not incorporated in the work, retain acceptable sample units in the building until completion and acceptance of the work.
  5. Remove sample units from the premises when directed by the Architect.
- C. Shop Drawings
  1. Submit shop drawings showing plans, elevations, ends, cross-sections, service run spaces, locations and type of service fixtures with lines thereto. Show details and location of anchorages and fitting to floors, walls and base. Include layout of units with relation to surrounding walls, doors, windows, and other building components.
  2. Coordinate shop drawings with other work involved.

D. Test Reports - Certifications:

1. Submit the following:
  - a. Test reports certifying that the casework finish complies with chemical and other resistance requirements of the specifications.
  - b. Performance test reports from an independent testing lab on each specified top material.

**1.4 PRODUCT HANDLING**

- A. Deliver casework only after wet operations in building are complete.
- B. Store completed casework in ventilated place, protected from the weather, with relative humidity therein of 50% or less at 70°F.
- C. Protect sanded and finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

**1.5 JOB CONDITIONS**

- A. Advise Architect of requirements for maintaining heating, cooling and ventilation in installation areas as required to reach relative humidity necessary to maintain optimum moisture content.
- B. Examination of Substrate and Conditions
  1. Field measurements shall be taken to verify that the equipment will fit into the designated space. Entry ways, corridors and door openings shall be verified to ensure that the equipment be manufactured in a manner to permit it to be moved through properly into place.
  2. Examine the substrate and the conditions under which the work under this section is to be performed, and notify the Architect, in writing, of unsatisfactory conditions. Do not proceed with work under this section until unsatisfactory conditions have been corrected in an acceptable manner.

**1.6 WARRANTY**

- A. Special Project Warranty: Submit a written warranty signed by the manufacturer, the contractor, and the installer, guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributable to abnormal aging, without reducing or otherwise limiting any other rights to correction which the owner may have under the contract documents.
  1. The Manufacturer, shall warrant the casework to be free from defects in materials and workmanship, under normal use and service, for **three (3) years** from date of substantial completion. Within the warranty period, the Manufacturer, shall, at its option, repair, replace, or refund the purchase price of defective casework.
  2. The warranty with respect to products of another manufacturer sold by the casework manufacturer, is limited to the warranty extended by that manufacturer to the case work manufacturer. The warranty shall include responsibility for removing and



replacing other work as necessary to accomplish repairs or replacement of materials covered by the warranty.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include the following:
1. Wood-Metal Industries.
  2. TMI Systems Design Corp.
  3. Case Systems Inc.
  4. Stevens Industries, Inc.
  5. Or approved equal.

### **2.2 MATERIALS**

- A. Laminated Plastics / Finishes:
1. High pressure plastic laminate, .030 inch thickness, for exterior cabinet surfaces shall meet NEMA LD3-1991 GP28 standards including thickness.
  2. Exterior Color Selection Available:
    - a. Surface laminates from casework manufacturer's full range of all available colors, including wood grain patterns. Minimum of 53 selections available.
    - b. Architect has the right to choose up to 6 different colors per project.
    - c. Direction of wood grain to be vertical on door, end panels, fascia panels, and exposed backs; horizontal on drawer faces, aprons, and top rails.
  3. Plastic Laminate Balancing Sheet: White high pressure cabinet liner, .020 inch thick shall meet NEMA LD3-1991 CL 20 standards. Use for balancing exterior surface laminates.
  4. Countertop High Pressure Plastic Laminate:
    - a. High pressure plastic laminate, textured finish .050 inch thick or .042 inch postforming grade as detailed. Color as selected from manufacturer's full range of all available patterns and colors.
    - b. Heavy gauge neutral colored backing sheet for balanced construction.
  5. Pressure Fused Laminate:
    - a. Melamine resin impregnated, 80 gram PSM minimum, surface laminated to core under pressure.
    - b. Shall meet NEMA LD3.3-1991 GP28 standards and NEMA LD3-1991 CL20 standards.

- c. White pressure fused laminate for cabinet interiors behind door and drawers, interiors of all open cabinets, and underside of wall cabinet.
- d. Shall be balanced at all concealed surfaces with phenolic backer. Unsurfaced coreboard is not allowed.

B. High Performance Particle Board Core:

- 1. Particleboard to be 47 lb. density, of balanced 3-ply construction with moisture content not to exceed 8%. Particleboard shall conform to ANSI A208.1-1993, type M-3.
- 2. Particleboard cabinet components to be of the following minimum core thicknesses prior to lamination:
  - a. 3/8": Cabinet backs and drawer bottoms.
  - b. 1/2": Dividers, as detailed.
  - c. 3/4": Base and tall cabinet tops and bottoms, cabinet sides, drawer spreaders, door, drawer head, cabinet back rear hangstrips, dividers as detailed, exposed cabinet backs.
  - d. 1": Wall cabinet tops and bottoms, door-cabinet shelving 30 inch width and over, exposed cabinet shelving and off-wall shelving of all widths.

C. Fiberboard Core:

- 1. Uniform, medium density conforming to ANSI A208.2, shall meet the following minimum standards:
 

Screw holding, face:	355 lbs
Screw holding, edge:	300 lbs
Modulus of rupture:	4,500 psi
Modulus of elasticity:	500,000 psi
Internal bond:	100 psi
- 2. Fiberboard components to be of the following minimum core thicknesses prior to lamination:
  - a. 1/2": Drawer sides, subfront and back. Drawer under bottom stiffeners.

D. Edging type(s). Provide one or more of the following in accordance with Paragraph 2.1, E., "Edging Locations":

- 1. Flat Edge PVC, .020 inch. Solid, high impact, purified, color-thru, acid resistant PVC edging machine-applied with hot melt adhesives, automatically trimmed face, back and corners for uniform appearance. Manufacturer's option of .030 inch high pressure plastic laminate if PVC match is unavailable.
- 2. 3mm thick PVC. Solid, high impact, purified, color-thru, acid resistant, pre-lamination primed edging, machine-applied with hot melt adhesives, automatically trimmed, inside/outside length-radiused for uniform appearance, buffed and corner-radiused for consistent design.

- E. Edging Locations. Provide the above specified edging types at the following locations, of the following colors:
1. Door/Drawer front edge: 3mm radius extrusion PVC T-molding matching laminate in color, pattern, and finish.
  2. Cabinet body edge, including door/drawer front spacer rail: FlatEdge PVC, color matched to door/drawer face.
  3. Interior body component edging, interior dividers, top of drawer body, shelf: FlatEdge PVC to match cabinet interior surface color.
- F. Hardware:
1. Hinges:
    - a. Heavy duty, five knuckle 2-3/4 inch institutional type hinge shall meet ANSI/BHMA A156.9 Grade 1 requirements. Mill ground, hospital tip, tight pin feature with all edges eased. Hinge to be full wrap around type of tempered steel .095 inch thick. Each hinge to have minimum 9 screws, #7, 5/8 inch FHMS to assure positive door attachment.
    - b. One pair per door to 48 inch height. One and one-half pair over 48 inch in height. Hinge to accommodate 13/16 inch thick laminated door and allow 270 degree swing.
    - c. Finish to be LH-301 ChromeCoat Powder Finish, LH-302 Black, or LH-303 White epoxy coated.
  2. Pulls: Architect will select from the following options:
    - a. Wire design, LH-321 4 inch, in Chrome finish.
    - b. Wire design, LH-325 nylon, 4 inch, in White, StoneGrey, or Black.
    - c. Cast, projecting type, LH-319 4 inch, in Dull Chrome or Black.
  3. Sliding Door Hardware:
    - a. Framed 13/16 inch thick stile and rail sliding doors: LH-372 top mounted track with dual roller hangers. Vertical adjustment for accurate alignment.
  4. Drawer Slides:
    - a. Standard Drawers: Drawer Slide, LH-376, self-closing design, White epoxy powder coated with positive in-stop, out-stop, and out-keeper to maintain drawer in 80% open position. Captive nylon rollers, front and rear. Minimum 100 lb. dynamic load rating at 50,000 cycles. Minimum 150 lb. static load rating.
    - b. File Drawers: Full extension, 3-part progressive opening slide, minimum 100 lb., zinc plated or epoxy coated at manufacturer's option.
    - c. File Drawer Accessory: Knappe & Vogt No. 476 follower and track assembly, or Pendaflex rack, as Architect selected.

- d. Paper Storage Drawers: Full extension, 3-part progressive opening slide, minimum 100 lb., zinc plated or epoxy coated at manufacturer's option.
- 5. Adjustable Shelf Supports: To be LH-354 twin pin design with anti tip-up shelf restraints for both 3/4 inch and 1 inch shelves. Design to include keel to retard shelf slide-off, and slot for ability to mechanically attach shelf to clip. Load rating to be minimum 300 lbs. each support without failure, reference subparagraph 1.02, D. Cabinet interior sides shall be flush, without shelf system permanent projection.
- 6. Wardrobe Rod: To be 1-1/16 inch rod, LH-362, supported by LH-363 flanges.
- 7. Coat Hooks:
  - a. Single coat hooks, wall mount - LH-365 Satin Aluminum
  - b. Double coat hooks, wall mount - LH-366 Satin Aluminum
- 8. Molded Trays:
  - a. High impact Polyethylene with card holders. Color: White.
  - b. Sizes:       10-1/2" W x 3-1/2" H x 19"D  
                  14-1/2" W x 3-1/2" H x 19"D
  - c. Trays shall glide on molded, twin pin side rails, adjustable 1-1/4 inch on center. Color, White.
- 9. Molded Personal Pencil Drawer: Chemical resistant, high density polyethylene with in-stop and out-stop features. Compartmented drawer body and molded slides in StoneGrey. Provide where indicated on plans as "molded pencil drawer".
- 10. Locks: To be disc tumbler lock keyed alike and master keyed. Dull chrome finish.
  - a. Hinged doors and drawers, National Lock No. M4-7054
  - b. Sliding doors, 13/16 inch thick, National Lock No. M4-0057
  - c. 1/4 inch sliding glass doors, National Lock No. M2-0225
- 11. Catches: Catch to provide opening resistance in compliance with the Barrier-Free Subcode.
  - a. Provide one top-mounted magnetic catch for base, wall and tall cabinet door. Catch housing to be molded in White. LH-340ADA.

## **2.3 CONSTRUCTION**

### **A. Detailed Requirements for Cabinet Construction:**

- 1. Sub-Base:
  - a. Cabinet Sub-base: To be separate and continuous (no cabinet body sides-to-floor), water resistant exterior grade plywood with concealed fastening to cabinet bottom. Ladder-type construction of front, back and intermediates to form a

secure and level platform to which cabinets attach.

- b. Tubular steel 1-1/4 inch square base in brushed chrome, or black, furnished where specified.
2. Cabinet Top and Bottom:
    - a. Solid sub-top to be furnished for all base and tall cabinets.
    - b. Wall cabinet and library stack bottoms and tops to be 1 inch thick.
    - c. Exterior exposed wall cabinet bottoms to be Pressure Fused White laminate both sides. Assembly devices to be concealed on bottom side of wall cabinets.
  3. Cabinet Ends:
    - a. Holes drilled for adjustable shelves 1-1/4 inch on center.
    - b. Exposed exterior cabinet ends to be laminated with high pressure plastic laminate, balanced with high pressure cabinet liner interior surface.
  4. Fixed and Adjustable Shelves:
    - a. Thickness: Behind doors, to be 3/4 inch to 27 inches wide. One inch shelving at 30 inch wide cabinet and over.
    - b. Thickness at all widths of open cabinets to be 1 inch.
  5. Cabinet Backs:
    - a. Cabinet back to be fully housed into sides, top, and bottom, recessed 7/8 inch from cabinet rear. Rear, unexposed, side of back to receive continuous bead of hot melt adhesive at joint between back and sides/top/bottom.
    - b. Hang rails shall be glued to rear of cabinet back and mechanically fastened to cabinet sides. Provide minimum of 2 at base, 2 at wall, and 3 at tall cabinets.
    - c. Exposed exterior backs to be high pressure plastic laminate balanced with high pressure cabinet liner.
  6. Door and Drawer Fronts:
    - a. Laminated door and drawer fronts to be 13/16 inch thick for all hinged doors. Drawer fronts and hinged doors are to overlay the cabinet body. Maintain a maximum 1/8 inch reveal between pairs of doors, between door and drawer front, or between multiple drawer fronts within the cabinet.
    - b. Stile and Rail doors to be 13/16 inch thick with full 1/4 inch thick laminated safety glass. Available hinged. All exposed lite-opening edges to be trimmed and glazed with extruded vinyl glazing bead.
  7. Drawers:
    - a. Drawer fronts shall be applied to separate drawer body component sub-front.

- b. Drawer sides shall be dadoed and glued to receive front and back, machine squared and held under pressure while hot melt glued and pinned together.
  - c. Drawer bottom to be housed into front, sides, and back. Underside of drawer to receive continuous bead of hot melt adhesive at joint between bottom and back/sides/front for sealing and rigidity. Reinforce drawer bottoms with 1/2 inch x 4 inch front-to-back intermediate underbody stiffeners, hot melt glued and fastened. One at 24 inch, two at 36 inch, four at 48 inch.
  - d. Paper storage drawers fitted with full width hood at back.
  - e. All drawers shall have roller guides as specified in subparagraph 2.2, F.4.
8. Vertical and Horizontal Dividers: One of the following as indicated by cabinet number:
- a. Natural hardboard 1/4 inch thick, smooth both faces. Secured in cabinet with molded plastic clips.
  - b. Pressure Fused laminate 3/4 inch thickness. Secured in cabinet with molded plastic clips or dowels.
9. Door/Drawer Front Rail: Provide minimum 3/4 inch x 6 inch x full width cabinet body rails immediately behind all door/drawer and multiple drawer horizontal joints to maintain exact body dimensions, close off reveal, and be locator for lock strikes.
10. Barrier - Free Access Subcode Requirements:
- a. Countertop height: With or without cabinet below, not to exceed a height of 34 inches A.F.F., (Above Finished Floor), at a surface depth of 24 inches.
  - b. Kneespace clearance: To be minimum 27 inches A.F.F., and 30 inches clear span width.
  - c. Wardrobe cabinets: To be furnished with rod/shelf adjustable to 48 inches A.F.F. at a maximum 21 inch shelf depth.
  - d. Sink cabinet clearances: In addition to 10.a, b. above, upper kneespace frontal depth to be no less than 8 inches, and lower toe frontal depth to be no less than 11 inches, at a point 15 inches A.F.F., and as further described in Volume 56, Section 4.19.
- B. Tops (See Equipment Schedule):
- 1. High pressure plastic laminate bonded to particleboard core: Thickness as shown on plans. Underside to be properly balanced with heavy gauge backing sheet. Furnish countertops with edge treatment and design profile as shown on drawings. Provide tops in as long as practical continuous lengths. Provide field glued splines at joints. No joints closer than 24 inch either side of sink cutout.
- C. Service Fixtures:
- 1. Water, or other services: Triple chrome plated, have heavy-duty construction and are specifically designed for laboratory use.

- a. **Water Faucets - Hot and Cold:** Faucets are cast from red brass, and have four-arm type handles with color coded indexes. Faucets have serrated hose nozzles. Faucets have patented REX unit ceramic disc cartridges, and replaceable seats. The stem is brass, with full Acme threads, and has a brass cap nut. Goosenecks are rigid. Fixture outlets are tapped 3/8 inch I.P.S. for aerators, vacuum breakers, hose connections, and or other accessories. Provide vacuum breakers.
    - (1) Provide lever handle type faucet control for barrier free applications in accordance with sink notes indicated on drawings.
  - b. **Vacuum Breakers:** Watts NLF-9, or comparable, vacuum breakers are brass with polished chrome plating, screw-in type with stainless steel working parts, and durable rubber diaphragm and disc. Vacuum breaker is for hot or cold faucet and has a primary valve with a soft disc that seats against mating part. The secondary check valve utilizes a soft disc to metal seating. Breaker is tapped 3/8 inch N.P.T.
2. Sinks and Sink Outlets:
- a. Stainless steel sinks have a satin finish. They are 18 gauge, type 304, 18-8 stainless steel, with heavily undercoated bottoms and positive pitch drains. Outlets are chromeplated brass. Drain holes are 3-1/2 inch diameter for 4-1/2 inch stainless steel cup strainers. The cup strainer has a neoprene stopper. Provide necessary tail pieces to tie into plumbing roughing, typical.
- D. Other Equipment: As per casework schedules, refer to the drawings.
- E. Workmanship:
- 1. All exposed exterior cabinet surfaces to be .030 inch high pressure laminate, color as selected from casework manufacturer's standards, minimum 53 colors/wood grains available. Laminate surface/ balancing liner to core under controlled conditions, by approved and regulated laminating methods to assure a premium lamination. Natural-setting hybrid P.V.A. Type III water resistant adhesives that cure through chemical reaction, containing no health or environmentally hazardous ingredients, are required. Methods requiring heat are not allowed; "contact" methods of laminating are not allowed.
  - 2. Cabinet parts shall be accurately machined and bored for premium grade quality joinery construction utilizing automatic machinery to insure consistent sizing of modular components. End panels shall be doweled to receive bottom and top.
  - 3. Back panel shall be fully housed into, and recessed 7/8 inch from the back of cabinet sides, top, and bottom to insure rigidity and a fully closed cabinet. Cabinet back shall be shimmed from rear of body for tight interior fit.
  - 4. Drawer bottom shall be fully housed into and recessed 1/2 inch up from the bottom of sides, back and subfront. Sides of drawer shall be fully dadoed to receive drawer back, locked in fully to subfront, fastened with glue and mechanical fasteners.
  - 5. 3/4 inch thick hang rails shall be glued to backside and mechanically fastened to end panels of all wall, base, and tall cabinets for extra rigidity and to facilitate installation.

6. Rear of cabinet back and underside of drawer bottom joints to receive a continuous bead of hot melt adhesive to add to unit body strength and develop moisture and vermin seal.
7. All cases shall be square, plumb, and true.
8. Case body and drawer workmanship and quality of construction shall be further evidenced by Independent Testing Laboratory results as described in subparagraph 1.3, D above.
9. Provide removable back panels and closure panels for plumbing access where shown on drawings.

### **PART 3 - EXECUTION**

#### **3.1 COORDINATION**

- A. Coordinate work of this Section with related work of other Sections as necessary to obtain proper installation of all items.
- B. Verify site dimensions of cabinet locations in building prior to fabrication.

#### **3.2 INSTALLATION**

- A. Storage and Protection: Casework shall be protected in transit. Store under cover in a ventilated building not exposed to extreme temperature and humidity changes. Do not store or install casework in building until concrete, masonry, and drywall/plaster work is dry.
- B. Installers: Install casework under the supervision of the manufacturer's representative with factory-trained mechanics certified by manufacturer.
- C. Workmanship:
  1. Erect casework straight, level and plumb and securely anchor in place. Scribe and closely fit to adjacent work. Cut and fit work around pipes, ducts, etc.
  2. Install all items complete and adjust all moving parts to operate properly.
  3. Leave surface clean and free from defects at time of final acceptance.
- D. Guarantee: All materials shall be guaranteed for a period of **three (3) years** from manufacturer's defects and workmanship.
- E. Clean Up: Remove all cartons, debris, sawdust, scraps, etc., and leave spaces clean and all casework ready for Owner's use.

**END OF SECTION 11010**



## SECTION 11011 - CASEWORK AND EQUIPMENT

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK

- A. Section Includes: Wood Casework and related equipment.
1. Pre-manufactured wood casework and equipment, covered by this specification and accompanying drawings, are manufactured or supplied by one manufacturer to avoid divided responsibility.
- B. Work included in this section:
1. Furnish all items of equipment as listed in the specifications, equipment schedule and/or as shown on the drawings, including delivery to the building, unpacking, setting in place, leveling, and scribing to walls and floors as required.
  2. **Furnishing:** Equipment Subcontractor shall make cutouts, holes and openings in countertops so as to be ready for installation of fixtures by the Plumbing Work Contractor.
    - a. The Casework and Equipment Subcontractor(s) shall turn over to the Plumbing Contractor in a package, all sinks, fixtures, faucets, tailpieces, strainers, gas cocks, etc., and nipples and locknuts, etc., for installation and final connection by the Plumbing Contractor.
  3. The Casework and Equipment Subcontractor shall provide an itemized lists and a designated site location for the transfer of the above referenced materials to the Plumbing Contractor. The list shall have a description of the items and quantity along with a sign-off line for the Plumbing Contractor.
    - a. **A copy of the signed list is to be submitted to the Architect/Owner prior to billing for this equipment.**
  4. All debris, dirt and rubbish accumulated as a result of this installation shall be removed and the premises left clean and orderly.
  5. All contractors shall familiarize themselves with the job conditions and building measurements in order to coordinate the planning, design, connections, delivery and erection of the fixed casework and related equipment furnished under these specifications with other related and associated work during the term of this contract.
- C. Work included under the work of other contracts:
1. The **connection** of sinks, tailpieces, traps, service lines, drainlines, and piping within the equipment and through, under or along the backs of working surfaces as required by the specifications and/or as shown on the drawing shall be by the Plumbing and Drainage Work Contractor in accordance with Part-4 Specifications Sections.
  2. The furnishing of any framing or reinforcements for walls, floors, or ceilings to support any equipment, General Construction Work Contractor in accordance with Part-2 Specifications Sections.

## 1.2 QUALITY ASSURANCE

- A. Provide all casework (for integration with tops, sinks and service fixtures, as required) manufactured or furnished by the same company for single responsibility.
- B. Basis of Design: **"Campbell Rhea - Classic Oak Series", as manufactured by Institutional Casework, Inc., Paris Tennessee.**
- C. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
  - 1. Comparable products of the following manufacturers will be considered if it can be clearly shown that their products are equal to or will exceed the construction quality requirements and other design attributes listed above.
    - a. Wood-Metal Industries.
    - b. Diversified Woodcraft.
    - c. Leonard Peterson - Vanguard Line, Lipped.
    - d. Or approved equal.
  - 2. The use of one manufacturer's catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of other manufacturer's products or procedures which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.
  - 3. Substitute products will be considered for substitution only when submitted to the Architect as per the requirements of AIA A232 and Section 00800.
  - 4. Substituted product(s) shall be meet the following minimum requirements:
    - a. All four corners of drawer boxes must be dove-tailed together, and the bottom of all drawer boxes must be let in to the sides, front and back, to be "fully captured." Applied drawer bottoms will not be permitted.
    - b. All drawer front shall be fabricated from solid red oak lumber.
    - c. All cabinet doors shall be framed with solid oak rails on four sides. Tall case doors shall include a lightweight core to reduce stress on hinges. Doors constructed of plywood or particleboard, edge-banded with oak will not be permitted. Tall case doors shall be mounted with (4) hinges.
    - d. All tall case doors shall be complete with three-point latching mechanism. Single-point latching will not be permitted.
  - 5. The General Contractor will not award subcontract to a wood laboratory casework supplier who is not on the approved list, unless the Architect has approved that supplier's samples, certificates, individual product drawings, and proof of ability to perform.

### **1.3 SUBMITTALS**

- A. Submit two copies of manufacturer's data and installation instructions for each type of equipment.
- B. Samples:
  - 1. Submit samples of available laminated plastic patterns and colors for Architect's selection.
  - 2. Submit one full size sample of finished base cabinet unit complete with hardware, doors and drawers, without finish top.
  - 3. Submit one full size sample of finished wall mounted cabinet unit complete with hardware, doors and adjustable shelves.
  - 4. Acceptable sample units will be used for comparison inspections at project. Unless otherwise directed, acceptable sample units may be incorporated in the work. Notify Architect of their exact locations. If not incorporated in the work, retain acceptable sample units in the building until completion and acceptance of the work.
  - 5. Remove sample units from the premises when directed by the Architect.
- C. Shop Drawings
  - 1. Submit shop drawings showing plans, elevations, ends, cross-sections, service run spaces, locations and type of service fixtures with lines thereto. Show details and location of anchorages and fitting to floors, walls and base. Include layout of units with relation to surrounding walls, doors, windows, and other building components.
  - 2. Coordinate shop drawings with other work involved.
- D. **Test Reports - Certifications:**
  - 1. Submit the following:
    - a. Test reports certifying that the casework finish complies with chemical and other resistance requirements of the specifications.
    - b. Performance test reports from an independent testing lab on each specified top material.

### **1.4 PRODUCT HANDLING**

- A. Deliver casework only after wet operations in building are complete.
- B. Store completed wood furniture in ventilated place, protected from the weather, with relative humidity therein of 50% or less at 70°F.
- C. Protect sanded and finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective coating.

## 1.5 JOB CONDITIONS

- A. Advise Architect of requirements for maintaining heating, cooling and ventilation in installation areas as required to reach relative humidity necessary to maintain optimum moisture content.
- B. Examination of Substrate and Conditions
  - 1. Field measurements shall be taken to verify that the equipment will fit into the designated space. Entry ways, corridors and door openings shall be verified to ensure that the equipment be manufactured in a matter to permit it to be moved through properly into place.
  - 2. Examine the substrate and the conditions under which the work under this section is to be performed, and notify the Architect, in writing, of unsatisfactory conditions. Do not proceed with work under this section until satisfactory conditions have been corrected in an acceptable manner.

## 1.6 WARRANTY

- A. Manufacturer shall warrant the casework to be free from defects in materials and workmanship, under normal use and service, for **three (3) years** from date of delivery.
  - 1. Within the warranty period, manufacturer shall repair, replace, or refund the purchase price of defective casework.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. The best cabinet making practices for casework construction shall be followed. All cabinets shall be integral units, each completely enclosed without the use of common partitions unless otherwise specified.

### 2.2 MATERIALS

- A. Lumber:
  - 1. Oak lumber is red oak, grade FAS or better, air dried and kiln dried to a 6 percent moisture content, then tempered to 7-8 percent prior to fabrication. Red oak lumber exposed to view, is free of stains, splits, shakes, season checks and other similar defects.
  - 2. Other hardwoods are grade FAS or better, air dried to a 6 percent moisture content, then tempered to 7-8 percent prior to fabrication. Other hardwoods are used in semi-exposed, or unexposed, areas and comply with NHLA grading for FAS or better lumber.
- B. Plywood:
  - 1. Oak plywood is red oak, grade A-2, plain sliced, book-matched, crossbanded, and has a solid core.
    - a. 3/4 inch is a minimum of 7-ply.
    - b. 1/2 inch is a minimum of 5-ply.
    - c. 1/4 inch is a minimum of 3-ply.
    - d. 3/32 inch is a minimum of 3-ply.

2. Other hardwood plywoods are sound grade, have a solid core and are suitable for semi-exposed or unexposed areas.
  - a. 3/4 inch is a minimum of 7-ply.
  - b. 1/2 inch is a minimum of 5-ply.
  - c. 1/4 inch is a minimum of 3-ply.
  - d. 3/32 inch is a minimum of 3-ply.

C. Hardboard:

1. Hardboard is service tempered and consists of steam-exploded wood fibers, highly compressed into a hard, dense, 1/4 inch thick, homogeneous sheet, using natural resins and other added binders.
2. Physical properties:
  - a. Average modulus of rupture is 5,300 lbs./sq. inch
  - b. Density is 50 to 60 lbs./cu. foot
  - c. Tensile strength of 3,500 lbs./sq. inch.

D. Particleboard:

1. Particleboard is industrial grade.
2. Physical properties:
  - a. Density, 46 to 50 lbs./cu. ft.
  - b. Modulus of rupture, minimum, 2,200 psi
  - c. Modulus of elasticity, minimum, 450,000 psi.

E. Service Fixtures:

1. Water, gas, steam, or other services: Triple chrome plated, have heavy-duty construction and are specifically designed for laboratory use.
  - a. **Water Faucets - Hot and Cold:** Faucets are cast from red brass, and have four-arm type handles with color coded indexes. Faucets have serrated hose nozzles. Faucets have patented REX unit ceramic disc cartridges, and replaceable seats. The stem is brass, with full Acme threads, and has a brass cap nut. Goosenecks are rigid. Fixture outlets are tapped 3/8 inch I.P.S. for aerators, vacuum breakers, hose connections, and or other accessories. Provide vacuum breakers.  
  
**(1) Provide lever handle type faucet control for barrier free applications in accordance with sink notes indicated on drawings.**
  - b. **Vacuum Breakers:** Watts NLF-9, or comparable, vacuum breakers are brass with polished chrome plating, screw-in type with stainless steel working parts, and durable rubber diaphragm and disc. Vacuum breaker is for hot or cold faucet and has a primary valve with a soft disc that seats against mating part. The secondary check valve utilizes a soft disc to metal seating. Breaker is tapped 3/8 inch N.P.T.
2. Sinks and Sink Outlets:
  - a. **Stainless steel** sinks have a satin finish. They are 18 gauge, type 304, 18-8 stainless steel, with heavily undercoated bottoms and positive pitch drains. Outlets are

chrome plated brass. Drain holes are 3-1/2 inch diameter for 4-1/2 inch stainless steel cup strainers. The cup strainer has a neoprene stopper. Provide necessary tail pieces to tie into plumbing roughing, typical.

NOTE: Coordinate with Plumbing Drawings and Specifications.

F. Tops (See Equipment Schedule):

1. Rheatex: Top surface and edges are 0.050 inch thick, horizontal grade, **high pressure, plastic laminate** applied to a 46-50 lb. density particleboard core. Finished top is one inch thick, and the curb is four inches high unless specifically dimensioned higher on Equipment Plans. A phenolic backing sheet is applied to the bottom surface.
  - a. Colors: to be selected from manufacturer's available full range of colors.

G. Hardware and Accessories:

1. Pulls: Shall be selected by the Architect from manufacturer's available standard and custom units at no additional cost to the Owner.
2. Handles:
  - a. Latching handle LH-1 is die cast zinc alloy, 4-1/4 inches long, has a dull chrome plated finish. Handle operates with 1/4 turn. Double door cases have latching handles on the right door and dummy handles on the left door. The rods are 5/16 inch in diameter and move in nylon guides attached to the back of the door. The middle of the door is secured by a latch plate which engages the side of the case, or latches behind the left door on cases with double doors.
  - b. Locking handle LK-1 is a latching handle with a lock mechanism incorporated into the handle head. On double door cases, the left door has a dummy handle, and the right door has the locking handle. Lock is laboratory grade with a 5-disc tumbler mechanism and a dull chrome plated face. Tumblers and keys are brass, while the plug and cylinder are die cast zinc alloy. Locks are keyed differently, master keyed and furnished with 2 keys per lock.
3. Locks:
  - a. Lock SL-1 is a laboratory grade, cylinder cam lock, with a 5-disc tumbler mechanism, and a dull chrome plated face. Tumblers and keys are brass, while plug and cylinder are die cast zinc alloy. Lock operates with a 180 degree turn of the key. There are 500 key changes standard. Locks are keyed differently, master keyed and furnished with 2 keys per lock.
  - b. Locks are to be furnished on all doors and drawers.
4. Hinges:
  - a. Hinge CP-1 is heavy duty, institutional type, 5-knuckle hospital tipped, and made from .095 inch thick, chrome plated mild steel. Hinge is wrap around style, and 2-3/4 inches high. The wing for mounting to end panel has 4 holes, two of which are slotted for adjustability; wing for the door has 5 holes, two of which are slotted for adjustability.

- b. Elbow catch is a steel, spring loaded catch that releases with finger pressure. The catch and steel strike plate are mounted with screws. Strike plate screw holes are slotted for adjustability and pin hole is provided to help anchor its position.
5. Drawer Slides:
- a. Drawer slides DS-1 are electrostatically epoxy powder coated, cold rolled steel, heavy-duty, side mounted, and have a 150 lb. load capacity. They are equipped with heavy-duty, ball bearing nylon rollers for smooth effortless operation. Slides have automatic positive stop levers to prevent accidental drawer removal, but allow quick removal without tools.
  - b. File drawer slides FD-1 are zinc plated, cold rolled steel, heavy-duty, side mounted, and have a 100 lb. load capacity. They are equipped with heavy-duty, ball bearing nylon rollers. Slides are full extension with a positive stop, and a lift out disconnect.
6. Shelf Clips:
- a. **Shelf support clips shall be “seismic” twin pin type for mounting on interior of cabinet work. Clips shall be corrosion resistant and shall retain shelves from accidental removal. Shelves in all cabinets are adjustable on 32mm centers.**
    - 1) **Single pin support clips and surface mounted metal support strips and clips subject to corrosion are not acceptable.**

### 2.3 FABRICATION

- A. Factory assembly of casework in the largest components possible aids in the installation. Mortise and tenon construction with glued and screwed joints is used for maximum strength; and the use of precision jigs and clamps ensures square corners and plumb vertical surfaces.
- B. Fabrication of laboratory casework and equipment is completed to dimensions in the final, approved copy of shop drawings.
- C. Base Cabinets:
  - 1. All base cabinets are rigidly constructed, integral units with the strongest most advanced joinery methods utilized of bored, doweled, dadoed, glued and screwed construction. Each base cabinet is completely enclosed without the use of common partitions, and has flush construction with overlapping doors and drawers, which provides a dust resistant interior. A base cabinet has a full horizontal top frame with bored, doweled and glued joints, intermediate front rails and a 3/4 inch plywood bottom; rear horizontal parting rails and separators are provided as required. Horizontal top frame, intermediate parting rails and the bottom are bored, doweled and glued. Separators where indicated, are let into routed intermediate rails. Backs are recessed and encapsulated into dadoed end panels and further secured with glue blocks on each side, except where they need to be removable for access to plumbing. Backs are screwed to the top frame and further secured with glue blocks on each side. An enclosed toe space, 2-1/4 inches by 4 inches, is furnished with the toe rail bored, doweled and glued to end panels.

D. Wall and Upper Cases:

1. All wall and upper cases are rigidly constructed, integral units with the strongest most advanced joinery methods utilized of bored, doweled, dadoed, glued and screwed construction. Each case is completely enclosed without the use of common partitions, and has flush construction with overlapping doors, which provides a dust resistant interior. Top panel is bored, doweled and glued into end panels. Bottom panel is bored, doweled and glued into end panels; and glued and screwed to the back. Backs are recessed and encapsulated into dadoed end panels, and further secured with glue blocks on each side. Exterior hanger rails, at the top of the back, are glued to the back and then screwed to the top panel and bored, doweled and glued into end panels. Exterior hanger rails, at the bottom of the back, are glued to the back and then screwed to the bottom panel and bored, doweled and glued into end panels. Adjustable shelves are supported on **“seismic” twin pin type** shelf clips, which fit into holes drilled 32 mm on centers, in the case end panels.

E. Tall Cases:

1. All tall cases are rigidly constructed, integral units with the strongest most advanced joinery methods utilized of bored, doweled, dadoed, glued and screwed construction. Each case is completely enclosed without the use of common partitions, and has flush construction with overlapping doors, which provides a dust resistant interior. Top panel is bored, doweled and glued into end panels. Bottom panel is bored, doweled and glued into end panels and glued and screwed to the back. An exterior back cross rail is provided at the top of each case, glued to the back, and then screwed to the top panel and bored, doweled and glued into the end panels. Additional back cross rails are provided, as required. Backs are recessed, let into dadoed end panels, and further secured with glue blocks at the sides. An enclosed toe space, 2-1/4 inches by 4 inches high, is furnished with toe rail securely bored, doweled and glued to end panels and bottom panel.
2. Rails:
  - a. Interior: 2-1/4 inches by 3/4 inch, solid hardwood
  - b. Exterior: 4-1/8 inches by 3/4 inch, solid oak
3. Top panel, bottom panel, dividers, fixed shelf and adjustable shelves:
  - a. Cases with exposed interiors: All are 1 inch oak plywood
  - b. Cases with unexposed interiors: All are 1 inch hardwood plywood.
4. Backs:
  - a. Cases with exposed interiors and exposed exteriors: Back is 1/4 inch oak plywood.
  - b. Cases with unexposed interiors and unexposed exteriors: Back is 1/4 inch service tempered hardboard.
5. End panels:
  - a. Cases with exposed interiors: End panels are 3/4 inch oak plywood.
  - b. Cases with exposed exteriors: end panels are 3/4 inch oak plywood.
  - c. Cases with unexposed interiors and one exposed end panel and one unexposed end panel: Exposed end panel is 3/4 inch oak plywood; unexposed end panel is



- 3/4 inch hardwood plywood.
      - d. Cases with unexposed interiors and unexposed exteriors: end panels are 3/4 inch hardwood plywood.
    - 6. Exposed edges of end panels, dividers and shelves are edgebanded with 1/4 inch solid oak.
    - 7. Exterior back cross rails: 3 inches by 3/4 inch hardwood plywood.
  - F. Drawers:
    - 1. Components:
      - a. Drawer front: 13/16 inch oak lumber.
      - b. Drawer sides and back: 1/2 inch hardwood lumber.
      - c. Drawer bottom: 1/4 inch service tempered hardboard.
      - d. Construction: All four corners of the drawer are dovetailed and glued. Edges of the drawer front are machine radiused to form a lip and overlap the opening 1/4 inch on all sides. Drawer fronts are one piece of lumber, providing consistency in color and grain within each drawer front. The back perimeter of the drawer front is routed so drawer front is recessed into the opening and projects 13/32 of an inch. The top edge of drawer sides and back are radiused. The bottom is let into the box on four sides and securely glued underneath with a continuous bead of glue around the perimeter of the drawer bottom. In cabinets 24 inches or less in width, drawers have one, AL-1 aluminum pull which is surface mounted with 2 screws, 4 inches on centers. In cabinets over 24 inches wide, drawers have two AL-1 aluminum pulls. Drawers are supported on DS-1 slides which are side mounted, heavy duty, electrostatically epoxy powder coated, cold rolled steel, and have a 150 lb. load capacity. Slides are equipped with heavy-duty, ball bearing nylon rollers for smooth effortless operation. DS-1 slides have automatic, positive stop levers to prevent drawer's accidental removal, but allow for quick removal without tools. File drawers are supported on side mounted FD-1 full extension steel slides. File drawers have an interior, screw mounted, metal bottom track and an adjustable metal file follower. Lock SL-1 is furnished when indicated.
  - G. Doors:
    - 1. Hinged solid doors, 48 inches or less in height:
      - a. Core ply: Solid oak rails on four edges framing a particleboard core.
      - b. Hardwood plywood crossbands: Four; two laminated on each side of core ply.
      - c. Red oak veneer: Face plys; one applied to each side.
      - d. Construction: Hinged solid doors, 48 inches or less in height, are 13/16 inch thick and have solid oak rails on the four edges. Doors overlap the opening 1/4 inch on all sides and have machined radiused edges. Doors have one aluminum pull which is surface mounted with two screws. Doors have two, CP-1 chrome plated, heavy duty, institutional type, 5-knuckle hospital tipped hinges, each attached with 5

tempered steel screws into solid oak framing of door, and 4 Euro screws into the end panel. Doors are secured by zinc plated steel, friction roller catches, with positive action, spring cushioned, polyethylene roller, and a metal strike plate. Catch and steel strike plate are attached with screws. On lockable double door cabinets, the left door is secured with a steel, spring loaded, elbow catch that releases with finger pressure. The catch and the strike plate are attached with screws. Strike plate screw holes are slotted for adjustability and a pin hole is provided to help anchor plate's position. Lock SL-1 is furnished when indicated.

2. Hinged solid doors over 48 inches in height:
  - a. Core ply: Solid oak rails on four edges framing a particleboard core.
  - b. Hardwood plywood crossbands: Four; two laminated on each side of core ply.
  - c. Red oak veneer: Face plys; one applied to each side.
  - d. Construction: Hinged solid doors over 48 inches in height, are one inch thick and have solid oak rails on the four edges. Doors overlap opening 1/4 inch on all sides, and machined radiused edges. Single doors and right door of double doors have a LH-1 latching handle, which is 4-1/4 inches long, streamline design, with a dull chrome plated finish. Handle operates with 1/4 turn. Left door of double doors has a fixed handle, which is the same size and finish as a LH-1 latching handle. A three point latching system provides single doors and right door of double doors positive engagement at the top and bottom of the door with tapered aluminum rods which engage plastic strike plates and pull the door snug. The rods are 5/16 inch in diameter and move in nylon guides attached to the back of the door. The middle of the door is secured by a latch plate which engages the side of the case, or latches behind the left door on cases with double doors. Right door of double doors lap over the integral machined astragal on left door, securely holding door shut. Doors have three, CP-1 chrome plated, heavy duty, institutional type, 5-knuckle hospital tipped hinges; each attached with 5 tempered steel screws in to solid oak framing of the door, and 4 Euro screws into the end panel. Left door of double doors is additionally secured with two zinc plated steel, friction roller catches, with positive action, spring cushioned, polyethylene roller, and a metal strike plate. Catches and steel strike plates are attached with screws. Catch screw holes are slotted for adjustability, and the strike plate has two nips to help anchor its position. Locking handle LK-1 is furnished when indicated.

#### H. Casework Finishes:

1. Surfaces to be Finished: Exposed exterior and exposed interior surfaces of cabinets receive the full finishing process. The unexposed interior surfaces of cupboards, drawers, wall cases, upper cases, and tall cases receive a baked on protective coat of moisture and chemical resistant catalyzed sealer, and a top coat of clear, catalyzed conversion varnish. Other unexposed surfaces are processed through standard finishing steps, and receive a baked on protective coat of moisture and chemical resistant catalyzed sealer.
2. Finishing Process: Prior to assembly lumber for doors, drawers and cabinets, and plywood for cabinets, are machine sanded with 120 grit, 180 grit, and finally, 220 grit sand paper. Flat surfaces receive two additional machine sandings: one in an orbital crossbelt sander with 40 micron and 60 micron grit sanding belts; and, one through a rotary polisher with 150 grit sand paper. Door and drawer front edges are machine

sanded to a very smooth surface through a profile edge sander utilizing a 100 grit and a 150 grit paper. After assembly, drawers, doors, and casework are thoroughly examined and fine-finished by hand to provide a consistently smooth surface. Prior to the first application in the finishing process, items are placed in the dust-off booth where compressed air is used to remove loose fibers and dust. Selected surfaces are stained with NGR stain to the desired color and allowed to dry. Next a protective coat of moisture and chemical resistant, catalyzed sealer is applied. After flash drying, items are oven baked at 130°F. Following a cool down period, surfaces that receive the final top coat are carefully hand sanded and wiped clean. A top coat of clear, catalyzed, conversion varnish is applied, allowed to dry, and then oven baked at 130°F. The final top coat provides chemical resistance, toughness, durability, and excellent color stability with a smooth finish and high-gloss lustre.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Condition casework and furniture to average prevailing humidity conditions in installation areas prior to installing.

#### **3.2 INSTALLATION**

- A. Install plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where casework abuts other finished work, scribe and cut for accurate fit. Before making cutouts, drill pilot holes at corners. Install wall cabinets in accordance with details on drawings.
- B. Trim and Moldings: Install in single, unjointed lengths for openings and for runs less than maximum length of lumber available. For longer runs, use only one piece less than maximum length available in any straight run. Stagger joints in adjacent members.
- C. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

#### **3.3 CLEANING AND PROTECTION**

- A. Repair or remove and replace defective work as directed upon completion of installation.
- B. Protection: Perform all procedures and precautions for protection of materials and installed casework from damage by the work of other trades until acceptance of the work by the Owner. Advise HVAC Contractor of the required temperature/humidity conditions which must be maintained during the remainder of the construction period.
- C. Cover casework with 4-mil polyethylene film for protection against soiling and deterioration during remainder of construction period.
- D. Clean up cut out pieces, sawdust and debris, packing cases, etc. Leave areas in broom clean condition. Remove all debris as a result of work of this Contract.

**END OF SECTION 11011**

## **SECTION 15420 - RADON MITIGATION SYSTEM**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 DESCRIPTION OF WORK**

- A. Extent of radon mitigation system work is shown on the drawings.
  - 1. Under slab - on grade piping and fittings.
  - 2. Above ceilings piping and fittings.
- B. Provide inverts, instructions, supervision, and inspection to insure that work of other related work by other trades on the project, (executing earthwork, masonry chases, roof flashings, electrical work, etc.), will conform to the requirements for radon mitigation system work. Report any deficiencies to the Architect.
- C. Other Related Work by Other Trades:
  - 1. Refer to Section 02200 - Earthwork, for excavation, backfill and under slab aggregate covered under General Construction Work .
  - 2. Refer to Section 03300 - Cast in Place Concrete for concrete slab on grade and continuous vapor barrier covered under General Construction Work.
  - 3. Refer to Section 04200 - Unit Masonry for pipe chase covered under General Construction Work.
  - 4. Refer to Roofing System section for roof flashings covered under General Construction Work.
  - 5. Refer to Part 6 - Specification Sections for electrical boxes, wiring, etc., covered under Electrical Work.

#### **1.3 QUALITY ASSURANCE**

- A. Codes and Standards: Perform work in compliance with applicable requirements of governing authorities having jurisdiction.
  - 1. All work shall be in compliance with requirements of the N.J. UCC. Act, P.L. 1975, c. 217, as amended or supplemented and New Jersey Department of Environmental Protection.

#### **1.4 REFERENCES**

- A. ANSI/ASTM D2729 - Poly Vinyl Chloride (PVC) pipe and fittings.

#### **1.5 SUBMITTALS**

- A. Submit product data on materials proposed for use.

- B. Certification: Submit certification signed by Contractor that installed materials conform to specified requirements and system was successfully checked and tested prior to covering with fill.

## **PART 2 - PRODUCTS**

### **2.1 PIPE AND FITTINGS**

- A. Furnish under slab on grade vent pipe system complete with bends, adapters, couplings, T - pipe fittings and joint materials.
  - 1. Polyvinyl Chloride Pipe (PVC): ASTM D 2729.
- B. Furnish above ceilings vent piping system complete with fittings and joints material.
  - 1. Cast-iron pipe and fittings: ASTM A 888.
    - a. Provide hangers supports and clamps.
- C. Pipe Accessories:
  - 1. Fittings: Same material as pipe, molded or formed to suit pipe size and end design, if required, tees, bends, elbows, reducers, and other configurations required.
  - 2. Sealant, tapes, etc. for joints: Provide appropriate sealants, adhesives, tapes, connectors for approved connection of piping system. All materials shall be compatible and approved to satisfy installation requirements.

## **PART 3 - EXECUTION**

### **3.1 GENERAL REQUIREMENTS**

- A. Install piping systems and accessories in accordance with the best practices of the various trades and the requirements specified herein. Install specialty products in conformance with the manufacturer's recommendations and approved shop drawings.
- B. Comply with all applicable requirements of the "N.J. UCC. Act, P.L. 1975, c. 217, as amended or supplemented and New Jersey Department of Environmental Protection" and applicable requirements of governing authorities having jurisdiction.

### **3.2 EXCAVATING, TRENCHING, BACKFILLING, AND UNDER SLAB AGGREGATE**

- A. Coordinate work of this section with work specified in Section 02200.

### **3.3 PIPING**

- A. Test pipe for soundness and clean interior and joint surfaces before lowering the pipe into the trench.
- B. Lay pipe in straight lines and on uniform grades between points where changes in alignment or grade are shown.
- C. Bed the pipe barrel firmly and uniformly. Check the line and invert grade of each pipe from a top line carried on batter boards not over 25 feet apart.

- D. Fit the pipes to form close concentric joints.
- E. Keep a stopper in the pipe mouth when pipe laying is not in progress.
- F. Testing Lines: Test or check lines before backfilling to assure free flow. Remove obstructions, replace damaged components, and retest system until satisfactory.

### **3.4 PROTECTION**

- A. Protect incomplete open ends of pipe runs from infiltration of water and debris by installing a row of straw bales across the open mouth of the pipe. Alternate protection may be provided using filter fabric secured to open end of pipe.
- B. Remove all obstructions and correct all defects which are discovered.

### **3.5 FINAL INSPECTION**

- A. At the time of final inspection, the piping system covered by this section shall be completed in every aspect and in perfect operating conditions.
- B. All surplus materials of every character resulting from the work of this section shall have been removed. Any defects discovered in the work subsequent to this inspection shall have been corrected.
- C. Apply and pay for all required permits and arrange for inspections by all governing authorities having jurisdiction. Obtain approvals and certificates which to be submitted in accordance with Section 01700 - Project Closeout Document.

### **3.6 RECORD DRAWINGS**

- A. As the work progresses, record on one set of drawings all changes and deviations from the Contract Drawings in sizes, line and grade.
- B. Record the exact final location of lines by offset distances to surface improvements such buildings lines.
- C. Make sufficient measurements to locate definitely all lines. Reference underground bends, etc., by offset distances to establish bench marks.
- D. At completion of work, transfer accurately all such records to a set of record prints of the drawings as specified in Section 01700, and deliver to the Architect.

**END OF SECTION 15420**