U.S. Army Corps of Engineers, Kansas City District

CONTRACT NO. W912DQ-15-D-3017, TASK ORDER 0003

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SOUTH PLAINFIELD, NEW JERSEY

OPERABLE UNIT 4: BOUND BROOK
Remedial Design

Phase 3: Groundwater Hydraulic Containment

CONTRACT SPECIFICATIONS
VOLUME 1 OF 2
FINAL DESIGN

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DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

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Phase 3 - Groundwater Extraction and Treatment System Installation and Operation
Cornell-Dubilier Electronics Superfund Site, Operable Unit 4
29-Jan-18

CLIN	Bid Item	MEASUREMENT AND PAYMENT	Unit	Quantity	Total ($)
001	General Conditions	Payment for General Conditions will be made at the lump sum price bid shall be full compensation for the expense of said conditions. General Conditions shall include all of the items required under these Contract Documents but not covered under other bid items including, but not limited to: Contractor's programmatic costs for project management, quality assurance, and health and safety, insurance, bonds, fees, permits, required access agreements, and other similar expenses directly related to and required by these Contract Documents, project photographs and videotaping, preparation and submittal of all required planning documents, planning for and executing the health and safety program, documentation surveys, geophysical testing, environmental protection and spill control, pre-construction period planning, meetings, scheduling, submittals, reporting, and administration, and other requirements and related miscellaneous items specified under Special Clauses, General Requirements, and Civil.	L.S.	N/A	
002	Temporary Facilities and Controls	All labor, equipment, material, and incidentals required to install, maintain and operate the staging area and temporary facilities throughout the duration of the project. Costs shall include, but not be limited to, furnishing project trailers, flagpoles, temporary and permanent utility connections and services (power, telephone, internet, water and sanitary), portable toilets, sanitary facilities and potable water for workers, office supplies and equipment, temporary fencing, stormwater management, erosion control, cleaning services for the trailers, project signs, traffic control, work lights, site cleaning, all other temporary facilities, and site security.	L.S.	N/A	
003	Extraction Wells	All labor, equipment, material, and incidentals required to install four new Extraction Wells as specified with a total depth of up to 550 LF and convert one existing well to an Extraction Well. Costs shall include, but not be limited to, extraction well drilling and construction, well development, capacity pump test, extraction well pump, appurtenances, and handling and offsite disposal of soil cuttings and liquid waste for both the extraction and observation wells.	L.S.	N/A	
004	Observation Wells	All necessary labor, equipment, material, and incidentals required to install two new Observation Wells (with a total depth of up to 160 LF) and convert three Existing Monitoring Wells to Observation Wells. Costs shall include, but not be limited to, monitoring well drilling and construction, and well development. Management and disposal of soil cuttings and liquid waste are included under CLIN 003.	L.S.	N/A	
005	Transmission Piping, Control Line Conduits, and Gauging Station,	All necessary labor, equipment, material, and incidentals required to provide/install transmission piping and conduits for power and control lines from the five extraction wells, five observation wells, and one gauging station to the GETS facility service panel/piping manifold. Costs shall include, but not be limited to, removal of asphalt, excavation of up to 1500 LF of trench, trench stabilization, installation of up to 2,100 LF of transmission piping, installation of up to 4,200 LF of electric and instrumentation control line conduit, well head installation, trench backfill, gauging station construction, soil compaction and documentation. Includes excavation of trench from Hamilton Boulevard to the tie-in point in the trench serving Extraction Well EW-1; payment for installation of utilities in this portion of trench is addressed under CLIN 007.	L.S.	N/A	
006	Effluent Discharge Piping	All necessary labor, equipment, material, and incidentals required to provide/install the effluent discharge pipeline. Costs shall include, but not be limited to removal of asphalt, excavation, trench backfill and soil compaction, installing up to 115 LF of pipe from the GETS facility to the specified discharge location, construction of a concrete collar to stabilize the pipe in the spillway, removal and replacement of riprap within the spillway to facilitate piping/conduit installation, repairs to geotextiles and geomembranes within the limits of the spillway as necessary, valves, instruments, and appurtenances.	L.S.	N/A	

Section 00 00 01 Bid Schedule
Phase 3 - Groundwater Extraction and Treatment System Installation and Operation
Cornell-Dubilier Electronics Superfund Site, Operable Unit 4
29-Jan-18

CLIN	Bid Item	MEASUREMENT AND PAYMENT	Unit	Quantity	Total ($)
007	Utilities: Electrical, Fire and Potable Water Supply; Sanitary Sewer Connection and Telecommunications	All necessary labor, equipment, material, and incidentals required to install electrical service lines, water supply (potable and fire control) pipelines, sewer connection lines, and telecommunication service for the GETS facility; utilities shall be installed to the service panel or point of use in the GETS facility. Costs shall include, but not be limited to, 1,000 LF potable water supply line, 1,000 LF of fire protection supply line and hydrant, 200 LF sanitary sewer connection line, 1,000 LF of new buried power lines for GETS facility (including conduit), and 1,000 LF of line for new telecommunications service; coordination with utility companies for installation of service; reimbursement for all charges from utility companies for service installation.	L.S.	N/A	
008	Foundation Construction	All necessary labor, equipment, material, and incidentals required to remove asphalt and excavate soil within the footprint of the GETS facility plus five feet laterally, prepare subgrade, replace backfill, compact and moisture condition structural fill soils under and around the GETS building, provide/install vapor mitigation system, concrete slabs and knee walls, equipment pads, bollards, sump, and containment curbs. Costs shall include, but not be limited to, up to 700 cy of soil, up to 80 cy of crushed stone, up to 165 cy of concrete, field and laboratory testing, and surveying of final grades.	LS	NA	
009	Asphalt Cap Repair	All necessary labor, equipment, material, and incidentals required to reestablish the asphalt cap across the site. Costs shall include, but not be limited to, testing and final compaction of top layer of structural fill materials (installed under CLIN 005), placement and compaction of up to 185 cy crushed stone layer, placement of up to 24,000 sf of asphalt base and surface course; patching and repairs to asphalt cap damaged during construction. Includes, but not limited to, areas impacted by utility trenching (CLIN 005), discharge line trenching (CLIN 006), and foundation construction (CLIN 008).	L.S.	N/A	
010	Building Construction	All necessary labor, equipment, material, and incidentals required to provide/construct the GETS treatment building and associated components. Costs shall include, but not be limited to, 2000 sf pre-engineered metal building walls and roof, doors, restroom, conference room, and incidental equipment (i.e., fire extinguishers, cabinets, desk, chair, conference room table and chairs).	L.S.	N/A	
011	Process Equipment	All necessary labor, equipment, material, and incidentals required to purchase and install all process equipment, associated piping, and appurtenances. Costs shall include, but not be limited to, carbon vessels, air stripper system, tanks, pressure filters, associated local control panels, process piping, valves, sensors, gauges, and related appurtenances.	L.S.	N/A	
012	Mechanical and Plumbing Systems	All necessary labor, equipment, material, and incidentals required to purchase and install mechanical and plumbing systems. Costs shall include, but not be limited to, geothermal heating system, supplemental heating and cooling systems, ducting and venting systems, valving, metering, and sensoring, instrumentation and control systems, toilet and sinks, potable water lines and sanitary waste sewer lines within building, grey water system, floor drains, emergency eyewash and shower, hose bibs, valves, meters, control systems, and associated appurtenances.	L.S.	N/A	

Section 00 00 01 Bid Schedule
Phase 3 - Groundwater Extraction and Treatment System Installation and Operation
Cornell-Dubilier Electronics Superfund Site, Operable Unit 4
29-Jan-18

CLIN	Bid Item	MEASUREMENT AND PAYMENT	Unit	Quantity	Total ($)
013	Electrical Systems and Motor Controls	All necessary labor, equipment, material, and incidentals required to purchase and install electrical and motor control systems, power lines to the extraction wells, general wiring for interior and exterior lighting and receptacles, and all other electrical wiring within GETS building, motor controls, telecommunication system wiring and panel, low voltage system, electrical panels, site security system, fire alarm system, lightning protection system, vehicle door controls and associated appurtenances; backup generator and connection system, and all other alarms, meters, control systems.	L.S.	N/A	
014	Instrumentation and Controls Systems	All necessary labor, equipment, material, and incidentals required to purchase and install instrumentation and process control systems. Costs shall include, but not be limited to, instrumentation lines to the extraction and observation wells and gauging station, instrumentation lines within GETS facility (from the service panel to the instrumentation controls), instrumentation and control system, control panels, VFD and PLC control systems and operator interface, remote dialer system (SCADA), software and hardware for operator remote access; and associated appurtenances.	L.S.	N/A	
015	Treatment System Startup	All necessary labor, equipment, material, and incidentals required to provide equipment testing and facility startup in accordance with Section 01 91 14, Equipment Testing and Facility Startup. Costs shall include, but not be limited to, functional and performance testing to test system operations, and performance of necessary analytical sampling and analyses to demonstrate effectiveness of treatment system during startup phase before commencing the 1st year operation period.	L.S.	N/A	
016	Demobilization	All necessary labor, equipment, material, and incidentals required to for site restoration, including, but not limited to, moving out all personnel, equipment, trailers and temporary utilities, cleaning the site, removing all debris and rubbish associated with Contractor activities, construction project close out, record drawings, and other reporting required in Contract Documents.	L.S.	N/A	
017	First Year of Operations	All necessary labor, equipment, material, and incidentals required to provide one year of continuous operation and maintenance of the groundwater treatment system in accordance with Section 01 92 00 First Year Operation and Maintenance Service. Costs shall include, but not be limited to, staffing including site operators and administrative, project management, quality assurance health and safety support including all direct and customary indirect charges, all consumable supplies and equipment (not specified elsewhere), PPE and other required health and safety program equipment, regular building and grounds maintenance, general debris disposal, payment of all utility bills and fees, and provide snow removal for one winter season.	L.S.	N/A	
018	End of Contract Transition	All necessary labor, equipment, material, and incidentals required to plan for, train and transfer operation of the GETS facility to the Relieving Operator over a 1-month transition period. This shall occur during the final month of the 1st year of operation (CLIN 017).	L.S.	N/A	
019	Vapor Phase Carbon Change Out	All necessary labor, equipment, material, and incidentals required to perform one vapor phase carbon change out. Costs shall include, but not be limited to, removal of up to 2,000 pounds of carbon from one cannister, PPE and monitoring as required by accepted Health and Safety Plan, handling and disposal of spent carbon, profiling of carbon, inspection of vessels, plumbing modifications, and replacement with up to 2,000 pounds new carbon.	L.S.	N/A	

Section 00 00 01 Bid Schedule
Phase 3 - Groundwater Extraction and Treatment System Installation and Operation
Cornell-Dubilier Electronics Superfund Site, Operable Unit 4
29-Jan-18

CLIN	Bid Item	MEASUREMENT AND PAYMENT	Unit	Quantity	Total ($)
020	Liquid Phase Carbon Change Out	All necessary labor, equipment, material, and incidentals required to perform one liquid phase carbon change out. Costs shall include, but not be limited to, removal of up to 2,000 pounds of carbon from one cannister, PPE and monitoring as required by accepted Health and Safety Plan, handling and disposal of spent carbon, profiling of carbon, inspection of vessels, plumbing modifications, and replacement with up to 2,000 pounds new carbon.	L.S.	N/A	
021	Air Discharge Compliance Sampling	All necessary labor, equipment, material, and incidentals required to perform weekly sampling of vapor phase carbon effluent to demonstrate compliance with NJDEP air emission standards during 1st year of operation. Costs shall include, but not be limited to, sample collection, PPE and monitoring as required by accepted Health and Safety Plan, packaging, shipping, analytical laboratory cost, data reporting, and QA/QC of all data.	L.S.	N/A	
022	Effluent Discharge Compliance Sampling	All necessary labor, equipment, material, and incidentals required to perform monthly sampling of liquid phase carbon effluent to demonstrate compliance with NJDEP discharge standard during 1st year of operation. Costs shall include, but not be limited to, sample collection, PPE and monitoring as required by accepted Health and Safety Plan, packaging, shipping, analytical laboratory cost, data reporting, and QA/QC of all data.	L.S.	N/A	
023	Performance Sampling and Reporting	All necessary labor, equipment, material, and incidentals required to perform weekly performance sampling as described in Section 01 92 00, First Year Operation and Maintenance Service. Costs shall include, but not be limited to, sample collection, PPE and monitoring as required by accepted Health and Safety Plan, packaging, shipping, analytical laboratory cost, data reporting, and QA/QC of all data.	L.S.	N/A	
		Subtotal			**$0.00**
		Optional Items			
024	Additional Extraction Wells	All necessary labor, equipment, material, and incidentals required to provide one additional Extraction Well as specified beyond the four required in CLIN 003, constructed as specified in a location determined by the Contracting Officer. Measurement for this pay item will be the number of additional wells installed. Costs shall include, but not be limited to, permitting, extraction well drilling and construction (assumed well depth 200 feet), well development and capacity pumping test, handling and offsite disposal of soil cuttings and water, wellhead construction, extraction well pump, transmission piping, power and instrumentation lines, utility tie-ins as necessary, trenching and backfill, repair of asphalt cap, modifications to instrumentation systems, and appurtenances. Item is in event yield from drilled wells is not sufficient to achieve hydraulic control.	Each	1	
025	Additional Drilling Depth over 770 feet	All necessary labor, equipment, material, and incidentals required to provide additional drilling effort beyond the combined depth of 770 feet required in CLIN 003 and CLIN 004, as necessary to address site conditions at the currently proposed well locations. Up to 10 feet of drilling at each well location will be considered incidental. Measurement for this pay item will be the total depth of drilling minus 770 feet. This CLIN does not include the costs associated with the drilling for a new well at a separate location which are included under CLIN 024. Costs shall include, but not be limited to, extraction well drilling and construction and IDW handling and offsite disposal of additional soil cuttings and water. Item is in event site conditions require drilling additional depth to support proposed pumping conditions.	LF	50	

Section 00 00 01 Bid Schedule
Phase 3 - Groundwater Extraction and Treatment System Installation and Operation
Cornell-Dubilier Electronics Superfund Site, Operable Unit 4
29-Jan-18

CLIN	Bid Item	MEASUREMENT AND PAYMENT	Unit	Quantity	Total ($)
026	Off-site Disposal of Excess PCB-Contaminated Soil and Debris	All necessary labor, equipment, material, and incidentals required to dispose of excess contaminated soil generated during construction as specified. Measurement for this unit price item will be the number of tons of hazardous soil removed, transported, and disposed of offsite at a TSCA/Subtitle C permitted landfill. Payment for offsite disposal of hazardous soil will be made at the unit price bid, for which price and payment will be full compensation for all labor, equipment, material and incidentals required for the characterization, transportation and disposal of excess contaminated soil offsite at a TSCA/Subtitle C landfill in accordance with Section 02 81 00 Handling, Transportation and Disposal of Waste Materials.	Tons	100	
027	Off-site Disposal of Excess Non Hazardous Soil and Debris	All necessary labor, equipment, material, and incidentals required to dispose of non hazardous soil and debris generated during construction as specified. Measurement for this unit price item will be the number of tons of non hazardous soil and debris transported, and disposed of offsite at a Subtitle D permitted landfill. Payment for offsite disposal of hazardous soil will be made at the unit price bid, for which price and payment will be full compensation for all labor, equipment, material and incidentals required for the characterization, transportation and disposal of excess contaminated soil offsite at a Subtitle D landfill in accordance with Section 02 81 00 Handling, Transportation and Disposal of Waste Materials.	Tons	100	
028	Bedrock, Boulders, or Building Foundation Excavation	All necessary labor, equipment, material, and incidentals required to excavate bedrock or boulders, or former building foundations, as specified and encountered. Measurement for this unit price item will be the number of cubic yards of bedrock, boulder, and former concrete foundation excavation. Only bedrock, boulders, or former concrete foundation of more than 1 cubic yard in volume when encountered in excavation will be measured for payment. Payment for disposal of materials excavated under this CLIN shall be under CLIN O-002.	CY	50	
029	Additional Vapor Phase Carbon Change Out	All necessary labor, equipment, material, and incidentals required to perform one additional vapor phase carbon change out beyond that required under CLIN 019. Costs shall include, but not be limited to, removal of up to 2,000 pounds of carbon from one cannister, PPE and monitoring as required by accepted Health and Safety Plan, handling and disposal of spent carbon, profiling of carbon, inspection of vessels, plumbing modifications, and replacement with up to 2,000 pounds of new carbon.	Each	1	
030	Additional Liquid Phase Carbon Change Out	All necessary labor, equipment, material, and incidentals required to perform one additional liquid phase carbon change out beyond that required under CLIN 020. Costs shall include, but not be limited to, removal of up to 2,000 pounds of carbon from one cannister, PPE and monitoring as required by accepted Health and Safety Plan, handling and disposal of spent carbon, profiling of carbon, inspection of vessels, plumbing modifications, and replacement with up to 2,000 pounds of new carbon.	Each	1	
		Subtotal			**$0.00**
		Grand Total			**$0.00**

DOCUMENT 00 01 15

LIST OF DRAWINGS
02/11

PART 1 GENERAL

1.01 SUMMARY

This section lists the drawings for the project pursuant to contract clause "DFARS 252.236-7001, Contract Drawings, Maps and Specifications."

1.02 CONTRACT DRAWINGS

Contract drawings are as follows:

DRAWING NO.	REVISION NO.	TITLE
G-001	-	Index of Drawings, Permits, and Abbreviations
G-002	-	Legend and General Notes
C-001	-	Existing Site Conditions Plan
C-002	-	Site Layout
C-003	-	GETS Building Area Plan
C-004	-	GETS Building General Layout Plan
C-005	-	Site and GETS Building Civil Details
C-006	-	Site and GETS Building Civil Details

DRAWING NO.	REVISION NO.	TITLE
C-007	-	Site and GETS Building Civil Details
C-008	-	Site and GETS Building Civil Details
C-009	-	Site and GETS Building Civil Details
C-010	-	Sub-Slab Vapor Mitigation System Plan
C-011	-	Sub-Slab Vapor Mitigation System Details
C-012	-	Soil Erosion & Sediment Control Plan
C-013	-	Soil Erosion & Sediment Control Plan Details and Notes
C-014	-	Stormwater Management Plan
A-001	-	General Notes, Abbreviations
A-002	-	Life Safety Plan and Code Information
A-101	-	First Floor Plan
A-102	-	First Floor Reflected Ceiling Plan
A-103	-	Roof Plan
A-201	-	Building Elevations
A-301	-	Building Sections & Details

DRAWING NO.	REVISION NO.	TITLE
A-401	-	Enlarged Plans & Interior Elevations
A-601	-	Schedules and Details
S-001	-	Structural General Notes
S-002	-	Structural General Notes
S-003	-	Foundation Plan
S-004	-	Typical Sections & Details
S-005	-	Typical Sections & Details
M-001	-	Mechanical Symbols and Abbreviations
M-101	-	Mechanical Ductwork Plan
M-102	-	Mechanical Hydronic Plan
M-501	-	Mechanical Details
M-601	-	Mechanical Schedules
M-701	-	Mechanical Controls
M-702	-	Mechanical Controls
M-703	-	Mechanical Controls

DRAWING NO.	REVISION NO.	TITLE
P-001	-	Plumbing Symbols and Abbreviations
P-101	-	Plumbing D-W-V Plan
P-102	-	Plumbing Domestic Water Plan
P-601	-	Plumbing Schedules
E-001	-	Electrical Symbols and Abbreviations
E-002	-	Overall Electrical Site Plan
E-003	-	Detailed Electrical Site Plan
E-004	-	GETS Building Lighting Data Plan
E-005	-	GETS Building Power & Data Plan
E-006	-	GETS Building Fire Alarm & Security Plan
E-007	-	GETS Building Control Plan & Diagram
E-008	-	GETS Building Lightning Protection Plan
E-009	-	Load Calculations and Overcurrent Protection
E-010	-	GETS Electrical One-Line Diagram and Wiring Schedule
E-011	-	GETS Building Fire Alarm & Security Diagrams

DRAWING NO.	REVISION NO.	TITLE
E-012	-	GETS Building Process Control Wiring Diagram
E-013	-	GETS Building Panelboard Schedules
E-014	-	Electrical Details
E-015	-	Electrical Details
E-016	-	Electrical Details
E-017	-	Electrical Details
I-001	-	GETS Process Flow & Instrumentation Diagram (PF&ID)
I-002	-	GETS Building Piping Layout Plan

-- End of Document --

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 11 00

SUMMARY OF WORK
08/15

PART 1 GENERAL

1.01 REFERENCES

LOUIS BERGER (LBG)

LBG 2012	(2012) Final Remedial Investigation Report Operable Unit 3: Groundwater. Cornell-Dubilier Electronics Superfund Site, South Plainfield, NJ.
LBG 2014a	(2014) Final Remedial Investigation Report Operable Unit 4: Bound Brook. Cornell-Dubilier Electronics Superfund Site, South Plainfield, NJ.
LBG 2014b	(2014) Final Feasibility Study Report Operable Unit 4: Bound Brook. Cornell-Dubilier Electronics Superfund Site, South Plainfield, NJ.
LBG 2017a	(2017) Final Pre-Design Investigation Report for Phase 3: Groundwater Hydraulic Containment. Operable Unit 4: Bound Brook. Cornell-Dubilier Electronics Superfund Site, South Plainfield, NJ.
LBG 2017b	(2017) Final Pre-Design Investigation Report for Phase 2: Water Line Replacement. Operable Unit 4: Bound Brook. Cornell-Dubilier Electronics Superfund Site, South Plainfield, NJ.

1.02 PROJECT BACKGROUND

A. Site History

1. The Spicer Manufacturing Company operated a manufacturing plant on the property now known as the former Cornell-Dubilier Electronics (CDE) facility from 1912 to 1929 manufacturing universal joints, drive shafts, clutches, and other parts for the automative industry.

2. From 1936 to 1962, CDE manufactured electronic components including polychlorinated biphenyl (PCB)-containing capacitors at the Site. During operations, CDE released/buried material contaminated with PCBs and volatile organic compounds (VOCs), primarily TCE, contaminating soil, sediment, and groundwater.

3. After CDE departed the property in 1962, the site was operated as a rental property, most recently known as the Hamilton Industrial Park, with numerous buildings and various

commercial and light industrial tenants.

4. A series of site investigations were conducted by USEPA starting in the late 1990s. VOCs and PCBs were detected in the soil, groundwater, building interiors, and on nearby properties, as well as in surface water and sediments of Bound Brook. The Site was included on the National Priorities List in July 1998.

5. To manage remediation, USEPA divided the site into four operable units (OUs):

   a. OU1 addressed residential, commercial, and municipal properties in the vicinity of the former CDE facility. In September 2003, USEPA signed a ROD for OU1. Remediation has been completed.

   b. OU2 addressed contaminated soils and building at the Site. In September 2004, USEPA signed a ROD for OU2. Remediation has been completed.

   c. OU3 addressed contaminated groundwater. In September 2013, USEPA signed a ROD for OU3. During the FS, it was found to be technically impracticable to remediate a groundwater plume located in bedrock and a waiver of ARARs was issued. Monitoring of groundwater is ongoing.

   d. OU4 addressed contaminated sediment and soils in Bound Brook, Green Brook, and several tributaries to Bound Brook; associated floodplain areas; buried capacitor debris near the former CDE facility; contaminated groundwater discharges to Bound Brook; and replacement of a water line crossing the former CDE facility property. In May 2015, USEPA signed a ROD for OU4. This work is being performed under the OU4 ROD.

6. The OU4 ROD was divided into four phases of work:

   a. Phase 1 - Capacitor Debris Area Excavation
   b. Phase 2 - Water Line Replacement
   c. Phase 3 - Groundwater Hydraulic Containment
   d. Phase 4 - Bound Brook Sediments and Floodplain

   This Work addresses Phase 3 of the OU4 ROD.

7. During soil remediation activities performed under OU2, soils containing PCBs were left on site under an asphalt cap. The concentration of PCBs in the soil varies from non-detect to less than 499 mg/kg. The contaminants that have been detected in the soil and groundwater at the site include metals, volatile organic compounds, semi-volatile organic compounds, pesticides, PCBs, and dioxins.

8. An extensive description of the site history, geology, hydrogeology, location, setting, and previous investigations is summarized in the Final OU4 Remedial Investigation Report (LBG 2014a) and Final OU4 Feasibility Study Report(LBG 2014b). Further discussion can also be found in the final Pre-Design Investigation Reports for Phase 2 and Phase 3 (LBG 2017a and

LBG 2017b).

B. Site Description

1. The former CDE facility is located at 333 Hamilton Boulevard, South Plainfield, Middlesex County, New Jersey. The Site is bounded on the northeast by Bound Brook and railroad tracks; on the northwest by Hamilton Boulevard; on the southeast by Bound Brook and residential and Borough properties along Spicer Avenue; and on the southwest by Spicer Avenue.

2. The Site is a 26-acre fenced lot. There are no buildings currently present on site. A former water tower remains on the property; the water tower is currently in use as a cell phone tower. The remedial action activities will primarily take place within the former CDE facility property boundaries, with the exception of a gauging station, which will extend into Bound Brook adjacent to the former CDE facility.

3. All areas of the former CDE property involved in this remedial action are characterized as flat to gently sloped.

4. Most of the project site is currently paved with approximately 6 inches of asphalt as per the OU2 remedial action. A portion of the soil under the asphalt cap had been thermally treated to 10 ppm total PCBs or less, and backfilled on the former CDE facility; however, soil that was not treated may contain PCB concentrations up to 499 ppm as the OU2 remedial action required removal and treatment of soil with PCB concentrations of 500 ppm or greater.

5. There is an approximately 1.7 acre storm water detention basin on the property and a number of storm water collection catch basins and drain lines that serve to collect surface water from the asphalt cap and divert it to the storm water detention basin prior to discharge to Bound Brook. These systems will remain in place at the site.

C. Site Geology and Hydrogeology

1. The site is located within the Newark Basin, a tectonic rift basin extending from southern New York through New Jersey and southeastern Pennsylvania. Below the overburden is the Passaic Formation, part of an ancient basin of Triassic-Jurassic sedimentary and igneous rocks found across the region. Results of tests conducted during the OU3 RI (LBG 2012) indicate sedimentary rock (e.g., mudstone, siltstone and shale) typical of the Upper Passaic Formation, with numerous fracture zones present in bedrock from its surface to approximately 600 ft below ground surface (bgs), the maximum drilled depth.

2. Hydraulic influences, including several high capacity water supply wellfields, led to an extensive, area-wide VOC groundwater plume and allowed for a wide distribution of contamination in the bedrock pore spaces. Data indicate a complex groundwater flow regime in highly fractured bedrock, with high levels of VOCs, primarily TCE and

cis-1,2-dichloroethylene (cis-1,2-DCE), and other compounds trapped in the pore space of the Passaic Formation. The extent of groundwater contamination extends well beyond the boundaries of the former CDE facility property. The OU3 ROD technical impracticability (TI) waiver for remediation of the plume identified the potential for contaminated groundwater discharge to surface water in Bound Brook at levels that would pose an unacceptable hazard to ecological receptors requiring further assessment.

3. The Final OU4 RI confirmed the discharge of contaminated groundwater into Bound Brook in areas adjacent to the former CDE facility. While the sediment beds in Bound Brook currently possess a large contaminant inventory, the PCB load in groundwater discharging to Bound Brook near the former CDE facility is a potential source of recontamination of future remediated sediments.

D. Project Objectives

1. The remedial action objective (RAO) for this Work as outlined in the Record of Decision is as follows: "Prevent migration of contaminated groundwater above acceptable surface water quality standards to the surface water and sediments" of Bound Brook.

2. The RAO will be achieved through implementation of the remedial actions presented in these documents, which include:

a. Extraction of groundwater from portions of the contaminantplume within the former CDE facility boundaries.

b. Treatment of extracted groundwater using filtration, air stripping, and GAC adsorption.

c. Discharge of treated groundwater to Bound Brook in accordance with state and local requirements.

d. Long-term monitoring of head conditions in the groundwater and Bound Brook to assess compliance.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Description

The completed Work will provide the Government with a groundwater extraction and treatment system (GETS) for CDE OU4 Phase 3. The major project components include:

1. Mobilization.

2. Preparation of planning documents and other submittals for the performance of the Work.

3. Acquisition of all applicable permit and permit equivalencies.

4. Establishment of temporary facilities and temporary controls including work zones (Exclusion Zone, Contaminant Reduction

Zone, and Support Zone), and personnel and equipment decontamination facilities.

5. Provision of site security and access controls features.

6. Installation of groundwater extraction wells and controls.

7. Installation of observation wells.

8. Evaluation of well performance.

9. On-site temporary storage, treatment, and discharge and/or disposal of investigation derived waste generated during the well development and pumping tests, including extracted groundwater.

10. Installation of a surface water gauging station in Bound Brook.

11. Installation of a utility corridor to the treatment building location, with utility hookups for sewer, potable water, power, and telecommunications, including relocation of existing utilities, as necessary.

12. Installation of transmission pipelines from extraction wells to the treatment building.

13. Construction of a treatment building including vapor mitigation system.

14. Restoration of the OU2 cap disturbed by site construction along with other site restoration activities.

15. Provision and installation of all groundwater treatment system components.

16. Provision and installation of all process, instrumentation and control, and electrical and mechanical elements to construct and operate the treatment system.

17. Provision of treatment system startup and testing services.

18. Provision of 1-year of treatment system operation and maintenance.

19. Demobilization and project closeout.

20. Specific tasks not mentioned or not completely described that are necessary to perform tasks described as "Work" shall also be considered part of the work.

B. Access

1. Primary access to the Site will be from the Hamilton Boulevard entrance.

2. Make all necessary arrangements with the local authorities with jurisdiction for the movement of Contractor materials and equipment to and from the Site over public roadways.

3. Contractor will be responsible for coordinating any necessary access to areas adjacent to the work area.

4. Before the Work is started, arrange with the Contracting Officer a sequence of procedures, means of access, space for storage of materials and equipment, and use of property. All Work including equipment staging and temporary facilities shall be conducted within the Limits of Construction shown on the Contract Drawings.

1.04 EXISTING WORK

In addition to "FAR 52.236-9, Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements", the Contractor shall:

1. Remove or alter existing Work in such a manner as to prevent injury or damage to any portions of the existing Work which remain.

2. Repair or replace portions of existing Work which have been altered during construction operations to match existing or adjoining Work, as approved by the Contracting Officer. At the completion of operations, existing Work must be in a condition equal to or better than that which existed before new Work started.

3. Protect all existing monitoring wells, survey benchmarks, fencing or other facilities, including Water Tower, currently located on the property on the Site. Contractor will be responsible for repairing or replacing any existing equipment damaged during construction at no additional cost to the Government.

1.05 WORK BY GOVERNMENT

1. Government to provide access agreements or easements with property owners associated with areas of construction work and lay down areas.

2. Government will provide certain permit equivalencies as noted in Paragraph 1.09 of this specification.

1.06 SEQUENCE OF WORK

A. Work Stages

Work will be divided into the following stages:

1. Stage 1 - Installation of extraction wells and performance of pumping tests to confirm groundwater removal/drawdown efficiency; installation of observation wells.
2. Stage 2 - Establishment of work zones and decontamination facilities and temporary facilities and controls; removal of asphalt cap within areas of work.
3. Stage 3 - Excavation of potentially contaminated soils; this phase covers all work dealing with potentially contaminated soils including trenching and installation of transmission pipelines, wellheads and controls; excavation and foundation preparation; installation of

vapor mitigation system; construction of concrete slab for treatment building; and installation of effluent discharge line and gauging station.
4. Stage 4 - Restoration of asphalt cap.
5. Stage 5 - Construction of remainder of GETS facility and appurtenances.
6. Stage 6 - Site restoration.
7. Stage 7 - Startup, testing, and first year of operations and maintenance.

B. Management of Contaminated Soils

As noted previously, contaminated soils are present at the site and are likely to be encountered during invasive activities at the site such as excavation. In handling all soils at the site, the following shall apply:

1. All excess soils (e.g., soils excavated but not reused as backfill) shall be disposed off-site in accordance with all applicable state and federal regulations.
2. Work zones shall be established and maintained until cap is restored. Exposed soils shall be stabilized and covered when not involved in active construction. Sequence work to minimize amount of uncovered soil at any time.
3. Dust controls and soil erosion controls will apply.
4. Sweep the site regularly to control trackout. Following the restoration of the asphalt cap and the completion of work involving soils and/or waste, clean and sweep site.
5. All water (including storm water) that contacts exposed soil shall be considered Contact Water and shall be segregated for separate treatment and disposal to the MCUA sewer or Bound Brook in accordance with MCUA, NJDEP, and all other state and local regulatory requirements.

1.07 WORK HOURS

A. Work can be performed onsite Monday through Friday. Construction activities will be limited to 7 a.m. to 7 p.m. for any heavy machinery or outside noises in accordance with Borough of South Plainfield ordinances. Mobilization activities may take place starting at 6:30 a.m. Alternative work hours must be communicated and approved by the Contracting Officer and Borough of South Plainfield.

B. Coordinate deliveries such that trucks enter and leave site between hours of 9 a.m. and 2 p.m. to mitigate impact to nearby schools. Establish routes into and out of Site that does not include travel within school zones.

1.08 UTILITIES

A. Location of Underground Utilities

Prior to the start of any invasive work activities, the entire area to be disturbed shall be checked for buried obstructions including but not limited to pipelines, former building foundations, buried utilities, grounding grids, or other items. This evaluation shall include review of historical documents on

the Site, communications with local utility operators, visual clues and other procedures that would indicate obstructions. Identify and mark all utilities not managed and located by the local utility companies. Locations of such objects drawn on the Contract Drawings shall be considered approximate and are provided for informational purposes only.

Scan the areas to be disturbed extending a minimum of 10 feet beyond limits of construction, with Ground Penetrating Radar (GPR), electromagnetic, or sonic equipment, and mark the surface of the ground or paved surface where existing underground obstructions are discovered.

Verify the elevations of existing piping, utilities, and any type of underground or encased obstruction not indicated or specified to be removed, that is indicated or discovered during scanning, in locations to be traversed by piping or buried utilities and other work to be conducted or installed. Verify elevations before installing new Work closer than nearest manhole or other structure at which an adjustment in grade can be made.

B. Notification Prior to Excavation

Notify the Contracting Officer at least 48 hours prior to starting excavation work.

C. Other Utilities

1. Contractor shall coordinate with Public Service Electric and Gas Company (PSE&G) to provide 3-phase 4.16 or 13.2 KV service to the treatment facility.

2. Contractor shall be responsible for the installation of two permanent, potable water lines connected to the New Jersey American Water Company (NJAW) service main on Hamilton Blvd. One line shall be sized to serve a fire hydrant at the treatment facility; the second line shall provide sufficient potable water for the treatment facility building. Connection with existing water main shall meet the requirements of NJAW.

3. Contractor shall be responsible for connection of the treatment facility to an existing sanitary sewer located on the former CDE facility. This work shall be coordinated with the Borough of South Plainfield and the Plainfield Area Regional Sewer Authority (PARSA), owners of the sewer system. Connection with the existing sewer main shall meet all requirements of the Borough of South Plainfield and PARSA.In addition, approval for discharge must be obtained from the Middlesex County Sewer Authority (MCUA) which owns the treatment facility.

4. Contractor is responsible for providing permanent, hardwired Internet service to the treatment facility from a local Internet service provider (ISP).

5. Temporary utilities will be provided from local utility providers in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

1.09 PERMITS AND PERMIT EQUIVALENCIES

A. Contractor Responsibilities

Contractor shall be responsible for all local permits/approvals, including, but not limited to:

1. Building permit.
2. Electrical permit.
3. Plumbing permit.
4. Fire permit.
5. Certificate of occupancy.
6. Bureau of Water Allocation and Well Permitting - CERCLA Application Permit.
7. Middlesex County Utilities Authority (MCUA) Non-Domestic Wastewater Discharge Permit.
8. Freehold Soil Conservation District Soil Erosion and Sediment Control Plan Certification.

B. Government Responsibilities

Government shall be responsible for submitting permit equivalencies for the following items:

1. NJPDES Discharge to Surface Water (DSW) Permit.
2. NJDEP Treatment Works Approval (TWA).
3. NJDEP Air Pollution Control (APC) Preconstruction Permit (PCP) and Certificate to Operate.
4. NJDEP Division of Land Use Regulation (DLUR) Permit Approval.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

-- End of Section --

SECTION 01 25 00

MEASUREMENT AND PAYMENT
08/15

PART 1 GENERAL

1.01 SUMMARY

This section covers the methods and procedures which will be used to measure the Contractor's work and to provide payment to the Contractor for work performance. It is the responsibility of the Contractor to make a thorough investigation of the drawings, specifications, and the Site to determine the scope of work included in each bid item. Payments will be made to the Contractor based on the quantities of work as measured in accordance with the specified methods of measurement and the prices stipulated as shown on the Bidding Schedule. This method of payment will constitute complete compensation for all work shown on the Contract Drawings and provided in the Contract Specifications or other Contract Documents, and for all costs of accepting the general risks, liabilities and shall include, but not be limited to, compensation for overhead, profit, materials and services, and performing all work required to accomplish and complete the work specified under each item and all other work required.

1.02 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

48 CFR 52.232-5	Payments under Fixed Price Contracts
48 CFR 52.232-27	Prompt Payment For Construction Contracts

1.03 DEFINITIONS

A. LUMP SUM ITEMS

1. The quantities of Work performed under lump sum items will not be measured except for the purpose of determining reasonable interim payments.

2. Interim payments will be made in accordance with the estimated value of Work done as determined by the Contracting Officer or as specified in this section and in accordance with the following Contract Clauses: PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (FAR 52.232-5; 48 CFR 52.232-5) and PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (FAR 52.232-27; 48 CFR 52.232-27)/

B. UNIT PRICE ITEMS - Optional Items Only

1. Payments will be made for unit price items in accordance with

the measurement methods set forth in this section or, where specified payment limits are unclear, as determined reasonable by the Contracting Officer, at the unit prices entered in the Bidding Schedule.

2. Interim measurements and/or payments may be adjusted to account for partially completed work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 GENERAL CONDITIONS (CLIN 001)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for General Conditions will be made at the lump sum price bid, which shall be full compensation for the expense of said conditions. General Conditions shall include all of the items required under these Contract Documents but not covered under other bid items including, but not limited to: programmatic costs for project management, quality assurance, health and safety; insurance, bonds, fees, permits, required access agreements, and other similar expenses directly related to and required by these Contract Documents; project photographs and videotaping; preparation and submittal of all required planning documents; planning for and executing the health and safety program; documentation surveys; geophysical testing; environmental protection and spill control; pre-construction period planning, meetings, scheduling, submittals, reporting, and administration; and other requirements and related miscellaneous items specified under Special Clauses, General Requirements, and Civil.

3.02 TEMPORARY FACILITIES AND CONTROLS (CLIN 002)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for temporary facilities and controls will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions:

1. All labor, equipment, materials, and incidentals for furnishing, installing, and maintaining the main staging area including the provision of support trailer(s) for the Government and Contractor; storage containers for equipment, chemicals and other supplies; Contractor's potable water and sewer connections; sanitary facilities for workers; office equipment and supplies; health and safety supplies; cleaning services for the site and office facilities; flag poles; bulletin board and appropriate signage; and all else in connection therewith and incidental thereto for which separate

payment is not provided under other Items.

2. All labor, equipment, materials, and incidentals for furnishing and installing environmental control systems and perimeter drainage controls including sitewide soil erosion and sediment controls; stormwater management controls for both Contact Water and Non Contact Water; soil stockpile controls; water treatment and disposal systems; dust management for stockpiles and work areas; perimeter air quality monitoring; weather monitoring; snow removal for one construction season; periodic pavement sweeping on- and off-site to control trackout; and all necessary incidentals in connection therewith and incidental thereto for which separate payment is not provided under other Items.

3. All labor, equipment, materials, and incidentals required to furnish and pay for temporary utility service connections: temporary water service including connection to existing potable water supply, piping and piping supports, couplings, mechanical seals, gauges, valves, backflow prevention valve(s) and meter; sanitary sewer service including connection to existing sewer system, piping, check and control valves, and service meter; electrical service including transformers, wiring and support poles, and meter; Internet service including connection to existing system, wiring and service connection; reimbursement to local utilities for all charges including all deposits, connection fees, usage fees, taxes, and all other related charges and necessary incidentals in connection therewith and incidental thereto for which separate payment is not provided under other Items.

4. All labor, equipment, materials, and incidentals to prepare, set up and operate the exclusion, contaminant reduction and support zones when work requires such controls including, but not limited to, decontamination facilities for personnel and equipment entering and exiting the exclusion zone; personal protective equipment for site workers and spare sets for the Government; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

5. All labor, equipment, materials, and incidentals to set up and maintain site security and access controls including the provision of site security during all non-work hours over the length of construction; temporary fencing and other access controls; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

6. All labor, equipment, materials, and incidentals to identify and locate existing utilities (overhead and underground) and buried obstructions within the Limits of Construction and including access to utility services in the public right-of-way on Hamilton Boulevard and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3.03 EXTRACTION WELLS (CLIN 003)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for drilling and installation of four new extraction wells and conversion of one former test well to an extraction well, will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required to install four new extraction wells with a total combined drilling depth of 550 feet performed in accordance with Section 33 23 00 including, but not limited to, obtaining necessary permits for well installation; conducting well drilling including installation of protective casing; provision and installation of all pumps and controls; management of all drilling mud, overburden soil, and liquid waste from drilling operations; well development and well capacity pump test; management of all liquid waste; documentation and submittal of records for work on the well; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required to convert the former test well to an extraction well including, but not limited to, provision and installation of all pumps and controls; well development; documentation and submittal of records for work on the well; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3. All labor, equipment, materials and incidentals required to characterize and dispose of all investigation derived waste generated during CLIN 003 and 004, at a Government permitted and approved facility including, but not limited to, on-site treatment and disposal of liquid waste generated during drilling, well development, and capacity test pumping; segregation, dewatering, and characterization of overburden soils as a TSCA/hazardous waste; segregation, dewatering, and characterization of bedrock coring solids as a non-hazardous waste; disposal of all IDW, personal protective equipment and decontamination supplies; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

4. Payment for the installation of all wellheads, transmission lines and power and control line conduits will be under CLIN 005.

3.04 OBSERVATION WELLS (CLIN 004)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for installation of two new observation wells and

conversion of three existing monitoring wells to observation wells will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required to install two new observation wells with a total combined drilling depth of 160 feet in accordance with Section 33 51 39 including, but not limited to, obtaining necessary permits for well installation; providing horizontal and vertical control tied to the site benchmarks; conducting well drilling including installation of casing; management of all drilling mud, overburden soil, and liquid waste during drilling operations; well development and management of liquid waste;documentation and submittal of records for work on the well; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required to convert three existing monitoring wells to observation wells including, but not limited to, providing horizontal and vertical control tied to the site benchmarks; documentation and submittal of records for work on the well; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3. Payment for the management, characterization and disposal of investigation derived waste will be under CLIN 003.

4. Payment for the installation of all wellheads, transmission lines and power and control line conduits will be under CLIN 005.

3.05 TRANSMISSION PIPING, CONTROL LINE CONDUITS AND GAUGING STATION (CLIN 005)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for installation of wellheads, transmission lines, conduits for power and control lines in the utility trenches, and gauging station for water level measurement in Bound Brook will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required to remove and dispose of existing asphalt pavement including, but not limited to, marking proposed utility corridors on the ground surface; identifying and addressing any obstructions; neatly saw cutting pavement along perimeter of utility trenches; removing and containerizing asphalt pavement; characterizing the removed pavement for disposal; transport to and disposal of the asphalt at a Government permitted and approved facility; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required to construct the utility corridors as shown on the Contract Drawings including, but not limited to, excavation of soil from within the utility corridors to all extraction and observation wells and the gauging station (including the trench across the existing stormwater detention basin spillway and the trench crossing the stormwater clean corridor); excavation of the utility trench running from Hamilton Boulevard to the point of connection with the trench serving Extraction Well EW-1; installation of shoring or other trench support systems as necessary; removal and segregation of debris and rock encountered in excavated soil in accordance with Section 31 23 10; stockpiling of soil in locations designated in the excavation planning documents; management of soil stockpiles in accordance with Contract Documents; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3. All labor, equipment, materials and incidentals required to provide and install concrete manholes sections flush with the ground surface to serve as wellhead access points for each of the five extraction wells (four new wells and one existing well) including, but not limited to, excavation of soil at each location; compaction of subgrade soils; placement of geotextile barrier; placement and compaction of crushed stone layer; placement of precast concrete footing and subsequent manhole segments; placement of cover slab and manhole cover; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

4. All labor, equipment, materials and incidentals required to provide and install concrete manholes sections flush with the ground surface to serve as wellhead access points for each of the five observation wells including, but limited not to, excavation at each location; compaction of subgrade soils; placement of geotextile barrier; placement and compaction of crushed stone layer; placement precast concrete footing and subsequent manhole segments; placement of cover slab and manhole cover; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

5. All labor, equipment, materials and incidentals required to install conduits for power and instrumentation lines within the utility corridors as shown on the Contract Drawings up to the point of entry into the GETS building including, but not limited to, compaction of subgrade soils in accordance with Section 31 50 00; placement and compaction of base layer of pipe bedding soil in accordance with Section 31 23 16; transmission piping and conduit for power and control lines; electrical manholes as shown on Contract Documents to provide access to conduits for installation of electrical and instrumentation cables in accordance with Section 26 05 43; placement and compaction of pipe bedding soils over the transmission lines and conduits in accordance with Section 31 23 16; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

6. All labor, equipment, materials and incidentals required to construct one gauging station for monitoring water elevations in Bound Brook including, but not limited to, providing and installing an electrical service box (aka handhole) flush mounted with the asphalt paving; conduit for instrumentation line to GETS building; excavation of soil for the PVC carrier pipe extending from the handhole to the water level; provision and installation of pipe supports anchored in bedrock along the slope and in streambed; cast-in-place concrete pipe anchor; stainless steel carrier pipe and well screen mounted horizontally in the Brook; backfilling with clean soil on slope; slope restoration including reseeding and mulching; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

7. All labor, equipment, materials and incidentals required to backfill and compact soil in utility trenches including, but not limited to, placement of previously excavated contaminated soil from trenches back into utility trenches; restoration of trenches across existing stormwater detention basin spillway and stormwater clean corridor, including repairs to geomembrane and geotextiles disturbed during pipeline installation, to final finish condition; backfill of utility trench running from Hamilton Boulevard to the point of connection with the trench serving Extraction Well EW-1; compaction of excavated contaminated soil as structural fill in accordance with Section 31 23 16; backfilling around access manholes, electrical manholes, and handhole; and restoration of fill up to the base of the asphalt pavement; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

8. All labor, equipment, materials and incidentals required to stabilize soil and prevent stormwater from entering the utility trenches prior to restoration of the asphalt pavement (asphalt cap) including, but not limited to, providing and installing an impervious cover over the entire extent to prevent infiltration of stormwater into the finished trench; placement of sandbags or other items to weigh down the cover; maintenance of the cover system; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

9. Material removed during trench excavation shall be reused as backfill as feasible, in accordance with the Contract Documents. Payment for characterization, transport and disposal of excess soil and debris as TSCA/hazardous waste will be made under CLIN 026. Payment for characterization, transport and disposal of excess soil, rock, and debris as non hazardous waste will be made under CLIN 027.

11. Payment for restoration of the asphalt pavement will be made under CLIN 009.

12. Payment for excavation and backfill associated with the construction of the GETS facility foundation will be made under CLIN 008.

13. Payment for installation of permanent water, power, and

telecommunication utility lines (CLIN 007) will be made under separate bid line items.

3.06 EFFLUENT DISCHARGE PIPING (CLIN 006)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for installation of the effluent discharge line from the treated water tank in the GETS facility to the established discharge location in the existing emergency spillway of the stormwater detention basin will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required to excavate and manage soil from the GETS facility to the discharge location in the existing spillway of the stormwater detention basin including, but not limited to, removal and disposal of asphalt in a Government permitted and approved facility; excavation of soil; installing any shoring or other trench support systems as necessary; removal and segregation of debris and rock encountered in excavated soil in accordance with Section 31 23 10; stockpiling of soil in locations designated in the excavation planning documents; backfilling of trench with stockpiled soils; compaction of backfill; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required to install the effluent discharge line including but not limited to the connection to treated water tank; provision and installation of effluent discharge pipeline to discharge location; construction of concrete collar to stabilize the discharge pipe in the spillway; removal and replacement of riprap in spillway as necessary for installation; repairs to geomembrane and geotextiles in the spillway as necessary for pipeline installation; all valves and associated appurtenance for the discharge line; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3. Payment for replacement of asphalt cap will be made under CLIN 009.

4. Material removed during trench excavation shall be reused as backfill as feasible, in accordance with the Contract Documents. Payment for characterization, transport and disposal of excess soil and debris as TSCA/hazardous waste will be made under CLIN 026 and as non hazardous waste under CLIN 027.

3.07 UTILITIES: ELECTRICAL, FIRE AND POTABLE WATER SUPPLY, SANITARY SEWER CONNECTION, AND TELECOMMUNICATIONS (CLIN 007)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for utility installation will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required to install conduits for installation of buried power lines to the service disconnect at the GETS building; installation of electrical meters and transformer for the service lines; coordination with the local utility company providing the electrical service; payment for labor, material and equipment supplied by the utilities (if any); and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required to install a telecommunications line providing telephone and Internet service to serve the GETS facility to the service panel within the GETS facility; coordination with the local telecommunications company providing the service; payment of all charges from the local utilities associated with this work including payment for labor, material and equipment supplied by the utilities (if any); and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3. All labor, equipment, materials and incidentals required to install and connect water lines to existing water service to serve the GETS facility including, but not limited to, installation of a fire protection line from the public right-of-way to the new fire hydrant location; installation of a potable domestic water supply line to the point of service within the building; installation of a flow meter; installation of a fire hydrant near the GETS facility;coordination with the local water company providing the water service; payment of all charges from the local utility associated with this work including payment for labor, material and equipment supplied by the utility (if any); and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

4. All labor, equipment, materials and incidentals required to install connections to the on-site public sanitary sewer including, but not limited to, the portion of the waste lines running between the building and the sanitary sewer (serving the building sanitary system and the floor sump in the treatment area); coordination with utility boards providing the sewer and treatment services; payment of all charges from the local utility associated with this work including payment for labor, material and equipment supplied by the utility (if any); and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

5. Payment for excavation and backfill of the utility corridor will be made under CLIN 005. Payment for replacement of asphalt following backfilling will be made under separate bid line items CLIN 009.

3.08 FOUNDATION CONSTRUCTION (CLIN 008)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for excavation, placement of foundation soils, and construction of the building foundation will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required to remove and dispose of existing asphalt pavement including, but not limited to, marking proposed limits of excavation on ground surface in accordance with Section 31 23 10; identifying and addressing any buried obstructions; neatly saw cutting pavement along perimeter of excavation; removing and containerizing asphalt pavement; characterizing the removed pavement for disposal; transport to and disposal of the asphalt at a Government approved facility; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required to excavate soil and debris for the GETS building construction as shown on the Contract Drawings including, but not limited to, excavation of soil from within the building footprint plus an additional five feet laterally on all sides; installation of any shoring or other slope support systems as necessary; removal and segregation of debris and rock encountered in excavated soil in accordance with Section 31 23 10; stockpiling of soil in locations designated in the excavation planning documents; management of soil stockpiles in accordance with Contract Documents; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3. All labor, equipment, materials and incidentals required to place excavated soil back in the excavation in a controlled, documented manner including, but not limited to, testing and preparation of subgrade soils in accordance with Section 31 50 00; moisture conditioning and placement of structural fill in shallow lifts in accordance with Section 31 60 00 to achieve the specified degree of compaction to the elevation specified in the Contract Documents; field and laboratory testing as necessary to meet requirements in Section 31 60 00 and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

4. All labor, equipment, materials and incidentals required to install the vapor mitigation system including, but not limited to, placement and compaction of crushed stone layer; installation of geotextile sheet goods in accordance with Section 31 21 14.13; application of spray on geomembrane barrier in accordance with Section 31 21 14.14; pipe laterals, headers, and riser; roof mounted turbine; provisions for pipe penetrations as shown on Contract Drawings; and all else in connection therewith and included thereto for which separate

payment is not provided under other Items.

5. All labor, equipment, materials and incidentals required for constructing cast-in-place concrete slabs, integrated apron, and concrete kneewalls including, but not limited to, installation of rebar in accordance with Contract Drawings; formwork, water stops and appurtenances; process equipment conduits placed within the slab; waste service lines placed below the concrete slab within the building footprint; equipment pads; poured in place concrete for slabs, apron and knee wall; finishing concrete surfaces in accordance with Contract Drawings; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

6. All labor, equipment, materials and incidentals required to place backfill in a controlled, documented manner following the placement and curing of the concrete slabs including, but not limited to, moisture conditioning and placement of structural fill in shallow lifts in accordance with Section 31 60 00 to achieve the specified degree of compaction to the elevation specified in the Contract Documents; field and laboratory testing as necessary to meet requirements in Section 31 60 00; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

7. Payment for restoration of the asphalt pavement will be made under CLIN 009.

8. Payment for excavation and backfill associated with the construction of the utility trenches will be made under CLIN 005.

9. Material removed during excavation shall be reused as backfill as feasible, in accordance with the Contract Documents. Payment for characterization, transport and disposal of excess soil and debris as TSCA/hazardous waste will be made under CLIN 026. Payment for characterization, transport and disposal of excess soil, rock and debris as non hazardous waste will be made under CLIN 027.

3.09 ASPHALT CAP REPAIR (CLIN 009)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for restoration of the asphalt cap disturbed during construction will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required to reestablish the asphalt cap across the site including but not limited to, testing and final compaction of top layer of structural fill materials (installed under CLIN 005); placement and compaction of crushed stone layer; placement of base and surface course of asphalt; and all else in connection

therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required to patch and repair areas of the asphalt cap damaged during construction and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3. This bid item includes all areas impacted by transmission piping, gauging station, and control line conduits (CLIN 005), effluent discharge piping (CLIN 006), and foundation construction (CLIN 008).

3.10 BUILDING CONSTRUCTION (CLIN 010)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for construction of the GETS building will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required to construct a pre-engineered metal building structure including, but not limited to, building structure and doors; siding and roofing; interior finishes; lighting; provision of restroom, conference room, and records room fixtures and fittings as specified; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required to purchase furniture for the meeting room and records room in accordance with GSA procurement procedures. Items to be purchased: conference room table, eight conference room chairs, operator's desk and desk chairs, 3 four-drawer locking file cabinets, 10 feet of heavy duty open shelving for storage, and flammable materials storage cabinet.

2. Payment for installation of in-slab electrical conduit and underslab piping systems will be made under CLIN 008.

3.11 PROCESS EQUIPMENT (CLIN 011)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for installation of process equipment will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required to install the process equipment system including, but not limited to, equalization and treated water tanks; pressure filters; air stripper; vapor phase granular activated carbon canisters and carbon; liquid phase granular activated carbon

canisters and carbon; associated pumps and blower systems; local control panels; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required to install the process piping system including, but not limited to, pipe manifold; process piping to individual equipment units; pipe supports; exhaust stack from vapor phase granular activated carbon; internal and external venting lines; associated valves, controllers, meters, sensors, and appurtenances; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3.12 MECHANICAL AND PLUMBING SYSTEMS (CLIN 012)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for mechanical and plumbing systems will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required for installation of the building heating, cooling and ventilation systems including, but not limited to, geothermal heating system; supplemental heating and cooling systems; ducting and venting systems; valving, metering, and sensoring; instrumentation and control system; backflow preventers, associated appurtenances; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required for installation of plumbing including, but not limited to, potable water lines to restroom and conference room; grey water system for toilet, hose bibs, and utility sink; hose bibs; floor drains; emergency eyewash and shower; treatment area floor sump; valves, meters, control systems and associated appurtenances; water heater; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3.13 ELECTRICAL SYSTEMS AND MOTOR CONTROLS (CLIN 013)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for electrical systems and motor controls will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required for installation of the electrical systems including, but not limited to, electrical panels; general wiring for lighting and receptacles; backup generator connection system; all other

electrical lines within GETS facility; motor controllers; power supply for geothermal heating system and supplemental heating and cooling systems; meters and sensors; power lines to extraction wells; associated appurtenances; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required for installation of telecommunications systems including, but not limited to, telecommunication system wiring and panel; low voltage system; electrical panels; site security system; fire alarm system; lightning protection system; vehicle door controls; associated appurtenances; all other alarms, meters, control systems; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3.14 INSTRUMENTATION AND CONTROL SYSTEMS (CLIN 014)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for instrumentation and control systems will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required for installation of the instrumentation and control systems including, but not limited to, installation of instrumentation lines for extraction and observation wells, and gauging station; instrumentation lines within GETS facility; instrumentation and control system; control panels and wiring; VFD and PLC control systems and operator interface; remote dialer system (SCADA); software and hardware for operator remote access; associated appurtenances; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required for installation of instrumentation and monitoring systems including but not limited to, site security system; fire alarm system; process equipment; keyless entry system; appurtenances; all other alarms, meters, control systems; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3.15 TREATMENT SYSTEM STARTUP (CLIN 015)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for the startup and testing of the groundwater treatment system will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required for

facility startup and testing in accordance with Section 01 91 14 including, but not limited to, provision of water for facility testing and tanks for storage of treated groundwater prior to disposal; coordination with manufacturers' representatives to be present during testing; calibration of equipment as necessary; cleaning equipment prior to use; lubricating and checking equipment to ensure in proper working order; spare parts and tools; startup and shutdown of all equipment; sustained operations of system with potable water and then actual site groundwater; sample collection and analysis; disposal of all water generated during facility testing; documentation and reporting; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3.16 DEMOBILIZATION (CLIN 016)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for demobilization will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required for demobilization including, but not limited to, moving out all personnel, equipment, trailers, storage facilities, and temporary utility connections; cleaning the site; payment of all final utility bills; removing all debris and rubbish associated with Contractor activities; construction project close out; record drawings; other reporting required in Contract Documents; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3.17 FIRST YEAR OF OPERATIONS (CLIN 017)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for first year operations will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment, materials and incidentals required for site operations in accordance with Section 01 92 00 First Year Operation and Maintenance Service including, but not limited to, all necessary staffing including site operators and administrative, project management, quality assurance, health and safety support including all direct and customary indirect charges; all consumable supplies and equipment; PPE and other required health and safety program equipment; regular building and grounds maintenance; general debris disposal; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

2. All labor, equipment, materials and incidentals required to

maintain utility service at the GETS facility including, but not limited to, payment of all utility bills, fees, taxes, and other charges; coordination with utility companies; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3. All costs required for snow removal and salting from Hamilton Boulevard to and around the GETS facility during one year of site operations and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3.18 END OF CONTRACT TRANSITION (CLIN 018)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for End of Contract Transition will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said conditions.

1. All labor, equipment and materials required to develop planning and training documents to successfully transition operations to a Relieving Contractor, in accordance with Section 01 92 00.

2. All labor, equipment and materials necessary to provide training for staff for the Relieving Operator over the last 30 days of the operations contract, in accordance with Section 01 92 00. This shall occur during the final month of the First Year of operation (CLIN 017).

3. All labor, equipment and materials necessary to coordinate transfer of all utility bills, permits, approvals, and other documents into the name of the Relieving Operator.

3.19 VAPOR PHASE CARBON CHANGEOUT (CLIN 019)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for one vapor phase carbon changeout will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said work, including all labor, equipment and materials required to remove vapor phase carbon from one canister; performance of any and all maintenance or cleaning activities in the canister; replacement of the vapor phase carbon in one canister with 2000 pounds of new carbon; and changes to plumbing connections to convert lead canister to lag canister in accordance with Operations and Maintenance Manual prepared in accordance with Section 01 78 23.

3.20 LIQUID-PHASE CARBON CHANGEOUT (CLIN 020)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for one liquid- phase carbon changeout will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said work, including all labor, equipment and materials required to remove liquid-phase carbon from one canister; performance of any and all maintenance or cleaning activities in the canister; replacement of the liquid-phase carbon in one canister with 2000 pounds of new carbon; and changes to plumbing connections to convert lead canister to lag canister in accordance with Operations and Maintenance Manual prepared in accordance with Section 01 78 23.

3.21 AIR DISCHARGE COMPLIANCE SAMPLING (CLIN 021)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for air discharge compliance sampling will be made at the lump sum price bid for which price and payment shall be full compensation for the expense of said work. This will include, but not be limited to, all labor, equipment, and materials required to collect samples of air emitted from process equipment generated by the GETS facility in accordance with Section 01 35 45 and Section 01 78 23 and NJDEP air emission permit equivalency; ship samples to an approved private contract laboratory; pay for the contract laboratory's services; evaluate the results of the analyses to verify compliance with standards; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3.22 EFFLUENT DISCHARGE COMPLIANCE SAMPLING (CLIN 022)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for effluent discharge compliance sampling will be made at the lump sum price bid for which price and payment shall be full compensation for the expense of said work. This will include, but not be limited to, all labor, equipment, and materials required to collect samples of treated groundwater generated by the GETS facility in accordance with Section 01 35 45 and Section 01 78 23 and NJPDES; ship samples to an approved private contract laboratory; pay for the contract laboratory's services; evaluate the results of the analyses to verify compliance with discharge limits; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3.23 PERFORMANCE SAMPLING AND REPORTING (CLIN 023)

A. Measurement for this lump sum item shall include all items described under this bid item, and no separate quantity measurement shall be made.

B. Payment for performance sampling and reporting will be made at the lump sum price bid, for which price and payment shall be full compensation for the expense of said work. This will include, but not be limited to, all labor, equipment, and materials required to

collect air and water samples from process equipment within the GETS facility in accordance with Section 01 35 45 and Section 01 78 23 as well as sub-slab vapor samples; ship samples to an approved private contract laboratory; pay for the contract laboratory's services; evaluate the results of the analyses to verify performance and monitor operations; and all else in connection therewith and included thereto for which separate payment is not provided under other Items.

3.24 ADDITIONAL EXTRACTION WELLS - OPTIONAL ITEM (CLIN 024)

A. Measurement for this unit price item will be the number of additional extraction wells installed beyond those required in CLIN 003.

B. Payment for additional extraction wells will be made at the unit price bid, which will be full compensation for necessary labor, equipment, material, and incidentals required to provide one additional Extraction Well beyond those required in CLIN 003, constructed as specified, in a location determined by the Contracting Officer. Costs shall include, but not be limited to, permitting, extraction well drilling and construction (assumed depth 200 feet); well development and capacity testing; offsite disposal of soil cuttings and water generated during drilling, development and well testing; wellhead construction; installation of extraction well pump and transmission piping; installation of power and instrumentation control conduit and lines; instrumentation modifications; trenching and backfill; repair of asphalt cap; and appurtenances. Item is in event yield from drilled wells is not sufficient to achieve hydraulic control.

3.25 ADDITIONAL DRILLING DEPTH OVER 770 FEET - OPTIONAL ITEM (CLIN 025)

A. Measurement for this unit price item will be the number of feet drilled in excess of 770 feet in the event site conditions require drilling additional depth to encounter the correct conditions for well installation.

B. Payment for additional drilling activities will be made at the unit price bid which will be full compensation for necessary labor, equipment, material, and incidentals required to provide additional drilling services beyond that originally included in CLIN 003 and CLIN 004 in existing boreholes. Costs shall include, but not be limited to, drilling services; management of IDW generated during drilling; and offsite disposal of soil cuttings and water generated during drilling. Item is in event site conditions require deeper wells in one or more locations to achieve proposed pumping conditions.

1. Costs are for additional drilling in excess of 770 feet, combined depth, for all drilling activities. Up to 10 feet of additional drilling at each of the six new wells is considered incidental to the original cost for drilling activities.

2. This cost does not include any of the costs associated with the drilling for a new well at a separate location (if necessary) which are included under CLIN 024.

3.26 OFF-SITE DISPOSAL OF EXCESS PCB-CONTAMINATED SOIL AND DEBRIS - OPTIONAL ITEM (CLIN 026)

A. Measurement for this unit price item will be the number of tons of excess PCB-contaminated soil and debris generated as part of trenching and foundation construction activities that are transported and disposed of offsite in Government permitted and approved a Subtitle C/TSCA landfill. Soil and debris from well installation activities shall be managed as IDW under those CLINs.

B. Payment for offsite disposal of TSCA/hazardous soil will be made at the unit price bid, for which price and payment will be full compensation for all labor, equipment, material and incidentals required for the characterization, removal, transportation and disposal of excess PCB contaminated soil and debris offsite at a Government permitted and approved Subtitle C/TSCA landfill in accordance with Section 02 81 00.

1. Contractor shall make every attempt to minimize the generation of excess contaminated soil throughout the project.

2. Cost is for bidding purposes only; actual disposal requirements will be based on waste characterization results.

3. Cost for managing, transport and disposal of soil cuttings generated under CLIN 003, CLIN 004, CLIN 024 and CLIN 025 as IDW shall be included under those CLINs.

3.27 OFF-SITE DISPOSAL OF EXCESS NON HAZARDOUS SOIL AND DEBRIS - OPTIONAL ITEM (CLIN 027)

A. Measurement for this unit price item will be the number of tons of excess PCB-contaminated soil and debris generated as part of trenching and foundation construction activities that are transported and disposed of offsite in a Government permitted and approved Subtitle D landfill.

B. Payment for offsite disposal of non hazardous soil will be made at the unit price bid, for which price and payment will be full compensation for all labor, equipment, material and incidentals required for the characterization, removal, transportation and disposal of excess non hazardous soil, rock, and debris offsite at a Government permitted and approved Subtitle D landfill in accordance with Section 02 81 00.

1. Contractor shall make every attempt to minimize the generation of excess contaminated soil throughout the project.

2. Cost is for bidding purposes only; actual disposal requirements will be based on waste characterization results.

3. Cost for managing, transport and disposal of soil cuttings generated under CLIN 003, CLIN 004, CLIN 024, and CLIN 025 shall be managed as IDW under those CLINs.

3.28 BEDROCK, BOULDERS, AND FORMER BUILDING FOUNDATIONS EXCAVATION - OPTIONAL ITEM (CLIN 028)

A. Measurement for this unit price item will be the number of cubic

yards of bedrock, boulders, or former concrete foundations excavated. Only bedrock or boulders of more than 1 cubic yard in volume when encountered in earth or trench excavation will be measured for payment. When rock or boulders are encountered, the material shall be uncovered and the Contracting Officer notified. The Contracting Officer will prepare cross sections of the rock surface. If the Contractor fails to notify the Contracting Officer in a timely manner to allow ample time for cross sectioning the undisturbed material, the Contractor shall have no right of claim to any classification other than that allowed by the Government. The quantity of rock and boulder excavation to be paid for will be the number of cubic yards of rock, boulders, or former building foundations measured in place, as directed by the Government, within the limits herein specified.

B. Payment for bedrock, boulder or foundation excavation will be made for the quantities as above determined measured in cubic yards, at the unit price bid, for which price and payment will be full compensation for excavation, characterization, and disposal of bedrock, boulders, or foundation materials; backfilling and providing structural fill for any voids left as a result of bedrock, boulder, and foundation excavation; and all work incidental thereto, for which payment is not provided under other items. No separate payment will be made for refill material to replace any voids left as a result of rock and boulder excavation.

1. Payment for disposal of bedrock, boulders, or foundation materials excavated under this CLIN will be handled under CLIN 026 AND CLIN 027.

2. Excess soils will be used to refill void spaces left by removal of rock, boulders, or foundation materials.

3. The following conversion factors should be used: soil - 105 pounds per cubic foot; rock and concrete - 150 pounds per cubic feet.

3.29 ADDITIONAL VAPOR PHASE CARBON CHANGEOUT - OPTIONAL ITEM (CLIN 029)

A. Measurement for this unit price will the number of additional vapor phase carbon change-outs performed during the First Year of operations in accordance with Section 01 92 00 beyond the initial changeout service required under CLIN 019.

B. Payment for vapor phase carbon change-out will be made at the unit price bid as measured above for which price and payment will be full compensation for the removal of 2,000 pounds of spent carbon from one on-site carbon canister and replacing in the canister that carbon with 2000 pounds of new carbon meeting the requirements of Section 01 92 00; PPE and monitoring as required by accepted Health and Safety Plan; handling and disposal of spent carbon; profiling of carbon; inspection of vessels; changes to plumbing connections to convert lead canister to lag canister in accordance with Operations and Maintenance Manual in accordance with Section 01 78 23, for which payment shall be full compensation for the expense of said conditions. No separate payment will be made for additional vapor phase carbon material to replace.

3.30 ADDITIONAL LIQUID PHASE CARBON CHANGEOUT - OPTIONAL BID (CLIN 030)

A. Measurement for this unit price will the number of additional liquid phase carbon change-outs performed during the First Year of operations in accordance with Section 01 92 00 beyond the initial changeout service required under CLIN 020.

B. Payment for liquid phase carbon change-out will be made at the unit price bid as measured above for which price and payment will be full compensation for the removal of 2,000 pounds of spent carbon from one on-site carbon canister and replacing in the canister that carbon with 2000 pounds of new carbon meeting the requirements of Section 01 92 00; PPE and monitoring as required by accepted Health and Safety Plan; handling and disposal of spent carbon; profiling of carbon; inspection of vessels; changes to plumbing connections to convert lead canister to lag canister in accordance with Operations and Maintenance Manual in accordance with Section 01 78 23, for which payment shall be full compensation for the expense of said conditions. No separate payment will be made for additional vapor phase carbon material to replace.

-- End of Section --

SECTION 01 31 13

PROJECT COORDINATION
09/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

FEDERAL GEODETIC CONTROL COMMITTEE (FGCC)

FGCC 1984	(1984) Standards and Specification for Geodetic Control Networks

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Name And Experience Of The Project Manager; G

Project Organizational Chart; G

Land Survey Statement Of Qualifications; G

SD-02 Shop Drawings

Photographic Documentation; G

Video Recordings; G

1.03 PROJECT ORGANIZATIONAL STRUCTURE

Within 14 calendar days following the Notice to Proceed, the Contractor shall submit in writing to the Government the name and experience of the Project Manager and provide an organizational chart identifying all personnel and subcontractors to be employed on the project. For subcontractors, the main point of contact shall be identified along with contact information.

The Contractor shall provide a project management team including a Project Manager and administrative personnel qualified and capable to manage the project including supervising construction, expediting labor relations, staffing, and recordkeeping. The Contractor shall submit a detailed Project Organizational Chart showing the individuals directly involved in the project.

The Project Manager shall have overall responsibility for conducting the work and for ensuring that the work is conducted in accordance

with the requirements of the Contract Documents. The Project Manager shall be responsible for communication with the Government and shall officially represent the Contractor in all project-related activities. The Project Manager shall have the authority to sign payments and change orders. The Contractor shall provide the name and experience of the Project Manager.

The Contractor shall provide a data retrieval recordkeeping system approved by the Government, which will make available in a timely manner records of all site activity, quantities of materials delivered to the Site, quantities of materials utilized, quantities of materials excavated, quantities of treated water discharged, quantities of waste produced, laboratory results, waste transportation information, and all other information required to support requests for payment.

1.04 UTILITY NOTIFICATION AND COORDINATION

Coordinate the Work with the various utilities within Project limits. Notify applicable utilities prior to commencing Work, if damage occurs, or if conflicts or emergencies arise during the Work.

1.05 STAKEHOLDER

Prior to initiating the work, the Project Manager may be required to meet with Borough of South Plainfield and stakeholders with permission from the Government, and, in the presence of the Environmental Protection Agency (EPA), to discuss the planned construction approach The Contractor shall record the minutes of the meeting and include all significant proceedings and decisions.

1.06 OU2 ASPHALT CAP

A. Protect the integrity of the existing asphalt paving which serves as an infiltration barrier for contaminated soils present at the Site. All soil beneath the asphalt cap shall be treated as a hazardous/TSCA waste unless indicated otherwise through characterization.

B. Clearly mark limits of proposed cap disturbance along pipeline routes and under treatment facility prior to the start of work. Attempts shall be made to minimize the amount of disturbed cap. Limit the amount of contaminated soils open at any one time. Once work is complete, tarp or otherwise stabilize all open areas until asphalt cap is restored. Coordinate with Contracting Officer on the proposed sequencing and extent of removal of the cap.

C. During periods when portions of the asphalt cap have been removed, access to those areas of the site shall be controlled and limited to HAZWOPER trained personnel in accordance with Section 01 35 29, HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES. Appropriate work zones (Exclusion Zone, Contaminant Reduction Zone, and Support Zone) and decontamination procedures shall apply to all personnel and equipment entering those portions of the Site.

1.07 ADJACENT FACILITIES AND PROPERTIES

A. Examination

1. After the Effective Date of the Agreement and before Work at

Site is started, Contractor and Contracting Officer shall make a thorough examination of pre-existing conditions including structures, fencing, monitoring wells, benchmarks, and other improvements in vicinity of Work which could be damaged by construction operations including truck traffic. The examination shall attempt to include affected property owner, Borough of South Plainfield, and utility owners.

2. Periodic (approximately monthly) reexamination shall be jointly performed to include, but not limited to, cracks in structures, fencing, roadways, sidewalks and curbs; settlement and damage to asphalt cap; leakage, and similar conditions.

B. Documentation

1. Record and submit documentation of observations made on examination inspections in accordance with Article 1.06 Photographic Documentation.

2. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and is for the protection of adjacent property owners, Contractor, and Government.

1.08 DATA AND RECORDKEEPING SYSTEM

The Contractor shall submit a description of the proposed data retrieval and recordkeeping system to be used during the project.

1.09 PHOTOGRAPHIC DOCUMENTATION

A. General

1. Photographically document all phases of the Project including preconstruction, construction progress, and post-construction.

2. Contracting Officer will have right to select subject matter and vantage point from which photographs are to be taken.

3. Digital Images: No post-session electronic editing of images is allowed. Stored image shall be actual image as captured without cropping or other edits.

4. Submit two copies of DVD disc containing images within 5 days of being taken. Each image is to have a minimum file size of 1.4 Mb (1,400 Kb) so viewed resolution is high quality. The production of larger file sizes with higher resolution is encouraged.

B. Preconstruction and Post-Construction

1. After the Effective Date of the Agreement and before Work at Site is started, and again upon issuance of Substantial Completion, take a minimum of 100 photographs of Site and property adjacent to perimeter of Site that could be impacted by Work.

2. Particular emphasis shall be directed to:

a. Structures both inside and outside the Site including water tower, stormwater basin, overflow spillway, and .
b. Existing roadways and access points to Site including sidewalks, curbs, and gutters.
c. Site fencing.
d. OU2 asphalt cap within and adjacent to Limits of Construction.

3. Format: Digital, minimum resolution of 2,176 by 3,264 pixels and 24-bit, millions of color.

C. Construction Progress Photos

1. Photographically demonstrate progress of construction, showing every aspect of Site and adjacent properties as well as interior and exterior of new or impacted structures.

2. Weekly: Take a minimum of 24 photographs using digital, minimum resolution of 2,176 by 3,264 pixels and 24-bit, millions of color.

3. Provide a minimum of one progress photo in each weekly submittal that is taken from the same reference point to show construction progress.

D. Documentation of Digital Images

1. Electronic image shall have date taken embedded into image.

2. Archive using a commercially available photo management system that provides listing of photographs including date, keyword description, and direction of photograph.

3. Label each disk with Project name, month and year images were produced, Contract Number, and Contractor name.

1.10 VIDEO RECORDINGS

A. General

1. Video-graph all phases of the Project including preconstruction, construction progress, and post-construction.

2. Particular emphasis shall be directed to physical condition of existing vegetation, structures, and pavement along utility corridor and/or pipeline route, treatment building footprint, including subgrade and under slab construction, and areas on or adjacent to Contractor storage and staging areas.

3. Contracting Officer shall have right to select subject matter and vantage point from which videos are to be taken.

4. Contracting Officer reserves the right to reject the video because of poor quality, unintelligible audio, or uncontrolled pan or zoom. Any video rejected by the Government shall be rerecorded at no cost to the Government. Under no circumstances shall the construction begin until the

Government has received and accepted the Pre-Construction Video.

5. Submit two copies on DVD disc, including updated copy of project video log, within 5 days of being taken.

B. Preconstruction and Post-Construction

1. Before Work at Site is started, and again upon issuance of Substantial Completion, take a video of Site and property adjacent to perimeter of Site.

2. In the case of preconstruction recording, no work shall begin in the area prior to Government's review and approval of content and quality of video for that area.

C. Video Format and Quality

1. DVD format, with sound.

2. Video

a. Produce bright, sharp, and clear images with accurate colors, free of distortion and other forms of picture imperfections.

b. Electronically, and accurately display the month, day, year, and time of day of the recording.

3. Audio

a. Audio documentation shall be done clearly, precisely, and at a moderate pace.

b. Indicate date, project name, Contract Number, Contractor's name, and brief description of the location of recording, including:

1) Facility name
2) Street names or easements
3) Addresses of private property
4) Direction of coverage, including engineering stationing, if applicable.

4. DVD Label

a. DVD number (numbered sequentially, beginning with 001).

b. Project name.

c. Name of street(s) or easement(s) included.

d. Date and time of coverage.

e. Contract Number.

f. Contractor Name.

5. Project Video Log: Maintain an ongoing log that incorporates

above noted information for DVDs on Project.

1.11 CONTROL SURVEYS

A. Location and elevation of temporary bench marks to be provided by Contractor. All temporary benchmarks shall be tied to existing permanent benchmarks established at the site.

B. All horizontal coordinates shall be referenced to the New Jersey State Plane Coordinate System, NAD 83, and the vertical datum shall reference NAD 88.

C. Quality Control: All survey work shall be according to third-order accuracy standards as specified by the Federal Geodetic Control Committee in the "Standards and Specifications for Geodetic Control Networks", published September 1984 (FGCC 1984). The units of measure shall be U.S. Survey Feet.

D. Reference Points

1. Verify location of all existing reference points prior to starting work. Promptly notify Contracting Officer of any discrepancies discovered.

2. The Contractor shall take all reasonable measures to protect and preserve existing site reference points (benchmarks) during performance of the Work. Reference points shall not be relocated without prior written approval of the Contracting Officer.

3. The Contracting Officer shall be immediately notified of loss, damage, or destruction of any reference point, or any relocation required because of changes in grade or other reasons.

E. Record Documents

1. Throughout the project, the Contractor shall prepare and maintain record drawings that document the location for all major components of the system including, but not limited to, the following:

a. Treatment facility, including subgrade elevation, under slab piping, vapor mitigation system, vents, and other components.

b. All extraction wells, observation wells, and gauging station locations, including top of casing and top of rock.

c. All buried transmission lines and wellheads, including power and control lines and spare conduits.

d. All buried utilities.

e. Portions of cap disturbed and reconstructed.

f. Fence lines and gates.

g. Final site grading.

2. All disturbed areas shall be clearly identified.

3. The drawings shall also include as-built features for the treatment system and building. The drawings shall show the as-built position, size, and arrangement of, but not be limited to, vapor mitigation system, foundations, treatment equipment, piping, ductwork, controls, mechanical, electrical, instrumentation, security system, utilities, doors, windows, louvers, roof and wall penetrations, and sumps.

4. The Contractor shall submit three paper copies of the final as-built drawings to be signed and sealed by a New Jersey licensed surveyor as described in Section 01 78 00 CLOSEOUT SUBMITTALS.

5. The Contractor shall also submit an electronic deliverable that includes an electronic copy of the as-built drawings. The electronic copy shall be identical to the submitted paper copies. The Contractor shall also submit a text file or MS Excel file that includes a list of all survey points. For each point, the file shall include a point number, description, X-coordinate, Y-coordinate, and elevation.

F. Contractor's Responsibilities

1. Establish temporary benchmarks convenient to Work and at least every 500 feet along pipeline routes. All temporary benchmarks shall be tied to existing reference points on the property.

2. Establish horizontal reference points or coordinate system with benchmarks and reference points for Contractor's use as necessary to lay out Work.

3. Establish centerlines of principal structures and pipelines, and baseline from which these facilities may be located.

4. Establish clearing limits, set toe of fill and top of cut stakes, and set bench marks convenient for use as necessary to establish basic layout of the Work.

5. For transmission pipelines over 500 feet in length, set offset stakes indicating locations of pipelines at approximate 200-foot intervals along line and indicate depth of cut when required.

6. Establish location of all utility poles and anchors, grounding grids,and other buried services..

7. Provide additional survey and layout required to layout the Work. Periodically verify layout.

8. Check and establish exact location of existing facilities and utilities prior to construction of new facilities, utilities, and any connections thereto.

9. Retain professional land surveyor or civil engineer registered in State of New Jersey who shall perform or supervise engineering surveying for construction staking and layout.

Submit Land Survey Statement of Qualifications for selected individual or firm.

10. Maintain complete accurate log of survey work including detailing the actual conditions of surface and subsurface construction as it progresses as a Record Document. Submit monthly Record Document updates to the Government.

11. On request of Contracting Officer, submit documentation.

12. Provide competent employee(s), tools, stakes, and other equipment and materials to:

    a. Establish control points, lines, and easement boundaries.

    b. Check layout, survey, and measurement work performed by others.

    c. Measure quantities for payment purposes.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 CUTTING, FITTING, AND PATCHING

A. Cut, fit, adjust, or patch Work and work of others, including excavation, backfilling, and paving as required, to make Work complete.

B. Obtain prior written authorization of Contracting Officer before commencing Work to cut or otherwise alter:

    1. Structural or reinforcing steel, structural column or beam, elevated slab, trusses, or other structural member, grounding grids, or buried utilities.

    2. Weather-resistant or moisture-resistant elements, including asphalt cap.

    3. Efficiency, maintenance, or safety of element.

    4. Work of others.

C. Refinish surfaces to provide an even finish.

D. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and fill voids.

E. Remove specimens of installed work for testing when requested by Government.

-- End of Section --

SECTION 01 31 19

PROJECT MEETINGS
09/17

PART 1 GENERAL

1.01 GENERAL

A. Pre-Construction Conference

A Pre-Construction Conference will be held to discuss the contract and project schedules including: submittals, health and safety, payrolls, labor relations, environmental protection, work plan and schedules, schedule of values, payment procedures, and procurement of materials as well as the principal features of Work.

B. Preliminary Schedules Review Meeting

A Preliminary Schedules Review Meeting will be held to discuss the preliminary schedule for Work.

C. Progress Meetings

Progress meetings will be held regularly throughout the project at a time and date agreed to.

The Contractor shall schedule and administer Progress Meetings a minimum of once per week, as well as any additional meetings requested by either the Government or the Contractor during any stage of this project when it is deemed necessary to raise any significant questions, establish new guidelines, introduce a new aspect of the project, or discuss any other items that will affect the progress of work. The Contractor and all necessary personnel, as determined by the Government, shall attend these meetings for the duration of this contract.

Meetings and conferences shall take place at the project site or some other location that is satisfactory to both the Government and the Contractor.

The Contractor shall administer the following general requirements for the Progress Meetings:

1. Prepare and distribute the agenda and related attachments for meetings.

2. Make physical arrangements for meetings.

3. Preside at meetings.

4. Record the minutes, including a detailed description of proceedings and decisions.

The Contractor shall be responsible for recording the minutes of all Progress Meetings and including any significant proceedings and decisions. The Contractor shall reproduce and submit to the

Government an electronic copy of the minutes of the meeting within 2 business days. After the Government's review and approval, the Contractor shall distribute copies to each participant in the meeting and to parties affected by decisions made at the meeting.

At a minimum the following information shall be addressed at progress meetings:

1. Review and approval of the minutes of the previous meeting.

2. Review of health and safety issues.

3. Review of work progress.

4. Permit/permit equivalency activities.

5. Field observations, problems, and conflicts.

6. Review and revision of the project schedule, including:

    a. Review of problems and proposed changes for their effect on construction, completion date, and other contracts of the project, and corrective actions proposed to regain the projected schedule.

    b. Review of offsite delivery schedules.

    c. Coordination of schedules, including review and expedition, as required, of submittal schedules.

    d. Planned progress during the succeeding work period based on the current project schedule.

    e. Milestone dates.

    f. Estimate percent complete versus accepted schedule planned percent complete.

7. Review of transmittals submitted to USACE, submittals returned from USACE, transmittals pending re-submittal, and Requests for Information (RFIs).

8. Review of quality control, including all completed inspections (Preparatory Phase, Initial Phase, Follow-Up Phase, Pre-Final, and Final), scheduled inspections, and the deficiency tracking system.

9. Pending and proposed changes and substitutions.

10. Progress payment.

11. Remedial Action Report development.

12. Community relations issues.

13. Review of old business.

14. Review of new business.

D. Other Meetings

Other meetings may be held as required for the progress of the Work and in accordance with the Specification sections. These include, but are not limited to, the following:

1. Quality Control Meetings
2. Process Instrumentation and Control Systems (PICS) Coordination Meetings
3. Preinstallation Meetings
4. Facility Startup Meetings
5. Construction and Demolition Waste Management Meetings
6. Coordination Meetings
7. Pre-Warranty Conference
8. Other meetings, as detailed in individual Specification sections

E. Contractor Responsibilities

Contractor shall schedule physical arrangements for meetings throughout progress of the Work, prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes.

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Meeting Agenda; G

Project Schedule; G

Schedule Of Submittals; G

Schedule Of Values; G

1.03 PRECONSTRUCTION CONFERENCE

A. At least 7 days prior to the Preconstruction Conference, Contractor shall provide the following information to attendees in accordance with the General Conditions:

1. Preconstruction Meeting Agenda
2. Project Schedule
3. Schedule of Submittals
4. Schedule of Values

B. Preconstruction Conference will be held prior to the start of any work at the Site at a time to be arranged. The Contractor is responsible for setting up the meeting, attending, and preparing

minutes of the meeting for distribution to all attendees. At a minimum, the Contractor shall be prepared to discuss the following subjects:

1. Status of Bonds and insurance.
2. Required schedule elements.
3. Sequencing of critical path work items.
4. Progress payment procedures.
5. Project changes and clarification procedures
6. Use of Site, access, office and storage areas, security and temporary facilities.
7. Major product delivery and priorities.
8. Contractor's safety plan and representative.

C. Attendees shall include:

1. Government's representatives.
2. Contractor's project manager
3. Contractor's office representative.
4. Contractor's resident superintendent.
5. Contractor's quality control representative.
6. Contractor's health and safety officer.
7. Subcontractors' representatives whom Contractor may desire or Government may request to attend.
8. Testing and inspection agencies, as appropriate.
9. Others as appropriate.

C. Contractor shall bring copies of the following to the conference in a sufficient number of copies for all attendees:

1. Preliminary Progress Schedule.
2. Preliminary Schedule of Submittals.
3. Preliminary Schedule of Values.
4. List of emergency contacts information for Project Manager, Superintendent, Foreman, Health and Safety Officer including office, field, cellular and home phone numbers. This information shall be posted in the field offices and updated as necessary.

1.04 PRELIMINARY SCHEDULES REVIEW MEETING

As set forth in General Conditions and Section 01 32 16.00, PROJECT SCHEDULE.

1.05 PROGRESS MEETINGS

A. General

Progress meetings shall be held throughout the Project. Contractor shall schedule and conduct regular weekly progress meetings, to review the Work progress. Attendees will include:

1. Government's representative(s).
2. Contractor Project Manager, superintendent, and foreman.
3. Subcontractors, and Suppliers, as appropriate.
4. Others as appropriate.

The Contractor shall administer the following general requirements for the Progress Meetings:

1. Prepare and distribute the agenda and related attachments for meetings.
2. Make physical arrangements for meetings.
3. Preside at meetings.
4. Record the minutes, including a detailed description of proceedings and decisions.

The Contractor shall be responsible for recording the minutes of all Progress Meetings and including any significant proceedings and decisions. The Contractor shall reproduce and submit to the Government an electronic copy of the minutes of the meeting within 2 business days. After the Government's review and approval, the Contractor shall distribute copies to each participant in the meeting and to parties affected by decisions made at the meeting.

B. Meeting Topics

At a minimum the following information shall be addressed at each progress meetings:

1. Review and approval of the minutes of the previous meeting.

2. Review of health and safety issues.

3. Review of work progress.

4. Permit/permit equivalency activities.

5. Field observations, problems, and conflicts.

6. Review and revision of the project schedule, including:

    a. Review of problems and proposed changes for their effect on construction, completion date, and other contracts of the project, and corrective actions proposed to regain the projected schedule.
    b. Review of offsite delivery schedules.
    c. Coordination of schedules, including review and expedition, as required, of submittal schedules.
    d. Planned progress during the succeeding work period based on the current project schedule.
    e. Milestone dates.
    f. Estimate percent complete versus accepted schedule planned percent complete.

7. Review of transmittals submitted to USACE, submittals returned from USACE, transmittals pending re-submittal, and Requests for Information (RFIs).

8. Review of quality control, including all completed inspections (Preparatory Phase, Initial Phase, Follow-Up Phase, Pre-Final, and Final), scheduled inspections, and the deficiency tracking system.

9. Pending and proposed changes and substitutions.

10. Progress payment.

11. Remedial Action Report development.

12l. Community relations issues.

13. Review of old business.

14. Review of new business.

C. Handouts

Contractor shall bring to each progress meeting copies of the following handouts in adequate quantity for all meeting attendees:

1. Agenda
2. List of Work accomplished since the previous progress meeting
3. Up-to-date Progress Schedule
4. Up-to-date Schedule of Submittals
5. List of Work planned to be performed prior to next progress meeting.
6. Other materials as appropriate.

1.06 QUALITY CONTROL MEETINGS

A. Quality Control Meetings will be held in accordance with Section 01 45 00, CONTRACTOR QUALITY CONTROL.

B. Attendees shall include the following:

1. Contractor's Project Manager, Superintendent.
2. Contractor's designated quality control representative.
3. Subcontractors and Suppliers, as necessary.
4. Government's representatives.
5. Others as requested.

1.07 PROCESS INSTRUMENTATION AND CONTROL SYSTEMS (PICS) COORDINATION MEETINGS

A. Contractor shall schedule meetings to review specific requirements of PICS work in accordance with Section 25 01 00 MASTER CONTROL SYSTEM.

B. Attendees shall include the following:

1. Contractor's Project Manager, Superintendent.
2. Government's representatives.
3. PICS Subcontractor/Installer(s).
4. Others as appropriate.

1.08 PREINSTALLATION MEETINGS

When required in individual Specification sections, pre-installation meetings shall be held at the Site prior to commencing the Work of that section. Attendance shall include entities directly affecting, or affected by, the Work of that section. Government representatives shall be notified 7 days in advance of meeting date. The Contractor shall provide a suggested agenda to the Government prior to the meeting which shall include reviewing conditions of installation, preparation and installation or application procedures, and

coordination with related Work and work of others.

1.09 FACILITY STARTUP MEETINGS

A. Contractor shall schedule and attend a minimum of two facility startup meetings. The first of such meetings shall be held prior to submitting Facility Startup Plan, as specified in Section 01 91 14, Equipment Testing and Facility Startup, and shall include preliminary discussions regarding such plan.

B. The Contractor shall prepare an agenda for the meeting. Discussion shall include, but not be limited to, content of Facility Startup Plan, coordination needed between various parties in attendance, and potential problems associated with startup.

C. Attendees shall include:

1. Contractor's Project Manager, Superintendent.
2. Contractor's designated quality control representative.
3. Subcontractors and equipment manufacturer's representatives whom Contractor deems to be directly involved in facility startup.
4. Government's representatives.
5. Contractor's operations personnel.
6. Others as required by Contract Documents or as deemed necessary by Contractor or Government.

1.10 OTHER MEETINGS

In accordance with Contract Documents and as may be required by Government.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 32 16.00

PROJECT SCHEDULE
02/15

PART 1 GENERAL

1.01 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Schedule; G

SD-07 Certificates

Monthly Updates; G

1.02 RESIDENT MANAGEMENT SYSTEM

The Government will use the Resident Management System (RMS) to assist in its monitoring and administration of this Contract, in accordance with Section 01 45 00.15 RESIDENT MANAGEMENT SYSTEM.

1.03 ACCEPTANCE

Prior to the start of work, prepare and submit to the Contracting Officer for acceptance a construction schedule in the form of a Bar Chart Schedule in accordance with the terms in Contract Clause "FAR 52.236-15, Schedules for Construction Contracts," except as modified in this contract.

The acceptance of a Baseline Construction Schedule is a condition precedent to:

a. The Contractor starting work on the demolition or construction stage(s) of the contract.

b. Processing Contractor's invoice(s) for construction activities/items of work.

c. Review of any schedule updates.

Submittal of the Baseline Schedule, and subsequent schedule updates, is understood to be the Contractor's certification that the submitted schedule meets all of the requirements of the Contract Documents, represents the Contractor's plan on how the work will be accomplished, and accurately reflects the work that has been accomplished and how it was sequenced (as-built logic).

1.04 SCHEDULE FORMAT

A. Network Analysis Schedule (NAS)

Use the critical path method (CPM) to schedule and control project activities. Prepare and maintain project schedules using Primavera P6. Importing data into the scheduling program using data conversion techniques or third party software is cause for rejection of the submitted schedule. Build the schedule as follows:

a. The Project Schedule must show submittals, Government review periods, material/equipment delivery, utility outages, all on-site construction, inspection, testing, and closeout activities. Government and Contractor on-site work activities must be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days.

b. With the exception of the Contract Award and End Contract milestone activities, no activities shall be open-ended; each activity must have predecessor and successor ties. No activity must have open start or open finish (dangling) logic. Minimize redundant logic ties. Once an activity exists on the schedule it must not be deleted or renamed to change the scope of the activity and must not be removed from the schedule logic without approval from the Contracting Officer. While an activity cannot be deleted, where said activity is no longer applicable to the schedule but must remain within the logic stream for historical record, it can be changed to a milestone. Document any such change in the milestone's "Notebook", including a date and explanation for the change. The ID number for a deleted activity must not be re-used for another activity.

c. Each activity must be assigned its appropriate Responsibility Code indicating responsibility to accomplish the work indicated by the activity, Phase Code and Work Location Code.

d. Date/time constraint(s) and/or lags, other than those required by the contract, are not allowed unless accepted by the Contracting Officer. Include as the last activity in the contract schedule, a milestone activity named "Contract Completion Date".

1. Primavera P6 Settings and Parameters

Use the following Primavera P6 settings and parameters in preparing the Baseline Schedule. Deviation from these settings and parameters, without prior consent of the Contracting Officer, is cause for rejection of schedule submission.

a. General: Define or establish Calendars and Activity Codes at the "Project" level, not the "Global" level.

b. Admin Drop-Down Menu, Admin Preferences, Time Periods

Tab:

(1) Set time periods for P6 to 8.0 Hours/Day, 40.0 Hours/Week, 172.0 Hours/Month and 2000.0 Hours/Year.
(2) Use assigned calendar to specify the number of work hours for each time period: Must be checked.

c. Project Level, Dates Tab:

(1) Set "Must Finish By" date to "Contract Completion Date".

d. Project Level, Defaults Tab:

(1) Duration Type: Set to "Fixed Duration & Units".
(2) Percent Complete Type: Set to "Physical".
(3) Activity Type: Set to "Task Dependent".
(4) Calendar: Set to "Standard 5 Day Workweek". Calendar must reflect Saturday, Sunday and all Federal holidays as non-work days. Alternative calendars may be used with Contracting Officer approval.

e. Project Level, Calculations Tab:

(1) Activity percent complete based on activity steps: Must be Checked.
(2) Reset Remaining Duration and Units to Original: Must be Checked.
(3) Subtract Actual from At Completion: Must be Checked.
(4) Recalculate Actual units and Cost when duration percent(%) complete changes: Must be Checked.
(5) Link Actual to Date and Actual This Period Units and Cost: Must be Checked.

f. Project Level, Settings Tab:

(1) Define Critical Activities: Check "Total Float is less than or equal to" and add "0d".

g. No on-site construction activity may have durations in excess of 20 working days.

B. Bar Chart Schedule

The Bar Chart must, as a minimum, show work activities, submittals, Government review periods, material/equipment delivery, utility outages, on-site construction, inspection, testing, and closeout activities. The Bar Chart must be time scaled and generated using an electronic spreadsheet program.

C. Schedule Submittals and Procedures

Submit NAS and Bar Chart Schedules and updates in hard copy and on electronic media that is acceptable to the Contracting Officer. Submit an electronic back-up of the project schedule in an import format compatible with the Government's scheduling program.

1.05 SCHEDULE MONTHLY UPDATES

Update the Construction Schedule at monthly intervals or when the schedule has been revised. The updated schedule must be kept current, reflecting actual activity progress and plan for completing the remaining work. Submit copies of purchase orders and confirmation of delivery dates as directed by the Contracting Officer.

a. Narrative Report: Provide with schedule updates. Identify and justify;

(1) Progress made in each area of the project
(2) Critical Path
(3) Date/time constraint(s), other than those required by the contract
(4) Changes in the following; added or deleted activities, original and remaining durations for activities that have not started, logic, milestones, planned sequence of operations, and critical path
(5) Status of Contract Completion Date and interim milestones;
(6) Current and anticipated delays (describe cause of delay and corrective actions(s) and mitigation measures to minimize);
(7) Description of current and future schedule problem areas.

Each entry in the narrative report must cite the respective Activity ID and Activity Description, the date and reason for the change, and description of the change.

1.06 CONTRACT MODIFICATION

Submit a Time Impact Analysis (TIA) with each cost and time proposal for a proposed change. TIA must illustrate the influence of each change or delay on the Contract Completion Date or milestones. No time extensions will be granted nor delay damages paid unless a delay occurs which consumes all available Project Float, and extends the Projected Finish beyond the Contract Completion Date.

a. Each TIA must be in both narrative and schedule form. The narrative must define the scope and conditions of the change; provide start and finish dates of impact, successor and predecessor activity to impact period, responsible party, describe how it originated, and how it impacts the schedule. The schedule submission must consist of three native files:

(1) Fragnet used to define the scope of the changed condition

(2) Most recent accepted schedule update as of the time of the proposal or claim submission that has been updated to show all activity progress as of the time of the impact start date.

(3) The impacted schedule that has the fragnet inserted in the updated schedule and the schedule "run" so that the new completion date is determined.

b. For claimed as-built project delay, the inserted fragnet TIA method must be modified to account for as-built events known to occur after the data date of schedule update used.

c. All TIAs must include any mitigation, and must determine the

apportionment of the overall delay assignable to each individual delay. The associated narrative must clearly describe the findings in a chronological listing beginning with the earliest delay event.

1) Identify types of delays as follows:

(a) Excusable Delay: Force-Majeure (e.g., weather) - Contractor may receive time extension, but time will not be compensable.
(b) Inexcusable Delay: Contractor Responsibility - Contractor will not receive time extension.
(c) Compensable Delay: Government Responsibility - Contractor may receive compensable time extension.

2) If a combination of any of the delay types outlined above occurs, it is considered a Concurrent Delay, which will require an analysis of the facts to determine compensability and entitlement to any time extension under the applicable contract clauses.

d. Submit Data disks containing the narrative and native schedule files.

e. Unless the Contracting Officer requests otherwise, only add conformed contract modifications into the Project NAS.

1.07 3-WEEK LOOK AHEAD SCHEDULE

Prepare and issue a 3-Week Look Ahead schedule to provide a more detailed day-to-day plan of upcoming work identified on the Construction Schedule. Key the work plans to activity numbers when a NAS is required and update each week to show the planned work for the current and following two-week period. Additionally, include upcoming outages, closures, preparatory meetings, and initial meetings.

Identify critical path activities on the Three-Week Look Ahead Schedule. The detail work plans are to be bar chart type schedules, maintained separately from the Construction Schedule on an electronic spreadsheet program and printed on 8-1/2 by 11 inch sheets as directed by the Contracting Officer. Activities must not exceed 5 working days in duration and have sufficient level of detail to assign crews, tools and equipment required to complete the work. Deliver three hard copies and one electronic file of the 3-Week Look Ahead Schedule to the Contracting Officer no later than 8 a.m. each Monday, and review during the weekly CQC Coordination or Production Meeting.

1.08 CORRESPONDENCE AND TEST REPORTS:

All correspondence (e.g., letters, Requests for Information (RFIs), e-mails, meeting minute items, Production and QC Daily Reports, material delivery tickets, photographs) must reference Schedule Activities that are being addressed. All test reports (e.g., concrete, soil compaction, weld, pressure) must reference Schedule Activitiesthat are being addressed.

For ease and speed of communications, exchange correspondence and other documents in electronic format to the maximum extent feasible. Some correspondence, including pay requests and payrolls, are also to

be provided in paper format with original signatures. Paper documents will govern, in the event of discrepancy with the electronic version.

1.09 ADDITIONAL SCHEDULING REQUIREMENTS

Any references to additional scheduling requirements, including systems to be inspected, tested and commissioned, that are located throughout the remainder of the Contract Documents, are subject to all requirements of this section.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES
05/11

PART 1 GENERAL

1.01 SUMMARY

The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections.

Units of weights and measures used on all submittals are to be the same as those used in the Contract Drawings.

Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with Contract requirements.

Contractor's Quality Control (CQC) System Manager shall check and approve all items prior to submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

Submittals requiring Government approval are to be scheduled and made prior to the acquisition of the material or equipment covered thereby. Pick up and dispose of samples not incorporated into the work in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

A submittal register showing items of equipment and materials for which submittals are required by the specifications is provided as " Appendix A - Submittal Register". The Contractor shall amend and update this register as appropriate throughout the Project.

1.02 RESIDENT MANAGEMENT SYSTEM

The Government will use the Resident Management System (RMS) to assist in its monitoring and administration of this contract. The Government accesses the system using the Government Mode of RMS (RMS GM) and the Contractor accesses the system using the Contractor Mode (RMS CM). The term RMS will be used in the remainder of this section for both RMS GM and RMS CM. The joint Government-Contractor use of RMS facilitates electronic exchange of information and overall management of the contract. The Contractor accesses RMS to record, maintain, input, track, and electronically share information with the Government throughout the contract period in the following areas:

Administration
Finances
Quality Control
Submittal Monitoring
Scheduling

Closeout
Import/Export of Data

1.03 DEFINITIONS

A. Types of Submittals

Action Submittal: Written and graphic information submitted by Contractor that requires Government's approval.

Information Submittal: Information submitted by Contractor that requires Government's review and determination that submitted information is in accordance with the Conditions of the Contract.

1. Submittal Descriptions (SD)

SD-01 Preconstruction Submittals

Submittals which are required prior to the start of Work, includes schedules, tabular list of data, or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

Examples include:

Certificates of insurance

Surety bonds

List of proposed Subcontractors

List of proposed products

Construction progress schedule

Submittal register

Schedule of prices or Earned Value Report

Health and safety plan

Work plan

Contractor's Quality Control(QC) plan

Environmental protection plan

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how

multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Design calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. Unless specified in another section, testing must have been within three years of date of contract award for the project.

Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports.

Daily logs and checklists.

Final acceptance test and operational test procedure.

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that the product, system, or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier, installer or Subcontractor through Contractor. The document purpose is to further promote the orderly progression of a portion of the work by documenting procedures, acceptability of methods, or personnel qualifications.

Confined space entry permits.

Text of posted operating instructions.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and (MSDS)concerning impedances, hazards and safety precautions.

SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must be signed by an authorized official of a testing laboratory or agency and state the test results; and indicate whether the material, product, or system has passed or failed the test.

Factory test reports.

SD-10 Operation and Maintenance Data

Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel, including manufacturer's help and product line documentation necessary to maintain and install equipment. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

This data is intended to be incorporated in an operations and maintenance manual or control system.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Submittals required for Guiding Principle Validation (GPV) or Third Party Certification (TPC).

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

B. Approving Authority

Office or designated person authorized to approve submittal.

C. Work

As used in this section, on- and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.04 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit in accordance with this section.

1.05 TRANSMITTAL OF SUBMITTAL

A. Correspondence and Electronic Communications

For ease and speed of communications, exchange correspondence and other documents in electronic format to the maximum extent feasible using the RMS software. Some correspondence are also to be provided in paper format with original signatures. Paper documents will govern, in the event of discrepancy with the electronic version.

For documents not submitted through the RMS, direct submittals to Government at the address in the Contract Documents. As directed by the Government, a complete electronic copy of select submittals will be provided to EPA for EPA to upload to their Superfund Enterprise Management System (SEMS) Document Management System (SDMS).

B. Prior to Transmittal

1. Contractor shall:

a. Review each submittal and check for compliance with Contract Documents.

b. Stamp each submittal with uniform approval stamp before submitting.

1) Stamp to include Project name, submittal number, Specification number, Contractor's reviewer name, date of Contractor's approval, and statement certifying submittal has been reviewed, checked, and approved for compliance with Contract Documents.

2) Submittals that do not bear Contractor's approval stamp will not be reviewed and will be returned without action.

C. Transmittal Form

Complete, sign, and transmit with each submittal package, one transmittal form. Use the attached sample transmittal form (Appendix B ENG Form 4025-R) for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms are included in the Quality Control System (QCS) software that the Contractor is required to use for this Contract. Properly complete this form by filling out all the heading blank spaces and identifying each item submitted. Exercise special care to ensure proper listing of the specification paragraph and sheet number of the contract drawings pertinent to the data submitted for each item. Identify and describe each deviation or variation from Contract Documents.

1.06 ACTION SUBMITTALS

A. Prepare and submit Action Submittals required by individual Specification sections.

B. Shop Drawings

1. Copies: Three copies unless otherwise specified.

2. Identify and indicate:

a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.

b. Equipment and Component Title: Identical to title shown on Drawings.

c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.

d. Project-specific information drawn accurately to scale.

3. Manufacturer's standard schematic drawings

a. Modify to delete information that is not applicable to the Work.

b. Supplement standard information to provide information

specifically applicable to the Work.

4. Product Data: Provide as specified in individual Specifications.

5. Deferred Submittal: See Contract Drawings for list of deferred submittals.

   a. Contractor-design drawings and product data related to permanent construction.

      1) Written and graphic information
      2) Drawings.
      3) Cut sheets.
      4) Data sheets.
      5) Action item submittals requested in individual Specification section.

   b. Prior to installation of indicated structural or nonstructural element, equipment, distribution system, or component or its anchorage, submit required supporting data and drawings for review and acceptance by Government. Documentation of review and approval provided on Government's comment form, along with completed submittal, and approved by permitting agency prior to installation.

6. Foreign Manufacturers: When proposed, include names and addresses of at least two companies that maintain technical service representatives close to Project.

C. Samples.

1. Copies: Three copies unless otherwise specified.

2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:

   a. Manufacturer name.

   b. Model number.

   c. Material.

   d. Sample source.

3. Manufacturer's Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.

4. Full-size Samples:

   a. Size as indicated in individual Specification section.

   b. Prepared from same materials to be used for the Work.

   c. Cured and finished in manner specified.

   d. Physically identical with product proposed for use.

1.07 INFORMATIONAL SUBMITTALS

A. General

1. Refer to individual Specification sections for specific submittal requirements.

2. Copies: Three, unless otherwise specified in individual Specifications.

3. Contracting Officer will review each submittal. If submittal meets conditions of the Contract, Contracting Officer will forward copy to appropriate parties. If Government determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, Contracting Officer will retain one copy and return remaining copy with review comments to Contractor, and require that submittal be corrected and resubmitted.

B. Certificates

1. General:

a. Provide notarized statement that includes signature of entity responsible for preparing certification.

b. Signed by officer or other individual authorized to sign documents on behalf of that entity.

2. Welding: In accordance with individual Specification sections.

3. Installer: Prepare written statements on manufacturer's letterhead certifying installer complies with requirements as specified in individual Specification section.

4. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual Specification sections.

6. Manufacturer's Certificate of Compliance: In accordance with Section 01 43 33, MANUFACTURERS' FIELD SERVICES.

7. Manufacturer's Certificate of Proper Installation: In accordance with Section 01 43 33, MANUFACTURERS' FIELD SERVICES.

C. Construction Photographs: In accordance with Section 01 31 13, PROJECT COORDINATION, and as may otherwise be required in Contract Documents.

D. Meeting Documentation: In accordance with Section 01 31 19, PROJECT MEETINGS and 01 45 00, CONTRACTOR QUALITY CONTROL.

E. Closeout Submittals: In accordance with Section 01 78 00, CLOSEOUT

SUBMITTALS.

F. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual Specification section.

G. Operation and Maintenance Data: As required in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

H. Payment: In accordance with Section 01 25 00, MEASUREMENT AND PAYMENT.

I. Quality Control Documentation: As required in Section 01 45 00, CONTRACTOR QUALITY CONTROL.

J. Schedules: In accordance with Section 01 32 16.00, PROJECT SCHEDULE.

K. Special Guarantee: Supplier's written guarantee as required in individual Specification sections

L. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty Subcontractor, trade, Specialist, consultant, installer, and other professionals.

M. Submittals Required by Laws, Regulations, and Governing Agencies:

1. Promptly submit notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.

2. Transmit to Government one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.

N. Test, Evaluation, and Inspection Reports:

1. General: Shall contain signature of person responsible for test or report.

2. Factory

a. Identification of product and specification section, type of inspection or test with referenced standard or code.

b. Date of test, Project title and number, and name and signature of authorized person.

c. Test results.

d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.

e. Provide interpretation of test results, when requested by Government.

f. Other items as identified in individual Specification sections.

3. Field

a. As a minimum, include the following:

1) Project title and number.
2) Date and time.
3) Record of temperature and weather conditions.
4) Identification of product and specification section.
5) Type and location of test, Sample, or inspection, including referenced standard or code.
6) Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
7) If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
8) Provide interpretation of test results, when requested by Government.
9) Other items as identified in individual Specification sections.

O. Testing and Startup Data: In accordance with Section 01 91 14, EQUIPMENT TESTING AND FACILITY STARTUP.

P. Training Data: In accordance with Section 01 43 33, MANUFACTURERS' FIELD SERVICES.

1.08 SUBMITTAL REGISTER

Prepare and maintain submittal register, as the work progresses. A submittal register showing items of equipment and materials for which submittals are required by the specifications is provided as an attachment. This list may not be all inclusive and additional submittals may be required.

A. Use of Submittal Register

1. Submit submittal register. Submit with CQC Plan and project schedule. Verify that all submittals required for project are listed and add missing submittals.

2. Coordinate and complete the following fields on the register submitted with the CQC Plan and the project schedule:

a. Activity number from the project schedule.

b. Contractor Submit Date: Scheduled date for approving authority to receive submittals.

c. Contractor Approval Date: Date Contractor needs approval of submittal.

d. Contractor Material: Date that Contractor needs material delivered to Contractor control.

e. Receipt Date: Date Government received submittal.

f. Return Date: Date Government returned submittal.

B. Copies Delivered to the Government

Deliver one copy of submittal register updated by Contractor to Government with each invoice request.

1.09 SCHEDULING

Schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Include certifications to be submitted with the pertinent drawings at the same time. No delay damages or time extensions will be allowed for time lost in late submittals.

A. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential resubmittal of requirements.

B. Submittals called for by the Contract Documents will be listed on the register. If a submittal is called for but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the Contract Documents but which have been omitted from the register or marked "N/A."

C. Carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

1.10 GOVERNMENT APPROVING AUTHORITY

When approving authority is Contracting Officer, the Government will:

a. Note date on which submittal was received.

b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and compliance with contract documents.

c. Identify returned submittals with one of the actions defined in paragraph REVIEW NOTATIONS and with markings appropriate for action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date submittals. One copy of the submittal will be retained by the Contracting Officer and the remaining copies of the submittal will be returned to the Contractor.

A. Review Notations

Contracting Officer review will be completed within 30 calendar days after date of submission. Submittals will be returned to the Contractor with the following notations:

a. Submittals marked "approved" or "accepted" authorize the Contractor to proceed with the work covered.

b. Submittals marked "approved as noted" or "approved, except as noted, resubmittal not required," authorize the Contractor to proceed with the work covered provided he takes no exception to the corrections.

c. Submittals marked "not approved" or "disapproved," or "revise and resubmit," indicate noncompliance with the contract requirements or design concept, or that submittal is incomplete. Resubmit with appropriate changes. No work shall proceed for this item until resubmittal is approved.

d. Submittals marked "not reviewed" will indicate submittal has been previously reviewed and approved, is not required, does not have evidence of being reviewed and approved by Contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by Contractor or for being incomplete, with appropriate action, coordination, or change.

1.11 REJECTED SUBMITTALS

Make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications; notice as required under the FAR clause entitled CHANGES, is to be given to the Contracting Officer. Contractor is responsible for the dimensions and design of connection details and construction of work. Failure to point out deviations may result in the Government requiring rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, make such revisions and submission of the submittals in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

1.12 APPROVED SUBMITTALS

The Contracting Officer's approval or acceptance of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing and other information are satisfactory.

Approval or acceptance will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work.

After submittals have been approved or accepted by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.13 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not be construed to change or modify any contract requirements. Before submitting samples, the Contractor to assure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Match the approved samples for materials and equipment incorporated in the work. If requested, approved samples, including those which may be damaged in testing, will be returned to the Contractor, at his expense, upon completion of the contract. Samples not approved will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make of that material. Government reserves the right to disapprove any material or equipment which previously has proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the Contracting Officer for testing. Samples failing to meet contract requirements will automatically void previous approvals. Contractor to replace such materials or equipment to meet contract requirements.

Approval of the Contractor's samples by the Contracting Officer does not relieve the Contractor of his responsibilities under the contract.

1.14 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE

For use of this form, see ER 415-1-10; the proponent agency is CECW-CE.

DATE	TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (*This section will be initiated by the contractor*)

TO:	FROM:	CONTRACT NO.	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL _____

SPECIFICATION SEC. NO. (*Cover only one section with each transmittal*)	PROJECT TITLE AND LOCATION	THIS TRANSMITTAL IS FOR: (*Check one*) ☐ FIO ☐ GA ☐ DA ☐ CR ☐ DA/CR ☐ DA/GA

ITEM NO. (*See Note 3*) a.	DESCRIPTION OF SUBMITTAL ITEM (*Type size, model number/etc.*) b.	SUBMITTAL TYPE CODE (*See Note 8*) c.	NO. OF COPIES d.	CONTRACT DOCUMENT REFERENCE		CONTRACTOR REVIEW CODE g.	VARIATION Enter "Y" if requesting a variation (*See Note 6*) h.	USACE ACTION CODE (*Note 9*) i.
				SPEC. PARA. NO. e.	DRAWING SHEET NO. f.			

REMARKS	I certify that the above submitted items had been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.
	NAME OF CONTRACTOR / SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (*List by item No.*)	NAME AND TITLE OF APPROVING AUTHORITY	SIGNATURE OF APPROVING AUTHORITY	DATE

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.

2. Each Transmittal shall be numbered consecutively. The Transmittal Number typically includes two parts separated by a dash (-). The first part is the specification section number. The second part is a sequential number for the submittals under that spec section. If the Transmittal is a resubmittal, then add a decimal point to the end of the original Transmittal Number and begin numbering the resubmittal packages sequentially after the decimal.

3. The "Item No." for each entry on this form will be the same "Item No." as indicated on ENG FORM 4288-R.

4. Submittals requiring expeditious handling will be submitted on a separate ENG Form 4025-R.

5. Items transmitted on each transmittal form will be from the same specification section. Do not combine submittal information from different specification sections in a single transmittal.

6. If the data submitted are intentionally in variance with the contract requirements, indicate a variation in column h, and enter a statement in the Remarks block describing he detailed reason for the variation.

7. ENG Form 4025-R is self-transmitting - a letter of transmittal is not required.

8. When submittal items are transmitted, indicate the "Submittal Type" (*SD-01 through SD-11*) in column c of Section I.
   Submittal types are the following:

   SD-01 - Preconstruction SD-02 - Shop Drawings SD-03 - Product Data SD-04 - Samples SD-05 - Design Data SD-06 - Test Reports
   SD-07 - Certificates SD-08 - Manufacturer's Instructions SD-09 - Manufacturer's Field Reports SD-10 - O&M Data SD-11 - Closeout

9. For each submittal item, the Contractor will assign Submittal Action Codes in column g of Section I. The U.S. Army Corps of Engineers approving authority will assign Submittal Action Codes in column i of Section I. The Submittal Action Codes are:

   A -- Approved as submitted.
   B -- Approved, except as noted on drawings. Resubmission not required.
   C -- Approved, except as noted on drawings. Refer to attached comments. Resubmission required.
   D -- Will be returned by separate correspondence.
   E -- Disapproved. Refer to attached comments.
   F -- Receipt acknowledged.
   X -- Receipt acknowledged, does not comply with contract requirements, as noted.
   G -- Other action required *(Specify)*
   K -- Government concurs with intermediate design. (*For D-B contracts*)
   R -- Design submittal is acceptable for release for construction. (*For D-B contracts*)

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract.

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

CDE OU4 Phase 3: Groundwater Hydraulic Containment

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		01 31 13	SD-01 Preconstruction Submittals															
			Name And Experience Of The	1.03	G													
			Project Manager															
			Organizational Chart	1.03	G													
			Land Survey Statement Of	1.11	G													
			Qualifications															
			SD-02 Shop Drawings															
			Photographic Documentation	1.09	G													
			Video Recordings	1.10	G													
		01 31 19	SD-01 Preconstruction Submittals															
			Preconstruction Meeting Agenda	1.03	G													
			Project Schedule	1.03	G													
			Schedule Of Submittals	1.03	G													
			Schedule Of Values	1.03	G													
		01 32 16.00	SD-01 Preconstruction Submittals															
			Construction Schedule	1.03	G													
			SD-07 Certificates															
			Monthly Updates	1.05	G													
		01 35 29	SD-01 Preconstruction Submittals															
			Accident Prevention Plan/Site	1.04	G													
			Safety And Health Plan															
			(APP/SSHP)															
			SD-02 Shop Drawings															
			Work Zones	3.07 A.	G													
			Decontamination Facilities	3.08 A.	G													
			SD-03 Product Data															

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		01 35 29	Amendments to the APP/SSHP	1.04	G													
			Dust Control Plan	3.04 A.	G													
			Personnel Exposure	3.04	G													
			Monitoring/Air Sampling Program															
			Site Control Log	3.07 B.														
			SSHO's Daily Inspection Logs	1.08	G													
			SD-07 Certificates															
			Certificate Of Worker/Visitor	1.07														
			Acknowledgement															
			Health and Safety Team	1.05	G													
			Qualifications															
			Training Certificates	3.02 A.														
			SD-11 Closeout Submittals															
			Safety And Health Phase-Out	1.09	G													
			Report															
		01 35 45	SD-01 Preconstruction Submittals															
			Uniform Federal Policy Quality	3.03	G													
			Assurance Project Plan															
			SD-03 Product Data															
			Sampling and Analysis Plan	3.03 C.	G													
			SD-06 Test Reports															
			QA Sample Collection and	1.06 B.	G													
			Analysis															
			Chemistry Data Package	3.04	G													
			Chemical Data Final Report	3.07	G													
		01 36 20	SD-01 Preconstruction Submittals															

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		01 36 20	Perimeter Air Monitoring Plan	1.04	G													
			(PAMP)															
			AQS Name And Qualifications	1.06	G													
			SD-06 Test Reports															
			Daily Air Monitoring Summary	1.07 C.2.														
			Report															
			Monthly Air Monitoring Report	1.07 C.3.	G													
			Compilation															
			Meteorological Data	1.07 B.	G													
		01 43 33	SD-10 Operation and Maintenance															
			Data															
			Training Schedule	3.04 B.	G													
		01 45 00	SD-01 Preconstruction Submittals															
			Contractor Quality Control (CQC)	3.02	G													
			Plan															
			SD-06 Test Reports															
			Verification Statement	3.09 B.	G													
		01 45 35	SD-01 Preconstruction Submittals															
			Special Inspections Agency's	3.01 B.	G													
			Written Practices															
			NDT Procedures and Equipment	3.01 B.	G													
			Calibration Records															
			SD-06 Test Reports															
			Daily Reports	3.01 B.	G	AE												
			Biweekly Reports	3.01 A.	G	AE												
			SD-07 Certificates															

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		01 45 35	Certified Fabrication Plant	2.01	G AE												
			AC472 Accreditation	2.01	G AE												
			Special Inspector Qualifications	1.05	G AE												
			Qualification Records for	3.01 B.	G AE												
			nondestructive testing (NDT)														
			technicians														
			Certificate Of Compliance	2.01	G												
			SD-11 Closeout Submittals														
			Interim Final Report of Special	3.01 B.	G												
			Inspections														
			Comprehensive Final Report of	2.01	G AE												
			Special Inspections														
			Comprehensive Final Report of	3.01 B.	G AE												
			Special Inspections														
		01 50 00	SD-01 Preconstruction Submittals														
			Construction Site Plan	1.08	G												
			Traffic Control Plan	3.04 B.	G												
			Permits And Approvals	1.03	G												
			Temporary Utility Plan	1.04	G												
			Temporary Site Facility Plan	1.05	G												
			Noise Control Plan	1.06	G												
			SD-06 Test Reports														
			Backflow Preventer Tests	2.05	G												
			SD-07 Certificates														
			Backflow Tester	1.09 A.													
			Backflow Preventers	1.09													

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		01 50 00	Backflow Prevention Training	1.09 B.														
			Certificate															
		01 57 13	SD-01 Preconstruction Submittals															
			Stormwater, Sediment And Soil	1.05	G													
			Erosion Control Plan															
			Contact Water Handling And	3.01	G													
			Treatment Plan															
		01 57 19	SD-01 Preconstruction Submittals															
			Environmental Protection Plan	1.04	G													
		01 67 00	SD-01 Preconstruction Submittals															
			Renewable Energy Program	3.01	G													
			Fuel Purchase Program	3.02	G													
			GAC Regeneration Facility	3.03	G													
			Information															
			Recycling Facility Information	3.03	G													
			Paper Product Literature	3.03	G													
			SD-07 Certificates															
			Green Remediation	3.03														
			Documentation															
		01 74 19	SD-01 Preconstruction Submittals															
			Waste Minimization Plan	1.05	G													
			SD-11 Closeout Submittals															
			Records	1.06	G													
		01 78 00	SD-03 Product Data															
			Warranty Management Plan	1.10 A.	G													
			Warranty Tags	1.10 D.	G													

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		01 78 00	Final Site Cleanup	3.06	G													
			Spare Parts Data	1.07	G													
			SD-10 Operation and Maintenance															
			Data															
			Operation and Maintenance	3.05	G													
			Manuals															
			SD-11 Closeout Submittals															
			As-Built Drawings	3.02	G													
			Record Drawings	3.03	G													
			Certification of EPA Designated	2.01	G													
			Items															
			Remedial Action Report	1.04	G													
			Remedial Action Report	3.01	G													
		01 78 23	SD-10 Operation and Maintenance															
			Data															
			O&M Database	1.04	G													
		01 88 15	SD-02 Shop Drawings															
			Anchorage Drawings And	2.02	G	AE												
			Calculations															
			List Of Equipment	2.02	G													
			Seismic Attachment Assemblies'	2.02	G	AE												
			Drawings															
			SD-03 Product Data															
			Manufacturers' Engineered	2.02	G	AE												
			Seismic Hardware Product Data															
			SD-05 Design Data															

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		01 88 15	Seismic Anchorage And Bracing	2.02	G	AE												
			Calculations															
			SD-08 Manufacturer's Instructions															
			Manufacturer's Seismic	2.02	G													
			Hardware Installation															
			Requirements															
		01 91 14	SD-01 Preconstruction Submittals															
			Facility Startup And Performance	1.04	G													
			Demonstration Plan															
			SD-06 Test Reports															
			Unit Process Startup Form	3.04	G													
			Functional And Performance Test	3.04	G													
			Results															
			Equipment Test Report	3.02 C.	G													
			SD-07 Certificates															
			Facility Performance	3.04														
			Demonstration/Certification Form															
			And Report															
			Manufacturer's Certificate Of	3.02 B.														
			Proper Installation															
		01 92 00	SD-07 Certificates															
			Training Certificate	1.06														
			SD-10 Operation and Maintenance															
			Data															
			Operation And Maintenance Plan	1.05	G													
			Progress Reports	1.07	G													

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		01 92 00	Regulatory-Required Monitoring	1.07	G													
			Reports															
			SD-11 Closeout Submittals															
			Transition Plan	1.06	G													
			Annual Status Report	1.08	G													
		02 81 00	SD-01 Preconstruction Submittals															
			Waste Management Plan	1.05 D.	G													
			SD-03 Product Data															
			Onsite Hazardous Waste	3.01	G													
			Management															
			SD-06 Test Reports															
			Recordkeeping	3.08	G													
			Spill Response Reporting	3.09	G													
			Exception Report	3.08	G													
			SD-07 Certificates															
			Transporter Certification	1.05 C.														
			Security Plan	1.05 B.	G													
			Designated Transportation and	1.05 A.														
			Disposal Coordinator															
			Training Certificates	1.05 B.														
			Off-Site Policy Certification Memo	1.05 D.														
			Certificates of Disposal	1.05 F.														
			Waste Minimization Certification	3.07														
			Vehicle Decontamination	1.05 E.														
			Verification															

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		02 81 00	Notices Of Non-Compliance And	3.06														
			Notices Of Violations															
			Information Necessary To File	3.08	G													
			State Annual Or EPA Biennial															
			Reports															
			SD-11 Closeout Submittals															
			Closeout Submittals	1.05 F.	G													
			Truck Manifests	1.05 F.	G													
		03 15 00.00	SD-02 Shop Drawings															
			Waterstops	2.04	G	AE												
			SD-03 Product Data															
			Preformed Expansion Joint Filler	2.02	G	AE												
			Waterstops	2.04	G	AE												
			SD-04 Samples															
			Field-Molded Type Sealant	2.03 C.	G	AE												
			Sealant	2.03	G	AE												
			Sample Of Each Waterstop	2.04	G	AE												
			Material															
			SD-06 Test Reports															
			Certified Manufacturer's Test	2.02	G	AE												
			Reports For Premolded Expansion															
			Joint Filler Strips															
			SD-07 Certificates															
			Preformed Expansion Joint Filler	2.02	G	AE												
			Waterstops	2.04	G	AE												
			Sealant	2.03	G	AE												

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		03 20 00.00	SD-02 Shop Drawings															
			Detail Drawings	3.01	G	AE												
			Support Details	3.01	G	AE												
			SD-03 Product Data															
			Reinforcing Steel	2.01	G	AE												
			SD-06 Test Reports															
			Mill Reports	2.01	G	AE												
		03 30 00.00	SD-01 Preconstruction Submittals															
			Laboratory Qualifications And Accreditation	1.04 A.3.	G	AE												
			Concrete Quality Control Program	1.04 B.	G	AE												
			Sampling Program For Materials Testing	1.04 B.	G	AE												
			SD-02 Shop Drawings															
			Formwork	1.04 E.	G	AE												
			Construction Joint Layout	1.04 E.	G	AE												
			SD-03 Product Data															
			Chemical Admixtures	2.04 F.	G	AE												
			Floor Hardener	2.08	G	AE												
			Cementitious Materials	2.02	G	AE												
			Floor Finish	2.01 E.	G	AE												
			SD-05 Design Data															
			Design Mix	2.02 G.	G	AE												
			SD-06 Test Reports															
			Compressive Strength	2.01 F.4.	G	AE												

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		03 30 00.00	Slump	2.01 I.	G	AE												
			Aggregates	2.03	G	AE												
			Testing And Inspection For CQC	3.07	G	AE												
			Mix Water	2.05	G	AE												
			Mixture Proportions	2.01 A.	G	AE												
			Fly Ash	2.02 C.	G	AE												
			Ground Granulated	2.02 F.	G	AE												
			Blast-Furnace (GGBF) Slag															
			Air Content	3.07 E.1.	G	AE												
			SD-07 Certificates															
			Ready-Mix Plant	3.02 A.	G	AE												
			Contractor Quality Control	1.04	G	AE												
			Personnel															
		03 35 43	SD-03 Product Data															
			Polish	3.01	G	AE												
			Stain	3.02	G	AE												
			SD-04 Samples															
			Field Sample Panels	1.04 A.	G	AE												
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Written	3.01	G	AE												
			Instructions															
			Manufacturer's Written	3.02	G	AE												
			Instructions															
		03 39 00.00	SD-03 Product Data															
			Concrete Curing Compound	2.01	G	AE												
			SD-06 Test Reports															

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		03 39 00.00	Testing And Inspection For CQC	3.02	G	AE												
			SD-08 Manufacturer's Instructions															
			Concrete Curing Compound	2.01	G	AE												
		05 50 13	SD-02 Shop Drawings															
			Structural Steel Door Frames	2.07	G	AE												
			Floor Gratings	2.04	G	AE												
			Bollards/Pipe Guards	2.05	G	AE												
			Angles and Plates	2.06	G	AE												
			SD-03 Product Data															
			Corner Guards	2.03	G	AE												
			Floor Gratings	2.04	G	AE												
			Structural Steel Door Frames	2.07	G	AE												
		06 41 16.00	SD-02 Shop Drawings															
			Shop Drawings	2.07	G	AE												
			Installation Drawings	3.01	G	AE												
			SD-03 Product Data															
			Wood Materials	2.01	G	AE												
			Wood Finish	1.02	G	AE												
			Finish Schedule	1.02	G	AE												
			Laminate Clad Casework	3.01	G	AE												
			SD-04 Samples															
			Plastic Laminates	2.03	G													
			Cabinet Hardware	2.04	G													
			SD-07 Certificates															
			Quality Control Statement	1.04	G	AE												
		06 65 00	SD-03 Product Data															

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ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY					MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		06 65 00	Manufacturer's Data Sheets On	2.05	G	AE												
			Each Product To Be Used															
			SD-04 Samples															
			Verification Samples	2.05	G	AE												
			SD-07 Certificates															
			Manufacturer's Certificates	2.05	G	AE												
			SD-08 Manufacturer’s Instructions															
			Preparation Instructions	2.05	G	AE												
			Storage And Handling	2.05	G	AE												
			Requirements															
			Installation Methods	2.05	G	AE												
			SD-10 Operation and Maintenance															
			Data															
			Maintenance Instructions	2.05	G	AE												
		06 83 16	SD-03 Product Data															
			Each Type Of Product Required	2.04	G	AE												
			SD-04 Samples															
			Finish, Colors, Patterns, And	2.04	G	AE												
			Textures															
			SD-06 Test Reports															
			Test And Evaluation Reports	2.04	G	AE												
			SD-07 Certificates															
			Certification	2.04	G	AE												
			Manufacturer's Project	2.04	G	AE												
			References															
			Installer's Project References	2.04	G	AE												

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		06 83 16	SD-08 Manufacturer’s Instructions															
			Manufacturer's Installation And	2.04	G	AE												
			Storage Instructions															
			Care And Maintenance	2.04	G	AE												
			Instructions															
			SD-11 Closeout Submittals															
			Manufacturer's Standard	2.04	G	AE												
			Warranty															
		07 10 00	SD-03 Product Data															
			Data Sheets On Each Product To	2.04	G	AE												
			Be Used															
			SD-08 Manufacturer’s Instructions															
			Preparation Instructions	2.04	G	AE												
			Storage And Handling	2.04	G	AE												
			Requirements															
			Installation Methods	2.04	G	AE												
			SD-11 Closeout Submittals															
			Warranty	2.04	G	AE												
		07 11 13	SD-07 Certificates															
			Manufacturer's Original Labeling	1.03														
		07 22 00	SD-03 Product Data															
			Insulation	2.01	G	AE												
			Fasteners	2.04	G	AE												
			Moisture Control	2.03	G	AE												
			Felt Materials	1.03	G	AE												
			SD-06 Test Reports															

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		07 22 00	Flame Rating Test Results	1.04 A.	G													
			SD-07 Certificates															
			Qualifications	1.03	G	AE												
			Recycling Content Certificate	1.03														
			SD-08 Manufacturer’s Instructions															
			Roof Insulation	2.01 C.	G	AE												
			Nails And Fasteners	2.04	G	AE												
			Nails And Fasteners	2.04 B.	G	AE												
			Manufacturer's Installation	2.04 B.	G	AE												
			Instructions															
		07 26 00	SD-03 Product Data															
			Manufacturer's Data Sheets On	2.04	G	AE												
			Each Product															
			SD-04 Samples															
			Verification Samples	2.04	G	AE												
			Samples Of Reinforced Vapor	2.04	G	AE												
			Retarder															
			SD-08 Manufacturer’s Instructions															
			Preparation Instructions	2.04	G	AE												
			Storage And Handling	2.04	G	AE												
			Requirements															
			Installation Methods	2.04	G	AE												
		07 62 00	SD-02 Shop Drawings															
			Fabrication	2.04 C.	G	AE												
			Jointing And Securing Of Sheet	2.04 C.	G	AE												
			Metal															

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		07 62 00	Expansion Joint Details And	2.04 C.	G	AE												
			Connections															
			SD-03 Product Data															
			Manufacturer's Product	2.04 A.	G	AE												
			Specifications															
			Data And Color Chart	2.04 A.	G	AE												
			SD-04 Samples															
			Specified Sheet Metals In	2.04 B.	G	AE												
			Specified Gauges															
			SD-08 Manufacturer’s Instructions															
			Installation Instructions	2.04 A.	G	AE												
			General Recommendations	2.04 A.	G	AE												
		07 65 26	SD-03 Product Data															
			Manufacturer's Data Sheets On	2.04	G	AE												
			Each Product															
			SD-04 Samples															
			Verification Samples	2.04	G	AE												
			SD-06 Test Reports															
			Performance Characteristics	2.04	G	AE												
			SD-08 Manufacturer’s Instructions															
			Preparation Instructions	2.04	G	AE												
			Storage And Handling	2.04	G	AE												
			Requirements															
			Installation	2.04	G	AE												
			SD-10 Operation and Maintenance															
			Data															

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		07 65 26	Maintenance Methods	2.04	G	AE												
		07 71 23	SD-02 Shop Drawings															
			Fabrication And Installation	2.07	G	AE												
			SD-03 Product Data															
			Each Type Of Product Specified	2.07	G	AE												
			SD-04 Samples															
			Finish And Color Selection	2.07	G	AE												
			SD-08 Manufacturer’s Instructions															
			Installation Instructions	2.07	G	AE												
		07 72 53	SD-03 Product Data															
			Manufacturer's Product Data	2.03	G	AE												
			SD-04 Samples															
			Full-Size Snow-Guard In Color	2.03	G	AE												
			And Material Selected															
			SD-08 Manufacturer’s Instructions															
			Installation Instructions	2.03	G	AE												
		07 84 13	SD-02 Shop Drawings															
			Penetration Seals	1.07	G	AE												
			UL Illustration Of Each Proposed	1.07	G	AE												
			System															
			SD-03 Product Data															
			Listing Of All Manufacturers,	2.02	G	AE												
			Products, Model Numbers, And															
			Designs															
			SD-07 Certificates															

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		07 84 13	Installer's Qualification	1.04	G	AE												
			Certificates															
			SD-11 Closeout Submittals															
			Record Drawings	3.05 A.	G													
		07 91 00	SD-02 Shop Drawings															
			Preformed Joint Seal Schedule	2.04	G	AE												
			SD-03 Product Data															
			Product Data	2.04	G	AE												
			SD-04 Samples															
			Manufacturer's Color Charts	2.04	G	AE												
			Joint Seals	2.04	G	AE												
			SD-06 Test Reports															
			Product Test Reports	2.04	G	AE												
			SD-11 Closeout Submittals															
			Warranties	2.04	G	AE												
		07 92 00	SD-03 Product Data															
			Sealants	2.01	G	AE												
			Primers	2.02	G	AE												
			Backstops	2.04	G	AE												
			Bond Breakers	2.03	G	AE												
			SD-07 Certificates															
			Sealant Certificate of Compliance	2.01 F.	G	AE												
		08 11 13	SD-02 Shop Drawings															
			Doors	2.01	G	AE												
			Frames	2.05	G	AE												
			Schedule Of Doors	1.04	G	AE												

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		08 11 13	Schedule Of Frames	1.04	G	AE												
			Door And Frame Locations	1.04	G	AE												
			SD-03 Product Data															
			Doors	2.01	G	AE												
			Frames	2.05	G	AE												
			Accessories	2.03	G	AE												
			Weatherstripping	2.07	G	AE												
			SD-04 Samples															
			Factory-Applied Enamel Finish	2.09 B.	G	AE												
			Color Samples	2.09 B.	G	AE												
		08 14 16	SD-02 Shop Drawings															
			Doors	2.04	G	AE												
			SD-03 Product Data															
			Manufacturer's Product	2.04	G	AE												
			Literature, Specifications															
			SD-04 Samples															
			Transparent Wood Finish	2.04	G	AE												
			SD-07 Certificates															
			Certification Of Compliance	2.04	G	AE												
			SD-08 Manufacturer’s Instructions															
			Installation Instructions	2.04	G	AE												
			SD-11 Closeout Submittals															
			Warranty	2.04	G	AE												
		08 33 23	SD-02 Shop Drawings															
			Overhead Coiling Doors	1.03	G	AE												
			Counterbalancing Mechanism	1.04	G	AE												

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		08 33 23	Manual Door Operator	2.06	G	AE												
			Electric Door Operators	1.04	G	AE												
			SD-03 Product Data															
			Overhead Coiling Doors	1.03	G	AE												
			Hardware	2.04	G	AE												
			Counterbalancing Mechanism	1.04	G	AE												
			Electric Door Operators	1.04	G	AE												
			Bottom Bars	2.03 C.	G	AE												
			Mounting Brackets	2.05 A.	G	AE												
			SD-06 Test Reports															
			Wind Load Test Data	2.02 A.	G	AE												
			SD-08 Manufacturer’s Instructions															
			Installation Drawings	1.03	G	AE												
			SD-10 Operation and Maintenance															
			Data															
			Operation and Maintenance	1.04	G													
			Manuals															
			Materials	1.04	G													
			Devices	1.04	G													
			Procedures	1.04	G													
			Manufacture's Brochures	1.04	G													
			Parts Lists	1.04	G													
			Cleaning	2.07	G													
			Hood	1.04	G													
			Painting	1.04	G													
		08 34 73	SD-01 Preconstruction Submittals															

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		08 34 73	Manufacturers Qualifications	1.06	G													
			SD-02 Shop Drawings															
			Elevations	1.06	G	AE												
			Frame Details	1.06	G	AE												
			Details Of Doors	1.06	G	AE												
			Reinforcement And Preparations For Hardware	1.06	G	AE												
			Each Different Wall Opening Condition	1.06	G	AE												
			Anchorages, Joints, Field Splices, And Connections	1.06	G	AE												
			Accessories	1.06	G	AE												
			Moldings, Removable Stops, And Glazing	1.06	G	AE												
			SD-04 Samples															
			Factory Applied Wood Veneer	2.08	G	AE												
			SD-06 Test Reports															
			Test Reports	1.05	G	AE												
			SD-08 Manufacturer’s Instructions															
			Installation Instructions And Installation Tolerances	1.06	G													
			SD-11 Closeout Submittals															
			Warranty	1.09	G													
		08 45 23	SD-02 Shop Drawings															
			Shop Drawings	1.05	G	AE												
			Plans, Elevations, And Details	1.05	G	AE												

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		08 45 23	SD-03 Product Data															
			Manufacturer's Product Data	2.01	G	AE												
			SD-04 Samples															
			Sandwich panels: 24' x 14' units	2.04	G													
			Factory finished aluminum: 5'	2.04	G													
			long sections															
			SD-06 Test Reports															
			International Building Code	1.05	G	AE												
			Evaluation Report															
			Flame Spread and Smoke	1.05	G	AE												
			Developed															
			Burn Extent	1.05	G	AE												
			Color Difference	1.05	G	AE												
			Impact Strength	1.05	G	AE												
			Bond Tensile Strength	1.05	G	AE												
			Bond Shear Strength	1.05	G	AE												
			Beam Bending Strength	1.05	G	AE												
			Insulation U-Factor	1.05	G	AE												
			NFRC System U-Factor	1.05	G	AE												
			Certification															
			NFRC Visible Light	1.05	G	AE												
			Transmittance															
			Solar Heat Gain Coefficient	1.05	G	AE												
			Condensation Resistance Factor	1.05	G	AE												
			Air Leakage	1.05	G	AE												
			Structural Performance	1.05	G	AE												

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		08 45 23	Water Penetration	1.05	G	AE												
			1200°F Fire Resistance	1.05	G	AE												
			Fall Through Resistance	1.05	G	AE												
			Ul Listed Class A Roof System	1.05	G	AE												
			Hurricane Debris Impact	1.05	G	AE												
			Resistance															
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Installation	3.03	G	AE												
			Recommendations															
			SD-11 Closeout Submittals															
			Field Maintenance Manual	3.05	G													
			Installer Certificate	3.05	G													
			Manufacturer's And Installer's	1.07	G													
			Written Warranty															
		08 71 00	SD-02 Shop Drawings															
			Hardware Assembly Components	1.03	G	AE												
			And Interface															
			Verification of Existing Conditions	1.03	G	AE												
			Hardware Schedule	1.05	G	AE												
			Keying System	2.03 G.	G	AE												
			SD-03 Product Data															
			Hardware Items	2.03	G	AE												
			SD-07 Certificates															
			Documentation Of ABA/ADA	1.04														
			Accessibility Compliance															
			SD-08 Manufacturer’s Instructions															

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		08 71 00	Installation	3.01	G	AE												
			SD-10 Operation and Maintenance															
			Data															
			Hardware Schedule Data	1.05 G.	G	AE												
			Package 1															
			SD-11 Closeout Submittals															
			Key Bitting Charts	1.06 A.	G	AE												
		08 74 00	SD-02 Shop Drawings															
			Lock Templates	2.03	G	AE												
			SD-03 Product Data															
			Manufacturer's Data Sheets On	2.03	G	AE												
			Each Product															
			SD-04 Samples															
			Selection Samples	2.03	G	AE												
			Verification Samples	2.03	G	AE												
			SD-07 Certificates															
			Product Certificates	2.03	G	AE												
			SD-08 Manufacturer’s Instructions															
			Preparation Instructions	2.03	G	AE												
			Storage And Handling	2.03	G	AE												
			Requirements															
			Installation Methods	2.03	G	AE												
			SD-09 Manufacturer’s Field															
			Reports															
			Manufacturer's Field Reports	2.03	G	AE												

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CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY					MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		08 74 00	SD-10 Operation and Maintenance															
			Data															
			Operation And Maintenance Data	2.03	G	AE												
			SD-11 Closeout Submittals															
			Warranty Documents	2.03	G	AE												
			Project Record Documents	2.03	G	AE												
		08 81 00	SD-02 Shop Drawings															
			Details Of The Proposed Setting	2.01	G	AE												
			Methods, Mullion Details, Edge															
			Blocking, Size Of Openings,															
			Frame Details, Materials, And															
			Types And Thickness Of Glass															
			SD-03 Product Data															
			Putty And Glazing Compound	2.04 A.	G	AE												
			Glazing Compound	2.04 B.	G	AE												
			Sealants	2.04 C.	G	AE												
			Glazing Gaskets	2.04 H.	G	AE												
			Accessories	2.04 I.	G	AE												
			Setting Blocks And Edge Blocks	2.04 G.	G	AE												
			Sealing Tapes	2.04 F.	G	AE												
			Mastic	2.05 A.	G	AE												
			Glass	2.02	G	AE												
			Mirrors	2.02 C.	G	AE												
			SD-04 Samples															

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		08 81 00	Samples Of Each Of The	2.01	G AE													
			Following: Tinted Glass, Patterned															
			Glass, Heat-Absorbing Glass, And															
			Insulating Glass															
			SD-07 Certificates															
			Manufacture's Certification	2.01														
			SD-08 Manufacturer’s Instructions															
			Cleaning Instructions For Plastic	2.01	G													
			Sheets.															
			Installation	2.01	G													
			Setting And Sealing Materials	2.01	G													
			SD-11 Closeout Submittals															
			Warranty	1.06	G													
		08 91 00	SD-02 Shop Drawings															
			Shop Drawings	2.02 D.	G AE													
			SD-03 Product Data															
			Manufacturer's Literature	2.02 D.	G AE													
			SD-04 Samples															
			Manufacturer's Standard Finishes	2.04 A.2.	G													
			And Colors															
			SD-06 Test Reports															
			Factory Test Data	2.02 D.	G													
			SD-07 Certificates															
			Certificates Of AMCA Ratings	2.02 D.														
			SD-08 Manufacturer’s Instructions															
			Installation Instructions	2.02 D.	G AE													

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		09 22 00	SD-02 Shop Drawings															
			Metal support systems	2.01 B.	G	AE												
		09 29 00	SD-03 Product Data															
			Gypsum Board	2.01 A.	G	AE												
			Glass Mat Water-Resistant	2.01 B.	G	AE												
			Gypsum Tile Backing Board															
			Accessories	2.01 G.	G	AE												
			SD-07 Certificates															
			Material Safety Data Sheets	2.01	G	AE												
			SD-10 Operation and Maintenance															
			Data															
			Manufacturer Maintenance	2.01	G	AE												
			Instructions															
		09 30 13	SD-03 Product Data															
			Ceramic Tile	2.01	G	AE												
			Mortar And Adhesive Materials	2.03	G	AE												
			Grout	2.04	G	AE												
			Thresholds	2.05	G	AE												
			Sealant	2.05	G	AE												
			Mortar Bed	2.06	G	AE												
			Compounds	2.06	G	AE												
			SD-04 Samples															
			Tile Samples	1.08	G	AE												
			SD-08 Manufacturer's Instructions															
			Floor Sealer And Protective	3.03	G	AE												
			Coating															

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		09 30 13	SD-11 Closeout Submittals															
			Maintenance Materials	1.06	G													
		09 51 00	SD-02 Shop Drawings															
			Suspension System, Method Of	1.02	G	AE												
			Anchoring And Fastening, Details,															
			And Reflected Ceiling Plan															
			SD-03 Product Data															
			UL Classification Of Fire-Rated	1.02 D.	G	AE												
			Ceilings															
			Acoustical Units	2.01	G	AE												
			SD-04 Samples															
			Acoustical Unit	2.01	G	AE												
			Suspension Grid Tee Section	2.01	G	AE												
			SD-06 Test Reports															
			Sound Transmission	1.02 D.	G	AE												
			Requirements															
			SD-07 Certificates															
			Recycled Materials Certificate	1.02 D.														
		09 65 13	SD-03 Product Data															
			Description Of Each Product	2.04	G	AE												
			Adhesives And Primers	2.04	G	AE												
			SD-04 Samples															
			Resilient Base	2.04	G	AE												
			SD-08 Manufacturer's Instructions															
			Installation Instructions	2.04	G	AE												

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		09 65 13	SD-10 Operation and Maintenance															
			Data															
			Care Instructions	2.04	G	AE												
		09 77 00	SD-03 Product Data															
			Accessories	2.03	G	AE												
			Glass-Fiber-Reinforced Plastic	2.02	G	AE												
			Paneling															
			SD-04 Samples															
			Manufacturer's Standard Molding	2.03	G	AE												
			Glass-Fiber-Reinforced Plastic	2.02	G	AE												
			Panels															
			SD-08 Manufacturer’s Instructions															
			Installation	3.03	G	AE												
		09 81 16	SD-03 Product Data															
			Glass Fiber Acoustical Insulation	2.02 A.	G	AE												
			SD-08 Manufacturer’s Instructions															
			Installation	3.02	G	AE												
		09 90 00	SD-01 Preconstruction Submittals															
			Applicator's Qualifications	1.04	G	AE												
			Third Party Laboratory	1.05 A.2.	G	AE												
			SD-02 Shop Drawings															
			Color Stencil Code	3.12	G													
			SD-03 Product Data															
			Paints	2.02	G	AE												
			Coatings	2.02	G	AE												
			Sealants	2.02	G	AE												

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		09 90 00	Other Materials Used	2.02	G AE													
			SD-04 Samples															
			Manufacturer's Samples Of Paint	1.11	G													
			Colors															
			SD-06 Test Reports															
			Batch Quality Conformance	1.05 A.2.	G AE													
			Testing															
			Qualification Testing	1.05 A.2.	G AE													
			SD-07 Certificates															
			Change In Contractor	1.04 B.	G AE													
			Certification Status															
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Application	2.02	G													
			Instructions															
			Manufacturer's Application	3.04 A.	G													
			Instructions															
			Mixing Instructions	2.02	G													
			SD-10 Operation and Maintenance															
			Data															
			Cleaning And Maintenance	2.02	G													
			Instructions															
			SD-11 Closeout Submittals															
			Paint Safety Data Sheet (PSDS)	3.08 A.	G													
		10 14 00.20	SD-02 Shop Drawings															
			Detail Drawings	1.03 B.	G AE													
			SD-04 Samples															

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		10 14 00.20	Interior Signage	1.03 A.	G	AE												
			SD-08 Manufacturer's Instructions															
			Installation	3.01	G													
			SD-10 Operation and Maintenance															
			Data															
			Maintenance Instructions	3.01 B.	G													
			SD-11 Closeout Submittals															
			Warranty	1.05	G													
		10 14 01	SD-01 Preconstruction Submittals															
			Exterior Signage Schedule	1.02	G													
			SD-02 Shop Drawings															
			Approved Detail Drawings	3.01	G	AE												
			SD-03 Product Data															
			Exterior Signage	2.01	G	AE												
			Wind Load Design Analysis	1.02 A.	G	AE												
			SD-04 Samples															
			Exterior Sign	1.02	G													
			SD-08 Manufacturer's Instructions															
			Installation	3.01	G													
			SD-10 Operation and Maintenance															
			Data															
			Maintenance Instructions	3.01 B.	G													
		10 26 00	SD-02 Shop Drawings															

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		10 26 00	Corner Guards, Door And Door	2.02	G													
			Frame Protectors, Wall Guards															
			(Bumper Guards), Wall Panels															
			And Wall Covering															
			SD-03 Product Data															
			Corner Guards	2.03	G AE													
			SD-04 Samples															
			Color And Finish	2.05	G													
			SD-06 Test Reports															
			Fire Rating	2.02 A.2.	G AE													
			SD-07 Certificates															
			Product Certification	1.03 A.1.														
			Documentation															
			Recycled Content For Aluminum	2.03 A.														
			Component Of Corner Guards															
			SD-11 Closeout Submittals															
			Warranty	1.05	G													
		10 28 13	SD-04 Samples															
			Fasteners	2.02	G AE													
			Accessory Items	2.02	G AE													
			SD-07 Certificates															
			Recycled Content For Stainless	2.01														
			Steel Toilet Accessories															
			SD-11 Closeout Submittals															
			Performance Guarantees Or	1.04	G													
			Warranties															

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		10 44 13	SD-02 Shop Drawings															
			Connections Of Units And	2.05	G	AE												
			Hardware To Other Work															
			SD-03 Product Data															
			Manufacturer's Technical Data	2.05	G	AE												
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Installation	2.05	G	AE												
			Instructions															
			SD-11 Closeout Submittals															
			Warranty	1.07	G													
		10 44 16	SD-02 Shop Drawings															
			Fabrication Drawings	Part 2	G	AE												
			SD-03 Product Data															
			Manufacturer's Data	2.01 A.	G	AE												
			SD-04 Samples															
			Fire Extinguisher	1.03 A.	G													
			Wall Brackets	1.03 A.	G													
			Accessories	1.03 A.	G													
			SD-07 Certificates															
			Fire Extinguishers Comply With	2.01 A.														
			Local Codes And Regulations															
			SD-11 Closeout Submittals															
			Warranty	1.04	G													
			Replacement Parts List	3.02 A.	G													
		12 36 61.16	SD-03 Product Data															
			Product Data	2.01	G	AE												

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		12 36 61.16	Solid Surface Material	2.01	G	AE												
			SD-08 Manufacturer's Instructions															
			Installation Instructions	2.01	G	AE												
		13 34 19	SD-01 Preconstruction Submittals															
			Manufacturer's Qualifications	1.06 C.	G	AE												
			Erection Contractor Qualifications	1.06 D.	G	AE												
			Conditions Detrimental To	3.01	G	AE												
			Performance Of The Work															
			Construction Schedule	1.06 A.	G	AE												
			SD-02 Shop Drawings															
			Entire Structure	1.06 C.	G	AE												
			SD-03 Product Data															
			Manufacturer's Catalog Data	1.06 A.	G	AE												
			SD-04 Samples															
			Coil Stack	1.06 M.	G	AE												
			Roof Panels	1.06 M.	G	AE												
			Wall Panels	1.06 M.	G	AE												
			Metal Strip Closures	1.06 M.	G	AE												
			Insulation	1.06 M.	G	AE												
			Vapor Barrier	1.06 M.	G	AE												
			Fasteners	1.06 M.	G	AE												
			Manufacturer's Color and	1.06 M.	G	AE												
			Finishes Chart And Chips															
			Roof And Wall Accessories And	1.06 M.	G	AE												
			Specialties															
			Flashing And Trim	1.06 M.	G	AE												

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		13 34 19	Aluminized Steel Repair Paint,	1.06 M.	G	AE												
			Galvanizing Repair Paint, And															
			Enamel Repair Paint															
			SD-05 Design Data															
			Manufacturer's Descriptive And	1.06 A.	G	AE												
			Technical Literature															
			Certified Engineering	1.06 C.	G	AE												
			Calculations															
			Building Design Analysis	1.06 C.	G	AE												
			SD-06 Test Reports															
			Test Reports	1.06 A.	G	AE												
			Combustion Characteristics	1.06 I.	G	AE												
			Fire-Resistance Ratings	1.06 I.	G	AE												
			Factory Color Finish Performance	1.06 A.	G	AE												
			Requirements															
			Coatings And Base Metals	1.06 A.	G	AE												
			SD-07 Certificates															
			Coil Stock	1.06 A.	G	AE												
			SD-08 Manufacturer’s Instructions															
			Detailed Written Instructions For	1.06 C.	G	AE												
			Assembly															
			SD-11 Closeout Submittals															
			Manufacturer's Warranty	3.14 A.	G													
			Contractor's Warranty for	3.14 B.	G													
			Installation															

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		13 34 19	Contractor's Five (5) Year No	3.14 C.	G													
			Penal Sum Warranty															
		22 00 00	SD-02 Shop Drawings															
			Schedules, Performance Charts,	2.01 A.	G	AE												
			Instructions, Diagrams, And Other															
			Information To Illustrate The															
			Requirements And Operations Of															
			Systems That Are Not Covered By															
			The Plumbing Code.															
			Complete Plumbing System	2.01 A.	G	AE												
			Including Piping Layouts And															
			Locations Of Connections;															
			Dimensions For Roughing-In,															
			Foundation, And Support Points;															
			Schematic Diagrams And Wiring															
			Diagrams Or Connection And															
			Interconnection Diagrams															
			SD-03 Product Data															
			Plumbing System	2.01 B.	G													
			Fixtures With Manufacturer,	2.01 B.	G	AE												
			Model, And Flow Rate															
			Flush Valve Water Closets	2.05 C.	G													
			Wall Hung Lavatories	2.05 D.	G													
			Kitchen Sinks	2.05 E.	G													
			Service Sinks	2.05 F.	G													

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		22 00 00	Emergency Eyewash And Shower	2.05 G.	G													
			Water Heaters	2.09	G													
			Pumps	2.10	G													
			Backflow Prevention Assemblies	2.01 B.	G													
			Vibration-Absorbing Features	2.01 B.	G													
			SD-06 Test Reports															
			Tests, Flushing and Disinfection	2.01 C.	G													
			Test of Backflow Prevention Assemblies	3.08 A.1.	G													
			Smoke Test	3.08 A.	G	AE												
			Drainage And Vent Systems Test	3.08 A.	G	AE												
			Building Sewers Tests	3.08 A.	G	AE												
			Water Supply Systems Tests	3.08 A.	G	AE												
			SD-07 Certificates															
			Materials and Equipment	1.03														
			Bolts	2.02 A.														
			SD-10 Operation and Maintenance Data															
			Operation And Maintenance Data	2.01 E.	G	AE												
		22 07 19.00	SD-02 Shop Drawings															
			Installation Drawings	3.01	G													
			SD-03 Product Data															
			Adhesives	2.03	G													
			Coatings	2.03	G													
			Insulating Cement	2.03	G													

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		22 07 19.00	Insulation Materials	2.03	G													
			Jacketing	2.03	G													
			Tape	2.03	G													
			SD-08 Manufacturer's Instructions															
			Installation Manual	3.01	G													
			SD-11 Closeout Submittals															
			Record Drawings	3.04	G													
			Adhesives	2.03	G													
			Coatings	2.03	G													
			Insulation Materials	2.03	G													
			Recycled Materials	1.03 A.	G													
		23 00 00	SD-02 Shop Drawings															
			Detail Drawings	1.04 E.	G													
			SD-03 Product Data															
			Insulated Nonmetallic Flexible	2.08 A.1.	G													
			Duct Runouts															
			Duct Connectors	2.08 A.1.	G													
			Duct Access Doors	2.08 B.	G													
			Fire Dampers	2.08 C.	G													
			Manual Balancing Dampers	2.08 D.	G													
			Sound Attenuation Equipment	2.08 G.	G													
			Acoustical Duct Liner	2.08 G.2.	G													
			Diffusers	2.08 H.1.	G													
			Registers and Grilles	2.08 H.2.	G													
			Louvers	2.08 I.	G													

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		23 00 00	Centrifugal Type Power Roof Ventilators	2.09 A.1.	G													
			Ceiling Exhaust Fans	2.09 A.2.	G													
			Air Handling Units	3.02 B.	G													
			Room Fan-Coil Units	3.12	G													
			Coil Induction Units	2.08 A.1.	G													
			Test Procedures	1.04 F.	G													
			Diagrams	1.02 A.2.	G													
			SD-06 Test Reports															
			Performance Tests	3.11	G													
			Damper Acceptance Test	3.09	G													
			Ductwork Leak Test	3.11	G													
			SD-07 Certificates															
			Ozone Depleting Substances	1.04 C.														
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Installation Instructions	3.02	G													
			Operation and Maintenance Training	3.13 B.	G													
			SD-10 Operation and Maintenance Data															
			Operation and Maintenance Manuals	3.13 A.	G													
			Fire Dampers	2.08 C.	G													
			Manual Balancing Dampers	2.08 D.	G													

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		23 00 00	Centrifugal Type Power Roof Ventilators	2.09 A.1.	G													
			Ceiling Exhaust Fans	2.09 A.2.	G													
			Room Fan-Coil Units	3.12	G													
		23 05 15	SD-01 Preconstruction Submittals															
			Material, Equipment, and Fixture Lists	1.02	G													
			SD-02 Shop Drawings															
			Record Drawings	1.02	G													
			Connection Diagrams	1.02	G													
			Coordination Drawings	1.02	G													
			Fabrication Drawings	1.02	G													
			Installation Drawings	3.01	G													
			SD-03 Product Data															
			Pipe and Fittings	2.01	G													
			Piping Specialties	2.02	G													
			Valves	2.03	G													
			Miscellaneous Materials	2.04	G													
			Supporting Elements	2.05	G													
			Equipment Foundation Data	1.02	G													
			SD-04 Samples															
			Manufacturer's Standard Color Charts	1.02	G													
			SD-05 Design Data															
			Pipe and Fittings	2.01	G													
			Piping Specialties	2.02	G													

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		23 05 15	Valves	2.03	G													
			SD-06 Test Reports															
			Hydrostatic Tests	3.01	G													
			Air Tests	3.01	G													
			Valve-Operating Tests	3.01	G													
			Drainage Tests	3.01	G													
			Pneumatic Tests	3.01	G													
			Non-Destructive Electric Tests	3.01	G													
			System Operation Tests	3.01	G													
			SD-07 Certificates															
			Record of Satisfactory Field	1.04 B.														
			Operation															
			List of Qualified Permanent	1.04 C.														
			Service Organizations															
			Listing of Product Installations	1.02														
			Surface Resistance	3.01	G													
			Shear and Tensile Strengths	3.01	G													
			Temperature Ratings	3.01	G													
			Bending Tests	3.01	G													
			Flattening Tests	3.01	G													
			Transverse Guided Weld Bend	3.01	G													
			Tests															
			SD-10 Operation and Maintenance															
			Data															
			Operation and Maintenance	3.09	G													
			Manuals															

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		23 05 48.00	SD-02 Shop Drawings															
			Installation Drawings	1.02	G													
			Outline Drawings	1.02	G													
			SD-03 Product Data															
			Equipment and Performance	1.02	G													
			Data															
			Isolators	2.02 D.	G													
			SD-06 Test Reports															
			Type of Isolator	2.04	G													
			Type of Base	2.04	G													
			Allowable Deflection	2.04	G													
			Measured Deflection	2.04	G													
		23 05 93	SD-01 Preconstruction Submittals															
			Records of Existing Conditions	1.03 C.	G													
			TAB Firm	1.05 C.1.	G													
			TAB Specialist	1.05 B.	G													
			TAB Specialist	1.05 C.2.	G													
			SD-02 Shop Drawings															
			TAB Schematic Drawings and	1.03 C.	G													
			Report Forms															
			SD-03 Product Data															
			Equipment and Performance	1.03	G													
			Data															
			TAB Related HVAC Submittals	1.05 C.4.	G													
			TAB Procedures	1.03 C.	G													
			TAB Procedures	1.05 B.	G													

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		23 05 93	Calibration	1.05 B.	G													
			Systems Readiness Check	1.03 C.	G													
			TAB Execution	1.05 D.	G													
			TAB Verification	1.05 D.3.	G													
			SD-06 Test Reports															
			Completed Pre-Final DALT	3.03 E.	G													
			Report															
			Certified Final DALT Report	3.03 H.	G													
			Tab Report For Season 1	1.05 E.2.	G													
			TAB Report for Season 2	1.05 E.2.	G													
			SD-07 Certificates															
			Independent TAB Agency and	1.05 A.	G													
			Personnel Qualifications															
			DALT and TAB Submittal and	1.06 A.	G													
			Work Schedule															
			TAB Pre-Field Engineering	1.06 D.	G													
			Report															
			TAB Firm	1.05 C.1.	G													
			Design Review Report	1.03 C.	G													
			Design Review Report	1.06 B.	G													
			Pre-field DALT Preliminary	1.06 C.	G													
			Notification															
			Advanced Notice for Season 1	1.06 A.	G													
			TAB Field Work															
			Prerequisite HVAC Work Check	1.06 A.	G													
			Out List For Season 1															

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		23 05 93	Advanced Notice for Season 2	1.06 A.	G													
			TAB Field Work															
			Prerequisite HVAC Work Check	1.06 A.	G													
			Out List For Season 2															
			SD-11 Closeout Submittals															
			Warranty	1.07	G													
		23 07 00	SD-02 Shop Drawings															
			MICA National Insulation	2.01 A.	G													
			Standards Plates															
			Pipe Insulation Systems	2.02 D.	G													
			Duct Insulation	3.01 A.2.	G													
			SD-03 Product Data															
			Pipe Insulation Systems	2.02 D.	G													
			Duct Insulation	3.01 A.2.	G													
			SD-04 Samples															
			Display Samples	3.01 A.	G													
			SD-08 Manufacturer's Instructions															
			Pipe Insulation Systems	2.02 D.	G													
			Duct Insulation	3.01 A.2.	G													
		23 09 00	SD-02 Shop Drawings															
			DDC Contractor Design Drawings	3.02	G													
			Draft As-Built Drawings	3.02	G													
			Final As-Built Drawings	3.02	G													
			SD-03 Product Data															
			Certificate of Networthiness	2.02	G													
			Documentation															

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		23 09 00	Programming Software	1.07 C.	G													
			Controller Application Programs	1.07 D.	G													
			Configuration Software	1.07 A.	G													
			Controller Configuration Settings	2.02	G													
			Manufacturer's Product Data	2.02	G													
			SD-06 Test Reports															
			Start-Up Testing Report	3.04 C.	G													
			PVT Procedures	3.05 A.	G													
			PVT Report	3.05 C.	G													
			Pre-Construction Quality Control	1.08 A.	G													
			(QC) Checklist															
			Post-Construction Quality Control	1.08 B.	G													
			(QC) Checklist															
			SD-10 Operation and Maintenance															
			Data															
			Operation and Maintenance	3.06	G													
			(O&M) Instructions															
			Training Documentation	3.08 A.	G													
			SD-11 Closeout Submittals															
			Enclosure Keys	2.05	G													
			Password Summary Report	3.01 F.1.	G													
			Closeout Quality Control (QC)	1.08 C.	G													
			Checklist															
		23 21 23	SD-02 Shop Drawings															
			System Coordination	2.01 B.	G													
			SD-03 Product Data															

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		23 21 23	Instructions	2.02 B.	G													
			Equipment Data	2.02 E.	G													
			Training Period	3.05 B.	G													
			SD-06 Test Reports															
			Factory Tests	2.08	G													
			Field Quality Control	3.03	G													
			SD-07 Certificates															
			Manufacturer's Representative	1.03 A.														
			SD-10 Operation and Maintenance															
			Data															
			Operation and Maintenance	3.05 A.	G													
			Manuals															
			Training	3.05 B.	G													
		23 64 26	SD-03 Product Data															
			Calibrated Balancing Valves	2.04 F.	G													
			Automatic Flow Control Valves	2.04 G.	G													
			Water Temperature Mixing Valve	2.04 H.	G													
			Water Temperature Regulating	2.04 I.	G													
			Valves															
			Water Pressure Reducing Valve	2.04 J.	G													
			Pressure Relief Valve	2.04 K.	G													
			Combination Pressure and	2.04 L.	G													
			Temperature Relief Valves															
			Expansion Joints	2.05 G.	G													
			Pumps	2.06	G													
			Expansion Tanks	2.07	G													

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		23 64 26	Air Separator Tanks	2.08	G													
			Water Treatment Systems	2.09	G													
			Water Treatment Plan	2.09 C.1	G													
			SD-06 Test Reports															
			Condenser Water Quality Test	3.04 C.	G													
			Reports															
			Pressure Tests Reports	3.04 B.	G AE													
			SD-07 Certificates															
			Fittings	2.01														
			Unions	2.01														
			Flanges	2.01														
			Gaskets	2.01														
			Bolting	2.01														
			SD-08 Manufacturer's Instructions															
			Lesson plan for the Instruction	3.05	G													
			Course															
			SD-10 Operation and Maintenance															
			Data															
			Spare Parts Data For Each	2.15	G													
			Different Item Of Equipment															
			Water Treatment System	2.15	G													
			Operation Manual															
			Water Treatment System	2.15	G													
			Maintenance Manual															
			Calibrated Balancing Valves	2.04 F.	G													
			Automatic Flow Control Valves	2.04 G.	G													

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		23 64 26	Water Temperature Mixing Valve	2.04 H.	G													
			Water Temperature Regulating	2.04 I.	G													
			Valves															
			Water Pressure Reducing Valve	2.04 J.	G													
			Pressure Relief Valve	2.04 K.	G													
			Combination Pressure and	2.04 L.	G													
			Temperature Relief Valves															
			Expansion Joints	2.05 G.	G													
			Pumps	2.06	G													
			Expansion Tanks	2.07	G													
			Air Separator Tanks	2.08	G													
		23 81 47	SD-01 Preconstruction Submittals															
			Installer Qualifications	3.01 B.	G													
			SD-02 Shop Drawings															
			System Diagrams	1.04 F.	G													
			Well and Piping System Layout	1.04 F.	G													
			Drawings															
			SD-03 Product Data															
			Water-Source Water-to-Water	2.01 A.	G													
			Heat Pumps															
			Plate Heat Exchangers	2.01 B.	G													
			Pumps	2.01 C.	G													
			Pipe, Fittings, and Piping	1.05	G													
			Components															
			Expansion Tanks	2.04 G.	G													
			Air Separators	2.04 H.	G													

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		23 81 47	SD-06 Test Reports															
			Water-Source Water-To-Water	3.05 B.2.	G													
			Heat Pumps - Field Acceptance															
			Test Plan															
			Plate Heat Exchangers - Field	3.05 B.2.	G													
			Acceptance Test Plan															
			Water-Source Water-To-Water	3.05 B.3.	G													
			Heat Pumps - Field Acceptance															
			Test Report															
			Plate Heat Exchangers - Field	3.05 B.3.	G													
			Acceptance Test Report															
			SD-07 Certificates															
			ARI/ISO Performance Data For	2.01 A.	G													
			Water Source Heat Pumps															
			Hydrostatic Test	3.05 A.	G													
			SD-08 Manufacturer's Instructions															
			Water-Source Water-To-Water	3.01 A.	G													
			Heat Pumps - Installation															
			Instructions															
			Plate Heat Exchangers -	3.01 A.	G													
			Installation Instructions															
			On-Site Training	3.05 D.	G													
			SD-10 Operation and Maintenance															
			Data															
			Water-source water-to-water heat	2.01 A.	G													
			pumps															

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		23 81 47	Plate Heat Exchangers, Data	1.04 G.	G													
			Package 2															
			SD-11 Closeout Submittals															
			As-Built Drawings	3.01 A.	G													
		25 01 00	SD-02 Shop Drawings															
			System Description	2.03 A.2.a	(G1)													
			Equipment Hardware	2.03 A.2.b	(G2)													
			Instruments	2.03 A.2.c	G													
			MCS Cabinets And RDP	2.03 A.2.d	(G3)													
			Information															
			SD-03 Product Data															
			Product Information For All	2.03 A.2.e	G													
			Sensors/Transducers And															
			Instruments															
			Software Description	2.03 A.2.f	(G3)													
			SD-10 Operation and Maintenance															
			Data															
			Control System Operation And	2.03 B.	G													
			Maintenance Manual															
			SD-11 Closeout Submittals															
			Record Drawings And	2.03 C.	G													
			Documentation															
		26 05 04	SD-03 Product Data															
			Control Devices	2.01	G	AE												
			Control Relays	2.01	G	AE												
			Circuit Breakers	2.01	G	AE												

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		26 05 04	Fused Switches	2.01	G	AE												
			Non-Fused Switches	2.01	G	AE												
			Fuses	2.01	G	AE												
			Magnetic Contactors	2.01	G	AE												
			Intrinsic Safety Barriers	2.01	G	AE												
			Fire Stopping Systems	2.01	G	AE												
			Extra Materials	2.01	G	AE												
			Fuses, 0 To 600 Volts	2.01	G	AE												
		26 05 05	SD-06 Test Reports															
			Written Report	3.04	G	AE												
		26 05 33.10	SD-03 Product Data															
			Surface Raceways, Wireways,	2.01	G	AE												
			And Fittings Required On The															
			Project															
		26 05 33.20	SD-03 Product Data															
			Floor Boxes, Hinged-Cover	2.01	G	AE												
			Enclosures, And Cabinets															
		26 05 43	SD-01 Preconstruction Submittals															
			Qualification Data For	2.01	G													
			Professional Engineer, Firms And															
			Testing Agency.															
			SD-02 Shop Drawings															
			Duct-Bank Coordination	2.01	G	AE												
			Drawings															
			SD-03 Product Data															
			Duct-Bank Materials	2.01	G	AE												

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		26 05 43	Ducts And Conduits And Their	2.01	G	AE												
			Accessories															
			Accessories For	2.01	G	AE												
			Manholes/Handholes, Boxes															
			Warning Tape	2.01	G													
			SD-06 Test Reports															
			Source Quality-Control Test	2.01	G													
			Reports															
			Field Quality-Control Test	2.01	G													
			Reports															
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Installation	2.01	G	AE												
			Instructions															
			SD-11 Closeout Submittals															
			Project Record Documents	2.01	G													
		26 05 48	SD-01 Preconstruction Submittals															
			Qualification Data	2.01	G													
			SD-02 Shop Drawings															
			Anchorage And Bracing Not	2.01	G	AE												
			Defined By Details And Charts On															
			Drawings															
			Fabrication And Arrangements	2.01	G													
			Coordination Drawings	2.01	G	AE												
			Building Structure	2.01	G													
			SD-03 Product Data															
			Seismic Restraint Component	2.01	G	AE												

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		26 05 48	SD-05 Design Data															
			Design Analysis	2.01	G													
			SD-07 Certificates															
			Product Certificates	2.01														
		26 05 53	SD-03 Product Data															
			Each Electrical Identification	2.01	G	AE												
			Product															
			SD-04 Samples															
			Nameplate Schedule	2.01	G													
			Samples For Each Type Of Label	2.01	G													
			And Sign															
		26 05 73	SD-01 Preconstruction Submittals															
			Professional Engineer	1.05	G													
			Qualifications:															
			SD-03 Product Data															
			Computer Software Program	2.01	G													
			SD-05 Design Data															
			Field Data As Required By The	3.02	G													
			Power System Studies															
			Short-Circuit And Protective	3.03	G	AE												
			Device Evaluation Study															
			Protective Device Coordination	3.04	G	AE												
			Study															
			Arc Flash Hazard Analysis	3.05	G	AE												
			Final Reports	2.01	G	AE												
			SD-07 Certificates															

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		26 05 73	Product Certificates	2.01	G													
			SD-11 Closeout Submittals															
			Arc Flash Training	3.09	G													
		26 05 93	SD-01 Preconstruction Submittals															
			Installer Qualifications	1.06	G													
			SD-02 Shop Drawings															
			Each Through-Penetration	2.01	G	AE												
			Firestop System															
			SD-03 Product Data															
			Each Type Of Product Indicated	2.01	G	AE												
			Material Safety Data Sheets	2.01	G													
			SD-06 Test Reports															
			Inspection Reports	2.01	G													
			Firestopping Tests	1.06	G													
			SD-07 Certificates															
			Certification Of Compliance With	2.01														
			Building Codes															
			SD-08 Manufacturer's Instructions															
			Manufacturer's Installation	2.01	G													
			Instructions															
			SD-11 Closeout Submittals															
			Warranty	1.11	G													
		26 08 00	SD-01 Preconstruction Submittals															
			Testing Firm Qualifications	1.03	G													
			SD-05 Design Data															

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		26 08 00	Inspections And Testing	2.01	G													
			Procedures															
			Energization Plan	2.01	G													
			SD-06 Test Reports															
			Test Or Inspection Reports And	2.01	G													
			Certificates															
			SD-10 Operation and Maintenance															
			Data															
			Operation And Maintenance Data	2.01	G													
			SD-11 Closeout Submittals															
			Programmable Settings	2.01	G AE													
		26 09 35	SD-03 Product Data															
			Manufacturer's Technical Data	2.01	G													
			And Application Instructions															
			SD-10 Operation and Maintenance															
			Data															
			Maintenance Data	2.01	G													
		26 22 00	SD-01 Preconstruction Submittals															
			Qualification Data For Testing	2.01	G													
			Agency															
			SD-02 Shop Drawings															
			Wiring Diagrams	2.01	G AE													
			Equipment Assemblies	2.01	G AE													
			SD-03 Product Data															

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		26 22 00	Nameplate Data, Capacities,	2.01	G													
			Weights, Dimensions, Minimum															
			Clearances, Installed Devices And															
			Features, And Performance For															
			Each Type And Size Of															
			Transformer															
			SD-06 Test Reports															
			Source Quality-Control Test	2.01	G													
			Reports															
			Field Quality-Control Test	2.01	G													
			Reports															
			SD-10 Operation and Maintenance															
			Data															
			Operation And Maintenance Data	2.01	G													
		26 24 16	SD-02 Shop Drawings															
			Each Panelboard And Related	2.01	G	AE												
			Equipment															
			SD-03 Product Data															
			Each Type Of Panelboard,	2.01	G	AE												
			Switching And Overcurrent															
			Protective Device, Accessory, And															
			Component															
			Panelboard Schedules	2.01	G	AE												
			SD-06 Test Reports															
			Field Quality-Control Reports	2.01	G													
			SD-07 Certificates															

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		26 24 16	Compliance With Test	3.04														
			Parameters															
			SD-10 Operation and Maintenance															
			Data															
			Operation And Maintenance Data	2.01	G													
			SD-11 Closeout Submittals															
			Maintenance Materials	2.01	G													
			Warranty	1.10	G													
		26 24 17	SD-01 Preconstruction Submittals															
			Qualification Data For	2.01	G													
			Manufacturer And Testing Agency															
			SD-02 Shop Drawings															
			Fabrication And Installation	2.01	G	AE												
			Details Of RUGTC															
			SD-03 Product Data															
			Rated Capacities, Weights,	2.01	G													
			Operating Characteristics,															
			Furnished Specialties, And															
			Accessories															
			SD-06 Test Reports															
			Field Quality-Control Reports.	2.01	G													
			Certified Copies Of Factory Test	3.01	G													
			Reports															
			SD-07 Certificates															
			Seismic Qualification Certificates	2.01	G													
			SD-11 Closeout Submittals															

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		26 24 17	Operation And Maintenance Manuals	2.01	G													
		26 24 19	SD-02 Shop Drawings															
			Interconnection Diagrams	2.01	G	AE												
			Outline Diagrams	2.01	G													
			Schematic (Elementary) Diagrams	2.01	G													
			One-Line Diagrams	2.01	G	AE												
			Control Diagrams	2.01	G													
			Conduit Entrance Locations	2.01	G	AE												
			Front MCC Elevations	2.01	G													
			Dimensional Drawings	2.01	G	AE												
			SD-03 Product Data															
			Typed Tabulation Of Equipment Data	2.01	G													
			Descriptive Information	2.01	G													
			Itemized Bill Of Material	2.01	G													
			Bus Data	2.01	G	AE												
			Protective Devices	2.01	G	AE												
			SD-06 Test Reports															
			Factory Inspection And Test Checklists	2.06	G													
			Factory Test Reports, Certified	2.01	G													
			SD-08 Manufacturer's Instructions															
			Anchoring Instructions And Details	2.01	G													

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		26 24 19	Manufacturer's Installation	2.01	G													
			Instructions															
			SD-10 Operation and Maintenance															
			Data															
			Operational Description	2.01	G													
			Operation And Maintenance Data	2.01	G													
		26 27 13	SD-02 Shop Drawings															
			Electricity-Metering Equipment	2.01	G	AE												
			Electricity-Metering Equipment	2.01	G	AE												
			SD-03 Product Data															
			Electricity-Metering Equipment	2.01	G	AE												
			Electricity-Metering Equipment	2.01	G	AE												
			SD-06 Test Reports															
			Field Quality-Control Test	2.01	G	AE												
			Reports															
			SD-07 Certificates															
			Manufacturer Seismic	2.01														
			Qualification Certification For															
			Electricity-Metering Equipment															
			SD-10 Operation and Maintenance															
			Data															
			Operation And Maintenance Data	2.01	G													
		26 27 26	SD-03 Product Data															
			Each Product Required On The	2.01	G	AE												
			Project															

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		26 27 26	SD-10 Operation and Maintenance															
			Data															
			Maintenance Data For Materials	2.01	G													
			And Products															
			SD-11 Closeout Submittals															
			NPS-CQC Accessibility	3.04	G													
			Inspection Report															
		26 28 16	SD-02 Shop Drawings															
			Enclosed Switches And Circuit	2.01	G	AE												
			Breakers															
			SD-03 Product Data															
			Enclosed Switch, Circuit Breaker,	2.01	G	AE												
			Accessory, And Component															
			SD-09 Manufacturer's Field															
			Reports															
			Field Quality-Control Reports	2.01	G	AE												
			SD-10 Operation and Maintenance															
			Data															
			Time-Current Coordination	2.01	G													
			Curves															
			Written Instructions For Testing	2.01	G													
			And Adjusting															
			Operation And Maintenance Data	2.01	G													
			SD-11 Closeout Submittals															
			Maintenance Materials	2.01	G													
		26 29 13	SD-01 Preconstruction Submittals															

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		26 29 13	Manufacturer Qualifications:	1.05	G	AE												
			Testing Agency Qualifications:	1.05	G	AE												
			SD-02 Shop Drawings															
			Each Enclosed Controller	2.01	G	AE												
			Coordination Drawings	2.01	G	AE												
			Wiring Diagrams	2.01	G	AE												
			SD-03 Product Data															
			Each Type Of Enclosed	2.01	G	AE												
			Controller															
			SD-06 Test Reports															
			Field Quality-Control Test	2.01	G													
			Reports															
			SD-07 Certificates															
			Manufacturer Seismic	2.01	G													
			Qualification Certification															
			SD-08 Manufacturer’s Instructions															
			Written Instructions For Testing	2.01	G													
			And Adjusting Overcurrent															
			Protective Devices															
			SD-10 Operation and Maintenance															
			Data															
			Operation And Maintenance Data	2.01	G													
			SD-11 Closeout Submittals															
			Extra Materials	1.09	G													
		26 29 23	SD-01 Preconstruction Submittals															
			Manufacturer Qualifications	1.06	G													

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		26 29 23	Testing Agency Qualifications	1.06	G													
			SD-02 Shop Drawings															
			Each VFD	2.01	G	AE												
			Wiring Diagrams	2.01	G	AE												
			Coordination Drawings	2.01	G	AE												
			SD-03 Product Data															
			Each Type And Rating Of VFD	2.01	G	AE												
			SD-05 Design Data															
			Load-Current And List Of	2.01	G	AE												
			Settings Of Adjustable Overload															
			Relays															
			SD-06 Test Reports															
			Field Quality-Control Reports	2.01	G													
			Harmonic Analysis Report	2.01	G	AE												
			SD-07 Certificates															
			Manufacturer Seismic	2.01														
			Qualification Certification															
			Product Certificates	2.01														
			SD-10 Operation and Maintenance															
			Data															
			Written Instructions For Testing	2.01	G													
			And Adjusting															
			Routine Maintenance	2.01	G													
			Requirements For VFDs And All															
			Installed Components															

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		26 29 23	Written Instructions For Testing	2.01	G													
			And Adjusting Thermal-Magnetic															
			Circuit Breaker And Motor-Circuit															
			Protector Trip Settings.															
			Written Instructions For Testing,	2.01	G													
			Adjusting, And Reprogramming															
			Microprocessor Control Modules															
			Written Instructions For Setting	2.01	G													
			Field-Adjustable Timers, Controls,															
			And Status And Alarm Points															
			SD-11 Closeout Submittals															
			Warranty	1.10	G													
			Extra Materials	2.01	G													
		26 36 00	SD-01 Preconstruction Submittals															
			Manufacturer And Supplier	2.01	G													
			Qualification Data															
			SD-02 Shop Drawings															
			Dimensioned Outline Drawings	2.01	G	AE												
			Installation And Mounting	2.01	G	AE												
			Instructions															
			Interconnection Wiring Diagrams	2.01	G	AE												
			Internal Electrical Wiring And	2.01	G	AE												
			Control Drawings															
			Single-Line Diagram	2.01	G	AE												
			SD-03 Product Data															
			Transfer Switch Mechanism	2.01	G	AE												

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		26 36 00	Control System	2.01	G	AE												
			Protective Devices	2.01	G	AE												
			Cabinet	2.01	G	AE												
			SD-07 Certificates															
			Manufacturer Seismic	2.01														
			Qualification Certification															
			SD-10 Operation and Maintenance															
			Data															
			Each Type Of Product To Include	2.01	G													
			In Emergency, Operation, And															
			Maintenance Manuals															
		26 41 00	SD-01 Preconstruction Submittals															
			Installer Qualifications	1.06	G													
			Manufacturer Qualifications	1.06	G													
			SD-02 Shop Drawings															
			Lightning Protection System	2.01	G	AE												
			SD-03 Product Data															
			Air Terminals	2.01	G	AE												
			Conductors	2.01	G	AE												
			Mounting Accessories	2.01	G	AE												
			SD-06 Test Reports															
			Field Inspection Reports	2.01	G													
			SD-07 Certificates															
			Roof Adhesive	2.01	G													
		26 43 00	SD-02 Shop Drawings															

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		26 43 00	Materials And Procedures	2.01	G	AE												
			Specified															
			SD-03 Product Data															
			For Each Type Of Product	2.01	G	AE												
			Required															
			SD-06 Test Reports															
			Field Test Reports	2.01	G	AE												
			SD-07 Certificates															
			Test Data Product Certificates	2.01	G													
			SD-10 Operation and Maintenance															
			Data															
			Maintenance Data	2.01	G													
			SD-11 Closeout Submittals															
			Warranty	1.08	G													
		26 50 00	SD-01 Preconstruction Submittals															
			Testing Laboratory Qualifications	1.06	G													
			(Manufactures)															
			Testing Laboratory Qualifications	1.06	G													
			(Independent)															
			SD-02 Shop Drawings															
			Wiring Diagrams	2.01 B.	G	AE												
			Coordination Drawings	2.01 B.	G	AE												
			SD-03 Product Data															
			Physical Description Of Lighting	2.01 A.	G	AE												
			Fixture Including Dimensions															

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		26 50 00	Emergency Lighting Units	2.01 A.	G	AE												
			Including Battery And Charger															
			Energy-Efficiency Data	2.01 A.	G	AE												
			Photometric Data	2.01 A.	G	AE												
			SD-04 Samples															
			Interior Lighting Fixtures	2.01 C.	G	AE												
			SD-06 Test Reports															
			Field Quality-Control Test	2.01 F.	G													
			Reports															
			SD-07 Certificates															
			Product Certificates	2.01 D.	G													
			SD-10 Operation and Maintenance															
			Data															
			Operation And Maintenance Data	2.01 G.	G													
			SD-11 Closeout Submittals															
			Warranties	2.01 H.	G													
			Extra Materials	1.09	G													
		26 90 30	SD-02 Shop Drawings															
			For the Equipment Specified	2.01	G													
			SD-03 Product Data															
			Software Configuration	2.01	G													
			Coordination Requirements	2.01	G	AE												
			Software Installation Media	1.08	G													
			Software Documentation	1.08	G													
			SD-06 Test Reports															
			Record Of Tests And Inspections	3.05	G	AE												

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		26 90 30	SD-05 Design Data															
			Substantiating Battery	2.05	G	AE												
			Calculations For Supervisory And															
			Alarm Power Requirements															
			SD-07 Certificates															
			Software License Certificates	1.08	G													
			SD-11 Closeout Submittals															
			Operation & Maintenance	1.08	G													
			Manuals And Instructions															
			Extra Materials	1.11	G													
			Instructional Videotape	3.06	G													
		27 10 00	SD-01 Preconstruction Submittals															
			Installer Qualifications	2.01	G													
			Testing Agency Qualifications	2.01	G													
			SD-03 Product Data															
			For Each Type Of Product	2.01	G	AE												
			Surface-Burning Characteristics	2.01	G	AE												
			SD-06 Test Reports															
			Field Quality-Control Reports	2.01	G	AE												
			Source Quality Control	3.06	G	AE												
			SD-11 Closeout Submittals															
			Warranty	1.06	G													
		27 13 23	SD-01 Preconstruction Submittals															
			Schedule	2.01	G													
			Fiber Optic Cable Installer	1.07	G													
			Splicer Qualifications	1.07	G													

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		27 13 23	Manufacturer Qualifications	2.01	G													
			Installer Qualifications	2.01	G													
			Testing Agency Qualifications	2.01	G													
			SD-02 Shop Drawings															
			Equipment Placement	2.01	G	AE												
			SD-03 Product Data															
			Product Information In Sufficient	2.01	G	AE												
			Detail To Indicate That															
			Components Meet These															
			Specifications															
			Calculations For Each Fiber Optic	2.01	G	AE												
			Cable Span															
			Cable Running Lists Per	2.01	G	AE												
			Subsystem															
			SD-06 Test Reports															
			Field Quality-Control Reports	2.01	G													
			Source Quality Control	2.05	G	AE												
			SD-11 Closeout Submittals															
			Warranty	1.10	G													
		28 16 11	SD-02 Shop Drawings															
			Riser Drawing For Each	2.01	G	AE												
			Applicable Security Subsystem															
			System Drawing For Each	2.01	G	AE												
			Applicable Security System															
			Detail And Elevation Drawings	2.01	G	AE												
			For All Devices															

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		28 16 11	SD-03 Product Data															
			Manufacturer Security System	2.01	G	AE												
			Product Cut-Sheets															
			Schedule For All Of The	2.01	G	AE												
			Applicable Security Subsystems															
			SD-07 Certificates															
			Certificates Of Compliance	2.01	G													
			Manufacture's Certification Of	2.01	G													
			Underwriters Laboratories, Inc.															
			(UI) Listing															
			SD-10 Operation and Maintenance															
			Data															
			Maintenance And Operating	2.01	G													
			Manuals															
			SD-11 Closeout Submittals															
			As-Built Packages	2.01	G													
		28 23 00	SD-01 Preconstruction Submittals															
			Installer Qualifications	1.05 A.	G													
			SD-02 Shop Drawings															
			Wiring Diagrams	2.01 A.	G													
			Plan And Elevation Views Of	2.01 A.	G	AE												
			Components And Enclosures															
			Details Of Control Panels	2.01 A.	G	AE												
			Preliminary (Draft) Record	3.09	G	AE												
			Drawings															
			SD-03 Product Data															

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		28 23 00	Manufacturer's Specifications For	2.01 B.	G	AE												
			Each Component															
			SD-04 Samples															
			Completion Matrix	3.09	G													
			SD-05 Design Data															
			Structural Analysis For Installed	2.01 A.	G													
			Products															
			Letter of Final Acceptance	3.09	G													
			SD-06 Test Reports															
			Functional Tests	3.09	G	AE												
			Burn-In Tests	3.09	G	AE												
			Field Quality Control	3.07	G	AE												
			Video Surveillance System	3.09	G													
			SD-07 Certificates															
			Written Certification	3.09	G													
			SD-10 Operation and Maintenance															
			Data															
			Operating Instructions	2.01 C.	G	AE												
			Routine maintenance	2.01 C.	G	AE												
			requirements for system															
			components															
			Lists Of Spare Parts And	2.01 C.	G													
			Replacement Components															
			SD-11 Closeout Submittals															
			Warranty	1.08	G													
			Extra Materials	1.09	G													

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		28 23 00	Coordination Drawings	2.01 D.	G	AE												
			Checklist	3.09	G	AE												
			Final As-Built Drawings	3.09	G	AE												
		28 31 11	SD-01 Preconstruction Submittals															
			Installer Qualifications	1.07	G													
			SD-02 Shop Drawings															
			Plans, Elevations, Sections,	2.01	G	AE												
			Details, And Attachments															
			Plan View Drawing Showing	2.01	G	AE												
			Device Locations, Terminal															
			Cabinet Locations, Junction															
			Boxes, Other Related Equipment															
			Conduit Routing, Wire Counts,															
			Circuit Identification In Each															
			Conduit, And Circuit Layouts															
			Riser Diagrams	2.01	G	AE												
			Wiring Diagram	2.01	G	AE												
			Duct Smoke Detectors	2.01	G	AE												
			Voice/Alarm Signaling-Service	2.01	G	AE												
			Equipment Rack Or Console															
			Layout															
			SD-03 Product Data															
			For Each Type Of Product	2.01	G	AE												
			Indicated.															
			System Operation	2.01	G	AE												
			Annotated Catalog Data	2.01	G	AE												

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		28 31 11	Performance Parameters	2.01	G	AE												
			Final Acceptance Testing	2.01	G	AE												
			Procedures															
			SD-05 Design Data															
			Voltage Drop Calculations	2.01	G	AE												
			Battery-Size Calculations	2.01	G	AE												
			Amplifiers	2.01	G	AE												
			SD-06 Test Reports															
			Field Quality-Control Reports	2.01	G													
			Field Quality Control	3.05	G													
			SD-08 Manufacturer's Instructions															
			Installation Details	2.01	G													
			SD-10 Operation and Maintenance															
			Data															
			Fire-Alarm Systems And	2.01	G													
			Components															
			SD-11 Closeout Submittals															
			Software Service Agreement	1.09	G													
			Record Of Completion	2.01	G													
			Documents															
			Copy Of Site-Specific Software	2.01	G													
			Maintenance, Inspection And	2.01	G													
			Testing Records															
			Software And Firmware	2.01	G													
			Operational Documentation															
		31 05 19	SD-03 Product Data															

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		31 05 19	Manufacturing Quality Control	2.02	G													
			Sampling and Testing															
			Geotextile	2.01 A.	G													
			SD-04 Samples															
			Quality Assurance Samples and	3.01	G													
			Tests															
			SD-07 Certificates															
			Certificate Of Compliance	2.01	G													
		31 05 20	SD-01 Preconstruction Submittals															
			Qualifications	1.04	G													
			SD-02 Shop Drawings															
			Repair Drawings	3.01	G													
			As-Built Drawings	3.09	G													
			SD-03 Product Data															
			Tests, Inspections, And	2.02	G													
			Verifications															
			SD-04 Samples															
			Samples	3.05	G													
			SD-06 Test Reports															
			Materials	2.01	G													
			Surface Preparation	3.02	G													
			Field Seaming	3.04	G													
			QC Testing	3.06 A.	G													
			Non-Destructive Field Seam	3.06 B.	G													
			Continuity Testing															
		31 21 14.13	SD-03 Product Data															

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		31 21 14.13	Piping And Fittings	2.01	G													
			Source Of Crushed Stone	2.01	G													
			SD-06 Test Reports															
			Gradation Test Results	2.01	G													
			Post-Installation Diagnostic Test	3.04	G													
			Verification Sampling Results	3.04	G													
			Verification Sampling Results	3.04	G													
			Report															
		31 21 14.14	SD-01 Preconstruction Submittals															
			GVB Barrier Application Plan	1.04	G													
			Qualifications Of Analytical	1.04	G													
			Laboratory															
			SD-03 Product Data															
			For Each Type Of GVB Material	1.05	G													
			SD-04 Samples															
			GVB Membrane Field Sample	1.05	G													
			SD-06 Test Reports															
			Material Performance Testing	1.04	G													
			SD-07 Certificates															
			GVB Subcontractor Certification	1.05														
			SD-11 Closeout Submittals															
			Warranty	1.08	G													
		31 23 10	SD-01 Preconstruction Submittals															
			Trenching And Shoring Plan	1.06	G													
			Excavation Plan	1.05	G													
		31 23 16	SD-01 Preconstruction Submittals															

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		31 23 16	Backfill Sampling and Placement Plan	1.04	G													
			Qualifications of Analytical Laboratory	1.04	G													
			Qualifications for Geotechnical Engineer	1.04	G													
			Manufacturer's Data Sheets for Compaction Equipment	1.04	G													
			SD-06 Test Reports															
			Certified Chemical Analytical Results	2.01	G													
			Certified Modified Proctor Compaction Test Results	2.01	G													
			Certified Gradation Test Results	2.01	G													
			Certified Gradation Test Results	2.01	G													
			Compressive Strength Of CLSM	2.01	G													
			Laboratory Performance Of Mix Designs	2.01	G													
			In-Place Fill Testing	3.06	G													
		31 60 00	SD-03 Product Data															
			Tabular List Of Light Power Tools	3.02	G													
			SD-06 Test Reports															
			Soil Testing Results	2.01 A.	G													
			Test Records	3.04 B.	G													
			Records Of Inspection	3.04 B.	G													
		32 12 16	SD-01 Preconstruction Submittals															

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		32 12 16	Calibration Laboratory	1.07	G													
			Testing Laboratory	1.07 A.	G													
			SD-05 Design Data															
			Mix Design	1.04 A.	G													
			Bituminous Mix Tests	3.07 B.2.	G													
			SD-06 Test Reports															
			Specific Gravity Of Mineral Filler	3.07 A.4.	G													
			Specific Gravity Of Asphalt	3.07 A.5.	G													
			Pavement Courses Testing	3.07 B.3.	G													
			Aggregates Tests	3.07 B.1.	G													
			Field Density Tests	3.07 B.3.	G													
			SD-07 Certificates															
			Certification	2.02 A.														
		32 31 13	SD-02 Shop Drawings															
			Layout Of Fencing, Gates, And Accessories	2.07	G													
			SD-03 Product Data															
			Product Data	2.07	G													
		33 05 01.10	SD-01 Preconstruction Submittals															
			Hydrostatic Testing Plan	1.04	G													
			Qualifications	1.05	G													
			Qualifications	1.05	G													
			SD-02 Shop Drawings															
			Connection Details	2.02 A.	G													
			SD-03 Product Data															

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		33 05 01.10	Pipe, Fittings, And Other Materials	2.02 A.	G													
			SD-06 Test Reports															
			Fusion Weld Documentation Report	1.05	G													
			Fusion Weld Documentation Report	3.07	G													
			Leakage Test	3.09 B.2.	G													
			Pressure Test	3.09 B.1.	G													
			SD-07 Certificates															
			Manufacturer's Certificate Of Compliance	1.05	G													
			SD-11 Closeout Submittals															
			Invert Of Installed Pipe	1.05	G													
		33 05 01.12	SD-01 Preconstruction Submittals															
			Manufacturer's Written In-Plant Quality Control Program	2.10	G													
			Field Leakage Testing Plan	3.08 A.	G													
			Name And Qualifications Of Inspection Firm	1.04	G													
			SD-02 Shop Drawings															
			Tee Fabrication Details	2.10	G													
			SD-03 Product Data															
			Certified Statement From Manufacturer Of Gaskets	2.10	G													

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		33 05 01.12	Product Information, Including	3.09 A.1.	G													
			But Not Limited To, Brand Name															
			And Model Number Of Video															
			Equipment															
			SD-05 Design Data															
			Quick Setting Grout Design Mix	2.10	G													
			Fabrication Plans And	2.10	G													
			Calculations															
			SD-06 Test Reports															
			Pipe And Pipe Joint Test Results	2.10	G													
			Test Or Historical Performance	2.10	G													
			Data															
			Manufacturer's Certificate Of	2.10	G													
			Compliance															
			PVC Pipe Deflection Test Results	3.08 G.1.	G													
			CCTV Inspection Results	3.09 A.1.	G													
			Test Report Documentation	3.08 E.	G													
			SD-07 Certificates															
			Letter Of Certification	2.10														
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Written	2.10	G													
			Instructions															
		33 05 13	SD-02 Shop Drawings															
			Well Vault	2.01	G													
			Precast Manholes Riser Sections	2.01	G													

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		33 05 13	Precast Base and Top Slab	2.01	G													
			Sections															
			Design Of Manhole Frame To	2.01	G													
			Structure Seals															
			SD-06 Test Reports															
			Source Quality Control	2.09	G													
			SD-07 Certificates															
			Certification	1.03														
		33 11 00	SD-03 Product Data															
			Pipe, Fittings, Joints and	2.02	G	AE												
			Couplings															
			Valves	2.03	G	AE												
			Valve Boxes	2.03 B.	G	AE												
			Hydrant	2.04 A.	G	AE												
			Meters	2.05	G													
			Pipe Anchorage	2.02 D.	G	AE												
			Tapping Sleeves	2.06 A.	G	AE												
			Corporation Stops	2.06 F.1.	G	AE												
			SD-06 Test Reports															
			Bacteriological Samples	3.02 G.	G	AE												
			SD-07 Certificates															
			Pipe, Fittings, Joints and	2.02														
			Couplings															
			Valves	2.03														
			Meters	2.05														
			Disinfection Procedures	3.02 G.														

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		33 11 00	Manufacturer's Certification	2.02 A.1.	G													
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Instructions	3.02 A.	G													
			SD-11 Closeout Submittals															
			As-Built Drawings	3.04	G													
		33 11 54	SD-01 Preconstruction Submittals															
			Installation Plan	1.06	G													
			Qualifications	1.07	G													
			Permits And Licenses	1.08 A.	G													
			SD-03 Product Data															
			Catalog Data For PVC Piping,	2.01	G													
			Stainless Steel Screen,															
			Flush-Mount Manhole And															
			Traffic-Rated Manhole Covers															
			SD-06 Test Reports															
			Soil Analytical Results	3.03 B.	G													
			SD-11 Closeout Submittals															
			Certification For Coating Material	2.04	G													
			And Coated Steel Bars															
			Gauging Station As-Built	1.11 A.	G													
			Drawings															
		33 23 00	SD-01 Preconstruction Submittals															
			Permits And Licenses	1.09 A.	G													
			Qualifications	1.08	G													
			Investigation Derived Waste Plan	1.07 B.	G													
			Well Installation Plan	1.07 A.	G													

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		33 23 00	SD-03 Product Data															
			Catalog Data	1.07 A.	G													
			SD-05 Design Data															
			Extraction Well Pump Selections	3.03 N.	G													
			SD-06 Test Reports															
			Testing Results	3.06 B.	G													
			SD-07 Certificates															
			Treatment And Disposal	1.07 C.														
			Certificates															
			Treatment Facility Permit	1.07 B.														
			Delivery Certificates	1.07 C.														
			Shipment Manifests	1.07 C.														
			Extraction Well Registrations	1.07 A.														
			SD-11 Closeout Submittals															
			Borehole Logs	3.06 B.	G													
			Well Installation Diagrams	1.12 B.	G													
			Extraction Well Development	3.06 B.	G													
			Records															
			Well	1.12 D.	G													
			Decommissioning/Abandonment															
			Records															
		33 51 39	SD-01 Preconstruction Submittals															
			Permits and Licenses	1.09 A.	G													
			Qualifications	1.08	G													
			SD-03 Product Data															
			Catalog Data	2.01	G													

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		33 51 39	SD-06 Test Reports															
			Testing Results	3.05 B.	G													
			SD-07 Certificates															
			Observation Well Registrations	1.09 B.														
			SD-11 Closeout Submittals															
			Borehole Logs	3.05 B.	G													
			Observation Well Development	3.05 B.	G													
			Records															
			Well Installation Diagrams	1.12 B.	G													
			Monitoring Well Modification	1.09 B.	G													
			Records															
			Well	3.05 A.	G													
			Decommissioning/Abandonment															
			Records															
		33 71 73	SD-01 Preconstruction Submittals															
			PSE&G Prepared Drawings Of	1.06	G													
			Equipment															
		33 79 00	SD-01 Preconstruction Submittals															
			Manufacturer Qualifications	1.05	G													
			SD-02 Shop Drawings															
			Grounding And Installation	2.02	G	AE												
			Details															
			SD-03 Product Data															
			Grounding Electrodes And	2.02	G	AE												
			Connectors															
			SD-06 Test Reports															

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		33 79 00	Test Reports	2.02	G	AE												
			SD-08 Manufacturer's Instructions															
			Manufacturer's Instructions	2.02	G													
			SD-11 Closeout Submittals															
			Project Record Documents	2.02	G													
		33 80 00	SD-01 Preconstruction Submittals															
			Qualification Data: For	2.03	G													
			Professional Engineering And															
			Testing Agency															
			SD-02 Shop Drawings															
			Duct-Bank Coordination	2.03	G													
			Drawings															
			Precast Or Factory-Fabricated	2.03	G													
			Underground Utility Structures															
			Factory-Fabricated Handholes	2.03	G													
			And Boxes Other Than Precast															
			Concrete															
			SD-03 Product Data															
			Product Data	2.03	G													
			SD-06 Test Reports															
			Field Quality-Control Test	2.03	G													
			Reports															
			Source Quality-Control Test	2.03	G													
			Reports															
			SD-07 Certificates															
			Concrete And Steel	2.03	G	AE												

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		40 05 15	SD-02 Shop Drawings															
			Revisions To Support Systems	2.12	G													
			Each Support, Sway Brace,	2.12	G													
			Seismic Brace, Hanger, Guide,															
			Component, And Anchor For All															
			Piping 2 Inches And Larger															
			SD-03 Product Data															
			Piping Support System	2.12	G													
			SD-10 Operation and Maintenance															
			Data															
			Maintenance Information	2.12	G													
		40 27 01	SD-02 Shop Drawings															
			Layout Drawings	2.08	G													
			SD-03 Product Data															
			Manufacturer's Data On	2.08	G													
			Materials, Construction, End															
			Connections, Ratings, Overall															
			Lengths, And Live Lengths															
			SD-08 Manufacturer’s Instructions															
			Installation And Operation	2.08	G													
			SD-10 Operation and Maintenance															
			Data															
			Operation And Maintenance Data	2.08	G													
		40 27 02	SD-03 Product Data															
			Product Data Sheets	2.05	G													

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		40 27 02	Catalog Information, Descriptive	2.05	G													
			Literature, Specifications, And															
			Identification Of Materials Of															
			Construction															
			SD-07 Certificates															
			Manufacturer's Certificate Of	2.05														
			Proper Installation															
			SD-06 Test Reports															
			Test Results	3.02	G													
			Inspection Records	3.02	G													
			SD-08 Manufacturer’s Instructions															
			Manufacturer's	2.05	G													
			Recommendations Or Instructions															
			On Installation															
			SD-10 Operation and Maintenance															
			Data															
			Operation And Maintenance Data	2.05	G													
		40 42 13	SD-08 Manufacturer’s Instructions															
			Manufacturer's Installation	2.04	G													
			Instructions															
			SD-10 Operation and Maintenance															
			Data															
			Maintenance Information	2.04	G													
		40 80 01	SD-01 Preconstruction Submittals															
			Testing Plan	1.03	G													
			SD-06 Test Reports															

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		40 80 01	Test Report Documentation	3.04	G													
			SD-07 Certificates															
			Certificates Of Calibration	1.03														
		43 13 13.13	SD-02 Shop Drawings															
			Fabrication Drawings Of The	2.03 E.	G													
			Proposed Units															
			SD-03 Product Data															
			Data Sheets On The Proposed	2.02	G													
			Carbon															
			Weights Of Each Vessel, Empty	2.03 E.	G													
			And Full Of Carbon															
			Type Of Activated Carbon With	2.02	G													
			Isotherms For The Selected															
			Carbon															
			SD-04 Samples															
			Vapor Phase Gac Media	2.02	G													
			SD-05 Design Data															
			Minimum Requirements For	2.02	G													
			Relative Humidity And															
			Temperature For															
			Structural And Other Calculations	2.03 E.	G													
			For ASME Certified Tank															
			Estimated Carbon Usage Based	2.02	G													
			On Estimated Contaminants															
			Anchoring And Bracing	2.03 E.	G													
			Calculations															

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		43 13 13.13	Design Calculations Or Vendor	2.02	G													
			Computer Models To Estimate															
			The Mass Of Carbon Required															
			SD-06 Test Reports															
			Field Quality Control	3.04	G													
			SD-07 Certificates															
			Manufacturer's Certificates	2.02														
			Certificate Of Proper Installation	2.03 E.														
			System Supplier Testing	2.03 E.														
			Certificates Attesting That The	2.02														
			Activated Carbon Furnished Meets															
			The Specified Requirements															
			SD-08 Manufacturer’s Instructions															
			Installation Instructions For	2.03 E.	G													
			Vessels															
			Installation Instructions For Vapor	2.03 E.	G													
			Phase GAC															
			SD-10 Operation and Maintenance															
			Data															
			Operation And Maintenance	2.03 E.	G													
			Manuals															
		43 31 13.14	SD-02 Shop Drawings															
			Process Flow Diagram And	2.02 F.	G													
			Piping Diagram For Pipe/Valve															
			Manifold System															

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		43 31 13.14	Dimensions, Weight, Layout, And	2.02 F.	G													
			Anchoring Locations															
			SD-03 Product Data															
			Catalog Cut Sheets And	2.02 F.	G													
			Technical Descriptions															
			Material Data Sheet	2.03 B.	G													
			SD-04 Samples															
			Liquid-Phase GAC Media	2.03 B.	G													
			SD-05 Design Data															
			Anchorage And Bracing	2.02 F.	G													
			Calculations															
			Structural Calculations For The	2.02 F.	G													
			Adsorber Shells, Tanks And															
			Mounting And Support Details															
			Headloss Properties Of Supplied	2.03 B.	G													
			GAC Material															
			Model Results	2.03 B.	G													
			SD-06 Test Reports															
			Factory Pressure Test	2.08	G													
			Field Test	3.06	G													
			SD-07 Certificates															
			ASTM Pressure Vessel Stamp	2.02 F.														
			Information															
			Manufacturer's Certificates On	2.03 A.	G													
			Source And Chemical															
			Composition Of GAC															

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		43 31 13.14	Manufacturers Certificate Of	2.02 F.														
			Proper Installation															
			SD-08 Manufacturer’s Instructions															
			Vessel Lifting And Hoisting	2.02 F.	G													
			Instructions															
			GAC Change Out Instructions	2.03 A.	G													
			Initial Preparations And GAC	2.03 A.	G													
			Loading Instructions															
			SD-10 Operation and Maintenance															
			Data															
			Operation And Maintenance	2.02 F.	G													
			Manuals															
		43 41 45	SD-02 Shop Drawings															
			Each Tank And Accessories	2.02 F.	G													
			SD-03 Product Data															
			Anchoring and bracing	2.02 F.	G													
			calculations															
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Installation And	1.05	G													
			Operating Guidelines															
			Manufacturer's Installation	3.01	G													
			Manual And Operating Guidelines															
			Manufacturer's Installation	3.02	G													
			Manual And Operating Guidelines															

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		43 41 45	Storage And Handling	2.02 F.	G													
			Requirements And															
			Recommendations															
			Installation Preparation And	2.02 F.	G													
			Recommendations															
			SD-11 Closeout Submittals															
			Warranty	1.06	G													
		44 42 10	SD-02 Shop Drawings															
			Power And Control Wiring	2.03	G													
			Diagrams															
			Equipment Fabrications And	2.03	G													
			Interface With Other Items															
			SD-03 Product Data															
			Make, Model, Weight, And	2.03	G													
			Horsepower Of Each Piece Of															
			Equipment															
			Manufacturer's Catalog	2.03	G													
			Information															
			Instrument Cut Sheets And	2.03	G													
			Ranges															
			Shop And Field Painting Systems	2.03	G													
			SD-05 Design Data															
			Anchorage And Bracing	2.03	G													
			Calculations															
			Pressure Drop Calculations	2.03	G													
			External Utility Requirements	2.03	G													

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		44 42 10	SD-06 Test Reports															
			Factory Test	3.03 A.	G													
			Field Test	3.03 B.	G													
			SD-07 Certificates															
			Calibration Certificates	2.03														
			Manufacturer's Certificate Of	2.03														
			Compliance															
			Manufacturer's Certificate Of	2.03														
			Proper Installation															
			SD-08 Manufacturer’s Instructions															
			Special Shipping, Storage And	2.03	G													
			Protection, And Handling															
			Instructions															
			Manufacturer's Written/Printed	2.03	G													
			Installation Instructions															
			SD-10 Operation and Maintenance															
			Data															
			Routine Maintenance	2.03	G													
			Requirements															
			Operation And Maintenance Data	2.03	G													
			SD-11 Closeout Submittals															
			Tools	1.05	G													
			Warranty	1.06	G													
		44 42 56.17	SD-02 Shop Drawings															
			Mechanical And Electrical	2.07	G													
			Drawings															

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		44 42 56.17	Power And Control Wiring	2.07	G													
			Diagrams															
			SD-03 Product Data															
			Catalog Information	2.07	G													
			Performance Data Curves	2.07	G													
			Motor Nameplate Data	2.07	G													
			SD-05 Design Data															
			Anchoring And Bracing	2.07	G													
			Calculations															
			SD-06 Test Reports															
			Performance Tests	3.03 C.	G													
			Factory Functional Test Report	2.07	G													
			Functional Test	3.03 B.	G													
			SD-07 Certificates															
			Manufacturer's Certificate Of	2.07														
			Proper Installation															
			Manufacturer's Certificate Of	3.04														
			Proper Installation															
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Printed	2.07	G													
			Installation Instructions															
			Shipping, Storage And	2.07	G													
			Protection, And Handling															
			Instructions															
			SD-10 Operation and Maintenance															
			Data															

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		44 42 56.17	Spare Parts List	2.07	G													
			Operation And Maintenance Data	2.07	G													
		46 61 00	SD-01 Preconstruction Submittals															
			Qualifications Of The Installer,	1.03	G													
			And The Manufacturer's And															
			Media Supplier's Representatives															
			SD-02 Shop Drawings															
			Wiring And Schematic Diagrams	2.01	G													
			Dimensions, Weight, Layout, And	2.03 A.	G													
			Anchoring Locations															
			Process Flow Diagram And	2.03 A.	G													
			Piping Diagram For Pipe/Valve															
			Manifold System															
			SD-03 Product Data															
			Posting Framed Instructions	3.07	G													
			Catalog Cut Sheets And	2.03 A.	G													
			Technical Descriptions															
			SD-06 Test Reports															
			Acceptance Testing	3.08 B.	G													
			SD-10 Operation and Maintenance															
			Data															
			Field Training	3.09	G													
			Operating And Maintenance	3.10	G													
			Instructions															
			Spare Parts Data For Each	1.05	G													
			Different Item															

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		46 61 00	SD-11 Closeout Submittals															
			Special Tools, Calibration	2.03 E.	G													
			Devices, And Instruments															
			Wiring And Control Diagrams	3.07	G													
			Under Glass Or In Laminated															
			Plastic															

SECTION 01 35 29

HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES
11/15

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH 0100	(2015; Suppl 2002-2016) Documentation of the Threshold Limit Values and Biological Exposure Indices
ACGIH 0116	(2016) TLVs and BEIs

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE Z590.3	(2011; R 2016) Prevention through Design Guidelines for Addressing Occupational Hazards and Risks in Design and Redesign Processes
ASSE/SAFE Z88.2	(2015) American National Standard Practices for Respiratory Protection

ASTM INTERNATIONAL (ASTM)

ASTM F2412	(2011) Standard Test Methods for Foot Protection
ASTM F2413	(2017) Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(2013) Standard for Portable Fire Extinguishers
NFPA 51B	(2014) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2) National Electrical Code
NFPA 70E	(2015; ERTA 1 2015) Standard for Electrical Safety in the Workplace
NFPA 241	(2013; Errata 2015) Standard for Safeguarding Construction,Alteration, and Demolition Operations

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z87.1	(2015) Occupational and Educational Personal Eye and Face Protection Devices
ANSI/ISEA Z89.1	(2014) American National Standard for Requirements for Industrial Head Protection
ANSI/ISEA Z358.1	(2014) American National Standard for Emergency Eyewash and Shower Equipment

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH 85-115	(1985) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities

NEW JERSEY ADMINISTRATIVE CODE (NJAC)

NJAC 7:10	New Jersey Safe Drinking Water Act
NJAC 7:13	(2017) Flood Hazard Area Act Rules
NJAC 7:26E	Technical Requirements for Site Remediation
NJAC 7:26G	(2014) Hazardous Waste
NJAC 7:29	(2012) Noise Control

NEW JERSEY DEPARTMENT OF AGRICULTURE STATE SOIL CONSERVATION COMMITTEE (SCS)

SCS Standards	(2014; R 2017) The Standards for Soil Erosion and Sediment Control in New Jersey

NEW JERSEY STATUTES ANNOTATED (NJSA)

NJSA 4:24-39	(1975) Soil Erosion and Sediment Control Act

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual
ER 385-1-92	(2007) Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 450/4-87-007	Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)
EPA 9285.1-03	Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

10 CFR 19	Notices, Instructions, and Reports to Workers; Inspection and Investigations
29 CFR 1904	Recording and Reporting Occupational Injuries and Illnesses
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.132	Personal Protective Equipment
29 CFR 1910.1000	Air Contaminants
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1910.38	Emergency Action Plans
29 CFR 1926	Safety and Health Regulations for Construction
40 CFR 302	Designation, Reportable Quantities, and Notification
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

1.02 PRECONSTRUCTION SAFETY CONFERENCE

Conduct a preconstruction safety conference prior to the start of site activities and after submission of the Accident Prevention Plan/Site Safety And Health Plan (APP/SSHP). The objective of the meeting is to discuss health and safety concerns related to the impending work, discuss project health and safety organization and expectations, review and answer comments and concerns regarding the APP/SSHP or other health and safety concerns. Ensure that those individuals responsible for health and safety at the project level are available and attend this meeting.

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan/Site Safety And Health Plan (APP/SSHP);

G

SD-02 Shop Drawings

Work Zones; G

Decontamination Facilities; G

SD-03 Product Data

Amendments to the APP/SSHP; G

Dust Control Plan; G

Personnel Exposure Monitoring/Air Sampling Program; G

Site Control Log

SSHO's Daily Inspection Logs; G

SD-07 Certificates

Certificate Of Worker/Visitor Acknowledgement;

Health and Safety Team Qualifications; G

Training Certificates;

SD-11 Closeout Submittals

Safety And Health Phase-Out Report; G

1.04 ACCIDENT PREVENTION PLAN/SITE SAFETY AND HEALTH PLAN (APP/SSHP)

The Government considers the Contractor to be the "controlling authority" for site safety and health for all work performed by the subcontractors. The Contractor is responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried.

Contractor shall develop and implement a Site Safety and Health Plan and attach to the Accident Prevention Plan (APP) as an appendix (APP/SSHP). OSHA Standards 29 CFR 1910, Section 120 (b) and 29 CFR 1926, Section 65(b) require employers to develop and implement a written Health and Safety Plan for employees involved in hazardous waste operations. The site-specific program requirements of the OSHA Standards shall be integrated in the APP/SSHP. The APP/SSHP shall interface with the Contractor's overall Health and Safety Program. Any portions of the overall Contractor's Health and Safety Program that are referenced in the APP/SSHP shall be included as appendices to the APP/SSHP.

The APP/SSHP shall address all occupational safety and health hazards (traditional construction as well as contaminant-related hazards) associated with cleanup operations in accordance with EM 385-1-1. Current versions of EM 385-1-1 can found on the internet at

http://www.publications.usace.army.mil/USACE-Publications/Engineer-Manuals/

SSHP appendix elements that overlap with APP elements need not be duplicated in the APP/SSHP provided each safety and occupational health (SOH) issue receives adequate attention and is documented in the APP/SSHP. The APP/SSHP is a dynamic document, subject to change as project operations/execution change. Modify the APP/SSHP to address changing and previously unidentified health and safety conditions. Ensure that the APP/SSHP is updated accordingly. Submit amendments to the APP/SSHP to the Contracting Officer as the APP/SSHP is updated throughout the project. The APP/SSHP must contain all updates.

A. Activity Hazard Analysis (AHA)

The APP/SSHP shall contain AHAs for all construction activities to be performed at the site. The AHAs shall be continuously reviewed and, when appropriate, modified to address changing site conditions or operations, with the concurrence of the SHM, the Site Superintendent, and the Government.

The Activity Hazard Analyses shall comply with 29 CFR 1910, Subpart I, "Personal Protective Equipment."

The following major site tasks, at a minimum, shall be addressed as applicable:

1. Mobilization.
2. Temporary facilities and controls, including SOH controls.
3. Well installation and testing (including extraction wells, observation wells, and gauging station).
4. On-site temporary storage, treatment and discharge and/or disposal of investigation derived waste generated during the pumping tests, including extracted groundwater.
5. Utility installation.
6. Pipe trenching and installation.
7. Asphalt cap restoration.
8. Groundwater treatment building construction, including vapor mitigation system.
9. Groundwater treatment system equipment installation.
10. Start-up and testing.
11. Site restoration.
12. One year of Site operations.
13. Demobilization.

B. Acceptance and Modifications

Prior to submittal, the APP/SSHP must be signed and dated by the Safety and Health Manager and the Site Superintendent. Submit for review 30 days prior to the Preconstruction Safety Conference. The Government will review the APP/SSHP and deficiencies in the APP/SSHP will be discussed at the preconstruction safety conference, and must be revised to correct the deficiencies and resubmitted for acceptance. Onsite work must not begin until the plan has been accepted. Maintain a copy of the written APP/SSHP onsite. Changes and modifications to the APP/SSHP must be made with the knowledge and concurrence of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer. Bring to the attention of the Safety and

Health Manager, the Site Superintendent, and the Contracting Officer any unforeseen hazard that becomes evident during the performance of the work, through the Site Safety and Health Officer (SSHO) for resolution as soon as possible. In the interim, take necessary action to re-establish and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment. Disregard for the provisions of this specification or the accepted APP/SSHP is cause for stopping work until the matter has been rectified.

C. Availability

A copy of the current APP/SSHP shall be available on-site at all times in the Contractor's job trailer. Make available the APP/SSHP in accordance with 29 CFR 1910.120, (b)(1)(v) and 29 CFR 1926.65, (b)(1)(v).

D. Failure to Comply

Failure of contractor or subcontractor personnel to comply with required safety requirements in the specifications or the accepted APP/SSHP will result in removal of project site."

1.05 STAFF ORGANIZATION, QUALIFICATION AND RESPONSIBILITIES

An organizational structure shall be developed that sets forth lines of authority, responsibilities, and communication procedures concerning site safety, health, and emergency response. The APP/SSHP shall include a description of this organizational structure as well as qualifications and responsibilities of each of the following individuals. The Contractor shall submit the Health and Safety team qualifications and shall obtain the Government's acceptance before replacing any member of the health and safety staff. The health and safety organization shall be separately identified from the project's operations organizations in order to maintain the appropriate degree of independence from day-to-day activities. The project manager shall be responsible for health and safety on the project including providing the proper and adequate personnel, materials, and resources to implement the health and safety program.

Provide hazardous waste operations and emergency response organization in accordance with EM 385-1-1, Section 33.

A. Safety and Health Manager (SHM)

Safety and Health Manager must be an Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene or a safety professional certified by the Board of Certified Safety Professionals.

Apply the following in conjunction with the required qualifications and responsibilities stated in EM 385-1-1, Section 33.C.01.

1. Additional Qualifications

The Safety and Health Manager must have the following qualifications:

a. A minimum of 3 years experience in developing and implementing safety and occupational health programs at HTRW sites.
b. Documented experience in supervising professional and technician level personnel.
c. Documented experience in developing worker exposure assessment programs and air monitoring programs and techniques.
d. Documented experience in developing and managing personal protective equipment (PPE) programs and conducting PPE hazard evaluations for the types of activities and hazards likely to be encountered on the project, including programs for working in and around potentially toxic environments and confined spaces.
e. Working knowledge of state and Federal occupational safety and health regulations.

2. Responsibilities and Duties

a. Development, implementation, oversight, and enforcement of the APP/SSHP.
b. Provide onsite consultation as needed to ensure the APP/SSHP is fully implemented.
c. Conduct initial site-specific training.
d. Be present onsite during the first 3 days of remedial activities and at the startup of each new major phase of work.
e. Visit the site as needed and at least once per month for the duration of activities, to audit the effectiveness of the APP/SSHP.
f. Be available at all times for emergencies.
g. Coordinate any modifications to the APP/SSHP with the Site Superintendent, the SSHO, and the Contracting Officer.
h. Be responsible for evaluating air monitoring data and recommending changes to engineering controls, work practices, and PPE.
i. Provide continued support for upgrading/downgrading of the level of personal protection.
j. Serve as a member of the quality control staff.
k. Review accident reports and results of daily inspections.
l. Sign and date the APP/SSHP prior to submittal.

B. Site Safety and Health Officer

Designate an individual and one alternate as the Site Safety and Health Officer (SSHO). Include the name, qualifications (education and training summary and documentation), and work experience of the Site Safety and Health Officer and alternate in the APP/SSHP.

The following qualifications apply in conjunction with the required qualifications and responsibilities stated in EM 385-1-1, Section 33.C.02.

1. Qualifications

The SSHO and alternate shall have the following qualifications:

a. A minimum of 2 years experience in implementing SOH programs at HTRW sites where Level C personal protective equipment was required.
b. Meet 29 CFR 1910.120/29 CFR 1926.65 requirements for 40-hour initial and 8-hour supervisor training and, maintain 8-hour refresher training requirements.
c. Certified as having completed training in First Aid and CPR by a recognized organization such as the American Red Cross.
d. Specific training in personal and respiratory protective equipment, confined space entry and in the proper use of air monitoring instruments and air sampling methods.
e. Documented experience in construction techniques and construction safety procedures.
f. Working knowledge of Federal and state SOH regulations.

2. Responsibilities and Duties

a. Assist and represent the Safety and Health Manager in onsite training and the day to day onsite implementation and enforcement of the accepted APP/SSHP. The SSHO shall report directly to the SHM.
b. Be assigned to the site on a full time basis for the duration of field activities. The SSHO will have no duties other than SOH related duties. If operations are performed during more than 1 work shift per day, a Site Safety and Health Officer must be present for each shift.
c. Have authority to stop work if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions.
d. Have authority to ensure site compliance with specified SOH requirements, Federal, state and OSHA regulations and all aspects of the APP/SSHP including, but not limited to, activity hazard analyses, air monitoring, use of PPE, decontamination, site control, standard operating procedures used to minimize hazards, safe use of engineering controls, the emergency response plan, confined space entry procedures, spill containment program, and preparation of records by performing a daily SOH inspection and documenting results on the Daily Safety Inspection Log in accordance with 29 CFR 1904.
e. In coordination with site management and the Safety and Health Manager, recommend corrective actions for identified deficiencies and oversee the corrective actions.
f. Consult with and coordinate any modifications to the APP/SSHP with the Safety and Health Manager, the Site Superintendent, and the Contracting Officer.
g. Conduct daily safety inspection and document SOH findings into the Daily Safety Inspection Log. Track noted SOH deficiencies to ensure that they are corrected.
h. Conduct accident investigations and prepare accident reports.
i. Serve as a member of the quality control staff on matters relating to SOH.

C. Occupational Physician or Licensed Health Care Provider (LHCP)

Utilize the services of a licensed physician or LHCP, who is certified in occupational medicine by the American Board of Preventative Medicine, or who, by necessary training and experience is Board eligible. The physician or LHCP must be familiar with the site's hazards and the scope of this project. Include the medical consultant's name, qualifications, and knowledge of the site's conditions and proposed activities in the APP/SSHP. The physician is responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1910.120, (f) and 29 CFR 1926.65, (f) and paragraph 3.03 MEDICAL SURVEILLANCE PROGRAM.

D. Persons Certified in First Aid and CPR

At least two persons who are currently certified in first aid and CPR by the American Red Cross or other approved agency must be onsite at all times during site operations. They must be trained in universal precautions and the use of PPE as described in the Bloodborne Pathogens Standard of 29 CFR 1910, Section 1030. These persons may perform other duties but must be immediately available to render first aid when needed. An automated external defibrillator (AED) will be placed on-site and site personnel will be trained in its usage.

E. Safety and Health Technicians

For each work crew in the Exclusion Zone, one person, designated as a Safety and Health technician, must perform activities such as air monitoring, decontamination, and safety oversight on behalf of the SSHO. They must have appropriate training equivalent to the SSHO in each specific area for which they have responsibility and report to and be under the supervision of the SSHO.

1.06 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

Develop and implement an Emergency Response Plan, that meets the requirements of EM 385-1-1 Section 33.G, 29 CFR 1910.120 (l) and 29 CFR 1926.65 (l), as a section of the APP/SSHP. This plan must present procedures the Contractor shall follow in the case of an injury or in case the Contractor observes an emergency unrelated to the field work.

The Government shall be notified immediately (no later than 2 hours), verbally or via email, and shall receive a written notice within 24 hours, after any accident, injury or spill. Immediate notification (no later than 2 hours) of all incidents, near misses and accidents to USACE COR via email and/or verbally. In addition, the Government shall be notified in accordance with EM 385-1-1. Within two working days of any reportable accident, an Accident Report shall be completed on the attached ENG Form 3394 and submitted to the Contracting Officer. Emergency response planning procedures and Contractor personnel responsible for handling potential emergencies shall be identified in the APP/SSHP. Emphasis in the emergency response planning section shall be placed on procedures. Emergency response planning shall include situations that will involve mobilization of the surrounding

community.

A meeting with the local emergency preparedness agency shall be scheduled by the Contractor to discuss the response measures that shall be followed in the event of a major emergency that may affect off-site areas. A representative of the USEPA, the Government or their representative, local municipalities, and the Contractor (including the SHM) will all be required to attend. It shall be the responsibility of the Contractor to prepare an agenda and chair this meeting. This agenda shall be sent to all participating parties prior to the scheduled meeting. At this meeting, the Contractor shall present suggested guidelines and requirements for protecting local residents in the event of major fires and explosions and the off-site migration of releases from the site. Emergency response procedures shall be confirmed by consensus agreement of the attending parties. Minutes of the meeting shall be distributed to all attendees with 5 days of the meeting.

In the event of any emergency associated with remedial action, without delay, alert all onsite employees and as necessary offsite emergency responders that there is an emergency situation; take action to remove or otherwise minimize the cause of the emergency; alert the Contracting Officer; and institute measures necessary to prevent repetition of the conditions or actions leading to, or resulting in, the emergency. Train employees that are required to respond to hazardous emergency situations to their level of responsibility according to 29 CFR 1910.120 (q) and 29 CFR 1926.65 (q) requirements. Rehearse the plan regularly as part of the overall training program for site operations. Review the plan periodically and revise as necessary to reflect new or changing site conditions or information. Provide copies of the Emergency Response Plan to the affected local emergency response agencies. Address, as a minimum, the following elements in the plan:

A. Pre-emergency planning. Coordinate with local emergency response providers during preparation of the Emergency Response Plan. At a minimum, coordinate with local fire, rescue, hazardous materials response teams, police and emergency medical providers to assure all organizations are capable and willing to respond to and provide services for on-site emergencies. Ensure the Emergency Response Plan for the site is compatible and integrated with the local fire, rescue, medical and police security services available from local emergency response planning agencies.The form at the end of this section entitled "Agreement for Emergency Response Services" shall be used by the Contractor to develop an individual agreement between the Contractor, a local emergency responder, USACE (EPA's Contracting Party), and EPA.

B. Acceptance letter of an Emergency Care Facility issued by SHM.

C. Personnel roles, lines of authority, communications for emergencies.

D. Emergency recognition and prevention.

E. Site topography, layout, and prevailing weather conditions.

F. Criteria and procedures for site evacuation (emergency alerting procedures, employee alarm system, emergency PPE and equipment,

safe distances, places of refuge, evacuation routes, site security and control).

G. Specific procedures for decontamination and medical treatment of injured personnel.

H. Route maps to nearest prenotified medical facility. Site-support vehicles must be equipped with maps. At the beginning of project operations, drivers of the support vehicles must become familiar with the emergency route and the travel time required.

I. Specific procedures for decontamination and medical treatment of injured personnel.

J. Emergency alerting and response procedures including posted instructions and a list of names and telephone numbers of emergency contacts (physician, nearby medical facility, fire and police departments, ambulance service, Federal, state, and local environmental agencies; as well as Safety and Health Manager, the Site Superintendent, the Contracting Officer and their alternates).

K. Criteria for initiating community alert program, contacts, and responsibilities.

L. Procedures for reporting incidents to appropriate government agencies. In the event that an incident such as an explosion or fire, or a spill or release of toxic materials occurs during the course of the project, the appropriate government agencies must be immediately notified. In addition, verbally notify the Contracting Officer and the local district safety office immediately and submit a written notification within 24 hours. Include within the report the following items:

1. Name, organization, telephone number, and location of the Contractor.
2. Name and title of the person(s) reporting.
3. Date and time of the incident.
4. Location of the incident, i.e., site location, facility name.
5. Brief summary of the incident giving pertinent details including type of operation ongoing at the time of the incident.
6. Cause of the incident, if known.
7. Casualties (fatalities, disabling injuries).
8. Details of any existing chemical hazard or contamination.
9. Estimated property damage, if applicable.
10. Nature of damage, effect on contract schedule.
11. Action taken to ensure safety and security.
12. Other damage or injuries sustained, public or private.

M. Procedures for critique of emergency responses and follow-up.

N. Site security and control for incidents.

O. Procedures for dealing with fires, explosives, and spills.

P. Procedures for decontaminating emergency response vehicles and equipment.

1.07 CERTIFICATE OF WORKER/VISITOR ACKNOWLEDGEMENT

A copy of a certificate of worker/visitor acknowledgement must be completed and submitted for each visitor allowed to enter the Contaminant Reduction or Exclusion Zones, and for each employee, following the Example Certificate Of Worker/Visitor Acknowledgement at the end of this section.

1.08 INSPECTIONS

The SSHO shall perform daily inspections of the job site and the work in progress to ensure compliance with EM 385-1-1, the APP/SSHP, and other occupational health and safety requirements of the contract, and to determine the effectiveness of the Health and Safety Program. Procedures for correcting deficiencies (including actions, timetable and responsibilities) shall be described in the APP/SSHP. Follow-up inspections to ensure correction of deficiencies shall be conducted and documented. Daily Safety Inspection Logs shall be used to document the inspections, noting health and safety deficiencies, deficiencies in the effectiveness of the APP/SSHP, and corrective actions taken.

Attach to and submit with the Daily Quality Control reports the SSHO's Daily Inspection Logs. Include with each entry the following: date, work area checked, employees present in work area, PPE and work equipment being used in each area, special SOH issues and notes, and signature of preparer.

1.09 SAFETY AND HEALTH PHASE-OUT REPORT

Submit a Safety and Health Phase-Out Report in conjunction with the project close out report, prior to final acceptance of the work. Include the following minimum information :

A. Summary of the overall performance of SOH (e.g., accidents or incidents including near misses, unusual events, lessons learned).

B. Final decontamination documentation including procedures and techniques used to decontaminate equipment, vehicles, and on site facilities.

C. Summary of exposure monitoring and air sampling accomplished during the project.

D. Signatures of Safety and Health Manager and SSHO.

E. Copies of hazardous waste manifest forms indicating proper disposal of hazardous wastes was accomplished.

F. Initial and final physical/medical certifications.

G. Daily Safety Inspection Reports.

H. Weekly Safety Reports.

I. Training Logs.

J. Accident Reports.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

Comply with the following: EM 385-1-1; ER 385-1-92; NIOSH 85-115; 49 CFR 171; 49 CFR 172; 29 CFR 1926.65;, 29 CFR 1910.120, OSHA requirements in 29 CFR 1910 and 29 CFR 1926 with work performed under this contract, and state specific OSHA requirements where applicable in 10 CFR 19; NFPA 70; NFPA 70E; NJAC 7:10; NJAC 7:13; NJAC 7:26E; NJAC 7:26G; NJAC 7:29; NJSA 4:24-39et seq.; and SCS Standards. This includes, but is not limited to:

NFPA 51B- Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations
EPA 9285.1-03 - Safety and Health Requirements Manual
29 CFR 1910.120 - Hazardous Waste Site Operations and Emergency Response
29 CFR 1910.1000 - Air Contaminants
29 CFR 1910.38 - Employee Emergency Plans and Fire Prevention Plans
49 CFR 171 - General Information, Regulations, and Definitions
49 CFR 172 - Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

Submit to the Contracting Officer for resolution matters of interpretation of standards before starting work. The most stringent requirements apply where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary.

2.02 PERSONAL PROTECTIVE EQUIPMENT

A. Site Specific PPE Program

The Contractor's PPE program shall comply with 29 CFR 1910.132 and 29 CFR 1910.120. Operations under this contract will require work exposure to potentially hazardous materials. Contractor shall provide onsite personnel exposed to contaminants with appropriate personal protective equipment and shall assure the wearing of all necessary PPE for all personnel on-site. Components of levels of protection (B, C, D and modifications) must be relevant to site-specific conditions, including heat and cold stress potential and safety hazards. Use only respirators approved by NIOSH.

Keep protective equipment and clothing clean and well maintained. Include site-specific procedures to determine PPE program effectiveness and for onsite fit-testing of respirators, cleaning, maintenance, inspection, cartridge change out, and storage of PPE within the PPE section of the APP/SSHP.

The PPE program shall comply with but not be limited to the following guidance: ASTM F2412; ASTM F2413; ANSI/ISEA Z87.1; ASSE/SAFE Z88.2; ANSI/ISEA Z89.1; ANSI/ISEA Z358.1; AND ASSE/SAFE Z590.3.

B. Levels of Protection

The Safety and Health Manager must establish and evaluate as the work progresses the levels of protection for each work activity. Also establish action levels for upgrade or downgrade in levels of PPE. Describe in the SSHP the protocols and the communication network for changing the level of protection. Address air monitoring results, potential for exposure, changes in site conditions, work phases, job tasks, weather, temperature extremes, and individual medical considerations within the PPE evaluation protocol.

Based on available information, the initial minimum protective equipment for workers exposed to the site soils shall be Level C for each major task and operation. Once the asphalt cap has been reestablished, if conditions warrant, Level D may be appropriate. Available site information shall be reviewed and the list of tasks and operations and these levels of protection shall be expanded and/or revised during preparation of the APP/SSHP.

The initial minimum protective equipment requirements for major work activities are listed below. Available site information shall be reviewed and the list of tasks and operations and these levels of protection shall be expanded and/or revised during preparation of the SSHP.

OPERATION	**INITIAL LEVEL OF PROTECTION**
Site Preparation/Mobilization	Level D
Work Zone Establishment	Level D
Well Installation/Testing	Level D
Asphalt Cap Removal	Level C
Excavation and Backfilling	Level C
Buried Utilities/Wellhead Construction	Level C
Building Foundation/Slab Construction	Level C
Asphalt Cap Restoration	Level C
Building Construction	Level D
Site Restoration	Level D
Demobilization	Level D

C. PPE for Government Personnel

Five clean sets of personal protective equipment and clothing, as required for entry into the Exclusion Zone and Contamination Reduction Zone, must be available for use by the Government or official visitors (excluding air-purifying negative-pressure respirators and safety shoes, which will be provided by individual visitors). The items must be cleaned, maintained and clearly marked: "FOR USE BY GOVERNMENT ONLY." The Contractor shall provide basic training in the use and limitations of the PPE provided, and institute administrative controls to check

prerequisites prior to issuance. Such prerequisites include meeting minimum training requirements for the work tasks to be performed and medical clearance for site hazards and respirator use. Visitors shall be responsible for adhering to the requirements of their Health and Safety Plan as well as the Contractor's Health and Safety Plan.

2.03 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

Maintain, as a minimum, the following items onsite and available for immediate use:

A. First aid equipment and supplies approved by the consulting physician.

B. Emergency eyewashes and showers that comply with ANSI/ISEA Z358.1.

C. Emergency-use respirators. For rescue purposes, supply positive pressure self-contained breathing apparatus (SCBA). Dedicate these for emergency use only and maintained onsite in the Contamination Reduction Zone.

D. Provide fire extinguishers (NFPA 10) with a minimum rating of 20-A: 120-B:C in all vehicles and at any other site locations where flammable or combustible materials present a fire risk.

E. Spill control materials and equipment that are sufficient to meet the requirements described in Paragraph 3.06 - Spill and Discharge Control.

PART 3 EXECUTION

3.01 HAZARDS

The following potential hazards may be encountered during site work and shall be addressed. These are not complete lists; therefore, they shall be expanded and/or revised as necessary during preparation of the AHAs and APP/SSHP.

A. Safety Hazards - Hazards including heavy equipment operation, containment handling, process equipment operations, slips, trips, and falls, etc.

B. Chemical Hazards - Hazards involving chemical, physical and toxicological properties of contaminants sources and pathways of employee exposures.

C. Physical Agents - Hazards associated with noise and heat/cold stress.

D. Biological Hazards - Hazards associated with poisonous plants, insects, and animals.

E. Action Levels - Action levels shall be established for the active work areas.

F. Confined Space Entry - Entry into and work in a confined space will not be allowed when oxygen readings are less than 19.5

percent or greater than 23.5 percent or if the Lower Explosive Limit (LEL) reading is greater than 10 percent, unless these conditions are adequately addressed in the Confined Space Entry Program.

3.02 TRAINING

In conjunction with EM 385-1-1, Section 33D, meet the training program requirements for workers performing cleanup operations and who will be exposed to contaminants.

A. General HTRW Operations Training

All Personnel performing duties with potential for exposure to onsite contaminants must meet and maintain the following 29 CFR 1910.120/29 CFR 1926.65 (e) training requirements:

1. 40 hours of off site HTRW instruction.
2. 3 days actual on-the-job field experience under the direct supervision of a trained, experienced supervisor.
3. 8 hours refresher training annually.

Onsite supervisors must have an additional 8 hours management and supervisor training specified in 29 CFR 1910.120/29 CFR 1926.65 (e) (4).

Copies of current training certificates shall be submitted prior to initial entry onto the work site. The Contractor shall maintain, at the work site, documentation that shows that each on-site employee or subcontractor has completed the safety and health training course appropriate for their job function and responsibility. The training certificates shall be current within 12 months of the start of work and remain up-to-date during work performance.

1. Site-Specific Training

Site-specific training sessions shall be documented in accordance with Section 01.B.03.b of EM 385-1-1. The Contractor's SHM shall approve a site-specific training session for the Contractor and Government personnel scheduled to work on-site. This training may be given by the SSHO. This site-specific training shall consist of an initial health and safety briefing on the following information:

a. Names of personnel and alternate responsible for site health and safety.
b. Hazards present on the site.
c. Hazard communications training.
d. Safe use of engineering controls and equipment on-site.
e. Work practice by which the employee can minimize risks from hazards.
f. Selection, use, care, and maintenance of PPE.
g. Site control procedures, including log-in and log-out.
h. Confined space training (as needed).
i. Site decontamination procedures.
j. Standard operating safety procedures.
k. Site emergency response contingency plan.

B. Pre-Entry Briefing

Prior to commencement of onsite field activities, all site employees, including those assigned only to the Support Zone, must attend a site-specific SOH training session. This session will be conducted by the Safety and Health Manager and the Site Safety and Health Officer to ensure that all personnel are familiar with requirements and responsibilities for maintaining a safe and healthful work environment. Thoroughly discuss procedures and contents of the accepted APP/SSHP and Sections 01.B.02 and 28.D.03 of EM 385-1-1. Each employee must sign a training log to acknowledge attendance and understanding of the training. Notify the Contracting Officer at least 5 days prior to the initial site-specific training session so government personnel involved in the project may attend.

C. Periodic Sessions

Conduct periodic onsite training by the SSHO daily for personnel assigned to work at the site during the following day. Address SOH procedures, work practices, any changes in the APP/SSHP, activity hazard analyses, work tasks, or schedule; results of previous day's air monitoring, review of safety discrepancies and accidents. Convene a meeting prior to implementation of the change should an operational change affecting onsite field work be made, to explain SOH procedures. Conduct a site-specific training sessions for new personnel, visitors, and suppliers by the SSHO using the training curriculum outlines developed by the Safety and Health Manager. Each employee must sign a training log to acknowledge attendance and understanding of the training.

D. Daily Safety Meeting

Daily safety meetings shall be conducted and documented as required by EM 385-1-1. Minutes showing contract title, signatures of attendees and a list of topics discussed shall be attached to the Contractor's Daily Quality Control Report.

3.03 MEDICAL SURVEILLANCE PROGRAM

Meet all requirements of 29 CFR 1910.120/29 CFR 1926.65 medical surveillance program and EM 385-1-1, Section 33.G for workers performing cleanup operations and who will be exposed to contaminants. Ensure the Occupational Physician or the physician's designee performs the physical examinations and reviews examination results. Participation in the medical surveillance program is without cost to the employee, without loss of pay and at a reasonable time and place.

3.04 PERSONNEL EXPOSURE MONITORING/AIR SAMPLING PROGRAM

The APP/SSHP shall include the environmental monitoring procedures for occupational exposures. The environmental monitoring, at minimum, shall include procedures to detect combustible gases, volatile organic compounds (VOCs), dust, noise, and oxygen levels and comply with ACGIH 0100, ACGIH 0116, and EPA 450/4-87-007. The plan shall be designed to detect and quantify the contaminants and physical agents that may be a concern during construction activities. The plan shall

provide enough information to allow the SSHO and site staff to recognize conditions that require changes in work practices or level of protection. A separate Perimeter Air Monitoring Program shall be completed in accordance with Section 01 36 20, Perimeter Air Monitoring.

A. Dust and Emission Control

Dust control shall be used throughout the work at the site. A Dust Control Plan shall be included in the APP/SSHP. The Dust Control Plan shall identify materials, equipment, and methods to be used to monitor and control dust during project operations. The SSHO shall ensure that dust suppression practices are effective and being used. At a minimum, the following provisions shall be incorporated into the Dust Control Plan as follows:

1. The use of real-time airborne monitoring equipment to measure dust levels along the perimeter of the excavations and at the site perimeter.
2. The Contractor shall implement dust control measures during all activities that may potentially generate airborne dust including, but not limited to, excavation, trenching, truck loading and transport. Visible, airborne dust shall be minimized at all times. The Contractor shall cease all dust generating activities when the wind speed, as measured by the on-site meteorological station, exceeds 15 mph for a sustained period of 15 minutes. Potential dust generating activities may resume based on the determination of the SSHO.
3. The Contractor shall provide and use water as a dust-suppressing agent to prevent the creation and dispersion of dust. The Contractor shall avoid methods that generate slippery conditions or sticky mud.
4. Trucks in which the rubble and contaminated debris are carried shall be covered and sealed to control dust releases with a double, positive locking mechanism on the tailgates.
5. Stock piles shall be covered at all times when not in use.

The SSHO shall ensure that dust suppression practices are effective and being utilized.

B. Soil Erosion and Sediment Control Plan

Develop and implement a soil erosion and sediment control plan that identifies materials, equipment and methods to be used to control sediment during project operations, in accordance with the Contractor's approved Sedimentation and Soil Erosion Control Plan as detailed in Section 01 57 13, Temporary Erosion and Sediment Control.

3.05 HEAT AND COLD STRESS MONITORING AND MANAGEMENT

Document in the APP/SSHP and implement the procedures and practices in Section 06.J. in EM 385-1-1 to monitor and manage heat stress.

3.06 SPILL AND DISCHARGE CONTROL

Develop and implement written spill and discharge containment/control procedures. Describe prevention measures, such as building berms or dikes; spill control measures and material to be used (e.g., booms,

vermiculite); location of the spill control material; personal protective equipment required to cleanup spills; disposal of contaminated material; and responsibility for reporting the spill.

Storage of contaminated material or hazardous materials must be appropriately bermed, diked, and contained to prevent any spillage of material on uncontaminated soil and tarped to control dusting. Minimize the amount of material stored at the Site. The Contractor shall notify and respond to any spill of hazardous substances (as designated in 40 CFR 302), or pollutant or contaminant that is in custody or care of the Contractor, pursuant to this contract. Response shall be implemented within one hour, or as soon as practicable, following any accident or release of debris, as directed by the Government. Any direction from the Government concerning a spill or release shall not be considered a change under the contract. The Contractor shall comply with all applicable requirements of Federal, State, or local laws or regulations regarding any spill incident.

If the contaminated water/liquid/etc. enters the "waters of the state, or onto land to which it could flow to the waters of the state (groundwater included)" it shall be considered reportable. Notify NJDEP through the NJDEP Spill Hotline (1-800-WARNDEP).

If the spill or discharge is reportable, and/or human health or the environment are threatened, notify the National Response Center, the state, and the Contracting Officer as soon as possible. Notification of the accident shall include location of the accident, resultant damage or injury, person involved, probable cause, amount of waste spilled, and any other pertinent information concerning the accident.

3.07 SITE CONTROL MEASURES

To prevent the spread of contamination and control the flow of personnel, vehicles, and materials into and out of work areas, site control measures shall be established and described in the APP/SSHP.

A. Work Zones

Initial anticipated work zone boundaries (Exlusion Zone, Contamination Reduction Zone, Support Zone, all access points and decontamination areas) are to be clearly delineated on the site drawings. Base delineation of work zone boundaries on the contamination characterization data and the hazard/risk analysis to be performed as described in EM 385-1-1 06.A.02. As work progresses and field conditions are monitored, work zone boundaries may be modified (and site drawings modified) with approval of the Government. Clearly identify work zones and mark in the field (using fences, tape, or signs). Submit and post a site map, showing work zone boundaries and locations of decontamination facilities in the onsite office. Work zones must consist of the following:

1. Exclusion Zone (EZ)

The Exclusion Zone is the area where hazardous contamination is either known or expected to occur and the greatest potential for exposure exists. Entry into this area shall be controlled and exit may only be made through the Contamination Reduction Zone (CRZ).

2. Contamination Reduction Zone (CRZ)

The CRZ is the transition area between the Exclusion Zone and the Support Zone. The personnel and equipment decontamination areas must be separate and unique areas located in the CRZ.

3. Support Zone (SZ)

The Support Zone is defined as areas of the site, other than Exclusion Zones and Contamination Reduction Zones, where workers do not have the potential to be exposed to hazardous substances or dangerous conditions resulting from HTRW operations. Secure the Support Zone against active or passive contamination. Site offices, parking areas, and other support facilities must be located in the Support Zone.

B. Site Control Log

A log of personnel visiting, entering, or working on the site must be maintained. Include the following: date, name, agency or company, time entering and exiting site, time entering and exiting the Exclusion Zone (if applicable). Before visitors are allowed to enter the Contamination Reduction Zone or Exclusion Zone, they must show proof of current training, medical surveillance and respirator fit testing (if respirators are required for the tasks to be performed) and fill out a Certificate of Worker or Visitor Acknowledgment. Record this visitor information, including date, in the log.

C. Communication

The APP/SSHP shall identify the method by which Contractor personnel shall communicate in the event of an emergency. Communications with the office trailer, if it is outside vocal range, shall be by radio. Two-way radio communication shall be required during construction activity. Communications between Contractor and other organizations (e.g., the Government, or the emergency response provider) shall be over the telephone.

At a minimum, the following emergency telephone numbers must appear in the APP/SSHP:

1. Medical treatment facility and physician, including names and address.
2. Ambulance services.
3. Fire department.
4. Police department.
5. EPA Region II.
6. EPA and NJDEP spill control.
7. National Response Center.

D. Signs

The Contractor shall provide, install, and maintain signs and other warning devices to inform site personnel and members of the public of hazards present on the site in accordance with Section 10 14 00.20, Interior Signage and Section 10 14 01, Exterior

Signage.

3.08 PERSONAL HYGIENE AND DECONTAMINATION

Initially set up a decontamination line in the CRZ. Employees must exit the Exclusion Zone through the CRZ and implement the decontamination procedures identified in the APP/SSHP. It is the Site Safety and Health Officer's responsibility to recommend techniques to improve personnel decontamination procedures, if necessary.

Disposable PPE used in the work zone shall be removed and discarded into properly labeled PPE impermeable receptacles. Non-disposable PPE shall be decontaminated. The Contractor shall evaluate the use of a qualified service to launder PPE. The decontamination wash water shall be treated on-site by the treatment system in accordance with the site New Jersey Pollutant Discharge Elimination System Discharge to Groundwater (NJPDES- DGW) permit equivalency or stored for treatment by the proposed groundwater treatment facility. Decontaminated PPE shall be stored in a secure area of the SZ.

A. Decontamination Facilities

Submit drawings showing the layout of the personnel and equipment decontamination areas.

B. Personnel Decontamination

Initially set up a decontamination line in the CRZ. Employees must exit the Exclusion Zone through the CRZ and implement decontamination procedures and techniques outlined in the APP/SSHP or as follows: scrub and rinse waterproof outer garments; remove all outer garments; hand and face wash; and shower. Showers must comply with 29 CFR 1910, Section.141 and EM 385-1-1, 02 F, Washing Facilities.

C. Equipment Decontamination

Decontaminate the vehicles and equipment used in the EZ in the CRZ prior to leaving the Site.

1. Facilities for Equipment and Personnel

Provide a vehicle/equipment decontamination station within the CRZ for decontaminating vehicles and equipment leaving the EZ. The decontamination station shall include the following: A traffic surface pad of sufficient strength to support traffic. Construct the pad to capture decontamination water, including overspray, and allow for collection and removal of the decontamination water using sumps, dikes and ditches as required. In addition, provide a high pressure, low volume, water wash area for equipment and vehicles; provide a steam cleaning system for use after the mud or site material has been cleaned from the equipment. Provide a designated "clean area" in the CRZ for performing equipment maintenance. Equipment within the EZ or CRZ must be decontaminated before maintenance is performed.

2. Procedures

Procedures for equipment decontamination must be developed and utilized to prevent the spread of contamination into the SZ and offsite areas. These procedures must address disposal of contaminated products and spent materials used on the site, including, as a minimum, containers, fluids, and oils. Assume any item taken into the EZ to be contaminated and perform an inspection and decontaminate prior to removal from the EZ. Vehicles, equipment, and materials must be cleaned and decontaminated prior to leaving the site. Handle construction material in such a way as to minimize the potential for contaminants being spread or carried offsite. Prior to exiting the site, vehicles and equipment must be monitored to ensure the adequacy of decontamination.

3.09 SUPPLEMENTS

The supplements listed below, prior to "End of Section," are part of this Specification.

1. ENG FORM 3394: Accident Investigation Report

-- End of Section --

(For Safety Staff only)	REPORT NO.	EROC CODE	**UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT** *(For Use of this Form See Help Menu and USACE Suppl to AR 385-40)*	**REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)**

1. **ACCIDENT CLASSIFICATION**

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE	MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ PUBLIC	☐ FATAL ☐ OTHER		☐	

2. **PERSONAL DATA**

a. Name *(Last, First, MI)*	b. AGE	c. SEX	d. SOCIAL SECURITY NUMBER (Last 4 or 0000)	e. GRADE
		☐ MALE ☐ FEMALE		

f. JOB SERIES/TITLE	g. DUTY STATUS AT TIME OF ACCIDENT	h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
	☐ ON DUTY ☐ TDY ☐ OFF DUTY	☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER ☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL ☐ TEMPORARY ☐ STUDENT ☐ OTHER *(Specify)* _____

3. **GENERAL INFORMATION**

a. DATE OF ACCIDENT	b. TIME OF ACCIDENT *(Military time)*	c. EXACT LOCATION OF ACCIDENT	d. CONTRACTOR'S NAME
	hrs		(1) PRIME: (2) SUBCONTRACTOR:

e. CONTRACT NUMBER	f. TYPE OF CONTRACT	g. HAZARDOUS/TOXIC WASTE ACTIVITY
_____ ☐ CIVIL WORKS ☐ MILITARY ☐ OTHER *(Specify)* _____	☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER *(Specify)* _____	☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER *(Specify)* _____

4. **CONSTRUCTION ACTIVITIES ONLY** *(Fill in line and corresponding code number in box from list - see help menu)*

a. CONSTRUCTION ACTIVITY (CODE)	b. TYPE OF CONSTRUCTION EQUIPMENT (CODE)

5. INJURY/ILLNESS INFORMATION *(Include name on line and corresponding code number in box for items e, f & g - see help menu)*

a. SEVERITY OF ILLNESS/INJURY (CODE)	b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED (CODE)	g. TYPE AND SOURCE OF INJURY/ILLNESS
PRIMARY (CODE) SECONDARY	(CODE) TYPE (CODE) SOURCE
f. NATURE OF ILLNESS/INJURY (CODE)	

6. PUBLIC FATALITY *(Fill in line and correspondence code number in box - see help menu)*

a. ACTIVITY AT TIME OF ACCIDENT (CODE)	b. PERSONAL FLOATATION DEVICE USED?
	☐ YES ☐ NO ☐ N/A

7. MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE	b. TYPE OF COLLISION	c. SEAT BELTS	USED	NOT USED	NOT AVAILABLE
☐ PICKUP/VAN ☐ AUTOMOBILE ☐ TRUCK ☐ OTHER *(Specify)* _____	☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END ☐ BROADSIDE ☐ ROLL OVER ☐ BACKING ☐ OTHER *(Specify)* _____	(1) FRONT SEAT	☐	☐	☐
		(2) REAR SEAT	☐	☐	☐

8. PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM	b. OWNERSHIP	c. $ AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT *(Fill in line and correspondence code number in box from list - see help menu)*

a. TYPE OF VESSEL/FLOATING PLANT (CODE)	b. TYPE OF COLLISION/MISHAP (CODE)

10. ACCIDENT DESCRIPTION *(Use additional paper, if necessary)*

11. **CAUSAL FACTOR(S)** *(Read Instruction Before Completing)*

a. (Explain YES answers in item 13)	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	☐	☐
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES: Were operating procedures a factor?	☐	☐
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐

a. *(CONTINUED)*	YES	NO
CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	☐	☐
OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	☐	☐
SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident	☐	☐

b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?

☐ YES *(If yes, attach a copy.)* ☐ NO

12. **TRAINING**

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING.	c. DATE OF MOST RECENT FORMAL TRAINING.
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	

13. **FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES** *(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)*

a. DIRECT CAUSE

b. INDIRECT CAUSE(S)

14. **ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).**

DESCRIBE FULLY:

15. **DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.**

a. BEGINNING b. ANTICIPATED COMPLETION

c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT	d. DATE *(Mo/Da/Yr)*	e. ORGANIZATION IDENTIFIER *(Div, Br, Sect)*	f. OFFICE SYMBOL
CORPS _____ CONTRACTOR _____			

16. **MANAGEMENT REVIEW** *(1st)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

17. **MANAGEMENT REVIEW** *(2nd - Chief Operations, Construction, Engineering, etc.)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

18. **SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW**

a. ☐ CONCUR b. ☐ NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS

SIGNATURE	TITLE	DATE

19. **COMMAND APPROVAL**

COMMENTS

COMMANDER SIGNATURE	DATE

*U.S. GOVERNMENT PRINTING OFFICE: 1993-0-791-757

10. ACCIDENT DESCRIPTION ***(Continuation)***

13a. DIRECT CAUSE ***(Continuation)***

13b. INDIRECT CAUSES *(Continuation)*

14. ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S) *(Continuation)*

SECTION 01 35 45

CHEMICAL DATA QUALITY CONTROL
04/06

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

This section covers requirements for the Contractor's Chemical Data Quality Control for remedial action for Phase 3: Groundwater Hydraulic Containment at the Cornell-Dubilier Electronics Superfund Site. This Section addresses the preparation of a Uniform Federal Policy for Quality Assurance Project Plan (UFP-QAPP), monitoring of subcontract laboratory performance, data validation, data reporting, and preparation of chemical data final report, as defined in this section. The UFP-QAPP shall contain the necessary technical detail and directions for all sampling and field measurements and specifies all quality assurance (QA) and quality control (QC) procedures required for planning, implementation and assessment of the remedial action.

Field measurements and laboratory analytical samples shall be collected by the Contractor to characterize imported backfill materials; to characterize waste material for offsite disposal (e.g., drilling cuttings, trench spoils, spent carbon etc.), to monitor the treatment system water and air discharge, and to monitor air quality during construction.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

NEW JERSEY ADMINISTRATIVE CODE (NJAC)

NJAC 7:14A	New Jersey Pollutant Discharge Elimination System (NJPDES) Rules
NJAC 7:26D	Soil Remediation Standards
NJAC 7:26E	Technical Requirements for Site Remediation

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 200-1-3	(2001) Engineering and Design -- Requirements for the Preparation of Sampling and Analysis Plans
EM 200-1-6	(1997) Environmental Quality -- Chemical Quality Assurance for HTRW Projects
ER 1110-1-12	(2006; Change 1) Engineering and Design -- Quality Management
ER 1110-1-263	(1998) Engineering and Design -- Chemical Data Quality Management for Hazardous,

	Toxic, Radioactive Waste Remedial Activities

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 240/B-06/001	(2006) Guidance on Systematic Planning Using the Data Quality Objectives Process
EPA 402-B-04-001A	(2004) Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP) Part I: Chapters 1 - 9, Appendices A - E, (Volume I)
EPA 540/P-87/001	(1987) A Compendium of Superfund Field Operations Methods
EPA 540-R-08-01	USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review
EPA 540-R-09-03	(2011) Sampler's Guide: Contract Laboratory Program Guidance for Field Samplers
EPA 540-R-10-011	(2010) USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review
EPA 600/R-04/003	(2003) National Environmental Laboratory Accreditation Committee (NELAC) Standards
EPA SW-846	(Third Edition; Update IV) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 268	Land Disposal Restrictions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 178	Specifications for Packagings

U.S. DEPARTMENT OF DEFENSE (DOD)

DOD/DOE QSM	(2017) Department of Defense (DoD) and Department of Energy (DOE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1

1.03 ACRONYMS

The definition of acronyms used by the Contractor that pertain to chemical data quality control shall be clearly defined for all contract related products and communications.

1.04 CHEMISTRY REQUIREMENTS

Chemical Data Quality Control (CDQC) shall be as defined in ER 1110-1-263; this ER, which integrates USACE guidance on the subject, shall be supplemented by EM 200-1-6 for detail technical guidance on CDQC. Tables and charts defining remedial technology specific chemistry shall be according to or consistent with EM 200-1-3. Current versions of these documents can be found on the internet at http://www.publications.usace.army.mil/USACE-Publications/Engineer-Manuals/.

A. Data Quality Objectives (DQO)

1. Project Objective:

The remedial action objective (RAO) for this Work as outlined in the Record of Decision is as follows: "Prevent migration of contaminated groundwater above acceptable surface water quality standards to the surface water and sediments" in Bound Brook. The RAO will be achieved through implementation of the remedial actions presented in these documents, which include:

a. Extraction of groundwater from the contaminated portions of the plume within the former CDE facility boundaries as necessary to lower groundwater levels near the Brook.

b. Treatment of extracted groundwater using filtration, air stripping, and GAC adsorption.

c. Discharge of treated groundwater to Bound Brook in accordance with state and local requirements.

d. Long-term monitoring of head conditions in the groundwater and Bound Brook to assess compliance.

2. Sampling Objectives:

Samples shall be acquired and analyzed in such a manner that the resulting data meets and supports data use requirements. Both definitive and field screening data are anticipated for this project, as defined by the USEPA Guidance for Systematic Planning (EPA 240/B-06/001) and the USACE Chemical QA for HTRW Projects (EM 200-1-6). Field screening quality data shall be generated for health and safety purposes which can be used to identify media or samples that may be subject to further analysis. Definitive level quality data shall be used to characterize waste; demonstrate imported backfill quality; verify that the effluent samples meet discharge limits for surface water and/or POTW requirements; and verify the vapor discharges meet air quality requirements. Definitive quality data shall be acquired, documented, verified and reported to ensure that the specified data quality indicators' (DQIs) (precision, accuracy, completeness, comparability and

representativeness) measurement performance requirements are achieved. Sampling objectives will be discussed in detail to ensure that the data obtained will be of sufficient quality and quantity to meet the DQOs. The sampling objectives to be contained in the Contractor's UFP-QAPP shall include specific disposal facility requirements for sampling, analysis and reporting.

a. Waste disposal characterization samples (solid): Waste disposal characterization samples from excavated soil and debris shall be analyzed in accordance with disposal facility sampling requirements. The analytical results obtained by the Contractor shall be sufficient to address any and all requirements of the selected disposal facility.

b. Waste disposal characterization samples (water): Waste disposal characterization samples from well development, pump tests and other liquid waste collection, shall be analyzed in accordance with disposal facility sampling requirements. The analytical results obtained by the Contractor shall be sufficient to address any and all requirements of the selected disposal facility.

c. Samples of imported backfill from each offsite source shall be collected and analyzed for the parameters listed in Table 1. Sample data shall be sufficient to demonstrate that backfill materials do not contain contaminants that are hazardous to human health or the environment or exceed limits established for the site under OU2. Material delivered to the site shall meet the definition provided in NJAC 7:26E-1.8. The Contractor shall compare sample data against available site background data and/or NJAC 7:26D, NJDEP Soil Cleanup Standard. The data will be compared to the most stringent NJDEP soil cleanup standard, which will be the lowest value for each listed compound from either Table 1A-Residential Direct Contact Health Based Criteria and Soil Remediation Standards (mg/kg) or Table 1B-Non-Residential Direct Health Based Criteria and Soil Remediation Standards (mg/kg), where those numbers are not below background or method detection limits. No backfill shall be brought to the site without written approval from the Contracting Officer.

d. Performance samples from the treatment system shall be collected and analyzed to monitor treatment plant performance effectiveness and refine operating procedures. The analytical results obtained by the Contractor shall be sufficient to address any and all requirements of the monitoring program.

e. Compliance samples (Table 1) shall be collected and analyzed to monitor compliance with the applicable permit limits. Table 1 will be updated once final permit/permit equivalencies are issued for the facility. The sampling objectives to be contained in the Contractor's UFP-QAPP shall include effluent limits for all compounds required under applicable permit

equivalency.

f. Verification sampling shall be conducted on sub-slab and indoor air samples to verify compliance with permit equivalency limits for soil vapor mitigation system (Section 31 21 14.13 VAPOR MITIGATION SUB-SLAB VENTING SYSTEM). The analytical results obtained by the Contractor shall be sufficient to address any and all requirements of the monitoring program.

g. Field sampling will be conducted on air quality to verify that the limits set in Section 01 36 20 PERIMETER AIR MONITORING are not violated during construction.

3. Chemical DQO:

Chemical data shall be acquired, documented, verified and reported in a manner that assures that the precision, accuracy, and completeness requirements provided in Table 2 are achieved. The UFP-QAPP shall comply with the DQO process requirements as specified in EPA 240/B-06/001.

B. Sampling, Analysis and Measurement

The requirements that are listed in the following subsections shall be included in the UFP-QAPP.

1. Waste Disposal Characterization Samples

a. Samples from contaminated soil and debris excavated during construction and not reused during construction as backfill, shall be collected and analyzed in accordance with Contractor's approved disposal facility requirements in accordance with Section 02 81 00 HANDLING, TRANSPORT AND DISPOSAL OF WASTE MATERIALS. Samples shall be analyzed for waste characteristics to determine handling, transportation and disposal requirements. The number and volume of samples are determined by disposal facility. The analytes are listed in Table 1. The Contractor shall ensure that all the disposal facility requirements are met prior to shipment of the waste.

b. Samples from well development activities shall be collected and analyzed in accordance with Contractor's approved disposal facility requirements in accordance with Section 02 81 00 HANDLING, TRANSPORT AND DISPOSAL OF WASTE MATERIALS.. The minimum required analytes are listed in Table 1. The Contractor shall ensure that all the disposal facility requirements are met prior to shipment of the waste.

c. Material shipping manifesting shall be in accordance with 40 CFR 261, 40 CFR 262, 40 CFR 268, 49 CFR 172, and 49 CFR 178. Manifesting samples shall be collected and analyzed according to Table 1.

2. Imported Fill Material Samples

a. Backfill material samples shall be collected at a frequency stated in Section 31 23 16 BACKFILL AND COMPACTION. Analytical methods are included in Tables 1 and 2.

b. Sample data shall be sufficient to demonstrate that backfill and topsoil materials meet the definition of clean fill per NJAC 7:26E-1.8. The criteria for backfill to be free of radiological contamination are listed below:

1) Ra-226 less than 3 picoCuries per gram (pCi/g) (assuming background level of 1 pCi/g).
2) Gamma Radiation Exposure Rate less than 30 microRoentgen per hour (uR/hr).

3. Performance and Compliance Samples

The Contractor shall collect and analyze water for compliance and performance purposes in accordance with Table 1. Permit requirements apply as specified in Section 01 92 00 FIRST YEAR OPERATION AND MAINTENANCE SERVICES, and as specified in NJAC 7:14A. The Contractor shall prepare a table that shows effluent criteria for each chemical analyte/compound/test parameter included in the water testing program. The NJPDES permit equivalency application and MCUA POTW discharge permit will be developed by the EPA and provided to the Contractor at the time of Notice to Proceed.

4. Verification Samples (SVSS)

Sub-slab and indoor air samples shall be collected and shipped to a primary laboratory according to Table 1, to verify the performance of the vapor mitigation system. If the data indicates that the system is not controlling soil vapor emissions into the building, steps will be taken to improved performance as outlined Section 31 21 14.13 VAPOR MITIGATION SUB-SLAB VENTING SYSTEM

5. Perimeter Air Monitoring During Construction

Field samples will be collected during construction in accordance with Section 01 36 20 PERIMETER AIR MONITORING, using direct read devices. The results will be compared to limits set in Section 01 36 20 PERIMETER AIR MONITORING and actions will be taken if the limits are violated to reduce air quality impacts. Data will be collected on a data logger and periodic submitted to the Contracting Officer.

1.05 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Uniform Federal Policy Quality Assurance Project Plan; G

SD-03 Product Data

Sampling and Analysis Plan; G

SD-06 Test Reports

QA Sample Collection and Analysis; G

Chemistry Data Package; G

Chemical Data Final Report; G

1.06 QUALITY ASSURANCE (QA) / Quality Control (QC) ELEMENTS

Follow the QA/QC elements necessary to monitor and ensure the quality of chemical data produced.

A. Analytical Testing Laboratory

1. General

a. The Contractor shall comply with the Superfund Field and Analytical Services Teaming Advisory Committee (FASTAC) policy in selecting and implementing analytical services for this project. This policy requires use of the tiered decision tree for procuring Superfund analytical services for all non-time critical data collection projects. For this project, all data are time critical so a subcontract laboratory will be used, however, the Contractor shall comply with the following parts of the FASTAC policy:

b. The Contractor shall submit the analytical service request (ASR) form to the EPA Regional Sample Control Center (RSCC) a minimum of two weeks prior to mobilization of the sampling event. The Contractor shall include in the ASR the proposed analytical subcontract laboratories to be used.

c. The ANSETS Form shall be submitted to the EPA RSCC as described in Paragraph 1.06.C.2.

d. The ASR shall be submitted to EPA's Sharepoint site. The selected subcontract laboratory shall be approved by the EPA's Remedial Project Manager (RPM) and the USACE. The Contractor shall provide justification for use of a subcontract laboratory to the EPA RPM along with the ASR indicating the required analyses, turnaround times, special requests, etc. The subcontract laboratory shall meet the certification requirements listed in Paragraph 1.06.A.3.

2. Subcontracted Laboratory Analytical Requirements

The Contractor shall provide chemical analyses for all parameters by methods specified in the project specification or UFP-QAPP to achieve the project DQO.

3. Subcontract Laboratory Certification

Environmental laboratory services are to be provided only by laboratories compliant with the most recently published version of USACEER 1110-1-12 and the DOD Quality Systems Manual (QSM; DOD/DOE QSM) including the National Environmental Laboratory Accreditation Committee (NELAC) Standard Chapter 5 and Appendix requirements (EPA 600/R-04/003) and holding a current National Environmental Laboratory Accreditation Program (NELAP) accreditation for all appropriate fields-of-testing and certified by the State of New Jersey. Before testing services can be performed by the laboratory, the Contractor shall verify the candidate laboratory's acceptability by reviewing their certifications. NELAP accreditation information is to be provided annually. The laboratory shall notify the Government immediately of change in status of laboratory operations that may affect on-going compliance with these requirements. The USACE/EPA may, at any time, conduct audits (including requests for pertinent data or information) that support an environmental laboratory's self-declaration of compliance with this policy. If the USACE/EPA finds the laboratory is in non-compliance; the Contractor shall utilize alternate, compliant laboratory services until such time as compliance is again demonstrated. Before performing environmental testing, the laboratory shall have access to the approved UFP-QAPP.

4. Subcontract Laboratory Performance

The Contractor shall provide oversight to ensure continued acceptable analytical performance and shall establish a procedure to address data deficiencies noted by review and/or quality control sample results. The Contractor shall provide and implement a mechanism for providing analytical laboratories with the UFP-QAPP, for monitoring analytical performance and for ensuring corrective action procedures are implemented.

B. QA Sample Collection and Analysis

Collect and transport QA samples to the QA laboratory. Samples for all analyses (except volatiles) shall be taken as splits of homogenized samples. Samples for volatiles shall be collected as discrete duplicates/triplicates. Samples shall be collected at a rate of 5 percent per matrix per analysis per sampling event.

1. Submit the QA Laboratory Advance Notification (QALAN) to the QA laboratory. The QALAN shall include a copy of the UFP-QAPP. The UFP-QAPP shall include but not be limited to, identification of extraction and analysis method numbers, a list of analytes with required limits, estimated number of tests, approximate sampling dates, and requested completion

date for QA testing. Notify the Contracting Officer and the QA laboratory immediately of any changes.

2. Provide all labor and field supplies, including sample containers and shipping coolers, for collecting and shipping samples for QA testing. In the presence of the Contracting Officer, properly collect, label, and package the QA samples, fill out all chain-of-custody forms, and ship the samples by one-day delivery service to the designated QA laboratory for analysis. Notify the laboratory when all sampling is completed and shall clearly mark the chain-of-custody form accompanying the final shipment "FINAL" in 1 inch high lettering.

3. Allow 60 calendar days for laboratory analysis of QA samples, data review, and submission of the Government chemical quality assurance report. The elapsed time shall begin when the Contractor's last sample arrives at the QA laboratory, provided that the Contractor's completed chemistry data package is received within 30 calendar days thereafter. Otherwise, allow 30 calendar days from the date the completed chemistry data package is received at the laboratory. The Contractor may, as an option, continue activities based on initial sampling and QC results, before receipt of QA test results. Where QA results are unacceptable due to Contractor negligence (e.g., improper sample collection and/or handling by the Contractor), or where QA sample results conflict with the Contractor's primary sample results, further sampling and testing shall be performed as directed by the Contracting Officer. All costs for such additional sampling and testing due to Contractor negligence, including both QC and QA testing and analysis, and for any required remedial actions in the work, shall be borne by the Contractor. USACE acceptance of final disposition of any excavated soil shall not occur until the Contractor's sampling and QC results have been confirmed by QA results. This includes all final stockpiling, backfilling, and related construction. No payment will be made for laboratory sampling and testing before receipt and acceptance by the Government of the QA samples and the completed Chemical Data Final Report (CDFR), properly formulated according to these specifications.

C. Documentation of Sample Collection and Analysis

1. CLP Laboratory: The Contractor shall submit a trip report to the EPA RSCC within seven days of collection of the final sample in a CLP Case for samples analyzed by a CLP laboratory. The trip report shall include sample locations, dates of collection and shipment, identification of QC samples, and names of laboratories to which samples were submitted. The trip report shall be submitted via email to the RSCC coordinator, Mr. Adly Michael at the EPA Region 2 office, MX215, 2890 Woodbridge Avenue, Edison, New Jersey 08837.

2. Subcontract Laboratory: The Contractor shall submit an ANSETS Data Requirement Form documenting analytical services provided by any subcontracted laboratory (Attachment 5, Exhibit 1 of EPA Region II SOP HW-32). The form shall include

the laboratory name and location, number of samples, analytical methods, and costs. The ANSETS Form shall be submitted to EPA RSCC at the end of each month, by the 5th of the next month following sample collection, via email to Adly Michael, Jennifer Feranda, and Robert Toth. Prior to submission to EPA RSCC, the ANSETS Form shall be submitted to the USACE PM for review.

D. Documentation of Sample Collection and Analysis

The Contractor shall be responsible for the independent data review of the entire primary data set.

E. Contractor QC Sample Collection and Analysis

Quality control samples shall be collected and analyzed by the Contractor in accordance with EPA's Contract Laboratory Program Guidance for Field Samplers (EPA 540-R-09-03) and other guidance documents and the Contractor's approved UFP-QAPP. Quality control samples shall be collected as described in the Contractor's approved UFP-QAPP. The following summarizes the minimum QC sampling requirements:

1. Field duplicates shall be collected at a rate of at least one per every 20 samples to assess the overall precision of the field sampling technique.

2. One trip blank shall be included with each daily shipment that contains aqueous samples collected for VOC analysis to verify the presence or absence of cross contamination in VOC samples during handling and shipment from the field to the laboratory.

3. One field (equipment/rinsate) blank shall be collected at a frequency of one per decontamination event, not to exceed one per day, for each equipment type and for each sample matrix to assess the effectiveness of equipment decontamination.

4. One cooler temperature indicator or "temperature blank" will be placed in each cooler containing samples (solid and aqueous) for analysis to verify that samples have been maintained at 0 to 6 degrees C (32 to 42.8 degrees F).

5. One matrix spike/spike duplicate or matrix duplicate (MS/MSD or MD) will be collected at a rate of least one per every 20 samples to demonstrate the accuracy of laboratory analysis.

F. Data Validation

1. The Contractor shall validate analytical data for samples analyzed by the Contractor's subcontract laboratory. The inorganic and organic data shall be evaluated in accordance with EPA Contract Laboratory Program National Functional Guidelines (Inorganic - EPA 540-R-10-011 and Organic - EPA 540-R-08-01). Radionuclide data shall be evaluated in accordance with Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP) Chapter 8, Section 8.5 (EPA 402-B-04-001A). Items listed below shall be assessed as part of the data validation. The data validation criteria

shall be consistent with project DQOs and discussed in the approved UFP-QAPP. The Contractor shall prepare a data validation report, which shall include a summary of the independent data reviewer's findings. The summary shall consist of a table listing each QC result outside of established criteria, the established criteria, and the validation actions. Comments shall be included on how these data affect the validity of analytical results of the samples including data qualifiers used. The data validation report shall include, but not be limited to, the following parameters:

a. Data completeness.
b. Method blank and field blanks.
c. Holding time including sample integrity.
d. Surrogate recovery.
e. Instrument calibration.
f. Matrix spike.
g. Continuing calibration verification.
h. Laboratory and field duplicate results.
i. Laboratory control samples.
j. Verification of sample results.

2. The Contractor shall have the laboratory data validated by an organization independent of the organization generating the data.

G. Analytical Data

1. Hard Copy: The chemistry data packages shall be re-produced and provided to the Government no later than 4 weeks after receipt of the analytical data package from the subcontract laboratory. The chemistry data package shall contain information to demonstrate that the project's DQOs have been fulfilled.

2. Electronic Data Deliverables:

a. All laboratory data shall be submitted by the Contractor to EPA in the Staged Electronic Data Deliverable (SEDD) format. Details on the SEDD format are provided in the SEDD Version 5.2 (or most recent version) specification located at: https://www.epa.gov/clp/staged-electronic-data-deliverable-sedd
b. The Contractor shall prepare and submit to EPA a final EDD for all final sampling results prepared in accordance with the procedures and requirements set forth in the Comprehensive EDD Specification Manual (current edition) and as described at the following website: https://www.epa.gov/superfund/region-2-superfund-electronic-data-submission.

c. The Contractor shall provide the Government with a copy of the transmittal letter for all EDD submissions, identifying what data were provided in the EDD. The Contractor shall also provide the Government with a copy of the notice from EPA that the EDD submittal was successfully uploaded.

1.07 QUALIFICATIONS

A. Chemical Quality Control Officer

As a minimum, the Contractor's Chemical Quality Control Officer shall have: a Bachelor's Degree (B.A. or B.S.) degree in Chemistry; three years of experience with Hazardous Toxic and Radioactive Waste (HTRW) Quality Control including hazardous waste manifesting.

The Chemical Quality Control Officer shall ensure that all chemistry related objectives including responsibilities for DQO definitions, sampling and analysis, project requirements for data documentation and validation, and final project reports are attained. The Chemical Quality Control officer need not be present onsite during routine sampling, but shall be available for consultation with Government and Contractor personnel.

B. Project Chemist

As a minimum, the Contractor's Project Chemist shall have: a Bachelor's Degree (B.A. or B.S.)degree in Chemistry; three years of experience related to investigations, studies, design and remedial actions at HTRW sites; two field seasons experience in calibrating and operating various field monitoring devices; and two years of experience in the operation of an HTRW commercial laboratory with standard analytical chemistry methods common for analyzing soil, water, air and other materials for chemical contamination assessment, including data for hazardous waste manifesting. The project chemist shall ensure that all chemistry related goals of the program are attained.

C. Environmental Sampler

As a minimum, the Contractor's Environmental Sampler shall have: a Bachelor's Degree (B.A. or B.S.) degree in Chemistry, Environmental Science, Engineering, Geology, Hydrology, or a related field; three years of experience in the development and preparation of SAP and work plans; one year of experience in and knowledge of EPA methods for collecting environmental and hazardous waste samples; one year of experience in operation of field screening equipment (e.g., PID, FID). The Environmental Sampler shall collect all onsite samples and perform all field screening tests. The Environmental Sampler shall review the sampling results, and provide recommendations for the Contractor's sampling program. The Environmental Sampler shall be onsite during excavation and stockpiling operations involving contaminated soil.

1.08 COORDINATION MEETING

After the preconstruction conference, before any sampling or testing, the Contractor and the Contracting Officer will meet at the construction site to discuss the CQC Plan and the UFP-QAPP. The coordination meeting will be simultaneous to any CQC coordination meeting required in Section 01 45 00 CONTRACTOR QUALITY CONTROL unless otherwise indicated or directed. A list of definable features that involve chemical measurements shall be agreed upon. At a minimum, each matrix (soil, water, air, etc.) shall be a definable work

feature. Management of the chemical data quality system including project DQO, project submittals, chemical data documentation, chemical data assessment, required sampling and analysis protocols, and minimum data reporting requirements shall be agreed upon. The meeting will serve to establish an interrelationship between the Contractor's chemical data quality management and Government chemical quality assurance requirements. Minutes of the meeting will be documented by the Contractor and shall be signed by both the Contractor and the Government. The minutes will include any or all unresolved chemical issues along with the conditions for resolution and will become a part of the contract file. There may be occasions when additional conferences may be called by either party to reconfirm mutual understandings, and/or to address deficiencies in the CQC system, or procedures that may require corrective action by the Contractor.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

Provide chemical sample acquisition, sample analysis, instrumental measurements of chemical parameters for chemical data quality control. An effective chemical data quality control system shall be established that meets the requirements for the chemical measurement DQO applicable to the Project. The system shall cover chemical measurements pertaining to and required for Contractor and subcontractor produced chemical data. Control field screening, sampling, and testing in conjunction with remedial activities to meet all DQO; minimize the amount of excavated material requiring temporary storage; prevent dilution of contaminated soils with clean soils; and ensure completion of work within the required time.

3.02 CONTRACTOR QUALITY CONTROL PLAN

A. Additional Requirements

In addition to the quality control requirements specified in Section 01 45 00 CONTRACTOR QUALITY CONTROL, the CQC Plan shall incorporate the qualifications, authority and responsibilities of all chemical quality management and support personnel. Chemical measurements including sampling and/or chemical parameter measurement will not be permitted to begin until after production and acceptance of the CQC Plan, and Government approval of the UFP-QAPP.

B. Chemistry Elements of the CQC Plan

To cover contract related chemical measurements by the Contractor and all subcontractors, the CQC Plan shall include the following as a minimum.

1. Qualifications

Names, education, experience qualifications, authorities,

and decision-making responsibilities of all chemical quality management and support personnel. The CQC Plan shall contain a copy of a letter from the project QC manager designating and authorizing a Chemical Quality Control Officer and chemical quality control organization staff.

2. Authority and Responsibility

A diagram, flow chart, or figure clearly depicting the chemical data quality management and support staff and the authority and responsibility of each for chemical sampling and analysis, procedures for corrective actions, deliverables and submittals, deviations and changes, chemical quality documentation, data validation, minimum data reporting requirements, and DQO for chemical parameter measurement by the Contractor and subcontractors. The contents of this section of the CQC Plan shall be included in the applicable "Project Organization" elements of the FSP and the QAPP.

3.03 UNIFORM FEDERAL POLICY QUALITY ASSURANCE PROJECT PLAN

A. General

The UFP-QAPP shall describe all chemical parameter measurements for all phases of the remedial action. The Contractor must provide sufficient detail for the project team to obtain data that meets the data quality objectives of the project. The Contractor's developed QAPP shall be in accordance with the UFP-QAPP Manuals referenced in Paragraph 1.02.

B. Level of Detail

The UFP-QAPP shall contain necessary technical detail and direction such that field and laboratory personnel understand all sampling and field measurement requirements. It shall document all aspects of the project, planning, implementation, assessment, corrective actions and reconciliation of completed tasks with documented planned objectives. It shall contain sufficient direction and detail that onsite personnel can perform all onsite activities required to attain project DQOs, including: collection of samples for offsite chemical analysis, shipment of samples for offsite analyses, and performance of onsite instrumental parameter measurements, data documentation and reporting requirements. The level of detail in the UFP-QAPP shall be such that any technically-competent personnel unfamiliar with the Site can follow the plan and perform all required work. It shall contain sufficient direction and detail that analytical laboratory personnel understand the analytical methods required and the project required reporting limits, project data validation and reporting requirements.

C. Appendices

The Appendices of the UFP-QAPP shall contain all Contractor standard forms, project figures and tables, and SOPs, and all references pertaining to the project requirements included in the UFP-QAPP relating to project DQOs, standard and non-standard measurement method, equivalency data, U.S. Government and

regional agency guidance and regulatory documents, existing site related documents, and other contract related chemical analysis documents. Reference to all applicable SOPs from EPA 540/P-87/001, Compendium of Superfund Field Operations Methods, or Contractor SOPs, where applicable, shall be included.

The UFP-QAPP will contain one or more Sampling and Analysis Plan (s),or SAP, as an appendix. Each SAP will describe the procedures for sample collection and analysis for one or more sampling programs that will be undertaken at the site during construction or the first year of operations.

D. Content

The UFP-QAPP shall cover, at minimum, the following topics and meet the requirements of the UFP-QAPP Manual:

1. Distribution List.
2. Title and Approval Page.
3. Project Description.
4. Introduction including, Summary of Scope and Objectives, Site History and Contaminants.
5. Existing Site Data Summary-Evaluation of Secondary Data and Use Limitations.
6. Project Description/Problem Definition/ Site Specific Analysis Problems.
7. Project Objectives/Systematic Planning Documentation/Data Quality Objectives.
8. Sampling Design and Rationale.
9. Scope and Objectives.
10. Project Schedule and Timelines.
11. Project Organization and Responsibility.
12. Personnel Responsibilities, Qualifications and Special Training Requirements.
13. Field Activities and Procedures (SOPs).
14. Field and Laboratory QC Samples.
15. Sampling Procedures and Container/Preservation Requirements.
16. Sample Custody, Chain-of-Custody/Sample Documentation.
17. Sample Handling/ Identification.
18. Field Logbooks and Contents; Documentation Procedures.
19. Sample Packaging and Shipping.
20. Equipment Decontamination.
21. Contractor Quality Control.
22. Daily Quality Control Reports.
23. Field Quality Control and Corrective Actions.
24. Sampling Apparatus and Field Instrumentation.
25. Data Quality Objectives and Measurement Performance Criteria.
26. Sample Custody and Holding Times.
27. Analytical Procedures.
28. Reference Limits and Evaluation of Quantization Limit Goals.
29. Laboratory Calibration Procedures and Frequency.
30. Internal QC Checks.
31. Calculation of Data Quality Indicators.
32. Laboratory Corrective Actions.
33. Data Reduction, Review, Validation and Reporting.
34. Laboratory Reporting Requirements.

35. Preventive Maintenance (Field and Laboratory).
36. Performance and System Audits.
37. QC Reports to Management.
38. Appendices.

E. Table of Contents

The UFP-QAPP shall include a table of contents; crosswalk showing that all UFP-QAPP elements have been addressed; definitions, acronyms, references pertaining to the project, and other related chemical analysis documents such as the data validation SOP for parameters not included in the National Functional Guidelines.

F. Packing and Shipping

The following procedures shall be followed for sample packing and shipment:

1. Subcontract Laboratory - USACE engineering manual EM 200-1-3, Appendix F.
2. CLP/DESA Laboratory - Contract Laboratory Program Guidance for Field Samplers (EPA 540-R-09-03), January 2011.

G. Regulatory Requirements

All Department of Transportation (DOT) regulations 40 CFR 261, 106 to 179 shall be followed regarding shipment of the samples.

3.04 CHEMISTRY DATA PACKAGE

The chemistry data package shall contain information to demonstrate that the project's DQO have been fulfilled. Content of a data package is defined in EM 200-1-6. The chemistry data package shall be produced and provided to the Government monthly. The QA function will compare QA sample results to corresponding primary sample results, will assess the Contractor's compliance with the UFP-QAPP, and will recommend corrective action as necessary.

3.05 CONTROL OF CHEMICAL DATA QUALITY

A. General

Contractor chemical data quality control ensures that a quality control program is in place that assures sampling and analytical activities and the resulting chemical parameter measurement data comply with the DQO and the requirements of the UFP-QAPP. Utilize the three-phase control system that includes a preparatory, initial and follow-up phase for each definable feature of work. The Contractor's three-phase chemical data control process shall ensure that data reporting requirements are achieved and shall be implemented according to Section 01 45 00 CONTRACTOR QUALITY CONTROL. When possible, the three-phase chemical data control process shall be combined with that under Section 01 45 00 CONTRACTOR QUALITY CONTROL.

B. Three Phase Chemical Data Control Process

1. The preparatory phase shall include a review of the specification, UFP-QAPP, and all relevant SOPs for the

chemical parameter measurement and/or chemical sample acquisition and shipment. It shall include a physical examination of all required forms, materials and equipment to ensure conformance with the UFP-QAPP and that all materials are on site. It shall include a demonstration of sampling procedures by the Contractor's field sampling personnel.

2. The initial phase shall be performed at the initiation of each definable feature of work by the CQC Representative to confirm compliance with the UFP-QAPP, including: instrument calibration, operation and performance checks, sample acquisition, labeling, and shipment in accordance with required SOPs, sampling equipment decontamination, and completion of all required documentation.

3. The follow up phase shall require daily inspections to ensure compliance with the UFP-QAPP.

3.06 ANALYTICAL TESTING LABORATORIES

If DESA or CLP cannot accommodate the analyses, Contractor shall propose the analytical laboratories to be used for the primary samples analyses. Laboratory validation requirements shall be in accordance with paragraph Paragraph 1.06.F Data Validation. The Contractor may utilize its own laboratory or utilize subcontract laboratories to achieve the primary required sample analyses.

A. Laboratory Analytical Requirements

Provide the specified chemical analyses by the Contractor's laboratory and /or by subcontractor's laboratory. Provide chemical analyses to achieve the project DQO for all parameters by the methods in the UFP-QAPP. To give the USACE programs the greatest flexibility in the execution of its projects, the EPA SW-846 methods are generally the methods employed for the analytical testing of environmental samples. These methods are flexible and shall be adapted to individual project-specific requirements.

B. Laboratory Performance

Monitor and ensure continued acceptable analytical performance and establish a procedure to address data deficiencies noted by review and/or quality assurance sample results. Provide and implement a mechanism for providing analytical labs with the UFP-QAPP, for monitoring the lab's performance and for performing corrective action procedures. Acquire analytical services with additional USACE and State of New Jersey validated laboratories in the event a project lab loses its validation status during the project.

3.07 CHEMICAL DATA FINAL REPORT

The Chemical Data Final Report (CDFR) shall be produced including a summary of quality control practices employed and all chemical parameter measurement activities after project completion. As a minimum, the CDFR shall contain the following:

A. Summary of project scope and description.

B. Summary of any deviations from the UFP-QAPP or the design chemical parameter measurement specifications.

C. Summary of chemical parameter measurements performed as contingent measurements.

D. Summary discussion of resulting data including achieving data reporting requirements.

E. Summary of achieving project specific DQO.

F. Presentation and evaluation of the data to include an overall assessment on the quality of the data for each method and matrix.

G. Internal QC data generated during the project, including tabular summaries correlating sample identifiers with all blank, matrix spikes, surrogates, duplicates, laboratory control samples, and batch identifiers.

H. A list of the affected sample results for each analyte (indexed by method and matrix) including the appropriate data qualifier flag (J, B, R, etc.), where sample results are negatively impacted by adverse quality control criteria.

I. Comparison of the USACE QA samples to the corresponding project sample data analyzed by the Subcontract laboratory.

J. Summary of field and laboratory oversight activities, providing a discussion of the reliability of the data, QC problems encountered, and a summary of the evaluation of data quality for each analysis and matrix as indicated by the laboratory QC data and any other relevant findings.

K. Conclusions and recommendations.

L. Appendices containing the chemistry data packages for all subcontract laboratory data and validation reports.

3.08 NOTIFICATION OF NON-COMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. Take immediate corrective action after receipt of such notice.

3.09 SUPPLEMENTS

A. The supplements listed below, prior to "End of Section," are part of this Specification.

1. Table 1: Analytical Methods for Chemical Parameters.
2. Table 2: General Data Quality Objectives for Chemical Parameters.

-- End of Section --

SECTION 01 35 45 - TABLE 1
ANALYTICAL METHODS FOR CHEMICAL PARAMETERS

Data Use	Media	Parameter	Method		CLP SOW
			Prep/Extraction	Analysis	
Waste Characterization	Solid	TCLP VOCs	SW1311	SW8260	SOW SOM02.4
		TCLP SVOCs	SW1311	SW8270	SOW SOM02.4
		TCLP RCRA Metals	SW1311	SW6020, SW7470	SOW ISM02.4
		TCLP Pesticides	SW1311	SW8081	SOW SOM02.4
		TCLP Herbicides	SW1311	SW8151	NA
		TCL PCBs	SW3540 or similar extraction method	SW8082	SOW SOM02.4
		Paint Filter	NA	SW9095	NA
		Corrosivity	NA	SW9045	NA
		Ignitability	NA	SW1030	NA
		Reactivity	per 40 CFR 261.23	per 40 CFR 261.23	NA
	Water	TCLP VOCs	SW1311	SW8260	SOW SOM02.4
		TCLP SVOCs	SW1311	SW8270	SOW SOM02.4
		TCLP RCRA Metals	SW1311	SW6020, SW7470	SOW ISM02.4
		TCLP Pesticides	SW1311	SW8081	SOW SOM02.4
		TCLP Herbicides	SW1311	SW8151	NA
		TCL PCBs	SW3540 or similar extraction method	SW8082	SOW SOM02.4
		Corrosivity	NA	SW9040	NA
		Ignitability	NA	ASTM D93-79 or D93-80	NA
		Reactivity	per 40 CFR 261.23	per 40 CFR 261.23	NA
Imported Material (Backfill, Topsoil, Sand) Chemical Characterization	Solid	TCL VOCs	SW5030	SW8260	SOW SOM02.4
		TCL SVOCs	SW3510 or similar extraction method	SW8270	SOW SOM02.4
		TCL Pesticides	SW3510 or similar extraction method	SW8081	SOW SOM02.4
		TCL PCBs	SW3540 or similar extraction method	SW8082	SOW SOM02.4
		TAL Metals and Mercury (total and dissolved)	SW3010 or similar digestion	SW6020, SW7470	SOW ISM02.4
		Radium 226 (Gamma Spec)	NA	EML HASL-300 GA-01	NA

SECTION 01 35 45 - TABLE 1
ANALYTICAL METHODS FOR CHEMICAL PARAMETERS

Data Use	Media	Parameter	Method		CLP SOW
			Prep/Extraction	Analysis	
Performance Sampling	Water	TCL VOCs	SW5030	SW8260	SOW SOM02.4
		TCL SVOCs	SW3510 or similar extraction method	SW8270	SOW SOM02.4
		TCL Pesticides	SW3510 or similar extraction method	SW8081	SOW SOM02.4
		TCL PCBs	SW3510 or similar extraction method	SW8082	SOW SOM02.4
		TAL Metals and Mercury	SW3010 or similar digestion	SW6020, SW7470	SOW ISM02.4
		pH	NA	SW9040	NA
		TOC	NA	SW9060	NA
		TSS	NA	SM 2540D	NA
Compliance Sampling	Water	TCL VOCs	SW5030	SW8260	SOW SOM02.4
		TCL SVOCs	SW3510 or similar extraction method	SW8270	SOW SOM02.4
		TCL Pesticides	SW3510 or similar extraction method	SW8081	SOW SOM02.4
		TCL PCBs	SW3510 or similar extraction method	SW8082	SOW SOM02.4
		TAL Metals and Mercury (total and dissolved)	SW3010 or similar digestion	SW6020, SW7470	SOW ISM02.4
		Cyanide	refer to analytical method	SW9012	SOW ISM02.4
		2,3,7,8-TCDD Screen	SW3540 or similar extraction method	EPA Method 613	NA
		Total Petroleum Hydrocarbons	SW3540 or similar extraction method	SW8015	NA
		pH	NA	SW9040	NA
		TOC	NA	SW9060	NA
		TSS	NA	SM 2540D	NA
		TDS	NA	SM 2540C	NA
		Sulfate	NA	SM 4500	NA
Verification Sampling (SSVS)	Air	VOCs	NA	TO-15	NA
Perimeter Air Monitoring During Construction	Air	Respirable dust (PM10)	dust meter	direct read	NA
		Air Sampling (PM10)	PID	direct read	NA
		Vapor	PID	direct read	NA
		Combustible Gas	combustible gas meter	direct read	NA
		Oxygen	combustible gas meter	direct read	NA

Notes:
Field parameters = dissolved oxygen, ORP, pH, temperature, conductivity, and turbidity

NA = Not Applicable
ORP = Oxidation Reduction Potential
PCBs = Polychlorinated Biphenyls
PID = Photoionization Device
SOW = Statement Of Work
SSVS = Sub-Slab Venting System
SVOCs = Semivolatile Organic Compounds
TAL = Target Analyte List
TCDD = Tetrachlorodibenzo-p-dioxin
TCL = Target Compound List
TCLP = Toxicity Characteristic Leaching Procedures
TOC = Total Organic Carbon
TSS = Total Suspended Solids
VOCs = Volatile Organic Compounds

SECTION 01 35 45 - TABLE 2
DATA QUALITY OBJECTIVES FOR CHEMICAL PARAMETERS (SUBJECT TO CHANGE PER THE PROJECT UFP QAPP TO BE DEVELOPED)

Data Use	Media	Parameter	Precision (RPD) *				Accuracy *			Completeness
			Field Duplicate	Laboratory Duplicate	LCS/LCSD	MS/MSD	Surrogate Recoveries	LCS Recoveries	MS/MSD Recoveries	
Waste Characterization	Solid	TCLP VOCs	<50%	NA	<30%	NA	<35%		NA	>90%
		TCLP SVOCs	<50%	NA	<30%	NA	<35%		NA	>90%
		TCLP RCRA Metals	<50%	NA	<30%	NA	NA	20%	NA	>90%
		TCLP Pesticides	<50%	NA	<30%	NA	<35%		NA	>90%
		TCLP Herbicides	<50%	NA	<30%	NA	<35%		NA	>90%
		TCL PCBs	<50%	NA	<30%	NA	<35%		NA	>90%
		Paint Filter	<50%	<50%	NA	NA	NA			>90%
		Corrosivity	<50%	<50%	NA	NA	NA			>90%
		Ignitability	<50%	<50%	NA	NA	NA			>90%
		Reactivity	<50%	<50%	NA	NA	NA			>90%
	Water	TCLP VOCs	<40%	NA	<30%	NA	<35%		NA	>90%
		TCLP SVOCs	<40%	NA	<30%	NA	<35%		NA	>90%
		TCLP RCRA Metals	<40%	NA	<30%	NA	NA	20%	NA	>90%
		TCLP Pesticides	<40%	NA	<30%	NA	<35%		NA	>90%
		TCLP Herbicides	<40%	NA	<30%	NA	<35%		NA	>90%
		TCL PCBs	<40%	NA	<30%	NA	<35%		NA	>90%
		Corrosivity	<50%	<50%	NA	NA	NA			>90%
		Ignitability	<50%	<50%	NA	NA	NA			>90%
		Reactivity	<50%	<50%	NA	NA	NA			>90%
Imported Material (Backfill, Topsoil, Sand) Chemical Characterization	Solid	TCL VOCs	<50%	NA	<30%	<30%	≤35% Recovery for all analytes			>90%
		TCL SVOCs	<50%	NA	<30%	<30%	≤35% Recovery for all analytes			>90%
		TCL Pesticides	<50%	NA	<30%	<30%	≤45% Recovery for all analytes			>90%
		TCL PCBs	<50%	NA	<30%	<30%	≤45% Recovery for all analytes			>90%
		TAL Metals and Mercury	<50%	<30%	<20%	<20%	NA	≤20% Recovery for all analytes		>90%
		Radium 226 (Gamma Spec)	<50%	NA	<30%	<30%	≤45% Recovery			>90%

SECTION 01 35 45 - TABLE 2
DATA QUALITY OBJECTIVES FOR CHEMICAL PARAMETERS (SUBJECT TO CHANGE PER THE PROJECT UFP QAPP TO BE DEVELOPED)

Data Use	Media	Parameter	Precision (RPD) *				Accuracy *			Completeness
			Field Duplicate	Laboratory Duplicate	LCS/LCSD	MS/MSD	Surrogate Recoveries	LCS Recoveries	MS/MSD Recoveries	
Performance Sampling	Water	TCL VOCs	<40%	NA	<30%	<30%	≤35% Recovery for all analytes			>90%
		TCL SVOCs	<40%	NA	<30%	<30%	≤35% Recovery for all analytes			>90%
		TCL Pesticides	<40%	NA	<30%	<30%	≤45% Recovery for all analytes			>90%
		TCL PCBs	<40%	NA	<30%	<30%	≤45% Recovery for all analytes			>90%
		TAL Metals and Mercury (total and dissolved)	<40%	<30%	<20%	<20%	NA	≤20% Recovery for all analytes		>90%
		pH	<40%	NA	NA	NA	NA		NA	>90%
		TOC	<40%	NA	NA	NA	NA		NA	>90%
		TSS	<40%	NA	NA	NA	NA		NA	>90%
Compliance Sampling	Water	TCL VOCs	<40%	NA	<30%	<30%	≤35% Recovery for all analytes			>90%
		TCL SVOCs	<40%	NA	<30%	<30%	≤35% Recovery for all analytes			>90%
		TCL Pesticides	<40%	NA	<30%	<30%	≤45% Recovery for all analytes			>90%
		TCL PCBs	<40%	NA	<30%	<30%	≤45% Recovery for all analytes			>90%
		TAL Metals and Mercury (total and dissolved)	<40%	<30%	<20%	<20%	NA	≤20% Recovery for all analytes		>90%
		Cyanide	<40%	<30%	<20%	<20%	NA	≤20% Recovery for all analytes		>90%
		2,3,7,8-TCDD Screen	<40%	NA	<30%	<30%	≤35% Recovery for all analytes			>90%
		Total Petroleum Hydrocarbons	<40%	NA	<30%	<30%	≤35% Recovery for all analytes			>90%
		pH	<40%	NA	NA	NA	NA		NA	>90%
		TOC	<40%	NA	NA	NA	NA		NA	>90%
		TSS	<40%	NA	NA	NA	NA		NA	>90%
		TDS	<40%	NA	NA	NA	NA		NA	>90%
		Sulfate	<40%	<20%	<20%	<20%	N/A	≤15% Recovery for all analytes		>90%
Verification Sampling (SSVS)	Air	VOCs	<50%	<30%	<30%	NA	≤35% Recovery for all analytes			>90%
Perimeter Air Monitoring During Construction	Air	Respirable dust (PM10)	NA	NA	NA	NA	NA	NA	NA	>90%
		Air Sampling (PM10)	NA	NA	NA	NA	NA	NA	NA	>90%
		Vapor	NA	NA	NA	NA	NA	NA	NA	>90%
		Combustible Gas	NA	NA	NA	NA	NA	NA	NA	>90%
		Oxygen	NA	NA	NA	NA	NA	NA	NA	>90%

LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
MS = Matrix Spike
MSD = Matrix Spike Duplicate
NA = Not Applicable
PCBs = Polychlorinated Biphenyls
RPD = Relative Percent Difference
SSVS = Sub-Slab Venting System
SVOCs = Semivolatile Organic Compounds
TAL = Target Analyte List
TCDD = Tetrachlorodibenzo-p-dioxin
TCL = Target Compound List
TCLP = Toxicity Characteristic Leaching Procedures
TOC = Total Organic Carbon
TSS = Total Suspended Solids
VOCs = Volatile Organic Compounds

SECTION 01 36 20

PERIMETER AIR MONITORING
09/17

PART 1 GENERAL

1.01 SCOPE OF WORK

This section describes the responsibilities of the Contractor for monitoring potentially contaminated particulates at the site perimeter fenceline. This section is to be used in the preparation of the Perimeter Air Monitoring Plan (PAMP). The Contracting Officer is committed that the work performed under these specifications will be actively managed so that airborne dust and contaminants generated by site activities are maintained below the applicable allowable levels established for general public exposure.

Matters of interpretation of these standards associated with perimeter air monitoring shall be identified and submitted to the Contracting Officer. All matters of interpretation shall be resolved before starting work. Where the requirements of this Specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 625/R-96/010a	(1999) Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Perimeter Air Monitoring Plan (PAMP); G

AQS Name And Qualifications; G

SD-06 Test Reports

Daily Air Monitoring Summary Report

Monthly Air Monitoring Report Compilation; G

Meteorological Data; G

1.04 PERIMETER AIR MONITORING PLAN

The Contractor shall develop, submit for Government review, and implement after Government acceptance, a written Perimeter Air Monitoring Plan (PAMP) for Remedial Action operations.

A. The PAMP shall address remediation activities to be performed by the Contractor and all subcontractors. The PAMP shall establish, in detail, the protocols necessary for the anticipation, recognition, evaluation, and control of emissions associated with each task performed based upon site-specific conditions.

B. The PAMP shall be a stand-alone plan and shall include, but not be limited to, the following:

1. Control of airborne contaminant emissions.
2. Air quality monitoring and sampling procedures.
3. Collection of meteorological data.
4. Detailed descriptions of proposed perimeter air monitoring equipment, O&M procedures, and calibrations schedules.
5. Organizational structure indicating personnel responsibilities.
6. The qualifications of the Air Quality Monitoring Specialist.
7. Plans for response if and when the action levels have been exceeded.
8. Location of the nearest residents, and proposed monitoring locations. Reference EPA 625/R-96/010a for height above ground, and detailed spacing criteria.

C. Acceptance and Modification of PAMP

1. The PAMP shall be submitted to the Contracting Officer for review and approval. Any deficiencies in the PAMP will be discussed at the pre-construction safety conference, and the PAMP shall be revised to correct the deficiencies and resubmitted for acceptance. Onsite work shall not begin until the plan has been accepted by the Contracting Officer.

2. The Contractor shall keep a copy of the written PAMP on site for review by the USACE and its representatives. As work proceeds, the PAMP shall be adapted to new situations and new conditions. Changes and modifications to the accepted PAMP shall be made with the knowledge and concurrence of the Air Quality Specialist (AQS), the Site Superintendent, and the Contracting Officer. The requested modification shall not be implemented until authorized in writing by the Contracting Officer. Should the Contracting Officer require a modification of any portion or provision of the PAMP, the Contracting Officer will notify the Contractor in writing of such modifications.

3. The Contracting Officer may stop all site work at any point if the Contractor shows any disregard for the provisions of this specification or the accepted PAMP.

1.05 AIR QUALITY PROTECTION PRINCIPLES

The Contractor shall provide all equipment, materials, and personnel

necessary to monitor and quantify dust at the site perimeter fence-line during intrusive site activities. The PAMP shall describe procedures, equipment, and training needed to monitor and quantify the amount of airborne particulate and airborne organic vapors generated by site work activities. The Contractor shall operate a program of equipment maintenance in accordance with the manufacturer's specifications. The Contracting Officer may reject the use of equipment if, in his opinion, it provides less protection than that specified in the PAMP.

A. Action Levels: The Contractor shall perform remediation in a manner such that ambient air quality objectives at the site perimeter are achieved in accordance with the action levels presented in Table 01 36 20-1. The action levels and required actions shall be presented in the PAMP in both text and tabular form in accordance with Table 01 36 20-1. Contractor shall confirm that there are no local or state action levels at the site that are lower than these action levels.

B. **The Contractor shall notify the Contracting Officer every time a community action level is exceeded as well as actions taken.**

Table 01 36 20-1

Analyte	Action Level (Note 4)	Frequency Per Location (Notes 2 and 3)	Analytical Method	Action Required
Background Site Perimeter - 1 Upwind Location (Note 5)				
Real Time Respirable Dust (PM10)	None	Continuously during the work day, and for 1 hour before and after. Log 15-minute averages	Direct Reading dust meter with data logger	None
Real Time Vapor Monitoring	None	Continuously during the work day. Log 15-minute averages	Direct Reading Photoionization meter with data logger	None
Combustible Gas in air	None	Twice per day, once in morning and once in evening	Direct Reading instrument with data logger	None

Table 01 36 20-1				
Analyte	Action Level (Note 4)	Frequency Per Location (Notes 2 and 3)	Analytical Method	Action Required
Oxygen	None	Twice per day, once in morning and once in evening	Direct Reading instrument with data logger	None
Site Perimeter - 3 Downwind Locations (Note 5				
Real Time Respirable Dust (PM10)	150 ug/m3, (Note 1) (15 min.)	Continuously during the work day, and for 1 hour before and after. Log 15-minute averages	Direct Reading dust meter with data logger	First Instance: Evaluate engineering controls, implement dust control After an Hour: The above steps plus Stop work and notify Contracting Officer. Resume work after Contracting Officer acceptance

Table 01 36 20-1

Analyte	Action Level (Note 4)	Frequency Per Location (Notes 2 and 3)	Analytical Method	Action Required
Air Sampling (PM 10)	Upwind plus 150 ug/m3	Continuously during the work day. Log 15-minute averages	Direct Reading Photoionization meter with data logger	Compare to real-time particulate monitoring results. Review the real-time action levels and reduce them as necessary. Evaluate dust-generating operations. Implement more stringent measures as appropriate.
Real Time Vapor Monitoring	2 ppm (15 minute) 0.5 ppm (work shift)	Continuously during the work day. Log 15-minute averages	Direct Reading Photoionization meter with data logger	First Instance: Evaluate engineering controls, implement vapor emission control. After an Hour: The above steps plus Stop work and notify Contract Officer. Resume work after CO acceptance of control measures.

Table 01 36 20-1				
Analyte	Action Level (Note 4)	Frequency Per Location (Notes 2 and 3)	Analytical Method	Action Required
Combustible Gas in air	More than 10 percent LEL	Twice per day, once in morning and once in evening	Direct Reading instrument with data logger	Evacuate area
Oxygen	Less than 19.5 percent or more than 22 percent	Twice per day, once in morning and once in evening	Direct Reading instrument with data logger	Evacuate area if oxygen levels out of range.

Table Notes
1. Ambient concentrations, over background.
2. Frequencies listed in the table are for active construction periods - See Section 1.09.B. The Contracting Officer may modify this frequency.
3. Sampling shall comply with EPA protocols and shall achieve detection limits to demonstrate compliance with specified action levels. Note that the sampling equipment described in EPA 625/R-96/010a must be adjusted to measure particle size of less than 10um.
4. Total dust and compound-specific action levels are evaluated using data corrected for upwind values.
5. Three downwind measurements are required with one between active zone and nearest residence or receptor. Locations shall be approved by the Contracting Officer.
6. If perimeter action levels are exceeded, the Contractor shall stop work and initiate dust controls or other remedy actions immediately.

1.06 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

The Contractor's project team shall include an Air Quality Specialist (AQS) and an Air Monitoring and Sampling Technician (AM&ST):

A. The services of an AQS who is experienced in air monitoring and sampling, shall be utilized. The Safety and Health Manager (SHM) can also serve as the AQS if he/she meets the qualification requirements of an AQS listed in Paragraph 1.06.B below. This specialist shall be familiar with this site's hazards and the scope of this project.

B. The Contractor shall document the AQS name and qualifications in the PAMP. The Contractor shall demonstrate to the Contracting Officer that this AQS has the following credentials:

1. At least one year of experience in air monitoring or sampling, including the following:

   a. Serving in responsible professional charge on at least one project in which the impacts of site work on community air was measured.
   b. At least 40 hours of hands-on experience (each) in taking ambient air measurements and samples by EPA methods.

2. A scientific or engineering college degree that included the study of air quality issues. The Contracting Officer may accept equivalent training at his or her sole discretion.

3. Appropriate credentials for working on the site are included in the SSHP.
4. Although the Contracting Officer may accept other credentials, the Certified Industrial Hygienist credential offered by the American Board of Industrial Hygiene and the Qualified Environmental Professional credential offered by the Institute for Professional Environmental Practice are both deemed appropriate.

C. The AQS shall be responsible for the following:

1. Preparation of the air monitoring and sampling protocols for the site work.

2. Selecting the equipment to be used for air monitoring and sampling

3. Determining the times, durations, and locations of air measurements and samples.

4. Develop protocols to determine upwind location and to adjust monitoring and sample results for ambient background.

5. Approving the qualifications of any technicians that will collect air measurements or samples.

6. Interpreting the results of the air monitoring and sampling effort.

7. Approving and signing reports of air quality that the Contractor provides to the Contracting Officer or his representatives.

8. Periodically evaluating if the selected equipment and protocols are adequately representing perimeter conditions.

9. Periodically audit the implementation of the PAMP, and take corrective action when necessary.

D. During intrusive activities by the Contractor, an AM&ST shall perform the air monitoring activities as specified in the PAMP. The Site Safety and Health Officer (SSHO) can also serve as the AM&ST, if the AQS approves. The AM&ST shall have appropriate training approved by the Air Quality Specialist.

1.07 AIR QUALITY MONITORING AND SAMPLING

A. General

The monitoring specified in the PAMP shall detect and quantify vapors, dust, and pesticides.

The Contractor shall collect, at minimum, the number of air quality measurements and samples as shown in Table 01 36 20-1. The Contractor shall use monitoring and analytical sampling / methods that accurately measure at detection limits that are consistent with the action levels listed in Table 01 36 20-1.

B. Sampling Requirements

1. The continuous air monitoring equipment shall be capable of providing the following:

   a. Downloadable data capable of providing continuous graph of readings.
   b. Auto-Dialer, emergency lights or other alerting systems to promptly and effectively notify the Contractor that action levels have been exceeded.
   c. The AQS shall certify that the air monitoring equipment proposed is consistent with Perimeter Air Monitoring objectives and associated action levels presented in Table 01 36 20-1. Air monitoring methods and equipment locations shall be proposed by the Contractor in the PAMP.

2. The perimeter air sampling should be conducted at all times during intrusive site activities. Sampling shall be conducted at the frequencies defined in Table 01 36 20-1. The Contracting Officer may direct a change in air sampling frequency.

3. Subsurface contaminant concentrations will vary as the excavation progresses. Site maximum concentrations shall be used to establish site action levels.

4. Equipment used for air monitoring or sampling in accordance with this section shall be calibrated before and after each use, as required, and maintained as per specified methods, manufacturer's recommendations, and good industrial hygiene practices. Test instruments used in the calibration of air sampling equipment shall be calibrated and traceable to NIST standards.

5. The Contractor shall document, in the site log or site files, the regular calibration of each instrument used. Only individuals trained to operate this equipment shall do so.

6. The Contractor shall furnish, install and maintain a portable meteorological station in accordance with 01 35 29, HEALTH, SAFETY AND EMERGENCY RESPONSE PROCEDURES for the collection of meteorological data including continuous observation and recording of wind speed, wind direction, ambient air temperature, atmospheric pressure, atmospheric humidity, solar insolation, and atmospheric precipitation.

   a. The station shall be capable of recording all measured

parameters every 5 minutes. The station shall also transmit real-time data back to a central location so that the real-time particulate and vapor monitoring can be correlated to wind direction.

b. Meteorological data collected by the station shall be logged on each day of intrusive site work, so that the weather influences on the air samples can be characterized. Contractor shall maintain records, written or electronic, of the meteorological monitoring results for the duration of the project.

c. Visual wind direction indicators shall be established in a central location at each active work area.

7. The Contractor shall collect each air measurement over a duration that the AQS determines will yield an accurate representation of the air quality at that time and location.

8. The sampling and analytical procedures to be followed for the collection, handling, and analysis of air samples are those prescribed by EPA Analytical Procedures listed in Table 01 36 20-1. Air samples shall be collected by drawing a known volume of air into a collector as specified in the EPA sampling guide. The analytical results shall be compared to Action Levels established in Table 01 36 20-1 and, if appropriate, action shall be undertaken (i.e., evaluation of work practices). Equipment calibration protocols described in the EPA methods shall be followed.

C. Air Sampling and Monitoring Results Reporting:

1. Air Sampling and Monitoring Logs

The Contractor shall maintain an up-to-date log for all sampling activities. A copy of the log shall be submitted to the Contracting Officer weekly during the course of the project site work. The log shall contain sufficient information to verify that proper procedures were followed, and confirm the accuracy of results.

2. Daily Air Monitoring Summary Report

The daily air monitoring summary report shall discuss calibration, calibration check, general observations, weather conditions, and discussion of all required corrective action. In addition, the report shall contain additional information where real-time sampling is utilized.

The Air Sample Analysis Results shall be collected and submitted. A summary of real-time monitoring results shall be presented in tabular form. The table shall include results from all monitoring locations including background.

3. Monthly Air Monitoring Report Compilation

Within 5 working days of month's end, the Contractor shall compile and submit copies of each Daily Air Monitoring Summary Report and the weekly air sampling results, for

which results were received from the previous calendar month.

1.08 RESPONSE TO AIR EMISSIONS

A. Contractor shall compare the highest of direct reading measurements for dust downwind of the site (minus the value upwind) to the action levels in Table 01 36 20-1. If the wind is blowing from a direction for which there is no monitor, the upwind value shall be assumed to be the lowest of the values collected by any of the monitors.

B. When the ambient air monitoring system reveals that action level has been exceeded for 15 or more minutes, the Contractor shall evaluate its engineering controls and implement emission controls. If its process modifications succeed, Contractor shall report the exceedance in its daily air monitoring summary report.

C. When the air monitoring system reveals that the action level has been exceeded for an hour or more, Contractor shall temporarily suspend intrusive activities, notify the Contracting Officer, and implement corrective action to reduce site-related emissions to below required action levels. The adequacy of these controls is subject to acceptance by the Contracting Officer's representative prior to restarting intrusive activities. Contractor shall report the exceedance in its daily air monitoring summary report.

D. Site emissions control measures that may be needed to reduce the emissions to below action levels may include, but are not limited to:

1. Adding moisture to exposed soil or stockpiles.
2. Applying a vapor barrier (plastic) to exposed soil or stockpiles.
3. Using a misting system with an odor neutralizing additive.
4. Applying foam to exposed soil or stockpiles.
5. Reducing the speed of equipment that disturbs the soil.
6. Installing barriers to reduce wind speed near excavations.
7. Limiting the rate of excavation.
8. Ceasing some operations until wind speeds decrease.

E. When the ambient air sampling system reveals that action level has been exceeded, the AQS shall use that information to modify the action levels to which the direct-reading measurements are compared so that they will protect the community.

1.09 INSPECTIONS

The Contractor shall perform daily inspections of the job site and the surrounding work in progress in accordance with 01 35 29, HEALTH, SAFETY AND EMERGENCY RESPONSE PROCEDURES to ensure compliance with PAMP. Contracting Officer may stop all site work at any point if the Contractor shows any disregard for the provisions of this specification or the accepted PAMP.

1.10 DUST AND EMISSION CONTROL

Dust control shall be used throughout the work at the site and offsite in accordance with the Contractor's approved Dust Control Plan as required in 01 35 29, HEALTH, SAFETY AND EMERGENCY RESPONSE PROCEDURES.

The AQS shall ensure that dust suppression practices are effective and being utilized. Visual surveillance shall be conducted along construction access roads and downwind portions of the Site at least once a day and the areas swept as necessary to control dust and tracking.

PART 2 PRODUCTS

2.01 General

The Contractor shall provide all necessary sampling devices, pumps and collection media and support equipment to perform the sampling per the approved Perimeter Air Monitoring Plan.

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS
11/14

PART 1 GENERAL

1.01 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization (e.g. ASTM B564 Standard Specification for Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.02 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

ACOUSTICAL SOCIETY OF AMERICA (ASA)
1305 Walt Whitman Road, Suite 300
Melville, NY 11747-4300
Ph: 516-576-2360
Fax: 631-923-2875
E-mail: asa@aip.org
Internet: http://asa.aip.org

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL (AMCA)
30 West University Drive
Arlington Heights, IL 60004-1893
Ph: 847-394-0150
Fax: 847-253-0088
E-mail: amca@amca.org
Internet: http://www.amca.org

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)
2111 Wilson Blvd, Suite 500
Arlington, VA 22201
Ph: 703-524-8800
Fax: 703-562-1942
Internet: http://www.ahrinet.org

ALUMINUM ASSOCIATION (AA)
National Headquarters
1525 Wilson Boulevard, Suite 600
Arlington, VA 22209
Ph: 703-358-2960
E-Mail: info@aluminum.org
Internet: http://www.aluminum.org

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)
1827 Walden Office Square, Suite 550
Schaumburg, IL 60173-4268
Ph: 847-303-5664
Fax: 847-303-5774
E-mail: customerservice@aamanet.org
Internet: http://www.aamanet.org

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
444 North Capital Street, NW, Suite 249
Washington, DC 20001
Ph: 202-624-5800
Fax: 202-624-5806
E-Mail: info@aashto.org
Internet: http://www.aashto.org

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)
38800 Country Club Drive
Farmington Hills, MI 48331-3439
Ph: 248-848-3700
Fax: 248-848-3701
E-mail: bkstore@concrete.org
Internet: http://www.concrete.org

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)
1330 Kemper Meadow Drive
Cincinnati, OH 45240
Ph: 513-742-2020 or 513-742-6163
Fax: 513-742-3355
E-mail: mail@acgih.org
Internet: http://www.acgih.org

AMERICAN HARDBOARD ASSOCIATION (AHA)
1210 West Northwest Highway
Palatine, IL 60067
Ph: 847-934-8800
Fax: 847-934-8803
E-mail: aha@hardboard.org
Internet: http://domensino.com/AHA/

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
One East Wacker Drive, Suite 700
Chicago, IL 60601-1802
Ph: 312-670-2400
Fax: 312-670-5403
Bookstore: 800-644-2400
E-mail: aisc@ware-pak.com
Internet: http://www.aisc.org

AMERICAN IRON AND STEEL INSTITUTE (AISI)
25 Massachusetts Avenue, NW Suite 800
Washington, DC 20001
Ph: 202-452-7100
Internet: http://www.steel.org

AMERICAN LADDER INSTITUTE (ALI)
2025 M St. NW

Washington, DC 20036
Ph: 202-367-1217
Fax: 202-973-8712
E-mail: info@americanladderinstitute.org
Internet: http://www.americanladderinstitute.org

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
1899 L Street, NW,11th Floor
Washington, DC 20036
Ph: 202-293-8020
Fax: 202-293-9287
E-mail: storemanager@ansi.org
Internet: http://www.ansi.org/

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)
1801 Alexander Bell Drive
Reston, VA 20191
Ph: 703-295-6300; 800-548-2723
E-mail: member@asce.org
Internet: http://www.asce.org

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)
1791 Tullie Circle, NE
Atlanta, GA 30329
Ph: 800-527-4723 or 404-636-8400
Fax: 404-321-5478
E-mail: ashrae@ashrae.org
Internet: http://www.ashrae.org

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)
1800 East Oakton Street
Des Plaines, IL 60018
Ph: 847-699-2929
Internet: http://www.asse.org

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448
Ph: 708-995-3019
Fax: 708-479-6139
E-mail: staffengineer@asse-plumbing.org
Internet: http://www.asse-plumbing.org

AMERICAN WATER WORKS ASSOCIATION (AWWA)
6666 West Quincy Avenue
Denver, CO 80235-3098
Ph: 303-794-7711
E-mail: distribution@awwa.org
Internet: http://www.awwa.org

AMERICAN WELDING SOCIETY (AWS)
13301 NW 47 Ave
Miami, FL 33054

Ph: 888-WELDING, 305-824-1177, 305-826-6192
Fax: 305-826-6195
E-mail: customer.service@awspubs.com
Internet: http://www.aws.org

ARCHITECTURAL WOODWORK INSTITUTE (AWI)
46179 Westlake Drive, Suite 120
Potomac Falls, VA 20165
Ph: 571-323-3636
Fax: 571-323-3630
E-mail: info@awinet.org
Internet: http://www.awinet.org

ASME INTERNATIONAL (ASME)
Two Park Avenue, M/S 10E
New York, NY 10016-5990
Ph: 800-843-2763
Fax: 973-882-1717
E-mail: customercare@asme.org
Internet: http://www.asme.org

ASSOCIATED AIR BALANCE COUNCIL (AABC)
1518 K Street, NW
Washington, DC 20005
Ph: 202-737-0202
Fax: 202-638-4833
E-mail: info@aabc.com
Internet: http://www.aabc.com/

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959
Ph: 877-909-2786
Internet: http://www.astm.org

BACNET INTERNATIONAL (BTL)
BACnet Testing Laboratories
1827 Powers Ferry Road
Building 14, Suite 100
Atlanta, GA 30339
Ph: 770-971-6003
Fax: 678-229-2777
E-mail: btl-manager@bacnetinternational.org
Internet: http://www.bacnetlabs.org

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)
355 Lexington Avenue, 15th Floor
New York, NY 10017
Ph: 212-297-2122
Fax: 212-370-9047
Internet: http://www.buildershardware.com

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)
PO Box 997377, MS 0500
Sacramento, CA 95899-7377
Ph: 916-558-1784
Internet: http://www.cdph.ca.gov

CAST IRON SOIL PIPE INSTITUTE (CISPI)
3008 Preston Station Drive
Hixson, TN 37343
Ph: 423-842-2122

Internet: http://www.cispi.org

COMPOSITE PANEL ASSOCIATION (CPA)
19465 Deerfield Avenue, Suite 306
Leesburg, VA 20176
Ph: 703-724-1128
Fax: 703-724-1588
Internet: http://www.compositepanel.org/

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
933 North Plum Grove Road
Schaumburg, IL 60173-4758
Ph: 847-517-1200
Fax: 847-517-1206
Internet: http://www.crsi.org/

COPPER DEVELOPMENT ASSOCIATION (CDA)
Internet: http://www.copper.org

FLUID CONTROLS INSTITUTE (FCI)
1300 Sumner Avenue
Cleveland, OH 44115
Ph: 216-241-7333
Fax: 216-241-0105
E-mail: fci@fluidcontrolsinstitute.org
Internet: www.fluidcontrolsinstitute.org

FLUID SEALING ASSOCIATION (FSA)
994 Old Eagle School Rd. #1019
Wayne, PA 19087-1866
Ph: 610-971-4850
Internet: www.fluidsealing.com

FM GLOBAL (FM)
270 Central Avenue
P.O. Box 7500
Johnston, RI 02919-4923
Ph: 877-364-6726
Fax: 401-275-3029
E-mail: servicedesk.myrisk@fmglobal.com
Internet: http://www.fmglobal.com

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (FCCCHR)
University of South California
Research Annex 219
3716 South Hope Street
Los Angeles, CA 90089-7700
Ph: 213-740-2032 or 866-545-6340
Fax: 213-740-8399
E-mail: fccchr@usc.edu
Internet: http://www.usc.edu/dept/fccchr

GEOSYNTHETIC INSTITUTE (GSI)
475 Kedron Avenue
Folsom, PA 19033-1208
Ph: 610-522-8440
Fax: 610-522-8441
Internet: http://www.geosynthetic-institute.org

GLASS ASSOCIATION OF NORTH AMERICA (GANA)
800 SW Jackson St., Suite 1500
Topeka, KS 66612-1200
Ph: 785-271-0208
E-mail: gana@glasswebsite.com
Internet: http://www.glasswebsite.com

GREEN SEAL (GS)
1001 Connecticut Avenue, NW
Suite 827
Washington, DC 20036-5525
Ph: 202-872-6400
Fax: 202-872-4324
Internet: http://www.greenseal.org

GYPSUM ASSOCIATION (GA)
6525 Belcrest Road, Suite 480
Hyattsville, MD 20782
Ph: 301-277-8686
Fax: 301-277-8747
E-mail: info@gypsum.org
Internet: http://www.gypsum.org

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6 Campus Drive, First Floor North
Parsippany, NJ 07054-4406
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Fax: 973-267-9055
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Brea, CA 92821
Ph: 800-423-6587 ext. 66546
Fax: 562-695-4694
E-mail: es@icc-es.org
Internet: http://www.icc-es.org

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
445 and 501 Hoes Lane
Piscataway, NJ 08854-4141
Ph: 732-981-0060 or 800-701-4333
Fax: 732-562-9667
E-mail: onlinesupport@ieee.org
Internet: http://www.ieee.org

INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)
P.O. Box 1568
Carrollton, GA 30112
E-mail:
http://www.icea.net/Public_Pages/Contact/Email_Contact.html
Internet: http://www.icea.net

INSULATING GLASS MANUFACTURERS ALLIANCE (IGMA)
27 N. Wacker Dr. Suite 365
Chicago, IL 60606-2800
Ph: 613-233-1510
Fax: 613-482-9436

E-mail: enquiries@igmaonline.org
Internet: http://www.igmaonline.org

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)
800 Place Victoria
PO Box 113
Montréal, Quebec, H4Z 1M1
Ph: 514-390-6726 or 800-716-6326
Fax: 514-874-9659
E-mail: custserv@iata.org
Internet: http://www.iata.org

INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO)
4755 E. Philadelphia St.
Ontario, CA 91761
Ph: 909-472-4100
Fax: 909-472-4150
E-mail: iapmo@iapmo.org
Internet: http://www.iapmo.org

INTERNATIONAL CODE COUNCIL (ICC)
500 New Jersey Avenue, NW
6th Floor, Washington, DC 20001
Ph: 800-786-4452 or 888-422-7233
E-mail: order@iccsafe.org
Internet: www.iccsafe.org

INTERNATIONAL CONCRETE REPAIR INSTITUTE (ICRI)
10600 West Higgins Road, Suite 607
Rosemont, IL 60018
Ph: 847-827-0830
Fax: 847-827-0832
Internet: http://www.icri.org

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)
3050 Old Centre Ave. Suite 102
Portage, MI 49024
Ph: 269-488-6382
Internet: http://www.netaworld.org

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)
3, rue de Varembe
P.O. Box 131
CH-1211 Geneva 20, Switzerland
Ph: 41-22-919-02-11
Fax: 41-22-919-03-00
Internet: http://www.iec.ch

INTERNATIONAL GROUND SOURCE HEAT PUMP ASSOCIATION (IGSHPA)
1201 S Innovation Way, Suite 400
Stillwater, OK 74074
Ph: 800-626-4747 or 405-744-5175
Fax: 405-744-5283
E-mail: igshpa@okstate.edu
Internet: http://www.igshpa.okstate.edu/

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)
ISO Central Secretariat

Chemin de Blandonnet 8
CP 401 - 1214 Vernier, Geneva
Switzerland
Ph: 41-22-749-01-11
Fax: 41-22-733-34-30
E-mail: central@iso.ch
Internet: https://www.iso.org/contact-iso.html

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)
1901 North Moore Street
Arlington, VA 22209-1762
Ph: 703-525-1695
Fax: 703-528-2148
Internet: http://www.safetyequipment.org/

INTERNATIONAL TELECOMMUNICATION UNION (ITU)
Place des Nations
CH-1211 Geneve 20 Switzerland
Ph: 41-22-730-6141
Fax: 41-22-730-5194
E-mail: sales@itu.int
Internet: http://www.itu.int/en/Pages/default.aspx

INTERNATIONAL SOCIETY OF AUTOMATION (ISA)
67 T.W. Alexander Drive
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Research Triangle Park, NC 27709
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Fax: 919-549-8288
E-mail: info@isa.org
Internet: http://www.isa.org

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)
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Ph: 703-281-6613
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Internet: http://mss-hq.org/Store/index.cfm

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Fax: 1-888-211-8708
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Internet: http://www.mpi.net/

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Cleveland, OH 44115-2851
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Fax: 216-241-0105
E-mail: mbma@mbma.com
Internet: http://www.mbma.com

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Omaha, NE 68130

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800 Roosevelt Road, Bldg C, Suite 312
Glen Ellyn, IL 60137
Ph: 630-942-6591
Fax: 630-790-3095
E-mail: wlewis7@cox.net(Wes Lewis,technical consultant)
Internet: http://www.naamm.org

NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA)
3 Bethesda Metro Center, Suite 1100
Bethesda, MD 20814
Ph: 301-657-3110
Fax: 301-215-4500
Internet: http://www.necanet.org/

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
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Arlington, VA 22209
Ph: 703-841-3200
Internet: http://www.nema.org/

NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)
8575 Grovemont Circle
Gaithersburg, MD 20877
Ph: 301-977-3698
Fax: 301-977-9589
Internet: http://www.nebb.org

NATIONAL FENESTRATION RATING COUNCIL (NFRC)
6305 Ivy Lane, Suite 140
Greenbelt, MD 20770
Ph: 301-589-1776
Fax: 301-589-3884
E-Mail: info@nfrc.org
Internet: http://www.nfrc.org

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Ph: 617-770-3000
Fax: 617-770-0700
Internet: http://www.nfpa.org

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)
395 E Street, S.W.
Suite 9200
Patriots Plaza Building
Washington, DC 20201
Ph: 800-232-4636
Fax: 513-533-8347
E-mail: nioshdocket@cdc.gov
Internet: http://www.cdc.gov/niosh/

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)
100 Bureau Drive

Stop 1070
Gaithersburg, MD 20899-1070
Ph: 301-975-NIST (6478)
E-mail: inquiries@nist.gov
Internet: http://www.nist.gov

NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA)
Manager, Customer Service
900 Spring Street
Silver Spring, MD 20910
Ph: 240-485-1165
E-mail: jjenkins@nrmca.org (Jacques Jenkins)
Internet: http://www.nrmca.org

NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
10255 West Higgins Road, Suite 600
Rosemont, IL 60018-5607
Ph: 866-275-6722 (866-ASK-NRCA)
Fax: 847-299-1183
E-mail: info@nrca.net
Internet: http://www.nrca.net

NSF INTERNATIONAL (NSF)
789 North Dixboro Road
P.O. Box 130140
Ann Arbor, MI 48105
Ph: 734-769-8010 or 800-NSF-MARK
Fax: 734-769-0109
E-mail: info@nsf.org
Internet: http://www.nsf.org

PLASTIC PIPE AND FITTINGS ASSOCIATION (PPFA)
800 Roosevelt Road
Building C, Suite 312
Glen Ellyn, IL 60137
Ph: 630-858-6540
Fax: 630-790-3095
Internet: http://www.ppfahome.org

PLASTICS PIPE INSTITUTE (PPI)
105 Decker Court, Suite 825
Irving, TX 75062
Ph: 469-499-1044
Fax: 469-499-1063
Internet: http://www.plasticpipe.org

PLUMBING AND DRAINAGE INSTITUTE (PDI)
800 Turnpike Street, Suite 300
North Andover, MA 01845
Ph: 978-557-0720 or 800-589-8956
E-Mail: pdi@PDIonline.org
Internet: http://www.pdionline.org

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)
2000 Powell Street, Suite 600
Emeryville, CA 94608
Ph: 800-326-3228
E-mail: info@SCSglobal services.com

Internet: http://www.scsglobalservices.com/

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
4201 Lafayette Center Drive
Chantilly, VA 20151-1219
Ph: 703-803-2980
Fax: 703-803-3732
Internet: http://www.smacna.org

SOCIETY FOR PROTECTIVE COATINGS (SSPC)
40 24th Street, 6th Floor
Pittsburgh, PA 15222
Ph: 412-281-2331
Fax: 412-281-9992
E-mail: info@sspc.org
Internet: http://www.sspc.org

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)
400 Commonwealth Drive
Warrendale, PA 15096
Ph: 724-776-4970
Fax: 877-606-7323
E-mail: customerservice@sae.org
Internet: http://www.sae.org

SOCIETY OF CABLE TELECOMMUNICATIONS ENGINEERS (SCTE)
140 Philips Road
Exton, PA 19341-1318
Ph: 800-542-5040 or 610-363-6888
Fax: 610-363-5898
E-Mail: information@scte.org
http://www.scte.org

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)
21865 Copley Drive
Diamond Bar, CA 91765
Ph: 909-396-2000
E-mail: webinquiry@aqmd.gov
Internet: http://www.aqmd.gov

STEEL DOOR INSTITUTE (SDI/DOOR)
30200 Detroit Road
Westlake, OH 44145
Ph: 440-899-0010
Fax: 440-892-1404
E-mail: info@steeldoor.org
Internet: http://www.steeldoor.org

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1320 N. Courthouse Rd., Suite 200
Arlington, VA 22201
Ph: 703-907-7700
Fax: 703-907-7727
Internet: http://www.tiaonline.org

TRIDIUM, INC (TRIDIUM)
3951 Westerre Parkway, Suite 350
Richmond, VA 23233

Ph: 804-747-4771
Fax: 804-747-5204
Internet: http://www.tridium.com

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http://www.hnc.usace.army.mil/Missions/Engineering/TECHINFO.aspx

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Office of the Law Revision Counsel
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Internet: http://assist.daps.dla.mil/online/start/; account registration required
Obtain Unified Facilities Criteria (UFC) from:
Whole Building Design Guide (WBDG)
National Institute of Building Sciences (NIBS)
1090 Vermont Avenue NW, Suite 700
Washington, CD 20005
Ph: 202-289-7800
Fax: 202-289-1092
Internet: http://www.wbdg.org/references/docs_refs.php

U.S. DEPARTMENT OF ENERGY (DOE)
1000 Independence Avenue Southwest
Washington, D.C. 20585
Internet: www.eere.energy.gov

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20004
Ph: 202-272-0167
Internet: http://www2.epa.gov/libraries
--- Some EPA documents are available only from:
National Technical Information Service (NTIS)
5301 Shawnee Road
Alexandria, VA 22312
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Fax: 703-605-6900
E-mail: info@ntis.gov
Internet: http://www.ntis.gov

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Internet: http://www.gpoaccess.gov/

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Washington, D.C. 20037
Ph: 800-795-1747
Internet: http://www.usgbc.org

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Internet: http://www.gpoaccess.gov

UNDERWRITERS LABORATORIES (UL)
2600 N.W. Lake Road
Camas, WA 98607-8542
Ph: 877-854-3577
E-mail: CEC.us@us.ul.com
Internet: http://www.ul.com/
UL Directories available through IHS at http://www.ihs.com

WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)
330 N Wabash Avenue, Suite 2000
Chicago, IL 60611
Ph: 312-321-6802
E-mail: wdma@wdma.com
Internet: http://www.wdma.com

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 42 13

ABBREVIATIONS AND ACRONYMS
09/17

PART 1 GENERAL

1.01 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES

A. Reference to standards and specifications of technical societies and reporting and resolving discrepancies associated therewith shall be as provided in Article 3 of the General Conditions, and as may otherwise be required herein and in the individual Specification sections.

B. Work specified by reference to published standard or specification of government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall meet requirements or surpass minimum standards of quality for materials and workmanship established by designated standard or specification.

C. Where so specified, products or workmanship shall also meet or exceed additional prescriptive or performance requirements included within Contract Documents to establish a higher or more stringent standard of quality than required by referenced standard

D. Where two or more standards are specified to establish quality, product and workmanship shall meet or exceed requirements of most stringent.

E. Where both a standard and a brand name are specified for a product in Contract Documents, proprietary product named shall meet or exceed requirements of specified reference standard.

F. Copies of standards and specifications of technical societies:

1. Copies of applicable referenced standards have not been bound in these Contract Documents.
2. Where copies of standards are needed by Contractor, obtain a copy or copies directly from publication source and maintain in an orderly manner at the Site as Work Site records, available to Contractor's personnel, Subcontractors, Government.

1.02 ABBREVIATIONS AND ACRONYMS

Abbreviations for trade organizations and government agencies: Following is a list of construction industry organizations and government agencies to which references may be made in the Contract Documents, with abbreviations used.

Abbreviation	Full Name
AA	Aluminum Association

Abbreviation	Full Name
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ABMA	American Bearing Manufacturers' Association
ACI	American Concrete Institute
AEIC	Association of Edison Illuminating Companies
AGA	American Gas Association
AGMA	American Gear Manufacturers' Association
AI	Asphalt Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALS	American Lumber Standards
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
APA	APA - The Engineered Wood Association
API	American Petroleum Institute
APWA	American Public Works Association
AHRI	Air-Conditioning, Heating, and Refrigeration Institute
ASA	Acoustical Society of America
ASABE	American Society of Agricultural and Biological Engineer
ASCE	American Society of Civil Engineers
ASHRAW	American Society of Heating, Refrigerating and Air-Conditioning
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASSE	American Society of Sanitary Engineering

Abbreviation	Full Name
ASTM	ASTM International
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers' Association
AWPI	American Wood Preservers' Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers' Association
CDM	Certified Ballast Manufacturer
CDA	Copper Development Association
CGA	Compressed Gas Association
CISPO	Cast Iron Soil Pipe Institute
CAAM	Crane Manufacturers' Association of America
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard
CSA	Canadian Standards Association
CSI	Construction Specifications Institute
DIN	Deutsches Institut fr Normung e.V.
DIPRA	Ductile Iron Pipe Research Association
DQO	Data Quality Objectives
EIA	Electronic Industries Alliance
EJCDC	Engineers Joint Contract Documents' Committee
ETL	Electrical Test Laboratories
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency

Abbreviation	Full Name
FIPS	Federal Information Processing Standards
FM	FM Global
Fed Spec	Federal Specifications (FAA Specifications)
FS	Federal Specifications and Standards(Technical Specifications)
GA	Gypsum Association
GANA	Glass Association of North America
HPDE	High Density Polyethylene
HI	Hydraulic Institute
HMI	Hoist Manufacturers' Institute
IBC	International Building Code
OCCBO	International Conference of Building Officials
ICC	International Code Council
ICEA	Insulated Cable Engineers' Association
IFC	International Fire Code
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IESNA	Illuminating Engineering Society of North America
IFI	Industrial Fasteners Institute
IGMA	Insulating Glass Manufacturer's Alliance
IMC	International Mechanical Code
INDA	Association of the Nonwoven Fabrics Industry
IPC	International Plumbing Code
ISA	International Society of Automation
IOS	International Organization for Standardization
ITL	Independent Testing Laboratory
JIC	Joint Industry Conferences of Hydraulic Manufacturers
MIA	Marble Institute of America

Abbreviation	Full Name
MIL	Military Specifications
MMA	Monorail Manufacturers' Association
MSS	Manufacturer's Standardization Society
NAAMM	National Association of Architectural Metal
NACE	NACE International
NBGQA	National Building Granite Quarries Association
NEBB	National Environmental Balancing Bureau
NEC	National Electrical Code
NECA	National Electrical Contractor's Association
NEMA	National Electrical Manufacturers' Association
MECS	National Electrical Safety Code
NETA	InterNational Electrical Testing Association
NFPA	National Fire Protection Association
NHLA	National Hardwood Lumber Association
NICET	National Institute for Certification in Engineering Technologies
NIST	National Institute of Standards and Technology
NRCA	National Roofing Contractors Association
NRTL	Nationally Recognized Testing Laboratories
NSE	NSF International
NSPE	National Society of Professional Engineers
NTMA	National Terrazzo and Mosaic Association
NWWDA	National Wood Window and Door Association
OSHA	Occupational Safety and Health Act (both Federal & State)
PCI	Precast/Prestressed Concrete Institute
PEI	Porcelain Enamel Institute
PPI	Plastic Pipe Institute

Abbreviation	Full Name
PS	Product Standards Section-U.S. Department of Commerce
RMA	Rubber Manufacturers' Association
RUS	Rural Utilities Service
SAE	SAE International
SDI	Steel Deck Institute
SID	Steel Door Institute
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPI	Society of the Plastics Industry
SSPC	The Society for Protective Coatings
STI/SPFA	Steel Tank Institute/Steel Plate Fabricators Association
SWI	Steel Window Institute
TEMA	Tubular Exchanger Manufacturers' Association
TCA	Tile Council of North America
TIA	Telecommunications Industry Association
UBC	Uniform Building Code
UFC	Uniform Fire Code
UL	Underwriters Laboratories Inc.
UMC	Uniform Mechanical Code
USBR	U.S. Bureau of Reclamation
VOC	Volatile Organic Compounds
WSLIB	West Coast Lumber Inspection Bureau
WI	Wood Institute
WWPA	Western Wood Products Association

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 43 33

MANUFACTURERS' FIELD SERVICES
09/17

PART 1 GENERAL

1.01 DEFINITIONS

A. Person-Day: One person for 8 hours within regular Contractor working hours.

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-10 Operation and Maintenance Data

Training Schedule; G

1.03 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

A. Qualifications:

Authorized representative of the manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment manufacturer to issue the certifications required of the manufacturer. Additional qualifications may be specified in the individual Specification section.

B. Acceptance by Government

Representative subject to acceptance by Government. No substitute representatives will be allowed unless prior written approval by such has been given.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

A. Furnish manufacturers' services, when required by an individual Specification section, to meet the requirements of this section.

B. Where time is necessary in excess of that stated in the Specifications for manufacturers' services, or when a minimum time is not specified, time required to perform specified services

shall be considered incidental.

C. Schedule manufacturer's services to avoid conflict with other onsite testing or other manufacturers' onsite services.

D. Determine, before scheduling services, that conditions necessary to allow successful testing have been met.

E. Only those days of service approved by Contracting Officer will be credited to fulfill specified minimum services.

F. When specified in individual Specification sections, manufacturer's onsite services shall include:

1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor's assembly, erection, installation or application procedures.

2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by manufacturer and necessary to furnish Manufacturer's Certificate of Proper Installation.

3. Providing, on a daily basis, copies of manufacturers' representatives field notes and data to Contracting Officer.

4. Revisiting the Site as required to correct problems and until installation and operation are acceptable to Contracting Officer.

5. Resolution of assembly or installation problems attributable to or associated with respective manufacturer's products and systems.

6. Assistance during functional and performance testing, and facility startup and evaluation.

7. Training of Government's personnel in the operation and maintenance of respective product as required.

3.02 MANUFACTURER'S CERTIFICATE OF COMPLIANCE

A. When so specified, a Manufacturer's Certificate of Compliance, a copy of which is attached to this section, shall be completed in full, signed by entity supplying the product, material, or service, and submitted prior to shipment of product or material or execution of the services.

B. Contracting Officer may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.

C. Such form shall certify proposed product, material, or service complies with that specified. Attach supporting reference data, affidavits, and certifications as appropriate.

D. May reflect recent or previous test results on material or product, if acceptable to Contracting Officer.

3.03 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

A. When so specified, a Manufacturer's Certificate of Proper Installation form, a copy of which is attached to this section, shall be completed and signed by equipment manufacturer's representative.

B. Such form shall certify signing party is a duly authorized representative of manufacturer, is empowered by manufacturer to inspect, approve, and operate their equipment and is authorized to make recommendations required to ensure equipment is complete and operational.

3.04 TRAINING

A. General

1. Furnish manufacturers' representatives for hands-on training to Government's and Contractor Operations personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.

2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings, and familiar with operation and maintenance manual information specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

3. Manufacturer's representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.

4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.

B. Training Schedule

Coordinate training schedule with Section 01 91 14, EQUIPMENT TESTING AND FACILITY STARTUP.

C. POST STARTUP TRAINING

If required in Specifications, furnish and coordinate training of Government's and Contractor Operations personnel by respective manufacturer's representatives.

3.05 SUPPLEMENTS

The supplements, following "End of Section", are part of this Specification.

1. Form: Manufacturer's Certificate of Compliance.
2. Form: Manufacturer's Certificate of Proper Installation.

-- End of Section --

MANUFACTURER'S CERTIFICATE OF COMPLIANCE

GOVERNMENT: _____

PROJECT NAME: _____

PROJECT NO: _____

PRODUCT, MATERIAL, OR SERVICE SUBMITTED: _____

Comments: _____

_____

_____

_____

_____

_____

I hereby certify that the above-referenced product, material, or service called for by the Contract for the named Project will be furnished in accordance with all applicable requirements. I further certify that the product, material, or service are of the quality specified and conform in all respects with the Contract requirements, and are in the quantity shown.

Date of Execution: _____, 20___

Manufacturer: _____

Manufacturer's Authorized Representative *(print)*: _____

_____

(Authorized Signature)

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

GOVERNMENT _____ EQPT SERIAL NO: _____

EQPT TAG NO: _____ EQPT/SYSTEM: _____

PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

☐ Installed in accordance with Manufacturer's recommendations.

☐ Inspected, checked, and adjusted.

☐ Serviced with proper initial lubricants.

☐ Electrical and mechanical connections meet quality and safety standards.

☐ All applicable safety equipment has been properly installed.

☐ Functional tests.

☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

_____

_____

_____

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20___

Manufacturer:_____

By Manufacturer's Authorized Representative: _____

(Authorized Signature)

SECTION 01 45 00

CONTRACTOR QUALITY CONTROL
11/16

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D3740	(2012a) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E329	(2014a) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor Quality Control (CQC) Plan; G

SD-06 Test Reports

Verification Statement; G

1.03 RESIDENT MANAGEMENT SYSTEM

The Government will use the Resident Management System (RMS) to assist in its monitoring and administration of this Contract, in accordance with Section 01 45 00.15 RESIDENT MANAGEMENT SYSTEM.

For ease and speed of communications, exchange correspondence and other documents in electronic format to the maximum extent feasible. Some correspondence are also to be provided in paper format with original signatures. Paper documents will govern, in the event of discrepancy with the electronic version.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

Establish and maintain an effective quality control (QC) system that complies with the Contract Clause titled "Inspection of Construction." QC consist of plans, procedures, and organization necessary to produce an end product which complies with the Contract requirements. The QC system covers all construction operations and will be keyed to the proposed construction sequence. The project superintendent will be held responsible for the quality of work and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the Contract. In this context the highest level manager responsible for the overall construction activities at the site, including quality and production is the project superintendent. The project superintendent maintains a physical presence at the site at all times and is responsible for all construction and related activities at the site, except as otherwise acceptable to the Contracting Officer.

3.02 CONTRACTOR QUALITY CONTROL (CQC) PLAN

Submit no later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The Government will consider an interim plan for the first 60 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional work.

A. Content of the CQC Plan

Include, as a minimum, the following to cover all construction-operations, including work by subcontractors, fabricators, suppliers and purchasing agents:

1. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff will implement the three phase control system for all aspects of the work specified. Include a CQC System Manager that reports to the project superintendent.

2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

3. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the Contract. Letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities will be issued by the CQC

System Manager. Furnish copies of these letters to the Contracting Officer.

4. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures must be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

5. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities approved by the Contracting Officer are required to be used.)

6. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

7. Procedures for tracking construction deficiencies from identification through acceptable corrective action. Establish verification procedures that identified deficiencies have been corrected.

8. Reporting procedures, including proposed reporting formats.

9. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and is identified by different trades or disciplines, or it is work by the same trade in a different environment. Although each section of the specifications can generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

10. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections. Where the applicable Code issue by the International Code Council (ICC) calls for inspections by the Building Official, the Contractor must include the inspections in the Quality Control Plan and must perform the inspections required by the applicable ICC. The Contractor must perform these inspections using independent qualified inspectors. Include the Special Inspection Plan requirements in the CQC Plan.

B. Acceptance of Plan

Acceptance of the Contractor's Plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in the CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

C. Notification of Changes

After acceptance of the CQC Plan, notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.03 COORDINATION MEETING

After the Preconstruction Conference, Section 01 31 19 PROJECT MEETINGS , before start of construction, and prior to acceptance by the Government of the CQC Plan, meet with the Contracting Officer and discuss the Contractor's quality control system. Submit the CQC Plan a minimum of 10 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details must be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting will be prepared by the Government, signed by both the Contractor and the Contracting Officer and will become a part of the contract file. There can be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which can require corrective action by the Contractor.

3.04 QUALITY CONTROL ORGANIZATION

A. Personnel Requirements

The requirements for the CQC organization are a Safety and Health Manager, CQC System Manager, and sufficient number of additional qualified personnel to ensure safety and Contract compliance. The Safety and Health Manager reports directly to a senior project (or corporate) official independent from the CQC System Manager. The Safety and Health Manager will also serve as a member of the CQC Staff. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff maintains a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure Contract compliance. The CQC staff will be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly complete and furnish all letters, material submittals, shop drawing submittals, schedules and all other project documentation to the CQC organization. The CQC organization is responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

B. CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization that is responsible for overall management of CQC and has the authority to act in all CQC matters for the Contractor. The CQC System Manager is required to be a graduate engineer, graduate architect, or a graduate of construction

management, with a minimum of 5 years construction experience on construction similar to this Contract or a construction person with a minimum of 10 years in related work. This CQC System Manager is on the site at all times during construction and is employed by the prime Contractor. The CQC System Manager is assigned as CQC System Manager but may have duties as backup to the project superintendent in addition to quality control. Identify in the plan an alternate to serve in the event of the CQC System Manager's absence. The requirements for the alternate are the same as the CQC System Manager.

C. CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: electrical, mechanical, structural, civil, geotechnical, environmental,geology/hydrogeology, architectural, and submittals clerk. These individuals, or specialized technical companies, are employees of the prime or a subcontractor; responsible to the CQC System Manager; physically present at the construction site during work on the specialized personnel's areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals can perform other duties but need to be allowed sufficient time to perform the specialized personnel's assigned quality control duties as described in the Contractor Quality Control Plan. A single person can cover more than one area provided that the single person is qualified to perform quality control activities in each designated and that workload allows.

Experience Matrix	
Area	Qualifications
Civil	Graduate Civil Engineer or Construction Manager with 2 years experience in the type of work being performed on this project or technician with 5 yrs related experience
Mechanical	Graduate Mechanical Engineer with 2 yrs experience or person with 5 years of experience supervising mechanical features of work in the field with a construction company
Electrical	Graduate Electrical Engineer with 2 years related experience or person 5 years of experience supervising electrical features of work in the field with a construction company

Experience Matrix	
Area	Qualifications
Process	Graduate Mechanical, Environmental or Civil Engineer with a minimum of 5 years of related experience in the construction or operation of groundwater treatment plants
Structural	Graduate Structural Engineer or Construction Manager with 2 years experience or person 5 years of experience supervising structural features of work in the field with a construction company
Architectural	Graduate Architect with 2 years experience or person with 5 years related experience
Geotechnical	Graduate Geotechnical Engineer with 5 years experience or person with 10 years related experience
Environmental	Graduate Environmental Engineer with 3 years experience or person with 5 years related experiences related experience
Geologist / Hydrogeologist	Graduate Geologist/Hydrogeolgist with 5 years experience
Submittals	Submittal Clerk with 1 year experience
Concrete, Pavements and Soils	Materials Technician with 2 years experience for the appropriate area
Testing, Adjusting and Balancing (TAB) Personnel	Specialist must be a member of AABC or an experienced technician of the firm certified by the NEBB

D. Additional Requirement

In addition to the above experience and education requirements, the CQC System Manager and Alternate CQC System Manager are required to have completed the USACE NAVFAC Construction Quality Management (CQM) for Contractors course. If the CQC System Manager does not have a current certification, obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Command and the Army Corps of Engineers. Contact the Contracting Officer for information on the next scheduled class.

The Construction Quality Management Training certificate expires after 5 years. If the CQC System Manager's certificate has expired, retake the course to remain current.

E. Organizational Changes

Maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.05 SUBMITTALS AND DELIVERABLES

Submittals, if needed, have to comply with the requirements in Section 01 33 00 SUBMITTAL PROCEDURES. The CQC organization is responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

3.06 CONTROL

CQC is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control are required to be conducted by the CQC System Manager for each definable feature of the construction work as follows:

A. Preparatory Phase

This phase is performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase includes:

1. A review of each paragraph of applicable specifications, reference codes, and standards. Make available during the preparatory inspection a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field. Maintain and make available in the field for use by Government personnel until final acceptance of the work.

2. Review of the Contract Drawings.

3. Check to assure that all materials and/or equipment have been tested, submitted, and approved.

4. Review of provisions that have been made to provide required control inspection and testing.

5. Review Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

6. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the Contract.

7. Examination of required materials, equipment, and sample work to ensure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

8. Review of the appropriate activity hazard analysis to ensure safety requirements are met.

9. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

10. Check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

11. Discussion of the initial control phase.

12. The Government needs to be notified at least 48 hours in advance of beginning the preparatory control phase. Include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. Document the results of the preparatory phase actions by separate minutes prepared by the CQC System Manager and attach to the daily CQC report. Instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

B. Initial Phase

This phase is accomplished at the beginning of a definable feature of work. Accomplish the following:

1. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

2. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing are in compliance with the contract.

3. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

4. Resolve all differences.

5. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

6. The Contracting Officer needs to be notified at least 48 hours in advance of beginning the initial phase for definable feature of work. Prepare separate minutes of this phase by the CQC System Manager and attach to the daily CQC report. Indicate the exact location of initial phase for definable feature of work for future reference and comparison with follow-up phases.

7. The initial phase for each definable feature of work is repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

8. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

C. Follow-up Phase

Perform daily checks to ensure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. Record the checks in the CQC documentation. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

D. Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.07 TESTS

A. Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. Procure the services of a USACE approved testing laboratory or establish an approved testing laboratory at the project site. Perform the following activities and record and provide the following data:

1. Verify that testing procedures comply with contract requirements.

2. Verify that facilities and testing equipment are available and comply with testing standards.

3. Check test instrument calibration data against certified standards.

4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

5. Record results of all tests taken, both passing and failing on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports are submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated

results in nonpayment for related work performed and disapproval of the test facility for this Contract.

B. Testing Laboratories

All testing laboratories must be validated by the USACE Material Testing Center (MTC) for the tests to be performed. Information on the USACE MTC with web-links to both a list of validated testing laboratories and for the laboratory inspection request for can be found at: http://www.erdc.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/476661/materials-testing-center/

1. Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel is required to meet criteria detailed in ASTM D3740 and ASTM E329.

C. Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.08 COMPLETION INSPECTION

A. Punch-Out Inspection

Conduct an inspection of the work by the CQC System Manager near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications. Prepare and include in the CQC documentation a punch list of items which do not conform to the approved drawings and specifications, as required by paragraph DOCUMENTATION. Include within the list of deficiencies the estimated date by which the deficiencies will be corrected. Make a second inspection the CQC System Manager or staff to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the Government that the facility is ready for the Government Pre-Final inspection.

B. Pre-Final Inspection

The Contracting Officer will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. Ensure that all items on this list have been corrected before notifying the Contracting Officer so that a Final inspection with the customer can be scheduled. Correct any items noted on the Pre-Final inspection in a timely manner. These inspections and any deficiency corrections required by this paragraph need to be accomplished within the time slated for

completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

C. Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative is required to be in attendance at the final acceptance inspection. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notify the Contracting Officer at least 14 days prior to the final acceptance inspection and include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the Contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the Contract clause titled "Inspection of Construction".

3.09 DOCUMENTATION

A. Quality Control Activities

Maintain current records providing factual evidence that required quality control activities and/or tests have been performed. Include in these records the work of subcontractors and suppliers on an acceptable form that includes, as a minimum, the following information:

1. The name and area of responsibility of the Contractor/Subcontractor.

2. Operating plant/equipment with hours worked, idle, or down for repair.

3. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

4. Test and/or control activities performed with results and references to specifications/drawings requirements. Identify the control phase (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.

5. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

6. Submittals and deliverables reviewed, with Contract reference, by whom, and action taken.

7. Offsite surveillance activities, including actions taken.

8. Job safety evaluations stating what was checked, results, and

instructions or corrective actions.

9. Instructions given/received and conflicts in plans and/or specifications.

B. Verification Statement

Indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. Cover both conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the Contract. Furnish the original and one copy of these records in report form to the Contracting Officer within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, prepare and submit one report for every 7 days of no work and on the last day of a no work period. All calendar days need to be accounted for throughout the life of the contract. The first report following a day of no work will be for that day only. Reports need to be signed and dated by the CQC System Manager. Include copies of test reports and copies of reports prepared by all subordinate quality control personnel within the CQC System Manager Report.

3.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, will be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer can issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders will be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --

SECTION 01 45 00.15

RESIDENT MANAGEMENT SYSTEM
11/16

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

1.02 CONTRACT ADMINISTRATION

The Government will use the Resident Management System (RMS) to assist in its monitoring and administration of this contract. The Government accesses the system using the Government Mode of RMS (RMS GM) and the Contractor accesses the system using the Contractor Mode (RMS CM). The term RMS will be used in the remainder of this section for both RMS GM and RMS CM. The joint Government-Contractor use of RMS facilitates electronic exchange of information and overall management of the contract. The Contractor accesses RMS to record, maintain, input, track, and electronically share information with the Government throughout the contract period in the following areas:

Administration
Finances
Quality Control
Submittal Monitoring
Scheduling
Closeout
Import/Export of Data

A. Correspondence and Electronic Communications

For ease and speed of communications, exchange correspondence and other documents in electronic format to the maximum extent feasible. Some correspondence, including pay requests and payrolls, are also to be provided in paper format with original signatures. Paper documents will govern, in the event of discrepancy with the electronic version.

B. Other Factors

Other portions of this document have a direct relationship to the reporting accomplished through RMS. Particular attention is directed to Contract Clause, 52.236-15 "Schedules for Construction Contracts"; Contract Clause, 52.232-27 "Prompt Payment for Construction Contracts"; Contract Clause, 52.232-15 "Payments Under Fixed-Priced Construction Contracts"; Section 01 32 16.00 00 PROJECT SCHEDULE; Section 01 33 00 SUBMITTAL

PROCEDURES; and Section 01 45 00 CONTRACTOR QUALITY CONTROL.

1.03 RMS SOFTWARE

RMS is a Windows-based program that can be run on a Windows-based PC meeting the requirements as specified in paragraph SYSTEM REQUIREMENTS. Download, install and be able to utilize the latest version of the RMS software within 7 calendar days of receipt of the Notice to Proceed. RMS software, user manuals, access and installation instructions, program updates and training information are available from the RMS website (http://rmsdocumentation.com). The Government and the Contractor will have different access authorities to the same contract database through RMS. The common database will be updated automatically each time a user finalizes an entry or change.

1.04 SYSTEM REQUIREMENTS

The following is the recommended system configuration to run the Contractor Mode RMS for full utilization of all features for all types and sizes of contracts. Smaller, less complicated, projects may not require the configuration levels described below. Required configuration also noted below.

Recommended RMS System Requirements	
Hardware	
Windows-based PC	1.7 GHz i3; AMD A6 3650 GHz or higher processor (REQUIRED)
RAM	8 GB
Hard drive disk	100 GB space for sole use by RMS system
Monitor	Screen resolution 1366 x 768
Mouse or other pointing device	
Windows compatible printer	Laser printer must have 4 MB+ of RAM
Connection to the Internet	minimum 4 Mbs per user
Software	
MS Windows	Windows 7 x 64 bit (RMS requires 64 bit O/S) or newer (REQUIRED)
Word Processing software	Viewer for MS Word 2013, MS Excel 2013 or newer (REQUIRED)
E-mail	MAPI compatible (REQUIRED)
Virus protection software	Regularly upgraded with all issued Manufacturer's updates and is able to detect most zero day viruses (REQUIRED)

1.05 CONTRACT DATABASE - GOVERNMENT

The Government will enter the basic contract award data in RMS prior

to granting the Contractor access. The Government entries into RMS will generally be related to submittal reviews, correspondence status, and Quality Assurance(QA)comments, as well as other miscellaneous administrative information.

1.06 CONTRACT DATABASE - CONTRACTOR

Contractor entries into RMS establish, maintain, and update data throughout the duration of the contract. Contractor entries generally include prime and subcontractor information, daily reports, submittals, RFI's, schedule updates and payment requests. RMS includes the ability to import attachments and export reports in many of the modules, including submittals. The Contractor responsibilities for entries in RMS typically include the following items:

A. Administration

1. Contractor Information

Enter all current Contractor administrative data and information into RMS within 7 calendar days of receiving access to the contract in RMS. This includes, but is not limited to, Contractor's name, address, telephone numbers, management staff, and other required items.

2. Subcontractor Information

Enter all missing subcontractor administrative data and information into RMS CM within 7 calendar days of receiving access to the contract in RMS or within 7 calendar days of the signing of the subcontractor agreement for agreements signed at a later date. This includes name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor is listed separately for each trade to be performed.

3. Correspondence

Identify all Contractor correspondence to the Government with a serial number. Prefix correspondence initiated by the Contractor's site office with "S". Prefix letters initiated by the Contractor's home (main) office with "H". Letters are numbered starting from 0001 (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C" or "RFP".

4. Equipment

Enter and maintain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

5. Reports

Track the status of the project utilizing the reports available in RMS. The value of these reports is reflective of the quality of the data input. These reports include the Progress Payment Request worksheet, Quality Control (QC) comments, Submittal Register Status, and Three-Phase Control

worksheets.

6. Request For Information (RFI)

Create and track all Requests For Information (RFI) in the RMS Administration Module for Government review and response.

B. Finances

1. Pay Activity Data

Develop and enter a list of pay activities in conjunction with the project schedule. The sum of pay activities equals the total contract amount, including modifications. Each pay activity must be assigned to a Contract Line Item Number (CLIN). The sum of the activities assigned to a CLIN equals the amount of each CLIN.

2. Payment Requests

Prepare all progress payment requests using RMS. Update the work completed under the contract at least monthly, measured as percent or as specific quantities. After the update, generate a payment request and prompt payment certification using RMS. Submit the signed prompt payment certification and payment request as well as supporting data either electronically or by hard copy. Unless waived by the Contracting Officer, a signed paper copy of the approved payment certification and request is also required and will govern in the event of discrepancy with the electronic version.

C. Contractor Quality Control (CQC)

Enter and track implementation of the 3-phase QC Control System, CQC testing, transferred and installed property and warranties in RMS. Prepare daily reports, identify and track deficiencies, document progress of work, and support other Contractor QC requirements in RMS. Maintain all data on a daily basis. Insure that RMS reflects all quality control methods, tests and actions contained within the Contractor Quality Control (CQC) Plan and Government review comments of same within 7 calendar days of Government acceptance of the CQC Plan.

1. Quality Control (QC) Reports

The Contractor's Quality Control (QC) Daily Report in RMS is the official report. The Contractor can use other supplemental formats to record QC data, but information from any supplemental formats are to be consolidated and entered into the RMS QC Daily Report. Any supplemental information may be entered into RMS as an attachment to the report. QC Daily Reports must be finalized and signed in RMS within 24 hours after the date covered by the report. Provide the Government a printed signed copy of the QC Daily Report, unless waived by the Contracting Officer.

2. Deficiency Tracking.

Use the QC Daily Report Module to enter and track deficiencies. Deficiencies identified and entered into RMS by the Contractor or the Government will be sequentially numbered with a QC or QA prefix for tracking purposes. Enter each deficiency into RMS the same day that the deficiency is identified. Monitor, track and resolve all QC and QA entered deficiencies. A deficiency is not considered to be corrected until the Government indicates concurrence in RMS.

3. Three-Phase Control Meetings

Maintain scheduled and actual dates and times of preparatory and initial control meetings in RMS. Worksheets for the three-phase control meetings are generated within RMS.

4. Labor and Equipment Hours

Enter labor and equipment exposure hours on a daily basis. Roll up the labor and equipment exposure data into a monthly exposure report.

5. Accident/Safety Reporting

Both the Contractor and the Government enter safety related comments in RMS as a deficiency. The Contractor must monitor, track and show resolution for safety issues in the QC Daily Report area of the RMS QC Module. In addition, follow all reporting requirements for accidents and incidents as required in EM 385-1-1, Section 01 35 29 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES and as required by any other applicable Federal, State or local agencies.

6. Definable Features of Work

Enter each feature of work, as defined in the approved CQC Plan, into the RMS QC Module. A feature of work may be associated with a single or multiple pay activities, however a pay activity is only to be linked to a single feature of work.

7. Activity Hazard Analysis

Import activity hazard analysis electronic document files into the RMS QC Module utilizing the document package manager.

D. Submittal Management

Enter all current submittal register data and information into RMS within 7 calendar days of receiving access to the contract in RMS. The information shown on the submittal register following the specification Section 01 33 00 SUBMITTAL PROCEDURES will already be entered into the RMS database when access is granted. Group electronic submittal documents into transmittal packages to send to the Government, except very large electronic files,

samples, spare parts, mock ups, color boards, or where hard copies are specifically required. Track transmittals and update the submittal register in RMS on a daily basis throughout the duration of the contract. Submit hard copies of all submittals unless waived by the Contracting Officer.

E. Schedule

Enter and update the contract project schedule in RMS by either manually entering all schedule data or by importing the Standard Data Exchange Format (SDEF) file, based on the requirements in Section 01 32 16.00 00 PROJECT SCHEDULE.

F. Closeout

Closeout documents, processes and forms are managed and tracked in RMS by both the Contractor and the Government. Ensure that all closeout documents are entered, completed and documented within RMS.

1.07 IMPLEMENTATION

Use of RMS as described in the preceding paragraphs is mandatory. Ensure that sufficient resources are available to maintain contract data within the RMS system. RMS is an integral part of the Contractor's required management of quality control.

1.08 NOTIFICATION OF NONCOMPLIANCE

Take corrective action within 7 calendar days after receipt of notice of RMS non-compliance by the Contracting Officer.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 45 35

SPECIAL INSPECTIONS
02/15

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

Perform Special Inspections in accordance with the Statement of Special Inspections, Schedule of Special Inspections and Chapter 17 of ICC IBC. The Statement of Special Inspections and Schedule of Special Inspections are included on the Contract Drawings. Special Inspections are to be performed by an independent third party and are intended to ensure that the work of the prime contractor is in accordance with the Contract Documents and applicable building codes. Special inspections do not take the place of the three phases of control inspections performed by the Contractor's QC Manager or any testing and inspections required by other sections of the Specifications.

Structural observations will be performed by the Government. The contractor must provide notification to the Contracting Officer 14 days prior to the following points of construction:

A. Concrete foundation slab

B. Metal building erection

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC (2015) International Building Code

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office
that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Special Inspections Agency's Written Practices; G

NDT Procedures and Equipment Calibration Records; G

SD-06 Test Reports

Special Inspections Daily Reports; G, AE

Special Inspections Biweekly Reports; G, AE

SD-07 Certificates

Certified Fabrication Plant; G, AE

AC472 Accreditation; G, AE

Special Inspector Qualifications; G, AE

Qualification Records for nondestructive testing (NDT) technicians; G, AE

Certificate Of Compliance; G

SD-11 Closeout Submittals

Interim Final Report of Special Inspections; G

Comprehensive Final Report of Special Inspections; G, AE

1.04 DEFINITIONS

A. Continuous Special Inspections

Continuous Special Inspections is the constant monitoring of specific tasks by a special inspector. These inspections must be carried out continuously over the duration of the particular tasks.

B. Periodic Special Inspections

Periodic Special Inspections are Special Inspections by the special inspector who is intermittently present where the work to be inspected has been or is being performed.

C. Perform

Perform these Special Inspections tasks for each welded joint or member.

D. Observe

Observe these Special Inspections items on a random daily basis. Operations need not be delayed pending these inspections.

E. Special Inspector (SI)

A qualified person retained by the Contractor and approved by the Contracting Officer as having the competence necessary to inspect a particular type of construction requiring Special Inspections. The SI must be an independent third party hired directly by the Contractor.

F. Associate Special Inspector (ASI)

A qualified person who assists the SI in performing Special Inspections but must perform inspection under the direct supervision of the SI and cannot perform inspections without the

SI on site.

G. Third Party

A third party inspector must not be company employee of the Contractor or any subcontractor performing the work to be inspected.

H. Contracting Officer

The Government official having overall authority for administrative contracting actions. Certain contracting actions may be delegated to the Contracting Officer's Representative (COR).

I. Contractor's Quality Control (QC) Manager

An individual retained by the prime contractor and qualified in accordance with the Section 01 45 00 CONTRACTOR QUALITY CONTROL having the overall responsibility for the Contractor's QC organization.

J. Designer of Record (DOR)

A registered design professional contracted by the Government as responsible for the overall design and review of submittal documents prepared by others. The DOR is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws in state in which the design professional works. The DOR is also referred to as the Engineer of Record (EOR) in design code documents.

K. Statement of Special Inspections (SSI)

A document developed by the DOR identifying the material, systems, components and work required to have Special Inspections.

L. Schedule of Special Inspections

A schedule which lists each of the required Special Inspections, the extent to which each Special Inspections is to be performed, and the required frequency for each in accordance with ICC IBC Chapter 17.

1.05 SPECIAL INSPECTOR QUALIFICATIONS

Submit special inspector qualifications for each specialty.

Certifying Associations	
ACI	American Concrete Institute
AWS	American Welding Society
FM	Factory Mutual

Certifying Associations	
ICC	International Code Council
NDT	Nondestructive Testing
NICET	National Institute for Certification in Engineering Technologies
UL	Underwriters Laboratories

A. Steel Construction and High Strength Bolting

1. Special Inspector

a. ICC Structural Steel and Bolting Special Inspector certificate with one year of related experience.

2. Associate Special Inspector

Engineer-In-Training with one year of related experience.

B. Welding Structural Steel

1. Special Inspector

a. ICC Structural Welding Special Inspector certificate with one year of related experience, or

b. AWS Certified Welding Inspector.

2. Associate Special Inspector

AWS Certified Associate Welding Inspector

C. Nondestructive Testing of Welds

1. Special Inspector

NDT Level III Certificate

2. Associate Special Inspector

NDT Level II Certificate plus one year of related experience

D. Cold Formed Steel Framing

1. Special Inspector

a. ICC Structural Steel and Bolting Special Inspector certificate with one year of related experience, or

b. ICC Commercial Building Inspector with one year of experience.

2. Associate Special Inspector

Engineer-In-Training with one year of related experience.

E. Concrete Construction

1. Special Inspector

a. ACI Concrete Construction Special Inspector.

2. Associate Special Inspector

a. ACI Concrete Construction Special Inspector in Training.

F. Verification of Site Soil Condition, Fill Placement and Load-Bearing Requirements

1. Special Inspector

a. ICC Soils Special Inspector Certificate with one year of related experience, or

b. NICET Soils Technician Level II Certificate in Construction Material Testing, or

c. NICET Geotechnical Engineering Technician Level II Construction or Generalist Certificate.

2. Associate Special Inspector

a. NICET Soils Technician Level I Certificate in Construction Material Testing with one year of related experience, or

b. NICET Geotechnical Engineering Technician Level I Construction or Generalist Certificate with one year of related experience.

PART 2 PRODUCTS

2.01 FABRICATOR SPECIAL INSPECTIONS

Special Inspections of fabricator's work performed in the fabricator's shop is required in accordance with the Statement of Special Inspections and the Schedule of Special Inspections unless the fabricator is certified by the approved agency to perform such work without Special Inspections. Submit the following certifications to the Contracting Officer for information to allow work performed in the fabricator's shop to not be subjected to Special Inspections.

American Institute of Steel Construction (AISC) Certified Fabrication Plant, Category STD.

International Accreditation Service, AC472 Accreditation

At the completion of fabrication, submit a certificate of compliance, to be included with the comprehensive final report of Special Inspections, stating that the materials supplied and work performed by the fabricator are in accordance the construction documents.

PART 3 EXECUTION

3.01 RESPONSIBILITIES

A. Quality Control System Manager

1. Supervise all Special Inspectors required by the contract documents and the IBC.

2. Verify the qualifications of all of the Special Inspectors.

3. Verify the qualifications of fabricators.

4. Maintain a 3-ring binder for the Special Inspector's daily and biweekly reports. This file must be located in a conspicuous place in the project trailer/office to allow review by the Contracting Officer and the DOR.

5. Maintain a rework items list that includes discrepancies noted on the Special Inspectors daily report.

B. Special Inspectors

1. Inspect all elements of the project for which the special inspector is qualified to inspect and are identified in the Schedule of Special Inspections.

2. Attend preparatory phase meetings related to the Definable Feature of Work (DFOW) for which the special inspector is qualified to inspect.

3. Submit Special Inspections agency's written practices for the monitoring and control of the agency's operations to include the following:

a. The agency's procedures for the selection and administration of inspection personnel, describing the training, experience and examination requirements for qualifications and certification of inspection personnel.

b. The agency's inspection procedures, including general inspection, material controls, and visual welding inspection.

4. Submit qualification records for nondestructive testing (NDT) technicians designated for the project.

5. Submit NDT procedures and equipment calibration records for NDT to be performed and equipment to be used for the project.

6. Submit a copy of the daily reports to the QC Manager.

7. Discrepancies that are observed during Special Inspections must be reported to the QC Manager for correction. If discrepancies are not corrected before the Special Inspector leaves the site the observed discrepancies must be documented in the daily report.

8. Submit a biweekly Special Inspection Report until all

inspections are complete. A report is required for each biweekly period in which Special Inspections activity occurs, and must include the following:

a. A brief summary of the work performed during the reporting time frame.

b. Changes and/or discrepancies with the drawings, specifications that were observed during the reporting period.

c. Discrepancies which were resolved or corrected.

d. A list of nonconforming items requiring resolution.

e. All applicable test result including nondestructive testing reports.

9. At the completion of each DFOW requiring Special Inspections, submit an interim final report of Special Inspections that documents the Special Inspections completed for that DFOW. Identify the inspector responsible for each item inspected and corrections of all discrepancies noted in the daily reports. The interim final report of Special Inspections must be signed, dated and indicate the certification of the special inspector qualifying them to conduct the inspection.

10. At the completion of the project submit a comprehensive final report of Special Inspections that documents the Special Inspections completed for the project and corrections of all discrepancies noted in the daily reports. The comprehensive final report of Special Inspections must be signed, dated and indicate the certification of the special inspector qualifying them to conduct the inspection.

3.02 DEFECTIVE WORK

Check work as it progresses, but failure to detect any defective work or materials must in no way prevent later rejection if defective work or materials are discovered, nor obligate the Contracting Officer to accept such work.

-- End of Section --

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS
08/09

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511	(2007) Standard for Reduced-Pressure Principle Backflow Prevention Assembly

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

ANSI/NAAMM FP 1001-07	((2007)Guide Specifications for Design of Metal Flagpoles 5th Edition

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (FCCCHR)

FCCCHR List	(continuously updated) List of Approved Backflow Prevention Assemblies
FCCCHR Manual	(10th Edition) Manual of Cross-Connection Control

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241	(2013; Errata 2015) Standard for Safeguarding Construction,Alteration, and Demolition Operations
NFPA 70	(2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2) National Electrical Code

NEW JERSEY ADMINISTRATIVE CODE (NJAC)

NJAC 7:10	New Jersey Safe Drinking Water Act

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Site Plan; G

Traffic Control Plan; G

Permits And Approvals; G

Temporary Utility Plan; G

Temporary Site Facility Plan; G

Noise Control Plan; G

SD-06 Test Reports

Backflow Preventer Tests; G

SD-07 Certificates

Backflow Tester Certification

Backflow Preventers Certificate of Full Approval

Backflow Prevention Training Certificate

1.03 PERMITS AND APPROVALS

Submit copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.

The Contractor shall provide notification to the Government regarding all permits required by the local authorities prior to pursuing and obtaining such permits.

1.04 TEMPORARY UTILITY PLAN

Submit a temporary utility plan including, but not limited to the following elements:

A. Describe temporary electrical power demand, location of connection to the utility, and distribution plans.

B. Describe potable water source location and supply.

C. Describe plans for sanitary facilities including location and quantity of facilities.

D. Describe the renewable energy program that will be used to purchase renewable energy through the local energy supplier for all site activities. Include renewable energy supplier; type and percentage of renewable energy to be used (solar, wind, etc.); and method of supply (direct or Renewable Energy Certificates).

1.05 TEMPORARY SITE FACILITY PLAN

Submit a temporary site facility plan including, but not limited to the following elements:

A. Describe general layouts of temporary site facilities including parking areas, location of field offices, equipment and material storage, emergency medical facilities, and decontamination areas (for equipment and personnel).

B. Provide floor plans, fixtures, and materials of construction for trailers.

C. Design of temporary decontamination pad and vehicle wheel wash.

D. Temporary fencing and gate locations and details.

E. Work zones (Exclusion Zone, Contaminant Reduction Zone, Support Zone) and site access controls during periods when the asphalt cap has been removed and contaminated soil exposed.

F. Temporary soil erosion and sedimentation controls.

1.06 TEMPORARY CONTROLS

A. Noise Control Plan describing the monitoring plans and plans to mitigate construction noise and to comply with noise control ordinances, including method of construction, equipment to be used, and acoustical treatments in accordance with the Borough of South Plainfield Noise Control Ordinance.

B. Dust Control Plan describing methods that will be used to control dust and soil track-out from areas where the asphalt cap is removed for construction, including construction procedures, methods of dust control, cleaning of paved surfaces, management of collected dust and soil, and air monitoring. Dust Control Plan shall be prepared in accordance with requirements detailed in Section 01 35 29 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.

1.07 MOBILIZATION

Mobilization shall include, but not be limited to, the following principal items:

A. Obtaining required permits.

B. Moving Contractor's field office and equipment required for first month operations onto Site staging area.

C. Installing temporary construction power, wiring, and lighting facilities.

D. Providing onsite communication facilities, including telephones.

E. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.

F. Arranging for and erection of Contractor's work and temporary staging areas. Use only areas designated for Contractor's temporary staging areas as shown on Drawings.

G. Posting OSHA required notices and establishing safety programs and procedures.

H. Full time presence of Contractor's superintendent at Site.

1.08 CONSTRUCTION SITE PLAN

Prior to the start of work, submit a site plan showing the locations and dimensions of temporary facilities including:

A. Layouts and details.

B. Equipment and material storage area (onsite and offsite)

C. Access and haul routes.

D. Avenues of ingress/egress to the fenced area and details of the fence installation.

E. Identify any areas which may have to be graveled to prevent the tracking of mud.

F. Indicate if the use of a supplemental or other staging area is desired.

G. Show locations of safety and construction fences, site trailers, construction entrances, trash dumpsters, temporary sanitary facilities, and worker parking areas.

1.09 BACKFLOW PREVENTERS CERTIFICATE ON WATER SUPPLY LINES

Certificate of Full Approval from FCCCHR List, University of Southern California, attesting that the design, size and make of each backflow preventer has satisfactorily passed the complete sequence of performance testing and evaluation for the respective level of approval. Certificate of Provisional Approval will not be acceptable.

A. Backflow Tester Certificate

Prior to testing, submit to the Contracting Officer certification issued by the State or local regulatory agency attesting that the backflow tester has successfully completed a certification course sponsored by the regulatory agency. Tester must not be affiliated with any company participating in any other phase of this Contract.

B. Backflow Prevention Training Certificate

Submit a certificate recognized by the State or local authority that states the Contractor has completed at least 10 hours of training in backflow preventer installations. The certificate must be current.

C. NJDEP Connection Test

The Contractor shall be responsible for completion of a NJDEP connection test and subsequent testing program including in accordance with NJAC 7:10-throughout the duration of the Contract.

PART 2 PRODUCTS

2.01 GOVERNMENT'S FIELD OFFICES

A. Furnish equipment specified for exclusive use of Contracting Officer and Government representatives.

B. Ownership of equipment furnished under this article will remain, unless otherwise specified, that of Contractor.

C. Equipment furnished shall be new or like new in appearance and function.

D. Two Flag Poles: two 20-foot aluminum flag poles meeting the American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM FP 1001-07, 5th Ed.), Guide Specifications for Design of Metal Flagpoles or equal and all of the standard hardware to fly the U.S. Flag and U.S. Army Corps of Engineers Flag. The flag poles will be installed at a location to be determined by the Government. Asphalt cap will be restored following removal of flag poles.

D. Trailer Type Mobile Structure: Two single-wide or one double-wide trailer.

E. Minimum features:

1. 110-volt lighting and wall plugs.
2. Fluorescent ceiling lights.
3. Electric heating and self-contained air conditioning unit, properly sized for Project locale and conditions. Provide ample electrical power to operate installed systems.
4. Railed stairways and landings at entrances.
5. Exterior door(s):

    a. Number: Two. Type: Solid Core.
    b. Lock(s): Cylindrical keyed alike.

6. Number of windows: Two.
7. Minimum Interior Height: 8 feet.

F. Floor Space: Minimum 225 square feet.

G. Rooms: Two, with minimum private office floor space of 80 square feet and remainder configured for open meeting or storage space.

H. Plan table; plan rack; one double desk(s) with desk surface located 29 inches from floor; two 2-drawer, lockable steel file cabinets; and overhead shelf(s).

I. All-metal frame; all-metal exterior, side, and roof; and insulated double walls, floor, and roof.

J. Security guard screens on windows.

K. Refrigerator.

L. Toilet and wash basin in separate compartment with hot and cold water and drains.

M. Blinds or drapes on windows.

N. Office Equipment - General (some may be repeated from above):

1. Bottled Water Service: one with cooler capable of producing hot water and cold water.
2. Paper Cup Dispenser with Cups: One.
3. Paper Towel Dispenser with Towels: One.
4. Desk: One, steel 30 inches by 60 inches with the desk surface located 29 inches from floor.
5. Desk Chair: Three, with the following characteristics:

    a. Five castor base.
    b. Adjustable height.
    c. Swivels.
    d. Locking Back.
    e. Adjustable seat back for height and angle.
    f. Adjustable arms.

6. Folding Table: One; 36 inches by 72 inches.
7. Steel Folding Chairs: Six.
8. Drawing Rack with Drawing Hangers: One.
9. Bookcase: One; 36 inches wide by 48 inches high.
10. Wastepaper and Recycling Baskets: Two of each.
11. Clothes Rack: One.
12. First-Aid Kit: One.At a minimum, first aid kit in trailer shall include antiseptic, eyewash solution, bandages, insect sting medication, aspirin, acetaminophen, and a cold pack.
13. Automated external defibrillator approved by the United States Food and Drug Administration. Include provisions for proper testing and certifications. Contractor shall provide personnel with proper training in accordance with state and federal requirements. AED provided by Contractor shall be tested and remain at the GETS facility following startup.
14. Tri-Class (ABC), Dry Chemical Fire Extinguisher, 10-Pound: One.
15. Telephone: Two, with one intercom line and two incoming/outgoing lines, Touch-Tone, with conference speaker, and 12 foot coiled handset cord.
16. Telecommunications: a high-speed internet connection shall be provided for exclusive use by the Government. DSL business internet connection shall be with dedicated IP address and applicable modem/network switch. A minimum of five live portable computer (PC) ports; appropriate jacks, CAT 5 patch cords, wiring, and equipment required for a complete telecommunications system.
17. Two LCD monitors.
18. Digital Answering Machine.
19. Multifunction printer, scanner, fax: The printer/copies shall be a business/commercial grade copier/printer. One (1) desktop color copy machine/fax machine/scanner/printer with dedicated telephone line and auto-feed, reduction, enlargement, sorting, stapling, and monochrome functions, capable of producing a minimum of ten copies per minute. The machine shall be equipped with individual trays for 8.5-inch by 11-inch, 8.5-inch by 14-inch, and 11-inch by 17-inch plain paper. The supply of paper and toner shall be replenished by the Contractor as required by the Government. The Contractor shall also provide copier service as required for the Contract

duration.
20. Maintenance service agreements for all hardware for duration of contract.

2.02 TEMPORARY SIGNAGE

A. Bulletin Board

In accordance with Section 01 58 13 SIGNS.

B. Project and Safety Signs

In accordance with Section 01 58 13 SIGNS.

2.03 TEMPORARY ACCESS CONTROL

A. Haul Roads

Construction traffic will enter the property off of Hamilton Blvd only, unless approved otherwise by Contracting Officer. Within the property, access routes shall be marked as necessary for proper prosecution of the work under this Contract and safety and to accommodate owner's use of property. Construction traffic shall be limited to designated areas. Provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. Location, width, and alignment of construction and hauling roads are subject to approval by the Contracting Officer.

B. Work Zone Fencing

Provide temporary work zone fencing along limits of Exclusion and Contaminant Reduction Zones to control access by unauthorized people.

1. The safety fencing must be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 48 inches high and maximum mesh size of 2 inches, supported and tightly secured to steel posts located on maximum 10 foot centers. Posts must be surface mounted and not penetrate the asphalt cover.
2. Once the asphalt cap has been restored, the fencing may be removed.

2.04 TEMPORARY WIRING

Provide temporary wiring in accordance with NFPA 241 and NFPA 70. Include frequent inspection of all equipment and apparatus.

2.05 BACKFLOW PREVENTERS

Reduced pressure principle type conforming to the applicable requirements AWWA C511. Provide backflow preventers complete with 150 pound flanged cast iron, mounted gate valve and strainer, 304 stainless steel or bronze, internal parts The particular make, model/design, and size of backflow preventers to be installed must be included in the latest edition of the List of Approved Backflow Prevention Assemblies issued by the FCCCHR List and be accompanied by a Certificate of Full Approval from FCCCHR List. After installation

conduct Backflow Preventer Tests and provide test reports verifying that the installation meets the FCCCHR Manual Standards.

PART 3 EXECUTION

3.01 EMPLOYEE PARKING

Contractor employees will park privately owned vehicles in an area designated by the Contracting Officer. This area will be within reasonable walking distance of the construction site.

3.02 TEMPORARY BULLETIN BOARD AND SIGNS

Locate the bulletin board on the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Bulletin board can be mounted on the field trailers or other structures at the site.

Posts used to mount project signs and bulletin board shall not penetrate the asphalt cap without approval of the Contracting Officer.

3.03 TEMPORARY UTILITY SERVICES

A. Temporary Utilities

Provide temporary utilities as required for construction. Materials may be new or used, must be adequate for the required usage, not create unsafe conditions, and not violate applicable codes and standards.

Contractor shall make arrangement and pay connection fees and monthly usage charges for electrical service, two telephone lines, and one dedicated fax line for Government Field Office. The Contractor shall also provide and pay for a teleconferencing phone number for participants to call into the weekly construction meetings or any additional meetings requested by the Government.

B. Payment for Utility Services

Unless otherwise provided in the contract, the amount of each utility service consumed will be charged to or paid for by the Contractor under agreement with the local utilities. The Contractor is responsible for arranging for local utility service and payment of utility bills.

C. Sanitation

1. Provide and maintain within the construction area, minimum field-type sanitary facilities approved by the Contracting Officer and periodically empty wastes into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility.

2. Obtain approval from the system owner prior to discharge into any municipal, district, or commercial sanitary sewer system. Any penalties and / or fines associated with improper discharge will be the responsibility of the

Contractor. Coordinate with the Contracting Officer and follow station regulations and procedures when discharging into the station sanitary sewer system.

3. Maintain these conveniences at all times without nuisance. Include provisions for pest control and elimination of odors. Government toilet facilities will not be available to Contractor's personnel.

D. Water Supply

1. Provide water for sanitary facilities, field offices, Site maintenance and cleaning. Continuously maintain adequate water flow and pressure for all purposes during the Project, until removal of temporary water system.

2. If on-site water system is directly connected to municipal system, backflow preventors will be installed, certified, and maintained.

3. Provide water for startup and testing from hydrant to be installed as part of the work. Secure written permission for connection and use from New Jersey American Water Company and Borough of South Plainfield and meet requirements for use. Notify fire department before obtaining water from fire hydrants. Use only special hydrant-operating wrenches to open hydrants. Make certain hydrant valve is open full, since cracking valve causes damage to hydrant. Repair damaged hydrants and notify appropriate agency as quickly as possible. Hydrants shall be completely accessible to fire department at all times. Include costs to connect and transport water to construction areas in Contract Price.

E. Telecommunications

Arrange and provide onsite telephone and internet service from Comcast, Verizon, or other local telecommunications provider at field trailers for use during construction. Arrange and provide onsite telephone service at treatment system for use during one year of operations. Pay costs of installation and monthly bills.

F. Fire Protection

Provide temporary fire protection equipment for the protection of personnel and property during construction. Remove debris and flammable materials weekly to minimize potential hazards. Furnish and maintain onsite adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of NFPA 241.

3.04 TRAFFIC PROVISIONS

A. Maintenance of Traffic

1. Conduct operations in a manner that will not close any thoroughfare or interfere in any way with traffic on local roadways.

2. Conduct work so as to minimize obstruction of traffic.

Obtain approval from the Contracting Officer prior to starting any activity that will obstruct traffic.

3. Provide, erect, and maintain, at Contractor's expense, lights, barriers, signals, passageways, detours, and other items, that may be required by authorities having jurisdiction.

B. Protection of Traffic

Develop a Traffic Control Plan to maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment the work, and the erection and maintenance of adequate warning, danger, and direction signs, will be as required by the State and local authorities having jurisdiction. Protect the traveling public from damage to person and property. Minimize the interference with public traffic on roads selected for hauling material to and from the site. Investigate the adequacy of existing roads and their allowable load limit. Contractor is responsible for the repair of any damage to roads caused by construction operations.

C. Rush Hour Restrictions

Do not interfere with the peak traffic flows preceding and during normal operations without notification to and approval by the Contracting Officer. Schedule large equipment deliveries to avoid rush hour traffic.

D. Dust Control

Dust control methods and procedures must be approved by the Contracting Officer. Treat dust abatement on access roads with applications of water and regular sweeping of project site to prevent trackout. Refer to dust control plan requirements in Section 01 35 29 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.

3.05 CONTRACTOR'S TEMPORARY FACILITIES

A. Field Offices

Provide and maintain field office facilities within the construction area at the designated site.

B. Storage Area

Designate an area for the Contractor's use and storage of trailers, equipment, and materials within the property boundaries. Fencing of materials or equipment will not be required at this site; however, the Contractor is responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area. Do not place or store Trailers, materials, or equipment outside the designated area. Park mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment within the fenced

area at the end of each work day.

C. Maintenance of Field Offices

1. Trailers utilized by the Contractor for administrative or material storage purposes must present a clean and neat exterior appearance and be in a state of good repair. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on installation property.

2. The Contractor shall maintain all temporary construction facilities areas and shall perform all necessary repairs, replacement, cleaning and any other maintenance required as directed by the Government. Included in this maintenance shall be sweeping and any other cleaning necessary to keep the facilities and associated support areas free of soil and debris.

3. Failure to maintain the temporary facilities will be sufficient reason to require their removal.

D. Maintenance of Storage Area

1. Keep storage area in a state of good repair and proper alignment.

E. Security Provisions

1. The Contractor shall be responsible and liable for maintaining site security and furnishing all labor, materials, equipment and incidentals to provide security for the project site, 24 hours a day, seven days a week, including holidays, throughout the duration of the contract. The Contractor shall establish a security program prior to any field construction activities and maintain/erect warning and security signs around the site perimeter. The Contractor shall provide control of all persons and vehicles entering and leaving the site.

2. The principal objectives of the Security Program are:

   a. Deter, restrict, and/or control financial losses to the Government and the Contractor. This includes prevention or detection of the following: theft, vandalism, sabotage, and arson.
   b. To keep unauthorized people from entering the site and receiving any injuries.
   c. To keep unauthorized people from entering the site and removing equipment, or hazardous substances.
   d. To keep unauthorized people from taking action on the site that might exacerbate the environmental problem or interfere with its remediation.

3. Security Personnel

   Conditions of employment for all site Security Officers shall include the following:

a. Detailed pre-employment history establishing moral character.

b. Applicant shall submit to a current physical examination conducted by the Contractor's designated physician. This physical shall include drug testing, and a list of all medicines applicant is currently taking or has taken during the last year. Physical shall also include vital statistics and tests to ensure the capability of the applicant to function on site without health restrictions.

c. Investigation that clears applicant of felony convictions.

d. Failure to maintain attentive and alert status in performance of duties, which includes sleeping while on duty, intoxication on the job, carrying firearms without express authorization and submittal of required documentation to government and contractor and bringing unauthorized personnel onsite, is completely unacceptable and shall be grounds for not employing or for terminating employment.

e. In general, Site Security Officers shall be physically fit, literate in the English language, experienced, stable, reliable, and possess the physical and psychological skills that are necessary to control unauthorized persons on the Site.

3. Security Requirements

a. A Security Officer shall be on the site during non-working hours on weekdays and 24 hours per day during holidays, weekends, and days when no activities are in progress for the entire duration of the construction activities. A Security Officer shall patrol the site. The Contractor shall be responsible for establishing security during working hours on workdays.

b. Maintain a log of all security incidents. This log shall be furnished to the Government upon request.

c. The Government has the right of approval and rejection of any and all security-assigned personnel of the Contractor for the duration of the contract. If approved by the Government, the Contractor may designate a member of their staff as Site Security Officer, during normal working hours. The Government may revoke this approval without cause or justification, at which time the Contractor shall immediately provide independent site security.

d. Gates in all perimeter fences shall remain closed, except when in use by authorized personnel.

e. Security Officers shall be responsible for touring the perimeter of the site on an hourly basis when there is no construction activity being performed, during the entire contract duration. The exact timing of the hourly tours shall be varied as to not allow a definable routine to

develop. There shall be a log of the tours, with observed conditions recorded and maintained, at the Security Center Office.

f. Security Officers shall be responsible for controlling conditions to ensure against any unauthorized entry. Should persons attempt unauthorized entry, the Security Officer shall be responsible for warning the individuals. If unauthorized persons ignore the warnings, the security officer shall notify appropriate law enforcement personnel to remove the persons.

g. The Government will maintain a list of personnel approved to be present on the site. A copy of the list will be provided to the Contractor. Only authorized personnel may make changes to the site list.

h. A copy of the emergency checklist, providing all emergency numbers for hospitals, ambulance service, law enforcement, paramedics, and fire departments, shall be posted in offices and at the designated project information board.

i. Temporary lighting shall be provided to ensure effective surveillance at night at active construction areas.

4. Entrance Control

a. Provide control of all persons, equipment, and vehicles entering and leaving the site. The Contractor shall maintain a list of persons authorized for site entry and submit a copy of the list to the Government on request.

b. Each person is required to display proper identification. All personnel and visitors having access to the site must sign in and sign out. A log of all people accessing the site will be maintained.

c. Vehicular access within the site is restricted to authorized vehicles only.

d. The Contractor shall accommodate and coordinate visits with local law enforcement agencies, including police, sheriff, highway patrol, emergency medical care units, fire department, and utility emergency teams.

5. Security Firm Requirements

a. The security firm shall be bonded.

b. Each Security Officer shall wear a uniform that displays the name of the security firm. These uniforms are to be complete, including hat, shirt, trousers, belt, and boots. Uniforms shall be pressed and boots shined. The officer shall present a neat, professional appearance.

c. During patrols, security personnel shall be in proper safety attire, including steel-toe boots and additional PPE as required by site conditions/activities.

d. The Security Officer shall remain on the site until the next shift replacement arrives. The site shall not be left unsecured.

e. Security personnel shall, in general, monitor, authorize entry, and inspect all areas on the project on a continuing basis and shall not serve any production work effort of the project.

f. In scheduling the site security personnel, the same employee shall not be scheduled for consecutive shifts.

F. Weather Protection of Temporary Facilities and Stored Materials

Take necessary precautions to ensure that roof openings and other critical openings in the trailer(s) are monitored carefully. Take immediate actions required to seal off such openings when rain or other detrimental weather is imminent, and at the end of each workday. Ensure that the openings are completely sealed off to protect materials and equipment in the building from damage.

1. Building and Site Storm Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions must include, but are not limited to, closing openings; removing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work or any nearby Government property.

3.06 GOVERNMENT FIELD OFFICE

A. Trailer-Type Mobile Office

1. The Contractor shall furnish and maintain two single wide or one double-wide trailer-type mobile office in a location acceptable to the Government and providing as a minimum the facilities specified above. The Contractor shall level, block, tie down, skirt, provide stairways, and relocate when necessary and approved. Construct on proper foundations, and provide proper surface drainage and connections for utility services. Securely anchor the trailer to the ground at all four corners to guard against movement during high winds. The field offices will be available for Government's use prior to start of the Work at Site and to remain on Site for minimum of 30 days after final acceptance of the Work.

B. Field Office Maintenance

1. Maintain in good repair and appearance, and provide weekly cleaning service and replenishment, as required, of paper towels, paper cups, hand soap, toilet paper, first-aid kit supplies, and bottled water.

2. Pay for all utilities.

3. Maintain in good repair and appearance, and provide weekly cleaning service and replenishment, as required, of paper towels, paper cups, hand soap, toilet paper, first-aid kit supplies, and bottled water.

4. Replenish, as needed, facsimile paper, duplicator paper and toner, computer paper, and printer toner.

3.07 COMMUNICATIONS

Whenever the Contractor has the individual elements of its plant so located that operation by normal voice between these elements is not satisfactory, the Contractor must install a satisfactory means of communication, such as telephone or other suitable devices and made available for use by Government personnel.

3.08 TEMPORARY WORK ZONE FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, furnish and erect temporary project safety fencing at the work site. Maintain the safety fencing until the asphalt cap or is in place. Upon completion and acceptance of the asphalt cap, work zone fencing may be removed from the work site per Contracting Officer approval.

3.09 CLEANUP

Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned and handled as potentially contaminated material. Neatly stack stored materials not in trailers, whether new or salvaged.

3.10 RESTORATION OF STORAGE AREA

Upon completion of the project remove the bulletin board, signs, barricades, haul roads, and any other temporary products from the site. After removal of trailers, materials, and equipment from within the fenced area, remove the fence that will become the property of the Contractor. Restore areas used by the Contractor for the storage of equipment or material, or other use to the original or better condition. Restore the area to its original condition, including top soil and seeding as necessary.

-- End of Section --

SECTION 01 57 13

TEMPORARY STORMWATER, EROSION AND SEDIMENT CONTROLS
09/17

PART 1 GENERAL

1.01 SUMMARY OF WORK

This section covers Work necessary for management of storm water and stabilization of soil to prevent the transport of soil released during construction and land disturbing activities. The minimum areas requiring soil erosion and sediment control measures are indicated on the Contract Drawings. Government reserves right to modify use, location, and quantities of soil erosion and sediment control measures based on activities of Contractor.

A. Erosion, Sediment, and Flood Control

1. Provide, maintain, and operate temporary facilities to control erosion and sediment releases in accordance with Middlesex County Sedimentation and Soil Erosion Control and the state of New Jersey Department of Agriculture, and Freehold Soil Conservation District soil erosion and sediment control requirements. In the event of a conflict, the more stringent requirement shall apply.

2. Plan and execute construction by methods to control surface drainage from cuts and fills, from stockpiles, staging areas, and other work areas. Prevent erosion and sedimentation.

3. All necessary sedimentation control and soil erosion control measures installed shall be adequately maintained for the duration of the project or until such measures are permanently stabilized, whichever is longer.

B. Soil Erosion Stabilization and Sediment Control Elements

1. Maintenance of permanent storm drainage piping and catchbasins, detention basin, and spillway.

2. Construction of temporary erosion control facilities such as inlet protections, silt fences, compost filter sock (a.k.a., filter tubes), and straw bales.

3. Placement and maintenance of temporary seeding on areas disturbed by construction.

4. Erosion control devices for stockpile areas to restrict sediment transport.

5. Cover all stockpiles or open soil when not in active use.

6. Contact Water (water that has been in contact with contaminated soil) shall be either treated on-site prior to discharge to the MCUA Sewer or Bound Brook, in accordance with applicable permits, or containerized for off-site

disposal.

C. Storm Water Management

1. Manage stormwater stormwater generated on the former CDE property during construction.

2. Storm water that has come in contact with contaminated soil (Contact Water) shall be presumed to be impacted requiring treatment before disposal. All stormwater generated within the Limits of Construction (LOC) shall be considered Contact Water and managed as such.

3. Stormwater that has NOT come into contact with contaminated soil (Non Contact Water) shall be presumed to be clean. All stormwater generated outside the limits of Construction shall be considered Non Contact Water unless impacted by a spill or trackout from the LOC.

4. Install inlet protection devices on all inlets on the former CDE facility property, both within LOC and outside of LOC, in accordance with Contract Documents. Type of devices will vary depend on location.

4. Non Contact Water can be diverted to inlets to the on-site retention basin.

5. **Contact water shall NOT at any time to be allowed to enter storm drains that discharge into Bound Brook via the existing storm water detention basin.**

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D3776/D3776M	(2009a; R 2013) Standard Test Method for Mass Per Unit Area (Weight) of Fabric
ASTM D4355/D4355M	(2014) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus
ASTM D4632/D4632M	(2015a) Grab Breaking Load and Elongation of Geotextiles
ASTM G155	(2013) Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

NEW JERSEY ADMINISTRATIVE CODE (NJAC)

NJAC 7:14	Water Pollution Control Act
NJAC 7:14A	New Jersey Pollutant Discharge Elimination System (NJPDES) Rules

NEW JERSEY DEPARTMENT OF AGRICULTURE STATE SOIL CONSERVATION COMMITTEE (SCS)

SCS Standards	(2014; R 2017) The Standards for Soil Erosion and Sediment Control in New Jersey

NEW JERSEY STATUTES ANNOTATED (NJSA)

NJSA 4:24-39	(1975) Soil Erosion and Sediment Control Act

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Stormwater, Sediment And Soil Erosion Control Plan; G

Contact Water Handling And Treatment Plan; G

1.04 QUALITY ASSURANCE

Water pollution control shall comply with procedures outlined in U.S. Environmental Protection Agency manuals entitled, "Guidelines for Erosion and Sedimentation Control Planning" and "Implementation, Processes, Procedures, and Methods to Control Pollution Resulting from all Construction Activity".

1.05 STORMWATER, SEDIMENT AND SOIL EROSION CONTROL PLAN

Submit a stormwater, sediment and soil erosion control plan containing elements addressing, but not limited to, those detailed in Paragraph 1.01.

The Plan shall comply with the Freehold Soil Conservation District and State of New Jersey regulations and guidance including NJDEP DSW General Permit for Construction Activity Stormwater NJAC 7:14 Water Pollution Control Act, including NJAC 7:14A, Pollutant Discharge Elimination System; NJSA 4:24-39 et seq., and SCS Standards Standards for Soil Erosion and Sediment Control in New Jersey

PART 2 PRODUCTS

2.01 SILT CONTROL BARRIERS

A. Site Fencing

1. Geotextile: Supply Geotextile in accordance with the following:

Physical Property	**Required Value**	**Test Method**
Weight, oz/sq yd, min.	4	ASTM D3776/D3776M
Weight, oz/sq yd, min.	50-70	U.S. Standard Sieve
Grab Tensile Strength, lb, min.	160	ASTM D4632/D4632M
Ultraviolet Radiation Resistance, % Strength Retention	70	ASTM D4355/D4355M

2. Fence posts

a. In unpaved areas, supply and install fence posts in accordance with manufacturer's recommendations. Use heavy duty staples at least 1-inch long, tie wires, or hog rings as recommended by manufacturer of geotextile.
b. In paved areas, mount silt fence to 2 inch by 2 inch wooden posts attached to 2 ft by 2 ft by 3/4 inch plywood squares placed on surface.

2.02 COMPOST FILTER SOCKS (FILTER TUBES)

A. Sock Infill and Filter Media Materials
1. In accordance with the following:.

Material Type	Multi-Filament Polypropylene (MFPP)
Material Characteristic	Photodegradable
Sock Diameter	12 inch 18 inch 24 inch 32 inch
Mesh Opening	3/8 inch
Tensile Strength	44 psi
Ultraviolet Stability % Original Strength ASTM G155)	100 percent at 1000 hr
Minimum Functional Longevity	1 year

B. Compost Materials

1. In accordance with the following

Compost Characteristic	Acceptable Standards
Organic matter content	25 percent to 100 percent (dry weight)

Compost Characteristic	Acceptable Standards
Organic portion	Fibrous and elongated
pH	6.0 to 8.0
Moisture content	30 percent to 60 percent
Particle size	100 percent pass a 1-inch screen and 10 percent to 50 percent passing a 3/8-inch screen
Soluble salt concentration	5.0 dS/m (mmhos/cm) maximum

2.03 STRAW BALES

A. Clean salt hay or straw of oat, wheat, barley, or rye free from seed of noxious weeds; machine baled using standard baling wire or string.

B. Posts for Straw Bale: 2-inch by 2-inch untreated wood or commercially manufactures metal posts.

2.04 STORMWATER INLET PROTECTION

1. Non Contact Water Controls: Permeable non woven filter fabric across entire inlet surface and extending 1 inch minimum pas grate in all direction. Secure fabric to pavement or grate with caulk, waterproof adhesive, or other approved mechanism. Ensure there is no leakage at edges of fabric.

2. Contact Water Controls: Impermeable flexible membrane liner material (20 mil PVC, EPDM, or similar material). Secure fabric to pavement or grate with caulk, waterproof adhesive, or other approved mechanism. Weight down liner with rock, sand bags, or other to ensure tight seal. Ensure there is no leakage at edges of fabric.

2.05 SEED MIX

Use seed mix appropriate for native vegetation in Northern New Jersey or as approved by Contracting Officer.

PART 3 EXECUTION

3.01 PREPARATION

A. Acceptance of Stormwater, Sediment and Soil Erosion Control Plan required prior to starting earth disturbing activities.

B. Contractor shall be responsible for phasing Work in areas allocated for their exclusive use during the Project, including proposed stockpile areas and installation of temporary erosion control devices, or other facilities.

C. Areas set aside for Contractor's use during Project may be temporarily developed to provide satisfactory working, staging, and administrative areas. Preparation of these areas shall be in accordance with other requirements contained within Specifications and completed in a manner to control sediment transport away from area.

D. In areas where the asphalt cap has been removed to allow construction:

1. Minimize the amount of contact water by stabilizing and covering open areas as soon as possible after the completion of construction.

2. All stormwater generated within the Exclusion Zone shall be considered contact water and managed accordingly.

3. Divert all contact water in the Exclusion Zone back into containment areas and containerize for treatment and disposal or discharge to MCUA sewer or Bound Brook. Prevent runoff to clean areas. Submit a contact water handling and treatment plan describing proposed plan for managing contact water.

4. Non-contact stormwater from areas outside the Exclusion Zone meeting NJPDES discharge limits will be allowed to drain via existing catch basins to the on-site detention basin with the approval of the Contracting Officer.

5. Following restoration of the asphalt cap across the entire site, isolation fencing and erosion controls measures may be removed with the approval of the Contracting Officer.

3.02 SOIL STOCKPILES

A. Keep all stockpiles of contaminated soil covered at all times. Where possible, excavated excess contaminated soil shall be placed in rolloffs with lids or other covered storage containers prior to off-site disposal. Minimize the amount of contaminated soil stored on-site.

B. Sediment transport and erosion from stockpiles of excavated soils shall be controlled and restricted from moving beyond immediate stockpile area by use of temporary silt barriers such as compost sock filters or straw bales. Keep these temporary facilities in operational condition by regular cleaning, regrading, and maintenance.

C. Stockpiles of clean material brought in for construction shall be kept covered at all times not in active use, to minimize wind and water erosion.

3.03 SILT FENCE INSTALLATION

A. Install prior to starting earth disturbing activities.

B. Install in accordance with manufacturer's instructions.

C. Install geotextile in one piece, or continuously sewn to make one piece, for full length and height of fence, including portion of

geotextile buried in toe trench. Take precaution not to puncture geotextile during installation.

D. In unpaved areas, install bottom edge of sheet in toe trench and backfill in a way that securely anchors geotextile in trench. In paved areas, geotextile will extend along the surface a minimum of 1 foot and covered with stone to create a tight seal with the paved surface.

E. Securely fasten geotextile to each support post in a way that will not result in tearing of geotextile when fence is subjected to service loads.

F. Support posts shall be a spaced 8 ft on center or closer

G. When joints are necessary, splice geotextile together only at support post, with a minimum 6 inch overlap, and securely fasten both ends to support post.

H. Geotextile shall not extend more than 34 inches above ground surface. Securely fasten to upslope side of each support post using ties. Securely fasten to upslope side (upgradient) of each support post using ties. Do not staple geotextile to existing trees.

I. Remove after upgradient areas have been permanently stabilized.

3.04 COMPOST FILTER SOCK INSTALLATION

A. Place compost filter socks on the contour with both terminal ends of the sock extended 8 feet upslope at a 45 degree angle to prevent bypass flow.

B. Diameters designed for use shall be between 12 inch and 32 inch based on manufacturer's recommendations for the maximum slope length (in feet) for a given percent slope above the compost filter sock.

C. The flat dimension of the sock shall be at least 1.5 times the nominal diameter.

D. On unpaved areas, compost filter socks shall be anchored in earth with 2 inch by 2 inch wooden stakes driven 12 inch into the soil on 10 foot centers on the centerline of the sock. On uneven terrain, effective ground contact can be enhanced by the placement of a fillet of filter media on the disturbed area side of the compost sock.

E. On paved areas, compost filter socks shall be weighed down on 10 foot centers with a concrete block, sandbag, or any other suitable weight to secure the filter sock in place.

3.05 STRAW BALES

A. Place bales in two staggered rows on paved surface with ends at midpoint of bale in adjacent row.

B. Place with ends tightly abutting or overlapped. Corner abutment is not acceptable.

C. Install in order that bale bindings are oriented around sides and not over top and bottom of bale.

D. Use two posts horizontally through bales so that the two rows of bales form one unit.

E. Place rock, cinder block or other weighted object on the outward side of the bales to prevent movement.

F. Place a filter sock or wattle at the toe of the bales in the inward surface.

G. Wedge loose straws in gaps between bales.

3.06 STORMWATER INLET FILTER

A. Inlets Within Limits Of Construction (Contact Water)

All surface water within the Limits of Construction shall be assumed to have been in contact with contaminated soil and classified as Contact Water.

All Contact Water will be containerized and treated prior to discharge to the local sewer system or Bound Brook under a permit issued by the local sewer authority or NJDEP.

To prevent Contact Water from entering the existing on-site detention basin, all existing stormwater inlets will be sealed with a piece of impermeable geomembrane as shown on the Contract Drawings.

Following the restoration of the asphalt cap, the Contractor may request approval from the Contracting Officer to allow the removal of the geomembrane and its replacement with Non Contact Water controls as discussed in para 3.06 B. The geomembrane inlet seal shall be removed only with the express written approval of the Contracting Officer.

B. Inlets Outside Limits Of Construction (Non Contact Water)

All surface water generated outside the Limits of Construction but within the property boundary of the former CDE facility property, shall be assumed to not have been in contact with contaminated soil on the property and classified as Non Contact Water. Non Contact water will be allowed to discharge to the existing on-site stormwater detention basin through the existing stormwater inlets.

To prevent incidental dirt and debris generated during construction from entering the stormwater detention basin, geotextile filters shall be placed over the inlets in accordance with the site stormwater, sediment and soil erosion control plan and as discussed on the Contract Drawings. These filters shall remain in place and regularly inspected and maintained during the performance of the Work.

3.07 SEEDING

A. Soil Stabilization Seeding (if necessary):

1. Hydroseeding is acceptable method of applying seed and associated soil conditioning agents as needed to establish satisfactory stand of grass.

2. Place and maintain over disturbed areas. Maintain until such time as areas are approved for permanent seeding. As a minimum, maintenance shall include the following:

a. Fix up and reseeding of bare areas or redisturbed areas.
b. Mowing stands of grass or weeds exceeding 6 inches in height.

3.08 FIELD QUALITY CONTROL

A. Conduct inspections jointly with Government every 2 weeks to evaluate conformance to requirements of Specifications.

B. Replace or repair failed or overloaded silt fences, check dams, or other temporary erosion control devices within 2 days after Site inspections.

C. Accumulated soil from sweeping pavement on the site shall be containerized and characterized for disposal.

3.09 MAINTENANCE

A. Promptly repair or replace silt fence that becomes damaged.

B. Provide and maintain soil stabilization seeding at all times.

C. Stormwater inlets:

1. Clean collected sediment after every storm or as determined from biweekly inspections.
2. Perform cleaning in a manner that will not direct sediment into storm drain piping system.
3. Take removed sediment to area selected by Government where it can be cleaned of sticks and debris, then allowed to dry.
4. Dispose of final sediment onsite as designated by Government.
5. Dispose of debris offsite.

D. Inspect, repair, and replace erosion control measures weekly and within 24 hours after a 0.5-inch storm event during the time period from start of construction to completion of construction.

3.10 CLEAN UP AND RESTORATION

A. At the end of construction, remove all control devises and dispose of in accordance with all state and local regulations.

B. All accumulated soil/sediment will be containerized for characterization and disposal.

-- End of Section --

SECTION 01 57 19

ENVIRONMENTAL PROTECTION PLAN
11/15

PART 1 GENERAL

1.01 SCOPE OF WORK

This section covers the requirements for protection of the human and natural environment during site preparation, soil removal and dewatering, and site restoration. This includes furnishing all labor, materials, equipment and incidentals required to provide environmental pollution and damage control.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328	Definitions of Waters of the United States
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 279	Standards for the Management of Used Oil
40 CFR 68	Chemical Accident Prevention Provisions
49 CFR 171 - 178	Hazardous Materials Regulations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office
that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Environmental Protection Plan; G

1.04 ENVIRONMENTAL PROTECTION PLAN

The purpose of the Environmental Protection Plan is to present an

overview of known or potential environmental issues that must be considered and addressed during construction. Issues of concern shall be defined within the Environmental Protection Plan as outlined in this section. The Contractor shall address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this section, but which the Contractor considers necessary, shall be identified and discussed after those items formally identified in this section. Prior to submittal of the Environmental Protection Plan, the Contractor shall meet with the Government to discuss the implementation of the plan including any reporting requirements and methods for administration of the Contractor's Environmental Protection Plan. The Environmental Protection Plan shall be current and maintained on site by the Contractor.

A. Compliance

No requirement in this section will relieve the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During construction, the Contractor will be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

B. Contents

Include the following information the Environmental Protection Plan. If the topics listed in Items 5 through 11 below is contained in other required planning documents, these documents should be incorporated by cross reference and added as appendices to the Environment Protection Plan such that this plan can serve as a reference for all environmental controls required at the site.

1. Name of person within the Contractor's organization who will be responsible for ensuring adherence to the Environmental Protection Plan.

2. Name and qualifications of person responsible for manifesting hazardous waste to be removed from the Site.

3. Name and qualifications of person responsible for training the Contractor's environmental protection personnel.

4. Description of the Contractor's environmental protection personnel training program.

5. A solid waste disposal plan identifying methods and locations for waste disposal including but not limited to: uncontaminated debris found onsite, garbage and other waste generated by workers, and materials to be removed at the completion of remediation (such as dense graded aggregate (DGA), PPE and liners, common fill, asphalt if contaminated). The plan shall include schedules for disposal. The Contractor shall identify any subcontractors responsible for the transportation and disposal of solid waste at a permitted, commercially operating facilities. Evidence of each the disposal facility's acceptance of the solid waste shall be attached to this plan during the construction (i.e., shipping

manifest, delivery receipts). Report the total amount of waste generated and disposed.

6. A waste minimization plan with a list of measures to reduce consumption of energy and natural resources. The plan shall detail the Contractor's actions to comply with and to participate in Federal, State, regional, and local government-sponsored recycling programs to reduce the volume of solid waste at the source. Report the total amount of waste generated and total amount of waste diverted and/or recycled in tons along with the percent that was diverted.

7. A contaminant prevention plan that identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with EM 385-1-1, a copy of the Safety Data Sheets (SDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the contaminant prevention plan. As new hazardous materials are brought on site or removed from the Site, the plan shall be updated.

8. A wastewater management plan that identifies the methods and procedures for management and/or discharge of wastewaters which are directly derived from construction activities, such as hydrostatic test water, decontamination water, stormwater that comes into contact with contaminated soil, and water generated from soil dewatering.

9. A spill prevention and response plan that identifies methods and procedures for preventing spills and procedures for addressing spills that occur at the site.

10. A historical, archaeological, and cultural resources plan that defines procedures for identifying and protecting historical, archaeological, and cultural resources known to be on the project site, and/or identifies procedures to be followed if historical, archaeological, and cultural resources not previously known to be on site are discovered during construction. The plan shall include methods to ensure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Government.

11. Appendix

    a. Copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents shall be attached as an appendix, to the Environmental Protection Plan.

1.05 DEFINITIONS

A. Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally or historically.

B. Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

C. Contractor-Generated Hazardous Waste

Contractor-generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste as defined in 40 CFR 261. These waste streams would typically consist of material brought on site by the Contractor to execute work, but not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e., methyl ethyl ketone, toluene, etc.), waste thinners, excess paints, excess solvents, waste solvents, and excess pesticides, and pesticide-contaminated equipment rinse water.

D. Surface Discharge

The term "Surface Discharge" implies that water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "Waters of the United States" (as defined in Section 1.03E) and would require a permit to discharge water from the governing agency.

E. Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.06 GENERAL REQUIREMENTS

The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract.

The Environmental Protection Plan shall not be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. The Contractor shall

be responsible for any delays resulting from failure to comply with environmental laws and regulations. During construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan..

An Environmental Protection Plan shall be submitted for review and approval within 14 calendar days prior to the Pre-Work Conference.

1.07 SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors..

1.08 PROTECTION FEATURES

This paragraph supplements the Contract Clause "Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements". Prior to start of any onsite construction activities, the Contractor and the Government shall make a joint condition survey in accordance with Section 01 31 13 PROJECT COORDINATION. Immediately following the survey, the Contractor shall prepare a brief report including a plan describing the features requiring protection under the provisions of the Contract Clauses, but not specifically identified on the Contract Drawings as such, along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. This survey report shall be signed by both the Contractor and the Government upon mutual agreement as to its accuracy and completeness. The Contractor shall protect those environmental features included in the survey report and any indicated on the Contract Drawings, regardless of interference which their preservation may cause to the Contractor's work under the contract.

1.09 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the Contract Documents which may have an environmental impact will be subject to approval by the Government and may require an extended review, processing, and approval time. The Government reserves the right to disapprove alternate methods, even if they are more cost effective, if the Government determines that they will have an adverse environmental impact.

1.10 NOTIFICATION

The Government will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection Plan. The Contractor shall, after receipt of such notice, inform the Government of the proposed corrective action and take such action when approved by the Government. The Government may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Government may take under the contract or in accordance with the Federal Acquisition Regulation or other Federal law.

1.11 AIR MONITORING

For the protection of public health, monitor and control contaminant emissions to the air from remedial action area sources to minimize short-term risks that might be posed to the community during implementation of the remedial alternative in accordance with Section 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES and Section 01 36 20 - PERIMETER AIR MONITORING.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 ENVIRONMENTAL PERMITS AND COMMITMENTS

The Contractor shall be responsible for obtaining and complying with all environmental permits/permit equivalencies and commitments required by Federal, State, regional, and local environmental laws and regulations.

3.02 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the Contract Documents. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the work area. Except in areas indicated on the Contract Drawings or specified to be cleared, the Contractor shall not remove, cut, deface, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval. No ropes, cables or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. The Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil, or other materials displaced into uncleared areas shall be removed by the Contractor.

A. Work Area Limits

Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction commences.

B. Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the Contract Drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. Specifically, the Contractor shall not cut down any trees larger than 26 inches in diameter at breast height outside the excavation areas without Government approval. The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

C. Erosion and Sediment Control

Providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations is the Contractor's responsibility. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. Construct or install temporary and permanent erosion and sediment control best management practices (BMPs) in accordance with the Contractor's approved Soil Erosion Sediment Control plan and as specified in Section 01 57 13 - TEMPORARY STORMWATER, EROSION AND SEDIMENT CONTROLS. BMPs may include, but are not limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, and diversion channels and piping. The Contractor's BMPs must be in accordance with the New Jersey Pollutant Discharge Elimination System (NJPDES) Request for Authorization (RFA) for Stormwater Discharge during construction, which shall be reviewed by the Bureau of Nonpoint Pollutant Control, Division of Water Quality, New Jersey Department of Environmental Protection (NJDEP). Remove any temporary measures after the area has been stabilized.

D. Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, containment areas and water treatment system shall be placed in areas designated on the Contract Drawings or as directed by the Government and shall be installed with flood protection. Temporary movement or relocation of Contractor facilities shall be made only when approved.

3.03 WATER RESOURCES

The Contractor shall monitor construction activities to prevent pollution of surface and groundwater. Toxic or hazardous chemicals shall not be applied to soil or vegetation unless approved by Contracting Officer. All water areas affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to surface water when required by State- or Federally-issued Clean Water Act permits.

A. Dewatering and Stormwater Management Operations

Dewatering and stormwater management operations will be controlled at all times to maintain compliance with existing State water quality standards and designated uses of surface water bodies. Any water that comes into contact with contaminated soil shall be treated by the water treatment system prior to discharge in accordance with Section 01 57 13.

3.04 AIR RESOURCES

Equipment operation, activities, or processes will be in accordance

with all Federal and state air emission and performance laws and standards.

A. Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environmental damage by noise and in accordance with levels established in the site APP/SSHP. The Contractor shall comply with the noise control regulations of the State of New Jersey and local ordinances.

B. Burning

Burning shall be prohibited on the project site.

C. Particulates

Dust particles, aerosols, and gaseous by-products from construction activities must be controlled at all times, including weekends, holidays and hours when work is not in progress in accordance with the Dust Control Plan in Section 01 35 29 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES. Maintain excavations, stockpiles, haul roads, permanent and temporary haul roads, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, or local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Mulching, water sprinkling, temporary enclosures and other appropriate methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. Provide sufficient, competent equipment to accomplish these tasks. Properly maintain equipment to reduce gaseous pollutant emission.

D. Odors

Odor control shall be performed in accordance with APP/SSHP.

E. Air Emission Control

The Contractor shall implement the air monitoring program in accordance with Section 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES and 01 36 20 - PERIMETER AIR MONITORING.

3.05 WASTE HANDLING, STORAGE AND DISPOSAL

A. Solid and Hazardous Waste Management

Handling, storage, and disposal of solid waste shall be performed in accordance with Section 01 74 19 - CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT and Section 02 81 00 HANDLING, TRANSPORT, AND DISPOSAL OF WASTE MATERIALS.

B. Chemicals and Chemical Wastes

Chemicals shall be dispensed ensuring no spillage to the ground or water. Periodic inspections of dispensing areas to identify leakage and initiate corrective action shall be performed and

documented. This documentation will be periodically reviewed by the Government. Chemical waste shall be collected in corrosion-resistant, compatible containers. Collection drums shall be monitored and removed to a staging or storage area when contents are within 6 inches of the top. Wastes shall be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations. Chemical accident prevention provisions shall be made in accordance with 40 CFR 68.

C. Contractor-Generated Hazardous Wastes

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. At a minimum, manage and store hazardous waste in compliance with 40 CFR 262. Take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. Segregate hazardous waste from other materials and wastes, protect it from the weather by placing it in a safe covered location, and take precautionary measures such as berming or other appropriate measures against accidental spillage and flood. Storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178 and State and local laws and regulations are the Contractor's responsibility. Transport Contractor-generated hazardous waste in accordance with Environmental Protection Agency (EPA) and Department of Transportation (DOT) laws and regulations. Dispose of hazardous waste in compliance with Federal, State, and local laws and regulations. Spills of hazardous or toxic materials must be immediately reported to the Government and the Facility Environmental Office. Cleanup and cleanup costs due to spills are the Contractor's responsibility. The disposal of Contractor-generated hazardous waste is the Contractor's responsibility.

D. Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spillage and evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, regional, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed of in accordance with 40 CFR 279, and State and local laws and regulations.

E. Wastewater

Wastewater from construction activities, such as stormwater that comes into contact with contaminated soils, shall not be allowed to enter waterways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of construction-related wastewater in accordance with all Federal, State and local laws and regulations and Section 01 57 13.

The Contractor shall discharge treated water in accordance with the NJPDES Discharge to Surface Water (DSW) Permit. The Contractor is responsible to obtain NJPDES DSW permit equivalency.

F. Excess Hazardous Soil Management

Soil generated excavation of the trenches and building shall be managed as a hazardous/TSCA waste material unless deemed otherwise by characterization. Where feasible, this material will be used for backfill during construction. Excess quantities of this material will be handled in accordance with Section 02 81 00 HANDLING, TRANSPORT AND DISPOSAL OF WASTE MATERIALS.

3.06 RECYCLING AND WASTE MINIMIZATION

The Contractor shall participate in State and local government-sponsored recycling programs as practical. The Contractor shall recycle to the extent possible.

3.07 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

If, during excavation or other construction activities, any previously unidentified or unanticipated historical, archaeological, and/or cultural resources are discovered, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, walls, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery, the Contractor shall immediately notify the Government so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special removal of the finds should be made. The Contractor shall cease all activities that may result in impact to or destruction of these resources. The Contractor shall secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.08 EQUIPMENT

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds.

All equipment used in the exclusion zone will be decontaminated prior to removal from the exclusion zone and the site.

3.09 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the Contract or for the length of time construction activities create pollutants.

3.10 ROADWAY REPAIRS

The Contractor shall be responsible for repairing all incidental damage and settlement that occurs in roadways as result of construction related activities. Material and labor to complete all repair work, in accordance with all local codes and ordinances, shall be at the Contractor's expense. The Government will not provide additional compensation for this work.

3.11 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when site conditions change. The training and meeting agenda shall include: method of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative cover, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes and other regulated contaminants; and recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitats that are known to be in the area.

3.12 POST-CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction in accordance with Contract Clause, CLEANING UP. The Contractor shall, unless otherwise instructed in writing by the Government, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work.

-- End of Section --

SECTION 01 58 13

SIGNS
12/17

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, equipment, materials and incidentals required to provide and erect a U.S. Environmental Protection Agency (EPA)/U.S. Army Corps of Engineers (USACE) project site sign, safety signs and a bulletin board.

The Contractor shall provide and erect an EPA/USACE project site sign and safety signs meeting the requirements of this Section at a location to be determined by the Government. The sign requirements are shown at the end of this Section. Wording to be included on each sign shall be provided by the Government after contract award.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP 310-1-6a	(2006) Sign Standards Manual, VOL 1

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1903.2	Posting of Notice; Availability of the Act, Regulations and Applicable Standards.

PART 2 PRODUCTS

2.01 MATERIALS

Materials shall conform to the requirements as shown on the drawings at the end of this section and shall be suitable for use in an unprotected exterior environment.

The Contractor may modify and reuse existing signs from previous project phases. Dollar amounts and wording changes will be provided by the Government after contract award.

PART 3 EXECUTION

3.01 GENERAL

The Contractor shall place signs on the work area fence surrounding the property that bear the legend, in letters at least four inches high:

WARNING
HAZARDOUS WORK AREA

DO NOT ENTER UNLESS AUTHORIZED

The Contractor shall post hazard warning banners at areas of special hazard including, but not limited to, the perimeter of the Exclusion Zone. The Contractor shall provide all signs required on the Contract Documents. Letters shall be at least four inches high.

3.02 INSTALLATION REQUIREMENTS

The EPA/USACE project site sign and the safety signs are to be mounted on 4-inch by 4-inch by 12-foot treated timbers and set firmly into the ground above prevailing grade to permit public viewing. Signs shall be installed during site mobilization in accordance with the requirements of EP 310-1-6a included at the end of this Section.

3.03 BULLETIN BOARD

Immediately upon starting work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 36 inches by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, the Wage Rate Information poster and other information approved by the Government. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Government. Legible copies of the aforementioned information shall be displayed until work is completed. Upon completion of work, the bulletin board shall be removed by and remain the property of the Contractor.

The Contractor shall post and maintain a notice or notices, to be furnished by the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, informing employees of the protections and obligations provided for in the Occupational Safety and Health Act as per OSHA 29 CFR 1903.2(a)(1). The Contractor shall post such notice or notices in a conspicuous place or places where notices to employees are customarily posted. The Contractor shall take steps to ensure that such notices are not altered, defaced, or covered by other material.

3.04 CLOSURE REQUIREMENTS

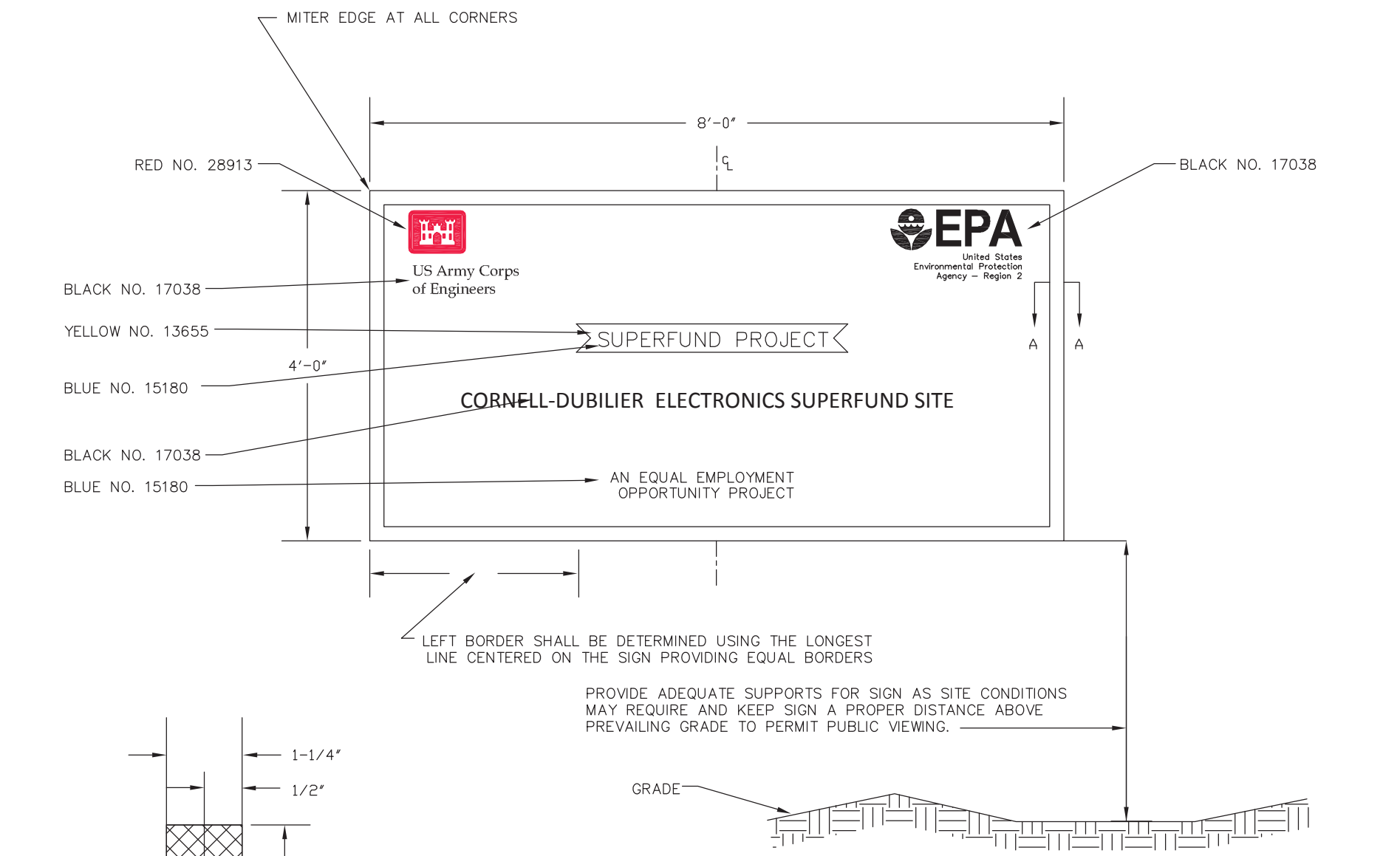
The EPA/USACE project site sign, bulletin board and the safety signs are to be removed from the Site after contract completion.

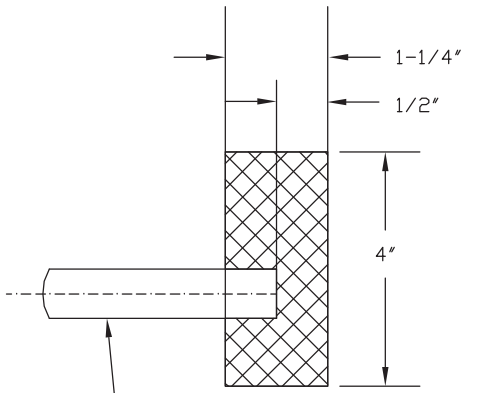
3.05 SUPPLEMENTS

The supplements listed below, prior to "End of Section", are part of this Specification.

1. Project Sign Details

-- End of Section --





SECTION "A-A"

COLOR NUMBERS REFER TO FEDERAL COLOR STANDARDS NO . 595a (1–68), WHICH ARE AVAILABLE FROM GSA SUPPLIES.

BACKGROUND AND ALL OTHER SIGN COMPONENTS NOT DESIGNATED ARE PAINTED WHITE NO. 17886.

Each contractor's safety record is to be posted on Corps managed or supervised construction projects and mounted with the Construction Project Identification sign specified on page 16-2.

The graphic format, color, size and typefaces used on the sign are to be reproduced exactly as specified below. The title with First Aid logo in the top section of the sign, and the performance record captions are standard for all signs of this type. Legend groups 2 and 3 below identify the project and the contractor and are to be placed on the sign as shown.

Safety record numbers are mounted on individual metal plates and are screw-mounted to the background to allow for daily revisions to posted safety performance record.

Special applications or situations not covered in these guidelines should be referred to the district Sign Program Manager.

Legend Group 1: Standard two-line title "Safety is a Job Requirement" with 8" (outside diameter) Safety Green first aid logo.
Color: To match Pantone system 347
Typeface: 3" Helvetica Bold
Color: Black

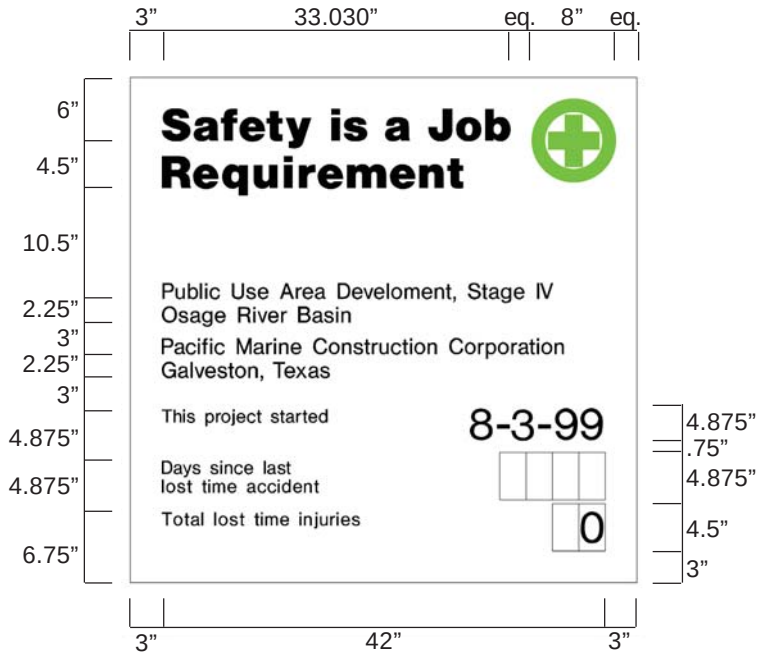
Legend Group 2: One- to two-line project title legend describes the work being done under this contract and name of host project.
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Legend Group 3: One- to two-line identification: name of prime contractor and city, state address. Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

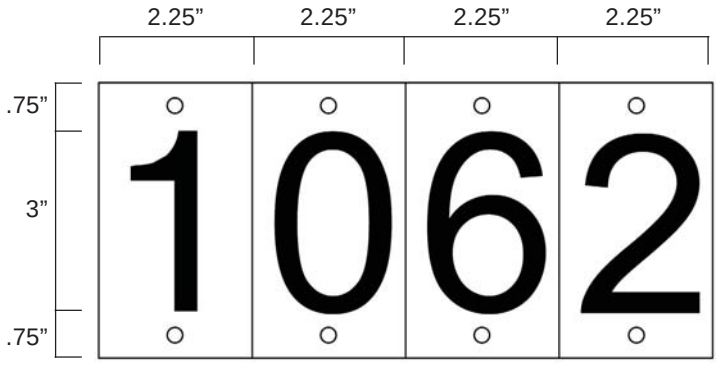
Legend Group 4: Standard safety record captions as shown.
Color: Black
Typeface: 1.25" Helvetica Regular

Replaceable numbers are to be mounted on white .060 aluminum plates and screw-mounted to background.
Color: Black
Typeface: 3" Helvetica Regular
Plate size: 2.5" x 4.5"

All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter- and word-spacing to follow Corps standards as specified in Appendix D.



Sign Type	Legend Size (A)	Panel Size	Post Size	Specification Code	Mounting Height	Color Bkg/Lgd
CID-02	various	4'x4'	4"x4"	HDO-3	48"	WH/BK-SG



All Construction Project Identification signs and Safety Performance signs are to be fabricated and installed as described below. The signs are to be erected at a location designated by the contracting officer representative and shall conform to the size, format, and typographic standards shown on pages16-2 and 16-3. Detailed specifications for HDO plywood panel preparation are provided in Appendix B.

Shown below the mounting diagram is a panel layout grid with spaces provided for project information. Photocopy this page and use as a worksheet when preparing sign legend orders.

For additional information on the proper method to prepare sign panel graphics, contact the district Sign Program Manager.

The sign panels are to be fabricated from .75" High Density Overlay Plywood. Panel preparation to follow HDO specifications provided in Appendix B.

Sign graphics to be prepared on a white nonreflective vinyl film with positionable adhesive backing.

All graphics except for the Communication Red background with Corps Signature on the project sign are to be die-cut or computer-cut nonreflective vinyl, prespaced legends prepared in the sizes and typefaces specified and applied to the background panel following the graphic formats shown on pages 16-2 and 16-3.

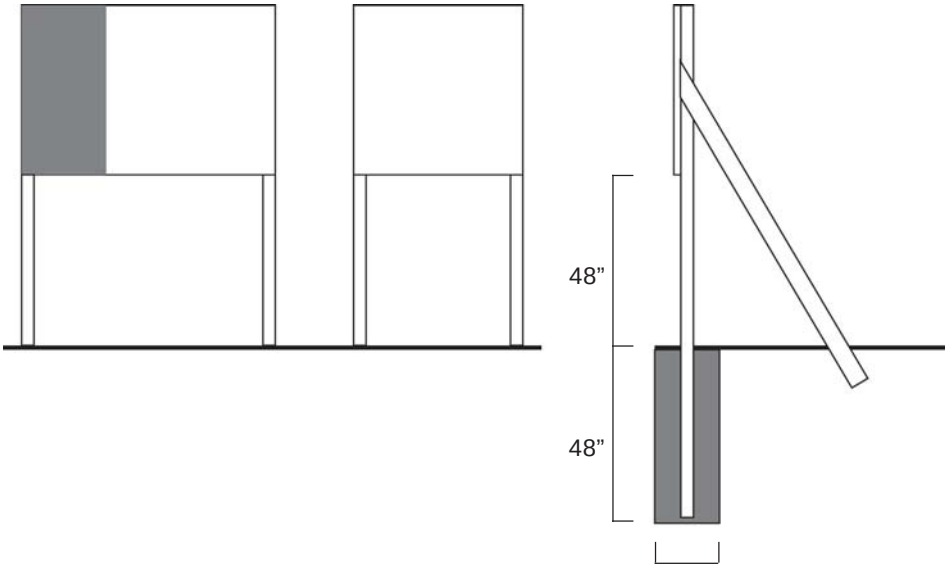
The 2'x 4' Communication Red panel (to match Pantone system 032) with full Corps Signature (reverse version) is to be screen-printed on the white background. Identification of the district or division may be applied under the signature with white cut vinyl letters prepared to Corps standards.

Drill and insert six (6) .375" T-nuts from the front face of the HDO sign panel. Position holes as shown. Flange of T-nut to be flush with sign face.

Apply graphic panel to prepared HDO plywood panel following manufacturers' instructions.

Sign uprights to be structural grade 4" x 4" treated Douglas Fir or Southern Yellow Pine, No.1 or better. Post to be 12' long. Drill six (6) .375" mounting holes in uprights to align with T-nuts in sign panel. Countersink (.5") back of hole to accept socket head cap screw (4" x .375").

Assemble sign panel and uprights. Imbed assembled sign panel and uprights in 4' hole. Local soil conditions and/or wind loading may require bolting additional 2" x 4" struts on inside face of uprights to reinforce installation as shown.



Construction Project Identification Sign
Legend Group 1: Corps Relationship

1. _____
2. _____

Legend Group 2: Division/District Name

1. _____
2. _____

Legend Group 2a: Military/Civil Works Sponsor

1. _____
2. _____

Legend Group 3: Project Title

1. _____
2. _____
3. _____

Legend Group 4: Facility Name

1. _____
2. _____

Legend Group 5: Contractor/A&E

1. _____
2. _____
3. _____
4. _____
5. _____

Legend Group 5b: Contractor/A&E

1. _____
2. _____
3. _____
4. _____
5. _____

Safety Performance Sign
Legend Group 2: Project Title

1. _____
2. _____

Legend Group 3: Contractor/A&E

1. _____
2. _____

SECTION 01 61 00

COMMON PRODUCT REQUIREMENTS
09/17

PART 1 GENERAL

1.01 DEFINITIONS

A. Products

1. New items for incorporation in the Work, whether purchased by Contractor or Government for the Project, or taken from previously purchased stock, and may also include existing materials or components required for reuse.

2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.

3. Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.02 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC (2015) International Building Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2) National Electrical Code

1.03 DESIGN REQUIREMENTS

A. Where Contractor design is specified, design of installation, systems, equipment, and components, including supports and anchorage, shall be in accordance with provisions of latest edition of International Building Code (ICC IBC) by International Code Council. Also refer to Contract Drawing Structural Legend for additional design criteria.

1.04 SUBSTITUTIONS

A. Substitution Process

The following general procedure shall be following when requesting substitutions of material and equipment followng the

Contract Award.

1. After the Notice to Proceed has been issued, Contracting Officer shall consider written requests for substitutions of materials, equipment, methods of construction, processes, products, or other items.

2. Contractor shall submit requests sufficiently in advance to avoid delay of the Work and shall process requests for material substitutions in a timely manner.

3. Contractor shall submit six (6) copies of the request for substitution which shall include the following:

    a. Complete data substantiating compliance of the proposed substitute with the Contract Document.

    b. Proposed product substitution information including:

        1) Product identification; include manufacturer's name.
        2) Manufacturer's literature, including but not limited to product description, marked to indicate specific model, type, size, and options to be considered; performance and test data; reference standards; difference in power demand; and dimensional differences for specified unit.
        3) Names and addresses of similar projects in which product was used, including date of installation and field performance data.
        4) Where substitutions include modifications to other elements of the Work, Contractor shall provide revised design drawings stamped by a Professional Engineer for Contracting Officer review.

    c. Proposed methods of construction substitution information including:

        1) Detailed description of proposed method.
        2) Drawings illustrating method.

    d. Itemized comparison of proposed substitution with product or method specified.

    e. Data relating to changes in construction schedule.

    f. Accurate cost data on proposed substitution in comparison with product or method specified.

4. In making a request for substitution, or in using an approved substitute item, CONTRACTOR represents:

    a. Contractor has personally investigated proposed product or method, and has determined that it is equal or superior in all respects to that specified and that it shall perform the function for which it is intended.

    b. Contractor shall provide the same guarantee for the

substitute item as for the product or method specified.

c. Contractor shall coordinate installation of the approved substitution into the Work, to include building modifications if necessary, making such changes as may be required for the Work to be complete in all aspects.

d. Contractor waives all claims for additional costs related to the substitution which subsequently become apparent. For substitutions following the Contract Award, Contractor shall comply with the requirements of the Contract Documents.

5. Requests for subtitutions will be made at the Contractor's expense.

6. Contractor shall obtain Contracting Officer's written approval of substitutions prior to ordering materials, equipment, or products for the Work. Should Contractor order such materials, equipment, or products before receiving written approval and if they are disapproved by the Contracting Officer, all return, reordering and repurchasing costs will be at Contractor's expense.

B. Conflicts

In the event of any conflicts between these procedures and the Contract, the Contract language shall have precedence.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Altitude

Provide materials and equipment suitable for installation and operation under rated conditions at 500 feet above sea level.

B. Weather Conditions

Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of 120 degrees F to 0 degrees F.

1.06 PREPARATION FOR SHIPMENT

A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.

B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.

C. Extra Materials, Special Tools, Test Equipment, and Expendables:

1. Furnish as required by individual Specifications.

2. Schedule:

    a. Ensure that shipment and delivery occurs concurrent with shipment of associated equipment.
    b. Transfer to Government shall occur immediately subsequent to Contractor's acceptance of equipment from Supplier.

3. Packaging and Shipment:

    a. Package and ship extra materials and special tools in original cartons insofar as possible,to avoid damage during long term storage or in appropriately sized, hinged-cover, wood, plastic, or metal box.
    b. Prominently displayed on each package, the following:

        1) Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.
        2) Applicable equipment description.
        3) Quantity of parts in package.
        4) Equipment manufacturer.

4. Deliver materials to Site.

5. Notify Construction Manager upon arrival for transfer of materials.

6. Replace extra materials and special tools found to be damaged or otherwise inoperable at time of transfer to Government.

D. Request a minimum 7 day advance notice of shipment from manufacturer.

E. Factory Test Results: Reviewed and accepted by Government before product shipment as required in individual Specification sections.

1.07 DELIVERY AND INSPECTION

A. Deliver products in accordance with accepted current Progress Schedule and coordinate to avoid conflict with the Work and conditions at Site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.

B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable.

C. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at Site. Promptly inspect for completeness and evidence of damage during shipment.

D. Remove damaged products from Site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of

the Work.

1.08 HANDLING, STORAGE, AND PROTECTION

A. Handle and store products in accordance with manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards or sheds provided in accordance with Section 01 50 00, TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Government.

B. Manufacturer's instructions for material requiring special handling, storage, or protection shall be provided prior to delivery of material.

C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.

D. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 degrees F. Protect electrical, instrumentation, and control products, and insulate against moisture, water, and dust damage. Connect and operate continuously space heaters furnished in electrical equipment.

E. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

F. Store finished products that are ready for installation in dry and well ventilated areas. Do not subject to extreme changes in temperature or humidity.

G. After installation, provide coverings to protect products from damage due to traffic and construction operations. Remove coverings when no longer needed.

H. Hazardous Materials: Prevent contamination of personnel, storage area, and Site. Meet requirements of product specification, codes, and manufacturer's instructions.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual Specifications.

B. Where product specifications include a named manufacturer, with or

without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.

C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.

D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

E. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.

F. Equipment, Components, Systems, and Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.

G. Regulatory Requirement: Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.

H. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16 gauge or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated 1/2 inch mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.

I. Authority Having Jurisdiction (AHJ):

1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.

2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

J. Equipment Finish:

1. Provide manufacturer's standard finish and color, except where specific color is indicated.

2. If manufacturer has no standard color, provide equipment with gray finish as approved by Government.

K. Special Tools and Accessories: Furnish to Government, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items

include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.

L. Lubricant: Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by Government.

2.02 FABRICATION AND MANUFACTURE

A. General:

1. Manufacture parts to U.S.A. standard sizes and gauges.

2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.

3. Design structural members for anticipated shock and vibratory loads.

4. Use 1/4 inch minimum thickness for steel that will be submerged, wholly or partially, during normal operation.

5. Modify standard products as necessary to meet performance Specifications.

B. Lubrication System:

1. Require no more than weekly attention during continuous operation.

2. Convenient and accessible; oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.

3. Provide constant-level oilers or oil level indicators for oil lubrication systems.

4. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

PART 3 EXECUTION

3.01 INSPECTION

Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects. Remove damaged material or equipment from the Site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor's control.

3.02 INSTALLATION

A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

B. No shimming between machined surfaces is allowed.

C. Install the Work in accordance with NECA Standard of Installation, unless otherwise specified.

D. Repaint painted surfaces that are damaged prior to equipment acceptance.

E. Do not cut or notch any structural member or building surface without specific approval of Government.

F. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's instructions, and as may be specified. Retain a copy of manufacturers' instruction at Site, available for review at all times.

G. For material and equipment specifically indicated or specified to be reused in the Work:

1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.

2. Arrange for transportation, storage, and handling of products that require offsite storage, restoration, or renovation. Include costs for such Work in the Contract Price.

3.03 FIELD FINISHING

In accordance with Section 09 90 00, PAINTING AND COATING, and individual Specification sections.

3.04 ADJUSTMENT AND CLEANING

Perform required adjustments, tests, operation checks, and other startup activities.

3.05 LUBRICANTS

Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by Government.

-- End of Section --

SECTION 01 67 00

GREEN REMEDIATION
09/17

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This section covers the requirements for performing green remediation practices at the site, including furnishing all labor, materials, equipment and incidentals required to complete the work described herein. Contractor shall implement the EPA Region 2 Touchstone Practices to the maximum extent practicable (refer to the most current version found at https://www.epa.gov/sites/production/files/2016-08/documents/region_2_clean_green_policy_metrics_touchstone_practices.pdf). The Touchstone practices are:

1. Use of 100 percent of electricity from renewable sources.

2. Clean diesel fuels and technologies.

3. Material reuse, reduction or recycling.

4. Industrial materials reuse or recycling within regulatory requirements

   a. Construction and demolition materials.
   b. Recycle and reuse of organic materials generated on site.

5. Capture geothermal energy with pump and treat remediation systems to heat/cool structures.

B. The Contractor shall incorporate green remediation practices during construction activities whenever feasible in accordance with the EPA Region 2 "Clean & Green" Policy, issued on March 17, 2009.

C. The overall goal for design, construction, and operation is to produce a treatment system that meets the functional needs and incorporates the principles of sustainability. Specifically:

1. Preserve and restore the site ecosystem and biodiversity; avoid site degradation and erosion. Minimize offsite environmental impact.

2. Use the minimum amount of energy, water, and materials feasible to meet the design intent. Select energy and water efficient equipment and strategies.

3. Use environmentally preferable products and decrease toxicity level of materials used.

4. Use renewable energy and material resources
.
5. Optimize operational performance (through commissioning efforts) in order to ensure energy efficient equipment operates as intended.

6. Consider the durability, maintainability, and flexibility of building systems.

7. Manage construction site and storage of materials to ensure no negative impact on the indoor environmental quality of the building.

8. Reduce construction waste through reuse, recycling, and supplier take-back.

9. Use of regional materials extracted, harvested or recovered, and manufactured near the project site (within 500 mile radius).

10. Use of low emitting materials for adhesives, sealants, paints, coatings, composite wood, agrifiber products, ceiling and wall systems.

11. Use of roofing materials with SRI greater than or equal to 29 to minimize heat island effect.

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Renewable Energy Program; G

Fuel Purchase Program; G

GAC Regeneration Facility Information; G

Recycling Facility Information; G

Paper Product Literature; G

SD-07 Certificates

Green Remediation Documentation

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 RENEWABLE ENERGY

Purchase 100 percent renewable energy through the local utility provider, Public Service Electricity and Gas (PSE&G) for all electricity used during the remedial construction and operation and maintenance of the treatment system.

Submit details regarding the renewable energy program that will be used to purchase renewable energy through the local energy supplier for all site activities, including the renewable energy supplier; type and percentage of renewable energy to be used, (solar, wind, etc.); and method of supply (direct or Renewable Energy Certificates {RECs}).

3.02 FUEL

A. Only ultra-low sulfur diesel (ULSD) fuel shall be used.

B. Vehicle idling time shall not be allowed for more than 5 minutes, including, but not limited to, drill rigs and earth moving equipment.

C. Fuel: Submit details of the fuel purchase program regarding the fuel providers and the type of fuels including sulfur content to be purchased during the construction activities.

3.03 MATERIAL REUSE, REDUCTION, AND RECYCLING

A. Use low-flow toilet in the plant.

B. Use portion of the treated water as grey water for non-potable use (e.g., bathroom sinks, toilet flushing, washdown, etc.)

C. One-hundred percent of the copy papers, file folders, and paper office supplies shall come from recycled sources. Required recovered materials content ranges shall be as recommended by EPA's Comprehensive Procurement Guidelines (CPGs) at http://www.epa.gov/epawaste/conserve/tools/cpg/index.htm. Submit paper product literature for all paper copy papers, file folders, and paper office supplies indicating the supplies meet the minimum requirements for recycled content as specified herein.

D. Spent GAC from the treatment system GAC units that passes Toxicity Characteristic Leaching Procedure (TCLP) testing shall be considered non-hazardous and shall be recycled at an approved carbon generation facility. All waste characterization sampling, handling, transportation, and disposal activities shall be performed in accordance with Section 02 81 00, HANDLING, TRANSPORT, AND DISPOSAL OF WASTE. Provide GAC regeneration facility information for disposal of non-hazardous spent carbon, including any applicable permits and licenses.

E. Energy Recycling - Capture geothermal energy with pump and treat remediation systems to heat/cool structures.

F. Use the minimum amount of energy, water, and materials feasible to meet the design intent. Select energy and water-efficient equipment and strategies.

G. Optimize operational performance in order to ensure energy efficient equipment operates as intended. Consider the durability, maintainability, and flexibility of building systems.

H. Manage construction site and storage of materials to ensure no negative impact on the indoor environmental quality of the building.

I. Reduce construction waste through reuse, recycling, and supplier take back. Provide recycling facility information for disposal of non-hazardous demolished concrete, including any applicable permits and licenses.

J. Green Remediation Documentation

Submit documentation to support the green remediation activities implemented, including, but not limited to:

a. Receipts for 100 percent renewable energy purchased.

b. Receipts for fuel purchased by Contractor and its subcontractors to support that only ULSD fuel was consumed.

c. Disposal certificates for waste sent to recycling and regeneration facilities.

d. Receipts for paper products purchased which indicate that the purchased products contain the required recycled content.

3.04 SITE RESTORATION

Preserve and restore the site ecosystem and biodiversity; avoid site degradation and erosion. Minimize offsite environmental impact.

-- End of Section --

SECTION 01 74 19

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
01/07

PART 1 GENERAL

1.01 GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse.

1.02 MANAGEMENT

Develop and implement a waste management program. Take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste, consider the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. Implement any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling accrue to the Contractor. Appropriately permit firms and facilities used for recycling, reuse, and disposal for the intended use to the extent required by federal, state, and local regulations. Also, provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

Soil on the site contains a mixture of PCBs, metals, and other contaminants and is not suitable for recycling or reuse. Concrete and debris buried in the soil and uncovered during excavation shall be considered contaminated as well. All excess soil and excavated debris generated during construction shall be sent to a permitted landfill based on the results of waste characterization in accordance with Section 02 81 00 HANDLING, TRANSPORT AND DISPOSAL OF WASTE MATERIALS.

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Waste Minimization Plan; G

SD-11 Closeout Submittals

Records; G

1.04 MEETINGS

Conduct Construction Waste Management meetings. After award of the Contract and prior to commencement of work, schedule and conduct a meeting with the Contracting Officer to discuss the proposed Waste Management Plan and to develop a mutual understanding relative to the details of waste management. The requirements for this meeting may be fulfilled during the coordination meeting outlined in Section 01 45 00 CONTRACTOR QUALITY CONTROL. At a minimum, discuss environmental and waste management goals and issues at the following additional meetings:

A. Pre-bid meeting.

B. Preconstruction meeting.

C. Regular meetings.

D. Work safety meetings.

1.05 WASTE MANAGEMENT PLAN

Submit a waste minimization plan within 30 days after notice to proceed and not less than 10 days before the preconstruction meeting. The plan demonstrates how to meet the the project waste diversion goal. Also, include the following in the plan:

A. Name of individuals on the Contractor's staff responsible for waste prevention and management.

B. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.

C. Description of the regular meetings to be held to address waste management.

D. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of wastes.

E. Characterization, including estimated types and quantities, of the waste to be generated.

F. Name of landfill(s) and/or incinerator(s) to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.

G. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity. Include the name,

location, and phone number for each reuse facility to be used, and provide a copy of the permit or license for each facility.

H. List of specific waste materials that will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, or recycled. Identify the recycling facilities by name, location, and phone number, including a copy of the permit or license for each facility.

I. Identification of materials that cannot be recycled/reused with an explanation or justification, to be approved by the Contracting Officer.

J. Description of the means by which any waste materials identified in item (H) above will be protected from contamination.

K. Description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).

L. Anticipated net cost/savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

M. Revise and resubmit Plan as required by the Contracting Officer. Approval of Contractor's Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Distribute copies of the Waste Management Plan to each subcontractor, the Contractor Quality Control System Manager, and the Contracting Officer.

1.06 RECORDS

Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Make the records available to the Contracting Officer during construction, and deliver to the Contracting Officer upon completion of the construction a copy of the records.

1.07 COLLECTION

Separate, store, protect, and handle at the site identified recyclable and salvageable waste products in a manner that maximizes recyclability and salvagability of identified materials. Provide the necessary containers, bins and storage areas to facilitate effective waste management and clearly and appropriately identify them. Provide materials for barriers and enclosures around recyclable material storage areas which are nonhazardous and recyclable or reusable. Locate out of the way of construction traffic. Provide adequate space for pick-up and delivery and convenience to subcontractors. Recycling and waste bin areas are to be kept neat and clean, and handle recyclable materials to prevent contamination of materials from incompatible products and materials. Clean contaminated materials prior to placing in collection containers. Use cleaning materials that are nonhazardous and biodegradable. Handle hazardous waste and

hazardous materials in accordance with applicable regulations and coordinate with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS. Separate materials by one of the following methods:

A. Source Separated Method.

Separate waste products and materials that are recyclable from trash and sorted as described below into appropriately marked separate containers and then transported to the respective recycling facility for further processing. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process). Separate materials into the following category types as appropriate to the project waste and to the available recycling and reuse programs in the project area:

1. Asphalt (not in contact with contaminated soil).

2. Concrete and masonry (not in contact with contaminated soil).

3. Metal (e.g., banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, lead brass, bronze).

    a. Ferrous.
    b. Non-ferrous.

4. Wood (nails and staples allowed).

5. Debris (not including material recovered during excavation).

6. Glass (colored glass allowed).

7. Paper.

    a. Bond.
    b. Newsprint.
    c. Cardboard and paper packaging materials.

8. Plastic.

Type	
1	Polyethylene Terephthalate (PET, PETE)
2	High Density Polyethylene (HDPE)
3	Vinyl (Polyvinyl Chloride or PVC)
4	Low Density Polyethylene (LDPE)
5	Polypropylene (PP)
6	Polystyrene (PS)

Type	
7	Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.

9. Gypsum.

10. Non-hazardous paint and paint cans.

11. Carpet.

12. Ceiling tiles.

13. Insulation.

14. Beverage containers.

15. Other.

B. Co-Mingled Method.

Place waste products and recyclable materials into a single container and then transport to a recycling facility where the recyclable materials are sorted and processed.

C. Waste Recovery Subcontractor

Retain a subcontractor to develop and manage a program to reuse/recycle construction materials.

D. Other Methods.

Other proposed methods may be used when approved by the Contracting Officer.

1.08 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures. Except as otherwise specified in other sections of the specifications, dispose of in accordance with the following:

A. Reuse.

Give first consideration to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. Coordinate reuse with the Contracting Officer. Consider sale or donation of waste suitable for reuse.

B. Recycle.

Recycle waste materials not suitable for reuse, but having value as being recyclable. Arrange for timely pickups from the site or deliveries to recycling facilities in order to prevent contamination of recyclable materials.

C. Waste.

Dispose of materials with no practical use or economic benefit to waste-to-energy plants where available. As the last choice, dispose of materials at a landfill or incinerator.

D. Return

Set aside and protect misdelivered and substandard products and materials and return to supplier for credit.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 78 00

CLOSEOUT SUBMITTALS
08/11

PART 1 GENERAL

1.01 REMEDIAL ACTION CLOSEOUT PACKAGE

The Remedial closeout package shall consist of a Remedial Action Report that summarizes remedial activities performed at the site. The closeout package shall also contain administrative records for substantial completion and for final acceptance of each remedial unit, certification of decontamination of all equipment, and cleaning of the project site.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP 1110-1-19	(2001) A Guide to Preparing and Reviewing Remedial Action Reports of Cost and Performance
ERDC/ITL TR-12-6	(2015) A/E/C CAD Standard - Release 6.0

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

OSWER 9320.2-22	(2011) Close Out Procedures for Nation Priorities List (NPL) Sites, Office of Solid Waste and Emergency Response (OSWER) Directive 9320.2-22

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

48 CFR 52.223-9	Estimate of Percentage of Recovered Material Content for EPA-Designated Items

1.03 DEFINITIONS

A. As-Built Drawings

As-built drawings are developed and maintained by the Contractor and depict actual conditions, including deviations from the Contract Documents. These deviations and additions may result from coordination required by, but not limited to: contract modifications; official responses to Contractor submitted Requests for Information; direction from the Contracting Officer; designs which are the responsibility of the Contractor, and differing site conditions. Maintain the as-builts throughout construction as red-lined hard copies on site. These files serve as the basis for the creation of the record drawings.

B. Record Drawings

The record drawings are the final compilation of actual conditions reflected in the as-built drawings.

C. Project Record Documents

In accordance with Section 01 78 39, PROJECT RECORD DOCUMENTS.

1.04 REMEDIAL ACTION REPORT

Contractor shall prepare and submit a Remedial Action Report containing all data and documentation required in accordance with OSWER 9320.2-22and EP 1110-1-19.

1.05 SOURCE DRAWING FILES

Request the full set of electronic drawings, in the source format, for Record Drawing preparation, after award and at least 30 days prior to required use.

A. Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction drawings and data for the referenced project. Any other use or reuse shall be at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim and waives to the fullest extent permitted by law, any claim or cause of action of any nature against the Government, its agents or sub consultants that may arise out of or in connection with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic CAD drawing files are not construction documents. Differences may exist between the CAD files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic CAD files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished Source drawing files, the signed and sealed construction documents govern. The Contractor is responsible for determining if any conflict exists. Use of these Source Drawing files does not relieve the Contractor of duty to fully comply with the contract documents, including and without limitation, the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction drawings and data related to this contract, remove all previous indicia of ownership (seals, logos, signatures, initials and dates).

1.06 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Warranty Management Plan; G

Warranty Tags; G

Final Site Cleanup; G

Spare Parts Data; G

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; G

SD-11 Closeout Submittals

As-Built Drawings; G

Record Drawings; G

Certification of EPA Designated Items; G

Remedial Action Report; G

1.07 SPARE PARTS DATA

Submit an electronic copy of the Spare Parts Data list to Government.

A. Indicate manufacturer's name, part number, nomenclature, and stock level required for maintenance and repair. List those items that may be standard to the normal maintenance of the system.

B. Supply two items of each part for spare parts inventory. Provision of spare parts does not relieve the Contractor of responsibilities listed under the contract guarantee provisions.

1.08 QUALITY CONTROL

Additions and corrections to the contract drawings must be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols must conform to ERDC/ITL TR-12-6.

1.09 DECONTAMINATION

Decontaminate all facilities, equipment, and materials prior to final removal from the site that may have com in contact with the contaminated soil on the site. This includes waste and material, transport vehicles, and all site equipment. Pay special attention to the removal of material on and within the tracks and sprockets of crawler equipment and the tires and axles of trucks and rubber mounted

equipment.

Tools and items for which decontamination is difficult or impossible to verify shall remain on site, until completion of the work, for subsequent disposal at an approved disposal facility. Examples of such equipment or materials may include wire, rope, lumber, some personnel protective equipment, etc.

Equipment and materials brought on-site following the restoration of the asphalt cap and the cleaning of site, shall only require normal handling and decontamination prior to being removed from the site.

1.10 WARRANTY MANAGEMENT

A. Warranty Management Plan

Develop a warranty management plan which contains information relevant to the clause Warranty of Construction in Contract Documents. At least 30 days before the planned pre-warranty conference, submit four sets of the warranty management plan. Include within the warranty management plan all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan must be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below must include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase must be submitted to the Contracting Officer for approval prior to each monthly pay estimate. Assemble approved information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period will begin on the date of project acceptance and continue for the full product warranty period. A joint 4 month and 9 month warranty inspection will be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Include within the warranty management plan , but not limited to, the following:

1. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.

2. Furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.

3. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.

4. A list for each warranted equipment, item, feature of construction or system indicating:

a. Name of item.
b. Model and serial numbers.
c. Location where installed.
d. Name and phone numbers of manufacturers or suppliers.
e. Names, addresses and telephone numbers of sources of spare parts.
f. Warranties and terms of warranty. Include one-year overall warranty of construction, including the starting date of warranty of construction. Items which have extended warranties must be indicated with separate warranty expiration dates.
g. Cross-reference to warranty certificates as applicable.
h. Starting point and duration of warranty period.
i. Summary of maintenance procedures required to continue the warranty in force.
j. Cross-reference to specific pertinent Operation and Maintenance manuals.
k. Organization, names and phone numbers of persons to call for warranty service.
l. Typical response time and repair time expected for various warranted equipment.

5. The plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

6. Procedure and status of tagging of all equipment covered by extended warranties.

7. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

B. Performance Bond

The Performance Bond must remain effective throughout the construction period.

1. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

2. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

3. Following oral or written notification of required construction warranty repair work, respond in a timely manner. Written verification will follow oral instructions. Failure to respond will be cause for the Contracting Officer to proceed against the Contractor.

C. Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty will be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, be continuously available, and be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

D. Warranty Tags

At the time of installation, tag each warranted item with a durable, oil and water resistant tag approved by the Contracting Officer. Attach each tag with a copper wire and spray with a silicone waterproof coating. Also, submit two record copies of the warranty tags showing the layout and design. The date of acceptance and the QC signature must remain blank until the project is accepted for beneficial occupancy. Show the following information on the tag.

Type of product/material	
Model number	
Serial number	
Contract number	
Warranty period from/to	
Inspector's signature	
Construction Contractor	
Address	
Telephone number	
Warranty contact	

Type of product/material	
Address	
Telephone number	
Warranty response time priority code	
WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.	

PART 2 PRODUCTS

2.01 CERTIFICATION OF EPA DESIGNATED ITEMS

Submit the Certification of EPA Designated Items as required by 48 CFR 52.223-9, "Certification and Estimate of Percentage of Recovered Material Content for EPA Designated Items". Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor. "I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current EPA standards for recycled/recovered materials content. The following exemptions may apply to the non-procurement of recycled/recovered content materials:

A. The product does not meet appropriate performance standards.

B. The product is not available within a reasonable time frame.

C. The product is not available competitively (from two or more sources).

D. The product is only available at an unreasonable price (compared with a comparable non-recycled content product).

PART 3 EXECUTION

3.01 REMEDIAL ACTION CLOSEOUT PACKAGE

The Remedial Action Closeout Package shall consist of certification of construction and facility startup, removal of temporary facilities, and submittal of the Remedial Action Report that summarizes all remedial activities undertaken at the site. The Remedial Action Report will consist of, but not be limited to, the following:

A. Report describing all the work at the site shall include but not be limited to the following:

1. Executive summary

2. Project background

3. Planning activities

4. Permits and permit equivalencies

5. Mobilization including temporary facilities, site controls,stormwater and soil erosion controls, management of Contact Water

6. Coordination activities with stakeholders, utilities, regulatory agencies and other affected parties

7. Sequence of work and control of the contaminants

8. Personnel and vehicle decontamination procedures

9. Restoration of the asphalt cap

10. General site restoration

11. Waste handling, transport, and disposal (hazardous, non hazardous, TSCA, recycled)

12. Site clean up and demobilization

13. Issues that required deviation from the design documents and their resolutions, documentation of changes and the approval process

14. Lessons learned

B. Project Records presented in an organized and structured manner

C. As-built drawings

D. Record Drawings

E. Other Appropriate Documents

3.02 AS-BUILT DRAWINGS

A. Markup Guidelines

Make comments and markup the drawings complete without reference to letters, memos, or materials that are not part of the As-Built drawing. Show what was changed, how it was changed, where item(s) were relocated and change related details. These working as-built markup prints must be neat, legible and accurate as follows:

1. Use base colors of red, green, and blue. Color code for changes as follows:

   a. Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.
   b. Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.
   c. Additions (Green) - Added items, lettering in notes and

leaders.

2. Provide a legend if colors other than the "base" colors of red, green, and blue are used.

3. Add and denote any additional equipment or material facilities, service lines, incorporated under As-Built Revisions if not already shown in legend.

4. Use frequent written explanations on markup drawings to describe changes. Do not totally rely on graphic means to convey the revision.

5. Use legible lettering and precise and clear digital values when marking prints. Clarify ambiguities concerning the nature and application of change involved.

6. Wherever a revision is made, also make changes to related section views, details, legend, profiles, plans and elevation views, schedules, notes and call out designations, and mark accordingly to avoid conflicting data on all other sheets.

7. For deletions, cross out all features, data and captions that relate to that revision.

8. For changes on small-scale drawings and in restricted areas, provide large-scale inserts, with leaders to the applicable location.

9. Indicate one of the following when attaching a print or sketch to a markup print:

   a. Add an entire drawing to contract drawings
   b. Change the contract drawing to show
   c. Provided for reference only to further detail the initial design.

10. Incorporate all shop and fabrication drawings into the markup drawings.

B. As-Built Drawings Content

Show on the as-built drawings, but not limited to, the following information:

1. The actual location, kinds and sizes of all sub-surface features including but not limited to extraction and observation wells, wellheads, transmission lines, and utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, show by offset dimensions to two permanently fixed surface features the end of each run including each change in direction on the record drawings. Locate valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Also record the average depth below the surface of each run.

2. The location and dimensions of any changes within the

building structure.

3. Layout and schematic drawings of electrical circuits and piping.

4. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

5. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to shop drawings, fabrication, erection, installation plans and placing details, pipe sizes, material type, insulation material, dimensions of equipment foundations, etc.

6. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.

7. Changes or Revisions which result from the final inspection.

8. Where contract drawings or specifications present options, show only the option selected for construction on the working as-built markup drawings. Options not selected should be neatly crossed out and noted.

9. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.

10. Changes in location of equipment and architectural features.

11. Modifications (include within change order price the cost to change working as-built markup drawings to reflect modifications).

12. Unusual or uncharted obstructions that are encountered in the contract work area during construction.

13. Location, extent, thickness, and size of stone protection particularly where it will be normally submerged by water.

3.03 RECORD DRAWINGS

At the completion of construction, the Contractor shall organize and compile the as-built drawings showing all modification to the Contract Documents that occurred during the construction project and all survey data collected on buried items (pipelines, foundation soils, under slab piping, etc.). Collect any remaining additional survey data documenting above grade items installed after restoration of the asphalt cap. Prepare a complete set of Record Drawings incorporating the above grade and below grade documentation.

3.04 PROJECT RECORD DOCUMENTS

At the completion of construction, the Contractor shall organize and compile a accurate and comprehensive records of all site activities as well as all additions, substitutions of materials, variations in work and any other revisions to the Contract Documents, in accordance with Section 01 78 39 PROJECT RECORD DOCUMENTS

As necessary, Contractor shall assist Government in preparing all documentation reqiored for any deed restriction or right-of way easement required as the results of construction activities.
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3.05 OPERATION AND MAINTENANCE MANUALS

Provide project operation and maintenance manuals as specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA. Provide four electronic copies of the Operation and Maintenance Manual files. Submit to the Contracting Officer for approval within 30 calendar days after notice of substantial completion. Update and resubmit files within 30 days of final acceptance of construction.

3.06 FINAL SITE CLEANUP

A. Site Cleanup

At completion of the Work or of a part thereof and immediately prior to Contractor's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor's notice of completion, clean entire Site or parts thereof, as applicable. All areas affected by the construction activities shall be restored to conditions equivalent or better than the original conditions or as indicated on the Contract Drawings.

1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Government.

2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.

3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.

4. Clean all windows.

5. Clean and wax wood, vinyl, or painted floors.

6. Broom clean exterior paved driveways and parking areas.

7. Hose clean sidewalks, loading areas, and others contiguous with principal structures.

8. Remove snow and ice from access to buildings if applicable.

9. Replace air-handling filters and clean ducts, blowers, and coils of ventilation units operated during construction.

10. Leave water courses, gutters, and ditches open and clean.

11. Clean all adjacent streets and sidewalks impacted by construction activities.

12. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

B. Roadway Repairs

The Contractor shall be responsible for repairing all incidental damage and settlement that occurs in roadways as result of construction related activities. Material and labor to complete all repair work, in accordance with all local codes and ordinances, shall be at the Contractor's expense. The Government will not provide additional compensation for this work.

-- End of Section --

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA
08/15

PART 1 GENERAL

1.01 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-10 Operation and Maintenance Data

O&M Database; G

1.02 DEFINITIONS

A. Preliminary Data: Initial and subsequent submissions for Government's review.

B. Final Data: Government Accepted data, submitted as specified herein.

C. Maintenance Operation: As used on Maintenance Summary Form, is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

1.03 OPERATION AND MAINTENANCE DATA

Submit Operation and Maintenance (O&M) Data for the provided equipment, product, or system, defining the importance of system interactions, troubleshooting, and long-term preventive operation and maintenance. Compile, prepare, and aggregate O&M data to include clarifying and updating the original sequences of operation to as-built conditions. Organize and present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Section 01 33 00 SUBMITTAL PROCEDURES.

A. Package Quality

Documents must be fully legible. Operation and Maintenance data must be consistent with the manufacturer's standard brochures, schematics, printed instructions, general operating procedures, and safety precautions.

B. Package Content

Provide data package content in accordance with paragraph 1.07 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES. Comply with the data package requirements specified in the individual

technical sections, including the content of the packages and addressing each product, component, and system designated for data package submission, except as follows.

C. Changes to Submittals

Provide manufacturer-originated changes or revisions to submitted data if a component of an item is so affected subsequent to acceptance of the O&M Data. Submit changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data within 30 calendar days of the notification of this change requirement.

1.04 O&M DATABASE

Develop an editable, electronic spreadsheet based on the equipment in the Operation and Maintenance Manuals that contains the information required to start a preventive maintenance program. As a minimum, provide list of system equipment, location installed, warranty expiration date, manufacturer, model, and serial number.

Provide an printout of the structure of the database prior to the for review prior to populating the database.

1.05 OPERATION AND MAINTENANCE MANUAL FILE FORMAT

Assemble data packages into electronic Operation and Maintenance Manuals in an instructional manual format. Both hard copies (to be retained at facility) and electronically formatted documents shall be provided.

Assemble each manual into a composite electronically indexed file using the most current version of Adobe Acrobat or similar software capable of producing PDF file format. Provide compact disks (CD) or data digital versatile disk (DVD) as appropriate, so that each one contains operation, maintenance and record files and project record documents. Include a complete electronically linked operation and maintenance directory.

Operation and Maintenance Manual data packages shall be submitted under the individual specifications.

A. Organization

Bookmark Product and Drawing Information documents using the current version of CSI Masterformat numbering system, and arrange submittals using the specification sections as a structure. Use CSI Masterformat and UFGS numbers along with descriptive bookmarked titles that explain the content of the information that is being bookmarked.

1. Hard Copy Binders

a. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.

b. Size: 8 1/2 inches by 11 inches, minimum.

c. Paper: 20 lb stock (minimum), white for typed pages.

Colored sheets can be used for dividers to identify selected elements. Three hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data

d. Text: Manufacturer's printed data, or neatly typewritten.

e. Section Dividers for each product.

f. Assemble and bind material, as much as possible, in same order as specified in the Contract Documents.

g. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.

h. Cover: Identify manual with typed or printed title "OPERATION AND MAINTENANCE DATA" and list:

(1) Project title.
(2) Designate applicable system, equipment, material, or finish.
(3) Identity of separate structure as applicable.
(4) Identify volume number if more than one volume.
(5) Identity of general subject matter covered in manual. Identity of equipment number and Specification section.

i. Spine:

(1) Project title.
(2) Identify volume number if more than one volume.

j. Title Page

(1) Contractor name, address, and telephone number.
(2) Subcontractor, Supplier, installer, or maintenance contractor's name, address, and telephone number, as appropriate. Identify each as to their area of responsibility and provide name, telephone number of local source of supply for parts and replacement.

k. Table of Contents:

(1) Neatly typewritten and arranged in systematic order with consecutive page numbers.
(2) Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.

B. CD or DVD Label and Disk Holder or Case

1. Provide the following information on the disk label and disk holder or case:

a. Project Title
b. Construction Contract Number
c. Prepared For: United States Environmental Protection

Agency
d. Prepared By: (Name, title, Company name, phone number and email address)
e. Include the disk content on the disk label
f. Date
g. Virus scanning program used

2. Portable Document Format

a. Submit Operation and Maintenance data in PDF format
b. Files to be fully functional and viewable in most recent version of Adobe Acrobat.

1.06 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

The following are a detailed description of the data package items listed in paragraph 1.07 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES.

A. Operating Instructions and Procedures

Organize in a consistent format under separate headings for each different procedure. Provide a logical sequence of instructions for each procedure. Provide information sheet for Government's personnel, including proper procedures in event of failure and instances that might affect validity of warranty or Bond. Provide specific instructions, procedures, and illustrations for the following phases of operation for the installed model and features of each system.

1. Safety Precautions and Hazards

List personnel hazards and equipment or product safety precautions for operating conditions. List all residual hazards identified in the Activity Hazard Analysis in the SSHP/APP. Provide recommended safeguards for each identified hazard.

2. Operator Prestart

Provide procedures required to install, set up, and prepare each system for use.

3. Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

4. Normal Operations

Provide Control Diagrams with data to explain operation and control of systems and specific equipment. Provide narrative description of Normal Operating Procedures.

5. Emergency Operations

Provide Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down

the equipment to prevent further damage to systems and equipment. Provide Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of utility systems including required valve positions, valve locations and zones or portions of systems controlled.

6. Operator Service Requirements

Provide instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gauge readings.

7. Environmental Conditions

Provide a list of Environmental Conditions (temperature, humidity, and other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to run.

8. Operating Log

Provide forms, sample logs, and instructions for maintaining necessary operating records.

B. Preventive Maintenance

Provide information for preventive and scheduled maintenance to minimize repairs for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

C. Repair

Provide manufacturer's recommended procedures and instructions for correcting problems and making repairs.

1. Troubleshooting Guides and Diagnostic Techniques

Provide procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

2. Wiring Diagrams and Control Diagrams

Provide point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.

3. Repair Procedures

Provide instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

4. Removal and Replacement Instructions

Provide step-by-step procedures and a list of required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Use a combination of text and illustrations.

5. Spare Parts and Supply Lists

Provide lists of spare parts and supplies required for repair to ensure continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead-time to obtain.

6. Repair Work-Hours

Provide manufacturer's projection of repair work-hours including requirements by type of craft. Identify, and tabulate separately, repair that requires the equipment manufacturer to complete or to participate.

7. Warranty, Bond, and Service Agreements

Provide Warranty, Bond, and Service Agreement documentation, as applicable, in accordance with Contract Documents.

D. Appendices

Provide information required below and information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment. Include the following:

1. Product Submittal Data

Provide a copy of SD-03 Product Data submittals documented with the required approval.

a. Include only those sheets that are pertinent to specific product.

b. Clearly annotate each sheet to:

1. Identify specific product or part installed.
2. Identify data applicable to installation.
3. Delete references to inapplicable information.

c. Function, normal operating characteristics, and limiting conditions.

d. Performance curves, engineering data, nameplate data,

and tests.

e. Complete nomenclature and commercial number of replaceable parts.

f. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.

g. Spare parts ordering instructions.

h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals)

2. Drawings

Supplement product data with Drawings as necessary to clearly illustrate:

a. Format:

1. Provide reinforced, punched, binder tab; bind in with text.
2. Reduced to 8 1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8 1/2 inches by 11 inches.
3. Where reduction is impractical, fold and place in 8 1/2 inch by 11 inch envelopes bound in text.
4. Identify Specification section and product on Drawings and envelopes.

b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
c. Control and flow diagrams.
d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.

3. Graphics and Charts

a. Provide as-installed, color-coded piping diagrams.

b. Provide charts of valve tag numbers with the location and function of each valve.

4. Manufacturer's Instructions

Provide a copy of SD-08 Manufacturer's Instructions submittals documented with the required approval.

5. O&M Submittal Data

Provide a copy of the Operation and Maintenance Data submittals documented with the required approval under each technical specifications.

6. Parts Identification

Provide identification and coverage for the parts of each

component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing must show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Group the parts shown in the listings by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master parts catalog.

7. Warranty Information

List and explain the various warranties and clearly identify the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Include warranty information for primary components of the system. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

8. Extended Warranty Information

List all warranties for products, equipment, components, and sub-components whose duration exceeds one year. For each warranty listed, indicate the applicable specification section, duration, start date, end date, and the point of contact for warranty fulfillment. Also, list or reference the specific operation and maintenance procedures that must be performed to keep the warranty valid. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

9. Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components. Provide final set points.

10. Testing and Performance Data

Include completed prefunctional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting and blank test forms. Provide final set points.

11. Field Test Reports

Provide a copy of Field Test Reports (SD-06) submittals documented with the required approval.

12. Contractor Information

Provide a list that includes the name, address, and telephone number of the General Contractor and each Subcontractor who installed the product or equipment, or system. For each item, also provide the name address and telephone number of the manufacturer's representative and service organization that can provide replacements most convenient to the project site. Provide the name, address, and telephone number of the product, equipment, and system manufacturers.

1.07 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Provide the O&M data packages specified in individual technical sections. The information required in each type of data package follows:

A. Data Package 1:

1. Safety precautions and hazards
2. Cleaning recommendations
3. Maintenance and repair procedures
4. Warranty information
5. Extended warranty information
6. Contractor information
7. Spare parts and supply list

B. Data Package 2:

1. Safety precautions and hazards
2. Normal operations
3. Environmental conditions
4. Lubrication data
5. Preventive maintenance plan, schedule, and procedures
6. Cleaning recommendations
7. Maintenance and repair procedures
8. Removal and replacement instructions
9. Spare parts and supply list
10. Parts identification
11. Warranty information
12. Extended warranty information
13. Contractor information

C. Data Package 3:

1. Safety precautions and hazards
2. Operator prestart
3. Startup, shutdown, and post-shutdown procedures
4. Normal operations
5. Emergency operations
6. Environmental conditions
7. Operating log
8. Lubrication data
9. Preventive maintenance plan, schedule, and procedures
10. Cleaning recommendations
11. Troubleshooting guides and diagnostic techniques
12. Wiring diagrams and control diagrams
13. Maintenance and repair procedures

14. Removal and replacement instructions
15. Spare parts and supply list
16. Product submittal data
17. O&M submittal data
18. Parts identification
19. Warranty information
20. Extended warranty information
21. Testing equipment and special tool information
22. Testing and performance data
23. Contractor information
24. Field test reports

D. Data Package 4:

1. Safety precautions and hazards
2. Operator prestart
3. Startup, shutdown, and post-shutdown procedures
4. Normal operations
5. Emergency operations
6. Operator service requirements
7. Environmental conditions
8. Operating log
9. Lubrication data
10. Preventive maintenance plan, schedule, and procedures
11. Cleaning recommendations
12. Troubleshooting guides and diagnostic techniques
13. Wiring diagrams and control diagrams
14. Repair procedures
15. Removal and replacement instructions
16. Spare parts and supply list
17. Repair work-hours
18. Product submittal data
19. O&M submittal data
20. Parts identification
21. Warranty information
22. Extended warranty information
23. Personnel training requirements
24. Testing equipment and special tool information
25. Testing and performance data
26. Contractor information
27. Field test reports

E. Data Package 5:

1. Safety precautions and hazards
2. Operator prestart
3. Start-up, shutdown, and post-shutdown procedures
4. Normal operations
5. Environmental conditions
6. Preventive maintenance plan, schedule, and procedures
7. Troubleshooting guides and diagnostic techniques
8. Wiring and control diagrams
9. Maintenance and repair procedures
10. Removal and replacement instructions
11. Spare parts and supply list
12. Product submittal data
13. Manufacturer's instructions
14. O&M submittal data
15. Parts identification

16. Testing equipment and special tool information
17. Warranty information
18. Extended warranty information
19. Testing and performance data
20. Contractor information
21. Field test reports
22. Additional requirements for HVAC control systems

1.08 SUPPLEMENTAL INFORMATION FOR ELECTRIC OR ELECTRONIC ITEMS OR SYSTEMS

A. Description of Unit and Component Parts:

1. Function, normal operating characteristics, and limiting conditions.
2. Performance curves, engineering data, nameplate data, and tests.
3. Complete nomenclature and commercial number of replaceable parts.
4. Interconnection wiring diagrams, including control and lighting systems.

B. Circuit Directories of Panelboards

C. Electrical service.

D. Control requirements and interfaces.

E. Communication requirements and interfaces.

F. List of electrical relay settings, and control and alarm contact settings.

G. Electrical interconnection wiring diagram, including as applicable, single-line, three-line, schematic and internal wiring, and external interconnection wiring.

H. As installed control diagrams by control manufacturer.

I. Operating Procedures:

1. Routine and normal operating instructions.
2. Startup and shutdown sequences, normal and emergency.
3. Safety precautions.
4. Special operating instructions.

J. Maintenance Procedures:

1. Routine maintenance.
2. Guide to troubleshooting
3. Adjustment and checking.
4. List of relay settings, control and alarm contact settings.

K. Manufacturer's printed operating and maintenance instructions.

L. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

1.09 DATA FOR MATERIALS AND FINISHES

A. Content for Architectural Products, Applied Materials, and Finishes:

1. Manufacturer's data, giving full information on products:

a. Catalog number, size, and composition.
b. Color and texture designations.
c. Information required for reordering special-manufactured products.

2. Instructions for Care and Maintenance:

a. Manufacturer's recommendation for types of cleaning agents and methods.
b. Cautions against cleaning agents and methods that are detrimental to product.
c. Recommended schedule for cleaning and maintenance.

B. Instructions for Care and Maintenance:

1. Manufacturer's data, giving full information on products:

a. Applicable standards.
b. Chemical composition
c. Details of installation.

2. Instructions for inspection, maintenance, and repair.

1.10 FORMS

An example of a maintenance summary form is attached. The Contractor shall provide his own form similar to the attached document.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____
2. MANUFACTURER _____
3. EQUIPMENT/TAG NUMBER(S) _____
4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____
5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____
6. MANUFACTURER'S LOCAL REPRESENTATIVE _____
   a. Name_____ Telephone No. _____
   b. Address _____
7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	**Frequency**	**Lubricant (If Applicable)**
List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR GOVERNMENT'S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

SECTION 01 78 39

PROJECT RECORD DOCUMENTS
12/17

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to maintain accurate and comprehensive records of all site activities.

The Contractor shall maintain accurate and comprehensive records of all site activities as well as all additions, substitutions of materials, variations in work and any other revisions to the Contract Documents.

The Contractor shall maintain at the Site for the Government one record copy suitable for electronic archiving of:.

A. Record drawings showing progress of work.

B. Technical specifications.

C. Addenda.

D. Modifications to the contract.

E. Government's directive.

F. Written reports of any significant quality assurance problems.

G. Progress meeting minutes.

H. Final as-built drawings.

I. Daily work activity summary reports, including:

1. DVD videos and photographs.
2. Reports on any emergency response actions.
3. Reports on all daily site activities.
4. Chain-of-custody documents.
5. Construction schedule and progress chart of work.
6. Change orders and other modifications to the contract.
7. All laboratory analytical results.
8. Meteorological records.
9. Air monitoring data.
10. All safety and accident reports.
11. All spill incident reports.
12. Daily construction quality control reports.
13. Truck load tickets.
14. Records of quantity of contaminated and uncontaminated material removed from the Site.
15. All waste disposal manifests.
16. Record of treatment plant activities including Surface water discharge volume.
17. Other items as required by the Government.

Where appropriate, one copy of all project record documents shall be maintained on hard disk compatible with the Government's software.

1.02 MAINTENANCE OF DOCUMENTS

The Contractor shall store record documents and samples in the Contractor's Field Office apart from documents used for construction work.

The Contractor shall provide files and racks for the storage of documents; storage space that can be secured and locked; and a storage area that is clean and dry. Documents and samples should be filed in an organized manner to facilitate retrieval.

Make documents available at all times for inspection by the Government.

The Contractor shall keep up-to-date a complete record set of blueline drawings, which shall be corrected daily to show every change, and the approved shop drawings. This set shall be legibly marked.

The Contractor shall keep up-to-date a complete set of specifications and addenda to record changes made by directive or by change order. This set shall be legibly marked.

The sets of marked drawings and specifications shall be submitted to the Government at the completion of construction.

The Contractor shall be responsible for final handling and storage of project record documents, including boxing, labeling, and shipping to a final destination as determined by the Government. If approved by the Government, the Contractor may instead scan project record documents for electronic storage to eliminate physical storage costs.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 88 15

SEISMIC ANCHORAGE AND BRACING
09/17

PART 1 GENERAL

1.01 SCOPE OF WORK

This section covers requirements for seismic anchorage and bracing for equipment and nonstructural components required in accordance with the International Building Code (IBC).

1.02 REFERENCES

The following is a list of standards which may be referenced in this section:

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	(2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC	(2015) International Building Code

1.03 DESIGN AND PERFORMANCE REQUIREMENTS

A. General: Contractor shall be responsible for designing code required seismic attachments, braces, and anchors to the structure for elements of the architectural, mechanical, and electrical systems included in the Work in accordance with this section unless a design is specifically provided within the Contract Documents.

B. Design Requirements:

1. In accordance with 2015 ICC IBC, Section 1613 and Chapter 13 of ASCE 7.

2. Architectural, mechanical, electrical and other nonstructural systems, components, and elements permanently attached to the structure shall be designed to transfer the component seismic forces specified in ASCE 7 Section 13.3.1 to the structure.

3. Design forces for anchors in concrete or masonry shall be in accordance with ASCE 7, Section 13.4.2.

4. Seismic anchorage and bracing systems shall be designed by a qualified professional engineer registered in the State of New Jersey.

5. Nonstructural Components: Design as nonbuilding structures for components with weights greater than or equal to 25 percent of the effective seismic weight of the overall structure.

6. Architectural Components: Includes, but are not limited to, nonstructural walls and elements, partitions, cladding and veneer, access flooring, signs, cabinets, suspended ceilings, and partitions.

7. Design seismic attachments, braces, and anchorages for parts or elements of the process equipment, architectural, mechanical, and electrical systems in accordance with the provisions of the International Building Code and seismic design parameters as stated on Contract Drawings.

8. Seismic Design Category (SDC): B unless noted otherwise. Same as supporting structure's SDC, as shown on Contract Drawings.

9. Occupancy Category: II, unless noted otherwise. The anchorage and bracing Occupancy Category shall be the same as that for supporting structure as shown on Contract Drawings.

10. Analyze local region of body of nonstructural component for load transfer of anchorage attachment if component Ip (Seismic Importance Factor) = 1.5.

11. Component Important Factor:

    a. Ip = 1.0, unless noted otherwise.
    b. Ip shall be taken as 1.5 for components needed for or whose failure could impair continued operation of hazardous or essential facilities.
    c. Ip shall be taken as 1.5 for components that contain hazardous materials or that are required for life safety to be functional after a seismic event.
    d. Refer to Section 01 45 35, SPECIAL INSPECTIONS for list of designated components for which Ip equals 1.5.

C. In accordance with ASCE 7, the following are exempt from the requirements of the section for provision of seismic anchorages and bracing, in addition to those items specifically exempted in ASCE 7, Part 13.5 for architectural components and Part 13.6 for electrical and mechanical equipment:

1. Architectural components with Ip equals 1.0, other than parapets supported by bearing walls or shear walls.
2. Mechanical and electrical components.
3. Distribution systems with Ip equals 1.0 weighing 5 pounds per foot or less.

D. Supporting Drawings and calculations for electrical distribution components shall be provided if any of the following apply:

1. Ip is equal to 1.5 and conduit diameter is greater than 2.5 inch trade size.

2. Ip is equal to 1.5 and the total weight of bus duct, cable tray, or conduit supported by trapeze assemblies exceeds 10 pounds per foot.

3. Supports are cantilevered up from floor.

4. Supports include bracing to limit deflection and are

constructed as rigid welded frames.

5. Attachments utilize spot welds, plug welds, or minimum size welds as defined by AISC.

E. Other seismic design and detailing requirements identified in ASCE 7, Chapter 13 are required to be provided for new architectural, mechanical and electrical component, system, or equipment.

1.04 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Anchorage Drawings And Calculations; G, AE

List Of Equipment; G

Seismic Attachment Assemblies' Drawings; G, AE

SD-03 Product Data

Manufacturers' Engineered Seismic Hardware Product Data; G, AE

SD-05 Design Data

Seismic Anchorage And Bracing Calculations; G, AE

SD-08 Manufacturer's Instructions

Manufacturer's Seismic Hardware Installation Requirements; G

PART 2 PRODUCTS

2.01 GENERAL

A. Attachments and supports transferring seismic loads to structure shall be constructed of materials and products suitable for the application and shall be designed and constructed in accordance with the design criteria shown on Contract Drawings and nationally recognized standards.

B. In accordance with Section 05 50 13, MISCELLANEOUS METAL FABRICATIONS. Source quality control shall be in accordance with the referenced section.

C. Provide anchor bolts, and concrete and masonry anchors for anchorage of equipment in concrete or masonry in accordance with Section 05 50 13, MISCELLANEOUS METAL FABRICATIONS. Size of anchor bolts and anchors, and required minimum embedment and spacing shall be based on calculations submitted by Contractor.

D. Powder actuated fasteners and sleeve anchors shall not be used for seismic attachments and anchorage where resistance to tension loads is required. Expansion anchors, other than undercut anchors, shall not be used for nonvibration isolated mechanical equipment rated over 10 hp.

2.02 PRODUCT INFORMATION

A. Submit Shop Drawings with supporting calculations no less than 4 weeks in advance of installation of component, equipment or distribution system to be anchored to structure.

B. Submitted anchorage drawings and calculations are identified as IBC deferred submittals and will be submitted to and accepted by permitting agency prior to installation of component, equipment or distribution system.

C. Submit list of equipment, including architectural, mechanical, electrical and process equipment weighing more than 20 pounds, and electrical, piping, and mechanical distribution systems weighing more than 5 pounds per foot shall be anchored, unless specifically exempted hereinafter.

D. Submit manufacturers' engineered seismic hardware product data and manufacturer's seismic hardware installation requirements.

E. Submit seismic attachment assemblies' drawings. Include connection hardware, braces, and anchors or anchor bolts for modified, nonexempt existing components, equipment, and systems where combination of new and existing systems or component's final condition would require seismic anchorage or bracing under this Specification for new equipment.

F. Submittals will be rejected if proposed anchorage method would create an overstressed condition of supporting member. Revise anchorages and strengthening of structural support so there is no overstressed condition.

G. Seismic Anchorage and Bracing Calculations: For seismic attachments, braces, and anchorages. Include IBC and project specific criteria as noted on General Structural Legend Sheets on Drawing, in addition to manufacturer's specific criteria used for the design; sealed by a civil or structural engineer registered in the State of New Jersey.

PART 3 EXECUTION

3.01 GENERAL

A. Make seismic attachments, bracing, and anchorage in such a manner that component seismic force is transferred to the lateral force resisting system of the structure through a complete load path.

B. Overall seismic anchorage system shall provide restraint in all directions, including vertical, for each component or system so anchored.

C. Components mounted on vibration isolation systems shall have

snubbers in each horizontal direction and vertical restraints where required to resist overturning.

D. Anchor piping in such a manner as to ensure piping system has adequate flexibility and expansion capabilities at flexible connections and expansion joints. Piping and ductwork suspended more than 12 inches below the supporting structure shall be braced for seismic effects to avoid significant bending of the hangers and their attachments, unless high-deformability piping is used per ASCE 7, Section 13.6.8 or HVAC ducts have a cross sectional area of less than 6 square feet.

E. Tall and narrow equipment such as motor control centers and telemetry equipment shall be anchored at the base and within 12 inches from the top of the equipment, unless approved otherwise by Contracting Officer.

F. Process equipment, architectural, mechanical, or electrical components shall not be attached to more than one element of a building structure at a single restraint location where such elements may respond differently during a seismic event. Such attachments shall also not be made across building expansion and contraction joints.

3.02 INSTALLATION

A. Do not install components or their seismic anchorages or restraints prior to review and acceptance by Contracting Officer and permitting agency.

B. Notify Contracting Officer upon completion of seismic restraints in accordance with Section 01 45 35, SPECIAL INSPECTIONS.

3.03 FIELD QUALITY CONTROL

A. Field Quality Control shall be in accordance with Section 05 50 13, MISCELLANEOUS METAL FABRICATIONS.

-- End of Section --

SECTION 01 91 14

EQUIPMENT TESTING AND FACILITY STARTUP
09/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

NEW JERSEY ADMINISTRATIVE CODE (NJAC)

NJAC 7:10	New Jersey Safe Drinking Water Act

1.02 DEFINITIONS

A. Facility: Entire Project, or an agreed upon portion, including its entire unit processes.

B. Functional Test: Test or tests in presence of Contracting Officer to demonstrate that installed equipment meets manufacturer's installation, calibration, and adjustment requirements and other requirements as specified.

C. Performance Test: Test or tests performed after any required functional test in presence of Contracting Officer to demonstrate and confirm individual equipment meets performance requirements specified in individual sections.

D. Unit Process: As used in this section, a unit process is a portion of the facility that performs a specific process function, such as air stripper, vapor phase carbon, and liquid-phase carbon.

E. Facility Performance Demonstration:

1. A demonstration, conducted by Contractor, with assistance of Contracting Officer, to demonstrate and document the performance of the entire operating facility, both manually and automatically (if required), based on criteria developed in conjunction with Contracting Officer and as accepted by Government.

2. Such demonstration is for the purposes of (i) verifying to Contracting Officer entire facility performs as a whole, and (ii) documenting performance characteristics of completed facility for Government's records. Neither the demonstration nor the evaluation is intended in any way to make operation of a unit process or entire facility the responsibility of Contractor, unless such performance is otherwise specified.

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the

office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Facility Startup And Performance Demonstration Plan; G

SD-06 Test Reports

Unit Process Startup Form; G

Functional And Performance Test Results; G

Equipment Test Report; G

SD-07 Certificates

Facility Performance Demonstration/Certification Form And Report

Manufacturer's Certificate Of Proper Installation

1.04 FACILITY STARTUP AND PERFORMANCE DEMONSTRATION PLAN

A. Develop a written plan, in conjunction with Government's operations personnel, to include the following:

1. Step by step instructions for startup of each unit process and the complete facility.

2. Unit Process Startup Form (sample attached), to minimally include the following:

a. Description of the unit process, including equipment numbers/nomenclature of each item of equipment and all included devices.
b. Detailed procedure for startup of the unit process, including valves to be opened/closed, order of equipment startup, etc.
c. Startup requirements for each unit process, including water, power, chemicals, etc.
d. Space for evaluation comments.

3. Facility Performance Demonstration/Certification Form (sample attached), to minimally include the following:

a. Description of unit processes included in the facility startup.
b. Sequence of unit process startup to achieve facility startup.
c. Description of computerized operations, if any, included in the facility.
d. Data from performance test demonstrating compliance with operational and treatment requirements.
e. Contractor certification facility is capable of performing its intended function(s), including fully automatic operation.
f. Signature spaces for Contractor and Contracting Officer.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 GENERAL

A. Facility Startup Meetings: Schedule, in accordance with requirements of Section 01 31 19, PROJECT MEETINGS, to discuss test schedule, test methods, materials, chemicals and liquids required, facilities operations interface, and Government involvement.

B. Contractor's Testing and Startup Representative:

1. Designate and furnish one or more personnel to coordinate and expedite testing and facility startup.
2. Representative(s) shall be present during startup meetings and shall be available at all times during testing and startup.

C. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required for testing and startup.

D. Provide adequate Subcontractor and equipment manufacturers' staff to prevent delays. Schedule ongoing work so as not to interfere with or delay testing and startup.

E. Contractor shall

1. Provide water, power, chemicals, and other items as required for equipment testing and facility startup, unless otherwise indicated.
2. Provide for storage and disposal of water used in equipment testing and facility startup.
3. Operate process units and facility.
4. Provide labor and materials as required for laboratory analyses.
5. Make available spare parts, special tools, and operation and maintenance information for treatment system components.

3.02 EQUIPMENT TESTING

A. General

Contractor shall, unless otherwise indicated, furnish labor, materials, and supplies for conducting the tests and taking samples and performance measurements.

B. Preparation:

1. Complete installation before testing.

2. Furnish qualified manufacturers' representatives, when required by individual Specification sections.

3. Obtain and submit from equipment manufacturer's

representative Manufacturer's Certificate of Proper Installation Form, in accordance with Section 01 43 33, MANUFACTURERS' FIELD SERVICES, when required by individual Specification sections.

4. Backflow preventers to be tested and inspected as required by NJAC 7:10 and is certified to be in compliance with this regulation.

5. Equipment Test Report Form: Provide written test report for each item of equipment to be tested, to include the minimum information:

    a. Project Name.
    b. Equipment or item tested.
    c. Date and time of test.
    d. Type of test performed (Functional or Performance).
    e. Test method.
    f. Test conditions.
    g. Test results.
    h. Signature spaces for Contractor and Contracting Officer as witness.

6. Cleaning and Checking: Prior to beginning functional testing:

    a. Calibrate testing equipment in accordance with manufacturer's instructions.
    b. Inspect and clean equipment, devices, connected piping, and structures to ensure they are free of foreign material.
    c. Lubricate equipment in accordance with manufacturer's instructions.
    d. Turn rotating equipment by hand when possible to confirm that equipment is not bound.
    e. Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
    f. Check power supply to electric powered equipment for correct voltage.
    g. Adjust clearances and torque.
    h. Test piping for leaks.

7. Ready to test determination will be made by Contracting Officer based at least on the following:

    a. Acceptable Operation and Maintenance Data.
    b. Notification by Contractor of equipment readiness for testing.
    c. Receipt of Manufacturer's Certificate of Proper Installation, if so specified.
    d. Adequate completion of work adjacent to, or interfacing with, equipment to be tested.
    e. Availability and acceptability of manufacturer's representative, when specified, to assist in testing of respective equipment.
    f. Satisfactory fulfillment of other specified manufacturer's responsibilities.
    g. Equipment and electrical tagging complete.
    h. Delivery of all spare parts and special tools.

C. Functional Testing

1. Conduct as specified in individual Specification sections.

2. Notify Contracting Officer in writing at least 10 days prior to scheduled date of testing.

3. Prepare Equipment Test Report summarizing test method and results.

4. When, in Contracting Officer's opinion, equipment meets functional requirements specified, such equipment will be accepted for purposes of advancing to performance testing phase, if so required by individual Specification sections. Such acceptance will be evidenced by Contracting Officer's signature as witness on Equipment Test Report.

D. Performance Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Contracting Officer in writing at least 10 days prior to scheduled date of test.
3. Performance testing shall not commence until equipment has been accepted by Contracting Officer as having satisfied functional test requirements specified.
4. Type of fluid, gas, or solid for testing shall be as specified.

3.03 FUNCTIONAL STARTUP OF UNIT PROCESSES

A. Prior to unit process startup, equipment within unit process shall be accepted by Contracting Officer as having met functional and performance testing requirements specified.

B. Startup sequencing of unit processes shall be as chosen by Contractor to meet schedule requirements.

C. Make adjustments, repairs, and corrections necessary to complete unit process startup.

D. Startup shall be considered complete when, in opinion of Contracting Officer, unit process has operated in manner intended for 7 continuous days without significant interruption. This period is in addition to performance test periods specified elsewhere.

E. Significant Interruption: May include any of the following events:

1. Failure of Contractor to provide and maintain qualified onsite startup personnel as scheduled.
2. Failure to meet specified functional operation for more than 2 consecutive hours.
3. Failure of any critical equipment or unit process that is not satisfactorily corrected within 5 hours after failure.
4. Failure of any noncritical equipment or unit process that is not satisfactorily corrected within 8 hours after failure.
5. As determined by Contracting Officer.

F. A significant interruption will require startup then in progress to be stopped. After corrections are made, startup test period to start from beginning again.

3.04 FACILITY PERFORMANCE DEMONSTRATION

A. When, in the opinion of Contracting Officer, startup of all unit processes has been achieved, sequence each unit process to the point that facility is operational.

B. Demonstrate proper operation of required interfaces within and between individual unit processes.

C. Sample influent, effluent, and intermediate points for a period of 7 days of operation for contaminants to demonstrate removal efficiencies and effluent quality meets expected performance. Samples to be collected in accordance with Section 01 35 45 CHEMICAL DATA QUALITY CONTROL and Contractor's approved UFP-QAPP.

D. Compliance samples shall meet the permit equivalents issued by NJDEP and provided in Section 01 92 00, FIRST YEAR OPERATIONS AND MAINTENANCE.

E. Locations and parameters for compliance test sampling include:

1. Effluent:

a. Treated Discharge - Water:

1) Sampling location: Treated Water Tank (T-800) Outlet Sampling Port.
2) Sampling frequency: As per the permit equivalency requirements.
3) Analytical: Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), Pesticides, PCBs, Metals (total and dissolved),required geochemistry parameters including, but not limited to pH, Total Suspended Solids (TSS), and Total Organic Carbon (TOC).

b. Treated Discharge - Air:

1) Sampling location: Vapor Phase Carbon 2 (VPGAC 2) Outlet Sampling Port
2) Sampling Frequency: As per permit equivalency requirements.
3) Analytical: VOCs.
4) Additional daily sampling for VOCs via a hand-held Photoionization Detector (PID).

F. Locations and parameters for performance test sampling include:

1. Influent:

a. Vapor Phase Carbon Influent - Air:

1) Sampling location: Vapor Phase Carbon 1 (VPGAC 1) Inlet Sampling Port.
2) Sampling frequency: Laboratory samples - twice during

startup period.
3) Analytical: VOCs.
4) Additional daily sampling for VOCs via a hand-held Photoionization Detector (PID)

b. Treatment System Combined Influent - Water:

1) Sampling location: Influent Equalization (EQ) Tank (T-100) Inlet Sampling Port.
2) Sampling frequency: Daily.
3) Analytical: VOCs, SVOCs, Pesticides, PCBs, Metals (total and dissolved) required geochemistry parameters including, but not limited to, pH, TSS, and TOC.

2. Effluent:

a. Air Stripper Effluent - Water:

1) Sampling location: Air Stripper (AS-300) Outlet Sampling Port.
2) Sampling frequency: Daily.
3) Analytical: VOCs, Total Metals, and Dissolved Metals.

3. Intermediate:

a. Liquid-Phase Carbon Breakthrough - Water:

1) Sampling location: Liquid-Phase Carbon 1 (LPGAC 1) Outlet Sampling Port.
2) Sampling frequency: Daily.
3) Analytical: VOCs, PCBs.

G. Record operational parameters via plant control system for:

1. Air flowrate.
2. Extraction well flowrate.
3. GAC feed flowrate.
4. Pressure drop across Liquid GAC vessels.
5. Pressure drop across Vapor GAC vessels.

H. Once treatment system is shown to achieve the required discharge concentrations and is within expected operational parameters and specifications, Contractor, with approval from Contracting Officer, may begin discharge to Bound Brook and remove any temporary storage for testing water.

I. Upon approval from the Contracting Officer, Contractor shall be permitted to dispose of test water to the influent of the treatment system providing total suspended solids (TSS) are removed prior to discharge to the permanent treatment system.

J. After facility is operating, complete performance testing of any equipment and systems not previously tested.

K. Document, as defined in Facility Startup and Performance Demonstration Plan, the performance of the facility including its computer system, until all unit processes are operable and under control of computer system.

L. Certify, on the Facility Performance Demonstration/Certification Form, that facility is capable of performing its intended function(s), including fully automatic and computerized operation.

M. Prepare and submit the Facility Performance Demonstration/Certification Form and Report documenting the results of the performance testing. The report shall include the following:

1. Functional and performance test results
2. Unit Process Startup Form for each unit process

3.05 SUPPLEMENTS

A. Supplements listed below, following "End of Section", are a part of this Specification:

1. Unit Process Startup Form.
2. Facility Performance Demonstration/Certification Form.

-- End of Section --

UNIT PROCESS STARTUP FORM

GOVERNMENT:_____ **PROJECT:**_____

Unit Process Description: (Include description and equipment number of all equipment and devices):

Startup Procedure (Describe procedure for sequential startup and evaluation, including valves to be opened/closed, order of equipment startup, etc.):

Startup Requirements (Water, power, chemicals, etc.):_____

Evaluation Comments:_____

FACILITY PERFORMANCE DEMONSTRATION/CERTIFICATION FORM

GOVERNMENT:_____ **PROJECT:**_____

Unit Processes Description (List unit processes involved in facility startup):

_____

_____

_____

_____

Unit Processes Startup Sequence (Describe sequence for startup, including computerized operations, if any):

_____

_____

_____

_____

_____

Contractor Certification that Facility is capable of performing its intended function(s), including fully automatic operation:

Contractor: _____ **Date:** _____**, 20____**

Government: _____ **Date:** _____**, 20____**
(Authorized Signature)

SECTION 01 92 00

FIRST YEAR OPERATIONS AND MAINTENANCE
09/17

PART 1 GENERAL

1.01 SCOPE OF WORK

Provide operations for the first year (1 year) of Operations and Maintenance (O&M) for the groundwater extraction and treatment system (GETS) including, but not limited to, the following:

A. Operation and maintenance of a 5 well network of groundwater extraction wells.

B. Collection and analysis of compliance and performance monitoring samples

C. Operation and maintenance of the system to monitor water levels in the groundwater and surface water (Bound Brook).

D. Operation and maintenance of the groundwater treatment system, including changeout service as necessary for spent media.

E. Monitoring of discharges of treated groundwater to Bound Brook.

F. Payment for all utilities.

G. Maintenance of GETS building and surrounding property.

H. Collection and collation of data on site operations and performance.

I. Maintenance of permits, preparation of reports and other required recordkeeping.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

NEW JERSEY ADMINISTRATIVE CODE (NJAC)

NJAC 7:10	New Jersey Safe Drinking Water Act

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 542-R-05-010	(2005) O&M Report Template for Groundwater Remedies

1.03 DEFINITIONS

A. Maintenance shall include, but not be limited to:

1. Any routine maintenance required to ensure satisfactory performance and longevity of equipment. Examples of typical

maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

2. Any preventive maintenance that consists primarily of inspection, cleaning, lubrication, adjustment, calibration, and minor part and component replacement (e.g., filters, belts, hoses, oil, and grease) as required to minimize malfunctions, breakdown, and deterioration of equipment.

3. Any corrective maintenance and repair work that is required to return a system or component to its proper operating condition. Repair may be overhaul, reprocessing, or replacement of constituent parts or materials such as spent media in treatment canister, that have deteriorated by action of the elements or usage and have not been corrected through maintenance.

B. Operations shall include, but not be limited to:

1. Day to day performance of activities required to operate the extraction and treatment system, including routine monitoring required to ensure satisfactory operation of equipment and potential system modification (if necessary).

2. All related environmental and health and safety activities.

3. Provision of site security.

4. Testing and inspection activities.

5. Cleaning of site and facility.

6. Recordkeeping.

7. Data collection, collation, evaluation, and maintenance.

8. All other management activities associated with the GETS including general oversight, accounting, health and safety, provision of labor, supplies and equipment, and communication with applicable stakeholders including local, State, and Federal authorities.

C. First year O&M services shall start after successful completion of the facility performance test.

1.04 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-07 Certificates

Training Certificate

SD-10 Operation and Maintenance Data

Operation And Maintenance Plan; G

Progress Reports; G

Regulatory-Required Monitoring Reports (As Applicable Based on Permit-Equivalency Requirements); G

SD-11 Closeout Submittals

Transition Plan; G

Annual Status Report; G

1.05 OPERATION AND MAINTENANCE PLAN

Contractor shall prepare an Operation and Maintenance Plan for the GETS. The plan shall include, but not be limited to, the following:

A. Describe the project organization including a chart showing lines of authority, lower-tier subcontractors.

B. Staffing plan including the names and certifications for the site operators.

C. Describe the operating procedures to ensure continuous operation and compliance with discharge criteria.

D. Provide maintenance, inspection, and sampling schedule.

E. Include Operation and Maintenance Data (Section 01 78 23, OPERATION AND MAINTENANCE DATA).

F. Describe components to be inspected and maintained, inspection and maintenance techniques, and frequencies, and reporting methodology.

G. Describe the process control strategy and specific procedures for startup and shutdown of the treatment system.

H. Describe field operating procedures for the carbon changeouts.

1.06 TRANSITION PLAN

Contractor shall prepare a Transition Plan describing activities and training that would be performed at the end of the First Year of Operations, assuming the Relieving Operator would take over operations of the GETS after the first year. The plan shall include, but not be limited to, the following:

A. Develop a plan for turning over the responsibility for the management, operation, and maintenance of the treatment system to the Relieving Operator, and training the Relieving Operator.

B. Submit a draft Transition Plan for approval within 90 calendar days before the completion of the first year of operation. Submit a final Transition Plan for approval within 20 days following receipt of Government comment on the draft Transition Plan.

C. The transition/training period will be the final 30 calendar days of the Contractor's final year of operation. Should the Government

exercise any 1-year options, the 30 day transition will be the last 30 days of the final option year.

D. During the first half of the training period, Relieving Operator's personnel shall observe operational procedures at the facilities as performed by the Contractor. During the remainder of the training period, the Relieving Operator's personnel shall operate and maintain the facilities under the supervision of the Contractor.

E. At end of the training period, the Relieving Operator will assume full responsibility for the management, operation, and maintenance of all facilities. The Contractor shall issue a Training Certificate, countersigned by the Relieving Operator, that the required training has taken place and satisfactorily completed.

F. The Transition Plan shall include all procedures required to effect a smooth transition of the management, operation, and maintenance responsibility, including a schedule detailing when and how the Relieving Operator's personnel will be trained by the Contractor in the management, operation, and maintenance of all equipment, systems, processes, and appurtenances.

G. Transition plan shall include the transfer of all utility bills (electric, sewer, water, internet) to the Relieving Operator.

1.07 PROGRESS REPORTS

Contractor shall prepare monthly Progress Reports describing the operations and maintenance activities performed at the GETS during the proceeding month.

A. The monthly reports shall include, but not be limited to, the following:

1. The safety summary shall highlight any accidents and corrective action, safety instruction, deficiencies noted during routine inspections, etc. including but not limited to the following items:

   a. Health and safety activities,
   b. Safety hours (hours onsite) status
   c. Problems for the month

2. Operation and maintenance activities and status including:

   a. Total flows treated and estimate for contaminant removed in each process per month, and total removal to date.
   b. Readiness rate determined by fully capable operational days divided by available operational days in any particular month.
   c. If used, chemical consumption per month, to date and projection for next month, including quantities and cost to Contractor.
   d. Summary of compliance sampling, analytical results, problems, and corrective actions.
   e. Summary of performance sampling, analytical results, problems, and corrective actions.
   f. Summary of data logged by PLC per month.

g. Carbon use per month, to date and projection for next change out.
h. Updated operation and maintenance logs as detailed in the approved OMP.
i. Maintenance performed on the extraction system, including extraction wells, observation wells, and transmission piping.

3. Identification of problems, suggested correction actions and activities performed by the Contractor to correct problem.

4. Planned activities and schedule for significant operations, maintenance, laboratory and administrative activities to be performed.

5. All other factors which affect the operation, maintenance, and management of the treatment system.

B. Regulatory-required monitoring reports. The results of monitoring required under NJDEP permit equivalences at the frequency specified in the permit equivalency.

C. Submit report to Contracting Officer by the 15th of each month.

1.08 ANNUAL STATUS REPORT

Contractor shall prepare an annual status report summarizing the operations and maintenance activities performed at the GETS during the proceeding year, in accordance with the USEPA guidance EPA 542-R-05-010 O&M Report Template for Ground Water Remedies.

The report shall include, but not be limited to, the following:

A. Evaluation of plant condition and performance at conclusion of the operation period.

B. Maintenance items affecting plant reliability, not anticipated in the Operations and Maintenance Plan.

C. Proposed changes to unit process standard operating procedures that maximize performance and minimize chemical usage and energy requirements.

D. Summary of the process monitoring data to evaluate the effectiveness of the remedy.

E. Extraction and observation well inventory and recommended repairs, if needed.

F. Inventory of general facility repairs and upgrades if needed.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 GENERAL

Contractor shall have the following responsibilities:

A. Responsible for operation and maintenance, monitoring, sampling, completing records and reports, and managing the treatment system for one year. Furnish all labor, supervision, tools, materials, incidental engineering, and transportation necessary for the continuous operation, maintenance, and repair of the treatment system in accordance with the approved Operation and Maintenance Plan (paragraph 1.05). The Contractor shall maintain the facilities in a fully operational condition at all times and shall perform maintenance and repairs to the maximum extent possible with own personnel.

B. Procure, arrange delivery, and pay for all carbon, chemicals (if needed), spare parts, and lubricants as required for the operation and maintenance of the treatment.

C. Cut brush and weeds in all areas within the site boundaries as necessary to maintain proper working conditions and site appearance.

D. Properly dispose of all litter, cut brush and weeds, and other similar onsite generated waste.

E. Immediately repair damage to asphalt cap within the Site fence.

F. Immediately repair minor on-site soil erosion within the site fence to prevent major erosion problems. Repair of areas of erosion at effluent discharge location with more or larger riprap, as necessary.

G. Inventory spare parts, tools, and materials on-site and equipment manufacturers' information and develop, maintain, and recommend adds/deletes to a spare parts, tools, and materials list based on the existing inventory including health and safety supplies, personnel protection equipment, and first aid supplies. The Contractor shall resupply the spare parts, tools, and materials inventory as parts and materials are used for maintenance and keep the inventory up-to-date and fully stocked.

H. Maintain the site litter-free at all times. Maintain neat and clean work areas and equipment at all times, including:

1. All places of employment, passageways, storeroom, conference room, bathroom, and service areas shall be kept clean and orderly and in a sanitary condition.
2. Trash and debris and rubbish shall be picked up from the floor, walkways, stairways, and passageways.
3. Paved areas shall be kept free of grease and oil.
4. General house cleaning shall be scheduled to keep the facility clean and clear of debris.
5. All roads, drives, and parking areas shall be kept clear and clean, and repairs to the parking lot and other areas provided if damaged.
6. Provide snow removal for the paved parking areas and building

entrance to provide continuous operations.

7. Provide maintenance of paint or coatings affiliated with all equipment and appurtenances of the treatment system.

I. Operate the treatment system to ensure the treated water meets the discharge requirements and all other provisions established in the NJPDES Discharge Permit Equivalent.

J. Operate the treatment system to ensure the treated air meets the discharge requirements and all other provisions established in the NJ Air Discharge Permit Equivalent.

K. Furnish a minimum of two certified N2 operators. One operator who will act as the person responsible for plant operation and responding to system shutdowns and the second as a backup replacement in the event the operator responsible for the facility operation is unavailable. The operator shall be present at the facility not less than 1 day per week. The operator is required to respond to alarm conditions within 24-hours of the shutdown notification. Provide a minimum of two people onsite during any required operating shift when safety concerns warrants this requirement in accordance the Contactor's accepted Site Specific Health and Safety Plan.

L. Responsible for providing carbon, materials, equipment, supplies necessary to perform all carbon change outs as required to meet the requirements of the air and water discharge permit equivalents.

M. Backflow preventer(s)to be inspected, maintained, and reports prepared as required by NJAC 7:10.

N. Prepare Monthly Progress Reports and Annual Status Report. Includes a monthly download of process data logged on the Operator Interface Terminal (OIT).

O. Contractor responsible for Quality Control of all data and information.

P. Responsible for material, equipment, and supplies necessary to collect and ship compliance and performance samples. Maintain the collection points in a clean and fully operational condition and repair as needed if leaks develop. Contractor shall furnish services of an analytical laboratory which is fully equipped to conduct water and air quality analysis of the samples.

Q. Responsible for material, equipment, and supplies necessary to collect and ship untreated groundwater samples from extraction wells and post-treatment groundwater samples to confirm effectiveness of the treatment system on meeting the applicable NJPDES Discharge Permit Equivalent and MCUA TDA approval requirements, as necessary. Contractor shall furnish services of an analytical laboratory which is fully equipped to conduct water quality analysis of the samples.

R. Provide trained and responsible staff for all subsequent programming changes.

S. Maintain and pay for all utilities necessary for use at the Site.

T. Train the Relieving Operator in the operation, maintenance, and management of all facilities including equipment, processes, systems and appurtenances for a period of one month. This item is further described in paragraph 1.06 and paragraph 3.08, Transition Plan.

U. Maintain all wells, pipelines, instrumentation, controls, remote access, equipment, systems, processes, and appurtenances in proper functioning condition at all times.

V. Make no changes or additions to any of the onsite facilities without prior written approval of the Contracting Officer. The Contractor shall maintain up-to-date as-built revisions to existing drawings where changes are made.

W. Operate the treatment system to the necessary hydraulic containment using all appropriate equipment and regulate extraction well pumping to optimize the extraction system within the limits of the treatment system capacity.

X. The Contractor shall examine the use of chemicals, if needed, to regulate pH in the extracted and discharged water and the Contractor shall attempt to achieve the lowest practicable concentration of contaminants in the plant effluent, in compliance with discharge permit requirements, balancing the usage of the vapor phase and liquid-phase GAC adsorption within equipment limits.

3.02 CORRECTIVE MAINTENANCE

A. Corrective maintenance is everything not defined as routine and preventative and can generally be described as repairs to all piping, equipment, facilities and grounds associated with the treatment system that could not have been anticipated or steps taken to prevent. Examples include, but are not limited to, paving repair, replacement of failed equipment, repair of major piping failure, electrical and instrumentation repairs and repairs to doors and windows.

B. Non-Warranted Corrective Maintenance: Corrective maintenance involving replacement due to normal failure of equipment and materials not under warranty shall be performed by the Contractor utilizing the onsite maintenance staff to the greatest extent possible. The spare parts inventory shall be used to the maximum extent possible. Failure due to lack of maintenance, abuse, misuse shall not be considered normal failure.

C. Warranted Corrective Maintenance: Corrective maintenance performed by suppliers, manufacturers or subcontractors on warranted equipment, components, materials or workmanship shall be coordinated by the Contractor with the Government and supplier, subcontractor or manufacturer. The Contractor shall be responsible for coordinating and supervising all warranty work on behalf of the Government. Government approval shall be sought in determining the best course of action which may include:

1. Work performed by warrantor personnel within time frame established by Government and Contractor to minimize impacts

to the operation.

2. Work executed by Contractor maintenance staff or subcontract under direction, approval, and reimbursement by the warrantor.

D. The goal of the Contractor's corrective maintenance program shall be to maintain an 85 percent operational readiness rate. If the readiness rate drops below 85 percent, the Contractor shall submit in writing to the Government recommended actions to improve plant operation. Action may include additional spare parts or maintenance equipment, equipment improvements, additional operator or maintenance training, revised operating procedures, etc.

E. The Contractor staff must have the authority to prepare proposals, negotiate, and execute modifications arising from corrective maintenance activities.

3.03 WASTE DISPOSAL

A. Responsible for the characterization, disposal, and handling of all debris and waste generated by the treatment system and sampling events in accordance with Section 02 81 00, HANDLING, TRANSPORT AND DISPOSAL OF WASTE MATERIALS. Dispose of waste at Government approved disposal locations and facilities.

B. Responsible for general refuse management and disposal.

3.04 SAFETY

A. Responsible for all safety activities associated with the execution of the Work including safety of lower- tier subcontractors in accordance with 01 35 29 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.

B. Maintain up-to-date health and safety records for all onsite personnel.

C. Inform Government of all near misses, incidents, onsite accidents, and related claims.

D. Provide all necessary personal protective equipment for Contractor personnel prior to proceeding with the Work.

E. All workers associated with any activity that may expose them to contaminated materials or the treatment of such must have proper OSHA approved 40-hour health and safety training and subsequent 8 hour refreshers.

3.05 UTILITIES SERVICES

A. Electricity usage shall be in compliance with USEPA policy for renewable energy usage. The Contractor shall coordinate with the local electrical utility to transfer all utility accounts to the Contractor's name. Electricity furnished shall not be wasted.

B. Provide required telecommunications services, including internet, through the local public utilities company serving the area. Pay all service and monthly fees as part of Plant Operations & Maintenance.

C. Temporary connections and facilities installed by the Contractor shall be removed in a workmanlike manner to the satisfaction of the Government.

D. The costs for all electricity and Government telephone fees shall not be included in the Contractor's estimated price. All electricity and Government telephone fees shall be paid by the Contractor. The Government will reimburse the Contractor for documented and justifiable electric and Government telephone fees.

E. Provide and pay for sanitary sewer and potable water service.

3.06 SYSTEM SAMPLING AND ANALYSIS

A. Sampling and analysis at the treatment system shall be conducted in accordance with the approved UFP-QAPP (per Section 01 35 45, CHEMICAL DATA QUALITY CONTROL).

B. Samples shall be analyzed using applicable EPA methods with detection limits to demonstrate compliance with the applicable permit requirements and as defined in Section 01 35 45, CHEMICAL DATA QUALITY CONTROL.

C. The Government reserves the right to require the use of a USEPA CLP laboratory for analysis.

D. Any testing done by the Contractor or by a subcontracted off-site laboratory must be validated in accordance with the DESA/CLP process and adhere to the requirements of Section 01 35 45, CHEMICAL DATA QUALITY CONTROL

E. Additional samples may be required by the Government if the sample results show non-compliance or unit process performance issues beyond those listed in this section to implement corrective action.

F. Compliance Samples: Samples from the treatment system discharge in accordance with applicable permit equivalent requirements provided in attached Supplements:

1. Treated Discharge - Water: Sampling location: Treated Water Tank (T-800) Outlet Sampling Port.

2. Treated Discharge - Air: Sampling location: Vapor Phase Carbon 2 (VPGAC 2) Outlet Sampling Port

G. Performance Samples: Samples collected to evaluate the effectiveness of the treatment process in removing contaminants from waste stream.

1. Vapor Phase Carbon Influent - Air:

a. Sampling location: Vapor Phase Carbon 1 (VPGAC 1) Inlet Sampling Port.
b. Sampling frequency: Weekly.
c. Analytical: VOCs via Photoionization Detector (PID).

2. Vapor Phase Carbon Effluent - Air

a. Sampling Location: Vapor Phase Carbon 2 (VPGAC 2) Outlet Sampling Port.
b. Sampling Frequency: Weekly.
c. Analytical: VOCs via Photoionization Detector (PID).

3. Air Stripper Effluent - Water:

a. Sampling location: Air Stripper (AS-300) Outlet Sampling Port.
b. Sampling frequency: Monthly.
c. Analytical: VOCs.

4. Treatment System Combined Influent - Water:

a. Sampling location: Influent Equalization (EQ) Tank (T-100) Inlet Sampling Port.
b. Sampling frequency: Weekly for first month, monthly for three months,and then quarterly for the remainder of the year.
c. Analytical: VOCs, SVOCs, Pesticides, PCBs, Metals (total and dissolved), required geochemistry parameters including, but not limited to pH, TSS, and TOC.

5. Liquid-Phase Carbon Breakthrough - Water:

a. Sampling location: Liquid-Phase Carbon 1 (LPGAC 1) Outlet Sampling Port.
b. Sampling frequency: Monthly.
c. Analytical: VOCs, PCBs.

6. Extraction Wells:

a. Sampling location: EW-1 through EW-5 sampling ports at the influent piping manifold inside the GETS building.
b. Sampling frequency: Quarterly, once prior to startup and once every 3 months after startup of treatment system.
c. Analytical: VOCs, SVOCs, Pesticides, PCBs, Metals (total and dissolved), required geochemistry parameters including, but not limited to pH, TSS, and TOC.

7. Soil Vapor System

a. Sampling location: Sub-slab sampling port on riser pipe in treatment area; indoor air location in conference room.
b. Sampling frequency: During first year of operations - quarterly during heating season for passive system. If Verification Sampling determines that an active system is required and is operational, annual sampling. Subsequent years in accordance with NJDEP guidance.
c. Analytical: same as Verification Sampling in accordance with Tables 1 and 2 in Section 01 35 45 Chemical Data Quality Control.

7. Performance testing requirements may be reduced at the discretion of the Government after 6 months of successful performance.

3.07 CARBON CHANGEOUTS

A. Procure, arrange delivery, and pay for all carbon, equipment, materials, and other supplies to provide complete carbon change outs for the vapor phase and liquid-phase vessels as required to meet the discharge limits.

B. Carbon changeout will be required when:

1. Stage 1 of liquid-phase GAC shows 75 percent of influent polychlorinated biphenyls (PCBs) concentration as breakthrough based on performance samples.
2. Effluent of vapor phase GAC units shows detectable VOCs in effluent.

C. Contractor shall be responsible for evaluating the recommended changeout frequency during operation. Recommendations for revising frequency shall be made to Government for review and approval prior to any changes.

D. If effluent samples at any time exceed discharge criteria, the treatment system shall be shut down and GAC replacement completed.

E. Vapor phase carbon shall conform to the requirements in Section 43 13 13.13, VAPOR PHASE ACTIVATED CARBON ADSORPTION UNITS.

F. Liquid-phase carbon shall conform to the requirements in Section 43 31 13.14, LIQUID-PHASE GRANULAR ACTIVATED CARBON ADSORPTION UNITS (LPGAC).

G. Provide the characterization, packaging, loading, and disposal of the carbon removed and the carbon supplied during change out.

H. Contractor shall be responsible for proper disposal of spent carbon.

I. Carbon to be removed by vacuum from the vessels and packaged in UN/D.O.T approved containers for disposal. Vessel internals to be inspected and repairs performed prior to refilling the vessel with fresh, activated carbon. New carbon will be loaded by vacuum into the empty vessels.

3.08 TRANSITION PLAN

A. Within the 1-month Transition period the Contractor shall ensure the following are met:

1. All process equipment maximum auxiliary equipment, and supplies necessary to treat a sustained and continuous flow of 65 gpm (or maximum allowable from well testing and startup) are available and operational.

2. All necessary permits are transferred.

3. All utility accounts are transferred.

4. All plans listed in the paragraph 1.03 Submittals, are approved as specified.

5. All plant modifications or in-progress work is completed before transition.

B. Provide a checklist of all spare parts, tools, and materials necessary for operations.

3.09 USE OF CONSULTANTS OR SUBCONTRACTORS

A. Notwithstanding any provisions in these specifications, the use of consultants or subcontractor services in the performance of operation of the System shall be subject to the prior written approval of the Contracting Officer.

B. If the Contractor utilizes a consultant or subcontractor for any part of the work identified herein, said consultant or subcontractor shall be identified in the Staffing Plan, Plan of Operation, and in the appropriate required plans as identified within this section.

C. The Contractor shall describe the services to be performed and provide resumes and references of the consultant or subcontractor for approval by the Contracting officer prior to the work identified being performed.

D. The Contractor shall be responsible for preparing all subcontracts and purchase orders for work performed.

3.10 WARRANTIES/GUARANTEES

A. The Contractor shall operate and maintain all equipment, systems, processes, and appurtenances in accordance with the manufacturer's recommendations to ensure that the warranties or guarantees are not voided.

B. The Contractor shall be responsible for and correct any deficiency where the Contractor voided a warranty/guarantee due to his operation or maintenance practices.

C. The Contractor shall obtain all warranties/guarantees available from subcontractors, suppliers, or manufacturers for any new materials, equipment, products, or construction incorporated into the plant or site, as part of the performance of this contract, including any modifications thereto. Warranties will be transferable to the Government. All warranties obtained are to be added to the plant warranty summary report. (The summary report is part of the plant files which are kept onsite.)

-- End of Section --

DIVISION 02 – EXISTING CONDITIONS

SECTION 02 81 00

HANDLING, TRANSPORT AND DISPOSAL OF WASTE MATERIALS
02/10

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals necessary for the handling, storage, and off-site transport and disposal of waste materials. Waste materials refer to any and all materials including, but not limited to, excavated soils determined not to be suitable for backfilling, construction debris, drill cuttings, drilling fluids, sediments from well development, spent carbon generated during the operation of the Contact Water treatment system, liquid waste including Contact Water, groundwater generated during well development and pump tests, other fluids generated during construction, and waste during site operations. The Contractor's plans, which will be based on the requirements of this section, shall provide the detailed methods for performing the work.

B. Characterize all waste in accordance with the sample requirements and methodology in Section 01 35 45 CHEMICAL DATA QUALITY CONTROL, the Contractor's approved UFP-QAPP, as required by the off-site disposal facilities, and all Federal, State, and local requirements.

C. Ensure all operations for handling, storage, loading and hauling of wastes are in compliance with all Federal, State, and local requirements.

D. Waste is to be characterized as defined in 40 CFR 261. The site is known to be contaminated with chlorinated volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBSs). Concentrations of trichloroethene (TCE) up to 22 parts per million have been found in the groundwater in the areas in which drilling will occur. PCB contaminant levels in the soil range from ND ("not detected") to 499 ppm.

E. The work includes removal and disposal of PCB contaminated soils and buried debris encountered during excavation at the Site. Where possible, excavated soil will be used for backfill (excepting debris defined as material greater than 2 inch in size) which, when encountered during excavation, shall be segregated and stockpiled and shipped off site for disposal along with any excess soil remaining following backfilling operations.

F. All soil exposed following removal of the asphalt cap shall be considered contaminated and handled as as RCRA/TSCA was until characterization determines is classification. Disposal of the waste material will be based on waste characterization results.

1.02 REFERENCES

The publications listed below form a part of this specification to the

extent referenced. The publications are referred to within the text by the basic designation only.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

IATA DGR	(2013) Dangerous Goods Regulations

U.S. CODE (USC)

10 USC 2692	Storage, Treatment, and Disposal of Nondefense Toxic and Hazardous Materials
33 USC 2701	Oil Pollution Act
49 USC 5101	Hazardous Materials Transportation Act

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

49 CFR 107	Hazardous Materials Program Procedures
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program
40 CFR 272	Approved State Hazardous Waste Management Programs

40 CFR 273	Standards For Universal Waste Management
40 CFR 279	Standards for the Management of Used Oil
40 CFR 280	Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST)
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions

NEW JERSEY ADMINISTRATIVE CODE (NJAC)

NJAC 7:26	Solid and Hazardous Waste Management Regulations,

1.03 DEFINITIONS

A. Hazardous Material

A substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated pursuant to the Hazardous Materials Transportation Act, 49 USC 5101. The term includes materials designated as hazardous materials under the provisions of 49 CFR 172, Sections .101 and .102 and materials which meet the defining criteria for hazard classes and divisions in 49 CFR 173. EPA designated hazardous wastes are also hazardous materials.

B. Hazardous Waste

A waste which meets criteria established in RCRA or specified by the EPA in 40 CFR 261 or which has been designated as hazardous by a RCRA authorized state program.

C. PCB and PCBs (Polychlorinated Biphenyls)

PCB and PCBs means any chemical substance that is limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain such substance as defined in 40 CFR 761.

D. PCB Contaminated Soil and Debris

All soils and associated buried debris removed during excavation at the site are assumed to be contaminated with PCBs. Unless specific testing is performed, it should be assumed that all PCB contaminated soil and debris will require disposal in TSCA permitted facility.

1.04 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Waste Management Plan; G

SD-03 Product Data

Onsite Hazardous Waste Management; G

SD-06 Test Reports

Recordkeeping; G

Spill Response Reporting; G

Exception Report; G

SD-07 Certificates

Transporter Certification

Security Plan; G

Designated Transportation and Disposal Coordinator

Training Certificates

Off-Site Policy Certification Memo

Certificates of Disposal

Waste Minimization Certification

Vehicle Decontamination Verification

Notices Of Non-Compliance And Notices Of Violations

Information Necessary To File State Annual Or EPA Biennial Reports; G

SD-11 Closeout Submittals

Closeout Submittals; G

Truck Manifests; G

1.05 QUALITY ASSURANCE

A. Designated Transportation and Disposal Coordinator

Designate, by position and title, one person to act as the Transportation and Disposal Coordinator (TDC) for this Contract.

The TDC shall serve as the single point of contact for all environmental regulatory matters and shall have overall responsibility for total environmental compliance at the site including, but not limited to, accurate identification and classification of hazardous waste and hazardous materials; determination of proper shipping names; identification of marking, labeling, packaging and placarding requirements; completion of waste profiles, hazardous waste manifests, asbestos waste shipment records, PCB manifests, bill of ladings, exception and discrepancy reports; and all other environmental documentation. The TDC shall have, at a minimum, one year of specialized experience in the management and transportation of hazardous waste and have been Department of Transportation certified under 49 CFR 172, Subpart H.

B. Training Certificates

The Contractor's hazardous materials employees shall be trained, tested, and certified to safely and effectively carry out their assigned duties in accordance with Section 01 35 29 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES. The Contractor's employees transporting hazardous materials or preparing hazardous materials for transportation, including samples, shall be trained, tested, and certified in accordance with 49 CFR 172, Subpart H, including security awareness and any applicable security plans. Where shipment of hazardous materials by air may be occurring, such as for sample shipments, the Contractor's hazardous material employees shall also be trained on IATA DGR. Contractor employees making determinations that shipments do not constitute DOT regulated hazardous materials shall also be trained, tested, and certified in accordance with 49 CFR 172, Subpart H.

C. Transporter Certification

The Contractor and/or subContractors transporting hazardous materials shall possess a current certificate of registration issued by the Research and Special Programs Administration (RSPA), U.S. Department of Transportation, when required by 49 CFR 107, Subpart G. Submit copies of the certificates or written statements certifying exemption from these requirements.

D. Waste Management Plan

A. Contractor shall prepare a Waste Management Plan that details procedures for the handling, transport, and disposal of all waste material generated during implementation of the Work.

B. At a minimum, the Waste Management Plan shall include the following:

1. Procedures to be employed to ensure a written waste determination is made for appropriate wastes which are to be generated.

2. Procedures for collecting representative samples and required analysis.

3. List of notifications and permit applications to be made.

4. Methods of hazardous waste accumulation/storage (i.e., in tanks and/or containers).

5. Management procedures for storage, labeling, and packaging of waste.

6. Management procedures for transporting waste including transportation requirements, transport vehicles, potential hazards during hauling operations, and procedures for mitigation of hazards.

7. Management procedures for disposal of waste including requirements by the permitted waste facilities.

8. Management procedures for proper documentation of waste disposal including documentation that disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268).

9. Used oil management procedures in accordance with 40 CFR 279.

10. Pollution prevention and hazardous waste minimization procedures.

11. Procedures to be employed to ensure all required employee training records are maintained.

12. Procedures to verify compliance with Off-Site Rule Policy reviews and approvals. Sample OFF-SITE POLICY CERTIFICATION MEMO is attached.

13. Provide inventory log for waste stored onsite.

14. Provide the locations where various types of waste will be disposed or recycled. Include letters of acceptance or as applicable, submit one copy of a State and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

15. Provide documentation that all operators and vehicles used to transport contaminated material meet all federal, state, and local regulations for the transport of waste to the disposal facility.

16. Describe methods, techniques, and phases of dealing with the PCB-contaminated soil, including: a sequence of operations, the method of excavation, hauling, and handling of the contaminated materials, and the proposed equipment. Coordinate work with other activities being conducted at the site. Ensure that work operations or processes involving PCB-contaminated materials are conducted in accordance with 40 CFR 761 and the applicable requirements of this section.

E. Vehicle Decontamination Verification

Provide documentation verifying that vehicles and containers in contact with contaminated soils were decontaminated prior to leaving the disposal site, were properly operating, and were covered, within 24 hours after removal of waste from the site.

F. Closeout Submittals

Include in Closeout Submittals prepared under Section 01 78 00, CLOSEOUT SUBMITTALS, the following items: all test results including readings and locations, a diagram of the limits of the excavated area with sample locations indicated (indicate reference benchmark used), chain of custody forms, certificates of disposal, truck manifests, and description of the work completed.

G. Laws and Regulations Requirements

Work shall meet or exceed the minimum requirements established by Federal, state, and local laws and regulations which are applicable. These requirements are amended frequently and compliance with amendments is required as they become effective. In the event that compliance exceeds the scope of work or conflicts with specific requirements of the Contract, notify the Contracting Officer immediately.

PART 2 PRODUCTS

2.01 MATERIALS

Provide all the materials required for the packaging, labeling, marking, placarding and transportation of hazardous wastes and hazardous materials in conformance with Department of Transportation and State of New Jersey standards. Details in this specification shall not be construed as establishing the limits of the Contractor's responsibility.

A. Shipping Containers

1. Shipping containers shall be suitable to receive and contain the waste until the waste is disposed of at the approved facility.

2. Inspect the condition of all containers upon arrival at the site. Containers that are deteriorating or leaking must not be used.

3. Drums shall be UN/DOT approved and in accordance with NJAC 7:26-7.2(b), 9.3 and 9A. 2.2 LABELING.

4. Containers to be marked and labeled in accordance with federal, state, and locate requirements. Labels to be durable, weather resistant, and capable of withstanding, without deterioration or substantial color change, a 180-day exposure to conditions reasonably expected to be encountered during container storage and transportation.

B. Placards

Provide primary and subsidiary placards, both quantity and type, as required by federal, state and local requirement for each off-site shipment of material/waste

2.02 EQUIPMENT AND TOOLS

Provide miscellaneous equipment and tools necessary to handle hazardous, nonhazardous, and TSCA wastes in a safe and environmentally sound manner.

PART 3 EXECUTION

3.01 ONSITE HAZARDOUS WASTE MANAGEMENT

These paragraphs apply to Government-owned waste originating at the Site only. Contractors are prohibited by 10 USC 2692 from storing Contractor-owned waste onsite for any length of time. The Contractor is responsible for ensuring compliance with all Federal, state, and local hazardous waste laws and regulations and shall verify those requirements when preparing reports, waste shipment records, hazardous waste manifests, or other documents. Identify hazardous wastes using criteria set forth in 40 CFR 261 or all applicable state and local laws, regulations, and ordinances. When accumulating hazardous waste onsite, comply with generator requirements in 40 CFR 262 and any applicable state or local law or regulations. Onsite accumulation times shall be restricted to applicable time frames referenced in 40 CFR 262, or as approved by Contracting Officer. Accumulation start dates shall commence when waste is first generated (i.e., containerized or otherwise collected for discard).

Only use containers in good condition and compatible with the waste to be stored. Ensure containers are closed except when adding or removing waste, and immediately mark all hazardous waste containers with the words "hazardous waste" and other information required by 40 CFR 262, Section .32 and any applicable state or local law or regulation as soon as the waste is containerized. Stockpiles shall be covered at all times when not in use. Surface water runoff will be diverted away from stockpiles and any leachate generated captured and controlled.

An additional marking shall be placed on containers of "unknowns" designating the date sampled, and the suspected hazard. Inspect containers for signs of deterioration and for responding to any spills or leaks. Inspect all hazardous waste areas weekly and provide written documentation of the inspection. Include date and time of inspection, name of individual conducting the inspection, problems noted, and corrective actions taken on the inspection logs.

3.02 CONTROL AND MANAGEMENT OF WASTE

A. Pick up general site refuse and place in covered containers which are regularly emptied. Recycling is encouraged.

B. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the site clean.

C. Provide all field screening and sampling and analytical services necessary to characterize the waste in accordance with the disposal facility requirements, all applicable federal, state, and local requirements, and the approved UFP-QAPP.

D. Cover all transport vehicles containing waste with tarps before leaving the site.

E. Remove all solid waste (including non-hazardous debris) from Government property and dispose off-site at an approved landfill. Solid waste disposal off-site must comply with most stringent local, State, and Federal requirements.

F. Coordinate the schedule for vehicle arrival and material deliveries at the site to meet the approved project schedule.

G. Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated by environmental law. Maintain spill cleanup equipment and materials at the work site.

H. Maintain spill cleanup equipment and materials at the work site and clean up all hazardous and non-hazardous waste spills in accordance with the approved Accident Prevention Plan.

I. As noted in para 1.03, excavated material from trenching for pipeline installation and from foundation construction shall be assumed to be PCB-contaminated. The Contractor shall stockpile all excavated soils in a controlled manner in accordance with para 3.02 and the Contract Drawings, for reuse as backfill in constructing trenches or building foundation. Excess excavated material that cannot be used for backfill shall be characterized for off-site disposal.

J. Solid and liquid waste will be generated as part of well installation activities.

   1. Solids: Solids will include drill cuttings from overburden soils as well as from bedrock drilling. Prior to characterization, overburden soils are assumed to be hazardous/TSCA waste; rock corings are assumed to be non hazardous waste. These materials should be handled accordingly until characterization documentation is available

   2. Liquids: Liquids will include drilling liquids, well development water and capacity pump test water, Contract Water, and dewatering fluids, if generated. This water shall be containerized and characterized for subsequent treatment.

   3. All solids and liquids generated during well drilling activities will be disposed off-site in accordance with characterization documentation. Neither solid or liquids wastes should be reintroduced to any borehole or well, even if the decision is made not to develop that borehole or well.

K. Establish an Exclusion Zone (i.e., PCB control area) around the area where excavation below the asphalt cap will occur, to prevent unauthorized entry of personnel. Mark out areas and provide signs

at approaches and around perimeter. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Allow only personnel briefed on the elements and trained as specified herein into the area.

1. Include provisions to ensure that airborne PCB concentrations below the PEL of air defined herein are not exceeded outside of the PCB control area or by workers inside the PCB control area. Provide air monitoring within the Exclusion Zone in accordance with Section 01 35 29 as well as perimeter air monitoring in accordance with Section 01 36 20, and other sampling to ensure workers safety as determined by the CIH.

2. Maintain strict dust control at all times to prevent dust particles with PCB attached from becoming airborne. Mist water over the the soil in areas disturbed by operations.

3. Stockpile contaminated soil removed from the excavation in a temporary containment area near the excavation area. Divert water from the containment area. Cover containment area with 30 mil polyethylene sheeting. Place excavated soil on the impervious barrier and cover with 6 mil polyethylene sheeting. Provide straw bale berm around the outer limits of the containment area and cover with polyethylene sheets. Secure edges of sheets to keep the polyethylene sheeting in place. Cover excavated contaminated soil at all times when stockpile not in use. Maintain sheeting and replace when worn or ripped. As an option, soil may be stockpiled in trucks suitable for carrying PCB contaminated soils as specified herein.

4. Do not expose PCBs to open flames or other high temperature sources since toxic decomposition by-products may be produced. Do not heat PCBs to temperatures of 135 degrees F or higher without Contracting Officer's concurrence.

3.03 HAZARDOUS WASTE DISPOSAL

A. No hazardous, toxic, or universal waste, PCB-contaminated soil or debris, or hazardous material shall be disposed or abandoned on Government property. Unless otherwise noted in this Contract, the Government is not responsible for disposal of Contractor-generated waste material. The disposal of incidental materials used to accomplish the work including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor.

B. The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or water way or conduct waste treatment or disposal on Government property without appropriate permits and the written approval of the Contracting Officer.

C. Control of stored waste, packaging, sampling, analysis, and disposal will be determined by the details in the Contract. The requirements for activities identified in the following paragraphs will be used as the guidelines for disposal of any hazardous waste generated.

1. Provide all service necessary for the final treatment/disposal of the hazardous material/waste in accordance with all local, State and Federal laws and regulations, and the terms and conditions of the Contract within 60 days after the materials have been generated. These services will include all necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal, and/or transportation, including manifesting or completing waste profile sheets, equipment, and the compilation of all documentation is required).

2. Contain all waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 272, 40 CFR 273, 40 CFR 279, 40 CFR 280, and 40 CFR 761.

3. Obtaining a representative sample of the material generated for each job done to provide waste stream determination.

4. Analyzing for each sample taken and providing analytical results to the Government.

5. Determine the DOT proper shipping names for all waste (each container requiring disposal) and will demonstrate how this determination is developed and supported by the sampling and analysis requirements contained herein to the Contracting Officer.

3.04 WASTE LOADING AND VEHICLE INSPECTION

A. Provide equipment that is appropriate to accomplish the work and its use is in compliance with Occupational Safety and Health Administration (OSHA) requirements. Take all necessary precautions for the safe operation of the equipment and the protection of the public from injury and damage from the equipment.

B. Inspect vehicles at the Site prior to loading to ensure that the vehicles have no fluid leaks, no unusually noisy mufflers or tailpipes, tires that are in good condition, and have operational brakes, horn, steering, operating controls, and safety devices. Vehicle beds used for hauling shall be free from drain holes, cracks, or other conditions that might permit waste material to leak from the vehicle beds.

C. If the vehicle used for hauling has tailgates for dumping, the Contractor shall demonstrate to the Contracting Officer that the tailgates can be sealed watertight during operation. Any vehicle bed not providing an adequate leak-proof seal shall be repaired or replaced as required. Bed liners may be used with approval of Contracting Officer.

D. Tarpaulin covers shall be placed over all vehicle beds during waste transport to the disposal facility. Covers shall be placed over trucks, trailers or other conveyances used for bulk shipment to avoid spillage of the waste material and entrance of rain or snow during transport. The covers shall completely enclose the bulk shipment with no open areas along the sides or openings on the top. Cover systems shall meet the criteria for a closed transport vehicle as specified in 49 CFR 173.403(c). Failure of the shipping container, liner, seals, hatches, doors, or tarpaulin

system to meet the above requirements which causes material to be rejected by disposal facility shall be addressed at the Contractor's expense.

E. The Contractor shall coordinate recording quantities of waste leaving the site with the Contracting Officer.

F. Vehicles/containers, either empty or loaded, shall not remain at the site, unless specific arrangements are made otherwise. Immediately after loading, they shall be sealed, weighed, and transported directly to the disposal facility.

3.05 TRANSPORTATION

A. Meet all existing Federal, State, and local regulations for vehicle operations in transporting the waste on public roads and highways. Haul routes shall be maintained in a clean condition so that no dirt or contamination is tracked onto clean areas or public roads and highways.

B. Responsible for any and all actions necessary to remedy situations involving material spilled in transit on- or off-site or mud and dust tracked off-site. This cleanup shall be accomplished at the Contractor's expense.

C. Transportation routes to and from project areas shall be in accordance with the approved Waste Management Plan. No deviation from transportation routes shall be allowed without prior written approval from the Contracting Officer.

D. Responsible for all repair costs for damages to structures, roads, bridges and any other features affected by the Contractor's off-site transportation and disposal operations.

3.06 OFF-SITE DISPOSAL

A. Dispose of all waste at an approved off-site disposal facility and coordinate the proposed modes of transportation and scheduling and notification of all shipments with the disposal facility. Notify the Contracting Officer in writing within 14 calendar days of any problems or issues which occur during transportation to the disposal location. This notification shall include any damage to containers during transportation and any scheduling conflicts with the disposal subcontractor which may adversely impact project schedule or cost.

B. Provide for the weighing of each loaded container by a certified weigh-master at a State-certified scale at the disposal facility. Shipping documentation shall be faxed to the Contracting Officer immediately after each load container is weighed. Provide the Contracting Officer with an original copy of the shipping documentation within two days following shipment.

C. The Contractor shall be responsible for all wastes until they are accepted by the disposal facility. It is the Contractor's responsibility to ensure that all waste shipments are in compliance with the disposal facility's requirements at the time of receipt of the shipments at the disposal facility.

D. The Contractor shall maintain communication throughout the transportation process associated with each shipment to ensure adequate notification of scheduled arrival times for containers reaching the site. The Contractor shall be responsible for all delays in turnaround time for transport vehicles.

E. Following determination of disposal site(s), submit any subsequent notices of non-compliance and notices of violations issued to the facility(ies).

3.07 WASTE MINIMIZATION CERTIFICATION

Minimize the generation of hazardous waste to the maximum extent practicable and take all necessary precautions to avoid mixing clean and contaminated wastes. Identify and evaluate recycling and reclamation options as alternatives to land disposal. Requirements of 40 CFR 266 shall apply to: hazardous wastes recycled in a manner constituting disposal; hazardous waste burned for energy recovery; lead-acid battery recycling; and hazardous wastes with economically recoverable precious metals. Submit written certification that waste minimization efforts have been undertaken to reduce the volume and toxicity of waste to the degree economically practicable and that the method of treatment, storage, or disposal selected minimizes threats to human health and the environment.

3.08 RECORDKEEPING

Maintain adequate records to support information provided to the Contracting Officer regarding exception reports, monthly reports, annual reports, and biennial reports and maintain bill of ladings for a minimum of 375 days from the date of shipment or any longer period required by any applicable law or regulation or any other provision of this Contract. Submit information necessary to file state annual or EPA biennial reports for all hazardous waste transported, treated, stored, or disposed of under this Contract. The submittal shall contain all the information necessary for filing of the formal reports in the form and format required by the governing Federal or state regulatory agency. A cover letter shall accompany the data to include the Contract number, Contractor name, and project location. In the events that a manifest copy documenting receipt of hazardous waste at the treatment storage and disposal facility is not received within 35 days of shipment initiation, or that a manifest copy documenting receipt of PCB waste at the designated facility is not received within 35 days of shipment initiation, prepare and submit an exception report to the Contracting Officer within 37 days of shipment initiation.

3.09 SPILL RESPONSE REPORTING

In the event of a spill or release of a hazardous substance (as designated in 40 CFR 302), or pollutant or contaminant, or oil (as governed by the Oil Pollution Act (OPA), 33 USC 2701 et seq.), notify the Contracting Officer immediately (within 2 hours). Any direction from the Contracting Officer concerning a spill or release shall not be considered a change under the Contract. If the spill exceeds a reporting threshold, follow the pre-established procedures for immediate reporting to the Contracting Officer. Comply with all applicable requirements of Federal, state, or local laws or regulations regarding any spill incident.

3.10 EMERGENCY CONTACTS

The Contractor is responsible for complying with the emergency contact provisions in 49 CFR 172, Section .604. Whenever the Contractor ships hazardous materials, provide a 24 hr emergency response contact and phone number of a person knowledgeable about the hazardous materials being shipped and who has comprehensive emergency response and incident mitigation information for that material, or has immediate access to a person who possesses such knowledge and information. The phone shall be monitored on a 24 hour basis at all times when the hazardous materials are in transportation, including during storage incidental to transportation. Ensure that information regarding this emergency contact and phone number are placed on all hazardous material shipping documents. Designate an emergency coordinator and post the following information at areas in which hazardous wastes are managed:

A. The name of the emergency coordinator.

B. Phone number through which the emergency coordinator can be contacted on a 24 hour basis.

C. The telephone number of the local fire department.

D. The location of fire extinguishers and spill control materials.

Attachment A SAMPLE OFF-SITE POLICY CERTIFICATION MEMO	
Project/Contract #:	
Waste Stream:	
Primary TSD Facility, EPA ID # and Location:	
Alter. TSD Facility, EPA ID # and Location:	
EPA Region	Contact
I	(617) 918-1752
II	(212) 637-4130
III	(214) 814-5267
IV	(404) 562-8591
V	(312) 353-8207
VI	(214) 665-2282
VII	(913) 551-7154
VIII	(303) 312-6419
IX	(415) 972-3304
X	(206) 553-2859
EPA representative contacted:	
EPA representative phone number:	

Attachment A SAMPLE OFF-SITE POLICY CERTIFICATION MEMO	
Date contacted:	
Comment:	
The above EPA representative was contacted on _____. As of that date the above sites were considered acceptable in accordance with the Off-Site Policy in 40 CFR 300.440.	
Date:	Signature:
Phone number:	

-- End of Section --

DIVISION 03 – CONCRETE

SECTION 03 15 00.00

CONCRETE ACCESSORIES
05/14

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN HARDBOARD ASSOCIATION (AHA)

AHA A135.4	(1995; R 2004) Basic Hardboard

ASTM INTERNATIONAL (ASTM)

ASTM C919	(2012; R 2017) Standard Practice for Use of Sealants in Acoustical Applications
ASTM C920	(2014a) Standard Specification for Elastomeric Joint Sealants
ASTM D1751	(2004; E 2013; R 2013) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D1752	(2004a; R 2013) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion
ASTM D2628	(1991; R 2011) Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements
ASTM D2835	(1989; R 2012) Lubricant for Installation of Preformed Compression Seals in Concrete Pavements
ASTM D412	(2016) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D5249	(2010; R 2016) Standard Specification for Backer Material for Use with Cold-and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 513	(1974) Corps of Engineers Specifications for Rubber Waterstops

COE CRD-C 572 (1974) Corps of Engineers Specifications for Polyvinylchloride Waterstops

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Waterstops; G, AE

SD-03 Product Data

Preformed Expansion Joint Filler; G, AE

Waterstops; G, AE

SD-04 Samples

Field-Molded Type Sealant; G, AE

Sealant; G, AE

Sample Of Each Waterstop Material; G, AE

SD-06 Test Reports

Certified Manufacturer's Test Reports For Premolded Expansion Joint Filler Strips; G, AE

SD-07 Certificates

Preformed Expansion Joint Filler; G, AE

Waterstops; G, AE

Sealant; G, AE

1.03 DELIVERY, STORAGE, AND HANDLING

Protect material delivered and placed in storage off the ground from moisture, dirt, and other contaminants. Deliver sealants in the manufacturer's original unopened containers. Remove sealants from the site whose shelf life has expired.

PART 2 PRODUCTS

2.01 CONTRACTION JOINT STRIPS

Use 1/8 inch thick tempered hardboard contraction joint strips conforming to AHA A135.4, Class 1. In lieu of hardboard strips, rigid polyvinylchloride (PVC) or high impact polystyrene (HIPS) insert strips specifically designed to induce controlled cracking in slabs on grade may be used. Such insert strips must have removable top section.

2.02 PREFORMED EXPANSION JOINT FILLER

Use preformed expansion joint filler material conforming to ASTM D1751 or ASTM D1752, Type I, or resin impregnated fiberboard confirming to the physical requirements of ASTM D1752. Submit certified manufacturer's test reports for premolded expansion joint filler strips to verify compliance with applicable specifications. Unless otherwise indicated, filler material must be 3/8 inch thick and of a width applicable for the joint formed. Backer material, when required, must conform to ASTM D5249.

2.03 SEALANT

Joint sealant conforming to the following:

A. Preformed Polychloroprene Elastomeric Type

In accordance with ASTM D2628.

B. Lubricant for Preformed Compression Seals

In accordance with ASTM D2835. Submit a piece not less than 9 ft of 1 inch nominal width or wider seal or a piece not less than 12 ft of compression seal less than 1 inch nominal width. Provide one quart of lubricant.

C. Field-Molded Type

In accordance with ASTM C920. Use Type M, Grade P or NS, Class 25, Use T sealant for horizontal joints. Type M, Grade NS, Class 25, Use NT for vertical joints. Use polyethylene tape, coated paper, metal foil or similar type materials as bond breaker. The back-up material must be compressible, non-shrink, nonreactive with sealant, and non-absorptive material type such as extruded butyl or polychloroprene rubber. Submit 1 gallon of field-molded type sealant and 1 quart of primer (when primer is recommended by the sealant manufacturer) identified to indicate manufacturer, type of material, quantity, and shipment or lot represented.

2.04 WATERSTOPS

Submit a sample of each waterstop material consisting of a piece not less than 12 inches long, cut from each 200 feet of finished water stop furnished, but not less than a total of 4 linear feet of each type and size furnished. Submit a shop drawing of the waterstops showing the placement and configuration.

A. Non-Metallic Materials

Manufacture non-metallic waterstops from prime virgin resin; reclaimed materials is not acceptable. The compound must contain plasticizers, stabilizers, and other additives to meet specified requirements. Polyvinyl chloride waterstops conforming to COE CRD-C 572.

B. Non-Metallic Hydrophilic

Swellable strip type compounds of polymer modified chloroprene rubber that swells upon contact with water conforming to ASTM D412

as follows: Tensile strength 420 psi minimum on the Type A durometer and the volumetric expansion ratio in distilled water 70 degrees F shall be 3 to 1 minimum.

2.05 TESTS, INSPECTIONS, AND VERIFICATIONS

A. Material Tests

1. Field-Molded Sealants

Test samples of sealant and primer, when use of primer is recommended by the manufacturer, as required in paragraph 2.03 C Field-Molded Type, by and at the expense of the Government for compliance with paragraph 2.03 C. If the sample fails to meet specification requirements, provide new samples and the cost of retesting will be deducted from payments due to the Contractor.

2. Non-Metallic Waterstops
Samples of materials and splices will be visually inspected and tested by and at the expense of the Government for compliance with COE CRD-C 513 or COE CRD-C 572 as applicable. If a sample fails to meet the specification requirements, provide new samples and the cost of retesting will be deducted from payments due to the Contractor.

B. Splicing Waterstops

1. Procedures and Performance Qualifications

Demonstrate procedure and performance qualifications for splicing waterstops in the presence of the Contracting Officer.

2. Non-Metallic Waterstops

Demonstrate procedures and performance qualifications for splicing non-metallic waterstops by the manufacturer at the factory and the Contractor at the job site by each making three spliced samples of each size and type of finished waterstop.

PART 3 EXECUTION

3.01 INSTALLATION

Provide joint locations and details, including materials and methods of installation of joint fillers, as specified and indicated. In no case may any fixed metal be continuous through an expansion or contraction joint.

A. Contraction Joints

Contraction joints may be constructed by inserting tempered hardboard strips or rigid PVC or HIPS insert strips into the plastic concrete using a steel parting bar, when necessary, or by cutting the concrete with a saw after concrete initial set. Make joints 1/4 inch wide and extend into the slab one-fourth the slab

thickness, minimum, but not less than 1 inch.

1. Joint Strips

Provide strips of the required dimensions and as long as practicable. After the first floating, groove the concrete with a tool at the joint locations. Insert the strips in the groove and depress them until the top edge of the vertical surface is flush with the surface of the slab. Float and finish the slab as specified. Work the concrete adjacent to the joint the minimum necessary to fill voids and consolidate the concrete. Where indicated, saw out the top portion of the strip after the curing period to form a recess for sealer. Discard the removable section of PVC or HIPS strips and leave the insert in place. Maintain true alignment of the strips during insertion.

2. Sawed Joints

Saw joints early enough to prevent uncontrolled cracking in the slab, but late enough that this can be accomplished without appreciable spalling. Start cutting as soon as the concrete has hardened sufficiently to prevent raveling of the edges of the saw cut. Complete cutting before shrinkage stresses become sufficient to produce cracking. Use concrete sawing machines that are adequate in number and power, and with sufficient replacement blades to complete the sawing at the required rate. Cut joints to true alignment and in sequence of concrete placement. Remove sludge and cutting debris. Form reservoir for joint sealant.

3. Bond Breaker

Coat joints requiring a bond breaker with curing compound or with bituminous paint. Protect waterstops during application of bond breaking material to prevent them from being coated.

B. Joint Sealant

Fill sawed contraction joints and expansion joints in slabs with joint sealant, unless otherwise shown. Joint surfaces must be clean, dry, and free of oil or other foreign material which would adversely affect the bond between sealant and concrete. Apply joint sealant as recommended by the manufacturer of the sealant.

1. Joints With Preformed Compression Seals

Install compression seals with equipment capable of installing joint seals to the prescribed depth without cutting, nicking, twisting, or otherwise distorting or damaging the seal or concrete and with no more than 5 percent stretching of the seal. Cover the sides of the joint and, if necessary, the sides of the compression seal with a coating of lubricant. Coat butt joints with liberal applications of lubricant.

2. Joints With Field-Molded Sealant

Do not seal joints when the sealant material, ambient air, or concrete temperature is less than 40 degrees F. When the sealants are meant to reduce the sound transmission

characteristics of interior walls, ceilings, and floors follow the guidance provided in ASTM C919. Coat joints requiring a bond breaker with curing compound or with bituminous paint. Install bond breaker and back-up material where required. Prime joints and fill flush with joint sealant in accordance with the manufacturer's recommendations.

3.02 WATERSTOPS, INSTALLATION, AND SPLICES

Install waterstops at the locations shown to form a continuous water-tight diaphragm. Make adequate provision to support and completely protect the waterstops during the progress of the work. Repair or replace any waterstop punctured or damaged. Protect exposed waterstops during application of form release agents to avoid being coated. Provide suitable guards to protect exposed projecting edges and ends of partially embedded waterstops from damage when concrete placement has been discontinued. Accomplish splices with certified trained personnel using approved equipment and procedures.

A. Non-Metallic

Fittings must be shop made using a machine specifically designed to mechanically weld the waterstop. Use a miter guide, proper fixturing (profile dependant), and portable power saw to miter cut the ends to be joined to ensure good alignment and contact between joined surfaces. Splice straight lengths by squaring the ends to be joined. Maintain continuity of the characteristic features of the cross section of the waterstop (for example, ribs, tabular center axis, protrusions) across the splice.

B. Polyvinyl Chloride Waterstop

Make splices by heat sealing the adjacent waterstop edges together using a thermoplastic splicing iron utilizing a non-stick surface specifically designed for waterstop welding. Use the correct temperature to sufficiently melt without charring the plastic. Reform waterstops at splices with a remolding iron with ribs or corrugations to match the pattern of the waterstop. The spliced area, when cooled, must show no signs of separation, holes, or other imperfections when bent by hand in as sharp an angle as possible.

C. Quality Assurance

Edge welding will not be permitted. Compress or close centerbulbs when welding to non-centerbulb type. Waterstop splicing defects which are unacceptable include, but are not limited to the following:

1. Tensile strength less than 80 percent of parent section..
2. Free lap joints
3. Misalignment of centerbulb, ribs, and end bulbs greater than 1/16 inch.
4. Misalignment which reduces waterstop cross section more than 15 percent.
5. Bond failure at joint deeper than 1/16 inch or 15 percent of material thickness.
6. Misalignment of waterstop splice resulting in misalignment of

waterstop in excess of 1/2 inch in 10 feet.
7. Visible porosity in the weld area, including pin holes.
8. Charred or burnt material.
9. Bubbles or inadequate bonding.
10. Visible signs of splice separation when cooled splice is bent by hand at a sharp angle.

D. Non-Metallic Hydrophilic Waterstop Installation

Miter cut ends to be joined with sharp knife or shears. Adhere the ends with cyanacryiate (super glue) adhesive. When joining hydrophilic type waterstop to PVC waterstop, the hydrophilic waterstop shall be positioned as shown on the drawings. Apply a liberal amount of a single component hydrophilic sealant to the junction to complete the transition.

3.03 CONSTRUCTION JOINTS

Treat construction joints coinciding with expansion and contraction joints as expansion or contraction joints as applicable.

-- End of Section --

SECTION 03 20 00.00

CONCRETE REINFORCING
05/14

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 117	(2010; Errata 2011) Specifications for Tolerances for Concrete Construction and Materials and Commentary
ACI 318	(2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7 2017) Building Code Requirements for Structural Concrete and Commentary
ACI SP-66	(2004) ACI Detailing Manual

AMERICAN WELDING SOCIETY (AWS)

AWS D1.4/D1.4M	(2011) Structural Welding Code - Reinforcing Steel

ASTM INTERNATIONAL (ASTM)

ASTM A1064/A1064M	(2017) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM A615/A615M	(2016) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI 10MSP	(2009; 28th Ed) Manual of Standard Practice

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Drawings Showing Reinforcing Steel Placement,

Schedules, Sizes, Grades, And Splicing And Bending Details; G, AE

Support Details Including Types, Sizes And Spacing; G, AE

SD-03 Product Data

Reinforcing Steel; G, AE

SD-06 Test Reports

Mill Reports Attesting That The Reinforcing Steel Furnished Contains No Less Than 25 Percent Recycled Scrap Steel; G, AE

1.03 QUALITY ASSURANCE

A. Welding Qualifications

Welders are required to be qualified in accordance with AWS D1.4/D1.4M. Perform qualification test at the worksite and notify the Contracting Officer 24 hours prior to conducting tests. Special welding procedures and welders qualified by others may be accepted as permitted by AWS D1.4/D1.4M.

1.04 DELIVERY, STORAGE, AND HANDLING

Store reinforcement and accessories off the ground on platforms, skids, or other supports.

PART 2 PRODUCTS

2.01 REINFORCING STEEL

Reinforcing steel of deformed bars conforming to ASTM A615/A615M grades and sizes as indicated.

Submit certified copies of mill reports attesting that the reinforcing steel furnished contains no less than 25 percent recycled scrap steel and meets the requirements specified herein, prior to the installation of reinforcing steel.

2.02 WELDED WIRE REINFORCING

Welded wire reinforcing conforming to ASTM A1064/A1064M

2.03 WIRE TIES

Use wire ties that are 16 gauge or heavier black annealed steel wire.

2.04 SUPPORTS

Design bar supports for formed surfaces in accordance with CRSI 10MSP and fabricate of steel or precast concrete blocks. Provide precast concrete blocks with wire ties and not less than 4 inches square when supporting reinforcement on ground. Precast concrete block must have compressive strength equal to that of the surrounding concrete. Coat steel supports for coated or galvanized bars with electrically compatible material for a distance of at least 2 inches beyond the point of contact with the bar. Where concrete formed surfaces will be

exposed to weather or where surfaces are to be painted, use galvanized, plastic protected or stainless steel supports within 1/2 inch of concrete surface. Concrete supports used in concrete exposed to view must have the same color and texture as the finish surface. For slabs on grade and topping slabs on steel deck, supports use precast concrete blocks, plastic coated steel fabricated with bearing plates, or specifically designed wire-fabric supports fabricated of plastic.

PART 3 EXECUTION

3.01 REINFORCEMENT

Fabricate and place reinforcement steel and accessories as specified, as indicated, and as shown on approved shop drawings. Fabrication and placement details of steel and accessories not specified or shown must be in accordance with ACI SP-66 and ACI 318. Cold bend reinforcement unless otherwise authorized. Bending may be accomplished in the field or at the mill. Mill bend zinc-coated and epoxy-coated bars prior to coating. Bend all steel cold unless authorized. Do not bend bars after embedment in concrete. Place safety caps on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety. Face wire tie ends away from the forms. Submit detail drawings showing reinforcing steel placement, schedules, sizes, grades, and splicing and bending details. Show support details including types, sizes and spacing.

A. Placement

Reinforcement must be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete. Place reinforcement in accordance with ACI 318 at locations indicated plus or minus one bar diameter. Do not continue reinforcement through expansion joints and place as indicated through construction or contraction joints. Cover with concrete coverage as indicated or as required by ACI 318. If bars are moved more than two bar diameters to avoid interference with other reinforcement, conduits or embedded items, the resulting arrangement of bars, including additional bars required to meet structural requirements, requires approval before concrete is placed.

B. Placing Tolerances

Conform bar spacing and concrete cover to ACI 117.

C. Splicing

Conform splices of reinforcement to ACI 318 and make only as required or indicated. Bars may be spliced at alternative or additional locations at no additional cost to the Government subject to approval. Splicing must be by lapping except that lap splices must not be used for bars larger than No. 11 unless otherwise indicated.

Lap Splices: Place lapped bars in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Do not space lapped bars further apart than 1/5 of the required length of the lap or 6

inches.

3.02 WELDED-WIRE REINFORCEMENT PLACEMENT

Place welded-wire reinforcement in slabs as indicated. Reinforcement placed in slabs on grade must be continuous between expansion, construction, and contraction joints. Reinforcement placement at joints must be as indicated in Contract Drawings.

Lay lap splices in such a way that the overlapped areas equals the distance between the outermost crosswires plus 2 inches. Stagger laps to avoid continuous laps in either direction. Wire or clip together reinforcement at laps at intervals not to exceed 4 feet. Position reinforcement by the use of supports.

3.03 DOWEL INSTALLATION

Install dowels in slabs on grade at locations indicated and at right angles to joint being doweled. Accurately position and align dowels parallel to the finished concrete surface before concrete placement. Rigidly support dowels during concrete placement. Coat one end of dowels with a bond breaker.

-- End of Section --

SECTION 03 30 00.00

CAST-IN-PLACE CONCRETE
05/14

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 117	(2010; Errata 2011) Specifications for Tolerances for Concrete Construction and Materials and Commentary
ACI 121R	(2008) Guide for Concrete Construction Quality Systems in Conformance with ISO 9001
ACI 211.1	(1991; R 2009) Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete
ACI 214R	(2011) Evaluation of Strength Test Results of Concrete
ACI 301	(2016) Specifications for Structural Concrete
ACI 304.2R	(1996; R 2008) Placing Concrete by Pumping Methods
ACI 304R	(2000; R 2009) Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 305.1	(2014) Specification for Hot Weather Concreting
ACI 306.1	(1990; R 2002) Standard Specification for Cold Weather Concreting
ACI 309R	(2005) Guide for Consolidation of Concrete
ACI 318	(2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7 2017) Building Code Requirements for Structural Concrete and Commentary
ACI SP-15	(2011) Field Reference Manual: Standard Specifications for Structural Concrete ACI 301-05 with Selected ACI References

ASTM INTERNATIONAL (ASTM)

ASTM C1017/C1017M	(2013; E 2015) Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1064/C1064M	(2011) Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1077	(2016) Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C1107/C1107M	(2014a) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C1157/C1157M	(2011) Standard Specification for Hydraulic Cement
ASTM C1260	(2014) Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C136/C136M	(2014) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143/C143M	(2015) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150/C150M	(2017) Standard Specification for Portland Cement
ASTM C1567	(2013) Standard Test Method for Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C172/C172M	(2014a) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173/C173M	(2016) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C192/C192M	(2016a) Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C231/C231M	(2017) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260/C260M	(2010a; R 2016) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	(2011) Standard Specification for Liquid

	Membrane-Forming Compounds for Curing Concrete
ASTM C31/C31M	(2015a; E 2016) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C311/C311M	(2013) Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete
ASTM C33/C33M	(2016) Standard Specification for Concrete Aggregates
ASTM C39/C39M	(2017) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C42/C42M	(2013) Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C494/C494M	(2016) Standard Specification for Chemical Admixtures for Concrete
ASTM C552	(2016a) Standard Specification for Cellular Glass Thermal Insulation
ASTM C578	(2016) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
ASTM C591	(2016) Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
ASTM C595/C595M	(2017) Standard Specification for Blended Hydraulic Cements
ASTM C618	(2012a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C78/C78M	(2016) Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C94/C94M	(2017) Standard Specification for Ready-Mixed Concrete
ASTM C989/C989M	(2017) Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM D5759	(2012) Characterization of Coal Fly Ash and Clean Coal Combustion Fly Ash for Potential Uses
ASTM D75/D75M	(2014) Standard Practice for Sampling Aggregates

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI 10MSP	(2009; 28th Ed) Manual of Standard Practice

NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA QC 3	(2011) Quality Control Manual: Section 3, Plant Certifications Checklist: Certification of Ready Mixed Concrete Production Facilities
NRMCA TMMB 100	(2001; R 2007) Truck Mixer, Agitator and Front Discharge Concrete Carrier Standards

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 104	(1980) Method of Calculation of the Fineness Modulus of Aggregate

1.02 DEFINITIONS

A. Cementitious Material

As used herein, includes all Portland cement, pozzolan, fly ash, ground granulated blast-furnace slag.

B. Chemical Admixtures

Materials in the form of powder or fluids that are added to the concrete to give it certain characteristics not obtainable with plain concrete mixes.

C. Complementary Cementing Materials (CCM)

Coal fly ash, granulated blast-furnace slag, natural or calcined pozzolans, and ultra-fine coal ash when used in such proportions to replace the portland cement that result in considerable improvement to sustainability, durability.

D. Design Strength (f'c)

The specified compressive strength of concrete at time(s) specified in this section to meet structural design criteria.

E. Mass Concrete

Any concrete system that approaches a maximum temperature of 158 degrees F within the first 72 hours of placement. In addition, it includes all concrete elements with a section thickness of 3 feet or more regardless of temperature.

F. Mixture Proportioning

The process of designing concrete mixture proportions to enable it to meet the strength, service life and constructability requirements of the project.

G. Mixture Proportions

The masses or volumes of individual ingredients used to make a unit measure (cubic yard) of concrete.

H. Pozzolan

Siliceous or siliceous and aluminous material, which in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds possessing cementitious properties.

I. Workability or Consistency

The ability of a fresh (plastic) concrete mix to fill the form/mould properly with the desired work (vibration) and without reducing the concrete's quality. Workability depends on water content, chemical admixtures, aggregate (shape and size distribution), cementitious content and age (level of hydration).

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Laboratory Qualifications And Accreditation; G, AE

Concrete Quality Control Program; G, AE

Sampling Program For Materials Testing; G, AE

SD-02 Shop Drawings

Formwork; G, AE

Construction Joint Layout; G, AE

SD-03 Product Data

Chemical Admixtures; G, AE

Floor Hardener; G, AE

Cementitious Materials; G, AE

Floor Finish; G, AE

SD-05 Design Data

Design Mix; G, AE

SD-06 Test Reports

Compressive Strength; G, AE

Slump; G, AE

Aggregates; G, AE

Testing And Inspection For CQC; G, AE

Mix Water; G, AE

Mixture Proportions; G, AE

Fly Ash; G, AE

Ground Granulated Blast-Furnace (GGBF) Slag; G, AE

Air Content; G, AE

SD-07 Certificates

Ready-Mix Plant; G, AE

Contractor Quality Control Personnel; G, AE

1.04 QUALITY ASSURANCE

Submit qualifications for Contractor Quality Control personnel assigned to concrete construction as American Concrete Institute (ACI) Certified Workmen in one of the following grades or show written evidence of having completed similar qualification programs:

Concrete Field Testing Technician	Grade I
Concrete Laboratory Testing Technician	Grade I or II
Concrete Construction Inspector	Level II
Concrete Transportation Construction Inspector or Reinforced Concrete Special Inspector	Jointly certified by American Concrete Institute (ACI), Building Official and Code Administrators International (BOCA), International Code Council (ICC), and Southern Building Code Congress International (SBCCI)
Foreman or Lead Journeyman of the flatwork finishing crew	Similar qualification for ACI Concrete Flatwork Technician/Finisher or equal, with written documentation

A. Laboratory Accreditation

Provide laboratory and testing facilities. The laboratories performing the tests must be accredited in accordance with

ASTM C1077, including ASTM C78/C78M and ASTM C1260. The accreditation must be current and must include the required test methods, as specified. Furthermore, the testing must comply with the following requirements:

1. Aggregate Testing and Mix Proportioning

   Perform aggregate testing and mixture proportioning studies in an accredited laboratory, under the direction of a registered professional engineer in the state of New Jersey who is competent in concrete materials. This person is required to sign all reports and designs.

2. Acceptance Testing

   Furnish all materials, labor, and facilities required for molding, curing, testing, and protecting test specimens at the site and in the laboratory. Furnish and maintain boxes or other facilities suitable for storing and curing the specimens at the site while in the mold within the temperature range stipulated by ASTM C31/C31M.

3. Contractor Quality Control

   All sampling and testing must be performed by an approved, onsite, independent, accredited laboratory. Contractor shall submit laboratory qualifications and accreditation documentation.

B. Quality Control Plan

Submit a concrete quality control program in accordance with the guidelines of ACI 121R and as specified herein. Identify the approved laboratories. Provide direct oversight for the concrete qualification program inclusive of associated sampling and testing. Provide all quality control reports to the Quality Manager, Concrete Supplier and the Contracting Officer. Maintain a copy of ACI SP-15 and CRSI 10MSP at the project site. Develop a sampling program for materials testing in accordance with the requirements of this specification.

C. Pre-installation Meeting

A pre-installation meeting with the Contracting Officer is required at least 10 days prior to start of construction. Conduct the meeting with the Project Superintendent and active installation personnel present.

D. Special Properties and Products

Concrete may contain admixtures other than air entraining agents, such as water reducers, superplasticizers, or set retarding agents to provide special properties to the concrete, if specified or approved. Include any of these materials to be used on the project in the mix design studies.

E. Shop Drawings

Contractor shall submit the following Shop Drawings:

1. Formwork
2. Construction Joint Layout

F. Government Assurance Inspection and Testing

Day-to day inspection and testing is the responsibility of the Contractor Quality Control (CQC) staff. However, representatives of the Contracting Officer can and will inspect construction as considered appropriate and will monitor operations of the CQC staff. Government inspection or testing will not relieve any CQC responsibilities.

1. Materials

The Government will sample and test aggregates, cementitious materials, other materials, and concrete to determine compliance with the specifications as considered appropriate. Provide facilities and labor as may be necessary for procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with ASTM D75/D75M. Other materials will be sampled from storage at the jobsite or from other locations as considered appropriate. Samples may be placed in storage for later testing when appropriate.

2. Fresh Concrete

Fresh concrete will be sampled and tested as delivered in accordance with ASTM C172/C172M in accordance with these specifications, as considered necessary.

3. Hardened Concrete

Tests on hardened concrete will be performed by the Government when such tests are considered necessary.

4. Inspection

Concrete operations may be tested and inspected by the Government as the project progresses. Failure to detect defective work or material will not prevent rejection later when a defect is discovered nor will it obligate the Government for final acceptance.

1.05 DELIVERY, STORAGE, AND HANDLING

Follow ACI 301 and ACI 304R requirements and recommendations. Store cement and other cementitious materials in weathertight buildings, bins, or silos that exclude moisture and contaminants and keep each material completely separated. Arrange and use aggregate stockpiles in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of aggregates. Do not store aggregate directly on ground unless a sacrificial layer is left undisturbed. Store reinforcing bars and accessories above the ground on platforms, skids or other supports. Store other materials in a manner to avoid contamination and deterioration. Admixtures which have been in storage at the project site for longer than 6 months or which have been subjected to freezing cannot be used unless

retested and proven to meet the specified requirements. Materials must be capable of being accurately identified after bundles or containers are opened.

PART 2 PRODUCTS

2.01 SYSTEM DESCRIPTION

Provide concrete composed of Portland cement, other cementitious and pozzolanic materials as specified, aggregates, water and admixtures as specified.

A. Proportioning Studies-Normal Weight Concrete

Trial design batches, mixture proportions studies, and testing requirements for various types of concrete specified are the responsibility of the Contractor. Base mixture proportions on compressive strength as determined by test specimens fabricated in accordance with ASTM C192/C192M and tested in accordance with ASTM C39/C39M. Obtain mix design approval from the Contracting Officer prior to concrete placement.

1. Samples of all materials used in mixture proportioning studies must be representative of those proposed for use in the project and be accompanied by the manufacturer's or producer's test reports indicating compliance with these specifications.

2. Make trial mixtures having proportions, consistencies, and air content suitable for the work based on methodology described in ACI 211.1, using at least three different water-cementitious material ratios for each type of mixture, which produce a range of strength encompassing those required for each type of concrete required on the project.

3. The maximum water-cementitious material ratios allowed in paragraph 2.01G WATER-CEMENTITIOUS MATERIAL RATIO below will be the equivalent water-cementitious material ratio as determined by conversion from the weight ratio of water to cement plus pozzolan by the weight equivalency method as described in ACI 211.1. In the case where silica fume or GGBF slag is used, include the weight of the silica fume and GGBF slag in the equations in ACI 211.1 for the term P, which is used to denote the weight of pozzolan. If pozzolan is used in the concrete mixture, the maximum pozzolan content is 25 percent by weight of the total cementitious material.

4. Design laboratory trial mixtures for maximum permitted slump and air content. Make separate sets of trial mixture studies for each combination of cementitious materials and each combination of admixtures proposed for use. No combination of either may be used until proven by such studies, except that, if approved in writing and otherwise permitted by these specifications, an accelerator or a retarder may be used without separate trial mixture study. Separate trial mixture studies must also be made for concrete for any conveying or placing method proposed which requires special properties and for concrete to be placed in unusually difficult placing

locations. For previously approved concrete mix designs used within the past twelve months, the previous mix design may be re-submitted without further trial batch testing if accompanied by material test data conducted within the last six months.

5. Report the temperature of concrete in each trial batch. For each water-cementitious material ratio, make at least three test cylinders for each test age, cure in accordance with ASTM C192/C192M and test at 7 and 28 days in accordance with ASTM C39/C39M. From these test results, plot a curve showing the relationship between water-cementitious material ratio and strength for each set of trial mix studies. In addition, plot a curve showing the relationship between 7 day and 28 day strengths. Design each mixture to promote easy and suitable concrete placement, consolidation and finishing, and to prevent segregation and excessive bleeding.

6. Submit the results of trial mixture design studies along with a statement giving the maximum nominal coarse aggregate size and the proportions of ingredients that will be used in the manufacture of each strength of concrete, at least 60 days prior to commencing concrete placing operations. Base aggregate weights on the saturated surface dry condition. Accompany the statement with test results from an approved independent commercial testing laboratory, showing that mixture design studies have been made with materials proposed for the project and that the proportions selected will produce concrete of the qualities indicated. No substitutions may be made in the materials used in the mixture design studies without additional tests to show that the quality of the concrete is satisfactory.

B. Average Compressive Strength

The mixture proportions selected during mixture design studies must produce a required average compressive strength (f'cr) exceeding the specified compressive strength (f'c) by the amount indicated below, but may not exceed the specified strength at the same age by more than 20 percent. This required average compressive strength, f'cr, will not be a required acceptance criteria during concrete production. However, whenever the daily average compressive strength at 28 days drops below f'cr during concrete production, or daily average 7-day strength drops below a strength correlated with the 28-day f'cr, adjust the mixture, as approved, to bring the daily average back up to f'cr. During production, the required f'cr must be adjusted, as appropriate, based on the standard deviation being attained on the job.

C. Computations from Test Records

Where a concrete production facility has test records, establish a standard deviation in accordance with the applicable provisions of ACI 214R. Test records from which a standard deviation is calculated must represent materials, quality control procedures, and conditions similar to those expected; must represent concrete produced to meet a specified strength or strengths (f'c) within 1000 psi of that specified for proposed work; and must consist of at least 30 consecutive tests. A strength test must be the

average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days. Required average compressive strength f'cr used as the basis for selection of concrete proportions must be in accordance with ACI 318 Chapter 5.

D. Tolerances

Except as otherwise specified herein, tolerances for concrete batching, mixture properties, and construction as well as definition of terms and application practices must be in accordance with ACI 117. Take level and grade tolerance measurements of slabs as soon as possible after finishing; when forms or shoring are used, the measurements must be made prior to removal.

E. Floor Finish

For floor finishes, see Section 03 35 00.00 CONCRETE FINISHING.

F. Strength Requirements

Specified compressive strength (f'c) must be as follows:

COMPRESSIVE STRENGTH	STRUCTURE OR PORTION OF STRUCTURE
4000 psi at 28 days	All structural concrete

Concrete made with high-early strength cement must have a 7-day strength equal to the specified 28-day strength for concrete made with Type I or II Portland cement. Compressive strength must be determined in accordance with ASTM C39/C39M.

1. Evaluation of Concrete Compressive Strength

Fabricate six compressive strength specimens, (6 inch by 12 inch) cylinders, laboratory cure them in accordance with ASTM C31/C31M and test them in accordance with ASTM C39/C39M. Test one cylinder at 7 days, one cylinder at 14 days, two cylinders at 28 days, and hold two cylinder in reserve for additional testing at 56 days, if necessary. The strength of the concrete is considered satisfactory so long as the 28-day and 56-day cylinders indicate that the specified concrete strength f'c has been achieved and no individual test result falls below the specified strength f'c by more than 500 psi), unless approved by the Contracting Officer. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Additional analysis or testing, including taking cores and/or load tests may be required when the strength of the concrete in the structure is considered potentially deficient.

2. Investigation of Low-Strength Compressive Test Results

When any strength test of standard-cured test cylinders falls below the specified strength requirement by more than 500 psi or if tests of field-cured cylinders indicate

deficiencies in protection and curing, take steps to assure that the load-carrying capacity of the structure is not jeopardized. When the strength of concrete in place is considered potentially deficient, obtain cores and test in accordance with ASTM C42/C42M. Take at least three representative cores from each member or area of concrete in place that is considered potentially deficient. The location of cores will be determined by the Contracting Officer to least impair the strength of the structure. Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement. Non-destructive tests (tests other than test cylinders or cores) may not be used as a basis for acceptance or rejection. Perform the coring and repair the holes; cores will be tested by the Government.

3. Load Tests

If the core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be directed by the Contracting Officer in accordance with the requirements of ACI 318. Correct concrete work evaluated by structural analysis or by results of a load test as being understrength in a manner satisfactory to the Contracting Officer. Perform all investigations, testing, load tests, and correction of deficiencies approved by the Contracting Officer, except that if all concrete is found to be in compliance with the drawings and specifications, the cost of investigations, testing, and load tests will be at the expense of the Government.

4. Test Results

Submit all results of compressive strength testing.

G. Water-Cementitious Material Ratio

Maximum water-cementitious material ratio (w/c) for normal weight concrete is as follows:

WATER-CEMENTITIOUS MATERIAL RATIO, BY WEIGHT	STRUCTURE OR PORTION OF STRUCTURE
0.45	All structural concrete

H. Air Entrainment

Air entrain normal weight concrete based on the following table, except as otherwise specified for lightweight concrete.

MINIMUM AIR CONTENT Percent	STRUCTURE OR PORTION OF
0-6.0	All structural concrete

Attain specified air content at point of placement into the forms within plus or minus 1.5 percent. Determine air content for normal weight concrete in accordance with ASTM C231/C231M. Submit test results of air entrainment testing.

I. Slump

Slump of the concrete, as delivered to the point of placement into the forms, must be within the following limits. Determine slump in accordance with ASTM C143/C143M.

Structural Element	Slump inches	
	Minimum	Maximum
Foundation walls, substructure walls, footings, slabs	1	3
Any structural concrete approved for placement by pumping:		
At pump	2	8
At discharge of line	1	4

When use of a plasticizing admixture conforming to ASTM C1017/C1017M or when a Type F or G high range water reducing admixture conforming to ASTM C494/C494M is permitted to increase the slump of concrete, concrete must have a slump of 2 to 4 inches before the admixture is added and a maximum slump of 8 inches at the point of delivery after the admixture is added. For troweled floors, slump of structural lightweight concrete with normal weight sand placed by pump must not exceed 5 inches at the point of placement. For other slabs, slump of lightweight concrete must not exceed 4 inches at point of placement. Submit slump test results.

J. Concrete Temperature

The temperature of the concrete as delivered must not exceed 90 degrees F. When the ambient temperature during placing is 40 degrees F or less, or is expected to be at any time within 6 hours after placing, the temperature of the concrete as delivered must be between 55 and 75 degrees F.

K. Size of Coarse Aggregate

Use the largest feasible nominal maximum size aggregate (NMSA), specified in PART 2 paragraph AGGREGATES, in each placement. However, do not exceed nominal maximum size of aggregate for any

of the following: three-fourths of the minimum cover for reinforcing bars, three-fourths of the minimum clear spacing between reinforcing bars, one-fifth of the narrowest dimension between sides of forms, or one-third of the thickness of slabs or toppings.

2.02 CEMENTITIOUS MATERIALS

Cementitious Materials must be Portland cement, Portland-pozzolan cement, Portland blast-furnace slag cement, or Portland cement in combination with pozzolan or ground granulated blast furnace slag conforming to appropriate specifications listed below. Restrict usage of cementitious materials in concrete that will have surfaces exposed in the completed structure so there is no change in color, source, or type of cementitious material.

A. Portland Cement

ASTM C150/C150M, Type I or II domestic-made Portland cement, free from water soluble salts or alkalis which will cause efflorescence on exposed surfaces.

B. Blended Cements

Conform blended cement to ASTM C595/C595M and ASTM C1157/C1157M, Type IP or IS, including the optional requirement for mortar expansion and consist of a mixture of ASTM C150/C150M Type I, or Type II cement and a complementary cementing material. The slag added to the Type IS blend must be ASTM C989/C989M ground granulated blast-furnace slag. The pozzolan added to the Type IP blend must be ASTM C618 Class F and must be interground with the cement clinker. Provide a manufacturer's statement that the amount of pozzolan in the finished cement will not vary more than plus or minus 5 mass percent of the finished cement from lot-to-lot or within a lot. Do not change the percentage and type of mineral admixture used in the blend from that submitted for the aggregate evaluation and mixture proportioning.

C. Fly Ash

Conform fly ash to ASTM C618, Class F, except that the maximum allowable loss on ignition cannot exceed 6 percent. Report the chemical analysis of the fly ash in accordance with ASTM C311/C311M. Evaluate and classify fly ash in accordance with ASTM D5759.

D. Raw or Calcined Natural Pozzolan

Natural pozzolan must be raw or calcined and conform to ASTM C618, Class N, including the optional requirements for uniformity and effectiveness in controlling Alkali-Silica reaction and must have an on ignition loss not exceeding 3 percent. Class N pozzolan for use in mitigating Alkali-Silica Reactivity must have a Calcium Oxide (CaO) content of less than 13 percent and total equivalent alkali content less than 3 percent.

E. Ultra Fine Fly Ash and Ultra Fine Pozzolan

Conform Ultra Fine Fly Ash (UFFA) and Ultra Fine Pozzolan (UFP)

ASTM C618, Class F or N, and the following additional requirements:

1. The strength activity index at 28 days of age is at least 95 percent of the control specimens.
2. The average particle size does not exceed 6 microns.
3. The sum of SiO2 + Al2O3 + Fe2O3 is greater than 77 percent.

F. Ground Granulated Blast-Furnace (GGBF) Slag

ASTM C989/C989M, Grade 100. Submit test results in accordance with ASTM C989/C989M for GGBF slag. Submit test results performed within 6 months of submittal date.

G. Cementitious Materials

Submit proposed design mix indicating proposed use of cementitious materials.

2.03 AGGREGATES

Test and evaluate fine and coarse aggregates for alkali-aggregate reactivity in accordance with ASTM C1260. Evaluate the fine and coarse aggregates separately and in combination, which matches the proposed mix design proportioning. All results of the separate and combination testing must have a measured expansion less than 0.10 (0.08) percent at 16 days after casting. Should the test data indicate an expansion of 0.10 (0.08) percent or greater, reject the aggregate(s) or perform additional testing using ASTM C1260 and ASTM C1567. Perform the additional testing using ASTM C1260 and ASTM C1567 using the low alkali portland cement in combination with ground granulated blast furnace (GGBF) slag, or Class F fly ash. The combination of fly ash and GGBF may not exceed 25 percent of the total cementitious material by weight.Provide fine and coarse aggregates conforming to the following.

A. Fine Aggregate

Conform to the quality and gradation requirements of ASTM C33/C33M.

B. Coarse Aggregate

Conform to ASTM C33/C33M, Class 3S, size designation No.57.

2.04 CHEMICAL ADMIXTURES

When required or permitted, conform to the appropriate specification listed. Furnish admixtures in liquid form and of suitable concentration for easy, accurate control of dispensing.

A. Air-Entraining Admixture

ASTM C260/C260M and must consistently entrain the air content in the specified ranges under field conditions.

B. Accelerating Admixture

ASTM C494/C494M, Type C or E, except that calcium chloride or admixtures containing calcium chloride cannot be used.

C. Water-Reducing or Retarding Admixture

ASTM C494/C494M, Type A, B, or D, except that the 6-month and 1-year compressive strength tests are waived.

D. High-Range Water Reducer

ASTM C494/C494M, Type F or G, except that the 6-month and 1-year strength requirements are waived. Use the admixture only when approved in writing, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan and upon performance of separate mixture design studies.

E. Other Chemical Admixtures

Provide chemical admixtures for use in producing flowing concrete in compliance with ASTM C1017/C1017M, Type I or II. Use these admixtures only when approved in writing, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan and upon performance of separate mixture design studies.

F. Design Mix

Submit product information on all proposed chemical admixtures.

2.05 WATER

Provide water complying with the requirements of ASTM C94/C94M. Provide potable water for mixing, free of injurious amounts of oil, acid, salt, or alkali. Submit test reports on the mix water.

2.06 NONSHRINK GROUT

Provide nonshrink grout conforming to ASTM C1107/C1107M, and a commercial formulation suitable for the proposed application.

2.07 EMBEDDED ITEMS

Provide the size and type indicated or as needed for the application.

2.08 FLOOR HARDENER

Provide a colorless aqueous solution containing zinc silicofluoride, magnesium silicofluoride, or sodium silicofluoride. These silicofluorides can be used individually or in combination. Proprietary hardeners may be used if approved in writing by the Contracting Officer. Submit product data on proposed floor hardener.

2.09 PERIMETER INSULATION

Polystyrene conforming to ASTM C578, Type II; polyurethane conforming to ASTM C591, Type II; or cellular glass conforming to ASTM C552, Type I or IV.

2.10 JOINT MATERIALS

A. Joint Fillers, Sealers, and Waterstops

Provide materials for expansion joint fillers and waterstops in accordance with Section 03 15 00.00 CONCRETE ACCESSORIES.

B. Contraction Joints in Slabs

Provide materials for contraction joint inserts in accordance with Section 03 15 00.00 CONCRETE ACCESSORIES.

PART 3 EXECUTION

3.01 PREPARATION FOR PLACING

Before commencing concrete placement, perform the following: Clean surfaces to receive concrete, free from frost, ice, mud, and water. Place, clean, tie, and support reinforcing steel in accordance with Section 03 20 00.00 CONCRETE REINFORCING. Transporting and conveying equipment is in-place, ready for use, clean, and free of hardened concrete and foreign material. Equipment for consolidating concrete is at the placing site and in proper working order. Equipment and material for curing and for protecting concrete from weather or mechanical damage is at the placing site, in proper working condition and in sufficient amount for the entire placement. When hot, windy conditions during concreting appear probable, equipment and material is at the placing site to provide windbreaks, shading, fogging, or other action to prevent plastic shrinkage cracking or other damaging drying of the concrete as required in Section 03 39 00.00 CONCRETE CURING.

A. Foundations

1. Concrete on Foundations
Earth (subgrade, base, or subbase courses) surfaces over which concrete is to be placed are to be lined with a vapor mitigation sub-slab gas vapor barrier system per the construction documents and specification Section 31 21 14.14. Barrier surface shall be clean, and free from debris, frost, ice, and standing or running water. Prior to placement of concrete, the foundation sub-grade must be well drained, satisfactorily graded and uniformly compacted.

2. Excavated Surfaces in Lieu of Forms
Concrete for footings and foundation walls below grade may be placed directly over the soil (lined with the prescribed vapor mitigation sub-slab gas vapor barrier system per specification Section 31 21 14.14) provided the earth or rock has been carefully trimmed, is uniform and stable, and meets the compaction requirements of Section 31 60 00 FOUNDATION PREPARATION and Section 31 23 16 BACKFILL AND COMPACTION. Place the concrete without becoming contaminated by loose material, and outlined within the specified tolerances.

B. Previously Placed Concrete

Prepare concrete surfaces to which additional concrete is to be bonded for receiving the next horizontal lift by cleaning the construction joint surface with either air-water cutting, sandblasting, high-pressure water jet, or other approved method. Prepare concrete at the side of vertical construction joints as approved by the Contracting Officer. Do not use air-water cutting on formed surfaces or surfaces congested with reinforcing steel. Regardless of the method used, the resulting surfaces must be free from all laitance and inferior concrete so that clean surfaces of well bonded coarse aggregate are exposed and make up at least 10-percent of the surface area, distributed uniformly throughout the surface. Do not undercut the edges of the coarse aggregate. Keep the surface of horizontal construction joints continuously wet for the first 12 hours during the 24-hour period prior to placing fresh concrete. Wash the surface completely clean as the last operation prior to placing the next lift.

1. Air-Water Cutting

Perform air-water cutting of a fresh concrete surface at the proper time and only on horizontal construction joints. The air pressure used in the jet must be 100 psi, plus or minus 10 psi, and the water pressure must be just sufficient to bring the water into effective influence of the air pressure. When approved by the Contracting Officer, a surface retarder complying with the requirements of ASTM C309 may be applied to the surface of the lift in order to prolong the period of time during which air-water cutting is effective. After cutting, wash and rinse the surface as long as there is any trace of cloudiness of the wash water. Where necessary to remove accumulated laitance, coatings, stains, debris, and other foreign material, use high-pressure waterjet or sandblasting as the last operation before placing the next lift.

2. High-Pressure Water Jet

Use a stream of water under a pressure of not less than 3,000 psi for cutting and cleaning. Delay its use until the concrete is sufficiently hard so that only the surface skin or mortar is removed and there is no undercutting of coarse-aggregate particles. If the waterjet is incapable of a satisfactory cleaning, clean the surface by sandblasting.

3. Wet Sandblasting

Use wet sandblasting after the concrete has reached sufficient strength to prevent undercutting of the coarse aggregate particles. After wet sandblasting, thoroughly wash the surface of the concrete to remove all loose materials.

4. Waste Disposal

Dispose of waste water employed in cutting, washing, and rinsing of concrete surfaces in a manner that the waste

water does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area. The method of disposal is subject to approval.

5. Preparation of Previously Placed Concrete

Abrade concrete surfaces to which other concrete is to be bonded in an approved manner that exposes sound aggregate uniformly without damaging the concrete. Remove laitance and loose particles. Thoroughly wash surfaces, leaving them moist but without free water when concrete is placed.

C. Vapor Barrier

Install vapor mitigation sub-slab gas vapor barrier system per the construction documents and specification Section 31 21 14.14 prior to placement of concrete.

D. Perimeter Insulation

Install perimeter insulation at locations indicated. Use adhesive where insulation is applied to the interior surface of foundation walls and may be used for exterior application.

E. Embedded Items

Before placement of concrete, determine that all embedded items are firmly and securely fastened in place as indicated on the drawings, or required. Conduit and other embedded items must be clean and free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete is permitted only when specifically authorized or directed. Temporarily fill voids in sleeves, inserts, and anchor slots with readily removable materials to prevent the entry of concrete into voids. Do not weld on embedded metals within 12 inches of the surface of the concrete. Do not tack weld on or to embedded items.

3.02 CONCRETE PRODUCTION

A. General Requirements

Batch, mix, and transport ready-mixed concrete in accordance with ASTM C94/C94M, except as otherwise specified. Truck mixers, agitators, and nonagitating transporting units must comply with NRMCA TMMB 100. Ready-mix plant equipment and facilities must be certified in accordance with NRMCA QC 3. Submit name, location and certification for ready-mix plant. Furnish approved batch tickets for each load of ready-mixed concrete.

3.03 PLACING CONCRETE

Discharge mixed concrete within 1.5 hours or before the mixer drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregates. When the concrete temperature exceeds 85 degrees F, reduce the time to 45 minutes. Place concrete within 15 minutes after it has been discharged from the transporting unit. Handle concrete from mixer or transporting unit to forms in a continuous manner until the approved unit of operation is

completed. Provide adequate scaffolding, ramps and walkways so that personnel and equipment are not supported by in-place reinforcement. Placing will not be permitted when the sun, heat, wind, or limitations of facilities prevent proper consolidation, finishing and curing. Provide sufficient placing capacity so that concrete can be kept free of cold joints.

A. Depositing Concrete

Deposit concrete in accordance with ACI 301 Section 5 and ACI 304.2R.

B. Consolidation

Immediately after placing, consolidate each layer of concrete in accordance with ACI 301 Section 5 and ACI 309R.

C. Cold Weather Requirements

Perform cold weather concreting in accordance with ACI 306.1. Use special protection measures, approved by the Contracting Officer, if freezing temperatures are anticipated before the expiration of the specified curing period. The ambient temperature of the air where concrete is to be placed and the temperature of surfaces to receive concrete must be not less than 40 degrees F. The temperature of the concrete when placed must be not less than 50 degrees F nor more than 75 degrees F. Heat the mixing water or aggregates to regulate the concrete placing temperature. Materials entering the mixer must be free from ice, snow, or frozen lumps. Do not incorporate salt, chemicals or other materials in the concrete to prevent freezing. Upon written approval, an accelerating admixture conforming to ASTM C494/C494M, Type C or E may be used, provided it contains no calcium chloride. Do not use calcium chloride.

D. Hot Weather Requirements

When job-site conditions are present or anticipated that accelerate the rate of moisture loss or rate of cement hydration of freshly mixed concrete, including an ambient temperature of 80 degrees F or higher, and an evaporation rate that exceeds 0.2 $lb/ft^2/h$, conform concrete work to all requirements of ACI 305.1.

E. Prevention of Plastic Shrinkage Cracking

During hot weather with low humidity, and particularly with appreciable wind, as well as interior placements when space heaters produce low humidity, be alert to the tendency for plastic shrinkage cracks to develop and institute measures to prevent this. Take particular care if plastic shrinkage cracking is potentially imminent and especially if it has developed during a previous placement. Conform with the requirement of ACI 305.1. In addition further protect the concrete placement by erecting shades and windbreaks and by applying fog sprays of water, sprinkling, ponding or wet covering. Fill plastic shrinkage cracks that occur by injection of epoxy resin as directed, after the concrete hardens. Never trowel over plastic shrinkage cracks or fill with slurry.

3.04 JOINTS

Locate and construct joints as indicated or approved. Locate and construct joints not indicated to minimize the impact on the strength of the structure. In general, locate such joints near the middle of the spans of supported slabs, beams, and girders unless a beam intersects a girder at this point, in which case the offset joint in the girder a distance equal to twice the width of the beam. Locate joints in walls and columns at the underside of floors, slabs, beams, or girders and at the tops of footings or floor slabs, unless otherwise approved. Construct joints perpendicular to the main reinforcement. Continue and develop all reinforcement across joints; except that reinforcement or other fixed metal items must not be continuous through expansion joints, or through construction or contraction joints in slabs on grade. Reinforcement must be 2 inches clear from each joint. Except where otherwise indicated, construction joints between interior slabs on grade and vertical surfaces consist of preformed expansion joint filler extending for the full depth of the slab. The perimeters of the slabs must be free of fins, rough edges, spalling, or other unsightly appearance. Form reservoir for sealant for construction and contraction joints in slabs to the dimensions indicated by removing snap-out joint-forming inserts, by sawing sawable inserts, or by sawing to widen the top portion of sawed joints.

A. Construction Joints

For concrete other than slabs on grade, locate construction joints so that the unit of operation does not exceed 20 feet. Place concrete continuously so that each unit is monolithic in construction. Do not place fresh concrete against adjacent hardened concrete until it is at least 24 hours old. Locate construction joints as indicated or approved. Where concrete work is interrupted by weather, end of work shift or other similar type of delay, location and type of construction joint is subject to approval of the Contracting Officer. Unless otherwise indicated and except for slabs on grade, extend reinforcing steel through construction joints. Key or dowel construction joints in slabs on grade as indicated. Concrete columns, walls, or piers must be in place at least 2 hours, or until the concrete begins to lose its plasticity, before placing concrete for beams, girders, or slabs thereon. In walls having door or window openings, terminate lifts at the top and bottom of the opening. Terminate other lifts at such levels to conform to structural requirements or architectural details. Where horizontal construction joints in walls or columns are required, tack a strip of 1 inch square-edge lumber, beveled and oiled to facilitate removal, to the inside of the forms at the construction joint. Place concrete to a point 1 inch above the underside of the strip. Remove the strip 1 hour after the concrete has been placed, level off any irregularities in the joint line with a wood float, and remove all laitance. Prior to placing additional concrete, prepare horizontal construction joints as specified in paragraph 3.01B PREVIOUSLY PLACED CONCRETE.

B. Contraction Joints in Slabs on Grade

Locate and detail contraction joints as indicated. Produce contraction joints by forming a weakened plane in the concrete

slab using materials and procedures specified in Section 03 15 00.00 CONCRETE ACCESSORIES.

C. Expansion Joints

Conform installation of expansion joints and sealing of these joints to the requirements of Section 03 15 00.00 CONCRETE ACCESSORIES.

D. Waterstops

Install waterstops in conformance with the locations and details indicated using materials and procedures specified in Section 03 15 00.00 CONCRETE ACCESSORIES.

E. Dowels and Tie Bars

Install dowels and tie bars at the locations shown on the drawings and to the details shown, using materials and procedures specified in Section 03 20 00.00 CONCRETE REINFORCING and herein. Install conventional smooth "paving" dowels in slabs using approved methods to hold the dowel in place during concreting within a maximum alignment tolerance of 1/8 inch in 12 inches. Install "structural" type deformed bar dowels, or tie bars, to meet the specified tolerances. Take care during placing adjacent to and around dowels and tie bars to ensure there is no displacement of the dowel or tie bar and that the concrete completely embeds the dowel or tie bar and is thoroughly consolidated.

3.05 EXTERIOR SLAB AND RELATED ITEMS

A. Pavements

Construct pavements where shown on the drawings. After forms are set and underlying material prepared as specified, place the concrete uniformly throughout the area and thoroughly vibrated. As soon as placed and vibrated, strike off the concrete and screed to the crown and cross section and to such elevation above grade that when consolidated and finished, the surface of the pavement is at the required elevation. Tamp the entire surface with the strike off, or consolidated with a vibrating screed, and continue this operation until the required compaction and reduction of internal and surface voids are accomplished. Take care to prevent bringing excess paste to the surface.

B. Sidewalks

Minimum concrete thickness of 4 inches. Provide contraction joints at 5 feet spaces unless otherwise indicated. Cut contraction joints 1 inch deep with a jointing tool after the surface has been finished. Provide transverse expansion joints 1/2 inch thick at changes in direction and where sidewalk abuts curbs, steps, rigid pavement, or other similar structures. Provide a transverse slope of 1/4 inch per foot, unless otherwise indicated. Limit variations in cross section to 1/4 inch in 5 feet.

C. Curbs and Gutters

Form, place and finish concrete by hand using a properly shaped "mule" or construct using a slipform machine specially designed for this work. Cut contraction joints 3 inches deep with a jointing tool after the surface has been finished. Provide 1/2 inch wide expansion joints at 100 feet maximum spacing unless otherwise indicated.

D. Pits and Trenches

Construct pits and trenches as indicated Place bottoms and walls monolithically or provide waterstops and keys as approved.

3.06 SETTING BASE PLATES AND BEARING PLATES

After being properly positioned, set column base plates, bearing plates for beams and similar structural members, and machinery and equipment base plates to the proper line and elevation with nonshrink grout. The thickness of the mortar or grout must be approximately 1/24 the width of the plate, but not less than 3/4 inch. Concrete and metal surfaces in contact with grout must be clean and free of oil and grease, and concrete surfaces in contact with grout damp and free of laitance when grout is placed.

A. Nonshrink Grout

Ready-mixed material requiring only the addition of water. Water content must be the minimum that will provide a flowable mixture and completely fill the space to be grouted without segregation, bleeding, or reduction of strength.

1. Mixing and Placing of Nonshrink Grout

Mix and place in conformance with the material manufacturer's instructions and as specified therein. Thoroughly dry-mix ingredients before adding water. After adding water, mix the batch for 3 minutes. Size batches to allow continuous placement of freshly mixed grout. Discard grout not used within 30 minutes after mixing. Fill the space between the top of the concrete or machinery-bearing surface and the plate solid with the grout. Use wood forms or other equally suitable material for completely retain the grout on all sides and on top, remove forms after the grout has set. Carefully work the placed grout by rodding or other means to eliminate voids; however, avoid overworking and breakdown of the initial set. Do not subject grout to retempering or to vibration from any source. Where clearances are unusually small, place under pressure with a grout pump. Maintain the temperature of the grout, and of surfaces receiving the grout, at 65 to 85 degrees F until after setting.

2. Treatment of Exposed Surfaces

For metal-oxidizing nonshrink grout, cut back exposed surfaces 1 inch and immediately cover with a parge coat of mortar consisting of 1 part portland cement and 2-1/2 parts fine aggregate by weight, with sufficient water to make a

plastic mixture. Smooth finish the parge coat. For other mortars or grouts, exposed surfaces must have a smooth-dense finish and be left untreated. Cure in compliance with Section 03 39 00.00 CONCRETE CURING.

3.07 TESTING AND INSPECTION FOR CQC

Perform the inspection and tests described below and, based upon the results of these inspections and tests, take the action required. Submit certified copies of laboratory test reports, including mill tests and all other test data, for portland cement, blended cement, pozzolan, ground granulated blast furnace slag, silica fume, aggregate, admixtures, and curing compound proposed for use on this project.

1. When, in the opinion of the Contracting Officer, the concreting operation is out of control, cease concrete placement and correct the operation.

2. The laboratory performing the tests must be onsite and conform with ASTM C1077. Materials may be subjected to check testing by the Government from samples obtained at the manufacturer, at transfer points, or at the project site.

3. The Government will inspect the laboratory, equipment, and test procedures prior to start of concreting operations for conformance with ASTM C1077.

A. Grading and Corrective Action

1. Fine Aggregate

At least once during each shift when the concrete plant is operating, there must be one sieve analysis and fineness modulus determination in accordance with ASTM C136/C136M and COE CRD-C 104 for the fine aggregate or for each fine aggregate if it is batched in more than one size or classification. Select the location at which samples are taken as the most advantageous for control. However, the Contractor is responsible for delivering fine aggregate to the mixer within specification limits. When the amount passing on any sieve is outside the specification limits, immediately resample and retest the fine aggregate. If there is another failure on any sieve, immediately report the failure to the Contracting Officer, stop concreting , and take immediate steps to correct the grading.

2. Coarse Aggregate

At least once during each shift in which the concrete plant is operating, there must be a sieve analysis in accordance with ASTM C136/C136M for each size of coarse aggregate. Select the location at which samples are taken as the most advantageous for control. However, the Contractor is responsible for delivering the aggregate to the mixer within specification limits. A test record of samples of aggregate taken at the same locations must show the results of the current test as well as the average results of the five most recent tests including the current test. Limits may be

adopted for control coarser than the specification limits for samples taken other than as delivered to the mixer to allow for degradation during handling. When the amount passing any sieve is outside the specification limits, immediately resample and retest the coarse aggregate. If the second sample fails on any sieve, report that failure to the Contracting Officer. Where two consecutive averages of 5 tests are outside specification limits, the operation is be considered out of control and must be reported to the Contracting Officer. Stop concreting and take immediate steps to correct the grading.

B. Quality of Aggregates

Thirty days prior to the start of concrete placement, perform all tests for aggregate quality required by ASTM C33/C33M. In addition, after the start of concrete placement, perform tests for aggregate quality at least every three months, and when the source of aggregate or aggregate quality changes. Take samples for testing after the start of concrete placement immediately prior to entering the concrete mixer.

C. Scales, Batching and Recording

Check the accuracy of the scales by test weights prior to start of concrete operations and at least once every three months. Also conduct such tests as directed whenever there are variations in properties of the fresh concrete that could result from batching errors. Once a week check the accuracy of each batching and recording device during a weighing operation by noting and recording the required weight, recorded weight, and the actual weight batched. At the same time, test and ensure that the devices for dispensing admixtures are operating properly and accurately. When either the weighing accuracy or batching accuracy does not comply with specification requirements, do not operate the plant until necessary adjustments or repairs have been made. Immediately correct discrepancies in recording accuracies.

D. Batch-Plant Control

Continuously control the measurement of concrete materials, including cementitious materials, each size of aggregate, water, and admixtures. Adjust the aggregate weights and amount of added water as necessary to compensate for free moisture in the aggregates. Adjust the amount of air-entraining agent to control air content within specified limits. Prepare a report indicating type and source of cement used, type and source of pozzolan or slag used, amount and source of admixtures used, aggregate source, the required aggregate and water weights per cubic yard amount of water as free moisture in each size of aggregate, and the batch aggregate and water weights per cubic yard for each class of concrete batched during each day's plant operation.

E. Concrete Mixture

1. Air Content Testing

Perform air content tests when test specimens are

fabricated. In addition, make at least two tests for air content on randomly selected batches of each separate concrete mixture produced during each 8-hour period of concrete production. Perform additional tests when excessive variation in workability is reported by the placing foreman or Government inspector. Conduct tests in accordance with ASTM C231/C231M for normal weight concrete and ASTM C173/C173M for lightweight concrete. Plot test results on control charts. Submit the control charts weekly and make them readily available to the Government. Keep copies of the current control charts in the field by testing crews and results plotted as tests are made. When a single test result reaches either the upper or lower action limit, perform a second test immediately. Average the results of the two tests and use this average as the air content of the batch to plot on both the air content and the control chart for range, and for determining need for any remedial action. Plot the result of each test, or average as noted in the previous sentence, on a separate control chart for each mixture on which an "average line" is set at the midpoint of the specified air content range from paragraph AIR ENTRAINMENT. Set an upper warning limit and a lower warning limit line 1.0 percentage point above and below the average line, respectively. Set an upper action limit and a lower action limit line 1.5 percentage points above and below the average line, respectively. Plot the range between each two consecutive tests on a secondary control chart for range where an upper warning limit is set at 2.0 percentage points and an upper action limit is set at 3.0 percentage points. Samples for air content may be taken at the mixer, however, the Contractor is responsible for delivering the concrete to the placement site at the stipulated air content. If the materials or transportation methods cause air content loss between the mixer and the placement, take correlation samples at the placement site as required by the Contracting Officer, and the control the air content at the mixer as directed.

2. Air Content Corrective Action

Whenever points on the control chart for percent air reach either warning limit, immediately make an adjustment in the amount of air-entraining admixture batched. As soon as practical after each adjustment, make another test to verify the result of the adjustment. Whenever a point on the secondary control chart for range reaches the warning limit, recalibrate the admixture dispenser to ensure that it is operating accurately and with good reproducibility. Whenever a point on either control chart reaches an action limit line, the air content is considered out of control and the concreting operation immediately halted until the air content is under control. Make additional air content tests when concreting is restarted.

3. Slump Testing

In addition to slump tests which are made when test specimens are fabricated during concrete placement/discharge, make at least four slump tests on

randomly selected batches in accordance with ASTM C143/C143M for each separate concrete mixture produced during each 8-hour or less period of concrete production each day. Also, make additional tests when excessive variation in workability is reported by the placing foreman or Government inspector. Plot test results on control charts. Submit the control charts and make them readily available to the Government. Keep copies of the current control charts in the field by testing crews and results plotted as tests are made. When a single slump test reaches or goes beyond either the upper or lower action limit, immediately perform a second test. Average the results of the two tests and use this average as the slump of the batch to plot on both the control charts for slump and the chart for range, and for determining need for any remedial action. Set limits on separate control charts for slump for each type of mixture. Set the upper warning limit at 1/2 inch below the maximum allowable slump specified in paragraph SLUMP in PART 1 for each type of concrete and, set an upper action limit line and lower action limit line at the maximum and minimum allowable slumps, respectively, as specified in the same paragraph. Plot the range between each consecutive slump test for each type of mixture on a single control chart for range on which an upper action limit is set at 2 inches. Take samples for slump at the mixer. However, the Contractor is responsible for delivering the concrete to the placement site at the stipulated slump. If the materials or transportation methods cause slump loss between the mixer and the placement, take correlation samples at the placement site as required by the Contracting Officer, and the slump at the mixer controlled as directed.

4. Slump Corrective Action

Whenever points on the control charts for slump reach the upper warning limit, make an adjustment immediately in the batch weights of water and fine aggregate. The adjustments are to be made so that the total water content does not exceed that amount allowed by the maximum w/c ratio specified, based on aggregates which are in a saturated surface dry condition. When a single slump reaches the upper or lower action limit, deliver no further concrete to the placing site until proper adjustments have been made. Immediately after each adjustment, make another test to verify the correctness of the adjustment. Whenever two consecutive individual slump tests, made during a period when there was no adjustment of batch weights, produce a point on the control chart for range at or above the upper action limit, halt the concreting operation immediately, and take appropriate steps to bring the slump under control. Make additional slump tests as directed.

5. Temperature

Measure the temperature of the concrete when compressive strength specimens are fabricated in accordance with ASTM C1064/C1064M. Report the temperature along with the compressive strength data.

6. Strength Specimens

Perform on at least one set of test specimens, for compressive strength as appropriate, on each different concrete mixture placed during the day for each 200 cubic yards or portion thereof of that concrete mixture placed each day. At least one set of test specimens shall be tested for each day's pour of each concrete mixture. Perform on additional sets of test specimens, as directed by the Contracting Officer, when the mixture proportions are changed or when low strengths have been detected. Develop a truly random (not haphazard) sampling plan for approval by the Contracting Officer prior to the start of construction. Show in the plan that sampling is done in a completely random and unbiased manner.

a. A set of test specimens for concrete with a 28-day specified strength in accordance with paragraph STRENGTH REQUIREMENTS in PART 2 consists of six specimens for each type of curing (laboratory or field), one to be tested at 7 days, one to be tested at 14 days, two at 28 days, and two cylinders held in reserve.

b. A strength test is the average of the strengths of at least two 6 inch by 12 inch cylinders made for the same sample of concrete.

c. Mold and cure test specimens in accordance with ASTM C31/C31M, and test in accordance with ASTM C39/C39M for test cylinders. Immediately report results of all strength tests to the Contracting Officer.

d. Maintain quality control charts for individual strength "tests", ("test" as defined in paragraph STRENGTH REQUIREMENTS) moving average of last 3 "tests" for strength, and moving average for range for the last 3 "tests" for each mixture. Provide charts similar to those found in ACI 214R.

F. Inspection Before Placing

Inspect foundations, construction joints, forms, and embedded items in sufficient time prior to each concrete placement in order to certify to the Contracting Officer that they are ready to receive concrete. Report the results of each inspection in writing.

G. Placing

The placing foreman must supervise placing operations, determine that the correct quality of concrete or grout is placed in each location as specified and as directed by the Contracting Officer, and be responsible for measuring and recording concrete temperatures and ambient temperature hourly during placing operations, weather conditions, time of placement, volume placed, and method of placement. The placing foreman must not permit batching and placing to begin until it has been verified that an adequate number of vibrators in working order and with competent operators are available. Do not continue placing if any pile of

concrete is inadequately consolidated. If any batch of concrete fails to meet the temperature requirements, take immediate steps to improve temperature controls.

H. Cold-Weather Protection

At least once each shift and once per day on non-work days, inspect all areas subject to cold-weather protection. Note any deficiencies, correct, and report.

I. Reports

Report all results of tests or inspections conducted, informally as they are completed and in writing daily. Prepare a weekly report for the updating of control charts covering the entire period from the start of the construction season through the current week. During periods of cold-weather protection, prepare daily reports of pertinent temperatures. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Confirm such reports of failures and the action taken in writing in the routine reports. The Contracting Officer has the right to examine all contractor quality control records.

3.08 REPAIR, REHABILITATION AND REMOVAL

Before the Government accepts the structure and final payment is made, inspect the structure for cracks, damage and substandard concrete placements that may adversely affect the service life of the structure. Submit a report documenting these defects, which includes recommendations for repair, removal and/or remediation to the Contracting Officer for approval before any corrective work is accomplished.

A. Crack Repair

Prior to final acceptance, document and repair all cracks in excess of 0.02 inches wide. Submit the proposed method and materials to repair the cracks to the Contracting Officer for approval. Address the amount of movement expected in the crack due to temperature changes and loading.

B. Repair of Weak Surfaces

Weak surfaces are defined as mortar-rich, rain-damaged, uncured, or containing exposed voids or deleterious materials. Diamond grind concrete surfaces with weak surfaces less than 1/4 inch thick to remove the weak surface. Remove and replace surfaces containing weak surfaces greater than 1/4 inch thick, or mitigate in a manner acceptable to the Contracting Officer.

C. Failure of Quality Assurance Test Results

Do not proceed with proposed mitigation efforts to restore the service life until approved by the Contracting Officer.

-- End of Section --

SECTION 03 35 00.00

CONCRETE FINISHING
05/14

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 301	(2016) Specifications for Structural Concrete
ACI 305R	(2010) Guide to Hot Weather Concreting

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 FINISHING FORMED SURFACES

Finish formed surfaces as specified herein. Unless another type of architectural or special finish is specified, leave surfaces with the texture imparted by the forms except that defective surfaces must be repaired.

3.02 REPAIRS

Repair in accordance with ACI 301, Section 5.

3.03 FINISHING UNFORMED SURFACES

The finish of all unformed surfaces must meet the requirements of paragraph TOLERANCES in Section 03 30 00.00, CAST-IN-PLACE CONCRETE, when tested as specified herein.

A. General

The ambient temperature of spaces adjacent to unformed surfaces being finished and of the base on which concrete will be placed must not be less than 50 degrees F. In hot weather meet all requirements of Section 03 30 00.00 10 CAST-IN-PLACE CONCRETE paragraphs HOT WEATHER REQUIREMENTS and PREVENTION OF PLASTIC SHRINKAGE CRACKING. In hot weather when the rate of evaporation of surface moisture, as determined by use of Figure 2.1.5 of ACI 305R, may reasonably be expected to exceed 0.2 pounds per square foot per hour. Make provisions for windbreaks, shading, fog spraying, or wet covering with a light-colored material in advance of placement, and take such protective measures as quickly as finishing operations will allow. Float finish

unformed surfaces that are not to be covered by additional concrete or backfill, with additional finishing as specified below, and true to the elevation indicated. Bring surfaces to receive additional concrete or backfill to the elevation indicated, properly consolidate, and leave true and regular. Unless otherwise indicated, evenly slope exterior surfaces for drainage. Where drains are provided, evenly slope interior floors to the drains. Carefully make joints with a jointing or edging tool. Protect the finished surfaces from stains or abrasions. Grate tampers or "jitterbugs" cannot be used for any surfaces. The dusting of surfaces with dry cement or other materials or the addition of any water during finishing is not be permitted. If bleedwater is present prior to finishing, carefully drag off the excess water or remove by absorption with porous materials such as burlap. During finishing operations, take extreme care to prevent over finishing or working water into the surface; this can cause "crazing" (surface shrinkage cracks which appear after hardening) of the surface. Remove and replace any slabs with surfaces which exhibit significant crazing. During finishing operations, check surfaces with a 10 foot straightedge, applied in both directions at regular intervals while the concrete is still plastic, to detect high or low areas.

B. Rough Slab Finish

In accordance with ACI 301, Section 5.

C. Float Finish

In accordance with ACI 301, Section 5.

D. Trowel Finish

In accordance with ACI 301, Section 5.

E. Non-Slip Finish

Construct non-slip floors in accordance with ACI 301, Section 5.

3.04 EXTERIOR SLAB AND RELATED ITEMS

A. Pavements

Immediately following the final consolidation of the surface, float the pavement longitudinally from bridges resting on the side forms and spanning but not touching the concrete. If necessary, place and screed additional concrete, and operate the float until a satisfactory surface has been produced. Advance the floating operation not more than half the length of the float and then continued over the new and previously floated surfaces. After finishing is completed but while the concrete is still plastic, eliminate minor irregularities and score marks in the pavement surface by means of long-handled cutting straightedges. Use straightedges that are 12 feet in length and operated from the sides of the pavement and from bridges. Equip a straightedge operated from the side of the pavement with a handle 3 feet longer than one-half the width of the pavement. Test the surface for trueness with a 12 foot straightedge held in successive positions parallel and at right angles to the center line of the

pavement, and the whole area covered as necessary to detect variations. Advance the straightedge along the pavement in successive stages of not more than one-half the length of the straightedge. Immediately fill depressions with freshly mixed concrete, strike off, consolidate, and refinish. Also strike and refinish projections above the required elevation. Continue the straightedge testing and finishing until the entire surface of the concrete is true. Before the surface sheen has disappeared and well before the concrete becomes nonplastic, give the surface of the pavement a nonslip sandy surface texture by use of a broom or burlap drag. For a burlap drag, a strip of clean, wet burlap from 3 to 5 feet wide and 2 feet longer than the pavement width shall be carefully pulled across the surface. Round edges and joints with an edger having a radius of 1/8 inch.

B. Sidewalks

Apply a lightly broomed finish.

C. Curbs and Gutters

Finish exposed surfaces using a stiff bristled brush.

-- End of Section --

SECTION 03 35 43

POLISHED CONCRETE FINISHING
11/17

PART 1 GENERAL

1.01 SUMMARY

Section includes polished concrete finishing including staining.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D4263	(1983; R 2012) Indicating Moisture in Concrete by the Plastic Sheet Method
ASTM F710	(2011) Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Polish; G, AE

Stain; G, AE

SD-04 Samples

Field Sample Panels; G, AE

SD-08 Manufacturer's Instructions

Manufacturer's Written Instructions; G, AE

1.04 QUALITY ASSURANCE

A. Field Sample Panels

After approval of samples, produce field sample panels to demonstrate the approved range of selections made under Sample submittals. Produce a minimum of three sets of full-scale panels, approximately 48 by 48 inches minimum, to demonstrate the expected range of finish, color, and appearance variations.

A. Locate panels as indicated or, if not indicated, as directed by Contracting Officer.

B. Maintain field sample panels during construction in an undisturbed condition as a standard for judging the completed Work.

C. Demolish and remove field sample panels when directed.

PART 2 PRODUCTS

2.01 STAIN MATERIALS

Reactive Stain: Acidic-based stain with wetting agents and high-grade, UV-stable metallic salts that react with calcium hydroxide in cured concrete to produce permanent, variegated, or translucent color effects.

A. Manufacturers

1. Scofield, L. M. Company http://www.scofield.com/.
2. SureCrete Design Products https://www.surecretedesign.com
3. Increte Systems Inc. http://www.increte.com
2. Or approved equal.

PART 3 EXECUTION

3.01 POLISHING

Polish: Level 3: High sheen, 800 grit.

Apply polished concrete finish system to cured and prepared slabs. Submit product data for polish used.

A. Machine grind floor surfaces to receive polished finishes level and smooth.

B. Apply reactive stain for polished concrete in polishing sequence and according to manufacturer's written instructions.

C. Apply penetrating liquid floor treatment for polished concrete in polishing sequence and according to manufacturer's written instructions, allowing recommended drying time between successive coats.

D. Apply penetrating stain for polished concrete in polishing sequence and according to manufacturer's written instructions.

E. Continue polishing with progressively finer-grit diamond polishing pads to gloss level, to match approved mockup.

F. Control and dispose of waste products produced by grinding and polishing operations.

G. Neutralize and clean polished floor surfaces.

3.02 STAINING

Submit product data for stain used.

A. Newly placed concrete shall be at least 30 days old before staining.

B. Prepare surfaces according to manufacturer's written instructions and as follows:

1. Clean concrete thoroughly by scraping, applying solvents or stripping agents, sweeping and pressure washing, or scrubbing with a rotary floor machine and detergents recommended by stain manufacturer. Rinse until water is clear and allow surface to dry.

a. Do not use acidic solutions to clean surfaces.

2. Test surfaces with droplets of water. If water beads and does not penetrate surface, or penetrates only in some areas, profile surfaces by grinding or sanding. Retest and continue profiling surface until water droplets immediately darken and uniformly penetrate concrete surfaces.

3. Apply acidic solution to dampened concrete surfaces, scrubbing with uncolored, acid-resistant nylon-bristle brushes until bubbling stops and concrete surface has texture of 120-grit sandpaper. Do not allow solution to dry on concrete surfaces. Rinse until water is clear. Control, collect, and legally dispose of runoff.

4. Neutralize concrete surfaces and rinse until water is clear. Test surface for residue with clean white cloth. Test surface according to ASTM F710 to ensure pH is between 7 and 8.

C. Allow concrete surface to dry before applying stain. Verify readiness of concrete to receive stain according to ASTM D4263 by tightly taping 18-by-18-inch , 4-mil-thick polyethylene sheet to a representative area of concrete surface. Apply stain only if no evidence of moisture has accumulated under sheet after 16 hours.

D. Reactive Stain: Apply reactive stain to concrete surfaces according to manufacturer's written instructions and as follows:

1. Apply stain by uncolored bristle brush, roller, or high-volume, low-pressure sprayer and immediately scrub into concrete surface with uncolored, acid-resistant nylon-bristle brushes in continuous, circular motion. Do not spread stain after fizzing stops. Allow to dry four hours and repeat application of stain in sufficient quantity to obtain color consistent with approved mockup.

2. Remove stain residue after four hours by wet scrubbing with commercial-grade detergent recommended by stain manufacturer. Rinse until water is clear. Control, collect, and legally dispose of runoff.

-- End of Section --

SECTION 03 39 00.00

CONCRETE CURING
05/14

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 301	(2016) Specifications for Structural Concrete
ACI 308.1	(2011) Specification for Curing Concrete

ASTM INTERNATIONAL (ASTM)

ASTM C1602/C1602M	(2012) Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Concrete Curing Compound; G, AE

SD-06 Test Reports

Testing And Inspection For CQC; G, AE

SD-08 Manufacturer's Instructions

Concrete Curing Compound; G, AE

1.03 DELIVERY, STORAGE, AND HANDLING

Store materials in such a manner as to avoid contamination and deterioration. Materials must be capable of being accurately identified after bundles or containers are opened.

PART 2 PRODUCTS

2.01 CURING MATERIALS

Provide curing materials in accordance with ACI 301 Sections 5 and

ACI 308.1 Section 2. Submit product data and manufacturer's instructions for concrete curing compound.

2.02 WATER

Provide water for curing that is fresh, clean, potable, and free of injurious amounts of oil, acid, salt, or alkali, except that non-potable water may be used if it meets the requirements of ASTM C1602/C1602M.

PART 3 EXECUTION

3.01 CURING AND PROTECTION

Cure and protect concrete in accordance with ACI 301 Section 5.

3.02 TESTING AND INSPECTION FOR CQC

Perform the inspection and tests described below and, based upon the results of these inspections and tests, take the action required. Submit certified copies of laboratory test reports, including curing compound proposed for use on this project.

A. Moist Curing Inspections

At least once each shift, and not less than twice per day on both work and non-work days, inspect all areas subject to moist curing. Note and record the surface moisture condition.

B. Moist Curing Corrective Action

When a daily inspection report lists an area of inadequate curing, take immediate corrective action, and extend the required curing period for those areas by 1 day.

C. Membrane Curing Inspection

Apply no curing compound until the Contractor has verified that the compound is properly mixed and ready for spraying. At the end of each operation, estimate the quantity of compound used by measurement of the container and the area of concrete surface covered, compute the rate of coverage in square feet/gallon, and note whether or not coverage is uniform.

D. Membrane Curing Corrective Action

When the coverage rate of the curing compound is less than that specified or when the coverage is not uniform, spray the entire surface again.

E. Sheet Curing Inspection

At least once each shift and once per day on non-work days, inspection all areas being cured using impervious sheets. Note and record the condition of the covering and the tightness of the laps and tapes.

F. Sheet Curing Corrective Action

When a daily inspection report lists any tears, holes, or laps or joints that are not completely closed, promptly repair the tears and holes or replace the sheets, close the joints, and extend the required curing period for those areas by 1 day.

-- End of Section --

DIVISION 05 – METALS

SECTION 05 50 13

MISCELLANEOUS METAL FABRICATIONS
05/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF45	(2003; Reaffirmed 2009) Designation System for Aluminum Finishes

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 303	(2016) Code of Standard Practice for Steel Buildings and Bridges

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.3	(2013) Operations - Safety Requirements for Powder Actuated Fastening Systems

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2015; Errata 1 2015; Errata 2 2016) Structural Welding Code - Steel

ASME INTERNATIONAL (ASME)

ASME B18.2.1	(2012; Errata 2013) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(2015) Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series)
ASME B18.21.1	(2009; R 2016) Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers (Inch Series)
ASME B18.21.2M	(1999; R 2014) Lock Washers (Metric Series)
ASME B18.22M	(1981; R 2017) Metric Plain Washers
ASME B18.6.2	(1998; R 2010) Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Set Screws: Inch Series
ASME B18.6.3	(2013) Machine Screws, Tapping Screws, and Machine Drive Screws (Inch Series)

ASTM INTERNATIONAL (ASTM)

ASTM A108	(2013) Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
ASTM A123/A123M	(2015) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153/A153M	(2016) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A29/A29M	(2016) Standard Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought
ASTM A307	(2014; E 2017) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
ASTM A36/A36M	(2014) Standard Specification for Carbon Structural Steel
ASTM A47/A47M	(1999; R 2014) Standard Specification for Ferritic Malleable Iron Castings
ASTM A500/A500M	(2013) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A53/A53M	(2012) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A653/A653M	(2015; E 2016) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A780/A780M	(2009; R 2015) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A924/A924M	(2017) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B108/B108M	(2015) Standard Specification for Aluminum-Alloy Permanent Mold Castings
ASTM B209	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B209M	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM B221	(2014) Standard Specification for Aluminum

	and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B221M	(2013) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM B26/B26M	(2014; E 2015) Standard Specification for Aluminum-Alloy Sand Castings
ASTM C1513	(2013) Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections
ASTM D1187/D1187M	(1997; E 2011; R 2011) Asphalt-Base Emulsions for Use as Protective Coatings for Metal

MASTER PAINTERS INSTITUTE (MPI)

MPI 79	(Oct 2009) Alkyd Anti-Corrosive Metal Primer

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 3	(1982; E 2004) Power Tool Cleaning
SSPC SP 6/NACE No.3	(2007) Commercial Blast Cleaning

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Structural Steel Door Frames, fabrication drawings; G, AE

Floor Gratings, Installation Drawings; G, AE

Bollards/Pipe Guards; G, AE

Embedded Angles and Plates, Installation Drawings; G, AE

SD-03 Product Data

Corner Guards; G, AE

Floor Gratings; G, AE

Structural Steel Door Frames; G, AE

1.03 QUALIFICATION OF WELDERS

Qualify welders in accordance with AWS D1.1/D1.1M. Use procedures, materials, and equipment of the type required for the work.

1.04 DELIVERY, STORAGE, AND PROTECTION

Protect from corrosion, deformation, and other types of damage. Store items in an enclosed area free from contact with soil and weather. Remove and replace damaged items with new items.

1.05 MISCELLANEOUS REQUIREMENTS

A. Fabrication Drawings

Submit fabrication drawings showing layout(s), connections to structural system, and anchoring details as specified in AISC 303.

B. Installation Drawings

Submit templates, erection, and installation drawings indicating thickness, type, grade, class of metal, and dimensions. Show construction details, reinforcement, anchorage, and installation in relation to the building construction.

PART 2 PRODUCTS

2.01 MATERIALS

Provide exposed fastenings of compatible materials (avoid contact with dissimilar metals). Coordinate color and finish with the material to which fastenings are applied.

A. Structural Carbon Steel

Provide in accordance with ASTM A36/A36M.

B. Structural Tubing

Provide in accordance with ASTM A500/A500M.

C. Steel Pipe

Provide in accordance with ASTM A53/A53M, Type E or S, Grade B.

D. Fittings for Steel Pipe

Provide standard malleable iron fittings in accordance with ASTM A47/A47M.

E. Gratings

Provide metal plank grating, non-slip requirement, steel in accordance with ASTM A653/A653M, Z275 G90.

F. Anchor Bolts

Provide in accordance with ASTM A307. Where exposed, provide anchor bolts of the same material, color, and finish as the metal to which they are applied.

1. Expansion Anchors and Adhesive Anchors

2. Lag Screws and Bolts

Provide in accordance with ASME B18.2.1, type and grade best suited for the purpose.

3. Bolts, Nuts, Studs and Rivets

Provide in accordance with ASME B18.2.2 or ASTM A307.

4. Powder Actuated Fasteners

Follow safety provisions in accordance with ASSE/SAFE A10.3.

5. Screws

Provide in accordance with ASME B18.2.1, ASME B18.6.2, ASME B18.6.3 and ASTM C1513.

6. Washers

Provide plain washers in accordance with ASME B18.22M, ASME B18.21.1. Provide beveled washers for American Standard beams and channels, square or rectangular, tapered in thickness, and smooth. Provide lock washers in accordance with ASME B18.21.2M, ASME B18.21.1.

7. Welded Headed Shear Studs

Provide in accordance with ASTM A108 or ASTM A29/A29M-12.

G. Aluminum Alloy Products

Provide in accordance with ASTM B209M, ASTM B209 for sheet plate, ASTM B221M, ASTM B221M, ASTM B221 for extrusions and ASTM B26/B26M or ASTM B108/B108M for castings. Provide aluminum extrusions at least 1/8 inch thick and aluminum plate or sheet at least 0.050 inch thick.

2.02 FABRICATION FINISHES

A. Galvanizing

Hot-dip galvanize items specified to be zinc-coated, after fabrication where practicable. Provide galvanizing in accordance with ASTM A123/A123M, ASTM A153/A153M, ASTM A653/A653M or ASTM A924/A924M, Z275 G90.

B. Galvanize

Anchor bolts, grating fasteners, washers, and parts or devices necessary for proper installation, unless indicated otherwise.

C. Repair of Zinc-Coated Surfaces

Repair damaged surfaces with galvanizing repair method and paint in accordance with ASTM A780/A780M or by application of stick or thick paste material specifically designed for repair of galvanizing, as approved by Contracting Officer. Clean areas to be repaired and remove slag from welds. Heat, with a torch, surfaces to which stick or paste material will be applied. Heat to a temperature sufficient to melt the metals in the stick or paste. Spread molten material uniformly over surfaces to be coated and wipe off excess material.

D. Shop Cleaning and Painting

1. Surface Preparation

Blast clean surfaces in accordance with SSPC SP 6/NACE No.3. Surfaces that will be exposed in spaces above ceiling or in attic spaces, crawl spaces, furred spaces, and chases may be cleaned in accordance with SSPC SP 3 in lieu of being blast cleaned. Wash cleaned surfaces which become contaminated with rust, dirt, oil, grease, or other contaminants with solvents until thoroughly clean. Steel to be embedded in concrete must be free of dirt and grease prior to embed. Do not paint or galvanize bearing surfaces, including contact surfaces within slip critical joints. Shop coat these surfaces with rust prevention.

2. Pretreatment, Priming and Painting

Apply pre-treatment, primer, and paint in accordance with manufacturer's printed instructions.

E. Nonferrous Metal Surfaces

Protect by plating, anodic, or organic coatings.

F. Aluminum Surfaces

1. Surface Condition

Before finishes are applied, remove roll marks, scratches, rolled-in scratches, kinks, stains, pits, orange peel, die marks, structural streaks, and other defects which will affect uniform appearance of finished surfaces.

2. Aluminum Finishes

Unexposed sheet, plate and extrusions may have mill finish as fabricated. Sandblast castings' finish, medium, AA DAF45. Unless otherwise specified, provide all other aluminum items with a standard mill finish. Provide a coating thickness not less than that specified for protective and decorative type finishes for items used in interior locations or architectural Class I type finish for items used in exterior locations. Provide in accordance with AA DAF45. Provide a polished satin finish on items to be anodized.

2.03 CORNER GUARDS

For jambs and sills of openings and edges of platforms provide steel shapes and plates anchored in masonry or concrete with welded steel straps or end-weld stud anchors. Form corner guards for use with glazed or ceramic tile finish on walls with 0.0625 inch thick corrosion-resisting steel with satin finish, extend 5 feet above the top of cove base or to the top of the wainscot, whichever is less, and securely anchor to the supporting wall. Provide galvanized corner guards on exterior. Provide interior corner guards as indicated in Section 10 26 00 WALL AND DOOR PROTECTION.

2.04 FLOOR GRATINGS

A. Provide floor gratings as indicated on the Contract Drawings. Grating shall be product specified or as equal. Install grating per manufacturer's instructions and the details shown on the Contract Drawings.

B. Provide slip resistant surface finishes.

2.05 BOLLARDS/PIPE GUARDS

Provide 6 inch prime coated weight steel pipe in accordance with ASTM A53/A53M. Anchor posts in concrete and fill solidly with concrete with minimum compressive strength of 2500 psi.

2.06 MISCELLANEOUS PLATES AND SHAPES

Provide items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings and frames. Provide lintels fabricated from structural steel shapes over openings in masonry walls and partitions as indicated and as required to support wall loads over openings. Provide with connections.

Provide angles and plates in accordance with ASTM A36/A36M, for embedment as indicated. Galvanize embedded items exposed to the elements in accordance with ASTM A123/A123M.

2.07 STRUCTURAL STEEL DOOR FRAMES

A. Provide support where track, guides, hoods, hangers, operators, and other accessories are required.

B. Provide jamb anchors near top, bottom, and at not more than 24 inch intervals. Provide the bottom of each jamb member with a clip angle welded in place with two 1/2 inch diameter floor bolts for adjustment.

C. Provide spreaders between bottoms of floor jamb members. When floor construction permits, spreaders may be left in place and concealed in the floor.

Provide frames of rolled shapes as indicated. Miter and weld heads to jambs, or provide riveted clip angle connections concealed in the finished work. Provide frames for swinging doors with 5/8 by 1-1/2 inch solid bar stops secured to the frame by welding or by 1/4 inch diameter countersunk machine screws spaced not more than 12 inches on centers. Stiffen head openings greater

than 3 feet as necessary to limit deflection to not more than 1/16 inch. Secure frames to masonry with zinc-coated metal anchors spaced not more than 30 inches on centers. Where necessary to engage the threads of machine screws for fastening hardware, back frames on inside faces with steel plates of suitable thickness. Tap frames and reinforcing plates as necessary for the installation of hardware and other work. Countersink rivets and screw heads where they will be exposed in the finished work. Grind welds smooth.

PART 3 EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

Install items at locations indicated in accordance with manufacturer's instructions. Verify all field dimensions prior to fabrication. Include materials and parts necessary to complete each assembly, whether indicated or not. Misalignment and missizing of holes for fasteners is cause for rejection. Conceal fastenings where practicable. Joints exposed to weather must be watertight.

3.02 WORKMANSHIP

Provide miscellaneous metalwork that is true and accurate in shape, size, and profile. Make angles and lines continuous and straight. Make curves consistent, smooth and unfaceted. Provide continuous welding along the entire area of contact except where tack welding is permitted. Do not tack weld exposed connections. Unless otherwise indicated and approved, provide a smooth finish on exposed surfaces. Provide countersunk rivets where exposed. Provide coped and mitered corner joints aligned flush and without gaps.

3.03 ANCHORAGE, FASTENINGS, AND CONNECTIONS

Provide anchorage as necessary, whether indicated or not, for fastening miscellaneous metal items securely in place. Include slotted inserts, expansion shields, powder-driven fasteners, toggle bolts (when approved for concrete), through bolts for masonry, headed shear studs, machine and carriage bolts for steel, through bolts, lag bolts, and screws for wood. Do not use wood plugs. Provide non-ferrous attachments for non-ferrous metal. Provide exposed fastenings of compatible materials (avoid contact of dissimilar metals), that generally match in color and finish the surfaces to which they are applied. Conceal fastenings where practicable. Provide all fasteners flush with the surfaces they fasten, unless indicated otherwise. Test a minimum of 2 bolt, nut, and washer assemblies from each certified mill batch in a tension measuring device at the job site prior to the beginning of bolting start-up.

3.04 WELDING

Perform welding, welding inspection, and corrective welding in accordance with AWS D1.1/D1.1M. Use continuous welds on all exposed connections. Grind visible welds smooth in the finished installation. Provide welded headed shear studs in accordance with AWS D1.1/D1.1M, Clause 7, except as otherwise specified. Provide in accordance with the safety requirements of EM 385-1-1.

3.05 DISSIMILAR METALS

Where dissimilar metals are in contact, protect surfaces with a coating in accordance with MPI 79 to prevent galvanic or corrosive action. Where aluminum is in contact with concrete, plaster, mortar, masonry, wood, or absorptive materials subject to wetting, protect in accordance with ASTM D1187/D1187M, asphalt-base emulsion. Clean surfaces with metal shavings from installation at the end of each work day.

3.06 PREPARATION

A. Material Coatings and Surfaces

Remove rust preventive coating just prior to field erection, using a remover approved by the metal manufacturer. Surfaces, when assembled, must be free of rust, grease, dirt and other foreign matter.

B. Environmental Conditions

Do not clean or paint surfaces when damp or exposed to foggy or rainy weather, when metallic surface temperature is less than minus 5 degrees F above the dew point of the surrounding air, or when surface temperature is below 45 degrees F or over 95 degrees F, unless approved by the Contracting Officer. Metal surfaces to be painted must be dry for a minimum of 48 hours prior to the application of primer or paint.

3.07 INSTALLATION OF BOLLARDS/PIPE GUARDS

Set bollards/pipe guards vertically in concrete piers. Fill hollow cores with concrete having a compressive strength of 3000 psi.

3.08 STRUCTURAL STEEL DOOR FRAMES

Secure door frames to the floor slab by means of angle clips and expansion bolts. Provide any necessary reinforcements and drill and tap frames as required for hardware. Clean metal shavings from finished surfaces at the end of each work day.

For freight elevator hoistway entrances, include a non-skid metal sill installed in accordance with the elevator manufacturer's written installation instructions.

3.09 INSTALLATION MISCELLANEOUS PLATES AND SHAPES

Provide lintels fabricated from structural steel shapes over openings in masonry walls and partitions as required to support wall loads over openings. Provide with connections. Construct to have at least 8 inches bearing on masonry at each end.

-- End of Section --

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

SECTION 06 41 16.00

LAMINATE CLAD ARCHITECTURAL CASEWORK
08/10

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A161.2	(1998) Decorative Laminate Countertops, Performance Standards for Fabricated High Pressure
ANSI A208.2	(1986; R 2009) Medium Density Fiberboard (MDF) for Interior Applications

ARCHITECTURAL WOODWORK INSTITUTE (AWI)

AWI AWS	(2nd Edition) Architectural Woodwork Standards

ASTM INTERNATIONAL (ASTM)

ASTM D1037	(2012) Evaluating Properties of Wood-Base Fiber and Particle Panel Materials
ASTM E84	(2016) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM F547	(2006; R 2012) Nails for Use with Wood and Wood-Base Materials

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.9	(2015) Cabinet Hardware
ANSI/BHMA A156.11	(2014) Cabinet Locks
ANSI/BHMA A156.18	(2016) Materials and Finishes

COMPOSITE PANEL ASSOCIATION (CPA)

CPA A208.1	(2016) Particleboard
CPA A208.2	(2016) Medium Density Fiberboard (MDF) for Interior Applications

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI/NEMA LD 3	(2005) Standard for High-Pressure Decorative Laminates

WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)

ANSI/WDMA I.S.1A	(2013) Interior Architectural Wood Flush Doors

1.02 SYSTEM DESCRIPTION

Work in this section includes laminate clad custom casework cabinets as shown on the drawings and as described in this specification. This Section includes high-pressure laminate surfacing and cabinet hardware. All exposed and semi-exposed surfaces, whose finish is not otherwise noted on the drawings or finish schedule, shall be sanded smooth and shall receive a clear finish of polyurethane. Wood finish may be shop finished or field applied in accordance with Section 09 90 00 PAINTING AND COATING.

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Drawings; G, AE

Installation Drawings; G, AE

SD-03 Product Data

Wood Materials; G, AE

Wood Finish; G, AE

Finish Schedule; G, AE

Laminate Clad Casework; G, AE

SD-04 Samples

Plastic Laminates; G

Cabinet Hardware; G

SD-07 Certificates

Quality Control Statement; G, AE

1.04 QUALITY ASSURANCE

Unless otherwise noted on the drawings, all materials, construction methods, and fabrication shall conform to and comply with the premium

grade quality standards as outlined in AWI AWS Section for laminate clad cabinets. These standards shall apply in lieu of omissions or specific requirements in this specification. Contractors and their personnel engaged in the work shall be able to demonstrate successful experience with work of comparable extent, complexity and quality to that shown and specified. Submit a quality control statement which illustrates compliance with and understanding of AWI AWS requirements, in general, and the specific AWI AWS requirements provided in this specification. The quality control statement shall also certify a minimum of ten years Contractor's experience in laminate clad casework fabrication and construction. The quality control statement shall provide a list of a minimum of five successfully completed projects of a similar scope, size, and complexity.

1.05 DELIVERY, STORAGE, AND HANDLING

Casework may be delivered knockdown or fully assembled. Deliver all units to the site in undamaged condition, stored off the ground in fully enclosed areas, and protected from damage. The storage area shall be well ventilated and not subject to extreme changes in temperature or humidity.

1.06 SEQUENCING AND SCHEDULING

Coordinate work with other trades. Units shall not be installed in any room or space until painting, and ceiling installation are complete within the room where the units are located. Floor cabinets shall be installed before finished flooring materials are installed.

PART 2 PRODUCTS

2.01 WOOD MATERIALS

A. Lumber

1. All framing lumber shall be kiln-dried Grade III to dimensions as shown on the drawings. Frame front, where indicated on the drawings, shall be nominal 3/4 inch hardwood.

2. Standing or running trim casework components, which are specified to receive a transparent finish, shall be oak hardwood species, plain sawn. AWI grade shall be premium. Location, shape, and dimensions shall be as indicated on the drawings.

3. Assemble in plant to the maximum extent possible, miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together. Trim members pressured glued and joined by lemon spline, biscuit or dowels.

d. For wood base, use solid lumber, do not glue for width.

B. Panel Products

1. Plywood

All plywood panels used for framing purposes shall be veneer core hardwood plywood, AWI AWS Grade AA. Nominal thickness

of plywood panels shall be as indicated in this specification and on the drawings.

2. Particleboard

All particleboard shall be industrial grade, medium density 40 to 50 pounds per cubic foot, 3/4 inch thick. A moisture-resistant particleboard in grade Type 2-M-2 or 2-M-3 shall be used as the substrate for plastic laminate covered cabinets and other areas subjected to moisture. Particleboard shall meet the minimum standards listed in ASTM D1037 and CPA A208.1.

3. Medium Density Fiberboard

Medium density fiberboard (MDF) shall be an acceptable panel substrate where noted on the drawings. Medium density fiberboard shall meet the minimum standards listed in CPA A208.2.

2.02 SOLID POLYMER MATERIAL

Solid surfacing casework components shall conform to the requirements of Section 12 36 61.16, SOLID SURFACING COUNTERTOPS.

2.03 HIGH PRESSURE DECORATIVE LAMINATE (HPDL)

All plastic laminates shall meet the requirements of ANSI/NEMA LD 3 and ANSI A161.2 for high-pressure decorative laminates. Design, colors, surface finish and texture, and locations shall be as indicated on the drawings. Submit two samples of each plastic laminate pattern and color. Samples shall be a minimum of 5 by 7 inches in size. Plastic laminate types and nominal minimum thicknesses for casework components shall be as indicated in the following paragraphs.

A. Horizontal General Purpose Standard (HGS) Grade

Horizontal general purpose standard grade plastic laminate shall be 0.048 inches (plus or minus 0.005 inches) in thickness. This laminate grade is intended for horizontal surfaces where postforming is not required.

B. Vertical General Purpose Standard (VGS) Grade

Vertical general purpose standard grade plastic laminate shall be 0.028 inches (plus or minus 0.004 inches) in thickness. This laminate grade is intended for exposed exterior vertical surfaces of casework components where postforming is not required.

C. Horizontal General Purpose Postformable (HGP) Grade

Horizontal general purpose postformable grade plastic laminate shall be 0.042 inches (plus or minus 0.005 inches) in thickness. This laminate grade is intended for horizontal surfaces where post forming is required.

D. Vertical General Purpose Postformable (VGP) Grade

Vertical general purpose postformable grade plastic laminate shall be 0.028 inches (plus or minus 0.004 inches) in thickness. This laminate grade is intended for exposed exterior vertical surfaces of components where postforming is required for curved surfaces.

E. Horizontal General Purpose Fire Rated (HGF) Grade

Horizontal general purpose fire rated grade plastic laminate shall be 0.048 inches (plus or minus 0.005 inches) in thickness. Laminate grade shall have a class 1, class A fire rating in accordance with ASTM E84.

F. Vertical General Purpose Fire Rated (VGF) Grade

Vertical general purpose fire rated grade plastic laminate shall be 0.028 inches (plus or minus 0.004 inches) in thickness. This laminate grade shall have a class 1, class A fire rating in accordance with ASTM E84.

G. Cabinet Liner Standard (CLS) Grade

Cabinet liner standard grade plastic laminate shall be 0.020 inches in thickness. This laminate grade is intended for light duty semi-exposed interior surfaces of casework components.

H. Backing Sheet (BK) Grade

Undecorated backing sheet grade laminate is formulated specifically to be used on the backside of plastic laminated panel substrates to enhance dimensional stability of the substrate. Backing sheet thickness shall be 0.020 inches. Backing sheets shall be provided for all laminated casework components where plastic laminate finish is applied to only one surface of the component substrate.

2.04 CABINET HARDWARE

Submit one sample of each cabinet hardware item specified to include hinges, pulls, and drawer glides. All hardware shall conform to ANSI/BHMA A156.9, unless otherwise noted, and shall consist of the following components:

A. Door Hinges

Frameless concealed Hinges (European type), ANSI/BHMA A156.9 No. BO1602, 100 degree opening, self-closing.

B. Back-Mounted Pulls

4 inch Stainless steel wire pull.

C. Catches

Push-In Magnetic Catches, ANSI/BHMA A156.9, B031031.

D. Adjustable Shelf Standards and Supports

ANSI/BHMA A156.9, B04071; with shelf rests, B0408,1
ANSI/BHMA A156.9, B04102; with shelf brackets, B04112.

E. Drawer Slide

Side mounted type extending bottom edge of drawer, ANSI/BHMA A156.9, B05091 with full extension and a minimum 100 pound load capacity. Slides shall include an integral stop to avoid accidental drawer removal.

F. Locks

1. Door Locks: ANSI/BHMA A156.11, E07121.
2. Drawer Locks: ANSI/BHMA A156.11, E07041.

G. Concealed Hardware

For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in Section 2.7.4 in ANSI/BHMA A156.9

H. Exposed Hardware Finishes

For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for BHMA finish number 630 Satin Stainless Steel.

2.05 FASTENERS

Nails, screws, and other suitable fasteners shall be the size and type best suited for the purpose and shall conform to ASTM F547 where applicable.

2.06 ADHESIVES, CAULKS, AND SEALANTS

A. Adhesives

Adhesives shall be of a formula and type recommended by AWI. Adhesives shall be selected for their ability to provide a durable, permanent bond and shall take into consideration such factors as materials to be bonded, expansion and contraction, bond strength, fire rating, and moisture resistance. Adhesives shall meet local regulations regarding VOC emissions and off-gassing.

1. Wood Joinery

Adhesives used to bond wood members shall be a Type II for interior use. Do not use adhesives that contain urea-formaldehyde resin formula. Adhesives shall withstand a bond test as described in ANSI/WDMA I.S.1A.

2. Laminate Adhesive

Adhesive used to join high-pressure decorative laminate to wood shall be an adhesive consistent with AWI and laminate manufacturer's recommendations. PVC edgebanding shall be

adhered using a polymer-based hot melt glue.

B. Caulk

Caulk used to fill voids and joints between laminated components and between laminated components and adjacent surfaces shall be clear, 100 percent silicone.

C. Sealant

Sealant shall be of a type and composition recommended by the substrate manufacturer to provide a moisture barrier at sink cutouts and all other locations where unfinished substrate edges may be subjected to moisture.

2.07 FABRICATION

Verify field measurements as indicated in the shop drawings before fabrication. Fabrication and assembly of components shall be accomplished at the shop site to the maximum extent possible. Construction and fabrication of cabinets and their components shall meet or exceed the requirements for AWI premium grade unless otherwise indicated in this specification. Cabinet style, in accordance with AWI AWS, Section 400-G descriptions, shall be as indicated on the drawings.

A. Plastic Laminate Casework

1. Cabinet Components

Frame members shall be glued-together, kiln-dried hardwood lumber. Top corners, bottom corners, and cabinet bottoms shall be braced with either hardwood blocks or water-resistant glue and nailed in place metal or plastic corner braces. Cabinet components shall be constructed from the following materials and thicknesses:

a. Grade: Comply with AWI AWS Section 400B, Premium Grade.
b. AWI Type of construction: As indicated.
c. Substrate for Panel Products: Medium Density Fiberboard, conforming to ANSI A208.2.
d. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

1) Horizontal, Vertical Surfaces and Edges, Other than Tops: HGS (0.048 inch).
2) Postformed Surfaces: HGP (0.039 inch).

e. Materials for Semi-exposed Surfaces: Provide surface materials indicated below:

1) Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, VGS (0.28 inch).
2) Loose (adjustable) Shelving: High-pressure decorative laminate, HGS (0.048 inch), cover all six sides with laminate.
3) Drawer Sides and Backs: Solid-hardwood lumber, shop finished.

4) Drawer Bottoms: Hardwood veneer core plywood, shop finished.
5) Drawer Construction Technique: Multiple or French dovetail, or doweled, glued under pressure. Lock shoulder or miter folded NOT allowed.
6) Cabinet backs: 0.5 inch thick.

2. Joinery Method for Case Body Members

a. Tops, Exposed Ends, and Bottoms

1) European assembly screws or concealed interlocking mechanical system fasteners NOT permitted. Wall hung cabinet backs fully bound and captured. Floor standing cabinet backs side bound and captured.

2) Stop dado or doweled, glued under pressure, and either nailed, stapled or screwed (fasteners will not be visible on exposed parts).

b. Cabinet Backs (Wall Hung Cabinets)

Wall hung cabinet backs must not be relied upon to support the full weight of the cabinet and its anticipated load for hanging/mounting purposes. Method of back joinery and hanging/mounting mechanisms should transfer the load to case body members.

PART 3 EXECUTION

3.01 INSTALLATION

Installation shall comply with applicable requirements for AWI AWS premium quality standards. Countertops and fabricated assemblies shall be installed level, plumb, and true to line, in locations shown on the drawings. Submit installation drawings for all cabinetry. Cabinets and other laminate clad casework assemblies shall be attached and anchored securely to the floor and walls with mechanical fasteners that are appropriate for the wall and floor construction.

A. Anchoring Systems

1. Floor

Base cabinets shall utilize a floor anchoring system as detailed on the drawings. Anchoring and mechanical fasteners shall not be visible from the finished side of the casework assembly. Cabinet assemblies shall be attached to anchored bases without visible fasteners as indicated in the drawings. Where assembly abuts a wall surface, anchoring shall include a minimum 1/2 inch thick lumber or panel product hanging strip, minimum 2-1/2 inch width; securely attached to the top of the wall side of the cabinet back.

2. Wall

Cabinet and counters to be wall mounted shall utilize minimum 1/2 inch thick lumber or panel product hanging strips,

minimum 2-1/2 inch width; securely attached to the wall side of the cabinet back, both top and bottom.

B. Countertops

Countertops shall be installed in locations as indicated on the drawings. Countertops shall be fastened to supporting casework structure with mechanical fasteners, hidden from view. All joints formed by the countertop or countertop splash and adjacent wall surfaces shall be filled with a clear silicone caulk. Loose splashes shall be adhered to both the countertop surface perimeter and the adjacent wall surface with adhesives appropriate for the type of materials to be adhered. Joints between the countertop surface and splash shall be filled with clear silicone caulk in a smooth consistent concave bead. Bead size shall be the minimum necessary to fill the joint and any surrounding voids or cracks.

C. Hardware

Casework hardware shall be installed in types and locations as indicated on the drawings. Where fully concealed European-style hinges are specified to be used with particleboard or fiberboard doors, the use of plastic or synthetic insertion dowels shall be used to receive 3/16 inch "Euroscrews". The use of wood screws without insertion dowels is prohibited.

D. Doors, Drawers and Removable Panels

The fitting of doors, drawers and removable panels shall be accomplished within target fitting tolerances for gaps and flushness in accordance with AWI AWS premium grade requirements.

E. Plumbing Fixtures

Install sinks, sink hardware, and other plumbing fixtures in locations as indicated on the drawings and in accordance with Section 22 00 00 PLUMBING, GENERAL PURPOSE.

-- End of Section --

SECTION 06 65 00

PLASTIC SIMULATED WOOD TRIM
10/17

PART 1 GENERAL

1.01 SECTION INCLUDES

A. PVC Trimboard.

B. PVC Sheetboard.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D570	(1998; E 2010; R 2010) Standard Test Method for Water Absorption of Plastics
ASTM D635	(2014) Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position
ASTM D648	(2016) Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position
ASTM D696	(2016) Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C and 30 degrees C With a Vitreous Silica Dilatometer
ASTM D790	(2015; E 2016; E 2016) Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D792	(2013) Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D1761	(2012) Standard Test Methods for Mechanical Fasteners in Wood
ASTM D4226	(2016) Standard Test Methods for Impact Resistance of Rigid Poly(Vinyl Chloride) (PVC) Building Products
ASTM E84	(2016) Standard Test Method for Surface Burning Characteristics of Building Materials

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Manufacturer's Data Sheets On Each Product To Be Used; G, AE

SD-04 Samples

Verification Samples; G, AE

SD-07 Certificates

Manufacturer's Certificates; G, AE

SD-08 Manufacturer's Instructions

Preparation Instructions; G, AE

Storage And Handling Requirements; G, AE

Installation Methods; G, AE

SD-10 Operation and Maintenance Data

Maintenance Instructions; G, AE

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer with a minimum of 5 years producing PVC trim products.

B. Installer Qualifications: Installer with a minimum of 3 years experience with the installation of PVC trim products.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Contracting Officer.

2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Contracting Officer.

3. Refinish mock-up area as required to produce acceptable work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products on a flat and level surface on a full shipping pallet. Handle materials to prevent damage to product edges and corners.

C. Store materials under a protective covering to prevent jobsite dirt and residue from collecting on the boards.

1.06 SEQUENCING

Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.07 PROJECT CONDITIONS

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.

1.08 WARRANTY

Provide manufacturer's 25 year warranty against defects in manufacturing that causes the products to rot, corrode, delaminate, or excessively swell from moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers

1. Royal Building Products - Siding & Trim Board, 328 Industrial Drive, Bristol, TN 37620 USA. Toll Free: 800-368-3117. Phone: 276-783-8161. Fax: 276-782-3292. Web Site:www.royalbuildingproducts.com. Email: RBPCustomerCare@royalbuildingproducts.com.

2. Versatex - 400 Steel St., Aliquippa, PA 15001; Tel: 724-857-1111; Fax: 724-241-3599; Email: request info (sales@versatex.com); Web: www.versatex.com

3. Or approved equal.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 61 00 - COMMON PRODUCT REQUIREMENTS.

2.02 MATERIALS

A. PVC

Free Foam Cellular PVC material with a small-cell microstructure and density of .57 grams/Cm3.

1. Physical:

a. Density: 0.57 g/cm3 when tested in accordance with ASTM D792.
b. Water Absorption: Less than 0.47 percent when tested in accordance with ASTM D570.

2. Mechanical:

a. Flexural Strength: 2,899 psi when tested in accordance with ASTM D790.
b. Flexural Modulus: 155,529 psi when tested in accordance with ASTM D790.
c. Screw Hold: 187 lbf/in of penetration when tested in accordance with ASTM D1761.
d. Staple Hold: 79 lbf/in of penetration when tested in accordance with ASTM D1761.
e. Gardner Impact: 28 In-lbs when tested in accordance with ASTM D4226.

3. Thermal:

a. Coefficient of Linear Expansion: 3.08 x 10-5 in/in/degrees F when tested in accordance with ASTM D696.
b. Burning Rate: Failed to Ignite when tested in accordance with ASTM D635.
c. Flame Spread Index: 40 when tested in accordance with ASTM E84.
d. Heat Deflection Temp (264 psi): 121 degrees F when tested in accordance with ASTM D648.
e. Heat Deflection Temp (66 psi): 149 degrees F when tested in accordance with ASTM D648.

4. Workmanship, Finish, and Appearance:

a. Free Foam Cellular PVC that is homogeneous and free of voids, holes, cracks, foreign inclusions and other defects. Edges must be square and top and bottom surfaces shall be flat with no convex or concave deviation.
b. Uniform surface free from cupping, warping, and twisting.

2.03 SIMULATED WOOD TRIM

A. PVC Trimboard

Royal Trimboard S4S, designed with a natural appearance to compliment fiber cement and natural cedar.

1. Size: 1 inch nominal (3/4 inch actual) thick Trimboard.

a. Width.

(1) 2 inches nominal (1-1/2 Inches actual).
(2) 3 inches nominal (2-1/2 Inches actual).
(3) 4 Inches nominal (3-1/2 Inches actual).
(4) 5 Inches nominal (4-1/2 Inches actual).
(5) 6 Inches nominal (5-1/2 Inches actual).
(6) 8 Inches nominal (7-1/4 Inches actual).
(7) 10 Inches nominal (9-1/4 Inches actual).
(8) 12 Inches nominal (11-1/4 Inches actual).

b. Length:

(1) 18 feet.
(2) Custom lengths.

2. Finish:

a. Smooth/Smooth finish.
b. Reversible with Smooth/Timber Ridge finish.

2.04 ACCESSORIES

A. Fasteners

Stainless steel fasteners designed for wood trim and siding.

B. Adhesives

Finishing System: Adhere simulated wood trim to itself with PVC cement or cellular PVC adhesives to prevent joint separation. Acceptable adhesives are:

1. PVC Trim Welder.

2. IPS Weld-On 705 (white).

3. Zevo PVC Trim adhesive.

4. Or approved equal.

C. Nail Hole Filler

Cortex plug system by Fasten Master or approved equal.

D. Sealants

Urethane, polyurethane, polymer blends or acrylic based sealants that do not contain silicone.

2.05 PRODUCT INFORMATION

Submit the following product information:

A. 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.

B. Verification Samples: For each finish product specified, two samples, minimum size 6 inches square, representing actual product, color, and patterns.

C. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

D. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic checking and maintenance.

PART 3 EXECUTION

3.01 EXAMINATION

Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

Clean surfaces thoroughly prior to installation.

Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Cutting, Drilling, Milling, and Routing

Install in accordance with manufacturer's instructions and as follows.

1. Cutting

a. Cut using standard woodworking saws. Conventional carbide-tipped blades designed for cutting wood are preferred. Avoid using fine-tooth metal-cutting blades.

b. Rough-cut edges are typically caused by excessive friction, poor board support, or worn or improper tooling.

2. Drilling

a. Drill using standard woodworking drill bits. Do not use drill bits made for rigid PVC.

b. Avoid frictional heat build-up.

c. Remove shavings periodically from a drill hole as necessary.

3. Milling and Moulding

a. Milled or mould using standard milling or moulding machines found in millwork shops.

b. Rake angle 20 to 30 degrees. 25 degrees is recommended.

c. Cutting speed to be optimized with the number of knives and feed rate.

4. Routing

a. Route with virtually any piece of equipment used to rout wood.

B. Expansion and Contraction

Allow for expansion and contraction with changes in temperature. Proper fastening along the entire length is required to minimize expansion and contraction.

1. Allow 3/16 inch space per 18-foot run of trim for expansion and contraction.

2. Bond joints between pieces of simulated wood trim to eliminate separation.

3. Allow expansion and contraction space at the ends of long runs.

C. Mechanical Fastening

1. Use 12 gauge stainless steel fasteners designed for wood trim and siding. Fastener should have sufficient flexural and tensile strength to resist bending.

2. Use fasteners with thin shanks, blunt points, and full round heads that are long enough to penetrate the substrate a minimum of 1-1/2 inches.

3. Do not use staples, small brads and wire nails. Avoid using fine threaded wood screws and ring-shank fasteners.

4. Use standard nail guns with a pressure setting between 70 psi and 100 psi. The recommended pressure depends on the type of gun, type of nail, ambient temperature, and the substrate. Care should be taken not to overdrive the nail into the material.

5. Pre-drilling is not typically required unless large fasteners are used or the product is installed during temperatures below 40 degrees F.

6. Use two fasteners for every framing member for trimboard applications. Sheet and trimboards 8 inches and wider require additional fasteners.

7. Install fasteners no more than 2 inches from the end of each board.

8. Avoid fastening trim over hollow or uneven areas. Fasten onto flat, solid substrates.

9. Sheet and Beadboard 3/8 inch and 1/2 inch thick is not designed to be ripped and used for trim applications. These products must be glued and mechanically fastened to the substrate.

D. Adhesives: Finishing System

1. All bonded surfaces must be smooth, clean, and in complete contact with each other for best results.

2. Adhere simulated wood trim to itself with PVC cement or

cellular PVC adhesives to prevent joint separation.

3. Scarf cut joints are recommended where applicable.

4. Bonded joints should be secured with fasteners and fastened with two rows on each side of the joint.

5. When bonding simulated wood trim to other substrates, consult the adhesive manufacturer to determine suitability.

E. Cleaning

1. Be sure surface to be painted is clean, dry, and free of dirt, loose or peeling paint, mildew, chalk, grease and any other surface contaminants before paint application.

2. Finish nail holes with nail hole filler or a UV resistant acrylic caulk.

3. Use 100 percent acrylic latex or 100 percent acrylic latex with urethane additive paint with a light reflective value (LRV) equal to or greater than 55 units.

4. Follow the paint manufacturer's application recommendations.

F. Painting

Paint as specified in Section 09 90 00, PAINTING AND COATING.

1. Be sure surface to be painted is clean, dry, and free of dirt, loose or peeling paint, mildew, chalk, grease and any other surface contaminants before paint application.

2. Finish nail holes with nail hole filler or a UV resistant acrylic caulk.
3. Use 100 percent acrylic latex or 100 percent acrylic latex with urethane additive paint with a light reflective value (LRV) equal to or greater than 55 units.

4. Follow the paint manufacturer's application recommendations.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

-- End of Section --

SECTION 06 83 16

FIBERGLASS REINFORCED PANELING
10/17

PART 1 GENERAL

1.01 SECTION INCLUDES

Fiberglass reinforced plastic (FRP) wall panels.

1.02 RELATED REQUIREMENTS

Section 07 92 00, JOINT SEALANTS.

1.03 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D2583	(2013a) Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
ASTM D5319	(2017) Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels
ASTM D5420	(2016) Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Strike Impacted by a Falling Weight (Gardner Impact)
ASTM E84	(2016) Standard Test Method for Surface Burning Characteristics of Building Materials

UNDERWRITERS LABORATORIES (UL)

UL 2818	(2013) GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings

1.04 PREINSTALLATION MEETINGS

A. Convene preinstallation meeting 1 week before start of Work of this Section.

B. Require attendance of parties directly affecting Work of this Section, including Contracting Officer or designate, Contractor, Architect, installer, and manufacturer's representative.

C. Review the Following:

1. Materials.
2. Preparation.

3. Installation.
4. Field quality control.
5. Adjusting.
6. Cleaning.
7. Protection.
8. Coordination with other Work.

1.05 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Each Type Of Product Required; G, AE

SD-04 Samples

Finish, Colors, Patterns, And Textures; G, AE

SD-06 Test Reports

Test And Evaluation Reports; G, AE

SD-07 Certificates

Certification; G, AE

Manufacturer's Project References; G, AE

Installer's Project References; G, AE

SD-08 Manufacturer's Instructions

Manufacturer's Installation And Storage Instructions; G, AE

Care And Maintenance Instructions; G, AE

SD-11 Closeout Submittals

Manufacturer's Standard Warranty; G, AE

1.06 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Manufacturer regularly engaged, for a minimum of 10 years, in the manufacturing of FRP panels of similar type to that specified.

B. Installer's Qualifications:

1. Installer regularly engaged, for a minimum of 5 years, in installation of FRP panels of similar type to that specified.
2. Employ persons trained for installation of FRP panels.

C. Surface-Burning Characteristics: Determined by testing identical

products according to ASTM E84by a testing agency acceptable to authorities having jurisdiction.

1. Flame-Spread Index: 25 (Class A)
2. Smoke-Developed Index: 450

D. FM Approved: Crane Composites "Glasbord FXE".

E. Meets USDA/FSIS requirements.

F. Environmental Certification: GREENGUARD Certification UL 2818.

G. Mock-ups:

1. Install at Project site a mock-up using acceptable products and manufacturer-approved installation methods.
2. Construct mock-up at location determined by Architect.
3. Obtain Architect approval and acceptance of finish, color, texture, pattern, trim, fasteners, and quality of installation.
4. Mock-Up Size: 4 feet by 4 feet.
5. Maintain mock-up during construction for quality comparison.
6. Remove mock-up when no longer required.
7. Mock-up may be incorporated into final construction upon Architect approval.

1.07 DELIVERY STORAGE, AND HANDLING

A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and Handling Requirements:

1. Store and handle materials in accordance with manufacturer's instructions.
2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
3. Store materials in clean, dry area indoors at temperature and humidity conditions in accordance with manufacturer's instructions.
4. Store materials on flat, level surface, raised above floor, with adequate support to prevent sagging.
5. Store materials out of direct sunlight.
6. Protect materials and finish during storage, handling, and installation to prevent damage.

1.08 AMBIENT CONDITIONS

A. **Do Not Begin Installation Until**:

1. Building is enclosed.
2. Permanent heating and cooling equipment is in operation.
3. Residual moisture from plaster, concrete, or terrazzo has dissipated.

B. During installation and within 48 hours before installation, maintain ambient temperature and relative humidity within limits required by type of FRP panel adhesive used and adhesive manufacturer's instructions.

1.09 WARRANTY

A. Warranty Period: 1 year from date of purchase.

B. Limited Warranty Period: Prorated years 2 to 10 from date of purchase.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers

1. Crane Composites, Inc. (formerly Kemlite) 23525 West Eames Street, Channahon, Illinois 60410. Toll Free 800-435-0080. Phone 815-467-8600. Fax 815-467-8666. Website www.cranecomposites.com. Email salesbp@cranecomposites.com.

2. Citadel Architectural Products, Inc. Website www.citadelap.com, Email: info@citadelap.com:

3. Or approved equal.

B. Single Source: Provide FRP panels and accessories from single manufacturer.

2.02 FRP PANELS

A. Fiberglass Reinforced Plastic (FRP) Panels: Crane Composites FM Approved "Glasbord Smooth Finish FSFM".

1. Class A.
2. Use: Walls.
3. Surface Finish: Smooth.
4. Scratch Resistance, ASTM D2583, Barcol Hardness: 55.
5. Abrasion Resistance, Taber Abrasion Test, CS-17 abrasive wheels with 1,000 g weight: Weight loss after 25 cycles of no more than 0.038 percent.
6. Impact Strength, ASTM D5420: 11.0 in-lbs (0.58 J), showing no visible damage on finish side.

B. Panel Compliance: ASTM D5319.

C. Panel Low-Emitting Materials: Comply with testing and product requirements of California Department of Health Services standards for Volatile Organic Emissions.

D. Panel Surface Protection: "Surfaseal" molecularly-bonded surface protection film for impact, abrasion, and scratch resistance.

E. Panel Color: As selected by Architect from manufacturer's full range.

F. Panel Dimensions:

1. Nominal Thickness: 0.12 inch.
2. Wall Panel Size: 4 feet by 12 feet (1.2 m by 3.7 m).

2.03 ACCESSORIES

A. Moldings, Trim, and Caps: 1-piece extruded polypropylene or PVC, configured to cover panel edges and corners.

1. Color: As selected by Architect from manufacturer's full product range.

B. Panel Adhesive: As recommended by FRP panel manufacturer for required substrates.

1. VOC Content: Maximum 50 g/L.

C. Panel Seam Sealant: Bright white, 2-part urethane sealant, as recommended by FRP panel manufacturer.

1. VOC Content: 0.0 g/L.

D. Rivets:

1. Color: Match FRP panels.

2.04 PRODUCT INFORMATION

Submit the following product information:

1. Product Data: Submit manufacturer's product data for each type of product required.

2. Samples:

a. Submit manufacturer's selection and verification samples for finish, colors, patterns, and textures.
b. Submit 2 samples of each type of panel, trim, and fastener.

3. Certificates: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.

4. Test and Evaluation Reports: Submit reports showing compliance with specified performance characteristics and physical properties.

5. Manufacturer's Instructions: Submit manufacturer's installation and storage instructions.

6. Manufacturer's Project References: Submit manufacturer's list of successfully completed FRP panel projects, including project name and location, name of architect, and type and quantity of FRP panels furnished.

7. Installer's Project References: Submit installer's list of successfully completed FRP panel projects, including project name and location, name of architect, and type and quantity of FRP panels installed.

8. Care and Maintenance Instructions: Submit manufacturer's care and maintenance instructions, including cleaning and repairing instructions.

9. Warranty Documentation: Submit manufacturer's standard warranty.

2.05 EXTRA STOCK MATERIALS

A. Deliver to Owner extra stock materials from same production run as products installed.

B. Quantity: Furnish quantity of FRP panels equal to 10 percent of amount installed.

C. Delivery, Storage, and Protection:

1. Comply with Owner's requirements for delivery, storage, and protection of extra stock materials

2. Package extra stock materials with protective covering and include labels clearly identifying product name and manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas to receive FRP panels.

B. Examine Substrate Surfaces to Determine:

1. Corners: Plumb and straight.
2. Surfaces: Smooth, sound, and uniform.
3. Nails or Screw Fasteners: Countersunk.
4. Joints and Cracks: Filled flush and smooth with adjoining surfaces.

C. Notify Architect of conditions that would adversely affect installation or subsequent use.

D. Do not begin preparation or installation until unacceptable conditions are corrected.

3.02 PREPARATION

A. Clean substrates to remove substances that could impair bond of adhesive, including oil, grease, dirt, dust, or other contaminates.

B. Acclimate FRP panels by unpacking and placing in installation space a minimum of 24 hours before installation.

C. Lay out FRP panels before beginning installation.

1. Locate panel joints to provide equal panel widths at ends of walls.

2. Locate panel joints to provide trimmed panels at corners a minimum of 12 inches (300 mm) wide.

3.03 INSTALLATION

A. Install FRP panels in accordance with manufacturer's instructions at locations indicated on the Drawings.

B. Install FRP panels plumb, level, square, flat, and in proper alignment.

C. Install FRP panels to be water resistant and washable.

D. Install FRP panels with manufacturer's recommended gap for panel field and corner joints.

E. Fasteners:

1. Use fasteners in accordance with manufacturer's instructions to install FRP panels securely to supports.
2. Pre-drill fastener holes in FRP panels, 1/8 inch (3.2 mm) greater in diameter than fasteners.

F. Adhesive:

1. Install FRP panels in full spread of adhesive.
2. Follow adhesive manufacturer's instructions for application of adhesive.

G. Install trim accessories with adhesive and nails or staples.

1. Do not fasten through FRP panels.

H. Sealant:

1. Fill grooves in trim accessories with sealant before installing FRP panels.
2. Bed inside corner trim in bead of sealant.
3. Remove excess sealant and smears as FRP panels are installed.
4. Clean in accordance with sealant manufacturer's instructions.

I. Tolerances: Install FRP panels within manufacturer's installation tolerances.

3.04 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: If requested by Owner, provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.05 ADJUSTING

Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Contracting Officer.

Remove and replace with new material, damaged components that cannot be successfully repaired, as determined by Contracting Officer.

3.06 CLEANING

Clean FRP panels promptly after installation in accordance with

manufacturer's instructions.

Do not use harsh cleaning materials or methods that could damage finish.

3.07 PROTECTION

Protect installed FRP panels and finish surfaces from damage during construction.

-- End of Section --

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 07 10 00

DAMPPROOFING AND WATERPROOFING
10/17

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fluid-applied dampproofing.

B. Fluid-applied waterproofing.

1.02 RELATED SECTIONS

A. Section 03 30 00.00 CAST-IN-PLACE CONCRETE

1.03 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C836/C836M	(2015) High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use With Separate Wearing Course
ASTM D2240	(2015) Standard Test Method for Rubber Property - Durometer Hardness
ASTM D412	(2016) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D1227	(2013) Emulsified Asphalt Used as a Protective Coating for Roofing
ASTM D1187/D1187M	(1997; E 2011; R 2011) Asphalt-Base Emulsions for Use as Protective Coatings for Metal
ASTM D2967	(2017) Standard Test Method for Corner Coverage of Powder Coatings
ASTM E96/E96M	(2016) Standard Test Methods for Water Vapor Transmission of Materials
ASTM D4479/D4479M	(2007; E 2012; R 2012) Asphalt Roof Coatings - Asbestos-Free
ASTM D4586/D4586M	(2007; E 2012; R 2012) Asphalt Roof Cement, Asbestos-Free

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS-SS-W-110	Water-Repellent Colorless, Silicone Resin Base

1.04 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Data Sheets On Each Product To Be Used; G, AE

SD-08 Manufacturer's Instructions

Preparation Instructions; G, AE

Storage And Handling Requirements; G, AE

Installation Methods; G, AE

SD-11 Closeout Submittals

Warranty; G, AE

1.05 QUALITY ASSURANCE

A. Applicator Qualifications

Applicator shall be experienced in applying the same or similar materials.

B. Regulatory Requirements

Comply with applicable codes, regulations, ordinances, and laws regarding use and application of products that contain volatile organic compounds (VOC).

C. Mock-up

Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Contracting Officer.

2. Do not proceed with remaining work until workmanship is approved by Contracting Officer.

3. Rebuild mock-up area as required to produce acceptable work.

1.06 PREINSTALLATION MEETINGS

A. Preinstallation Conference

Prior to beginning work, convene a conference to review

conditions, installation procedures, schedules and coordination with other work. Convene minimum two weeks prior to starting work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

Deliver materials to project site in original, factory-sealed, unopened containers bearing manufacturer's name and label intact and legible with following information.

1. Name of material.

2. Manufacturer's stock number and date of manufacture.

Store materials in protected and well ventilated area. Handle materials to avoid damage.

1.08 PROJECT CONDITIONS

A. Do not apply when surface temperature or weather conditions conflict with manufacturer's published requirements.

B. Coordinate waterproofing work with other trades.

C. Keep flammable products away from spark or flame. Do not allow the use of spark producing equipment during application and until all vapors have dissipated. Post "NO SMOKING" signs.

D. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.

1.09 SEQUENCING

Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.10 WARRANTY

Provide manufacturer's standard limited material warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers

1. Karnak Corp., which is located at: 330 Central Ave.; Clark, NJ 07066; Toll Free Tel: 800-526-4236; Tel: 732-388-0300; Fax: 732-388-9422; Email: request info (info@karnakcorp.com); Web: www.karnakcorp.com

2. Carlisle coating and waterproofing; Web: www.carlisleccw.com

3. W.R. Meadows SealTight, Email: wrmpa@wrmeadows.com: Web:www.wrmeadows.com/

4. Or approved equal.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 61 00, COMMON PRODUCT REQUIREMENTS.

2.02 DAMPPROOFING

A. Fibered Asphalt Dampproofing

Brush or spray applied Fibered Asphalt, general purpose dampproof coating. Manufactured with refined asphalt, clay emulsifiers, and selected non-asbestos fibers.

1. Cures to a tough, flexible, durable finish and will resist variations in temperature and weather.

2. Low odor coating.

3. May be applied to slightly damp surfaces.

4. ASTM D1227, Type II, Class I.

5. ASTM D1187/D1187M, Type I and II.

6. ASTM D1227 FS-SS-R-1781 (except non-Asbestos).

7. ASTM D1227 MIL-R-1781 (except non-Asbestos).

8. Coverage Rate: 4 to 6 gallons per 100 square feet.

9. Solids by Weight: 52 percent, nominal.

10. Solids by Volume: 49 percent, nominal.

11. Color: Black.

12. Permeance: 0.5 perms.

13. Cure Time: 24 to 48 hours at 77 degrees F and 50 percent Relative Humidity.

14. Service Temperature (Cured Film): -5 to 180 degrees F.

15. Fabric Reinforcing: Fiber Glass Membrane.

16. Fabric Reinforcing: Utility Grade Asphalt Saturated Cotton Fabric.

B. Non-Fibered Emulsion Dampproofing

Brush or spray applied, general purpose coating. Manufactured with refined asphalt, emulsifiers and selected clay fillers.

1. Dries to a tough, flexible, durable finish and will resist extreme variations in temperature and weather.

2. Low odor coating.

3. May be applied to damp surfaces.

4. ASTM D1227, Type III.

5. ASTM D1187/D1187M, Type II.

6. ASTM D1227 FS-SS-R-1781.

7. ASTM D1227 MIL-R-3472A.

8. Coverage Rate: 2 to 3 gallons per 100 square feet.

9. Solids by Weight: 54 to 58 percent, nominal.

10. Solids by Volume: 56 to 60 percent, nominal.

11. Color: Black.

12. Permeance: 0.5 perms.

13. Cure Time: 24 to 48 hours at 77 degrees F and 50 percent Relative Humidity.

14. Service Temperature (Cured Film): -40 to 180 degrees F.

15. Fabric Reinforcing: Fiber Glass Membrane.

16. Fabric Reinforcing: Utility Grade Asphalt Saturated Cotton Fabric.

C. Aqua-Repel Dampproofing

Brush or spray applied, environmentally friendly colorless silane modified siloxane emulsions manufactured for use as masonry water repellents.

1. Formulated for deep penetration.

2. Federal Specification FS-SS-W-110C.

3. NCHRP 244 Series II.

4. Coverage Rate: 125-175 square feet per gallon.

5. Prevents concrete corrosion by blocking salt penetration.

2.03 WATERPROOFING

A. Single component, elastomeric waterproofing membrane, polyurethane with bitumen modifiers

1. Single Layer Dry Film Thickness: 60 mils.

2. High-Build Multi-Layer Dry Film Thickness: 90 mils.

3. High-Build Multi-Layer Dry Film Thickness: 120 mils.

4. ASTM C836/C836M.

5. Complies with National Standard of Canada 37.58 - M86.

6. Coverage Rate: 4 gallons per 100 square feet.

7. Shore Hardness, ASTM C836/C836M: 85.

8. Elongation, ASTM D412: 600 percent.

9. Tensile Strength, ASTM D412: 50 PSI.

10. Water Vapor Permeance, ASTM E96/E96M: 0.1 perm.

11. Heat Aging, ASTM C836/C836M: No Cracking.

12. Crack Bridging, ASTM C836/C836M: Pass (10 cycles).

13. Adhesion, ASTM C836/C836M: 5 lbs/in.

14. Solids: Minimum 90 percent.

15. Color: Black.

B. 229AR Elastomeric Waterproofing: Single component, rubber reinforced asphalt that forms a highly elastomeric waterproof coating as well as an air barrier.

1. Dry film thickness: 40 mils.

2. Excellent resistance to acids, alkalines, and salts.

3. ASTM D4586/D4586M, Type I.

4. ASTM D4479/D4479M, Type I.

5. Complies with Chapter 13 of Massachusetts Energy Code.

6. Coverage Rate: 4 to 5 gallons per 100 square feet.

7. Hardness, ASTM D2240: 55.

8. Elongation, ASTM D412: 700 percent.

9. Tensile Strength, ASTM D412: 400 PSI.

10. Water Vapor Permeance, ASTM E96/E96M: 0.017 perm.

11. Air Permeability: 0.000 L/s.m2 at 75pa pressure difference.

12. Solids, Trowel, ASTM D2967: 70 percent.

13. Solids, Brush, ASTM D2967: 63 percent.

14. Solids, Spray, ASTM D2967: 60 percent.

15. Color: Black.

16. VOC Content: 300 g/L.

17. Chemical Resistance:

    a. Salt Fog Resistance, 1/16 cured film: 500 hours - excellent.

b. Abrasion Resistance: Excellent.
c. Resistance to Acid: 60 days - excellent.
d. 10 percent HCL: Excellent.
e. 10 percent H2SO4: Excellent.
f. 10 to 85 percent Phosphoric: Good.
g. Nitric Acid: Not Recommended.
h. Resistance to Alkalis: 60 days - excellent.
i. 10 percent NA OH: Excellent.
j. 45 percent Ammonium Nitrate: Excellent.
k. 10 percent Ammonium Sulfate: Excellent.

C. Rubberized Waterproofing: Spray applied, solvent based elastomeric asphalt compound, manufactured with selected asphalts, stabilizers and mineral spirits

1. Dry film thickness: 33 mils.

2. Excellent resistance to acids, alkalis, and salts.

3. ASTM D4479/D4479M, Type I.

4. Federal Specification SS-A-694d.

5. Coverage Rate: 4 gallons per 100 square feet.

6. Elongation, ASTM D412: 550 to 600 percent.

7. Tensile Strength, ASTM D412: 150 PSI.

8. Water Vapor Permeance, ASTM E96/E96M: 0.026 perm.

9. Air Permeability: 0.001 L/s.m2 at 75pa pressure difference.

10. Solids by Weight: 57.3 percent.

11. Solids by Volume: 51.3 percent.

12. Color: Black.

13. Cure Time: 24 to 48 hours at 77 degrees F and 50 percent Relative Humidity.

14. Chemical Resistance:

a. Acids: Excellent.
b. Alkaline: Excellent.
c. Salts: Excellent.

D. Elastic solvent based single component exterior waterproof coating.

1. Excellent color stability, weatherability, and flexibility.

2. Excellent resistance to salt spray, acid rain, and ultra-violet sunlight.

3. Dry film thickness: 20-24 mils.

4. Coverage Rate, Base: 1 to 1-1/2 gallons per 100 square feet.

5. Coverage Rate, Finish: 1 to 1-1/2 gallons per 100 square feet.

6. Elongation, ASTM D412: 650 percent.

7. Tensile Strength, ASTM D412: 1650 PSI.

8. Permeability: 0.01 perm.

9. Vapor Transmission: 0.25.

10. Water Absorption (7 days): 0.4 percent.

11. Solids by Weight: 50 percent.

12. Solids by Volume: 40 percent.

13. Color: To be selected by Contracting Officer.

14. Cure Time: Approximately 24 hours.

15. Dry Time: 4 to 6 hours at 77 degrees F and 50 percent Relative Humidity

2.04 PRODUCT INFORMATION

Submit the following product information:

A. 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.

B. Warranty: Submit a sample warranty identifying the terms and conditions stated in Warranty article.

PART 3 EXECUTION

3.01 EXAMINATION

Before work is started, applicator shall thoroughly examine all surfaces for any deficiencies. Notify Contracting Officer in writing of any defects.

3.02 SURFACE PREPARATION

Surface should be free of oil, grease, dirt, laitance and loose material. Repair all cracks and holes as recommended by Manufacturer, before applying surface coating.

3.03 APPLICATION

Comply with manufacturer recommendations and approved submittals. Mix as recommended by manufacturer. For fabric reinforced applications, apply first coat. Apply reinforcing fabric over the wet coating, overlapping all edges. Smooth out all wrinkles, to ensure there is no

trapped air beneath fabric. Apply second coat.

-- End of Section --

SECTION 07 11 13

BITUMINOUS DAMPPROOFING
08/11

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C208	(2012) Cellulosic Fiber Insulating Board
ASTM C728	(2017) Standard Specification for Perlite Thermal Insulation Board
ASTM D1187/D1187M	(1997; E 2011; R 2011) Asphalt-Base Emulsions for Use as Protective Coatings for Metal
ASTM D1227	(2013) Emulsified Asphalt Used as a Protective Coating for Roofing
ASTM D226/D226M	(2009) Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D227/D227M	(2003; R 2011; E 2012) Coal-Tar-Saturated Organic Felt Used in Roofing and Waterproofing

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-07 Certificates

Manufacturer's Original Labeling

1.03 DELIVERY AND STORAGE

Deliver materials in sealed containers bearing manufacturer's original labels. Manufacturer's labels shall include date of manufacture, contents of each container, performance standards that apply to the contents and recommended shelf life. Submit manufacturer's original labeling for each container. While in storage, do not allow water-based bituminous dampproofing to freeze.

PART 2 PRODUCTS

2.01 EMULSION-BASED ASPHALT DAMPPROOFING

A. Fibrated Emulsion-Based Asphalt

Fibrated emulsion-based asphalt dampproofing shall be cold-applied type conforming to ASTM D1227 Type II, Class 1, asbestos-free, manufactured of refined asphalt, emulsifiers and selected clay, fibrated with mineral fibers. For spray or brush application, emulsion shall contain a minimum of 59 percent solids by weight, 56 percent solids by volume. For trowel application, emulsion shall contain a minimum of 58 percent solids by weight, 55 percent solids by volume.

B. Non-Fibrated Emulsion-Based Asphalt

Non-fibrated emulsion-based asphalt dampproofing shall be cold-applied type conforming to ASTM D1187/D1187M Type II or ASTM D1227 Type III, manufactured of refined asphalt, emulsifiers and selected clay. Asphalt shall contain a minimum 58 percent solids by weight, 55 percent solids by volume.

2.02 SURFACE PROTECTION

A. Saturated Felt

ASTM D226/D226M, Asphalt Saturated, Type I, 15 pound;
ASTM D227/D227M, Coal-Tar Saturated.

B. Protection Board

Wood Fiber Board, ASTM C208, or Perlite Board, ASTM C728.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

Repair all cracks and holes as recommended by Manufacturer, before applying surface coating.

3.02 PROTECTION OF SURROUNDING AREAS

Before starting the dampproofing work, the surrounding areas and surfaces shall be protected from spillage and migration of dampproofing material onto other work. Drains and conductors shall be protected from clogging with dampproofing material.

3.03 APPLICATION

Prime surfaces to receive fibrous asphaltic dampproofing unless recommended otherwise by dampproofing materials manufacturer. Apply dampproofing after priming coat is dry, but prior to any deterioration of primed surface, and when ambient temperature is above 40 degrees F.

A. Surface Priming

Prime surfaces to receive asphalt or fibrous asphalt dampproofing with asphalt primer. Apply primer when ambient temperature is

above 40 degrees F and at rate of approximately one gallon per 100 square feet, fully covering entire surface to be dampproofed.

B. Cold-Application Method

1. Emulsion-Based Asphalt

Emulsion-based asphalt dampproofing work shall not be performed in temperatures below 40 degrees F. Emulsions shall have a smooth and uniform consistency at time of application. Dampproofing materials shall be applied in accordance with manufacturer's published instructions to produce a smooth uniform dry film of not less than 12 mils thick without voids or defects. Dull or porous spots shall be recoated. Dampproofing materials shall seal tightly around pipes and other items projecting through dampproofing. Rates of application shall be as follows:

a. Primer: 1/2 gallon per 100 square feet, cold-applied.

b. Fibrated Dampproofing: 2 gallons per 100 square feet, cold-applied with spray, brush or trowel.

c. Non-fibrated Dampproofing: 2 gallons per 100 square feet, cold-applied with spray, brush or trowel.

-- End of Section --

SECTION 07 22 00

ROOF AND DECK INSULATION
02/16

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C208	(2012) Cellulosic Fiber Insulating Board
ASTM C578	(2016) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
ASTM D4601/D4601M	(2004; R 2012) Asphalt-Coated Glass Fiber Base Sheet Used in Roofing
ASTM E84	(2016) Standard Test Method for Surface Burning Characteristics of Building Materials

FM GLOBAL (FM)

FM 4450	(1989) Approval Standard for Class 1 Insulated Steel Deck Roofs
FM APP GUIDE	(updated on-line) Approval Guide http://www.approvalguide.com/

UNDERWRITERS LABORATORIES (UL)

UL Bld Mat Dir	(updated continuously online) Building Materials Directory

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Insulation; G, AE

Fasteners; G, AE

Moisture Control; G, AE

Felt Materials; G, AE

SD-06 Test Reports

Flame Rating Test Results; G

SD-07 Certificates

Installer Qualifications; G, AE

Recycling Content Certificate

SD-08 Manufacturer's Instructions

Roof Insulation; G, AE

Nails And Fasteners; G, AE

Manufacturer's Installation Instructions; G, AE

1.03 MANUFACTURER'S CERTIFICATE

Submit certificate from the insulation manufacturer attesting that the installer has the proper qualifications for installing tapered roof insulation systems.

Recycling content certificate attesting that the expanded perlite or polyisocyanurate insulation contains recovered material and showing estimated percent of recovered material.

Certificates of compliance for felt materials.

1.04 QUALITY ASSURANCE

A. Insulation on Steel Decks

Roof insulation shall have a flame spread rating not greater than 75 and a smoke developed rating not greater than 150, exclusive of covering, when tested in accordance with ASTM E84. Submit flame rating test results in accordance with ASTM E84. Insulation bearing the UL label and listed in the UL Bld Mat Dir as meeting the flame spread and smoke developed ratings will be accepted in lieu of copies of test reports. Compliance with flame spread and smoke developed ratings will not be required when insulation has been tested as part of a roof construction assembly of the type used for this project and the construction is listed as fire-classified in the UL Bld Mat Dir or listed as Class I roof deck construction in the FM APP GUIDE. Insulation tested as part of a roof construction assembly shall bear UL or FM labels attesting to the ratings specified herein.

B. Foam Board on Steel Decks

Separate polystyrene insulation from a steel deck with a thermal barrier of glass mat gypsum roof board or roof insulation in accordance with the requirements of the UL Bld Mat Dir or the FM APP GUIDE.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery

Deliver materials to the project site in manufacturer's unopened and undamaged standard commercial containers bearing the following legible information:

1. Name of manufacturer

2. Brand designation

3. Specification number, type, and class, as applicable, where materials are covered by a referenced specification

Deliver materials in sufficient quantity to allow continuity of the work.

B. Storage and Handling

Store and handle materials in accordance with manufacturer's printed instructions. Protect from damage, exposure to open flame or other ignition sources, wetting, condensation, and moisture absorption. Keep materials wrapped and separated from off-gassing materials (such as drying paints and adhesives). Do not use materials that have visible moisture or biological growth. Store in an enclosed building or trailer that provides a dry, adequately ventilated environment. Replace damaged material with new material.

1.06 ENVIRONMENTAL CONDITIONS

Do not install roof insulation during inclement weather or when air temperature is below 40 degrees F and interior humidity is 45 percent or greater, or when there is visible ice, frost, or moisture on the roof deck.

1.07 PROTECTION OF PROPERTY

Install protective coverings at paving and building walls adjacent to hoist and kettles prior to starting the work. Lap protective coverings at least 6 inches, secure them against wind, and vent them to prevent collection of moisture on the covered surfaces. Keep protective coverings in place for the duration of the work with asphalt products.

PART 2 PRODUCTS

2.01 INSULATION

A. Insulation Types

Provide one, or an assembly of a maximum of three, of the following roof insulation materials. Provide roof insulation that is compatible with attachment methods for the specified insulation and roof membrane.

a. Polystyrene Board: In accordance with ASTM C578 REV A, Type II, IV, or X.

ASTM C208 Type II, Grade 1 or 2, roof insulating board, treated with sizing, wax or bituminous impregnation. Limit bituminous impregnation to 4 percent by weight when used over steel decks. Maximum board size: 4 feet by 4 feet.

B. Insulation Thickness

As necessary to provide the thermal resistance (R-value) of 19 or more. Base calculation on the R-value for aged insulation. For insulation over steel decks, satisfy both specified R-value and minimum thickness for width of rib opening recommended in insulation manufacturer's published literature.

C. Manufacturer's Insulation Instructions

Submit instruction for roof insulation, including field of roof and perimeter attachment requirements. Include minimum thickness of insulation for steel and concrete decks.

2.02 PROTECTION BOARD

For use as a thermal barrier (underlayment), fire barrier (overlayment), or cover board for hot-mopped, torched-down, or adhesive-applied roofing membrane over roof insulation.

2.03 MOISTURE CONTROL

A. Vapor Retarder

1. Asphalt Saturated Felt Base Sheet for Single Layer Application

Provide in accordance with ASTM D4601/D4601M, weighing not less than 35 pounds per 100 square feet.

2.04 NAILS AND FASTENERS

Provide flush-driven fasteners through flat round or hexagonal steel or plastic plates. Provide zinc-coated steel plates, flat round not less than 1 3/8 inch diameter, hexagonal not less than 28 gage. Provide high-density plastic plates, molded thermoplastic with smooth top surface, reinforcing ribs and not less than 3 inches in diameter. Fully recess fastener head into plastic plate after it is driven. Form plates to prevent dishing. Do not use bell or cup shaped plates. Provide fasteners in accordance with insulation manufacturer's recommendations for holding power when driven, or a minimum of 120 pounds each in steel deck, whichever is the higher minimum. Provide fasteners for steel or concrete decks in accordance with FM APP GUIDE (http://www.approvalguide.com/) for Class I roof deck construction, and spaced to withstand uplift pressure of 90 pounds per square foot.

A. Fasteners for Steel Decks

Approved hardened penetrating fasteners or screws in accordance with FM 4450 and listed in FM APP GUIDE for Class I roof deck construction. Quantity and placement to withstand a minimum uplift pressure of 90 psf in accordance with FM APP GUIDE.

B. Manufacturer's Installation Instructions

Submit instruction for use of nails and fasteners during roof installation including field of roof and perimeter attachment requirements. Include fastener pattern for insulation on steel decks.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Surface Inspection

Ensure surfaces are clean, smooth, and dry prior to application. Ensure surfaces receiving vapor retarder are free of projections that might puncture the vapor retarder. Check roof deck surfaces, including surfaces sloped to roof drains and outlets, for defects before starting work.

The Contractor and Contracting Officer shall inspect and approve the surfaces immediately before starting installation. Prior to installing vapor retarder insulation, perform the following:

1. Examine steel decks to ensure that panels are properly secured to structural members and to each other and that surfaces of top flanges are flat or slightly convex.

B. Surface Preparation

Correct defects and inaccuracies in roof deck surface to eliminate poor drainage from hollow or low spots, perform the following:

a. Provide wood nailers of the same thickness as the insulation at eaves, edges, curbs, walls, and roof openings for securing of cant strips, gravel stops, and flashing flanges. On decks with slopes of one in 12 (1 inch per foot) or more, install wood nailers perpendicular to slope for securing insulation. Space nailers in accordance with approved shop drawings.

b. Cover steel decks with a layer of insulation board of sufficient width to span the width of a deck rib opening, and in accordance with fire safety requirements. Secure with piercing or self-drilling, self-tapping fasteners of quantity and placement in accordance with FM APP GUIDE. Locate insulation joints parallel to ribs of deck on solid bearing surfaces only, not over open ribs.

3.02 INSTALLATION OF VAPOR RETARDER

Install vapor retarder in direct contact with roof deck surface insulation. Unless otherwise specified, vapor retarder to consist of either two plies of No. 15 asphalt-saturated felt, or one layer of asphalt-saturated felt base sheet. Lay vapor retarder at right angles to direction of slope. Install first ply of felt as specified herein for the specific deck. Apply second ply of 2-ply vapor retarder system using asphalt at rate of 20 to 35 lbs per 100 square feet,

applied within plus or minus 25 degrees F of EVT. Do not heat asphalt above asphalt's FBT or 525 degrees F, whichever is less. Use thermometers to check temperatures during heating and application. Completely seal side and end laps. Asphalt must be visible beyond all edges of each ply as it is being installed. Lay plies free of wrinkles, buckles, creases or fishmouths. Do not walk on mopped surfaces while asphalt is sticky. Press out air bubbles to obtain complete adhesion between surfaces. At walls, eaves, rakes, and other vertical surfaces, extend vapor retarder organic felts or separate plies 9 inches, with not less than 9 inches on the substrate, and the extended portion turned back and mopped in over the top of the insulation. At roof penetrations other than walls, eaves and rakes, and vertical surfaces, extend vapor retarder or separate plies 9 inches to form a lap folded back over the edge of the insulation. Provide asphalt roof cement under the vapor retarder for at least 9 inches from walls, eaves, and rakes.

A. Vapor Retarder on Steel Decks

Even mop the mechanically secured insulation surface with asphalt before installing vapor retarder. For a two-ply vapor retarder, install each sheet lapping 19 inches over the preceding sheet. Lap ends not less than 4 inches. Stagger the laps a minimum of 12 inches. Cement felts together with solid mopping of asphalt. Apply asphalt moppings at rate of 20 to 35 lbs per 100 square feet. For a vapor retarder consisting of one layer of asphalt base sheet, lap each sheet 4 inches over preceding sheet. Lap ends not less than 4 inches, and stagger laps a minimum of 12 inches. Cement base sheets together with solid mopping of asphalt.

3.03 INSULATION INSTALLATION

Apply insulation in two layers with staggered joints when total required thickness of insulation exceeds 1/2 inch. Lay insulation so that continuous longitudinal joints are perpendicular to direction of roofing, as specified in Section 13 34 19, METAL BUILDING SYSTEMS, and end joints of each course are staggered with those of adjoining courses. When using multiple layers of insulation, provide joints of each succeeding layer that are parallel and offset in both directions with respect to the layer below. Keep insulation 1/2 inch clear of vertical surfaces penetrating and projecting from roof surface. Verify required slopes to each roof drain.

A. Installation Using Only Mechanical Fasteners

Secure total thickness of insulation with penetrating type fasteners.

B. Special Precautions for Installation of Foam Insulation

1. Polystyrene Insulation

a. Over the top surface of non-composite polystyrene board, install 1/2 inch thick high density wood fiberboard, 3/4 inch thick expanded perlite board, glass mat gypsum roof board, or other overlayment approved by roofing sheet manufacturer. Tightly butt and stagger joints of field applied overlayment board at least 6 inches with respect to the polystyrene board below. Apply 6 inch wide glass

fiber roofing tape centered over joints and edges of overlayment board.

b. Where composite boards consisting of polystyrene insulation are provided, apply 6 inch wide glass fiber roofing tape centered over joints and edges of composite board. Apply joint strips as recommended by roofing sheet manufacturer.

3.04 PROTECTION

A. Protection of Applied Insulation

Completely cover each day's installation of insulation with finished roofing specified in metal building specification Section 13 34 19, METAL BUILDING SYSTEMS on same day. Phased construction is not permitted. Protect open spaces between insulation and parapets or other walls and spaces at curbs, scuttles, and expansion joints, until permanent roofing and flashing are applied. Storing, walking, wheeling, or trucking directly on insulation or on roofed surfaces is not permitted. Provide smooth, clean board or plank walkways, runways, and platforms near supports, as necessary, to distribute weight to specified live load limit. Protect exposed edges of insulation with cutoffs at the end of each work day or whenever precipitation is imminent. Cutoffs must be two layers of bituminous-saturated felt set in plastic bituminous cement set in roof cement. Fill all profile voids in cutoffs to prevent trapping moisture below the membrane. Remove cutoffs when work resumes.

B. Damaged Work and Materials

Restore work and materials that become damaged during construction to original condition or replace with new materials.

3.05 INSPECTION

Establish and maintain inspection procedures to assure compliance of the installed roof insulation with contract requirements. Remove, replace, correct in an approved manner, any work found not in compliance. Quality control must include, but is not limited to, the following:

a. Observation of environmental conditions; number and skill level of insulation workers; start and end time of work.

b. Verification of certification, listing or label compliance with FM Data Sheets. (https://www.fmglobal.com/fmglobalregistration/Downloads.aspx)

c. Verification of proper storage and handling of insulation and vapor retarder materials before, during, and after installation.

d. Inspection of vapor retarder application, including edge envelopes and mechanical fastening.

e. Inspection of mechanical fasteners; type, number, length, and spacing.

f. Coordination with other materials, cants, sleepers, and nailing strips.

g. Inspection of insulation joint orientation and laps between layers, joint width and bearing of edges of insulation on deck.

h. Installation of cutoffs and proper joining of work on subsequent days.

i. Continuation of complete roofing system installation to cover insulation installed same day.

j. Verification of required slope to each roof drain.

-- End of Section --

SECTION 07 26 00

VAPOR RETARDERS
10/17

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforced vapor retarders.

B. Tape to seal joints and repair vapor retarder.

C. Pipe boots for sealing penetrations.

1.02 RELATED SECTIONS

A. Section 03 30 00.00, CAST-IN-PLACE CONCRETE.

B. Section 13 34 19, METAL BUILDING SYSTEMS.

1.03 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D882	(2012) Tensile Properties of Thin Plastic Sheeting
ASTM D1709	(2016) Impact Resistance of Plastic Film by the Free-Falling Dart Method
ASTM D2582	(2016) Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting
ASTM D3776/D3776M	(2009a; R 2013) Standard Test Method for Mass Per Unit Area (Weight) of Fabric
ASTM D4833/D4833M	(2007; E 2013; R 2013) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM E1643	(2011; R 2017) Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
ASTM E1745	(2017) Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
ASTM E96/E96M	(2016) Standard Test Methods for Water Vapor Transmission of Materials

1.04 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Manufacturer's Data Sheets On Each Product; G, AE

SD-04 Samples

Verification Samples; G, AE

Samples Of Reinforced Vapor Retarder; G, AE

SD-08 Manufacturer's Instructions

Preparation Instructions; G, AE

Storage And Handling Requirements; G, AE

Installation Methods; G, AE

1.05 QUALITY ASSURANCE

Preinstallation Meeting: Convene a preinstallation meeting two weeks before start of installation of reinforced vapor retarders. Require attendance of parties directly affecting work of this section, including Contractor, Contracting Officer, and Installer. Review installation, protection, and coordination with other work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery

Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage

1. Store products in manufacturer's unopened packaging until ready for installation.

2. Store materials in a clean, dry area in accordance with manufacturer's instructions.

C. Handling

Protect materials during handling and installation to prevent damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Griffolyn, Division of Reef Industries, Inc., which is located at: 9209 Almeda Genoa Rd. ; Houston, TX 77075; Toll Free Tel: 800-231-6074; Tel: 713-507-4251; Fax: 713-507-4295; Email: request info (ri@reefindustries.com); Web: www.reefindustries.com/division.php?div=1

B. W.R. Meadows SealTight, 2150 Monroe Street York, PA 17404; Phone: (717) 792-2627, Email: wrmpa@wrmeadows.com: Web:www.wrmeadows.com/

C. Substitutions: or approved Equal.

D. Requests for substitutions will be considered in accordance with provisions of Section 01 61 00, COMMON PRODUCT REQUIREMENTS.

2.02 REINFORCED VAPOR RETARDERS

A. Reinforced Vapor Retarder

Complying with ASTM E1745 Class B:

1. Material: 5-ply laminate, combining three layers of high-density polyethylene and two high-strength non-woven cord grids.

2. Weight: 70 lb/1,000 sq ft when tested in accordance with ASTM D3776/D3776M.

3. Puncture Propagation Tear: 55 lb when tested in accordance with ASTM D2582.

4. Permeance (Perm): 0.027 grains/hr-sq ft-in Hg, when tested in accordance with ASTM E96/E96M.

5. Drop Dart: 1,900 g, when tested in accordance with ASTM D1709.

6. Tensile Strength: 225 lb/3,846 psi when tested in accordance ASTM D882, 3 inch wide specimen.

7. Puncture Strength: 50 lb, when tested in accordance with ASTM D4833/D4833M.

8. Usable Temperature Range: Minus 40 to 170 degrees F (minus 40 to 77 degrees C).

9. Application(s):

   a. Use on roof decks under insulation.
   b. Use on exterior walls on inside face of framing.
   c. Use under concrete slabs, over aggregate fill.
   d. Use under concrete slabs, under aggregate fill.

B. Reinforced Vapor Retarder

Complying with ASTM E1745 Class C.

1. Material: 3-ply laminate, combining two layers of high-density polyethylene and one high-strength non-woven cord grid.

2. Weight: 40 lb/1,000 sq ft, when tested in accordance with ASTM D3776/D3776M.

3. Puncture Propagation Tear: 30 lb when tested in accordance with ASTM D2582.

4. Permeance (Perm): 0.038 grains/hr-sq ft-in Hg, when tested in accordance with ASTM E96/E96M.

5. Drop Dart: 475 g, when tested in accordance with ASTM D1709.

6. Tensile Strength: 100 lb/4560 psi when tested in accordance with ASTM D882, 3 inch long test specimen.

7. Puncture Strength: 35 lb when tested in accordance with ASTM D4833/D4833M.

8. Usable Temperature Range: Minus 25 to 170 degrees F.

9. Application(s):

    a. Use on roof decks under insulation.
    b. Use on exterior walls on inside face of framing.
    c. Use under concrete slabs, over aggregate fill.
    d. Use under concrete slabs, under aggregate fill.

C. Vapor Retarder

15 mil thick, complying with ASTM E1745 Class A.

1. Material: Extruded polyethylene Film.

2. Weight: 73 lb/1,000 sq ft when tested in accordance with ASTM D3776/D3776M.

3. Puncture Propagation Tear: 46 lb (204 N), when tested in accordance with ASTM D2582.

4. Permeance (Perm): 0.018 grains/hr-sq ft-in Hg , when tested in accordance with ASTM E96/E96M.

5. Drop Dart: 3150 g, when tested in accordance with ASTM D1709.

6. Tensile Strength (1 inch Tensile): 72 lb/4800 psi when tested in accordance with ASTM D882.

7. Puncture Strength: 24 lb when tested in accordance with ASTM D4833/D4833M.

8. Usable Temperature Range: Minus 25 to 170 degrees F.

9. Application(s):

    a. Use on roof decks under insulation.
    b. Use on exterior walls on inside face of framing.

c. Use under concrete slabs, over aggregate fill.
d. Use under concrete slabs, under aggregate fill.

2.03 ACCESSORIES

A. General

Ensure accessories are from same manufacturer as reinforced vapor retarders.

B. Mastic Tape

Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

C. Self-Adhesive Repair Tape:

Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.

D. Fire Retardant Self-Adhesive Tape:

Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.

E. Vapor Retarder Fastener

Pancake-head, self-tapping steel drill screws; with fender washers.

2.04 PRODUCT INFORMATION

Provide the following product information:

A. 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.

B. Samples: Submit manufacturer's samples of reinforced vapor retarder s.

C. Verification Samples: For each product specified, two samples, minimum size 5 inches (125 mm) square, representing actual product, color, and patterns.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces and areas to receive reinforced vapor retarders. Notify Contracting Officer in writing of defects of work and other unsatisfactory site conditions that would cause defective

installation of vapor retarders. Do not begin installation until unacceptable conditions have been corrected.

B. Verify site dimensions.

C. Commencement of work will imply acceptance of substrate.

3.02 INSTALLATION

A. Install reinforced vapor retarders in accordance with manufacturer's instructions.

B. Install reinforced vapor retarders in accordance with manufacturer's instructions and ASTM E1643 at concrete slabs.

C. Install vapor retarders continuously at locations as indicated on the drawings. Ensure there are no discontinuities in vapor retarder at seams and penetrations.

D. Install vapor retarders in largest practical widths.

E. Ensure surface beneath vapor retarder is smooth with no sharp projections.

F. Join sections of vapor retarder and seal penetrations in vapor retarder with mastic tape. Ensure vapor retarder surfaces to receive mastic tape are clean and dry.

G. Immediately repair holes in vapor retarder with self-adhesive repair tape.

H. Seal around pipes and other penetrations in vapor retarder with pipe boots in accordance with manufacturer's instructions.

3.03 PROTECTION

A. Protect reinforced vapor retarders from damage until covered by roof insulation.

B. Protect reinforced vapor retarders from damage until covered by wall finish.

C. Protect reinforced vapor retarders from damage during installation of reinforcing steel and utilities and during placement of granular materials or concrete slab.

D. Immediately repair damaged vapor retarder in accordance with manufacturer's instructions.

-- End of Section --

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM
11/17

PART 1 GENERAL

1.01 SUMMARY

Section includes flashing and sheet metal indicated on Contract Drawings and as specified.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)

NRCA 0420	(2010) Architectural Metal Flashing, Condensation Control and Reroofing

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1793	(2012) Architectural Sheet Metal Manual, 7th Edition

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication; G, AE

Jointing And Securing Of Sheet Metal; G, AE

Expansion Joint Details And Connections; G, AE

SD-03 Product Data

Manufacturer's Product Specifications; G, AE

Data And Color Chart; G, AE

SD-04 Samples

Finished Specified Sheet Metals In Specified Gauges; G, AE

SD-08 Manufacturer's Instructions

Installation Instructions; G, AE

General Recommendations; G, AE

1.04 QUALITY ASSURANCE

A. Fabricator/Installer: A company experienced in the type of Work required and acceptable to the Roofing Installer.

B. Reference Standards: Except as otherwise specifically shown or specified, comply with applicable recommendations and details of the "Architectural Sheet Metal Manual" by SMACNA (SMACNA 1793).

1.05 PROJECT CONDITIONS

Coordinate Work with adjacent Work, including installation of roofing to avoid leaving roofing terminations unprotected.

1.06 WARRANTY

Provide a 2 year Contractor Installation Warranty.

PART 2 PRODUCTS

2.01 FLASHING

A. Membrane Roofs: At all locations where a membrane roof terminates, such as adjacent wall, parapet, coping, chimney, equipment curb, etc., flashing and counter flashing shall be designed to facilitate the replacement of the membrane. Flashing shall be designed such that, at the time the membrane requires replacement, it shall be possible to achieve watertight integrity equivalent to that of the original construction without having to:

1. Remove major building elements.
2. Disturb adjacent materials and systems.
3. Involve trades other than roofers and sheet metal workers.

B. To achieve this, two piece counter flashing shall be provided to protect the membrane termination. The upper piece of counter flashing shall integrate with the adjacent system.

C. Surface mounted counter flashing is only permitted in existing locations where it is technically infeasible to install counter flashing into the wall assembly.

D. In all cases, the vertical distance from the membrane surface to the termination bar shall be 8 inches minimum. The only permitted exception is existing conditions where it is not possible to achieve 8 inches. In locations where pavers are used, the 8 inches distance shall be provided from the termination bar to the top of the paver.

E. Roof accessories: All roof accessories, such as curbs, shall have a two-piece counter flashing.

F. All metal flashing and drainage for roofs shall be stainless steel or aluminum, as appropriate for use with adjacent materials.

G. Metal thickness shall be selected based on the exact size, configuration, and support conditions of the building. Consult SMACNA 1793 or NRCA 0420 for recommendations, but in all cases:

1. The minimum thickness for aluminum is .040.
2. The minimum thickness for stainless steel is 24 ga.

H. Lapped seams shall not be used. Non-moving seams shall be flat lock (2) and shall be soldered (except aluminum).

I. Moveable seams shall be S pocket (6), Double S pocket (7) or butt seams with cover and/or backer plate (18, 20, 21). Seam types listed here refer to SMACNA 1793 figure 3-2.

2.02 GUTTERS AND DOWNSPOUTS

A. All gutters and downspouts shall be designed to accommodate a 100 year rain event in accordance with SMACNA 1793 Table 1-2.

B. Where built-in gutters are used, SMACNA 1793 Figure 1-4 shows two different methods for returning and terminating the gutter at the roof edge.

C. An abundance of leaves from near by trees can create blockage problems in even generously sized downspouts. Unless there is a need to replicate the design of existing downspouts on a historic building, consider using open faced downspouts similar to NRCA 0420 Figure 63. For traditional fully enclosed downspouts, provide openable section near base, just above footing tile leader. Openable section is to provide access to clean blockages out of the downspout as well as the leader.

D. Gutters - Hung: Expansion joints for hung gutters shall be butt type joints with cover plate per SMACNA 1793 figure 1-7.

E. Gutters - Built-in: Expansion joints for built-in gutters shall be butt type joints with cover plate per SMACNA 1793 figure 1-8.

F. Outlets shall be placed as near to the corner of the building as possible so that water will not be required to flow far beyond a sharp turn.

G. Down spouts shall be anchored to the exterior wall of the building. These anchors shall be designed so that the downspout may be removed without damaging the downspout, and with minimal or no damage to the bracket. This facilitates tuckpointing and downspout replacement/repair. Downspout hangers similar to the kind shown in SMACNA 1793 fig 1-34B are suggested.

H. Unless the project needs to replicate existing construction, downspouts shall not be tight to the wall. They shall stand-off 2 to 3 inches.

I. Downspout seams shall be soldered prior to installation.

2.03 THROUGH WALL FLASHING

Through wall flashing shall be incorporated at the base of all walls

where the masonry veneer sits on the concrete foundation. With the exception of entrances and doorways where it is understood that the sidewalk must be at the same level as the interior floor for accessibility, there must be a minimum of 8 inches vertical distance between the top of the foundation wall and the top of the adjacent finished grade. Through wall flashing (stainless steel) must securely terminate at the cavity face of the metal wall panel, and form a drip edge on the exterior of the wall.

2.04 PRODUCT INFORMATION

Submit the following product information:

A. Product Data

1. Submit sheet metal manufacturer's product specifications, installation instructions and general recommendations for standard factory fabricated items.

2. Submit data and color chart for prefinished sheet metal.

B. Samples

Submit 6 inch square samples of specified sheet metals in specified gauges finished as specified text

C. Shop Drawings

Submit Shop Drawings showing fabrication, jointing and securing of sheet metal. Show expansion joint details and connections to adjoining Work and at obstructions and penetrations.

PART 3 EXECUTION

3.01 INSTALLATION

A. Unless otherwise indicated, install sheet metal work to comply with performance requirements, manufacturer's installation instructions, and SMACNA 1793. Anchor units of Work securely in place. Conceal fasteners were possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.

B. Install exposed sheet metal: Work free of oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal work to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.

D. Separate dissimilar metals from each other by painting each metal surface in area of contact with a heavy application of bituminous coating, or by other permanent separation as recommended by manufacturers of dissimilar metals.

E. Install Sheet metal Work with provisions for thermal expansion of running items of more than 15 feet continuous length. Maintain a water-tight installation at expansion seams. Locate expansion seams as shown or, if not shown, at the following maximum spacings for each general flashing use:

1. Counter Flashing: At 10 foot intervals.

F. Expansion Joints:

1. Overlap Type Expansion Joints: Lap minimum 3 inches and set in bead of sealant near edge of overlap.

a. Use for counterflashing.

G. Fabricate and install Sheet Metal Work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, waves and avoidable tool marks, considering temper and reflectivity of metal. Furnish uniform, neat seams with minimum exposure of solder, welds and sealant. Except as otherwise shown, fold back sheet metal to form hem on concealed side of exposed edges.

H. Conceal fasteners and expansion provisions where possible in exposed Work, and locate in order to minimize possibility of leakage. Cover and seal Work as required for a watertight installation.

I. Installation of Steel Items:

1. Furnish flat lock seams unless otherwise indicated, except at expansion joints.

3.02 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Furnish final protection and maintain conditions that ensure sheet metal flashing and trim work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

-- End of Section --

SECTION 07 65 26

SELF-ADHERING SHEET FLASHING
10/17

PART 1 GENERAL

1.01 SECTION INCLUDES

Self-adhering sheet flashing and accessories.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C920	(2014a) Standard Specification for Elastomeric Joint Sealants
ASTM D1970/D1970M	(2017) Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
ASTM D2523	(2013) Standard Practice for Testing Load-Strain Properties of Roofing Membranes
ASTM D903	(1998; R 2010) Peel or Stripping Strength of Adhesive Bonds
ASTM E2112	(2007; R 2016) Standard Practice for Installation of Exterior Windows, Doors and Skylights

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Manufacturer's Data Sheets On Each Product; G, AE

SD-04 Samples

Verification Samples; G, AE

SD-06 Test Reports

Performance Characteristics ; G, AE

SD-08 Manufacturer's Instructions

Preparation Instructions; G, AE

Storage And Handling Requirements; G, AE

Installation; G, AE

SD-10 Operation and Maintenance Data

Maintenance Methods; G, AE

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications:

Obtain primary materials from a single manufacturer regularly engaged in manufacturing building wraps. Obtain secondary materials from a source acceptable to the primary materials manufacturer.

B. Installer Qualifications

All products listed in this section are to be installed by a single installer with a minimum of two years demonstrated experience in installing products of the same type and scope as specified.

1.05 DELIVERY STORAGE, AND HANDLING

A. Deliver materials and products in unopened factory labeled packages.

B. Store and handle in strict compliance with manufacturer's instructions and recommendations.

C. Prevent damage or contamination to materials by construction activities.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. TYPAR 9335 Harris Corners Pkwy. Suite 300; Charlotte, NC 28269; Email:moreinfo@typarhousewrap.com; Web:www.typar.com

B. CertainTeed, 750 East Swedesford Road, Valley Forge, PA 19333; 800-233-8990; www.CertainTeed.com

C. Substitutions: or approved Equal.

D. Requests for substitutions will be considered in accordance with provisions of Section 01 61 00, COMMON PRODUCT REQUIREMENTS.

E. Obtain products from a single manufacturer.

2.02 MATERIALS

A. Self-Adhering Sheet Flashing 1

Having the following characteristics:

1. Face Material Composition: Conformable textured polyolefin.
2. Face Color: Dark gray.
3. Adhesive Composition: Butyl adhesive.
4. Thickness: 60 mil.
5. Release Liner: Siliconized paper.
6. Dimensions: 6 in by 75 ft, 9 in by 75 ft.
7. Low Temperature Flex: Meets or exceeds ASTM D903.
8. Nail Sealability: Meets or exceeds ASTM D1970/D1970M.
9. Tensile Strength: Meets or exceeds ASTM D2523.
10. Maximum Exposure Limit: 90 days.

B. Self-Adhering Sheet Flashing 2

Having the following characteristics:

1. Face Material Composition: Conformable Textured Polyolefin.
2. Face Color: Gray.
3. Adhesive Composition: Butyl adhesive.
4. Thickness: 25 mil.
5. Release Liner: Siliconized paper.
6. Dimensions: 4 inch, 6 inch or 9 in by 75 ft .
7. Low Temperature Flex: Meets or exceeds ASTM D903.
8. Nail Sealability: Meets or exceeds ASTM D1970/D1970M.
9. Tensile Strength: Meets or exceeds ASTM D2523.
10. Maximum Exposure Limit: 180 days.

C. Self-Adhering Sheet Flashing 3

Having the following characteristics:

1. Face Material Composition: Polyolefin.
2. Face Color: Gray.
3. Adhesive Composition: Rubberized asphalt.
4. Thickness: 25 mil.
5. Release Liner: Siliconized paper.
6. Dimensions: 4 inch, 6 inch, 9 inch or 12 inch by 75 ft.
7. Low Temperature Flex: Meets or exceeds ASTM D903.
8. Nail Sealability: Meets or exceeds ASTM D1970/D1970M.
9. Tensile Strength: Meets or exceeds ASTM D2523.
10. Maximum Exposure Limit: 90 days.

2.03 ACCESSORIES

A. Sealing Tape

1. Product: Typar Construction Tape by Fiberweb™ or approved equal.

2. Description: Elastomeric polymer based, butyl rubber, rubber based, meeting ASTM C920 evaluation.

B. Mechanical Fasteners

1. Plastic cap nails.
2. Plastic cap staples.
3. Rust-resistant screws with washers.
4. Sealant: Polyurethane based, meeting ASTM C920 evaluation.
5. Mechanical: Masonry fastener with washer.

C. Primer

Use Super77 by 3M or approved equal.

D. Sealant

Elastomeric polymer sealant must comply with ASTM C920.

2.04 PRODUCT INFORMATION

Submit the following product information:

A. 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 and maintenance methods.

B. Test Results: Submit copies of test results showing performance characteristics equaling or exceeding those specified.

C. Verification Samples: For each finish product specified submit 12 inch (30.5 cm) square sample for approval by the Architect.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Contracting Officer of unsatisfactory preparation before proceeding.

3.02 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.

3.03 INSTALLATION

A. Install prior to installation of windows in accordance with manufacturer's instruction.

B. Seal joints and penetrations through weather resistive barrier

with specified tape and fasteners prior to installation of finish material.

C. Air infiltration barrier shall be air tight and free from holes, tears, and punctures.

D. All window and door penetrations are to be flashed and sealed per ASTM E2112, AMMA guidelines and manufacturer instructions.

3.04 PROTECTION

Protect installed products until completion of project.

-- End of Section --

SECTION 07 71 23

MANUFACTURED GUTTERS AND DOWNSPOUTS
10/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 2605	(2013) Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels

1.02 RELATED DOCUMENTS

The provisions included under Division 1, General Requirements, are included as part of this section as though bound herein.

1.03 SUMMARY

A. Provide labor, material, and equipment necessary for furnishing a complete installation of commercial gutter system.

B. Related Work Specified Elsewhere:

1. Division 5 Sections for support framing.

2. Division 7 Sections for related roofing materials.

1.04 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication And Installation; G, AE

SD-03 Product Data

Each Type Of Product Specified; G, AE

SD-04 Samples

Finish And Color Selection; G, AE

SD-08 Manufacturer's Instructions

Installation Instructions; G, AE

1.05 QUALITY ASSURANCE

A. Where pre-engineered manufactured products are specified, other field fabricated or shop/field fabricated substitutions will not be accepted. However, where shop/field fabrications are indicated pre-engineered systems will be considered with Contracting Officer approval.

B. Obtain all components and related accessories from one single source manufacturer.

C. Follow manufacturer's printed instructions for installing commercial gutter system. Follow primary roofing manufacturer's printed instructions for installing associated roof material for flashing gutter system to roof.

1.06 DELIVERY, STORAGE, AND HANDLING

A. All products delivered shall be stored in a clean dry location prior to installation.

B. Products furnished with strippable protective masking shall not be exposed to direct sunlight for more than 30 minutes without removing masking.

C. Do not install finished materials with scars or abrasions.

1.07 PROJECT CONDITIONS

A. Coordinate work of this Section with adjoining work for proper sequencing to ensure protection from inclement weather and to protect materials and their finish against damage.

B. Do not install commercial gutter system during inclement weather. When installing in cold climates, warm adhesives, caulks, and primers to at least 50 degrees Fahrenheit prior to application.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide commercial gutter system, accessories, and drainware as manufactured by the following:

1. Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc. 8370 East Hwy 78, Villa Rica, GA 30180, (800) 334-9823, Online at http://www.saf.com/persys

2. Castle Metal Products, 1947 Quincy Court, Glendale Heights, IL 60139, Toll Free: 1-877-285-3975 or 847-806-4540, Email: castlemetal@msn.com, Web: http://castlemetalproducts.com

3. Berger Building Products, 805 Pennsylvania Blvd, Feasterville, PA 19053, Toll-free: 800-523-8852, Phone: 215-355-1200, Email: info@bergerbp.com, Web: http://www.bergerbp.com

4. Or approved equal.

2.02 TYPE

Provide SMACNA Series Gutter System, Style K (Ogee), size as indicated on Contract Drawings.

2.03 MATERIALS AND FABRICATION

A. Gutter

Shall be manufactured from 0.040 inch mill finished aluminum in 10 ft lengths. Gutter shall be:

1. Manufactured with 1 inch telescoping and notched end.
2. Factory punched with fastening holes elongated to allow for thermal movement.
3. Gutters shall be press formed on a CNC Press to provide repeated true and accurate profiles.

B. Support Bracket

Shall be manufactured from 0.125 inch by 1.00 inch aluminum, factory punched for fasteners. (Optional)

C. Interior Straps

Shall be manufactured from 0.125 inch by 1.00 inch aluminum.

2.04 ACCESSORIES

A. Mitered Corners

Miter shall be precision saw cut with a continuous heliarc weld watertight joint.

B. End Caps

Provide factory end caps at all gutter ends and wall abutments.

C. Liner Expansion Joint

Provide manufacturer's elastomeric expansion joints with cover plates at 40 foot intervals or as shown on shop drawings.

D. Sealant

Shall be polyurethane or silicon based water-proofing type, compatible with aluminum gutter, downspout, and abutting dissimilar materials for intended application.

2.05 DRAINWARE

A. Downspout and Elbows

Provide downspout Model Number DS-FM in sizes and locations as indicated on plans. Downspouts shall be manufactured from 0.040 aluminum, finished to match gutter. Downspout elbows shall have

heliarc welded joints.

B. Outlets

At all downspout locations provide aluminum outlets to connect liner to downspout.

C. Wall Brackets

Provide Style 1 Wall brackets at 60 inch maximum spacing (minimum 2 brackets). Brackets shall be manufactured from 0.125 inch by 1.00 inch aluminum, finished to match downspout.

2.06 FINISHES

A. General

Apply coatings to exposed aluminum components after fabrication for maximum coating performance and to prevent crazing, abrasion, and damage to finished surfaces.

B. Pretreatment

Aluminum components shall be pretreated with solutions to remove organic and inorganic surface soils, remove residual oxides, followed by a chrome phosphate conversion coating to which organic coatings will firmly adhere.

C. Coating Type

High Performance Coating, two-coat, shop applied, 70% Polyvinylidene Fluoride (PVDF) coating based on Elf Arkema Chemicals, Inc. Kynar 500, Ausimont U.S.A., Inc. Hylar 5000 resin,or approved equal, meeting AAMA 2605 specification.

D. Color

Select from manufacturer's full range of colors.

2.07 PRODUCT INFORMATION

Provide the following product information:

A. Product Data: Each type of product specified. Submit manufacturer's detailed technical product data, installation instructions and recommendations, dimensions of individual components, profiles, and finishes.

B. Shop Drawings: Show fabrication and installation of commercial gutter system including fully dimensioned roof plans, expansion joint locations, sections and details of components and other related trims.

C. Finish and Color Selection: Furnish manufacturer's technical data for specified finish and color chart showing full range of colors available.

PART 3 EXECUTION

3.01 EXAMINATION

The installer must examine substrates and conditions under which commercial gutter system will be installed. All wood plates and/or fascia boards shall be installed true, straight, and free of splits, cracks, or other irregularities. Do not proceed with installation until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Prior to the installation of the commercial gutter system, soffits, extenders, and associated cornice profiles shall be installed.

B. Installer shall thoroughly read and follow manufacturer's installation instructions before proceeding with installation.

3.03 INSTALLATION

A. General

The commercial gutter system shall be installed in strict accordance with manufacturer's printed instructions. Deviations from the instructions are not allowed.

B. Support Brackets

Layout support brackets to provide 1/2 inch slope in 40 linear feet. Install support brackets with #10 by 2 inch stainless steel wood screws.

C. Gutter

Install gutter onto support brackets and fasten to substrates with 1-1/2 inch aluminum or stainless steel nails. Rivet and seal liner joints with high grade exterior sealant as recommended by gutter manufacturer.

D. Expansion Joints

Install elastomeric expansion joints as shown on plans and/or shop drawings. Maximum expansion joint spacing shall be 40 foot centers.

E. Interior Straps:

Install interior straps by fully engaging them into gutter's hemmed edge, complete by securely riveting.

-- End of Section --

SECTION 07 72 53

SNOW-GUARDS
10/17

PART 1 GENERAL

1.01 SUMMARY

This Section specifies snow-guards for installation on sloped roofing.
1. Section13 34 19, METAL BUILDING SYSTEMS.

1.02 RELATED SECTIONS

Refer to the following Section for roofing material specifications:

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Manufacturer's Product Data; G, AE

SD-04 Samples

Full-Size Snow-Guard In Color And Material Selected; G, AE

SD-08 Manufacturer's Instructions

Installation Instructions; G, AE

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualifications

Provide snow-guards manufactured by a company with at least 20 years experience in manufacturing snow-guards.

1.05 DELIVERY, STORAGE, AND HANDLING

Deliver materials and products in unopened factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Zaleski Snow-Guards for Roofs, Inc., PO Box 700, New Britain, CT

B. Berger Building Products, 805 Pennsylvania Blvd, Feasterville, PA 19053, Toll-free: 800-523-8852, Phone: 215-355-1200, Email:

info@bergerbp.com, Web: http://www.bergerbp.com

C. Rocky Mountain Snow Guards, Inc., 2055 S. Raritan Street, Unit B Denver, CO 80223, Office: (720) 379-7756, Toll Free: (877) 414-7606, E-mail: info@rockymountainsnowguards.com, web: https://www.rockymountainsnowguards.com/

D. Or approved equal.

2.02 MATERIALS

Terne Coated Stainless Steel Snow-Guards: Using 0.020 inch thick stainless steel coated with lead and tin coating formed to double thickness:

1. Terne Coated Stainless Steel Roofing: Attach with solder.
2. Terne Coated Stainless Steel Roofing: Attach with sealant adhesive.

2.03 PRODUCT INFORMATION

Submit the following product information:

A. Product Data: Submit manufacturer's product data and installation instructions.

B. Samples: Submit one full-size snow-guard in color and material selected for approval.

PART 3 EXECUTION

3.01 EXAMINATION

A. Prior to start of installation, inspect existing conditions to ensure surfaces are suitable for installation of snow-guards.

B. For snow-guards installed with sealant, verify forecasted temperature will be above 20 degrees F for 48 hours after installation.

3.02 INSTALLATION

Snow-Guard Installation: Comply with manufacturer's installation instructions. Use manufacturer's recommended installation materials and installation tools. Attach snow-guards securely. Clean adjacent surfaces after installation.

-- End of Section --

SECTION 07 84 13

PENETRATION FIRESTOPPING
10/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E814	(2013a; R 2017) Standard Test Method for Fire Tests of Penetration Firestop Systems

FM GLOBAL (FM)

FM 4991	(2013) Approval of Firestop Contractors

UNDERWRITERS LABORATORIES (UL)

UL 1479	(2015) Fire Tests of Through-Penetration Firestops

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.03 REFERENCE STANDARD

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with all applicable requirements and standards.

1.04 QUALITY ASSURANCE

A. Arrange for work to be performed by an experienced installer who is certified, licensed, FM Approved in accordance with FM 4991, Certified by UL as a Qualified Contractor, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products per specified requirements. Installer shall have a minimum of three years experience in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this

Project. If requested, provide a list of past projects for verification of required experience.

B. Materials shall have been tested to provide fire rating equal to that of the construction, within the actual depth and thickness of the construction.

C. Submit installer's qualification certificates, or letters from firestopping manufacturer attesting to installer's successful completion of training.

1.05 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Penetration Seals ; G, AE

UL Illustration Of Each Proposed System ; G, AE

SD-03 Product Data

Listing Of All Manufacturers, Products, Model Numbers, And Designs; G, AE

SD-07 Certificates

Installer's Qualification Certificates; G, AE

SD-11 Closeout Submittals

Record Drawings; G

1.06 DELIVERY, STORAGE, AND HANDLING

Deliver materials undamaged in manufacturer's clearly labeled unopened containers, identified with brand, type, grade and UL label where applicable.

1.07 PROJECT CONDITIONS

A. Show each condition requiring penetration seals indicating proposed UL systems materials, anchorage, methods of installation, and actual adjacent construction.

B. Submit UL illustration of each proposed system indicating manufacturer approved modifications.

C. Verify existing conditions and substrates before starting Work. Correct unsatisfactory conditions before proceeding.

D. Proceed with installation only after penetrations of the substrate and supporting brackets have been installed.

PART 2 PRODUCTS

2.01 GENERAL

All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.02 MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following manufacturers:

1. Hilti Firestop Systems.
2. 3M, Electrical Products Division, St. Paul, Minnesota.
3. Metacaulk; Rectorseal Corp., Houston, Texas.
4. Specified Technologies Inc., Somerville, New Jersey.
5. United States Gypsum Company.
6. Or approved equal.

B. Submit a complete listing of all manufacturers, products, model numbers, and designs proposed for use in the Work of this Section.

2.03 MATERIALS

A. Provide materials classified by UL to provide fire barrier equal to time rating of construction being penetrated.

B. Provide asbestos free materials that comply with applicable Codes and have been tested in accordance with UL 1479 or ASTM E814.

PART 3 EXECUTION

3.01 PREPARATION

Clean surfaces to be in contact with penetration seal materials of dirt, grease, oil, loose materials, rust, or other substances that may affect proper fitting, adhesion, or the required fire resistance.

3.02 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer's published recommendations.

C. Install penetration seal materials in accordance with printed instructions of the UL Building Materials Directory and in accordance with manufacturer's instructions.

D. Seal holes or voids made by penetrations to ensure an effective smoke barrier.

E. Remove damming materials after curing if made of other than fire resistant materials.

F. Protect materials from damage on surfaces subject to traffic.

G. Environmental Requirements:

1. Keep flammable materials away from sparks or flame.
2. Provide masking and drop cloths to prevent contamination of adjacent surfaces by firestopping materials.
3. Maintain minimum 40 degrees F temperature of substrates for 24 hours before, during, and 24 hours after application of firestopping materials.

3.03 FIELD QUALITY CONTROL

A. Examine penetration sealed areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable authorities having jurisdiction.

C. Perform under this Section patching and repairing of firestopping caused by cutting or penetration by other trades.

3.04 ADJUSTING AND CLEANING

A. Clean up spills of liquid components with solvent.

B. Neatly cut and trim materials with sharp knife or blade as required.

C. Remove materials and debris, leaving area in undamaged, clean condition.

3.05 CLOSEOUT DOCUMENTATION

A. Record Drawings

Maintain two copies of all shop drawings, product data, and samples, manufacturer's specifications, recommendations, installation instructions, and maintenance data at the Project Site. At Project Closeout, turn over both copies to the Contracting Officer.

-- End of Section --

SECTION 07 91 00

PREFORMED JOINT SEALS
10/17

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preformed, foam joint seals.

B. Precured, extruded-silicone joint seals.

1.02 RELATED DOCUMENTS

Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

A. Related Requirements

1. Section 03 30 00.00, CAST-IN-PLACE CONCRETE

2. Section 13 34 19, METAL BUILDING SYSTEMS

3. Section 08 45 23, FIBERGLASS SANDWICH PANEL ASSEMBLIES

4. Section 07 92 00, JOINT SEALANTS, for liquid sealants applied over preformed seals in dual seal systems

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Preformed Joint Seal Schedule; G, AE

SD-03 Product Data

Product Data; G, AE

SD-04 Samples

Manufacturer's Color Charts; G, AE

Joint Seals; G, AE

SD-06 Test Reports

Product Test Reports; G, AE

SD-11 Closeout Submittals

Warranties; G, AE

1.04 QUALITY ASSURANCE

A. Mockups

Install mockups of assemblies specified in other Sections that are indicated to receive preformed joint seals specified in this Section. Use materials and installation methods specified in this Section.

1.05 WARRANTY

A. Special Warranty

Installer agrees to repair or replace preformed joint seals that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period

Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty

Manufacturer agrees to furnish preformed joint seals to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period

Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PREFORMED, FOAM JOINT SEALS

A. Preformed, Foam Joint Seals : Manufacturer's standard joint seal manufactured from urethane or EVA (ethylene vinyl acetate) foam with minimum density of 10 lb/cu. ft. and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths based on design criteria indicated, with factory- or field-applied adhesive for bonding to substrates.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. EMSEAL Joint Systems, Ltd; Emseal 25V.
b. Nystrom, Inc.; Dual Compression Seal (PES).
c. Sandell Manufacturing Co., Inc; Polyseal, Polyseal Type C.
d. Watson Bowman Acme Corp.; Wabo Seismic WeatherSeal.
e. Or approved equal.

2. Joint Seal Colors: As selected by Contracting Officer from full range of industry colors.

2.02 EXTRUDED SILICONE JOINT SEALS

A. Extruded-Silicone Joint Seals Manufacturer's standard seal consisting of precured low-modulus silicone extrusion, with a neutral-curing silicone sealant for bonding extrusions to substrates.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Dow Corning Corporation; Dow Corning® 123 Silicone Seal.
b. GE Construction Sealants; Momentive Performance Materials Inc.; UltraSpan US1100.
c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Silbridge 300.
d. Pecora Corporation; Sil-Span.
e. Sealex, Inc.; ImmerSeal.
f. Sika Corporation; Joint Sealants; Sika Silbridge-300.
g. Tremco Incorporated; Spectrum Simple Seal.
h. Or approved equal.

2. Joint Seal Color: As selected by Architect from full range of industry colors.

2.03 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by preformed-joint-seal manufacturer for joint substrates indicated.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to preformed joint seal manufacturer, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces, and formulated to promote best adhesion to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with preformed joint seals and surfaces adjacent to joints.

2.04 PRODUCT INFORMATION

Provide the following product information:

A. Product Data: For each preformed joint seal product.

B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each type and color of preformed joint seal required, provide Samples with joint seals in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint seals.

D. Preformed Joint Seal Schedule: Include the following information:

1. Joint seal location and designation.
2. Joint width and movement capability.
3. Joint seal manufacturer and product name.
4. Joint seal color.

E. Product Test Reports: For each preformed joint seal for tests performed by a qualified testing agency.

F. Warranties: For special warranties.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive preformed joint seals, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting preformed-joint seal performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing preformed joint seals to comply with preformed joint seal manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of preformed joint seal, including dust, paints (except for permanent protective coatings tested and approved for seal adhesion and compatibility by seal manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimal bond with preformed joint seals. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

a. Concrete.
b. Masonry.
c. Unglazed surfaces of ceramic tile.
d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint seals. Nonporous joint substrates include the following:

a. Metal.
b. Glass.
c. Porcelain enamel.

d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by preformed joint seal manufacturer or as indicated by tests or prior experience. Apply primer to comply with joint seal manufacturer's written instructions. Confine primers to areas of joint seal bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of adhesive or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove smears. Remove tape immediately after tooling without disturbing joint seal.

A. Clean surfaces thoroughly prior to installation.

B. Cleaners or primers for substrates shall be approved by joint sealant manufacturer and substrate manufacturer.

3.03 INSTALLATION

A. General: Comply with preformed joint seal manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Installation of Preformed, Foam Joint Seals:

1. Install each length of seal immediately after removing protective wrapping.

2. Firmly secure compressed joint seals to joint gap side to obtain full bond using exposed pressure-sensitive adhesive or field-applied adhesive as recommended by manufacturer.

3. Do not pull or stretch material. Produce seal continuity at splices, ends, turns, and intersections of joints.

4. For applications at low ambient temperatures, heat foam joint seal material in compliance with manufacturer's written instructions.

C. Installation of Precured, Extruded-Silicone Joint Seals:

1. Apply masking tape to each side of joint, outside of area to be covered by seal system.

2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone seal system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch. Hold edge of sealant bead 1/4 inch inside masking tape.

3. Press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact with substrate.

4. Complete installation of seal system in horizontal joints before installing in vertical joints. Lap vertical joints over

horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

3.04 PROTECTION

Protect preformed joint seals from damage resulting from construction operations or other causes so seals are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated seals immediately so installations with repaired areas are indistinguishable from original work.

-- End of Section --

SECTION 07 92 00

JOINT SEALANTS
08/16

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C1311	(2014) Standard Specification for Solvent Release Agents
ASTM C509	(2006; R 2015) Elastomeric Cellular Preformed Gasket and Sealing Material
ASTM C734	(2015) Low-Temperature Flexibility of Latex Sealants After Artificial Weathering
ASTM C834	(2017) Standard Specification for Latex Sealants
ASTM C919	(2012; R 2017) Standard Practice for Use of Sealants in Acoustical Applications
ASTM C920	(2014a) Standard Specification for Elastomeric Joint Sealants
ASTM D217	(2017) Standard Test Methods for Cone Penetration of Lubricating Grease
ASTM D2452	(2015) Standard Test Method for Extrudability of Oil- and Resin-Base Caulking Compounds
ASTM D2453	(2015) Standard Test Method for Shrinkage and Tenacity of Oil- and Resin-Base Caulking Compounds
ASTM E84	(2016) Standard Test Method for Surface Burning Characteristics of Building Materials

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data; G, AE

Sealants; G, AE

Primers; G, AE

Backstops; G, AE

Bond Breakers; G, AE

SD-07 Certificates

Sealant Certificate of Compliance; G, AE

1.03 PRODUCT DATA

Include storage requirements, shelf life, curing time, instructions for mixing and application, and accessories. Provide manufacturer's Safety Data Sheets (SDS) for each solvent, primer and sealant material proposed.

1.04 ENVIRONMENTAL CONDITIONS

Apply sealant when the ambient temperature is between 40 and 90 degrees F.

1.05 DELIVERY AND STORAGE

Deliver materials to the jobsite in unopened manufacturers' sealed shipping containers, with brand name, date of manufacture, color, and material designation clearly marked thereon. Label elastomeric sealant containers to identify type, class, grade, and use. Handle and store materials in accordance with manufacturer's printed instructions. Prevent exposure to foreign materials or subjection to sustained temperatures exceeding 90 degrees F or lower than 0 degrees F. Keep materials and containers closed and separated from absorptive materials such as wood and insulation.

1.06 QUALITY ASSURANCE

A. Compatibility with Substrate

Verify that each sealant is compatible for use with each joint substrate in accordance with sealant manufacturer's printed recommendations for each application.

B. Joint Tolerance

Provide joint tolerances in accordance with manufacturer's printed instructions.

C. Mock-Up

Provide a mock-up of each type of sealant using materials, colors, and techniques approved for use on the project. Approved mock-ups may be incorporated into the Work.

1.07 SPECIAL WARRANTY

Guarantee sealant joint against failure of sealant and against water

penetration through each sealed joint for 5 years.

PART 2 PRODUCTS

2.01 SEALANTS

Provide sealant products that have been tested, found suitable, and documented as such by the manufacturer for the particular substrates to which they will be applied.

A. Interior Sealants

Provide in accordance with ASTM C834. Location(s) and color(s) of sealant for the following: Note - color "as selected" refers to manufacturer's full range of color options

LOCATION	COLOR
a. Small voids between walls or partitions and adjacent lockers, casework, shelving, door frames, built-in or surface mounted equipment and fixtures, and similar items.	As selected
b. Perimeter of frames at doors, windows, and access panels which adjoin exposed interior concrete and masonry surfaces.	As selected
c. Joints of interior masonry walls and partitions which adjoin columns, pilasters, concrete walls, and exterior walls unless otherwise detailed.	As selected
d. Joints between edge members for acoustical tile and adjoining vertical surfaces.	As selected
e. Interior locations, not otherwise indicated or specified, where small voids exist between materials specified to be painted.	Match adjacent surface color
f. Joints formed between tile floors and tile base cove; joints between tile and dissimilar materials; joints occurring where substrates change.	Match adjacent surface color
g. Behind escutcheon plates at valve pipe penetrations and showerheads in showers.	Match adjacent surface color

B. Exterior Sealants

For joints in vertical surfaces, provide in accordance with ASTM C920, Type S or M, Grade NS, Class 25, Use NT. For joints in horizontal surfaces, provide ASTM C920, Type S or M, Grade P, Class 25, Use T. Provide location(s) and color(s) of sealant as follows:. Note - color "as selected" refers to manufacturer's

full range of color options:

LOCATION	COLOR
a. Joints and recesses formed where frames and subsills of windows, doors, louvers, and vents adjoin masonry, concrete, or metal frames. Use sealant at both exterior and interior surfaces of exterior wall penetrations.	Match adjacent surface color
b. Interior face of expansion joints in exterior concrete or masonry walls where metal expansion joint covers are not required.	As selected
c. Expansion and control joints.	As selected
d. Voids where items pass through exterior walls.	As selected
e. Metal-to-metal joints where sealant is indicated or specified.	Match adjacent surface color
f. Joints between ends of gravel stops, fasciae, copings, and adjacent walls.	As selected

C. Floor Joint Sealants

Provide in accordance with ASTM C920, Type S or M, Grade P, Class 25, Use T. Provide certification of indoor air quality for interior floor joint sealants. Provide location(s) and color(s) of sealant as follows: Note - color "as selected" refers to manufacturer's full range of color options:

LOCATION	COLOR
a. Seats of metal thresholds for exterior doors.	Match adjacent surface color
b. Control and expansion joints in floors, slabs, ceramic tile, and walkways.	Match adjacent surface color

D. Acoustical Sealants

Rubber or polymer based acoustical sealant in accordance with ASTM C919 to have a flame spread of 25 or less and a smoke developed rating of 50 or less when tested in accordance with ASTM E84. Provide non-staining acoustical sealant with a

consistency of 250 to 310 when tested in accordance with ASTM D217. Acoustical sealant must remain flexible and adhesive after 500 hours of accelerated weathering as specified in ASTM C734. Provide certification of indoor air quality for interior acoustical sealants.

E. Preformed Sealants

Provide preformed sealants of polybutylene or isoprene-butylene based pressure sensitive weather resistant tape or bead sealants capable of sealing out moisture, air and dust when installed as recommended by the manufacturer. At temperatures from minus 30 to plus 160 degrees F, sealants must be non-bleeding and have no loss of adhesion.

1. Foam Strip

Provide foam strip of polyurethane foam with cross section dimensions of 1 inch. Provide foam strip capable of sealing out moisture, air, and dust when installed and compressed in accordance with manufacturer's printed instructions. Service temperature must be minus 40 to plus 275 degrees F. Furnish untreated strips with adhesive to hold them in place. Do not allow adhesive to stain or bleed onto adjacent finishes. Saturate treated strips with butylene waterproofing or impregnate with asphalt.

F. Manufacturer's Information

Submit manufacturer's descriptive data on including storage requirements, shelf life, curing time, instructions for mixing and application, and primer data (if required). Provide a copy of the Material Safety Data Sheet for each solvent, primer or sealant material. Submit a sealant certificate of compliance stating that the materials conform to the specified requirements.

2.02 PRIMERS

Non-staining, quick drying type and consistency as recommended by the sealant manufacturer for the particular application.

Submit manufacturer's descriptive data on including storage requirements, shelf life, curing time, instructions for mixing and application, and primer data (if required). Provide a copy of the Material Safety Data Sheet for each solvent, primer or sealant material.

2.03 BOND BREAKERS

Type and consistency as recommended by the sealant manufacturer to prevent adhesion of the sealant to the backing or to the bottom of the joint.

Submit manufacturer's descriptive data on including storage requirements, shelf life, curing time, instructions for mixing and application, and primer data (if required). Provide a copy of the Material Safety Data Sheet for each solvent, primer or sealant material.

2.04 BACKSTOPS

Provide glass fiber roving, neoprene, butyl, polyurethane, or polyethylene foams free from oil or other staining elements as recommended by sealant manufacturer. Provide 25 to 33 percent oversized backing for closed cell and 40 to 50 percent oversized backing for open cell material, unless otherwise indicated. Provide backstop material that is compatible with sealant.

A. Synthetic Rubber

Provide in accordance with ASTM C509, Option I, Type I preformed rods for wall panel synthetic rubber backing.

B. Butyl Rubber Based

Provide in accordance with ASTM C1311, from a single component, with solvent release. color as selected from manufacturer's full range of color choices.

C. Silicone Rubber Base

Provide in accordance with ASTM C920, from a single component, with solvent release, Class 25. Color as selected from manufacturer's full range of color choices.

D. Manufacturer's Information

Submit manufacturer's descriptive data on including storage requirements, shelf life, curing time, instructions for mixing and application, and primer data (if required). Provide a copy of the Material Safety Data Sheet for each solvent, primer or sealant material.

2.05 CAULKING

For interior use and only where there is little or no anticipated joint movement. Provide in accordance with ASTM D2452 and ASTM D2453, for oil and resin-based caulking.

2.06 CLEANING SOLVENTS

Provide type(s) recommended by the sealant manufacturer and in accordance with environmental requirements herein.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

Prepare surfaces according to manufacturer's printed installation instructions. Clean surfaces from dirt, frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would destroy or impair adhesion. Remove oil and grease with solvent; thoroughly remove solvents prior to sealant installation. Wipe surfaces dry with clean cloths. When resealing an existing joint, remove existing caulk or sealant prior to applying new sealant. For surface types not listed below, provide in accordance with sealant manufacturer's printed instructions for each specific surface.

A. Steel Surfaces

Remove loose mill scale by sandblasting or, if sandblasting is impractical or would damage finished work, scraping and wire brushing. Remove protective coatings by sandblasting or using a residue free solvent. Remove resulting debris and solvent residue prior to sealant installation.

B. Aluminum or Bronze Surfaces

Remove temporary protective coatings from surfaces that will be in contact with sealant. When masking tape is used as a protective coating, remove tape and any residual adhesive prior to sealant application. For removing protective coatings and final cleaning, use non-staining solvents recommended by the manufacturer of the item(s) containing aluminum or bronze surfaces.

C. Concrete and Masonry Surfaces

Where surfaces have been treated with curing compounds, oil, or other such materials, remove materials by sandblasting or wire brushing. Remove laitance, efflorescence and loose mortar from the joint cavity. Remove resulting debris prior to sealant installation.

3.02 SEALANT PREPARATION

Do not add liquids, solvents, or powders to sealants. Mix multicomponent elastomeric sealants in accordance with manufacturer's printed instructions.

3.03 APPLICATION

A. Joint Width-To-Depth Ratios

Acceptable Ratios:

JOINT WIDTH	JOINT DEPTH	
	Minimum	Maximum
For metal, glass, or other nonporous surfaces:		
1/4 inch (minimum)	1/4 inch	1/4 inch
over 1/4 inch	1/2 of width	Equal to width
For concrete:		
1/4 inch (minimum)	1/4 inch	1/4 inch
over 1/4 inch to 1/2 inch	1/4 inch	Equal to width
over 1/2 inch to 2 inch	1/2 inch	5/8 inch
Over 2 inch	As recommended by sealant manufacturer	

Unacceptable Ratios: Where joints of acceptable width-to-depth

ratios have not been provided, clean out joints to acceptable depths and grind or cut to acceptable widths without damage to the adjoining work. Grinding is prohibited at metal surfaces.

B. Unacceptable Sealant Use

Do not install sealants in lieu of other required building enclosure weatherproofing components such as flashing, drainage components, and joint closure accessories, or to close gaps between walls, floors, roofs, windows, and doors, that exceed acceptable installation tolerances. Remove sealants that have been used in an unacceptable manner and correct building enclosure deficiencies to comply with contract documents requirements.

C. Masking Tape

Place masking tape on the finished surface on one or both sides of joint cavities to protect adjacent finished surfaces from primer or sealant smears. Remove masking tape within 10 minutes of joint filling and tooling.

D. Backstops

Provide backstops dry and free of tears or holes. Tightly pack the back or bottom of joint cavities with backstop material to provide joints in specified depths. Provide backstops where indicated and where backstops are not indicated but joint cavities exceed the acceptable maximum depths specified in JOINT WIDTH-TO-DEPTH RATIOS Table.

E. Primer

Clean out loose particles from joints immediately prior to application of. Apply primer to joints in concrete masonry units, wood, and other porous surfaces in accordance with sealant manufacturer's printed instructions. Do not apply primer to exposed finished surfaces.

F. Bond Breaker

Provide bond breakers to surfaces not intended to bond in accordance with, sealant manufacturer's printed instructions for each type of surface and sealant combination specified.

G. Sealants

Provide sealants compatible with the material(s) to which they are applied. Do not use a sealant that has exceeded its shelf life or has jelled and cannot be discharged in a continuous flow from the sealant gun. Apply sealants in accordance with the manufacturer's printed instructions with a gun having a nozzle that fits the joint width. Work sealant into joints so as to fill the joints solidly without air pockets. Tool sealant after application to ensure adhesion. Apply sealant uniformly smooth and free of wrinkles. Upon completion of sealant application, roughen partially filled or unfilled joints, apply additional sealant, and tool smooth as specified. Apply sealer over sealants in accordance with the sealant manufacturer's printed

instructions.

3.04 PROTECTION AND CLEANING

A. Protection

Protect areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled and no residual tape marks remain.

B. Final Cleaning

Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean and neat condition.

a. Masonry and Other Porous Surfaces: Immediately remove fresh sealant that has been smeared on adjacent masonry, rub clean with a solvent, and remove solvent residue, in accordance with sealant manufacturer's printed instructions. Allow excess sealant to cure for 24 hour then remove by wire brushing or sanding. Remove resulting debris.

b. Metal and Other Non-Porous Surfaces: Remove excess sealant with a solvent moistened cloth. Remove solvent residue in accordance with solvent manufacturer's printed instructions.

-- End of Section --

DIVISION 08 – OPENINGS

SECTION 08 11 13

STEEL DOORS AND FRAMES
02/10

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2015; Errata 1 2015; Errata 2 2016) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM C578	(2016) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
ASTM C591	(2016) Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
ASTM C612	(2014) Mineral Fiber Block and Board Thermal Insulation
ASTM D2863	(2013) Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
ASTM E1300	(2016) Standard Practice for Determining Load Resistance of Glass in Buildings
ASTM E283	(2004; R 2012) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM F2248	(2012) Standard Practice for Specifying an Equivalent 3-Second Duration Design Loading for Blast Resistant Glazing Fabricated with Laminated Glass

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.115	(2016) Hardware Preparation in Steel Doors and Steel Frames

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 105	(2016; TIA 16-1) Standard for Smoke Door Assemblies and Other Opening Protectives
NFPA 252	(2017) Standard Methods of Fire Tests of

	Door Assemblies
NFPA 80	(2016; TIA 16-1) Standard for Fire Doors and Other Opening Protectives

STEEL DOOR INSTITUTE (SDI/DOOR)

SDI/DOOR 111	(2009) Recommended Selection and Usage Guide for Standard Steel Doors, Frames and Accessories
SDI/DOOR 113	(2001; R2006) Standard Practice for Determining the Steady State Thermal Transmittance of Steel Door and Frame Assemblies
SDI/DOOR A250.10	(2011) Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames
SDI/DOOR A250.11	(2001) Recommended Erection Instructions for Steel Frames
SDI/DOOR A250.6	(2003; R2009) Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames
SDI/DOOR A250.8	(2003; R2008) Recommended Specifications for Standard Steel Doors and Frames

UNDERWRITERS LABORATORIES (UL)

UL 10C	(2016) UL Standard for Safety Positive Pressure Fire Tests of Door Assemblies

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Doors; G, AE

Frames; G, AE

Schedule Of Doors; G, AE

Schedule Of Frames; G, AE

Door And Frame Locations; G, AE

SD-03 Product Data

Doors; G, AE

Frames; G, AE

Accessories; G, AE

Weatherstripping; G, AE

SD-04 Samples

Factory-Applied Enamel Finish; G, AE

Color Samples; G, AE

1.03 DELIVERY, STORAGE, AND HANDLING

Deliver doors, frames, and accessories undamaged and with protective wrappings or packaging. Strap knock-down frames in bundles. Store doors and frames on platforms under cover in clean, dry, ventilated, and accessible locations, with 1/4 inch airspace between doors. Remove damp or wet packaging immediately and wipe affected surfaces dry. Replace damaged materials with new.

1.04 QUALITY ASSURANCE

1. Submit schedule of doors.

2. Submit schedule of frames.

3. Submit door and frame locations.

4. Submit manufacturer's descriptive literature for doors, frames, and accessories. Include data and details on door construction, panel (internal) reinforcement, insulation, and door edge construction. When "custom hollow metal doors" are provided in lieu of "standard steel doors," provide additional details and data sufficient for comparison to SDI/DOOR A250.8 requirements.

PART 2 PRODUCTS

2.01 STANDARD STEEL DOORS

Provide in accordance with SDI/DOOR A250.8, except as specified otherwise. Prepare doors to receive door hardware as specified in Section 08 71 00, DOOR HARDWARE. Undercut where indicated. Exterior doors shall have top edge closed flush and sealed to prevent water intrusion. Doors shall be 1-3/4 inch thick, unless otherwise indicated. Provide exterior glazing in accordance with ASTM F2248 and ASTM E1300.

A. Classification - Level, Performance, Model

1. Heavy Duty Doors

Provide in accordance with SDI/DOOR A250.8, Level 2, physical performance Level B, Model 2 (Seamless), with core construction as required by the manufacturer for interior doors, of size(s) and design(s) indicated. Where vertical

stiffener cores are required, the space between the stiffeners shall be filled with mineral board insulation.

2. Extra Heavy Duty Doors

Provide in accountancies with SDI/DOOR A250.8, Level 3, physical performance Level A, Model 2 (Seamless) with core construction as required by the manufacturer for interior doors, of size(s) and design(s) indicated. Where vertical stiffener cores are required, the space between the stiffeners shall be filled with mineral board insulation.

2.02 SOUND RATED STEEL DOORS

Doors shall have a Sound Transmission Class (STC) as indicated on the Contract Drawings.

2.03 ACCESSORIES

A. Moldings

1. Provide moldings around glass of interior and exterior doors and louvers of interior doors. Provide nonremovable moldings on outside of exterior doors and on corridor side of interior doors. Other moldings may be stationary or removable. Secure inside moldings to stationary moldings, or provide snap-on moldings. Muntins shall interlock at intersections and shall be fitted and welded to stationary moldings.

2.04 INSULATION CORES

Insulated cores shall be of type specified, and provide an apparent U-factor of 0.48 in accordance with SDI/DOOR 113 and shall conform to:

a. Rigid Cellular Polyisocyanurate Foam: ASTM C591, Type I or II, foamed-in-place or in board form, with oxygen index of not less than 22 percent when tested in accordance with ASTM D2863; or

b. Rigid Polystyrene Foam Board: ASTM C578, Type I or II; or

c. Mineral board: ASTM C612, Type I.

2.05 STANDARD STEEL FRAMES

Provide in accordance with SDI/DOOR A250.8, Level 2 and 3, except as otherwise specified. Form frames to sizes and shapes indicated, with welded corners.

A. Welded Frames

Continuously weld frame faces at corner joints. Mechanically interlock or continuously weld stops and rabbets. Grind welds smooth.

Weld frames in accordance with the recommended practice of the Structural Welding Code Sections 1 through 6, AWS D1.1/D1.1M and in accordance with the practice specified by the producer of the metal being welded.

B. Stops and Beads

Form stops and beads from 20 gage steel. Provide for glazed and other openings in standard steel frames. Secure beads to frames with oval-head, countersunk Phillips self-tapping sheet metal screws or concealed clips and fasteners. Space fasteners approximately 12 to 16 inch on center. Miter molded shapes at corners. Butt or miter square or rectangular beads at corners.

C. Cased Openings

Fabricate frames for cased openings of same material, gage, and assembly as specified for metal door frames, except omit door stops and preparation for hardware.

D. Anchors

Provide anchors to secure the frame to adjoining construction. Provide steel anchors, zinc-coated or painted with rust-inhibitive paint, not lighter than 18 gage.

1. Wall Anchors

Provide at least three anchors for each jamb. For frames which are more than 7.5 feet in height, provide one additional anchor for each jamb for each additional 2.5 feet or fraction thereof.

a. Stud partitions: Weld or otherwise securely fasten anchors to backs of frames. Design anchors to be fastened to closed steel studs with sheet metal screws, and to open steel studs by wiring or welding;

b. Completed openings: Secure frames to previously placed concrete or masonry with expansion bolts in accordance with SDI/DOOR 111; and

c. Solid plaster partitions: Secure anchors solidly to back of frames and tie into the lath. Provide adjustable top strut anchors on each side of frame for fastening to structural members or ceiling construction above. Size and type of strut anchors shall be as recommended by the frame manufacturer.

2. Floor Anchors

Provide floor anchors drilled for 3/8 inch anchor bolts at bottom of each jamb member. Where floor fill occurs, terminate bottom of frames at the indicated finished floor levels and support by adjustable extension clips resting on and anchored to the structural slabs.

2.06 FIRE DOORS AND FRAMES

Provide in accordance with NFPA 80 and NFPA 105 and this specification. The requirements of NFPA 80 and NFPA 105 shall take precedence over details indicated or specified.

A. Labels

Fire doors and frames shall bear the label of Underwriters Laboratories (UL), Factory Mutual Engineering and Research (FM), or Warnock Hersey International (WHI) attesting to the rating required. Testing shall be in accordance with NFPA 252 or UL 10C. Labels shall be metal with raised letters, and shall bear the name or file number of the door and frame manufacturer. Labels shall be permanently affixed at the factory to frames and to the hinge edge of the door. Door labels shall not be painted.

2.07 WEATHERSTRIPPING

Provide as specified in Section 08 71 00, DOOR HARDWARE.

A. Integral Gasket

Black synthetic rubber gasket with tabs for factory fitting into factory slotted frames, or extruded neoprene foam gasket made to fit into a continuous groove formed in the frame, may be provided in lieu of head and jamb seals specified in Section 08 71 00, DOOR HARDWARE. Insert gasket in groove after frame is finish painted. Air leakage of weatherstripped doors shall not exceed 0.5 cubic feet per minute of air per square foot of door area when tested in accordance with ASTM E283.

2.08 HARDWARE PREPARATION

Provide minimum hardware reinforcing gages as specified in SDI/DOOR A250.6. Drill and tap doors and frames to receive finish hardware. Prepare doors and frames for hardware in accordance with the applicable requirements of SDI/DOOR A250.8 and SDI/DOOR A250.6. For additional requirements refer to ANSI/BHMA A156.115. Drill and tap for surface-applied hardware at the project site. Build additional reinforcing for surface-applied hardware into the door at the factory. Locate hardware in accordance with the requirements of SDI/DOOR A250.8, as applicable. Punch door frames, with the exception of frames that will have weatherstripping or STC rated gasketing, to receive a minimum of two rubber or vinyl door silencers on lock side of single doors and one silencer for each leaf at heads of double doors. Set lock strikes out to provide clearance for silencers.

2.09 FINISHES

A. Prime Finish

1. Apply manufacturer's standard epoxy primer immediately after cleaning and pretreating.

2. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI/DOOR A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

3. Refer to Section 09 90 00, PAINTING AND COATING for field-applied coating.

B. Finish

1. Factory-applied enamel finish.

2. Submit color samples. Where colors are not indicated, submit manufacturer's standard colors and patterns for selection.

2.10 FABRICATION AND WORKMANSHIP

Finished doors and frames shall be strong and rigid, neat in appearance, and free from defects, waves, scratches, cuts, dents, ridges, holes, warp, and buckle. Molded members shall be clean cut, straight, and true, with joints coped or mitered, well formed, and in true alignment. Dress exposed welded and soldered joints smooth. Design door frame sections for use with the wall construction indicated. Corner joints shall be well formed and in true alignment. Conceal fastenings where practicable.

A. Grouted Frames

For frames to be installed in exterior walls and to be filled with mortar or grout, fill the stops with strips of rigid insulation to keep the grout out of the stops and to facilitate installation of stop-applied head and jamb seals.

2.11 PROVISIONS FOR GLAZING

Materials are specified in Section 08 81 00, GLAZING.

PART 3 EXECUTION

3.01 INSTALLATION

A. Frames

Set frames in accordance with SDI/DOOR A250.11. Plumb, align, and brace securely until permanent anchors are set. Anchor bottoms of frames with expansion bolts or powder-actuated fasteners. Build in or secure wall anchors to adjoining construction. Coat inside of frames with corrosion-inhibiting bituminous material. For frames in exterior walls, ensure that stops are filled with rigid insulation before grout is placed.

B. Doors

Hang doors in accordance with clearances specified in SDI/DOOR A250.8. After erection and glazing, clean and adjust hardware.

C. Fire Doors and Frames

Install fire doors and frames, including hardware, in accordance with NFPA 80. Install fire rated doors and frames in accordance with NFPA 80 and NFPA 105.

3.02 PROTECTION

Protect doors and frames from damage. Repair damaged doors and frames

prior to completion and acceptance of the project or replace with new, as directed. Wire brush rusted frames until rust is removed. Clean thoroughly. Apply an all-over coat of rust-inhibitive paint of the same type used for shop coat.

3.03 CLEANING

Upon completion, clean exposed surfaces of doors and frames thoroughly. Remove mastic smears and other unsightly marks.

-- End of Section --

SECTION 08 14 16

FLUSH WOOD DOORS
10/17

PART 1 GENERAL

1.01 SUMMARY

A. Related Documents:

1. Drawings and general provisions of the Contract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes:

1. Flush solid core wood doors.

C. Related Sections:

1. Division 01 Section 01 61 00, COMMON PRODUCT REQUIREMENTS.
2. Division 08 Section 08 11 13, STEEL DOORS AND FRAMES.
3. Division 08 Section 08 71 00, DOOR HARDWARE.
4. Division 08 Section 08 81 00, GLAZING.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)

ANSI/WDMA I.S.1A	(2013) Interior Architectural Wood Flush Doors

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Doors; G, AE

SD-03 Product Data

Manufacturer's Product Literature, Specifications; G, AE

SD-04 Samples

Transparent Wood Finish; G, AE

SD-07 Certificates

Certification Of Compliance; G, AE

SD-08 Manufacturer's Instructions

Installation Instructions; G, AE

SD-11 Closeout Submittals

Warranty; G, AE

1.04 QUALITY ASSURANCE

Comply with requirements of ANSI/WDMA I.S.1A and WIC. Where conflicts occur, the more stringent shall apply.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle wood doors in accordance with requirements of WIC and manufacturer's recommendations.

B. Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized in accordance with WIC requirements.

1.06 WARRANTY

A. Provide for replacing, rehanging and refinishing wood doors exhibiting manufacturing or material defects.

B. Warranty Period:

1. Interior Doors: Life of the original installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Algoma Hardwoods, Inc.;

B. Eggers Industries;

C. Marshfield DoorSystems, Inc.

D. Or approved equal.

2.02 MATERIALS

A. Solid Core Flush Wood Doors:

1. WIC grade, 1 3/4 inches thick, staved lumber or particleboard core, 5-ply construction.

2. Face Veneer: Medium density overlay (MDO) for painted finish.

3. Adhesive: Exterior Doors - Type I; interior Doors - Type II.

4. Blocking for Hardware: Provide blocking such that no through bolting is required for hardware installation. Provide blocking for closers on all doors whether or not closers are scheduled.

B. Accessories:

1. Glazing: Comply with Section 08 81 00 GLAZING.

2. Glazing Stops: Algoma, flush wood or wood veneered bead, labeled type required for fire rating, match door veneer.

2.03 FABRICATION

A. Fabricate doors in accordance with requirements of specified standards.

1. Factory prefit wood doors.

2. Shop prepare doors to receive hardware; refer to Division 08 Section 08 71 00, DOOR HARDWARE for hardware requirements, templates, and locations.

a. Factory machine doors for mortise hardware.
b. Electrical Hardware and Devices: Prepare doors and frames to receive electrical hardware specified in Section 08 71 00 DOOR HARDWARE.

3. Bevel strike edge of single-acting doors 1/8 inch in 2 inches.

4. Make cutouts for glass.

B. Fire and Smoke-and-Draft Rated Doors:

1. Labels: UL or ITS/Warnock-Hersey.

a. Items provided with labels other than the fire resistive rating shown on the Door Schedule are not permitted and will be rejected.
b. Install labels where visible when doors are installed, in open position.

2. Provide maximum allowable edge strips of wood species to match face veneers.

C. Finish: Factory finish in accordance with WI System 5, transparent, clear, satin sheen.

2.04 PRODUCT INFORMATION

Provide the following product information:

A. Product Data: Manufacturer's product literature, specifications and installation instructions.

B. Shop Drawings: Doors elevations, type, fire rating, WIC grade, dimensions, swing, core type, blocking for hardware, veneer, finish, cutout locations and details.

C. Samples: 12 by 12 inches for approval of transparent wood finish.

D. Certifications: Certification of compliance with applicable requirements of ANSI/WDMA I.S.1A and WIC.

E. Closeout Submittals: Warranty.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine frames and conditions under which doors are to be installed. Proceed with the work only when frames and conditions are satisfactory.

3.02 INSTALLATION

A. Install doors in accordance with reference standards and with manufacturer's recommendations and instructions.

1. Coordinate installation of doors with frames specified in Section 08 11 13, STEEL DOORS AND FRAMES, and hardware specified Section 08 71 00, DOOR HARDWARE and glazing specified in Section 08 81 00, GLAZING.

B. Rehang or replace doors which do not operate or swing freely.

C. Protection: Protect wood surfaces after installation. At Substantial Completion, doors shall be without indication of use, deterioration, or damage.

-- End of Section --

SECTION 08 33 23

OVERHEAD COILING DOORS
10/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	(2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE FUN IP	(2017) Fundamentals Handbook, I-P Edition

ASME INTERNATIONAL (ASME)

ASME B29.400	(2001; R 2013) Combination, "H" Type Mill Chains, and Sprockets

ASTM INTERNATIONAL (ASTM)

ASTM A153/A153M	(2016) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A27/A27M	(2017) Standard Specification for Steel Castings, Carbon, for General Application
ASTM A307	(2014; E 2017) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
ASTM A36/A36M	(2014) Standard Specification for Carbon Structural Steel
ASTM A48/A48M	(2003; R 2012) Standard Specification for Gray Iron Castings
ASTM A53/A53M	(2012) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A653/A653M	(2015; E 2016) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A666	(2015) Standard Specification for Annealed

	or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
ASTM A780/A780M	(2009; R 2015) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A924/A924M	(2017) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B221	(2014) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM D2000	(2012) Standard Classification System for Rubber Products in Automotive Applications
ASTM E330	(2002; R 2010) Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
ASTM E84	(2016) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM F568M	(2007) Standard Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 2	(2000; R 2005; Errata 2008) Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated 600 V
NEMA ICS 6	(1993; R 2016) Industrial Control and Systems: Enclosures
NEMA MG 1	(2016; SUPP 2016) Motors and Generators
NEMA ST 1	(1988; R 1994; R 1997) Specialty Transformers (Except General Purpose Type)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2) National Electrical Code

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Overhead Coiling Doors; G, AE

Counterbalancing Mechanism; G, AE

Manual Door Operator; G, AE

Electric Door Operators; G, AE

SD-03 Product Data

Overhead Coiling Doors; G, AE

Hardware; G, AE

Counterbalancing Mechanism; G, AE

Electric Door Operators; G, AE

Bottom Bars; G, AE

Mounting Brackets; G, AE

SD-06 Test Reports

Wind Load Test Data; G, AE

SD-08 Manufacturer's Instructions

Installation Drawings; G, AE

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; G

Materials; G

Devices; G

Procedures; G

Manufacture's Brochures; G

Parts Lists; G

Cleaning; G

Hood; G

Painting; G

1.03 OVERHEAD COILING DOORS DETAIL SHOP DRAWINGS

Provide installation drawings for overhead coiling door assemblies which show: elevations of each door type, shape and thickness of materials, insulation, finishes, details of joints and connections, details of guides and fittings, rough opening dimensions, location and description of hardware, anchorage locations, and counterbalancing mechanism and door operator details. Show locations of replaceable

fusible links on wiring diagrams for power, signal and controls. Include a schedule showing the location of each door with the drawings.

1.04 WARRANTY, OPERATION AND MAINTENANCE DATA

Submit Operation and Maintenance Manuals for Overhead Coiling Door Assemblies, including the following items:

Materials

Devices

Electric Door Operators

Hood

Counterbalancing Mechanism

Painting

Procedures

Manufacture's Brochures

Parts Lists

Furnish a written guarantee that the helical spring and counterbalance mechanism are free from defects in material and workmanship for not less than two years after completion and acceptance of the project.

Warrant that upon notification by the Government, any defects in material, workmanship, and door operation are immediately correct within the same time period covered by the guarantee, at no cost to the Government.

1.05 DELIVERY AND STORAGE

Deliver doors to the jobsite wrapped in a protective covering with the brands and names clearly marked thereon. Store doors in an adequately ventilated dry location that is free from dirt and dust, water, or other contaminants. Store in a manner that permits easy access for inspection and handling.

PART 2 PRODUCTS

2.01 DESCRIPTION

Doors to be coiling type, with interlocking slats, complete with anchoring and door hardware, guides, hood, and operating mechanisms, and designed for use on openings as indicated. Use grease-sealed or self-lubricating bearings for rotating members.

2.02 PERFORMANCE REQUIREMENTS

A. Wind Loading

Design and fabricate door assembly to withstand the wind loading pressure of at least indicated with a maximum deflection of 1/120

of the opening width. Provide wind load test data showing compliance with ASTM E330. Sound engineering principles may be used to interpolate or extrapolate test results to door sizes not specifically tested. Ensure complete assembly meets or exceeds the requirements of ASCE 7.

B. Operational Cycle Life

Design all portions of the door, hardware and operating mechanism that are subject to movement, wear, or stress fatigue to operate through a minimum number of 20 cycles per day. One complete cycle of door operation is defined as when the door is in the closed position, moves to the fully open position, and returns to the closed position.

2.03 OVERHEAD COILING DOORS

A. Curtain Materials and Construction

Provide curtain slats fabricated from Grade A steel sheets conforming to ASTM A653/A653M, with the additional requirement of a minimum yield point of 33,000 psi. Provide sheets, galvanized in accordance with ASTM A653/A653Mand ASTM A924/A924M.

Provide slats filled with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E84. Enclose insulation completely within slat faces on interior surface of slats.

B. Insulated Curtains

Form Curtains from manufacturer's standard shapes of interlocking slats. Supply slat system with a minimum R-value of 4 when calculated in accordance with ASHRAE FUN IP. Slats to consist of a polystyrene core not less than 11/16 inch thick, completely enclosed within metal facings. Ensure the exterior face of slats are the same gauge as specified for curtains. Select an interior face not lighter than 0.0219 inches. The insulated slat assembly requires a flame spread rating of not more than 25 and a smoke development factor of not more than 50 when tested in accordance with ASTM E84

C. Curtain Bottom Bar

Install curtain bottom bars as pairs of angles from the manufacturer's standard steel, stainless and aluminum extrusions not less than 2.0 by 2.0 inches by 0.188 inch. Ensure steel extrusions conform to ASTM A36/A36M. Stainless steel extrusions conforming to ASTM A666, Type 304. Aluminum extrusions conforming to ASTM B221. Galvanize angles and fasteners in accordance with ASTM A653/A653M and ASTM A924/A924M. Coat welds and abrasions with paint conforming to ASTM A780/A780M.

D. Locks

Provide end and/or wind locks of Grade B cast steel conforming to ASTM A27/A27M galvanized in accordance with ASTM A653/A653M, ASTM A153/A153M and ASTM A924/A924M. Secure locks at every other

curtain slat.

E. Weather Stripping

Ensure weather-stripping at the door-head and jamb is 1/8-inch thick sheet of natural or neoprene rubber with air baffles. Secure weather stripping to the insides of hoods with galvanized-steel fasteners through continuous galvanized-steel pressure bars at least 5/8-inch wide and 1/8-inch thick.

Ensure threshold weather-stripping is 1/8-inch thick sheet natural or neoprene rubber secured to the bottom bars.

Provide weather-stripping of natural or neoprene rubber conforming to ASTM D2000.

F. Locking Devices

Ensure slide bolt engages through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

Provide a locking device assembly which includes cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

Provide chain lock keeper which suitable for a standard padlock.

G. Safety Interlock

Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

H. Overhead Drum

Fabricate drums from nominal 0.028-inch thick, hot-dip galvanized steel sheet with G90 (Z275) zinc coating, complying with ASTM A653/A653M.

I. Slats

No. 5F, 20 gauge, Grade 40 steel, ASTM A653/A653M galvanized steel zinc coating.

2.04 HARDWARE

Ensure all hardware conforms to ASTM A153/A153M, ASTM A307 ASTM F568M, and ASTM A27/A27M.

A. Guides

Fabricate curtain jamb guides from the manufacturer's standard angles or channels of same material and finish as curtain slats unless otherwise indicated. Provide guides with sufficient depth and strength to retain curtain, and to withstand loading. Ensure curtain operates smoothly. Slot bolt holes for track adjustment.

B. Equipment Supports

Fabricate door-operating equipment supports from the manufacturer's standard steel shapes and plates conforming to ASTM A36/A36M, galvanized in accordance with ASTM A653/A653M and ASTM A924/A924M. Size the shapes and plates in accordance with the industry standards for the size, weight, and type of door installation.

C. Hood

Provide a hood with a minimum 24-gauge sheet metal, flanged at top for attachment to header and flanged at bottom to provide longitudinal stiffness. The hood encloses the curtain coil and counterbalance mechanism.

Provide a 24-gauge galvanized steel hood with reinforced top and bottom edges. Provide minimum 1/4 inch steel intermediate support brackets as required to prevent excessive sag.

2.05 COUNTERBALANCING MECHANISM

Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted, around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed or self-lubricating bearings for rotating members.

A. Brackets

Provide the manufacturer's standard mounting brackets with one located at each end of the counterbalance barrel conforming to ASTM A48/A48M Provide brackets of either cast iron or cold-rolled steel.

B. Counterbalance Barrels

Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, welded or seamless carbon-steel pipe, conforming to ASTM A53/A53M. Ensure the barrel is of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats. Limit barrel deflection to not more than 0.03 inch per foot of span under full load.

Curtain to be coiled on a pipe of sufficient size to carry door load with deflection not to exceed 0.033 inches per foot of door span and to be correctly balanced by helical springs, oil tempered torsion type. Use cast iron barrel plugs to anchor springs to tension shaft and pipe.

1. Barrel

Provide steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot of width.

2. Spring Balance

Provide an oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door. Ensure

that effort to operate manually operated units does not exceed 25 lbs. Provide wheel for applying and adjusting spring torque.

2.06 ELECTRIC DOOR OPERATORS

Provide electrical wiring and door operating controls conforming to the applicable requirements of NFPA 70.

Electric door-operator assemblies needs to be the sizes and capacities recommended and provided by the door manufacturer for specified doors. Furnish complete assemblies with electric motors and factory-prewired motor controls, starter, gear reduction units, solenoid-operated brakes, clutch, remote-control stations, manual or automatic control devices, and accessories as required for proper operation of the doors.

Design the operators so that motors may be removed without disturbing the limit-switch adjustment and affecting the emergency auxiliary operators.

Provide a manual door operator of crank-gear or chain-gear mechanisms with a release clutch to permit manual operation of doors in case of power failure. Arrange the emergency manual operator so that it may be put into and out of operation from floor level, and its use does not affect the adjustment of the limit switches. Provide an electrical or mechanical device that automatically disconnects the motor from the operating mechanism when the emergency manual operating mechanism is engaged.

A. Door-Operator Types

Provide an operator mounted to the right head plate with the operator on coil side of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Front clearance is required for this type of mounting.

B. Electric Motors

Provide motors which are the high-starting-torque, reversible, constant-duty electrical type with overload protection of sufficient torque and horsepower to move the door in either direction from any position. Ensure they produce a door-travel speed of not less than 8 nor more than 12 inches per second without exceeding the horsepower rating.

Provide motors which conform to NEMA MG 1 designation, temperature rating, service factor, enclosure type, and efficiency to the requirements specified.

C. Motor Bearings

Select bearings with bronze-sleeve or heavy-duty ball or roller antifriction type with full provisions for the type of thrust imposed by the specific duty load.

Pre-lubricate and factory seal bearings in motors less than 1/2 horsepower.

Equip motors coupled to worm-gear reduction units with either ball or roller bearings.

Equip bearings in motors 1/2 horsepower or larger with lubrication service fittings. Fit lubrication fittings with color-coded plastic or metal dust caps.

In any motor, bearings that are lubricated at the factory for extended duty periods do not need to be lubricated for a given number of operating hours. Display this information on an appropriate tag or label on the motor with instructions for lubrication cycle maintenance.

D. Motor Starters, Controls, and Enclosures

Provide each door motor with: a factory-wired, unfused, disconnect switch; a reversing, across-the-line magnetic starter with thermal overload protection; 120-volt operating coils with a control transformer limit switch; and a safety interlock assembled in a NEMA ICS 6 type enclosure as specified herein. Ensure control equipment conforms to NEMA ICS 2.

Provide adjustable switches, electrically interlocked with the motor controls and set to stop the door automatically at the fully open and fully closed position.

E. Control Enclosures

Provide control enclosures that conform to NEMA ICS 6 for oil-tight and dust-tight NEMA Type 13.

F. Transformer

Provide starters with 460 to 115 volt control transformers with one secondary fuse when required to reduce the voltage on control circuits to 120 volts or less. Provide a transformer conforming to NEMA ST 1.

G. Safety-Edge Device

Provide each door with a pneumatic safety device extending the full width of the door and located within a U-section neoprene or rubber astragal, mounted on the bottom rail of the bottom door section. Device needs to immediately stop and reverse the door upon contact with an obstruction in the door opening during downward travel and cause the door to return to full-open position. A safety device is not a substitute for a limit switch.

Connect safety device to the control circuit through a retracting safety cord and reel.

H. Remote-Control Stations

Provide exterior control stations which are full-guarded, momentary-contact three-button standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosures, key-operated, with the same operating functions as specified herein for interior remote-control stations.

I. Speed-Reduction Units

Provide speed-reduction units consisting of hardened-steel worm and bronze worm gear assemblies running in oil or grease and inside a sealed casing, coupled to the motor through a flexible coupling. Drive shafts need to rotate on ball- or roller-bearing assemblies that are integral with the unit.

Provide minimum ratings of speed reduction units in accordance with AGMA provisions for class of service. Ground worm gears to provide accurate thread form; machine teeth for all other types of gearing. Surface harden all gears.

Provide antifriction type bearings equipped with oil seals.

J. Chain Drives

Provide roller chains that are a power-transmission series steel roller type conforming to ASME B29.400, with a minimum safety factor of 10 times the design load.

Heat-treat or otherwise harden roller-chain side bars, rollers, pins, and bushings.

Provide high-carbon steel chain sprockets with machine-cut hardened teeth, finished bore and keyseat, and hollow-head setscrews.

K. Brakes

Provide 360-degree shoe brakes or shoe and drum brakes. Ensure the brakes are solenoid-operated and electrically interlocked to the control circuit to set automatically when power is interrupted.

L. Clutches

Ensure clutches are either the 4-inch diameter, multiple face, externally adjustable friction type or adjustable centrifugal type.

M. Weather/Smoke Seal Sensing Edge

Provide automatic stop control by an automatic sensing switch within neoprene astragal extending the full width of door bottom bar.

Provide an electric sensing edge device. Ensure the door immediately stops downward travel when contact occurs before door fully closes. Provide a self-monitoring wireless sensing edge connection to the motor operator; eliminating the need for a physical traveling electric cord connection between bottom bar sensing edge device and motor operator. Supervised system alters normal door operation; preventing damage, injury or death due to an inoperable sensing edge system.

2.07 SURFACE FINISHING

Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal

Products" for recommendations for applying and designating finishes. Noticeable variations in the same metal component are not acceptable.

Variations in appearance of adjoining components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

Powder-Coat Finish: Manufacturer's standard powder-coat finish consisting of primer and topcoat according to coating manufacturer's written instructions for cleaning, pretreatment, application, thermosetting, and minimum dry film thickness.

1. Color and Gloss: As selected by Contracting Officer from manufacturer's full range.

PART 3 EXECUTION

3.01 GENERAL

Install overhead coiling door assembly, anchors and inserts for guides, brackets, motors, switches, hardware, and other accessories in accordance with approved detail drawings and manufacturer's written instructions. Upon completion of installation, ensure doors are free from all distortion.

Install overhead coiling doors, motors, hoods, and operators at the mounting locations as indicated for each door in the contract documents and as required by the manufacturer.

Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility and as required by the manufacturer.

3.02 ACCEPTANCE PROVISIONS

After installation, adjust hardware and moving parts. Lubricate bearings and sliding parts as recommended by manufacturer to provide smooth operating functions for ease movement, free of warping, twisting, or distortion of the door assembly.

Adjust seals to provide weather-tight fit around entire perimeter.

Engage a factory-authorized service representative to perform startup service and checks according to manufacturer's written instructions.

Test the door opening and closing operation when activated by controls or alarm-connected fire-release system. Adjust controls and safeties. Replace damaged and malfunctioning controls and equipment. Reset door-closing mechanism after successful test.

Test and make final adjustment of new doors at no additional cost to the Government.

A. Maintenance and Adjustment

Not more than 90 calendar days after completion and acceptance of the project, examine, lubricate, test, and re-adjust doors as required for proper operation.

B. CLEANING

Clean stainless steel doors in accordance with manufacturer's approved instructions.

3.03 OPERATION AND MAINTENANCE

Submit 6 copies of the Operation and Maintenance Manuals 30 calendar days prior to testing the Overhead Coiling Door Assemblies. Update and resubmit data for final approval no later than 30 calendar days prior to contract completion.

Provide operation and maintenance manuals which are consistent with manufacturer's standard brochures, schematics, printed instructions, general operating procedures, and safety precautions. Provide test data that is legible and of good quality.

-- End of Section --

SECTION 08 34 73

SOUND CONTROL HOLLOW METAL DOOR ASSEMBLIES
10/17

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Mid-Range Sound Control Door and Frame Assemblies

2. Other additional items as required by specific assemblies.

B. Related Sections:

1. Division 08 Section 08 11 13, STEEL DOORS AND FRAMES for general requirements for installation of doors and frames, including installation of units specified in this Section.

2. Division 08 Section 08 81 00, GLAZING for glass view panels in sound control hollow metal doors.

3. Section 08 71 00, DOOR HARDWARE for door hardware for sound control hollow metal doors and frames.

4. Section 09 90 00, PAINTING AND COATING for field painting hollow metal doors and frames.

1.03 REFERENCES

ASTM INTERNATIONAL (ASTM)

ASTM A1008/A1008M	(2016) Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
ASTM A1011/A1011M	(2017) Standard Specification for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
ASTM A568/A568M	(2015) Standard Specifications for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for
ASTM A653/A653M	(2015; E 2016) Standard Specification for

	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A924/A924M	(2017) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM E1332	(2016) Standard Classification for Rating Outdoor-Indoor Sound Attenuation
ASTM E413	(2016) Classification for Rating Sound Insulation
ASTM E90	(2009) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.115	(2016) Hardware Preparation in Steel Doors and Steel Frames

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 105	(2016; TIA 16-1) Standard for Smoke Door Assemblies and Other Opening Protectives
NFPA 252	(2017) Standard Methods of Fire Tests of Door Assemblies
NFPA 80	(2016; TIA 16-1) Standard for Fire Doors and Other Opening Protectives

STEEL DOOR INSTITUTE (SDI/DOOR)

SDI/DOOR A250.10	(2011) Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames
SDI/DOOR A250.11	(2001) Recommended Erection Instructions for Steel Frames
SDI/DOOR A250.6	(2003; R2009) Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames
SDI/DOOR A250.8	(2003; R2008) Recommended Specifications for Standard Steel Doors and Frames
SDI-128	(2016) Guidelines for Acoustical Performance of Standard Steel Doors and Frames

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM HMMA 831	(2011) Hardware Locations for Hollow Metal Doors and Frames

NAAMM HMMA 840	(2007) Installation and Storage of Hollow Metal Doors and Frames
NAAMM HMMA 840-TN01	(2007) Painting Hollow Metal Doors and Frames
NAAMM HMMA 841	(2013) Tolerances and Clearances for Commercial Hollow Metal Doors and Frames
NAAMM HMMA 861	(2014) Guide Specifications for Commercial Hollow Metal Doors and Frames
NAAMM HMMA 865	(2013) Specifications for Sound Control Hollow Metal Doors and Frames
NAAMM HMMA 867	(2016) Guide Specifications for Commercial Laminated Core Hollow Metal Doors and Frames

UNDERWRITERS LABORATORIES (UL)

UL 10B	(2008; Reprint Feb 2015) Fire Tests of Door Assemblies
UL 10C	(2016) UL Standard for Safety Positive Pressure Fire Tests of Door Assemblies
UL 1784	(2015) Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives

1.04 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Manufacturers Qualifications; G

SD-02 Shop Drawings

Elevations; G, AE

Frame Details ; G, AE

Details Of Doors; G, AE

Reinforcement And Preparations For Hardware; G, AE

Each Different Wall Opening Condition; G, AE

Anchorages, Joints, Field Splices, And Connections; G, AE

Accessories; G, AE

Moldings, Removable Stops, And Glazing; G, AE

SD-04 Samples

Factory Applied Wood Veneer; G, AE

SD-06 Test Reports

Test Reports ; G, AE

SD-08 Manufacturer's Instructions

Installation Instructions And Installation Tolerances; G

SD-11 Closeout Submittals

Warranty; G

1.05 TESTING AND PERFORMANCE

A. Conduct sound control performance testing on a fully operable assembly in accordance with ASTM E90, ASTM E413 and ASTM E1332, by an independent testing laboratory. Qualify the laboratory referenced in the test report and/or certification under the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute for Science and Technology (NIST) or the International Accreditation Service (IAS) under the International Laboratory Accreditation Cooperation (ILAC) agreement.

B. Labeled Fire-Rated and/or Smoke Control Door and Frame Product

1. Where determined and scheduled:

a. Provide Listed or Classified doors, panels, frames, transom frames, sidelight, borrowed light and window assemblies bearing the label of a testing agency having a factory inspection service for openings requiring fire protection and/or smoke control ratings.

b. Test doors, panels, frames, transom frames and sidelight assemblies in accordance with ANSI/NFPA 252 or ANSI/UL 10B or UL 1784.

c. Construct products as Listed or Classified for labeling.

2. For any door or frame product specified by the Architect to be fire-rated, which cannot qualify for labeling due to design, hardware or other reason, advise the Contracting Officer in the submittal documents. Advise the Contracting Officer when hardware, glazing or other options specified, unknown at the time of submittal document preparation, affect fire labeling eligibility.

C. Prime Paint Performance (SDI/DOOR A250.10)

1. Sheet steel specimens, with the product manufacturer's production primer, replicating Finish 'as shipped', shall be tested in accordance with SDI/DOOR A250.10.

2. Performance shall meet the Acceptance Criteria described in SDI/DOOR A250.10.

3. Test Reports or Certificates of Compliance shall include a description of the test specimen, procedures used in testing, and indicate compliance with the contract document specified acceptance criteria.

D. Sound Rating: Provide sound-control door assemblies identical to assemblies tested by an independent testing agency per ASTM E90 with the specified minimum certified STC rating per ASTM E413, ASTM E1332 for the configurations indicated.

E. Sound Control Door Systems shall include doors, frames, threshold, and acoustical gaskets as needed to attain STC rating.

F. Sound Control doors and frames shall incorporate recycled materials in at least 30 percent by weight.

G. Assembly shall be manufactured for an STC of 57 attained by testing of similar operable units in accordance with ASTM E90, ASTM E413 and ASTM E1332.

H. Provide test reports from a qualified accredited testing agency as outlined in paragraph 1.3(A) of this specification section. Test reports will contain the laboratory name, test report number and date of test.

1.06 QUALITY ASSURANCE

A. Manufacturers Qualifications: Obtain acoustic assemblies through one source from a single manufacturer with a minimum five years of documented experience producing sound control door and frame type work similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Sound control assemblies to meet the requirements set forth in paragraphs 1.2(C) and 1.3(A) of this specification section.

C. Provide manufacturer's recommended installation instructions which will become the basis for accepting or rejecting actual sound control assembly installation.

D. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40 inch above sill) or UL 10C.

E. Pre-Installation Conference: Conduct conference in compliance with requirements in Section 01 31 19 PROJECT MEETINGS with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing sound control doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware if required.

F. Submit product data for each type of product indicated. Include construction details, material descriptions, core descriptions,

hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

G. Shop drawings:

1. Elevations of each door design.

2. Details of doors, including vertical and horizontal edge details and metal thicknesses.

3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.

4. Locations of reinforcement and preparations for hardware.

5. Details of each different wall opening condition.

6. Details of anchorages, joints, field splices, and connections.

7. Details of accessories.

8. Details of moldings, removable stops, and glazing.

F. Submit installation instructions and installation tolerances if other than as specified in SDI/DOOR A250.11 or NAAMM HMMA 840

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver sound control hollow metal work palletized, and crated to provide protection during transit and Project-site storage.

B. Store and handle products in accordance with SDI/DOOR A250.8, NAAMM HMMA 861, NAAMM HMMA 865, or NAAMM HMMA 840-TN01 in manufacturer's original, unopened, undamaged containers. Submit jobsite storage and protection requirements if other than as specified herein or in SDI/DOOR A250.8, NAAMM HMMA 861, NAAMM HMMA 865 or NAAMM HMMA 840-TN01

C. Protect materials from adverse temperature and humidity conditions.

D. Store doors and frames upright on wood planking, protected at corners to prevent damage.

E. Store accessories such as gaskets, and thresholds in a secure area protected from adverse temperature and humidity conditions.

F. Do not store in non-vented plastic or canvas shelters.

1.08 COORDINATION

A. Coordinate work with other directly affected trades, wall construction, and hardware installation.

B. Coordinate hardware locations with Sections 08 11 13.

C. Coordinate placing of material orders and fabrication schedules with construction progress.

1.09 WARRANTY

A. Submit written copy of manufacturer's standard warranty documents.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. MEGAMET INDUSTRIES, INC.
B. SECURITY ACOUSTICS
C. NOISE BARRIERS, LLC
D. Substitutions: Or approved equal.

2.02 MATERIALS

A. Cold and hot rolled steel for door faces and reinforcing shall comply with ASTM A568/A568M, ASTM A1008/A1008M and/or ASTM A1011/A1011M.

B. Reinforcing shall be cold rolled or hot rolled steel complying with ASTM A568/A568M, ASTM A1008/A1008M and/or ASTM A1011/A1011M

C. Coating thickness shall be Class A60.

D. Door Hardware: Provide required door hardware including perimeter seals, door bottoms, thresholds and hardware standoff brackets required to meet the specified STC rating. Balance of door hardware is to be furnished under Section 08 71 00, DOOR HARDWARE.

E. Glazing: Vision panels to be designed and tested by the manufacturer to meet the specified STC rating and comply with requirements in Section 08 81 00, GLAZING.

2.03 SOUND CONTROL HOLLOW METAL DOORS

A. General: Provide 1 3/4 inch (minimum) nominal thickness Mega-Sonic sound control doors as listed in the door schedule and indicated on the Drawings in accordance with this specification. Opening sizes, configurations and types shall be as indicated on the Drawings and/or door schedule.

1. Interior doors: Fabricate door faces from 14 gage material. Manufacture from cold-rolled steel conforming to ASTM A1008/A1008M.

2. Fabricate doors from two sheets of steel with no visible seams on faces.

3. Vertical edges shall be reinforced with continuous steel channels at hinge and lock edges. Channel shall be formed from one member; spliced channels shall not be allowed. Made of 14 gage material.

4. Fabricate interior doors as full flush with edges welded and filled smooth as described in NAAMM HMMA 865.

5. All doors shall be handed and lock edge square and hinge edge square. The use of filler plates to make doors reversible

shall not be allowed.

6. Edge profiles shall be provided on both vertical edges of doors as follows, unless hardware dictates otherwise:

   a. Single acting doors - beveled 1/8 inch in 2 inch profile

   b. Double acting doors - rounded on 2-1/8 inch radius.

7. Pairs of Mega-Sonic Model 2-A doors (double doors), if required, shall be fabricated with an integral rabbet at meeting stile edge including gaskets as required by rating. Design and gasketing at top, bottom, and meeting stile edge shall not prohibit the use of ANSI/BHMA A156.115 flushbolts.

8. The top and bottom edges shall be closed with a continuous steel channel, not less than 0.053 inch thickness, welded to both face sheets. All top channels to be flush and all bottom channels to be inverted unless hardware dictates otherwise.

10. Interior doors shall be closed flush at the top edge. Where required for attachment for weather-stripping, a flush steel closure channel shall also be provided at the bottom edge. Openings shall be provided in the bottom closure channel of exterior doors to permit the escape of entrapped moisture.

11. Door internal construction and thickness shall be manufacturer's standard internal construction of doors as required to meet the STC rating.

12. Hardware Reinforcements and Preparations: Fabricate according to SDI/DOOR A250.6 with reinforcing plates from same material as door face sheets.

    a. Hardware supplier to coordinate hardware compatibility with the sound door assembly manufacturer.

    b. Advise the Architect in the submittal documents of any hard-ware preparations that compromise the sound control capabilities of the assembly prior to fabrication.

    c. Mortise, reinforce, drill and tap doors at the factory for templated hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier.

    d. Weld all edge mounted hardware reinforcements to door.

    e. Reinforce doors for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, continuous hinges or non-templated hardware.

    f. Steel thickness for hardware reinforcements to be the manufacturer's standard as required to adequately support the door and hardware. Refer to specification section 08 71 00 DOOR HARDWARE, but shall not be less than:

       1. Full mortise hinges and pivots: 0.167 inch angle or channel shaped type

2. Lock fronts, latching devices and strikes: 0.067 inch or unitized reinforcement with extruded tapped holes that provide equivalent number of thread as 0.067 in
3. Flush bolts: 0.067 inch
4. Internal reinforcements for other surface applied hard-ware: 0.053 inch

13. Glazing Assemblies

a. Where specified or scheduled, provide steel fixed glass molding and removable stop glazing assemblies, matching the material type of the door face sheets, as tested by the manufacturer for the model and sound rating specified, to secure glazing materials furnished by and installed at the factory.

b. Advise the Architect in the submittal documents if glazing specified or scheduled by the Architect compromises the sound control capabilities of the door prior to fabrication.

c. When dual glazed systems are provided, each piece of glazing must be capable of being removed independently

d. Removable stops; Manufacturer's standard but not less than 0.032 inch steel, with butt or mitered corner joints, secured to the frame opening by cadmium or zinc coated screws.

e. Prepare fire-rated doors for listed glazing materials in accordance with the sound control door and glazing manufacturer's listings.

14. Operational Clearances

a. Critical clearances between doors and frames, and between doors and thresholds/floors required for optimum assembly performance are to be specifically noted in the submittal documents and manufacturer's installation instructions / recommendations. Where fire-rated and/or smoke control doors are specified, clearances must comply with NFPA 80 and/or NFPA 105.

2.04 SOUND CONTROL HOLLOW METAL PANELS

A. Fabricate panels of the same nominal thickness, materials and construction as specified in paragraph 2.01 and as tested by the manufacturer for the model and rating specified.

B. Finish as specified.

2.05 SOUND CONTROL HOLLOW METAL FRAMES

A. General: Provide frames for sound control doors listed in the door schedule and indicated on the Drawings in accordance with this specification. Opening sizes, profiles, anchors, and types shall be as indicated on the Drawings. Profiles may differ based on configurations required to achieve STC, STL, or OITC rating. Knock down type frames are not permitted. Construct frame product

in accordance with NAAMM HMMA 865 with additional specifications as provided by the manufacturer.

1. Interior Frame Product: Profiles shall be 0.053 inch minimum thickness. Frame product shall be 0.067 inch minimum thickness for single door openings exceeding 4 feet in width, and pairs with either door exceeding 4 feet in width.

2. Exterior Frame Product: Frame product shall be manufactured from zinc coated steel conforming to ASTM A653/A653M CS Type B, Coating Designation A60 (ZF180) Profiles shall be 0.053 inch minimum thickness.

3. Construct profiles of commercial quality zinc-coated steel sheet, free of scale, pitting or surface defects, conforming to ASTM A653/A653M CS Type B Coating Designation G60 (Z180) or A60 (ZF180).

4. Cold and hot rolled steel for frames and reinforcing shall comply with ASTM A568/A568M, ASTM A1008/A1008M and/or ASTM A1011/A1011M.

5. Hot-dip galvanized steel for frames shall comply with ASTM A653/A653M and ASTM A924/A924M. Coating thickness shall be Class A60.

6. Reinforcing shall be cold rolled or hot rolled steel complying with ASTM A568/A568M, ASTM A1008/A1008M and/or ASTM A1011/A1011M.

7. Fabricate using manufacturer standard corner to corner construction. Use 4 inch head miter at 62.8 degrees to create smooth seamless returns. 45 degree miters are not acceptable.

8. Welding

    a. Perimeter face joints (flush or indented) shall be continuously welded internally or externally. Flush face joints shall be finished smooth with seamless faces. Rabbets and soffits shall be continuously welded internally. The use of gussets or splice plates as a substitute for welding shall not be acceptable.

    b. Internal flush face joints shall be continuously welded and finished smooth with seamless faces.

    c. Members at internal indented intersections shall be securely welded to concealed reinforcements, and have hairline face seams.

    d. All other intersection elements shall have hairline seams

9. Surface Applied Hardware Reinforcements: Fabricate according to SDI/DOOR A250.6 with reinforcement plates from same material as frames.

    a. Mortise, reinforce, drill and tap frame product at the factory for templated hardware only, in accordance with the approved hardware schedule and templates provided by

the hard-ware supplier.

b. Reinforce frame product for surface mounted hardware, anchor hinges, thrust pivots, continuous hinges or non-templated mortised hardware.

c. Weld all hardware reinforcements to frame product.

d. Minimum thickness of hardware reinforcements:

1. Full Mortise Hinges and Pivots: 0.167 inch x 1.25 x 10 inch length or 0.123 inch thickness angle or channel
shaped type.
2. Strikes: 0.093 inch or 0.053 inch unitized reinforcement with extruded tapped holes that provide equivalent number of threads as 0.093 inch.
3. Surface bolts, closers, and other surface applied hardware: 0.093 inch.

B. Anchors

1. Floor Anchors

a. Weld floor anchors inside jambs. Provide two (2) holes for fasteners supplied and installed by others.

b. Thickness of floor anchors; same as frame, minimum.

c. Where specified or scheduled, provide adjustable floor anchors with no more than 2 inch height adjustment.

d. For applications that do not permit the use of a floor anchor, substitute an additional jamb anchor at a location not to exceed 8 inch from the base of the jamb.

2. Jamb Anchors

a. Provide frame product with anchorage appropriate to frame and wall construction.

C. Drywall Type:

1. Provide steel jamb anchors of suitable design, not less that 0.042 inch thickness, welded inside each jamb for frame product installed in drywall partitions. Place jamb anchors not greater than 18 inch from top and bottom of openings. Minimum number of anchors spaced at a maximum of 32 inch on center, provided on each jamb, based on the over-all frame height:

1. Up to 60 inch 3 anchors
2. Greater than 60 inch, up to 90 inch 4 anchors
3. Greater than 90 inch, up to 96 inch 5 anchors
4. Greater than 96 inch 5 anchors plus one (1) for each 24 inch or fraction thereof, spaced at 24 inch maximum spacing between anchors

2.06 MANUFACTURING TOLERANCES

A. The manufacturer of hollow metal doors and frame product is responsible only for the tolerances directly related to manufacturing of the product. The final clearances and relationships between door and frame depend on the setting of the frame, and the hanging and adjustment of the door and hardware. Manufacturing tolerances shall be maintained within the limits established by NAAMM HMMA 865, NAAMM HMMA 841, NAAMM HMMA 861, and NAAMM HMMA 867.

B. Hollow metal doors shall be undersized to fit the door opening of the frame. Edge clearances are based upon individual manufacturer's designs. Edge clearances of fire-rated doors shall comply with NFPA 80.

2.07 HARDWARE

A. The location of hardware on doors and frames shall be as established in NAAMM HMMA 831, NAAMM HMMA 861 and NAAMM HMMA 867. When hollow metal frame products are specified for use with doors to be furnished by others, hardware locations on the doors shall be governed by the location on the frames.

B. Door hardware supplier to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items

2.08 FINISHES

A. Primer Finish: Clean and treat exposed surfaces of doors and frames to ensure prime paint adhesion; apply one shop coat of "low VOC" gray rust-inhibitive primer meeting acceptance criteria of SDI/DOOR A250.10.

B. Special factory applied coatings:

1. Clean and treat exposed surfaces of frames to ensure prime paint adhesion; apply thermo-setting powder coating in color as selected and approved by Contracting Officer.

C. Submit samples of factory applied wood veneer for door faces, plastic laminate for door faces. Fabrication shall not begin until samples have been approved by Contracting Officer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Consult SDI-128 and NAAMM HMMA 865 for recommendations and warnings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General: Install sound control hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Installer is responsible for the following:

1. Prior to installation, check the area of floor on which the frame product is to be installed and within the path of the door swing, for flatness and correct as necessary.

2. Prior to installation, remove temporary spreaders. Check each door and frame product for correct size, swing, fire rating and opening number.

3. Prior to installation, remove temporary spreaders. Check each door and frame product for correct size, swing, fire rating and opening number.

C. During the setting of frame product check and correct as necessary for opening width, opening height, squareness, alignment, twist and plumbness. Maintain installation tolerances within the following limits:

1. Opening Width: measured from rabbet to rabbet at top, middle and bottom of frame; + 1/16 inch, - 1/32 inch.

2. Opening Height: measured vertically between the frame head rabbet and top of floor or bottom of frame minus jamb ex-tensions at each jamb and across the head; + 1/16 inch, -1/32 inch.

3. Squareness: measured on a line from jamb, perpendicular to frame head; not to exceed 1/16 inch.

4. Alignment: measured at jambs on a horizontal line parallel to the plane of the face; not to exceed 1/16 inch.

5. Twist: measured at opposite face corners of jambs on parallel lines perpendicular to the plane of the door rabbet; not to exceed 1/16 inch.

6. Plumbness: measured at the jambs on a perpendicular line from the head to the floor; not to exceed 1/16 inch.

D. Installer to refinish to match original, any marks caused by spreader removal.

E. Exposed hollow metal surfaces which have been scratched or otherwise marred during installation, cleaning, and/or field welding, shall promptly be finished smooth, cleaned, treated for maximum paint adhesion and touched up with a rust inhibitive primer comparable to and compatible with the shop applied primer and finish paint specified in Section 09 90 00. All touch-up primer and finish paint must be formulated for Direct to Metal (DTM) application.

F. Install acoustic doors and frame product in accordance with the

manufacturer's installation instructions, test reports and/or certifications.

G. Install labeled fire doors and frame product in accordance with the terms of their listings, NFPA 80 or the local Authority Having Jurisdiction.

H. Install hardware in accordance with hardware manufacturer's templates and instructions.

I. Maintain proper door clearances in accordance with NAAMM HMMA 865 except for special conditions otherwise noted. Where necessary, metal hinge shims, furnished by installer, are permitted to maintain clearances.

J. Install and adjust acoustical seals in accordance with the sound door manufacturer's installation instructions.

K. Install glazing materials in accordance with Section 08 81 00.

L. Finish paint in accordance with the sound door assembly and paint manufacturer's instructions and Section 09 90 00.

M. Sound door and frame product to be finished with a DTM (Direct-to-Metal) paint with a gloss rating not greater than 20% reflectance, measured using a 60 degree gloss meter.

3.03 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including sound control hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer. Prepare surfaces for field painting as recommended by door and frame manufacturer and as specified in Section 09 90 00.

-- End of Section --

SECTION 08 45 23

FIBERGLASS SANDWICH PANEL ASSEMBLIES
10/17

PART 1 GENERAL

1.01 SUMMARY

A. Section includes the insulated sandwich panel system and accessories as shown and specified. Work includes providing and installing:

1. Wall assemblies

B. Related Sections:

1. 07 62 00, SHEET METAL FLASHING AND TRIM

1.02 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 1503	(2009) Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
AAMA 2604	(2013) Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels

ASTM INTERNATIONAL (ASTM)

ASTM C297/C297M	(2016) Flatwise Tensile Strength of Sandwich Constructions
ASTM D1002	(2010) Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)
ASTM D1037	(2012) Evaluating Properties of Wood-Base Fiber and Particle Panel Materials
ASTM D2244	(2016) Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
ASTM D635	(2014) Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position

ASTM E1886	(2013a) Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
ASTM E1996	(2014a) Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
ASTM E283	(2004; R 2012) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E330/E330M	(2014) Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
ASTM E331	(2000; R 2016) Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
ASTM E661	(2003;R 2015; E 2015) Standard Test Method for Performance of Wood and Wood-Based Floor and Roof Sheathing Under Concentrated Static and Impact Loads
ASTM E72	(2015) Conducting Strength Tests of Panels for Building Construction

ICC EVALUATION SERVICE, INC. (ICC-ES)

ICC ES AC177	(2014; R 2017) Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems

NATIONAL FENESTRATION RATING COUNCIL (NFRC)

NFRC 100	(2014) Procedure for Determining Fenestration Product U-Factors
NFRC 202	(2017) Procedure for Determining Translucent Fenestration Product Visible Transmittance at Normal Incidence
NFRC 700	(2016) Product Certification Program

UNDERWRITERS LABORATORIES (UL)

UL 723	(2008; Reprint Aug 2013) Test for Surface Burning Characteristics of Building Materials

UL 790	(2004; Reprint Jul 2014) Standard Test Methods for Fire Tests of Roof Coverings
UL 972	(2006; Reprint Dec 2015) Standard for Burglary Resisting Glazing Material Type

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Drawings; G, AE

Plans, Elevations, And Details; G, AE

SD-03 Product Data

Manufacturer's Product Data; G, AE

SD-04 Samples

Sandwich panels: 24" x 14' units; G

Factory finished aluminum: 5" long sections; G

SD-06 Test Reports

International Building Code Evaluation Report; G, AE

Flame Spread and Smoke Developed; G, AE

Burn Extent; G, AE

Color Difference; G, AE

Impact Strength; G, AE

Bond Tensile Strength; G, AE

Bond Shear Strength; G, AE

Beam Bending Strength; G, AE

Insulation U-Factor; G, AE

NFRC System U-Factor Certification; G, AE

NFRC Visible Light Transmittance; G, AE

Solar Heat Gain Coefficient; G, AE

Condensation Resistance Factor; G, AE

Air Leakage; G, AE

Structural Performance; G, AE

Water Penetration; G, AE

1200°F Fire Resistance; G, AE

Fall Through Resistance; G, AE

Ul Listed Class A Roof System; G, AE

Hurricane Debris Impact Resistance (Optional-Windborne Debris); G, AE

SD-08 Manufacturer's Instructions

Manufacturer's Installation Recommendations; G, AE

SD-11 Closeout Submittals

Field Maintenance Manual; G

Installer Certificate; G

Manufacturer's And Installer's Written Warranty; G

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope and location. At least three of the projects shall have been in successful use for ten years or longer.

2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural and water infiltration testing of sandwich panel systems by an accredited agency.

3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components and production sandwich panels for conformance with ICC ES AC177.

B. Installer's Qualifications: Installation shall be by an experienced installer, which has been in the business of installing specified panel systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope and type.

1.05 PERFORMANCE REQUIREMENTS

A. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system.

1. Submit shop drawings including plans, elevations, and details.

2. When requested, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

3. Standard panel system shall have less than 0.01 cfm/ft² air leakage by ASTM E283 at 6.24 psf (50 mph) and no water penetration by ASTM E331 at 15 psf; and structural testing by ASTM E330/E330M.

4. Structural Loads (Wall Assemblies). Provide system capable of handling the following loads:

   a. Positive Wind Load (psf): as indicated for wall panels.
   b. Negative Wind Load (psf): as indicated for wall panels.

B. Windborne Debris Impact Resistance Performance:

1. Translucent panels must be impact-resistant meeting the requirements of an approved impact-resisting standard: ASTM E1996 and ASTM E1886.

2. Panel System designed to meet Missile D or E per ASTM E1996.

C. Deflection Limits:

1. Wall Panel Assemblies: Limited to L/6 of clear span for each assembly component.

D. Testing Results

Submit product reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project. Reports required (if applicable) are:

1. International Building Code Evaluation Report (ICC ES AC177)

2. Flame Spread and Smoke Developed (UL 723) - submit UL Card

3. Burn Extent (ASTM D635)

4. Color Difference (ASTM D2244)

5. Impact Strength (UL 972)

6. Bond Tensile Strength (ASTM C297/C297M after aging by ASTM D1037)

7. Bond Shear Strength (ASTM D1002)

8. Beam Bending Strength (ASTM E72)

9. Insulation U-Factor (NFRC 100)

10. NFRC System U-Factor Certification (NFRC 700)

11. NFRC Visible Light Transmittance (NFRC 202)

12. Solar Heat Gain Coefficient (NFRC or Calculations)

13. Condensation Resistance Factor (AAMA 1503) (Thermally Broken only)

14. Air Leakage (ASTM E283)

15. Structural Performance (ASTM E330/E330M)

16. Water Penetration (ASTM E331)

17. 1200°F Fire Resistance (SWRI)

18. Hurricane Debris Impact Resistance ASTM E1886 /ASTM E1996

20. Fall Through Resistance (ASTM E661) (Optional)

22. UL Listed Class A Roof System (UL 790) (Optional)

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver panel system, components and materials in manufacturer's standard protective packaging.

B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.07 WARRANTY

A. Provide manufacturer's and installer's written warranty agreeing to repair or replace panel system work, which fails in materials or workmanship within one year from the date of delivery. Failure of materials or workmanship shall include excessive deflection, deterioration of finish on metal in excess of normal weathering, defects in accessories, insulated translucent sandwich panels and other components of the work.

B. Extended Panel Warranty: 10 years from date of delivery.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. The basis for this specification is for products manufactured by Kalwall Corporation. Other manufacturers may bid this project subject to compliance with the performance requirements of this specification and submission of evidence thereof. Listing other manufacturers' names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.

B. Kalwall Corporation, Tel: (800) 258-9777 - Fax: (603) 627-7905 - Email: info@kalwall.com

C. Substitution: Or approved equal.

D. Submit manufacturer's product data including construction details, material descriptions, profiles and finishes of components.

2.02 PANEL COMPONENTS

A. Face Sheets:

1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.

a. Thermoplastic (e.g., polycarbonate, acrylic) faces are not acceptable.

b. Face sheets shall not deform, deflect or drip when subjected to fire or flame.

2. Interior face sheets:

a. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than Class A 25 and smoke developed no greater than 250 when tested in accordance with UL 723.

b. Burn extent by ASTM D635 shall be no greater than 1 inch.

3. Exterior face sheets:

a. Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D2244 after 5 years outdoor South Florida weathering at 5° facing south, determined by the average of at least three white samples with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.

b. Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand held pencil and repel an impact minimum of 230 ft. lbs. without fracture or tear when impacted by a 3-1/4 inch diameter, 5 lb. free-falling ball per UL 972.

c. Strength: Exterior face sheet shall be uniform in strength, with panel meeting ASTM E1996 and ASTM E1886.

d. Erosion Protection: Integral, embedded-glass erosion barrier.

4. Appearance:

a. Exterior face sheet: Smooth, 2-3/4 inches thick and color as selected by the Contracting Officer from manufacturer's full range.

b. Face sheets shall not vary more than plus or minus 10 percent in thickness and be uniform in color.

B. Grid Core:

1. Thermally Broken Composite I-beam grid core shall be of 6063-T6 or 6005-T5 alloy and temper with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16 inch.

2. I-beam Thermal break: Minimum 1 inch, thermoset fiberglass composite. Poured and de-bridged thermal break is not acceptable.

C. Laminate Adhesive:

1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council "Acceptance Criteria for Sandwich Panel Adhesives".

2. Minimum tensile strength of 750 psi when the panel assembly is tested by ASTM C297/C297M after two exposures to six cycles each of the aging conditions prescribed by ASTM D1037.

3. Minimum shear strength of the panel adhesive by ASTM D1002 after exposure to four separate conditions:

a. 50% Relative Humidity at 68 degrees F: 540 psi
b. 182 degrees F: 100 psi
c. Accelerated Aging by ASTM D1037 at room temperature: 800 psi
d. Accelerated Aging by ASTM D1037 at 182 degrees F: 250 psi

2.03 PANEL CONSTRUCTION

A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.

1. Thickness: 2-3/4 inches
2. Visible Light Transmittance (VLT):

a. Visible LT (NFRC 202) by NFRC certified laboratory: 15 %.

3. Panel U-factor by NFRC certified laboratory:

a. 2-3/4" thermally broken grid Insert U factor: .05

B. Standard panels shall deflect no more than 1.9 inch at 30 psf in 10 foot - 0 inch span without a supporting frame by ASTM E72.

C. Standard panels shall withstand 1200 degrees F fire for minimum one hour without collapse or exterior flaming.

D. Thermally broken panels: Minimum Condensation Resistance Factor of 80 by AAMA 1503 measured on the bond line.

2.04 BATTENS AND PERIMETER CLOSURE SYSTEM

A. Closure system (Wall):

1. Thermally Broken extruded aluminum 6063-T6 and 6063-T5 alloy and temper clamp-tite screw type closure system.

B. Sealing tape: Manufacturer's standard, pre-applied to closure system at the factory under controlled conditions.

C. Fasteners: 300 series stainless steel screws for aluminum closures, excluding final fasteners to the building.

D. Finish:

1. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be selected from manufacturer's standards.

2. Mill (optional)

3. Anodized

E. When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below. If finishes involve normal color variations, include sample sets consisting of two or more units showing the full range of variations expected.

1. Sandwich panels: 24" x 14' units

2. Factory finished aluminum: 5" long sections

PART 3 EXECUTION

3.01 EXAMINATION

A. Installer shall examine substrates, supporting structure and installation conditions.

B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

2. Where aluminum will contact concrete, masonry or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by manufacturer.

3.03 INSTALLATION

A. Install the panel system in accordance with the manufacturer's installation recommendations and approved shop drawings.

1. Anchor component parts securely in place by permanent mechanical attachment system.

2. Accommodate thermal and mechanical movements.

3. Set perimeter framing in a full bed of sealant compound, or with joint fillers or gaskets to provide weather-tight construction.

B. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturers suggested installation instructions.

3.04 CLEANING

A. Clean the panel system interior and exterior, immediately after installation.

B. Refer to manufacturer's written recommendations.

3.05 PROJECT CLOSEOUT

A. Provide field maintenance manual to include in project maintenance manuals.

B. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.

-- End of Section --

SECTION 08 71 00

DOOR HARDWARE
02/16

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E283	(2004; R 2012) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.1	(2016) Butts and Hinges
ANSI/BHMA A156.12	(2013) Interconnected Locks & Latches
ANSI/BHMA A156.13	(2017) Mortise Locks & Latches Series 1000
ANSI/BHMA A156.16	(2013) Auxiliary Hardware
ANSI/BHMA A156.17	(2014) Self Closing Hinges & Pivots
ANSI/BHMA A156.18	(2016) Materials and Finishes
ANSI/BHMA A156.2	(2017) Bored and Preassembled Locks and Latches
ANSI/BHMA A156.21	(2014) Thresholds
ANSI/BHMA A156.22	(2012) Door Gasketing and Edge Seal Systems
ANSI/BHMA A156.3	(2014) Exit Devices
ANSI/BHMA A156.36	(2010) Auxiliary Locks
ANSI/BHMA A156.4	(2013) Door Controls - Closers
ANSI/BHMA A156.6	(2015) Architectural Door Trim
ANSI/BHMA A156.7	(2016) Template Hinge Dimensions
ANSI/BHMA A156.8	(2015) Door Controls - Overhead Stops and Holders

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101	(2015; ERTA 2016) Life Safety Code

NFPA 80	(2016; TIA 16-1) Standard for Fire Doors and Other Opening Protectives

STEEL DOOR INSTITUTE (SDI/DOOR)

SDI/DOOR A250.8	(2003; R2008) Recommended Specifications for Standard Steel Doors and Frames

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines

UNDERWRITERS LABORATORIES (UL)

UL 14C	(2006; Reprint May 2013) Swinging Hardware for Standard Tin-Clad Fire Doors Mounted Singly and in Pairs
UL Bld Mat Dir	(updated continuously online) Building Materials Directory

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Hardware Assembly Components And Interface; G, AE

Verification of Existing Conditions; G, AE

Hardware Schedule; G, AE

Keying System; G, AE

SD-03 Product Data

Hardware Items; G, AE

SD-07 Certificates

Documentation Of ABA/ADA Accessibility Compliance

SD-08 Manufacturer's Instructions

Installation; G, AE

SD-10 Operation and Maintenance Data

Hardware Schedule Data Package 1;G, AE

SD-11 Closeout Submittals

Key Bitting Charts; G, AE

1.03 SHOP DRAWINGS

Submit manufacturer's detail drawings indicating all hardware assembly components and interface with adjacent construction. Indicate power components and wiring coordination for electrified hardware. Base shop drawings on verified field measurements and include verification of existing conditions.

1.04 PRODUCT DATA

Indicate fire-ratings at applicable components. Provide documentation of ABA/ADA accessibility compliance of applicable components, as required by 36 CFR 1191 Appendix D - Technical.

1.05 HARDWARE SCHEDULE

Prepare and submit hardware schedule in the following form:

A. HW Set 1

1. (3) Hinges: 5BB1HW 4.5x4.5 NRP, 630 Ives
2. (1) Surface Closer: SC70PA, 689 Falcon
3. (1) Exit Device: 98-EO RIM EXIT, US26 Von Duprin
4. (1) Threshold: Pemko 170A
5. (1) Door Sweep: Pemko 315 CN
6. (1) Weather Stripping: Pemko S88-D

B. HW Set 2

1. (3) Hinges: 5BB1 4.5x4.5, 652 Ives
2. (1) Privacy Lock: W301S, 626, Falcon
3. (3) Silencer: SR64, Ives
4. (1) Wall Stop: WS402CVX, 626, Ives

C. HW Set 3

1. (3) Hinges: 5BB1HW 4.5x4.5 NRP, 630 Ives
2. (1) Surface Closer: SC70PA, 689 Falcon
3. (1) Lever Handle Entry, Falcon
4. (1) Smoke Seal, S88D, Pemko
5. (3) Silencer: SR64, Ives

D. HW Set 4

1. (3) Hinges: 5BB1HW 4.5x4.5 NRP, 630 Ives
2. (1) Surface Closer: SC70PA, 689 Falcon
3. (1) Lever Handle Entry, Falcon
4. (1) Lever Handle Entry, Falcon

E. HW Set 5

1. (3) Hinges: 5BB1 4.5x4.5, 652 Ives
2. (1) Storeroom Lock: W581PD Quantum, 626, Falcon
3. (3) Silencer: SR64, Ives
4. (1) Wall Stop: WS402CVX, 626, Ives

F. Substitutions

Requests for substitutions will be considered in accordance with provisions of Section 01 61 00, COMMON PRODUCT REQUIREMENTS.

G. Data Package

In addition, submit hardware schedule data package 1 in accordance with Section 01 78 23, OPERATION AND MAINTENANCE DATA.

1.06 KEY BITTING CHART REQUIREMENTS

A. Requirements

Submit key bitting charts to the Contracting Officer prior to completion of the work. Include:

a. Complete listing of all keys (e.g. AA1 and AA2).

b. Complete listing of all key cuts (AA1-123456, AA2-123458).

c. Tabulation showing which key fits which door.

d. Copy of floor plan showing doors and door numbers.

e. Listing of 20 percent more key cuts than are presently required in each master system.

1.07 QUALITY ASSURANCE

A. Hardware Manufacturers and Modifications

Provide, as far as feasible, locks, hinges, pivots, and closers of one lock, hinge, pivot, or closer manufacturer's make. Modify hardware as necessary to provide features indicated or specified.

B. Key Shop Drawings Coordination Meeting

Prior to the submission of the key shop drawing, the Contracting Officer, Contractor, Door Hardware Subcontractor, using Activity and Base Locksmith must meet to discuss and coordinate key requirements for the facility.

1.08 DELIVERY, STORAGE, AND HANDLING

Deliver hardware in original individual containers, complete with necessary appurtenances including fasteners and instructions. Mark each individual container with item number as shown on hardware schedule. Deliver permanent keys and removable cores to the Contracting Officer, either directly or by certified mail. Deliver construction master keys with the locks.

PART 2 PRODUCTS

2.01 TEMPLATE HARDWARE

Conform to ANSI/BHMA A156.7 for template hinges. Coordinate hardware

items to prevent interference with other hardware.

2.02 HARDWARE FOR FIRE DOORS AND EXIT DOORS

Provide all hardware necessary to meet the requirements of NFPA 80 for fire doors, NFPA 101 for exit doors, and all other requirements indicated, even if such hardware is not specifically mentioned in paragraph HARDWARE SCHEDULE. Provide swinging hardware for tin-clad fire doors in accordance with UL 14C. Provide Underwriters Laboratories, Inc. labels for such hardware in accordance with UL Bld Mat Dir or equivalent labels in accordance with another testing laboratory approved in writing by the Contracting Officer.

2.03 HARDWARE ITEMS

Clearly and permanently mark with the manufacturer's name or trademark, hinges, pivots, locks, latches, exit devices, bolts and closers where the identifying mark will be visible after the item is installed. For closers with covers, the name or trademark may be beneath the cover.

A. Hinges

Provide in accordance with ANSI/BHMA A156.1. Provide hinges that are 4-1/2 by 4-1/2 inch unless otherwise indicated. Construct loose pin hinges for interior doors and reverse-bevel exterior doors so that pins are non-removable when door is closed. Other anti-friction bearing hinges may be provided in lieu of ball bearing hinges.

1. Protection Devices

Provide full height hand and finger protection device at the hinge-side area opening of doors and gates. Provide hinge-side protection devices on both sides of doors and gates, covering hinges and space between door and frame when doors are in the open position. The installed device must push hand and fingers out of the opening and away from a crushing hazard.

B. Pivots

Provide in accordance with ANSI/BHMA A156.17.

C. Spring Hinges

Provide in accordance with ANSI/BHMA A156.17.

D. Locks and Latches

1. Mortise Locks and Latches

Provide in accordance with ANSI/BHMA A156.13, Series 1000, Operational Grade 1. Provide mortise locks with escutcheons not less than 7 by 2-1/4 inch with a bushing at least 1/4 inch long. Cut escutcheons to fit cylinders and provide trim items with straight, beveled, or smoothly rounded sides, corners, and edges. Provide knobs and roses of mortise locks with screwless shanks and no exposed screws.

2. Bored Locks and Latches

Provide in accordance with ANSI/BHMA A156.2, Series 4000, Grade 1.

3. Residential Bored Locks and Latches

Provide in accordance with ANSI/BHMA A156.2, Series 4000, Grade 2. Install locks for exterior doors with threaded roses or concealed machine screws.

4. Interconnected Locks and Latches

Provide in accordance with ANSI/BHMA A156.12. Provide F96 or F97, unless otherwise specified.

5. Auxiliary Locks

Provide in accordance with ANSI/BHMA A156.36, Grade 1.

E. Exit Devices

Provide in accordance with ANSI/BHMA A156.3, Grade 1. Provide adjustable strikes for rim type and vertical rod devices. Provide open back strikes for pairs of doors with mortise and vertical rod devices. Provide touch bars in lieu of conventional crossbars and arms.

F. Cylinders and Cores

Provide cylinders and cores with seven pin tumblers. Provide cylinders from the products of one manufacturer, and provide cores from the products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets have interchangeable cores which are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core.

G. Keying System

Provide the following:

1. Master key - Verify with Owner key selection process.
2. Locks master keyed or grand master keyed to existing system, or existing master keys re-keyed into new keying system - Verify with Owner key selection process.
3. Cylinders keyed alike.
4. Keys: Nickel silver.

H. Lock Trim

Provide cast, forged, or heavy wrought construction and commercial plain design for lock trim.

1. Knobs and Roses

Provide in accordance with ANSI/BHMA A156.2 and ANSI/BHMA A156.13 for knobs, roses, and escutcheons. For

unreinforced knobs, roses, and escutcheons, provide a 0.050 inch thickness. For reinforced knobs, roses, and escutcheons, provide an outer shell thickness of 0.035 inch and a combined total thickness of 0.070 inch, except at knob shanks. Provide knob shanks 0.060 inch thick.

2. Lever Handles

Provide lever handles where indicated in the Hardware Schedule. Provide in accordance with ANSI/BHMA A156.3 for mortise locks of lever handles for exit devices. Provide lever handle locks with a breakaway feature (such as a weakened spindle or a shear key) to prevent irreparable damage to the lock when force in excess of that specified in ANSI/BHMA A156.13 is applied to the lever handle. Provide lever handles return to within 1/2 inch of the door face.

3. Texture

Provide knurled or abrasive coated knobs or lever handles for doors which are accessible to blind persons and which lead to dangerous areas.

I. Door Bolts

Provide in accordance with ANSI/BHMA A156.16. Provide dustproof strikes for bottom bolts, except at doors having metal thresholds. Provide automatic latching flush bolts in accordance with ANSI/BHMA A156.3, Type 25.

J. Closers

Provide in accordance with ANSI/BHMA A156.4, Series C02000, Grade 1, with PT 4C. Provide with brackets, arms, mounting devices, fasteners, full size covers, except at storefront mounting, and other features necessary for the particular application. Size closers in accordance with manufacturer's printed recommendations, or provide multi-size closers, Sizes 1 through 6, and list sizes in the Hardware Schedule. Provide manufacturer's 10 year warranty.

1. Identification Marking

Engrave each closer with manufacturer's name or trademark, date of manufacture, and manufacturer's size designation in locations that will be visible after installation.

K. Closer Holder-Release Devices

Provide in accordance with ANSI/BHMA A156.8.

L. Door Protection Plates

Provide in accordance with ANSI/BHMA A156.6.

1. Sizes of Kick Plates

2 inch less than door width for single doors; 1 inch less than door width for pairs of doors. Provide 8 inch kick

plates for flush doors.

2. Edge Guards

Stainless steel, of same height as armor plates. Apply to meeting stiles.

M. Door Stops and Silencers

Provide in accordance with ANSI/BHMA A156.16. Silencers Type L03011. Provide three silencers for each single door, two for each pair.

N. Thresholds

Provide in accordance with ANSI/BHMA A156.21. Use J35100, with vinyl or silicone rubber insert in face of stop, for exterior doors opening out, unless specified otherwise.

O. Weatherstripping Gasketing

Provide in accordance with ANSI/BHMA A156.22. Provide the type and function designation where specified in paragraph HARDWARE SCHEDULE. Air leakage of weatherstripped doors not to exceed 1.25 cubic feet per minute of air per square foot of door area when tested in accordance with ASTM E283. Provide weatherstripping with one of the following:

P. Soundproofing Gasketing

Provide in accordance with ANSI/BHMA A156.22.

Q. Rain Drips

Provide in accordance with ANSI/BHMA A156.22. Provide extruded aluminum rain drips, not less than 0.08 inch thick, clear anodized finish. Set drips in sealant and fasten with stainless steel screws.

1. Door Rain Drips

Approximately 1-1/2 inch high by 5/8 inch projection. Align bottom with bottom edge of door.

2. Overhead Rain Drips

Approximately 1-1/2 inch high by 2-1/2 inch projection. Align bottom with door frame rabbet.

R. Special Tools

Provide special tools, such as spanner and socket wrenches and dogging keys, as required to service and adjust hardware items.

2.04 FASTENERS

Provide fasteners of type, quality, size, and quantity appropriate to the specific application. Fastener finish to match hardware. Provide stainless steel or nonferrous metal fasteners in locations exposed to

weather. Verify metals in contact with one another are compatible and will avoid galvanic corrosion when exposed to weather.

2.05 FINISHES

Provide in accordance with ANSI/BHMA A156.18. Provide hardware in BHMA 630 finish (satin stainless steel), unless specified otherwise.

PART 3 EXECUTION

3.01 INSTALLATION

Provide hardware in accordance with manufacturers' printed installation instructions. Fasten hardware to wood surfaces with full-threaded wood screws or sheet metal screws. Provide machine screws set in expansion shields for fastening hardware to solid concrete and masonry surfaces. Provide toggle bolts where required for fastening to hollow core construction. Provide through bolts where necessary for satisfactory installation.

A. Weatherstripping Installation

Provide full contact, weathertight seals that allow operation of doors without binding the weatherstripping.

1. Stop Applied Weatherstripping

Fasten in place with color matched sheet metal screws not more than 9 inch on center after doors and frames have been finish painted.

2. Interlocking Type Weatherstripping

Provide interlocking, self adjusting type on heads and jambs and flexible hook type at sills. Nail weatherstripping to door 1 inch on center and to heads and jambs at 4 inch on center.

3. Spring Tension Type Weatherstripping

Provide spring tension type on heads and jambs. Provide bronze nails with bronze. Provide stainless steel nails with stainless steel. Space nails not more than 1-1/2 inch on center.

B. Soundproofing Installation

Provide as specified for stop applied weatherstripping.

C. Threshold Installation

Extend thresholds the full width of the opening and notch end for jamb stops. Set thresholds in a full bed of sealant and anchor to floor with cadmium-plated, countersunk, steel screws in expansion sleeves.

3.02 FIRE DOORS AND EXIT DOORS

Provide hardware in accordance with NFPA 80 for fire doors and NFPA 101 for exit doors.

3.03 HARDWARE LOCATIONS

Provide in accordance with SDI/DOOR A250.8, unless indicated or specified otherwise.

a. Kick and Armor Plates: Push side of single-acting doors. Both sides of double-acting doors.

b. Mop Plates: Bottom flush with bottom of door.

3.04 KEY CABINET AND CONTROL SYSTEM

Locate where directed. Tag one set of file keys and one set of duplicate keys. Place other keys in appropriately marked envelopes, or tag each key. Provide complete instructions for setup and use of key control system. On tags and envelopes, indicate door and room numbers or master or grand master key.

3.05 FIELD QUALITY CONTROL

After installation, protect hardware from paint, stains, blemishes, and other damage until acceptance of work. Submit notice of testing 15 days before scheduled, so that testing can be witnessed by the Contracting Officer. Adjust hinges, locks, latches, bolts, holders, closers, and other items to operate properly. Demonstrate that permanent keys operate respective locks, and give keys to the Contracting Officer. Correct, repair, and finish, errors in cutting and fitting and damage to adjoining work.

-- End of Section --

SECTION 08 74 00

ELECTRONIC LOCKING SYSTEM
10/17

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electronic standalone card access locking system.

B. Special function hardware.

C. Hospitality door locking system.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.13	(2017) Mortise Locks & Latches Series 1000
ANSI/BHMA A156.2	(2017) Bored and Preassembled Locks and Latches
ANSI/BHMA A156.25	(2013) Electrified Locking Devices

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101	(2015; ERTA 2016) Life Safety Code
NFPA 80	(2016; TIA 16-1) Standard for Fire Doors and Other Opening Protectives

1.03 ADDITIONAL GUIDANCE DOCUMENTS

1. Builders Hardware Manufacturers Association (BHMA).

2. Door and Hardware Institute (DHI).

3. Factory Mutual (FM).

4. Underwriters' Laboratories, Inc. (UL).

5. ANSI A117.1: Providing Accessibility and Usability for Physically Handicapped People, 1986 edition.

6. Federal Register Part III, Department of Justice, Office of the Attorney General, 28 CFR Part 36: Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities; Final Rule, July 26, 1991.

7. Federal Register Part II, Architectural and Transportation Barriers Compliance Board, 36 CFR Part 1191: Americans with

Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Amendment to Final Guidelines, September 6, 1991

1.04 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Lock Templates; G, AE

SD-03 Product Data

Manufacturer's Data Sheets On Each Product; G, AE

SD-04 Samples

Selection Samples; G, AE

Verification Samples; G, AE

SD-07 Certificates

Product Certificates; G, AE

SD-08 Manufacturer's Instructions

Preparation Instructions; G, AE

Storage And Handling Requirements; G, AE

Installation Methods; G, AE

SD-09 Manufacturer's Field Reports

Manufacturer's Field Reports; G, AE

SD-10 Operation and Maintenance Data

Operation And Maintenance Data; G, AE

SD-11 Closeout Submittals

Warranty Documents; G, AE

Project Record Documents; G, AE

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar systems.

B. Installer Qualifications: Minimum 2 year experience installing and servicing electronic lock systems and acceptable to the manufacturer of the system.

C. Regulatory requirements:

1. Building Codes: Comply with regulations of Authority Having Jurisdiction.

2. Rated Assemblies: Furnish locksets for fire-rated openings in compliance with NFPA 80 and NFPA 101.

3. Locking System Standards: Provide electronic locking system complying with the following:

a. ANSI/BHMA A156.13-18/987, including locks meeting ANSI Grade 1 standards.
b. ADA Accessibility Standards.
c. UL Security Standards.

D. Mock-Up: Provide a mock-up for evaluation of manufacturing and installation workmanship.

1. Provide installation in areas designated by Contracting Officer.

2. Do not proceed with remaining work until workmanship and operation are approved by Contracting Officer.

E. Pre-installation Meetings:

1. Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

1.06 DELIVERY, STORAGE & HANDLING

System components, including locksets shall be stored in a dry temperature controlled environment.

1.07 PROJECT CONDITIONS

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 recommended limits.

1.08 MAINTENANCE MATERIAL SUBMITTALS

A. Provide extra stock materials and deliver to Contracting Officer extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 23, OPERATION AND MAINTENANCE DATA.

1. Quantity: Furnish quantity of items listed equal to 5 percent of amount installed, not to exceed 20 of each of the following:

a. Locks.
b. Interior trim.
c. Exterior trim.

d. Handle sets.

2. Delivery, Storage and Protection: Comply with Contracting Officer's requirements for delivery and storage of extra materials.

3. Protect as follows:

a. Cover exposed surfaces with pressure-sensitive heavy protection paper or apply strippable plastic coating before shipping to jobsite.
b. Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.
c. Protect in accordance with manufacturer's written instructions.

1.09 WARRANTY

A. Manufacturer/installer has responsibility for an extended Corrective Period for work of this Section for the period stated from date of Substantial Completion against all the conditions indicated below, and when notified in writing from Contracting Officer.

1. Door locksets: 2 years.

2. Card readers and electronic equipment: 2 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Onity, Web: en.onity.com

B. Securitron: Web: https://www.securitron.com/en/site/securitron/

C. Substitutions: Or approved equal.

D. Requests for substitutions will be considered in accordance with provisions of Section 01 61 00, COMMON PRODUCT REQUIREMENTS.

2.02 COMMERCIAL WIRELESS ELECTRONIC ACCESS CONTROL SYSTEM

A. Product: Integra CT30 Wireless Locking System.

B. Furnish and install an electronic lock system, complete and including without limitation, the following components:

1. Lock units with batteries.

2. Software.

3. Encoder and cables.

4. Portable programmer.

5. Accessories, as required.

6. Special tools.

7. Operating manuals.

8. On-site training of staff.

C. Manufactured Units:

1. Electronic Lock.

a. Keying: Locks opened by an authorized Magnetic, MIFARE, MIFARE Plus ®, DESFire EV1, or DESFive EV2 card, or equal.
b. Lock capacity of up to 3000 individual cardholders.
c. Lock internal audit trail - must include time, date, door identification, card holder identification and function performed.
d. Programming of lock to be performed by portable programmer.
e. Lock supports timed events and changes in modes of operation.
f. Lock reader operates on standard high coercivity mag stripe and RFID cards.
g. Lock operates on standard AA alkaline batteries that are available from any wholesale or retail source.
h. Lock retains a non-volatile transaction memory.
i. Lock operates by a motorized clutch.
j. Lock utilizes freewheeling clutch operation.
k. Lock permits free egress.
l. Lock is applicable in interior or exterior applications.
m. Lock provides low battery indication.
n. Locks offers cylindrical and mortise latches.
o. Mortise lockset meets UL Fire Rating C through A.
p. Batteries are accessible from the interior of the door.
q. Mechanical override model accepts any ANSI standard 1 inch lock cylinder.
r. Lock has the ability to be integrated with OnGuard software platform.
s. Mortise grade: ANSI/BHMA A156.2 Certified, Grade 1.
t. Mortise with deadbolt grade: ANSI/BHMA A156.25 Certified, Grade 1.
u. Mortise without deadbolt grade: ANSI/BHMA A156.25 Certified, Grade 1.
v. Cylindrical grade: ANSI/BHMA Certified, Grade 2.
w. The lock supports Alternative Fire Code (AFC) functionality.
x. The locks are Americans with Disabilities Act (ADA) compliant.

2. Physical Characteristics:

a. Weight- 7.8 lb. for cylindrical. 9.8 lb. for mortise.
b. Lock dimensions - 9-1/2 inches by 3-1/8 inches by 3-1/4 inches.
c. Key Override: C-keyway.
d. Key Override: Small Format Interchangeable Core (SFIC).
e. Trim Sets: Custom.626 - Satin Chrome.
f. Trim Sets: Custom.606 - Satin Brass.
g. Trim Sets: Custom.605 - Bright Brass.
h. Trim Sets: Custom.609 - Antique Brass.
i. Trim Sets: Custom.695 - Dark Bronze Powder Coat.

j. Handle Sets: Removable type.
k. Style: Toledo. Finish to match trim set finish.
l. Style: Wing. Finish to match trim set finish.
m. Style: Granada. Finish to match trim set finish.

D. Software:

1. OS - Windows 7 / 8.1 / 10.
2. Server - Windows Server 2008 / 2008 R2 / 2012.
3. Database - SQL 2008 R2 / 2012 / 2014.
4. Capacity of up to 65,000 cardholders and 65,000 doors.
5. Programmable access levels.
6. Capable of importing cardholder profiles.
7. Capable of 32 programmable cardholder time zones that allow access only during specified hours and days.
8. 8-day week (with 8th day being designated for "Holiday" usage).
9. Automatically adjust for Daylight Savings and Standard Time changes.
10. Lock Audit Trail for date, local time, badge ID, operator ID, card issue code.

E. Portable Programmer:

1. Hand held unit powered by AA batteries with following characteristics:

a. Memory storage: 300+ lock data and openings records simultaneously.
b. Ability to upload/download programming information from software to locks.
c. Communicate updates to lock functions.
d. Perform diagnostic tests of locks.
e. Capable of powering and opening the lock and activating a stand-alone reader.
f. Capable of lock interrogation to provide the system with lock transaction log.

F. Card Reader:

1. Off-line and On-line Reader shall have the following characteristics.

a. Support up to 3000 cardholders for off-line reader and 65,000 cardholders for on-line reader.
b. Audit trail of up to 1184 entries in off-line reader and hard-drive memory available in on-line readers - must include time, date, door identification, card holder identification and function performed.
c. Provide for timed events and changes in modes of operation.
d. Reader that operates on standard high coercivity mag stripe and RFID keycards.
e. Non-volatile transaction memory.
f. All programming to be uploaded into off-line reader from Portable Programmer or directly from software into on-line reader.
g. Audit trail that can be downloaded from off-line reader to Portable Programmer or directly to software from on-line reader.

h. On-line reader with the ability to provide anti-passback function.
i. Controller capable of controlling multiple readers.
j. Card reader designed to be applicable in interior or exterior applications.
k. Reader capable of performing timed events.
l. Control unit with tamper indication.

2.03 PRODUCT INFORMATION

Provide the following product information:

A. Product Data: Manufacturer's data sheets on each product to be used.

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

B. Shop Drawings:

1. Templates: After approval of shop drawings, submit lock templates to door and frame manufacturer(s) for fabrication.

C. Quality Assurance Submittals: Refer to Quality Assurance requirements for information description.

1. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria, and physical requirements.

2. Manufacturer's Field Reports: Manufacturer's field reports specified herein.

D. Closeout Submittals:

1. Operation and Maintenance Data.

2. Warranty documents.

3. Project record documents for installed materials.

E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

PART 3 EXECUTION

3.01 EXAMINATION

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalogue installation

instructions and product carton instructions for installation.

1. Templates: After approval of shop drawings, furnish lock templates to door and frame manufacturer for fabrication.

B. Site Verification of Conditions: Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions.

1. Verify doors and areas where equipment is to be installed are in compliance with electronic locking system manufacturer's requirements.

C. Do not begin installation until areas, supporting construction and substrates have been properly prepared.

D. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 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.

3.03 CARD ACCESS SYSTEM INSTALLATION

A. Comply with manufacturer's written instructions and recommendations for installation of system components.

B. Install electronic lock units as directed.

C. Check and adjust operation of lock units in place, to ensure proper latching and locking.

D. Replace units if any are not fully functional as received.

3.04 SPECIAL FUNCTION HARDWARE INSTALLATION

A. Coordinate special function hardware work with work of other trades for proper time and sequence to avoid construction delays.

B. Install special function hardware in accordance with manufacturer's instructions.

C. Guest Doors: Install electronic lock units at locations as scheduled.

D. Back of House Doors: Install electronic lock units at locations as scheduled.

E. Egress Doors: Install electronic locking system on egress doors in compliance with regulatory agency requirement for emergency operation and latching.

F. Rated Doors: Install electronic locking system on rated doors in compliance with regulatory agency requirement for rated assembly.

3.05 HOSPITALITY DOOR LOCKING SYSTEM INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Electronic Locking System Installation:

1. Guest doors: Install electronic lock units at the locations as scheduled.

2. Back of house doors: Install electronic lock units at the locations as scheduled.

3. Egress doors: Install electronic locking system on egress doors in compliance with regulatory agency requirement for emergency operation and latching.

4. Rated doors: Install electronic locking system on rated doors in compliance with regulatory agency requirement for rated assembly.

3.06 DEMONSTRATION AND TRAINING

A. Demonstration:

1. Coordinate requirements for demonstration of system.

B. Training:

1. Instruct Owner's designated maintenance personnel in care, adjustment and operation of special function hardware.

2. Provide competent instructor for not less than four-hour training session(s) after completion and acceptance of work.

3. Forward statement to Owner countersigned by maintenance personnel confirming that these instructions have been provided.

3.07 ADJUSTING

Adjusting: Check and adjust operation of lock units in place, to ensure proper latching and locking. Replace units if any are not fully functional as received.

3.08 CLEANING

Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

3.09 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

-- End of Section --

SECTION 08 81 00

GLAZING
10/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1	(2015) Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test

ASTM INTERNATIONAL (ASTM)

ASTM C1036	(2016) Standard Specification for Flat Glass
ASTM C1184	(2014) Standard Specification for Structural Silicone Sealants
ASTM C509	(2006; R 2015) Elastomeric Cellular Preformed Gasket and Sealing Material
ASTM C864	(2005; R 2011) Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers
ASTM C920	(2014a) Standard Specification for Elastomeric Joint Sealants
ASTM D2287	(2012) Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
ASTM D395	(2014) Standard Test Methods for Rubber Property - Compression Set
ASTM E119	(2016a) Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E1300	(2016) Standard Practice for Determining Load Resistance of Glass in Buildings
ASTM E2226	(2015a) Standard Practice for Application of Hose Stream

GLASS ASSOCIATION OF NORTH AMERICA (GANA)

GANA Glazing Manual	(2009) Glazing Manual
GANA Sealant Manual	(2008) Sealant Manual

INSULATING GLASS MANUFACTURERS ALLIANCE (IGMA)

IGMA TB-3001	(2001) Guidelines for Sloped Glazing
IGMA TM-3000	(1990; R 2004) North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 252	(2017) Standard Methods of Fire Tests of Door Assemblies
NFPA 257	(2012; ERTA 2017) Standard on Fire Test for Window and Glass Block Assemblies
NFPA 80	(2016; TIA 16-1) Standard for Fire Doors and Other Opening Protectives

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

16 CFR 1201	Safety Standard for Architectural Glazing Materials

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Details Of The Proposed Setting Methods, Mullion Details, Edge Blocking, Size Of Openings, Frame Details, Materials, And Types And Thickness Of Glass; G, AE

SD-03 Product Data

Putty And Glazing Compound; G, AE

Glazing Compound; G, AE

Sealants; G, AE

Glazing Gaskets; G, AE

Accessories; G, AE

Setting Blocks And Edge Blocks; G, AE

Sealing Tapes; G, AE

Mastic; G, AE

Glass; G, AE

Mirrors; G, AE

SD-04 Samples

Samples Of Each Of The Following: Tinted Glass, Patterned Glass, Heat-Absorbing Glass, And Insulating Glass; G, AE

SD-07 Certificates

Manufacture's Certification

SD-08 Manufacturer's Instructions

Cleaning Instructions For Plastic Sheets.; G

Installation; G

Recommendations for Setting And Sealing Materials; G

SD-11 Closeout Submittals

Warranty; G

1.03 SYSTEM DESCRIPTION

Glazing systems shall be fabricated and installed watertight and airtight to withstand thermal movement and wind loading without glass breakage, gasket failure, deterioration of glazing accessories, and defects in the work. Glazed panels shall comply with the safety standards, as indicated in accordance with ANSI Z97.1. Glazed panels shall comply with indicated wind/snow loading in accordance with ASTM E1300.

1.04 DELIVERY, STORAGE, AND HANDLING

Deliver products to the site in unopened containers, labeled plainly with manufacturers' names and brands. Store glass and setting materials in safe, enclosed dry locations and do not unpack until needed for installation. Handle and install materials in a manner that will protect them from damage.

1.05 ENVIRONMENTAL REQUIREMENTS

Do not start glazing work until the outdoor temperature is above 40 degrees F and rising, unless procedures recommended by the glass manufacturer and approved by the Contracting Officer are made to warm the glass and rabbet surfaces. Provide ventilation to prevent condensation of moisture on glazing work during installation. Do not perform glazing work during damp or rainy weather.

1.06 WARRANTY

A. Warranty for Insulating Glass Units

Warranty insulating glass units against development of material obstruction to vision (such as dust, fogging, or film formation on the inner glass surfaces) caused by failure of the hermetic seal, other than through glass breakage, for a 10-year period following acceptance of the work. Provide new units for any

units failing to comply with terms of this warranty within 45 working days after receipt of notice from the Government. The warranty period shall be 10 years; warranty shall be signed by the manufacturer.

PART 2 PRODUCTS

2.01 PRODUCT INFORMATION

A. The following information will be supplied for each product:

1. Manufacturer's descriptive product data, handling and storage recommendations, installation instructions, and cleaning instructions.

2. Shop Drawings showing complete details of the proposed setting methods, mullion details, edge blocking, size of openings, frame details, materials, and types and thickness of glass.

3. Manufacture's certification that the units meet the luminous and solar radiant transmission requirements for heat absorbing glass or other product requirements. Labels or manufacturers marking affixed to the glass will be accepted in lieu of certificates.

4. Samples

    a. Two 8 by 10 inch samples of each of the following: tinted glass, patterned glass, heat-absorbing glass, and insulating glass units.
    b. Three samples of each indicated material. Samples of plastic sheets shall be minimum 5 by 7 inches.

5. Glass manufacturer's recommendations for setting and sealing materials and for installation of each type of glazing material specified. Include cleaning instructions for plastic sheets.

2.02 GLASS

Provide in accordance with ASTM C1036, unless specified otherwise. In doors and sidelights, provide safety glazing material conforming to 16 CFR 1201.

A. Clear Glass

For interior glazing (i.e., pass and observation windows), 1/4 inch thick glass should be used.

Type I, Class 1 (clear), Quality q4 (A). Provide for glazing openings not indicated or specified otherwise. Use double-strength sheet glass or 1/8 inch float glass for openings up to and including 15 square feet, 3/16 inch for glazing openings over 15 square feet but not over 30 square feet, and 1/4 inch for glazing openings over 30 square feet but not over 45 square feet.

B. Wired Glass

Glass for fire-rated windows shall be UL listed and shall be rated for 90 minutes when tested in accordance with ASTM E2226. Wired glass shall be Type II flat type, Class 3 - tinted, light-reducing, Quality q8 - glazing, Form 1 - wired and polished both sides. Wire mesh shall be polished stainless steel Mesh 1 - diamond. Wired glass for fire-rated windows shall bear an identifying UL label or the label of a nationally recognized testing agency, and shall be rated for 90 minutes when tested in accordance with NFPA 257. Wired glass for fire-rated doors shall be tested as part of a door assembly in accordance with NFPA 252.

C. Mirrors

1. Glass Mirrors

Glass for mirrors shall be Type I transparent flat type, Class 1-clear, Glazing Quality q1 1/4 inch thick conforming to ASTM C1036. Glass shall be coated on one surface with silver coating, copper protective coating, and mirror backing paint. Silver coating shall be highly adhesive pure silver coating of a thickness which shall provide reflectivity of 83 percent or more of incident light when viewed through 1/4 inch thick glass, and shall be free of pinholes or other defects. Copper protective coating shall be pure bright reflective copper, homogeneous without sludge, pinholes or other defects, and shall be of proper thickness to prevent "adhesion pull" by mirror backing paint. Mirror backing paint shall consist of two coats of special scratch and abrasion-resistant paint , and shall be baked in uniform thickness to provide a protection for silver and copper coatings which will permit normal cutting and edge fabrication.

D. Tempered Glass

ASTM C1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Class 1 (transparent), Quality q3, 1/4 inch thick. Color shall be clear.

E. Fire/Safety Rated Glass

Fire/safety rated glass shall be laminated Type I transparent flat type, Class 1-clear. Glass shall have a 90 minute rating when tested in accordance with ASTM E119. Glass shall be permanently labeled with appropriate markings.

2.03 INSULATING GLASS UNITS

A. Low Emissivity Insulating Glass

Interior and exterior glass panes for Low-E insulating units shall be Type I annealed flat glass, Class 1-clear with anti-reflective low-emissivity coating on No. 3 surface (inside surface of interior pane), Quality q3 - glazing select, conforming to ASTM C1036. Glass performance shall be U value maximum of 0.25 Btu/hr-ft2-F, Solar Heat Gain Coefficient (SHGC) maximum of 0.4. Color shall be clear.

2.04 SETTING AND SEALING MATERIALS

Provide as specified in the GANA Glazing Manual, IGMA TM-3000, IGMA TB-3001, and manufacturer's recommendations, unless specified otherwise herein. Do not use metal sash putty, nonskinning compounds, nonresilient preformed sealers, or impregnated preformed gaskets. Materials exposed to view and unpainted shall be gray or neutral color.

A. Putty and Glazing Compound

Glazing compound shall be as recommended by manufacturer for face-glazing metal sash. Putty shall be linseed oil type. Putty and glazing compounds shall not be used with insulating glass or laminated glass.

B. Glazing Compound

Use for face glazing metal sash. Do not use with insulating glass units or laminated glass.

C. Sealants

Provide elastomeric and structural sealants.

1. Elastomeric Sealant

Provide in accordance with ASTM C920, Type S, Grade NS, Class 12.5, Use G. Use for channel or stop glazing metal sash. Sealants shall be chemically compatible with setting blocks, edge blocks, and sealing tapes. Color of sealant shall be white.

2. Structural Sealant

Provide in accordance with ASTM C1184, Type S.

D. Joint Backer

Joint backer shall have a diameter size at least 25 percent larger than joint width; type and material as recommended in writing by glass and sealant manufacturer.

E. Preformed Channels

Neoprene, vinyl, or rubber, as recommended by the glass manufacturer for the particular condition.

F. Sealing Tapes

Preformed, semisolid, PVC-based material of proper size and compressibility for the particular condition, complying with ASTM D2287. Use only where glazing rabbet is designed for tape and tape is recommended by the glass or sealant manufacturer. Provide spacer shims for use with compressible tapes. Tapes shall be chemically compatible with the product being set.

G. Setting Blocks and Edge Blocks

Closed-cell neoprene setting blocks shall be dense extruded type conforming to ASTM C509 and ASTM D395, Method B, Shore A durometer between 70 and 90. Edge blocking shall be Shore A durometer of 50 (plus or minus 5). Silicone setting blocks shall be required when blocks are in contact with silicone sealant. Profiles, lengths and locations shall be as required and recommended in writing by glass manufacturer. Block color shall be black.

H. Glazing Gaskets

Glazing gaskets shall be extruded with continuous integral locking projection designed to engage into metal glass holding members to provide a watertight seal during dynamic loading, building movements and thermal movements. Glazing gaskets for a single glazed opening shall be continuous one-piece units with factory-fabricated injection-molded corners free of flashing and burrs. Glazing gaskets shall be in lengths or units recommended by manufacturer to ensure against pull-back at corners. Glazing gasket profiles shall be as recommended by the manufacturer for the intended application.

1. Fixed Glazing Gaskets

Fixed glazing gaskets shall be closed-cell (sponge) smooth extruded compression gaskets of cured elastomeric virgin neoprene compounds conforming to ASTM C509, Type 2, Option 1.

2. Wedge Glazing Gaskets

Wedge glazing gaskets shall be high-quality extrusions of cured elastomeric virgin neoprene compounds, ozone resistant, conforming to ASTM C864, Option 1, Shore A durometer between 65 and 75.

3. Aluminum Framing Glazing Gaskets

Glazing gaskets for aluminum framing shall be permanent, elastic, non-shrinking, non-migrating, watertight and weathertight.

I. Accessories

Provide as required for a complete installation, including glazing points, clips, shims, angles, beads, and spacer strips. Provide noncorroding metal accessories. Provide primer-sealers and cleaners as recommended by the glass and sealant manufacturers.

2.05 MIRROR ACCESSORIES

A. Mastic

Mastic for setting mirrors shall be a polymer type mirror mastic resistant to water, shock, cracking, vibration and thermal expansion. Mastic shall be compatible with mirror backing paint, and shall be approved by mirror manufacturer.

B. Mirror Clips

Concealed fasteners of type to suit wall construction material shall be provided with clips.

PART 3 EXECUTION

3.01 PREPARATION

Preparation, unless otherwise specified or approved, shall conform to applicable recommendations in the GANA Glazing Manual, GANA Sealant Manual, IGMA TB-3001, IGMA TM-3000, and manufacturer's recommendations. Determine the sizes to provide the required edge clearances by measuring the actual opening to receive the glass. Grind smooth in the shop glass edges that will be exposed in finish work. Leave labels in place until the installation is approved, except remove applied labels on heat-absorbing glass and on insulating glass units as soon as glass is installed. Securely fix movable items or keep in a closed and locked position until glazing compound has thoroughly set.

3.02 GLASS SETTING

Shop glaze or field glaze items to be glazed using glass of the quality and thickness specified or indicated. Glazing, unless otherwise specified or approved, shall conform to applicable recommendations in the GANA Glazing Manual, GANA Sealant Manual, IGMA TB-3001, IGMA TM-3000, and manufacturer's recommendations. Aluminum windows, wood doors, and wood windows may be glazed in conformance with one of the glazing methods described in the standards under which they are produced, except that face puttying with no bedding will not be permitted. Handle and install glazing materials in accordance with manufacturer's instructions. Use beads or stops which are furnished with items to be glazed to secure the glass in place. Verify products are properly installed, connected, and adjusted.

A. Insulating Glass Units

Do not grind, nip, or cut edges or corners of units after the units have left the factory. Springing, forcing, or twisting of units during setting will not be permitted. Handle units so as not to strike frames or other objects. Installation shall conform to applicable recommendations of IGMA TB-3001 and IGMA TM-3000.

B. Installation of Wire Glass

Install glass for fire doors in accordance with installation requirements of NFPA 80.

C. Installation of Heat-Absorbing Glass

Glass shall have clean-cut, factory-fabricated edges. Field cutting will not be permitted.

D. Installation of Laminated Glass

Sashes which are to receive laminated glass shall be weeped to the outside to allow water drainage into the channel.

3.03 CLEANING

Clean glass surfaces and remove labels, paint spots, putty, and other defacement as required to prevent staining. Glass shall be clean at the time the work is accepted. Clean plastic sheet in accordance with manufacturer's instructions.

3.04 PROTECTION

Glass work shall be protected immediately after installation. Glazed openings shall be identified with suitable warning tapes, cloth or paper flags, attached with non-staining adhesives. Reflective glass shall be protected with a protective material to eliminate any contamination of the reflective coating. Protective material shall be placed far enough away from the coated glass to allow air to circulate to reduce heat buildup and moisture accumulation on the glass. Upon removal, separate protective materials for reuse or recycling. Glass units which are broken, chipped, cracked, abraded, or otherwise damaged during construction activities shall be removed and replaced with new units.

-- End of Section --

SECTION 08 91 00

METAL WALL LOUVERS
10/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL (AMCA)

AMCA 500-L	(2015) Laboratory Methods of Testing Louvers for Rating
AMCA 511	(2010) Certified Ratings Program for Air Control Devices

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 2605	(2013) Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels

ASTM INTERNATIONAL (ASTM)

ASTM B209	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B221	(2014) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

1.02 DELIVERY, STORAGE, AND PROTECTION

Deliver materials to the site in an undamaged condition. Carefully store materials off the ground to provide proper ventilation, drainage, and protection against dampness. Louvers shall be free from nicks, scratches, and blemishes. Replace defective or damaged materials with new.

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Drawings; G, AE

SD-03 Product Data

Manufacturer's Literature; G, AE

SD-04 Samples

Manufacturer's Standard Finishes And Colors; G

SD-06 Test Reports

Factory Test Data; G

SD-07 Certificates

Certificates Of AMCA Ratings

SD-08 Manufacturer's Instructions

Installation Instructions; G, AE

1.04 DETAIL DRAWINGS

Show all information necessary for fabrication and installation of wall louvers. Indicate materials, sizes, thicknesses, fastenings, and profiles.

1.05 COLOR SAMPLES

Colors of finishes for wall louvers and door louvers shall closely approximate colors indicated. Where color is not indicated, submit the manufacturer's standard colors to the Contracting Officer for selection.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aluminum Sheet

ASTM B209, alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal produces for required finish.

B. Extruded Aluminum

ASTM B221, alloy 6063-T5 or -T52.

2.02 METAL WALL LOUVERS

Weather resistant type with bird screens and made to withstand a wind load of not less than 30 pounds per square foot. Wall louvers shall bear the AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500-L and AMCA 511. The rating shall show a water penetration of 0.020 or less ounce per square foot of free area at a free velocity of 800 feet per minute.

A. Extruded Aluminum Louvers

Fabricated of extruded 6063-T5 or -T52 aluminum with a wall

thickness of not less than 0.081 inch. Louver depth to be 4 inch.

B. Mullions and Mullion Covers

Same material and finish as louvers.

C. Screens and Frames

Bird Screening: Aluminum, 1/2-inch-square mesh, 0.063-inch wire. Mount screens in removable, rewirable frames of same material and finish as the louvers. Fabricate bird screen frame with mitered corners. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

D. Product Information

1. Manufacturer's Literature: Descriptive and performance data of louvers, including standard drawings and louver-free area.

   a. Factory test data.
   b. Certificates of AMCA ratings.
   c. Installation instructions.

2. Shop Drawings: Large scale details of louvers, anchorage, and relationship to adjoining construction.

2.03 FASTENERS AND ACCESSORIES

Provide stainless steel screws and fasteners for aluminum louvers and zinc-coated or stainless steel screws and fasteners for steel louvers. Provide other accessories as required for complete and proper installation.

2.04 FINISHES

A. Aluminum

Exposed aluminum surfaces shall be factory finished with an organic coating. Color shall be selected by the Contracting Officer from manufacturer's full range.

1. Organic Coating

Clean and prime exposed aluminum surfaces. Provide a high-performance finish in accordance with AAMA 2605 with total dry film thickness of not less than 1.2 mil.

2. Samples

Manufacturer's standard finishes and colors.

PART 3 EXECUTION

3.01 INSTALLATION

A. Wall Louvers

Install using stops or moldings, flanges, strap anchors, or jamb fasteners as appropriate for the wall construction and in accordance with manufacturer's recommendations.

B. Screens and Frames

Attach frames to louvers with screws or bolts.

3.02 PROTECTION FROM CONTACT OF DISSIMILAR MATERIALS

A. Aluminum

Where aluminum contacts metal other than zinc, paint the dissimilar metal with a primer and two coats of aluminum paint.

-- End of Section --

DIVISION 09 – FINISHES

SECTION 09 22 00

SUPPORTS FOR PLASTER AND GYPSUM BOARD
02/10

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 341	(2012) Seismic Provisions for Structural Steel Buildings

ASTM INTERNATIONAL (ASTM)

ASTM A463/A463M	(2010; R 2015) Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process
ASTM A653/A653M	(2015; E 2016) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM C645	(2014; E 2015) Nonstructural Steel Framing Members
ASTM C754	(2015) Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products

UNDERWRITERS LABORATORIES (UL)

UL Fire Resistance	(2014) Fire Resistance Directory

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Metal support systems; G, AE

1.03 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the job site and store in ventilated dry locations. Storage area shall permit easy access for inspection and handling. If materials are stored outdoors, stack materials off the ground, supported on a level platform, and fully protected from the

weather. Handle materials carefully to prevent damage. Remove damaged items and provide new items.

PART 2 PRODUCTS

2.01 MATERIALS

Provide steel materials for metal support systems with galvanized coating ASTM A653/A653M, G-60; aluminum coating ASTM A463/A463M, T1-25; or a 55-percent aluminum-zinc coating. Provide support systems and attachments per AISC 341 UFC 3-310-04, "Seismic Design for Buildings" in seismic zones.

A. Materials for Attachment of Gypsum Wallboard

1. Suspended and Furred Ceiling Systems

Provide in accordance with ASTM C645.

2. Nonload-Bearing Wall Framing and Furring

Provide in accordance with ASTM C645, but not thinner than 0.0179 inch thickness, with 0.0329 inch minimum thickness supporting wall hung items such as cabinetwork, equipment and fixtures.

3. Furring Structural Steel Columns

Provide in accordance ASTM C645. Steel (furring) clips and support angles listed in UL Fire Resistance may be provided in lieu of steel studs for erection of gypsum wallboard around structural steel columns.

4. Z-Furring Channels with Wall Insulation

Not lighter than 26 gage galvanized steel, Z-shaped, with2 inch furring depth.

B. Shop Drawings

1. Submit shop drawing metal support systems for the erection of metal framing, furring, and ceiling suspension systems. Indicate materials, sizes, thicknesses, and fastenings.

PART 3 EXECUTION

3.01 INSTALLATION

A. Systems for Attachment of Gypsum Wallboard

1. Suspended and Furred Ceiling Systems

In accordance with ASTM C754, except provide framing members 16 inches o.c. unless indicated otherwise.

2. Non-loadbearing Wall Framing and Furring

In accordance with ASTM C754, except as indicated otherwise.

3. Furring Structural Steel Columns

Install studs or galvanized steel clips and support angles for erection of gypsum wallboard around structural steel columns in accordance with the UL Fire Resistance, design number(s).

4. Z-Furring Channels with Wall Insulation

Install Z-furring channels vertically spaced not more than 24 inches o.c. Locate Z-furring channels at interior and exterior corners in accordance with manufacturer's printed erection instructions. Fasten furring channels to concrete walls with powder-driven fasteners or hardened concrete steel nails through narrow flange of channel. Space fasteners not more than 24 inches o.c.

3.02 ERECTION TOLERANCES

A. Provide framing members which will be covered by finish materials such as wallboard, plaster, or ceramic tile set in a mortar setting bed, within the following limits:

1. Layout of walls and partitions: 1/4 inch from intended position;

2. Plates and runners: 1/4 inch in 8 feet from a straight line;

3. Studs: 1/4 inch in 8 feet out of plumb, not cumulative; and

4. Face of framing members: 1/4 inch in 8 feet from a true plane.

B. Provide framing members which will be covered by ceramic tile set in dry-set mortar, latex-portland cement mortar, or organic adhesive within the following limits:

1. Layout of walls and partitions: 1/4 inch from intended position;
2. Plates and runners: 1/8 inch in 8 feet from a straight line;
3. Studs: 1/8 inch in 8 feet out of plumb, not cumulative; and
4. Face of framing members: 1/8 inch in 8 feet from a true plane.

-- End of Section --

SECTION 09 29 00

GYPSUM BOARD
08/16

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C1002	(2014) Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
ASTM C1047	(2014a) Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
ASTM C1178/C1178M	(2013) Standard Specification for Glass Mat Water-Resistant Gypsum Backing Panel
ASTM C1396/C1396M	(2014a) Standard Specification for Gypsum Board
ASTM C840	(2017) Standard Specification for Application and Finishing of Gypsum Board
ASTM C954	(2015) Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
ASTM D226/D226M	(2009) Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

GYPSUM ASSOCIATION (GA)

GA 214	(2010) Recommended Levels of Gypsum Board Finish
GA 216	(2010) Application and Finishing of Gypsum Panel Products
GA 253	(2012) Application of Gypsum Sheathing

UNDERWRITERS LABORATORIES (UL)

UL Fire Resistance	(2014) Fire Resistance Directory

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Gypsum Board; G, AE

Glass Mat Water-Resistant Gypsum Tile Backing Board; G, AE

Accessories; G, AE

SD-07 Certificates

Material Safety Data Sheets; G, AE

SD-10 Operation and Maintenance Data

Manufacturer Maintenance Instructions; G, AE

1.03 DELIVERY, STORAGE, AND HANDLING

A. Delivery

Deliver materials in the original packages, containers, or bundles with each bearing the brand name, applicable standard designation, and name of manufacturer, or supplier.

B. Storage

Keep materials dry by storing inside a sheltered building. Where necessary to store gypsum board and cementitious backer units outside, store off the ground, properly supported on a level platform, and protected from direct exposure to rain, snow, sunlight, and other extreme weather conditions. Provide adequate ventilation to prevent condensation. Store per manufacturer's recommendations for allowable temperature and humidity range. Gypsum wallboard shall not be stored with materials which have high emissions of volatile organic compounds (VOCs) or other contaminants. Do not store panels near materials that may offgas or emit harmful fumes, such as kerosene heaters, fresh paint, or adhesives.

C. Handling

Neatly stack gypsum board and cementitious backer units flat to prevent sagging or damage to the edges, ends, and surfaces.

1.04 QUALIFICATIONS

Furnish type of gypsum board work specialized by the installer with a minimum of 3 years of documented successful experience.

1.05 ENVIRONMENTAL CONDITIONS

Do not expose the gypsum board to excessive sunlight prior to gypsum board application. Maintain a continuous uniform temperature of not less than 50 degrees F and not more than 80 degrees F for at least one week prior to the application of gypsum board work, while the gypsum board application is being done, and for at least one week after the gypsum board is set. Shield air supply and distribution devices to prevent any uneven flow of air across the plastered surfaces. Provide ventilation to exhaust moist air to the outside during gypsum board application, set, and until gypsum board jointing is dry. In glazed areas, keep windows open top and bottom or side to side 3 to 4 inches. Reduce openings in cold weather to prevent freezing of joint compound when applied. For enclosed areas lacking natural ventilation, provide temporary mechanical means for ventilation. In unglazed areas subjected to hot, dry winds or temperature differentials from day to night of 20 degrees F or more, screen openings with cheesecloth or similar materials. Avoid rapid drying. During periods of low indoor humidity, provide minimum air circulation following gypsum boarding and until gypsum board jointing complete and is dry.

A. Temperature

Maintain a uniform temperature of not less than 50 degrees F in the structure for at least 48 hours prior to, during, and following the application of gypsum board, cementitious backer units, and joint treatment materials, or the bonding of adhesives.

B. Exposure to Weather

Protect gypsum board and cementitious backer unit products from direct exposure to rain, snow, sunlight, and other extreme weather conditions.

C. Temporary Ventilation

Provide temporary ventilation for work of this section.

PART 2 PRODUCTS

2.01 MATERIALS

Conform to specifications, standards and requirements specified. Provide gypsum board types, gypsum backing board types, cementitious backing units, and joint treating materials manufactured from asbestos free materials only. Certify that gypsum board types, gypsum backing board types, cementitious backer units, and joint treating materials do not contain asbestos. Submit Material Safety Data Sheets and manufacturer maintenance instructions for gypsum materials including adhesives.

A. Gypsum Board

Requirements per ASTM C1396/C1396M. Gypsum board must contain a minimum of 10 percent post-consumer recycled content, or a minimum of 20 percent post-industrial recycled content. Paper facings must contain a minimum of 100 percent post-consumer recycled paper content. Gypsum cores must contain a minimum of

95 percent post-industrial recycled gypsum content.

1. Regular

48 inch wide, 1/2 and 5/8 inch thick, tapered.

2. Type X (Special Fire-Resistant)

48 inch wide, 1/2 and 5/8 inch thick, tapered edges.

3. Product Data

Submit for each type of gypsum board and for cementitious backer units.

B. Glass Mat Water-Resistant Gypsum Tile Backing Board

Requirements per ASTM C1178/C1178M

1. Regular

48 inch wide, 1/2 and 5/8 inch thick, square edges.

2. Type X (Special Fire-Resistant)

48 inch wide, 1/2 and 5/8 inch thick, square edges.

3. Product Data

Submit for each type of gypsum board and for cementitious backer units.

C. Joint Treatment Materials

Use all purpose joint and texturing compound containing inert fillers and natural binders, including lime compound. Pre-mixed compounds must be free of antifreeze, vinyl adhesives, preservatives, biocides and other slow releasing compounds.

1. Embedding Compound

Specifically formulated and manufactured for use in embedding tape at gypsum board joints and compatible with tape, substrate and fasteners.

2. Finishing or Topping Compound

Specifically formulated and manufactured for use as a finishing compound.

3. All-Purpose Compound

Specifically formulated and manufactured to serve as both a taping and a finishing compound and compatible with tape, substrate and fasteners.

4. Setting or Hardening Type Compound

Specifically formulated and manufactured for use with fiber

glass mesh tape.

5. Joint Tape

Use cross-laminated, tapered edge, reinforced paper, or fiber glass mesh tape recommended by the manufacturer.

D. Fasteners

1. Screws

ASTM C1002, Type "G", Type "S" or Type "W" steel drill screws for fastening gypsum board to gypsum board, wood framing members and steel framing members less than 0.033 inch thick. ASTM C954 steel drill screws for fastening gypsum board to steel framing members 0.033 to 0.112 inch thick. Provide cementitious backer unit screws with a polymer coating.

2. Staples

No. 16 USS gage flattened galvanized wire staples with 7/16 inch wide crown outside measurement and divergent point for base ply of two-ply gypsum board application. Use as follows:

Length of Legs	Thickness of Gypsum Board
1-1/8 inches	1/2 inch
1-1/4 inches	5/8 inch

E. Adhesives

Do not use adhesive containing benzene, carbon tetrachloride, or trichloroethylene. Adhesive shall contain a maximum VOC content of 50 grams per liter. Adhesives to be Type recommended by gypsum board manufacturer.

F. Gypsum Studs

Provide one inch minimum thickness and 6 inch minimum width. Studs may be of one inch thick gypsum board or multilayers fastened to required thickness. Conform to ASTM C1396/C1396M for material.

G. Accessories

Conform to ASTM C1047. Fabricate from corrosion protected steel or plastic designed for intended use. Accessories manufactured with paper flanges are not acceptable. Flanges must be free of dirt, grease, and other materials that may adversely affect bond of joint treatment. Provide prefinished or job decorated materials.

H. Asphalt Impregnated Building Felt

Provide a 15 lb asphalt moisture barrier over glass mat covered

or reinforced gypsum sheathing. Conforming to ASTM D226/D226M Type 1 (No. 15) for asphalt impregnated building felt.

I. Water

Provide clean, fresh, and potable water.

PART 3 EXECUTION

3.01 EXAMINATION

A. Framing and Furring

Verify that framing and furring are securely attached and of sizes and spacing to provide a suitable substrate to receive gypsum board and cementitious backer units. Verify that all blocking, headers and supports are in place to support plumbing fixtures and to receive soap dishes, grab bars, towel racks, and similar items. Do not proceed with work until framing and furring are acceptable for application of gypsum board and cementitious backer units.

B. Gypsum Board and Framing

Verify that surfaces of gypsum board and framing to be bonded with an adhesive are free of dust, dirt, grease, and any other foreign matter. Do not proceed with work until surfaces are acceptable for application of gypsum board with adhesive.

3.02 APPLICATION OF GYPSUM BOARD

Apply gypsum board to framing and furring members in accordance with ASTM C840 or GA 216 and the requirements specified. Apply gypsum board with separate panels in moderate contact; do not force in place. Stagger end joints of adjoining panels. Neatly fit abutting end and edge joints. Use gypsum board of maximum practical length; select panel sizes to minimize waste. Cut out gypsum board to make neat, close, and tight joints around openings. In vertical application of gypsum board, provide panels in lengths required to reach full height of vertical surfaces in one continuous piece. Lay out panels to minimize waste; reuse cutoffs whenever feasible. Surfaces of gypsum board and substrate members may not be bonded together with an adhesive. Treat edges of cutouts for plumbing pipes, screwheads, and joints with water-resistant compound as recommended by the gypsum board manufacturer. Minimize framing by floating corners with single studs and drywall clips. Install 5/8 inch gypsum or 1/2 inch ceiling board over framing at 16 inches on center. Provide type of gypsum board for use in each system specified herein as indicated.

A. Application of Gypsum Board to Steel Framing and Furring

Apply in accordance with ASTM C840, System VIII or GA 216.

B. Glass Mat Covered or Fiber Reinforced Gypsum Sheathing

Apply glass mat covered or fiber reinforced gypsum sheathing in accordance to gypsum association publications GA 253. Follow gypsum sheathing manufacturer's requirements of design details

for joints and fasteners and be properly installed to protect the substrate from moisture intrusion. Do not leave exposed surfaces of the glass mat covered or fiber reinforced gypsum sheathing beyond the manufacturer's recommendation without a weather barrier cladding. Provide continuous asphalt impregnated building felt over sheathing surface in shingle fashion with edges and ends lapped a minimum of 6 inch. Properly flash the openings. Seal all joints, seams, and penetrations with a compatible silicone sealant.

C. Floating Interior Angles

Minimize framing by floating corners with single studs and drywall clips. Locate the attachment fasteners adjacent to ceiling and wall intersections in accordance with ASTM C840, System XII or GA 216, for single-ply applications of gypsum board to wood framing.

D. Control Joints

Install expansion and contraction joints in ceilings and walls in accordance with ASTM C840, System XIII or GA 216. Fill control joints between studs in fire-rated construction with firesafing insulation to match the fire-rating of construction.

3.03 FINISHING OF GYPSUM BOARD

Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Finish plenum areas above ceilings to Level 1 in accordance with GA 214. Finish water resistant gypsum backing board, ASTM C1396/C1396M, to receive ceramic tile to Level 2 in accordance with GA 214. Finish walls and ceilings to receive a heavy-grade wall covering or heave textured finish before painting to Level 3 in accordance with GA 214. Finish walls and ceilings without critical lighting to receive flat paints, light textures, or wall coverings to Level 4 in accordance with GA 214. Unless otherwise specified, finish all gypsum board walls, partitions and ceilings to Level 5 in accordance with GA 214. Provide joint, fastener depression, and corner treatment. Tool joints as smoothly as possible to minimize sanding and dust. Do not use self-adhering fiber glass mesh tape with conventional drying type joint compounds; use setting or hardening type compounds only. Provide treatment for water-resistant gypsum board as recommended by the gypsum board manufacturer. Protect workers, building occupants, and HVAC systems from gypsum dust.

A. Uniform Surface

Wherever gypsum board is to receive eggshell, semigloss or gloss paint finish, or where severe, up or down lighting conditions occur, finish gypsum wall surface in accordance to GA 214 Level 5. In accordance with GA 214 Level 5, apply a thin skim coat of joint compound to the entire gypsum board surface, after the two-coat joint and fastener treatment is complete and dry.

3.04 SEALING

Seal openings around pipes, fixtures, and other items projecting through gypsum board and cementitious backer units as specified in Section 07 92 00 JOINT SEALANTS. Apply material with exposed surface

flush with gypsum board or cementitious backer units.

A. Sealing for Glass Mat or Reinforced Gypsum Board Sheathing

Apply silicone sealant in a 3/8 inch bead to all joints and trowel flat. Apply enough of the same sealant to all fasteners penetrating through the glass mat gypsum board surface to completely cover the penetration when troweled flat. Do not place construction and materials behind sheathing until a visual inspection of sealed joints during daylight hours has been completed by Contracting Officer.

3.05 FIRE-RESISTANT ASSEMBLIES

Wherever fire-rated construction is indicated, provide materials and application methods, including types and spacing of fasteners, wall and ceiling framing in accordance with the specifications contained in UL Fire Resistance for the Design Number(s) indicated. Joints of fire-rated gypsum board enclosures must be closed and sealed in accordance with UL test requirements or GA requirements. Seal penetrations through rated partitions and ceilings tight in accordance with tested systems.

3.06 PATCHING

Patch surface defects in gypsum board to a smooth, uniform appearance, ready to receive finishes.

-- End of Section --

SECTION 09 30 13

CERAMIC TILING
10/17

PART 1 GENERAL

1.01 RELATED SECTIONS

1. Section 01 33 00, SUBMITTAL PROCEDURES.
2. Section 01 61 00, COMMON PRODUCT REQUIREMENTS.
3. Section 01 74 19, CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.
4. Section 01 78 00, CLOSEOUT SUBMITTALS.
5. Section 07 92 00, JOINT SEALANTS.
6. Section 09 29 00, GYPSUM BOARD.
7. Section 10 28 13, TOILET ACCESSORIES.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A118.1	(2012) American National Standard Specifications for Dry-Set Cement Mortar

ASTM INTERNATIONAL (ASTM)

ASTM C144	(2011) Standard Specification for Aggregate for Masonry Mortar
ASTM C207	(2006; R 2011) Standard Specification for Hydrated Lime for Masonry Purposes

CANADIAN GENERAL STANDARDS BOARD (CGSB)

CAN/CGSB-75.1	Tile, Ceramic

CANADIAN STANDARDS ASSOCIATION (CSA)

CAN/CSA-A5	(1998) Portland Cement

TERRAZZO TILE AND MARBLE ASSOCIATION OF CANADA (TTMAC)

TTMAC Guide 09300	Tile Specifications and Installation Manual

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation;

submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Ceramic Tile; G, AE

Mortar And Adhesive Materials; G, AE

Grout; G, AE

Thresholds; G, AE

Sealant; G, AE

Mortar Bed; G, AE

Compounds; G, AE

SD-04 Samples

Tile Samples; G, AE

SD-08 Manufacturer's Instructions

Floor Sealer And Protective Coating; G, AE

SD-11 Closeout Submittals

Maintenance Materials; G

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle and protect materials in accordance with Section 01 61 00, COMMON PRODUCT REQUIREMENTS.

B. Deliver, store and handle products in a manner to avoid damage or contamination.

C. Have materials delivered to job site prior to installation.

D. Deliver all products to job site in manufacturer's unopened cartons with all labels intact and legible.

E. Keep cartons dry and protect from vandalism and away from heavy traffic area.

F. Store cartons in upright position.

1.05 ENVIRONMENTAL CONDITIONS

A. Maintain air temperature and structural base temperature at ceramic tile installation area above 12°C for 48 hours before, during, and 48 hours after, installation.

B. Do not install tiles at temperatures less than 12°C or above 38°C.

C. Do not apply epoxy mortar and grouts at temperatures below 15°C or above 25°C.

1.06 EXTRA MATERIALS

A. Provide maintenance materials in accordance with Section 01 78 00, CLOSEOUT SUBMITTALS.

B. Provide minimum 2 percent of each type and color of tile required for project for maintenance use. Store where directed.

C. Maintenance material to be of same production run as installed material.

1.07 QUALIFICATIONS

Tile setters: Minimum 5 years proven experience.

1.08 MOCK-UP

A. Construct mock-ups in accordance with Section 01 45 00, CONTRACTOR QUALITY CONTROL.

B. Allow two (2) working days for inspection of mock-up by Contracting Officer before proceeding with work.

C. When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

D. Submit tile samples for each color, texture, size and pattern.

1. Duplicate 300 x 300 mm sample panels of each color, texture, size, and pattern of tile.

2. Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, color, and size.

3. Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.

1.09 QUALITY ASSURANCE

A. Provide certificate of quality compliance from tile manufacturer.

B. Provide certificate of quality compliance from tile installer upon satisfactory completion of installation.

PART 2 PRODUCTS

2.01 WALL TILE

Ceramic tile: to CAN/CGSB-75.1, Type 5, Class MR 4, size as indicated on drawings, rounded edges, glazed surface, color as selected by Contracting Officer. Matching bullnose edge trim to suit application.

2.02 TRIM SHAPES

A. Conform to applicable requirements of adjoining floor and wall tile.

B. Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.

2.03 MORTAR AND ADHESIVE MATERIALS

A. Portland cement: to CAN/CSA-A5, type 10.

B. Sand: to ASTM C144, passing 16 mesh.

C. Hydrated lime: to ASTM C207, Type N.

D. Latex additive: formulated for use in portland cement mortar and thin set bond coat.

E. Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.

F. Dry set mortar: to ANSI A118.1.

2.04 GROUT

A. Portland cement grout: as recommended by tile manufacturer.

B. Dry curing wall grout: as recommended by tile manufacturer.

C. Grout preparation: to manufacturers instructions.

2.05 ACCESSORIES

A. Thresholds: marble, 12 mm thick, rounded edges two sides, honed finish to exposed surfaces, size to suit door opening and frame width.

B. Sealant: acrylics one part, mildew resistant, in accordance with Section 07 92 00, JOINT SEALANTS.

C. Floor sealer and protective coating: to tile and grout manufacturers recommendations.

2.06 MORTAR AND ADHESIVE MIXES

A. Mortar bed for floors: 1 part Portland cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included. Mortar bed for walls 1 part portland cement, 1/5 Dry set mortar: mix to manufacturer's instructions.

B. Organic adhesive: pre-mixed.

C. Mix bond and levelling compounds, and grout to manufacturer's instructions.

D. Adjust water volumes to suit water content of sand.

2.07 CLEANING COMPOUNDS

A. Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.

B. Materials containing acid or caustic material are not acceptable.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. Do tile work in accordance with TTMAC Tile Installation Manual, TTMAC Guide 09300 "Ceramic Tile", latest edition.

B. Apply tile to clean and sound surfaces.

C. Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.

D. Maximum surface tolerance 1:800.

E. Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.

F. Lay out tiles so perimeter tiles are minimum 1/2 size.

G. Sound tiles after setting and replace hollow-sounding units to obtain full bond.

H. Make internal angles square, external angles bullnosed.

I. Use bullnose edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.

J. Install divider strips at junction of tile flooring and dissimilar materials.

K. Allow minimum 24 h after installation of tiles, before grouting.

L. Clean installed tile surfaces after installation and grouting cured.

M. Make control joints where indicated. Make joint width same as tile joints. Fill control joints with sealant in accordance with Section 07 92 00, JOINT SEALANTS. Keep building expansion joints free of mortar and grout.

3.02 WALL TILE

Install in accordance with TTMAC details 302W-2002, 303W-2002, 305W-2002.

3.03 FLOOR SEALER AND PROTECTIVE COATING

Apply in accordance with manufacturer's instructions.

Apply floor sealer and protective coating before equipment installation.

3.04 COMMISSIONING

A. Train user staff in the care and cleaning of ceramic tile and in the application of sealers.

B. Train user staff in the repair and or replacement of damaged tiles.

-- End of Section --

SECTION 09 51 00

ACOUSTICAL CEILINGS
08/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A489	(2012) Standard Specification for Carbon Steel Lifting Eyes
ASTM A641/A641M	(2009a; R 2014) Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
ASTM C423	(2009a) Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
ASTM C635/C635M	(2013a) Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings
ASTM C636/C636M	(2013) Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
ASTM C834	(2017) Standard Specification for Latex Sealants
ASTM E1264	(2014) Acoustical Ceiling Products
ASTM E1414/E1414M	(2011a; E 2014) Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
ASTM E580/E580M	(2014) Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions
ASTM E795	(2016) Standard Practices for Mounting Test Specimens During Sound Absorption Tests

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-310-04	(2013) Seismic Design for Buildings

1.02 SYSTEM DESCRIPTION

Provide sound controlling units mechanically mounted on a ceiling suspension system for acoustical treatment. The unit size, texture, finish, and color must be as specified. The location and extent of acoustical treatment shall be as shown on the approved detail drawings. Submit shop drawings showing suspension system, method of anchoring and fastening, details, and reflected ceiling plan.

A. Ceiling Attenuation Class and Test

Provide a ceiling system with an attenuation class (CAC) of not less than 35 when determined in accordance with ASTM E1414/E1414M. Provide fixture attenuators over light fixtures and other ceiling penetrations, and provide acoustical blanket insulation adjacent to partitions, as required to achieve the specified CAC. Provide test ceiling continuous at the partition and assembled in the suspension system in the same manner that the ceiling will be installed on the project.

B. Ceiling Sound Absorption

Determine the Noise Reduction Coefficient (NRC) in accordance with ASTM C423 Test Method.

C. Light Reflectance

Determine light reflectance factor in accordance with ASTM E1477 Test Method.

D. Other Submittal Requirements

The following shall be submitted:

a. Manufacturer's data indicating percentage of recycle material in acoustic ceiling tiles to verify affirmative procurement compliance.

b. Total weight and volume quantities of acoustic ceiling tiles with recycle material.

c. Manufacturer's catalog showing UL classification of fire-rated ceilings giving materials, construction details, types of floor and roof constructions to be protected, and UL design number and fire protection time rating for each required floor or roof construction and acoustic ceiling assembly.

d. Reports by an independent testing laboratory attesting that acoustical ceiling systems meet specified sound transmission requirements. Data attesting to conformance of the proposed system to Underwriters Laboratories requirements for the fire endurance rating listed in UL Fire Resistance may be submitted in lieu of test reports.

e. Recycled materials certificate attesting that the mineral based acoustical units furnished for the project contain recycled material and showing an estimated percent of such material.

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Suspension System, Method Of Anchoring And Fastening, Details, And Reflected Ceiling Plan; G, AE

SD-03 Product Data

UL Classification Of Fire-Rated Ceilings; G, AE

Acoustical Units; G, AE

SD-04 Samples

Acoustical Unit; G, AE

Suspension Grid Tee Section; G, AE

SD-06 Test Reports

Sound Transmission Requirements; G, AE

SD-07 Certificates

Recycled Materials Certificate

1.04 DELIVERY, STORAGE. AND HANDLING

Deliver materials to the site in the manufacturer's original unopened containers with brand name and type clearly marked. Carefully handle and store materials in dry, watertight enclosures. Immediately before installation, store acoustical units for not less than 24 hours at the same temperature and relative humidity as the space where they will be installed in order to assure proper temperature and moisture acclimation.

1.05 ENVIRONMENTAL REQUIREMENTS

Maintain a uniform temperature of not less than 60 degrees F nor more than 85 degrees F and a relative humidity of not more than 70 percent for 24 hours before, during, and 24 hours after installation of acoustical units.

1.06 SCHEDULING

Complete and dry interior finish work such as plastering, concrete and terrazzo work before ceiling installation. Complete mechanical, electrical, and other work above the ceiling line; install and start operating heating, ventilating, and air conditioning systems in order to maintain temperature and humidity requirements.

1.07 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a one year period. Include an agreement to repair or replace acoustical panels that fail within the warranty period in the standard performance guarantee or warranty. Failures include, but are not limited to, sagging and warping of panels; rusting and manufacturers defects of grid system.

1.08 EXTRA MATERIALS

Furnish 10% spare tiles, from the same lot as those installed, of each color.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

Submit two samples of each type of acoustical unit and each type of suspension grid tee section showing texture, finish, and color. Conform acoustical units to ASTM E1264, Class A, and the following requirements:

A. Units for Exposed-Grid System A

1. Type

III (non-asbestos mineral fiber with painted finish).

2. Flame Spread

Class A, 25 or less

3. Minimum NRC

0.60 when tested on mounting Type E-400 of ASTM E795.

4. Minimum Light Reflectance Coefficient
0.75 or greater.

5. Nominal Size

24 by 48 inch (ACT-1), and 24 by 48 inch (ACT-2)

6. Edge Detail

Square

7. Finish

Factory-applied standard finish .

8. Minimum CAC

35

2.02 SUSPENSION SYSTEM

Provide standard direct hung, concealed, downward access narrow width flange suspension system conforming to ASTM C635/C635M for intermediate-duty systems. Provide surfaces exposed to view of aluminum with a clear anodized finish. Provide wall molding having a flange of not less than 15/16 inch. Provide mitered corners. Suspended ceiling framing system must have the capability to support the finished ceiling, light fixtures, air diffusers, and accessories, as shown. Provide a suspension system with a maximum deflection of 1/360 of the span length. Conform seismic details to the guidance in UFC 3-310-04 and ASTM E580/E580M.

2.03 HANGERS

Provide hangers and attachment capable of supporting a minimum 300 pound ultimate vertical load without failure of supporting material or attachment.

A. Wires

Conform wires to ASTM A641/A641M, Class 1, 0.08 inch (12 gauge) in diameter.

B. Eyebolts

Provide eyebolts of weldless, forged-carbon-steel, with a straight-shank in accordance with ASTM A489. Eyebolt size must be a minimum 1/4 inch, zinc coated.

2.04 ACCESS PANELS

Provide access panels that match adjacent acoustical units, designed and equipped with suitable framing and fastenings for removal and replacement without damage. Size panel to be not less than 12 by 12 inch or more than 12 by 24 inch.

a. Attach an identification plate of 0.032 inch thick aluminum, 3/4 inch in diameter, stamped with the letters "AP" and finished the same as the unit, near one corner on the face of each access panel.

b. Identify ceiling access panel by a number utilizing white identification plates or plastic buttons with contrasting numerals. Provide plates or buttons of minimum 1 inch diameter and securely attached to one corner of each access unit. Provide a typewritten card framed under glass listing the code identification numbers and corresponding system descriptions listed above. Mount the framed card where directed and furnish a duplicate card to the Contracting Officer. Code identification system is as follows:

1. Fire detection/alarm system

2. Air conditioning controls

3. Plumbing system

4. Heating and steam systems

5. Air conditioning duct system

2.05 ADHESIVE

Use adhesive as recommended by tile manufacturer.

2.06 FINISHES

Use manufacturer's standard textures, patterns and finishes as specified for acoustical units and suspension system members. Treat ceiling suspension system components to inhibit corrosion.

2.07 ACOUSTICAL SEALANT

Conform acoustical sealant to ASTM C834, nonstaining.

PART 3 EXECUTION

3.01 INSTALLATION

Do not install building construction materials that show visual evidence of biological growth.

Examine surfaces to receive directly attached acoustical units for unevenness, irregularities, and dampness that would affect quality and execution of the work. Rid areas, where acoustical units will be cemented, of oils, form residue, or other materials that reduce bonding capabilities of the adhesive. Complete and dry interior finish work such as plastering, concrete, and terrazzo work before installation. Complete and approve mechanical, electrical, and other work above the ceiling line prior to the start of acoustical ceiling installation. Provide acoustical work complete with necessary fastenings, clips, and other accessories required for a complete installation. Do not expose mechanical fastenings in the finished work. Lay out hangers for each individual room or space. Provide hangers to support framing around beams, ducts, columns, grilles, and other penetrations through ceilings. Keep main runners and carrying channels clear of abutting walls and partitions. Provide at least two main runners for each ceiling span. Wherever required to bypass an object with the hanger wires, install a sususpension system so that all hanger wires will be plumb.

A. Suspension System

Install suspension system in accordance with ASTM C636/C636M and as specified herein. Do not suspend hanger wires or other loads from underside of steel decking.

1. Plumb Hangers

Install hangers plumb and not pressing against insulation covering ducts and pipes. Where lighting fixtures are supported from the suspended ceiling system, provide hangers at a minimum of four hangers per fixture and located not more than 6 inch from each corner of each fixture.

2. Splayed Hangers

Where hangers must be splayed (sloped or slanted) around obstructions, offset the resulting horizontal force by bracing, countersplaying, or other acceptable means.

B. Wall Molding

Provide wall molding where ceilings abut vertical surfaces. Miter corners where wall moldings intersect or install corner caps. Secure wall molding not more than 3 inch from ends of each length and not more than 16 inch on centers between end fastenings. Provide wall molding springs at each acoustical unit in semi-exposed or concealed systems.

C. Acoustical Units

Install acoustical units in accordance with the approved installation instructions of the manufacturer. Ensure that edges of acoustical units are in close contact with metal supports, with each other, and in true alignment. Arrange acoustical units so that units less than one-half width are minimized. Hold units in exposed-grid system in place with manufacturer's standard hold-down clips, if units weigh less than 1 psf or if required for fire resistance rating.

D. Caulking

Seal all joints around pipes, ducts or electrical outlets penetrating the ceiling. Apply a continuous ribbon of acoustical sealant on vertical web of wall or edge moldings.

E. Adhesive Application

Wipe back of tile to remove accumulated dust. Daub acoustical units on back side with four equal daubs of adhesive. Apply daubs near corners of tiles. Ensure that contact area of each daub is at least 2 inch diameter in final position. Press units into place, aligning joints and abutting units tight and uniform without differences in joint widths.

3.02 CEILING ACCESS PANELS

Locate ceiling access panels directly under the items which require access.

3.03 CLEANING

Following installation, clean dirty or discolored surfaces of acoustical units and leave them free from defects. Remove units that are damaged or improperly installed and provide new units as directed.

-- End of Section --

SECTION 09 65 13

RESILIENT BASE AND ACCESSORIES
10/17

PART 1 GENERAL

1.01 SUMMARY

Section Includes:

1. Resilient base (RB) adhered to interior walls and partitions.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D4259	(1988; R 2012) Standard Practice for Abrading Concrete
ASTM F1861	(2016) Standard Specification for Resilient Wall Base

INTERNATIONAL CONCRETE REPAIR INSTITUTE (ICRI)

ICRI 310.2R 13	Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Description Of Each Product; G, AE

Adhesives And Primers; G, AE

SD-04 Samples

Resilient Base; G, AE

SD-08 Manufacturer's Instructions

Installation Instructions; G, AE

SD-10 Operation and Maintenance Data

Care Instructions; G, AE

1.04 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.

B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.

C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.05 STORAGE AND HANDLING

A. Store products indoors in dry, weathertight facility.

B. Protect products from damage when handling and during construction operations.

1.06 FIELD CONDITIONS

A. Environment:

1. Product Temperature: Minimum 21 degrees C (70 degrees F) for minimum 48 hours before installation.

2. Work Area Ambient Temperature Range: 21 to 27 degrees C (70 to 80 degrees F) continuously, beginning 48 hours before installation.

3. Install products when building is permanently enclosed and when wet construction is completed, dried, and cured.

1.07 WARRANTY

Construction Warranty: FAR clause 52.246 21, "Warranty of Construction."

PART 2 PRODUCTS

2.01 PRODUCTS

A. Basis of Design: See Contract Drawings, SCHEDULE FOR FINISHES.

B. Provide each product from one manufacturer and from one production run.

2.02 RESILIENT BASE

A. Resilient Base: 3 mm (1/8 inch) thick, 100 mm (4 inches) high.

1. Type: Rubber or vinyl; use one type throughout.

2. ASTM F1861, Type TP thermoplastic rubber or Type TV thermoplastic vinyl, Group 2 - layered.

B. Applications:

1. Carpet Flooring Locations: Style A - Straight.

2. Other Locations: Style B - Cove.

2.03 ADHESIVES

Adhesives: Low pollutant emitting, water based type recommended by adhered product manufacturer for each application.

2.04 PRODUCT INFORMATION

Provide the following product information:

A. Manufacturer's Literature and Data:

1. Description of each product.

2. Adhesives and primers indicating manufacturer's recommendation for each application.

3. Installation instructions.

B. Samples:

1. Resilient Base: 150 mm (6 inches) long, each type and color.

C. Operation and Maintenance Data:

1. Care instructions for each exposed finish product.

PART 3 EXECUTION

3.01 PREPARATION

A. Examine and verify substrate suitability for product installation.

B. Protect existing construction and completed work from damage

C. Remove existing base to permit new installation.

1. Dispose of removed materials.

D. Correct substrate deficiencies.

1. Fill cracks, pits, and depressions with leveling compound.

2. Remove protrusions; grind high spots.

3. Apply leveling compound to achieve 3 mm (1/8 inch) in 3 m (10 feet) maximum surface variation.

E. Clean substrates. Remove contaminants capable of affecting subsequently installed product's performance.

1. Mechanically clean concrete floor substrate according to ASTM D4259.

2. Surface Profile: ICRI 310.2R 13.

F. Allow substrate to dry and cure.

3.02 INSTALLATION: GENERAL

Install products according to manufacturer's instructions. When instructions deviate from specifications, submit proposed resolution for Contracting Officer consideration.

3.03 RESILIENT BASE INSTALLATION

A. Applications:

1. Install resilient base in rooms scheduled on Drawings.

2. Install resilient base on casework and other curb supported fixed equipment.

3. Extend resilient base into closets, alcoves, and cabinet knee spaces, and around columns within scheduled room.

B. Lay out resilient base with minimum number of joints.

1. Length: 600 mm (24 inches) minimum, each piece.

2. Locate joints 150 mm (6 inches) minimum from corners and intersection of adjacent materials.

C. Installation:

1. Apply adhesive uniformly for full contact between resilient base and substrate.

2. Set resilient base with hairline butted joints aligned along top edge.

D. Field form corners and end stops.

1. V groove back of outside corner.

2. V groove face of inside corner and notch cove for miter joint.

E. Roll resilient base ensuring complete adhesion.

3.04 CLEANING

A. Remove excess adhesive before adhesive sets.

B. Clean exposed resilient base surfaces. Remove contaminants and stains.

1. Clean with mild detergent. Leave surfaces free of detergent residue.

C. Polish exposed resilient base to gloss sheen.

3.05 PROTECTION

A. Protect products from construction traffic and operations. Maintain protection until directed by Contracting Officer's Representative.

C. Replace damaged products and reclean.

1. Damaged Products include cut, gouged, scraped, torn, and unbonded products.

-- End of Section --

SECTION 09 77 00

SPECIAL WALL SURFACING
11/17

PART 1 GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D256	(2010) Determining the Izod Pendulum Impact Resistance of Plastics
ASTM D5319	(2017) Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels
ASTM D638	(2014) Standard Test Method for Tensile Properties of Plastics
ASTM D790	(2015; E 2016; E 2016) Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM E84	(2016) Standard Test Method for Surface Burning Characteristics of Building Materials

1.03 SUMMARY

A. Section Includes: Durable wall panels with smooth or textured finishes. Mounting hardware, adhesives, accessories and trims.

1.04 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "GG" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Accessories; G, AE

Glass-Fiber-Reinforced Plastic Paneling; G, AE

SD-04 Samples

Manufacturer's Standard Molding; G, AE

Glass-Fiber-Reinforced Plastic Panels; G, AE

SD-08 Manufacturer's Instructions

Installation; G, AE

1.05 QUALITY ASSURANCE

A. Testing Agency: Acceptable to authorities having jurisdiction.

1.06 PROJECT CONDITIONS

Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.

2.02 COMPOSITE PLASTIC SHEET PANELING

A. Provide Fiberglass Reinforced (FRP) Plastic with Corrugated Plastic Core Wall Panels complying with the following performance requirements

B. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D5319.

1. Surface-Burning Characteristics:As follows when tested by a qualified testing agency according to ASTM E84. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 25 or less.

b. Some-Developed Index: 450 or less.

2. Nominal Thickness: Not less than 0.200 inch.

3. Surface Finish: Smooth.

4. Color: White.

C. Flexural Strength (ASTM D790): Not less than 2,407 lbf/square inch.

D. Flexural Modulus (ASTM D790): 105,782 psi.

E. Tensile Strength (ASTM D638): 1,121 psi.

F. Izod Impact (ASTM D256): 2.87 ft-lb/in.

2.03 ACCESSORIES

A. Trim Accessories: Manufacturer's standard molding designed to retain and cover edges of panels. Provide division bars, inside corners, and caps as needed to conceal edges.

1. Color: White.

B. Adhesive: Provide panel adhesive as recommended by panel manufacturer.

C. Sealants: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 07 92 00 "JOINT SEALANTS."

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.

B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.

C. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.

1. Mark plumb lines on substrate at trim accessory locations for accurate installation.

2. Locate trim accessories to allow clearance at panel edges according to manufacturer's written instructions.

3.03 INSTALLATION

A. Install plastic paneling according to manufacturer's written instructions.

B. Install panels with fasteners. Layout fastener locations and mark on face of panels so that fasteners are accurately aligned.

C. Install trim accessories and molding per manufacturers recommendations.

D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.

E. Maintain uniform space between adjacent panels and between panels and floors, ceilings, and fixtures. Fill space with sealant.

F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

-- End of Section --

SECTION 09 81 16

ACOUSTIC BLANKET INSULATION
10/17

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Provide glass fiber acoustical blanket insulation for interior partitions.

B. Related Sections:

1. Section 09 29 00, GYPSUM BOARD.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C423	(2009a) Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
ASTM C665	(2012) Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
ASTM E119	(2016a) Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E84	(2016) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E136	(2016) Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Glass Fiber Acoustical Insulation; G, AE

SD-08 Manufacturer's Instructions

Installation; G, AE

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original packaging.

B. Store and protect products in accordance with manufacturer's instructions. Store in a dry indoors location. Protect insulation materials from moisture and soiling.

C. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

D. Do not install insulation that has been damaged or wet. Remove it from jobsite.

1. An exception may be allowed in cases where the contractor is able to demonstrate that wet insulation when fully dried out (either before installation or afterward following exposure to system operating temperatures) will provide installed performance that is equivalent in respects to new, completely dry insulation. In such cases, consult the insulation manufacturer for technical assistance.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Owens Corning Insulating Systems, LLC, Toledo, OH 43659; www.owenscorning.com.

B. CertainTeed, Web: https://www.certainteed.com

C. Thermafiber, https://www.thermafiber.com

D. Substitutions: Or approved equal.

2.02 ACOUSTIC BLANKET INSULATION (SOUND ATTENUATION BATTS), FIRE-RATED

A. Type

Unfaced glass fiber acoustical insulation, complying with ASTM C665, Type I.

Thickness	Width	Length
3-1/2" 89mm	16" 406mm - 24" 609mm	96" 2438mm

B. Surface Burning Characteristics:

1. In accordance with ASTM E84.
2. Maximum flame spread: 10.
3. Maximum smoke developed: 10.

C. Combustion Characteristics

Passes ASTM E136.

D. Fire Resistance Ratings

Part of ASTM E119 fire tested wall assemblies.

E. Sound Transmission Class

ASTM C423, STC 54.

F. Dimensional Stability

Linear Shrinkage less than 0.1%.

G. Product Data

Submit product characteristics, performance criteria, and limitations, including installation instructions, for each type of product indicated

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which the work of this Section is to be performed. Notify the Contracting Officer in writing of any unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Verify mechanical and electrical services within the partition have been tested and inspected.

3.02 INSTALLATION

A. Comply with manufacturer's installation instructions.

B. Friction-fit blanket insulation in place, until the interior finish is applied. Install batts to fill entire stud cavity, with no gaps, voids, or areas of compression. If stud cavity is less than 8 feet in height, cut lengths to friction fit against floor and ceiling tracks. Walls with penetrations require that insulation be carefully cut to fit around outlets, junction boxes, and other irregularities.

C. Where walls are not finished on both sides or where insulation does not fill the cavity depth, install supplementary support to hold product in place.

D. Where insulation must extend higher than 8 feet, provide temporary support to hold product in place, until finish material is applied.

3.03 PROTECTION

Protect installed insulation as recommended by manufacturer.

-- End of Section --

SECTION 09 90 00

PAINTING AND COATING
05/11

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH 0100	(2015; Suppl 2002-2016) Documentation of the Threshold Limit Values and Biological Exposure Indices

ASME INTERNATIONAL (ASME)

ASME A13.1	(2015) Scheme for the Identification of Piping Systems

ASTM INTERNATIONAL (ASTM)

ASTM C920	(2014a) Standard Specification for Elastomeric Joint Sealants
ASTM D235	(2002; R 2012) Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)
ASTM D2824/D2824M	(2013) Aluminum-Pigmented Asphalt Roof Coatings, Non-Fibered, Asbestos Fibered, and Fibered without Asbestos
ASTM D4214	(2007; R 2015) Standard Test Method for Evaluating the Degree of Chalking of Exterior Paint Films
ASTM D4263	(1983; R 2012) Indicating Moisture in Concrete by the Plastic Sheet Method
ASTM D4444	(2013) Use and Calibration of Hand-Held Moisture Meters
ASTM D523	(2014) Standard Test Method for Specular Gloss
ASTM D6386	(2016) Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
ASTM F1869	(2016) Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

MASTER PAINTERS INSTITUTE (MPI)

MPI 1	(Oct 2009) Aluminum Paint
MPI 10	(Oct 2009) Exterior Latex, Flat, MPI Gloss Level 1
MPI 101	(Oct 2009) Epoxy Anti-Corrosive Metal Primer
MPI 107	(Oct 2009) Rust Inhibitive Primer (Water-Based)
MPI 108	(Oct 2009) High Build Epoxy Coating, Low Gloss
MPI 11	(Oct 2009) Exterior Latex, Semi-Gloss, MPI Gloss Level 5
MPI 119	(Oct 2009) Exterior Latex, Gloss
MPI 134	(Oct 2009) Galvanized Primer (Waterbased)
MPI 138	(Oct 2009) Interior High Performance Latex, MPI Gloss Level 2
MPI 139	(Oct 2009) Interior High Performance Latex, MPI Gloss Level 3
MPI 140	(Oct 2009) Interior High Performance Latex, MPI Gloss Level 4
MPI 141	(Oct 2009) Interior High Performance Latex MPI Gloss Level 5
MPI 144	(Oct 2009) Institutional Low Odor / VOC Interior Latex, MPI Gloss Level 2
MPI 145	(Oct 2009) Institutional Low Odor / VOC Interior Latex, MPI Gloss Level 3
MPI 146	(Oct 2009) Institutional Low Odor/VOC Interior Latex, MPI Gloss Level 4
MPI 147	(May 2016) Institutional Low Odor / VOC Interior Latex, Semi-Gloss, MPI Gloss Level 5
MPI 153	(Oct 2009) Interior W.B. Light Industrial Coating, Semi-Gloss, MPI Gloss Level 5
MPI 161	(Oct 2009) Exterior W.B. Light Industrial Coating, MPI Gloss Level 3
MPI 163	(Oct 2009) Exterior W.B. Light Industrial Coating, Semi-Gloss, MPI Gloss Level 5
MPI 164	(Oct 2009) Exterior W.B. Light Industrial Coating, Gloss, MPI Gloss Level 6

MPI 19	(Oct 2009) Inorganic Zinc Rich Primer
MPI 2	(Oct 2009) Aluminum Heat Resistant Enamel (up to 427 C and 800 F
MPI 22	(Oct 2009) Aluminum Paint, High Heat (up to 590 degrees C and 1100 degrees F.
MPI 26	(Oct 2009) Cementitious Galvanized Metal Primer
MPI 27	(Oct 2009) Exterior / Interior Alkyd Floor Enamel, Gloss
MPI 39	(Oct 2009) Interior Latex-Based Wood Primer
MPI 42	(Oct 2009) Latex Stucco and Masonry Textured Coating
MPI 44	(Oct 2009) Interior Latex, MPI Gloss Level 2
MPI 47	(Oct 2009) Interior Alkyd, Semi-Gloss, MPI Gloss Level 5
MPI 48	(Oct 2009) Interior Alkyd, Gloss, MPI Gloss Level 6
MPI 49	(Oct 2009) Interior Alkyd, Flat, MPI Gloss Level 1
MPI 50	(Oct 2009) Interior Latex Primer Sealer
MPI 51	(Oct 2009) Interior Alkyd, Eggshell, MPI Gloss Level 2
MPI 52	(Oct 2009) Interior Latex, MPI Gloss Level 3
MPI 54	(Oct 2009) Interior Latex, Semi-Gloss, MPI Gloss Level 5
MPI 72	(Oct 2009) Polyurethane, Two Component, Pigmented, Gloss
MPI 77	(Oct 2009) Epoxy Gloss
MPI 79	(Oct 2009) Alkyd Anti-Corrosive Metal Primer
MPI 8	(Oct 2009) Exterior Alkyd, Flat, MPI Gloss Level I
MPI 9	(Oct 2009) Exterior Alkyd, Gloss, MPI Gloss Level 6
MPI 94	(Oct 2009) Exterior Alkyd, Semi-Gloss, MPI Gloss Level 5

MPI 95	(Oct 2009) Quick Drying Primer for Aluminum

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS SP-01	(2000) Environmentally Preferable Product Specification for Architectural and Anti-Corrosive Paints

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC 7/NACE No.4	(2007; E 2004) Brush-Off Blast Cleaning
SSPC PA 1	(2016) Shop, Field, and Maintenance Coating of Metals
SSPC PA Guide 3	(1982; E 1995) A Guide to Safety in Paint Application
SSPC QP 1	(2012; E 2012) Standard Procedure for Evaluating Painting Contractors (Field Application to Complex Industrial Structures)
SSPC SP 1	(2015) Solvent Cleaning
SSPC SP 10/NACE No. 2	(2007) Near-White Blast Cleaning
SSPC SP 12/NACE No.5	(2002) Surface Preparation and Cleaning of Metals by Waterjetting Prior to Recoating
SSPC SP 2	(1982; E 2000; E 2004) Hand Tool Cleaning
SSPC SP 3	(1982; E 2004) Power Tool Cleaning
SSPC SP 6/NACE No.3	(2007) Commercial Blast Cleaning
SSPC VIS 1	(2002; E 2004) Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning
SSPC VIS 3	(2004) Guide and Reference Photographs for Steel Surfaces Prepared by Hand and Power Tool Cleaning
SSPC VIS 4/NACE VIS 7	(1998; E 2000; E 2004) Guide and Reference Photographs for Steel Surfaces Prepared by Waterjetting

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA Method 24	(2000) Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface

Coatings

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FED-STD-313	(2014; Rev E) Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED NC	(2009) Leadership in Energy and Environmental Design(tm) New Construction Rating System

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.1000	Air Contaminants

1.02 DEFINITIONS AND ABBREVIATIONS

A. Qualification Testing

Qualification testing is the performance of all test requirements listed in the product specification. This testing is accomplished by MPI to qualify each product for the MPI Approved Product List, and may also be accomplished by Contractor's third party testing lab if an alternative to Batch Quality Conformance Testing by MPI is desired.

B. Batch Quality Conformance Testing

Batch quality conformance testing determines that the product provided is the same as the product qualified to the appropriate product specification. This testing shall only be accomplished by MPI testing lab.

C. Coating

A film or thin layer applied to a base material called a substrate. A coating may be a metal, alloy, paint, or solid/liquid suspensions on various substrates (metals, plastics, wood, paper, leather, cloth, etc.). They may be applied by electrolysis, vapor deposition, vacuum, or mechanical means such as brushing, spraying, calendaring, and roller coating. A coating may be applied for aesthetic or protective purposes or both. The term "coating" as used herein includes emulsions, enamels, stains, varnishes, sealers, epoxies, and other coatings, whether used as primer, intermediate, or finish coat. The terms paint and coating are used interchangeably.

D. DFT or dft

Dry film thickness, the film thickness of the fully cured, dry paint or coating.

E. DSD

Degree of Surface Degradation, the MPI system of defining degree

of surface degradation. Five (5) levels are generically defined under the Assessment sections in the MPI Maintenance Repainting Manual.

F. EPP

Environmentally Preferred Products, a standard for determining environmental preferability in support of Executive Order 13101.

G. EXT

MPI short term designation for an exterior coating system.

H. INT

MPI short term designation for an interior coating system.

I. micron / microns

The metric measurement for 0.001 mm or one/one-thousandth of a millimeter.

J. mil / mils

The English measurement for 0.001 in or one/one-thousandth of an inch, equal to 25.4 microns or 0.0254 mm.

K. mm

The metric measurement for millimeter, 0.001 meter or one/one-thousandth of a meter.

L. MPI Gloss Levels

MPI system of defining gloss. Seven (7) gloss levels (G1 to G7) are generically defined under the Evaluation sections of the MPI Manuals. Traditionally, Flat refers to G1/G2, Eggshell refers to G3, Semigloss refers to G5, and Gloss refers to G6.

Gloss levels are defined by MPI as follows:

Gloss Level	Description	Units at 60 degrees	Units at 85 degrees
G1	Matte or Flat	0 to 5	10 max
G2	Velvet	0 to 10	10 to 35
G3	Eggshell	10 to 25	10 to 35
G4	Satin	20 to 35	35 min
G5	Semi-Gloss	35 to 70	
G6	Gloss	70 to 85	
G7	High Gloss		

Gloss is tested in accordance with ASTM D523. Historically, the Government has used Flat (G1 / G2), Eggshell (G3), Semi-Gloss (G5), and Gloss (G6).

M. MPI System Number

The MPI coating system number in each Division found in either

the MPI Architectural Painting Specification Manual or the Maintenance Repainting Manual and defined as an exterior (EXT/REX) or interior system (INT/RIN). The Division number follows the CSI Master Format.

N. Paint

See Coating definition.

O. REX

MPI short term designation for an exterior coating system used in repainting projects or over existing coating systems.

P. RIN

MPI short term designation for an interior coating system used in repainting projects or over existing coating systems.

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

The current MPI, "Approved Product List" which lists paint by brand, label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use a subsequent MPI "Approved Product List", however, only one list may be used for the entire contract and each coating system is to be from a single manufacturer. All coats on a particular substrate must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

Samples of specified materials may be taken and tested for compliance with specification requirements.

In keeping with the intent of Executive Order 13101, "Greening the Government through Waste Prevention, Recycling, and Federal Acquisition", products certified by SCS as meeting SCS SP-01 shall be given preferential consideration over registered products. Products that are registered shall be given preferential consideration over products not carrying any EPP designation.

SD-01 Preconstruction Submittals

Applicator's Qualifications; G, AE

Third Party Laboratory Qualifications; G, AE

SD-02 Shop Drawings

Piping identification Color Stencil Code; G

SD-03 Product Data

Paints; G, AE

Coatings; G, AE

Sealants; G, AE

Other Materials Used; G, AE

SD-04 Samples

Manufacturer's Samples Of Paint Colors; G

SD-06 Test Reports

Batch Quality Conformance Testing; G, AE

Qualification Testing; G, AE

SD-07 Certificates

Change In Contractor Certification Status; G, AE

SD-08 Manufacturer's Instructions

Manufacturer's Application Instructions; G

Mixing Instructions; G

SD-10 Operation and Maintenance Data

Cleaning And Maintenance Instructions; G

SD-11 Closeout Submittals

Paint Safety Data Sheet (PSDS); G

1.04 APPLICATOR'S QUALIFICATIONS

A. Contractor Qualification

Submit the name, address, telephone number, FAX number, and e-mail address of the contractor that will be performing all surface preparation and coating application. Submit evidence that key personnel have successfully performed surface preparation and application of coatings on a minimum of three similar projects within the past three years. List information by individual and include the following:

1. Name of individual and proposed position for this work.

2. Information about each previous assignment including:

a. Position or responsibility
b. Employer (if other than the Contractor)
c. Name of facility owner
d. Mailing address, telephone number, and telex number (if non-US) of facility owner
e. Name of individual in facility owner's organization who can be contacted as a reference

f. Location, size and description of structure
g. Dates work was carried out
h. Description of work carried out on structure

B. SSPC QP 1 Certification

All contractors and subcontractors that perform surface preparation or coating application shall be certified by the Society for Protective Coatings (formerly Steel Structures Painting Council) (SSPC) to the requirements of SSPC QP 1 prior to contract award, and shall remain certified while accomplishing any surface preparation or coating application. The painting contractors and painting subcontractors must remain so certified for the duration of the project. If a contractor's or subcontractor's certification expires, the firm will not be allowed to perform any work until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered and liquidated damages will apply. Notify the Contracting Officer of any change in contractor certification status.

1.05 QUALITY ASSURANCE

A. Field Samples and Tests

The Contracting Officer may choose up to two coatings that have been delivered to the site to be tested at no cost to the Government. Take samples of each chosen product as specified in the paragraph "Sampling Procedures." Test each chosen product as specified in the paragraph "Testing Procedure." Products which do not conform, shall be removed from the job site and replaced with new products that conform to the referenced specification. Testing of replacement products that failed initial testing shall be at no cost to the Government.

Another required testing is Batch Quality Conformance Testing to prove conformance of the manufacturer's paint to the specified MPI standard. This testing is accomplished before the materials are delivered to the job site. Provide testing for at least 3 paint products. Test paint products as specified in the paragraph "Testing Procedure".

1. Sampling Procedure

The Contracting Officer will select paint at random from the products that have been delivered to the job site for sample testing. The Contractor shall provide one quart samples of the selected paint materials. The samples shall be taken in the presence of the Contracting Officer, and labeled, identifying each sample. Provide labels in accordance with the paragraph "Packaging, Labeling, and Storage" of this specification.

2. Testing Procedure

Provide Batch Quality Conformance Testing for specified products, as defined by and performed by MPI. As an alternative to Batch Quality Conformance Testing, the

Contractor may provide Qualification Testing for specified products above to the appropriate MPI product specification, using the third-party laboratory approved under the paragraph "Qualification Testing" laboratory for coatings. The qualification testing lab report shall include the backup data and summary of the test results. The summary shall list all of the reference specification requirements and the result of each test. The summary shall clearly indicate whether the tested paint meets each test requirement. Note that Qualification Testing may take 4 to 6 weeks to perform, due to the extent of testing required.

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party laboratory selected to perform testing of coating samples for compliance with specification requirements. Submit documentation that laboratory is regularly engaged in testing of paint samples for conformance with specifications, and that employees performing testing are qualified. If the Contractor chooses MPI to perform the Batch Quality Conformance testing, the above submittal information is not required, only a letter is required from the Contractor stating that MPI will perform the testing.

1.06 REGULATORY REQUIREMENTS

A. Environmental Protection

In addition to requirements specified elsewhere for environmental protection, provide coating materials that conform to the restrictions of the local Air Pollution Control District and regional jurisdiction. Notify Contracting Officer of any paint specified herein which fails to conform.

B. Lead Content

Do not use coatings having a lead content over 0.06 percent by weight of nonvolatile content.

C. Chromate Content

Do not use coatings containing zinc-chromate or strontium-chromate.

D. Asbestos Content

Materials shall not contain asbestos.

E. Mercury Content

Materials shall not contain mercury or mercury compounds.

F. Silica

Abrasive blast media shall not contain free crystalline silica.

G. Human Carcinogens

Materials shall not contain ACGIH 0100 confirmed human

carcinogens (A1) or suspected human carcinogens (A2).

1.07 PACKAGING, LABELING, AND STORAGE

Paints shall be in sealed containers that legibly show the contract specification number, designation name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name and address of manufacturer. Pigmented paints shall be furnished in containers not larger than 5 gallons. Paints and thinners shall be stored in accordance with the manufacturer's written directions, and as a minimum, stored off the ground, under cover, with sufficient ventilation to prevent the buildup of flammable vapors, and at temperatures between 40 to 95 degrees F.

1.08 SAFETY AND HEALTH

Apply coating materials using safety methods and equipment in accordance with the following:

Work shall comply with applicable Federal, State, and local laws and regulations, and with the ACCIDENT PREVENTION PLAN, including the Activity Hazard Analysis as specified in Section 01 35 29, HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES and in Appendix A of EM 385-1-1. The Activity Hazard Analysis shall include analyses of the potential impact of painting operations on painting personnel and on others involved in and adjacent to the work zone.

A. Safety Methods Used During Coating Application

Comply with the requirements of SSPC PA Guide 3.

B. Toxic Materials

To protect personnel from overexposure to toxic materials, conform to the most stringent guidance of:

a. The applicable manufacturer's Safety Data Sheets (SDS) or local regulation.

b. 29 CFR 1910.1000.

c. ACGIH 0100, threshold limit values.

1.09 ENVIRONMENTAL CONDITIONS

Comply, at minimum, with manufacturer recommendations for space ventilation during and after installation. Isolate area of application from rest of building when applying high-emission paints or coatings.

A. Coatings

Do not apply coating when air or substrate conditions are:

a. Less than 5 degrees F above dew point;

b. Below 50 degrees F or over 95 degrees F, unless specifically

pre-approved by the Contracting Officer and the product manufacturer. Under no circumstances shall application conditions exceed manufacturer recommendations.

1.10 SCHEDULING

Allow paint, polyurethane, varnish, and wood stain installations to cure prior to the installation of materials that adsorb VOCs.

1.11 COLOR SELECTION

Colors of finish coats shall be as indicated or specified. Where not indicated or specified, colors shall be selected by the Contracting Officer. Manufacturers' names and color identification are used for the purpose of color identification only. Named products are acceptable for use only if they conform to specified requirements. Products of other manufacturers are acceptable if the colors approximate colors indicated and the product conforms to specified requirements. Submit manufacturer's samples of paint colors. Cross reference color samples to color scheme as indicated.

Tint each coat progressively darker to enable confirmation of the number of coats.

Color, texture, and pattern of wall coating systems shall be as indicated on Contract Drawings.

1.12 LOCATION AND SURFACE TYPE TO BE PAINTED

A. Painting Included

Where a space or surface is indicated to be painted, include the following unless indicated otherwise.

1. Surfaces behind portable objects and surface mounted articles readily detachable by removal of fasteners, such as screws and bolts.

2. New factory finished surfaces that require identification or color coding and factory finished surfaces that are damaged during performance of the work.

3. Existing coated surfaces that are damaged during performance of the work.

4. Exterior Painting

Includes new surfaces, existing coated surfaces, and existing uncoated surfaces, of the building and appurtenances. Also included are existing coated surfaces made bare by cleaning operations.

5. Interior Painting

Includes new surfaces, existing uncoated surfaces, and existing coated surfaces of the building and appurtenances as indicated and existing coated surfaces made bare by cleaning operations. Where a space or surface is indicated to be painted, include the following items, unless indicated

otherwise.

a. Exposed columns, girders, beams, joists, and metal deck; and
b. Other contiguous surfaces.

B. Painting Excluded

Do not paint the following unless indicated otherwise.

1. Surfaces concealed and made inaccessible by panelboards, fixed ductwork, machinery, and equipment fixed in place.

2. Surfaces in concealed spaces. Concealed spaces are defined as enclosed spaces above suspended ceilings, furred spaces, attic spaces, crawl spaces, elevator shafts and chases.

3. Steel to be embedded in concrete.

4. Copper, stainless steel, aluminum, brass, and lead except existing coated surfaces.

5. Hardware, fittings, and other factory finished items.

6. Surfaces in the following areas shall not be painted: as required.

C. Mechanical and Electrical Painting

Includes field coating of interior and exterior new and existing surfaces.

1. Where a space or surface is indicated to be painted, include the following items unless indicated otherwise.

a. Exposed piping, conduit, and ductwork;
b. Supports, hangers, air grilles, and registers;
c. Miscellaneous metalwork and insulation coverings.

2. Do not paint the following, unless indicated otherwise:

a. New zinc-coated, aluminum, and copper surfaces under insulation
b. New aluminum jacket on piping
c. New interior ferrous piping under insulation.

D. Miscellaneous Painting

1. Lettering Building Areas

Lettering shall be provided as scheduled on the drawings, shall be block type, and shall be black enamel. Samples shall be approved before application.

PART 2 PRODUCTS

2.01 MATERIALS

Conform to the coating specifications and standards referenced in PART 3. Submit manufacturer's technical data sheets for specified coatings and solvents.

2.02 MANUFACTURER'S PRODUCT INFORMATION

A. Provide manufacturer's product data on the following:

1. All paints and coatings

2. All sealants

3. Other materials used.

B. Submit manufacturer's Safety Data Sheets for coatings, solvents, and other potentially hazardous materials, as defined in FED-STD-313.

C. Provide manufacturer's application instructions for all materials.

D. Provide detailed mixing instructions, minimum and maximum application temperature and humidity, potlife, and curing and drying times between coats.

E. Provide preprinted cleaning and maintenance instructions for all coating systems shall be provided.

PART 3 EXECUTION

3.01 PROTECTION OF AREAS AND SPACES NOT TO BE PAINTED

Prior to surface preparation and coating applications, remove, mask, or otherwise protect, hardware, hardware accessories, machined surfaces, radiator covers, plates, lighting fixtures, public and private property, and other such items not to be coated that are in contact with surfaces to be coated. Following completion of painting, workmen skilled in the trades involved shall reinstall removed items. Restore surfaces contaminated by coating materials, to original condition and repair damaged items.

3.02 REPUTTYING AND REGLAZING

Remove cracked, loose, and defective putty or glazing compound on glazed sash and provide new putty or glazing compound. Where defective putty or glazing compound constitutes 30 percent or more of the putty at any one light, remove the glass and putty or glazing compound and reset the glass. Remove putty or glazing compound without damaging sash or glass. Clean rabbets to bare wood or metal and prime prior to reglazing. Putty for wood sash shall be a linseed oil putty. Patch surfaces to provide smooth transition between existing and new surfaces. Finish putty or glazing compound to a neat and true bead. Allow glazing compound time to cure, in accordance with manufacturer's recommendation, prior to coating application. Allow putty to set one week prior to coating application.

3.03 RESEALING OF EXISTING EXTERIOR JOINTS

A. Surface Condition

Surfaces shall be clean, dry to the touch, and free from frost and moisture; remove grease, oil, wax, lacquer, paint, defective backstop, or other foreign matter that would prevent or impair adhesion. Where adequate grooves have not been provided, clean out to a depth of 1/2 inch and grind to a minimum width of 1/4 inch without damage to adjoining work. Grinding shall not be required on metal surfaces.

B. Backstops

In joints more than 1/2 inch deep, install glass fiber roving or neoprene, butyl, polyurethane, or polyethylene foams free of oil or other staining elements as recommended by sealant manufacturer. Backstop material shall be compatible with sealant. Do not use oakum and other types of absorptive materials as backstops.

C. Primer and Bond Breaker

Install the type recommended by the sealant manufacturer.

D. Ambient Temperature

Between 38 degrees F and 95 degrees F when applying sealant.

E. Exterior Sealant

For joints in vertical surfaces, provide ASTM C920, Type S or M, Grade NS, Class 25, Use NT. For joints in horizontal surfaces, provide ASTM C920, Type S or M, Grade P, Class 25, Use T. Color(s) shall be selected by the Contracting Officer. Apply the sealant in accordance with the manufacturer's printed instructions. Force sealant into joints with sufficient pressure to fill the joints solidly. Sealant shall be uniformly smooth and free of wrinkles.

F. Cleaning

Immediately remove fresh sealant from adjacent areas using a solvent recommended by the sealant manufacturer. Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean condition. Allow sealant time to cure, in accordance with manufacturer's recommendations, prior to coating.

3.04 SURFACE PREPARATION

Remove dirt, splinters, loose particles, grease, oil, disintegrated coatings, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. Oil and grease shall be removed prior to mechanical cleaning. Cleaning shall be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints, shall be spot-primed

with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

A. Additional Requirements for Preparation of Surfaces With Existing Coatings

1. Before application of coatings, perform the following on surfaces covered by soundly-adhered coatings, defined as those which cannot be removed with a putty knife:

   a. Test existing finishes for lead before sanding, scraping, or removing. If lead is present, refer to paragraph Toxic Materials.

   b. Wipe previously painted surfaces to receive solvent-based coatings, except stucco and similarly rough surfaces clean with a clean, dry cloth saturated with mineral spirits, ASTM D235. Allow surface to dry. Wiping shall immediately precede the application of the first coat of any coating, unless specified otherwise.

   c. Sand existing glossy surfaces to be painted to reduce gloss. Brush, and wipe clean with a damp cloth to remove dust.

   d. The requirements specified are minimum. Comply also with the paint manufacturer's application instructions.

   e. Previously painted surfaces specified to be repainted or damaged during construction shall be thoroughly cleaned of all grease, dirt, dust or other foreign matter.

   f. Blistering, cracking, flaking and peeling or other deteriorated coatings shall be removed.

   g. Chalk shall be removed so that when tested in accordance with ASTM D4214, the chalk resistance rating is no less than 8.

   h. Slick surfaces shall be roughened. Damaged areas such as, but not limited to, nail holes, cracks, chips, and spalls shall be repaired with suitable material to match adjacent undamaged areas.

   i. Edges of chipped paint shall be feather edged and sanded smooth.

   j. Rusty metal surfaces shall be cleaned as per SSPC requirements. Solvent, mechanical, or chemical cleaning methods shall be used to provide surfaces suitable for painting.

   k. New, proposed coatings shall be compatible with existing coatings.

B. Existing Coated Surfaces with Minor Defects

Sand, spackle, and treat minor defects to render them smooth.

Minor defects are defined as scratches, nicks, cracks, gouges, spalls, alligatoring, chalking, and irregularities due to partial peeling of previous coatings. Remove chalking by sanding or blasting so that when tested in accordance with ASTM D4214, the chalk rating is not less than 8.

C. Removal of Existing Coatings

1. Remove existing coatings from the following surfaces:

a. Surfaces containing large areas of minor defects;
b. Surfaces containing more than 20 percent peeling area; and
c. Surfaces designated by the Contracting Officer, such as surfaces where rust shows through existing coatings.

D. Substrate Repair

1. Repair substrate surface damaged during coating removal;

2. Sand edges of adjacent soundly-adhered existing coatings so they are tapered as smooth as practical to areas involved with coating removal; and

3. Clean and prime the substrate as specified.

3.05 PREPARATION OF METAL SURFACES

A. Existing and New Ferrous Surfaces

1. Ferrous Surfaces including Shop-coated Surfaces and Small Areas That Contain Rust, Mill Scale and Other Foreign Substances: Detergent wash in accordance with SSPC SP 1 to remove oil and grease. Where shop coat is missing or damaged, clean according to SSPC SP 2. Brush-off blast remaining surface in accordance with SSPC 7/NACE No.4; Water jetting to SSPC SP 12/NACE No.5 WJ-4 may be used to remove loose coating and other loose materials. Use inhibitor as recommended by coating manufacturer to prevent premature rusting. Shop-coated ferrous surfaces shall be protected from corrosion by treating and touching up corroded areas immediately upon detection.

B. Final Ferrous Surface Condition:

For tool cleaned surfaces, the requirements are stated in SSPC SP 2 and SSPC SP 3. As a visual reference, cleaned surfaces shall be similar to photographs in SSPC VIS 3.

For abrasive blast cleaned surfaces, the requirements are stated in SSPC 7/NACE No.4, SSPC SP 6/NACE No.3, and SSPC SP 10/NACE No. 2. As a visual reference, cleaned surfaces shall be similar to photographs in SSPC VIS 1.

For waterjet cleaned surfaces, the requirements are stated in SSPC SP 12/NACE No.5. As a visual reference, cleaned surfaces shall be similar to photographs in SSPC VIS 4/NACE VIS 7.

C. Galvanized Surfaces

1. New or Existing Galvanized Surfaces With Only Dirt and Zinc Oxidation Products: Clean with non-alkaline detergent solution in accordance with SSPC SP 1. If the galvanized metal has been passivated or stabilized, the coating shall be completely removed by brush-off abrasive blast. New galvanized steel to be coated shall not be "passivated" or "stabilized" If the absence of hexavalent stain inhibitors is not documented, test as described in ASTM D6386, Appendix X2, and remove by one of the methods described therein.

2. Galvanized with Slight Coating Deterioration or with Little or No Rusting: Water jetting to SSPC SP 12/NACE No.5 WJ3 to remove loose coating from surfaces with less than 20 percent coating deterioration and no blistering, peeling, or cracking. Use inhibitor as recommended by the coating manufacturer to prevent rusting.

3. Galvanized With Severe Deteriorated Coating or Severe Rusting: Water jet to SSPC SP 12/NACE No.5 WJ3 degree of cleanliness. Spot abrasive blast rusted areas as described for steel in SSPC SP 6/NACE No.3, and waterjet to SSPC SP 12/NACE No.5, WJ3 to remove existing coating.

D. Non-Ferrous Metallic Surfaces

1. Aluminum and aluminum-alloy, lead, copper, and other nonferrous metal surfaces.

2. Surface Cleaning: Solvent clean in accordance with SSPC SP 1 and wash with mild non-alkaline detergent to remove dirt and water soluble contaminants.

E. Terne-Coated Metal Surfaces

Solvent clean surfaces with mineral spirits, ASTM D235. Wipe dry with clean, dry cloths.

F. Existing Surfaces with a Bituminous or Mastic-Type Coating

Remove chalk, mildew, and other loose material by washing with a solution of 1/2 cup trisodium phosphate, 1/4 cup household detergent, one quart 5 percent sodium hypochlorite solution and 3 quarts of warm water.

3.06 PREPARATION OF CONCRETE AND CEMENTITIOUS SURFACE

A. Concrete and Masonry

1. Curing: Concrete, stucco and masonry surfaces shall be allowed to cure at least 30 days before painting, except concrete slab on grade, which shall be allowed to cure 90 days before painting.

2. Surface Cleaning: Remove the following deleterious substances.

a. Dirt, Chalking, Grease, and Oil: Wash new and existing

uncoated surfaces with a solution composed of 1/2 cup trisodium phosphate, 1/4 cuphousehold detergent, and 4 quarts of warm water. Then rinse thoroughly with fresh water. For large areas, water blasting may be used.

b. Fungus and Mold: Wash new , existing coated, and existing uncoated surfaces with a solution composed of 1/2 cup trisodium phosphate, 1/4 cup household detergent, 1 quart 5 percent sodium hypochlorite solution and 3 quarts of warm water. Rinse thoroughly with fresh water.

c. Paint and Loose Particles: Remove by wire brushing.

d. Efflorescence: Remove by scraping or wire brushing followed by washing with a 5 to 10 percent by weight aqueous solution of hydrochloric (muriatic) acid. Do not allow acid to remain on the surface for more than five minutes before rinsing with fresh water. Do not acid clean more than 4 square feet of surface, per workman, at one time.

e. Removal of Existing Coatings: For surfaces to receive textured coating MPI 42, remove existing coatings including soundly adhered coatings if recommended by textured coating manufacturer.

3. Cosmetic Repair of Minor Defects: Repair or fill mortar joints and minor defects, including but not limited to spalls, in accordance with manufacturer's recommendations and prior to coating application.

4. Allowable Moisture Content: Latex coatings may be applied to damp surfaces, but not to surfaces with droplets of water. Do not apply epoxies to damp vertical surfaces as determined by ASTM D4263 or horizontal surfaces that exceed 3 lbs of moisture per 1000 square feet in 24 hours as determined by ASTM F1869. In all cases follow manufacturers recommendations. Allow surfaces to cure a minimum of 30 days before painting.

B. Gypsum Board, Plaster, and Stucco

1. Surface Cleaning: Plaster and stucco shall be clean and free from loose matter; gypsum board shall be dry. Remove loose dirt and dust by brushing with a soft brush, rubbing with a dry cloth, or vacuum-cleaning prior to application of the first coat material. A damp cloth or sponge may be used if paint will be water-based.

2. Repair of Minor Defects: Prior to painting, repair joints, cracks, holes, surface irregularities, and other minor defects with patching plaster or spackling compound and sand smooth.

3. Allowable Moisture Content: Latex coatings may be applied to damp surfaces, but not surfaces with droplets of water. Do not apply epoxies to damp surfaces as determined by ASTM D4263. New plaster to be coated shall have a maximum moisture content of 8 percent, when measured in accordance with

ASTM D4444, Method A, unless otherwise authorized. In addition to moisture content requirements, allow new plaster to age a minimum of 30 days before preparation for painting.

3.07 PREPARATION OF WOOD AND PLYWOOD SURFACES

A. New, Existing Uncoated, and Existing Coated Plywood and Wood Surfaces, Except Floors:

1. Wood surfaces shall be cleaned of foreign matter.

   Surface Cleaning: Surfaces shall be free from dust and other deleterious substances and in a condition approved by the Contracting Officer prior to receiving paint or other finish. Do not use water to clean uncoated wood. Scrape to remove loose coatings. Lightly sand to roughen the entire area of previously enamel-coated wood surfaces.

2. Removal of Fungus and Mold: Wash existing coated surfaces with a solution composed of 3 ounces (2/3 cup) trisodium phosphate, 1 ounce (1/3 cup) household detergent, 1 quart 5 percent sodium hypochlorite solution and 3 quarts of warm water. Rinse thoroughly with fresh water.

3. Moisture content of the wood shall not exceed 12 percent as measured by a moisture meter in accordance with ASTM D4444, Method A, unless otherwise authorized.

4. Wood surfaces adjacent to surfaces to receive water-thinned paints shall be primed and/or touched up before applying water-thinned paints.

5. Cracks and Nailheads: Set and putty stop nailheads and putty cracks after the prime coat has dried.

6. Cosmetic Repair of Minor Defects:

   a. Knots and Resinous Wood and Fire, Smoke, Water, and Color Marker Stained Existing Coated Surface: Prior to application of coating, cover knots and stains with two or more coats of 3-pound-cut shellac varnish, plasticized with 5 ounces of castor oil per gallon. Scrape away existing coatings from knotty areas, and sand before treating. Prime before applying any putty over shellacked area.

   b. Open Joints and Other Openings: Fill with whiting putty, linseed oil putty. Sand smooth after putty has dried.

   c. Checking: Where checking of the wood is present, sand the surface, wipe and apply a coat of pigmented orange shellac. Allow to dry before paint is applied.

7. Prime Coat For New Exterior Surfaces: Prime coat wood doors, windows, frames, and trim before wood becomes dirty, warped, or weathered.

B. Interior Wood Surfaces, Stain Finish

Interior wood surfaces to receive stain shall be sanded. Oak and other open-grain wood to receive stain shall be given a coat of wood filler not less than 8 hours before the application of stain; excess filler shall be removed and the surface sanded smooth.

C. Water Blasting of Existing Coated Wood Surfaces:

1. Water blasting shall be provided for the following surfaces: as required.

a. Sample Panel: Prior to the initial surface cleaning, water blast a representative surface designated by the Contracting Officer. Final surface condition of remaining work shall be similar to sample panel approved by the Contracting Officer.

b. Initial Surface Cleaning: Water blasting shall consist of washing surfaces to receive paint with a high pressure spray, to remove loose paint, dirt, and other foreign or deleterious materials. The working pressure shall be between 400 and 700 pounds per square inch gage (psig) at a nozzle operating rate of a minimum 20 gallons per minute (g/min.). Do not flood vents or damage windows and floors. If the pressure specified will cause damage to existing wood, advise the Contracting Officer and obtain permission to vary the pressure. Direct the wash nozzle at the surface at an angle of approximately 75 degrees with the surface and at a distance not greater than 5 feet to apply water pressure required to remove loose paint, dirt, chalking, and other foreign matter.

c. Final Surface Cleaning: After allowing the surfaces to dry for a minimum of 24 hours, remove remaining dirt, splinters, loose particles, disintegrated and loose paint, grease, oil, and other foreign matter from the surface.

3.08 APPLICATION

A. Coating Application

Painting practices shall comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Apply coating materials in accordance with SSPC PA 1. SSPC PA 1 methods are applicable to all substrates, except as modified herein.

At the time of application, paint shall show no signs of deterioration. Uniform suspension of pigments shall be maintained during application.

Unless otherwise specified or recommended by the paint manufacturer, paint may be applied by brush, roller, or spray. Use trigger operated spray nozzles for water hoses. Rollers for applying paints and enamels shall be of a type designed for the coating to be applied and the surface to be coated. Wear

protective clothing and respirators when applying oil-based paints or using spray equipment with any paints.

Paints, except water-thinned types, shall be applied only to surfaces that are completely free of moisture as determined by sight or touch.

Thoroughly work coating materials into joints, crevices, and open spaces. Special attention shall be given to insure that all edges, corners, crevices, welds, and rivets receive a film thickness equal to that of adjacent painted surfaces.

Each coat of paint shall be applied so dry film shall be of uniform thickness and free from runs, drops, ridges, waves, pinholes or other voids, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete.

Touch up damaged coatings before applying subsequent coats. Interior areas shall be broom clean and dust free before and during the application of coating material.

Submit the attached Paint Safety Data Sheet (PSDS) for each coating system, include all components of the system (surface preparation, primer, intermediate coats, and finish coats). Include all components of a given
coating system on a single PSDS.

1. Drying Time: Allow time between coats, as recommended by the coating manufacturer, to permit thorough drying, but not to present topcoat adhesion problems. Provide each coat in specified condition to receive next coat.

2. Primers, and Intermediate Coats: Do not allow primers or intermediate coats to dry more than 30 days, or longer than recommended by manufacturer, before applying subsequent coats. Follow manufacturer's recommendations for surface preparation if primers or intermediate coats are allowed to dry longer than recommended by manufacturers of subsequent coatings. Each coat shall cover surface of preceding coat or surface completely, and there shall be a visually perceptible difference in shades of successive coats.

3. Finished Surfaces: Provide finished surfaces free from runs, drops, ridges, waves, laps, brush marks, and variations in colors.

4. Thermosetting Paints: Topcoats over thermosetting paints (epoxies and urethanes) should be applied within the overcoating window recommended by the manufacturer.

5. Floors: For nonslip surfacing on level floors, as the intermediate coat is applied, cover wet surface completely with almandite garnet, Grit No. 36, with maximum passing U.S. Standard Sieve No. 40 less than 0.5 percent. When the coating is dry, use a soft bristle broom to sweep up excess grit, which may be reused, and vacuum up remaining residue before application of the topcoat. For nonslip surfacing on ramps, provide MPI 77 with non-skid additive, applied by roller in accordance with manufacturer's instructions.

B. Mixing and Thinning of Paints

Reduce paints to proper consistency by adding fresh paint, except when thinning is mandatory to suit surface, temperature, weather conditions, application methods, or for the type of paint being used. Obtain written permission from the Contracting Officer to use thinners. The written permission shall include quantities and types of thinners to use.

When thinning is allowed, paints shall be thinned immediately prior to application with not more than 1 pint of suitable thinner per gallon. The use of thinner shall not relieve the Contractor from obtaining complete hiding, full film thickness, or required gloss. Thinning shall not cause the paint to exceed limits on volatile organic compounds. Paints of different manufacturers shall not be mixed.

C. Two-Component Systems

Two-component systems shall be mixed in accordance with manufacturer's instructions. Any thinning of the first coat to ensure proper penetration and sealing shall be as recommended by the manufacturer for each type of substrate.

D. Coating Systems

1. Systems by Substrates: Apply coatings that conform to the respective specifications listed in the following Tables:

Table

Division 5. Exterior Metal, Ferrous and Non-Ferrous Paint Table
Division 3. Interior Concrete Paint Table
Division 5. Interior Metal, Ferrous and Non-Ferrous Paint Table
Division 6. Interior Wood Paint Table
Division 9: Interior Plaster, Gypsum Board, Textured Surface Paint Table

2. Minimum Dry Film Thickness (DFT): Apply paints, primers, varnishes, enamels, undercoats, and other coatings to a minimum dry film thickness of 1.5 mil each coat unless specified otherwise in the Tables. Coating thickness where specified, refers to the minimum dry film thickness.

3. Coatings for Surfaces Not Specified Otherwise: Coat surfaces which have not been specified, the same as surfaces having similar conditions of exposure.

4. Existing Surfaces Damaged During Performance of the Work, Including New Patches In Existing Surfaces: Coat surfaces with the following:

a) One coat of primer.
b) One coat of undercoat or intermediate coat.
c) One topcoat to match adjacent surfaces.

e. Existing Coated Surfaces To Be Painted: Apply coatings conforming to the respective specifications listed in the Tables herein, except that pretreatments, sealers and fillers need not be provided on surfaces where existing coatings are soundly adhered and in good condition. Do not omit undercoats or primers.

3.09 COATING SYSTEMS FOR METAL

Apply coatings of Tables in Division 5 for Exterior and Interior.

a. Apply specified ferrous metal primer on the same day that surface is cleaned, to surfaces that meet all specified surface preparation requirements at time of application.

b. Inaccessible Surfaces: Prior to erection, use one coat of specified primer on metal surfaces that will be inaccessible after erection.

c. Shop-primed Surfaces: Touch up exposed substrates and damaged coatings to protect from rusting prior to applying field primer.

d. Surface Previously Coated with Epoxy or Urethane: Apply MPI 101, 1.5 mils DFT immediately prior to application of epoxy or urethane coatings.

e. Pipes and Tubing: The semitransparent film applied to some pipes and tubing at the mill is not to be considered a shop coat, but shall be overcoated with the specified ferrous-metal primer prior to application of finish coats.

f. Exposed Nails, Screws, Fasteners, and Miscellaneous Ferrous Surfaces. On surfaces to be coated with water thinned coatings, spot prime exposed nails and other ferrous metal with latex primer MPI 107.

3.10 COATING SYSTEMS FOR CONCRETE AND CEMENTITIOUS SUBSTRATES

Apply coatings of Tables in Division 3, 4 and 9 for Exterior and Interior.

3.11 COATING SYSTEMS FOR WOOD AND PLYWOOD

A. Apply coatings of Tables in Division 6 for Exterior and Interior.

B. Prior to erection, apply two coats of specified primer to treat and prime wood and plywood surfaces which will be inaccessible after erection.

C. Apply stains in accordance with manufacturer's printed instructions.

D. Wood Floors to Receive Natural Finish: Thin first coat 2 to 1 using thinner recommended by coating manufacturer. Apply all coatings at rate of 300 to 350 square feet per gallon. Apply second coat not less than 2 hours and not over 24 hours after first coat has been applied. Apply with lambs wool applicators or roller as recommended by coating manufacturer. Buff or lightly sand between intermediate coats as recommended by coating

manufacturer's printed instructions.

3.12 PIPING IDENTIFICATION

Piping Identification, Including Surfaces In Concealed Spaces: Provide in accordance with ASME A13.1. Place stenciling in clearly visible locations. On piping not covered by ASME A13.1, stencil approved names or code letters, in letters a minimum of 1/2 inch high for piping and a minimum of 2 inches high elsewhere. Stencil arrow-shaped markings on piping to indicate direction of flow using black stencil paint. Submit color stencil code.

3.13 INSPECTION AND ACCEPTANCE

In addition to meeting previously specified requirements, demonstrate mobility of moving components, including swinging and sliding doors, cabinets, and windows with operable sash, for inspection by the Contracting Officer. Perform this demonstration after appropriate curing and drying times of coatings have elapsed and prior to invoicing for final payment.

3.14 WASTE MANAGEMENT

As specified in the Waste Management Plan and as follows. Do not use kerosene or any such organic solvents to clean up water based paints. Properly dispose of paints or solvents in designated containers. Close and seal partially used containers of paint to maintain quality as necessary for reuse. Store in protected, well-ventilated, fire-safe area at moderate temperature. Place materials defined as hazardous or toxic waste in designated containers. Coordinate with manufacturer for take-back program. Set aside scrap to be returned to manufacturer for recycling into new product. When such a service is not available, local recyclers shall be sought after to reclaim the materials. Set aside extra paint for future color matches or reuse by the Government. Where local options exist for leftover paint recycling, collect all waste paint by type and provide for delivery to recycling or collection facility for reuse by local organizations.

3.15 PAINT TABLES

All DFT's are minimum values. Use only materials with a GPS green check mark having a minimum MPI "Environmentally Friendly" E2 rating based on VOC (EPA Method 24) content levels. Use only interior paints and coatings that meet VOC requirements of LEED low emitting materials credit (LEED NC). Acceptable products are listed in the MPI Green Approved Products List, available at http://www.specifygreen.com/APL/ProductIdxByMPInum.asp.

A. EXTERIOR PAINT TABLES

DIVISION 5: EXTERIOR METAL, FERROUS AND NON-FERROUS PAINT TABLE

STEEL / FERROUS SURFACES

A. New and existing steel blast cleaned to SSPC SP 10/NACE No. 2:

1. Waterborne Light Industrial
MPI EXT 5.1R-G5 (Semigloss)
Primer: Intermediate: Topcoat:

STEEL / FERROUS SURFACES

MPI 101	MPI 108	MPI 163
System DFT: 8.5 mils		

MPI EXT 5.1R-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 101	MPI 108	MPI 164
System DFT: 8.5 mils		

2. Pigmented Polyurethane

MPI EXT 5.1J-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 101	MPI 108	MPI 72
System DFT: 8.5 mils		

B. Metal floors (non-shop-primed surfaces or non-slip deck surfaces) with non-skid additive (NSA), load at manufacturer's recommendations.:

1. Alkyd Floor Enamel

MPI EXT 5.1S-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 79	MPI 27	MPI 27 (plus NSA)
System DFT: 5.25 mils		

EXTERIOR GALVANIZED SURFACES

A. New Galvanized surfaces:

1. Cementitious primer / Latex

MPI EXT 5.3A-G1 (Flat)

Primer:	Intermediate:	Topcoat:
MPI 26	MPI 10	MPI 10
System DFT: 4.5 mils		

MPI EXT 5.3A-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 26	MPI 11	MPI 11
System DFT: 4.5 mils		

MPI EXT 5.3A-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 26	MPI 119	MPI 119
System DFT: 4.5 mils		

2. Waterborne Primer / Latex

MPI EXT 5.3H-G1 (Flat)

Primer:	Intermediate:	Topcoat:
MPI 134	MPI 10	MPI 10
System DFT: 4.5 mils		

MPI EXT 5.3H-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 134	MPI 11	MPI 11
System DFT: 4.5 mils		

MPI EXT 5.3H-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 134	MPI 119	MPI 119
System DFT: 4.5 mils		

EXTERIOR GALVANIZED SURFACES

3. Waterborne Primer / Waterborne Light Industrial Coating
MPI EXT 5.3J-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 134	MPI 163	MPI 163

System DFT: 4.5 mils

MPI EXT 5.3J-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 134	MPI 164	MPI 164

System DFT: 4.5 mils

4. Epoxy Primer / Waterborne Light Industrial Coating
MPI EXT 5.3K-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 101	MPI 163	MPI 163

System DFT: 5 mils

MPI EXT 5.3K-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 101	MPI 164	MPI 164

System DFT: 5 mils

5. Pigmented Polyurethane
MPI EXT 5.3L-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 101	N/A	MPI 72

System DFT: 5 mils

B. Galvanized surfaces with slight coating deterioration; little or norusting:

1. Waterborne Light Industrial Coating
MPI REX 5.3J-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 134	N/A	MPI 163

System DFT: 4.5 mils

2. Pigmented Polyurethane
MPI REX 5.3D-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 101	N/A	MPI 72

System DFT: 5 mils

C. Galvanized surfaces with severely deteriorated coating or rusting:

1. Waterborne Light Industrial Coating
MPI REX 5.3L-G5(Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 101	MPI 108	MPI 163

System DFT: 8.5 mils

MPI REX 5.3L-G6(Gloss)

Primer:	Intermediate:	Topcoat:
MPI 101	MPI 108	MPI 164

System DFT: 8.5 mils

2. Pigmented Polyurethane

EXTERIOR GALVANIZED SURFACES
MPI REX 5.3K-G6(Gloss)

Primer:	Intermediate:	Topcoat:
MPI 101	MPI 108	MPI 72

System DFT: 5 mils

EXTERIOR SURFACES, OTHER METALS (NON-FERROUS)

A. Aluminum, aluminum alloy and other miscellaneous non-ferrous metal items not otherwise specified except hot metal surfaces, roof surfaces, and new prefinished equipment. Match surrounding finish:

1. Alkyd

MPI EXT 5.4F-G1 (Flat)

Primer:	Intermediate:	Topcoat:
MPI 95	MPI 8	MPI 8

System DFT: 5 mils

MPI EXT 5.4F-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 95	MPI 94	MPI 94

System DFT: 5 mils

MPI EXT 5.4F-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 95	MPI 9	MPI 9

System DFT: 5 mils

2. Waterborne Light Industrial Coating

MPI EXT 5.4G-G3(Eggshell)

Primer:	Intermediate:	Topcoat:
MPI 95	MPI 161	MPI 161

System DFT: 5 mils

MPI EXT 5.4G-G5(Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 95	MPI 163	MPI 163

System DFT: 5 mils

MPI EXT 5.4G-G6(Gloss)

Primer:	Intermediate:	Topcoat:
MPI 95	MPI 164	MPI 164

System DFT: 5 mils

B. Existing roof surfaces previously coated:

1. Aluminum Pigmented Asphalt Roof Coating ASTM D2824/D2824M: Sufficient coats to provide not less than 8 mils of finished coating system (without asbestos fibers).

2. Aluminum Paint
MPI REX 10.2D

Primer:	Intermediate:	Topcoat:
MPI 107	MPI 1	MPI 1

System DFT: 3.5 mils

C. Surfaces adjacent to painted surfaces: Mechanical, Electrical, exposed copper piping, and miscellaneous metal items not otherwise specified except floors, hot metal surfaces, and new prefinished

EXTERIOR SURFACES, OTHER METALS (NON-FERROUS)
equipment. Match surrounding finish.

1. Alkyd
   MPI EXT 5.1D-G1 (Flat)
   Primer: Intermediate: Topcoat:
   MPI 79 MPI 8 MPI 8
   System DFT: 5.25 mils

   MPI EXT 5.1D-G5 (Semigloss)
   Primer: Intermediate: Topcoat:
   MPI 79 MPI 94 MPI 94
   System DFT: 5.25 mils

   MPI EXT 5.1D-G6 (Gloss)
   Primer: Intermediate: Topcoat:
   MPI 79 MPI 9 MPI 9
   System DFT: 5.25 mils

2. Waterborne Light Industrial Coating
   MPI EXT 5.1C-G3(Eggshell)
   Primer: Intermediate: Topcoat:
   MPI 79 MPI 161 MPI 161
   System DFT: 5 mils

   MPI EXT 5.1C-G5(Semigloss)
   Primer: Intermediate: Topcoat:
   MPI 79 MPI 163 MPI 163
   System DFT: 5 mils

   MPI EXT 5.1C-G6(Gloss)
   Primer: Intermediate: Topcoat:
   MPI 79 MPI 164 MPI 164
   System DFT: 5 mils

D. Ferrous metal subject to high temperature, up to 750 degrees F:

1. Inorganic Zinc Rich Coating
   MPI EXT 5.2C
   Primer: Intermediate: Topcoat:
   MPI 19 Surface preparation and number of coats per manufacturer's instructions.
   System DFT: Per Manufacturer

2. Heat Resistant Aluminum Enamel
   MPI EXT 5.2B (Aluminum Finish)
   Primer: Intermediate: Topcoat:
   MPI 2 Surface preparation and number of coats per manufacturer's instructions.
   System DFT: Per Manufacturer

E. New surfaces and Existing surfaces made bare cleaning to SSPC SP 10/NACE No. 2 subject to temperatures up to 593 degrees C (1100 degrees F):

1. Heat Resistant Coating
   MPI EXT 5.2D
   Primer: Intermediate: Topcoat:
   MPI 22 Surface preparation and number of coats per

EXTERIOR SURFACES, OTHER METALS (NON-FERROUS)
manufacturer's instructions.
System DFT: Per Manufacturer

B. INTERIOR PAINT TABLES

DIVISION 3: INTERIOR CONCRETE PAINT TABLE

A. New and uncoated existing and previously painted Concrete, vertical surfaces, not specified otherwise:

1. Latex
New: MPI INT 3.1A-G2 (Flat) / Existing: MPI RIN 3.1A-G2 (Flat)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 44	MPI 44

System DFT: 4 mils

New: MPI INT 3.1A-G3 (Eggshell) / Existing: MPI RIN 3.1A-G3 (Eggshell)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 52	MPI 52

System DFT: 4 mils

New: MPI INT 3.1A-G5 (Semigloss) / Existing: MPI RIN 3.1A-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 54	MPI 54

System DFT: 4 mils

2. High Performance Architectural Latex
New: MPI INT 3.1C-G2 (Flat) / Existing: MPI RIN 3.1J-G2 (Flat)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 138	MPI 138

System DFT: 4 mils

New: MPI INT 3.1C-G3 (Eggshell) / Existing: MPI RIN 3.1J-G3 (Eggshell)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 139	MPI 139

System DFT: 4 mils

New: MPI INT 3.1C-G4 (satin)/ Existing: MPI RIN 3.1J-G4

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 140	MPI 140

System DFT: 4 mils

New: MPI INT 3.1C-G5 (Semigloss) / Existing: MPI RIN 3.1J-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 141	MPI 141

System DFT: 4 mils

3. Institutional Low Odor / Low VOC Latex
New: MPI INT 3.1M-G2 (Flat) / Existing: MPI RIN 3.1L-G2 (Flat)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 144	MPI 144

System DFT: 4 mils

DIVISION 3: INTERIOR CONCRETE PAINT TABLE

New: MPI INT 3.1M-G3 (Eggshell) / Existing: MPI RIN 3.1L-G3 (Eggshell)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 145	MPI 145

System DFT: 4 mils

New: MPI INT 3.1M-G4 (satin) / Existing: MPI RIN 3.1L-G4

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 146	MPI 146

System DFT: 4 mils

New: MPI INT 3.1M-G5 (Semigloss) / Existing: MPI RIN 3.1L-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 147	MPI 147

System DFT: 4 mils

B. New and uncoated existing and previously painted Concrete in toilets, and other high-humidity areas not otherwise specified except floors:

1. Epoxy

New: MPI INT 3.1F-G6 (Gloss) / Existing: MPI RIN 3.1E-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 77	MPI 77	MPI 77

System DFT: 4 mils

Note: Primer may be reduced for penetration per manufacturer's instructions.

C. New and uncoated existing and previously painted concrete floors in following areas : as required.

1. Epoxy

New: MPI INT 3.2C-G6 (Gloss) / Existing: MPI RIN 3.2C-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 77	MPI 77	MPI 77

System DFT: 5 mils

Note: Primer may be reduced for penetration per manufacturer's instructions.

DIVISION 5: INTERIOR METAL, FERROUS AND NON-FERROUS PAINT TABLE

INTERIOR STEEL / FERROUS SURFACES

A. Metal, Mechanical, Electrical,surfaces adjacent to painted surfaces (Match surrounding finish), exposed copper piping, and miscellaneous metal items not otherwise specified except floors, hot metal surfaces, and new prefinished equipment:

1. High Performance Architectural Latex

MPI INT 5.1R-G2 (Flat)

Primer:	Intermediate:	Topcoat:
MPI 79	MPI 138	MPI 138

System DFT: 5 mils

MPI INT 5.1R-G3 (Eggshell)

INTERIOR STEEL / FERROUS SURFACES

Primer:	Intermediate:	Topcoat:
MPI 79	MPI 139	MPI 139

System DFT: 5 mils

MPI INT 5.1R-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 79	MPI 141	MPI 141

System DFT: 5 mils

2. Alkyd

MPI INT 5.1E-G2 (Flat)

Primer:	Intermediate:	Topcoat:
MPI 79	MPI 49	MPI 49

System DFT: 5.25 mils

MPI INT 5.1E-G3 (Eggshell)

Primer:	Intermediate:	Topcoat:
MPI 79	MPI 51	MPI 51

System DFT: 5.25 mils

MPI INT 5.1E-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 79	MPI 47	MPI 47

System DFT: 5.25 mils

MPI INT 5.1E-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 79	MPI 48	MPI 48

System DFT: 5.25 mils

B. Metal floors (non-shop-primed surfaces or non-slip deck surfaces) with non-skid additive (NSA), load at manufacturer's recommendations.:

1. Alkyd Floor Paint

MPI INT 5.1U-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 79	MPI 27	MPI 27 (plus NSA)

System DFT: 5.25 mils

2. Epoxy

MPI INT 5.1L-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 101	MPI 77	MPI 77 (plus NSA)

System DFT: 5.25 mils

DIVISION 6: INTERIOR WOOD PAINT TABLE

A. New and Existing, uncoated Wood and plywood not otherwise specified:

1. High Performance Architectural Latex

MPI INT 6.4S-G3 (Eggshell)

Primer:	Intermediate:	Topcoat:
MPI 39	MPI 139	MPI 139

System DFT: 4.5 mils

MPI INT 6.4S-G4 (Satin)

DIVISION 6: INTERIOR WOOD PAINT TABLE

Primer:	Intermediate:	Topcoat:
MPI 39	MPI 140	MPI 140

System DFT: 4.5 mils

MPI INT 6.4S-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 39	MPI 141	MPI 141

System DFT: 4.5 mils

DIVISION 9: INTERIOR PLASTER, GYPSUM BOARD, TEXTURED SURFACES PAINT TABLE

A. New and Existing, previously painted Plaster and Wallboard not otherwise specified:

1. Latex

New: MPI INT 9.2A-G2 (Flat) / Existing: RIN 9.2A-G2 (Flat)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 44	MPI 44

System DFT: 4 mils

New: MPI INT 9.2A-G3 (Eggshell) / Existing: RIN 9.2A-G3 (Eggshell)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 52	MPI 52

System DFT: 4 mils

New: MPI INT 9.2A-G5 (Semigloss) / Existing: RIN 9.2A-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 54	MPI 54

System DFT: 4 mils

B. New and Existing, previously painted Plaster and Wallboard in toilets and other high humidity areas not otherwise specified.:

1. Waterborne Light Industrial Coating

New: MPI INT 9.2L-G5(Semigloss) / Existing: MPI RIN 9.2L-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 50	MPI 153	MPI 153

System DFT: 4 mils

-- End of Section --

PAINT SYSTEM DATA SHEET

Complete this PSDS for each coating system, include all components of the system (surface preparation, primer, intermediate coats, and finish coats). Include all components of a given coating system on a single PSDS.

Paint System Number (from Spec.):		
Paint System Title (from Spec.):		
Coating Supplier:		
Representative:		
Surface Preparation:		
Paint Material (Generic)	Product Name/Number (Proprietary)	Min. Coats, Coverage

DIVISION 10 – SPECIALTIES

SECTION 10 14 00.20

INTERIOR SIGNAGE
08/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA PK-1	(2015) Pink Sheets: Designations and Chemical Composition Limits for Aluminum Alloys in the Form of Castings & Ingot

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1	(2015) Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test

AMERICAN WELDING SOCIETY (AWS)

AWS D1.2/D1.2M	(2014) Structural Welding Code - Aluminum

ASTM INTERNATIONAL (ASTM)

ASTM B209	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B221	(2014) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Drawings; G, AE

SD-04 Samples

Interior Signage; G, AE

SD-08 Manufacturer's Instructions

Installation; G

SD-10 Operation and Maintenance Data

Maintenance Instructions; G

SD-11 Closeout Submittals

Warranty; G

1.03 QUALITY ASSURANCE

A. Samples

Submit interior signage samples of each sign types showing typical quality, workmanship and color: Standard Room sign. The samples may be installed in the work, provided each sample is identified and location recorded.

B. Detail Drawings

Submit detail drawings showing elevations of each type of sign, dimensions, details and methods of mounting or anchoring, mounting height, shape and thickness of materials, and details of construction. Include a schedule showing the location, each sign type, and message.

1.04 DELIVERY, STORAGE, AND HANDLING

Materials must be packaged to prevent damage and deterioration during shipment, handling, storage and installation. Product must be delivered to the jobsite in manufacturer's original packaging and stored in a clean, dry area in accordance with manufacturer's instructions.

1.05 WARRANTY

Warrant the interior signage for a period of 2 years against defective workmanship and material. Warranties must be signed by the authorized representative of the manufacturer. Submit warranty accompanied by the document authenticating the signer as an authorized representative of the guarantor. Guarantee that the signage products and the installation are free from any defects in material and workmanship from the date of delivery.

PART 2 PRODUCTS

2.01 STANDARD PRODUCTS

Signs, plaques, directories, and dimensional letters must be the standard product of a manufacturer regularly engaged in the manufacture of such products that essentially duplicate signs that

have been in satisfactory use at least 2 years prior to bid opening. Obtain signage from a single manufacturer with edges and corners of finished letterforms and graphics true and clean.

2.02 ROOM IDENTIFICATION SYSTEM

A. Standard Room Signs

Signs must consist of acrylic plastic 0.080 inch thickness minimum conforming to ANSI Z97.1.

a. Units must be frameless. Corners of signs must be squared.

B. Type of Mounting For Signs

Provide extruded aluminum brackets for hanging, projecting, and double-sided signs. Mounting for framed, hanging, and projecting signs must be by mechanical fasteners. Surface mounted signs must be mounted with countersunk mounting holes in plaques and mounting screws fabricated from materials that are not corrosive to sign material and mounting surface.

C. Graphics

Signage graphics for modular signs must conform to the following:

1. Solid Aluminum Letters

Provide 1/8, 1/4 inch thick and fasten to the message panel with concealed fasteners.

D. Character Proportions and Heights

Letters and numbers on signs conform to 36 CFR 1191.

E. Tactile Letters, Symbols and Braille

Raised letters and numbers on signs must conform to 36 CFR 1191.

2.03 GREY WATER SYSTEM

In all locations where grey water will be available for use, provide signs reading "NON POTABLE WATER - NOT FOR CONSUMPTION". This will include but not be limited to hose bibs and utility sink,

2.04 ALUMINUM ALLOY PRODUCTS

Aluminum extrusions must be at least 1/8 inch thick, and aluminum plate or sheet must be at least 0.0508 inch thick. Extrusions must conform to ASTM B221; plate and sheet must conform to ASTM B209. Where anodic coatings are specified, alloy must conform to AA PK-1 alloy designation 514.0. Exposed anodized aluminum finishes must be as shown. Welding for aluminum products must conform to AWS D1.2/D1.2M.

2.05 FABRICATION AND MANUFACTURE

A. Factory Workmanship

Holes for bolts and screws must be drilled or punched. Drilling

and punching must produce clean, true lines and surfaces. Exposed surfaces of work must have a smooth finish and exposed riveting must be flush. Fastenings must be concealed where practicable.

B. Dissimilar Materials

Where dissimilar metals are in contact, the surfaces will be protected to prevent galvanic or corrosive action.

2.06 COLOR, FINISH, AND CONTRAST

Finish of all signs must be eggshell, matte, or other non-glare finish as required in handicapped-accessible buildings.

2.07 TYPEFACE

Helvetica Regular.

PART 3 EXECUTION

3.01 INSTALLATION

Signs must be installed plumb and true and in accordance with approved manufacturer's instructions at locations shown on the detail drawings, and door schedule. Mounting height and mounting location must conform to 36 CFR 1191. Required blocking must be installed. Signs on doors or other surfaces must not be installed until finishes on such surfaces have been installed. Signs installed on glass surfaces must be installed with matching blank back-up plates in accordance with manufacturer's instructions.

Do not install items that show visual evidence of biological growth.

A. Anchorage

Anchorage must be in accordance with approved manufacturer's instructions. Anchorage not otherwise specified or shown must include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine carriage bolts for steel; lag bolts and screws for wood. Exposed anchor and fastener materials must be compatible with metal to which applied and must have matching color and finish.

a. Signs mounted to painted gypsum board surfaces must be removable for painting maintenance.

b. Mount signs mounted to lay-in ceiling grids with clip connections to ceiling tees.

c. Install signs mounted on metal surfaces with magnetic tape.

d. Install signs mounted on fabric surfaces with hook and loop tape or pin mount.

B. Protection and Cleaning

Protect the work against damage during construction. Hardware and electrical equipment must be adjusted for proper operation. Glass, frames, and other sign surfaces must be cleaned at completion of sign installation in accordance with the manufacturer's approved instructions and the requirements of Section 01 78 23 OPERATION AND MAINTENANCE DATA, Package 1. Submit six copies of maintenance instructions listing routine procedures, repairs, and guides.

-- End of Section --

SECTION 10 14 01

EXTERIOR SIGNAGE
10/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF45	(2003; Reaffirmed 2009) Designation System for Aluminum Finishes

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2015; Errata 1 2015; Errata 2 2016) Structural Welding Code - Steel
AWS D1.2/D1.2M	(2014) Structural Welding Code - Aluminum

ASTM INTERNATIONAL (ASTM)

ASTM A1011/A1011M	(2017) Standard Specification for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
ASTM A123/A123M	(2015) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A36/A36M	(2014) Standard Specification for Carbon Structural Steel
ASTM A653/A653M	(2015; E 2016) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A924/A924M	(2017) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

1.02 GENERAL REQUIREMENTS

All exterior signage shall be provided by a single manufacturer. Exterior signage shall be of the design, detail, sizes, types, and message content shown on the drawings, shall conform to the requirements specified, and shall be provided at the locations indicated. Submit exterior signage schedule in electronic media with spread sheet format. Spread sheet shall include sign location, sign type, and message. Signs shall be complete with lettering, framing as

detailed, and related components for a complete installation. Submit samples for each exterior sign. Each sample shall consist of a complete sign panel with letters and symbols. Samples may be installed in the work, provided each sample is identified and location recorded. Submit three color samples for each material requiring color and 12 inch square sample of sign face color sample.

A. Wind Load Requirements

Exterior signage shall be designed to withstand 120 mph windload. Submit wind load design analysis and supporting calculations performed in support of specified signage.

B. Character Proportions and Heights

Letters and numbers on indicated signs for handicapped-accessible buildings shall have a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10. Characters and numbers on indicated signs shall be sized according to the viewing distance from which they are to be read. The minimum height is measured using an upper case letter "X". Lower case characters are permitted.

1.03 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Exterior Signage Schedule; G

SD-02 Shop Drawings

Approved Detail Drawings; G, AE

SD-03 Product Data

Exterior Signage; G, AE

Wind Load Design Analysis G, AE

SD-04 Samples

Exterior SignMockup; G

SD-08 Manufacturer's Instructions

Installation; G

SD-10 Operation and Maintenance Data

Maintenance Instructions; G

1.04 QUALIFICATIONS

Signs, plaques, and dimensional letters shall be the standard product of a manufacturer regularly engaged in the manufacture of the products. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least 2 years prior to bid opening.

1.05 DELIVERY AND STORAGE

Materials shall be wrapped for shipment and storage, delivered to the jobsite in manufacturer's original packaging, and stored in a clean, dry area in accordance with manufacturer's instructions.

1.06 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

PART 2 PRODUCTS

2.01 EXTERIOR SIGNAGE SYSTEM

Exterior signage shall consist of coordinated identification and regulatory type signs located where shown on Contract Drawings. Submit manufacturer's descriptive data and catalog cuts.

A. Panel Type Signs

1. Panels

Panels shall be provided in sizes shown on drawings. Panels shall be fabricated a minimum of 0.125 inch aluminum . Panels with metal return sheeting shall have welded corners, ground smooth. Panels shall be building mounted with concealed hardware, at exterior locations and to contain information shown on the design documents

2. Finishes

Metal panel system finish shall be anodized conforming to AA DAF45.

3. Mounting

Provide permanent mounting by embedding concealed aluminum hardware in the exterior metal wall panel.

2.02 GRAPHICS FOR EXTERIOR SIGNAGE SYSTEMS

A. Graphics

Signage graphics shall conform to the following:

1. Plate aluminum letters, 1/4 inch thick shall be provided and fastened to the message panel with concealed fasteners. Letters shall project 0 inches from face of panel.

B. Text and Graphics

Contracting Officer will provide approved text. Typeface: Helvetica medium. Type size as indicated.

C. Approval

Contractor shall provide a quarter size mockup of proposed exterior signage for review and approval of the Contracting Officer before the start of fabrication.

2.03 METAL PLAQUES

Design and location of plaques shall be at one exterior location as indicated.

A. Cast Metal Plaques

1. Fabrication

Cast metal plaques shall have the logo, emblem and artwork cast in the flat relief technique. Plaques shall be fabricated from prime aluminum.

2. Size

Plaque size shall be as indicated.

3. Border

Border shall be plain edge.

4. Background

Background texture shall be leather.

5. Mounting

Mounting shall be concealed.

6. Finish

Finishes shall consist of aluminum with background sprayed dark gunmetal colored lacquer. Letters shall be satin polished and entire plaque sprayed with two coats clear lacquer.

B. Chemically Etched Metal Plaques

1. Fabrication

Plaque shall be chemically single-etched one-piece stainless steel 0.125 inch thick.

2. Size

Plaque size shall be as shown.

3. Finish

Single-etched raised areas shall be in silver-tone finish and recessed areas shall be colorfilled.

2.04 STEEL PRODUCTS

Structural steel products shall conform to ASTM A36/A36M. Sheet and strip steel products shall conform to ASTM A1011/A1011M. Welding for steel products shall conform to AWS D1.2/D1.2M.

2.05 ANCHORS AND FASTENERS

Exposed anchor and fastener materials shall be compatible with metal to which applied and shall match in color and finish and shall be non-rusting, non-corroding, and non-staining. Exposed fasteners shall be tamper-proof.

2.06 SHOP FABRICATION AND MANUFACTURE

A. Factory Workmanship

Work shall be assembled in the shop, as far as practical, ready for installation at the site. Work that cannot be shop assembled shall be given a trial fit in the shop to ensure proper field assembly. Holes for bolts and screws shall be drilled or punched. Drilling and punching shall produce clean, true lines and surfaces. Welding to or on structural steel shall be in accordance with AWS D1.1/D1.1M. Welding shall be continuous along the entire area of contact. Exposed welds shall be ground smooth. Exposed surfaces of work shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed where practical. Items specified to be galvanized shall be by hot-dip process after fabrication if practical. Galvanization shall be in accordance with ASTM A123/A123M and ASTM A653/A653M, as applicable. Other metallic coatings of steel sheet shall be in accordance with ASTM A924/A924M. Joints exposed to the weather shall be formed to exclude water. Drainage and weep holes shall be included as required to prevent condensation buildup.

B. Dissimilar Materials

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of asphalt varnish or a coat of zinc-molybdate primer to prevent galvanic or corrosive action.

C. Shop Painting

Surfaces of miscellaneous metal work, except nonferrous metal, corrosion resisting steel, and zinc-coated work, shall be given one coat of zinc-molybdate primer or an approved rust-resisting treatment and metallic primer in accordance with manufacturer's standard practice. Surfaces of items to be embedded in concrete shall not be painted. Upon completion of work, damaged surfaces shall be recoated.

2.07 COLOR, FINISH, AND CONTRAST

Color shall be selected from manufacturers standard colors. Color listed is not intended to limit the selection of equal colors from other manufacturers. For buildings required to be handicapped-accessible, the characters and background of signs shall be eggshell, matte, or other non-glare finish. Characters and symbols shall contrast with their background - either light characters on a dark background or dark characters on a light background.

PART 3 EXECUTION

3.01 INSTALLATION

Signs, plaques, or dimensional letters shall be installed in accordance with approved manufacturer's instructions at locations shown on the approved detail drawings; submit drawings showing elevations of each type of sign; dimensions, details, and methods of mounting or anchoring; shape and thickness of materials; and details of construction. A schedule showing the location, each sign type, and message shall be included. Signs shall be installed plumb and true at mounting heights indicated, and by method shown or specified. Signs mounted on other surfaces shall not be installed until finishes on such surfaces have been completed. Submit manufacturer's installation instructions and cleaning instructions.

A. Anchorage

Anchorage and fastener materials shall be in accordance with approved manufacturer's instructions for the indicated substrate. Anchorage not otherwise specified or indicated shall include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine carriage bolts for steel; lag bolts and screws for wood.

B. Protection and Cleaning

The work shall be protected against damage during construction. Hardware and electrical equipment shall be adjusted for proper operation. Glass, frames, and other sign surfaces shall be cleaned in accordance with manufacturer's instructions. After signs are completed and inspected, Cover all project identification, directional, and other signs which may mislead the public. Covering shall be maintained until instructed to be removed by the Contracting Officer or until the facility is to be opened for business. Submit six copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The instructions shall include simplified diagrams for the equipment as installed. Signs shall be cleaned, as required, at time of cover removal.

3.02 FIELD PAINTED FINISH

Miscellaneous metals and frames shall be field painted in accordance with Section 09 90 00 PAINTING AND COATING. Anodized metals, masonry, and glass shall be protected from paint. Finish shall be free of

scratches or other blemishes.

-- End of Section --

SECTION 10 26 00

WALL AND DOOR PROTECTION
08/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM B221	(2014) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM D256	(2010) Determining the Izod Pendulum Impact Resistance of Plastics
ASTM D543	(2014) Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
ASTM D635	(2014) Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position
ASTM E84	(2016) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM G21	(2015) Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

CDPH SECTION 01350	Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers

GREEN SEAL (GS)

GS-36	(2011) Commercial Adhesives

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS	SCS Global Services (SCS)Indoor Advantage

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE J1545	(2005; R 2014) Instrumental Color

Difference Measurement for Exterior Finishes, Textiles and Colored Trim

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

SCAQMD Rule 1168 (1989; R 2005) Adhesive and Sealant Applications

UNDERWRITERS LABORATORIES (UL)

UL 2818 (2013) GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Corner Guards, Door And Door Frame Protectors, Wall Guards (Bumper Guards), Wall Panels And Wall Covering; G

SD-03 Product Data

Corner Guards; G, AE

SD-04 Samples

Color And Finish; G

SD-06 Test Reports

Fire Rating; G, AE

SD-07 Certificates

Product Certification Documentation

Recycled Content For Aluminum Component Of Corner Guards

SD-11 Closeout Submittals

Warranty; G

1.03 CERTIFICATIONS

A. Indoor Air Quality

1. Adhesives and Sealants

Provide products certified to meet indoor air quality requirements by UL 2818 (Greenguard) Gold, SCS Global Services Indoor Advantage Gold or provide certification or validation by other third-party program that products meet

the requirements of this section. Provide current product certification documentation from certification body.

1.04 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the project site in manufacturer's original unopened containers with seals unbroken and labels and trademarks intact. Keep materials dry, protected from weather and damage, and stored under cover. Materials must be stored at approximately 70 degrees F for at least 48 hours prior to installation.

1.05 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

1. Pawling Corporation Architectural Products. 32 Nelson Hill Rd, Wassaic, NY 12592, Tel: 800-431-3456; www.pawling.com

2. Wallguard.com, Tel: 877-943-6826; http://www.wallguard.com

3. Or approved equal.

2.02 STANDARD PRODUCTS

To the maximum extent possible, corner guards, door and door frame protectors, wall guards (bumper guards), wall panels and wall covering must be the standard products of a single manufacturer and must be furnished as detailed. Drawings show general configuration of products required, and items differing in minor details from those shown will be acceptable.

A. Resilient Material

Provide resilient material consisting of high impact resistant extruded acrylic vinyl, polyvinyl chloride, or injection molded thermal plastic conforming to the following:

1. Minimum Impact Resistance

Minimum impact resistance must be 18 ft-lbs/sq. inch when tested in accordance with ASTM D256, (Izod impact, ft-lbs per sq inch notched).

2. Fire Rating

Fire rating must be Class 1 when tested in accordance with ASTM E84, having a maximum flame spread of 25 and a smoke developed rating of 450 or less. Material must be rated self extinguishing when tested in accordance with ASTM D635. Material must be labeled and tested by an approved nationally known testing laboratory. Resilient material used for protection on fire rated doors and frames must be listed by the testing laboratory performing the tests.

Resilient material installed on fire rated wood/steel door and frame assemblies must have been tested on similar type assemblies. Test results of material tested on any other combination of door/frame assembly will not be acceptable.

3. Integral Color

Colored components must have integral color and must be matched in accordance with SAE J1545 to within plus or minus 1.0 on the CIE-LCH scales.

4. Chemical and Stain Resistance

Materials must be resistant to chemicals and stains reagents in accordance with ASTM D543.

5. Fungal and Bacterial Resistance

Materials must be resistant to fungi and bacteria in accordance with ASTM G21, as applicable.

2.03 CORNER GUARDS

A. Resilient Corner Guards

Corner guard units must be surface mounted type, radius formed to profile shown. Corner guards must extend from floor to ceiling. Mounting hardware, cushions, and base plates must be furnished. Assembly must consist of a snap-on corner guard formed from high impact resistant resilient material, mounted on a continuous aluminum retainer. Extruded aluminum retainer must conform to ASTM B221, alloy 6063, temper T5 or T6. Provide aluminum components that contain a minimum of 35 percent recycled content. Provide data identifying percentage of recycled content for aluminum component of corner guards. Flush mounted type guards must act as a stop for adjacent wall finish material. Factory fabricated end closure caps must be furnished for top and bottom of surface mounted corner guards. Flush mounted corner guards installed in fire rated wall must maintain the rating of the wall. Insulating materials that are an integral part of the corner guard system must be provided by the manufacturer of the corner guard system. Exposed metal portions of fire rated assemblies must have a paintable surface.

2.04 TRIM, FASTENERS AND ANCHORS

Provide vinyl trim, fasteners and anchors for each specific installation as shown.

2.05 COLOR AND FINISH

Submit three samples indicating color and texture of materials requiring color and finish. Color must be in accordance with Contract Drawings, SCHEDULES FOR FINISHES,selected from manufacturers standard colors.

A. Resilient Material Finish

Finish for resilient material must be velour texture with colors

in accordance with SAE J1545.

2.06 ADHESIVES

Adhesive for resilient material must be in accordance with manufacturers recommendations. Provide sealants and non-aerosol adhesive products used on the interior of the building (defined as inside of the weatherproofing system) that meet either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) the VOC content requirements of SCAQMD Rule 1168, or VOC content requirements of GS-36. Provide certification of indoor air quality for adhesives.

PART 3 EXECUTION

3.01 INSTALLATION

Do not install items that show visual evidence of biological growth.

A. Corner Guards

Material must be mounted at location indicated in accordance with manufacturer's recommendations.

-- End of Section --

SECTION 10 28 13

TOILET ACCESSORIES
08/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C1036	(2016) Standard Specification for Flat Glass

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-04 Samples

Fasteners; G, AE

Accessory Items; G, AE

SD-07 Certificates

Recycled Content For Stainless Steel Toilet Accessories

SD-11 Closeout Submittals

Performance Guarantees Or Warranties; G

1.03 DELIVERY, STORAGE, AND HANDLING

Wrap toilet accessories for shipment and storage, then deliver to the jobsite in manufacturer's original packaging, and store in a clean, dry area protected from construction damage and vandalism.

1.04 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period.

PART 2 PRODUCTS

2.01 MANUFACTURED UNITS

Provide toilet accessories where indicated in accordance with paragraph SCHEDULE. Porcelain type, tile-wall accessories are specified in Section 09 30 13 CERAMIC TILING. Provide each accessory item complete with the necessary mounting plates of sturdy construction with corrosion resistant surface.

Provide stainless steel products listed herein manufactured from materials containing a minimum of 50 percent recycled content. Provide data identifying percentage of recycled content for stainless steel toilet accessories.

A. Anchors and Fasteners

Provide anchors and fasteners capable of developing a restraining force commensurate with the strength of the accessory to be mounted and suited for use with the supporting construction. Provide oval heads exposed fasteners with finish to match the accessory.

B. Finishes

Except where noted otherwise, provide the following finishes on metal:

Metal	Finish
Stainless steel	No. 4 satin finish

2.02 ACCESSORY ITEMS

Conform to the requirements for accessory items specified below. Submit fasteners proposed for use for each type of wall construction, mounting, operation, and cleaning instructions and one sample of each other accessory items proposed for use. Incorporate approved samples into the finished work, provided they are identified and their locations noted. Submit certificate for each type of accessory specified, attesting that the items meet the specified requirements.

A. Grab Bar (GB-1, GB-2)

Provide an 18 gauge, 1-1/4 inch grab bar OD Type 304 stainless steel. Provide form and length for grab bar as indicated. Provide concealed mounting flange. Provide grab with satin finish. Furnish installed bars capable of withstanding a 500 pound vertical load without coming loose from the fastenings and without obvious permanent deformation. Allow 1-1/2 inch space between wall and grab bar.

B. Mirrors, Glass (MR-1)

Provide Type I transparent flat type, Class 1-clear glass for mirrors. Glazing Quality q1 1/4 inch thick conforming to ASTM C1036. Coat glass on one surface with silver coating,

copper protective coating, and mirror backing paint. Provide highly adhesive pure silver coating of a thickness which provides reflectivity of 83 percent or more of incident light when viewed through 1/4 inch thick glass, free of pinholes or other defects. Provide copper protective coating with pure bright reflective copper, homogeneous without sludge, pinholes or other defects, of proper thickness to prevent "adhesion pull" by mirror backing paint. Provide mirror backing paint with two coats of special scratch and abrasion-resistant paint and baked in uniform thickness to provide a protection for silver and copper coatings which will permit normal cutting and edge fabrication.

C. Soap Dispenser (SD)

Provide soap dispenser surface mounted, liquid type consisting of a vertical Type 304 stainless steel tank with holding capacity of 40 fluid ounces with a corrosion-resistant all-purpose valve that dispenses liquid soaps, lotions, detergents and antiseptic soaps.

D. Coat Hook (CH)

Provide coat hook with concealed wall fastenings, and a pin integral with or permanently fastened to wall flange with maximum projection of 4 inch. Provide satin finish.

E. Toilet Paper Dispenser (TPD)

Furnish Type II - surface mounted toilet tissue holder with two rolls of standard tissue mounted horizontally. Provide stainless steel, satin finish cabinet.

F. Toilet Seat Cover Dispenser (TSCD)

Provide Type 304 stainless steel with surface mounted toilet seat cover dispensers. Provide dispenser with a minimum capacity of 500 seat covers.

G. Paper Towel Dispenser/Waste Receptacle (PTD)

Provide stainless steel and recessed mounted paper towel dispenser, and waste receptacle combination. Provide a waste receptacle of the reusable liner of type standard with the receptacle manufacturer. Provide receptacle with 2 cubic feet capacity. Furnish tumbler key lock locking mechanism.

H. Mop and Broom Holder (MH)

Stainless steel with grip jaw cam mechanism securing 4 mop or broom handles. Also includes storage shelf.

PART 3 EXECUTION

3.01 INSTALLATION

Do not install items that show visual evidence of biological growth. Provide the same finish for the surfaces of fastening devices exposed after installation as the attached accessory. Provide oval exposed screw heads. Install accessories at the location and height

indicated. Protect exposed surfaces of accessories with strippable plastic or by other means until the installation is accepted. After acceptance of accessories, remove and dispose of strippable plastic protection. Coordinate accessory manufacturer's mounting details with other trades as their work progresses. After installation, thoroughly clean exposed surfaces and restore damaged work to its original condition or replace with new work.

A. Recessed Accessories

Fasten accessories with wood screws to studs, blocking or rough frame in wood construction. Set anchors in mortar in masonry construction. Fasten to metal studs or framing with sheet metal screws in metal construction.

B. Surface Mounted Accessories

Mount on concealed backplates, unless specified otherwise. Conceal fasteners on accessories without backplates. Install accessories with sheet metal screws or wood screws in lead-lined braided jute, PTFE or neoprene sleeves, or lead expansion shields, or with toggle bolts or other approved fasteners as required by the construction. Install backplates in the same manner, or provide with lugs or anchors set in mortar, as required by the construction. Fasten accessories mounted on gypsum board and plaster walls without solid backing into the metal or wood studs or to solid wood blocking secured between wood studs, or to metal backplates secured to metal studs.

3.02 CLEANING

Clean material in accordance with manufacturer's recommendations. Do not use alkaline or abrasive agents. Take precautions to avoid scratching or marring exposed surfaces.

3.03 SCHEDULE

Please see Sheet A-401 on the Contract Drawings for details and schedule.

-- End of Section --

SECTION 10 44 13

FIRE EXTINGUISHER CABINETS
10/17

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

Non-Fire Rated Fire Extinguisher Cabinets for the following:

1. Portable fire extinguishers.

2. Fire hose valves.

3. Fire hoses and racks.

B. Related Requirements

Section 10 44 16 "FIRE EXTINGUISHERS".

1.02 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E814	(2013a; R 2017) Standard Test Method for Fire Tests of Penetration Firestop Systems

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(2013) Standard for Portable Fire Extinguishers

UNDERWRITERS LABORATORIES (UL)

UL 1479	(2015) Fire Tests of Through-Penetration Firestops

1.03 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers and related items indicated are accommodated.

B. Size Variations: Obtain Contracting Officer's acceptance and approval of manufacturer's standard size units that may vary slightly from sizes indicated on Drawings.

C. Coordinate sizes and locations of fire-protection cabinets with wall depths.

1.04 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Connections Of Units And Hardware To Other Work; G, AE

SD-03 Product Data

Manufacturer's Technical Data; G, AE

SD-08 Manufacturer's Instructions

Manufacturer's Installation Instructions; G, AE

SD-11 Closeout Submittals

Warranty; G

1.05 QUALITY ASSURANCE

A. NFPA 10 requirements for portable fire extinguishers.

B. 2010 ADA Standards for maximum cabinet projection of 4 inches and mounting heights.

C. ASTM E814 for fire resistive cabinets in rated wall assemblies.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with Division 01 requirements.

B. Packing and Shipping: Deliver products in original unopened packaging with legible manufacturer's identification.

C. Store per manufacturer's instructions.
   1. Store in dry area out of direct sunlight.

1.07 WARRANTY

A. Provide manufacturer's written warranty.

B. Warrant materials and workmanship against defects after completion and final acceptance of Work.

   1. Repair defects, or replace with new materials, faulty materials or fabrication developed during the warranty period at no expense to Owner.

   2. Fire Extinguisher Cabinet: 5 years from date of Substantial Completion of Project.

PART 2 PRODUCTS

2.01 MANUFACTURERS

1. Nystrom 9300 73rd Avenue N; Nystrom, MN 55428, Phone: (800) 547-2635; Fax: (800) 317-8770; www.Nystrom.com

2. Larsen's Manufacturing Company 7421 Commerce Lane NE, Minneapolis MN 55432, Phone: (800) 527-7367; www.larsensmfg.com/home

3. Potter Roemer LLC., 17451 Hurley Street, City of Industry CA 91744, Phone: (800) 366-3473; www.potterroemer.com

4. Or approved equal.

2.02 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

B. Fire extinguishers in accordance with Section 10 44 16 FIRE EXTINGUISHERS.

2.03 FIRE PROTECTION CABINET

A. Nystrom; Alpine™ Fire Extinguisher Cabinet

1. Description: Steel unit construction, continuous piano hinge with 180 degree opening. Weld joints and grind smooth.

2. Cabinet Mounting: Recessed, 1/2 inch Surface

3. Components:

a. Door and Frame:

1) 0.036 inch cold rolled steel

a) Color and Finish: Red factory applied powder coat paint finish.

2) 6063-T5 anodized aluminum.

a) Color and Finish: Satin finish, clear polyester coated.

3) 0.0652 inch stainless steel.

a) Color and Finish: Type 304 Stainless Steel with #4 finish.

b. Tub: 0.036 inch cold rolled steel

1) Color Finish: White factory applied powder coat paint finish.

c. Door Type: Full break glass with lock and breakrite handle.

4. Options:

    a. Door Glazing Type: Tinted or obscured tempered safety glass.
    b. Lettering: Vertical die cut, white.
    c. Latching: Flush pull handle.

5. Cabinet Dimensions: Size to match extinguisher type.

6. Fire Rating: Non-fire rated.

B. Nystrom; Palisade™ Fire Extinguisher Cabinet

1. Description: Steel unit construction, plexiglass door, gravity pin hinge with set screws to open 135 degrees. Weld joints and grind smooth.

2. Cabinet Mounting:Recessed, 1/2 inch Surface Trimless

3. Components:

    a. Door and Frame:

        1) 0.036 inch cold rolled steel.

            a) Color and Finish: Red factory applied powder coat paint finish.

        2) 6063-T5 anodized aluminum.

            a) Color and Finish: Satin finish, clear polyester coated.

        3) 0.0652 inch stainless steel.

            a) Color and Finish: Type 304 Stainless Steel with #4 finish

    b. Tub: 0.036 inch cold rolled steel.

        1) Color and Finish: White factory applied powder coat paint finish.

    c. Door Type: 0.236 inch plexiglass.

4. Options:

    a. Door Glazing Type: Clear acrylic door.
    b. Lettering: Vertical die cut, white.
    c. Latching: Magnetic Catch

5. Cabinet Dimensions: Size to match extinguisher type.

6. Fire Rating: Non-fire rated

2.04 ACCESSORIES

A. Lettering and warning labels.

2.05 PRODUCT INFORMATION

Provide the following product information:

A. Shop Drawings:

1. General: Show connections of units and hardware to other Work. Include schedules showing location of each type and size of door and panel units.

B. Product Data: Manufacturer's technical data for each type of access door and panel assembly, including setting drawings, templates, fire-resistive characteristics, finish requirements, and details of anchorage devices.

1. Include complete schedule, types, locations, construction details, finishes, latching or locking provisions, and other pertinent data.

C. Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimensions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings for cabinet are correctly sized and located.

B. Verify blocking is in place for brackets.

3.02 PREPARATION

Coordinate work relating to fire extinguisher cabinet installation including rough opening dimensions and locations of supports.

3.03 INSTALLATION

A. 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.

B. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

C. Fire-rated units: Include UL label, UL classified listing No. 7N43 ANSI/UL 1479.

-- End of Section --

SECTION 10 44 16

FIRE EXTINGUISHERS
05/15

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 1	(2015; ERTA 2015) Fire Code
NFPA 10	(2013) Standard for Portable Fire Extinguishers
NFPA 101	(2015; ERTA 2016) Life Safety Code

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.106	Flammable and Combustible Liquids
29 CFR 1910.157	(2003) Portable Fire Extinguishers

UNDERWRITERS LABORATORIES (UL)

UL 154	(2005; Reprint May 2014) Carbon-Dioxide Fire Extinguishers

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication Drawings; G, AE

SD-03 Product Data

Manufacturer's Data; G, AE

SD-04 Samples

Fire Extinguisher; G,

Wall Brackets; G

Accessories; G

SD-07 Certificates

Fire Extinguishers Comply With Local Codes And Regulations

SD-11 Closeout Submittals

Warranty; G

Replacement Parts List; G

1.03 DELIVERY, STORAGE, AND HANDLING

Protect materials from weather, soil, and damage during delivery, storage, and construction.

Deliver materials in their original packages, containers, or bundles bearing the brand name and the name and type of the material.

A. Samples

Provide the following samples: One of each type of fire extinguisher being installed; three samples of wall brackets and accessories of each type being used.

Use approved samples for installation, with proper identification and storage.

1.04 WARRANTY

Guarantee that Fire Extinguishers are free of defects in materials, fabrication, finish, and installation and that they will remain so for a period of not less than 10 years after completion.

PART 2 PRODUCTS

Submit fabrication drawings consisting of fabrication and assembly details performed in the factory and product data for the following items: Fire Extinguishers; Accessories, cabinets, Wall Brackets.

2.01 SYSTEM DESCRIPTION

A. Types

Submit certificates that show fire extinguishers comply with local codes and regulations.

Provide fire extinguishers conforming to NFPA 10. Provide quantity and placement in compliance with the applicable sections of NFPA 1, NFPA 101, 29 CFR 1910.106 and 29 CFR 1910.157.

Provide carbon-dioxide type fire extinguishers compliant with UL 154.

Submit manufacturer's data for each type of Fire Extinguisher required, detailing all related Cabinet, Wall Mounting and Accessories information, complete with manufacturer's warranty with inspection tag.

B. Material

Provide enameled steel extinguisher shell.

C. Size

10 pounds .

D. Accessories

Forged brass valve
Fusible plug
Safety release
Antifreeze
Pressure gauge

2.02 EQUIPMENT

Cabinets in accordance with Section 10 44 13 FIRE EXTINGUISHER CABINETS.

PART 3 EXECUTION

3.01 INSTALLATION

Fire Extinguishers where indicated on the drawings. Verify exact locations with Contracting Officer prior to installation.

Provide extinguishers which are fully charged and ready for operation upon installation. Provide extinguishers complete with Manufacturer's Warranty with Inspection Tag attached.

Comply with the manufacturer's recommendations for all installations.

3.02 PROTECTION

A. Repairing

Remove and replace damaged and unacceptable portions of completed work with new work at no additional cost to the Government.

Submit replacement parts list indicating specified items replacement part, replacement cost, and name, address and contact for replacement parts distributor.

B. Cleaning

Clean all surfaces of the work, and adjacent surfaces which are soiled as a result of the work. Remove from the site all construction equipment, tools, surplus materials and rubbish resulting from the work.

-- End of Section --

DIVISION 12 – FURNISHINGS

SECTION 12 36 61.16

SOLID SURFACING COUNTERTOPS
10/17

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

ARCHITECTURAL WOODWORK INSTITUTE (AWI)

AWI AWS	(2nd Edition) Architectural Woodwork Standards

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Product Data; G, AE

Solid Surface Material; G, AE

SD-08 Manufacturer's Instructions

Installation Instructions; G, AE

1.03 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.04 SUMMARY

Section Includes:

1. Solid surface material countertops.

2. Solid surface material backsplashes.

3. Solid surface material end splashes.

4. Solid surface material apron fronts.

1.05 FIELD CONDITIONS

Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop

fabrication is complete.

1.06 COORDINATION

Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 PRODUCTS

2.01 SOLID SURFACE COUNTERTOP MATERIALS

Submit manufacturer's standard product data and installation instructions for selected products.

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ANSI/ICPA SS-1.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Avonite Surfaces.
b. E. I. du Pont de Nemours and Company.
c. Formica Corporation.
d. LG Chemical, Ltd.
e. Meganite Inc.
f. Samsung Chemical USA, Inc.
g. Swan Corporation
h. Transolid Div of Trumbull Industries.
i. Wilsonart International Holdings, Inc.
j. Or approved equal.

3. Colors and Patterns: As selected by Contracting Officer from manufacturer's full range.

2.02 COUNTERTOP FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's AWI AWS "Architectural Woodwork Standards", must be supported by wood or steel members.

B. Configuration:

1. Front: Straight, slightly eased at top.

2. Backsplash: Straight, slightly eased at corner.

3. End Splash: Matching backsplash.

C. Countertops: 3/4-inch thick, solid surface material.

D. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers,

fabrication, and finishing.

1. Fabricate with loose backsplashes for field assembly.

2. Install integral sink bowls in countertops in the shop.

E. Joints: Fabricate countertops without joints.

F. Cutouts and Holes:

1. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

2.03 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

1. Adhesives shall have a VOC content of 70 g/L or less.

2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Sealant for Countertops: Comply with applicable requirements in Section 07 92 00 "JOINT SEALANTS."

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Fasten subtops to cabinets by screwing through subtops into

cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.

D. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

1. Install metal splines in kerfs in countertop edges at joints. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.

2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

F. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

G. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

H. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

I. Apply sealant to gaps at walls; comply with Section 07 92 00 "JOINT SEALANTS".

-- End of Section --

DIVISION 13 – SPECIAL CONSTRUCTION

SECTION 13 34 19

METAL BUILDING SYSTEMS
11/11

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ALUMINUM ASSOCIATION (AA)

AA ADM	(2015) Aluminum Design Manual
AA ASD1	(2013) Aluminum Standards and Data

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 325	(2011; Errata 1 2012; Errata 2 2013; Errata 3 2015) Steel Construction Manual
AISC 341	(2012) Seismic Provisions for Structural Steel Buildings
AISC 360	(2016) Specification for Structural Steel Buildings

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISC/AISI 121	(2004) Standard Definitions for Use in the Design of Steel Structures
AISI SG03-3	(2002; Suppl 2001-2004; R 2008) Cold-Formed Steel Design Manual Set

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	(2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

AMERICAN WELDING SOCIETY (AWS)

AWS A5.1/A5.1M	(2012) Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding
AWS D1.1/D1.1M	(2015; Errata 1 2015; Errata 2 2016) Structural Welding Code - Steel
AWS D1.3/D1.3M	(2008; Errata 2008) Structural Welding Code - Sheet Steel

ASTM INTERNATIONAL (ASTM)

ASTM A1008/A1008M	(2016) Standard Specification for Steel,

	Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
ASTM A1011/A1011M	(2017) Standard Specification for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
ASTM A123/A123M	(2015) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153/A153M	(2016) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A193/A193M	(2016) Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service and Other Special Purpose Applications
ASTM A307	(2014; E 2017) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
ASTM A325	(2014) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A36/A36M	(2014) Standard Specification for Carbon Structural Steel
ASTM A475	(2003; R 2014) Standard Specification for Zinc-Coated Steel Wire Strand
ASTM A500/A500M	(2013) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A501/A501M	(2014) Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A529/A529M	(2014) Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality
ASTM A53/A53M	(2012) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A563	(2015) Standard Specification for Carbon and Alloy Steel Nuts
ASTM A563M	(2007; R 2013) Standard Specification for

	Carbon and Alloy Steel Nuts (Metric)
ASTM A572/A572M	(2015) Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A606/A606M	(2009a) Standard Specification for Steel Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
ASTM A653/A653M	(2015; E 2016) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A755/A755M	(2016; E 2016) Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products
ASTM A780/A780M	(2009; R 2015) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A992/A992M	(2011) Standard Specification for Structural Steel Shapes
ASTM B117	(2016) Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM B209	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B221	(2014) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B221M	(2013) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM B695	(2004; R 2016) Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
ASTM C1363	(2011) Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
ASTM C518	(2015) Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
ASTM C665	(2012) Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing

ASTM C920	(2014a) Standard Specification for Elastomeric Joint Sealants
ASTM D1056	(2014) Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D1308	(2013) Effect of Household Chemicals on Clear and Pigmented Organic Finishes
ASTM D1667	(2017) Standard Specification for Flexible Cellular Materials - Poly (Vinyl Chloride) Foam (Closed-Cell)
ASTM D2244	(2016) Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
ASTM D2247	(2015) Testing Water Resistance of Coatings in 100% Relative Humidity
ASTM D2794	(1993; R 2010) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D3363	(2005; E 2011; R 2011; E 2012) Film Hardness by Pencil Test
ASTM D4214	(2007; R 2015) Standard Test Method for Evaluating the Degree of Chalking of Exterior Paint Films
ASTM D522/D522M	(2014) Mandrel Bend Test of Attached Organic Coatings
ASTM D523	(2014) Standard Test Method for Specular Gloss
ASTM D714	(2002; R 2009) Evaluating Degree of Blistering of Paints
ASTM D822	(2013) Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings
ASTM D968	(2015) Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM DEFONLINE	(2008) ASTM Online Dictionary of Engineering Science and Technology
ASTM E119	(2016a) Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E136	(2016) Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C

ASTM E1592	(2005; R 2012) Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
ASTM E1646	(1995; R 2011) Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Air Pressure Difference
ASTM E1680	(2016) Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems
ASTM E283	(2004; R 2012) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E331	(2000; R 2016) Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
ASTM E84	(2016) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E96/E96M	(2016) Standard Test Methods for Water Vapor Transmission of Materials
ASTM F1554	(2015; E 2016; E 2017) Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
ASTM F1852	(2014) Standard Specification for "Twist Off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM F436	(2011) Hardened Steel Washers
ASTM F844	(2007a; R 2013) Washers, Steel, Plain (Flat), Unhardened for General Use
ASTM G152	(2013) Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
ASTM G153	(2013) Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

METAL BUILDING MANUFACTURERS ASSOCIATION (MBMA)

MBMA MBSM	(2002) Metal Building Systems Manual

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM AMP 500	(2006) Metal Finishes Manual

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 252	(2017) Standard Methods of Fire Tests of Door Assemblies
NFPA 80	(2016; TIA 16-1) Standard for Fire Doors and Other Opening Protectives

NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)

NRCA RoofMan	(2011 thru 2014) The NRCA Roofing Manual

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1793	(2012) Architectural Sheet Metal Manual, 7th Edition

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC Paint 15	(1999; E 2004) Steel Joist Shop Primer
SSPC Painting Manual	(2002) Good Painting Practice, Steel Structures Painting Manual, Volume 1
SSPC SP 2	(1982; E 2000; E 2004) Hand Tool Cleaning

UNDERWRITERS LABORATORIES (UL)

UL Bld Mat Dir	(updated continuously online) Building Materials Directory

1.02 GENERAL REQUIREMENTS

A. Structural Performance

Provide metal building systems capable of withstanding the effects of gravity loads and the following loads and stresses within the limits and conditions indicated.

1. Engineering

Design metal building systems conforming to procedures described in MBMA MBSM.

2. Design Loads

Conform to the requirements of MBMA MBSM, ASCE 7, and the building code applicable to the project geographical location.

3. Live Loads

Include all vertical loads induced by the building occupancy indicated on the drawings, as well as loads induced by

maintenance workers, materials and equipment for roof live loads.

4. Roof Snow Loads

Include vertical loads induced by the ground snow load at the project site of 25 psf. Allow for unbalanced and drift loads.

5. Wind Loads

Include horizontal loads induced by a basic wind speed Project site of 114 mph per ASCE 7-10.

6. Collateral Loads

Include additional dead loads other than the weight of metal building system for permanent items such as piping, mechanical systems, electrical systems, and ceilings.

7. Auxiliary Loads

Include dynamic live loads, such as those generated by cranes and materials-handling equipment indicated on Contract Drawings.

8. Load Combinations

Design metal building systems to withstand the most critical effects of load factors and load combinations as required by MBMA MBSM, ASCE 7, and the building code applicable to the project location.

9. Deflection Limits

Engineer assemblies to withstand design loads with deflections no greater than the following:

a. Purlins and Rafters; vertical deflection of 1/180.

b. Girts; horizontal deflection of 1/180.

c. Metal Roof Panels; vertical deflection of 1/180.

d. Metal Wall Panels; horizontal deflection of 1/180.

Design secondary framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings. Provide metal panel assemblies capable of withstanding the effects of loads and stresses indicated, based on testing according to ASTM E1592.

B. Seismic Performance

Design and engineer metal building system capable of withstanding the effects of earthquake motions determined according to ASCE 7, AISC 341, and the applicable portions of the building code in the geographic area where the construction will take place.

C. Thermal Movements

Provide metal panel systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss as follows:

Temperature Change (Range); 120 F, ambient; 180 F, material surfaces.

D. Thermal Performance

Provide insulated metal panel assemblies with the following maximum U-factors and minimum R-values for opaque elements when tested according to ASTM C1363 or ASTM C518.

1. Metal Roof Panel Assemblies

a. R-Value: 30

2. Metal Wall Panel Assemblies

a. R-Value: 20

E. Air Infiltration for Metal Roof Panels

Air leakage through assembly must not exceed 0.06 cfm/sq.ft. of roof area when tested according to ASTM E1680 at negative test-pressure difference of 1.57 lb/sq.ft.

F. Air Infiltration for Metal Wall Panels

Air leakage through assembly of not more than 0.06 cfm/sq.ft. of wall area when tested according to ASTM E283 at static-air-pressure difference of 6.24 lbf/sq.ft.

G. Water Penetration for Metal Roof Panels

No water penetration when tested according to ASTM E1646 at test-pressure difference of 2.86 lbf/sq.ft.

H. Water Penetration for Metal Wall Panels

No water penetration when tested according to ASTM E331 at a minimum differential pressure of 20 percent of inward-acting, wind-load design pressure of not less than 6.24 lbf/sq.ft. and not more than 12 lbf/sq. ft.

I. Wind-Uplift Resistance

Provide metal roof panel assemblies that comply with ASCE 7 and the current state building code of New Jersey.

1.03 DEFINITIONS

a. Bay: Dimension between main frames measured normal to frame (at

centerline of frame) for interior bays, and dimension from centerline of first interior main frame measured normal to end wall (outside face of end-wall girt) for end bays.

b. Building Length: Dimension of the building measured perpendicular to main framing from end wall to end wall (outside face of girt to outside face of girt).

c. Building Width: Dimension of the building measured parallel to main framing from sidewall to sidewall (outside face of girt to outside face of girt).

d. Clear Span: Distance between supports of beams, girders, or trusses (measured from lowest level of connecting area of a column and a rafter frame or knee).

e. Eave Height: Vertical dimension from finished floor to eave (the line along the sidewall formed by intersection of the planes of the roof and wall).

f. Clear Height under Structure: Vertical dimension from finished floor to lowest point of any part of primary or secondary structure, not including crane supports, located within clear span.

g. Terminology Standard: Refer to MBMA "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in referenced standards.

1.04 SYSTEM DESCRIPTION

General: Provide a complete, integrated set of metal building system manufacturer's standard, mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior. Include primary and secondary framing, metal roof panels, metal wall panels, and accessories complying with requirements indicated.

Provide metal building system of size and with spacing, slopes, and spans indicated.

A. Primary Frame Type

a. Rigid Clear Span: Solid-member, structural-framing system without interior columns.

B. Fixed End-Wall Framing

Provide manufacturer's standard fixed end wall, for buildings not required to be expandable, consisting of primary frame, capable of supporting one-half of a bay design load, and end-wall columns.

C. Secondary Frame Type

Provide manufacturer's standard purlins and joists and exterior-framed (bypass) girts.

D. Eave Height

Eave height must be 13 feet.

E. Bay Spacing

Bay Spacing must be as shown on the Contract Drawings.

F. Roof Slope

Roof slope must be 3 inches per 12 inches.

G. Roof System

Provide manufacturer's standard standing-seam metal roof panels with insulation.

H. Exterior Wall System

Provide manufacturer's standard field-assembled, insulated metal wall panels complete with vapor barrier conforming to ASTM E96/E96M.

1.05 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Manufacturer's Qualifications; G, AE

Erection Contractor Qualifications; G, AE

Conditions Detrimental To Performance Of The Work; G, AE

Construction Schedule; G, AE

SD-02 Shop Drawings

Detailed Drawings of Entire Structure; G, AE

SD-03 Product Data

Manufacturer's Catalog Data; G, AE

SD-04 Samples

Coil Stack; G, AE

Roof Panels; G, AE

Wall Panels; G, AE

Metal Strip Closures; G, AE

Insulation; G, AE

Vapor Barrier; G, AE

Fasteners; G, AE

Manufacturer's Color and Finishes Chart And Chips; G, AE

Roof And Wall Accessories And Specialties; G, AE

Flashing And Trim; G, AE

Aluminized Steel Repair Paint, Galvanizing Repair Paint, And Enamel Repair Paint; G, AE

SD-05 Design Data

Manufacturer's Descriptive And Technical Literature; G, AE

Certified Engineering Calculations; G, AE

Building Design Analysis; G, AE

SD-06 Test Reports

All Test Reports; G, AE

Combustion Characteristics; G, AE

Fire-Resistance Ratings; G, AE

Factory Color Finish Performance Requirements; G, AE

Coatings And Base Metals; G, AE

SD-07 Certificates

Coil Stock; G, AE

SD-08 Manufacturer's Instructions

Detailed Written Instructions For Assembly; G, AE

SD-11 Closeout Submittals

Manufacturer's Warranty; G

Contractor's Warranty for Installation; G

Contractor's Five (5) Year No Penal Sum Warranty; G

1.06 QUALITY ASSURANCE

A. Pre-Erection Conference

After submittals are received and approved but before metal building system work, including associated work, is performed, the Contracting Officer will hold a pre-erection conference to review the following:

a. The Contract Drawings, specifications, and manufacturer's descriptive and technical literature.

b. Finalize construction schedule and verify availability of materials, erector's personnel, equipment, and facilities needed to make progress and avoid delays.

c. Methods and procedures related to metal building system erection, including, but not limited to: qualification of manufacturer, qualification of erector, manufacturer's catalog data, building design analysis, written instructions and test reports.

d. Support conditions for compliance with requirements, including alignment between and erection of structural members.

e. Flashing, special roofing and siding details, roof and wall penetrations, openings, and condition of other construction that will affect metal building system, including coatings and base metals, factory color finish performance requirements, system components, and certificates for coil stock.

f. Governing regulations and requirements for certificates, insurance, tests and inspections if applicable.

g. Temporary protection requirements for metal panel assembly during and after installation.

h. Samples of aluminized steel repair paint, galvanizing repair paint, and enamel repair paint.

1. Pre-Roofing and Siding Installation Conference

After structural framing system erection and approval but before roofing, siding work, including associated work, is performed; the Contracting Officer will hold a pre-roofing and siding conference to review the following:

a) Examine purlins, sub-girts and formed shapes conditions for compliance with requirements, including flatness and attachment to structural members.

b) Review structural limitations of purlins, sub-girts and formed shapes during and after roofing and siding.

c) Review flashings, special roof and wall details, roof drainage, roof and wall penetrations, roof equipment curbs, and condition of other construction that will affect the metal building system.

d) Review temporary protection requirements for metal roof and wall panels' assembly during and after installation.

e) Review roof and wall observation and repair procedures after metal building system erection.

B. Manufacturer's Technical Representative

The representative must have authorization from manufacturer to approve field changes and be thoroughly familiar with the products, erection of structural framing and installation of roof and wall panels in the geographical area where construction will take place.

C. Manufacturer's Qualifications

Metal building system manufacturer must have a minimum of five (5) years experience as a qualified manufacturer and a member of MBMA of metal building systems and accessory products.

Provide engineering services by an authorized currently licensed engineer in the state of New Jersey, having a minimum of four years experience as an engineer knowledgeable in building design analysis, protocols and procedures for the "Metal Building Systems Manual" (MBMA MBSM); ASCE 7,current building code of the state of New Jersey, and ASTM E1592.

Provide certified engineering calculations and building design analysis using the products submitted for:

1. Roof and Wall Wind Loads with basic wind speed, exposure category, co-efficient, importance factor, designate type of facility, positive and negative pressures for each zone, methods and requirements of attachment.

2. Roof Dead and Live Loads

3. Collateral Loads

4. Foundation Loads

5. Roof Snow Load

6. Seismic Loads

Provide detailed shop drawings for the entire structure and detailed written instructions for assembly.

D. Erection Contractor Qualifications

An experienced erector who has specialized in erecting and installing work similar in material, design, and extent to that indicated for this Project and must be approved and certified by the metal building system manufacturer.

E. Single Source

Obtain primary and secondary components and structural framing members, each type of metal roof, wall and liner panel assemblies, clips, closures and other accessories from the standard products of the single source from a single manufacturer to operate as a complete system for the intended use.

F. Welding

Qualify procedures and personnel according to AWS A5.1/A5.1M, AWS D1.1/D1.1M, and AWS D1.3/D1.3M.

G. Structural Steel

Comply with AISC 325, AISC 360, for design requirements and allowable stresses.

H. Cold-Formed Steel

Comply with AISC/AISI 121 and AISI SG03-3 for design requirements and allowable stresses.

I. Fire-Resistance Ratings

Where indicated, provide metal panels identical to those of assemblies tested for fire resistance per ASTM E119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Indicate design designations from UL Bld Mat Dir or from the listings of another qualified testing agency. Combustion Characteristics must conform to ASTM E136.

J. Surface-Burning Characteristics

Provide metal panels having insulation and vapor barrier material with the following surface-burning characteristics as determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency showing:

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

K. Fabrication

Fabricate and finish metal panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes and as necessary to fulfill indicated performance requirements. Comply with indicated profiles with dimensional and structural requirements

Provide metal panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel. Aluminum and aluminum-alloy sheet and plate must conform to ASTM B209.

Fabricate metal panel side laps with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will seal weather-tight and minimize noise from movements within panel assembly.

Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA 1793 that apply to the design, dimensions, metal, and other characteristics of item indicated:

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

2. End Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

3. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

5. Fabricate cleats and attachment devices of size and metal thickness recommended by SMACNA or by metal building system manufacturer for application, but not less than thickness of metal being secured.

L. Finishes

Comply with NAAMM AMP 500 for recommendations for applying and designating finishes.

Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

M. Samples

Submit samples of the following items for approval of Contracting Officer prior to fabrication:

1. Coil stack - 12 inches long by actual panel width

2. Roof panels - 12 inches long by actual panel width

3. Wall panels - 12 inches long by actual panel width

4. Metal strip closures - 10 inches long of each types

5. Insulation - approximately 8 by 11 inches

6. Vapor barrier

7. Fasteners

8. Manufacturer's color and finishes chart and chips

9. Roof and Wall Accessories and Specialties

10. Flashing and Trim

11. Aluminized steel repair paint, galvanizing repair paint, and

enamel repair paint.

If samples not acceptable to Contracting Officer, Contractor shall provide alternatives from range of options provided by Manufacturer at no additional cost to Government.

1.07 SHIPPING, HANDLING AND STORAGE

A. Delivery

Package and deliver components, sheets, metal panels, and other manufactured items so as not to be damaged or deformed and protected during transportation and handling.

Stack and store metal panels horizontally on platforms or pallets, covered with suitable weather-tight and ventilated covering to ensure dryness, with positive slope for drainage of water. Store in a manner to prevent bending, warping, twisting, and surface damage. Do not store metal wall panels in contact with other materials that might cause staining, denting, or other surface damage. Retain strippable protective covering on metal panel for entire period up to metal panel installation.

Protect foam-plastic insulation as follows:

a. Do not expose to sunlight, except to extent necessary for period of installation and concealment.

b. Protect against ignition at all times. Do not deliver foam-plastic insulation materials to project site before installation time.

Complete installation and concealment of plastic materials as rapidly as possible in each area of construction to minimize ultraviolet exposure.

1.08 PROJECT CONDITIONS

A. Weather Limitations

Proceed with installation preparation only when existing and forecasted weather conditions permit Work to proceed without water entering into existing panel system or building.

B. Field Measurements

1. Established Dimensions for Foundations

Comply with established dimensions on approved anchor-bolt plans, established foundation dimensions, and proceed with fabricating structural framing. Do not proceed without verifying field measurements. Coordinate anchor-bolt installation to ensure that actual anchorage dimensions correspond to established dimensions.

2. Established Dimensions for Metal Panels

Where field measurements cannot be made without delaying the Work, either establish framing and opening dimensions and

proceed with fabricating metal panels without field measurements, or allow for field trimming metal panels. Coordinate construction to ensure that actual building dimensions, locations of structural members, and openings correspond to established dimensions.

3. Verification Record

Verify locations of all framing and opening dimensions by field measurements before metal panel fabrication and indicate measurements on Shop Drawings.

1.09 COORDINATION

Coordinate size and location of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Section 03 30 00.00 CAST-IN-PLACE CONCRETE.

Coordinate installation of plumbing system piping and supports and accessories, which are specified in Division 22 - PLUMBING.

Coordinate installation of HVAC system equipment supports ductwork and supports piping and supports and accessories, which are specified in Division 23.

Coordinate installation of equipment supports roof penetrations, which are specified in Division 07.

Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leak-proof, secure, and non-corrosive installation.

1.10 WARRANTY

A. Building System Warranty

Furnish manufacturer's no-dollar-limit warranty for the metal building system. The warranty period is to be no less than 20 years from the date of acceptance of the work and be issued directly to the Government. The warranty must provide that if within the warranty period, the metal building system shows evidence of deterioration resulting from defective materials and/or workmanship, correcting of any defects is the responsibility of the metal building system manufacturer. Repairs that become necessary because of defective materials and workmanship while metal building system is under warranty are to be performed within 48 hours after notification, unless additional time is approved by the Contracting Officer. Failure to perform repairs within 48 hours of notification will constitute grounds for having emergency repairs performed by others and will not void the warranty.

B. Roof System Weather-Tightness Warranty

Furnish manufacturer's no-dollar-limit warranty for the metal panel system. The warranty period is to be no less than 20 years from the date of acceptance of the work and be issued directly to the Government.

The warranty is to provide that if within the warranty period the roof panel system shows evidence of corrosion, perforation, rupture, lost of weather-tightness or excess weathering due to deterioration of the panel system resulting from defective materials and correction of the defective workmanship is to be the responsibility of the metal building system manufacturer.

Repairs that become necessary because of defective materials and workmanship while roof panel system is under warranty are to be performed within 48 hours after notification, unless additional time is approved by the Contracting Officer. Failure to perform temporary repairs within 48 hours of notification will constitute grounds for having emergency repairs performed by others and not void the warranty. Immediate follow-up and completion of permanent repairs must be performed within 7 days from date of notification.

C. Roof and Wall Panel Finish Warranty

Furnish manufacturer's no-dollar-limit warranty for the metal panel system. The warranty period is to be no less than 20 years from the date of acceptance of the work and be issued directly to the Government.

The warranty is to provide that if within the warranty period the metal panel system shows evidence of checking, delaminating cracking, peeling, chalk in excess of a numerical rating of eight, as determined by ASTM D4214 test procedures; or change colors in excess of five CIE or Hunter units in accordance with ASTM D2244 or excess weathering due to deterioration of the panel system resulting from defective materials and finish or correction of the defective workmanship is to be the responsibility of the metal building system manufacturer.

Liability under this warranty is exclusively limited to replacing the defective coated materials.

Repairs that become necessary because of defective materials and workmanship while roof and wall panel system is under warranty are to be performed within 48 hours after notification, unless additional time is approved by the Contracting Officer. Failure to perform repairs within 48 hours of notification will constitute grounds for having emergency repairs performed by others and not void the warranty.

PART 2 PRODUCTS

2.01 STRUCTURAL FRAMING MATERIALS

A. W-Shapes

ASTM A992/A992M.

B. Channel, Angles, M-Shapes and S-Shapes

ASTM A36/A36M; ASTM A572/A572M or ASTM A529/A529M.

C. Plate and Bar

ASTM A36/A36M, ASTM A572/A572M or ASTM A529/A529M.

D. Steel Pipe

ASTM A36/A36M, ASTM A53/A53M, ASTM A572/A572M or ASTM A529/A529M.

E. Cold-Formed and Hot Formed Hollow Structural Sections

Cold formed:ASTM A500/A500M or ASTM B221, ASTM B221M.
Hot-formed: ASTM A501/A501M.

F. Structural-Steel Sheet

Hot-rolled, ASTM A1011/A1011M or cold-rolled, ASTM A1008/A1008M.

G. Metallic-Coated Steel Sheet

ASTM A653/A653M, ASTM A606/A606M.

H. Metallic-Coated Steel Sheet Pre-painted with Coil Stock Coating

Steel sheet metallic coated by the hot-dip process and pre-painted by the coil-coating process to comply with ASTM A755/A755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, and ASTM A123/A123M.

I. High-Strength Bolts, Nuts, and Washers

ASTM A325, heavy hex steel structural bolts; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers.

Finish: Plain or Hot-dip zinc coating, ASTM A153/A153M as required.

Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F1852, heavy-hex-head steel structural bolts with spline.

Finish: Plain or Mechanically deposited zinc coating, ASTM B695 as required.

J. Non-High-Strength Bolts, Nuts, and Washers

ASTM A307, ASTM A563, and ASTM F844.

Finish: Plain or ASTM A153/A153M.

K. Anchor Rods

ASTM F1554.

1. Configuration: Straight.
2. Nuts: ASTM A563 heavy hex carbon steel.
3. Plate Washers: ASTM A36/A36M carbon steel.
4. Washers: ASTM F436 hardened carbon steel.
5. Finish: Plain or Hot-dip zinc coating, ASTM A153/A153M as

required.

L. Threaded Rods

ASTM A193/A193M, ASTM A572/A572M, ASTM A36/A36M, or ASTM A307.

1. Nuts: ASTM A563 heavy hex carbon steel.
2. Washers: ASTM F436 hardened carbon steel.
3. Finish: Plain or Hot-dip zinc coating, ASTM A153/A153M as required.

M. Primer

SSPC-Paint 15, Type I, red oxide.

2.02 FABRICATION

A. General

Comply with MBMA MBSM - "Metal Building Systems Manual": Chapter IV, Section 9, "Fabrication and Erection Tolerances."

2.03 STRUCTURAL FRAMING

A. General

Clean all framing members to remove loose rust and mill scale. Provide 1 shop coat of primer to an average dry film thickness of 1 mil according to SSPC SP 2. Balance of painting and coating procedures must conform to SSPC Paint 15 and SSPC Painting Manual.

B. Primary Framing

Manufacturer's standard structural primary framing system includes transverse and lean-to frames; rafter, rakes, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing designed to withstand required loads and specified requirements. Provide frames with attachment plates, bearing plates, and splice members. Provide frame span and spacing indicated.

Shop fabricate framing components by welding or by using high-strength bolts to the indicated size and section with base-plates, bearing plates, stiffeners, and other items required. Cut, form, punch, drill, and weld framing for bolted field erection.

1. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.

2. Frame Configuration: Single gable.

3. Exterior Column Type: Tapered.

4. Rafter Type: Tapered.

C. Secondary Framing

Manufacturer's standard secondary framing members, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Fabricate framing from cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet pre-painted with coil coating, unless otherwise indicated.

Shop fabricate framing components by roll-forming or break-forming to the indicated size and section with base-plates, bearing plates, stiffeners, and other plates required for erection. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

1. Purlins: C or Z-shaped sections; fabricated from steel sheet, built-up steel plates, or structural-steel shapes; minimum depth As required to comply with system performance requirements.

2. Girts: C or Z-shaped sections; fabricated from steel sheet, built-up steel plates, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees to flange minimum depth as required to comply with system performance requirements.

3. Eave Struts: Unequal-flange, C-shaped sections; fabricated from steel sheet, built-up steel plates, or structural-steel shapes; to provide adequate backup for metal panels.

4. Flange Bracing: Structural-steel angles or cold-formed structural tubing to stiffen primary frame flanges.

5. Sag Bracing: Structural-steel angles.

6. Base or Sill Angles: Zinc-coated (galvanized) steel sheet.

7. Purlin and Girt Clips: Steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.

8. Secondary End-Wall Framing: Manufacturer's standard sections fabricated from zinc-coated (galvanized) steel sheet.

9. Framing for Openings: Channel shapes; fabricated cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings, and head, jamb, and sill of other openings.

10. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

D. Bracing

Provide adjustable wind bracing as follows:

1. Rods: ASTM A36/A36M; ASTM A572/A572M; or ASTM A529/A529M threaded as required and indicated by the metal building

manufacturer's design.

2. Cable: ASTM A475, extra-high-strength grade, zinc-coated; with threaded end anchors.

3. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.

4. Rigid Portal Frames: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.

5. Fixed-Base Columns: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.

6. Diaphragm Action of Metal Panels: Design metal building to resist wind forces through diaphragm action of metal panels.

7. Bracing: Provide wind bracing using any method specified above, at manufacturer's option.

2.04 PANEL MATERIALS

A. Aluminum Sheet

Roll-form aluminum roof and wall panels to the specified profile, with fy = 0.050 inch thickness and depth as indicated. Material must be plumb and true, and within the tolerances listed:

1. Aluminum Sheet conforming to ASTM B209, AA ADM and AA ASD1.

2. Individual panels to have continuous length to cover the entire length of any roof slope or wall area with no joints or seams and formed without warping, waviness, or ripples that are not part of the panel profile and free of damage to the finish coating system.

3. Provide panels with thermal expansion and contraction consistent with the type of system specified.

   a. Profile and coverage to be a minimum height and width from manufacturer's standard for the indicated roof slope or wall area.

   b. Profile to be a 1-1/2 inch high rib at 12 inches o.c. with small stiffening ribs, 38 inch overall width with 36 inch coverage and exposed fasteners.

   c. Profile for wall panels to be a 1 inch high rib at 8 inches o.c., 41-5/8 inch overall width with 40 inch coverage and exposed fasteners.

   d. Smooth, flat Surface Texture.

B. Finish

All panels are to receive a factory-applied Kynar 500/Hylar 5000 finish consisting of a baked-on top-coat with a manufacturer's

recommended prime coat conforming to the following:

1. Metal Preparation: All metal is to have the surfaces carefully prepared for painting on a continuous process coil coating line by alkali cleaning, hot water rinsing, application of chemical conversion coating, cold water rinsing, sealing with acid rinse, and thorough drying.

2. Prime Coating: A base coat of epoxy paint, specifically formulated to interact with the top-coat, is to be applied to the prepared surfaces by roll coating to a dry film thickness of 0.20 plus 0.05 mils. This prime coat must be oven cured prior to application of finish coat.

3. Exterior Finish Coating: Apply the finish coating over the primer by roll coating to dry film thickness of 0.80 plus 5 mils (3.80 plus 0.50 mils for Vinyl Plastisol) for a total dry film thickness of 1.00 plus 0.10 mils (4.00 plus 0.10 mils for Vinyl Plastisol). This finish coat must be oven-cured.

4. Interior Finish Coating: Apply a wash-coat on the reverse side over the primer by roll coating to a dry film thickness of 0.30 plus 0.05 mils for a total dry film thickness of 0.50 plus 0.10 mils. The wash-coat must be oven-cured.

5. Color: The exterior finish chosen from the manufacturer's color and finishes chart and chips.

6. Physical Properties: Coating must conform to the industry and manufacturer's standard performance criteria as listed by the following certified test reports:

   Chalking: ASTM DEFONLINE
   Color Change and Conformity: ASTM D2244
   Weatherometer: ASTM G152, ASTM G153 and ASTM D822
   Humidity: ASTM D2247 and ASTM D714
   Salt Spray: ASTM B117
   Chemical Pollution: ASTM D1308
   Gloss at 60 degrees: ASTM D523
   Pencil Hardness: ASTM D3363
   Reverse Impact: ASTM D2794
   Flexibility: ASTM D522/D522M
   Abrasion: ASTM D968
   Flame Spread: ASTM E84

C. Repair Of Finish Protection

Repair paint for color finish enameled metal panel must be compatible paint of the same formula and color as the specified finish furnished by the metal panel manufacturer, conforming to ASTM A780/A780M.

2.05 MISCELLANEOUS METAL FRAMING

A. General

Cold-formed metallic-coated steel sheet conforming to ASTM A653/A653M unless otherwise indicated.

B. Fasteners for Miscellaneous Metal Framing

Refer to the following paragraph "FASTENERS".

2.06 FASTENERS

A. General

Type, material, corrosion resistance, size and sufficient length to penetrate the supporting member a minimum of 1 inch with other properties required to fasten miscellaneous metal framing members to substrates in accordance with the metal panel manufacturer's and ASCE 7 requirements.

B. Exposed Fasteners

Fasteners for metal panels to be corrosion resistant coated steel, aluminum, stainless steel, or nylon capped steel compatible with the sheet panel or flashing and of a type and size recommended by the manufacturer to meet the performance requirements and design loads. Fasteners for accessories to be the manufacturer's standard. Provide an integral metal washer matching the color of attached material with compressible sealing EPDM gasket approximately 3/32 inch thick.

C. Screws

Screws to be corrosion resistant coated steel, aluminum and/or stainless steel being the type and size recommended by the manufacturer to meet the performance requirements.

D. Rivets

Rivets to be closed-end type, corrosion resistant coated steel, aluminum or stainless steel where watertight connections are required.

E. Attachment Clips

Fabricate clips from steel hot-dipped galvanized in accordance with ASTM A653/A653M or Series 300 stainless steel. Size, shape, thickness and capacity as required meeting the insulation thickness and design load criteria specified.

2.07 FRAMES AND MATERIALS FOR OPENINGS

A. Doors

Fire-Rated and Non-Fire-Rated Door Assemblies conforming with NFPA 80 and based on testing according to NFPA 252 as specified in Division 08 - OPENINGS unless otherwise indicated.

B. Fiberglass Translucent Panels

Fibgerlass Translucent Panels as specified in Section 08 45 23, Fiberglas Sandwish Panel Assemblies unless otherwise indicated.

2.08 ACCESSORIES

A. General

All accessories to be compatible with the metal panels; sheet metal flashing, trim, metal strip closure, caps and similar metal accessories must not be less than the minimum thickness specified for the metal panels. Exposed metal accessories/finishes to match the panels furnished, except as otherwise indicated. Molded foam rib, ridge and other closure strips to be non-absorbent closed-cell or solid-cell synthetic rubber or pre-molded neoprene to match configuration of the panels.

B. Roof and Wall Accessories and Specialties

Steel roof curbs, equipment supports, roof hatches, dropout-type heat and smoke vents, hatch-type heat and smoke vents, gravity and roof ridge ventilators, wall louvers and other miscellaneous roof and wall equipment or penetrations conforming to AAMA, ASTM, and UL as specified in Division 07 unless otherwise indicated.

C. Insulation

Faced, Glass-Fiber Blanket Insulation: ASTM C665, Type I, blankets without membrane coverings; Class A, membrane-faced surface with a flame spread of 25 or less, except a flame spread rating of 25 and a smoke developed rating of 150 or less when tested in accordance with ASTM E84.

1. Polyethylene Vapor Retarder

Install polyethylene vapor retarder membrane over entire wall and roof surface. Use fully compatible polyethylene tape to seal the edges of the sheets to provide a vapor tight membrane. Lap sheets not less than 6 inch. Provide sufficient material to avoid inducing stresses in sheets due to stretching or binding. All tears or punctures visible in the finished surface, at anytime during the construction process, must be sealed with polyethylene tape.

2. Wall Liner

Securely fasten wall liner into place in accordance with the manufacturer's recommendation and in a neatly presented appearance.

D. Rubber Closure Strips

Closed-cell, expanded cellular rubber conforming to ASTM D1056 and ASTM D1667; extruded or molded to the configuration of the specified metal panel and in lengths supplied by the metal panel manufacturer.

E. Metal Closure Strips

Factory fabricated steel closure strips to be the same gauge, color, finish and profile of the specified roof and wall panel.

F. 2.6.6 Joint Sealants

1. Sealants

Sealants are to be an approved gun type for use in hand or air-pressure caulking guns at temperatures above 40 degrees F (or frost-free application at temperatures above 10 degrees F with minimum solid content of 85 percent of the total volume. Sealant is to dry with a tough, durable surface skin which permits it to remain soft and pliable underneath, providing a weather-tight joint. No migratory staining is permitted on painted or unpainted metal, stone, glass, vinyl, or wood.

Prime all joints to receive sealants with a compatible one-component or two-component primer as recommended by the metal panel manufacturer.

2. Shop-Applied

Sealant for shop-applied caulking must be an approved gun grade, non-sag one component polysulfide or silicone conforming to ASTM C920, Type II, and with a curing time to ensure the sealant's plasticity at the time of field erection.

3. Field-Applied

Sealant for field-applied caulking must be an approved gun grade, non-sag one component polysulfide or two-component polyurethane with an initial maximum Shore A durometer hardness of 25, and conforming to ASTM C920, Type II. Color to match panel colors.

4. Tape Sealant

Pressure sensitive, 100 percent solid with a release paper backing; permanently elastic, non-sagging, non-toxic and non-staining as approved by the metal panel manufacturer.

2.09 SHEET METAL FLASHING AND TRIM

A. Fabrication

Shop fabricate sheet metal flashing and trim where practicable to comply with recommendations in SMACNA 1793 that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.

Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

2.10 FINISHES

A. General

Comply with NAAMM AMP 500 for recommendations for applying and

designating finishes.

B. Appearance of Finished Work

Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.01 EXAMINATION

Before erection proceeds examine with the erector present the concrete foundation dimensions, concrete and/or masonry bearing surfaces, anchor bolt size and placement, survey slab elevation, locations of bearing plates, and other embedment's to receive structural framing with the metal building manufacturer's templates and drawings before erecting any steel components for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

Examine primary and secondary framing to verify that rafters, purlins, angles, channels, and other structural and metal panel support members and anchorages have been installed within alignment tolerances required by metal building manufacturer, UL, ASTM, ASCE 7 and as required by the building code for the geographical area where construction will take place.

Examine roughing-in for components and systems penetrating metal roof or wall panels to verify actual locations of penetrations relative to seam locations of metal panels before metal roof or wall panel installation.

Submit to the Contracting Officer a written report, endorsed by Erector, listing conditions detrimental to performance of the Work.

Proceed with erection only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

Provide temporary shoring, guys, braces, and other supports during erection to keep the structural framing secure, plumb, and in alignment against temporary construction loading or loads equal in intensity of the building design loads. Remove temporary support systems when permanent structural framing, connections, and bracing are in place, unless otherwise indicated.

Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment and performance.

Miscellaneous Framing: Install sub-purlins, girts, angles, furring, and other miscellaneous support members or anchorage for the metal roof or wall panels, doors, fiberglass panels, roof curbs, ventilators

and louvers according to metal building manufacturer's written instructions.

3.03 ERECTION OF STRUCTURAL FRAMING

Erect metal building system according to manufacturer's written erection instructions, approved shop drawings and other erection documents in accordance with MBMA MBSM - "Metal Building Systems Manual".

Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer and the Contracting Officer.

Set structural framing accurately in locations and to elevations indicated and according to AISC 325 specifications. Maintain structural stability of frame during erection.

Clean and roughen concrete and masonry bearing surfaces prior to setting plates. Clean bottom surface of plates.

Align and adjust structural framing before permanent bolt-up and connections. Perform necessary adjustments and alignment to compensate for changes or discrepancies in elevations.

Maintain erection tolerances of structural framing in accordance with AISC 360.

3.04 METAL WALL PANEL INSTALLATION

Provide metal wall panels of full length from sill to eave as indicated, unless otherwise indicated or restricted by shipping limitations. Anchor metal wall panels and other components of the Work securely in place, in accordance with MBMA MBSM.

Erect wall panel system in accordance with the approved erection drawings, the printed instructions and safety precautions of the metal building manufacturer.

Sheets are not to be subjected to overloading, abuse, or undue impact. Do not install bent, chipped, or defective sheets.

Sheets must be erected true and plumb and in exact alignment with the horizontal and vertical edges of the building, securely anchored, and with the indicated eave, and sill.

Work is to allow for thermal movement of the wall panel, movement of the building structure, and to provide permanent freedom from noise due to wind pressure.

Field cutting metal wall panels by torch is not permitted.

3.05 ROOF PANEL INSTALLATION

Provide metal roof panels of full length from eave to ridge or eave to wall as indicated, unless otherwise indicated or restricted by shipping limitations. Anchor metal roof panels and other components of the Work securely in place in accordance with NRCA RoofMan and MBMA MBSM.

Erect roofing system in accordance with the approved erection drawings, the printed instructions and safety precautions of the metal building manufacturer.

Sheets are not to be subjected to overloading, abuse, or undue impact. Do not install bent, chipped, or defective sheets.

Sheets must be erected true and plumb and in exact alignment with the horizontal and vertical edges of the building, securely anchored, and with the indicated rake and eave overhang.

Work must allow for thermal movement of the roofing, movement of the building structure, and provide permanent freedom from noise due to wind pressure.

Field cutting metal roof panels by torch is not permitted.

Roofing sheets must be laid with corrugations in the direction of the roof slope. End laps of exterior roofing must not be less than 8 inches; the side laps of standard exterior corrugated sheets must not be not less than 2-1/2 corrugations.

Do not permit storage, walking, wheeling, and trucking directly on applied roofing materials. Provide temporary walkways, runways, and platforms of smooth clean boards or planks as necessary to avoid damage to the installed roofing materials, and to distribute weight to conform to the indicated live load limits of roof construction.

3.06 METAL PANEL FASTENER INSTALLATION

Anchor metal panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

3.07 FLASHING, TRIM AND CLOSURE INSTALLATION

A. Comply with performance requirements, manufacturer's written installation instructions, and SMACNA 1793. Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Sheet metalwork is to be accomplished to form weather-tight construction without waves, warps, buckles, fastening stresses or distortion, and allow for expansion and contraction. Cutting, fitting, drilling, and other operations in connection with sheet metal required to accommodate the work of other trades is to be performed by sheet metal mechanics.

3.08 DOOR AND FRAME INSTALLATION

Install doors and frames plumb, rigid, properly aligned, and securely fastened in place according to manufacturer's written instructions. Coordinate installation with metal panel flashings and other components. Caulk and seal perimeter of each door frame with elastomeric sealant compatible with metal panels. Comply with installation requirements in Division 08 - OPENINGS.

3.09 TRANSLUCENT PANEL INSTALLATION

Refer to installation of fiberglass translucent panels in accordance with Section 08 45 23 FIBERGLASS SANDWICH PANEL ASSEMBLIES

3.10 ACCESSORY INSTALLATION

A. General

Install accessories with positive anchorage to building and weather-tight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

B. Dissimilar Metals

Where dissimilar metals contact one another or corrosive substrates are present, protect against galvanic action by painting dissimilar metal surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each surface, or by other permanent separation techniques as recommended by the metal building manufacturer.

C. Gutters and Downspouts

Comply with performance requirements, manufacturer's written installation instructions, and install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA 1793 recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

D. Insulation

Comply with performance requirements and manufacturer's written installation instructions. Install insulation concurrently with metal panel installation, in thickness indicated to cover entire roof and wall area, as specified in Division 07 - ROOF AND DECK INSULATION.

E. Roof and Wall Accessories and Specialties

Install roof and wall accessories and specialties complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports as specified in Division 07, unless otherwise indicated.

3.11 CLEAN-UP AND PROTECTION

A. Structural Framing

Clean all exposed structural framing at completion of installation. Remove metal shavings, filings, bolts, and wires from work area. Remove grease and oil films, excess sealants, handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean. Exposed metal surfaces to be free of dents, creases, waves, scratch marks, solder or weld marks, and damage to the finish coating.

B. Metal Panels

Clean all exposed sheet metal work at completion of installation. Remove metal shavings, filings, nails, bolts, and wires from work area. Remove protective coverings/films, grease and oil films, excess sealants, handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean. Exposed metal surfaces to be free of dents, creases, waves, scratch marks, solder or weld marks, and damage to the finish coating.

C. Touch-Up Painting

After erection, promptly clean, prepare, and prime or re-prime field connections, rust spots, and abraded surfaces of prime-painted structural framing and accessories. Clean and touch-up paint with manufacturer's touch-up paint unless otherwise indicated.

3.12 WASTE MANAGEMENT

Separate waste in accordance with the Waste Management Plan, placing copper materials, ferrous materials, and galvanized sheet metal in designated areas for reuse. Close and seal tightly all partly used adhesives and solvents; store protected in a well-ventilated, fire-safe area at moderate temperature.

Collect and place scrap/waste debris in containers. Promptly dispose of scrap/waste debris. Do not allow scrap/waste debris to accumulate on-site; transport scrap/waste debris from government property and legally dispose of them.

3.13 SPECIAL INSPECTION AND TESTING FOR SEISMIC-RESISTING SYSTEMS

Special inspections and testing for seismic-resisting systems and components shall be done in accordance with Section 01 45 35 SPECIAL INSPECTIONS.

3.14 WARRANTY

A. MANUFACTURER'S WARRANTY

Submit all manufacturers' signed warranties to Contracting Officer prior to final commissioning and acceptance.

B. CONTRACTOR'S WARRANTY for INSTALLATION

Submit contractor's warranty for installation to the Contracting Officer prior to final commissioning and acceptance.

C. CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
METAL BUILDING SYSTEM

FACILITY
DESCRIPTION:_____

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
METAL BUILDING SYSTEM

BUILDING
NUMBER:_____

CORPS OF ENGINEERS CONTRACT
NUMBER:_____

CONTRACTOR

CONTRACTOR:_____
ADDRESS:_____

POINT OF
CONTACT:_____

TELEPHONE
NUMBER:_____

OWNER

OWNER:_____
ADDRESS:_____

POINT OF
CONTACT:_____

TELEPHONE
NUMBER:_____

CONSTRUCTION AGENT

CONSTRUCTION
AGENT:_____
ADDRESS:_____

POINT OF
CONTACT:_____

_
TELEPHONE
NUMBER:_____

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
METAL BUILDING SYSTEM
(continued)

THE METAL BUILDING SYSTEM INSTALLED ON THE ABOVE NAMED BUILDING IS WARRANTED BY [_____] FOR A PERIOD OF FIVE [5][10][20][_____] YEARS AGAINST WORKMANSHIP AND MATERIAL DEFICIENCIES, WIND DAMAGE AND STRUCTURAL FAILURE WITHIN PROJECT SPECIFIED DESIGN LOADS, AND LEAKAGE. THE METAL BUILDING SYSTEM COVERED UNDER THIS WARRANTY INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING:

FRAMING AND STRUCTURAL MEMBERS, ROOFING AND SIDING PANELS AND SEAMS, INTERIOR OR EXTERIOR GUTTERS AND DOWNSPOUTS, ACCESSORIES, TRIM, FLASHINGS AND MISCELLANEOUS BUILDING CLOSURE ITEMS SUCH AS DOORS AND WINDOWS (WHEN FURNISHED BY THE MANUFACTURER), CONNECTORS, COMPONENTS, AND FASTENERS, AND OTHER SYSTEM COMPONENTS AND ASSEMBLIES INSTALLED TO PROVIDE A WEATHERTIGHT SYSTEM; AND ITEMS SPECIFIED IN OTHER SECTIONS OF THESE SPECIFICATIONS THAT BECOME PART OF THE METAL BUILDING SYSTEM.

ALL MATERIAL AND WORKMANSHIP DEFICIENCIES, SYSTEM DETERIORATION CAUSED BY EXPOSURE TO THE ELEMENTS AND/OR INADEQUATE RESISTANCE TO SPECIFIED SERVICE DESIGN LOADS, WATER LEAKS AND WIND UPLIFT DAMAGE MUST BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER.

ALL MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE AND LEAKAGE ASSOCIATED WITH THE METAL BUILDING SYSTEM COVERED UNDER THIS WARRANTY MUST BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER.

THIS WARRANTY COVERS THE ENTIRE COST OF REPAIR OR REPLACEMENT, INCLUDING ALL MATERIAL, LABOR, AND RELATED MARKUPS. THE ABOVE REFERENCED WARRANTY COMMENCED ON THE DATE OF FINAL ACCEPTANCE ON [_____] AND WILL REMAIN IN EFFECT FOR STATED DURATION FROM THIS DATE.

SIGNED, DATED, AND NOTARIZED (BY COMPANY PRESIDENT)

_____

(Company President) (Date)

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
METAL BUILDING SYSTEM
(continued)

THE CONTRACTOR HEREBY SUPPLEMENTS THIS WARRANTY WITH WRITTEN WARRANTIES FROM THE MANUFACTURER AND/OR INSTALLER OF THE METAL BUILDING SYSTEM, WHICH IS SUBMITTED ALONG WITH THE CONTRACTOR'S WARRANTY. HOWEVER, THE CONTRACTOR IS ULTIMATELY RESPONSIBLE FOR THIS WARRANTY AS OUTLINED IN THE SPECIFICATIONS AND AS INDICATED IN THIS WARRANTY.

EXCLUSIONS FROM COVERAGE

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
METAL BUILDING SYSTEM
(continued)

1. NATURAL DISASTERS, ACTS OF GOD (LIGHTNING, FIRE, EXPLOSIONS, SUSTAINED WIND FORCES IN EXCESS OF THE DESIGN CRITERIA, EARTHQUAKES, AND HAIL).

2. ACTS OF NEGLIGENCE OR ABUSE OR MISUSE BY GOVERNMENT OR OTHER PERSONNEL,INCLUDING ACCIDENTS, VANDALISM, CIVIL DISOBEDIENCE, WAR, OR DAMAGE CAUSED BY FALLING OBJECTS.

3. DAMAGE BY STRUCTURAL FAILURE, SETTLEMENT, MOVEMENT, DISTORTION, WARPAGE, OR DISPLACEMENT OF THE BUILDING STRUCTURE OR ALTERATIONS MADE TO THE BUILDING.

4. CORROSION CAUSED BY EXPOSURE TO CORROSIVE CHEMICALS, ASH OR FUMES GENERATED OR RELEASED INSIDE OR OUTSIDE THE BUILDING FROM CHEMICAL PLANTS, FOUNDRIES, PLATING WORKS, KILNS, FERTILIZER FACTORIES, PAPER PLANTS, AND THE LIKE.

5. FAILURE OF ANY PART OF THE BUILDING SYSTEM DUE TO ACTIONS BY THE OWNER WHICH INHIBIT FREE DRAINAGE FROM THE ROOF, GUTTERS AND DOWNSPOUTS; OR CONDITIONS WHICH CREATE PONDING WATER ON THE ROOF OR AGAINST THE BUILDING SIDING.

6. THIS WARRANTY APPLIES TO THE METAL BUILDING SYSTEM. IT DOES NOT INCLUDE ANY CONSEQUENTIAL DAMAGE TO THE BUILDING INTERIOR OR CONTENTS WHICH IS COVERED BY THE WARRANTY OF CONSTRUCTION CLAUSE INCLUDED IN THIS CONTRACT.

7. THIS WARRANTY CANNOT BE TRANSFERRED TO ANOTHER OWNER WITHOUT WRITTEN CONSENT OF THE CONTRACTOR AND THIS WARRANTY AND THE CONTRACT PROVISIONS TAKE PRECEDENCE OVER ANY CONFLICTS WITH STATE STATUTES. REPORTS OF LEAKS AND BUILDING SYSTEM DEFICIENCIES MUST BE RESPONDED TO WITHIN 48 HOURS OF RECEIPT OF NOTICE BY TELEPHONE OR IN WRITING FROM EITHER THE OWNER, OR CONTRACTING OFFICER. EMERGENCY REPAIRS, TO PREVENT FURTHER ROOF LEAKS, MUST BE INITIATED IMMEDIATELY; A WRITTEN PLAN MUST BE SUBMITTED FOR APPROVAL TO REPAIR OR REPLACE THIS SSSMR SYSTEM WITHIN SEVEN CALENDAR DAYS. ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT MUST BE STARTED WITHIN 30 DAYS AFTER RECEIPT OF NOTICE, AND COMPLETED WITHIN A REASONABLE TIME FRAME. IF THE CONTRACTOR FAILS TO ADEQUATELY RESPOND TO THE WARRANTY PROVISIONS, AS STATED

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
METAL BUILDING SYSTEM
(Exclusions from Coverage Continued)

IN THE CONTRACT AND AS CONTAINED HEREIN, THE CONTRACTING OFFICER MAY HAVE THE METAL BUILDING SYSTEM REPLACED OR REPAIRED BY OTHERS AND CHARGE THE COST TO THE CONTRACTOR. IN THE EVENT THE CONTRACTOR DISPUTES THE EXISTENCE OF A WARRANTABLE DEFECT, THE CONTRACTOR MAY CHALLENGE THE OWNER'S DEMAND FOR REPAIRS AND/OR REPLACEMENT DIRECTED BY THE OWNER OR CONTRACTING OFFICER EITHER BY REQUESTING A CONTRACTING OFFICER'S DECISION, UNDER THE CONTRACT DISPUTES ACT, OR BY REQUESTING THAT AN ARBITRATOR RESOLVE THE ISSUE. THE REQUEST FOR AN ARBITRATOR MUST BE MADE WITHIN 48 HOURS OF BEING NOTIFIED OF THE DISPUTED

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
METAL BUILDING SYSTEM
(Exclusions from Coverage Continued)

DEFECTS. UPON BEING INVOKED THE PARTIES MUST, WITHIN 10 DAYS JOINTLY REQUEST A LIST OF FIVE (5) ARBITRATORS FROM THE FEDERAL MEDIATION AND CONCILIATION SERVICE. THE PARTIES MUST CONFER WITHIN 10 DAYS AFTER RECEIPT OF THE LIST TO SEEK AGREEMENT ON AN ARBITRATOR. IF THE PARTIES CANNOT AGREE ON AN ARBITRATOR, THE CONTRACTING OFFICER AND THE PRESIDENT OF THE CONTRACTOR'S COMPANY WILL STRIKE ONE (1) NAME FROM THE LIST ALTERNATIVELY UNTIL ONE NAME REMAINS. THE REMAINING PERSON WILL BE THE DULY SELECTED ARBITRATOR. THE COSTS OF THE ARBITRATION, INCLUDING THE ARBITRATOR'S FEE AND EXPENSES, COURT REPORTER, COURTROOM OR SITE SELECTED ETC., MUST BE BORNE EQUALLY BETWEEN THE PARTIES. EITHER PARTY DESIRING A COPY OF THE TRANSCRIPT MUST PAY FOR THE TRANSCRIPT. A HEARING WILL BE HELD AS SOON AS THE PARTIES CAN MUTUALLY AGREE. A WRITTEN ARBITRATOR'S DECISION WILL BE REQUESTED NOT LATER THAN 30 DAYS FOLLOWING THE HEARING. THE DECISION OF THE ARBITRATOR WILL NOT BE BINDING; HOWEVER, IT WILL BE ADMISSIBLE IN ANY SUBSEQUENT APPEAL UNDER THE CONTRACT DISPUTES ACT.

POST A FRAMED COPY OF THIS WARRANTY IN THE MECHANICAL ROOM OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

-- End of Section --

DIVISION 22 – PLUMBING

SECTION 22 00 00

PLUMBING, GENERAL PURPOSE
11/15

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z21.22/CSA 4.4	(2015) Relief Valves for Hot Water Supply Systems

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 146	(2011) Method of Testing and Rating Pool Heaters
ASHRAE 189.1	(2014; ERTA 1 2017) Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings
ASHRAE 90.1 - IP	(2016; ERTA 1-4 2017; INT 1-2 2017) Energy Standard for Buildings Except Low-Rise Residential Buildings

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

ASSE 1001	(2016) Performance Requirements for Atmospheric Type Vacuum Breakers
ASSE 1010	(2004) Performance Requirements for Water Hammer Arresters (ANSI approved 2004)
ASSE 1011	(2004; Errata 2004) Performance Requirements for Hose Connection Vacuum Breakers (ANSI approved 2004)
ASSE 1012	(2009) Performance Requirements for Backflow Preventer with an Intermediate Atmospheric Vent - (ANSI approved 2009)
ASSE 1013	(2011) Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers - (ANSI approved 2010)
ASSE 1018	(2001) Performance Requirements for Trap Seal Primer Valves - Potable Water Supplied (ANSI Approved 2002

ASSE 1020	(2004; Errata 2004; Errata 2004) Performance Requirements for Pressure Vacuum Breaker Assembly (ANSI Approved 2004)

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA 10084	(2005) Standard Methods for the Examination of Water and Wastewater
AWWA B300	(2010; Addenda 2011) Hypochlorites
AWWA B301	(2010) Liquid Chlorine
AWWA C203	(2008) Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
AWWA C606	(2015) Grooved and Shouldered Joints
AWWA C651	(2014) Standard for Disinfecting Water Mains
AWWA C652	(2011) Disinfection of Water-Storage Facilities
AWWA C700	(2015) Standard for Cold Water Meters - Displacement Type, Bronze Main Case
AWWA C701	(2015) Cold-Water Meters - Turbine Type for Customer Service

AMERICAN WELDING SOCIETY (AWS)

AWS A5.8/A5.8M	(2011; Amendment 2012) Specification for Filler Metals for Brazing and Braze Welding
AWS B2.2/B2.2M	(2016) Specification for Brazing Procedure and Performance Qualification

ASME INTERNATIONAL (ASME)

ASME A112.1.2	(2012; R 2017) Air Gaps in Plumbing Systems (For Plumbing Fixtures and Water-Connected Receptors)
ASME A112.14.1	(2003; R 2017) Backwater Valves
ASME A112.19.2/CSA B45.1	(2013) Standard for Vitreous China Plumbing Fixtures and Hydraulic Requirements for Water Closets and Urinals
ASME A112.19.3/CSA B45.4	(2017) Stainless Steel Plumbing Fixtures
ASME A112.36.2M	(1991; R 2017) Cleanouts
ASME A112.6.1M	(1997; R 2017) Floor Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use

ASME A112.6.3	(2016) Standard for Floor and Trench Drains
ASME A112.6.4	(2003: R 2012) Roof, Deck and Balcony Drains
ASME B1.20.1	(2013) Pipe Threads, General Purpose (Inch)
ASME B16.15	(2013) Cast Copper Alloy Threaded Fittings Classes 125 and 250
ASME B16.18	(2012) Cast Copper Alloy Solder Joint Pressure Fittings
ASME B16.21	(2011) Nonmetallic Flat Gaskets for Pipe Flanges
ASME B16.22	(2013) Standard for Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME B16.24	(2011) Cast Copper Alloy Pipe Flanges and Flanged Fittings: Classes 150, 300, 600, 900, 1500, and 2500
ASME B16.29	(2012) Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV
ASME B16.34	(2013) Valves - Flanged, Threaded and Welding End
ASME B16.5	(2013) Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24 Metric/Inch Standard
ASME B16.50	(2013) Wrought Copper and Copper Alloy Braze-Joint Pressure Fittings
ASME B31.5	(2016) Refrigeration Piping and Heat Transfer Components
ASME B40.100	(2013) Pressure Gauges and Gauge Attachments
ASME CSD-1	(2016) Control and Safety Devices for Automatically Fired Boilers
ASME BPVC SEC IV	(2010) BPVC Section IV-Rules for Construction of Heating Boilers

ASTM INTERNATIONAL (ASTM)

ASTM A105/A105M	(2014) Standard Specification for Carbon Steel Forgings for Piping Applications
ASTM A193/A193M	(2016) Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service and Other Special Purpose Applications
ASTM A515/A515M	(2010) Standard Specification for Pressure

	Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service
ASTM A516/A516M	(2010; R 2015) Standard Specification for Pressure Vessel Plates, Carbon Steel, for
ASTM A74	(2016) Standard Specification for Cast Iron Soil Pipe and Fittings
ASTM A888	(2013a) Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications
ASTM B117	(2016) Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM B306	(2013) Standard Specification for Copper Drainage Tube (DWV)
ASTM B32	(2008; R 2014) Standard Specification for Solder Metal
ASTM B370	(2012) Standard Specification for Copper Sheet and Strip for Building Construction
ASTM B42	(2015a) Standard Specification for Seamless Copper Pipe, Standard Sizes
ASTM B584	(2014) Standard Specification for Copper Alloy Sand Castings for General Applications
ASTM B813	(2016) Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube
ASTM B88	(2016) Standard Specification for Seamless Copper Water Tube
ASTM C564	(2014) Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings
ASTM C920	(2014a) Standard Specification for Elastomeric Joint Sealants
ASTM D2000	(2012) Standard Classification System for Rubber Products in Automotive Applications
ASTM D2235	(2004; R 2016) Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings
ASTM D2564	(2012) Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems

ASTM D2665	(2014) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D2822/D2822M	(2005; R 2011; E 2011) Standard Specification for Asphalt Roof Cement, Asbestos-Containing
ASTM D2855	(2015) Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
ASTM D2996	(2015) Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe
ASTM D3138	(2004; R 2016) Standard Specification for Solvent Cements for Transition Joints Between Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Non-Pressure Piping Components
ASTM D3139	(1998; R 2011) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM D3212	(2007; R 2013) Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D3311	(2011; R 2016) Drain, Waste, and Vent (DWV) Plastic Fittings Patterns
ASTM E1	(2014) Standard Specification for ASTM Liquid-in-Glass Thermometers
ASTM F1760	(2016) Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content
ASTM F2389	(2017a) Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems
ASTM F409	(2017) Standard Specification for Thermoplastic Accessible and Replaceable Plastic Tube and Tubular Fittings
ASTM F477	(2014) Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F493	(2014) Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings
ASTM F891	(2016) Standard Specification for Coextruded Poly (Vinyl Chloride) (PVC)

	Plastic Pipe with a Cellular Core

CAST IRON SOIL PIPE INSTITUTE (CISPI)

CISPI 301	(2009) Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications
CISPI 310	(2011) Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

COPPER DEVELOPMENT ASSOCIATION (CDA)

CDA A4015	(2010) Copper Tube Handbook

INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO)

IAPMO PS 117	(2005b) Press Type Or Plain End Rub Gasketed W/ Nail CU & CU Alloy Fittings 4 Install On CU Tubing

INTERNATIONAL CODE COUNCIL (ICC)

ICC A117.1 COMM	(2009) Standard And Commentary and Usable Buildings and Facilities
ICC IPC	(2015) International Plumbing Code

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z358.1	(2014) American National Standard for Emergency Eyewash and Shower Equipment

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-110	(2010) Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
MSS SP-25	(2013) Standard Marking System for Valves, Fittings, Flanges and Unions
MSS SP-58	(1993; Reaffirmed 2010) Pipe Hangers and Supports - Materials, Design and Manufacture, Selection, Application, and Installation
MSS SP-67	(2017) Butterfly Valves
MSS SP-70	(2011) Gray Iron Gate Valves, Flanged and Threaded Ends
MSS SP-71	(2011; Errata 2013) Gray Iron Swing Check Valves, Flanged and Threaded Ends

MSS SP-72	(2010a) Ball Valves with Flanged or Butt-Welding Ends for General Service
MSS SP-78	(2011) Cast Iron Plug Valves, Flanged and Threaded Ends
MSS SP-80	(2013) Bronze Gate, Globe, Angle and Check Valves
MSS SP-85	(2011) Gray Iron Globe & Angle Valves Flanged and Threaded Ends

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(2014) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA MG 1	(2016; SUPP 2016) Motors and Generators
NEMA MG 11	(1977; R 2012) Energy Management Guide for Selection and Use of Single Phase Motors

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 90A	(2015) Standard for the Installation of Air Conditioning and Ventilating Systems

NEW JERSEY ADMINISTRATIVE CODE (NJAC)

NJAC 7:10	New Jersey Safe Drinking Water Act

NSF INTERNATIONAL (NSF)

NSF 372	(2011) Drinking Water System Components - Lead Content
NSF/ANSI 14	(2016a) Plastics Piping System Components and Related Materials
NSF/ANSI 61	(2016) Drinking Water System Components - Health Effects

PLASTIC PIPE AND FITTINGS ASSOCIATION (PPFA)

PPFA Fire Man	(2010) Firestopping: Plastic Pipe in Fire Resistive Construction

PLUMBING AND DRAINAGE INSTITUTE (PDI)

PDI WH 201	(2010) Water Hammer Arresters Standard

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE J1508	(2009) Hose Clamp Specifications

U.S. DEPARTMENT OF DEFENSE (DOD)

DODI 4170.11	Installation Energy Management

U.S. DEPARTMENT OF ENERGY (DOE)

Energy Star	(1992; R 2006) Energy Star Energy Efficiency Labeling System (FEMP)

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

PL 93-523	(1974; A 1999) Safe Drinking Water Act

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

10 CFR 430	Energy Conservation Program for Consumer Products
40 CFR 141.80	National Primary Drinking Water Regulations; Control of Lead and Copper; General Requirements
PL 109-58	Energy Policy Act of 2005 (EPAct05)

UNDERWRITERS LABORATORIES (UL)

UL 499	(2014; Reprint Feb 2016) UL Standard for Safety Electric Heating Appliances

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Schedules, Performance Charts, Instructions, Diagrams, And Other Information To Illustrate The Requirements And Operations Of Systems That Are Not Covered By The Plumbing Code.; G, AE

Complete Plumbing System Including Piping Layouts And Locations Of Connections; Dimensions For Roughing-In, Foundation, And Support Points; Schematic Diagrams And Wiring Diagrams Or Connection And Interconnection Diagrams; G, AE

SD-03 Product Data

Plumbing System; G

Fixtures With Manufacturer, Model, And Flow Rate; G, AE

Flush Valve Water Closets; G

Wall Hung Lavatories; G

Kitchen Sinks; G

Service Sinks; G

Emergency Eyewash And Shower; G

Water Heaters; G

Pumps; G

Backflow Prevention Assemblies; G

Vibration-Absorbing Features; G

SD-06 Test Reports

Tests, Flushing and Disinfection; G

Test of Backflow Prevention Assemblies; G

Smoke Test; G, AE

Drainage And Vent Systems Test; G, AE

Building Sewers Tests; G, AE

Water Supply Systems Tests; G, AE

SD-07 Certificates

Materials and Equipment

Bolts

SD-10 Operation and Maintenance Data

Operation And Maintenance Data; G, AE

1.03 STANDARD PRODUCTS

Specified materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacture of such products. Specified equipment shall essentially duplicate equipment that has performed satisfactorily at least two years prior to bid opening. Standard products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year use shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2 year period.

A. Alternative Qualifications

Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturer's factory or laboratory tests, can be shown.

B. Service Support

The equipment items shall be supported by service organizations. Submit a certified list of qualified permanent service organizations for support of the equipment which includes their addresses and qualifications. These service organizations shall

be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

C. Manufacturer's Nameplate

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

D. Modification of References

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction", or words of similar meaning, to mean the Contracting Officer.

1. Definitions

For the International Code Council (ICC) Codes referenced in the contract documents, advisory provisions shall be considered mandatory, the word "should" shall be interpreted as "shall." Reference to the "code official" shall be interpreted to mean the "Contracting Officer." References to the "permit holder" shall be interpreted to mean the "Contractor."

2. Administrative Interpretations

For ICC Codes referenced in the contract documents, the provisions of Chapter 1, "Administrator," do not apply. These administrative requirements are covered by the applicable Federal Acquisition Regulations (FAR) included in this contract and by the authority granted to the Officer in Charge of Construction to administer the construction of this project. References in the ICC Codes to sections of Chapter 1, shall be applied appropriately by the Contracting Officer as authorized by his administrative cognizance and the FAR.

1.04 DELIVERY, STORAGE, AND HANDLING

Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations, and as approved by the Contracting Officer. Replace damaged or defective items.

1.05 REGULATORY REQUIREMENTS

Unless otherwise required herein, plumbing work shall be in accordance with ICC IPC. Energy consuming products and systems shall be in accordance with PL 109-58 and ASHRAE 90.1 - IP.

1.06 PROJECT/SITE CONDITIONS

The Contractor shall become familiar with details of the work, verify

dimensions in the field, and advise the Contracting Officer of any discrepancy before performing any work.

1.07 INSTRUCTION TO GOVERNMENT PERSONNEL

When specified in other sections, furnish the services of competent instructors to give full instruction to the designated Government personnel in the adjustment, operation, and maintenance, including pertinent safety requirements, of the specified equipment or system. Instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work.

Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the Government for regular operation. The number of man-days (8 hours per day) of instruction furnished shall be as specified in the individual section. When more than 4 man-days of instruction are specified, use approximately half of the time for classroom instruction. Use other time for instruction with the equipment or system.

When significant changes or modifications in the equipment or system are made under the terms of the contract, provide additional instruction to acquaint the operating personnel with the changes or modifications.

1.08 ACCESSIBILITY OF EQUIPMENT

Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Install concealed valves, expansion joints, controls, dampers, and equipment requiring access, in locations freely accessible through access doors.

PART 2 PRODUCTS

2.01 PRODUCT INFORMATION

A. Shop Drawings for Plumbing System

Detail drawings consisting of schedules, performance charts, instructions, diagrams, and other information to illustrate the requirements and operations of systems that are not covered by the Plumbing Code.

Detail drawings for the complete plumbing system including piping layouts and locations of connections; dimensions for roughing-in, foundation, and support points; schematic diagrams and wiring diagrams or connection and interconnection diagrams.

Detail drawings shall indicate clearances required for maintenance and operation. Where piping and equipment are to be supported other than as indicated, details shall include loadings and proposed support methods. Mechanical drawing plans, elevations, views, and details, shall be drawn to scale.

B. Product Data

1. List of installed fixtures with manufacturer, model, and flow rate.

2. For backflow prevention assemblies, provide a copy of qualified procedures and a list of names and identification symbols of qualified welders and welding operators.

3. Details of vibration-absorbing features, including arrangement, foundation plan, dimensions and specifications.

4. For the plumbing system, provide diagrams, instructions, and other sheets proposed for posting. Manufacturer's recommendations for the installation of bell and spigot and hubless joints for cast iron soil pipe.

C. Test Results

1. Reports for tests, flushing and disinfection shall be reported in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria, completion and testing of the installed system. Each test report shall indicate the final position of controls.

2. A test of backflow prevention assemblies will be performed and certification of proper operation of backflow preventer shall be provided in accordance with New Jersey state regulations (NJAC 7:10) by an individual certified by the state to perform such tests. The Contractor shall provide written documentation of the tests performed and signed by the individual performing the tests.

D. Certificates

1. Where equipment is specified to conform to requirements of the ASME Boiler and Pressure Vessel Code, the design, fabrication, and installation shall conform to the code.

2. Written certification by the bolt manufacturer that the bolts furnished comply with the specified requirements.

E. Operation and Maintenance Data

Submit in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

2.02 MATERIALS

Materials for various services shall be in accordance with TABLES I and II. Pipe schedules shall be selected based on service requirements. Pipe fittings shall be compatible with the applicable pipe materials. Plastic pipe, fittings, and solvent cement shall meet NSF/ANSI 14 and shall be NSF listed for the service intended. Plastic pipe, fittings, and solvent cement used for potable hot and cold water service shall bear the NSF seal "NSF-PW." Polypropylene pipe and fittings shall conform to dimensional requirements of Schedule 40, Iron Pipe size and shall comply with NSF/ANSI 14, NSF/ANSI 61 and

ASTM F2389. Polypropylene piping that will be exposed to UV light shall be provided with a Factory applied UV resistant coating. Pipe threads (except dry seal) shall conform to ASME B1.20.1. Grooved pipe couplings and fittings shall be from the same manufacturer. Material or equipment containing a weighted average of greater than 0.25 percent lead shall not be used in any potable water system intended for human consumption, and shall be certified in accordance with NSF/ANSI 61, Annex G or NSF 372. In line devices such as water meters, building valves, check valves, meter stops, valves, fittings and back flow preventers shall comply with PL 93-523 and NSF/ANSI 61, Section 8. End point devices such as drinking water fountains, lavatory faucets, kitchen and bar faucets, residential ice makers, supply stops and end point control valves used to dispense water for drinking must meet the requirements of NSF/ANSI 61, Section 9. Hubless cast-iron soil pipe shall not be installed underground, under concrete floor slabs, or in crawl spaces below kitchen floors. Plastic pipe shall not be installed in air plenums. Plastic pipe shall not be installed in a pressure piping system in buildings greater than three stories including any basement levels.

A. Pipe Joint Materials

Grooved pipe and hubless cast-iron soil pipe shall not be used underground. Solder containing lead shall not be used with copper pipe. Cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Institute. Joints and gasket materials shall conform to the following:

1. Coupling for Cast-Iron Pipe: for hub and spigot type ASTM A74, AWWA C606. For hubless type: CISPI 310

2. Coupling for Steel Pipe: AWWA C606.

3. Flange Gaskets: Gaskets shall be made of non-asbestos material in accordance with ASME B16.21. Gaskets shall be flat, 1/16 inch thick, and contain Aramid fibers bonded with Styrene Butadiene Rubber (SBR) or Nitro Butadiene Rubber (NBR). Gaskets shall be the full face or self centering flat ring type. Gaskets used for hydrocarbon service shall be bonded with NBR.

4. Brazing Material: Brazing material shall conform to AWS A5.8/A5.8M, BCuP-5.

5. Brazing Flux: Flux shall be in paste or liquid form appropriate for use with brazing material. Flux shall be as follows: lead-free; have a 100 percent flushable residue; contain slightly acidic reagents; contain potassium borides; and contain fluorides.

6. Solder Material: Solder metal shall conform to ASTM B32.

7. Solder Flux: Flux shall be liquid form, non-corrosive, and conform to ASTM B813, Standard Test 1.

8. PTFE Tape: PTFE Tape, for use with Threaded Metal or Plastic Pipe.

9. Rubber Gaskets for Cast-Iron Soil-Pipe and Fittings (hub and

spigot type and hubless type): ASTM C564.

10. Rubber Gaskets for Grooved Pipe: ASTM D2000, maximum temperature 230 degrees F.

11. Flexible Elastomeric Seals: ASTM D3139, ASTM D3212 or ASTM F477.

12. Solvent Cement for Transition Joints between ABS and PVC Nonpressure Piping Components: ASTM D3138.

13. Plastic Solvent Cement for ABS Plastic Pipe: ASTM D2235.

14. Plastic Solvent Cement for PVC Plastic Pipe: ASTM D2564 and ASTM D2855.

15. Plastic Solvent Cement for CPVC Plastic Pipe: ASTM F493.

16. Flanged fittings including, but not limited to, flanges, bolts, nuts and bolt patterns shall be in accordance with ASME B16.5 class 150 and shall have the manufacturer's trademark affixed in accordance with MSS SP-25. Flange material shall conform to ASTM A105/A105M. Blind flange material shall conform to ASTM A516/A516M cold service and ASTM A515/A515M for hot service. Bolts shall be high strength or intermediate strength with material conforming to ASTM A193/A193M.

17. Press fittings for Copper Pipe and Tube: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22 and performance criteria of IAPMO PS 117. Sealing elements for copper press fittings shall be EPDM, FKM or HNBR. Sealing elements shall be factory installed or an alternative supplied fitting manufacturer. Sealing element shall be selected based on manufacturer's approved application guidelines.

18. Copper tubing shall conform to ASTM B88, Type K, L or M.

B. Miscellaneous Materials

Miscellaneous materials shall conform to the following:

1. Water Hammer Arrester: PDI WH 201. Water hammer arrester shall be diaphragm or piston type.

2. Copper, Sheet and Strip for Building Construction: ASTM B370.

3. Asphalt Roof Cement: ASTM D2822/D2822M.

4. Hose Clamps: SAE J1508.

5. Supports for Off-The-Floor Plumbing Fixtures: ASME A112.6.1M.

6. Metallic Cleanouts: ASME A112.36.2M.

7. Plumbing Fixture Setting Compound: A preformed flexible ring seal molded from hydrocarbon wax material. The seal material shall be nonvolatile nonasphaltic and contain germicide and

provide watertight, gastight, odorproof and verminproof properties.

8. Coal-Tar Protective Coatings and Linings for Steel Water Pipelines: AWWA C203.

9. Hypochlorites: AWWA B300.

10. Liquid Chlorine: AWWA B301.

11. Gauges - Pressure and Vacuum Indicating Dial Type - Elastic Element: ASME B40.100.

12. Thermometers: ASTM E1. Mercury shall not be used in thermometers.

C. Pipe Insulation Material

Insulation shall be as specified in Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS.

2.03 PIPE HANGERS, INSERTS, AND SUPPORTS

Pipe hangers, inserts, and supports shall conform to MSS SP-58.

2.04 VALVES

Valves shall be provided on supplies to equipment and fixtures. Valves 2-1/2 inches and smaller shall be bronze with threaded bodies for pipe and solder-type connections for tubing. Valves 3 inches and larger shall have flanged iron bodies and bronze trim. Pressure ratings shall be based upon the application. Grooved end valves may be provided if
the manufacturer certifies that the valves meet the performance requirements of applicable MSS standard. Valves shall conform to the following standards:

Description	Standard
Butterfly Valves	MSS SP-67
Cast-Iron Gate Valves, Flanged and Threaded Ends	MSS SP-70
Cast-Iron Swing Check Valves, Flanged and Threaded Ends	MSS SP-71
Ball Valves with Flanged Butt-Welding Ends for General Service	MSS SP-72
Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends	MSS SP-110
Cast-Iron Plug Valves, Flanged and Threaded Ends	MSS SP-78
Bronze Gate, Globe, Angle, and Check Valves	MSS SP-80

Steel Valves, Socket Welding and Threaded Ends	ASME B16.34
Cast-Iron Globe and Angle Valves, Flanged and Threaded Ends	MSS SP-85
Backwater Valves	ASME A112.14.1
Vacuum Relief Valves	ANSI Z21.22/CSA 4.4
Water Heater Drain Valves	ASME BPVC SEC IV, Part HLW-810: Requirements for Potable-Water Heaters Bottom Drain Valve
Trap Seal Primer Valves	ASSE 1018
Temperature and Pressure Relief Valves for Hot Water Supply Systems	ANSI Z21.22/CSA 4.4
Temperature and Pressure Relief Valves for Automatically Fired Hot Water Boilers	ASME CSD-1 Safety Code No., Part CW, Article 5

A. Backwater Valves

Backwater valves shall be either separate from the floor drain or a combination floor drain, P-trap, and backwater valve, as shown. Valves shall have cast-iron bodies with cleanouts large enough to permit removal of interior parts. Valves shall be of the flap type, hinged or pivoted, with revolving disks. Hinge pivots, disks, and seats shall be nonferrous metal. Disks shall be slightly open in a no-flow no-backwater condition. Cleanouts shall extend to finished floor and be fitted with threaded countersunk plugs.

B. Wall Faucets (Hose Bibs)

Wall faucets with vacuum-breaker backflow preventer shall be brass with 3/4 inch male inlet threads, hexagon shoulder, and 3/4 inch hose connection. Faucet handle shall be securely attached to stem.

C. Relief Valves

Water heaters and hot water storage tanks shall have a combination pressure and temperature (P&T) relief valve. The pressure relief element of a P&T relief valve shall have adequate capacity to prevent excessive pressure buildup in the system when the system is operating at the maximum rate of heat input. The temperature element of a P&T relief valve shall have a relieving capacity which is at least equal to the total input of the

heaters when operating at their maximum capacity. Relief valves shall be rated according to ANSI Z21.22/CSA 4.4. Relief valves for systems where the maximum rate of heat input is less than 200,000 Btu/h shall have 3/4 inch minimum inlets, and 3/4 inch outlets. Relief valves for systems where the maximum rate of heat input is greater than 200,000 Btu/h shall have 1 inch minimum inlets, and 1 inch outlets. The discharge pipe from the relief valve shall be the size of the valve outlet.

D. Thermostatic Mixing Valves

Provide thermostatic mixing valve for lavatory faucets. Mixing valves, thermostatic type, pressure-balanced or combination thermostatic and pressure-balanced shall be line size and shall be constructed with rough or finish bodies either with or without plating. Each valve shall be constructed to control the mixing of hot and cold water and to deliver water at a desired temperature regardless of pressure or input temperature changes. The control element shall be of an approved type. The body shall be of heavy cast bronze, and interior parts shall be brass, bronze, corrosion-resisting steel or copper. The valve shall be equipped with necessary stops, check valves, unions, and sediment strainers on the inlets. Mixing valves shall maintain water temperature within 5 degrees F of any setting.

2.05 FIXTURES

Fixtures shall be water conservation type, in accordance with ASHRAE 189.1 Section 6.3.2.1 (Plumbing fixtures and Fittings). Water closet replacements in major renovations may have a flush valve of up to 1.6 GPF to accommodate existing plumbing capacity. Fixtures for use by the physically handicapped shall be in accordance with ICC A117.1 COMM. Vitreous China, nonabsorbent, hard-burned, and vitrified throughout the body shall be provided. Porcelain enameled ware shall have specially selected, clear white, acid-resisting enamel coating evenly applied on surfaces. No fixture will be accepted that shows cracks, crazes, blisters, thin spots, or other flaws. Fixtures shall be equipped with appurtenances such as traps, faucets, stop valves, and drain fittings. Each fixture and piece of equipment requiring connections to the drainage system, except grease interceptors, shall be equipped with a trap. Brass expansion or toggle bolts capped with acorn nuts shall be provided for supports, and polished chromium-plated pipe, valves, and fittings shall be provided where exposed to view. Fixtures with the supply discharge below the rim shall be equipped with backflow preventers. Internal parts of flush valves and flushometer valves, shower mixing valves, shower head face plates, pop-up stoppers of lavatory waste drains, and pop-up stoppers and overflow tees and shoes of bathtub waste drains may contain acetal resin, fluorocarbon, nylon, acrylonitrile-butadiene-styrene (ABS) or other plastic material, if the material has provided satisfactory service under actual commercial or industrial operating conditions for not less than 2 years.

A. Lavatories

Vitreous china lavatories shall be provided with two integral molded lugs on the back-underside of the fixture and drilled for bolting to the wall in a manner similar to the hanger plate. Lavatory faucets and lavatory faucet accessories must meet the

EPA WaterSense product definition specified in http://www.epa.gov/watersense/partners/product_program_specs.html and must be EPA WaterSense labeled products.

B. Automatic Controls

Flushing and faucet systems shall consist of solenoid-activated valves with light beam sensors. Flush valve for water closet shall include an override pushbutton. Flushing devices shall be provided as described in paragraph FIXTURES AND FIXTURE TRIMMINGS.

C. Flush Valve Water Closets

ASME A112.19.2/CSA B45.1, white vitreous china, siphon jet, elongated bowl, floor-mounted, floor outlet. Top of toilet seat height above floor shall be 14 to 15 inches, except 17 to 19 inches for wheelchair water closets. Provide wax bowl ring including plastic sleeve. Provide white solid plastic elongated closed-front seat with cover.

Water flushing volume of the water closet and flush valve combination shall not exceed 1.28 gallons per flush. Water closets must meet the EPA WaterSense product definition specified in http://www.epa.gov/watersense/partners/product_program_specs.html and must be EPA WaterSense labeled products.

Provide large diameter flush valve including angle control-stop valve, vacuum breaker, tail pieces, slip nuts, and wall plates; exposed to view components shall be chromium-plated or polished stainless steel. Flush valves shall be nonhold-open type. Mount flush valves not less than 11 inches above the fixture. Mounted height of flush valve shall not interfere with the hand rail in ADA stalls. Provide solenoid-activated flush valves including electrical-operated light-beam-sensor to energize the solenoid.

D. Wall Hung Lavatories

ASME A112.19.2/CSA B45.1, white vitreous china, ,straight back type, minimum dimensions of 19 inches, wide by 17 inches front to rear, with supply openings for use with top mounted centerset faucets, and openings for concealed arm carrier installation. Provide aerator with faucet. Water flow rate shall not exceed 0.5 gpm when measured at a flowing water pressure of 60 psi. Lavatory faucets and lavatory faucet accessories must meet the EPA WaterSense product definition specified in http://www.epa.gov/watersense/partners/product_program_specs.html and must be EPA WaterSense labeled products. Provide ASME A112.6.1M concealed chair carriers with vertical steel pipe supports and concealed arms for the lavatory. Mount lavatory with the front rim 34 inches above floor and with 29 inches minimum clearance from bottom of the front rim to floor. Provide top-mounted solenoid-activated lavatory faucets including electrical-operated light-beam-sensor to energize the solenoid.

E. Kitchen Sinks

ASME A112.19.3/CSA B45.4, 20 gauge stainless steel with integral mounting rim for flush installation, minimum dimensions of 33

inches wide by 21 inches front to rear, two compartments, with undersides fully sound deadened, with supply openings for use with top mounted washerless sink faucets with hose spray, and with 3.5 inch drain outlet. Provide aerator with faucet. Water flow rate shall not exceed 2.2 gpm when measured at a flowing water pressure of 60 psi. Provide stainless steel drain outlets and stainless steel cup strainers. Provide separate 1.5 inch P-trap and drain piping to vertical vent piping from each compartment. Provide top mounted washerless sink faucets with hose spray.

F. Service Sinks

ASME A112.19.3/CSA B45.4 302 stainless steel with integral back and wall hanger supports, minimum dimensions of 22 inches wide by 20 inches front to rear, with two supply openings in 10 inch high back. Provide floor supported wall outlet cast iron P-trap and stainless steel rim guards as recommended by service sink manufacturer. Provide back mounted washerless service sink faucets with vacuum breaker and 0.75 inch external hose threads.

G. Emergency Eyewash and Shower

ANSI/ISEA Z358.1, floor supported free standing unit. Provide deluge shower head, stay-open ball valve operated by pull rod and ring or triangular handle. Provide eyewash and stay-open ball valve operated by foot treadle or push handle.

2.06 BACKFLOW PREVENTERS

Backflow prevention devices must be approved by the State of New Jersey or local regulatory agencies. If there is no State or local regulatory agency requirements, the backflow prevention devices must be listed by the Foundation for Cross-Connection Control & Hydraulic Research, or any other approved testing laboratory having equivalent capabilities for both laboratory and field evaluation of backflow prevention devices and assemblies.

Reduced pressure principle assemblies, double check valve assemblies, atmospheric (nonpressure) type vacuum breakers, and pressure type vacuum breakers shall be meet the above requirements.

Backflow preventers with intermediate atmospheric vent shall conform to ASSE 1012. Reduced pressure principle backflow preventers shall conform to ASSE 1013. Hose connection vacuum breakers shall conform to ASSE 1011. Pipe applied atmospheric type vacuum breakers shall conform to ASSE 1001. Pressure vacuum breaker assembly shall conform to ASSE 1020. Air gaps in plumbing systems shall conform to ASME A112.1.2.

2.07 DRAINS

A. Area Drains

Area drains shall be plain pattern with polished stainless steel perforated or slotted grate and bottom outlet. The drain shall be circular or square with a 12 inch nominal overall width or diameter and 10 inch nominal overall depth. Drains shall be cast iron with manufacturer's standard coating. Grate shall be easily lifted out for cleaning. Outlet shall be suitable for inside caulked connection to drain pipe. Drains shall conform to

ASME A112.6.3.

B. Floor Sinks

Floor sinks shall be square, with 12 inch nominal overall width and 10 inch nominal overall depth. Floor sink shall have an acid-resistant enamel interior finish with cast-iron body, ABS sediment bucket, and perforated grate of cast iron in industrial areas and stainless steel in finished areas. The outlet pipe size shall be as indicated or of the same size as the connecting pipe.

C. Roof Drains and Expansion Joints

Roof drains shall conform to ASME A112.6.4, with dome and integral flange, and shall have a device for making a watertight connection between roofing and flashing. The whole assembly shall be galvanized heavy pattern cast iron. For aggregate surface roofing, the drain shall be provided with a gravel stop. On roofs other than concrete construction, roof drains shall be complete with underdeck clamp, sump receiver, and an extension for the insulation thickness where applicable. A clamping device for attaching flashing or waterproofing membrane to the seepage pan without damaging the flashing or membrane shall be provided when required to suit the building construction. Strainer openings shall have a combined area equal to twice that of the drain outlet. The outlet shall be equipped to make a proper connection to threaded pipe of the same size as the downspout. An expansion joint of proper size to receive the conductor pipe shall be provided. The expansion joint shall consist of a heavy cast-iron housing, brass or bronze sleeve, brass or bronze fastening bolts and nuts, and gaskets or packing. The sleeve shall have a nominal thickness of not less than 0.134 inch. Gaskets and packing shall be close-cell neoprene, O-ring packing shall be close-cell neoprene of 70 durometer. Packing shall be held in place by a packing gland secured with bolts.

2.08 TRAPS

Unless otherwise specified, traps shall be plastic per ASTM F409 or copper-alloy adjustable tube type with slip joint inlet and swivel. Traps shall be without a cleanout. Tubes shall be copper alloy with walls not less than 0.032 inch thick within commercial tolerances, except on the outside of bends where the thickness may be reduced slightly in manufacture by usual commercial methods. Inlets shall have rubber washer and copper alloy nuts for slip joints above the discharge level. Swivel joints shall be below the discharge level and shall be of metal-to-metal or metal-to-plastic type as required for the application. Nuts shall have flats for wrench grip. Outlets shall have internal pipe thread, except that when required for the application, the outlets shall have sockets for solder-joint connections. The depth of the water seal shall be not less than 2 inches. The interior diameter shall be not more than 1/8 inch over or under the nominal size, and interior surfaces shall be reasonably smooth throughout. A copper alloy "P" trap assembly consisting of an adjustable "P" trap and threaded trap wall nipple with cast brass wall flange shall be provided for lavatories. The assembly shall be a standard manufactured unit and may have a rubber-gasketed swivel joint.

2.09 WATER HEATERS

Water heater types and capacities shall be as indicated. Each water heater shall have replaceable anodes. Each primary water heater shall have controls with an adjustable range that includes 90 to 160 degrees F. The thermal efficiencies and standby heat losses shall conform to TABLE II for each type of water heater specified. .

A. Electric Instantaneous Water Heaters (Tankless)

UL 499 and UL listed flow switch activated, tankless electric instantaneous water heater for wall mounting below sink or lavatory.Electric instantaneous (tankless) type heaters must meet the Energy Star product definition specified in https://www.energystar.gov/products/spec and must be Energy Star certified.

2.10 PUMPS

A. Sump Pumps

Sump pumps shall be of capacities indicated. The pumps shall be of the automatic, electric motor-driven, submerged type, complete with necessary control equipment and with a split or solid cast-iron or steel cover plate. The pumps shall be direct-connected by an approved flexible coupling to a vertical electric motor having a continuous oiling device or packed bearings sealed against dirt and moisture. Motors shall be totally enclosed, fan-cooled of sizes as indicated and shall be equipped with an across-the-line magnetic controller in a NEMA 250, Type 1 enclosure. Integral size motors shall be the premium efficiency type in accordance with NEMA MG 1. Each pump shall be fitted with a high-grade thrust bearing mounted above the floor. Each shaft shall have an alignment bearing at each end, and the suction inlet shall be between 3 and 6 inches above the sump bottom. The suction side of each pump shall have a strainer of ample capacity. A float switch assembly, with the switch completely enclosed in a NEMA 250, Type 1 enclosure, shall start and stop each motor at predetermined water levels. Duplex pumps shall be equipped with an automatic alternator to change the lead operation from one pump to the other, and for starting the second pump if the flow exceeds the capacity of the first pump. The discharge line from each pump shall be provided with a union or flange, a nonclog swing check valve, and a stop valve in an accessible location near the pump.

B. Flexible Connectors

Flexible connectors shall be provided at the suction and discharge of each pump that is 1 hp or larger. Connectors shall be constructed of neoprene, rubber, or braided bronze, with Class 150 standard flanges. Flexible connectors shall be line size and suitable for the pressure and temperature of the intended service.

2.11 DOMESTIC WATER SERVICE METER

The requirements for metering and submetering are specified in Section 33 11 00 WATER UTILITY DISTRIBUTION PIPING.

Cold water meters 2 inches and smaller shall be positive displacement type conforming to AWWA C700. Cold water meters 2-1/2 inches and larger shall be turbine type conforming to AWWA C701. Meter register may be round or straight reading type, as provided by the local utility. Meter shall be provided with a pulse generator, remote readout register and all necessary wiring and accessories.

Provide water meters to monitor use in building consuming indoor and outdoor water as required by DODI 4170.11 (Installation Energy Management). Implement sub-metering when authorized in writing by the installation. Refer to ASHRAE 189.1 Section 7.3.3 (Energy Consumption Management) for subsystem implementation.

Meters must be connected to the base wide energy and utility monitoring and control system (if this system exists) using the installation's advanced metering protocols.

2.12 ELECTRICAL WORK

Provide electrical motor driven equipment specified complete with motors, motor starters, and controls as specified herein and in Division 26. Provide internal wiring for components of packaged equipment as an integral part of the equipment. Provide high efficiency type, single-phase, fractional-horsepower alternating-current motors, including motors that are part of a system, corresponding to the applications in accordance with NEMA MG 11. In addition to the requirements of Division 26, provide polyphase, squirrel-cage medium induction motors with continuous ratings, including motors that are part of a system, that meet the efficiency ratings for premium efficiency motors in accordance with NEMA MG 1. Provide motors in accordance with NEMA MG 1 and of sufficient size to drive the load at the specified capacity without exceeding the nameplate rating of the motor.

Motors shall be rated for continuous duty with the enclosure specified. Motor duty requirements shall allow for maximum frequency start-stop operation and minimum encountered interval between start and stop. Motor torque shall be capable of accelerating the connected load within 20 seconds with 80 percent of the rated voltage maintained at motor terminals during one starting period. Motor bearings shall be fitted with grease supply fittings and grease relief to outside of the enclosure.

Controllers and contactors shall have auxiliary contacts for use with the controls provided. Manual or automatic control and protective or signal devices required for the operation specified and any control wiring required for controls and devices specified, but not shown, shall be provided. For packaged equipment, the manufacturer shall provide controllers, including the required monitors and timed restart.

Power wiring and conduit for field installed equipment shall be provided under and conform to the requirements of Division 26.

2.13 MISCELLANEOUS PIPING ITEMS

A. Escutcheon Plates

Provide one piece or split hinge metal plates for piping entering floors, walls, and ceilings in exposed spaces. Provide

chromium-plated on copper alloy plates or polished stainless steel finish in finished spaces. Provide paint finish on plates in unfinished spaces.

B. Pipe Sleeves

Provide where piping passes entirely through walls, ceilings, roofs, and floors. Sleeves are not required where drain, waste, and vent (DWV) piping passes through concrete floor slabs located on grade, except where penetrating a membrane waterproof floor.

1. Sleeves in Masonry and Concrete

Provide steel pipe sleeves or schedule 40 PVC plastic pipe sleeves. Sleeves are not required where drain, waste, and vent (DWV) piping passes through concrete floor slabs located on grade. Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in the core-drilled hole are completely grouted smooth.

2. Sleeves Not in Masonry and Concrete

Provide 26 gauge galvanized steel sheet or PVC plastic pipe sleeves.

C. Pipe Hangers (Supports)

Provide MSS SP-58 Type 1 with adjustable type steel support rods, except as specified or indicated otherwise. Attach to steel joists with Type 19 or 23 clamps and retaining straps. Attach to Steel W or S beams with Type 21, 28, 29, or 30 clamps. Attach to steel angles and vertical web steel channels with Type 20 clamp with beam clamp channel adapter. Attach to horizontal web steel channel and wood with drilled hole on centerline and double nut and washer. Attach to concrete with Type 18 insert or drilled expansion anchor. Provide Type 40 insulation protection shield for insulated piping.

D. Nameplates

Provide 0.125 inch thick melamine laminated plastic nameplates, black matte finish with white center core, for equipment, gauges, thermometers, and valves; valves in supplies to faucets will not require nameplates. Accurately align lettering and engrave minimum of 0.25 inch high normal block lettering into the white core. Minimum size of nameplates shall be 1.0 by 2.5 inches. Key nameplates to a chart and schedule for each system. Frame charts and schedules under glass and place where directed near each system. Furnish two copies of each chart and schedule.

PART 3 EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

Piping located in air plenums shall conform to NFPA 90A requirements. Piping located in shafts that constitute air ducts or that enclose air ducts shall be noncombustible in accordance with NFPA 90A. Installation of plastic pipe where in compliance with NFPA may be

installed in accordance with PPFA Fire Man. The plumbing system shall be installed complete with necessary fixtures, fittings, traps, valves, and accessories. Water and drainage piping shall be extended 5 feet outside the building, unless otherwise indicated. A gate valve and drain shall be installed on the water service line inside the building approximately 6 inches above the floor from point of entry. Piping shall be connected to the exterior service lines or capped or plugged if the exterior service is not in place. Sewer and water pipes shall be laid in separate trenches, except when otherwise shown. Exterior underground utilities shall be at least 12 inches below the average local frost depth or as indicated on the drawings. If trenches are closed or the pipes are otherwise covered before being connected to the service lines, the location of the end of each plumbing utility shall be marked with a stake or other acceptable means. Valves shall be installed with control no lower than the valve body.

A. Water Pipe, Fittings, and Connections

1. Utilities

The piping shall be extended to fixtures, outlets, and equipment. The hot-water and cold-water piping system shall be arranged and installed to permit draining. The supply line to each item of equipment or fixture, except faucets, flush valves, or other control valves which are supplied with integral stops, shall be equipped with a shutoff valve to enable isolation of the item for repair and maintenance without interfering with operation of other equipment or fixtures. Supply piping to fixtures, faucets, hydrants, shower heads, and flushing devices shall be anchored to prevent movement.

2. Cutting and Repairing

The work shall be carefully laid out in advance, and unnecessary cutting of construction shall be avoided. Damage to building, piping, wiring, or equipment as a result of cutting shall be repaired by mechanics skilled in the trade involved.

3. Protection of Fixtures, Materials, and Equipment

Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water, chemicals, and mechanical injury. Upon completion of the work, the fixtures, materials, and equipment shall be thoroughly cleaned, adjusted, and operated. Safety guards shall be provided for exposed rotating equipment.

4. Mains, Branches, and Runouts

Piping shall be installed as indicated. Pipe shall be accurately cut and worked into place without springing or forcing. Structural portions of the building shall not be weakened. Aboveground piping shall run parallel with the lines of the building, unless otherwise indicated. Branch pipes from service lines may be taken from top, bottom, or

side of main, using crossover fittings required by structural or installation conditions. Supply pipes, valves, and fittings shall be kept a sufficient distance from other work and other services to permit not less than 1/2 inch between finished covering on the different services. Bare and insulated water lines shall not bear directly against building structural elements so as to transmit sound to the structure or to prevent flexible movement of the lines. Water pipe shall not be buried in or under floors unless specifically indicated or approved. Changes in pipe sizes shall be made with reducing fittings. Use of bushings will not be permitted except for use in situations in which standard factory fabricated components are furnished to accommodate specific accepted installation practice. Change in direction shall be made with fittings, except that bending of pipe 4 inches and smaller will be permitted, provided a pipe bender is used and wide sweep bends are formed. The center-line radius of bends shall be not less than six diameters of the pipe. Bent pipe showing kinks, wrinkles, flattening, or other malformations will not be acceptable.

5. Pipe Drains

Pipe drains indicated shall consist of 3/4 inch hose bibb with renewable seat and ball valve ahead of hose bibb. At other low points, 3/4 inch brass plugs or caps shall be provided. Disconnection of the supply piping at the fixture is an acceptable drain.

6. Expansion and Contraction of Piping

Allowance shall be made throughout for expansion and contraction of water pipe. Each hot-water and hot-water circulation riser shall have expansion loops or other provisions such as offsets and changes in direction where indicated and required. Risers shall be securely anchored as required or where indicated to force expansion to loops. Branch connections from risers shall be made with ample swing or offset to avoid undue strain on fittings or short pipe lengths. Horizontal runs of pipe over 50 feet in length shall be anchored to the wall or the supporting construction about midway on the run to force expansion, evenly divided, toward the ends. Sufficient flexibility shall be provided on branch runouts from mains and risers to provide for expansion and contraction of piping. Flexibility shall be provided by installing one or more turns in the line so that piping will spring enough to allow for expansion without straining. If mechanical grooved pipe coupling systems are provided, the deviation from design requirements for expansion and contraction may be allowed pending approval of Contracting Officer.

7. Thrust Restraint

Plugs, caps, tees, valves and bends deflecting 11.25 degrees or more, either vertically or horizontally, in waterlines 4 inches in diameter or larger shall be provided with thrust blocks, where indicated, to prevent movement. Thrust

blocking shall be concrete of a mix not leaner than: 1 cement, 2-1/2 sand, 5 gravel; and having a compressive strength of not less than 2000 psi after 28 days. Blocking shall be placed between solid ground and the fitting to be anchored. Unless otherwise indicated or directed, the base and thrust bearing sides of the thrust block shall be poured against undisturbed earth. The side of the thrust block not subject to thrust shall be poured against forms. The area of bearing will be as shown. Blocking shall be placed so that the joints of the fitting are accessible for repair. Steel rods and clamps, protected by galvanizing or by coating with bituminous paint, shall be used to anchor vertical down bends into gravity thrust blocks.

8. Commercial-Type Water Hammer Arresters

Commercial-type water hammer arresters shall be provided on hot- and cold-water supplies and shall be located as generally indicated, with precise location and sizing to be in accordance with PDI WH 201. Water hammer arresters, where concealed, shall be accessible by means of access doors or removable panels. Commercial-type water hammer arresters shall conform to ASSE 1010. Vertical capped pipe columns will not be permitted.

B. Joints

Installation of pipe and fittings shall be made in accordance with the manufacturer's recommendations. Mitering of joints for elbows and notching of straight runs of pipe for tees will not be permitted. Joints shall be made up with fittings of compatible material and made for the specific purpose intended.

1. Threaded

Threaded joints shall have American Standard taper pipe threads conforming to ASME B1.20.1. Only male pipe threads shall be coated with graphite or with an approved graphite compound, or with an inert filler and oil, or shall have a polytetrafluoroethylene tape applied.

2. Unions and Flanges

Unions, flanges and mechanical couplings shall not be concealed in walls, ceilings, or partitions. Unions shall be used on pipe sizes 2-1/2 inches and smaller; flanges shall be used on pipe sizes 3 inches and larger.

3. Cast Iron Soil, Waste and Vent Pipe

Bell and spigot compression and hubless gasketed clamp joints for soil, waste and vent piping shall be installed per the manufacturer's recommendations.

4. Copper Tube and Pipe

a. Brazed. Brazed joints shall be made in conformance with AWS B2.2/B2.2M, ASME B16.50, and CDA A4015 with flux and are acceptable for all pipe sizes. Copper to copper

joints shall include the use of copper-phosphorus or copper-phosphorus-silver brazing metal without flux. Brazing of dissimilar metals (copper to bronze or brass) shall include the use of flux with either a copper-phosphorus, copper-phosphorus-silver or a silver brazing filler metal.

b. Soldered. Soldered joints shall be made with flux and are only acceptable for piping 2 inches and smaller. Soldered joints shall conform to ASME B31.5 and CDA A4015. Soldered joints shall not be used in compressed air piping between the air compressor and the receiver.

c. Copper Tube Extracted Joint. Mechanically extracted joints shall be made in accordance with ICC IPC.

5. Other Joint Methods

C. Dissimilar Pipe Materials

Connections between ferrous and non-ferrous copper water pipe shall be made with dielectric unions or flange waterways. Dielectric waterways shall have temperature and pressure rating equal to or greater than that specified for the connecting piping. Waterways shall have metal connections on both ends suited to match connecting piping. Dielectric waterways shall be internally lined with an insulator specifically designed to prevent current flow between dissimilar metals. Dielectric flanges shall meet the performance requirements described herein for dielectric waterways. Connecting joints between plastic and metallic pipe shall be made with transition fitting for the specific purpose.

D. Pipe Sleeves and Flashing

Pipe sleeves shall be furnished and set in their proper and permanent location.

1. Sleeve Requirements

Unless indicated otherwise, provide pipe sleeves meeting the following requirements:

Secure sleeves in position and location during construction. Provide sleeves of sufficient length to pass through entire thickness of walls, ceilings, roofs, and floors.

A modular mechanical type sealing assembly may be installed in lieu of a waterproofing clamping flange and caulking and sealing of annular space between pipe and sleeve. The seals shall consist of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and sleeve using galvanized steel bolts, nuts, and pressure plates. The links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and each nut. After the seal assembly is properly positioned in the sleeve, tightening of the bolt shall cause the rubber sealing

elements to expand and provide a watertight seal between the pipe and the sleeve. Each seal assembly shall be sized as recommended by the manufacturer to fit the pipe and sleeve involved.

Sleeves shall not be installed in structural members, except where indicated or approved. Rectangular and square openings shall be as detailed. Each sleeve shall extend through its respective floor, or roof, and shall be cut flush with each surface, except for special circumstances. Pipe sleeves passing through floors in wet areas such as mechanical equipment rooms, lavatories, kitchens, and other plumbing fixture areas shall extend a minimum of 4 inches above the finished floor.

Unless otherwise indicated, sleeves shall be of a size to provide a minimum of one inch clearance between bare pipe or insulation and inside of sleeve or between insulation and inside of sleeve. Sleeves in bearing walls and concrete slab on grade floors shall be steel pipe or cast-iron pipe. Sleeves in nonbearing walls or ceilings may be steel pipe, cast-iron pipe, galvanized sheet metal with lock-type longitudinal seam, or plastic.

Except as otherwise specified, the annular space between pipe and sleeve, or between jacket over insulation and sleeve, shall be sealed as indicated with sealants conforming to ASTM C920 and with a primer, backstop material and surface preparation as specified in Section 07 92 00 JOINT SEALANTS. The annular space between pipe and sleeve, between bare insulation and sleeve or between jacket over insulation and sleeve shall not be sealed for interior walls which are not designated as fire rated.

Sleeves through below-grade walls in contact with earth shall be recessed 1/2 inch from wall surfaces on both sides. Annular space between pipe and sleeve shall be filled with backing material and sealants in the joint between the pipe and masonry wall as specified above. Sealant selected for the earth side of the wall shall be compatible with dampproofing/waterproofing materials that are to be applied over the joint sealant. Pipe sleeves in fire-rated walls shall conform to the requirements in Section 07 84 13 PENETRATION FIRESTOPPING.

2. Flashing Requirements

Pipes passing through roof shall be installed through a 16 ounce copper flashing, each within an integral skirt or flange. Flashing shall be suitably formed, and the skirt or flange shall extend not less than 8 inches from the pipe and shall be set over the roof or floor membrane in a solid coating of bituminous cement. The flashing shall extend up the pipe a minimum of 10 inches. For cleanouts, the flashing shall be turned down into the hub and caulked after placing the ferrule. Pipes passing through pitched roofs shall be flashed, using lead or copper flashing, with an adjustable integral flange of adequate size to extend not less than 8 inches from the pipe in all directions and

lapped into the roofing to provide a watertight seal. The annular space between the flashing and the bare pipe or between the flashing and the metal-jacket-covered insulation shall be sealed as indicated. Flashing for dry vents shall be turned down into the pipe to form a waterproof joint. Pipes, up to and including 10 inches in diameter, passing through roof or floor waterproofing membrane may be installed through a cast-iron sleeve with caulking recess, anchor lugs, flashing-clamp device, and pressure ring with brass bolts. Flashing shield shall be fitted into the sleeve clamping device. Pipes passing through wall waterproofing membrane shall be sleeved as described above. A waterproofing clamping flange shall be installed.

3. Waterproofing

Waterproofing at floor-mounted water closets shall be accomplished by forming a flashing guard from soft-tempered sheet copper. The center of the sheet shall be perforated and turned down approximately 1-1/2 inches to fit between the outside diameter of the drainpipe and the inside diameter of the cast-iron or steel pipe sleeve. The turned-down portion of the flashing guard shall be embedded in sealant to a depth of approximately 1-1/2 inches; then the sealant shall be finished off flush to floor level between the flashing guard and drainpipe. The flashing guard of sheet copper shall extend not less than 8 inches from the drainpipe and shall be lapped between the floor membrane in a solid coating of bituminous cement. If cast-iron water closet floor flanges are used, the space between the pipe sleeve and drainpipe shall be sealed with sealant and the flashing guard shall be upturned approximately 1-1/2 inches to fit the outside diameter of the drainpipe and the inside diameter of the water closet floor flange. The upturned portion of the sheet fitted into the floor flange shall be sealed.

4. Optional Counterflashing

Instead of turning the flashing down into a dry vent pipe, or caulking and sealing the annular space between the pipe and flashing or metal-jacket-covered insulation and flashing, counterflashing may be accomplished by utilizing the following:

a. A standard roof coupling for threaded pipe up to 6 inches in diameter.
b. A tack-welded or banded-metal rain shield around the pipe.

5. Pipe Penetrations of Slab on Grade Floors

Where pipes, fixture drains, floor drains, cleanouts or similar items penetrate slab on grade floors, except at penetrations of floors with waterproofing membrane as specified in paragraphs FLASHING REQUIREMENTS and WATERPROOFING, a groove 1/4 to 1/2 inch wide by 1/4 to 3/8 inch deep shall be formed around the pipe, fitting or drain. The groove shall be filled with a sealant as specified in

Section 07 92 00 JOINT SEALANTS.

6. Pipe Penetrations

Provide sealants for all pipe penetrations. All pipe penetrations shall be sealed to prevent infiltration of air, insects, and vermin.

E. Fire Seal

Where pipes pass through fire walls, fire-partitions, fire-rated pipe chase walls or floors above grade, a fire seal shall be provided as specified in Section 07 84 13 PENETRATION FIRESTOPPING.

F. Supports

1. General

Hangers used to support piping 2 inches and larger shall be fabricated to permit adequate adjustment after erection while still supporting the load. Pipe guides and anchors shall be installed to keep pipes in accurate alignment, to direct the expansion movement, and to prevent buckling, swaying, and undue strain. Piping subjected to vertical movement when operating temperatures exceed ambient temperatures shall be supported by variable spring hangers and supports or by constant support hangers. In the support of multiple pipe runs on a common base member, a clip or clamp shall be used where each pipe crosses the base support member. Spacing of the base support members shall not exceed the hanger and support spacing required for an individual pipe in the multiple pipe run. Threaded sections of rods shall not be formed or bent.

2. Pipe Supports and Structural Bracing, Seismic Requirements

Structural steel required for reinforcement to properly support piping, headers, and equipment, but not shown, shall be provided. Material used for supports shall be as specified in Section 40 05 15 PIPING SUPPORT SYSTEMS.

3. Pipe Hangers, Inserts, and Supports

Installation of pipe hangers, inserts and supports shall conform to MSS SP-58 except as modified herein.

a. Types 5, 12, and 26 shall not be used.

b. Type 3 shall not be used on insulated pipe.

c. Type 18 inserts shall be secured to concrete forms before concrete is placed. Continuous inserts which allow more adjustment may be used if they otherwise meet the requirements for type 18 inserts.

d. Type 19 and 23 C-clamps shall be torqued per MSS SP-58 and shall have both locknuts and retaining devices furnished by the manufacturer. Field-fabricated C-clamp

bodies or retaining devices are not acceptable.

e. Type 20 attachments used on angles and channels shall be furnished with an added malleable-iron heel plate or adapter.

f. Type 24 may be used only on trapeze hanger systems or on fabricated frames.

g. Type 39 saddles shall be used on insulated pipe 4 inches and larger when the temperature of the medium is 60 degrees F or higher. Type 39 saddles shall be welded to the pipe.

h. Type 40 shields shall:

(1) Be used on insulated pipe less than 4 inches.
(2) Be used on insulated pipe 4 inches and larger when the temperature of the medium is 60 degrees F or less.
(3) Have a high density insert for all pipe sizes. High density inserts shall have a density of 8 pcf or greater.

i. Horizontal pipe supports shall be spaced as specified in MSS SP-58 and a support shall be installed not over 1 foot from the pipe fitting joint at each change in direction of the piping. Pipe supports shall be spaced not over 5 feet apart at valves. Operating temperatures in determining hanger spacing for PVC or CPVC pipe shall be 120 degrees F for PVC and 180 degrees F for CPVC. Horizontal pipe runs shall include allowances for expansion and contraction.

j. Vertical pipe shall be supported at each floor, except at slab-on-grade, at intervals of not more than 15 feet nor more than 8 feet from end of risers, and at vent terminations. Vertical pipe risers shall include allowances for expansion and contraction.

k. Type 35 guides using steel, reinforced polytetrafluoroethylene (PTFE) or graphite slides shall be provided to allow longitudinal pipe movement. Slide materials shall be suitable for the system operating temperatures, atmospheric conditions, and bearing loads encountered. Lateral restraints shall be provided as needed. Where steel slides do not require provisions for lateral restraint the following may be used:

(1) On pipe 4 inches and larger when the temperature of the medium is 60 degrees F or higher, a Type 39 saddle, welded to the pipe, may freely rest on a steel plate.
(2) On pipe less than 4 inches a Type 40 shield, attached to the pipe or insulation, may freely rest on a steel plate.
(3) On pipe 4 inches and larger carrying medium less that 60 degrees F a Type 40 shield, attached to the pipe or insulation, may freely rest on a steel plate.

l. Pipe hangers on horizontal insulated pipe shall be the size of the outside diameter of the insulation. The insulation shall be continuous through the hanger on all pipe sizes and applications.

m. Where there are high system temperatures and welding to piping is not desirable, the type 35 guide shall include a pipe cradle, welded to the guide structure and strapped securely to the pipe. The pipe shall be separated from the slide material by at least 4 inches or by an amount adequate for the insulation, whichever is greater.

n. Hangers and supports for plastic pipe shall not compress, distort, cut or abrade the piping, and shall allow free movement of pipe except where otherwise required in the control of expansion/contraction.

4. Structural Attachments

Attachment to building structure concrete and masonry shall be by cast-in concrete inserts, built-in anchors, or masonry anchor devices. Inserts and anchors shall be applied with a safety factor not less than 5. Supports shall not be attached to metal decking. Supports shall not be attached to the underside of concrete filled floor or concrete roof decks unless approved by the Contracting Officer. Masonry anchors for overhead applications shall be constructed of ferrous materials only.

G. Pipe Cleanouts

Pipe cleanouts shall be the same size as the pipe except that cleanout plugs larger than 4 inches will not be required. cleanout installed in connection with cast-iron soil pipe shall consist of a long-sweep 1/4 bend or one or two 1/8 bends extended to the place shown. An extra-heavy cast-brass or cast-iron ferrule with countersunk cast-brass head screw plug shall be caulked into the hub of the fitting and shall be flush with the floor. Cleanouts in connection with other pipe, where indicated, shall be T-pattern, 90-degree branch drainage fittings with cast-brass screw plugs, except plastic plugs shall be installed in plastic pipe. Plugs shall be the same size as the pipe up to and including 4 inches. Cleanout tee branches with screw plug shall be installed at the foot of soil and waste stacks, at the foot of interior downspouts, on each connection to building storm drain where interior downspouts are indicated, and on each building drain outside the building. Cleanout tee branches may be omitted on stacks in single story buildings with slab-on-grade construction or where less than 18 inches of crawl space is provided under the floor. Cleanouts on pipe concealed in partitions shall be provided with chromium plated bronze, nickel bronze, nickel brass or stainless steel flush type access cover plates. Round access covers shall be provided and secured to plugs with securing screw. Square access covers may be provided with matching frames, anchoring lugs and cover screws. Cleanouts in finished walls shall have access covers and frames installed flush with the finished wall. Cleanouts installed in finished

floors subject to foot traffic shall be provided with a chrome-plated cast brass, nickel brass, or nickel bronze cover secured to the plug or cover frame and set flush with the finished floor. Heads of fastening screws shall not project above the cover surface. Where cleanouts are provided with adjustable heads, the heads shall be cast iron.

3.02 WATER HEATERS AND HOT WATER STORAGE TANKS

A. Relief Valves

No valves shall be installed between a relief valve and its water heater or storage tank. The P&T relief valve shall be installed where the valve actuator comes in contact with the hottest water in the heater. Whenever possible, the relief valve shall be installed directly in a tapping in the tank or heater; otherwise, the P&T valve shall be installed in the hot-water outlet piping. A vacuum relief valve shall be provided on the cold water supply line to the hot-water storage tank or water heater and mounted above and within 6 inches above the top of the tank or water heater.

B. Connections to Water Heaters

Connections of metallic pipe to water heaters shall be made with dielectric unions or flanges.

3.03 FIXTURES AND FIXTURE TRIMMINGS

Polished chromium-plated pipe, valves, and fittings shall be provided where exposed to view. Angle stops, straight stops, stops integral with the faucets, or concealed type of lock-shield, and loose-key pattern stops for supplies with threaded, sweat or solvent weld inlets shall be furnished and installed with fixtures. Where connections between copper tubing and faucets are made by rubber compression fittings, a beading tool shall be used to mechanically deform the tubing above the compression fitting. Exposed traps and supply pipes for fixtures and equipment shall be connected to the rough piping systems at the wall, unless otherwise specified under the item. Floor and wall escutcheons shall be as specified. Drain lines and hot water lines of fixtures for handicapped personnel shall be insulated and do not require polished chrome finish. Plumbing fixtures and accessories shall be installed within the space shown.

A. Fixture Connections

Where space limitations prohibit standard fittings in conjunction with the cast-iron floor flange, special short-radius fittings shall be provided. Connections between earthenware fixtures and flanges on soil pipe shall be made gastight and watertight with a closet-setting compound or neoprene gasket and seal. Use of natural rubber gaskets or putty will not be permitted. Fixtures with outlet flanges shall be set the proper distance from floor or wall to make a first-class joint with the closet-setting compound or gasket and fixture used.

B. Flushometer Valves

Flushometer valves shall be secured to prevent movement by

anchoring the long finished top spud connecting tube to wall adjacent to valve with approved metal bracket. Flushometer valves for water closets shall be installed 39 inches above the floor, except at water closets intended for use by the physically handicapped where flushometer valves shall be mounted at approximately 30 inches above the floor and arranged to avoid interference with grab bars. In addition, for water closets intended for handicap use, the flush valve handle shall be installed on the wide side of the enclosure.

C. Height of Fixture Rims Above Floor

Lavatories shall be mounted with rim 31 inches above finished floor. Wall-hung drinking fountains and water coolers shall be installed with rim 42 inches above floor. Wall-hung service sinks shall be mounted with rim 28 inches above the floor. Installation of fixtures for use by the physically handicapped shall be in accordance with ICC A117.1 COMM.

D. Fixture Supports

Fixture supports for off-the-floor lavatories, urinals, water closets, and other fixtures of similar size, design, and use, shall be of the chair-carrier type. The carrier shall provide the necessary means of mounting the fixture, with a foot or feet to anchor the assembly to the floor slab. Adjustability shall be provided to locate the fixture at the desired height and in proper relation to the wall. Support plates, in lieu of chair carrier, shall be fastened to the wall structure only where it is not possible to anchor a floor-mounted chair carrier to the floor slab.

1. Support for Solid Masonry Construction

Chair carrier shall be anchored to the floor slab. Where a floor-anchored chair carrier cannot be used, a suitable wall plate shall be imbedded in the masonry wall.

2. Support for Concrete-Masonry Wall Construction

Chair carrier shall be anchored to floor slab. Where a floor-anchored chair carrier cannot be used, a suitable wall plate shall be fastened to the concrete wall using through bolts and a back-up plate.

3. Support for Steel Stud Frame Partitions

Chair carrier shall be used. The anchor feet and tubular uprights shall be of the heavy duty design; and feet (bases) shall be steel and welded to a square or rectangular steel tube upright. Wall plates, in lieu of floor-anchored chair carriers, shall be used only if adjoining steel partition studs are suitably reinforced to support a wall plate bolted to these studs.

E. Backflow Prevention Devices

Plumbing fixtures, equipment, and pipe connections shall not cross connect or interconnect between a potable water supply and

any source of non potable water. Backflow preventers shall be installed where indicated and in accordance with ICC at all other locations necessary to preclude a cross-connect or interconnect between a potable water supply and any non potable substance. In addition backflow preventers shall be installed at all locations where the potable water outlet is below the flood level of the equipment, or where the potable water outlet will be located below the level of the non potable substance. Backflow preventers shall be located so that no part of the device will be submerged. Backflow preventers shall be of sufficient size to allow unrestricted flow of water to the equipment, and preclude the backflow of any non potable substance into the potable water system. Bypass piping shall not be provided around backflow preventers. Access shall be provided for maintenance and testing. Each device shall be a standard commercial unit.

F. Access Panels

Access panels shall be provided for concealed valves and controls, or any item requiring inspection or maintenance. Access panels shall be of sufficient size and located so that the concealed items may be serviced, maintained, or replaced.

G. Traps

Each trap shall be placed as near the fixture as possible, and no fixture shall be double-trapped. Traps installed on cast-iron soil pipe shall be cast iron. Traps installed on steel pipe or copper tubing shall be recess-drainage pattern, or brass-tube type. Traps installed on plastic pipe may be plastic conforming to ASTM D3311. Traps for acid-resisting waste shall be of the same material as the pipe.

3.04 VIBRATION-ABSORBING FEATURES

Mechanical equipment, including compressors and pumps, shall be isolated from the building structure by approved vibration-absorbing features, unless otherwise shown. Each foundation shall include an adequate number of standard isolation units. Each unit shall consist of machine and floor or foundation fastening, together with intermediate isolation material, and shall be a standard product with printed load rating. Piping connected to mechanical equipment shall be provided with flexible connectors. Isolation unit installation shall limit vibration to 5 percent of the lowest equipment rpm.

3.05 IDENTIFICATION SYSTEMS

A. Identification Tags

Identification tags made of brass, engraved laminated plastic, or engraved anodized aluminum, indicating service and valve number shall be installed on valves, except those valves installed on supplies at plumbing fixtures. Tags shall be 1-3/8 inch minimum diameter, and marking shall be stamped or engraved. Indentations shall be black, for reading clarity. Tags shall be attached to valves with No. 12 AWG, copper wire, chrome-plated beaded chain, or plastic straps designed for that purpose.

B. Pipe Color Code Marking

Color code marking of piping shall be as specified in Section 09 90 00 PAINTING AND COATING.

3.06 ESCUTCHEONS

Escutcheons shall be provided at finished surfaces where bare or insulated piping, exposed to view, passes through floors, walls, or ceilings, except in boiler, utility, or equipment rooms. Escutcheons shall be fastened securely to pipe or pipe covering and shall be satin-finish, corrosion-resisting steel, polished chromium-plated zinc alloy, or polished chromium-plated copper alloy. Escutcheons shall be either one-piece or split-pattern, held in place by internal spring tension or setscrew.

3.07 PAINTING

Painting of pipes, hangers, supports, and other iron work, either in concealed spaces or exposed spaces, is specified in Section 09 90 00 PAINTING AND COATING.

A. Painting of New Equipment

New equipment painting shall be factory applied or shop applied, and shall be as specified herein, and provided under each individual section.

1. Factory Painting Systems

Manufacturer's standard factory painting systems may be provided subject to certification that the factory painting system applied will withstand 125 hours in a salt-spray fog test, except that equipment located outdoors shall withstand 500 hours in a salt-spray fog test. Salt-spray fog test shall be in accordance with ASTM B117, and for that test the acceptance criteria shall be as follows: immediately after completion of the test, the paint shall show no signs of blistering, wrinkling, or cracking, and no loss of adhesion; and the specimen shall show no signs of rust creepage beyond 0.125 inch on either side of the scratch mark.

The film thickness of the factory painting system applied on the equipment shall not be less than the film thickness used on the test specimen. If manufacturer's standard factory painting system is being proposed for use on surfaces subject to temperatures above 120 degrees F, the factory painting system shall be designed for the temperature service.

2. Shop Painting Systems for Metal Surfaces

Clean, pretreat, prime and paint metal surfaces; except aluminum surfaces need not be painted. Apply coatings to clean dry surfaces. Clean the surfaces to remove dust, dirt, rust, oil and grease by wire brushing and solvent degreasing prior to application of paint, except metal surfaces subject to temperatures in excess of 120 degrees F shall be cleaned to bare metal.

Where more than one coat of paint is specified, apply the second coat after the preceding coat is thoroughly dry. Lightly sand damaged painting and retouch before applying the succeeding coat. Color of finish coat shall be aluminum or light gray.

a. Temperatures Less Than 120 Degrees F: Immediately after cleaning, the metal surfaces subject to temperatures less than 120 degrees F shall receive one coat of pretreatment primer applied to a minimum dry film thickness of 0.3 mil, one coat of primer applied to a minimum dry film thickness of one mil; and two coats of enamel applied to a minimum dry film thickness of one mil per coat.

b. Temperatures Between 120 and 400 Degrees F: Metal surfaces subject to temperatures between 120 and 400 degrees F shall receive two coats of 400 degrees F heat-resisting enamel applied to a total minimum thickness of 2 mils.

c. Temperatures Greater Than 400 Degrees F: Metal surfaces subject to temperatures greater than 400 degrees F shall receive two coats of 600 degrees F heat-resisting paint applied to a total minimum dry film thickness of 2 mils.

3.08 TESTS, FLUSHING AND DISINFECTION

A. Plumbing System

The following tests shall be performed on the plumbing system in accordance with IPC, except that the drainage and vent system final test shall include the smoke test. The Contractor has the option to perform a peppermint test in lieu of the smoke test. If a peppermint test is chosen, the Contractor must submit a testing procedure and reasons for choosing this option in lieu of the smoke test to the Contracting Officer for approval.

a. Drainage and Vent Systems Test. The final test shall include a smoke test.

b. Building Sewers Tests.

c. Water Supply Systems Tests.

1. Test of Backflow Prevention Assemblies

Backflow prevention assembly shall be tested using gauges specifically designed for the testing of backflow prevention assemblies.

Backflow prevention assembly test gauges shall be tested annually for accuracy in accordance with the requirements of State or local regulatory agencies. If there is no State or local regulatory agency requirements, gauges shall be tested annually for accuracy in accordance with the requirements of University of Southern California's Foundation of Cross

Connection Control and Hydraulic Research or the American Water Works Association Manual of Cross Connection (Manual M-14), or any other approved testing laboratory having equivalent capabilities for both laboratory and field evaluation of backflow prevention assembly test gauges. Report form for each assembly shall include, as a minimum, the following:

Data on Device	Data on Testing Firm
Type of Assembly	Name
Manufacturer	Address
Model Number	Certified Tester
Serial Number	Certified Tester No.
Size	Date of Test
Location	
Test Pressure Readings	Serial Number and Test Data of Gauges

If the unit fails to meet specified requirements, the unit shall be repaired and retested.

B. Defective Work

If inspection or test shows defects, such defective work or material shall be replaced or repaired as necessary and inspection and tests shall be repeated. Repairs to piping shall be made with new materials. Caulking of screwed joints or holes will not be acceptable.

C. System Flushing

1. During Flushing

Before operational tests or disinfection, potable water piping system shall be flushed with hot potable water. Sufficient water shall be used to produce a water velocity that is capable of entraining and removing debris in all portions of the piping system. This requires simultaneous operation of all fixtures on a common branch or main in order to produce a flushing velocity of approximately 4 fps through all portions of the piping system. In the event that this is impossible due to size of system, the Contracting Officer (or the designated representative) shall specify the number of fixtures to be operated during flushing. Contractor shall provide adequate personnel to monitor the flushing operation and to ensure that drain lines are unobstructed in order to prevent flooding of the facility. Contractor shall be responsible for any flood damage resulting from flushing of the system. Flushing shall be continued until entrained dirt and other foreign

materials have been removed and until discharge water shows no discoloration. All faucets and drinking water fountains, to include any device considered as an end point device by NSF/ANSI 61, Section 9, shall be flushed a minimum of 0.25 gallons per 24 hour period, ten times over a 14 day period.

2. After Flushing

System shall be drained at low points. Strainer screens shall be removed, cleaned, and replaced. After flushing and cleaning, systems shall be prepared for testing by immediately filling water piping with clean, fresh potable water. Any stoppage, discoloration, or other damage to the finish, furnishings, or parts of the building due to the Contractor's failure to properly clean the piping system shall be repaired by the Contractor. When the system flushing is complete, the hot-water system shall be adjusted for uniform circulation. Flushing devices and automatic control systems shall be adjusted for proper operation according to manufacturer's instructions. Comply with ASHRAE 90.1 - IP for minimum efficiency requirements. Unless more stringent local requirements exist, lead levels shall not exceed limits established by 40 CFR 141.80 (c)(1). The water supply to the building shall be tested separately to ensure that any lead contamination found during potable water system testing is due to work being performed inside the building.

D. Operational Test

Upon completion of flushing and prior to disinfection procedures, the Contractor shall subject the plumbing system to operating tests to demonstrate satisfactory installation, connections, adjustments, and functional and operational efficiency. Such operating tests shall cover a period of not less than 8 hours for each system and shall include the following information in a report with conclusion as to the adequacy of the system:

1. Time, date, and duration of test.

2. Water pressures at the most remote and the highest fixtures.

3. Operation of each fixture and fixture trim.

4. Operation of each valve, hydrant, and faucet.

5. Pump suction and discharge pressures.

6. Temperature of each domestic hot-water supply.

7. Operation of each floor and roof drain by flooding with water.

8. Operation of each vacuum breaker and backflow preventer.

E. Disinfection

After all system components are provided and operational tests are complete, the entire domestic hot- and cold-water distribution system shall be disinfected. Before introducing

disinfecting chlorination material, entire system shall be flushed with potable water until any entrained dirt and other foreign materials have been removed.

1. Water chlorination procedure shall be in accordance with AWWA C651 and AWWA C652 as modified and supplemented by this specification. The chlorinating material shall be hypochlorites or liquid chlorine. The chlorinating material shall be fed into the water piping system at a constant rate at a concentration of at least 50 parts per million (ppm). Feed a properly adjusted hypochlorite solution injected into the system with a hypochlorinator, or inject liquid chlorine into the system through a solution-feed chlorinator and booster pump until the entire system is completely filled.

2. Test the chlorine residual level in the water at 6 hour intervals for a continuous period of 24 hours. If at the end of a 6 hour interval, the chlorine residual has dropped to less than 25 ppm, flush the piping including tanks with potable water, and repeat the above chlorination procedures. During the chlorination period, each valve and faucet shall be opened and closed several times.

3. After the second 24 hour period, verify that no less than 25 ppm chlorine residual remains in the treated system. The 24 hour chlorination procedure must be repeated until no less than 25 ppm chlorine residual remains in the treated system.

4. Upon the specified verification, the system including tanks shall then be flushed with potable water until the residual chlorine level is reduced to less than one part per million. During the flushing period, each valve and faucet shall be opened and closed several times.

5. Take additional samples of water in disinfected containers, for bacterial examination, at locations specified by the Contracting Officer. Test these samples for total coliform organisms (coliform bacteria, fecal coliform, streptococcal, and other bacteria) in accordance with AWWA 10084. The testing method used shall be EPA approved for drinking water systems and shall comply with applicable local and state requirements.

6. Disinfection shall be repeated until bacterial tests indicate the absence of coliform organisms (zero mean coliform density per 100 milliliters) in the samples for at least 2 full days. The system will not be accepted until satisfactory bacteriological results have been obtained.

3.09 POSTED INSTRUCTIONS

Framed instructions under glass or in laminated plastic, including wiring and control diagrams showing the complete layout of the entire system, shall be posted where directed. Condensed operating instructions explaining preventive maintenance procedures, methods of checking the system for normal safe operation, and procedures for safely starting and stopping the system shall be prepared in typed form, framed as specified above for the wiring and control diagrams and posted beside the diagrams. The framed instructions shall be

posted before acceptance testing of the systems.

3.10 PERFORMANCE OF WATER HEATING EQUIPMENT

Standard rating condition terms are as follows:

EF = Energy factor, minimum overall efficiency.

ET = Minimum thermal efficiency with 70 degrees F delta T.

SL = Standby loss is maximum (Btu/h) based on a 70 degrees F temperature difference between stored water and ambient requirements.

V = Rated volume in gallons

Q = Nameplate input rate in kW (Btu/h)

3.11 TABLES

TABLE I

PIPE AND FITTING MATERIALS FOR DRAINAGE, WASTE, AND VENT PIPING SYSTEMS

Item #	Pipe and Fitting Materials	SERVICE A	SERVICE B	SERVICE C	SERVICE D	SERVICE E	SERVICE F
1	Cast iron soil pipe and fittings, hub and spigot, ASTM A74 with compression gaskets. Pipe and fittings shall be marked with the CISPI trademark.	X	X	X	X	X	
2	Cast iron soil pipe and fittings hubless, CISPI 301 and ASTM A888. Pipe and fittings shall be marked with the CISPI trademark.		X	X	X	X	

TABLE I

PIPE AND FITTING MATERIALS FOR DRAINAGE, WASTE, AND VENT PIPING SYSTEMS

Item #	Pipe and Fitting Materials	SERVICE A	SERVICE B	SERVICE C	SERVICE D	SERVICE E	SERVICE F
3	Bronze sand casting grooved joint pressure fittings for non-ferrous pipe ASTM B584, for use with Item 5	X	X		X	X	
4	Bronzed flanged fittings, ASME B16.24 for use with Items 11 and 14				X	X	
5	Seamless copper pipe, ASTM B42						X
6	Cast bronze threaded fittings, ASME B16.15				X	X	
7	Copper drainage tube, (DWV), ASTM B306	X*	X	X*	X	X	
8	Wrought copper and wrought alloy solder-joint drainage fittings. ASME B16.29	X	X	X	X	X	
9	Polyvinyl Chloride plastic drain, waste and vent pipe and fittings, ASTM D2665, ASTM F891, (Sch 40) ASTM F1760	X	X	X	X	X	X

TABLE I

PIPE AND FITTING MATERIALS FOR DRAINAGE, WASTE, AND VENT PIPING SYSTEMS

Item #	Pipe and Fitting Materials	SERVICE A	SERVICE B	SERVICE C	SERVICE D	SERVICE E	SERVICE F
10	Filament-wound reinforced thermosetting resin (RTRP) pipe, ASTM D2996						X

SERVICE:
A - Underground Building Soil, Waste and Storm Drain
B - Aboveground Soil, Waste, Drain In Buildings
C - Underground Vent
D - Aboveground Vent
E - Interior Rainwater Conductors Aboveground
F - Corrosive Waste And Vent Above And Belowground
* - Hard Temper

TABLE II

STANDARD RATING CONDITIONS AND MINIMUM PERFORMANCE RATINGS FOR WATER HEATING EQUIPMENT

FUEL	STORAGE CAPACITY GALLONS	INPUT RATING	TEST PROCEDURE	REQUIRED PERFORMANCE
A. STORAGE WATER HEATERS				
Elect.	60 max.		10 CFR 430	EF = 0.93
Elect.	60 min.		10 CFR 430	EF = 0.91
Elect.	20 min.	12 kW max.	10 CFR 430	EF = 0.93-0.00132V minimum
Elect.	20 min.	12 kW max.	ANSI Z21.10.3/ CSA 4.3 (Addenda B)	SL = 20+35x(V^^1/2) maximum
Elect. Heat Pump		24 Amps or less and 250	10 CFR 430	EF = 0.93-0.00132V
Gas	50 max.		10 CFR 430	EF = 0.67
Gas	20 min.	75,000 Btu/h max.	10 CFR 430	EF = 0.67-0.0019V min.
Gas	1,000 (Btu/h)/ga max.	75,000 Btu/h	ANSI Z21.10.3/ CSA 4.3	ET = 80 percent min. SL = 1.3+38/V max.
Oil	20 min.	105,000 Btu/h max.	10 CFR 430	EF = 0.80-0.0019V min.
Oil	4,000 (Btu/h)/ga max	105,000 Btu/h min.	ANSI Z21.10.3/ CSA 4.3	ET = 78 percent; SL = 1.3+38/V max.
B. Unfired Hot Water Storage, R-12.5 min.				
C. Instantaneous Water Heater				
Gas	4,000 (btu/h)/ga and 2 gal max.	50,000 Btu/h min 200,000 Btu/h max.	10 CFR 430	EF = 0.62-0.0019V

TABLE II

STANDARD RATING CONDITIONS AND MINIMUM PERFORMANCE RATINGS FOR WATER HEATING EQUIPMENT

FUEL	STORAGE CAPACITY GALLONS	INPUT RATING	TEST PROCEDURE	REQUIRED PERFORMANCE
Gas	4,000 (btu/h)/ga and 2 gal max.	200,000 Btu/h min.	ANSI Z21.10.3/ CSA 4.3	ET = 80 percent
Gas	4,000 (btu/h)/ga and 2 gal max.	200,000 Btu/h min.	ANSI Z21.10.3/ CSA 4.3	ET = 80 percent SL = (Q/800+ 110x(V^^1/2))
Oil	4,000 (btu/h)/ga and 2 gal max.	50,000 Btu/h min. 210,000 Btu/h max.	10 CFR 430	EF = 0.59-0.0019V SL = (Q/800+ 110x(V^^1/2))
Oil	4,000 (btu/h)/ga and 10 gal max.	210,000 Btu/h min.	ANSI Z21.10.3/ CSA 4.3	ET = 80 percent
Oil	4,000 (btu/h)/ga and 10 gal max.	210,000 Btu/h min.	ANSI Z21.10.3/ CSA 4.3	ET = 78 percent SL = (Q/800+ 110x(V^^1/2)) max.
D. Pool Heater				
Gas or Oil	All	All	ASHRAE 146	ET = 78 percent
Heat Pump All	All	All	ASHRAE 146	COP = 4.0

TERMS:

EF = Energy factor, minimum overall efficiency.
ET = Minimum thermal efficiency with 70 degrees F delta T.
SL = Standby loss is maximum Btu/h based on a 70 degree F temperature difference between stored water and ambient requirements.
V = Rated storage volume in gallons
Q = Nameplate input rate in Btu/h

-- End of Section --

SECTION 22 07 19.00

PLUMBING PIPING INSULATION
08/16

PART 1 GENERAL

Section 22 00 00 PLUMBING, GENERAL PURPOSE applies to work specified in this section.

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C1136	(2017) Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation
ASTM C195	(2007; R 2013) Standard Specification for Mineral Fiber Thermal Insulating Cement
ASTM C449	(2007; R 2013) Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement
ASTM C534/C534M	(2016) Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form
ASTM C647	(2008; R 2013) Properties and Tests of Mastics and Coating Finishes for Thermal Insulation
ASTM C795	(2008; R 2013) Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel
ASTM C916	(2014) Standard Specification for Adhesives for Duct Thermal Insulation
ASTM C920	(2014a) Standard Specification for Elastomeric Joint Sealants
ASTM C921	(2010) Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation
ASTM D5590	(2000; R 2010; E 2012) Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay

ASTM D579/D579M (2015) Standard Specification for Greige Woven Glass Fabrics

ASTM E96/E96M (2016) Standard Test Methods for Water Vapor Transmission of Materials

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 220 (2015) Standard on Types of Building Construction

NFPA 255 (2006; Errata 2006) Standard Method of Test of Surface Burning Characteristics of Building Materials

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE AMS 3779 (2016; Rev B) Tape Adhesive, Pressure Sensitive Thermal Radiation Resistant, Aluminum Foil/Glass Cloth

U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-PRF-19565 (1988; Rev C) Coating Compounds, Thermal Insulation, Fire- and Water-Resistant, Vapor-Barrier

1.02 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Installation Drawings; G

SD-03 Product Data

Adhesives; G

Coatings; G

Insulating Cement; G

Insulation Materials; G

Jacketing; G

Tape; G

SD-08 Manufacturer's Instructions

Installation Manual; G

SD-11 Closeout Submittals

Record Drawings; G

Adhesives; G

Coatings; G

Insulation Materials; G

Recycled Materials; G

1.03 QUALITY CONTROL

A. Recycled Materials

Provide thermal insulation containing recycled materials to the extent practicable, provided that the material meets all other requirements of this section. The minimum recycled material content of the following insulation types are:

1. Rock Wool - 75 percent slag by weight

2. Fiberglass - 20-25 percent glass cullet by weight

3. Plastic Rigid Foam - 9 percent recovered material

4. Polyisocyanurate/Polyurethane - 9 percent recovered material

5. Rigid Foam - 9 percent recovered material

Submit recycled materials documentation indicating percentage of post-industrial and post-consumer recycled content per unit of product. Indicate relative dollar value of recycled content products to total dollar value of products included in project.

PART 2 PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Performance Requirements

Provide noncombustible thermal-insulation system materials, as defined by NFPA 220. Provide adhesives, coatings, sealants, facings, jackets, and thermal-insulation materials, except cellular elastomers, with a flame-spread classification (FSC) of 25 or less, and a smoke-developed classification (SDC) of 50 or less. Determine these maximum values in accordance with NFPA 255. Provide coatings and sealants that are nonflammable in their wet state.

Provide adhesives, coatings, and sealants with published or certified temperature ratings suitable for the entire range of working temperatures normal for the surfaces to which they are to be applied.

2.02 COMPONENTS

A. Insulation

1. Cellular Elastomer Insulation

Provide cellular elastomer insulation conforming to ASTM C534/C534M. Ensure the water vapor permeability does not exceed 0.30 grain per foot per inch per hour per square foot mercury pressure difference for 1-inch thickness of cellular elastomer.

2. Pipe Fittings

Provide molded pipe fitting insulation covering for use at temperatures up to and including 1200 degrees F.

B. Adhesives

1. Vapor-Barrier Material Adhesives

Ensure adhesives conform to the requirements of ASTM C916, Type I, when attaching fibrous-glass insulation to metal surfaces or attaching insulation to itself, to metal, and to various other substrates.

2. Cellular Elastomer Insulation Adhesive

For cellular elastomer insulation adhesive, provide a solvent cutback chloroprene elastomer conforming to ASTM C916, Type I, and is approved by the manufacturer of the cellular elastomer for the intended use.

C. Insulating Cement

1. General Purpose Insulating Cement

Provide general purpose insulating cement, mineral fiber, conforming to ASTM C195. Ensure composite is rated for 1800 degrees F service, with a thermal-conductivity maximum of 0.85 Btu per inch per hour per square foot for each degree F temperature differential at 200 degrees F mean temperature for a 1 inch thickness.

2. Finishing Insulating Cement

Provide finishing insulating cement of a mineral-fiber, hydraulic-setting type conforming to ASTM C449.

D. Caulk

Provide elastomeric joint sealant in accordance with ASTM C920, Type S, Grade NS, Class 25, Use A.

E. Coatings

1. Indoor Vapor-Barrier Finishing

Provide a pigmented resin and solvent compound coatings

conforming to ASTM C1136, Type II.

2. Vapor Retarder

The vapor retarder coating shall be fire and water resistant and appropriately selected for either outdoor or indoor service. Color shall be white. The water vapor permeance of the compound shall be 0.013 perms or less at 43 mils dry film thickness as determined according to procedure B of ASTM E96/E96M utilizing apparatus described in ASTM E96/E96M. The coating shall be nonflammable, fire resistant type. To resist mold/mildew, coating shall meet ASTM D5590 with 0 growth rating. Coating shall meet MIL-PRF-19565 Type II (if selected for indoor service) and be Qualified Products Database listed. All other application and service properties shall be in accordance with ASTM C647.

3. Cellular-Elastomer Finishing

Provide a polyvinylchloride lacquer coating recommended by the manufacturer of the cellular elastomer finish.

F. Tape

Provide a knitted elastic cloth glass lagging specifically suitable for continuous spiral wrapping of insulated pipe bends and fittings that produces a smooth, tight, wrinkle-free surface. Conform to requirements of SAE AMS 3779, ASTM D579/D579M, and ASTM C921 for tape, weighing not less than 10 ounces per square yard.

2.03 MATERIALS

A. Submit manufacturer's catalog data for the following items:

1. Adhesives

2. Coatings

3. Insulating Cement

4. Insulation Materials

5. Jacketing

6. Tape

B. Provide compatible materials that do not contribute to corrosion, soften, or otherwise attack surfaces to which applied, in either the wet or dry state. Meet ASTM C795 requirements for materials to be used on stainless steel surfaces. Provide materials that are asbestos free.

PART 3 EXECUTION

Apply insulation only to the system or component surfaces that have previously been tested and approved by the Contracting Officer.

3.01 PREPARATION

Submit installation drawings for pipe insulation, conforming with the adhesive manufacturer's written instructions for installation. Submit installation manual clearly stating the manufacturer's instructions for insulation materials.

Clean surfaces to remove oil and grease before insulation adhesives or mastics are applied. Provide solvent cleaning required to bring metal surfaces to such condition.

3.02 INSTALLATION OF INSULATION SYSTEMS

Apply materials in conformance with the recommendations of the manufacturer.

Install smooth and continuous contours on exposed work. Smoothly and securely paste down cemented laps, flaps, bands, and tapes. Apply adhesives on a full-coverage basis.

Install insulation lengths tightly butted against each other at joints. Where lengths are cut, provide smooth and square and without breakage of end surfaces. Where insulation terminates, neatly taper and effectively seal ends, or finish as specified. Direct longitudinal seams of exposed insulation away from normal view.

Use insulation meeting maximum value conductance as tested at any point, do not use an average. Meet or exceed the specified maximum conductance by adding additional insulation thickness.

A. Cold-Water and Condensate-Drain Piping

Insulate aboveground pipes, valve bodies, fittings, unions, flanges, and miscellaneous surfaces.

Install a cellular-elastomer insulation conforming to ASTM C534/C534M, with a water-vapor permeability not exceeding 0.1 grain per square foot per hour per inch mercury pressure-differential for 1 inch thickness.

Provide flexible cellular-elastomeric thermal insulation for cold water piping, Type T-3, with a thickness of 1/2 inch. Use expanded, closed-cell pipe insulation only aboveground, not for underground piping.

3.03 APPLICATION

A. Type T-3, Cellular Elastomer

Cover piping-system surfaces with flexible cellular-elastomer sheet or preformed insulation. Maintain vapor seal. Cement insulation into continuous material using a solvent cutback chloroprene adhesive recommended by the manufacturer for the specific purpose. Apply adhesive to both of the contact surfaces on a 100-percent coverage basis to a minimum thickness of 10-mils wet or approximately 150 square feet per gallon of undiluted adhesive.

Set cold water piping insulation into an outdoor vapor-barrier

coating applied intermittently over a minimum length of 6 inches at maximum intervals of 12 feet. At piping supports, ensure insulation is continuous by using outside-carrying type clevis hangers with insulation shield. Install Cork load-bearing inserts between the pipe and insulation shields to prevent insulation compression.

Insulate hot-water, cold-water, and condensate drain pipes to the extent shown with nominal 3/81/2-inch thick, fire retardant (FR), cellular elastomer, preformed pipe insulation. Seal joints with adhesive.

At pipe hangers or supports where the insulation rests on the pipe hanger strap, cut the insulation with a brass cork borer and insert a No. 3 superior grade cork. Seal seams with approved adhesive. Insulate sweat fitting with miter-cut pieces of cellular elastomer insulation of the same nominal pipe size and thickness as the insulation on the adjacent piping or tubing. Join miter-cut pieces with approved adhesive. Slit and snap covers over the fitting, and seal joints with approved adhesive.

Insulate screwed fittings with sleeve-type covers formed from miter-cut pieces of cellular elastomer thermal insulation having an inside diameter large enough to overlap adjacent pipe insulation. Lap pipe insulation against fittings, and overlap not less than 1 inch. Use adhesive to join cover pieces and cement the cover to the pipe insulation.

Finish surfaces exposed to view or ultraviolet light with not less than a 2 mil minimum dry-film thickness application of a polyvinylchloride lacquer recommended by the manufacturer. Apply in not less than two coats.

3.04 CLOSEOUT ACTIVITIES

Final acceptance of the performed work is dependent upon providing Record Drawings details to the Contracting Officer. Include construction details, by building area, the insulation material type, amount, and installation method. An illustration or map of the pipe routing locations may serve this purpose.

Provide a cover letter/sheet clearly marked with the system name, date, and the words "Record Drawings Insulation/Material" for the data. Forward to the Systems Engineer for inclusion in the Maintenance Database."

-- End of Section --