DESIGN BID BUILD PROJECT SPECIFICATIONS

PREPARED BY:

Naval Facilities Engineering Command, Southeast
P.O. Box 30, NAS Jacksonville, Florida 32212-0030

CONSTRUCTION ISSUE - 10 June 2016

WHARF BRAVO STRUCTURAL REPAIRS

NAVAL STATION GUANTANAMO BAY, CUBA

E PROJECT #: 1295318

FOR COMMANDER NAVFAC SE – BLTL: Michele Jackson, P.E.

PROJECT MANAGER: Elaine Gallant, P.E.

TECHNICAL BRANCH HEAD: Michael Johnson, R.A.

Discipline	Prepared By:	Reviewed By:
Waterfront:	John McCoy, P.E.	Kurt Wittman, P.E.
Structural:	Vitaly Feygin, P.E.	Kurt Wittman, P.E.
Electrical:	Chris Duguid, P.E	FLORES.RAMON.H.1383332679 Digitally signed by FLORES.RAMON.H.1383332679 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=FLORES.RAMON.H.1383332679 Date: 2016.06.09 15:39:09 -04'00' Ramon Flores, P.E.
Civil:	Ricardo Palmo	Jeff Frank, P.E.

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Wharf Bravo Structural Repairs

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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		00 73 01.00 25	SD-01 Preconstruction Submittals															
			Entry Approval for Employees	1.3.1.1	G													
		01 14 00.00 25	SD-01 Preconstruction Submittals															
			List of Contact Personnel	1.3.1.1	G													
		01 20 00.00 25	SD-01 Preconstruction Submittals															
			Schedule of Prices	1.3	G													
		01 30 00.00 25	SD-01 Preconstruction Submittals															
			View Location Map	1.3	G													
			Progress and Completion	1.4	G													
			Pictures															
		01 32 17.00 25	SD-01 Preconstruction Submittals															
			Qualifications	1.5	G													
			Baseline Network Analysis	1.3	G													
			Schedule															
			SD-07 Certificates															
			Monthly Network Analysis	1.7.1	G													
			SD-11 Closeout Submittals															
			As-Built Schedule	1.7.2	G													
		01 33 00	SD-01 Preconstruction Submittals															
			Submittal Register		G													
		01 35 26.00 25	SD-01 Preconstruction Submittals															
			Accident Prevention Plan (APP)	1.8	G													
			SD-06 Test Reports															
			Monthly Exposure Reports	1.4														
			Notifications and Reports	1.13														
			Accident Reports	1.13.2	G													

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		01 35 26.00 25	LHE Inspection Reports	1.13.3														
			SD-07 Certificates															
			Contractor Safety Self-Evaluation	1.5														
			Checklist															
			Crane Operators/Riggers	1.7.1.5														
			Standard Lift Plan	1.8.2.2	G													
			Critical Lift Plan	1.8.2.3	G													
			Naval Architecture Analysis	1.8.2.3	G													
			Activity Hazard Analysis (AHA)	1.9														
			Confined Space Entry Permit	1.10.1														
			Hot Work Permit	1.10.1														
			Certificate of Compliance	1.13.4														
			Third Party Certification of	1.13.5														
			Barge-Mounted Mobile Cranes															
			License Certificates	1.15														
			Radiography Operation Planning	1.15.1	G													
			Work Sheet															
		01 45 00.00 25	SD-01 Preconstruction Submittals															
			Construction Quality Control (QC)	1.6.1	G													
			Plan															
			Indoor Air Quality (IAQ)	1.18	G													
			Management Plan															
			Basis of Design and Design	1.10.1														
			Intent															
			SD-07 Certificates															
			CA Resume															

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		01 45 35.00 25	SD-01 Preconstruction Submittals															
			Contractor Statement of	1.3.12	G													
			Responsibility															
			Project Manual		G													
			Written Practices	3.1.2	G													
			SD-06 Test Reports															
			Daily Reports	3.1.2	G													
			Biweekly Reports	3.1.1	G													
			SD-07 Certificates															
			Special Inspector	1.5	G													
			SD-11 Closeout Submittals															
			Comprehensive Final Report	3.1.2	G													
		01 50 00.00 25	SD-01 Preconstruction Submittals															
			Construction site plan	1.3	G													
			Traffic control plan	3.4.1	G													
			SD-03 Product Data															
			Backflow preventers	1.4	G													
			SD-06 Test Reports															
			Backflow Preventer Tests		G													
			SD-07 Certificates															
			Backflow Tester		G													
			Backflow Preventers	1.4														
		01 57 19.00 25	SD-01 Preconstruction Submittals															
			Solid Waste Management Permit	1.9	G													
			Environmental Protection Plan	1.6	G													
			SD-11 Closeout Submittals															

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		01 57 19.00 25	Stormwater Pollution Prevention	3.2.1.2	G													
			Plan Compliance Notebook															
		01 74 19.00 25	SD-01 Preconstruction Submittals															
			Waste Management Plan	1.5	G													
			SD-11 Closeout Submittals															
			Records	1.6														
		01 78 00.00 25	SD-03 Product Data															
			Warranty Management Plan	1.6.1														
			Warranty Tags	1.6.4														
			Spare Parts Data	1.5														
			SD-08 Manufacturer’s Instructions															
			Instructions	1.6.1														
			SD-10 Operation and Maintenance															
			Data															
			Operation and Maintenance	3.3	G													
			Manuals															
			SD-11 Closeout Submittals															
			As-Built Drawings	3.1	G													
			Record Drawings	3.2	G													
			Certification of EPA Designated	2.1	G													
			Items															
			Interim DD FORM 1354	3.5	G													
			Checklist for DD FORM 1354	3.5	G													
			NAVFAC Sustainable & Energy	3.6	G													
			Data Record Card															

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		01 78 23.00 25	SD-10 Operation and Maintenance																
			Data																
			O&M Database		G														
			Training Plan		G														
			Training Outline		G														
			Training Content		G														
			SD-11 Closeout Submittals																
			Training Video Recording		G														
			Validation of Training Completion		G														
		02 41 00	SD-01 Preconstruction Submittals																
			Existing Conditions	1.9	G														
			SD-07 Certificates																
			Demolition Plan	1.2.1	G														
			Notification	1.6	G														
			SD-11 Closeout Submittals																
			Receipts																
		03 01 32	SD-01 Preconstruction Submittals																
			Work Plan	1.6.6	G														
			Demolition Plan	1.7.3	G														
			Demolition Plan	3.2.1	G														
			Water Control Plan	1.7.3	G														
			Contractor Qualifications	1.6.1.1															
			Worker Qualifications	1.6.1.2															
			SD-03 Product Data																
			Bond Breaker																
			Fiber Reinforcement																

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		03 01 32	Testing Technicians	1.6.1.3														
			SD-04 Samples															
			Field-Molded Sealants and															
			Primer															
			SD-05 Design Data															
			Repair material mixture	1.6.4														
			proportioning															
			SD-06 Test Reports															
			Compression Seals and															
			Lubricant															
			Cement-Based Concrete	1.6.4														
			Cement-Based Concrete	1.6.5.1														
			Cement-Based Mortar	1.6.4														
			Cement-Based Mortar	1.6.5.1														
			Rapid-Hardening Repair Material															
			Dry-Pack Mortar															
			SD-07 Certificates															
			Grout Fluidifier	2.1.2														
			Aggregate	2.1.3														
			SD-08 Manufacturer’s Instructions															
			Rapid-Hardening Repair Material															
			Manufacturer's Material Safety	1.6														
			Data Sheets															
		03 31 29	SD-01 Preconstruction Submittals															
			Concrete Curing Plan	1.8.2.2	G													
			Concrete Qualification Program	1.7.4	G													

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		03 31 29	Concrete Quality Control		G													
			Program															
			Concrete Placement and	1.8.2.4	G													
			Compaction															
			Concrete Pumping	1.8.2.4														
			Curing concrete elements	1.8.2.1														
			Form Removal Schedule	1.8.2.3														
			Laboratory Qualifications	1.6.2	G													
			Quality Control Personnel	1.6.1	G													
			SD-02 Shop Drawings															
			closure pour detail joints		G													
			Formwork	1.8.1.1														
			Precast elements		G													
			Reinforcing steel	1.6.1.2	G													
			SD-03 Product Data															
			Admixtures	1.8.5.5	G													
			Air Entraining	2.4.1	G													
			Aggregates	1.8.5.4	G													
			Materials for curing concrete	2.8.1	G													
			Material Safety Data Sheets															
			Mechanical Reinforcing Bar		G													
			Connectors															
			Non-shrink grout		G													
			Pore Blocker Admixture		G													
			Preformed joint filler															
			Reinforcing Bars		G													

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		03 31 29	Reinforcement		G														
			Reinforcement supports	3.2.1	G														
			SD-05 Design Data																
			Concrete Mixture Requirements	1.8.5.1	G														
			Mixture designs	1.8.2.6	G														
			Mass Concrete Temperature		G														
			Control Plans																
			SD-06 Test Reports																
			Air Entraining	2.4.1															
			Aggregates	1.8.5.4															
			Admixtures	1.8.5.5															
			As-Built Report																
			Cement	1.8.5.6															
			Concrete mixture proportions																
			Concrete Test Reports	1.8.5															
			Complementary Cementing	1.8.5.2															
			Materials																
			Fresh Concrete Properties	1.7.4.1															
			Hardened Concrete Properties	1.7.4.2															
			Mechanical Reinforcing Bar																
			Connectors																
			Reinforcing Bars																
			Reinforcement and Hot-Dip		G														
			Galvanizing Coating																
			Water	2.3															
			Pore Blocker		G														

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		03 31 29	SD-07 Certificates																
			Admixtures	1.8.5.5															
			Cementitious Materials	2.1															
			Cementitious material mill	1.8.3.1															
			certificates																
			Field testing technician and	1.6.1.2															
			testing agency																
			SD-08 Manufacturer’s Instructions																
			Coatings																
			SD-11 Closeout Submittals																
			Aggregate Moisture Content	1.8.3.1															
			Aggregate Sampling	1.8.3.1															
			As-built report		G														
			Concrete Test Reports	1.8.5	G														
			Quality Control Charts																
			Daily inspection reports	1.8.4.1															
			Quality Team Meetings	1.8.4.3															
			Sampling logs	1.8.4.2															
		05 12 00	SD-02 Shop Drawings																
			Fabrication drawings	1.3.1	G														
			SD-03 Product Data																
			Shop primer	2.6.2															
			Welding electrodes and rods	2.4.1															
			Non-Shrink, Non-Metallic Grout																
			SD-06 Test Reports																
			Bolts, nuts, and washers	2.3															

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		05 12 00	SD-07 Certificates																
			Steel	2.2															
			Bolts, nuts, and washers	2.3															
			Galvanizing	2.5															
			Welding procedures and	1.3.2.1															
			qualifications																
		05 50 13	SD-02 Shop Drawings																
			angles and plates		G														
			Steel railing and handrails		G														
			Mooring bollards and anchor		G														
			bolts																
			SD-03 Product Data																
			Mooring bollards and anchor		G														
			bolts																
			SD-07 Certificates																
			Qualification of Welders and																
			Welding Operators																
			Certified Load Capacity of																
			Bollards and Bits																
		06 71 33	SD-01 Preconstruction Submittals																
			Qualification of Manufacturer	1.4.1															
			Qualification of Engineer of	1.4.2															
			Record																
			SD-02 Shop Drawings																
			Fabrication and Installation	1.4.2	G														
			Drawings and Details																

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		06 71 33	SD-03 Product Data															
			Manufacturer's Catalog Data	1.2.1	G													
			SD-06 Test Reports															
			Ultraviolet Testing	2.1.1														
			Thermal Expansion	2.1.1														
			Flame Spread	2.1.1														
			SD-07 Certificates															
			Manufacturer's Sample Warranty	1.2.1														
			SD-08 Manufacturer’s Instructions															
			Manufacturer's	1.5														
			Recommendations															
			SD-11 Closeout Submittals															
			Manufacturer's Warranty	3.2.1	G													
		09 97 13.26	SD-07 Certificates															
			Coal tar epoxy-polyamide	2.1.1.1														
		22 05 83.63	SD-03 Product Data															
			Installation Equipment	2.1														
			CIPP Lining Tube	2.2.1														
			Epoxy Resin	2.1														
			Liner Materials	2.1														
			SD-08 Manufacturer’s Instructions															
			CIPP Manufacturer's Written	3.2	G													
			Installation Instructions															
			SD-11 Closeout Submittals															
			Report Summarizing The Extent	3.2	G													
			Of Pipe Lining Performed															

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		22 05 83.63	Pre-Lining Inspection	3.2	G														
			Post-Lining Inspection	3.2	G														
			Manufacturer's Warranty	1.4	G														
			Record Drawings	3.2	G														
		26 05 33	SD-02 Shop Drawings																
			600 V Power Connection Station	2.1	G														
			5 kV Power Connection Station	2.2	G														
			Ship Service Emergency Trip	2.3	G														
			Panel																
			SD-03 Product Data																
			600 V Single Pole Connectors	2.1.2	G														
			Industrial Service Auxiliary	2.1.4	G														
			Devices																
			Metering Accessories	2.1.5	G														
			5 kV Cable Couplers	2.2.2	G														
			Deadbreak Junctions	2.2.3.1	G														
			High-Voltage Connectors	2.2.3.2	G														
			Flexible Power Cable	2.2.4	G														
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			Paint Coating System	2.7.1	G														
			600 V Single Pole Connector	2.7.2	G														
			Compatibility Tests																
			600 V Single Pole Connector	2.7.3	G														
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			Power Receptacle and Plug	2.7.4	G														
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		26 05 33	5 kV Cable Coupler Design Tests	2.7.5	G													
			Acceptance Checks and Tests	3.6.1	G													
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			Data															
			600 V Power Connection Station	2.1	G													
			5 kV Power Connection Station	2.2	G													
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			Acceptance tests and inspections	3.1	G DOR													
			SD-07 Certificates															
			Qualifications	1.4.1	G DOR													
			Acceptance test and inspections	1.4.3	G DOR													
			procedure															
		26 08 10.00 25	SD-01 Preconstruction Submittals															
			Commissioning Plan		G													
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			(FPT) procedures															
			Narrative descriptions		G													
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			(FPT) procedures															

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			Insulating flange sets															
			Anode junction boxes, bonding															
			boxes and test stations															
			Joint bonds															
			SD-03 Product Data															
			Anodes	2.1	G													
			SD-07 Certificates															
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			SD-11 Closeout Submittals															
			Initial Cathodic Protection System	3.2.1.3	G													
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		26 56 00.00 20	SD-01 Preconstruction Submittals															
			Photometric Plan	1.5.2	G DOR													
			LED Luminaire Warranty	1.7.1	G DOR													
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			Luminaire drawings	1.5.1.1	G DOR													
			SD-03 Product Data															
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			Environmental Data	1.6.2														
			Energy Efficiency	1.6.3														
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		26 56 00.00 20	Luminaire Ballasts, Generators	2.2.3	G DOR														
			and Power Supply Units (Drivers)																
			Lighting contactor	2.3.3	G DOR														
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			Photocell	2.3.1	G DOR														
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			Aluminum poles		G DOR														
			Steel poles		G DOR														
			Fiberglass poles		G DOR														
			Brackets																
			Obstruction Marker Luminaires		G DOR														
			SD-04 Samples																
			Fluorescent, and LED Luminaires		G DOR														
			SD-05 Design Data																
			Design Data for luminaires	1.5.3	G DOR														
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			LED Luminaire - IES LM-79 Test	1.5.4	G														
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			LED Light Source - IES LM-80	1.5.5	G														
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			Operating test	3.2															
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			Luminaire Useful Life Certificate	1.7.1	G														
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		26 56 00.00 20	Electronic Ballast Warranty	1.7.2															
			Operational Service	1.8															
		31 00 00	SD-01 Preconstruction Submittals																
			Shoring	3.3	G														
			Dewatering Work Plan	1.3.2	G														
			SD-03 Product Data																
			Utilization of Excavated Materials	3.5	G														
			SD-06 Test Reports																
			Testing	3.11															
			Borrow Site Testing																
			SD-07 Certificates																
			Testing	3.11															
		31 23 00.00 20	SD-05 Design Data																
			Cementitious Flowable Fill mix		G														
			design																
			SD-06 Test Reports																
			Borrow Site Testing	1.5	G														
			Fill and backfill	3.12.2.1															
			Select material	3.12.2.2															
			Porous fill	3.12.2.3															
			Density tests	3.12.2.4															
			Cementitious Flowable Fill tests	3.12.2.5															
		31 32 23	SD-01 Preconstruction Submittals																
			Qualifications and Resumes of		G														
			Key Personnel																

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		31 32 23	Field Demonstration Test		G														
			Program																
			SD-03 Product Data																
			Drilling Equipment	3.1.2	G														
			Grouting Equipment		G														
			Grout Plant		G														
			SD-05 Design Data																
			Grout Mix Design		G														
			Jet Grouting Procedure		G														
			Soil-Cement Reports		G														
			Data Monitoring and Recording		G														
			SD-11 Closeout Submittals																
			Daily Reports		G														
		31 41 16	SD-02 Shop Drawings																
			Metal Sheet Piling	2.1	G														
			SD-03 Product Data																
			Driving	3.2.2.2															
			Pile Driving Equipment	3.2.1	G														
			Pulling and Redriving	3.2.5	G														
			Interlocked Joint Strength in		G														
			Tension Test																
			SD-06 Test Reports																
			Materials Tests	2.3.1															
			Interlocked Joint Strength in		G														
			Tension Test																
			SD-11 Closeout Submittals																

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		31 41 16	Pile Driving Record	3.4														
		31 62 00	SD-01 Preconstruction Submittals															
			Soil Stabilization Design and		G													
			Calculations															
			CDSM Improvement Plan	1.5	G													
			Mitigation Plan	1.5.2	G													
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			Cement	2.1														
			CDSM Verification Test Results	1.5.3	G													
			Test Area CDSM Program Report	3.2	G													
			and Survey															
			Final Report	1.5.4	G													
			SD-08 Manufacturer’s Instructions															
			CDSM Improvement Statement	1.5	G													
			Monitoring	1.7														
			SD-11 Closeout Submittals															
			Documentation	1.5.1	G													
		31 62 16.16	SD-02 Shop Drawings															
			Pile placement	3.3.3	G													
			steel points	2.1.1														
			SD-03 Product Data															
			Pile driving equipment	3.2	G													
			Pile driving records	3.3.2	G													
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			Wave equation analysis	3.1.1														
			SD-11 Closeout Submittals															

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		31 62 16.16	records															
		32 01 19	SD-03 Product Data															
			Manufacturer's		G													
			Recommendations															
			Equipment	1.2														
			SD-06 Test Reports															
			Certified copies of the test reports	1.4.2	G													
		32 11 16	SD-03 Product Data															
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			SD-06 Test Reports															
			Sampling and Testing	1.5	G													
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			Proposed Techniques	3.1.2	G													
			SD-05 Design Data															
			Proportioning Studies	2.12.2	G													
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			SD-07 Certificates															
			Contractor Quality Control Staff	1.4.1	G													
			Laboratory Accreditation	1.4.3	G													
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		33 11 00	Water service line	2.2														
			Hydrants	2.1.2.4														
			Valve boxes	2.1.2.5														
			SD-05 Design Data															
			Design calculations of water	1.2.1														
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			Disinfection	3.1.3														
			Test results	3.1.3														
			SD-07 Certificates															
			Water distribution main	2.1														
			Water service line	2.2														
			Lining	2.1.1.1														
			Lining	2.1.1.2														
			hydrants	2.1.2.4														
			SD-08 Manufacturer’s Instructions															
			Delivery, storage, and handling	1.4														
			Installation	3.1.1														
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			SD-07 Certificates															
			Resin Certification	2.1.2														
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		33 71 02.00 20	SD-02 Shop Drawings															
			Precast underground structures	1.4.1														

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		33 71 02.00 20	SD-03 Product Data															
			Medium voltage cable	2.5														
			Medium voltage cable	2.6														
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			Live end caps	2.9														
			Precast concrete structures		G													
			Sealing Material															
			Pulling-In Irons															
			Manhole frames and covers		G													
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			Cable supports	2.15	G													
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			Arc-proofing test	2.17.1	G													
			Arc-proofing test	2.17.1	G													
			Medium voltage cable	2.17.2														
			qualification and production tests															
			Field Acceptance Checks and	3.16.1	G													
			Tests															
			Cable Installation Plan and	3.3														
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			SD-07 Certificates															
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		35 59 13.19	Hardware	2.3	G														
			SD-05 Design Data																
			curve	2.4.1															
			Dimension	2.1															
			Fender	2.1															
			Design	2.1	G														
			SD-06 Test Reports																
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			Shore Hardness (Durometer)	2.2															
			Modulus at 400 Percent	2.2															
			Elongation																
			Maximum Compression Set	2.2															
			Tear Resistance	2.2															
			Minimum Elongation	2.2															
			Ozone Resistance	2.2															
			Low Temperature Impact	2.2															
			Resistance																
			Water Absorption	2.2															
			Heat Resistance	2.2															
			Compression Deflection	2.2															
			Resistance																
			Fender Compression Test	2.4.1															
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			Test																
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PART 1 GENERAL

1.1 SUMMARY

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

1.2 CONTRACT DRAWINGS

Contract drawings are as follows:

DRAWING	TITLE	NAVFAC DWG
GENERAL		
G001	COVER & SIGNATURE SHEET	15081047
G002	DRAWING SHEET INDEX	15081048
CIVIL		
C001	GENERAL NOTES AND LEGENDS	15081049
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C203	SITE PLAN - SOUTH	15081067
C204	SITE PLAN - SOUTH	15081068
C205	GRADING AND DRAINAGE PLAN - NORTH	15081069
C206	GRADING AND DRAINAGE PLAN - NORTH	15081070
C207	GRADING AND DRAINAGE PLAN - SOUTH	15081071
C208	GRADING AND DRAINAGE PLAN - SOUTH	15081072
C209	SEDIMENT CONTROL PLAN - NORTH	15081073

DRAWING	TITLE	NAVFAC DWG
C210	SEDIMENT CONTROL PLAN - NORTH	15081074
C211	SEDIMENT CONTROL PLAN - SOUTH	15081075
C212	SEDIMENT CONTROL PLAN - SOUTH	15081076
C300	UTILITY SITE PLAN - NORTH	15081077
C301	UTILITY SITE PLAN - NORTH	15081078
C400	CONCRETE JOINT PLAN - NORTH	15081079
C401	CONCRETE JOINT PLAN - NORTH	15081080
C402	CONCRETE JOINT PLAN - SOUTH	15081081
C403	CONCRETE JOINT PLAN - SOUTH	15081082
C501	SITE CONSTRUCTION DETAILS	15081083
C502	SITE CONSTRUCTION DETAILS	15081084
C503	UTILITY DETAILS	15081085
STRUCTURAI		
S001	STRUCTURAL NOTES 1 OF 2	15081086
S002	STRUCTURAL NOTES 2 OF 2	15081087
S003	SOIL STABILIZATION AREAS	15081088
S011	INSPECTION RESULTS 1 OF 2	15081089
S012	INSPECTION RESULTS 2 OF 2	15081090
S013	SITE PHOTOS	15081091
SD101	DEMOLITION PLAN & DETAILS 1 OF 2	15081092
SD102	DEMOLITION PLAN & DETAILS 2 OF 2	15081093
S111	STRUCTURAL PLANS 1 OF 5	15081094
S112	STRUCTURAL PLANS 2 OF 5	15081095
S113	STRUCTURAL PLANS 3 OF 5	15081096
S114	STRUCTURAL PLANS 4 OF 5	15102421
S115	STRUCTURAL PLANS 5 OF 5	15102422
S301	TYPICAL WHARF SECTIONS	15102423
S401	ENLARGED PLANS AND SECTIONS 1 OF 2	15102424
S402	ENLARGED PLANS AND SECTIONS 2 OF 2	15102425
S501	DETAILS AND PLANS - BULKHEAD	15102426
S502	DETAILS AND SECTIONS - BULKHEAD	15102427
S503	DETAILS - REINFORCEMENT AT MOORING	15102428
S504	DETAILS - WALE, DEADMAN, BULLNOSE, PIN	15102429
S505	DETAILS - FENDERS AND MISC.	15102430
ELECTRICAI		
E001	GENERAL NOTES SYMBOLS AND LEGENDS	15102431
ES101	SITE PLAN	15102432
ES102	SITE PLAN	15102433
E501	ELECTRICAL DETAILS	15102434
E600	ELECTRICAL DIAGRAMS & RISERS	15102435

1.3 SUPPLEMENTARY DRAWINGS

These supplementary drawings may not be a part of the contract but are included with the drawings for information.

1.3.1 Reference Drawings

The following reference drawings are intended only to show the original construction. Drawings are the property of the Government and shall not be used for any purpose other than that intended by the contract.

NAVFAC DWG NO.	TITLE
4221150-4221181	REPAIRS TO WHARF BRAVO DRAWINGS - PHASE I
4249498-4249519	REPAIRS TO WHARF BRAVO DRAWINGS - PHASE II
4407592-4407623	OILY WASTE COLLECTION PIER A AND WHARVES B, T, AND U
4407683-4407708	SUMP PUMPS PIER A AND WHARVES B, T, AND U

-- End of Document --

SECTION 00 73 01.00 25

SPECIAL CONDITIONS FOR GUANTANAMO BAY PROJECTS
4/16
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)

ANSI/AHRI 210/240	(2008; Add 1 2011; Add 2 2012) Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	(2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

FLORIDA DEPARTMENT OF HIGHWAY SAFETY AND MOTOR VEHICLES (FDHSMV)

Chapter 15C-1	Rules of the Department of Highway Safety and Motor Vehicles - Division of Motor Vehicles,Bureau of Mobile Home and Recreational VehicleConstruction

INSTRUCTIONS AND STANDARDS FOR NAVBASE GUANTANAMO BAY CUBA (COMNAVBASEGTMOINST)

11300.3	Base Energy Conservation Regulations

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC	(2012) International Building Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101	(2015; ERTA 2015) Life Safety Code
NFPA 70	(2014; AMD 1 2013; Errata 1 2013; AMD 2 2013; Errata 2 2013; AMD 3 2014; Errata 3-4 2014; AMD 4-6 2014) National Electrical Code
NFPA 90A	(2015) Standard for the Installation of Air Conditioning and Ventilating Systems

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-301-01	(2013; Change 1) Structural Engineering

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

HUD Regulations	Manufactured Home Construction and Safety Standards, 24 CFR Part 3280

U.S. NAVAL FACILITIES ENGINEERING SERVICE CENTER (NFESC)

UG-2029-ENV	(1998)CROSS-CONNECTION CONTROL AND BACKFLOW PREVENTION PROGRAM IMPLEMENTATION AT NAVY SHORE FACILITIES, User's Guide

1.2 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

Entry Approval for Employees; G

1.3 INFORMATIONAL DATA

1.3.1 Work Force

Due to the sensitive locale of the U.S. Naval Base, Guantanamo Bay, Cuba, foreign nationals from dissident political areas may be excluded and denied entry approval. The Contractor agrees to dismiss from the site, when directed by the Contracting Officer, any individual whose continued employment is deemed to be contrary to the public interest or inconsistent with the best interest of the national security.

1.3.1.1 Entry Approval for Employees

No employee or representative of the Contractor will be admitted to the U.S. Naval Base, Guantanamo Bay, Cuba without prior entry approval. The background of Contractor personnel will be screened prior to entry to the U.S. Naval Base, Guantanamo Bay, Cuba. The Contractor shall submit to the Contracting Officer the full name, date and place of birth, Social Security number, and addresses of such persons. This information shall be received by the Contracting Officer 45 calendar days prior to the scheduled or desired arrival at the Naval Base.

1.3.1.2 Identification of Employees

The Contractor shall be responsible for furnishing to each employee and for requiring each employee to display such identification as may be approved and directed by the Contracting Officer. Employees may be fingerprinted prior to employment as a condition of entry onto the Naval Base. Prescribed Government identification cards shall be immediately delivered to the Contracting Officer for cancellation upon release of any employee.

1.3.1.3 Local Labor

Proselytizing of labor, that is the hiring of Government or Contractor on-base employees by offering higher wages or other amenities, shall not be permitted unless a release from the employer is executed or the employee resigns and leaves the base for a minimum of 90 days. Accordingly, labor

which the Contractor proposes to use shall be approved by the Contracting Officer.

1.3.1.4 Management Personnel

The Contractor shall be responsible for furnishing the personnel required, with the necessary skills and qualifications, to perform the work as described. Additionally, the Contractor shall provide an individual on-site, who is authorized to negotiate and financially commit change orders for the Principal.

1.3.1.5 Work outside Regular Hours

Normal working hours are 0730 to 1630, Monday through Friday (except Federal Holidays). The Government recognizes that, because of the isolation of the Naval Base and the added cost to house and feed a work force, there are mutual benefits in allowing Contractors to work outside normal working hours. For example, some Contractors work the extended hours of six ten-hour days per week. If the Contractor desires to work outside the Regular Work Hours (including extended hours, Saturdays, Sundays, or Holidays), advance written request must be submitted to the Contracting Officer, who has full discretion to approve, disapprove, or withdraw approval of a request. Some typical constraints on working outside normal working hours are:

a. The Contractor's request must be made at least two business days in advance (e.g., request received by Government by close of business Wednesday for work on following Sunday)and must include a description of planned work activities. Prior to submitting the request, the Contractor must coordinate personnel, materials, AHA's, dig permits and utility outages required for the work that will be performed.

b. A Contractor with quality, safety or material storage site problems (as determined by the Contracting Officer) may be restricted to regular work hours.

c. A Contractor who fails to correct deficiencies within a reasonable time (as determined by the Contracting Officer) may be restricted to normal working hours or may be allowed to work outside normal working hours only to correct those deficiencies.

d. The Contractor shall schedule his work to cause the least amount of interference to Base operations, to minimize disturbance to Base residents, and to avoid high risk activities when working outside Regular Work Hours. All work performed outside of Regular Work Hours shall be available for inspection the following business day.

e. Contractor personnel may not work more than 13 consecutive days.

1.3.2 Storage of Materials

The Contractor shall store materials only in places where directed. No fire-hazardous materials or flammable liquids shall be stored or otherwise maintained within a building or structure, except as approved, in accordance with the local fire regulations.

1.3.3 Access Roads

The Contractor shall refrain from the use of roads, grounds, or other

facilities which have not been specifically authorized for his use.

1.3.4 Availability and Cost of Government Materials and Services

The availability of Government materials, equipment, and services indicated in this specification may vary subject to local supply priority requirements for operations and maintenance of the base. Non-availability will not be considered as an excusable delay under the General Conditions Clause entitled "Changes." The cost of Government materials, equipment, and services reflected in this specification are subject to fluctuation, revision, and adjustment. Changes in rates or prices for goods and services in this and following paragraphs shall not be used as a basis for a change to the contract. Some materials and equipment may be furnished to the Contractor by the Government at current rates subject to 3 days' advance notice in writing. Request shall be made to the Contracting Officer. Equipment will not be available for long-term rental. Short-term equipment rental (1 to 2 days), one-time hauling service, and one-time crane service may be available if there is no conflict with Government workload. Government equipment will not be provided without Government operators.

1.3.5 Ocean Freight

The Contractor shall provide loading of freight and ocean freight, off-loading, and handling as required, based on the following:

a. Marine Insurance: Marine insurance, to the extent required, shall be furnished by the Contractor.

b. Ship Arrival

(1) No ships or vessels may enter the Guantanamo Bay Defense Sea Area except as approved by Commander, U.S. Naval Base, Guantanamo Bay, Cuba. Not less than 48 hours prior to departure of vessel from the port of embarkation, the Contractor shall furnish to the Contracting Officer the following information:

(a) Name of vessel.

(b) Place of registry and registry number.

(c) Name, nationality, and address of owner.

(d) Name, nationality, and address of operator.

(e) Gross tonnage, length, beam, and draft of vessel.

(f) Nationality and numbers of officers and crew (include crew list).

(g) Number of passengers (include passenger list).

(h) Last port of call prior to entry into Guantanamo Bay Naval Defense Sea Area.

(i) Purpose of visit.

(j) Proposed date of entry and estimated duration of stay.

(2) Passengers and crew will be subject to Base regulations.

(3) Commercial vessels will be permitted to discharge cargo at cargo docks to the extent that space is available.

(4) Contractor shall coordinate off-loading of barge materials with the Naval Station Guantanamo Bay port operations contractor.

c. Vessels on Contract to Government

(1) Contract for shipping service, scheduled every other week to and from Guantanamo Bay, Cuba and Jacksonville, Florida, is provided by Schuyler Line Navigation Co. LLC., as the Government Carrier. Sailing schedule set at 14 days between Jacksonville, Florida and Guantanamo Bay.

Schuyler Line Navigation Co. (SLNC) LLC
130 Severn Ave, Ste 200
Annapolis MD 21403, United States
Office: (410) 216-9281
Fax: (410) 216-6021
Web: http://schulerline.com/cuba-liner-serice/

SLNC Broker: Dome Chartering & Trading Corp.
Office: (410) 216-6020
Fax: (410) 216-6021
Web: www.domechartering.com
Email: ops@domechartering.com

SLNC Jacksonville Port Agent: CB Agencies
Mr. Chuck Bridges
3565 Cardinal Point Drive
Jacksonville, FL 32257
Office: (904) 449-4714 (24 hrs)
Email: cbagency@aol.com

(2) Since these vessels are under Government contract, priority materials for Government agencies may delay receipt of Contractor's equipment and materials. The cost of containerization, shipping, on-loading, and off-loading, is at the Contractor's expense; and arrangements shall be made directly with the shipping company.

(3) The Government Carrier is subject to change. If a change in Government Carrier should occur, the Government is not liable for any additional costs which may be incurred by the Contractor for the construction contract.

(4) The Contractor is under no obligation to use the Government Carrier and may use others subject to the terms and conditions of this contract and U.S. Maritime law.

(5) The Contractor may ship materials and equipment by air or sea provided all clearances are met and approved in advance. The Contractor may make use of the Government Carrier's barge service, if space is available, at the established commercial rates provided by the Government Carrier. The Government's material will have priority over Contractor material on the Government Carrier's barge.

1.3.6 Medical and Dental Services

Medical and dental services available to the Contractor's employees are limited in Guantanamo Bay. The Naval Hospital and Dental Clinic are staffed to treat primarily DOD personnel. The Contractor shall screen prospective employees with the objective to exclude those with admitted chronic disorders from traveling to Guantanamo Bay. Advise prospective employees of the limited medical and dental services available in Guantanamo Bay; and explain the Contractor's policy concerning the extent of liability and coverage for required treatment. Every reasonable attempt shall be made to prevent personnel with chronic disorders, which may require treatment, such as cardiovascular defects, tuberculosis, mental health problems, and alcoholism, from being sent to Guantanamo Bay. The Contractor shall provide and have available, both at the job site and in the berthing areas, first aid for minor and emergency treatment. Government ambulance and medical care, when required, will be billed at the then current rates. The Naval Hospital and Dental Clinic use CHAMPUS Maximum Allowable Charge (CMAC) rates. These rates are reviewable at Health.mil.

1.3.7 Post Exchange and Commissary Privilege and Recreation Facilities

Post Exchange and commissary privileges and recreation facilities are available to authorized Contractor personnel and dependents of Contractor personnel in accordance with current base regulations.

1.3.8 On-Base Transportation

The Contractor shall provide necessary personnel, vehicles, and equipment required for on-base vehicular transportation, and shall bear the cost of required fuel, oil, lubricants, and maintenance there-for. The vehicles shall be operated only by Contractor's employees who possess a valid motor vehicle operator's identification card; and vehicular registration will be provided without cost by the Government. The Contractor shall comply with the latest traffic safety program set forth in OPNAV Instruction 5100.12.

1.3.9 Laundry and Dry Cleaning

The Government will make available laundry and dry cleaning facilities for Contractor personnel and dependents of Contractor personnel at current rates as set forth by the Navy Exchange, Guantanamo Bay, Cuba.

1.3.10 Government Utilities

The General Conditions Clause entitled "Availability and Use of Utility Services" applies. Water and electricity will be available at designated outlets at the prevailing Government rates. Current rates (01 Oct 2015) are as follows:

Electricity - $ 500.00 per thousand kWh
Water - $ 25.00 per thousand gallons
Sewage - $ 23.50 per thousand gallons

Power and water usage in office and shop areas will be metered by meter furnished and installed by and at the expense of the Contractor. The meters furnished shall be sealed and tagged to indicate last calibration date and name of the person performing the calibration. The Government

reserves the right to require the recalibration of the meters if erroneous readings are suspected.

The Contractor shall provide Backflow Protection at the source for all temporary water connections used in accomplishment of this contract. Backflow device must be tested and pass certification prior to opening connection. Person installing and certifying device must be trained in accordance with CROSS-CONNECTION CONTROL AND BACKFLOW PREVENTION PROGRAM IMPLEMENTATION AT NAVY SHORE FACILITIES, User's Guide, UG-2029-ENV dtd May 98. Cross-Connection Control and Backflow Prevention Program Certification must be current prior to installation.

1.3.11 Port-a-let, Refuse Collection and Sanitary Sewage Trucking Service

These services are provided by the Base Maintenance Services Contractor, Centerra Group, LLC. For the current rates, call 011-53-99-3126.

a. Refuse containers will be furnished and serviced by the Government at living quarters. Refuse collection service is mandatory. Contractors are required to meet base regulations concerning collection and disposal of refuse. Pickup is scheduled and charged based on volume of the dumpster, not necessarily the volume of refuse. Only refuse deposited in the Government-furnished containers will be collected. This service does not include articles left outside of the containers. This service will not be available for construction or demolition sites.

1.3.12 Transportation of Personnel

a. Air travel to and from the base is limited, with demand often far in excess of supply. Specifically:

(1) Travel to and from Jacksonville, Florida; Norfolk, Virginia; and Kingston, Jamaica is provided by the Air Mobility Command (AMC) at the contractor's expense and passage will be in reserved seats.

Plane Fares to Guantanamo Bay, Cuba as of 1 October 2015. Rates are Subject to change.

From Norfolk, Virginia	$862.00 Round Trip
From Jacksonville, Florida	$606.00 Round Trip
From Kingston, Jamaica	$126.00 Round Trip

(2) Emergency leave travel for verified personal emergencies such as death or serious illness of a family member will be authorized to any destination on the next available flight, also chargeable to the Contractor at the international tariff rate.

1.3.13 Food Facilities

Contractor personnel may eat at the Navy Exchange food outlets, or at other open food service facilities on a cash basis at current prices.

1.3.14 Petroleum Products

a. Sales: Sales of petroleum products shall be made from Naval Station Supply Department Stocks under special deposit procedures based on prevailing stock ledger prices. Current major petroleum product prices (01 October 15) are subject to change. Prices are as follows:

Aviation Gasoline (AVGAS)	$ NOT AVAILABLE
Motor Gasoline Midgrade (MUM)	$ 3.05 per gallon
Jet Fuel (JP-5)	$ 2.98 per gallon
Diesel Fuel Distillates (F76)	$ 2.97 per gallon

Prices are subject to change and are adjusted on average two times per year.

b. Bulk Fuels: Only bulk fuels are available. Deliveries can be arranged through the Fuel Department of the Naval Station Supply Department for tanker delivery to your equipment or day tanks. Regular filling station pumps at the Navy exchange service station may be utilized by paying the current price at time of purchase.

1.3.15 Purchases From the Government

a. Sale of Government Supplies: Provisions and camp supplies other than petroleum products will be sold to the Contractor from Naval Station Supply Department Stocks under special deposit procedures in compliance with Paragraph 26046, 2d and 3, BuS&A Manual. Miscellaneous construction materials may be sold to the Contractor under the same procedure if such sales are not detrimental to the Naval Station Supply Department stock position as determined by the Naval Station Supply Officer. Materials other than petroleum products will be issued as required, during normal working hours.

b. Payment for Purchases From the Government: Invoices covering sales of equipment and materials specified will be charged to a special deposit account, to be established by the Contractor in advance. The Contractor is required to provide a cash deposit only to the Naval Station Comptroller prior to incurring charges. The Contractor shall maintain a minimum balance in this account equal to two times the anticipated monthly expenditures or $200, whichever is greater. The Contractor shall comply with directives governing special deposit accounts as established by the Comptroller, U.S. Naval Base, Guantanamo Bay, Cuba. Failure to settle accounts due promptly will jeopardize the availability of goods and services. The Government is entitled to withhold special deposit account arrearages from progress payments.

1.3.16 Private Aircraft

Prior to making shipment of cargo or personnel by private aircraft, the Contractor shall have on record with the Naval Air Station Operations Officer a valid facilities license. Further, at least 7 working days prior to each such shipment, the Contractor shall notify the ROICC of his intentions so that appropriate area and flight clearances may be obtained.

1.3.17 Contractor Debts

The Contractor shall be liable for debts to the Government incurred by his employees for personal services at Guantanamo Bay, Cuba, including but not limited to private telephone service, medical and dental services, and W.T. Sampson School expenses. If an employee departs the Guantanamo Bay Naval Base without liquidating his debts, sufficient funds to cover this type of obligation will be withheld from Contractor payments until the debts are paid.

1.3.18 Energy Conservation

The Contractor shall observe the Base Energy Conservation Regulation, COMNAVBASEGTMO Instruction 11300.3 series. It is mandatory that the Contractor obtain a copy of this instruction and post it in a conspicuous location for the Contractor's employees to read. Copies of the instructions are available from the ROICC office. Ensure that employees comply with these regulations at all times. It is suggested that an employee be appointed as energy monitor by the Contractor for buildings under the jurisdiction of the Contractor.

1.3.19 Drug Abuse by Contract Employees

The Secretary of the Navy has determined that the illegal possession and use of drugs and paraphernalia by civilian and contract employees in the military setting contributes directly to military drug abuse and undermines command efforts to eliminate drug abuse among military personnel. The policy of the Department of the Navy, including the Marine Corps, is to deter and detect drug offenses by civilian and contract employees on military installations. Measures to be taken to identify drug offenses on military installations, and to prevent introduction of illegal drugs and paraphernalia include routine, random inspections of vehicles and personnel possessions on entry or exit, with drug detection dog teams, when available. Where there is probable cause to believe that a civilian or contract employee on board a Naval or Marine Corps installation has been engaged in use, possession, or trafficking of drugs, that employee may be restricted or detained for the period necessary until that employee can be removed from the installation or can be turned over to local law enforcement authorities having jurisdiction, as appropriate. When illegal drugs are discovered during an inspection or search of a vehicle operated by a civilian or contract employee, the employee and vehicle may be detained for a reasonable period of time necessary to turn the employee and the vehicle over to appropriate civil law enforcement officials; action may be taken to suspend, revoke, or deny installation driving privileges. Implicit with the acceptance of this contract is the Contractor's agreement to comply with Federal statutes, laws, and regulations, including those regulations issued by the commander of the military installation.

1.3.20 Available Living Quarters

1.3.20.1 Crew Berthing

The Contractor shall provide temporary housing facilities (man camp) for all prime and subcontractor workers. Contractor shall be responsible to provide all required facilities for his personnel at a site designated by the Contracting Officer's designated representative. Contractor shall tie into existing utilities at designated locations and maintain these utilities until completion of the project. Contractor shall be billed for

utilities at prevailing rates. Upon completion of the project, Contractor shall restore site to the original condition.

1.3.20.1.1 Codes

Temporary berthing units shall be weather tight house trailers. The trailers shall be designed, constructed, and erected in accordance with ICC IBC, the latest edition of the HUD Regulations, ASCE 7 and as modified herein. Air conditioning units shall conform to NFPA 90A and ANSI/AHRI 210/240. All electrical work shall conform to NFPA 70. Design wind velocity shall be in accordance with UFC 3-301-01 for NS Guantanamo Bay. Seismic loading criteria shall be in accordance with NS Guantanamo Bay, of the referenced UFC.

Minimum furnishings shall include a bed (single or bunked) and a wardrobe or dresser for each person. Minimum house furnishings shall also include a television, cable box, telephone, and refrigerator that are shared with other assigned housemates. Two house mates may be assigned to one trailer. Provide a house trailer with a minimum of 100 square feet of useful floor area up and above the floor area required for the private furnishings and joint furnishings specified and the bathroom.

1.3.20.1.2 Description

The work includes delivery, erection, and removal of temporary berthing including all necessary furnishings adequate to house the Contractor's workforce for the duration of the project, complete and ready for use. The work includes providing a group site with stairs, platforms, railings, walks, parking, lighting and utility connections to existing water supply, sanitary, and electrical systems. Site shall be properly drained. Provide refuse collection. Provide temporary berthing and utility connections prior to workforce arriving. Provide furnishings and equipment as required and specified.

a. Layout and Location: Trailers shall be located at a group site as designated by the Contracting Officer.

b. Shipping and Delivery: Contractor shall provide transportation for temporary house trailers and associated accessories to and from the Naval Station and to and from the temporary site location as determined by the Contracting Officer, bearing all costs incurred. Delays in shipping shall not cause an extension in the contract completion date, unless Contracting Officer determines otherwise.

c. Anchors, Piers and Tie-Down Components: Provide anchors, piers and tie-down components, used in the installation of temporary housing units, tested, listed and approved by Chapter 15C-1 of the FDHSMV DMV.

d. Stairs and Ramps: Stairs, ramps, platforms and railings shall be provided and as required to facilitate access from finished grade to the temporary housing units. Construct stairs, ramps, and railings in accordance with NFPA 101.

e. Utility Connections: The facility shall be connected to existing sanitary collection, water distribution, and electrical systems. Provide backflow protection in accordance with Section 01 50 00.00 25, "Temporary Construction Facilities and Control". Power and water usage for temporary berthing shall be metered by meters furnished and installed by and at the expense of the Contractor. All costs

associated with establishing utility connection shall be the responsibility of the Contractor. Notify Contracting Officer 15 days prior to utility connections.

f. Refuse Collection: Provide refuse collection through the Base Maintenance Service Contractor.

1.3.20.1.3 Installation

a. Erection: The facility shall be assembled, connected, and finished in accordance with the HUD Regulations, the manufacturer's written instructions, and in accordance with applicable codes and ordinances. Install temporary housing units including anchors, piers, and tie-down components in accordance with the minimum requirements of Chapter 15C-1 of the FDHSMV DMV.

b. Maintenance: Adequate provisions shall be made for maintenance of the site and temporary house trailers. Suitably paint and maintain the temporary facilities. Failure to do so will be sufficient reason to require their removal. Site shall be kept free of refuse and unused debris. Provide a custodial service to clean each temporary berthing unit.

c. Removal: Remove temporary housing units and associated sited improvements within 45 days after the contract is completed. Notify Contracting Officer 15 days prior to disconnecting utilities.

d. Acceptance Testing: Upon completion and before final acceptance of work, test each system to demonstrate compliance with the contract requirements, including testing of air conditioning, ventilation, lighting, and plumbing systems. Adjust controls and balance systems prior to final acceptance of completed systems. Test controls through every cycle of operation. Test safety controls to demonstrate performance of required function. Correct defects in work and repeat tests. Furnish instruments, connecting devices, and personnel for tests. Flush and clean piping before placing in operation. Clean equipment, piping, strainers, ducts, and provide new filters.

1.3.20.2 Contractor Management/Supervisory Housing

For this contract, the Government will provide up to two (2) housing units (based on availability) for the Contractor's use. These units are reserved for use by accompanied or unaccompanied personnel in performing management/supervisory functions for the overall MACC contract. The Government will provide up to two (2) additional housing units (based on availability) for use by accompanied or unaccompanied personnel performing in supervisory/management functions associated with this task order.

Housing will be assigned as follows: accompanied personnel by family composition with maximum family size of three (3) dependents; unaccompanied personnel assignment will be made based on a minimum of one person per bedroom. If house sharing, accompaniment by dependents will not be allowed. The Government will provide family housing units with the following appliances: refrigerator, stove, dishwasher, microwave, washer, and dryer. Housing may provide temporary loaner furniture for up to 90 days, depending on availability. No extensions will be granted. All furnishings other than the listed appliances will be provided by the Contractor. Issuance of these housing units and rental rates are controlled by the Housing Department, Building 2295, phone

011-53-99-4172/4174. Should the Contractor's assigned units not be fully occupied, the Housing Department will cancel the assignment and return the unit to inventory for other use. Personnel shall abide by all Family Housing instructions, which are not part of the contract but available on request. Rental rates include trash and maintenance costs. Rental rates are normally adjusted annually based on market appraisal, utilities cost adjustment and/or the annual Consumer Price Index. All family housing units are equipped with electric and water meters. Utilities cost is billed along with monthly rent and is based on established rates and actual consumption. All rent is due in advance. No personal checks accepted.

Current Fair Market Rental Rates as of 01 October 2015:

Rental	Shelter Rent
1 Bedroom - 1 Bath	N/A
2 Bedroom - 1 Bath	$737 Month
2 Bedroom - 1.5 Bath	$788 Month
3 Bedroom - 1 Bath	N/A
3 Bedroom - 2 Bath	$976 Month
4 Bedroom - 2.5 Bath	$1,166 Month

The Contractor will be responsible for the applicable monthly rent above plus actual utilities. Rates may be adjusted annually.

1.3.20.3 Extended Stay Berthing Facilities (ESBF)

For this task order, the Government will supply the number of ESBF beds for the period of time as supported by the Contractor's personnel-loaded CPM schedule. Refer to Specification Section 01 32 17.00 25.

Except for allowed fair market rental units (Family/Management Quarters) Contractor employees (unaccompanied status) shall be berthing with the Housing Department, Navy Gateway Inns and Suites Division (NGIS) in ESBF located on both sides of the bay; Windward (WW) and Leeward (LW). ESBF primarily consists of multi occupancy rooms with wither shared or gang head bathrooms. Due to the configuration of most facilities, they are not suitable for mixing genders; therefore female residents are not accepted by NGIS for occupancy in ESBF. The Contractor must provide alternate berthing for all female employees.

Costs are based on occupied beds. The current rate is $8.00 per person per bed, regardless of room configurations and subject to change, as well as a utility cost of $8.52 per person per bed. Rates are reviewed each March for implementation each October. Should prices increase, the Contractor shall receive at a minimum 30 days notification. Bed night costs are not negotiable.

Contractors shall be billed monthly for the number of beds assigned to their company. Contractors are charged for beds assigned to employees on leave unless the employee removed all personal property and checks out of the facility. Contractors shall remit payment on or before due dates. Administrative and late fees apply. Failure to promptly pay can result in eviction from the premises regardless of impact to Contractor ability perform the contract specifications. Housing makes no guarantee of bed availability or berthing locations.

Prior to berthing or any employees, Contractor shall be required to complete a Contractor Berthing Agreement with the NGIS. A copy of this agreement is available at the NGIS management offices located at Building 1670. To determine availability, advance registration and notification of berthing requirements is highly recommended, send information via e-mail to NGIS mail box at ngismail@usnbgtmo.navy.mil.

1.3.21 Electronic Invoices

The Contractor shall submit invoices electronically via e-mail or computer disc.

1.3.22 E-mail and Internet

The Contractor shall have e-mail and Internet service for their office on the base.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Document --

SECTION 01 11 00.00 25

SUMMARY OF WORK
09/15
NAVFAC SE VERSION

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

1.1.1 Project Description

The work includes for repair and maintenance measures designed to promote long-term life and serviceability of Wharf Bravo including repair of steel sheet pile, soil stabilization, repair sections of spalled concrete, replacement of steel fender framing, replacement of missing chains on camels and cleaning and recoating and/or replacing deteriorated mooring fittings. The project also includes installation of new steel sheet pile wall in order to create a single linear facility. and incidental related work.

1.1.2 Location

The work is located at the Wharf Bravo as indicated in the contract documents. The exact location will be shown by the Contracting Officer.

1.2 OCCUPANCY OF PREMISES

Adjacent buildings will be occupied during performance of work under this Contract.

1.3 EXISTING WORK

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

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

b. 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.

1.4 LOCATION OF UNDERGROUND UTILITIES

Obtain digging permits prior to start of excavation, and comply with Installation requirements for locating and marking underground utilities. Contact local utility locating service a minimum of 15 calendar days prior to excavating, to mark utilities, and within sufficient time required if work occurs on a Monday or after a Holiday. Verify existing utility locations indicated on contract drawings, within area of work.

1.4.1 Notification Prior to Excavation

Notify the Contracting Officer at least 15 days prior to starting

excavation work.

1.5 SALVAGE MATERIAL AND EQUIPMENT

Items designated by the Contracting Officer to be salvaged remain the property of the Government. Segregate, itemize, deliver and off-load the salvaged property at the Government designated storage area located within 5 miles of the construction site.

Maintain property control records for material or equipment designated as salvage. Use a system of property control that is approved by the Contracting Officer. Store and protect salvaged materials and equipment until disposition by the Contracting Officer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 14 00.00 25

WORK RESTRICTIONS
12/14
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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

List of Contact Personnel; G

1.2 SPECIAL SCHEDULING REQUIREMENTS

a. Pier Charlie must be ready for operation as approved by Contracting Officer before work is started on Wharf Bravo in order to eliminate any possible interference with normal operation.

b. Have materials, equipment, and personnel required to perform the work at the site prior to the commencement of the work. Specific items of work to which this requirement applies include:

c. The project will be split into two phases. The south end of Wharf Bravo will remain in operation during the work to the north end. The north end of the wharf will remain in operation during the work to the south end. The Contractor must conduct his operations so as to cause the least possible interference with normal operations of the Activity.

d. Permission to interrupt any Activity roads, railroads, and/or utility service must be requested in writing a minimum of 15 calendar days prior to the desired date of interruption.

e. The work under this contract requires special attention to the scheduling and conduct of the work in connection with existing operations. Identify on the construction schedule each factor which constitutes a potential interruption to operations.

1.3 CONTRACTOR ACCESS AND USE OF PREMISES

1.3.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations including safety, fire, traffic and security regulations. Keep within the limits of the work and avenues of ingress and egress. Wear hard hats in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. Mark Contractor equipment for identification.

1.3.1.1 Subcontractors and Personnel Contacts

Provide a list of contact personnel of the Contractor and subcontractors

including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in previous lists.

1.3.1.2 Identification Badges and Installation Access

Refer to Section 00 73 01.00 25 SPECIAL CONDITIONS FOR GUANTANAMO BAY PROJECTS

1.3.1.3 No Smoking Policy

Smoking is prohibited within and outside of all buildings on installation, except in designated smoking areas. This applies to existing buildings, buildings under construction and buildings under renovation. Discarding tobacco materials other than into designated tobacco receptacles is considered littering and is subject to fines. The Contracting Officer will identify designated smoking areas.

1.3.2 Working Hours

For normal working hours, see 00 73 01.00 25, Special Conditions for Guantanamo Bay Projects

1.3.3 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer approval. Make application 15 calendar days prior to such work to allow arrangements to be made by the Government for inspecting the work in progress, giving the specific dates, hours, location, type of work to be performed, contract number and project title. Based on the justification provided, the Contracting Officer may approve work outside regular hours. During periods of darkness, the different parts of the work must be lighted in a manner approved by the Contracting Officer.

1.3.4 Occupied and Existing Buildings

The Contractor shall be working around existing buildings which are occupied. Do not enter the buildings without prior approval of the Contracting Officer.

The existing buildings and their contents must be kept secure at all times. Provide temporary closures as required to maintain security as directed by the Contracting Officer.

1.3.5 Utility Cutovers and Interruptions

a. Make utility cutovers and interruptions after normal working hours or on Saturdays, Sundays, and Government holidays. Conform to procedures required in the paragraph "Work Outside Regular Hours."

b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.

c. Operation of Station Utilities: The Contractor must not operate nor disturb the setting of control devices in the station utilities system, including water, sewer, electrical, and steam services. The Government will operate the control devices as required for normal conduct of the work. The Contractor must notify the Contracting Officer giving reasonable advance notice when such operation is required.

1.4 SECURITY REQUIREMENTS

Contract Clause "FAR 52.204-2, Security Requirements and Alternate II," "FAC 5252.236-9301, Special Working Conditions and Entry to Work Area," apply.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 20 00.00 25

PRICE AND PAYMENT PROCEDURES
12/14
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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-1110-1-8	(2009) Construction Equipment Ownership and Operating Expense Schedule

1.2 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

Schedule of Prices; G

1.3 SCHEDULE OF PRICES

1.3.1 Data Required

This contract requires the use of a cost-loaded Network Analysis Schedule (NAS). The information required for the Schedule of Prices will be entered as an integral part of the Network Analysis Schedule. Within 15 calendar days of notice of award, prepare and deliver to the Contracting Officer a Schedule of Prices (construction contract) as directed by the Contracting Officer. Provide a detailed breakdown of the contract price, giving quantities for each of the various kinds of work, unit prices, and extended prices. Costs shall be summarized and totals provided for each construction category.

1.3.2 Schedule Instructions

Payments will not be made until the Schedule of Prices has been submitted to and accepted by the Contracting Officer. Identify the cost for site work, and include incidental work to the 5 ft line. Identify costs for the building(s), and include work out to the 5 ft line. Work out to the 5 ft line shall include construction encompassed within a theoretical line 5 ft from the face of exterior walls and shall include attendant construction, such as pad mounted HVAC cooling equipment, cooling towers, and transformers placed beyond the 5 ft line.

1.4 CONTRACT MODIFICATIONS

In conjunction with the Contract Clause "DFARS 252.236-7000, Modification

Proposals-Price Breakdown," and where actual ownership and operating costs of construction equipment cannot be determined from Contractor accounting records, equipment use rates shall be based upon the applicable provisions of the EP-1110-1-8.

1.5 CONTRACTOR'S INVOICE AND CONTRACT PERFORMANCE STATEMENT

1.5.1 Content of Invoice

Requests for payment will be processed in accordance with the Contract Clause FAR 52.232-27, Prompt Payment Construction Contracts and FAR 52.232-5, Payments Under Fixed-Price Construction Contracts. The requests for payment shall include the documents listed below.

a. Updated Project Schedule and reports required by the contract.

b. Contractor Safety Self Evaluation Checklist.

c. Other supporting documents as requested.

d. Updated copy of submittal register.

e. Invoices not completed in accordance with contract requirements will be returned to the Contractor for correction of the deficiencies.

f. Contractor's Monthly Estimate for Voucher (NAVFAC LANT Form 4-330/110 (New 7/84)) with Subcontractor and supplier payment certification.

g. Affidavit to accompany invoice (NAVFAC LANT NORVA Form 4-4235/4 (Rev.5/81)).

h. Materials on Site.

1.5.2 Submission of Invoices

If NFAS Clause 5252.232-9301 is included in the contract, the documents listed in paragraph "CONTENT OF INVOICE" shall be provided in their entirety as attachments in Wide Area Work Flow (WAWF) for each invoice submitted. The maximum size of each WAWF attachment is two megabytes, but there are no limits on the number of attachments. If a document cannot be attached in WAWF due to system or size restriction it shall be provided as instructed by the Contracting Officer.

1.5.3 Final Invoice

a. A final invoice shall be accompanied by the certification required by DFARS 252.247.7023 TRANSPORTATION OF SUPPLIES BY SEA, and the Contractor's Final Release. If the Contractor is incorporated, the Final Release shall contain the corporate seal. An officer of the corporation shall sign and the corporate secretary shall certify the Final Release.

b. For final invoices being submitted via WAWF, the original Contractor's Final Release Form and required certification of Transportation of Supplies by Sea must be provided directly to the respective Contracting Officer prior to submission of the final invoice. Once receipt of the original Final Release Form and required certification of Transportation of Supplies by Sea has been confirmed by the Contracting Officer, the Contractor shall then submit final invoice and attach a

copy of the Final Release Form and required certification of Transportation of Supplies by Sea in WAWF.

c. Final invoices not accompanied by the Contractor's Final Release and required certification of Transportation of Supplies by Sea will be considered incomplete and will be returned to the Contractor.

1.6 PAYMENTS TO THE CONTRACTOR

Payments will be made on submission of itemized requests by the Contractor which comply with the requirements of this section, and will be subject to reduction for overpayments or increase for underpayments made on previous payments to the Contractor.

1.6.1 Obligation of Government Payments

The obligation of the Government to make payments required under the provisions of this contract will, at the discretion of the Contracting Officer, be subject to reductions and/or suspensions permitted under the FAR and agency regulations including the following in accordance with "FAR 32.503-6:

a. Reasonable deductions due to defects in material or workmanship;

b. Claims which the Government may have against the Contractor under or in connection with this contract;

c. Unless otherwise adjusted, repayment to the Government upon demand for overpayments made to the Contractor; and

d. Failure to provide up to date record drawings not current as stated in Contract Clause "FAC 5252.236-9310, Record Drawings."

1.6.2 Payment for Onsite and Offsite Materials

Progress payments may be made to the contractor for materials delivered on the site, for materials stored off construction sites, or materials that are in transit to the construction sites under the following conditions:

a. FAR 52.232-5(b) Payments Under Fixed Price Construction Contracts.

b. Materials delivered on the site but not installed, including completed preparatory work, and off-site materials to be considered for progress payment shall be major high cost, long lead, special order, or specialty items, not susceptible to deterioration or physical damage in storage or in transit to the construction site. Examples of materials acceptable for payment consideration include, but are not limited to, structural steel, non-magnetic steel, non-magnetic aggregate, equipment, machinery, large pipe and fittings,precast/prestressed concrete products, plastic lumber (e.g., fender piles/curbs), and high-voltage electrical cable. Materials not acceptable for payment include consumable materials such as nails, fasteners, conduits, gypsum board, glass, insulation, and wall coverings.

c. Materials to be considered for progress payment prior to installation shall be specifically and separately identified in the Contractor's estimates of work submitted for the Contracting Officer's approval in accordance with Schedule of Prices requirement of this contract. Requests for progress payment consideration for such items shall be

supported by documents establishing their value and that the title requirements of the clause at FAR 52.232-5 have been met.

d. Materials are adequately insured and protected from theft and exposure.

e. Provide a written consent from the surety company with each payment request for offsite materials.

f. Materials to be considered for progress payments prior to installation shall be stored either in Hawaii, Guam, Puerto Rico, or the Continental United States. Other locations are subject to written approval by the Contracting Officer.

g. Materials in transit to the job site or storage site are not acceptable for payment.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 30 00.00 25

ADMINISTRATIVE REQUIREMENTS
09/15
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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)

EM 385-1-1	(2014) Safety and Health Requirements Manual

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

15 CFR 772	Definition of Terms
15 CFR 773	Special Licensing Procedures

1.2 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

View Location Map; G

Progress and Completion Pictures; G

1.3 VIEW LOCATION MAP

Submit, prior to or with the first digital photograph submittals, a sketch or drawing indicating the required photographic locations. Update as required if the locations are moved.

1.4 PROGRESS AND COMPLETION PICTURES

Photographically document site conditions prior to start of construction operations. Provide monthly, and within one month of the completion of work, digital photographs, 1600x1200x24 bit true color minimum resolution in JPEG file format showing the sequence and progress of work. Take a minimum of 20 digital photographs each week throughout the entire project from a minimum of ten views from points located by the Contracting Officer. Submit with the monthly invoice two sets of digital photographs, each set on a separate compact disc (CD) or data versatile disc (DVD), cumulative of all photos to date. Indicate photographs demonstrating environmental procedures. Provide photographs for each month in a separate monthly directory and name each file to indicate its location on the view location sketch. Also provide the view location sketch on the CD or DVD as

a digital file. Include a date designator in file names. Cross reference submittals in the appropriate daily report. Photographs provided are for unrestricted use by the Government.

1.5 MINIMUM INSURANCE REQUIREMENTS

Provide the minimum insurance coverage required by FAR 28.307-2 LIABILITY, during the entire period of performance under this contract. Provide other insurance coverage as required by State law.

a. Prior to commencement of work hereunder, the Contractor shall furnish to the Contracting Officer a certificate or written statement of the above required insurance. The policies evidencing required insurance shall contain an endorsement to the effect that cancellation or any material change in the policies adversely affecting the interests of the Government in such insurance shall not be effective until 30 days after written notice thereof to the Contracting Officer.

1.6 SUPERVISION

1.6.1 Minimum Communication Requirements

Have at least one qualified superintendent, or competent alternate, capable of reading, writing, and conversing fluently in the English language, on the job-site at all times during the performance of contract work. In addition, if a Quality Control (QC) representative is required on the contract, then that individual must also have fluent English communication skills.

1.6.2 Superintendent Qualifications

The project superintendent must have a minimum of 10 years experience in construction with at least 5 of those years as a superintendent on projects similar in size and complexity. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance. The individual must be capable of interpreting a critical path schedule and construction drawings. The qualification requirements for the alternate superintendent are the same as for the project superintendent. The Contracting Officer may request proof of the superintendent's qualifications at any point in the project if the performance of the superintendent is in question.

1.6.2.1 Duties

The project superintendent is primarily responsible for managing and coordinating day-to-day production and schedule adherence on the project. The superintendent is required to attend NAVFAC Red Zone meetings, partnering meetings, and quality control meetings. The superintendent or qualified alternative must be on-site at all times during the performance of this contract until the work is completed and accepted.

1.6.3 Non-Compliance Actions

The Project Superintendent is subject to removal by the Contracting Officer for non-compliance with requirements specified in the contract and for failure to manage the project to insure timely completion. Furthermore, the Contracting Officer may 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 is acceptable as the subject of claim for

extension of time for excess costs or damages by the Contractor.

1.7 PRECONSTRUCTION MEETING

After award of the contract but prior to commencement of any work at the site, meet with the Contracting Officer to discuss and develop a mutual understanding relative to the administration of the value engineering and safety program, preparation of the schedule of prices or earned value report, shop drawings, and other submittals, scheduling programming, prosecution of the work, and clear expectations of the "Interim DD Form 1354" Submittal. Major subcontractors who will engage in the work must also attend.

1.8 FACILITY TURNOVER PLANNING MEETINGS (NAVFAC Red Zone - NRZ)

Meet with the Government to identify strategies to ensure the project is carried to expeditious closure and turnover to the Client. Start the turnover process at the Pre-Construction Conference meeting with a discussion of the NAVFAC Red Zone (NRZ) process and convene at regularly scheduled NRZ Meetings. Include the following in the facility Turnover effort:

1.8.1 NRZ Checklist

a. Contracting Officer's Technical Representative (COTR) will provide the Contractor a copy of the NRZ Checklist template prior to 75 percent completion.

b. Prior to 75 percent completion add/delete critical activities to the NRZ Checklist template as necessary to match the project scope, and schedule critical activities and insert planned completion dates in the NRZ checklist for each critical activity. Present the NRZ Checklist to COTR and review during a regularly scheduled QC Meeting.

1.8.2 Meetings

a. Upon Government acceptance of the NRZ Checklist, the Project Superintendent is required to lead regular NRZ Meetings beginning at approximately 75 percent project completion, or three to six months prior to Beneficial Occupancy Date (BOD), whichever comes first.

b. The Contracting Officer will determine the frequency of the meetings, which is expected to increase as the project completion draws nearer.

c. Using the NRZ Checklist as a Plan of Action and Milestones (POAM) and basis for discussion, review upcoming critical activities and strategies to ensure work is completed on time.

d. Coordinate with the COTR any upcoming activities that require Government involvement.

e. Maintain the NRZ Checklist by documenting the actual completion dates as work is completed and update the NRZ Checklist with revised planned completion dates as necessary to match progress. Distribute copies of the current NRZ Checklist to attendees at each NRZ Meeting.

1.9 EXPORT LICENSES FOR OVERSEAS PROJECTS

Obtain individual export licenses and project export licenses required by

the Department of Commerce regulations (15 CFR 772 and 15 CFR 773) so that no delays are experienced in shipping from the United States of America to a foreign country. For additional information, the Contractor may contact one of the U.S. and Foreign Commercial Service District Offices of the Department of Commerce which are located in almost every State.

1.10 PARTNERING

To most effectively accomplish this contract, the Government requires the formation of a cohesive partnership within the Project Team whose members are from the Government, the Contractor and their Subcontractors. Key personnel from the Supported Command, the End User (who will occupy the facility), the Government Design and Construction team and Subject Matter Experts, the Installation, the Contractor and Subcontractors, and the Designer of Record will be invited to participate in the Partnering process. The Partnership will draw on the strength of each organization in an effort to achieve a project that is without any safety mishaps, conforms to the Contract, and stays within budget and on schedule.

The Contracting Officer will provide Information on the Partnering Process and a list of key and optional personnel who should attend the Partnering meeting.

1.10.1 Informal Partnering

The Contracting Officer will organize the Partnering Sessions with key personnel of the project team, including Contractor personnel and Government personnel.

The Initial Partnering session should be a part of the Pre-Construction Meeting. Partnering sessions will be held at a location agreed to by the Contracting Officer and the Contractor (typically a conference room provided by the PWD FEAD/ROICC office or the Contractor). The Initial Informal Partnering Session will be conducted and facilitated using electronic media (a video and accompanying forms) provided by the Contracting Officer. The Partners will determine the frequency of the follow-on sessions, at no more than three to six month intervals.

1.11 AVAILABILITY OF CADD DRAWING FILES

After award and upon request, the electronic "Computer-Aided Drafting and Design (CADD)" drawing files will only be made available to the Contractor for use in preparation of construction data related to the referenced contract subject to the following terms and conditions. Request specific drawing numbers of files required; the entire set of drawing files will not be provided.

Data contained on these electronic files shall not be used for any purpose other than as a convenience in the preparation of construction 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 shall 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 shall, 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 CADD drawing files are not construction documents. Differences may exist between the CADD files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic CADD files, nor does it make representation to the compatibility of these files with the Contractors hardware or software. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished CADD files, the signed and sealed construction documents shall govern. The Contractor is responsible for determining if any conflict exists. Use of these CADD 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 and/or modifies these electronic CADD files for use in producing construction data related to this contract, all previous indicia of ownership (seals, logos, signatures, initials and dates) shall be removed.

1.12 ELECTRONIC MAIL (E-MAIL) ADDRESS

Establish and maintain electronic mail (e-mail) capability along with the capability to open various electronic attachments as text files, pdf files, and other similar formats. Within 10 days after contract award, provide the Contracting Officer a single (only one) e-mail address for electronic communications from the Contracting Officer related to this contract including, but not limited to contract documents, invoice information, request for proposals, and other correspondence. The Contracting Officer may also use email to notify the Contractor of base access conditions when emergency conditions warrant, such as hurricanes or terrorist threats. Multiple email addresses are not allowed.

It is the Contractor's responsibility to make timely distribution of all Contracting Officer initiated e-mail with its own organization including field office(s). Promptly notify the Contracting Officer, in writing, of any changes to this email address.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 32 17.00 25

COST-LOADED NETWORK ANALYSIS SCHEDULES (NAS)
12/15
NAVFAC SE VERSION

PART 1 GENERAL

1.1 DESCRIPTION

The Contractor is responsible for scheduling procurement, Contractor quality control and construction, acceptance testing and training. Refer to Specification Section 01 33 00 SUBMITTAL PROCEDURES to determine if any items require Government approval prior to construction; if any are required, include that submittal review time in the schedule.

The schedule is a tool to manage the project, both for Contractor and Government activities. It will also be used to report progress and evaluate time extensions. The Project NAS must be cost-loaded and will provide the basis for progress payments. Use the Critical Path Method (CPM) and the Precedence Diagram Method (PDM) to satisfy time and cost applications. For consistency, when scheduling software terminology is used in this specification, the terms in Primavera's scheduling programs are used.

1.2 SUBMITTALS

The use of a "G" following a submittal indicates that a Government approval action is required. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Qualifications; G

Baseline Network Analysis Schedule (NAS); G

SD-07 Certificates

Monthly Network Analysis Schedule Update; G

SD-11 Closeout Submittals

As-Built Schedule; G

1.3 SCHEDULE ACCEPTANCE PRIOR TO START OF WORK

Participate with the Contracting Officer in a preliminary meeting(s) to discuss the proposed schedule and requirements of this section prior to the Contractor preparing the Project Baseline Schedule. Government review comments on the Contractor's schedule(s) do not relieve the Contractor from compliance with requirements of the Contract Documents. Only bonds may be paid prior to acceptance of the Baseline Network Analysis Schedule (NAS) The acceptance of a Baseline NAS is a condition precedent to:

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

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

c. Review of any schedule updates.

Submittal of the Baseline Network Analysis 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).

1.4 SOFTWARE

Prepare and maintain project schedules using Primavera P6. Importing data into P6 using data conversion techniques or third party software is cause for rejection of the submitted schedule.

A listing of Primavera P6 settings and parameters which must be used in preparing the Schedules are contained later in this specification section. Deviation from these settings and parameters, without prior consent of the Contracting Officer, is cause for rejection of schedule submission.

1.5 QUALIFICATIONS

The designated Scheduler for the project must have prepared and maintained at least 3 previous schedules of similar size and complexity of this contract using Primavera P3, Primavera SureTrak, or Primavera P6. At least one of the three must be in Primavera P6. Submit a resume outlining the qualifications of the Scheduler. Payment will not be processed until an acceptable Scheduler is provided.

1.6 NETWORK SYSTEM FORMAT

The system must include time-scaled logic diagrams and specified reports.

1.6.1 Diagrams

Provide Time-scaled Logic Diagram printed in color on ANSI D size sheets. The diagram must clearly show activities on the critical path. Include the following information for each activity:

a. Activity ID

b. Activity Description

c. Original Duration in Work Days

d. Remaining duration in Work Days

e. Physical Percent Complete

f. Start Date

g. Finish Date

h. Total Float

1.6.2 Schedule Activity Properties and Level of Detail

The NAS must identify all Government, Construction Quality Management (CQM), Construction activities planned for the project and all other activities that could impact project completion if delayed. Create separate activities for each Phase, Area, Floor Level and Location the activity is occurring. Activity categories included in the schedule are specified below.

With the exception of the Contract Award and Contract Completion Date (CCD) milestone activities, no activity 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. Within the Baseline Schedule no more than 20 percent of the activities shall be critical or near critical. Critical is defined as having zero days of Total Float. "Near Critical" is defined as having Total Float of 1 to 14 days. Contractor activities must be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days.

1.6.2.1 Activity Categories

1.6.2.1.1 Procurement Activities

Examples of procurement activities include, but are not limited to; Material/equipment submittal preparation, submittal and approval of material/equipment; material/equipment fabrication and delivery, and material/equipment on-site. As a minimum, separate procurement activities will be provided for critical items, long lead items, items requiring Government approval and material/equipment procurement for which payment will be requested in advance of installation. Show each delivery with relationship tie to the Construction Activity specifically for the delivery.

1.6.2.1.2 Government Activities

Government and other agency activities that could impact progress must be clearly identified. Government activities include, but are not limited to; Government approved submittal reviews, Government conducted inspections/tests, environmental permit approvals by State regulators, utility outages, and delivery of Government Furnished Material/Equipment.

1.6.2.1.3 Quality Management (QM) Activities

The Preparatory Phase and Initial Phase for each Definable Feature of Work identified in the Contractor's Quality Control Plan must be added to each Three-Week Look Ahead Schedule referenced in the paragraph THREE-WEEK LOOK AHEAD SCHEDULE. The Follow-up Phase will be represented by the Construction Activities in the Baseline Schedule and in the schedule updates.

1.6.2.1.4 Construction Activities

No on-site construction activity may have a duration in excess of 20 working days. Contractor activities must be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days, unless otherwise defined in this contract.

1.6.2.1.5 Turnover and Closeout Activities

Include activities with all items on the NAVFAC Red Zone Checklist/POAM that are applicable to this project. As a minimum, include all testing, specialized inspection activities, Pre-Final Inspection, Punch List Completion, Final Inspection and Acceptance. Add a milestone for the Facility Turnover Planning Meeting at approximately 75 percent construction contract completion or three to six months prior to Contract Completion Date (CCD), whichever is sooner.

1.6.2.2 Contract Milestones and Constraints

1.6.2.2.1 Project Start Date Milestones

Include as the first activity on the schedule a start milestone titled "Contract Award", which must have a Mandatory Start constraint equal to the Contract Award Date.

1.6.2.2.2 Facility Turnover Planning Meeting Milestones

See paragraph ACTIVITY CATEGORIES above.

1.6.2.2.3 Substantial Completion Milestone

Include an unconstrained finish milestone on the schedule titled "Substantial Completion". Substantial Completion is defined as the point in time the Government would consider the project ready for beneficial occupancy wherein by mutual agreement of the Government and Contractor, Government use of the facility is allowed while construction access continues in order to complete remaining items (e.g. punch list and other close out submittals).

1.6.2.2.4 Projected Completion Milestone

Include an unconstrained finish milestone on the schedule titled "Projected Completion". Projected Completion is defined as the point in time the Government would consider the project complete. This milestone must have the Contract Completion (CCD) milestone as its only successor.

1.6.2.2.5 Contract Completion Date (CCD) Milestone

Include as the last activity on the schedule a finish milestone titled "Contract Completion (CCD)". Calculation of schedule updates must be such that if the finish of the "Projected Completion" milestone falls after the contract completion date, then negative float will be calculated on the longest path and if the finish of the "Projected Completion" milestone falls before the contract completion date, the float calculation must reflect positive float on the longest path.

1.6.2.3 Work Breakdown Structure & Activity Code

At a minimum, the Contractor must establish a Work Breakdown Structure

(WBS) and provide activity codes identified as follows:

1.6.2.3.1 Work Breakdown Structure (WBS)

Group all activities and milestones within appropriate WBS categories including, at a minimum, the following:

a. Project Milestones:

(1) Management Milestones

(2) Project Administrative Meetings

b. Pre-Construction Phase:

(1) Submittals and Reviews

(2) Procurement

c. Construction Phase; Create multiple sub-sections in accordance with project specific categories of work including in WBS descending order as follows:

(1) General Area

(a) Type of Work Item

1. Location

d. Commissioning & Testing:

(1) Specific area/locations of commissioning

(2) Final Testing

(3) Training

e. Project Closeout: Include activity items such as Punchlist, Demobilization, O&M, As-built Drawings, and As-built NAS.

f. Modifications: Create multiple sub-sections as the project progresses identified by modifications issued.

1.6.2.3.2 Responsibility Code

All activities in the project schedule must be identified with the party responsible for completing the task. Activities must not belong to more than one responsible party.

1.6.2.4 Anticipated Weather Lost Work Days

Use the National Oceanic and Atmospheric Administration's (NOAA) historical monthly averages for days with precipitation, using a nominal 30-year, greater than 0.10 inch amount parameter, as indicated on the Station Report for the NOAA location closest to the project site as the basis for establishing a "Weather Calendar" showing the number of anticipated non-workdays for each month due to adverse weather, in addition to Saturdays, Sundays and all Federal Holidays as non-work days. Assign the Weather Calendar to any activity that could be impacted by

adverse weather. The Contracting Officer will issue a modification in accordance with the contract clauses, giving the Contractor a time extension for the difference of days between the anticipated and actual adverse weather delay if the number of actual adverse weather delay days exceeds the number of days anticipated for the month in which the delay occurs and the adverse weather delayed activities are critical to contract completion. A lost workday due to weather conditions is defined as a day in which the Contractor cannot work at least 50 percent of the day on the impacted activity.

1.6.2.5 Cost Loading

1.6.2.5.1 Cost Loading Activities

Assign Material and Equipment Costs, for which payment will be requested in advance of installation, to their respective procurement activity (i.e., the material/equipment on-site activity). Assign cost for material/equipment, paid for after installation; labor; and construction equipment to their respective Construction Activities. The value of commissioning, testing and closeout WBS section may not be less than 10 percent of the total costs for Procurement and Construction Activities. Evenly disperse overhead and profit to each activity over the duration of the project.

1.6.2.5.2 Quantities and Units of Measure

Each cost loaded activity must have a detailed quantity breakdown and unit of measure. Lump sum costing is not acceptable.

1.6.3 Schedule Software Settings and Restrictions

a. Activity Constraints: Date/time constraint(s), other than those required by the contract, are not allowed unless accepted by the Contracting Officer. Identify any constraints proposed and provide an explanation for the purpose of the constraint in the Narrative Report as described in paragraph REQUIRED TABULAR REPORTS.

b. Default Progress Data Disallowed: Actual Start and Actual Finish dates on the CPM schedule must match the dates on the Contractor Quality Control and Production Reports.

c. Software Settings: Handle schedule calculations and Out-of-Sequence progress (if applicable) through Retained Logic, not Progress Override. Show all activity durations and float values in days. Show activity progress using Remaining Duration. Set default activity type to "Task Dependent".

d. At a minimum, include the following settings and parameters in Baseline Schedule preparation:

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

(2) Admin Drop-Down Menu, Admin Preferences, Time Periods Tab:

(a) Set time periods for P6 to 8.0 Hours/Day, 40.0 Hours/Week, 172.0 Hours/Month and 2000.0 Hours/Year.

(b) Use assigned calendar to specify the number of work hours for

each time period: Must be checked.

(3) Admin Drop-Down Menu, Admin Preferences, Earned Value Tab:

(a) Earned Value Calculation: Use "Budgeted values with current dates".

(4) Project Level, Dates Tab:

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

(5) Project Level, Defaults Tab:

(a) Duration Type: Set to "Fixed Duration & Units".

(b) Percent Complete Type: Set to "Physical".

(c) Activity Type: Set to "Task Dependent".

(d) 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.

(6) Project Level, Calculations Tab:

(a) Activity percent complete based on activity steps: Must be Checked.

(b) Reset Remaining Duration and Units to Original: Must be Checked.

(c) Subtract Actual from At Completion: Must be Checked.

(d) Recalculate Actual units and Cost when duration percent(%) complete changes: Must be Checked.

(e) Link Actual to Date and Actual This Period Units and Cost: Must be Checked.

(f) Price/Unit: Set to "$1/h".

(g) Update units when costs change on resource assignments: Must be Unchecked.

(7) Project Level, Settings Tab:

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

(8) Work Breakdown Structure Level, Earned Value Tab:

(a) Technique for Computing Performance Percent Complete: "Activity percent complete" is selected.

(b) Technique for Computing Estimate to Complete (ETC): "PF = 1" is selected.

1.6.4 Required Tabular Reports

Include the following reports with the Baseline, Monthly Update and any other required schedule submittals:

a. Log Report: Listing of all changes made between the previous schedule and current updated schedule.

b. Narrative Report: 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, critical path, and cost loading;

(5) Any decrease in previously reported activity Earned Amount;

(6) Pending items and status thereof, including permits, changes orders, and time extensions;

(7) Status of Contract Completion Date and interim milestones;

(8) Current and anticipated delays (describe cause of delay and corrective actions(s) and mitigation measures to minimize);

(9) 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.

c. Earned Value Report: List all activities having a budget amount cost loaded. Compile total earnings on the project from notice to proceed to current progress payment request. Show current budget, previous physical percent complete, to-date physical percent complete, previous earned value, to-date earned value and cost to complete on the report for each activity.

d. Schedule Variance Control (SVC) Diagram: With each schedule submission, provide a SVC diagram showing 1) Cash Flow S-Curves indicating planned project cost based on projected early and late activity finish dates and 2) Earned Value to-date. Revise Cash Flow S-Curves when the contract is modified, or as directed by the Contracting Officer.

1.7 SUBMISSION AND ACCEPTANCE

1.7.1 Monthly Network Analysis Updates

Meet with Government representatives at monthly intervals to review and agree on the information presented in the updated project schedule. The submission of an acceptable, updated schedule to the Government is a

condition precedent to the processing of the Contractor's invoice. Submit an acceptable, updated schedule to the Government regardless of whether a Contractor's invoice is submitted for the given period. The Contractor and Government consent to agree on percentage of payment for each activity progressed during the update period. Monthly update schedules must incorporate as-built events as they occurred and provide ongoing status of anticipated finish dates. As-built events must correspond to contemporaneous records including but not limited to submittals, daily production reports and quality control reports.

Provide the following with each Schedule submittal:

a. Time-Scaled Logic Diagram.

b. Reports listed in paragraph entitled "REQUIRED TABULAR REPORTS."

c. Data disks containing the project schedule. Include the back-up native .xer program files.

1.7.2 As-Built Schedule

As a condition precedent to the release of retention and making final payment, submit an "As-Built Schedule," as the last schedule update showing all activities at 100 percent completion. This schedule must reflect the exact manner in which the project was actually constructed.

1.8 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 Concurrent Delay, which will require an analysis of the facts to determine entitlement, followed by compensability 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.

1.8.1 No Reservation of Rights

All direct costs, indirect cost, and time extensions will be negotiated and made full, equitable and final at the time of modification issuance.

1.9 PROJECT FLOAT

Project Float is the length of time between the Contractor's Projected Completion Milestone and the Contract Completion Date Milestone. Project Float available in the schedule will not be for the exclusive use of either the Government or the Contractor.

The use of Resource Leveling or other techniques used for the purpose of artificially adjusting activity durations to consume float and influence critical path is prohibited.

1.10 THREE-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 Project Network Analysis Schedule. Key the work plans to NAS activity numbers and update each week to show the planned work for the current and following two-week period. Additionally, include upcoming outages, closures, field evaluation tests, 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, derived from but maintained separately from the Project NAS 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.

1.11 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 activity IDs that are being addressed. All test reports (e.g., concrete, soil compaction, weld, pressure) must reference schedule activity IDs that are being addressed.

1.12 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

1.1 DEFINITIONS

1.1.1 Submittal Descriptions (SD)

Submittals requirements are specified in the technical sections. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

SD-01 Preconstruction Submittals

Submittals which are required prior to or commencing work on site.

Certificates of insurance

Surety bonds

List of proposed Subcontractors

List of proposed products

Construction progress schedule

Network Analysis Schedule (NAS)

Submittal register

Schedule of prices or Earned Value Report

Health and safety plan

Work plan

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 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-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.

1.1.2 Approving Authority

Office or designated person authorized to approve submittal.

1.1.3 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.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor QC approval. Submit the following in accordance with this section.

SD-01 Preconstruction Submittals

Submittal Register; G

1.3 FORWARDING SUBMITTALS REQUIRING GOVERNMENT APPROVAL

1.3.1 Submittals Required from the Contractor

As soon as practicable after award of contract, and before procurement or fabrication, establish the Web-based Electronic Submittal Register required under subsection 1.7 of this specification section and submit electronically all submittals required in the technical sections of these specifications. Subsection 1.7 includes specific requirements for web-based routing of submittals designated for DOR (NAVFAC technical team) and COR (Contracting Officer's Representative).

NAVFAC SE will review and approve for the Contracting Officer those submittals reserved for Contracting Officer approval to verify submittals comply with the contract requirements.

1.3.1.1 O&M Data

NAVFAC SE will review and approve for the Contracting Officer O&M Data to verify the submittals comply with the contract requirements; submit data specified for a given item within 30 calendar days after the item is delivered to the contract site.

In the event the Contractor fails to deliver O&M Data within the time limits specified, the Contracting Officer may withhold from progress payments 50 percent of the price of the item with which such O&M Data are applicable.

1.4 PREPARATION

1.4.1 Transmittal Form

Transmit each submittal, except sample installations and sample panels to office of approving authority. Transmit submittals with transmittal form prescribed by Contracting Officer and standard for project. On the transmittal form identify Contractor, indicate date of submittal, and include information prescribed by transmittal form and required in paragraph IDENTIFYING SUBMITTALS of this section. Process transmittal forms to record actions regarding sample installations .

1.4.2 Identifying Submittals

When submittals are provided by a Subcontractor, the Prime Contractor is to prepare, review and stamp with Contractor's approval all specified submittals prior to submitting for Government approval.

Identify submittals, except sample installations and sample panels, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

a. Project title and location.

b. Construction contract number.

c. Date of the drawings and revisions.

d. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other subcontractor associated with the submittal.

e. Section number of the specification section by which submittal is required.

f. Submittal description (SD) number of each component of submittal.

g. When a resubmission, add alphabetic suffix on submittal description, for example, submittal 18 would become 18A, to indicate resubmission.

h. Product identification and location in project.

1.4.3 Format for SD-02 Shop Drawings

Shop drawings are not to be less than 8 1/2 by 11 inches nor more than 30 by 42 inches, except for full size patterns or templates. Prepare drawings to accurate size, with scale indicated, unless other form is required. Drawings are to be suitable for reproduction and be of a quality to produce clear, distinct lines and letters with dark lines on a white background.

Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph IDENTIFYING SUBMITTALS.

Number drawings in a logical sequence. Each drawing is to bear the number of the submittal in a uniform location adjacent to the title block. Place the Government contract number in the margin, immediately below the title block, for each drawing.

Dimension drawings, except diagrams and schematic drawings; prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

Include the nameplate data, size and capacity on drawings. Also include applicable federal, military, industry and technical society publication references.

Submit drawings PDF format.

1.4.4 Format of SD-03 Product Data and SD-08 Manufacturer's Instructions

Present product data submittals for each section. Include table of contents, listing page and catalog item numbers for product data.

Indicate, by prominent notation, each product which is being submitted; indicate specification section number and paragraph number to which it pertains.

Supplement product data with material prepared for project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for project, with information and format as required for submission of SD-07 Certificates.

Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable federal,

military, industry and technical society publication references. Should manufacturer's data require supplemental information for clarification, submit as specified for SD-07 Certificates.

Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), and Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal and marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically. Partial submittals will not be accepted for expedition of construction effort.

Submit manufacturer's instructions prior to installation.

1.4.5 Format of SD-04 Samples

Furnish samples in sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately same size as specified:

a. Sample of Equipment or Device: Full size.

b. Sample of Materials Less Than 2 by 3 inches: Built up to 8 1/2 by 11 inches.

c. Sample of Materials Exceeding 8 1/2 by 11 inches: Cut down to 8 1/2 by 11 inches and adequate to indicate color, texture, and material variations.

d. Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.

e. Sample of Non-Solid Materials: Pint. Examples of non-solid materials are sand and paint.

f. Color Selection Samples: 2 by 4 inches. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified. Sizes and quantities of samples are to represent their respective standard unit.

g. Sample Panel: 4 by 4 feet.

h. Sample Installation: 100 square feet.

Samples Showing Range of Variation: Where variations in color, finish, pattern, or texture are unavoidable due to nature of the materials, submit

sets of samples of not less than three units showing extremes and middle of range. Mark each unit to describe its relation to the range of the variation.

Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples are to be in undamaged condition at time of use.

Recording of Sample Installation: Note and preserve the notation of area constituting sample installation but remove notation at final clean up of project.

When color, texture or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.4.6 Format of SD-05 Design Data and SD-07 Certificates

Provide design data and certificates on 8 1/2 by 11 inches paper.

1.4.7 Format of SD-06 Test Reports and SD-09 Manufacturer's Field Reports

Indicate by prominent notation, each report in the submittal. Indicate specification number and paragraph number to which it pertains.

1.4.8 Format of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

When submittal includes a document which is to be used in project or become part of project record, other than as a submittal, do not apply Contractor's approval stamp to document, but to a separate sheet accompanying document.

1.4.9 Source Drawings for Shop Drawings

The entire set of Source Drawing files (DWG) will not be provided to the Contractor. Only those requested by the Contractor to prepare shop drawings may be provided. Request the specific Drawing Number only for the preparation of Shop Drawings. These drawings may only be provided after award.

1.4.9.1 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 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 Source Drawing files are not construction documents. Differences may exist between the Source Drawing files and the corresponding construction documents. The Government makes no

representation regarding the accuracy or completeness of the electronic Source Drawing 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 data related to this contract, remove all previous indicia of ownership (seals, logos, signatures, initials and dates).

1.4.10 Electronic File Format

Provide submittals in electronic format, with the exception of material samples required for SD-04 Samples items. Compile the submittal file as a single, complete document, to include the Transmittal Form described within. Name the electronic submittal file specifically according to its contents, coordinate the file naming convention with the Contracting Officer. Electronic files must be of sufficient quality that all information is legible. Electronic format shall be in PDF, unless otherwise specified or directed by the Contracting Officer. Generate PDF files from original documents with bookmarks so that the text included in the PDF file is both searchable and can be copied. If documents are scanned, Optical Character Resolution (OCR) routines are required. Index and bookmark files exceeding 30 pages to allow efficient navigation of the file. When required, the electronic file must include a valid electronic signature, or scan of a signature.

Email electronic submittal documents fewer than 10MB to an email address as directed by the Contracting Officer. Provide electronic documents over 10MB on an optical disc, or through an electronic file sharing system such as the AMRDEC SAFE Web Application located at the following website: https://safe.amrdec.army.mil/safe/.

Provide hard copies of submittals when requested by the Contracting Officer. Up to 3 additional hard copies of any submittal may be requested at the discretion of the Contracting Officer, at no additional cost to the Government.

1.5 QUANTITY OF SUBMITTALS

1.5.1 Number of Samples SD-04 Samples

a. Submit two samples, or two sets of samples showing range of variation, of each required item. One approved sample or set of samples will be retained by approving authority and one will be returned to Contractor.

b. Submit one sample panel or provide one sample installation where directed. Include components listed in technical section or as directed.

c. Submit one sample installation, where directed.

d. Submit one sample of non-solid materials.

1.6 VARIATIONS

Variations from contract requirements require both Designer of Record (DOR) and Government approval pursuant to contract Clause FAR 52.236-21 and will be considered where advantageous to Government.

1.6.1 Considering Variations

Discussion with Contracting Officer prior to submission, after consulting with the DOR, will help ensure functional and quality requirements are met and minimize rejections and re-submittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

Specifically point out variations from contract requirements in transmittal letters. Failure to point out deviations may result in the Government requiring rejection and removal of such work at no additional cost to the Government.

1.6.2 Proposing Variations

When proposing variation, deliver written request to the Contracting Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government, including the DOR's written analysis and approval. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

1.6.3 Warranting that Variations are Compatible

When delivering a variation for approval, Contractor, including its Designer(s) of Record, warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.6.4 Review Schedule is Modified

In addition to normal submittal review period, a period of 10 working days will be allowed for consideration by the Government of submittals with variations.

1.7 WEB-BASED ELECTRONIC SUBMITTAL REGISTER FOR DESIGN-BID-BUILD

1.7.1 DESCRIPTION

Provide a Web-based Electronic Submittal Register with the following functionality:

a. Website performance. The online submittal register shall be organized into a single website with sufficient speed of access for users to be able to conveniently download and upload large (30-100 MB) .pdf format files and compressed video files with U.S. industry average wait times. Slow download and upload capability of the website can inhibit use and reduce its functionality. The provider of the website shall have a good track record of performance for similar web-based services as required herein.

b. All submittal documents (SD-01 thru SD-11, except as excluded in

paragraph g. below) shall be in .pdf format, and shall be listed by specification section and paragraph with other identifying requirements as listed in paragraph entitled, "Identifying Submittals," of this section.

c. All submittals required under 01 33 00 Submittal Procedures and the Contract Specifications shall be included, un-bundled. A bundled submittal is one where unrelated components are included under a single submission and would require a single review determination. For example, plumbing fixtures and plumbing hardware shall not be bundled, but shall be listed, submitted, and reviewed separately.

d. Each submittal shall have sequenced submittal approval pages with separate access permissions for 1) The NAVFAC technical team and designees, 2)The NAVFAC Project Manager/Design Manager, 3) The Contracting Officer's Representative, COR and designees, and 4) View Only. No submittal determination shall be accessible for download by the Contractor until the COR has reviewed and made a determination on a submittal.

e. Workflow

1. Submittals reserved for DOR/EOR/certifying official approval: The Contractor shall initially upload the .pdf submittal, and provide email notification to the NAVFAC team (technical team, PM/DM, COR). The NAVFAC Technical team member shall review the submittal, make a determination with electronic stamp, and upload the document. Once the document is uploaded the system shall provide email notification to the PM/DM. The PM/DM will then be able to review the document, make a determination with electronic stamp, and upload the document. Once the PM/DM has made a determination, an email notification shall be sent to the COR. The COR shall then be able to review the document, make a determination with electronic stamp, and upload the document. Once the COR has made a determination, an email notification shall be sent to the Contractor.

2. Submittals designated government approval, but not reserved for EOR/DOR/certifying official approval: The Contractor shall initially upload the .pdf submittal, and provide email notification to the COR. The COR shall then be able to review the document, make a determination with electronic stamp, and upload the document. Once the COR has made a determination, an email notification shall be sent to the Contractor.

3. Determination of workflow. Prior to the meeting in sub-paragraph (i) below, the government shall provide an annotated submittal register indicating which submittals shall receive workflow (1) above or workflow (2) above.

f. Determination actions. Provide for the following determinations in electronic pull-down menus for each submittal: 1) The four determinations listed in the paragraph entitled Review Notations: A, Approved; NA, Not Approved; AN, Approved as Noted; and NR, Not Reviewed, submittal is substantially incomplete. 2) In addition, provide the following additional action: RA, Receipt acknowledged.

g. Samples (SD-04), and Material and Color Submittals required under paragraph entitled Format of SD-04 Samples of this section shall be

submitted in duplicate (2) by mail to NAVFAC. Sample panels shall be provided non-electronically as may be required elsewhere in the Contract Specifications.

h. It is the intent of this subsection that the Web-based system provide the functionality of the traditionally paper based submittal register and submittal process. The Contractor may provide any additional functionality to the Web-based system such as date needed etc, which may benefit the Contractor's tracking of submittals.

i. The contractor shall arrange a meeting with the NAVFAC PM/DM and the Contracting Officer's representative early in the project startup to set up the Web-based Submittal Register. Additional linked web-pages and/or format editing may revise the proposed submittal register to assure complete functionality as directed by NAVFAC at no additional cost to the government.

j. Other required construction related web-based pages. In addition to the submittal register noted above, provide the following as part of a comprehensive web-based construction services portfolio.

1. RFI Log. Provide a web-based RFI log. All RFI's and responses shall be logged. The contractor shall upload pdf files of RFI's using a standard RFI format. Provide for response and endorsement by NAVFAC and by the Contracting Officer's Representative. Indicate whether the RFI is anticipated to have a cost or time impact. Set permissions for access to the RFI log as determined by NAVFAC SE and the Contracting Officer's representative.

2. Construction Sketch Log. All supplementary construction sketches incorporated into the contract during the course of construction shall be logged/uploaded by discipline. Set permissions for access to the construction sketch log as determined by NAVFAC SE and the Contracting Officer's Representative.

3. Contacts log. Provide a list of names and email addresses of all individuals involved in the project. This shall include the NAVFAC Construction Management team, the Contracting Officer, the NAVFAC SE Technical Team members, the NAVFAC SE Project Manager, and other individuals representing the Contractor. Set permissions for access as determined by NAVFAC SE and the Contracting Officer's representative.

4. Contract Documents. Provide viewable and downloadable .pdf files of the conformed Contract documents, both the Contract Drawings and Contract Specifications. Set permissions for access as determined by NAVFAC SE and the Contracting Officer's representative.

5. Correspondence. Provide pdf files of all formal correspondence (all letters and other notices), filed by date in a web-based correspondence file. Set permissions for access as determined by NAVFAC SE and the Contracting Officer's representative.

6. Meeting Notes. Provide a web-based file of .pdf copies of all meeting notes for the duration of the project. Set permissions for access as determined by NAVFAC SE and the Contracting Officer's representative.

7. Photos. Provide a viewable and downloadable log of all project photographs required under this contract. Provide legible thumbnail viewing on-line as well as download capability of the original full sized photographs. Set permissions for access as determined by NAVFAC SE and the Contracting Officer's representative.

8. Construction progress daily reports. Provide a .pdf file of all daily reports. Set permissions for access as determined by NAVFAC SE and the Contracting Officer's representative.

9. Quality Control Report. Provide a .pdf log of all quality control reports. Set permissions for access as determined by NAVFAC SE and the Contracting Officer's representative.

10. Miscellaneous files. Provide a miscellaneous file for any other items relating to the project not covered by the above. Set permissions for access as determined by NAVFAC SE and the Contracting Officer's representative.

11. Web server log. For the duration of the project maintain a web server log. Submit an electronic copy (DVD's) of the web server log every month, and as part of project close-out documentation. The intent of the web-server log is to record every electronic communication of the electronic submittal register and other required documentation in subparagraph 1.7.1 (b) through (j). k) The web-based submittal register and all other required functionality required in sub-paragraph 1.7.1 shall be provided under this contract by a commercial entity in the business of specifically providing web-based products to the construction industry for construction administration services. Individuals employed by the web-based construction services company to service this project shall have at least 5 years experience in providing customized web-based construction services.

1.7.2 Copies Delivered to the Government

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

1.8 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. Re-submit register and annotate monthly by the Contractor with actual submission and approval dates. When all items on the register have been fully approved, no further re-submittal is required.

d. 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."

e. Except as specified otherwise, allow review period, beginning with receipt by approving authority, that includes at least 15 working days for submittals for QC Manager approval and 20 working days for submittals for Contracting Officer approval. Period of review for submittals with Contracting Officer approval begins when Government receives submittal from QC organization.

f. Period of review for each resubmittal is the same as for initial submittal.

1.8.1 Reviewing, Certifying, Approving Authority

The QC organization is responsible for reviewing and certifying that submittals are in compliance with contract requirements. Approving authority on submittals is QC Manager unless otherwise specified for specific submittal. At each "Submittal" paragraph in individual specification sections, a notation "G," following a submittal item, indicates Contracting Officer is approving authority for that submittal item. An "S" following a submittal item, indicates that the QC Manager is the approving authority, and that a copy of the approved submittal must be provided to the Designer of Record.

1.8.2 Constraints

Conform to provisions of this section, unless explicitly stated otherwise for submittals listed or specified in this contract.

Submit complete submittals for each definable feature of work. Submit at the same time components of definable feature interrelated as a system.

When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, submittal will be returned without review.

Approval of a separate material, product, or component does not imply approval of assembly in which item functions.

1.8.3 QC Organization Responsibilities

a. Note date on which submittal was received from Contractor on each submittal.

b. Review each submittal; and check and coordinate each submittal with requirements of work and contract documents.

c. Review submittals for conformance with project design concepts and compliance with contract documents.

d. Act on submittals, determining appropriate action based on QC organization's review of submittal.

(1) When QC Manager is approving authority, take appropriate action on submittal from the possible actions defined in paragraph APPROVED SUBMITTALS.

(2) When Contracting Officer is approving authority or when variation has been proposed, forward submittal to Government with certifying statement or return submittal marked "not reviewed" or "revise and resubmit" as appropriate. The QC organization's review of submittal determines appropriate action.

e. Ensure that material is clearly legible.

f. Stamp each sheet of each submittal with QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.

(1) When approving authority is Contracting Officer, QC organization will certify submittals forwarded to Contracting Officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract Number ____, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is submitted for Government approval.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Certified by QC Manager _____, Date _____"
(Signature)

(2) When approving authority is QC Manager, QC Manager will use the following approval statement when returning submittals to Contractor as "Approved" or "Approved as Noted."

"I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with contract Number , is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager _____, Date _____"
(Signature)

g. Sign certifying statement or approval statement. The QC organization member designated in the approved QC plan is the person signing certifying statements. The use of original ink for signatures is required. Stamped signatures are not acceptable.

h. Update submittal register as submittal actions occur and maintain the submittal register at project site until final acceptance of all work by Contracting Officer.

i. Retain a copy of approved submittals at project site, including Contractor's copy of approved samples.

j. For "S" submittals, provide a copy of the approved submittal to the Designer of Record.

1.9 GOVERNMENT APPROVING AUTHORITY

When approving authority is Contracting Officer, the Government will:

a. Note date on which submittal was received from QC Manager.

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.

1.9.1 Review Notations

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.

1.10 DISAPPROVED SUBMITTALS

Contractor shall 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 Contract clause 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.

1.11 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.

1.12 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.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 35 26.00 25

GOVERNMENTAL SAFETY REQUIREMENTS
12/15
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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 SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.34	(2001; R 2012) Protection of the Public on or Adjacent to Construction Sites
ASSE/SAFE A10.44	(2014) Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations
ASSE/SAFE Z244.1	(2003; R 2014) Control of Hazardous Energy Lockout/Tagout and Alternative Methods
ASSE/SAFE Z359.0	(2012) Definitions and Nomenclature Used for Fall Protection and Fall Arrest
ASSE/SAFE Z359.1	(2007) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
ASSE/SAFE Z359.11	(2014) Safety Requirements for Full Body Harnesses
ASSE/SAFE Z359.12	(2009) Connecting Components for Personal Fall Arrest Systems
ASSE/SAFE Z359.13	(2013) Personal Energy Absorbers and Energy Absorbing Lanyards
ASSE/SAFE Z359.14	(2014) Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems
ASSE/SAFE Z359.15	(2014) Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems
ASSE/SAFE Z359.2	(2007) Minimum Requirements for a Comprehensive Managed Fall Protection Program
ASSE/SAFE Z359.3	(2007) Safety Requirements for Positioning and Travel Restraint Systems
ASSE/SAFE Z359.4	(2013) Safety Requirements for

	Assisted-Rescue and Self-Rescue Systems, Subsystems and Components
ASSE/SAFE Z359.6	(2009) Specifications and Design Requirements for Active Fall Protection Systems
ASSE/SAFE Z359.7	(2011) Qualification and Verification Testing of Fall Protection Products

ASME INTERNATIONAL (ASME)

ASME B30.20	(2013; INT Oct 2010 - May 2012) Below-the-Hook Lifting Devices
ASME B30.22	(2010) Articulating Boom Cranes
ASME B30.26	(2015; INT Jun 2010 - Jun 2014) Rigging Hardware
ASME B30.3	(2012) Tower Cranes
ASME B30.5	(2014) Mobile and Locomotive Cranes
ASME B30.8	(2010) Floating Cranes and Floating Derricks
ASME B30.9	(2014; INT Feb 2011 - Nov 2013) Slings

ASTM INTERNATIONAL (ASTM)

ASTM F855	(2015) Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 1048	(2003) Guide for Protective Grounding of Power Lines
IEEE C2	(2012; Errata 2012; INT 1-4 2012; INT 5-7 2013; INT 8-10 2014; INT 11 2015) National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA Z535.2	(2011) Environmental and Facility Safety Signs

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(2013) Standard for Portable Fire Extinguishers
NFPA 241	(2013; Errata 2015) Standard for Safeguarding Construction,Alteration, and Demolition Operations

NFPA 306	(2014) Standard for Control of Gas Hazards on Vessels
NFPA 51B	(2014) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2014; AMD 1 2013; Errata 1 2013; AMD 2 2013; Errata 2 2013; AMD 3 2014; Errata 3-4 2014; AMD 4-6 2014) National Electrical Code
NFPA 70E	(2015; ERTA 1 2015) Standard for Electrical Safety in the Workplace

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

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

10 CFR 20	Standards for Protection Against Radiation
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1910.147	Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1910.333	Selection and Use of Work Practices
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1915.89	Control of Hazardous Energy (Lockout/Tags-Plus)
29 CFR 1919	Gear Certification
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.1400	Cranes and Derricks in Construction
29 CFR 1926.16	Rules of Construction
29 CFR 1926.450	Scaffolds
29 CFR 1926.500	Fall Protection
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
CPL 2.100	(1995) Application of the Permit-Required Confined Spaces (PRCS) Standards, 29 CFR 1910.146

1.2 DEFINITIONS

1.2.1 Competent Person (CP)

The CP is a person designated in writing, who, through training, knowledge and experience, is capable of identifying, evaluating, and addressing existing and predictable hazards in the working environment or working conditions that are dangerous to personnel, and who has authorization to take prompt corrective measures with regards to such hazards.

1.2.2 Competent Person, Confined Space

The CP, Confined Space, is a person meeting the competent person requirements as defined EM 385-1-1 Appendix Q, with thorough knowledge of OSHA's Confined Space Standard, 29 CFR 1910.146, and designated in writing to be responsible for the immediate supervision, implementation and monitoring of the confined space program, who through training, knowledge and experience in confined space entry is capable of identifying, evaluating and addressing existing and potential confined space hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.3 Competent Person, Cranes and Rigging

The CP, Cranes and Rigging, as defined in EM 385-1-1 Appendix Q, is a person meeting the competent person, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the Crane and Rigging Program, who through training, knowledge and experience in crane and rigging is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.4 Competent Person, Excavation/Trenching

A CP, Excavation/Trenching, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and 29 CFR 1926, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the excavation/trenching program, who through training, knowledge and experience in excavation/trenching is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.5 Competent Person, Fall Protection

The CP, Fall Protection, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and in accordance with ASSE/SAFE Z359.0, who has been designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the fall protection program, who through training, knowledge and experience in fall protection and rescue systems and equipment, is capable of identifying, evaluating and addressing existing and potential fall hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.6 Competent Person, Scaffolding

The CP, Scaffolding is a person meeting the competent person requirements in EM 385-1-1 Appendix Q, and designated in writing by the employer to be

responsible for immediate supervising, implementing and monitoring of the scaffolding program. The CP for Scaffolding has enough training, knowledge and experience in scaffolding to correctly identify, evaluate and address existing and potential hazards and also has the authority to take prompt corrective measures with regard to these hazards. CP qualifications must be documented and include experience on the specific scaffolding systems/types being used, assessment of the base material that the scaffold will be erected upon, load calculations for materials and personnel, and erection and dismantling. The CP for scaffolding must have a documented, minimum of 8-hours of scaffold training to include training on the specific type of scaffold being used (e.g. mast-climbing, adjustable, tubular frame), in accordance with EM 385-1-1 Section 22.B.02.

1.2.7 Competent Person (CP) Trainer

A competent person trainer as defined in EM 385-1-1 Appendix Q, who is qualified in the material presented, and who possesses a working knowledge of applicable technical regulations, standards, equipment and systems related to the subject matter on which they are training Competent Persons. A competent person trainer must be familiar with the typical hazards and the equipment used in the industry they are instructing. The training provided by the competent person trainer must be appropriate to that specific industry. The competent person trainer must evaluate the knowledge and skills of the competent persons as part of the training process.

1.2.8 High Risk Activities

High Risk Activities are activities that involve work at heights, crane and rigging, excavations and trenching, scaffolding, electrical work, and confined space entry.

1.2.9 High Visibility Accident

A High Visibility Accident is any mishap which may generate publicity or high visibility.

1.2.10 Load Handling Equipment (LHE)

LHE is a term used to describe cranes, hoists and all other hoisting equipment (hoisting equipment means equipment, including crane, derricks, hoists and power operated equipment used with rigging to raise, lower or horizontally move a load).

1.2.11 Medical Treatment

Medical Treatment is treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

1.2.12 Near Miss

A Near Miss is a recognized hazard that was corrected, avoided potential accident, or a minor incident with no injury or damage that was "on the spot" corrected. Self-report near misses to the Contracting Officer. Near miss reports are used by Contracting Officer for Operational Risk Management purposes and are not held against the Contractor for evaluation purposes..

1.2.13 Operating Envelope

The Operating Envelope is the area surrounding any crane or load handling equipment. Inside this "envelope" is the crane, the operator, riggers and crane walkers, other personnel involved in the operation, rigging gear between the hook, the load, the crane's supporting structure (i.e. ground or rail), the load's rigging path, the lift and rigging procedure.

1.2.14 Qualified Person (QP)

The QP is a person designated in writing, who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems related to the subject matter, the work, or the project.

1.2.15 Qualified Person, Fall Protection (QP for FP)

A QP for FP is a person meeting the requirements of EM 385-1-1 Appendix Q, and ASSE/SAFE Z359.0, with a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, and evaluating and specifying fall protection and rescue systems.

1.2.16 Recordable Injuries or Illnesses

Recordable Injuries or Illnesses are any work-related injury or illness that results in:

a. Death, regardless of the time between the injury and death, or the length of the illness;

b. Days away from work (any time lost after day of injury/illness onset);

c. Restricted work;

d. Transfer to another job;

e. Medical treatment beyond first aid;

f. Loss of consciousness; or

g. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (a) through (f) above.

1.2.17 USACE Property and Equipment

Interpret "USACE" property and equipment specified in USACE EM 385-1-1 as Government property and equipment.

1.2.18 Load Handling Equipment (LHE) Accident or Load Handling Equipment Mishap

A LHE accident occurs when any one or more of the eight elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment;

two-blocking; overload; or collision, including unplanned contact between the load, crane, or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents, even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, or roll over). Document any mishap that meets the criteria described in the Contractor Significant Incident Report (CSIR) using the NAVFAC prescribed Navy Crane Center (NCC) form.

1.3 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

Accident Prevention Plan (APP); G

SD-06 Test Reports

Monthly Exposure Reports

Notifications and Reports

Accident Reports; G

LHE Inspection Reports

SD-07 Certificates

Contractor Safety Self-Evaluation Checklist

Crane Operators/Riggers

Standard Lift Plan; G

Critical Lift Plan ; G

Naval Architecture Analysis; G

Activity Hazard Analysis (AHA)

Confined Space Entry Permit

Hot Work Permit

Certificate of Compliance

Third Party Certification of Barge-Mounted Mobile Cranes

License Certificates

Radiography Operation Planning Work Sheet; G

1.4 MONTHLY EXPOSURE REPORTS

Provide a Monthly Exposure Report and attach to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both Prime and subcontractor. Failure to submit the report may result in retention of up to 10 percent of the voucher.

1.5 CONTRACTOR SAFETY SELF-EVALUATION CHECKLIST

Contracting Officer will provide a "Contractor Safety Self-Evaluation checklist" to the Contractor at the pre-construction conference. Complete the checklist monthly and submit with each request for payment voucher. An acceptable score of 90 or greater is required. Failure to submit the completed safety self-evaluation checklist or achieve a score of at least 90 may result in retention of up to 10 percent of the voucher.

1.6 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, comply with the most recent edition of USACE EM 385-1-1, and federal, state, and local laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

1.6.1 Subcontractor Safety Requirements

For this contract, neither Contractor nor any subcontractor may enter into contract with any subcontractor that fails to meet the following requirements. The term subcontractor in this and the following paragraphs means any entity holding a contract with the Contractor or with a subcontractor at any tier.

1.6.1.1 Experience Modification Rate (EMR)

Subcontractors on this contract must have an effective EMR less than or equal to 1.10, as computed by the National Council on Compensation Insurance (NCCI) or if not available, as computed by the state agency's rating bureau in the state where the subcontractor is registered, when entering into a subcontract agreement with the Prime Contractor or a subcontractor at any tier. The Prime Contractor may submit a written request for additional consideration to the Contracting Officer where the specified acceptable EMR range cannot be achieved. Relaxation of the EMR range will only be considered for approval on a case-by-case basis for special conditions and must not be anticipated as tacit approval. Contractor's Site Safety and Health Officer (SSHO) must collect and maintain the certified EMR ratings for all subcontractors on the project and make them available to the Government at the Government's request.

1.6.1.2 OSHA Days Away from Work, Restricted Duty, or Job Transfer (DART) Rate

Subcontractors on this contract must have a DART rate, calculated from the most recent, complete calendar year, less than or equal to 3.4 when entering into a subcontract agreement with the Prime Contractor or a subcontractor at any tier. The OSHA Dart Rate is calculated using the following formula:

(N/EH) x 200,000

where:

N = number of injuries and illnesses with days away, restricted work, or job transfer

EH = total hours worked by all employees during most recent, complete calendar year

200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year)

The Prime Contractor may submit a written request for additional consideration to the Contracting Officer where the specified acceptable OSHA Dart rate range cannot be achieved for a particular subcontractor. Relaxation of the OSHA DART rate range will only be considered for approval on a case-by-case basis for special conditions and must not be anticipated as tacit approval. Contractor's Site Safety and Health Officer (SSHO) must collect and maintain self-certified OSHA DART rates for all subcontractors on the project and make them available to the Government at the Government's request.

1.7 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

1.7.1 Personnel Qualifications

1.7.1.1 Site Safety and Health Officer (SSHO)

Provide an SSHO that meets the requirements of EM 385-1-1 Section 1. The SSHO must ensure that the requirements of 29 CFR 1926.16 are met for the project. Provide a Safety oversight team that includes a minimum of one (1) person at each project site to function as the Site Safety and Health Officer (SSHO). The SSHO or an equally-qualified Alternate SSHO must be at the work site at all times to implement and administer the Contractor's safety program and government-accepted Accident Prevention Plan. The SSHO and Alternate SSHO must have the required training, experience, and qualifications in accordance with EM 385-1-1 Section 01.A.17, and all associated sub-paragraphs.

If the SSHO is off-site for a period longer than 24 hours, an equally-qualified alternate SSHO must be provided and must fulfill the same roles and responsibilities as the primary SSHO. When the SSHO is temporarily (up to 24 hours) off-site, a Designated Representative (DR), as identified in the AHA may be used in lieu of an Alternate SSHO, and must be on the project site at all times when work is being performed. Note that the DR is a collateral duty safety position, with safety duties in addition to their full time occupation.

1.7.1.2 Contractor Quality Control (QC) Manager:

The Contractor Quality Control Manager cannot be the SSHO on this project, even though the QC has safety inspection responsibilities as part of the QC duties.

1.7.1.3 Competent Person Qualifications

Provide Competent Persons in accordance with EM 385-1-1, Appendix Q and

herein. Competent Persons for high risk activities include confined space, cranes and rigging, excavation/trenching, fall protection, and electrical work. The CP for these activities must be designated in writing, and meet the requirements for the specific activity (i.e. competent person, fall protection).

The Competent Person identified in the Contractor's Safety and Health Program and accepted Accident Prevention Plan, must be on-site at all times when the work that presents the hazards associated with their professional expertise is being performed. Provide the credentials of the Competent Persons(s) to the the Contracting Officer for information in consultation with the Safety Office.

1.7.1.3.1 Competent Person for Confined Space Entry

Provide a Confined Space (CP) Competent Person who meets the requirements of EM 385-1-1, Appendix Q, and herein. The CP for Confined Space Entry must supervise the entry into each confined space.

Since this work involves marine operations that handle combustible or hazardous materials, this person must have the ability to understand and follow through on the air sampling, Personal Protective Equipment (PPE), and instructions of a Marine Chemist, Coast Guard authorized persons, or Certified Industrial Hygienist. Confined space and enclosed space work must comply with NFPA 306, OSHA 29 CFR 1915, Subpart B, "Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment," or as applicable, 29 CFR 1910.147 for general industry.

1.7.1.3.2 Competent Person for Scaffolding

Provide a Competent Person for Scaffolding who meets the requirements of EM 385-1-1, Section 22.B.02 and herein.

1.7.1.3.3 Competent Person for Fall Protection

Provide a Competent Person for Fall Protection who meets the requirements of EM 385-1-1, Section 21.C.04 and herein.

1.7.1.4 Qualified Trainer Requirements

Individuals qualified to instruct the 40 hour contract safety awareness course, or portions thereof, must meet the definition of a Competent Person Trainer, and, at a minimum, possess a working knowledge of the following subject areas: EM 385-1-1, Electrical Standards,Lockout/Tagout, Fall Protection, Confined Space Entry for Construction; Excavation, Trenching and Soil Mechanics, and Scaffolds in accordance with 29 CFR 1926.450, Subpart L.

Instructors are required to:

a. Prepare class presentations that cover construction-related safety requirements.

b. Ensure that all attendees attend all sessions by using a class roster signed daily by each attendee. Maintain copies of the roster for at least five (5) years. This is a certification class and must be attended 100 percent. In cases of emergency where an attendee cannot make it to a session, the attendee can make it up in another class session for the same subject.

c. Update training course materials whenever an update of the EM 385-1-1 becomes available.

d. Provide a written exam of at least 50 questions. Students are required to answer 80 percent correctly to pass.

e. Request, review and incorporate student feedback into a continuous course improvement program.

1.7.1.5 Crane Operators/Riggers

Provide Operators meeting the requirements in EM 385-1-1, Section 15.B for Riggers and Section 16.B for Crane Operators. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacities of 50,000 pounds or greater, designate crane operators qualified by a source that qualifies crane operators (i.e., union, a government agency, or an organization that tests and qualifies crane operators). Provide proof of current qualification.

1.7.2 Personnel Duties

1.7.2.1 Duties of the Site Safety and Health Officer (SSHO)

The SSHO must:

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily production report.

b. Conduct mishap investigations and complete required accident reports. Report mishaps and near misses.

c. Use OSHA's Form 300 to log work-related injuries and illnesses occurring on the project site for Prime Contractors and subcontractors. Post and maintain the Form 300 on the site Safety Bulletin Board.

d. Maintain applicable safety reference material on the job site.

e. Attend the pre-construction conference, pre-work meetings including preparatory meetings, and periodic in-progress meetings.

f. Review the APP and AHAs for compliance with EM 385-1-1, and approve, sign, implement and enforce them.

g. Establish a Safety and Occupational Health (SOH) Deficiency Tracking System that lists and monitors outstanding deficiencies until resolution.

h. Ensure subcontractor compliance with safety and health requirements.

i. Maintain a list of hazardous chemicals on site and their material Safety Data Sheets (SDS).

j. Maintain a weekly list of high hazard activities involving energy, equipment, excavation, entry into confined space, and elevation, and be

prepared to discuss details during QC Meetings.

k. Provide and keep a record of site safety orientation and indoctrination for Contractor employees, subcontractor employees, and site visitors.

l. Ensure "near miss" hazardous conditions are promptly and permanently corrected or that hazards which cannot be on-the-spot corrected are marked, barricaded, guarded or temporarily fixed to reduce hazard. Self report near misses to Contracting Officer using electronic NAVFAC SE "Near Miss" form provided at the Preconstruction Conference - Safety Meeting.

Superintendent, QC Manager, and SSHO are subject to dismissal if the above duties are not being effectively carried out. If Superintendent, QC Manager, or SSHO are dismissed, project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.

1.7.3 Meetings

1.7.3.1 Preconstruction Conference

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project must attend the preconstruction conference. This includes the project superintendent, Site Safety and Occupational Health officer, quality control manager, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, and Government review of AHAs to preclude project delays.

c. Deficiencies in the submitted APP, identified during the Contracting Officer's review, must be corrected, and the APP re-submitted for review prior to the start of construction. Work is not permitted to begin work until an APP is established that is acceptable to the Contracting Officer.

1.7.3.2 Safety Meetings

Conduct safety meetings to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent Safety and Occupational Health (SOH) training and motivation. Conduct meetings at least once a month for all supervisors on the project location. The SSHO, supervisors, foremen, or CDSOs must conduct meetings at least once a week for the trade workers. Document meeting minutes to include the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Maintain documentation on-site and furnish copies to the Contracting Officer on request. Notify the Contracting Officer of all scheduled meetings 7 calendar days in advance.

1.8 ACCIDENT PREVENTION PLAN (APP)

A qualified person must prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, Appendix A, and as supplemented herein. Cover all paragraph and subparagraph elements in EM 385-1-1, Appendix A. The APP must be job-specific and address any unusual or unique aspects of the project or activity for which it is written. The APP must interface with the Contractor's overall safety and health program referenced in the APP in the applicable APP element, and made site-specific. Describe the methods to evaluate past safety performance of potential subcontractors in the selection process. Also, describe innovative methods used to ensure and monitor safe work practices of subcontractors. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are 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 out. The APP must be signed by an officer of the firm (Prime Contractor senior person), the individual preparing the APP, the on-site superintendent, the designated SSHO, the Contractor Quality Control Manager, and any designated Certified Safety Professional (CSP) or Certified Health Physicist (CIH). The SSHO must provide and maintain the APP and a log of signatures by each subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Contracting Officer. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

Submit the APP to the Contracting Officer calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP. Once reviewed and accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP is cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified. Continuously review and amend the APP, as necessary, throughout the life of the contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Quality Control Manager. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered. Should any severe hazard exposure (i.e. imminent danger) become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate and remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34), and the environment.

1.8.1 Names and Qualifications

Provide plans in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

a. Names and qualifications (resumes including education, training, experience and certifications) of site safety and health personnel designated to perform work on this project to include the designated Site Safety and Health Officer and other competent and qualified

personnel to be used. Specify the duties of each position.

b. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; and personal protective equipment and clothing to include selection, use and maintenance.

1.8.2 Plans

Provide plans in the APP in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

1.8.2.1 Confined Space Entry Plan

Develop a confined or enclosed space entry plan in accordance with EM 385-1-1, applicable OSHA standards 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, OSHA Directive CPL 2.100, and any other federal, state and local regulatory requirements identified in this contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)

1.8.2.2 Standard Lift Plan (SLP)

Plan lifts to avoid situations where the operator cannot maintain safe control of the lift. Prepare a written SLP in accordance with EM 385-1-1, Section 16.A.03, using Form 16-2 for every lift or series of lifts (if duty cycle or routine lifts are being performed). The SLP must be developed, reviewed and accepted by all personnel involved in the lift in conjunction with the associated AHA. Signature on the AHA constitutes acceptance of the plan. Maintain the SLP on the LHE for the current lift(s) being made. Maintain historical SLPs for a minimum of 3 months.

1.8.2.3 Critical Lift Plan - Crane or Load Handling Equipment

Provide a Critical Lift Plan as required by EM 385-1-1, Section 16.H.01, using Form 16-3. Critical lifts require detailed planning and additional or unusual safety precautions. Develop and submit a critical lift plan to the Contracting Officer 30 calendar days prior to critical lift. Comply with load testing requirements in accordance with EM 385-1-1, Section 16.F.03.

In addition to the requirements of EM 385-1-1, Section 16.H.02, the critical lift plan must include the following:

a. For lifts of personnel, demonstrate compliance with the requirements of 29 CFR 1926.1400 and EM 385-1-1, Section 16.T.

b. For barge mounted mobile cranes, provide a Naval Architecture Analysis and include an LHE Manufacturer's Floating Service Load Chart in accordance with the criteria from the selected standard in EM 385-1-1, Section 16.L.02. The Floating Service Load Chart must provide a table of rated load versus boom angle and radius. The Floating Service Load

Chart must also provide the maximum allowable machine list and trim associated with the tabular loads and radii provided. If the Manufacturer's Floating Service Load Chart is not available, a floating service load chart may be developed and provided by a qualified Registered Professional Engineer (RPE), competent in the field of floating cranes. The Load Chart must be in accordance with the criteria from the selected standard in EM 385-1-1, Section 16.L; provide a table of rated load versus boom angle and radius; provide the maximum allowable machine list and machine trim associated with the tabular loads and radii provided; and be stamped by a RPE qualified and competent in the field of floating cranes. The RPE, competent in the field of floating cranes must stamp and certify (sign) that the Naval Architectural Analysis (NAA) meets the requirements of EM 385-1-1, Section 16.L.03.

c. Multi-purpose machines, material handling equipment, and construction equipment used to lift loads that are suspended by rigging gear, require proof of authorization from the machine OEM that the machine is capable of making lifts of loads suspended by rigging equipment. Demonstrate that the operator is properly trained and that the equipment is properly configured to make such lifts and is equipped with a load chart.

1.8.2.4 Fall Protection and Prevention (FP&P) Plan

The plan must comply with the requirements of EM 385-1-1, Section 21.D and ASSE/SAFE Z359.2, be site specific, and address all fall hazards in the work place and during different phases of construction. Address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 6 feet. A competent person or qualified person for fall protection must prepare and sign the plan documentation. Include fall protection and prevention systems, equipment and methods employed for every phase of work, roles and responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Review and revise, as necessary, the Fall Protection and Prevention Plan documentation as conditions change, but at a minimum every six months, for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. Keep and maintain the accepted Fall Protection and Prevention Plan documentation at the job site for the duration of the project. Include the Fall Protection and Prevention Plan documentation in the Accident Prevention Plan (APP).

1.8.2.5 Rescue and Evacuation Plan

Provide a Rescue and Evacuation Plan in accordance with EM 385-1-1 Section 21.N and ASSE/SAFE Z359.2, and include in the FP&P Plan and as part of the APP. Include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility.

1.8.2.6 Hazardous Energy Control Program (HECP)

Develop a HECP in accordance with EM 385-1-1 Section 12, 29 CFR 1910.147, 29 CFR 1910.333, 29 CFR 1915.89, ASSE/SAFE Z244.1, and ASSE/SAFE A10.44. Submit this HECP as part of the Accident Prevention Plan (APP). Conduct a preparatory meeting and inspection with all effected personnel to coordinate all HECP activities. Document this meeting and inspection in

accordance with EM 385-1-1, Section 12.A.02. Ensure that each employee is familiar with and complies with these procedures.

1.8.2.7 Excavation Plan

Identify the safety and health aspects of excavation, and provide and prepare the plan in accordance with EM 385-1-1, Section 25.A and Section 31 00 00 EARTHWORK.

1.8.2.8 Site Demolition Plan

Identify the safety and health aspects, and prepare in accordance with Section 02 41 00 DEMOLITION and referenced sources. Include engineering survey as applicable.

1.9 ACTIVITY HAZARD ANALYSIS (AHA)

Before beginning each activity, task or Definable Feature of Work (DFOW) involving a type of work presenting hazards not experienced in previous project operations, or where a new work crew or subcontractor is to perform the work, the Contractor(s) performing that work activity must prepare an AHA. AHAs must be developed by the Prime Contractor, subcontractor, or supplier performing the work, and provided for Prime Contractor review and approval before submitting to the Contracting Officer. AHAs must be signed by the SSHO, Superintendent, QC Manager and the subcontractor Foreman performing the work. Format the AHA in accordance with EM 385-1-1, Section 1 or as directed by the Contracting Officer. Submit the AHA for review at least 15 working days prior to the start of each activity task, or DFOW. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

AHAs must identify competent persons required for phases involving high risk activities, including confined entry, crane and rigging, excavations, trenching, electrical work, fall protection, and scaffolding.

1.9.1 AHA Management

Review the AHA list periodically (at least monthly) at the Contractor supervisory safety meeting, and update as necessary when procedures, scheduling, or hazards change. Use the AHA during daily inspections by the SSHO to ensure the implementation and effectiveness of the required safety and health controls for that work activity.

1.9.2 AHA Signature Log

Each employee performing work as part of an activity, task or DFOW must review the AHA for that work and sign a signature log specifically maintained for that AHA prior to starting work on that activity. The SSHO must maintain a signature log on site for every AHA. Provide employees whose primary language is other than English, with an interpreter to ensure a clear understanding of the AHA and its contents.

1.10 DISPLAY OF SAFETY INFORMATION

1.10.1 Safety Bulletin Board

Within one calendar day(s) after commencement of work, erect a safety

bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, may be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by EM 385-1-1, Section 01.A.06. Additional items required to be posted include:

a. Confined space entry permit.

b. Hot work permit.

1.10.2 Safety and Occupational Health (SOH) Deficiency Tracking System

Establish a SOH deficiency tracking system that lists and monitors the status of SOH deficiencies in chronological order. Use the tracking system to evaluate the effectiveness of the APP. A monthly evaluation of the data must be discussed in the QC or SOH meeting with everyone on the project. The list must be posted on the project bulletin board and updated daily, and provide the following information:

a. Date deficiency identified;

b. Description of deficiency;

c. Name of person responsible for correcting deficiency;

d. Projected resolution date;

e. Date actually resolved.

1.11 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in paragraph REFERENCES. Maintain applicable equipment manufacturer's manuals.

1.12 EMERGENCY MEDICAL TREATMENT

Contractors must arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

1.13 NOTIFICATIONS and REPORTS

1.13.1 Mishap Notification

Notify the Contracting Officer as soon as practical, but no more than twenty-four hours, after any mishaps, including recordable accidents, incidents, and near misses, as defined in EM 385-1-1 Appendix Q, any report of injury, illness, load handling equipment (LHE) or rigging mishaps, or any property damage. The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. Immediate reporting is required for electrical mishaps, to include Arc Flash; shock; uncontrolled release of hazardous energy (includes electrical and non-electrical); load handling equipment or rigging; fall from height (any level other than same surface); and underwater diving. These mishaps must be investigated in depth to identify all causes and to recommend hazard control measures.

Within notification include Contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (for example, type of construction equipment used and PPE used). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted. Assist and cooperate fully with the Government's investigation(s) of any mishap.

1.13.2 Accident Reports

a. Conduct an accident investigation for recordable injuries and illnesses, property damage, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. Complete the applicable NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS). The Contracting Officer will provide copies of any required or special forms.

b. Near Misses: For Navy Projects, complete the applicable documentation in NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS). Near miss reports are considered positive and proactive Contractor safety management actions.

c. Conduct an accident investigation for any load handling equipment accident (including rigging gear accidents) to establish the root cause(s) of the accident. Complete the LHE Accident Report (Crane and Rigging Gear) form and provide the report to the Contracting Officer within 30 calendar days of the accident. Do not proceed with crane operations until cause is determined and corrective actions have been implemented to the satisfaction of the Contracting Officer. The Contracting Officer will provide a blank copy of the accident report form.

1.13.3 LHE Inspection Reports

Submit LHE inspection reports required in accordance with EM 385-1-1 and as specified herein with Daily Reports of Inspections.

1.13.4 Certificate of Compliance and Pre-lift Plan/Checklist for LHE and Rigging

Provide a FORM 16-1 Certificate of Compliance for LHE entering an activity under this contract and in accordance with EM 385-1-1. Post certifications on the crane.

Develop a Standard Lift Plan (SLP) in accordance with EM 385-1-1, Section 16.H.03 using Form 16-2 Standard Pre-Lift Crane Plan/Checklist for each lift planned. Submit SLP to the Contracting Officer for approval within 15 calendar days in advance of planned lift.

1.13.5 Third Party Certification of Barge-Mounted Mobile Cranes

Certify barge-mounted mobile cranes in accordance with 29 CFR 1919 by an OSHA accredited person.

1.14 HOT WORK

1.14.1 Permit and Personnel Requirements

Submit and obtain a written permit prior to performing "Hot Work" (i.e. welding or cutting) or operating other flame-producing/spark producing devices, from the Fire Division. A permit is required from the Explosives Safety Office for work in and around where explosives are processed, stored, or handled. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. Provide at least two 20 pound 4A:20 BC rated extinguishers for normal "Hot Work". The extinguishers must be current inspection tagged, and contain an approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch must be trained in accordance with NFPA 51B and remain on-site for a minimum of one hour after completion of the task or as specified on the hot work permit.

When starting work in the facility, require personnel to familiarize themselves with the location of the nearest fire alarm boxes. REPORT ANY FIRE, NO MATTER HOW SMALL, TO THE RESPONSIBLE FIRE DIVISION IMMEDIATELY.

1.14.2 Work Around Flammable Materials

Obtain services from a NFPA Certified Marine Chemist for "HOT WORK" within or around flammable materials (such as fuel systems or welding/cutting on fuel pipes) or confined spaces (such as sewer wet wells, manholes, or vaults) that have the potential for flammable or explosive atmospheres.

Whenever these materials, except beryllium and chromium (VI), are encountered in indoor operations, local mechanical exhaust ventilation systems that are sufficient to reduce and maintain personal exposures to within acceptable limits must be used and maintained in accordance with manufacturer's instruction and supplemented by exceptions noted in EM 385-1-1, Section 06.H

1.15 RADIATION SAFETY REQUIREMENTS

Submit License Certificates, employee training records, and Leak Test Reports for radiation materials and equipment to the Contracting Officer and Radiation Safety Office (RSO), and Contracting Oversight Technician (COT)for all specialized and licensed material and equipment proposed for use on the construction project. Maintain on-site records whenever licensed radiological materials or ionizing equipment are on government property.

Protect workers from radiation exposure in accordance with 10 CFR 20, ensuring any personnel exposures are maintained As Low As Reasonably Achievable.

1.15.1 Radiography Operation Planning Work Sheet

Submit a Radiography Operation Planning Work Sheet to Contracting Officer 14 days prior to commencement of operations involving radioactive materials or radiation generating devices. The Contracting Officer and COT will review this worksheet and submit questions and comments.

Contractors must use primary dosimeters process by a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

1.15.2 Site Access and Security

Coordinate site access and security requirements with the Contracting Officer and COT for all radiological materials and equipment containing ionizing radiation that are proposed for use on a government facility. The Navy COT or authorized representative will meet the Contractor at a designated location, ensure safety of the materials being transported, and will escort the Contractor to the job site and return upon completion of the work.

Provide a copy of all calibration records, and utilization records to the COT for radiological operations performed on the site.

1.15.3 Loss or Release and Unplanned Personnel Exposure

Loss or release of radioactive materials, and unplanned personnel exposures must be reported immediately to the Contracting Officer, RSO, and Base Security Department Emergency Number.

1.15.4 Site Demarcation and Barricade

Properly demark and barricade an area surrounding radiological operations to preclude personnel entrance, in accordance with EM 385-1-1, Nuclear Regulatory Commission, and Applicable State regulations and license requirements, and in accordance with requirements established in the accepted Radiography Operation Planning Work Sheet.

Do not close or obstruct streets, walks, and other facilities occupied and used by the Government without written permission from the Contracting Officer.

1.15.5 Security of Material and Equipment

Properly secure the radiological material and ionizing radiation equipment at all times, including keeping the devices in a properly marked and locked container, and secondarily locking the container to a secure point in the Contractor's vehicle or other approved storage location during transportation and while not in use. While in use, maintain a continuous visual observation on the radiological material and ionizing radiation equipment. In instances where radiography is scheduled near or adjacent to buildings or areas having limited access or one-way doors, make no assumptions as to building occupancy. Where necessary, the Contracting Officer will direct the Contractor to conduct an actual building entry, search, and alert. Where removal of personnel from such a building cannot be accomplished and it is otherwise safe to proceed with the radiography, position a fully instructed employee inside the building or area to prevent exiting while external radiographic operations are in process.

1.15.6 Transportation of Material

Comply with 49 CFR 173 for Transportation of Regulated Amounts of Radioactive Material. Notify Local Fire authorities and the site Radiation Safety officer (RSO) of any Radioactive Material use.

1.15.7 Schedule for Exposure or Unshielding

Actual exposure of the radiographic film or unshielding the source must not be initiated until after 5 p.m. on weekdays.

1.15.8 Transmitter Requirements

Adhere to the base policy concerning the use of transmitters, such as radios and cell phones. Obey Emissions control (EMCON) restrictions.

1.16 CONFINED SPACE ENTRY REQUIREMENTS.

Confined space entry must comply with Section 34 of EM 385-1-1, OSHA 29 CFR 1926, OSHA 29 CFR 1910, OSHA 29 CFR 1910.146, and OSHA Directive CPL 2.100. Any potential for a hazard in the confined space requires a permit system to be used.

1.16.1 Entry Procedures

Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. Comply with EM 385-1-1, Section 34 for entry procedures. Hazards pertaining to the space must be reviewed with each employee during review of the AHA.

1.16.2 Forced Air Ventilation

Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its action level.

1.16.3 Sewer Wet Wells

Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.

1.16.4 Rescue Procedures and Coordination with Local Emergency Responders

Develop and implement an on-site rescue and recovery plan and procedures. The rescue plan must not rely on local emergency responders for rescue from a confined space.

1.17 DIVE SAFETY REQUIREMENTS

Develop a Dive Operations Plan, AHA, emergency management plan, and personnel list that includes qualifications, for each separate diving operation. Submit these documents to the District Dive Coordinator (DDC) for review and acceptance at least 15 working days prior to commencement of diving operations. These documents must be at the diving location at all times. Provide each of these documents as a part of the project file.

1.18 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must comply with the Station Storm Plan and:

a. Secure outside equipment and materials and place materials that could be damaged in protected areas.

b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.

c. Ensure that temporary erosion controls are adequate.

PART 2 PRODUCTS

2.1 CONFINED SPACE SIGNAGE

Provide permanent signs integral to or securely attached to access covers for new permit-required confined spaces. Signs for confined spaces must comply with NEMA Z535.2. Signs wording: "DANGER--PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" in bold letters a minimum of one inch in height and constructed to be clearly legible with all paint removed. The signal word "DANGER" must be red and readable from 5 feet.

PART 3 EXECUTION

3.1 CONSTRUCTION AND OTHER WORK

Comply with EM 385-1-1, NFPA 70, NFPA 70E, NFPA 241, the APP, the AHA, Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

PPE is governed in all areas by the nature of the work the employee is performing. Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be worn or carried/available on each person. Mandatory PPE includes:

a. Hard Hat

b. Long Pants

c. Appropriate Safety Shoes

d. Appropriate Class Reflective Vests

3.1.1 Worksite Communication

Employees working alone in a remote location or away from other workers must be provided an effective means of emergency communications (i.e., cellular phone, two-way radios, land-line telephones or other acceptable means). The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the area/environment. An employee check-in/check-out communication procedure must be developed to ensure employee safety.

3.1.2 Hazardous Material Use

Each hazardous material must receive approval from the Contracting Office or their designated representative prior to being brought onto the job site or prior to any other use in connection with this contract. Allow a minimum of 10 working days for processing of the request for use of a hazardous material.

3.1.3 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing

ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint, and hexavalent chromium, are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials. Low mercury lamps used within fluorescent lighting fixtures are allowed as an exception without further Contracting Officer approval. Notify the Radiation Safety Officer (RSO) prior to excepted items of radioactive material and devices being brought on base.

3.1.4 Unforeseen Hazardous Material

Contract documents identify materials such as PCB, lead paint, and friable and non-friable asbestos and other OSHA regulated chemicals (i.e. 29 CFR Part 1910.1000). If material(s) that may be hazardous to human health upon disturbance are encountered during demolition, repair, renovation, orconstruction operations, stop that portion of work and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to FAR 52.243-4, "Changes" and FAR 52.236-2, "Differing Site Conditions."

3.2 PRE-OUTAGE COORDINATION MEETING

Apply for utility outages at least 10 days in advance. As a minimum, the request must include the location of the outage, utilities being affected, duration of outage and any necessary sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved, and prior to beginning work on the utility system requiring shut down, attend a pre-outage coordination meeting with the Contracting Officer to review the scope of work and the lock-out/tag-out procedures for worker protection. No work will be performed on energized electrical circuits unless proof is provided that no other means exist.

3.3 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Provide and operate a Hazardous Energy Control Program (HECP) in accordance with EM 385-1-1 Section 12, 29 CFR 1910.333, 29 CFR 1915.89, and paragraph HAZARDOUS ENERGY CONTROL PROGRAM (HECP).

3.4 FALL PROTECTION PROGRAM

Establish a fall protection program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify roles and responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures in accordance with ASSE/SAFE Z359.2 and EM 385-1-1, Sections 21.A and 21.D.

3.4.1 Training

Institute a fall protection training program. As part of the Fall Protection Program, provide training for each employee who might be exposed

to fall hazards. Provide training by a competent person for fall protection in accordance with EM 385-1-1, Section 21.C. Document training and practical application of the competent person in accordance with EM 385-1-1, Section 21.C.04 and ASSE/SAFE Z359.2 in the AHA.

3.4.2 Fall Protection Equipment and Systems

Enforce use of personal fall protection equipment and systems designated (to include fall arrest, restraint, and positioning) for each specific work activity in the Site Specific Fall Protection and Prevention Plan and AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in EM 385-1-1, Section 21.

Provide personal fall protection equipment, systems, subsystems, and components that comply with EM 385-1-1 Section 21.I, 29 CFR 1926.500 Subpart M,ASSE/SAFE Z359.0, ASSE/SAFE Z359.1, ASSE/SAFE Z359.2, ASSE/SAFE Z359.3, ASSE/SAFE Z359.4, ASSE/SAFE Z359.6, ASSE/SAFE Z359.7, ASSE/SAFE Z359.11, ASSE/SAFE Z359.12, ASSE/SAFE Z359.13, ASSE/SAFE Z359.14, and ASSE/SAFE Z359.15.

3.4.2.1 Additional Personal Fall Protection

In addition to the required fall protection systems, other protection such as safety skiffs, personal floatation devices, and life rings, are required when working above or next to water in accordance with EM 385-1-1, Sections 21.O through 21.O.06. Personal fall protection systems and equipment are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall protection systems are required when operating other equipment such as scissor lifts. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, travel, or while performing work.

3.4.2.2 Personal Fall Protection Harnesses

Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. The use of body belts is not acceptable. Harnesses must have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Snap hooks and carabiners must be self-closing and self-locking, capable of being opened only by at least two consecutive deliberate actions and have a minimum gate strength of 3,600 lbs in all directions. Use webbing, straps, and ropes made of synthetic fiber. The maximum free fall distance when using fall arrest equipment must not exceed 6 feet, unless the proper energy absorbing lanyard is used. Always take into consideration the total fall distance and any swinging of the worker (pendulum-like motion), that can occur during a fall, when attaching a person to a fall arrest system. All full body harnesses must be equipped with Suspension Trauma Preventers such as stirrups, relief steps, or similar in order to provide short-term relief from the effects of orthostatic intolerance in accordance with EM 385-1-1, Section 21.I.06.

3.4.3 Fall Protection for Roofing Work

Implement fall protection controls based on the type of roof being constructed and work being performed. Evaluate the roof area to be accessed for its structural integrity including weight-bearing capabilities for the projected loading.

a. Low Sloped Roofs:

(1) For work within 6 feet of an edge, on a roof having a slope less than or equal to 4:12 (vertical to horizontal), protect personnel from falling by use of personal fall arrest/restraint systems, guardrails, or safety nets. A safety monitoring system is not adequate fall protection and is not authorized. Provide in accordance with 29 CFR 1926.500.

(2) For work greater than 6 feet from an edge, erect and install warning lines in accordance with 29 CFR 1926.500 and EM 385-1-1, Section L.

b. Steep-Sloped Roofs: Work on a roof having a slope greater than 4:1 (vertical to horizontal) requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also applies to residential or housing type construction.

3.4.4 Horizontal Lifelines (HLL)

Provide HLL in accordance with EM 385-1-1, Section 21.I.08.d.2. Commercially manufactured horizontal lifelines (HLL) must be designed, installed, certified and used, under the supervision of a qualified person, for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500). The competent person for fall protection may (if deemed appropriate by the qualified person) supervise the assembly, disassembly, use and inspection of the HLL system under the direction of the qualified person. Locally manufactured HLLs are not acceptable unless they are custom designed for limited or site specific applications by a Registered Professional Engineer who is qualified in designing HLL systems.

3.4.5 Guardrails and Safety Nets

Design, install and use guardrails and safety nets in accordance with EM 385-1-1, Section 21.F.01 and 29 CFR 1926 Subpart M.

3.4.6 Rescue and Evacuation Plan and Procedures

When personal fall arrest systems are used, ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue or assisted-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP). The plan must comply with the requirements of EM 385-1-1, ASSE/SAFE Z359.2, and ASSE/SAFE Z359.4.

3.5 WORK PLATFORMS

3.5.1 Scaffolding

Provide employees with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Comply with the following requirements:

a. Scaffold platforms greater than 20 feet in height must be accessed by use of a scaffold stair system.

b. Ladders commonly provided by scaffold system manufacturers are prohibited for accessing scaffold platforms greater than 20 feet maximum in height.

c. An adequate gate is required.

d. Employees performing scaffold erection and dismantling must be qualified.

e. Scaffold must be capable of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan.

f. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward.

g. Special care must be given to ensure scaffold systems are not overloaded.

h. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material are prohibited. The first tie-in must be at the height equal to 4 times the width of the smallest dimension of the scaffold base.

i. Scaffolding other than suspended types must bear on base plates upon wood mudsills (2 in x 10 in x 8 in minimum) or other adequate firm foundation.

j. Scaffold or work platform erectors must have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet.

k. Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

3.5.2 Elevated Aerial Work Platforms (AWPs)

Workers must be anchored to the basket or bucket in accordance with manufacturer's specifications and instructions (anchoring to the boom may only be used when allowed by the manufacturer and permitted by the CP). Lanyards used must be sufficiently short to prohibit worker from climbing out of basket. The climbing of rails is prohibited. Lanyards with built-in shock absorbers are acceptable. Self-retracting devices are not acceptable. Tying off to an adjacent pole or structure is not permitted unless a safe device for 100 percent tie-off is used for the transfer.

Use of AWPs must be operated, inspected, and maintained as specified in the operating manual for the equipment and delineated in the AHA. Operators of AWPs must be designated as qualified operators by the Prime Contractor. Maintain proof of qualifications on site for review and include in the AHA.

3.6 EQUIPMENT

3.6.1 Material Handling Equipment (MHE)

a. Material handling equipment such as forklifts must not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions. Material handling equipment fitted with personnel work platform attachments are prohibited from traveling or positioning while personnel are working on the platform.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions. Material Handling Equipment Operators must be trained in accordance with OSHA 29 CFR 1910, Subpart N.

c. Operators of forklifts or power industrial trucks must be licensed in accordance with OSHA.

3.6.2 Load Handling Equipment (LHE)

a. Equip cranes and derricks as specified in EM 385-1-1, Section 16.

b. Notify the Contracting Officer 15 working days in advance of any LHE entering the activity, in accordance with EM 385-1-1, Section 16.A.02, so that necessary quality assurance spot checks can be coordinated.Contractor's operator must remain with the crane during the spot check. Rigging gear must comply with OSHA, ASME B30.9 Standards safety standards.

c. Comply with the LHE manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.

d. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, ASME B30.8 for floating cranes and floating derricks, ASME B30.9 for slings, ASME B30.20 for below the hook lifting devices and ASME B30.26 for rigging hardware.

e. Under no circumstance must a Contractor make a lift at or above 90 percent of the cranes rated capacity in any configuration.

f. When operating in the vicinity of overhead transmission lines, operators and riggers must be alert to this special hazard and follow the requirements of EM 385-1-1 Section 11, and ASME B30.5 or ASME B30.22 as applicable.

g. Do not use crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane. Additionally, submit a specific AHA for this work to the Contracting Officer. Ensure the activity and AHA are thoroughly reviewed by all involved personnel.

h. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.

i. All employees must keep clear of loads about to be lifted and of suspended loads.

j. Use cribbing when performing lifts on outriggers.

k. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.

l. A physical barricade must be positioned to prevent personnel access where accessible areas of the LHE's rotating superstructure poses a risk of striking, pinching or crushing personnel.

m. Maintain inspection records in accordance by EM 385-1-1, Section 16.D, including shift, monthly, and annual inspections, the signature of the person performing the inspection, and the serial number or other identifier of the LHE that was inspected. Records must be available for review by the Contracting Officer.

n. Maintain written reports of operational and load testing in accordance with EM 385-1-1, Section 16.F, listing the load test procedures used along with any repairs or alterations performed on the LHE. Reports must be available for review by the Contracting Officer.

o. Certify that all LHE operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

p. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. At wind speeds greater than 20 mph, the operator, rigger and lift supervisor must cease all crane operations, evaluate conditions and determine if the lift may proceed. Base the determination to proceed or not on wind calculations per the manufacturer and a reduction in LHE rated capacity if applicable. Include this maximum wind speed determination as part of the activity hazard analysis plan for that operation.

3.6.3 Machinery and Mechanized Equipment

a. Proof of qualifications for operator must be kept on the project site for review.

b. Manufacture specifications or owner's manual for the equipment must be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Incorporate such additional safety precautions or requirements into the AHAs.

3.6.4 USE OF EXPLOSIVES

Explosives must not be used or brought to the project site without prior written approval from the Contracting Officer. Such approval does not relieve the Contractor of responsibility for injury to persons or for damage to property due to blasting operations.

Storage of explosives, when permitted on Government property, must be only where directed and in approved storage facilities. These facilities must be kept locked at all times except for inspection, delivery, and withdrawal of explosives.

3.7 EXCAVATIONS

Soil classification must be performed by a competent person in accordance with 29 CFR 1926 and EM 385-1-1.

3.7.1 Utility Locations

Provide a third party, independent, private utility locating company to positively identify underground utilities in the work area in addition to any station locating service and coordinated with the station utility department.

3.7.2 Utility Location Verification

Physically verify underground utility locations, including utility depth, by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system.

3.7.3 Utilities Within and Under Concrete, Bituminous Asphalt, and Other Impervious Surfaces

Utilities located within and under concrete slabs or pier structures, bridges, parking areas, and the like, are extremely difficult to identify. Whenever contract work involves chipping, saw cutting, or core drilling through concrete, bituminous asphalt or other impervious surfaces, the existing utility location must be coordinated with station utility departments in addition to location and depth verification by a third party, independent, private locating company. The third party, independent, private locating company must locate utility depth by use of Ground Penetrating Radar (GPR), X-ray, bore scope, or ultrasound prior to the start of demolition and construction. Outages to isolate utility systems must be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the Contractor from meeting this requirement.

3.8 ELECTRICAL

Perform electrical work in accordance with EM 385-1-1, Appendix A, Sections 11 and 12.

3.8.1 Conduct of Electrical Work

As delineated in EM 385-1-1, electrical work is to be conducted in a de-energized state unless there is no alternative method for accomplishing the work. In those cases obtain an energized work permit from the Contracting Officer. The energized work permit application must be accompanied by the AHA and a summary of why the equipment/circuit needs to be worked energized. Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Attach temporary grounds in accordance with ASTM F855 and IEEE 1048. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator is allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method.

When working in energized substations, only qualified electrical workers are permitted to enter. When work requires work near energized circuits as defined by NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves and electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA. Ensure that each employee is familiar with and complies with these procedures and 29 CFR 1910.147.

3.8.2 Qualifications

Electrical work must be performed by QP personnel with verifiable credentials who are familiar with applicable code requirements. Verifiable credentials consist of State, National and Local Certifications or Licenses that a Master or Journeyman Electrician may hold, depending on work being performed, and must be identified in the appropriate AHA. Journeyman/Apprentice ratio must be in accordance with State, Local requirements applicable to where work is being performed.

3.8.3 Arc Flash

Conduct a hazard analysis/arc flash hazard analysis whenever work on or near energized parts greater than 50 volts is necessary, in accordance with NFPA 70E.

All personnel entering the identified arc flash protection boundary must be QPs and properly trained in NFPA 70E requirements and procedures. Unless permitted by NFPA 70E, no Unqualified Person is permitted to approach nearer than the Limited Approach Boundary of energized conductors and circuit parts. Training must be administered by an electrically qualified source and documented.

3.8.4 Grounding

Ground electrical circuits, equipment and enclosures in accordance with NFPA 70 and IEEE C2 to provide a permanent, continuous and effective path to ground unless otherwise noted by EM 385-1-1.

Check grounding circuits to ensure that the circuit between the ground and a grounded power conductor has a resistance low enough to permit sufficient current flow to allow the fuse or circuit breaker to interrupt the current.

3.8.5 Testing

Temporary electrical distribution systems and devices must be inspected, tested and found acceptable for Ground-Fault Circuit Interrupter (GFCI) protection, polarity, ground continuity, and ground resistance before initial use, before use after modification and at least monthly. Monthly inspections and tests must be maintained for each temporary electrical distribution system, and signed by the electrical CP or QP.

-- End of Section --

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS
11/14

PART 1 GENERAL

1.1 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.

1.2 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.

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

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 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 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 PETROLEUM INSTITUTE (API)
Internet: http://www.api.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 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

AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)
P.O. Box 361784
Birmingham, AL 35236-1784
Ph: 205-733-4077
Fax: 205-733-4075
Internet: http://www.awpa.com

APA - THE ENGINEERED WOOD ASSOCIATION (APA)
7011 South 19th St.
Tacoma, WA 98466-5333
Ph: 253-565-6600
Fax: 253-565-7265
Internet: http://www.apawood.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

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/

CONCRETE SAWING AND DRILLING ASSOCIATION (CSDA)
100 2nd Ave South, Ste 402N
St. Petersburg, FL 33701
PH: 727-577-5004
E-mail: info@csda.org
Internet: http://www.csda.org

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

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

ILLUMINATING ENGINEERING SOCIETY (IES)
120 Wall Street, 17th Floor
New York, NY 10005-4001
Ph: 212-248-5000
Fax: 212-248-5018
E-mail: IES@IES.org

Internet: http://www.IES.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

INSTRUCTIONS AND STANDARDS FOR NAVBASE GUANTANAMO BAY CUBA (COMNAVBASEGTMOINST)
Naval Station Guantanamo Bay
c/o Admin Department
PSC 1005 Box 25
FPO AE Guantanamo Bay, 09593
Ph: (011) 5399-4511
Internet: http://www.cnic.navy.mil/Guantanamo

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 ELECTRICAL TESTING ASSOCIATION (NETA)
3050 Old Centre Ave. Suite 102
Portage, MI 49024
Ph: 269-488-6382
Internet: http://www.netaworld.org

MASTER PAINTERS INSTITUTE (MPI)
2800 Ingleton Avenue
Burnaby, BC CANADA V5C 6G7
Ph: 1-888-674-8937
Fax: 1-888-211-8708
E-mail: info@paintinfo.com or techservices@mpi.net
Internet: http://www.mpi.net/

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)
1300 North 17th Street, Suite 900
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 FIRE PROTECTION ASSOCIATION (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Ph: 617-770-3000
Fax: 617-770-0700
Internet: http://www.nfpa.org

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

U.S. ARMY CORPS OF ENGINEERS (USACE)
CRD-C DOCUMENTS available on Internet:
http://www.wbdg.org/ccb/browse_cat.php?c=68
Order Other Documents from:
USACE Publications Depot
Attn: CEHEC-IM-PD
2803 52nd Avenue
Hyattsville, MD 20781-1102
Ph: 301-394-0081
Fax: 301-394-0084
E-mail: pubs-army@usace.army.mil
Internet: http://www.publications.usace.army.mil/
or
http://www.hnc.usace.army.mil/Missions/Engineering/TECHINFO.aspx

U.S. DEPARTMENT OF DEFENSE (DOD)
Order DOD Documents from:
Room 3A750-The Pentagon
1400 Defense Pentagon
Washington, DC 20301-1400
Ph: 703-571-3343
FAX: 215-697-1462
E-mail: customerservice@ntis.gov
Internet: http://www.ntis.gov
Obtain Military Specifications, Standards and Related Publications from:
Acquisition Streamlining and Standardization Information System (ASSIST)
Department of Defense Single Stock Point (DODSSP)
Document Automation and Production Service (DAPS)
Building 4/D
700 Robbins Avenue
Philadelphia, PA 19111-5094
Ph: 215-697-6396 - for account/password issues
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 HOUSING AND URBAN DEVELOPMENT (HUD)
HUD User
P.O. Box 23268
Washington, DC 20026-3268
Ph: 800-245-2691 or 202-708-3178
TDD: 800-927-7589
Fax: 202-708-9981
Internet: http://www.huduser.org

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
Ph: 703-605-6050 or 1-688-584-8332
Fax: 703-605-6900
E-mail: info@ntis.gov
Internet: http://www.ntis.gov

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)
Order for sale documents from:
Superintendent of Documents
U.S. Government Printing Office (GPO)
710 North Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800
Fax: 202-512-2104
E-mail: contactcenter@gpo.gov
Internet: http://www.gpoaccess.gov
Order free documents from:
Federal Aviation Administration
Department of Transportation
800 Independence Avenue, SW
Washington, DC 20591
Ph: 1-866-835-5322
Internet: http://www.faa.gov

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)
FHWA, Office of Safety
1200 New Jersey Ave., SE
Washington, DC 20590
Ph: 202-366-4000
Internet: http://www.fhwa.dot.gov
Order from:

Superintendent of Documents
U. S. Government Printing Office (GPO)
710 North Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800
Fax: 202-512-2104
E-mail: contactcenter@gpo.gov
Internet: http://www.gpoaccess.gov

U. S. GREEN BUILDING COUNCIL (USGBC)
2101 L St NW, Suite 500
Washington, D.C. 20037
Ph: 800-795-1747
Internet: http://www.usgbc.org

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
8601 Adelphi Road
College Park, MD 20740-6001
Ph: 866-272-6272
Fax: 301-837-0483
Internet: http://www.archives.gov
Order documents from:
Superintendent of Documents
U.S.Government Printing Office (GPO)
710 North Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800
Fax: 202-512-2104
E-mail: contactcenter@gpo.gov
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

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

-- End of Section --

SECTION 01 45 00.00 25

QUALITY CONTROL
09/15
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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 SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 52.2	(2012; Errata 2013; INT 1 2014; ADD A, B, AND D SUPP 2015; INT 3 2015; Errata 2 2015; ADD C 2015) Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

ASTM INTERNATIONAL (ASTM)

ASTM D6245	(2012) Using Indoor Carbon Dioxide Concentrations to Evaluate Indoor Air Quality and Ventilation
ASTM D6345	(2010) Selection of Methods for Active, Integrative Sampling of Volatile Organic Compounds in Air

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

ANSI/SMACNA 008	(2007) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED GBDC Ref Guide	(2009; R 2010) LEED Reference Guide for Green Building Design, Construction and Major Renovations of Commercial and Institutional Buildings including Core & Shell and K-12 Projects

1.2 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 Quality Control (QC) Plan; G

Submit an approved Construction QC Plan prior to start of construction.

Indoor Air Quality (IAQ) Management Plan; G

Basis of Design and Design Intent

SD-07 Certificates

CA Resume

1.3 INFORMATION FOR THE CONTRACTING OFFICER

Prior to commencing work on construction, the Contractor can obtain a single copy set of the current report forms from the Contracting Officer. The report forms will consist of the Contractor Production Report, Contractor Production Report (Continuation Sheet), Contractor Quality Control (CQC) Report, (CQC) Report (Continuation Sheet), Preparatory Phase Checklist, Initial Phase Checklist, Rework Items List, and Testing Plan and Log.

Deliver the following to the Contracting Officer during Construction:

a. CQC Report: Submit the report electronically b 10:00 AM the next working day after each day that work is performed and for every seven consectutive calendar days of no-work.

b. Contractor Production Report: Submit the report electronically by 10:00 AM the next working day after each day that work is performed and for every seven consecutive calendar days of no-work.

c. Preparatory Phase Checklist: Submit the report electronically in the same manner as the CQC Report for each Preparatory Phase held.

d. Initial Phase Checklist: Submit the report electronically in the same manner as the CQC Report for each Initial Phase held.

f. Field Test Reports: Within two working days after the test is performed, submit the report as an electronic attachment to the CQC Report.

g. Monthly Summary Report of Tests: Submit the report as an electronic attachment to the CQC Report at the end of each month.

h. Testing Plan and Log: Submit the report as an electronic attachment to the CQC Report, at the end of each month. A copy of the final Testing Plan and Log shall be provided to the OMSI preparer for inclusion into the OMSI documentation.

i. Rework Items List: Submit lists containing new entries daily, in the same manner as the CQC Report.

j. CQC Meeting Minutes: Within two working days after the meeting is

held, submit the report as an electronic attachment to the CQC Report.

k. QC Certifications: As required by the paragraph entitled "QC Certifications."

1.4 QC PROGRAM REQUIREMENTS

Establish and maintain a QC program as described in this section. The QC program consists of a QC Organization, QC Plan, QC Plan Meeting(s), a Coordination and Mutual Understanding Meeting, QC meetings, three phases of control, submittal review and approval, testing, completion inspections, QC certifications, and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this Contract. The QC program must cover on-site and off-site work and be keyed to the work sequence. No construction work or testing may be performed unless the QC Manager is on the work site. The QC Manager must report to an officer of the firm and not be subordinate to the Project Superintendent or the Project Manager. The QC Manager, Project Superintendent and Project Manager must work together effectively. Although the QC Manager is the primary individual responsible for quality control, all individuals will be held responsible for the quality of work on the job.

1.4.1 Acceptance of the Construction Quality Control (QC) Plan

Acceptance of the QC Plan is required prior to the start of construction. The Contracting Officer reserves the right to require changes in the QC Plan and operations as necessary, including removal of personnel, to ensure the specified quality of work. The Contracting Officer reserves the right to interview any member of the QC organization at any time in order to verify the submitted qualifications. All QC organization personnel are subject to acceptance by the Contracting Officer. The Contracting Officer may require the removal of any individual for non-compliance with quality requirements specified in the Contract.

1.4.2 Preliminary Construction Work Authorized Prior to Acceptance

The only construction work that is authorized to proceed prior to the acceptance of the QC Plan is mobilization of storage and office trailers, temporary utilities, and surveying.

1.4.3 Notification of Changes

Notify the Contracting Officer, in writing, of any proposed changes in the QC Plan or changes to the QC organization personnel, a minimum of 10 work days prior to a proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

1.5 QC ORGANIZATION

1.5.1 QC Manager

1.5.1.1 Duties

Provide a QC Manager at the work site to implement and manage the QC program. The only duties and responsibilities of the QC Manager are to manage and implement the QC program on this Contract. The QC Manager is required to attend the partnering meetings, QC Plan Meetings, Coordination and Mutual Understanding Meeting, conduct the QC meetings, perform the

three phases of control except for those phases of control designated to be performed by QC Specialists, perform submittal review and approval, ensure testing is performed and provide QC certifications and documentation required in this Contract. The QC Manager is responsible for managing and coordinating the three phases of control and documentation performed by the QC Specialists, testing laboratory personnel and any other inspection and testing personnel required by this Contract. The QC Manager is the manager of all QC activities.

1.5.1.2 Qualifications

A graduate of a four year accredited college or university program in one of the following disciplines: Engineering, Architecture, Construction Management, Engineering Technology, Building Construction, or Building Science, with a minimum of 10 years experience as a Project Superintendent, QC Manager, Project Manager, Project Engineer or Construction Manager on similar size and type construction contracts which included the major trades that are part of this Contract. The individual must have at least two years experience as a QC Manager. The individual must be familiar with the requirements of EM 385-1-1, and have experience in the areas of hazard identification, safety compliance, and sustainability.

1.5.2 Construction Quality Management Training

In addition to the above experience and education requirements, the QC Manager must have completed the course entitled "Construction Quality Management (CQM) for Contractors." If the QC Manager does not have a current certification, they must 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.

1.5.3 Alternate QC Manager Duties and Qualifications

Designate an alternate for the QC Manager at the work site to serve in the event of the designated QC Manager's absence. The period of absence may not exceed two weeks at one time, and not more than 30 workdays during a calendar year. The qualification requirements for the Alternate QC Manager must be the same as for the QC Manager.

1.5.4 Underwater QC Team

Provide Underwater QC (UWQC) Team at the work site to perform underwater surveillance and inspection for the Contractor. The UWQC Team divers must have current commercial diver's license, with a minimum of five (5) years experience with underwater inspection. The personnel make up of the UWQC team shall comply with EM 385-1-1, OSHA and local requirements for Contract diving operations. Comply with all the applicable safety requirements of EM 385-1-1, OSHA and local requirements for Contract diving operations. The UWQC lead diver must be a licensed Professional Engineer thoroughly familiar with the design plans and specifications to sufficiently understand the engineering aspects of the underwater construction and to be able to recognize and document potential problem areas such as improperly constructed or defective areas. Provide all necessary equipment to conduct surveillance and inspection services, including diver's equipment, dive boat, communication equipment, and photographic/video equipment. Diver(s) must be equipped to maintain two-way communication with QC personnel during

diving operations. Prepare and submit a report including photographs and/or videos with the QC report after each dive. Frequency of underwater surveillance and inspection will be during installation and including final inspection. The UWQC Team must be an independent third party hired directly by the Prime Contractor, and shall have no involvement with the design, preparation of Contract, or installation of work. All inspection reports must be signed and sealed by the lead diver/engineer.

]1.6 QUALITY CONTROL (QC) PLAN

1.6.1 Construction Quality Control (QC) Plan

1.6.1.1 Requirements

Provide, for acceptance by the Contracting Officer, a Construction QC Plan submitted in a three-ring binder that includes a table of contents, with major sections identified with tabs, with pages numbered sequentially, and that documents the proposed methods and responsibilities for accomplishing quality control activities during the construction of the project:

a. QC ORGANIZATION: A chart showing the QC organizational structure.

b. NAMES AND QUALIFICATIONS: Names and qualifications, in resume format, for each person in the QC organization. Include the CQM for Contractors course certifications for the QC Manager and Alternate QC Manager as required by the paragraphs entitled "Construction Quality Management Training" and "Alternate QC Manager Duties and Qualifications".

c. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONNEL: Duties, responsibilities, and authorities of each person in the QC organization.

d. OUTSIDE ORGANIZATIONS: A listing of outside organizations, such as architectural and consulting engineering firms, that will be employed by the Contractor and a description of the services these firms will provide.

e. APPOINTMENT LETTERS: Letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager and stating that they are responsible for implementing and managing the QC program as described in this Contract. Include in this letter the responsibility of the QC Manager and Alternate QC Manager to implement and manage the three phases of control, and their authority to stop work which is not in compliance with the Contract. Letters of direction are to be issued by the QC Manager to all other QC Specialists outlining their duties, authorities, and responsibilities. Include copies of the letters in the QC Plan.

f. SUBMITTAL PROCEDURES AND INITIAL SUBMITTAL REGISTER: Procedures for reviewing, approving, and managing submittals. Provide the name(s) of the person(s) in the QC organization authorized to review and certify submittals prior to approval. Provide the initial submittal of the Submittal Register as specified in Section 01 33 00 SUBMITTAL PROCEDURES.

g. TESTING LABORATORY INFORMATION: Testing laboratory information required by the paragraphs entitled "Accreditation Requirements", as applicable.

h. TESTING PLAN AND LOG: A Testing Plan and Log that includes the tests required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test. Use Government forms to log and track tests.

i. PROCEDURES TO COMPLETE REWORK ITEMS: Procedures to identify, record, track, and complete rework items. Use Government forms to record and track rework items.

j. DOCUMENTATION PROCEDURES: Use Government form.

k. LIST OF DEFINABLE FEATURES: A Definable Feature of Work (DFOW) is a task that is separate and distinct from other tasks and has control requirements and work crews unique to that task. A DFOW is identified by different trades or disciplines and is an item or activity on the construction schedule. Include in the list of DFOWs, but not be limited to, all critical path activities on the NAS. Include all activities for which this specification requires QC Specialists or specialty inspection personnel. Provide separate DFOWs in the Network Analysis Schedule for each design development stage and submittal package.

l. PROCEDURES FOR PERFORMING THE THREE PHASES OF CONTROL: Identify procedures used to ensure the three phases of control to manage the quality on this project. For each DFOW, a Preparatory and Initial phase checklist will be filled out during the Preparatory and Initial phase meetings. Conduct the Preparatory and Initial Phases and meetings with a view towards obtaining quality construction by planning ahead and identifying potential problems for each DFOW.

m. PERSONNEL MATRIX: Not Applicable

n. PROCEDURES FOR COMPLETION INSPECTION: Procedures for identifying and documenting the completion inspection process. Include in these procedures the responsible party for punch out inspection, pre-final inspection, and final acceptance inspection.

o. TRAINING PROCEDURES AND TRAINING LOG: Procedures for coordinating and documenting the training of personnel required by the Contract.

p. ORGANIZATION AND PERSONNEL CERTIFICATIONS LOG: Procedures for coordinating, tracking and documenting all certifications on subcontractors, testing laboratories, suppliers, personnel, etc. QC Manager will ensure that certifications are current, appropriate for the work being performed, and will not lapse during any period of the contract that the work is being performed.

1.7 QC PLAN MEETINGS

Prior to submission of the QC Plan, the QC Manager will meet with the Contracting Officer to discuss the QC Plan requirements of this Contract. The purpose of this meeting is to develop a mutual understanding of the QC Plan requirements prior to plan development and submission and to agree on the Contractor's list of DFOWs.

1.8 COORDINATION AND MUTUAL UNDERSTANDING MEETING

After submission of the QC Plan, and prior to the start of construction, the QC Manager will meet with the Contracting Officer to present the QC

program required by this Contract. When a new QC Manager is appointed, the coordination and mutual understanding meeting shall be repeated.

1.8.1 Purpose

The purpose of this meeting is to develop a mutual understanding of the QC details, including documentation, administration for on-site and off-site work, design intent, environmental requirements and procedures, coordination of activities to be performed, and the coordination of the Contractor's management, production, and QC personnel. At the meeting, the Contractor will be required to explain in detail how three phases of control will be implemented for each DFOW, as well as how each DFOW will be affected by each management plan or requirement as listed below:

a. Waste Management Plan.

b. IAQ Management Plan.

c. Procedures for noise and acoustics management.

d. Environmental Protection Plan.

e. Environmental regulatory requirements.

1.8.2 Coordination of Activities

Coordinate activities included in various sections to assure efficient and orderly installation of each component. Coordinate operations included under different sections that are dependent on each other for proper installation and operation. Schedule construction operations with consideration for indoor air quality as specified in the IAQ Management Plan.

1.8.3 Attendees

As a minimum, the Contractor's personnel required to attend include an officer of the firm, the Project Manager, Project Superintendent, QC Manager, Alternate QC Manager, CA, Environmental Manager, and subcontractor representatives. Each subcontractor who will be assigned QC responsibilities shall have a principal of the firm at the meeting. Minutes of the meeting will be prepared by the QC Manager and signed by the Contractor and the Contracting Officer. Provide a copy of the signed minutes to all attendees.

1.9 QC MEETINGS

After the start of construction, conduct weekly QC meetings by the QC Manager at the work site with the Project Superintendent, CA, and the foremen who are performing the work of the DFOWs. The QC Manager is to prepare the minutes of the meeting and provide a copy to the Contracting Officer within two working days after the meeting. The Contracting Officer may attend these meetings. As a minimum, accomplish the following at each meeting:

a. Review the minutes of the previous meeting.

b. Review the schedule and the status of work and rework.

c. Review the status of submittals.

d. Review the work to be accomplished in the next two weeks and documentation required.

e. Resolve QC and production problems (RFI, etc.).

f. Address items that may require revising the QC Plan.

g. Review Accident Prevention Plan (APP).

h. Review environmental requirements and procedures.

i. Review Waste Management Plan.

j. Review IAQ Management Plan.

k. Review Environmental Management Plan.

l. Review the status of training completion.

1.10 DESIGN REVIEW AND DOCUMENTATION

1.10.1 Basis of Design and Design Intent

The CA must review the basis of design received from the Contracting Officer.

1.10.2 Contract Document Review

The CA must review the Contract documents to verify that each system is likely to meet the design intent relative to functionality, energy performance, water performance, maintainability, sustainability, system cost, and local environmental impacts.

1.11 THREE PHASES OF CONTROL

Adequately cover both on-site and off-site work with the Three Phases of Control and include the following for each DFOW.

1.11.1 Preparatory Phase

Notify the Contracting Officer at least two work days in advance of each preparatory phase meeting. The meeting will be conducted by the QC Manager and attended by the Project Superintendent, the CA, and the foreman responsible for the DFOW. When the DFOW will be accomplished by a subcontractor, that subcontractor's foreman shall attend the preparatory phase meeting. Document the results of the preparatory phase actions in the Preparatory Phase Checklist. Perform the following prior to beginning work on each DFOW:

a. Review each paragraph of the applicable specification sections.

b. Review the Contract drawings.

c. Verify that field measurements are as indicated on construction and/or shop drawings before confirming product orders, in order to minimize waste due to excessive materials.

d. Verify that appropriate shop drawings and submittals for materials and

equipment have been submitted and approved. Verify receipt of approved factory test results, when required.

e. Review the testing plan and ensure that provisions have been made to provide the required QC testing.

f. Review special inspections required by Section 01 45 35.00 25 SPECIAL INSPECTION, the statement of special inspections and the schedule of special inspections.

g. Examine the work area to ensure that the required preliminary work has been completed.

h. Coordinate the schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

i. Arrange for the return of shipping/packaging materials, such as wood pallets, where economically feasible.

j. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data.

k. Discuss specific controls used and construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW.

l. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets (MSDS) are submitted.

m. Ensure all preliminary work items have been completed and documented.

1.11.2 Initial Phase

Notify the Contracting Officer at least two work days in advance of each initial phase. When construction crews are ready to start work on a DFOW, conduct the initial phase with the Project Superintendent, and the foreman responsible for that DFOW. Observe the initial segment of the DFOW to ensure that the work complies with Contract requirements. Document the results of the initial phase in the Initial Phase Checklist. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met. Perform the following for each DFOW:

a. Establish the quality of workmanship required.

b. Resolve conflicts.

c. Ensure that testing is performed by the approved laboratory.

d. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.

e. Ensure all preparatory work items have been completed and documented.

1.11.3 Follow-Up Phase

Perform the following for on-going work daily, or more frequently as necessary, until the completion of each DFOW and document in the daily CQC Report:

a. Ensure the work is in compliance with Contract requirements.

b. Maintain the quality of workmanship required.

c. Ensure that testing is performed by the approved laboratory.

d. Ensure that rework items are being corrected.

e. Assure manufacturers representatives have performed necessary inspections if required and perform safety inspections.

f. Ensure all work items, testing, and documentation has been completed.

g. Coordinate scheduled work with special inspections required by Section 01 45 35.00 25 SPECIAL INSPECTIONS, the statement of special inspections and the schedule of special inspections.

1.11.4 Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same DFOW if the quality of on-going work is unacceptable, if there are changes in the applicable QC organization, if there are changes in the on-site production supervision or work crew, if work on a DFOW is resumed after substantial period of inactivity, or if other problems develop.

1.11.5 Notification of Three Phases of Control for Off-Site Work

Notify the Contracting Officer at least two weeks prior to the start of the preparatory and initial phases.

1.12 SUBMITTAL REVIEW AND APPROVAL

Procedures for submission, review and approval of submittals are described in Section 01 33 00 SUBMITTAL PROCEDURES.

1.13 TESTING

Except as stated otherwise in the specification sections, perform sampling and testing required under this Contract.

1.13.1 Accreditation Requirements

Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (E 329, C 1077, D 3666, D 3740, A 880, E 543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing shall meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the Corporate Office.

1.13.2 Laboratory Accreditation Authorities

Laboratory Accreditation Authorities include the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology at http://ts.nist.gov/ts/htdocs/210/214/214.htm , the American Association of State Highway and Transportation Officials (AASHTO) program at http://www.transportation.org/aashto/home.nsf/frontpage , International Accreditation Services, Inc. (IAS) at http://www.iasonline.org, U. S. Army Corps of Engineers Materials Testing Center (MTC)at http://www.wes.army.mil/SL/MTC/, the American Association for Laboratory Accreditation (A2LA) program at http://www.a2la.org/, the Washington Association of Building Officials (WABO) at http://www.wabo.org/ (Approval authority for WABO is limited to projects within Washington State), and the Washington Area Council of Engineering Laboratories (WACEL) at http://www.wacel.org/labaccred.html (Approval authority by WACEL is limited to projects within Facilities Engineering Command (FEC) Washington geographical area).

1.13.3 Capability Check

The Contracting Officer retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this Contract.

1.13.4 Test Results

Cite applicable Contract requirements, tests or analytical procedures used. Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify the Contracting Officer immediately. Conspicuously stamp the cover sheet for each report in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. Test results must be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to the Contracting Officer via the QC Manager. Furnish a summary report of field tests at the end of each month, per the paragraph entitled "INFORMATION FOR THE CONTRACTING OFFICER".

1.13.5 Test Reports and Monthly Summary Report of Tests

Furnish the signed reports, certifications, and a summary report of field tests at the end of each month to the Contracting Officer. Attach a copy of the summary report to the last daily Contractor Quality Control Report of each month. Provide a copy of the signed test reports and certifications to the OMSI preparer for inclusion into the OMSI documentation.

1.14 QC CERTIFICATIONS

1.14.1 CQC Report Certification

Contain the following statement within the CQC Report: "On behalf of the Contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge, except as noted in this report."

1.14.2 Invoice Certification

Furnish a certificate to the Contracting Officer with each payment request, signed by the QC Manager, attesting that as-built drawings are current, coordinated and attesting that the work for which payment is requested, including stored material, is in compliance with Contract requirements.

1.14.3 Completion Certification

Upon completion of work under this Contract, the QC Manager shall furnish a certificate to the Contracting Officer attesting that "the work has been completed, inspected, tested and is in compliance with the Contract." Provide a copy of this final QC Certification for completion to the OMSI preparer for inclusion into the OMSI documentation.

1.15 COMPLETION INSPECTIONS

1.15.1 Punch-Out Inspection

Near the completion of all work or any increment thereof, established by a completion time stated in the Contract Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the QC Manager and the CA must conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings, specifications and Contract. Include in the punch list any remaining items on the "Rework Items List", which were not corrected prior to the Punch-Out Inspection. Include within the punch list the estimated date by which the deficiencies will be corrected. Provide a copy of the punch list to the Contracting Officer. The QC Manager, or staff, must make follow-on inspections 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".

1.15.2 Pre-Final Inspection

The Government and QCM will perform this inspection to verify that the facility is complete and ready to be occupied. A Government "Pre-Final Punch List" will be documented by the CQM as a result of this inspection. The QC Manager will ensure that all items on this list are corrected prior to notifying the Government that a "Final" inspection with the Client can be scheduled. Any items noted on the "Pre-Final" inspection must be corrected in a timely manner and be accomplished before the contract completion date for the work,or any particular increment thereof, if the project is divided into increments by separate completion dates.

1.15.3 Final Acceptance Inspection

Notify the Contracting Officer at least 14 calendar days prior to the date a final acceptance inspection can be held. State within the notice that all items previously identified on the pre-final punch list will be corrected and acceptable, along with any other unfinished Contract work, by the date of the final acceptance inspection. The Contractor must be represented by the QC Manager, the Project Superintendent, the CA, and others deemed necessary. Attendees for the Government will include the Contracting Officer, other FEAD/ROICC personnel, and personnel representing the Client. 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 entitled "Inspection of Construction."

1.16 DOCUMENTATION

Maintain current and complete records of on-site and off-site QC program operations and activities.

1.16.1 Construction Documentation

Reports are required for each day that work is performed and must be attached to the Contractor Quality Control Report prepared for the same day. Maintain current and complete records of on-site and off-site QC program operations and activities. The forms identified under the paragraph "INFORMATION FOR THE CONTRACTING OFFICER" will be used. Reports are required for each day work is performed. Account for each calendar day throughout the life of the Contract. Every space on the forms must be filled in. Use N/A if nothing can be reported in one of the spaces. The Project Superintendent and the QC Manager must prepare and sign the Contractor Production and CQC Reports, respectively. The reporting of work must be identified by terminology consistent with the construction schedule. In the "remarks" sections of the reports, enter pertinent information including directions received, problems encountered during construction, work progress and delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered and a record of visitors to the work site, quality control problem areas, deviations from the QC Plan, construction deficiencies encountered, meetings held. For each entry in the report(s), identify the Schedule Activity No. that is associated with the entered remark.

1.16.2 Quality Control Validation

Establish and maintain the following in a series of three ring binders. Binders shall be divided and tabbed as shown below. These binders must be readily available to the Contracting Officer during all business hours.

a. All completed Preparatory and Initial Phase Checklists, arranged by specification section.

b. All milestone inspections, arranged by Activity Number.

c. An up-to-date copy of the Testing Plan and Log with supporting field test reports, arranged by specification section.

d. Copies of all contract modifications, arranged in numerical order. Also include documentation that modified work was accomplished.

e. An up-to-date copy of the Rework Items List.

f. Maintain up-to-date copies of all punch lists issued by the QC staff to the Contractor and Sub-Contractors and all punch lists issued by the Government.

1.16.3 Testing Plan and Log

As tests are performed, the CA and the QC Manager will record on the "Testing Plan and Log" the date the test was performed and the date the test results were forwarded to the Contracting Officer. Attach a copy of the updated "Testing Plan and Log" to the last daily CQC Report of each

month, per the paragraph "INFORMATION FOR THE CONTRACTING OFFICER". Provide a copy of the final "Testing Plan and Log" to the OMSI preparer for inclusion into the OMSI documentation.

1.16.4 Rework Items List

The QC Manager must maintain a list of work that does not comply with the Contract, identifying what items need to be reworked, the date the item was originally discovered, the date the item will be corrected by, and the date the item was corrected. There is no requirement to report a rework item that is corrected the same day it is discovered. The Contractor is responsible for including those items identified by the Contracting Officer.

1.16.5 As-Built Drawings

The QC Manager is required to ensure the as-built drawings, required by Section 01 78 00.00 25 CLOSEOUT SUBMITTALS are kept current on a daily basis and marked to show deviations which have been made from the Contract drawings. Ensure each deviation has been identified with the appropriate modifying documentation (e.g. PC No., Modification No., Request for Information No., etc.). The QC Manager must initial each revision. Upon completion of work, the QC Manager will furnish a certificate attesting to the accuracy of the as-built drawings prior to submission to the Contracting Officer.

1.17 NOTIFICATION ON NON-COMPLIANCE

The Contracting Officer will notify the Contractor of any detected non-compliance with the Contract. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may 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 for excess costs or damages by the Contractor.

1.18 CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT PLAN

Submit an IAQ Management Plan within 15 days after Contract award and not less than 10 days before the preconstruction meeting. Revise and resubmit Plan as required by the Contracting Officer. Make copies of the final plan available to all workers on site. Include provisions in the Plan to meet the requirements specified below and to ensure safe, healthy air for construction workers and building occupants.

1.18.1 Requirements During Construction

Provide for evaluation of indoor Carbon Dioxide concentrations in accordance with ASTM D6245. Provide for evaluation of volatile organic compounds (VOCs) in indoor air in accordance with ASTM D6345. Use filters with a Minimum Efficiency Reporting Value (MERV) of 8 in permanently installed air handlers during construction.

1.18.1.1 Control Measures

Meet or exceed the requirements of ANSI/SMACNA 008, Chapter 3, to help minimize contamination of the building from construction activities. The five requirements of this manual which must be adhered to are described

below:

a. HVAC protection: Isolate return side of HVAC system from surrounding environment to prevent construction dust and debris from entering the duct work and spaces.

b. Source control: Use low emitting paints and other finishes, sealants, adhesives, and other materials as specified. When available, cleaning products shall have a low VOC content and be non-toxic to minimize building contamination. Utilize cleaning techniques that minimize dust generation. Cycle equipment off when not needed. Prohibit idling motor vehicles where emissions could be drawn into building. Designate receiving/storage areas for incoming material that minimize IAQ impacts.

c. Pathway interruption: When pollutants are generated use strategies such as 100 percent outside air ventilation or erection of physical barriers between work and non-work areas to prevent contamination.

d. Housekeeping: Clean frequently to remove construction dust and debris. Promptly clean up spills. Remove accumulated water and keep work areas dry to discourage the growth of mold and bacteria. Take extra measures when hazardous materials are involved.

e. Scheduling: Control the sequence of construction to minimize the absorption of VOCs by other building materials.

1.18.1.2 Moisture Contamination

a. Remove accumulated water and keep work dry.

b. Use dehumidification to remove moist, humid air from a work area.

c. Do not use combustion heaters or generators inside the building.

d. Protect porous materials from exposure to moisture.

e. Remove and replace items which remain damp for more than a few hours.

1.18.2 Requirements after Construction

After construction ends and prior to occupancy, conduct a building flush-out or test the indoor air contaminant levels. Flush-out must be a minimum two-weeks with MERV-13 filtration media as determined by ASHRAE 52.2 at 100 percent outside air, or in accordance with LEED GBDC Ref Guide. Air contamination testing must be consistent with EPA's current Compendium of Methods for the Determination of Air Pollutants in Indoor Air, and with the LEED GBDC Ref Guide. After building flush-out or testing and prior to occupancy, replace filtration media. Filtration media must have a MERV of 13 as determined by ASHRAE 52.2.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PREPARATION

Designate receiving/storage areas for incoming material to be delivered

according to installation schedule and to be placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. Store and handle materials in a manner as to prevent loss from weather and other damage. Keep materials, products, and accessories covered and off the ground, and store in a dry, secure area. Prevent contact with material that may cause corrosion, discoloration, or staining. Protect all materials and installations from damage by the activities of other trades.

-- End of Section --

SECTION 01 45 35.00 25

SPECIAL INSPECTIONS
09/15
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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	(2012) International Building Code

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N	(2014) Navy and Marine Corps Design Procedures
UFC 3-301-01	(2013; Change 1) Structural Engineering

1.2 GENERAL REQUIREMENTS

Perform Special Inspections in accordance with the Statement of Special Inspections, Schedule of Special Inspections, Chapter 17 of ICC IBC and UFC 3-301-01. The Statement of Special Inspections and Schedule of Special Inspections are included as an attachment to this specification. 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.

1.3 DEFINITIONS

1.3.1 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.

1.3.2 Periodic Special Inspections

Periodic Special Inspections is Special Inspections by the special inspector who is intermittently present where the work to be inspected has been or is being performed.

1.3.3 Observe

Observe these Special Inspections items on a random daily basis. Operations need not be delayed pending these inspections.

1.3.4 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 Prime Contractor.

1.3.5 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.

1.3.6 Third Party

A third party inspector must not be company employee of the Contractor or any Sub-Contractor performing the work to be inspected.

1.3.7 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).

1.3.8 Contractor's Quality Control (QC) Manager

An individual retained by the prime contractor and qualified in accordance with the Section 01 45 00.00 25 QUALITY CONTROL having the overall responsibility for the contractor's QC organization.

1.3.9 Designer of Record (DOR)

A registered design professional employed by the Government 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.

1.3.10 Statement of Special Inspections (SSI)

A document developed by the DOR in accordance with FC 1-300-09N, Chapters 16 and 17 which identify the material, systems, components and work required to have Special Inspections.

1.3.11 Schedule of Special Inspections

A schedule of special inspections developed by the DOR 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 Special Inspection.

1.3.12 Contractor Statement of Responsibility

A Contractor Statement of Responsibility form developed by the DOR must be signed and submitted by the Contractor. When the project includes a component listed in the statement of special inspections, the Contractor must submit the written Statement of Responsibility to the Contracting

Officer prior to the commencement of work on the component. The Contractor's Statement of Responsibility must contain acknowledgement of awareness of the special requirements contained in the Statement of Special Inspection.

1.4 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

Contractor Statement of Responsibility; G
Special Inspections Project Manual; G
Special Inspections Agency's Written Practices; G

SD-06 Test Reports

Special Inspections Daily Reports; G
Special Inspections Biweekly Reports; G

SD-07 Certificates

Special Inspector Qualifications; G

SD-11 Closeout Submittals

Comprehensive Final Report of Special Inspections; G

1.5 SPECIAL INSPECTOR QUALIFICATIONS

Submit qualifications for each special inspector .

1.5.1 Concrete Construction

1.5.1.1 Special Inspector

a. ICC Reinforced Concrete Special Inspector Certificate with one year of related experience, or

b. ACI Concrete Construction Special Inspector, or

c. Registered Professional Engineer with related experience

1.5.1.2 Associate Special Inspector

a. ACI Concrete Construction Special Inspector in Training, or

b. Engineer-In-Training with one year of related experience

PART 2 PRODUCTS

PART 3 EXECUTION

3.1 RESPONSIBILITIES
3.1.1 Quality Control Manager

a. Supervise all Special Inspectors required by the contract documents and the IBC.

b. Verify the qualifications of all of the Special Inspectors.

c. 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.

d. Maintain a rework items list that includes discrepancies noted on the Special Inspectors daily report.

3.1.2 Special Inspectors

a. Inspect all elements of the project for which the special inspector is qualified to inspect and are identified in the Schedule of Special Inspections.

b. Submit Special Inspections agency's written practices for the monitoring and control of the agency's operations to include the following:

(1) 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.

(2) The agency's inspection procedures, including general inspection, material controls, and visual welding inspection.

c. Submit a copy of the daily reports to the QC Manager.

d. 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.

e. 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:

(1) A brief summary of the work performed during the reporting time frame.

(2) Changes and/or discrepancies with the drawings, specifications that were observed during the reporting period.

(3) Discrepancies which were resolved or corrected.

(4) A list of nonconforming items requiring resolution.

(5) All applicable test result including nondestructive testing reports.

f. 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.

3.2 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 --

Statement of Special Inspections & Schedule of Special Inspections

Wharf Bravo Structural Repairs
Naval Station Guantanamo Bay, Cuba

Prepared by:

NAVFAC SE
NAS Jacksonville
Jacksonville, FL 32212

June 10, 2016

STATEMENT OF SPECIAL INSPECTIONS

Registered Design Professional in Responsible Charge:
John McCoy, P.E.

This Statement of Special Inspections was prepared in accordance with Section 1704.3 of the 2012 International Building Code (IBC) and UFC 3-301-01, *Structural Engineering*.

☒ **The Contractor's Quality Control (QC) Manager**

☐ **The Special Inspector of Record (SIOR)**

shall oversee the special inspection requirements defined in this statement. The qualification requirements and responsibilities for the Contractor's Quality Control (QC) Manager, and various inspection and testing agents, report submittal requirements, discrepancy tracking procedures, and other procedures necessary to execute the special inspections program are defined in project specification 01 45 35.00 25 SPECIAL INSPECTIONS.

The Special Inspection program does not relieve the Contractor of the responsibility to comply with the Contract Documents. Jobsite safety and means and methods of construction are solely the responsibility of the Contractor.

This *Statement of Special Inspections* includes a *Schedule of Special Inspections* attached herein that defines the following:

- Materials, systems, components and work required to have special inspection or testing
- Type and extent of each special inspection
- Type and extent of each test
- Additional requirements for special inspection
- Identification as to whether special inspection is continuous or periodic for each type of special inspection

The *Schedule of Special Inspections* identifies the following elements of the structures for this project that require verification and inspection in accordance with IBC 2012 Section 1705.

☒ Concrete Construction (Concrete Pile Cap Only

John D. McCoy, PE_____
Registered Design Professional in Responsible Charge

_10-June-2016_____
Date

SCHEDULE OF SPECIAL INSPECTIONS

C – 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. (IBC)

P – Periodic Special Inspections is Special Inspections by the special inspector who is intermittently present where the work to be inspected has been or is being performed. (IBC)

CONCRETE CONSTRUCTION

IBC TABLE 1705.3, 1705.12.1:				
Required	Task	Continuous	Periodic	Description
☒	1. Reinforcing steel	-	P	Verify prior to placing concrete that reinforcing is of specified type, grade and size; that it is free of oil, dirt and rust; that it is located and spaced properly; that hooks, bends, ties, stirrups and supplemental reinforcement are placed correctly; that lap lengths, stagger and offsets are provided; and that all mechanical connections are installed per the manufacturer's instructions and/or evaluation report.
☒	2. Anchors cast in concrete	-	P	Verify prior to placing concrete that cast in anchors have proper embedment, spacing and edge distance.
☒	3. Post-installed anchors or dowels	C		Inspect all post-installed anchors/dowels as required by the approved ICC-ES report.
☒	4. Use of required mix design	-	P	Verify that all mixes used comply with the approved construction documents
☒	5. Concrete slump, air content, and temperature	C	-	At the time fresh concrete is sampled to fabricate specimens for strength test verify these tests are performed.
☒	6. Concrete placement	C	-	Verify proper application techniques are used during concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated.

CONCRETE CONSTRUCTION

IBC TABLE 1705.3, 1705.12.1:				
Required	Task	Continuous	Periodic	Description
☒	7. Curing temperature and techniques	-	P	Inspect curing and hot weather protection procedures.
☒	8. In-situ concrete strength verification	-	P	Prior to the removal of shores and forms, verify that adequate strength has been achieved.
☒	9. Formwork	-	P	Inspect the forms to ensure that they are placed plumb and conform to the shapes, lines, and dimensions of the members as required by the approved construction documents.
☒	10. Reinforcement complying with ASTM A 615 in sheet pile wall pile caps	-	P	Verify that ASTM A 615 reinforcing steel used in these areas complies with ACI 318: 21.1.5.2 by means of certified mill test reports. If this reinforcing steel is to be welded chemical tests shall be performed in accordance with ACI 318: 3.5.2.

CONTRACTOR STATEMENT OF RESPONSIBILITY

Each contractor responsible for the construction of the components listed in the *Statement of Special Inspections* shall submit a *Contractor Statement of Responsibility* to the Contracting Officer prior to the commencement of work on the system or component.

Project: **Wharf Bravo Structural Repairs**

Prime Contractor (Firm Name): _____

Address: _____

_____

The Contractor shall review the descriptions and special inspection requirements provided in the *Statement of Special Inspections.*

Contractor's Acknowledgment

I hereby acknowledge that I have received, read, and understand specification 01 45 35.00 25 SPECIAL INSPECTIONS, which includes the *Statement of Special Inspections* and the *Schedule of Special Inspections*.

I hereby acknowledge that I understand and am aware of the special inspection requirements contained in the *Statement of Special Inspections* and the *Schedule of Special Inspections*.

_____
Prime Contractor Representative's Name

_____ _____
Signature Date

SECTION 01 50 00.00 25

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS
06/15
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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.

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (FCCCHR)

FCCCHR List	(continuously updated) List of Approved Backflow Prevention Assemblies

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241	(2013; Errata 2015) Standard for Safeguarding Construction,Alteration, and Demolition Operations
NFPA 70	(2014; AMD 1 2013; Errata 1 2013; AMD 2 2013; Errata 2 2013; AMD 3 2014; Errata 3-4 2014; AMD 4-6 2014) National Electrical Code

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1	(2007; Rev K) Obstruction Marking and Lighting

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD	(2009) Manual on Uniform Traffic Control Devices

1.2 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 site plan; G
Traffic control plan; G

SD-03 Product Data

Backflow preventers; G

SD-06 Test Reports

Backflow Preventer Tests; G

SD-07 Certificates

Backflow Tester Certification; G

Backflow Preventers Certificate of Full Approval

1.3 CONSTRUCTION SITE PLAN

Prior to the start of work, submit a site plan showing the locations and dimensions of temporary facilities (including layouts and details, equipment and material storage area (onsite and offsite), and access and haul routes, avenues of ingress/egress to the fenced area and details of the fence installation. Identify any areas which may have to be graveled to prevent the tracking of mud. Indicate if the use of a supplemental or other staging area is desired. Show locations of safety and construction fences, site trailers, construction entrances, trash dumpsters, temporary sanitary facilities, and worker parking areas.

1.4 BACKFLOW PREVENTERS CERTIFICATE

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.

1.4.1 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.

1.5 HURRICANE CONDITION OF READINESS

Unless directed otherwise, comply with:

a. Condition FOUR (Sustained winds of 50 knots or greater expected within 72 hours): Normal daily jobsite cleanup and good housekeeping practices. Collect and store in piles or containers scrap lumber, waste material, and rubbish for removal and disposal at the close of each work day. Maintain the construction site including storage areas, free of accumulation of debris. Stack form lumber in neat piles less than 4 feet high. Remove all debris, trash, or objects that could become missile hazards. Contact Contracting Officer for Condition of Readiness (COR) updates and completion of required actions.

b. Condition THREE (Sustained winds of 50 knots or greater expected within 48 hours): Maintain "Condition FOUR" requirements and commence securing operations necessary for "Condition ONE" which cannot be completed within 18 hours. Cease all routine activities which might interfere with securing operations. Commence securing and stow all gear and portable equipment. Make preparations for securing buildings. Review requirements pertaining to "Condition TWO" and continue action as necessary to attain "Condition THREE" readiness. Contact Contracting Officer for weather and COR updates and completion

of required actions.

c. Condition TWO (Sustained winds of 50 knots or greater expected within 24 hours): Curtail or cease routine activities until securing operation is complete. Reinforce or remove form work and scaffolding. Secure machinery, tools, equipment, materials, or remove from the jobsite. Expend every effort to clear all missile hazards and loose equipment from general base areas. Contact Contracting Officer for weather and Condition of Readiness (COR) updates and completion of required actions.

d. Condition ONE. (Sustained winds of 50 knots or greater expected within 12 hours): Secure the jobsite, and leave Government premises.

PART 2 PRODUCTS

2.1 TEMPORARY SIGNAGE

2.1.1 Bulletin Board

Immediately upon beginning of work, provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer.

2.1.2 Project and Safety Signs

The requirements for the signs, their content, and location are as indicated. Erect signs within 15 days after receipt of the notice to proceed. Correct the data required by the safety sign daily, with light colored metallic or non-metallic numerals.

2.2 TEMPORARY TRAFFIC CONTROL

2.2.1 Haul Roads

Construct access and haul roads necessary for proper prosecution of the work under this contract. Construct with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic are be avoided. Provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, must be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads are subject to approval by the Contracting Officer. Lighting must be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations.

2.2.2 Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. Whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic barricades will be required. Securely place barricades clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

2.2.3 Fencing

Provide fencing along the construction site at all open excavations and tunnels to control access by unauthorized people.

a. 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, constructed at the approved location. Install fencing to be able to restrain a force of at least 250 pounds against it. Remove the fence from the work site upon completion of the contract.

2.2.4 Temporary Wiring

Provide temporary wiring in accordance with NFPA 241 and NFPA 70. Include frequent inspection of all equipment and apparatus.

PART 3 EXECUTION

3.1 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. Contractor employee parking must not interfere with existing and established parking requirements of the government installation.

3.2 TEMPORARY BULLETIN BOARD

Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer.

3.3 AVAILABILITY AND USE OF UTILITY SERVICES

3.3.1 Temporary Utilities

Provide temporary utilities 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.

3.3.2 Payment for Utility Services

a. The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed will be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. Carefully conserve any utilities furnished without charge.

b. Reasonable amounts of the following utilities will be made available to the Contractor . Refer to Section 00 73 01.00 25 SUPPLEMENTARY CONDITIONS FOR GUANTANAMO BAY PROJECTS, subpart 1.3.10 for electricity, water and sewage rates.

c. The point at which the Government will deliver such utilities or services and the quantity available is as indicated. Pay all costs

incurred in connecting, converting, and transferring the utilities to the work. Make connections, including providing meters; and providing transformers; and make disconnections.

3.3.3 Meters and Temporary Connections

At the Contractors expense and in a manner satisfactory to the Contracting Officer, provide and maintain necessary temporary connections, distribution lines, and meter bases (Government will provide meters) required to measure the amount of each utility used for the purpose of determining charges. Notify the Contracting Officer, in writing, 5 working days before final electrical connection is desired so that a utilities contract can be established. The Government will provide a meter and make the final hot connection after inspection and approval of the Contractor's temporary wiring installation. The Contractor will not make the final electrical connection.

3.3.4 Advance Deposit

An advance deposit for utilities consisting of an estimated month's usage or a minimum of $50.00 will be required. The last monthly bills for the fiscal year will normally be offset by the deposit and adjustments will be billed or returned as appropriate. Services to be rendered for the next fiscal year, beginning 1 October, will require a new deposit. Notification of the due date for this deposit will be mailed to the Contractor prior to the end of the current fiscal year.

3.3.5 Final Meter Reading

Before completion of the work and final acceptance of the work by the Government, notify the Contracting Officer, in writing, 5 working days before termination is desired. The Government will take a final meter reading, disconnect service, and remove the meters. Then remove all the temporary distribution lines, meter bases, and associated paraphernalia. Pay all outstanding utility bills before final acceptance of the work by the Government.

3.3.6 Sanitation

a. 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. 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. 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.

b. Provide temporary sewer and sanitation facilities that are self-contained units with both urinals and stool capabilities. Ventilate the units to control odors and fumes and empty and clean them at least once a week or more often if required by the Contracting Officer. The doors shall be self-closing. The exterior of the unit shall match the base standard color. Locate the facility behind the

construction fence or out of the public view.

3.3.7 Telephone

Make arrangements and pay all costs for telephone facilities desired.

3.3.8 Obstruction Lighting of Cranes

Provide a minimum of 2 aviation red or high intensity white obstruction lights on temporary structures (including cranes) over 100 feet above ground level. Light construction and installation must comply with FAA AC 70/7460-1. Lights must be operational during periods of reduced visibility, darkness, and as directed by the Contracting Officer.

3.3.9 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.

3.4 TRAFFIC PROVISIONS

3.4.1 Maintenance of Traffic

a. Conduct operations in a manner that will not close any thoroughfare or interfere in any way with traffic on railways or highways except with written permission of the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan detailing the proposed controls to traffic movement for approval. The plan must be in accordance with State and local regulations and the MUTCD, Part VI. . Contractor may move oversized and slow-moving vehicles to the worksite provided requirements of the highway authority have been met.

b. Conduct work so as to minimize obstruction of traffic, and maintain traffic on at least half of the roadway width at all times. Obtain approval from the Contracting Officer prior to starting any activity that will obstruct traffic.

c. Provide, erect, and maintain, at Contractor's expense, lights, barriers, signals, passageways, detours, and other items, that may be required by the Life Safety Signage, overhead protection authority having jurisdiction.

3.4.2 Protection of Traffic

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.

3.4.3 Dust Control

Dust control methods and procedures must be approved by the Contracting Officer. Treat dust abatement on access roads with applications of calcium chloride, water sprinklers, or similar methods or treatment.

3.5 CONTRACTOR'S TEMPORARY FACILITIES

3.5.1 Safety

Protect the integrity of any installed safety systems or personnel safety devices. If entrance into systems serving safety devices is required, the Contractor must obtain prior approval from the Contracting Officer. If it is temporarily necessary to remove or disable personnel safety devices in order to accomplish contract requirements, provide alternative means of protection prior to removing or disabling any permanently installed safety devices or equipment and obtain approval from the Contracting Officer.

3.5.2 Administrative Field Offices

Provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

3.5.3 Storage Area

Construct a temporary 6 foot high chain link fence around trailers and materials. Include plastic strip inserts, colored green, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Do not place or store Trailers, materials, or equipment outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the installation boundaries. Trailers, equipment, or materials must not be open to public view with the exception of those items which are in support of ongoing work on any given day. Do not stockpile materials outside the fence in preparation for the next day's work. 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.

3.5.4 Supplemental Storage Area

Upon Contractor's request, the Contracting Officer will designate another or supplemental area for the Contractor's use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but will be within the installation 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. Utilities will not be provided to this area by the Government.

3.5.5 Appearance of Trailers

a. 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.

b. Paint in accordance with facility standards and maintain the temporary facilities. Failure to do so will be sufficient reason to require their removal.

3.5.6 Maintenance of Storage Area

a. Keep fencing in a state of good repair and proper alignment. Grassed or unpaved areas, which are not established roadways, will be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways, should the Contractor elect to traverse them with construction equipment or other vehicles; gravel gradation will be at the Contractor's discretion. Mow and maintain grass located within the boundaries of the construction site for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers will be edged or trimmed neatly.

b. Cut grass (or annual weeds) within the construction and storage sites to a maximum 4 inch height at least once a week during the growing season unless the grass area is not visible to the public. Trim the grass around fences at time of grass cutting. Maintain grass or weeds on stockpiled earth as descried above.

3.5.7 New Building

In the event a new building is constructed for the temporary project field office, it will be a minimum 12 feet in width, 16 feet in length and have a minimum of 7 feet headroom. Equip the building with approved electrical wiring, at least one double convenience outlet and the required switches and fuses to provide 110-120 volt power. Provide a work table with stool, desk with chair, two additional chairs, and one legal size file cabinet that can be locked. The building must be waterproof, supplied with a heater, have a minimum of two doors, electric lights, a telephone, a battery operated smoke detector alarm, a sufficient number of adjustable windows for adequate light and ventilation, and a supply of approved drinking water. Approved sanitary facilities must be furnished. Screen the windows and doors and provide the doors with dead bolt type locking devices or a padlock and heavy duty hasp bolted to the door. Door hinge pins will be non-removable. Arrange the windows to open and to be securely fastened from the inside. Protect glass panels in windows by bars or heavy mesh screens to prevent easy access. In warm weather, furnish air conditioning capable of maintaining the office at 50 percent relative humidity and a room temperature 20 degrees F below the outside temperature when the outside temperature is 95 degrees F. Any new building erected for a temporary field office must be maintained by the Contractor during the life of the contract and upon completion and acceptance of the work become the property of the Contractor and removed from the site.

3.5.8 Security Provisions

Provide adequate outside security lighting at the Contractor's temporary facilities. The Contractor will be responsible for the security of its own equipment; in addition, the Contractor will notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

3.5.9 Weather Protection of Temporary Facilities and Stored Materials

Take necessary precautions to ensure that roof openings and other critical openings in the building 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.

3.5.9.1 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.

3.6 PLANT COMMUNICATION

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.

3.7 TEMPORARY PROJECT SAFETY 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 during the life of the contract and, upon completion and acceptance of the work, will become the property of the Contractor and be removed from the work site.

3.8 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 away. Store any salvageable materials resulting from demolition activities within the fenced area described above or at the supplemental storage area. Neatly stack stored materials not in trailers, whether new or salvaged.

3.9 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. Remove gravel used to traverse grassed areas and restore the area to its original condition, including top soil and seeding as necessary.

-- End of Section --

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TEMPORARY ENVIRONMENTAL CONTROLS
12/15
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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)

29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
40 CFR 112	Oil Pollution Prevention
40 CFR 122.26	Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258	Subtitle D Landfill Requirements
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 273	Standards For Universal Waste Management
40 CFR 273.2	Standards for Universal Waste Management - Batteries
40 CFR 273.4	Standards for Universal Waste Management - Mercury Containing Equipment
40 CFR 273.5	Standards for Universal Waste Management - Lamps
40 CFR 279	Standards for the Management of Used Oil
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 300.125	National Oil and Hazardous Substances Pollution Contingency Plan - Notification and Communications
40 CFR 355	Emergency Planning and Notification
40 CFR 60	Standards of Performance for New Stationary Sources
40 CFR 63	National Emission Standards for Hazardous Air Pollutants for Source Categories
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
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Class I and II Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act. A list of Class I ODS can be found on the EPA website at the following weblink. http://www.epa.gov/ozone/science/ods/classone.html.

Class II ODS is defined in Section 602(s) of The Clean Air Act. A list of Class II ODS can be found on the EPA website at the following weblink. http://www.epa.gov/ozone/science/ods/classtwo.html.

1.2.2 Contractor Generated Hazardous Waste

Contractor generated hazardous waste is materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of

construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene), waste thinners, excess paints, excess solvents, waste solvents, excess pesticides, and contaminated pesticide equipment rinse water.

1.2.3 Electronics Waste

Electronics waste is discarded electronic devices intended for salvage, recycling, or disposal.

1.2.4 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.

1.2.5 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.

1.2.6 Hazardous Debris

As defined in paragraph SOLID WASTE, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) in accordance with 40 CFR 261. Hazardous debris also includes debris that exhibits a characteristic of hazardous waste in accordance with 40 CFR 261.

1.2.7 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

Hazardous material is any material that: Is regulated as a hazardous material in accordance with 49 CFR 173; or requires a Safety Data Sheet (SDS) in accordance with 29 CFR 1910.120; or during end use, treatment, handling, packaging, storage, transportation, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261 Subparts A, B, C, or D. Designation of a material by this definition, when separately regulated or controlled by other sections or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this section for "control" purposes. Such material includes ammunition, weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs).

1.2.8 Hazardous Waste

Hazardous Waste is any material that meets the definition of a solid waste

and exhibit a hazardous characteristic (ignitability, corrosivity, reactivity, or toxicity) as specified in 40 CFR 261, Subpart C, or contains a listed hazardous waste as identified in 40 CFR 261, Subpart D.

1.2.9 Land Application

Land Application means spreading or spraying discharge water at a rate that allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" must occur. Comply with federal, state, and local laws and regulations.

1.2.10 Municipal Separate Storm Sewer System (MS4) Permit

MS4 permits are those held by installations to obtain NPDES permit coverage for their stormwater discharges.

1.2.11 National Pollutant Discharge Elimination System (NPDES)

The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

1.2.12 Oily Waste

Oily waste are those materials that are, or were, mixed with Petroleum, Oils, and Lubricants (POLs) and have become separated from that POLs. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, POLs and may be appropriately tested and discarded in a manner which is in compliance with other state and local requirements.

This definition includes materials such as oily rags, "kitty litter" sorbent clay and organic sorbent material. These materials may be land filled provided that: It is not prohibited in other state regulations or local ordinances; the amount generated is "de minimus" (a small amount); it is the result of minor leaks or spills resulting from normal process operations; and free-flowing oil has been removed to the practicable extent possible. Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, perform a hazardous waste determination prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

1.2.13 Regulated Waste

Regulated waste are solid wastes that have specific additional federal, state, or local controls for handling, storage, or disposal.

1.2.14 Sediment

Sediment is soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.15 Solid Waste

Solid waste is a solid, liquid, semi-solid or contained gaseous waste. A solid waste can be a hazardous waste, non-hazardous waste, or non-Resource

Conservation and Recovery Act (RCRA) regulated waste. Types of solid waste typically generated at construction sites may include:

1.2.15.1 Debris

Debris is non-hazardous solid material generated during the construction, demolition, or renovation of a structure that exceeds 2.5-inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (for example, cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

1.2.15.2 Green Waste

Green waste is the vegetative matter from landscaping, land clearing and grubbing, including, but not limited to, grass, bushes, scrubs, small trees and saplings, tree stumps and plant roots. Marketable trees, grasses and plants that are indicated to remain, be re-located, or be re-used are not included.

1.2.15.3 Material not regulated as solid waste

Material not regulated as solid waste is nuclear source or byproduct materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

1.2.15.4 Non-Hazardous Waste

Non-hazardous waste is waste that is excluded from, or does not meet, hazardous waste criteria in accordance with 40 CFR 263.

1.2.15.5 Surplus Soil

Surplus soil is existing soil that is in excess of what is required for this work, including aggregates intended, but not used, for on-site mixing of concrete, mortars, and paving. Contaminated soil meeting the definition of hazardous material or hazardous waste is not included and must be managed in accordance with paragraph HAZARDOUS MATERIAL MANAGEMENT.

1.2.15.6 Scrap Metal

This includes scrap and excess ferrous and non-ferrous metals such as reinforcing steel, structural shapes, pipe, and wire that are recovered or collected and disposed of as scrap. Scrap metal meeting the definition of hazardous material or hazardous waste is not included.

1.2.15.7 Wood

Wood is dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included. Treated wood includes, but is not limited to, lumber, utility poles, crossties, and other wood products with chemical treatment.

1.2.16 Surface Discharge

Surface discharge means discharge of water into drainage ditches, storm sewers, creeks or "waters of the United States". Surface discharges are discrete, identifiable sources and require a permit from the governing agency. Comply with federal, state, and local laws and regulations.

1.2.17 Wastewater

Wastewater is the used water and solids from a community that flow to a treatment plant.

1.2.17.1 Stormwater

Stormwater is any precipitation in an urban or suburban area that does not evaporate or soak into the ground, but instead collects and flows into storm drains, rivers, and streams.

1.2.18 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (for example, thermostats), and lamps (for example, fluorescent bulbs). The rule is designed to reduce hazardous waste in the municipal solid waste (MSW) stream by making it easier for universal waste handlers to collect these items and send them for recycling or proper disposal. These regulations can be found at 40 CFR 273. Also include any other hazardous wastes that have been designated as universal wastes in individual states (e.g. Texas - paint related waste; Florida - pharmaceutical waste).

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval.

SD-01 Preconstruction Submittals

Solid Waste Management Permit; G

Environmental Protection Plan; G

SD-11 Closeout Submittals

Stormwater Pollution Prevention Plan Compliance Notebook; G

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire duration of this Contract. Comply with federal, state, and local regulations pertaining to

the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

Tests and procedures assessing whether construction operations comply with Applicable Environmental Laws may be required. Analytical work must be performed by qualified laboratories; and where required by law, the laboratories must be certified.

1.4.1 Training in Environmental Compliance Assessment Training and Tracking System (ECATTS)

1.4.1.1 Personnel Requirements

The Environmental Manager is responsible for environmental compliance on projects. The Environmental Manager and other staff, must complete applicable ECATTS training modules (installation specific or general) prior to starting respective portions of on-site work under this Contract. If personnel changes occur for any of these positions after starting work, replacement personnel must complete applicable ECATTS training within 14 days of assignment to the project.

1.4.1.2 Certification

Submit an ECATTS certificate of completion for personnel who have completed the required ECATTS training. This training is web-based and can be accessed from any computer with Internet access using the following instructions.

Register for NAVFAC Environmental Compliance Training and Tracking System, by logging on to https://environmentaltraining.ecatts.com/. Obtain the password for registration from the Contracting Officer.

1.4.1.3 Refresher Training

This training has been structured to allow contractor personnel to receive credit under this contract and to carry forward credit to future contracts. Ensure the Environmental Manager review their training plans for new modules or updated training requirements prior to beginning work. Some training modules are tailored for specific state regulatory requirements; therefore, Contractors working in multiple states will be required to retake modules tailored to the state where the contract work is being performed.

1.4.2 Conformance with the Environmental Management System

Perform work under this contract consistent with the policy and objectives identified in the installation's Environmental Management System (EMS). Perform work in a manner that conforms to objectives and targets of the environmental programs and operational controls identified by the EMS. Support Government personnel when environmental compliance and EMS audits are conducted by escorting auditors at the Project site, answering questions, and providing proof of records being maintained. Provide monitoring and measurement information as necessary to address environmental performance relative to environmental, energy, and transportation management goals. In the event an EMS nonconformance or environmental noncompliance associated with the contracted services, tasks, or actions occurs, take corrective and preventative actions. In addition, employees must be aware of their roles and responsibilities under the installation EMS and of how these EMS roles and responsibilities affect

work performed under the contract.

Coordinate with the installation's EMS coordinator to identify training needs associated with environmental aspects and the EMS, and arrange training or take other action to meet these needs. Provide training documentation to the Contracting Officer. The Installation Environmental Office will retain associated environmental compliance records. Make EMS Awareness training completion certificates available to Government auditors during EMS audits and include the certificates in the Employee Training Records. See paragraph EMPLOYEE TRAINING RECORDS.

1.5 QUALITY ASSURANCE

1.5.1 Preconstruction Survey and Protection of Features

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any onsite construction activities, perform a Preconstruction Survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for the record. Include in the report a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection 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. The Contractor and the Contracting Officer will sign this survey report upon mutual agreement regarding its accuracy and completeness. Protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference that their preservation may cause to the work under the Contract.

1.5.2 Regulatory Notifications

Provide regulatory notification requirements in accordance with federal, state and local regulations. In cases where the Government will also provide public notification (such as stormwater permitting), coordinate with the Contracting Officer. Submit copies of regulatory notifications to the Contracting Officer within 15 days prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all-inclusive): demolition, renovation, NPDES defined site work, construction, removal or use of a permitted air emissions source, and remediation of controlled substances (asbestos, hazardous waste, lead paint).

1.5.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the installation; and types and quantities of wastes/wastewater that may be generated during the Contract. Discuss the results of the Preconstruction Survey at this time.

Prior to initiating any work on site, meet with the Contracting Officer and installation Environmental Office to discuss the proposed Environmental Protection Plan (EPP). Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural and cultural resources, required reports, required permits, permit requirements (such as mitigation measures), and other measures to be taken.

1.5.4 Employee Training Records

Prepare and maintain Employee Training Records throughout the term of the contract meeting applicable 40 CFR requirements. Provide Employee Training Records in the Environmental Records Binder. Submit these Assembled Employee Training Records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

Train personnel to meet local requirements. Conduct environmental protection/pollution control meetings for personnel prior to commencing construction activities. Contact additional meetings for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, 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; recognition and protection of archaeological sites, artifacts, waters of the United States, and endangered species and their habitat that are known to be in the area.

1.5.5 Non-Compliance Notifications

The Contracting Officer 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 EPP. After receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions will be granted or equitable adjustments allowed for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

1.6 ENVIRONMENTAL PROTECTION PLAN

The purpose of the EPP is to present an overview of known or potential environmental issues that must be considered and addressed during construction. Incorporate construction related objectives and targets from the installation's EMS into the EPP. Include in the EPP measures for protecting natural and cultural resources, required reports, and other measures to be taken. Meet with the Contracting Officer or Contracting Officer Representative to discuss the EPP and develop a mutual understanding relative to the details for environmental protection including measures for protecting natural resources, required reports, and other measures to be taken. Submit the EPP within 15 days after notice to proceed and not less than 10 days before the preconstruction meeting. Revise the EPP throughout the project to include any reporting requirements, changes in site conditions, or contract modifications that change the project scope of work in a way that could have an environmental impact. No requirement in this section will relieve the Contractor of any applicable federal, state, and local environmental protection laws and regulations. During Construction, identify, implement, and submit for approval any additional requirements to be included in the EPP. Maintain the current version onsite.

The EPP includes, but is not limited to, the following elements:

1.6.1 General Overview and Purpose

1.6.1.1 Descriptions

A brief description of each specific plan required by environmental permit or elsewhere in this Contract such as stormwater pollution prevention plan, spill control plan, solid waste management plan,.

1.6.1.2 Duties

The duties and level of authority assigned to the person(s) on the job site who oversee environmental compliance, such as who is responsible for adherence to the EPP, who is responsible for spill cleanup and training personnel on spill response procedures, who is responsible for manifesting hazardous waste to be removed from the site (if applicable), and who is responsible for training the Contractor's environmental protection personnel.

1.6.1.3 Procedures

A copy of any standard or project-specific operating procedures that will be used to effectively manage and protect the environment on the project site.

1.6.1.4 Communications

Communication and training procedures that will be used to convey environmental management requirements to Contractor employees and subcontractors.

1.6.1.5 Contact Information

Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

1.6.2 General Site Information

1.6.2.1 Drawings

Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, jurisdictional wetlands, material storage areas, structures, sanitary facilities, storm drains and conveyances, and stockpiles of excess soil.

1.6.2.2 Work Area

Work area plan showing the proposed activity in each portion of the area and identify the areas of limited use or nonuse. Include measures for marking the limits of use areas, including methods for protection of features to be preserved within authorized work areas and methods to control runoff and to contain materials on site, and a traffic control plan.Show where any fuels, hazardous substances, solvents, or lubricants will be stored. Provide a spill plan to address leaks or spills of fuels, hazardous substances, solvents, or lubricants.

1.6.2.3 Documentation

A letter signed by an officer of the firm appointing the Environmental

Manager and stating that person is responsible for managing and implementing the Environmental Program as described in this contract. Include in this letter the Environmental Manager's authority to direct the removal and replacement of non-conforming work.

1.6.3 Management of Natural Resources

a. Land resources

b. Tree protection

c. Replacement of damaged landscape features

d. Temporary construction

e. Stream crossings

f. Fish and wildlife resources

g. Wetland areas

1.6.4 Protection of Historical and Archaeological Resources

a. Objectives

b. Methods

1.6.5 Stormwater Management and Control

a. Ground cover

b. Erodible soils

c. Temporary measures

(1) Structural Practices

(2) Temporary and permanent stabilization

d. Effective selection, implementation and maintenance of Best Management Practices (BMPs).

1.6.6 Protection of the Environment from Waste Derived from Contractor Operations

Control and disposal of solid and sanitary waste. Control and disposal of hazardous waste.

This item consist of the management procedures for hazardous waste to be generated. The elements of those procedures will coincide with the Installation Hazardous Waste Management Plan. The Contracting Officer will provide a copy of the Installation Hazardous Waste Management Plan. As a minimum, include the following:

a. List of the types of hazardous wastes expected to be generated

b. Procedures to ensure a written waste determination is made for appropriate wastes that are to be generated

c. Sampling/analysis plan, including laboratory method(s) that will be used for waste determinations and copies of relevant laboratory certifications

d. Methods and proposed locations for hazardous waste accumulation/storage (that is, in tanks or containers)

e. Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted)

f. Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268)

g. Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and similar

h. Used oil management procedures in accordance with 40 CFR 279; Hazardous waste minimization procedures

i. Plans for the disposal of hazardous waste by permitted facilities; and Procedures to be employed to ensure required employee training records are maintained.

1.6.7 Prevention of Releases to the Environment

Procedures to prevent releases to the environment

Notifications in the event of a release to the environment

1.6.8 Regulatory Notification and Permits

List what notifications and permit applications must be made. Some permits require up to 180 days to obtain. Demonstrate that those permits have been obtained or applied for by including copies of applicable environmental permits. The EPP will not be approved until the permits have been obtained.

1.6.9 Clean Air Act Compliance

1.6.9.1 Haul Route

Submit truck and material haul routes along with a Dirt and Dust Control Plan for controlling dirt, debris, and dust on Installation roadways. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

1.6.9.2 Pollution Generating Equipment

Identify air pollution generating equipment or processes that may require federal, state, or local permits under the Clean Air Act. Determine requirements based on any current installation permits and the impacts of the project. Provide a list of all fixed or mobile equipment, machinery or operations that could generate air emissions during the project to the Installation Environmental Office (Air Program Manager).

1.6.9.3 Stationary Internal Combustion Engines

Identify portable and stationary internal combustion engines that will be

supplied, used or serviced. Comply with 40 CFR 60 Subpart IIII, 40 CFR 60 Subpart JJJJ, 40 CFR 63 Subpart ZZZZ, and local regulations as applicable. At minimum, include the make, model, serial number, manufacture date, size (engine brake horsepower), and EPA emission certification status of each engine. Maintain applicable records and log hours of operation and fuel use. Logs must include reasons for operation and delineate between emergency and non-emergency operation.

1.6.9.4 Refrigerants

Identify management practices to ensure that heating, ventilation, and air conditioning (HVAC) work involving refrigerants complies with 40 CFR 82 requirements. Technicians must be certified, maintain copies of certification on site, use certified equipment and log work that requires the addition or removal of refrigerant. Any refrigerant reclaimed is the property of the Government, coordinate with the Installation Environmental Office to determine the appropriate turn in location.

1.6.9.5 Air Pollution-engineering Processes

Identify planned air pollution-generating processes and management control measures (including, but not limited to, spray painting, abrasive blasting, demolition, material handling, fugitive dust, and fugitive emissions). Log hours of operations and track quantities of materials used.

1.6.9.6 Compliant Materials

Provide the Government a list of and SDSs for all hazardous materials proposed for use on site. Materials must be compliant with all Clean Air Act regulations for emissions including solvent and volatile organic compound contents, and applicable National Emission Standards for Hazardous Air Pollutants requirements. The Government may alter or limit use of specific materials as needed to meet installation permit requirements for emissions.

1.7 LICENSES AND PERMITS

Obtain licenses and permits required for the construction of the project and in accordance with FAR 52.236-7. Notify the Government of all general use permitted equipment the Contractor plans to use on site. This paragraph supplements the Contractor's responsibility under FAR 52.236-7.

1.8 ENVIRONMENTAL RECORDS BINDER

Maintain on-site a separate three-ring Environmental Records Binder and submit at the completion of the project. Make separate parts within the binder that correspond to each submittal listed under paragraph CLOSEOUT SUBMITTALS in this section.

1.9 SOLID WASTE MANAGEMENT PERMIT

Provide the Contracting Officer with written notification of the quantity of anticipated solid waste or debris that is anticipated or estimated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance from the receiving location or as applicable; submit one copy of the receiving location state and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before

transporting wastes off Government property.

1.9.1 Solid Waste Management Report

Monthly, submit a solid waste disposal report to the Contracting Officer. For each waste, the report will state the classification (using the definitions provided in this section), amount, location, and name of the business receiving the solid waste.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants, including their habitats. Prior to the commencement of activities, consult with the Installation Environmental Office, regarding rare species or sensitive habitats that need to be protected. The protection of rare, threatened, and endangered animal and plant species identified, including their habitats, is the Contractor's responsibility.

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work that is consistent with the requirements of the Installation Environmental Office or as otherwise specified. Confine construction activities to within the limits of the work indicated or specified.

3.1.1 Flow Ways

Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as specified and permitted.

3.1.2 Vegetation

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor is responsible for any resultant damage.

Protect existing trees that are to remain to ensure they are not injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. Coordinate with the Contracting Officer and Installation Environmental Office to determine appropriate action for trees and other landscape features scarred or damaged by equipment operations.

3.1.3 Streams

Stream crossings must allow movement of materials or equipment without violating water pollution control standards of the federal, state, and local governments. Construction of stream crossing structures must be in compliance with any required permits including, but not limited to, Clean

Water Act Section 404, and Section 401 Water Quality.

The Contracting Officer's approval and appropriate permits are required before any equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges. Obtain Contracting Officer's approval prior to installation. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition unless otherwise required by the Contracting Officer.

3.2 STORMWATER

Do not discharge stormwater from construction sites to the sanitary sewer. If the water is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization in advance from the Installation Environmental Office for any release of contaminated water.

3.2.1 Construction General Permit

Provide a Construction General Permit as required by 40 CFR 122.26. Under the terms and conditions of the permit, install, inspect, maintain BMPs, prepare stormwater erosion and sediment control inspection reports, and submit SWPPP inspection reports. Maintain construction operations and management in compliance with the terms and conditions of the general permit for stormwater discharges from construction activities.

3.2.1.1 Stormwater Pollution Prevention Plan

Submit a project-specific Stormwater Pollution Prevention Plan (SWPPP) to the Contracting Officer for approval, prior to the commencement of work. The SWPPP must meet the requirements of 40 CFR 122.26 for stormwater discharges from construction sites.

Include the following:

a. Comply with terms of the general permit for stormwater discharges from construction activities.

3.2.1.2 Stormwater Pollution Prevention Plan Compliance Notebook

Create and maintain a three ring binder of documents that demonstrate compliance with the Construction General Permit. Include a copy of the permit Notice of Intent, proof of permit fee payment, SWPPP and SWPPP update amendments, inspection reports and related corrective action records, copies of correspondence, and a copy of the permit Notice of Termination in the binder. At project completion, the notebook becomes property of the Government. Provide the compliance notebook to the Contracting Officer.

3.2.1.3 Stormwater Notice of Termination for Construction Activities

Submit a Notice of Termination to the Contracting Officer for approval once construction is complete and final stabilization has been achieved on all portions of the site for which the permittee is responsible. Once approved, submit the Notice of Termination to the Contracting Officer.

3.2.2 Erosion and Sediment Control Measures

Provide erosion and sediment control measures in accordance with state and local laws and regulations. Preserve vegetation to the maximum extent practicable.

Erosion control inspection reports may be compiled as part of a stormwater pollution prevention plan inspection reports.

3.2.3 Work Area Limits

Mark the areas that need not be disturbed under this Contract prior to commencing construction activities. Mark or fence isolated areas within the general work area that are not to be disturbed. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, any markers must be visible in the dark. Personnel must be knowledgeable of the purpose for marking and protecting particular objects.

3.2.4 Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings or as directed by the Contracting Officer. Move or relocate the Contractor facilities only when approved by the Government. Provide erosion and sediment controls for onsite borrow and spoil areas to prevent sediment from entering nearby waters. Control temporary excavation and embankments for plant or work areas to protect adjacent areas.

3.2.5 Municipal Separate Storm Sewer System (MS4) Management

Comply with the Installation's MS4 permit requirements.

3.3 SURFACE AND GROUNDWATER

3.3.1 Cofferdams, Diversions, and Dewatering

Construction operations for dewatering, removal of cofferdams, tailrace excavation, and tunnel closure must be constantly controlled to maintain compliance with existing state water quality standards and designated uses of the surface water body. Comply withlocal regulations. Do not discharge excavation ground water to the sanitary sewer, storm drains, or to surface waters without prior specific authorization in writing from the Installation Environmental Office. Discharge of hazardous substances will not be permitted under any circumstances. Use sediment control BMPs to prevent construction site runoff from directly entering any storm drain or surface waters.

If the construction dewatering is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization for any contaminated groundwater release in advance from the Installation Environmental Officer and the federal or state authority, as applicable. Discharge of hazardous substances will not be permitted under any circumstances.

3.4 PROTECTION OF CULTURAL RESOURCES

3.5 WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the EPP. Obtain a copy of the installation's Pollution Prevention/Hazardous Waste Minimization Plan for reference material when preparing this part of the EPP. If no written plan exists, obtain information by contacting the Contracting Officer. Describe the anticipated types of the hazardous materials to be used in the construction when requesting information.

3.5.1 Salvage, Reuse and Recycle

Identify anticipated materials and waste for salvage, reuse, and recycling. Describe actions to promote material reuse, resale or recycling. To the extent practicable, all scrap metal must be sent for reuse or recycling and will not be disposed of in a landfill.

Include the name, physical address, and telephone number of the hauler, if transported by a franchised solid waste hauler. Include the destination and, unless exempted, provide a copy of the state or local permit (cover) or license for recycling.

3.6 WASTE MANAGEMENT AND DISPOSAL

3.6.1 Waste Determination Documentation

Complete a Waste Determination form (provided at the pre-construction conference) for Contractor-derived wastes to be generated. All potentially hazardous solid waste streams that are not subject to a specific exclusion or exemption from the hazardous waste regulations (e.g. scrap metal, domestic sewage) or subject to special rules, (lead-acid batteries and precious metals) must be characterized in accordance with the requirements of 40 CFR 261 or corresponding applicable state or local regulations. Base waste determination on user knowledge of the processes and materials used, and analytical data when necessary. Consult with the Installation environmental staff for guidance on specific requirements. Attach support documentation to the Waste Determination form. As a minimum, provide a Waste Determination form for the following waste (this listing is not inclusive): oil- and latex -based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and containers of the original materials.

3.6.2 Solid Waste Management

3.6.2.1 Solid Waste Management Report

Provide copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, a statement indicating the disposal location for the solid waste that is signed by an employee authorized to legally obligate or bind the firm may be submitted. The sales documentation must include the receiver's tax identification number and business, EPA or state registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained for the Contractor's own use, submit the information previously described in this paragraph on the solid waste disposal report. Prices paid or received do

not have to be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

3.6.2.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers that are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with non-hazardous solid waste. Solid waste disposal offsite must comply with most stringent local, state, and federal requirements, including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, in accordance with 49 CFR 173.

3.6.3 Control and Management of Hazardous Waste

Do not dispose of hazardous waste on Government property. Do not discharge any waste to a sanitary sewer, storm drain, or to surface waters or conduct waste treatment or disposal on Government property without written approval of the Contracting Officer.

3.6.3.1 Hazardous Waste/Debris Management

Identify construction activities that will generate hazardous waste or debris. Provide a documented waste determination for resultant waste streams. Identify, label, handle, store, and dispose of hazardous waste or debris in accordance with federal, state, and local regulations, including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268.

Manage hazardous waste in accordance with the approved Hazardous Waste Management Section of the EPP. Store hazardous wastes in approved containers in accordance with 49 CFR 173 and 49 CFR 178. Hazardous waste generated within the confines of Government facilities is identified as being generated by the Government. Prior to removal of any hazardous waste from Government property, hazardous waste manifests must be signed by personnel from the Installation Environmental Office. Do not bring hazardous waste onto Government property. Provide the Contracting Officer with a copy of waste determination documentation for any solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D.

3.6.3.2 Universal Waste Management

Manage the following categories of universal waste in accordance with federal, state, and local requirements and installation instructions:

a. Batteries as described in 40 CFR 273.2

b. Lamps as described in 40 CFR 273.5

c. Mercury-containing equipment as described in 40 CFR 273.4

Mercury is prohibited in the construction of this facility, unless specified otherwise, and with the exception of mercury vapor lamps and

fluorescent lamps. Dumping of mercury-containing materials and devices such as mercury vapor lamps, fluorescent lamps, and mercury switches, in rubbish containers is prohibited. Remove without breaking, pack to prevent breakage, and transport out of the activity in an unbroken condition for disposal as directed.

3.6.3.3 Electronics End-of-Life Management

Recycle or dispose of electronics waste, including, but not limited to, used electronic devices such computers, monitors, hard-copy devices, televisions, mobile devices, in accordance with 40 CFR 260-262, state, and local requirements, and installation instructions.

3.6.3.4 Disposal Documentation for Hazardous and Regulated Waste

Contact the Contracting Officer for the facility RCRA identification number that is to be used on each manifest.

3.6.4 Releases/Spills of Oil and Hazardous Substances

3.6.4.1 Response and Notifications

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 in accordance with 40 CFR 300. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the Installation Fire Department, the Installation Command Duty Officer, the Installation Environmental Office, the Contracting Officer.

Submit verbal and written notifications as required by the federal (40 CFR 300.125 and 40 CFR 355), state, local regulations and instructions. Provide copies of the written notification and documentation that a verbal notification was made within 20 days. Spill response must be in accordance with 40 CFR 300 and applicable state and local regulations. Contain and clean up these spills without cost to the Government.

3.6.4.2 Clean Up

Clean up hazardous and non-hazardous waste spills. Reimburse the Government for costs incurred including sample analysis materials, clothing, equipment, and labor if the Government will initiate its own spill cleanup procedures, for Contractor- responsible spills, when: Spill cleanup procedures have not begun within one hour of spill discovery/occurrence; or, in the Government's judgment, spill cleanup is inadequate and the spill remains a threat to human health or the environment.

3.6.5 Mercury Materials

Immediately report to the Environmental Office and the Contracting Officer instances of breakage or mercury spillage. Clean mercury spill area to the satisfaction of the Contracting Officer.

Do not recycle a mercury spill cleanup; manage it as a hazardous waste for

disposal.

3.6.6 Wastewater

3.6.6.1 Disposal of wastewater must be as specified below.

3.6.6.1.1 Treatment

Do not allow wastewater from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, and forms to enter water ways or to be discharged prior to being treated to remove pollutants. Dispose of the construction- related waste water

3.6.6.1.2 Surface Discharge

For discharge of ground water, Surface discharge in accordance with federal, state, and local laws and regulations.

3.6.6.1.3 Land Application

Water generated from the flushing of lines after hydrostatic testing must be land- applied in accordance with federal, state, and local laws and regulations for land application.

3.7 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Safety Plan, in accordance with Section 01 35 26.00 25 GOVERNMENTAL SAFETY REQUIREMENTS. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. Do not bring hazardous material onto Government property that does not directly relate to requirements for the performance of this contract. Submit an SDS and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on the installation. Typical materials requiring SDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. Use hazardous materials in a manner that minimizes the amount of hazardous waste generated. Containers of hazardous materials must have National Fire Protection Association labels or their equivalent. Certify that hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste, in accordance with 40 CFR 261.

3.7.1 Contractor Hazardous Material Inventory Log

Submit the "Contractor Hazardous Material Inventory Log"(found at: http://www.wbdg.org/ccb/NAVGRAPH/graphtoc.pdf), which provides information required by (EPCRA Sections 312 and 313) along with corresponding SDS, to the Contracting Officer at the start and at the end of construction (30 days from final acceptance), and update no later than January 31 of each calendar year during the life of the contract. Keep copies of the SDSs for hazardous materials onsite. At the end of the project, provide the Contracting Officer with copies of the SDSs, and the maximum quantity of each material that was present at the site at any one time, the dates the material was present, the amount of each material that was used during the project, and how the material was used.

The Contracting Officer may request documentation for any spills or

releases, environmental reports, or off-site transfers.

3.8 PREVIOUSLY USED EQUIPMENT

Clean previously used construction equipment prior to bringing it onto the project site. Equipment must be free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the U.S. Department of Agriculture jurisdictional office for additional cleaning requirements.

3.9 PETROLEUM, OIL, LUBRICANT (POL) STORAGE AND FUELING

POL products include flammable or combustible liquids, such as gasoline, diesel, lubricating oil, used engine oil, hydraulic oil, mineral oil, and cooking oil. Store POL products and fuel equipment and motor vehicles in a manner that affords the maximum protection against spills into the environment. Manage and store POL products in accordance with EPA 40 CFR 112, and other federal, state, regional, and local laws and regulations. Use secondary containments, dikes, curbs, and other barriers, to prevent POL products from spilling and entering the ground, storm or sewer drains, stormwater ditches or canals, or navigable waters of the United States. Describe in the EPP (see paragraph ENVIRONMENTAL PROTECTION PLAN) how POL tanks and containers must be stored, managed, and inspected and what protections must be provided.

3.9.1 Used Oil Management

Manage used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while onsite exhibits a characteristic of hazardous waste. Used oil containing 1,000 parts per million of solvents is considered a hazardous waste and disposed of at the Contractor's expense. Used oil mixed with a hazardous waste is also considered a hazardous waste. Dispose in accordance with paragraph HAZARDOUS WASTE DISPOSAL.

3.9.2 Oil Storage Including Fuel Tanks

Provide secondary containment and overfill protection for oil storage tanks. A berm used to provide secondary containment must be of sufficient size and strength to contain the contents of the tanks plus 5 inches freeboard for precipitation. Construct the berm to be impervious to oil for 72 hours that no discharge will permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Use drip pans during oil transfer operations; adequate absorbent material must be onsite to clean up any spills and prevent releases to the environment. Cover tanks and drip pans during inclement weather. Provide procedures and equipment to prevent overfilling of tanks. If tanks and containers with an aggregate aboveground capacity greater than 1320 gallons will be used onsite (only containers with a capacity of 55 gallons or greater are counted), provide and implement a Spill Prevention, Control, and Countermeasure Plan (SPCC plan) meeting the requirements of 40 CFR 112. Do not bring underground storage tanks to the installation for Contractor use during a project. Submit the SPCC plan to the Contracting Officer for approval.

Monitor and remove any rainwater that accumulates in open containment dikes or berms. Inspect the accumulated rainwater prior to draining from a containment dike to the environment, to determine there is no oil sheen present.

3.10 INADVERTENT DISCOVERY OF PETROLEUM-CONTAMINATED SOIL OR HAZARDOUS WASTES

If petroleum-contaminated soil, or suspected hazardous waste is found during construction that was not identified in the Contract documents, immediately notify the Contracting Officer. Do not disturb this material until authorized by the Contracting Officer.

3.11 CHLORDANE

Evaluate excess soils and concrete foundation debris generated during the demolition of housing units or other wooden structures for the presence of chlordane or other pesticides prior to reuse or final disposal.

3.12 SOUND INTRUSION

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives are not permitted without written permission from the Contracting Officer, and then only during the designated times. Confine pile-driving operations to the period between 8 a.m. and 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

Keep construction activities under surveillance and control to minimize environment damage by noise.

3.13 POST CONSTRUCTION CLEANUP

Clean up areas used for construction in accordance with Contract Clause: "Cleaning Up". Unless otherwise instructed in writing by the Contracting Officer, remove traces 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. Grade parking area and similar temporarily used areas to conform with surrounding contours.

-- End of Section --

SECTION 01 58 00.00 25

PROJECT IDENTIFICATION
12/14
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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 WOOD PROTECTION ASSOCIATION (AWPA)

AWPA C1	(2003) All Timber Products - Preservative Treatment by Pressure Processes
AWPA C2	(2003) Lumber, Timber, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes

1.2 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

Preliminary one line drawings of project rendering; G

1.3 PROJECT SIGN

Prior to initiating any work on site, provide one project identification sign at the location indicated. Construct the sign in accordance with project sign detail, which can be downloaded at: http://www.wbdg.org/ccb/NAVGRAPH/graphtoc.pdf. Maintain sign throughout the life of the project. Upon completion of the project, remove the sign from the site.

1.3.1 Project Identification Signboard (Navy)

Provide preliminary drawing indicating layout and text content. The signboard shall be provided at a conspicuous location on the job site where directed by the Contracting Officer.

a. The field of the sign shall consist of a 4 by 8 foot sheet of grade B-B medium density overlaid exterior plywood.

b. Lumber shall be B or better Southern pine, pressure-preservative treated in accordance with AWPA C1 and AWPA C2. Nails shall be aluminum or galvanized steel.

c. The entire signboard and supports shall be given one coat of exterior alkyd primer and two coats of exterior alkyd enamel paint. The lettering and sign work shall be performed by a skilled sign painter using paint known in the trade as bulletin colors. The colors, lettering sizes, and lettering styles shall be as indicated. Where preservative-treated lumber is required, utilize only cured pressure-treated wood which has had the chemicals leached from the surface of the wood prior to painting.

d. Use spray applied automotive quality high gloss acrylic white enamel paint as background for the NAVFAC logo. NAVFAC logo shall be an applied 2 mil film sticker/decal with either transparent or white background or paint the logo by stencil onto the sign. The weather resistant sticker/decal film shall be rated for a minimum of 2-year exterior vertical exposure. The self-adhering sticker shall be mounted to the sign with pressure sensitive, permanent acrylic adhesive. Shop cut sticker/decal to rectangular shape and provide pull-off backing sheet on adhesive side of design sticker for shipping.

e. Sign paint colors (manufacturer's numbers/types listed below for color identification only)

(1) Blue = To match dark blue color in the NAVFAC logo.

(2) White = To match Brilliant White color in the NAVFAC logo.

f. NAVFAC logo must retain proportions and design integrity. NAVFAC logos in electronic format may be obtained from the NAVFAC web portal via the following link:
https://portal.navfac.navy.mil/portal/page?_pageid=181,3465071&_dad=portal&_schema=p
Use the following to choose color values for the paint to be used:

(1) Dark Blue = equivalent to CMYK values 100, 72, 0, 8 .

(2) Light Blue = equivalent to CMYK values 69, 34, 0, 0.

(3) Cyan = equivalent to CMYK values 100, 9, 0, 6.

(4) Yellow = equivalent to CMYK values 0.9,94, 0.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 74 19.00 25

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
06/15
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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. A minimum of 60 percent by weight of total project solid waste shall be diverted from the landfill.

1.2 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. The Environmental Manager, as specified in Section 01 57 19.00 25 Temporary Environmental Controls, shall be responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the project. 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 consideration shall be given to 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. The Contractor is responsible for implementation of 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.

1.3 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

Waste Management Plan; G

SD-11 Closeout Submittals

Records

1.4 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 and mutual understanding meeting outlined in Section 01 45 00.00 25 QUALITY CONTROL. At a minimum, environmental and waste management goals and issues shall be discussed at the following additional meetings:

a. Pre-bid meeting.

b. Preconstruction meeting.

c. Regular QC meetings.

d. Work safety meetings.

1.5 WASTE MANAGEMENT PLAN

A waste management plan shall be submitted within 15 days after notice to proceed and not less than 10 days before the preconstruction meeting. The plan shall demonstrate how the project waste diversion goal shall be met and shall include the following:

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 and/or incinerator 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. Recycling facilities that will be used shall be identified 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.

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 Quality Control Manager, and the Contracting Officer.

1.6 RECORDS

Records shall be maintained 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. Quantities may be measured by weight or by volume, but must be consistent throughout. List each type of waste separately noting the disposal or diversion date. Identify the landfill, recycling center, waste processor, or other organization used to process or receive the solid waste. Provide explanations for any waste not recycled or reused. With each application for payment, submit updated documentation for solid waste disposal and diversion, and submit manifests, weight tickets, receipts, and invoices specifically identifying the project and waste material. The records shall be made available to the Contracting Officer during construction, and a copy of the records shall be delivered to the Contracting Officer upon completion of the construction.

1.7 REPORTS

Provide quarterly reports and a final report to the Contracting Officer. Quarterly and final reports shall include project name, information for waste generated this quarter, and cumulative totals for the project. Each report shall include supporting documentation to include manifests, weight tickets, receipts, and invoices specifically identifying the project and waste material. Include timber harvest and demolition information, if any.

1.8 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 recyclable materials shall be handled 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 57 19.00 25 TEMPORARY ENVIRONMENTAL CONTROLS. Separate materials by one of the following methods:

1.8.1 Source Separated Method.

Waste products and materials that are recyclable shall be separated 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:

a. Land clearing debris.

b. Asphalt.

c. Concrete and masonry.

d. Metal (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, lead brass, bronze).

    (1) Ferrous.

    (2) Non-ferrous.

e. Wood (nails and staples allowed).

f. Debris.

g. Glass (colored glass allowed).

h. Paper.

    (1) Bond.

    (2) Newsprint.

    (3) Cardboard and paper packaging materials.

i. 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)
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.

j. Gypsum.

k. Non-hazardous paint and paint cans.

l. Carpet.

m. Ceiling tiles.

n. Insulation.

o. Beverage containers.

p. .

1.8.2 Co-Mingled Method.

Waste products and recyclable materials shall be placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed.

1.8.3 Other Methods.

Other methods proposed by the Contractor may be used when approved by the Contracting Officer.

1.9 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, disposal shall be in accordance with the following:

1.9.1 Reuse.

First consideration shall be given 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. Sale or donation of waste suitable for reuse shall be considered.

1.9.2 Recycle.

Waste materials not suitable for reuse, but having value as being recyclable, shall be made available for recycling. All fluorescent lamps, HID lamps, and mercury-containing thermostats removed from the site shall be recycled. Arrange for timely pickups from the site or deliveries to recycling facilities in order to prevent contamination of recyclable materials.

1.9.3 Waste.

Materials with no practical use or economic benefit shall be disposed at a landfill or incinerator.

1.9.4 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 00.00 25

CLOSEOUT SUBMITTALS
09/15
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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.

GREEN SEAL (GS)

GS-37	(2012) Cleaning Products for Industrial and Institutional Use

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N	(2014) Navy and Marine Corps Design Procedures
UFC 1-300-08	(2009, with Change 2) Criteria for Transfer and Acceptance of DoD Real Property

1.2 DEFINITIONS

1.2.1 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. As-built drawings are further defined in NFAS 5252.236-9310. These files serve as the basis for the creation of the record drawings.

1.2.2 Record Drawings

The record drawings are the final compilation of actual conditions reflected in the as-built drawings.

1.3 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.

1.3.1 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).

1.4 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-03 Product Data

Warranty Management Plan
Warranty Tags
Spare Parts Data

SD-08 Manufacturer's Instructions

Posted Instructions

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
Interim DD FORM 1354; G
Checklist for DD FORM 1354; G
NAVFAC Sustainable & Energy Data Record Card; G

1.5 SPARE PARTS DATA

Submit two copies of the Spare Parts Data list.

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.

1.6 WARRANTY MANAGEMENT

1.6.1 Warranty Management Plan

Develop a warranty management plan which contains information relevant to the clause Warranty of Construction. At least 30 days before the planned pre-warranty conference, submit one set 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:

a. 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.

b. Furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.

c. 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.

d. A list for each warranted equipment, item, feature of construction or system indicating:

   (1) Name of item.
   (2) Model and serial numbers.
   (3) Location where installed.
   (4) Name and phone numbers of manufacturers or suppliers.
   (5) Names, addresses and telephone numbers of sources of spare parts.
   (6) 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.
(7) Cross-reference to warranty certificates as applicable.
(8) Starting point and duration of warranty period.
(9) Summary of maintenance procedures required to continue the warranty in force.
(10) Cross-reference to specific pertinent Operation and Maintenance manuals.
(11) Organization, names and phone numbers of persons to call for warranty service.
(12) Typical response time and repair time expected for various warranted equipment.

e. The plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

f. Procedure and status of tagging of all equipment covered by extended warranties.

g. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

1.6.2 Performance Bond

The Performance Bond must remain effective throughout the construction period.

a. 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.

b. 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.

c. 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.

1.6.3 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.

1.6.4 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	
Address	
Telephone number	
Warranty response time priority code	
WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.	

PART 2 PRODUCTS

2.1 CERTIFICATION OF EPA DESIGNATED ITEMS

Submit the Certification of EPA Designated Items as required by FAR 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:

1) The product does not meet appropriate performance standards;
2) The product is not available within a reasonable time frame;
3) The product is not available competitively (from two or more sources);
4) The product is only available at an unreasonable price (compared with a comparable non-recycled content product)."

Record each product used in the project that has a requirement or option of containing recycled or biobased content, noting total price, total value of post-industrial recycled content, total value of post-consumer recycled content, total value of biobased content, exemptions (1, 2, 3, or 4, as indicated), and comments. Recycled and biobased content values may be determined by weight or volume percent, but must be consistent throughout.

PART 3 EXECUTION

3.1 AS-BUILT DRAWINGS

Provide and maintain As-Built Drawings in accordance with NFAS 5252.236-9310. Submit As-Built Drawings 30 days prior to Beneficial Occupancy Date (BOD).

3.1.1 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 items(s) were relocated and change related details. These working as-built markup prints must be neat, legible, and accurate as follows:

a. Provide a legend of colors in compliance with FC 1-300-09N.

b. Add and denote any additional equipment or material facilities, service lines, incorporated under As-Built Revisions if not already shown in legend.

c. Use frequent written explanations on markup drawings to describe changes. Do not totally rely on graphic means to convey the revision.

d. Use legible lettering and precise and clear digital values when marking prints. Clarify ambiguities concerning the nature and application of change involved.

e. 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.

f. For deletions, cross out all features, data and captions that relate to that revision.

g. For changes on small-scale drawings and in restricted areas, provide large-scale inserts, with leaders to the applicable location.

h. Indicate one of the following when attaching a print or sketch to a markup print:

1) Add an entire drawing to contract drawings

2) Change the contract drawing to show

3) Provided for reference only to further detail the initial design.

i. Incorporate all shop and fabrication drawings into the markup drawings.

3.1.2 As-Built Drawings Content

Show on the as-built drawings, but not limited to, the following information:

a. The actual location, kinds and sizes of all sub-surface 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.

b. The location and dimensions of any changes within the building structure.

c. Layout and schematic drawings of electrical circuits and piping.

d. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

e. 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, insulation material, dimensions of equipment foundations, etc.

f. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.

g. Changes or Revisions which result from the final inspection.

h. Where contract drawings or specifications present options, show only the option selected for construction on the working as-built markup drawings.

i. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, furnish a contour map of the final borrow pit/spoil area elevations.

j. Systems designed or enhanced by the Contractor, such as HVAC controls,

fire alarm, fire sprinkler, and irrigation systems.

k. Changes in location of equipment and architectural features.

j. Modifications (include within change order price the cost to change working as-built markup drawings to reflect modifications) and compliance with FC 1-300-09N procedures.

l. Actual location of anchors, construction and control joints, etc., in concrete.

m. Unusual or uncharted obstructions that are encountered in the contract work area during construction.

n. Location, extent, thickness, and size of stone protection particularly where it will be normally submerged by water.

3.2 RECORD DRAWINGS

Prepare and provide Record Drawings in accordance with FC 1-300-09N. Provide 2 copies of Record Drawings on two separate CDs or DVDs 30 days after BOD.

3.3 OPERATION AND MAINTENANCE MANUALS

Provide project operation and maintenance manuals as specified in Section 01 78 23.00 25 OPERATION AND MAINTENANCE MANUALS.

Provide four electronic copies of the Operation and Maintenance Manual files. Submit to the Contracting Officer for approval within 60 calendar days of the Beneficial Occupancy Date (BOD). Update and resubmit files for final approval at BOD.

3.4 CLEANUP

Leave premises "broom clean." Comply with GS-37 for general purpose cleaning and bathroom cleaning. Use only nonhazardous cleaning materials, including natural cleaning materials, in the final cleanup. Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Replace filters of operating equipment and comply with the Indoor Air Quality (IAQ) Management Plan. Clean debris from roofs, gutters, downspouts, and drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site. Recycle, salvage, and return construction and demolition waste from project in accordance with Section 01 57 19.00 25 TEMPORARY ENVIRONMENTAL CONTROLS, and 01 74 19.00 25 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.

3.5 REAL PROPERTY RECORD

Near the completion of Project, but a minimum of 60 days prior to final acceptance of the work, complete and submit an accounting of all installed property with Interim DD FORM 1354. Include any additional assets, improvements, and alterations from the Draft DD FORM 1354. Contact the Contracting Officer for any project specific information necessary to

complete the DD FORM 1354. Refer to UFC 1-300-08 for instruction on completing the DD FORM 1354. For information purposes, a blank fillable PDF DD FORM 1354 may be obtained at the following: http://www.dtic.mil/whs/directives/forms/eforms/dd1354.pdf

Submit the completed Checklist for DD FORM 1354 of Installed Building Equipment items. Attach this list to the updated DD FORM 1354.

3.6 NAVFAC SUSTAINABLE & ENERGY DATA RECORD CARD

Within 60 days of the completion of Project, complete an electronic copy of the NAVFAC Sustainable & Energy Data Record Card, and submit to the Contracting Officer. Draft Record card for this project should be available from Designer of Record (DOR) or Contracting Officer. Instructions and a blank DD Form (fill-able) in ADOBE (PDF) may be obtained at the Whole Building Design Guide web site by navigating: Home > Participating Agencies > Department of Defense (DoD) > NAVFAC Sustainable Development Program > Contract Documents > NAVFAC Sustainable & Energy Data Record Card; or directly at http://www.wbdg.org/pdfs/navfac_sustainable_energy_data_record_card.pdf.

-- End of Section --

SECTION 01 78 23.00 25

OPERATION AND MAINTENANCE DATA
09/15
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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 E1971	(2005; R 2011) Stewardship for the Cleaning of Commercial and Institutional Buildings

1.2 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-10 Operation and Maintenance Data

O&M Database ; G

Training Plan ; G

Training Outline ; G

Training Content ; G

SD-11 Closeout Submittals

Training Video Recording ; G

Validation of Training Completion ; G

1.3 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.

1.3.1 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.

1.3.2 Package Content

Provide data package content in accordance with paragraph 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. Use Data Package 5 for commissioned items without a specified data package requirement in the individual technical sections. Provide a Data Package 5 instead of Data Package 1 or 2, as specified in the individual technical section, for items that are commissioned.

1.3.3 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.

1.3.4 Commissioning Authority Review and Approval

Submit the commissioned systems and equipment submittals to the Commissioning Authority (CxA) to review for completeness and applicability. Obtain validation from the CxA that the systems and equipment provided meet the requirements of the Contract documents and design intent, particularly as they relate to functionality, energy performance, water performance, maintainability, sustainability, system cost, indoor environmental quality, and local environmental impacts. The CxA communicates deficiencies to the Contracting Officer. Submit the O&M manuals to the Contracting Officer upon a successful review of the corrections, and with the CxA recommendation for approval and acceptance of these O&M manuals. This work is in addition to the normal review procedures for O&M data.

1.4 OPERATION AND MAINTENANCE MANUAL FILE FORMAT

Assemble data packages into electronic Operation and Maintenance Manuals. 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, project record documents, and training videos. Include a complete electronically linked operation and maintenance directory.

1.4.1 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.

1.4.2 CD or DVD Label and Disk Holder or Case

Provide the following information on the disk label and disk holder or case:

a. Building Number

b. Project Title

c. Activity and Location

d. Construction Contract Number

e. Prepared For: (Contracting Agency)

f. Prepared By: (Name, title, phone number and email address)

g. Include the disk content on the disk label

h. Date

i. Virus scanning program used

1.5 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

The following are a detailed description of the data package items listed in paragraph SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES.

1.5.1 Operating Instructions

Provide specific instructions, procedures, and illustrations for the following phases of operation for the installed model and features of each system:

1.5.1.1 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 provided under Section 01 35 26.00 25 GOVERNMENT SAFETY REQUIREMENTS. Provide recommended safeguards for each identified hazard.

1.5.1.2 Operator Prestart

Provide procedures required to install, set up, and prepare each system for use.

1.5.1.3 Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

1.5.1.4 Normal Operations

Provide Control Diagrams with data to explain operation and control of systems and specific equipment. Provide narrative description of Normal Operating Procedures.

1.5.1.5 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.

1.5.1.6 Operator Service Requirements

Provide instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gauge readings.

1.5.1.7 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.

1.5.1.8 Operating Log

Provide forms, sample logs, and instructions for maintaining necessary operating records.

1.5.1.9 Additional Requirements for HVAC Control Systems

Provide Data Package 5 and the following for control systems:

a. Narrative description on how to perform and apply functions, features, modes, and other operations, including unoccupied operation, seasonal changeover, manual operation, and alarms. Include detailed technical manual for programming and customizing control loops and algorithms.

b. Full as-built sequence of operations.

c. Copies of checkout tests and calibrations performed by the Contractor (not Cx tests).

d. Full points list. Provide a listing of rooms with the following information for each room:

(1) Floor

(2) Room number

(3) Room name

(4) Air handler unit ID

(5) Reference drawing number

(6) Air terminal unit tag ID

(7) Heating or cooling valve tag ID

(8) Minimum cfm

(9) Maximum cfm

e. Full print out of all schedules and set points after testing and acceptance of the system.

f. Full as-built print out of software program.

g. Marking of system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.

1.5.2 Preventive Maintenance

Provide the following 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.

1.5.2.1 Lubrication Data

Include the following preventive maintenance lubrication data, in addition to instructions for lubrication required under paragraph OPERATOR SERVICE REQUIREMENTS:

a. A table showing recommended lubricants for specific temperature ranges and applications.

b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.

c. A Lubrication Schedule showing service interval frequency.

1.5.2.2 Preventive Maintenance Plan, Schedule, and Procedures

Provide manufacturer's schedule for routine preventive maintenance, inspections, condition monitoring (predictive tests) and adjustments required to ensure proper and economical operation and to minimize repairs. Provide instructions stating when the systems should be retested. Provide manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

a. Define the anticipated time required to perform each of each test (work-hours), test apparatus, number of personnel identified by responsibility, and a testing validation procedure permitting the record operation capability requirements within the schedule. Provide a remarks column for the testing validation procedure referencing operating limits of time, pressure, temperature, volume, voltage, current, acceleration, velocity, alignment, calibration, adjustments, cleaning, or special system notes. Delineate procedures for preventive maintenance, inspection, adjustment, lubrication and cleaning necessary to minimize repairs.

b. Repair requirements must inform operators how to check out, troubleshoot, repair, and replace components of the system. Include electrical and mechanical schematics and diagrams and diagnostic techniques necessary to enable operation and troubleshooting of the system after acceptance.

1.5.2.3 Cleaning Recommendations

Provide environmentally preferable cleaning recommendations in accordance with ASTM E1971.

1.5.3 Repair

Provide manufacturer's recommended procedures and instructions for correcting problems and making repairs for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

1.5.3.1 Troubleshooting Guides and Diagnostic Techniques

Provide step-by-step 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.

1.5.3.2 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.

1.5.3.3 Repair Procedures

Provide instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

1.5.3.4 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.

1.5.3.5 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.

1.5.3.6 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.

1.5.4 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:

1.5.4.1 Product Submittal Data

Provide a copy of SD-03 Product Data submittals documented with the required approval.

1.5.4.2 Manufacturer's Instructions

Provide a copy of SD-08 Manufacturer's Instructions submittals documented with the required approval.

1.5.4.3 O&M Submittal Data

Provide a copy of SD-10 Operation and Maintenance Data submittals documented with the required approval.

1.5.4.4 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.

1.5.4.5 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 componentsof the system. Provide copies of warranties required by Section 01 78 00.00 25 CLOSEOUT SUBMITTALS.

1.5.4.6 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 00.00 25 CLOSEOUT SUBMITTALS.

1.5.4.7 Personnel Training Requirements

Provide information available from the manufacturers that is needed for use in training designated personnel to properly operate and maintain the equipment and systems.

1.5.4.8 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.

1.5.4.9 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.

1.5.4.10 Field Test Reports

Provide a copy of Field Test Reports (SD-06) submittals documented with the required approval.

1.5.4.10.1 Manufacturer's Reports

Provide a copy of Manufacturer's Field Reports (SD-09) submittals documented with the required approval.

1.5.4.11 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.

1.6 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:

1.6.1 Data Package 1

a. Safety precautions and hazards

b. Cleaning recommendations

c. Maintenance and repair procedures

d. Warranty information

e. Extended warranty information

f. Contractor information

g. Spare parts and supply list

1.6.2 Data Package 2

a. Safety precautions and hazards

b. Normal operations

c. Environmental conditions

d. Lubrication data

e. Preventive maintenance plan, schedule, and procedures

f. Cleaning recommendations

g. Maintenance and repair procedures

h. Removal and replacement instructions

i. Spare parts and supply list

j. Parts identification

k. Warranty information

l. Extended warranty information

m. Contractor information

1.6.3 Data Package 3

a. Safety precautions and hazards

b. Operator prestart

c. Startup, shutdown, and post-shutdown procedures

d. Normal operations

e. Emergency operations

f. Environmental conditions

g. Operating log

h. Lubrication data

i. Preventive maintenance plan, schedule, and procedures

j. Cleaning recommendations

k. Troubleshooting guides and diagnostic techniques

l. Wiring diagrams and control diagrams

m. Maintenance and repair procedures

n. Removal and replacement instructions

o. Spare parts and supply list

p. Product submittal data

q. O&M submittal data

r. Parts identification

s. Warranty information

t. Extended warranty information

u. Testing equipment and special tool information

v. Testing and performance data

w. Contractor information

x. Field test reports

1.6.4 Data Package 4

a. Safety precautions and hazards

b. Operator prestart

c. Startup, shutdown, and post-shutdown procedures

d. Normal operations

e. Emergency operations

f. Operator service requirements

g. Environmental conditions

h. Operating log

i. Lubrication data

j. Preventive maintenance plan, schedule, and procedures

k. Cleaning recommendations

l. Troubleshooting guides and diagnostic techniques

m. Wiring diagrams and control diagrams

n. Repair procedures

o. Removal and replacement instructions

p. Spare parts and supply list

q. Repair work-hours

r. Product submittal data

s. O&M submittal data

t. Parts identification

u. Warranty information

v. Extended warranty information

w. Personnel training requirements

x. Testing equipment and special tool information

y. Testing and performance data

z. Contractor information

aa. Field test reports

1.6.5 Data Package 5

a. Safety precautions and hazards

b. Operator prestart

c. Start-up, shutdown, and post-shutdown procedures

d. Normal operations

e. Environmental conditions

f. Preventive maintenance plan, schedule, and procedures

g. Troubleshooting guides and diagnostic techniques

h. Wiring and control diagrams

i. Maintenance and repair procedures

j. Removal and replacement instructions

k. Spare parts and supply list

l. Product submittal data

m. Manufacturer's instructions

n. O&M submittal data

o. Parts identification

p. Testing equipment and special tool information

q. Warranty information

r. Extended warranty information

s. Testing and performance data

t. Contractor information

u. Field test reports

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 02 41 00

DEMOLITION
05/10

PART 1 GENERAL

1.1 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 SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.6	(2006) Safety Requirements for Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2008; Errata 1-2010; Changes 1-3 2010; Changes 4-6 2011; Change 7 2012) Safety and Health Requirements Manual

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

40 CFR 61	National Emission Standards for Hazardous Air Pollutants

1.2 PROJECT DESCRIPTION

1.2.1 Demolition/Deconstruction Plan

Prepare a Demolition Plan and submit proposed demolition, and removal procedures for approval before work is started. Include in the plan procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, a disconnection schedule of utility services, and a detailed description of methods and equipment to be used for each operation and of the sequence of operations. Identify components and materials to be salvaged for reuse or recycling with reference to paragraph Existing Facilities to be Removed. Append tracking forms for all removed materials indicating type, quantities, condition, destination, and end use. Coordinate with Waste Management Plan. Provide procedures for safe conduct of the work in accordance with EM 385-1-1. Plan shall be approved by Contracting Officer prior to work beginning.

1.2.2 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. The work of this section is to be performed in a manner that maximizes salvage and recycling of materials. Remove rubbish and debris from the project site; do not allow accumulations outside the buildings. The work includes demolition,, salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from the site daily and deposit it in locations designated by Contracting Officer. Store materials that cannot be removed

daily in areas specified by the Contracting Officer. In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections.

1.3 ITEMS TO REMAIN IN PLACE

Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government. Repair or replace damaged items as approved by the Contracting Officer. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

1.3.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove dust, dirt, and debris from work areas daily.

1.3.2 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations. Prior to start of work, utilities serving each area of alteration or removal will be shut off by the Government and disconnected and sealed by the Contractor.

1.3.3 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract.

1.4 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.5 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

Existing Conditions; G

SD-07 Certificates

Demolition Plan; G
Notification; G

SD-11 Closeout Submittals

Receipts

1.6 QUALITY ASSURANCE

Submit timely notification of demolition and renovation projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSE/SAFE A10.6. Comply with the Environmental Protection Agency requirements specified. Use of explosives will not be permitted.

1.6.1 Dust and Debris Control

Prevent the spread of dust and debris on wharf pavements and avoid the creation of a nuisance or hazard in the surrounding area. Sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to wharf vehicular traffic.

1.7 PROTECTION

1.7.1 Traffic Control Signs

a. Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Anchor barricades in a manner to prevent displacement by wind. Notify the Contracting Officer prior to beginning such work.

1.7.2 Protection of Personnel

Before, during and after the demolition work continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the project site. No area, section, or component of structural elements will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.8 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair or replace items to be

relocated which are damaged by the Contractor with new undamaged items as approved by the Contracting Officer.

1.9 EXISTING CONDITIONS

Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs sized 4 inches will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of surface conditions that exist prior to before starting work. It is the Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document. Submit survey results.

PART 2 PRODUCTS

2.1 FILL MATERIAL

a. Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill voids, depressions or excavations resulting from demolition or deconstruction of structures. Fill material shall be a coarse aggregate from the demolished and recycled concrete paver and portion of the demolished pile cap of the existing bulkhead. Appropriate recycled material shall be utilized until it is fully consumed.

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

Inspect and evaluate existing structures onsite for reuse. Existing construction scheduled to be removed for reuse shall be disassembled. Dismantled and removed materials are to be separated, set aside, and prepared as specified, and stored or delivered to a collection point for reuse, remanufacture, recycling, or other disposal, as specified. Materials shall be designated for reuse onsite whenever possible.

3.1.1 Structures

a. Remove existing structures indicated to be removed to grade. Structural and non structural elements requiring partial demolition include paver, pile cap and bull rail. Elements requiring removal include all extruded rubber fenders, floating fender pad eyes and mooring fittings between Sta 0+00 and Sta 5+00.

3.1.2 Utilities and Related Equipment

3.1.2.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition

or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.2.2 Disconnecting Existing Utilities

Remove existing utilities, as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered but are not indicated on the drawings, notify the Contracting Officer prior to further work in that area. Remove meters and related equipment and deliver to a location on the station in accordance with instructions of the Contracting Officer.

3.1.3 Paving and Slabs

Sawcut concrete and asphaltic concrete paving and slabs as indicated Provide neat sawcuts at limits of pavement removal as indicated. Pavement and slabs not to be used in this project shall be removed from the Installation at Contractor's expense.

3.1.4 Concrete

Saw concrete along straight lines to a depth of a minimum 2 inches.

3.1.5 Miscellaneous Metal

Salvage shop-fabricated items such as steel gratings, metal ladders, metal railings, and similar items as whole units. Scrap metal shall become the Contractor's property. Recycle scrap metal as part of demolition and deconstruction operations. Provide separate containers to collect scrap metal and transport to a scrap metal collection or recycling facility, in accordance with the Waste Management Plan.

3.1.6 Electrical Equipment and Fixtures

3.1.6.1 Electrical Devices

Remove and salvage switches, switchgear, transformers, conductors including wire and nonmetallic sheathed and flexible armored cable, regulators, meters, instruments, plates, circuit breakers, panelboards, outlet boxes, and similar items. Box and tag these items for identification according to type and size.

3.1.6.2 Wiring Ducts or Troughs

Remove and salvage wiring ducts or troughs. Dismantle plug-in ducts and wiring troughs into unit lengths. Remove plug-in or disconnecting devices from the busway and store separately.

3.1.6.3 Conduit and Miscellaneous Items

Salvage conduit except where embedded in concrete or masonry. Consider corroded, bent, or damaged conduit as scrap metal. Sort straight and undamaged lengths of conduit according to size and type. Classify supports, knobs, tubes, cleats, and straps as debris to be removed and disposed.

3.2 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition or deconstruction work in areas occupied by structures to be demolished or deconstructed until all demolition and deconstruction in the area has been completed and debris removed. Fill holes and other hazardous openings.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition, deconstruction, and removal procedures, and authorization by the Contracting Officer to begin demolition and deconstruction. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.3.2 Unsalvageable and Non-Recyclable Material

Dispose of unsalvageable and non-recyclable noncombustible material in the disposal area as directed by the Contracting Officer.

3.4 CLEANUP

Remove debris and rubbish from basement and similar excavations. Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.5 DISPOSAL OF REMOVED MATERIALS

3.5.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations as directed by the Contracting Officer.

3.5.2 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property.

3.5.3 Removal to Spoil Areas on Government Property

Transport noncombustible materials removed from demolition and deconstruction structures to designated spoil areas on Government property.

3.6 REUSE OF SALVAGED ITEMS

Recondition salvaged materials and equipment designated for reuse before installation. Replace items damaged during removal and salvage operations or restore them as necessary to usable condition.

-- End of Section --

SECTION 03 01 32

CONCRETE REHABILITATION FOR CIVIL WORKS
11/09

PART 1 GENERAL

1.1 RELATED SECTIONS

1.1.1 Formwork

Formwork shall conform to the requirements of Section 03 31 29 MARINE CONCRETE.

1.1.2 Reinforcing Steel

Reinforcing Steel shall conform to the requirements of Section 03 31 29 MARINE CONCRETE.

1.1.3 Concrete

Unless otherwise specified, concrete shall conform to the requirements of Section 03 31 29 MARINE CONCRETE.

1.1.4 Disposal of Waste Materials

Dispose waste materials in accordance with the requirements of Section 01 74 19.00 25 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT. Dispose of waste water in accordance with Section 01 57 19.00 25 TEMPORARY ENVIRONMENTAL CONTROLS.

1.2 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.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 334	(2008) Standard Method of Test for Estimating the Cracking Tendency of Concrete

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 117	(2010; Errata 2011) Specifications for Tolerances for Concrete Construction and Materials and Commentary
ACI 211.1	(1991; R 2009) Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete
ACI 318	(2011; Errata 2011; Errata 2012) Building Code Requirements for Structural Concrete and Commentary

ACI SP-66	(2004) ACI Detailing Manual

ASTM INTERNATIONAL (ASTM)

ASTM C1077	(2011c) Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C109/C109M	(2011b) Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens)
ASTM C117	(2004) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143/C143M	(2010a) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C157/C157M	(2008) Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
ASTM C172/C172M	(2010) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C192/C192M	(2012) Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C231/C231M	(2010) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C31/C31M	(2012) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33/C33M	(2011a) Standard Specification for Concrete Aggregates
ASTM C39/C39M	(2012) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C469/C469M	(2010) Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression
ASTM C494/C494M	(2012) Standard Specification for Chemical Admixtures for Concrete
ASTM C596	(2009) Drying Shrinkage of Mortar Containing Hydraulic Cement

ASTM C937	(2010) Grout Fluidifier for Preplaced-Aggregate Concrete
ASTM D75/D75M	(2009) Standard Practice for Sampling Aggregates
ASTM E488/E488M	(2010) Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements

CONCRETE SAWING AND DRILLING ASSOCIATION (CSDA)

CSDA-W-104	(June 1, 1998) Track Mounted Wall Sawing

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 164	(1992) Standard Test Method for Direct Tensile Strength of Cylindrical Concrete or Mortar Specimens
COE CRD-C 39	(1981) Test Method for Coefficient of Linear Thermal Expansion of Concrete
COE CRD-C 400	(1963) Requirements for Water for Use in Mixing or Curing Concrete
EM 385-1-1	(2008; Errata 1-2010; Changes 1-3 2010; Changes 4-6 2011; Change 7 2012) Safety and Health Requirements Manual

1.3 DEFINITIONS

1.3.1 Concrete

A mixture of binder material, water, and fine and coarse aggregate, with or without admixtures.

1.3.2 Mortar

A mixture of binder material, water, and fine aggregate, with or without admixtures.

1.3.3 Grout

A mixture of binder material and water, with or without a filler.

1.3.4 Cement-Based Material

A material consisting of portland cement and/or other cementitious materials as a binder and aggregate. As used in this specification, cement-based materials do not include materials with polymer modifiers.

1.4 SYSTEM DESCRIPTION

1.4.1 Design Requirements

Submit manufacturer's literature from suppliers that demonstrates compliance with applicable specifications for the above materials. For proportioned materials, submit three copies of the proposed mix design prior to placement. The mix design shall indicate the weight of each

ingredient of the mixture. No concrete shall be placed prior to approval of the proposed mix design. No deviation from the approved job-mix formula will be permitted without prior approval.

a. Concrete. Design the concrete mixtures in accordance with Section 03 31 29 MARINE CONCRETE.

b. Mortar. Design the mortar mixtures to produce material having an average compressive strength of 3000 psi at 28 days of age, determined in conformance with ASTM C109/C109M. Design the mixtures to secure an air content by volume of 5 percent, plus or minus 1-1/2 percent, based on measurements made on concrete at the point of placement in conformance with ASTM C231/C231M. The range of slump shall be 1/2 to 2 inches when tested in accordance with ASTM C143/C143M except that maximum slump may be increased to 4 inches when the Contractor has included an approved water-reducing, high range, admixture conforming to ASTM C494/C494M in the mix design. To minimize drying shrinkage, the maximum water-cementitious materials ratio by weight shall be 0.45 and the maximum cement content shall be kept to a minimum to limit water volume. Make mix design studies and tests in accordance with ASTM C39/C39M and ASTM C192/C192M, and submit the test results for approval.

c. Grout. Design the grout mixtures to produce material having an average compressive strength of 3000psi at 28 days of age, determined in conformance with ASTM C109/C109M. Design the mixtures to secure an air content by volume of 5 percent, plus or minus 1-1/2 percent, based on measurements made on concrete at the point of placement in conformance with ASTM C231/C231M. The range of slump shall be 1/2 to 2 inches when tested in accordance with ASTM C143/C143M except that maximum slump may be increased to 4 inches when the Contractor has included an approved water-reducing, high range, admixture conforming to ASTM C494/C494M in the mix design. To minimize drying shrinkage, the maximum water-cementitious materials ratio by weight shall be 0.45 and the maximum cement content shall be kept to a minimum to limit water volume. Make mix design studies and tests in accordance with ASTM C39/C39M and ASTM C192/C192M, and submit the test results for approval.

d. Repair Materials. Provide the services of a technical specialist experienced in using the repair materials.

1.4.2 Repair Material Performance Requirements

Place repair materials to the lines indicated on the drawings. Construction tolerances for concrete and mortar repair materials shall meet the requirements of ACI 117. Design repair materials to conform to the following requirements at 28 days unless otherwise indicated:

Physical Properties of Cement-Based Repair materials		
Property	Test method	Criteria
Tensile Strength (28 days)	COE CRD-C 164	400 psi (minimum)
Modulus of Elasticity	ASTM C469/C469M	3,500,000 psi (maximum)

Physical Properties of Cement-Based Repair materials		
Coefficient of Thermal Expansion	COE CRD-C 39	6.7 millionths/degree F (maximum)
Drying Shrinkage	ASTM C157/C157M (modified)	
(28 days)		400 millionths (maximum)
(1 year)		1,000 millionths (maximum)
Restrained Shrinkage Cracking Implied strain at 1 year	AASHTO T 334	No cracks within 14 days, 1,000 millionths (maximum)

Notes on Table:

a. ASTM C157/C157M (modified). The modifications to the test method for this requirement are as follows:

(1) Standard specimen size is 3x3x11-1/4 inch for concrete mortar expanded with aggregate and mortar.

(2) Remove sample from mold at 23 plus or minus 1/2 hours and make initial comparator reading immediately. (For rapid hardening materials, remove sample from mold at 3 hours and make initial comparator reading.)

(3) The specimens are then stored under the standard conditions at 73.4 plus or minus 3 degrees F and 50 plus or minus 4 percent RH.

Subsequent comparator readings are to be taken at ages of 3 days, 7 days, 14 days, 1 month, 2 months; measurements shall continue until 90 percent of ultimate drying shrinkage is reached. Ultimate shrinkage is to be determined as described in ASTM C596.

1.4.3 Sequencing and Scheduling

Unless otherwise specified, perform the work in such sequence that new work does not damage previously completed work. Do not perform concrete removal and other operations which cause vibrations within 50 feet of repair materials that have cured less than 24 hours.

1.5 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

Work Plan; G
Demolition Plan; G
Water Control Plan; G
Contractor Qualifications
Worker Qualifications

SD-03 Product Data

Bond Breaker

Fiber Reinforcement
Testing Technicians

SD-04 Samples

Field-Molded Sealants and Primer

SD-05 Design Data

Repair material mixture proportioning

SD-06 Test Reports

Compression Seals and Lubricant
Cement-Based Concrete
Cement-Based Mortar
Rapid-Hardening Repair Material.
Dry-Pack Mortar.

SD-07 Certificates

Grout Fluidifier
Aggregate

SD-08 Manufacturer's Instructions

Rapid-Hardening Repair Material
Manufacturer's Material Safety Data Sheets

1.6 QUALITY ASSURANCE

Perform all work in accordance with EM 385-1-1. To protect personnel from overexposure to toxic materials, conform to the applicable manufacturer's Material Safety Data Sheets (MSDS) or local regulation. Submit the MSDS for epoxies, polyurethanes, and other potentially hazardous materials.

1.6.1 Qualifications

The submittals shall, where applicable, identify individuals who will be working on this contract and their relevant experience. Do not make changes in approved personnel without prior approval of the Contracting Officer.

1.6.1.1 Contractor Qualifications

The Contractor performing the repair work shall have been involved in a minimum of three concrete repair projects similar in size and scope to this project for at least five years. Submit information, including name, dollar value, date, and point-of-contact for similar projects which demonstrates the required experience and/or training.

1.6.1.2 Worker Qualifications

Each worker engaged in the use of specialized removal or application equipment, including saw operators, shall have satisfactorily completed an instruction program in the operation of the equipment. Each worker engaged in the operation of specialized equipment for the contract work shall have a minimum of three years of experience in the operation of the equipment.

1.6.1.3 Quality Control Personnel Qualifications

The individuals who sample and test concrete, as required in this specification, shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I. Submit resumes, pertinent information, past experience, training, and education of all operators of specialized demolition equipment if needed for this and the three paragraphs above.

1.6.2 Regulatory Requirements

Perform all work in accordance with applicable Federal, State and local safety, health and environmental requirements, and EM 385-1-1. The Contractor is responsible for obtaining all permits required by Federal, State and local agencies for the performance of the work.

1.6.3 Pre-Construction Conference

Arrange a pre-construction conference to ensure that the Contractor's personnel understand all aspects of the repair material, its properties and application procedures. The conference shall include the Contracting Officer or authorized representative, the Contractor, and a competent Technical Representative of the material manufacturer. The Technical Representative shall be fully qualified to perform the work.

1.6.4 Repair Material Mixture Proportioning

Submit, at least 30 days before work commences, a repair material mixture proportioning for each use of cement-based concrete or cement-based mortar. Test reports and test results shall accompany the mixture proportions. Identify the proposed source of the materials and state the proportions of each constituent. When determining the mixture design, use samples of materials to be used on the job.

a. Trial batches: Trial batches and testing requirements for various repair materials specified shall be the responsibility of the Contractor. The laboratory performing the tests shall be on site and shall conform to ASTM C1077. Samples of aggregates shall be obtained in accordance with the requirements of ASTM D75/D75M. Samples of materials other than aggregate shall be representative of those proposed for the project and shall be accompanied by the manufacturer's test reports indicating compliance with applicable specified requirements. Trial mixtures having proportions, consistencies, and air content suitable for the work shall be made based on methodology described in ACI 211.1, which will produce a range of strength encompassing those required for the work. The maximum water-cementitious materials ratios required in Section 03 31 29 MARINE CONCRETE will be converted to a weight ratio of water to cementitious materials.

b. Supporting criteria: Include in the submittal the following data for each trial batch:

(1) Proportions by weight

(2) Unit weights and specific gravities of constituents

(3) Batch weights

(4) Compressive strengths in accordance with the following:

Material	Specimen Size	Test
Concrete	6 by 12 inch cylinders	ASTM C39/C39M
Mortar	3 by 6 inch cylinders	ASTM C39/C39M
Grout	2 inch cube	ASTM C109/C109M

(5) Curing time

(6) Working time

(7) Slump

(8) Air content

1.6.5 Test Reports

1.6.5.1 Cement-Based Concrete and Cement-Based Mortar

Include the following:

a. Initial Slump

b. Slump over Time

c. Air Content

d. Compressive Strength at 7 and 28 days.

e. Water to cementitious materials ratio

f. Tensile Strength

g. Flexural Strength

1.6.6 Field Samples

Prepare a work plan describing the methods of concrete removal and repair, including methods, equipment and materials to be used for each feature. Submit the work plan for approval at least 30 days prior to the start of the work. The plan shall include, but shall not be limited to, repair materials to be used with specific information on products and/or constituents, and requirements for handling, storage, etc., equipment to be used, surface preparation, and requirements for placement, finishing, curing and protection specific to the materials used. The work plan shall include a description of field demonstrations. Do not commence work until the work plan and field demonstration representative of the type of work are approved.

1.6.6.1 Concrete Removal

Prior to commencement of production concrete removal, perform a test break on an area of sufficient size to demonstrate that the proposed removal procedure will result in compliance with the specified requirements. The

test break shall verify suitability of the equipment to remove the existing materials.

1.6.6.2 Sample Repair Panels

Construct field test panels prior to beginning of work using the repair materials and procedures proposed for use on the job, to demonstrate the results to be attained. The panel shall contain reinforcing steel and embedded items as the production work. The quality and appearance of each panel shall be subject to the approval of the Contracting Officer, and, if not judged satisfactory, additional panels shall be constructed until approval is attained. Formed and finished surfaces in the completed structure shall match the quality and appearance of the approved sample repair panel.

1.7 DELIVERY, STORAGE, AND HANDLING

1.7.1 Packing, Shipping, Handling, and Unloading

Inspect materials delivered to site for damage, unload and store with a minimum of handling. Deliver resin components and aggregate materials in original sealed containers where applicable.

1.7.2 Chemical Admixtures

Protect chemical admixtures and store and maintain between 40 degrees F to 90 degrees F. Remove from the site any admixtures subjected to temperatures outside this range, or stored for longer than recommended by the manufacturer. Do not use any admixture that has been in storage for longer than recommended by the manufacturer or that has been subjected to freezing in the work. Remove such materials from the site.

1.7.3 Waste Management and Disposal

Prepare a water control plan to describe methods and equipment to be used for controlling, collection, treatment and disposal of wastewater from drilling, sawing and other concrete removal operations at least 60 days prior to performance of any operations that produce wastewater. The plan shall include copies of required permits or other evidence of compliance with applicable Federal, State and local laws and regulations. Unless otherwise specified, do not permit concrete and other debris to drop into the water. Collect concrete and/or debris and retain near to its point of removal. Submit the demolition plan describing the method of debris control and removal, and the procedures proposed for the accomplishment of the demolition and removal work. The procedures shall provide for safe conduct of the work, including procedures and methods to provide necessary supports, lateral bracing and shoring when required, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations in accordance with EM 385-1-1. Where applicable, the plan shall include drilling patterns and means of controlling crack propagation. The work plan shall also include an access plan for personnel; and method of controlling, collecting, and removing debris. The method of debris control and removal shall be approved by the Contracting Officer. Dispose of debris in accordance with Section 01 74 19.00 25 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT. Remove all concrete which falls into the water at no additional cost to the

Government. Do not permit waste water from surface preparation, cleaning, drilling and cutting operations to directly enter the water. Collect wastewater and treat in accordance with Section 01 57 19.00 25 TEMPORARY ENVIRONMENTAL CONTROLS.

1.8 PROJECT/SITE CONDITIONS

1.8.1 Environmental Requirements

Do not place repair materials when weather conditions detrimentally affect the quality of the finished product. Do not place cement-based repair materials when the air temperature is below 40 degrees F in the shade. When air temperature is likely to exceed 90 degrees F, the cement-based repair material shall have a temperature not exceeding 90 degrees F when deposited, and the surface of such placed cement-based repair material shall be kept damp with a water fog until the approved curing medium is applied. Placement restrictions for other materials shall be in accordance with the manufacturer's published literature. Halt work when weather conditions are potentially detrimental to the quality of repairing or bonding concrete. Follow manufacturer's instructions for weather conditions and temperature ranges.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cement-Based Materials

Cementitious materials shall meet the requirements specified in Section 03 31 29 MARINE CONCRETE.

2.1.2 Admixtures

Admixtures to be used, when required or permitted, shall conform to the appropriate specification listed. Admixtures shall meet the requirements specified in Section 03 31 29 MARINE CONCRETE. Grout Fluidifier shall conform to ASTM C937; submit manufacturer's certifications in lieu of laboratory test results for proposed materials. Certificates should certify compliance with the appropriate specification referenced herein. Do not place materials without prior approval from the Contracting Officer.

2.1.3 Aggregate

Aggregates shall meet the quality and grading requirements of ASTM C33/C33M Class Designations 4M or better and the following specific requirements. For material passing No. 200 sieve provide a non-plastic material composed of a minimum of 75 percent limestone dust, talc or silica inert filler. Provide dry aggregate.

2.1.4 Water

Water for cleaning, mixing and curing shall be 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 COE CRD-C 400.

2.1.5 Steel Bars

ASTM 615, GR 60, hot-dipped galvanized

2.2 EQUIPMENT

Assemble at the site of the work sufficient equipment that is dependable, appropriate and adequate to accomplish the work specified. Deliver the equipment a sufficient time before the start of repairs to permit thorough inspection, calibration of weighing and measuring devices, adjustment of parts, and the making of any repairs that may be required. Machines, tools, and equipment used in the performance of the work shall be approved before the work is started and shall be maintained in satisfactory condition at all times. Maintain the equipment in good working condition. Provide dust suppression on equipment as needed to comply with Section 01 57 19.00 25 TEMPORARY ENVIRONMENTAL CONTROLS.

2.2.1 Cement-Based Concrete Mixing Equipment

Mixing equipment shall conform to the requirements of Section 03 31 29 MARINE CONCRETE.

2.2.2 Grout Mixing Equipment

Use a high-speed, high-shear, colloidal type grout mixer capable of continuous mechanical mixing that will produce uniform and thoroughly mixed grout which is free of lumps and undispersed cement. The mixer shall be equipped with a suitable water and admixture measuring devices calibrated to read in cubic feet and tenths and so designed that after each delivery the device can be conveniently set back to zero.

2.2.3 Drilling Equipment

Use percussion or rotary drilling equipment of a type suitable for the depth, diameter and material to be drilled. Use only rotary drilling equipment where vibration from percussion drilling could damage the concrete to remain or adjacent structures. Use equipment capable of maintaining the required alignment.

2.2.4 Hand-Held Breaker

Use 30 pound breaker for removal of concrete above reinforcing steel. Use 15 pound chipping hammer to remove concrete around reinforcing steel.

2.3 MIXTURE PROPORTIONING

2.3.1 Cement-Based Concrete

Mixes for cement-based concrete shall be in accordance with paragraph DESIGN REQUIREMENTS and the applicable provisions of Section 03 31 29 MARINE CONCRETE. Approved batch tickets shall be furnished for each load of ready-mixed concrete.

2.3.2 Cement-Based Grout

Cement-based grout shall consist of equal parts of Type I or II, portland cement and sand by dry weight, thoroughly mixed with water to yield a thick, creamy mixture. The water-cementitious materials ratio shall not be greater than 0.45 by weight. The sand shall meet the requirements of the fine aggregate specified herein, except 100 percent shall pass a No. 8 sieve.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Protection of Existing Features

Before beginning any concrete removal work, carefully survey the structure and examine the drawings and specifications to determine the extent of the work. Take all necessary precautions to ensure against damage to existing concrete or other structures to remain in place, and repair or replace any damage to such items as approved by the Contracting Officer at no additional cost to the Government. Carefully coordinate the work of this section with all other work, and construct and maintain shoring, bracing and supports, as required. Ensure that structural elements are not overloaded, and increase structural supports or add new supports as may be required as a result of any removal work performed under any part of this contract.

3.1.2 Protection of Personnel

Ensure that adequate measures are in place to protect workers, facility operation personnel and the public from injury due to the operations being performed. Provide protective measures in accordance with EM 385-1-1.

3.2 REMOVAL OF EXISTING CONCRETE

3.2.1 General

Prepare a demolition plan describing the methods and equipment to be used to remove existing concrete. Remove the existing concrete in the area to be repaired to the minimum depth indicated and to such additional depth where necessary to expose a surface of sound, unweathered concrete that is uncontaminated by oils, greases, or deicing salts or solutions. The actual depth of removal shall be subject to approval by the Contracting Officer. Remove concrete with care to avoid damage to adjacent structures and concrete that is not to be repaired under this contract and embedded metal that is not to be removed. Repair any such damage at no additional cost to the Government. Mark on the surface the limits of concrete removal for approval by the Contracting Officer prior to any removal. Do not remove metal and other embedded items exposed during the concrete removal operations without authorization of the Contracting Officer. Unless otherwise indicated, continue removal using appropriate equipment to remove unsound concrete and to eliminate any offsets in the area to be repaired which would cause an abrupt change in thickness of the repair and to remove protrusions between holes. Variations in the final prepared surface shall not exceed the nominal maximum size aggregate of the repair material, except for relatively thin repairs in which case the variation shall not exceed 25 percent of the repair thickness. Any removal beyond the limits shown on the drawings shall be approved by the Contracting Officer prior to performing the additional removal. All equipment and removal methods shall comply with applicable sections of EM 385-1-1.

3.2.1.1 Determination of Removal Limits

Approximate locations and areas of repairs are indicated on the drawings. Determine actual locations and limits of deteriorated concrete by visual inspection and by tapping with a hammer or steel rod and listening for dull or hollow sounds. On horizontal surfaces, a chain drag may be used in lieu of the hammer or rod. Perform sounding in the presence of the Contracting

Officer or authorized representative. Mark areas where sounding does not produce a solid tone with highly visible paint. After the investigation process is completed, the Contracting Officer will inspect the areas marked by the Contractor to confirm and/or adjust the limits of removal. Do not remove concrete from these areas until the Contracting Officer or authorized representative approves the areas. Upon completion of removal, sound the surface and remove additional concrete until testing produces a solid tone. Additional removal of concrete within these areas will be measured for payment as specified.

3.2.1.2 Perimeter Saw Cut

Make a perpendicular saw cut at least 1 inch deep, but no deeper than the reinforcing steel, a minimum of 3 inches outside of the area to be repaired to delineate the perimeter of the repair area and avoid feather edges. The perimeter saw cut shall have no angles less than 90 degrees. Exercised care not to cut through existing steel reinforcement or embedded metal that is not to be removed. Omit saw-cutting where prohibited by existing metal or other items which are not to be removed. Perform sawing in accordance with CSDA-W-104, except as specified herein. Edges of repaired areas which are not mechanically anchored shall be dove-tailed. Where concrete is being removed from a vertical face by controlled blasting, mechanical presplitting, or expansive agents, sawcut the bottom limit of the removal area to the full depth of the removal.

3.2.1.3 Preliminary Surface Cleaning

Clean concrete surfaces that are contaminated with oil, grease or dirt prior to beginning concrete removal in the area. Use detergents, proprietary cleaners formulated for removal of contaminants from concrete, or steam cleaning in accordance with the manufacturer's written instructions. Do not use solvents for removal of oil or grease. All traces of cleaning agents and contaminants shall be removed from the surface.

3.2.1.4 Reinforcing Steel

Following the concrete removal operation, inspect the condition of all exposed reinforcing bars designated to remain in place. Remove and replace bars which are deteriorated at any point where the original cross section of any bar has been reduced by more than 20 percent or the original cross section of adjacent bars has been reduced by more than 20 percent. Splice new replacement steel in accordance with the provisions of ACI 318. Secure to adjacent bars all reinforcing steel that is free to vibrate or otherwise move excessively. Concrete reinforcement shall conform to Section 03 31 29 MARINE CONCRETE. Where the bond between the concrete and any reinforcing steel has been destroyed, or where the concrete deterioration is caused by corrosion of the reinforcing steel, remove the adjacent concrete to a depth that will permit cleaning of the steel and bonding of the concrete. Provide a minimum clearance below the steel of 1 inch or 1/4 inch plus the maximum size of aggregate in the repair material, which ever is greater, clearance around the steel, except where other reinforcing steel makes this impractical. Use chipping hammers weighing less than 15 pounds, abrasive water cutting, or high-pressure water for removal of concrete around reinforcing steel. Remove all corrosion from reinforcing steel by sandblasting.

3.2.1.5 Shallow Repairs

For shallow repairs that do not require reinforcing steel, remove the existing concrete to a minimum depth of 2 inches below the finished surface and to such additional depth where necessary to expose a surface of sound, unweathered concrete that is uncontaminated by oils, greases, or deicing salts or solutions. Remove all loose and deteriorated concrete from the spalled areas indicated.

3.2.2 Cutting

3.2.2.1 General

Use cutting to remove segments of concrete intact or to define the limits of removal by other methods.

3.2.2.2 Abrasive-Water-Jet Cutting

Perform abrasive-water-jet cutting by injecting abrasive material into a high pressure stream of water. The water pressure shall be 30,000 to 50,000 psi. Adjust the water pressure and amount of abrasive added as required to provide optimum cutting action.

3.2.2.3 Diamond-Blade Cutting

Use diamond-blade cutting for cutting through relatively thin sections and defining limits of removal to be performed by other methods. Perform diamond blade cutting using equipment of the correct type and power and with appropriate blade composition for the material being cut. Use a track system for maintaining the alignment of the saw for vertical cuts or where multiple cuts are required for deep cuts. Provide supports as required to support the concrete to be removed.

3.2.3 Impacting

Removal of concrete may be accomplished by use of impact-type power tools. Take adequate precautions to prevent impact equipment from vibrating on reinforcing steel. All demolition equipment shall be subject to approval of the Contracting Officer.

3.2.3.1 Hand-Held Breaker

Use hand-held breakers or chipping hammers for removal of concrete in small or restricted areas, where the energy to be applied is limited to prevent damage to adjacent concrete, structures or facilities which are not to be removed, and to complete removal where other methods have been used.

3.3 ANCHORING AND REINFORCING

3.3.1 Drilling and Grouting Dowels and Anchors

Drill holes for dowels and anchors using drilling equipment suitable for the intended purpose, as approved by the Contracting Officer. Diameter of holes shall be as shown on the drawings. Clean holes by flushing with water and compressed air prior to placing grout. Anchor dowels with epoxy grout. Place grout and install dowels as recommended by the grout manufacturer. Remove excess grout after the dowel has been set in place.

3.3.2 Installing Reinforcement

Place reinforcement steel and accessories as specified and as shown on the contract drawings. Placement details of steel and accessories not specified or shown on the drawings shall be in accordance with ACI SP-66 and ACI 318 or as directed by the Contracting Officer. Fabricate and place reinforcing steel in accordance with Section 03 31 29 MARINE CONCRETE.

3.4 MIXING MATERIALS

Make batches small enough to ensure placement before binder sets. Mix materials in accordance with manufacturer's recommendations.

3.5 SURFACE PREPARATION

3.5.1 General

After removal of concrete to the specified limits, clean the surface to which the repair material is to be applied to remove dust, debris and laitance. Perform final cleaning immediately prior to placement of the repair material. Unless otherwise specified, keep the existing concrete wet for a minimum of 12 hours and dried for 12 hours immediately prior to placing new concrete. The surface shall be dry with no standing water on the surface upon which concrete is placed.

3.5.2 Cleaning

Perform all cleaning operations to the satisfaction of the Contracting Officer. Protect adjacent structures and embedded items. Use potable water for all cleaning operations. Perform a preliminary washing as soon as the chipping and trimming are completed to remove loose materials and dust particles. Clean surfaces to which new concrete is to be bonded. Final cleaning shall remove all laitance, carbonation, scum, dirt, oil, grease, and loose or disintegrated concrete. Perform additional surface chipping to remove coarse aggregate that is undercut by cleaning process. Perform such additional chipping as determined necessary by the Contracting Officer at no additional cost to the Government. Wire brush or sandblast metal surfaces against which concrete is to be placed to remove rust and other contaminants which would prevent proper bond with the concrete. Perform final cleaning immediately prior to concrete placement. Protect all work from contamination during all phases of cleanup and preparation prior to repair.

3.5.3 Waste Water Disposal

Dispose of waste water employed in cutting, washing, and rinsing of concrete surfaces in a manner such 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 shall meet all requirements of Section 01 57 19.00 25 TEMPORARY ENVIRONMENTAL CONTROLS.

3.6 SURFACE REPAIRS

Place dowels and anchors as shown on the contract drawings.

3.6.1 Cement-Based Mortar or Concrete

For vertical surfaces, construct forms with a chimney at top for placement and consolidation of concrete. Place, consolidate and finish concrete in

accordance with applicable requirements of Section 03 31 29 MARINE CONCRETE. Use form and pump method of placement where placement through a form chimney is not possible. Inspect concrete surfaces to ensure that no areas remain which would trap air between the new and existing concrete. Make forms grout tight and brace to withstand pumped concrete pressures. Provide vents to release air from within the forms as concrete is placed. Pump concrete into form using variable output pump of appropriate size. After the cavity is filled with concrete, install a pressure cap at the form chimney and apply pressure while the form is vibrated. Cure in accordance with Section 03 31 29 MARINE CONCRETE.

3.7 TESTS AND INSPECTIONS

3.7.1 General

The individuals who sample and test repair materials as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I.

3.7.2 Preparations for Placing

Inspect prepared surfaces, forms, and embedded items in sufficient time prior to each placement of repair material to certify that the surfaces are ready to receive the repair material.

3.7.3 Grouted Dowels and Anchors

Test the first three dowels or anchors of each type and a minimum of three dowels or anchors per 1,000 dowels or anchors in accordance with ASTM E488/E488M. Use incremental loading for tensile test to 75 percent of the yield strength of the dowel or anchor. Consider anchors to have failed if displacement exceeds 0.1 inch or if any of the failure modes of paragraph 12.2 occur.

3.7.4 Cement-Based Concrete and Mortar

3.7.4.1 Air Content

Check air content at least once during each shift that concrete is placed for each type and class of repair material required. Obtain samples in accordance with ASTM C172/C172M and test in accordance with ASTM C231/C231M.

3.7.4.2 Slump

Check slump twice during each shift that concrete is produced for each type and class of repair material required. Obtain samples in accordance with ASTM C172/C172M and test in accordance with ASTM C143/C143M.

3.7.4.3 Consolidation and Protection

Ensure that the repair material is properly consolidated, finished, protected, and cured.

3.7.4.4 Compression Tests

Prepare compression test cubes in accordance with ASTM C31/C31M and cure at the site under the same conditions as the repair. Test in accordance with ASTM C109/C109M.

3.7.4.5 Curing

a. Moist-Curing Inspections - At least once each shift, and once per day on nonwork days, inspect all areas subject to moist curing. Note and record the surface moisture condition.

b. Membrane-Curing Inspection - Do not apply curing compound until the Contractor's authorized representative 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 repair material surface covered and compute the rate of coverage in square feet/gallon. Note whether or not coverage is uniform.

c. Sheet-Curing Inspection - At least once each shift and once per day on nonwork days, inspect all areas being cured using material sheets. Note and record the condition of the covering and the tightness of the laps and tapes.

3.7.5 Aggregates

Test gradation in accordance with ASTM C136 and ASTM C117. Determine the percent passing the No. 200 sieve by washing in accordance with ASTM C117.

3.7.6 Action Required

3.7.6.1 Placing

The placing foreman shall not permit placing to begin until he has verified that appropriate placement, consolidation and finishing equipment, which are in working order and have competent operators, are available.

3.7.6.2 Grouted Anchors and Dowels

Test a minimum of two adjacent anchors or dowels for each anchor or dowel that fails.

3.7.6.3 Air Content

Whenever a test result is outside the specification limits, do not deliver the concrete to the forms and adjust the dosage of the air-entrainment admixture.

3.7.6.4 Slump

Whenever a test result is outside the specification limits, do not deliver the concrete to the forms and an adjustment should be made in the batch weights of water and fine aggregate. The adjustments are to be made so that the water-cementitious materials ratio does not exceed that specified in the submitted concrete mixture proportion.

3.7.6.5 Curing

a. 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 such areas by one day.

b. 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.

c. 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 one day.

3.7.7 Final Inspection

Following completion of the work, inspect surfaces for damage, staining, and other distresses. Inspect repairs for cracking, crazing, delamination, unsoundness, staining and other defects. Inspect the finish and surface tolerances of the repairs to verify that all requirements have been met. Repair all surfaces exhibiting defects as directed at no cost to the Government when defects are due to Contractor workmanship or procedures.

3.7.8 Reports

Report the results of all tests and inspections conducted at the project site. Submit copies of test results, within 24 hours of physical completion of laboratory testing. Manufacturer's certifications may be submitted rather than laboratory test results for proposed materials. Certificates should certify compliance with the appropriate specification referenced herein. Do not place materials without prior approval from the Contracting Officer.

3.7.9 Manufacturer Field Service

Provide the services of a manufacturer's technical representative experienced in mixture proportioning and placement procedures for the following materials:

a. High molecular weight methacrylate sealer
b. Concrete containing High-Range Water Reducers (HRWRA)
c. Concrete containing Silica Fume

Provide, at no additional cost to the Government, the services of the manufacturer's experienced technical representative during mixture proportioning, planning and production. The manufacturer's representative shall be available for consultation by both the Contractor and the Contracting officer during mixture proportioning, planning, and production of the materials and shall be on-site immediately prior to and during at least the first placement of the material, and at other times if directed.

3.8 CLEAN UP

Clean all surfaces of concrete and adjacent facilities which are stained by dirt, oil, grease, fuel, or other byproducts that are created by the construction operations with detergent and pressure wash. Dispose of debris in accordance with Section 01 74 19.00 25 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT and Section 01 57 19.00 25 TEMPORARY ENVIRONMENTAL CONTROLS.

3.9 DUST CONTROL

Control dust resulting from demolition to prevent the spread of dust and avoid creation of a nuisance in the surrounding area. Do not use water

when it will result in, or create, hazardous or objectionable conditions such as ice, flooding, or pollution.

3.10 PROTECTION PRIOR TO ACCEPTANCE

Do not permit vehicular or heavy equipment traffic on the repair surfaces during the curing period until 7 days after completion of the repair. Permit light local traffic on the concrete surfaces at the end of the curing period, if approved by the Contracting Officer. Where shelter or other protective measures are provided for repair during inclement weather, maintain such protective measures until the repair material has cured and discontinuance of the measures is authorized.

-- End of Section --

SECTION 03 31 29

MARINE CONCRETE
08/12

PART 1 GENERAL

1.1 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 201.2R	(2008) Guide to Durable Concrete
ACI 211.1	(1991; R 2009) Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete
ACI 212.3R	(2010) Chemical Admixtures for Concrete
ACI 214R	(2011) Evaluation of Strength Test Results of Concrete
ACI 301	(2010; ERTA 2015) 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 305R	(2010) Guide to Hot Weather Concreting
ACI 308.1	(2011) Specification for Curing Concrete
ACI 309R	(2005) Guide for Consolidation of Concrete
ACI 311.4R	(2005) Guide for Concrete Inspection
ACI 347	(2004; Errata 2008; Errata 2012) Guide to Formwork for Concrete
ACI 364.3R	(2009) Guide for Cementitious Repair Material Data Sheet
ACI SP-15	(2011) Field Reference Manual: Standard

	Specifications for Structural Concrete ACI 301-05 with Selected ACI References
ACI SP-2	(2007; Abstract: 10th Edition) ACI Manual of Concrete Inspection
ACI SP-66	(2004) ACI Detailing Manual

APA - THE ENGINEERED WOOD ASSOCIATION (APA)

APA PS 1	(2009) Structural Plywood (with Typical APA Trademarks)

ASTM INTERNATIONAL (ASTM)

ASTM A 780/A 780M	(2009) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A1064/A1064M	(2015) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C 618	(2008a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
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	(2015) 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 C1152/C1152M	(2004; E 2012; R 2012) Standard Test Method for Acid-Soluble Chloride in Mortar and Concrete
ASTM C1157/C1157M	(2011) Standard Specification for Hydraulic Cement
ASTM C1231/C1231M	(2014) Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders
ASTM C1260	(2014) Standard Test Method for Potential Alkali Reactivity of Aggregates

	(Mortar-Bar Method)
ASTM C138/C138M	(2014) Standard Test Method for Density ("Unit Weight"), Yield, and Air Content (Gravimetric) of Concrete
ASTM C143/C143M	(2012) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150/C150M	(2015) 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 C157/C157M	(2008; R 2014; E 2014) Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
ASTM C1602/C1602M	(2012) Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete
ASTM C1611/C1611M	(2014) Standard Test Method for Slump Flow of Self-Consolidating Concrete
ASTM C171	(2007) Standard Specification for Sheet Materials for Curing Concrete
ASTM C172/C172M	(2014a) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173/C173M	(2014) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C192/C192M	(2015) Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C231/C231M	(2014) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260/C260M	(2010a) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C294	(2012) Standard Descriptive Nomenclature for Constituents of Concrete Aggregates
ASTM C295/C295M	(2012) Petrographic Examination of Aggregates for Concrete
ASTM C31/C31M	(2012) 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	(2013) Standard Specification for Concrete Aggregates
ASTM C39/C39M	(2015a) 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	(2013) Standard Specification for Chemical Admixtures for Concrete
ASTM C595/C595M	(2015; E 2015) 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 C642	(2013) Density, Absorption, and Voids in Hardened Concrete
ASTM C78/C78M	(2015a) Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C805/C805M	(2013a) Rebound Number of Hardened Concrete
ASTM C94/C94M	(2015) Standard Specification for Ready-Mixed Concrete
ASTM C989/C989M	(2014) Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM D1179	(2010) Fluoride Ion in Water
ASTM D3867	(2009) Nitrite-Nitrate in Water
ASTM D512	(2012) Chloride Ion in Water
ASTM D516	(2011) Sulfate Ion in Water
ASTM D75/D75M	(2014) Standard Practice for Sampling Aggregates
ASTM E329	(2014a) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI 10MSP	(2009; 28th Ed) Manual of Standard Practice

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 61	(1989A) Test Method for Determining the Resistance of Freshly Mixed Concrete to Washing Out in Water

1.2 DEFINITIONS

a. "Atmospheric zone" is any portion of the waterfront structure above the splash zone.

b. "Cementitious material" as used herein shall include portland cement and any pozzolanic material such as fly ash, natural pozzolans and ground granulated blast-furnace slag.

c. "Complementary cementing materials" (CCM) include 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 and in some cases a reduction in initial cost.

d. "Pore blockers, internal membrane admixtures" (PB) include all types of crystalline materials forming a chemical composition with calcium hydroxide and propagating growth of the insoluble crystals into the pores of concrete.

e. "Concrete System" is the term describing a structural element comprised of concrete, reinforcing steel and concrete cover.

f. "Design strength" (f'c) is the specified compressive strength of concrete at time(s) specified by Contracting Officer to meet structural design criteria. Typical duration is 28 days.

g. "Field test strength" (fcr) is the required compressive strength of concrete to meet structural and durability criteria. Determine (fcr) during mixture proportioning process.

h. "High-volume fly ash concrete" has a minimum of 50 percent Class F fly ash as a partial replacement to portland cement.

i. "Marine concrete" is all concrete that will be in contact with seawater or brackish water, tidal variations, splash, or spray from water in navigable waterways. Piles driven on land that extend below the water table that contains saltwater or brackish water shall be designed as marine concrete. In addition, structures may need to be designed using these criteria even though they are not adjacent to the waterfront. For example, structures located several hundred yards from the waterfront often deteriorate prematurely due to salt spray and salt fog brought to the structure by prevailing winds. An assessment of existing structures near the construction site can be an excellent indicator for the Engineer of Record and Owner to decide if the proposed structure should follow the guidelines for marine concrete.

j. "Mass Concrete" is 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.

k. "Mixture proportioning" is the process of designing concrete mixture proportions to enable it to meet the strength and constructability requirements and of the project while minimizing the initial and life-cycle cost.

l. "Mixture proportions" are the masses or volumes of individual ingredients used to make a unit measure (cubic yard or meter) of concrete.

m. "Permeability" (K) is the intrinsic permeability of the concrete evaluated from the moisture transport coefficient drying test.

n. "Pozzolan" is a 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.

o. "Process control sampling" is sampling and testing conducted by the Contractor to monitor the quality of materials or processes. Process control sampling is intended to indicate the quality of materials at critical steps in production that allow intervention prior to using a material on the project.

p. "Quality Acceptance Limit" (QAL) is the limiting value of a test result that indicates acceptable material quality. Quality acceptance limits are based on design criteria that may be either upper-bound limits where smaller values indicate acceptable material or lower-bound limits where larger values indicate acceptable material, such as compressive strength.

q. "Quality acceptance sampling" is sampling and testing conducted by the Contractor, or an independent testing agency, to evaluate the quality of materials used on the project. Quality acceptance sampling is conducted at regular intervals identified as "lots" to represent the quality of that portion of the material used in the project.

r. "Required compressive strength" (f'cr) is the mean compressive strength of concrete required to meet structural criteria. The required strength is the mean concrete strength for tests of properly batched concrete at the age specified herein.

s. "Splash zone" is the portion of the structure just above the tidal zone. This portion of the structure is predominantly dry, but is likely to intermittently wet by wave action and wind driven spray. For the purposes of this specification, the splash zone is defined as follows:

(1) for locations protected by seawalls or otherwise sheltered from open-ocean waves, the 6 feet area just above the tidal zone;

(2) for unprotected locations, the 20 feet area just above the tidal zone.

t. "Submerged zone" is defined as the submerged portion of the structure. For the purposes of this specification, any element or portion thereof that is located below Mean Lower Low Water (MLLW). In areas with minimal tides, it would be defined as that portion of the element below Mean Sea Level (MSL).

u. "Supplemental Corrosion Protection" includes (but not limited to) fusion-bonded epoxy-coated steel reinforcing, galvanized steel reinforcing, stainless reinforcing, barrier coatings to the concrete surface, cathodic protection and use of pore blocker admixtures or surface applied pore blocker slurry.

v. "Test Section" is a slab or wall separate from the main structure and constructed prior to main construction as an all inclusive demonstration of methods and materials. The adequacy of the Test Section must be approved by the owner's representative prior to construction of the project.

w. "Tidal zone" is defined as the portion of the structure regularly wetted by wave action. For the purposes of this specification, any element or portion thereof that is located between Mean Lower Low Water (MLLW) and Mean Higher High Water (MHHW) is in the tidal zone. In areas with minimal tides, this would be defined as the area located between Mean Sea Level (MSL) and Mean High Water (MHW).

x. "Volume of Permeable Voids" (phi) is the porosity of the concrete as determined by ASTM C642.

y. "50 percent Saturation water content" (S50 percent) is the degree of saturation of the saturated concrete after being allowed to come to equilibrium at 50 percent relative humidity. It is defined as the volume of the water in the concrete at equilibrium divided by the volume of permeable voids (phi) as determined by ASTM C642.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. 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

Concrete Curing Plan; G

Concrete Qualification Program; G

Concrete Quality Control Program; G

Concrete Placement and Compaction; G

Concrete Pumping

Curing concrete elements

Form Removal Schedule

Laboratory Qualifications; G

Quality Control Personnel Qualifications; G

SD-02 Shop Drawings

Construction and closure pour detail joints; G

Formwork

Precast elements; G

Reinforcing steel; G

Reproductions of contract drawings are unacceptable.

SD-03 Product Data

Admixtures; G

Air Entraining; G

Aggregates; G

Materials for curing concrete; G

Material Safety Data Sheets

Mechanical Reinforcing Bar Connectors; G

Non-shrink grout; G

Pore Blocker Admixture; G

Preformed joint filler

Reinforcing Bars; G

Reinforcement; G

Reinforcement supports; G

SD-05 Design Data

Concrete Mixture Requirements; G

Mixture designs; G

Mass Concrete Temperature Control Plans; G

SD-06 Test Reports

Air Entraining

Aggregates

Admixtures

As-Built Report

Cement

Concrete mixture proportions

Concrete Test Reports

Complementary Cementing Materials

Fresh Concrete Properties

Hardened Concrete Properties

Mechanical Reinforcing Bar Connectors

Reinforcing Bars

Reinforcement and Hot-Dip Galvanizing Coating; G

Water

Pore Blocker; G

SD-07 Certificates

Admixtures

Cementitious Materials

Cementitious material mill certificates

Field testing technician and testing agency

SD-08 Manufacturer's Instructions

Coatings

SD-11 Closeout Submittals

Aggregate Moisture Content

Aggregate Sampling

As-built report including observed defects; G

Concrete Test Reports; G

Quality Control Charts

Daily inspection reports

Quality Team Meetings

Sampling logs

1.4 MODIFICATION OF REFERENCES

Accomplish work in accordance with ACI publications except as modified herein. Consider the advisory or recommended provisions to be mandatory, as though the word "shall" had been substituted for the words "should" or "could" or "may," wherever they appear. Interpret reference to the "Building Official," the "Structural Engineer," and the "Architect/Engineer" to mean the Contracting Officer.

1.5 DELIVERY, PLACING, STORAGE, AND HANDLING OF CONCRETE

Follow ACI 301, ACI 304R, and ASTM A934/A934M requirements and recommendations. Do not deliver concrete until vapor barrier, forms, reinforcement, embedded items, and chamfer strips are in place and ready for concrete placement. Store reinforcement of different sizes and shapes in separate piles or racks raised above the ground. Protect materials from contaminants such as grease, oil, and dirt. Ensure materials can be accurately identified after bundles are broken and tags removed.

1.6 CONCRETE QUALITY CONTROL

The Contractor shall develop and submit for approval a concrete quality control program in accordance with the guidelines of ACI 121R and as specified herein. The plan shall include approved laboratories. The Contractor shall provide direct oversight for the concrete qualification program. If concrete cylinders tested during production indicate inadequate strength or inadequate mixing, then the owner may require the Contractor to extract concrete core samples from the hardened concrete for analysis at Contractor's expense to assure the quality of the concrete.

Develop and submit for approval a concrete quality control program in accordance with the guidelines of ACI 121R. Maintain a copy of ACI SP-15 and CRSI 10MSP at the project site.

1.6.1 Quality Control Personnel

The contractor shall submit for approval an organizational chart defining the quality control hierarchy, the responsibilities of the various positions, including the names and qualifications of the individuals in those positions.

Submit American Concrete Institute certification for the following:

a. CQC personnel responsible for inspection of concrete operations.

b. Lead Foreman or Journeyman of the Concrete Placing, Finishing, and Curing Crews.

c. Field Testing Technicians: ACI Concrete Field Testing Technician, Grade I.

d. Laboratory Testing Technicians: ACI Concrete Strength Testing Technician and Laboratory Testing Technician, Grade I or II.

f. Petrographer: Bachelor of Science degree in geology or petrography, trained in petrographic examination of concrete aggregate according to ASTM C294 and ASTM C295/C295M and trained in identification of the specific deleterious processes and tests identified in this specification. Resume shall detail the education, training and experience related to the project-specific test methods and deleterious materials and shall be submitted at least 20 days before petrographic and deleterious materials examination is to commence.

1.6.1.1 Quality Manager Qualifications

The quality manager shall hold a current license as a professional engineer in a U.S. state or territory with experience on at least five (5) similar projects. Evidence of extraordinary proven experience may be considered by

the Contracting Officer as sufficient to act as the Quality Manager.

1.6.1.2 Field Testing Technician and Testing Agency

Submit data on qualifications of proposed testing agency and technicians for approval by the Contracting Officer prior to performing testing on concrete.

a. Work on concrete under this contract shall be performed by an ACI Concrete Field Testing Technician Grade 1 qualified in accordance with ACI SP-2 or equivalent. Equivalent certification programs shall include requirements for written and performance examinations as stipulated in ACI SP-2.

b. Testing agencies that perform testing services on reinforcing steel shall meet the requirements of ASTM E329.

c. Testing agencies that perform testing services on concrete materials shall meet the requirements of ASTM C1077.

1.6.2 Laboratory Qualifications for Concrete Qualification Testing

The concrete testing laboratory shall have the necessary equipment and experience to accomplish required testing. The laboratory shall meet the requirements of ASTM C1077 and be Cement and Concrete Reference Laboratory (CCRL) inspected.

1.6.3 Laboratory Accreditation

Laboratory and testing facilities shall be provided by and at the expense of the Contractor. The laboratories performing the tests shall be accredited in accordance with ASTM C1077, including ASTM C78/C78M and ASTM C1260. The accreditation shall be current and shall include the required test methods, as specified.

a. Aggregate Testing and Mix Proportioning: Aggregate testing and mixture proportioning studies shall be performed by an accredited laboratory and under the direction of a licensed/registered civil engineer in a U.S. state or territory, who shall sign all reports and designs.

b. 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.

c. Contractor Quality Control: All sampling and testing shall be performed by an approved, onsite, independent, accredited laboratory.

1.7 CONCRETE DURABILITY

1.7.1 Concrete Mixture Proportions

At least 60 days prior to concrete placement, submit concrete mixture proportions, ingredient material certificates and test data, and trial batch test data for each concrete proposed for use on the project. Proportions shall indicate the mass of cement, pozzolans and ground granulated blast furnace slag, if used; w/c ratio, the mass of aggregates

in saturated surface-dry condition and quantities of all admixtures, including pore blockers and super plasticizers. Concrete mixtures shall not contain aggregate greater than 3/4". Concrete mixture proportions shall be determined by contractor and submitted for review and approval by Contracting Officer prior to placement.

1.7.2 Concrete Design Requirements

Proportion concrete mixtures to meet the requirements listed in Table 1 in accordance with the procedures outlined in ACI 201.2R and ACI 211.1.

The mixture proportions for concrete shall be developed by the Contractor to produce the required compressive strength (f'cr), drying shrinkage, and constructability for mixtures.

Table 1 - Concrete Design Requirements

Prescriptive requirements	Minimum	Maximum
Water/Cement Ratio	--	0.39
Concrete ASTM C157/C157M Drying Shrinkage percent, as modified per ACI 364.3R at 28 days.	--	0.05 percent
Initial acid-soluble chloride content in cast-in-place concrete per ASTM C1152/C1152M, percent/cement	--	0.10
Initial acid-soluble chloride content in prestressed concrete determined following ASTM C1152/C1152M, percent/cement	--	0.06

1.7.3 Concrete Mixture Qualifications

1.7.3.1 Concrete Mixtures

a. Submit complete ingredient material test data, including applicable reference specifications. Submit additional data regarding concrete aggregates if the source of aggregate changes.

b. Submit copies of test reports by independent test lab conforming to ASTM C1077 showing that the mixture has been successfully tested to produce concrete with the properties specified and that mixture will be suitable for the job conditions as described. Test reports shall be submitted along with the concrete mixture proportions. Obtain approval before concrete placement.

(1) Test and report fresh concrete property tests of each trial batch as follows:

(a) Slump in accordance with ASTM C143/C143M.

(b) Air content in accordance with ASTM C231/C231M or ASTM C173/C173M.

(c) Unit weight in accordance with ASTM C138/C138M.

(d) Temperature in accordance with ASTM C1064/C1064M.

(e) Permeability test conforming to ASTM C1202.

(2) Cast specimens, test, and report hardened concrete property tests of each trial batch as follows:

(a) Compressive strength at 3, 7, 28, 56 and 90 days in accordance with ASTM C39/C39M. Use of unbonded caps in accordance with ASTM C1231/C1231M is permitted.

(b) Drying shrinkage may be determined from one batch.

(c) Tensile strength (if required) may be determined using specimens cast from one batch.

(3) Moist cure concrete intended for cast-in-place applications in accordance with the standard moist curing conditions described in ASTM C192/C192M unless otherwise specified.

(5) Special handling will be necessary for shipments of specimens. These cylinders shall be wrapped completely with slightly damp paper towels with distilled water only. The wrapped cylinders shall be placed in either a vacuum package or double layers of sealed plastic bags. Package the test cylinders to prevent damage and ship to an approved testing laboratory.

1.7.4 Concrete Qualification Program

1.7.4.1 Fresh Concrete Properties

a. Air Content: Concrete that is air entrained shall conform to the air limits specified in ACI 301 for exposure and the aggregate size used and tested in accordance with ASTM C231/C231M. Variations outside the limits specified shall not be reason to reject the concrete.

b. Slump: The concrete mixture shall be proportioned to have, at the point of deposit, a maximum slump of 4 inches as determined by ASTM C143/C143M when admixtures that affect slump are not used. Where an ASTM C494/C494M, Type F or G admixture is used, the slump after the addition of the superplasticizer shall not exceed 8 inches. Slump tolerances shall comply with the requirements of ACI 117.

For process control sampling, the slump flow limit as determined by ASTM C1611/C1611M shall be no greater than 24 inches and the visual stability index limit shall be no greater than 1.0.

d. Underwater concrete: When the concrete is intended for placement under water using the tremie technique, the concrete shall be proportioned to be cohesive and flow with minimal out segregation. Viscosity modifying admixtures shall be used for underwater concrete unless approved by Contracting Officer prior to placement. Proportioning guidance in ACI 304R shall be considered. Concrete mixtures shall be qualified for tremie placement methods based on a trial placement approved by the Contracting Officer.

1.7.4.2 Hardened Concrete Properties

a. Compressive Strength: Minimum compressive strength results at 28 days shall not be less than 5,000 psi. Determine compressive strength (f'cr) for qualification of concrete mixtures and for quality acceptance testing. A compressive strength test result is defined as the mean of three properly conducted tests on 4 by 8 inch cylinders in accordance with ASTM C39/C39M. In addition:

(1) Specified Compressive Strength: Structural concrete elements exposed to a marine environment shall contain not less than 15% and not more than 25% of fly ash or other pozzolans conforming to ASTM C 618.

(2) Required Average Strength: The concrete shall be proportioned such that the minimum required average compressive strength (f'cr) exceeds the specified design strength (f'c) as per ACI 301.

(3) Strength of any individual concrete placement shall be considered satisfactory if both the following requirements are met:

(a) The arithmetic mean of any three consecutive lot strength tests is at least 1.0 f'c, and;

(b) No individual strength test result is less than 0.90 f'c.

(4) In the event that a placement is represented by single sampling lot, strength shall be considered satisfactory if either:

(a) The mean of the initial test is at least 1.0 f'c, or;

(b) The mean of the initial test and retest is at least 1.0 f'c, and neither strength test result is less than 0.90 f'c.

(5) For underwater concrete, cast compressive strength samples by placing concrete in four 5-gallon buckets below water using similar placement as the project. Permanently mark buckets as "3 days," "7 days," "28 days," and "Extra." Include date and station. Provide specimen sets at every 100 cubic yards of concrete for the first 500 cubic yards, then every 500 cubic yards thereafter with a minimum of one set per day of underwater concrete placement.

(a) Retrieve buckets at specified intervals and extract three cores from each bucket. Conduct compressive strength test in accordance with ASTM C42/C42M.

(b) Strength of underwater concrete shall be satisfactory if the compressive strength result from extracted cores at the age of the specified strength is at least 0.85 f'c with no individual strength test result less than 0.75 f'c.

b. Drying Shrinkage: Determine drying shrinkage for qualification of concrete mixtures prior to the fabrication of the Test Section and from samples made during the fabrication of the Test Section (see the subpart entitled "Test Section"). All test results shall not exceed 0.05 percent. A drying shrinkage test result shall be the mean value from three or more individual specimens constituting a test set. If an individual specimen's measurements deviate from the mean value by more

than 0.009 percent length change the specimen's measurements shall be discarded and a new average established. Casting more than three specimens for each set is permitted. Test procedures and test specimens shall conform to the following:

Drying shrinkage specimens, typically 3 by 3 by 11.25 inch prisms for 3/4 inch maximum size aggregate or smaller, shall be fabricated, cured, dried, and measured at 28 days in the manner delineated in ASTM C157/C157M except as modified by ACI 364.3R.

c. The use of silica fume is not allowed.

1.8 CONCRETE

1.8.1 Drawings

Fabrication Drawings for concrete formwork, reinforcement materials, precast elements, wall forms, and bulkhead forms must indicate concrete pressure calculations with both live and dead loads, along with material types. Provide design calculations by a registered Civil or Structural Engineer for the formwork.

1.8.1.1 Formwork

Prior to commencing work submit drawings for approval showing details of formwork including, but not limited to: joints, supports, studding and shoring, and sequence of form and shoring removal. Reproductions of contract drawings are unacceptable.

Design, fabricate, erect, support, brace, and maintain formwork so that it is capable of supporting without failure all vertical and lateral loads that may reasonably be anticipated to be applied to the formwork.

ACI 347. Include design calculations indicating arrangement of forms, sizes, species, and grades of supports (lumber), panels, and related components. Indicate placement schedule, construction, and location and method of forming control joints. Include locations of inserts, pipe work, conduit, sleeves, and other embedded items. Furnish drawings and descriptions of shoring and reshoring methods proposed for slabs, beams, and other horizontal concrete members.

1.8.1.2 Reinforcing Steel

ACI SP-66. Provide bending and cutting diagrams, assembly diagrams, splicing placement and laps of bars, shapes, dimensions, and details of bar reinforcing, accessories, and concrete cover. Do not scale dimensions from structural drawings to determine lengths of reinforcing bars. Only complete drawings will be accepted.

1.8.1.3 Joints

Submit a plan indicating the location of each closure pour detail/construction joint. Final joint locations are subject to Government approval.

1.8.2 Pre-Construction Submittals

1.8.2.1 Curing Concrete Elements

Submit proposed materials and methods for curing concrete elements.

1.8.2.2 Concrete Curing Plan

Submit proposed materials, methods, and duration for curing and cooling concrete elements in accordance with ACI 308.1.

Minimum moist curing duration shall be seven days.

Concrete shall be placed under thoroughly wet burlap and overlayed by polyethelene, or use wet polyethelene-coated burlap, immediately after placement and finishing. Burlap should be wetted using sprinklers. Use of hoses or jetted water for burlap wetting shall not be allowed. Protect concrete from premature drying, direct sun exposure, and mechanical injury; and maintain minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete.

1.8.2.3 Form Removal Schedule

Submit schedule for form removal indicating element and minimum length of time for form removal. Submit technical literature of forming material or liner, form release agent, form ties, and gasketing to prevent leakage at form and construction joints. Provide a full description of materials and methods to be used to patch form-tie holes.

1.8.2.4 Concrete Placement and Compaction

a. Submit technical literature for equipment and methods proposed for use in placing concrete. Include concrete pumping or conveying equipment including type, size and material for pipe, valve characteristics, and the maximum length and height concrete will be pumped. No adjustments shall be made to the mixture design to facilitate pumping.

b. Submit technical literature for equipment and methods proposed for vibrating and compacting concrete. Submittal shall include technical literature describing the equipment including vibrator diameter, length, frequency, amplitude, centrifugal force, and manufacturer's description of the radius of influence under load. Where flat work is to be cast, provide similar information relative to the proposed compacting screed or other method to ensure dense placement.

1.8.2.5 Concrete Report

Provide a Report inclusive of materials and methods used, test results, and the field test strength (fcr) for concrete that shows compliance with the structural requirements.

1.8.2.6 Mixture Designs

Provide a detailed report of materials and methods used, test results, and the field test strength (fcr) for marine concrete required to meet structural and durability requirements.

1.8.3 Sampling

The Contractor shall be responsible for conducting concrete production process control sampling and testing in compliance with this specification.

1.8.3.1 Ingredient Material Sampling

a. Cementitious material mill certificates and test reports shall be provided for each shipment. Record the date delivered and quantity of material represented by the certificate.

b. Conduct and log aggregate moisture content at a minimum frequency of twice daily for each day's production. Use of moisture sensors in storage bins is recommended practice, but does not satisfy this requirement.

c. Aggregate sampling for gradation and dry-rodded unit weight shall be conducted for each 100 tons delivered for use on the project, or portion thereof.

d. All course aggregate shall be kept in saturated surface dry condition and shall be protected from direct sun exposure at all times.

1.8.4 Reporting

1.8.4.1 Daily Inspection Reports

Contractor shall prepare daily inspection reports for all inspection activities such as base preparation, formwork preparation, reinforcement installation, concrete placement log, and temperature control activities. Submit sample forms and describe the procedure used to organize, archive, and retrieve inspection records in the Quality Program submittal.

1.8.4.2 Sampling Logs

Contractor shall maintain a concrete placement log as an electronic spreadsheet or database identifying each placement date, placement location, volume of concrete, batch ticket numbers, lot identification code, fresh concrete properties, compressive strength results, transport properties, inspection comments, and acceptance status. Contractor shall provide/transmit the concrete testing log to the Contracting Officer weekly. The Contractor shall provide copies of supporting documents for any placement requested by the Contracting Officer immediately upon request.

1.8.4.3 Quality Team Meetings

The contractor shall conduct regular quality control team meetings to review plans for future placements, review test results, and discuss dispensation of non-conforming materials. The quality team shall include the Contractor's quality manager, the project manager, the project superintendent, the Contracting Officer, and representatives of the testing agency and concrete producer, or approved substitutes. The transition from the weekly or bi-weekly meetings to the monthly meetings shall be with the Contracting Officer's approval.

The Contractor shall prepare quality control team meeting minutes for each meeting. The minutes shall include the date of each meeting, attendees, key discussion points, findings, recommendations, assigned tasks, assigned personnel, task completion dates and status of each task.

1.8.4.4 Non-conforming materials as Delivered

There are numerous possible indicators that the delivered concrete is non-conforming including (but not limited to) excessive slump and/or excessive water/cement ratio at delivery and/or placement. Any of these indicators alone are sufficient reason for the Contracting Officer to reject the concrete. Contractor shall bear all financial responsibility for concrete rejected on delivery.

1.8.4.5 Non-conforming Materials as Placed

The exact location of non-conforming as-placed concrete shall be identified and Contracting Officer shall be promptly notified. Investigations into non-conforming materials shall be conducted at the Contractor's expense. The Contractor shall be responsible for the investigation and shall make written recommendations to adequately mitigate or remediate the non-conforming concrete. The Contracting Officer may accept, require mitigation, or require removal and replacement of non-conforming material at no additional cost to the Government.

1.8.5 Test Reports

Concrete Test Reports shall be identified by a sequential report identification code. Each report shall identify the placement date, placement location, weather, name of testing technician, time of sampling, batch ticket number, fresh concrete test results, and hardened concrete test results.

1.8.5.1 Concrete Mixture Requirements

a. Submit copies of test reports conforming to ASTM C1077 showing that the mixture has been successfully tested to produce concrete with the properties specified and that mixture will be suitable for the job conditions. Test reports shall be submitted along with the concrete mixture proportions. Obtain Contracting Officer approval before concrete placement.
b. Fully describe the processes and methodology whereby mixture proportions were developed and tested and how proportions will be adjusted during progress of the work to achieve, as closely as possible, the designated levels of relevant properties.

1.8.5.2 Complementary Cementing Materials

Submit test results in accordance with ASTM C618 and the physical and chemical analysis in accordance with applicable ASTM standards such as ASTM C311/C311M for fly ash. Submit test results performed within 6 months of submittal date. Update this report during construction as necessary to assure that the complementary cementing materials used on the projects meets the ASTM criteria and the report on file is never older than 6 months.

1.8.5.2.1 Ground Granulated Blast-Furnace Slag

Submit test results in accordance with ASTM C989/C989M for ground granulated blast-furnace slag. Submit test results performed within 6 months of submittal date. Update this report during construction as necessary to assure that the report on file is never older than 6 months.

1.8.5.2.2 Ultra Fine Fly Ash or Pozzolan

Submit test results in accordance with ASTM C618 as a Class F fly ash or Class N pozzolan with the following additional requirements:

a. The strength activity index at 28 days shall be at least 95 percent of the control.

b. The average particle size shall not exceed 6 microns.

c. The sum SiO_2 plus Al_2O_3 plus Fe_2O_3 shall be greater than 77 percent.

Submit test results performed within 6 months of submittal date. Update this report during construction as necessary to assure that the report on file is never older than 6 months.

1.8.5.3 Pore Blocker (Crystalline Technology) Admixture

Marine concrete mix design for new pile caps shall include pore blocker admixture. The admixture shall be classified as a Permeability-Reducing Admixture - Hydrostatic (PRAH) as defined in ACI 212.3R. Selected admixture shall comply to vendor documentation and have a proven record of beneficial use within the last 5 years. Crystalline waterproofing admixtures shall be dosed at the rate recommended by the admixture manufacturer.

1.8.5.4 Aggregates

Aggregate samples shall be obtained in accordance with ASTM D75/D75M and shall be representative of the materials to be used for the project. Submit test results for aggregate quality in accordance with ASTM C33/C33M, and the combined gradation curve proposed for use in the work and used in the mixture qualification, and ASTM C295/C295M for results of petrographic examination. Confirm that the potential for alkali-silica reaction are within allowable limits by conducting tests in accordance with ASTM C1260. Submit results of all tests during progress of the work in tabular and graphical form as noted above, describing the cumulative combined aggregate grading and the percent of the combined aggregate retained on each sieve.

1.8.5.5 Admixtures

Submit test results in accordance with ASTM C494/C494M and ASTM C1017/C1017M for concrete admixtures, ASTM C260/C260M for air-entraining admixture, and manufacturer's literature and test reports for pore blocker admixture and anti-washout admixture. Submitted data shall be based upon tests performed within 6 months of submittal. Submit certified copies of test results for the specific lots or batches to be used on the project. Test results shall be not more than 6 months old prior to use in the work. Chemical admixtures that have been in storage at the project site for longer than 6 months will be retested at the expense of the Contractor.

1.8.5.6 Portland Cement, Supplementary Cementitious Materials and Pozzolans

Portland cement,ground granulated blast furnace (GGBF) slag, and pozzolan will be accepted on the basis of manufacturer's certification of compliance, accompanied by mill test reports showing that the material in each shipment meets the requirements of the specification under which it is furnished. Mill test reports shall be no more than 1 month old, prior to use in the work. No cementitious material shall be used until notice of

acceptance has been given by the Contracting Officer. Cementitious material may be subjected to check testing by the Government from samples obtained at the mill, at transfer points, or at the project site. If tests prove that a cementitious material that has been delivered is unsatisfactory, it shall be promptly removed at Contractor's expense from the site of the work. Cementitious material that has not been used within 6 months after testing shall be retested at the Contractor's expense and shall be rejected if test results are not satisfactory. Submit test results in accordance with ASTM C150/C150M portland cement and/or ASTM C595/C595M and ASTM C1157/C1157M for blended cement.

1.8.5.7 Acceptability of Work

The materials and the structure itself will be accepted on the basis of tests made by the Contractor and shall be in compliance with the criteria herein. The Government may make check tests at its expense to validate the results of the Contractor's testing. Testing performed by the Government will in no way relieve the Contractor from the specified testing requirements.

PART 2 PRODUCTS

2.1 CEMENTITIOUS MATERIALS

Cementitious materials shall be portland cement or cement blended with complementary cementing materials. New submittals are required when the cementitious materials change sources or types.

The Contractor shall provide cementitious materials meeting the requirements of the applicable specification, and as modified herein. Provide mill certificates and test results conducted within six-months of the submittal date as part of the concrete mixture qualification submittal.

2.1.1 Portland Cement

Provide portland cement conforming to ASTM C150/C150M, Type II,low alkali with tri-calcium aluminates (C3A) content greater than 6% and less than 10 percent and a maximum cement-alkali content of 0.80 percent Na2Oe (sodium oxide) equivalent.

ASTM C150/C150M cements shall be combined with complementary cementing materials in the concrete mixture.

2.1.2 Blended Cements

Blended cement shall conform to ASTM C595/C595M, 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 shall be ASTM C989/C989M ground granulated blast-furnace slag. The pozzolan added to the Type IP blend shall be ASTM C618 Class F and shall be interground with the cement clinker. The manufacturer shall state in writing 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. The percentage and type of mineral admixture used in the blend shall not change from that submitted for the aggregate evaluation and mixture proportioning.

2.1.3 Pozzolan

2.1.3.1 Fly Ash

Fly ash shall conform to ASTM C618, Class F, including the optional requirements for uniformity and effectiveness in controlling Alkali-Silica reaction and shall have a loss on ignition not exceeding 3 percent. Class F fly ash for use in mitigating Alkali-Silica Reactivity shall have a Calcium Oxide (CaO) content of less than 8 percent and a total equivalent alkali content less than 1.5 percent. Add with cement.

2.1.3.2 Raw or Calcined Natural Pozzolan

Natural pozzolan shall 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 shall have an on ignition loss not exceeding 3 percent. Class N pozzolan for use in mitigating Alkali-Silica Reactivity shall have a Calcium Oxide (CaO) content of less than 8 percent and total equivalent alkali content less than 1.5 percent.

2.1.3.3 Ultra Fine Fly Ash and Ultra Fine Pozzolan

Ultra Fine Fly Ash (UFFA) and Ultra Fine Pozzolan (UFP) shall conform to ASTM C618, Class F or N, and the following additional requirements:

a. The strength activity index at 28 days of age shall be at least 95 percent of the control specimens.

b. The average particle size shall not exceed 6 microns.

c. The sum of SiO_2 + Al_2O_3 + Fe_2O_3 shall be greater than 77 percent.

2.1.4 Ground Granulated Blast-Furnace (GGBF) Slag

Ground Granulated Blast-Furnace Slag shall conform to ASTM C989/C989M, Grade 100 or Grade 120. Add with cement.

2.1.5 Complementary Cementing Materials (AKA Supplementary Cementitious Materials (SCM) Content (SCM))

The concrete mix shall always contain complementary cementing materials whether or not the aggregates are found to be reactive in accordance with the subpart entitled "Aggregates". Concrete mixtures shall be designed and proportioned to meet the requirements for strength, constructability and shrinkage. Concrete mix design should contain between 15 and 25% of Class F fly ash or between 30 and 45% of ground granulated blast furnace slag.

2.2 AGGREGATES

Comply with ASTM C33/C33M Class 4S, except as modified herein.

The quantities to be retained on each sieve may be adjusted only where available aggregates are elongated or slivered and cause interference with mix mobility, or available aggregate gradations do not comply with the 18-8 requirement. When necessary to satisfy local conditions and when permitted, the combined aggregate percentages may be changed to not more than 22 percent nor less than 6 percent retained on any individual sieve.The combined aggregates in the mixture (coarse, intermediate, and fine) shall be well graded with no more than 18 percent nor less than 8

percent of the combined aggregate retained on any individual sieve, unless satisfactory performance can be demonstrated. The No. 50 sieve may have less than 8 percent retained; sieves finer than No. 50 shall have less than 8 percent retained, and the coarsest sieve may have less than 8 percent retained. Use intermediate sizes for blending where necessary, to provide a well graded combined aggregate.

a. Provide gradation of individual aggregate sizes using standard concrete aggregate sieves including one inch, 3/4 inch, 1/2 inch, 3/8 inch, No. 4, No. 8, No. 16, No. 30, No. 50, and No. 100.

b. Provide aggregates for exposed concrete from one source. Aggregate reactivity shall be limited per the subpart entitled "Aggregates". Provide aggregate containing no deleterious material properties as identified by ASTM C295/C295M.

c. Where a size designation is indicated, that designation indicates the nominal maximum size of the coarse aggregate.

d. Aggregate tests shall be conducted within 6 months from the date of concrete mixture submittal.

e. Provide ASTM C1260 or ASTM C1567 test results conducted with 6 months of the submittal date showing the proposed coarse and fine aggregates are either: innocuous to alkali silica reaction; or that reactivity has been mitigated by the proposed cementitious materials as modified herein. Conduct ASTM C1260 tests on each aggregate source separately. Fine and coarse aggregates to be used in all concrete shall be evaluated and tested for alkali-aggregate reactivity. Both coarse aggregate size groups shall be tested. Test results of the individual aggregates shall have a measured expansion equal to or less than 0.08 percent after 28 days of immersion in a 1M NaOH solution at 176 degrees.

f. Should the test data indicate an expansion of greater than 0.08 percent, the aggregate(s) shall be rejected or additional testing shall be performed as follows: utilize the Contractor's proposed low alkali portland cement, blended cement, and/or complementary cementing materials, in combination with each individual aggregate. If SCMs are being evaluated, the testing shall be in accordance with ASTM C1567. Determine the quantity that will meet all the requirements of these specifications and that will lower the expansion equal to or less than 0.08 percent after 28 days of immersion in a 1N NaOH solution. Mixture proportioning shall be based on the highest percentage of SCM required to mitigate ASR-reactivity.

2.3 WATER

Water shall comply with the requirements of ASTM C94/C94M and ASTM C1602/C1602M, except that the chloride and sulfate limits as tested in accordance with ASTM D512 and ASTM D516 shall not exceed 250 parts per million chloride ion and not more than 1000 parts per million of sulfate ion as SO4. Water shall be free from injurious amounts of oils, acids, alkalis, salts, and organic materials. Where non-potable water or water from reprocessed concrete is proposed for use in the work, submit results of tests in accordance with ASTM C1602/C1602M. Submit test results in accordance with ASTM D512 and ASTM D516.

2.4 ADMIXTURES

a. Provide certifications that chemical admixtures comply with the requirements shown in Table 5 and are compatible with each other. Use admixtures in accordance with manufacturer's recommendations, as appropriate for the climatic conditions and construction needs.

b. Do not use calcium chloride or admixtures containing chloride ion content in more than trace amounts from impurities in admixture ingredients or potable water. Provide maximum concentrations of corrosion-inducing chemicals as shown in Table 5.

Table 5 - Limits on Corrosion-Inducing Chemicals

Chemical*	Limits, Percent**	Test Method
Chlorides	0.10	ASTM D512
Fluorides	0.10	ASTM D1179
Nitrates	0.17	ASTM D3867

* Limits refer to water-soluble chemicals

** Limits are expressed as a percentage of the mass of the total cementitious materials.

c. Provide anti-washout or viscosity modifying admixtures for underwater concrete placement. Provide certification that the admixture is compatible with the cementitious materials and other chemical admixtures in the proposed concrete mixture. The anti-washout or viscosity modifying admixture shall require approval by the Contracting Officer and have a proven record of performance with a minimum of five similar projects. Test per COE CRD-C 61 to determine cumulative mass loss shall be performed once for each 350 cubic yards of underwater concrete and results submitted to Contracting Officer for approval prior to continued use.

d. The total alkali contribution of chemical admixtures shall not increase the total sodium-oxide equivalent content of the concrete mixture by more than 0.5 lb/yd3.

2.4.1 Air Entraining

Provide air entraining admixtures conforming to ASTM C260/C260M if concrete flowability requires improvement.

2.4.2 Retarding

ASTM C494/C494M, Type B, D, or G.

2.4.3 Water Reducing

ASTM C494/C494M, Type A, E, or F.

High Range Water Reducer (HRWR) shall be ASTM C494/C494M, Type F and ASTM C1017/C1017M.

2.4.4 Pore Blocker (Crystalline Technology) Admixture

Provide Permeability Reducing Admixture Hydrostatic (PRAH) in accordance with ACI 212.3R and per manufacturer's instructions.

2.5 NON-SHRINK, NON-METALLIC GROUT

ASTM C1107/C1107M. Minimum f'c of 5,000 psi.

2.6 MATERIALS FOR FORMS

Provide wood, plywood, or steel. Use plywood or steel forms where a smooth form finish is required. Lumber shall be square edged or tongue-and-groove boards, free of raised grain, knotholes, or other surface defects.

Plywood: APA PS 1, B-B concrete form panels or better. Steel form surfaces shall not contain irregularities, dents, or sags.

2.6.1 Form Ties and Form-Facing Material

a. Provide a form tie system that does not leave mild steel after break-off or removal any closer than 2 inches from the exposed surface. Do not use wire alone. Form ties and accessories shall not reduce the effective cover of the reinforcement.

b. Form-facing material shall be structural plywood or other material that can absorb air and some of the high water-cementitious materials ratio surface paste that may be trapped in pockets between the form and the concrete. Maximum reuse is three times. Provide forms with a form treatment to prevent bond of the concrete to the forms. Use a controlled permeability form liner in strict accordance with the manufacturer's recommendations.

2.7 REINFORCEMENT

2.7.1 Galvanized Reinforcing Bars

Provide galvanized reinforcing bars that conform to ASTM A767/A767M, Class II with galvanizing after fabrication.

2.7.2 Wire

Comply with ASTM A1064/A1064M carbon steel. Wires for tying rebar shall be hot-dip galvanized.

2.8 ACCESSORY MATERIALS

2.8.1 Materials for Curing Concrete

2.8.1.1 Impervious Sheeting

ASTM C171; polyethylene-coated burlap.

PART 3 EXECUTION

3.1 FORMS

a. Provide formwork with clean-out openings to permit inspection and

removal of debris. Formwork shall be gasketed or otherwise rendered sufficiently tight to prevent leakage of paste or grout under heavy, high-frequency vibration. Use a release agent that does not cause surface dusting. Limit reuse of plywood to no more than three times. Reuse may be further limited by the Contracting Officer if it is found that the pores of the plywood are clogged with paste so that the wood does not absorb air and some of the high water-cementitious materials ratio paste that may be trapped in pockets between the form and the concrete.

b. Comply with ACI 301. Chamfer above grade exposed joints, edges, and external corners of concrete 0.75 inch unless otherwise indicated. Forms submerged in water shall be watertight.

c. Patch form tie holes with a no shrink patching material in accordance with the manufacturer's recommendations and subject to approval.

3.1.1 Coating

Before concrete placement, coat the contact surfaces of forms with a non staining mineral oil, no staining form coating compound, or two coats of nitrocellulose lacquer. Do not use mineral oil on forms for surfaces to which adhesive, paint, or other finish material is to be applied.

3.1.2 Removal of Forms and Supports

After placing concrete, forms shall remain in place for the time periods specified in ACI 347, except for concrete placed underwater, forms shall remain in place a minimum of 48 hours. Prevent concrete damage during form removal.

3.1.2.1 Special Requirements for Reduced Time Period

Forms may be removed earlier than specified if ASTM C39/C39M test results of field-cured samples from a representative portion of the structure or other approved and calibrated non-destructive testing techniques show that the concrete has reached a minimum of 85 percent of the design strength.

3.2 PLACING REINFORCEMENT AND MISCELLANEOUS MATERIALS

ACI 301. Remove rust, scale, oil, grease, clay, or foreign substances that can potentially reduce bond between concrete and reinforcement. Do not tack weld. Inspect and verify proper reinforcement grade, quantity, spacing, and clearance requirements prior to concrete placement. Inspect placed steel reinforcing for coating damage prior to placing concrete. Repair all visible damage per ASTM A 780/A 780M.

3.2.1 Reinforcement Supports

Place reinforcement and secure with non-corrodible plastic chairs, spacers, and hangers. Metal hangers may be used, but shall be of similar material to the reinforcing. Support reinforcement on the ground with concrete or other non-corrodible material, having a compressive strength equal to or greater than the concrete being placed.

3.2.2 Splicing

As indicated. For splices not indicated, comply with ACI 301. Do not splice at points of maximum stress.

3.2.3 Future Bonding

Plug exposed, threaded, mechanical reinforcement bar connectors with a greased bolt. Bolt threads shall match the connector. Countersink the connector in the concrete. Caulk the depression after the bolt is installed.

3.2.4 Cover

3", UNO for concrete cover over the steel reinforcement. Use ACI 117 to determine allowable tolerances for the placement of the steel.

3.2.5 Setting Miscellaneous Material

Place and secure anchors, bolts, pipe sleeves, conduits, and other such items in position before concrete placement. Plumb anchor bolts and check location and elevation. Temporarily fill voids in sleeves with readily removable material to prevent the entry of concrete. Electrically isolate exposed steel work and its anchor systems from the primary steel reinforcement with at least 2 inches of concrete. Coat exposed steel work to reduce corrosion.

3.2.6 Closure Pours/Construction Joints

Locate closure pour/construction joints as indicated on the drawings. Continue reinforcement across closure pour/construction joints as indicated. Final joint locations are subject to Government approval.

Reinforcement within closure pours shall be lap spliced. Closure pours shall be spaced at 44'-0" on center maximum and shall be coordinated with location of the mooring fittings.

3.3 BATCHING, MEASURING, MIXING, AND TRANSPORTING CONCRETE

ASTM C94/C94M, ACI 301, and ACI 304R, except as modified herein. Batching equipment shall be such that the concrete ingredients are consistently measured within the following tolerances: 1 percent for cement and water, 2 percent for aggregate, and 3 percent for admixtures. Furnish mandatory batch tickets imprinted with mix identification, batch size, batch design and measured weights, moisture in the aggregates, and time batched for each load of ready mix concrete. When a pozzolan is batched cumulatively with the cement, it shall be batched after the cement has entered the weight hopper. Water-cement ratio shall be kept below 0.39.

3.3.1 Measuring

Make measurements at intervals as specified in subparts entitled "Sampling" and "Testing."

Adjust batch proportions to replicate the mixture design using methods provided in the approved quality assurance plan. Base the adjustments on results of tests of materials at the batch plant for use in the work. Maintain a full record of adjustments and the basis for each.

3.3.2 Mixing

Comply with ASTM C94/C94M and ACI 301.If time of discharge exceeds time required by ASTM C94/C94M or Section 3.3.3 of this Specification, whichever

has a more stringent requirement. Submit a request along with description of precautions to be taken.

3.3.3 Transporting

Comply with ACI 304R. Discharge of concrete shall be completed within 60 minutes or before the drum has revolved 300 revolutions, whichever comes first after introduction of water to the concrete mix. Maximum delivery temperature shall not exceed 90 deg F. Concrete not complying with outlined requirements shall be rejected and disposed for future recycling.

3.4 PLACING CONCRETE

Comply with ACI 304R and ACI 304.2R. Place concrete as soon as practicable after the forms and the reinforcement have been inspected and approved. Do not place concrete when weather conditions prevent proper placement and consolidation; in uncovered areas during periods of precipitation; or in standing water. Prior to placing concrete, remove dirt, construction debris and water from within the forms. Deposit concrete as close as practicable to the final position in the forms. Do not exceed a free vertical drop of 3 feet from the point of discharge. Place concrete in one continuous operation from one end of the structure towards the other or lifts for vertical construction. Position grade stakes on 20 foot centers maximum for exterior slabs.

3.4.1 Vibration

Comply with the requirements of ACI 309R using vibrators with a minimum frequency of 9000 vibrations per minute (VPM). Use only high cycle or high frequency vibrators. Motor-in-head 60 cycle vibrators may not be used. For deep beams, use a minimum of two vibrators with the first to melt down the mixture and the second to thoroughly consolidate the mass. Provide a spare vibrator at the casting site whenever concrete is placed. Place concrete in 18 inch maximum vertical lifts. Insert and withdraw vibrators approximately 18 inches apart. Penetrate at least 8 inches into the previously placed lift with the vibrator when more than one lift is required. Extract the vibrator using a series of up and down motions to drive the trapped air out of the concrete and from between the concrete and the forms. Concrete mix with anti washout admixture shall be checked for segregation resistance in order to determine proper amount of anti washout liquid in the mix design that can resist segregation during concrete placement and vibration.

For horizontal surface construction, use vibrating screeds.

3.4.2 Hot Weather

Comply with ACI 305R. Maintain required concrete temperature using Figure 2.1.5, "Effect of Concrete Temperatures, Relative Humidity, and Wind Velocity on the Rate of Evaporation of Surface Moisture From Concrete" in ACI 305R to prevent the evaporation rate from exceeding 0.2 pound of water per square foot of exposed concrete per hour. Relative humidity at time of concrete pour and evaporation rate should be documented. If necessary, cool ingredients before mixing or use other suitable means to control concrete temperature and prevent rapid drying of newly placed concrete. Shade the fresh concrete as soon as possible after placing. Start curing when the surface of the fresh concrete is sufficiently hard to permit curing without damage. Maintain a moist concrete surface throughout the curing period. For vertical surfaces, protect forms from direct sunlight.

Concrete should be placed between hours after sunset and two hours before sunset.

3.4.3 Prevention of Plastic Shrinkage Cracking

During weather with low humidity, and particularly with high temperature and appreciable wind, develop and institute measures to prevent plastic shrinkage cracks from developing. If plastic shrinkage cracking occurs, halt further placement of concrete until protective measures are in place to prevent further cracking. Periods of high potential for plastic shrinkage cracking can be anticipated by use of Figure 4.2 of ACI 305R. In addition to the protective measures concrete placement shall be further protected by erecting shades and windbreaks and by wet covering. Curing procedures shall be immediately commenced. The methods and materials to remove or repair areas affected by plastic shrinkage cracks shall be suggested by the Contractor, reviewed by the designated technical authority in Concrete Materials, and approved by the Contracting Officer. Cracks shall never be troweled over, but may be filled by special crystalline material, following manufacturer's recommendations.

3.4.4 Mass Concrete

All mass concrete elements shall be placed per the requirements of the Mass Concrete Temperature Control Plan.

3.4.5 Depositing Concrete Under Water

ACI 301 methods and equipment used shall prevent the washing of the cement from the mixture, minimize the formation of laitance, prevent the flow of water through the concrete before it has hardened, and minimize disturbance to the previously placed concrete. Tremies, if used, shall be watertight and sufficiently large to permit a free flow of concrete. Keep the discharge end continuously submerged in fresh concrete. Keep the shaft full of concrete to a level well above the water surface. Discharge and spread the concrete by raising the tremie to maintain a uniform flow. Place concrete without interruption until the top of the fresh concrete is at the required height.

3.5 SURFACE FINISHES

3.5.1 Defects

Repair formed surfaces by removing minor honeycombs, pits greater than one square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with non-shrink grout. Patch tie holes and defects when the forms are removed. Concrete with extensive honeycomb including exposed steel reinforcement, cold joints, entrapped debris, separated aggregate, or other defects which affect the serviceability or structural strength will be rejected, unless correction of defects is approved. Obtain approval of corrective action prior to repair. The surface of the concrete shall not vary more than the allowable tolerances of ACI 347. Exposed surfaces shall be uniform in appearance and finished to a smooth form finish unless otherwise indicated.

3.5.2 Formed Surfaces

3.5.2.1 Tolerances

Comply with ACI 117 and as indicated.

3.5.2.2 As-Cast Rough Form

Provide for surfaces not exposed to public view. Patch holes and defects and level abrupt irregularities. Remove or rub off fins and other projections exceeding 0.25 inch in height.

3.5.2.3 As-Cast Form

Provide form facing material producing a smooth, hard, uniform texture on the concrete. Arrange facing material in an orderly and symmetrical manner and keep seams to a practical minimum. Support forms as necessary to meet required tolerances. Material with raised grain, torn surfaces, worn edges, patches, dents, or other defects which will impair the texture of the concrete surface shall not be used. Patch tie holes and defects and completely remove fins.

3.6 FINISHES FOR HORIZONTAL CONCRETE SURFACES

3.6.1 Finish

Comply with ACI 301. Place, consolidate, and immediately strike off concrete to obtain proper contour, grade, and elevation before bleedwater appears. Permit concrete to attain a set sufficient for floating and supporting the weight of the finisher and equipment. If bleedwater is present prior to floating the surface, remove water by absorption with porous materials. Do not use dry cement to absorb bleedwater.

3.6.1.1 Scratched

Use for surfaces intended to receive bonded applied cementitious applications. After the concrete has been placed, consolidated, struck off, and leveled, the surface shall be roughened with stiff brushes of rakes before final set.

3.6.1.2 Floated

Exterior surfaces where not otherwise specified. After the concrete has been placed, consolidated, struck off, and leveled, do not work the concrete further, until ready for floating. Whether floating with a wood, magnesium, or composite hand float, with a bladed power trowel equipped with float shoes, or with a powered disc, float shall begin when the surface has stiffened sufficiently to permit the operation. Sponge remove all surface water before commencing floating.

3.6.1.3 Broomed

Perform a floated finish, then draw a broom or burlap belt across the surface to produce a coarse scored texture. Permit surface to harden sufficiently to retain the scoring or ridges. Broom transverse to traffic or at right angles to the slope of the surface.

3.7 CURING AND PROTECTION

Comply with ACI 301 and ACI 308.1 unless otherwise specified. Prevent concrete from drying. Begin curing immediately following final set. Avoid damage to concrete from vibration created by blasting, pile driving, movement of equipment in the vicinity of the 300 ft of freshly poured curing concrete, disturbance of formwork or protruding reinforcement, by

rain or running water, adverse weather conditions, and any other activity resulting in ground vibrations. Protect concrete from injurious action by sun, rain, flowing water, mechanical injury, tire marks, and oil stains. Do not allow concrete to dry out from time of placement until the expiration of the specified curing period.

3.7.1 Wet Curing

Wet cure marine concrete using ASTM C1602/C1602M compliant water for a minimum of 7 days. Do not allow construction loads to exceed the superimposed load which the structural member, with necessary supplemental support, is capable of carrying in current condition safely and without damage.

Leaving the forms in place for seven days is a suitable alternative to wet curing.

3.7.1.1 Impervious Sheeting

Wet the entire exposed surface of the concrete thoroughly with a fine spray of water and cover with impervious sheeting throughout the curing period. Lay sheeting directly on the concrete surface and overlap edges 12 inches minimum. Provide sheeting not less than 18 inches wider than the concrete surface to be cured. Secure edges and transverse laps to form closed joints. Repair torn or damaged sheeting or provide new sheeting. Cover or wrap vertical structural elements from the top down with impervious sheeting.

3.7.2 Curing Periods

Moist cure concrete using ASTM C1602/C1602M compliant water for a minimum of 7 days. Continue additional curing for a total period of 21 days. Begin curing immediately after placement. Protect concrete from premature drying, excessively hot temperatures, and mechanical injury; and maintain minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing shall be subject to approval by the Contracting Officer.

3.8 FIELD QUALITY CONTROL

3.8.1 Fresh Concrete Properties

For each concrete mixture, the Contractor shall take samples in accordance with ASTM C172/C172M, test and record the slump, and temperature. If the slump deviates from the previous batch by more than 1 inch, air content shall also be determined. Adjustment of air content and/or slump with chemical admixture is permitted provided the maximum allowable water to cementitious material ratio is not exceeded.

3.8.1.1 Slump Tests

ASTM C143/C143M. Take concrete samples during concrete placement. The maximum slump may be increased as specified with the addition of an approved high range water reducing (HRWR) admixture provided that the water-cementitious ratio is not exceeded. Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 50 cubic yards (maximum) of concrete. If concrete does not pass slump test, adjust using a HRWR and test every concrete batch

until two (2) consecutive batches meet slump without adjustment.

3.8.1.2 Temperature Tests

a. Test the concrete delivered and the concrete in the forms. Perform tests in hot weather conditions above 80 degrees F for each batch (minimum) or every 50 cubic yards (maximum) of concrete, until the specified temperature is obtained, and whenever test cylinders and slump tests are made.

b. Determine temperature of each concrete sample in accordance with ASTM C1064/C1064M. Temperatures must comply with the Concrete Temperature Control Plans.

3.8.1.3 Air Content Tests

ASTM C231/C231M or ASTM C173/C173M. Perform tests at commencement of concrete placement each day, when test cylinders are made, and if slump test varies by more than 1 inch from previous results or concrete does not pass slump test.

3.8.1.4 Unit Weight Test

ASTM C138/C138M. Take concrete samples during concrete placement. Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 50 cubic yards (maximum) of concrete.

3.8.2 Hardened Concrete Properties

Sample and test each lot at 100 cubic yards for the first 500 cubic yards, then every 500 cubic yards thereafter.

Cast and cure specimens in accordance with ASTM C172/C172M, ASTM C31/C31M, and applicable requirements of ACI 305R and ACI 306R.

For each lot, record the date and time sampled, the batch ticket code, cylinder ID code the location of placement, total volume of concrete represented by the sample, and fresh concrete properties; ASTM C143/C143M for slump or ASTM C1611/C1611M for slump flow and visual stability index (VSI), ASTM C231/C231M for air content, ASTM C1064/C1064M for temperature, and ASTM C138/C138M unit weight.

3.8.2.1 Compressive Strength Tests

ACI 214R tests for strength - conduct strength tests of concrete during construction in accordance with the following procedures:

a. Test cylinders in accordance with ASTM C39/C39M. Test three cylinders at 3 days, three cylinders at 7 days, and three cylinders at the age when the compressive strength requirement was specified. Hold the remaining three cylinders in storage. If one specimen in a test shows evidence of improper sampling, molding or testing, discard the specimen and consider the strength of the remaining cylinder to be the test result. If more than one specimen shows excess defects, the Contracting Officer may allow the entire test to be discarded. Test results shall not exceed the specified compressive strength by more than 20 percent for the age specified.

b. If the average strength test results are less than the specified

strength (f'c) extract three core samples from the structure in accordance with ASTM C42/C42M, from the area that correlates to the low test results. These extracted cores shall not contain steel reinforcing. Repair core holes with non-shrink grout. Match color and finish of adjacent concrete. For concrete not meeting strength criteria the Contractor shall prepare a remediation strategy for the review by the Contracting Officer.

c. Strength test reports shall be provided within 7 days of test completion.

3.8.2.2 Anti-Washout Admixture

Comply with COE CRD-C 61. Determine cumulative mass loss. Perform test once for each 350 cubic yards of underwater concrete.

3.8.2.3 Non-Destructive Tests

Use of a rebound hammer to obtain data on the strength of the concrete surface shall be in accordance with ASTM C805/C805M. Test results from the rebound hammer and other non-destructive testing may be helpful in selecting areas to extract concrete cores for destructive testing.

3.8.3 Core Samples and Compressive Strength Testing

Obtain and test cores in accordance with ASTM C42/C42M.

If concrete in the structure is dry under service conditions, air dry cores (temperature 60 to 80 degrees F, relative humidity less than 60 percent) for 7 days before testing and test dry. Otherwise, test the cores, after moisture conditioning, in accordance with ASTM C42/C42M.

Acceptance criteria for cylinder compressive strength are provided in subpart entitled "Acceptance of Concrete Strength".

Take at least three representative cores from each member or area of concrete in place that is considered potentially strength deficient. Impair the strength of the structure as little as possible. If, before testing, extracted cores show evidence of having been damaged subsequent to or during removal from the structure, take replacement cores.

Fill core holes with low slump concrete or mortar of a strength equal to or greater than the original concrete.

The Contracting Officer will evaluate and validate core tests in accordance with the specified procedures.

3.8.4 Acceptance of Concrete Strength

3.8.4.1 Standard Molded and Cured Strength Specimens

The acceptance of concrete strengths shall be based on averages of results from three consecutive compressive strength tests. When the averages of all sets of three consecutive compressive strength test results are at least 1.0 times the field test strength (fcr), and no individual strength test falls below fcr by more than 500 psi, the strength of the concrete is satisfactory. These criteria also apply when accelerated strength testing is specified unless another basis for acceptance is specified.

3.8.4.2 Non-Destructive Tests

Non-destructive tests may be used when permitted to evaluate concrete where standard molded and cured cylinders have yielded results not meeting the criteria.

3.8.4.3 Extracted Core Tests

When the average compressive strengths of the representative cores are between 0.85 fcr and 1.2 fcr and if no single core is less than 0.75 fcr, the strength of concrete is satisfactory.

3.8.5 Inspection

ACI 311.4R. Inspect concrete placed under water with qualified divers.

3.9 REPAIR, REHABILITATION AND REMOVAL

Before the Owner accepts the structure and final payment is made the Contractor shall inspect the structure for cracks, damage and substandard concrete placements. A report documenting these defects shall be prepared which includes recommendations for repair, removal and/or remediation which, will be reviewed by the agency's designated technical authority and submitted to the Contracting Officer for approval before any corrective work is accomplished.

3.9.1 Crack Repair

Prior to final acceptance, all cracks in excess of 0.02 inches wide shall be documented and repaired. The proposed method and materials to repair the cracks shall be submitted to the Contracting Officer for approval. The proposal shall address the amount of movement expected in the crack due to temperature changes and loading.

3.9.2 Repair of Weak Surfaces

Weak surfaces are defined as mortar-rich, rain-damaged, uncured, or containing exposed voids or deleterious materials. Concrete surfaces with weak surfaces less than 1/4 inch thick shall be diamond ground to remove the weak surface. Surfaces containing weak surfaces greater than 1/4 inch thick shall be removed and replaced or mitigated in a manner acceptable to the Contracting Officer.

-- End of Section --

SECTION 05 12 00

STRUCTURAL STEEL
05/14

PART 1 GENERAL

1.1 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 325	(2011) Steel Construction Manual
AISC 326	(2009) Detailing for Steel Construction
AISC 341	(2010) Seismic Provisions for Structural Steel Buildings
AISC 360	(2010) Specification for Structural Steel Buildings

AMERICAN WELDING SOCIETY (AWS)

AWS A2.4	(2012) Standard Symbols for Welding, Brazing and Nondestructive Examination
AWS D1.1/D1.1M	(2015) Structural Welding Code - Steel

ASME INTERNATIONAL (ASME)

ASME B46.1	(2009) Surface Texture, Surface Roughness, Waviness and Lay

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M	(2013) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A143/A143M	(2007; R 2014) Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
ASTM A193/A193M	(2015) Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service and Other Special Purpose Applications
ASTM A276/A276M	(2015) Standard Specification for Stainless Steel Bars and Shapes
ASTM A307	(2014) Standard Specification for Carbon

	Steel Bolts and Studs, 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 A490	(2014a) Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
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 A563	(2015) Standard Specification for Carbon and Alloy Steel Nuts
ASTM A6/A6M	(2014) Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
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 C1107/C1107M	(2014a) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C827/C827M	(2010) Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
ASTM F1554	(2007a; E 2011) Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
ASTM F436	(2011) Hardened Steel Washers
ASTM F844	(2007a; R 2013) Washers, Steel, Plain (Flat), Unhardened for General Use

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PA 1	(2000; E 2004) Shop, Field, and Maintenance Painting of Steel

SSPC Paint 20	(2002; E 2004) Zinc-Rich Primers (Type I, Inorganic, and Type II, Organic)
SSPC Paint 29	(2002; E 2004) Zinc Dust Sacrificial Primer, Performance-Based
SSPC SP 3	(1982; E 2004) Power Tool Cleaning
SSPC SP 6/NACE No.3	(2007) Commercial Blast Cleaning

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-301-01	(2013; Change 1) Structural Engineering

1.2 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

Fabrication drawings including description of connections; G

SD-03 Product Data

Shop primer

Welding electrodes and rods

Non-Shrink, Non-Metallic Grout

SD-06 Test Reports

Bolts, nuts, and washers

SD-07 Certificates

Steel

Bolts, nuts, and washers

Galvanizing

Welding procedures and qualifications

1.3 QUALITY ASSURANCE

1.3.1 Fabrication Drawing Requirements

Submit fabrication drawings for approval prior to fabrication. Prepare in accordance with AISC 326 and AISC 325. Fabrication drawings must not be reproductions of contract drawings. Sign and seal fabrication drawings by a registered professional engineer. Include complete information for the fabrication and erection of the structure's components, including the location, type, and size of bolts, welds, member sizes and lengths, connection details, blocks, copes, and cuts. Use AWS A2.4 standard welding symbols. Shoring and temporary bracing must be designed and sealed by a

registered professional engineer and submitted for record purposes, with calculations, as part of the drawings. Any deviations from the details shown on the contract drawings must be clearly highlighted on the fabrication drawings. Explain the reasons for any deviations from the contract drawings.

1.3.2 Certifications

1.3.2.1 Welding Procedures and Qualifications

Prior to welding, submit certification for each welder stating the type of welding and positions qualified for, the code and procedure qualified under, date qualified, and the firm and individual certifying the qualification tests. If the qualification date of the welding operator is more than one-year old, the welding operator's qualification certificate must be accompanied by a current certificate by the welder attesting to the fact that he has been engaged in welding since the date of certification, with no break in welding service greater than 6 months.

Conform to all requirements specified in AWS D1.1/D1.1M.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Provide the structural steel system, including galvanizing, complete and ready for use. Structural steel systems including design, materials, installation, workmanship, fabrication, assembly, erection, inspection, quality control, and testing must be provided in accordance with AISC 360, AISC 341, UFC 3-301-01 and UFC 3-310-04 except as modified in this contract.

2.2 STEEL

2.2.1 Structural Steel

Wide flange and WT shapes, ASTM A992/A992M. Angles, Channels and Plates, ASTM A36/A36M.

2.2.2 Structural Steel Tubing

ASTM A500/A500M, Grade B.

2.2.3 Steel Pipe

ASTM A53/A53M, Type E or S, Grade B, weight class STD (Standard).

2.3 BOLTS, NUTS, AND WASHERS

Submit the certified manufacturer's mill reports which clearly show the applicable ASTM mechanical and chemical requirements together with the actual test results for the supplied fasteners.

2.3.1 Common Grade Bolts

2.3.1.1 Bolts

ASTM A307, Grade A. The bolt heads and the nuts of the supplied fasteners must be marked with the manufacturer's identification mark, the strength grade and type specified by ASTM specifications.

2.3.1.2 Nuts

ASTM A563M, Grade A, heavy hex style.

2.3.1.3 Washers

ASTM F844.

2.3.2 High-Strength Bolts

2.3.2.1 Bolts

ASTM A325, Type 1 ASTM A490, Type 1 or 2.

2.3.2.2 Nuts

ASTM A563, Grade and Style as specified in the applicable ASTM bolt standard.

2.3.2.3 Washers

ASTM F436, plain carbon steel.

2.3.3 Foundation Anchorage

2.3.3.1 Anchor Rods

ASTM F1554 Gr 36 , Class 1A . Stainless steel ASTM A193/A193M.

2.3.3.2 Anchor Nuts

ASTM A563, Grade A, hex style. Stainless steel ASTM A193/A193M.

2.3.3.3 Anchor Washers

ASTM F844. Stainless steel Type 316 conforming to ASTM A276/A276M.

2.3.3.4 Anchor Plate Washers

ASTM A36/A36M Stainless steel Type 316 conforming to ASTM A276/A276M.

2.4 STRUCTURAL STEEL ACCESSORIES

2.4.1 Welding Electrodes and Rods

AWS D1.1/D1.1M.

2.4.2 Non-Shrink Grout

ASTM C1107/C1107M, with no ASTM C827/C827M shrinkage. Grout must be nonmetallic.

2.5 GALVANIZING

ASTM F2329 for threaded parts or ASTM A123/A123M for structural steel members, as applicable, unless specified otherwise galvanize after fabrication where practicable. All walers, nuts and mild steel threaded rods embedded into concrete should be hot dip galvanized.

2.6 FABRICATION

Fabrication must be in accordance with the applicable provisions of AISC 325. Fabrication and assembly must be done in the shop to the greatest extent possible. Punch, subpunch and ream, or drill bolt holes perpendicular to the surface of the member.

Compression joints depending on contact bearing must have a surface roughness not in excess of 500 micro inch as determined by ASME B46.1, and ends must be square within the tolerances for milled ends specified in ASTM A6/A6M.

Shop splices of members between field splices will be permitted only where indicated on the Contract Drawings. Splices not indicated require the approval of the Contracting Officer.

2.6.1 Markings

Prior to erection, members must be identified by a painted erection mark. Connecting parts assembled in the shop for reaming holes in field connections must be match marked with scratch and notch marks. Do not locate erection markings on areas to be welded. Do not locate match markings in areas that will decrease member strength or cause stress concentrations.

2.6.2 Shop Primer

SSPC Paint 20 or SSPC Paint 29, (zinc rich primer). Shop prime structural steel, except as modified herein, in accordance with SSPC PA 1. Do not prime steel surfaces embedded in concrete, galvanized surfaces, surfaces to receive epoxy coatings, or surfaces within 0.5 inch of the toe of the welds prior to welding (except surfaces on which metal decking is to be welded). If flash rusting occurs, re-clean the surface prior to application of primer. Apply primer to a minimum dry film thickness of 2.0 mil.

Slip critical surfaces must be primed with a Class B coating in accordance with AISC 325. Submit test report for Class B coating.

Prior to assembly, prime surfaces which will be concealed or inaccessible after assembly. Do not apply primer in foggy or rainy weather; when the ambient temperature is below 45 degrees F or over 95 degrees F; or when the primer may be exposed to temperatures below 40 degrees F within 48 hours after application, unless approved otherwise by the Contracting Officer. Repair damaged primed surfaces with an additional coat of primer.

2.6.2.1 Cleaning

SSPC SP 6/NACE No.3, except steel exposed in spaces above ceilings, attic spaces, furred spaces, and chases that will be hidden to view in finished construction may be cleaned to SSPC SP 3 when recommended by the shop primer manufacturer. Maintain steel surfaces free from rust, dirt, oil, grease, and other contaminants through final assembly.

2.6.3 Epoxy Coated Surfaces

For information on epoxy coating, refer to Section09 97 13.26 COATING OF STEEL WATERFRONT STRUCTURES.

2.7 DRAINAGE HOLES

Adequate drainage holes must be drilled to eliminate water traps. Hole diameter must be 1/2 inch and location must be indicated on the detail drawings. Hole size and location must not affect the structural integrity.

PART 3 EXECUTION

3.1 ERECTION

a. Erection of structural steel must be in accordance with the applicable provisions of AISC 325. Erection plan shall be reviewed, stamped and sealed by a licensed structural engineer.

After final positioning of steel members, provide full bearing under base plates and bearing plates using nonshrink grout. Place nonshrink grout in accordance with the manufacturer's instructions.

3.1.1 STORAGE

Material must be stored out of contact with the ground in such manner and location as will minimize deterioration.

3.2 CONNECTIONS

Except as modified in this section, connections not detailed must be designed in accordance with AISC 360. Build connections into existing work. Do not tighten anchor bolts set in concrete with impact torque wrenches. Holes must not be cut or enlarged by burning. Bolts, nuts, and washers must be clean of dirt and rust, and lubricated immediately prior to installation.

3.2.1 High-Strength Bolts

ASTM A325 bolts must be fully tensioned to 70 percent of their minimum tensile strength. Direct tension indicator tightening shall be the only acceptable tightening method. Bolts must be installed in connection holes and initially brought to a snug tight fit. After the initial tightening procedure, bolts must then be fully tensioned, progressing from the most rigid part of a connection to the free edges.

3.3 GAS CUTTING

Use of gas-cutting torch in the field for correcting fabrication errors will not be permitted on any major member in the structural framing.

3.4 WELDING

Welding must be in accordance with AWS D1.1/D1.1M. Provide AWS D1.1/D1.1M qualified welders, welding operators, and tackers.

Develop and submit the Welding Procedure Specifications (WPS) for all welding, including welding done using prequalified procedures. Prequalified procedures may be submitted for information only; however, procedures that are not prequalified must be submitted for approval.

3.4.1 Removal of Temporary Welds, Run-Off Plates, and Backing Strips

Removal is not required.

3.5 SHOP PRIMER REPAIR

Repair shop primer in accordance with the paint manufacturer's recommendation for surfaces damaged by handling, transporting, cutting, welding, or bolting.

3.5.1 Field Priming

Steel exposed to the weather, or located in building areas without HVAC for control of relative humidity must be field primed. After erection, the field bolt heads and nuts, field welds, and any abrasions in the shop coat must be cleaned and primed with paint of the same quality as that used for the shop coat.

3.6 GALVANIZING REPAIR

Repair damage to galvanized coatings using ASTM A780/A780M zinc rich paint for galvanizing damaged by handling, transporting, cutting, welding, or bolting. Do not heat surfaces to which repair paint has been applied.

3.7 FIELD QUALITY CONTROL

Perform field tests, and provide labor, equipment, and incidentals required for testing. The Contracting Officer must be notified in writing of defective welds, bolts, nuts, and washers within 7 working days of the date of the inspection.

3.7.1 Welds

3.7.1.1 Visual Inspection

AWS D1.1/D1.1M. Furnish the services of AWS-certified welding inspectors for fabrication and erection inspection and testing and verification inspections. All welds require visual inspection.

3.7.1.2 Nondestructive Testing

Nondestructive testing must be in accordance with AWS D1.1/D1.1M. Test locations must be selected by the Contracting Officer. If more than 20 percent of welds made by a welder contain defects identified by testing, then all welds made by that welder must be tested by ultrasonic testing, as approved by the Contracting Officer. When all welds made by an individual welder are required to be tested, magnetic particle testing must be used only in areas inaccessible to ultrasonic testing. Retest defective areas after repair. Submit weld inspection reports.

Testing frequency: Provide the following types and number of tests:

Test Type	Number of Tests
Ultrasonic Testing	100% testing on complete joint penetration(CJP) welds on materials greater than 5/16 inch thick.

3.7.2 High-Strength Bolts

3.7.2.1 Testing Bolt, Nut, and Washer Assemblies

Test a minimum of 3 bolt, nut, and washer assemblies from each mill certificate batch in a tension measuring device at the job site prior to the beginning of bolting start-up. Demonstrate that the bolts and nuts, when used together, can develop tension not less than the provisions specified in AISC 360, depending on bolt size and grade. The bolt tension must be developed by tightening the nut. Submit bolt testing reports.

3.7.2.2 Inspection

Inspection procedures must be in accordance with AISC 360. Confirm and report to the Contracting Officer that the materials meet the project specification and that they are properly stored. Confirm that the faying surfaces have been properly prepared before the connections are assembled. Observe the specified job site testing and calibration, and confirm that the procedure to be used provides the required tension. Monitor the work to ensure the testing procedures are routinely followed on joints that are specified to be fully tensioned.

3.7.2.3 Testing

The Government has the option to perform nondestructive tests on 5 percent of the installed bolts to verify compliance with pre-load bolt tension requirements. Provide the required access for the Government to perform the tests. The nondestructive testing will be done in-place using an ultrasonic measuring device or any other device capable of determining in-place pre-load bolt tension. The test locations must be selected by the Contracting Officer. If more than 10 percent of the bolts tested contain defects identified by testing, then all bolts used from the batch from which the tested bolts were taken, must be tested at the Contractor's expense. Retest new bolts after installation at the Contractor's expense.

3.7.3 Testing for Embrittlement

ASTM A143/A143M for steel products hot-dip galvanized after fabrication. Submit embrittlement test reports.

-- End of Section --

SECTION 05 50 13

MISCELLANEOUS METAL FABRICATIONS
05/10

PART 1 GENERAL

1.1 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 WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2015) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M	(2013) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153/A153M	(2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A307	(2014) Standard Specification for Carbon Steel Bolts and Studs, 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) 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	(2014) 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 B221	(2014) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B26/B26M	(2014; E 2015) Standard Specification for Aluminum-Alloy Sand Castings
ASTM D1187/D1187M	(1997; E 2011; R 2011) Asphalt-Base Emulsions for Use as Protective Coatings for Metal
ASTM F 1554	(2007a) Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

MASTER PAINTERS INSTITUTE (MPI)

MPI 79	(Oct 2009) Alkyd Anti-Corrosive Metal Primer

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 6/NACE No.3	(2007) Commercial Blast Cleaning

1.2 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

Embedded angles and plates, installation drawings; G

Embedded Steel railing and handrails, installation drawings; G

Mooring bollards and anchor bolts, installation drawings; G

Submit fabrication drawings showing layout(s), connections to structural system, and anchoring details as specified in AISC 303.

Submit templates, erection and installation drawings indicating thickness, type, grade, class of metal, and dimensions. Show construction details, reinforcement, anchorage, and installation with relation to the building construction.

SD-03 Product Data

Mooring bollards and anchor bolts; G

SD-07 Certificates

1.3 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.

1.4 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.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Structural Carbon Steel

ASTM A36/A36M.

2.1.2 Structural Tubing

ASTM A500/A500M.

2.1.3 Steel Pipe

ASTM A53/A53M, Type E or S, Grade B.

2.1.4 Fittings for Steel Pipe

Standard malleable iron fittings ASTM A47/A47M.

2.1.5 Anchor Bolts

ASTM F 1554, GR 36. Where exposed, shall be of the same material, color, and finish as the metal to which applied.

2.1.5.1 Lag Screws and Bolts

ASME B18.2.1, type and grade best suited for the purpose.

2.1.5.2 Toggle Bolts

ASME B18.2.1.

2.1.5.3 Bolts, Nuts, Studs and Rivets

ASME B18.2.2 or ASTM A307.

2.1.5.4 Screws

ASME B18.2.1, ASME B18.6.2, ASME B18.6.3 and ASTM C1513.

2.1.5.5 Washers

Provide plain washers to conform to ASME B18.21.1. Provide beveled washers

for American Standard beams and channels, square or rectangular, tapered in thickness, and smooth. Provide lock washers to conform to ASME B18.21.1.

2.1.6 Aluminum Alloy Products

Conform to ASTM B209 for sheet plate, ASTM B221 for extrusions and ASTM B26/B26M or ASTM B108/B108M for castings, as applicable. Provide aluminum extrusions at least 1/8 inch thick and aluminum plate or sheet at least 0.050 inch thick.

2.1.7 Deck Fittings: Low Double Bitts and Cleats

Provide ASTM A27 CAST STEEL bitts and cleats as shown on the drawings, including installation of anchor bolts, bolting of the deck fitting to embedded anchors, grouting of base, filling bollard with concrete, and filling of bolt holes with elastomeric material.

Deck Fittings shall have load ratings as indicated on the drawings in the direction of 0° to 25° in the vertical plane and 0° to 180° in the horizontal plane. Anchor hardware shall be designed in accordance with AISC Manual of Steel Construction, 13th Edition. Low Double Bitts shall have a hole through the top through which concrete will be deposited after placement and bolting of double bitts.

Grout shall be NON-METALLIC, NON SHRINK GROUT and have a minimum compressive stress of 5000 psi.

Deck Fittings shall be blasted to SSPC-SP6 and cleaned of any grease or other foreign matter with suitable degreaser before applying any coatings. Bollards shall be delivered to the site in a primed condition and shall be finished with a paint system as recommended by the manufacturer. Color shall be white.

2.2 FABRICATION FINISHES

2.2.1 Galvanizing

Hot-dip galvanize items specified to be zinc-coated, after fabrication where practicable. Galvanizing: ASTM A123/A123M, ASTM A153/A153M, ASTM A653/A653M or ASTM A924/A924M, G90, as applicable.

2.2.2 Galvanize

Anchor bolts, grating fasteners, washers, and parts or devices necessary for proper installation, unless indicated otherwise.

2.2.3 Repair of Zinc-Coated Surfaces

Repair damaged surfaces with galvanizing repair method and paint conforming to 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 surfaces to which stick or paste material is applied, with a torch to a temperature sufficient to melt the metallics in stick or paste; spread molten material uniformly over surfaces to be coated and wipe off excess material.

2.2.4 Shop Cleaning and Painting

2.2.4.1 Surface Preparation

Blast clean surfaces in accordance with SSPC SP 6/NACE No.3. Wash cleaned surfaces contaminated with rust, dirt, oil, grease, or other contaminants with solvents until thoroughly clean. Steel to be embedded in concrete shall be free of dirt and grease. Do not paint or galvanize bearing surfaces, including contact surfaces within slip critical joints, but coat with rust preventative applied in the shop.

2.2.4.2 Pretreatment, Priming and Painting

Apply pretreatment, primer, and paint in accordance with manufacturer's printed instructions.

2.2.5 Nonferrous Metal Surfaces

Protect by plating, anodic, or organic coatings.

2.2.6 Aluminum Surfaces

2.2.6.1 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.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

Install items at locations indicated, according to manufacturer's instructions. Verify all measurements and take all field measurements necessary before fabrication. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and harmonize with the material to which fastenings are applied. Include materials and parts necessary to complete each item, even though such work is not definitely shown or specified. Poor matching of holes for fasteners shall be cause for rejection. Conceal fastenings where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Form joints exposed to the weather shall be formed to exclude water.

3.2 WORKMANSHIP

Provide miscellaneous metalwork that is well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Provide continuous welding along the entire area of contact except where tack welding is permitted. Do not tack weld exposed connections of work in place and ground smooth. Provide a smooth finish on exposed surfaces of work in place and unless otherwise approved, flush exposed riveting. Mill joints where tight fits are required. Corner joints shall be coped or mitered, well formed, and in true alignment. Accurately set work to established lines and elevations and securely fastened in place. Install in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

3.3 ANCHORAGE, FASTENINGS, AND CONNECTIONS

Provide anchorage where necessary for fastening miscellaneous metal items securely in place. Include for anchorage not otherwise specified or indicated slotted inserts, expansion shields, and powder-driven fasteners, when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; through bolts, lag bolts, and screws for wood. Do not use wood plugs in any material. Provide non-ferrous attachments for non-ferrous metal. Make exposed fastenings of compatible materials, generally matching in color and finish, to which fastenings are applied. Conceal fastenings where practicable.

3.4 BUILT-IN WORK

Form for anchorage metal work built-in with concrete or masonry, or provide with suitable anchoring devices as indicated or as required. Furnish metal work in ample time for securing in place as the work progresses.

3.5 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.

3.6 FINISHES

3.6.1 Dissimilar Materials

Where dissimilar metals are in contact, protect surfaces with a coat conforming to 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 with ASTM D1187/D1187M, asphalt-base emulsion.

3.6.2 Field Preparation

Surfaces, when assembled, shall be free of rust, grease, dirt and other foreign matter.

3.6.3 Environmental Conditions

Do not clean or paint surface when damp or exposed to foggy or rainy weather, when metallic surface temperature is less than 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.

3.7 Deck Fittings

Anchor bolts shall be held in place with templates that match deck fitting manufacturer's bolt pattern. Templates shall ensure proper location of bolts during placement of concrete. Deck fittings base shall be leveled on top of a grout bed as shown on drawings. Nuts shall be hand tight before grouting of base. After grouting has cured for seven days, nuts shall be tightened to the snug tight condition in accordance with manufacturer's instructions. Areas around nuts in deck fitting base shall be filled with an elastomeric material so as to prevent standing water. To prevent damage to vessel mooring lines, no sharp edges around bolting area shall exist after installation. Deck fittings shall be painted after installation is

complete. All deck fittings must have their serial numbers stenciled onto the surface of the fitting. Anchor threads shall be cut off flush with the surface of the fitting.

-- End of Section --

SECTION 06 71 33

FIBERGLASS REINFORCED PLASTIC (FRP) LADDERS
02/15

PART 1 GENERAL

This Section includes, but is not limited to, new fiberglass reinforced plastic (FRP) ladder systems including safety ladder cages, mounting systems and related accessories.

1.1 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 LADDER INSTITUTE (ALI)

ALI A14.3	(2008) Standard for Fixed Ladders and Safety Requirements

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	(2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

ASTM INTERNATIONAL (ASTM)

ASTM D1148	(2013) Standard Test Method for Rubber Deterioration—Discoloration from Ultraviolet (UV) and Heat Exposure of Light-Colored Surfaces
ASTM D2344/D2344M	(2013) Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates
ASTM D4000	(2013) Standard Classification System for Specifying Plastic Materials
ASTM D430	(2006; R 2012) Standard Test Methods for Rubber Deterioration - Dynamic Fatigue
ASTM D495	(1999; R 2004) Standard Test Method for High-Voltage, Low-Current, Dry Arc Resistance of Solid Electrical Insulation
ASTM D638	(2014) Standard Test Method for Tensile Properties of Plastics
ASTM D696	(2008; E 2013) 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	(2010) Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM E84	(2015a) Standard Test Method for Surface Burning Characteristics of Building Materials

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101	(2015; ERTA 2015) Life Safety Code

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

29 CFR 1910.27	Fixed Ladders
29 CFR 1926	Safety and Health Regulations for Construction

1.2 ADMINISTRATIVE REQUIREMENTS

1.2.1 Pre-Installation Meetings

Within 30 calendar days of Contract Award, a pre-installation meeting will be scheduled by the Contracting Officer. Submit the following for review:

a. Qualification of Manufacturer

b. Qualification of Engineer of Record

c. Manufacturer's Catalog Data

Include two copies of manufacturers specifications, load tables, dimension diagrams, and anchor details for the following items:

(1) FRP Ladders and Ladder Safety Cages

(2) Anchorage Materials

d. Fabrication and Installation Drawings and Details

Include plans, elevations, sections, and details of FRP fabrications and their connections. Show anchorage and all accessory items.

Provide templates for anchors and bolts specified for installation under other Sections.

Provide structural analysis data complying with design loads, signed and sealed by the qualified professional engineer responsible for their preparation.

e. Manufacturer's Recommendations

Provide shipping, handling, erection procedures along with care and maintenance after installation.

f. Manufacturer's Sample Warranty

1.3 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

Qualification of Manufacturer

Qualification of Engineer of Record

SD-02 Shop Drawings

Fabrication and Installation Drawings and Details; G

SD-03 Product Data

Manufacturer's Catalog Data; G

SD-06 Test Reports

Ultraviolet Testing

Thermal Expansion

Flame Spread

SD-07 Certificates

Manufacturer's Sample Warranty

SD-08 Manufacturer's Instructions

Manufacturer's Recommendations

SD-11 Closeout Submittals

Manufacturer's Warranty; G

1.4 QUALITY CONTROL

1.4.1 Qualification of Manufacturer

Fiberglass Reinforced Plastic (FRP) manufacturer is required to have a minimum of 10 years experience in manufacturing FRP products.

Provide manufacturer's Warranty for all FRP products against defects in material and workmanship for a minimum of 5 years.

1.4.2 Qualification of Engineer of Record

Provide documentation that the Engineer of Record (ER) is approved, authorized, and currently licensed, and has a minimum of five years experience as an approved Engineer for manufacturers of similar ladder systems. Supply the names and locations of five projects of similar size and scope for which the ER has provided engineering calculations using the manufacturer's products submitted for this project within the previous

three years. Provide ER certified engineering calculations and sealed documents for:

a. Meeting ASCE 7 requirements in accordance with International Building Code

b. Fabrication and installation drawings and details

1.5 DELIVERY, HANDLING, AND STORAGE

Deliver all manufactured materials in original, unbroken pallets, packages, containers, or bundles bearing the label of the manufacturers, clearly marked and identified relative to the complete system. Provide all adhesives, resins and their catalysts and hardeners in clearly marked or noted crates or boxes to facilitate their safe movement to a dry indoor storage facility with a constant temperature range between 70 and 85 degrees F until they are required.

Submit manufacturer's recommendations for shipping and handling. Handle all materials to prevent abrasion, cracking, chipping, twisting, or other deformations and other types of damage.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Ensure all ladder side rails, rungs, mounting brackets, cage straps, and related safety rail system are FRP structural shapes manufactured to comply with or exceed the specified standards identified in this Section. Provide FRP ladders and ladder safety cages and anchorage materials, including cage hoops, brackets, and all other structural shapes composed of reinforced fiberglass components and resin in qualities, quantities, properties, arrangements and dimensions as specified in the Contract Documents. Ensure complete assembly meets the minimum requirements of ASCE 7, and 29 CFR 1910.27.

2.1.1 Design Requirements

Ensure fiberglass reinforcement is a combination of continuous roving, continuous strand mat, bi-directional roving mat and surfacing veil in sufficient quantities as required by the application and/or physical properties. Clearly identify components per ASTM D4000. Submit documentation verifying structural integrity in relation to thermal expansion.

Ensure all finished surfaces of FRP items are smooth, resin-rich, free of voids and dry spots, cracks, crazes or unreinforced areas. Provide system which is completely covered with resin protection against exposure due to wear, weathering, and ultraviolet light damage. Submit ultraviolet testing (UV) results and documented protection with:

a. Integral UV inhibitors in the resin.

b. A synthetic resin rich surfacing veil, meeting or exceeding the requirements of ASTM D1148.

Provide FRP products which have a tested flame spread rating of 25 or less per ASTM E84 Tunnel Test, with a ladder system meeting the minimum requirements of ASTM D430 and ASTM D495.

Provide 316 stainless steel bolts for attaching ladder cage vertical bars to hoops, ladder hoops to brackets, ladder cage brackets to the ladder, wall brackets to the ladder, and landing safety rails to the system. Mechanically attach all rungs to the ladder with 18-8 stainless steel rivets and chemically bond with resin.

All ladder and cage components are to be integrally pigmented yellow. All wall and vertical rail base mount brackets are to be light gray.

2.1.2 Performance Requirements

Provide structural shapes in the ladder system meeting minimum longitudinal mechanical properties as follows:

Tensile Strength	ASTM D638	30,000 psi
Tensile Modulus	ASTM D638	2,500,000 psi
Flexural Strength	ASTM D790	30,000 psi
Flexural Modulus	ASTM D790	1,800,000 psi
Flexural Modulus-Full Section		2,800,000 psi
Short Beam Shear	ASTM D2344/D2344M	4,500 psi
Shear Modulus-Transverse		450,000 psi
Coefficient of Thermal Expansion	ASTM D696	.000008 in/in/F
Flame Spread	ASTM E84	25 or less

2.1.2.1 Structural Performance of Ladders

Provide ladders capable of withstanding the effects of gravity loads as per ASCE 7 and the International Building Code, as well as loads and stresses within limits and under conditions specified in 29 CFR 1910.27 and ALI A14.3.

Ladder to support a concentrated vertical load of 1200 pounds applied at mid-span of the rung.

2.1.2.2 Thermal Movements

Provide exterior metal fabrications 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 connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss. The design criteria temperature change (range) is 120 degrees F, ambient; 180 degrees F, material surfaces.

2.1.2.3 Safety Performance of Ladders

Provide a ladder system, which fully complies with NFPA 101, OSHA 29 CFR 1910.27 and ALI A14.3 for distance between rungs, cleats, steps and

minimum clearances for cages and climbing space.

2.2 COMPONENTS

2.2.1 Ladders

The ladder side rails are a continuous pultruded 1-3/4-inch square tube with a minimum wall thickness of 1/4-inch or greater. The ladder rungs are to be 1-1/4-inch diameter pultruded structural shapes, continuously fluted to provide a non-slip surface. Rungs that are gritted as a secondary operation are not permitted. Fit the rungs in the centerline of the side rails.

Fabricate ladder wall and floor mounts from pultruded angles, 3/8-inch minimum thickness. Mechanically attach all ladder rungs to ladder side rails by use of stainless steel rivets and a chemical bond of epoxy.

Protect all pultruded ladder components from ultraviolet (UV) attack by providing integral UV inhibitors in the resin and a synthetic surfacing veil to help produce a resin rich surface.

PART 3 EXECUTION

3.1 INSTALLATION

Install fabricated FRP work in accordance with the approved detail drawings and descriptive data for each item of fabricated FRP, in conformance with 29 CFR 1926, and as specified.

Assemble and install ladder system and all components in strict accordance with the manufacturer's assembly documentation. Seal all cut or drilled surfaces per manufacturer's instructions. Provide adequate ventilation during all drilling, cutting, and resin application procedures.

3.1.1 Fabrication

The design and layout of ladders and safety cages to comply with ALI A14.3 and OSHA 29 CFR 1910.27. All ladder rungs are to penetrate the tube side wall of the ladder rails and the connection is to be both chemically locking epoxy and mechanically locking rivets.

Fully shop assemble ladders. Test assemble safety cages; drill and fit to ensure proper field assembly. Leave safety cage brackets attached with bolts to the ladder for shipping, but disassemble ladder cage components. Package and ship each set of cage components with each respective ladder.

Field attach hoops to the brackets. Seal all cut, machined edges, holes and notches to provide maximum corrosion resistance. Contractor to coat all field fabricated cuts in accordance with the manufacturer's instructions.

3.1.2 Fastening to Construction-In-Place

Provide anchorage devices and fasteners where necessary for fastening fabricated FRP items to construction-in-place. Fastening to include threaded fasteners for concrete inserts embedded in cast-in-place concrete; masonry anchorage devices and threaded fasteners for solid masonry and concrete-in-place; toggle bolts for hollow masonry and stud partitions; through bolting for masonry and wood construction; lag bolts and wood

screws for wood construction; and connections for structural steel.

3.2 CLOSEOUT ACTIVITIES

3.2.1 Manufacturer's Warranty

Submit 3 copies of manufacturer's warranty 30 calendar days before final inspection.

-- End of Section --

SECTION 09 97 13.26

COATING OF STEEL WATERFRONT STRUCTURES
04/06

PART 1 GENERAL

1.1 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 D7091	(2012) Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nondestructive Coatings Applied to Non-Ferrous Metals
ASTM E376	(2011) Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Test Methods

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PS 11.01	(1982; E 2004) Black (or Dark Red) Coal Tar Epoxy Polyamide Painting System
SSPC Paint 16	(2006) Coal Tar Epoxy-Polyamide Black (or Dark Red) Paint
SSPC SP 1	(1982; E 2004) Solvent Cleaning
SSPC SP 10/NACE No. 2	(2007) Near-White Blast Cleaning

1.2 SUBMITTALS

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

SD-07 Certificates

Coal tar epoxy-polyamide

1.3 ENVIRONMENTAL CONDITIONS

Start work only when ambient and curing temperatures are within limits of coating manufacturer's recommendations and at least 5 degrees F above dew point temperature.

1.4 SAFETY AND HEALTH PRECAUTIONS

Materials listed in this section contain coal tar pitch volatiles, which

are toxic. Follow safety procedures as recommended by manufacturer. Work in a well ventilated area. Provide, and require workers to use, impervious clothing, gloves, face shields (8 inches minimum), and other appropriate protective clothing necessary to prevent eye and skin contact with coating materials. Keep coatings away from heat, sparks and flame.

PART 2 PRODUCTS

2.1 COATING SYSTEMS

2.1.1 Coating

Provide catalyst components for coating specific for resin components. Use thinners which are compatible with the coating.

2.1.1.1 Coal Tar Epoxy-Polyamide

a. System: SSPC PS 11.01

b. Paints: SSPC Paint 16 Black

PART 3 EXECUTION

3.1 CLEANING AND PREPARATION OF SURFACES

3.1.1 Solvent Cleaning

SSPC SP 1. Remove visible oil, grease, and drawing and cutting compounds by solvent cleaning.

3.1.2 Blast Cleaning

SSPC SP 10/NACE No. 2. After solvent cleaning, complete surface preparation by near-white blast cleaning. Remove residual dust from blasted surface by blowing with dry, oil-free air, vacuuming, or sweeping. Provide surface profile of at least 2 1/2-mil thickness.

3.2 PROPORTIONING AND MIXING OF COATING SYSTEM

3.2.1 Proportioning of Coal Tar Epoxy-Polyamide System

Coal tar epoxy-polyamide consists of a two-component system. Component A contains a refined coal tar pitch, polyamide resin, and a polyamine promoter to accelerate curing rate. Component B is an epoxy resin. Mix both components in a ratio of 4 parts of Component A to 1 part of Component B by volume. Do not thin coatings when doing so will result in total volatile organic compounds exceeding limits enacted by local air pollution control districts. When thinning is allowed and is necessary for proper application, use xylene or the coating manufacturer's recommended thinner, to a maximum of 1/2 gallon to a 5-gallon batch.

3.2.2 Mixing of Coal Tar Epoxy-Polyamide System

Power stir components to a smooth, uniform consistency. Stir coating periodically during induction period. Follow coating manufacturer's requirements for induction time and pot life of mixed batches.

3.3 COATING APPLICATION

3.3.1 General

Apply primer coating to dry surfaces not more than 4 hours after near-white blast cleaning. Apply coats of each system so that finished surfaces are free from runs, sags, brush marks and variations in color.

3.3.1.1 Application Method for Coal Tar Epoxy-Polyamide System

Unless otherwise specified by manufacturer's recommendations, do not allow drying time between coats to exceed 72 hours. Under conditions of direct sunlight or elevated ambient temperatures of 90 degrees F or greater, limit intercoat drying period to a maximum of 24 hours.

3.3.2 Repair of Defects

Repair detected coating holidays, thin areas, and exposed areas damaged prior to or during installation by surface treatment and application of additional coating or by manufacturer's recommendations. Allow a period of at least 72 hours to pass following final coat before placing in immersion service.

3.3.3 Two-Coat Coal Tar Epoxy-Polyamide System

Apply each coat at a dry film thickness of not less than 8 mils.

3.3.4 Dry Film Thickness

Provide total system minimum dry film thickness of 16 mils. Measure using a magnetic gage.

3.4 SURFACES TO BE COATED

3.4.1 Steel Waterfront Construction

Waterside surface of bulkhead sheet piles from top of sheets to mudline.

3.5 FIELD TESTS

Conduct testing in presence of Contracting Officer.

3.5.1 Holiday Testing

Prior to installation, test for holidays in total coating system. Use a low-voltage holiday detector of less than 90 volts in accordance with manufacturer's instructions. After repair of holidays by surface treatment and application of additional coating or by manufacturer's recommendation, retest with a low-voltage holiday detector.

3.5.2 Dry Film Thickness

After repair of holidays, measure dry film thickness using a magnetic dry film thickness gage in accordance with ASTM D7091 and ASTM E376. Re-measure after an additional coat is applied, and add it to meet minimum thickness requirements.

-- End of Section --

SECTION 22 05 83.63

CURED-IN-PLACE PIPE (CIPP) LINING
11/13

PART 1 GENERAL

1.1 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 PETROLEUM INSTITUTE (API)

API Spec 13A	(2010; Errata 2014) Specification for Drilling-Fluid Materials

ASTM INTERNATIONAL (ASTM)

ASTM D543	(2014) Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
ASTM D638	(2010) Standard Test Method for Tensile Properties of Plastics
ASTM D790	(2010) Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM F1216	(2009) Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
ASTM F1743	(2008) Standard Practice for Rehabilitation of Existing Pipeline and Conduits by Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

1.2 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-03 Product Data

Installation Equipment

CIPP Lining Tube

Pipe Thermoset Epoxy Resin

Liner Materials

SD-08 Manufacturer's Instructions

CIPP Manufacturer's Written Installation Instructions; G

SD-11 Closeout Submittals

Report Summarizing The Extent Of Pipe Lining Performed; G

Pipe Pre-Lining Inspection; G

Pipe Post-Lining Inspection; G

Manufacturer's Warranty; G

Record Drawings; G

1.3 PROJECT/SITE CONDITIONS

Inspect the line with CCTV and determine the overall condition of the pipe prior to starting the Pre-conditioning of the pipe.

1.4 WARRANTY

Submit three copies of the signed Manufacturer's Warranty for all products within 30 days of final completion of the work.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Provide new cured-in-place pipe (CIPP) lining system for the storm sewer complete and ready for operation.

Perform the reconstruction using a tube of one or more layers of flexible needle perforated felt or an equivalent non-woven perforated material, of specified length not to exceed 60 feet, and a thermo-set resin with physical and chemical properties appropriate for the application, in conformance with ASTM F1216. Submit product data for epoxy resin, liner materials, and installation equipment. Ensure all drilling fluids conform to API Spec 13A.

2.2 PIPE LINING MATERIALS

2.2.1 CIPP Lining Tube

Provide a liner tube consisting of one or more layers of flexible needle perforated felt or an equivalent non-woven perforated material, continuous in length with uniform wall thickness. Overlapping sections are allowed in the length of the liner. Ensure that the liner tube is capable of conforming to 45 and 90 degree bends, offset joints, bells, and disfigured pipe sections.

Provide an integrated bladder within the felt tube that is made from materials compatible with the felt and resin systems used and capable of withstanding the required installation pressure.

2.2.2 Resin

Provide an epoxy resin impregnated, cured tube that is resistant to shrinkage, corrosion, oxidation, and is resistant to abrasion from solids, grit, sand in rainwater, and is solvent free. Use a resin with proven resistance to storm water and ultra-violet light (sunlight) at any stage prior to installation. Polyester or vinyl ester resins are not acceptable.

Ensure the proposed resin system does not contain silicones, stearates, and/or natural waxes that would adversely affect the adhesives properties or any other chemical or physical properties of the CIPP liner.

2.2.3 CIPP Properties

Provide CIPP with minimum chemical resistance requirements in accordance with ASTM D543. Conduct exposure to the chemical solutions listed in Table 1 at temperatures of up to 75 degrees F. Conduct this test for a minimum period of one month. Loss result can not exceed 20 percent of the initial structural properties.

TABLE 1 - CHEMICAL RESISTANCE REQUIREMENTS	
Chemical Solution Concentration	Percent
Tap Water (pH 6-9)	100.0
Nitric Acid	5.0
Phosphoric Acid	10.0
Sulfuric Acid	10.0
Gasoline	100.0
Vegetable Oil	100.0
Detergent or Soap	0.1

Ensure the CIPP meets the minimum structural properties listed in Table 2 below:

TABLE 2 - CIPP INITIAL STRUCTURAL PROPERTIES - ASTM F1743		
Property	ASTM Test Method	Minimum Value
Tensile Strength	ASTM D638	3,000 psi
Flexural Strength	ASTM D790	4,500 psi
Short Term Flexural Modulus of Elasticity	ASTM D790	250,000 psi

Provide a cured liner with a light blue reflective internal wall color so that a clear detail CCTV inspection can be accomplished.

PART 3 EXECUTION

3.1 INSTALLATION

Provide installation of CIPP system, including materials, workmanship, fabrication, assembly, erection, examination, and inspection.

3.1.1 Deviations

Should pre-installation inspection reveal conditions in the rain leader to be substantially different than those used in the design of wall thickness, liner tube construction, liner tube length, or resin system; notify the Contracting Officer and provide a videotape recording of existing conditions and design data. Do not proceed without direction from Contracting Officer.

3.1.2 Pipe Preparation

Perform pre-conditioning of the pipe section, including preparatory cleaning, corrosion removal, removal of grease buildup, or any other obstruction that may interfere with lining operations.

Leave obstructions that are less than 15 percent of the pipe diameter, that can not be removed from the pipe, in place and line over.

CCTV inspect the line immediately prior to lining and after the cleaning is complete to ensure that the pipe is ready for lining.

3.1.3 CIPP Installation Procedure

3.1.3.1 Wet Out

Accurately calculate and measure the amount of resin and catalyst required. Thoroughly mix the resin and catalyst. Thoroughly saturate/impregnate the flexible felt tube with the pre-calculated amount of epoxy resin prior to installation. Handle the resin impregnated flexible tube to retard or prevent resin setting until it is ready for insertion.

3.1.3.2 Insertion

Install the liner/bladder system using the pull in place method. Pull the liner/bladder system to the specified location in the pipe. Inflate the bladder using compressed air to a pressure adequate to form the liner to tightly fit the internal circumference of the pipe and to cause the resin to migrate into pipe joints, voids and defects. Install the liner at low pressure (not to exceed 10 psi) to prevent initial or further damage to the host pipe.

3.1.3.3 Curing

Inflate the bladder using compressed air and leave the liner in place until the resin curing cycle is complete. Curing occurs at ambient temperature within one hour.

When the curing process is complete, release the pressure and pull out the inflation bladder. Ensure the cured composite liner remains in place within the host pipe and provides a smooth bore interior that conforms to

the existing pipe. Ensure the tube is continuous in length, wall thickness, and is uniform. Reline any existing defects in the original pipe.

3.1.3.4 Finish

Do not leave in the host pipe, any barriers, coatings, or any material other than the cured liner tube/resin composite, specifically designed for desirable physical and chemical resistance properties. Remove any materials used in the installation, other than the cured liner tube/resin composite. Remove any cured liner tube/resin composite pipe left protruding from the service connection. Ensure that the finished CIPP is continuous and free from visual defects such as foreign inclusions, dry spots, pinholes, and delimitation.

3.1.4 Liner Inspection

Perform a final Closed-Circuit Television (CCTV) inspection to verify proper cure and integrity of the composite liner.

3.2 FIELD QUALITY CONTROL

Test system in accordance with ASTM F1743, as supplemented and modified by CIPP manufacturer's written installation instructions.

Upon completion, submit the DVD records of pre-lining inspection and post-lining inspection, along with the written report summarizing the extent of pipe lining performed. Update pipe lining contract record drawings to reflect the as-built condition after lining is complete and submit to the Contracting Officer. The Contracting Officer may review the video and documentation, and may inspect the work site to determine that the scope of work is complete, that the work is satisfactory, and the site has been returned to its original condition.

3.3 ADJUSTING AND CLEANING

After liner installation has been completed and accepted, clean the entire project area and restore the site to its original condition prior to the commencement of work. Dispose of all excess material and debris not incorporated into the permanent installation.

-- End of Section --

SECTION 26 00 00.00 20

BASIC ELECTRICAL MATERIALS AND METHODS
07/06

PART 1 GENERAL

1.1 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 D709	(2001; R 2007) Laminated Thermosetting Materials

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 100	(2000; Archived) The Authoritative Dictionary of IEEE Standards Terms
IEEE C2	(2012; Errata 2012; INT 1 2012; INT 2 2012) National Electrical Safety Code
IEEE C57.12.28	(2005; INT 3 2011) Standard for Pad-Mounted Equipment - Enclosure Integrity
IEEE C57.12.29	(2005) Standard for Pad-Mounted Equipment - Enclosure Integrity for Coastal Environments

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(2008) Enclosures for Electrical Equipment (1000 Volts Maximum)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2011; Errata 2 2012) National Electrical Code

1.2 RELATED REQUIREMENTS

This section applies to certain sections of Division 02, EXISTING CONDITIONS, Division 11, EQUIPMENT,. This section applies to all sections of Division 26 and 33, ELECTRICAL and UTILITIES, of this project specification unless specified otherwise in the individual sections. This section has been incorporated into, and thus, does not apply to, and is not referenced in the following sections.

Section 26 56 00.00 20 EXTERIOR LIGHTING
Section 33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION

1.3 DEFINITIONS

a. Unless otherwise specified or indicated, electrical and electronics

terms used in these specifications, and on the drawings, shall be as defined in IEEE 100.

b. The technical sections referred to herein are those specification sections that describe products, installation procedures, and equipment operations and that refer to this section for detailed description of submittal types.

c. The technical paragraphs referred to herein are those paragraphs in PART 2 - PRODUCTS and PART 3 - EXECUTION of the technical sections that describe products, systems, installation procedures, equipment, and test methods.

1.4 ELECTRICAL CHARACTERISTICS

Electrical characteristics for this project shall be _5_kV primary, three phase, four wire, 60 Hz, 208Y/120 volts secondary, three phase, four wire. Final connections to the power distribution system at the existing manhole and junction boxes shall be made by the Contractor as directed by the Contracting Officer.

1.5 ADDITIONAL SUBMITTALS INFORMATION

Submittals required in other sections that refer to this section must conform to the following additional requirements as applicable.

1.5.1 Shop Drawings (SD-02)

Include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices.

1.5.2 Product Data (SD-03)

Submittal shall include performance and characteristic curves.

1.6 QUALITY ASSURANCE

1.6.1 Regulatory Requirements

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. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated.

1.6.2 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory

commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in the technical section.

1.6.2.1 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.

1.6.2.2 Material and Equipment Manufacturing Date

Products manufactured more than 3 years prior to date of delivery to site shall not be used, unless specified otherwise.

1.7 WARRANTY

The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.8 POSTED OPERATING INSTRUCTIONS

Provide for each system and principal item of equipment as specified in the technical sections for use by operation and maintenance personnel. The operating instructions shall include the following:

a. Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.

b. Start up, proper adjustment, operating, lubrication, and shutdown procedures.

c. Safety precautions.

d. The procedure in the event of equipment failure.

e. Other items of instruction as recommended by the manufacturer of each system or item of equipment.

Print or engrave operating instructions and frame under glass or in approved laminated plastic. Post instructions where directed. For operating instructions exposed to the weather, provide weather-resistant materials or weatherproof enclosures. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

1.9 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.

1.10 FIELD FABRICATED NAMEPLATES

ASTM D709. Provide laminated plastic nameplates for each equipment enclosure, relay, switch, and device; as specified in the technical sections or as indicated on the drawings. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic, 0.125 inch thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be one by 2.5 inches. Lettering shall be a minimum of 0.25 inch high normal block style.

1.11 WARNING SIGNS

Provide warning signs for the enclosures of electrical equipment including substations, pad-mounted transformers, pad-mounted switches, generators, and switchgear having a nominal rating exceeding 600 volts.

a. When the enclosure integrity of such equipment is specified to be in accordance with IEEE C57.12.28 or IEEE C57.12.29, such as for pad-mounted transformers and pad-mounted electrical igloos, provide self-adhesive warning signs on the outside of the high voltage compartment door(s). Sign shall be a decal and shall have nominal dimensions of 7 by 10 inches with the legend "DANGER HIGH VOLTAGE" printed in two lines of nominal 2 inch high letters. The word "DANGER" shall be in white letters on a red background and the words "HIGH VOLTAGE" shall be in black letters on a white background. Decal shall be Panduit No. PPSO710D72 or approved equal.

1.12 ELECTRICAL REQUIREMENTS

Electrical installations shall conform to IEEE C2, NFPA 70, and requirements specified herein.

1.13 INSTRUCTION TO GOVERNMENT PERSONNEL

Where specified in the technical sections, furnish the services of competent instructors to give full instruction to designated Government personnel in the adjustment, operation, and maintenance of the specified systems and equipment, including pertinent safety requirements as required. 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 equipment or system. When significant changes or modifications in the equipment or system are made under the terms of the contract, provide additional instructions to acquaint the operating personnel with the changes or modifications.

PART 2 PRODUCTS

2.1 FACTORY APPLIED FINISH

Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA 250 corrosion-resistance test and the additional requirements specified in the technical sections.

PART 3 EXECUTION

3.1 FIELD APPLIED PAINTING

Paint electrical equipment as required to match finish of adjacent surfaces or to meet the indicated or specified safety criteria.

3.2 FIELD FABRICATED NAMEPLATE MOUNTING

Provide number, location, and letter designation of nameplates as indicated. Fasten nameplates to the device with a minimum of two sheet-metal screws or two rivets.

3.3 WARNING SIGN MOUNTING

Provide the number of signs required to be readable from each accessible side, but space the signs a maximum of 30 feet apart.

-- End of Section --

SECTION 26 05 33

DOCKSIDE POWER CONNECTION STATIONS
01/07

PART 1 GENERAL

1.1 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 A167	(2011) Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM B33	(2010) Standard Specification for Tinned Soft or Annealed Copper Wire for Electrical Purposes
ASTM D1535	(2012) Specifying Color by the Munsell System
ASTM D2240	(2005; R 2010) Standard Test Method for Rubber Property - Durometer Hardness
ASTM D709	(2001; R 2007) Laminated Thermosetting Materials

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 100	(2000; Archived) The Authoritative Dictionary of IEEE Standards Terms
IEEE 386	(2006; INT 1 2011) Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600V
IEEE C2	(2012; Errata 2012; INT 1 2012; INT 2 2012) National Electrical Safety Code
IEEE C57.12.28	(2005; INT 3 2011) Standard for Pad-Mounted Equipment - Enclosure Integrity
IEEE C57.13	(2008) Standard Requirements for Instrument Transformers

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

NETA ATS	(2013) Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI C12.1	(2008) Electric Meters Code for Electricity Metering
ANSI C12.7	(2005) Requirements for Watthour Meter Sockets

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2011; Errata 2 2012) National Electrical Code

U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-C-24368/1	(1987; Rev B) Connector Assemblies; Plug, Power Transfer, Shore to Ship and Ship to Ship, 500 Volts, 500 Amperes, 60 Hertz, Symbol Number 1160
MIL-C-24368/2	(1987; Rev B) Connector Assemblies; Receptacle, and Receptacle-Cabled, Power Transfer, Shore to Ship and Ship to Ship, 500 Volts, 500 Amperes, 60 Hertz, Symbol Number 1161
MIL-DTL-24643/3	(2009; Rev E) Cable, Electrical, -20 Degrees C to +90 Degrees, 600 Volts, Types LSSHOF, LSDHOF, LSTHOF, and LSFHOF

UNDERWRITERS LABORATORIES (UL)

UL 489	(2009; Reprint Jun 2011) Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures
UL 50	(2007; Reprint Apr 2012) Enclosures for Electrical Equipment, Non-environmental Considerations
UL 94	(1996; Reprint Jan 2012) Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

1.2 RELATED REQUIREMENTS

Section 26 08 00 APPARATUS INSPECTION AND TESTING applies to this section, with the additions and modifications specified herein.

1.3 DEFINITIONS

Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, shall be as defined in IEEE 100.

1.4 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. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

600 V Power Connection Station; G

5 kV Power Connection Station; G

Ship Service Emergency Trip Panel; G

Include wiring diagrams and installation details of equipment indicating layout and arrangement, control panels, accessories, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. Submittals shall include the nameplate data, size, and capacity. Submittals shall also include applicable federal, military, industry, and technical society publication references.

SD-03 Product Data

600 V Single Pole Connectors; G

Industrial Service Auxiliary Devices; G

Metering Accessories; G

5 kV Cable Couplers; G

Deadbreak Junctions; G

High-Voltage Connectors; G

Flexible Power Cable; G

SD-06 Test Reports

Paint Coating System; G

600 V Single Pole Connector Compatibility Tests; G

600 V Single Pole Connector Torque Test; G

Power Receptacle and Plug Assembly Tests; G

5 kV Cable Coupler Design Tests; G

Acceptance Checks and Tests; G

SD-10 Operation and Maintenance Data

600 V Power Connection Station, data package 5; G

5 kV Power Connection Station, data package 5; G

Ship Service Emergency Trip Panel; G

1.5 QUALITY ASSURANCE

1.5.1 Drawings

Furnish drawings that include, but are not limited to, the following:

a. One-line diagram including breakers, fuses, current transformers, and meters.

b. Outline drawings including front elevation, section views, footprint, and overall dimensions.

c. Markings and NEMA nameplate data, including fuse information (manufacturer's name, catalog number, and ratings).

d. Circuit breaker type, interrupting rating, and trip devices, including available settings.

e. Three-line diagrams and elementary diagrams and wiring diagrams with terminals identified, and indicating prewired interconnections between items of equipment and the interconnection between the items.

f. Manufacturer's instruction manuals and published time-current curves (on full size logarithmic paper) of the main secondary breaker and largest secondary feeder device. These shall be used by the designer of record to provide breaker settings that will insure protection and coordination are achieved.

1.5.2 Regulatory Requirements

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. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated.

1.5.3 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer and the component parts of the item shall be the products of the same manufacturer.

1.5.3.1 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.

1.5.3.2 Material and Equipment Manufacturing Date

Products manufactured more than 3 years prior to date of delivery to site shall not be used, unless specified otherwise.

1.6 WARRANTY

The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.7 MAINTENANCE

1.7.1 Operation and Maintenance Data

Submit Operation and Maintenance Manuals in accordance with Section 01 78 23.00 25 OPERATION AND MAINTENANCE DATA.

PART 2 PRODUCTS

2.1 600 V POWER CONNECTION STATION

Ship service and industrial service power connection station assemblies shall include enclosure, power receptacles, auxiliary devices, metering accessories, and related wiring. Each power connection station shall have the number of circuits indicated and each circuit shall provide three-phase, three-wire service.

2.1.1 Enclosure Integrity

Enclosure shall be UL 50 listed, type 3R, fabricated entirely of ASTM A167 type 304 or 304L stainless steel. All interior and exterior covers and doors shall be minimum 12 gauge stainless steel sheets. Unit shall have fixed top and open bottom. Side covers shall be bolt-on and removable. Rear covers shall be hinged. Optional doors shall have full height continuous hinge and door stop to allow door to be secured open at 90 degrees. Ventilating or similar openings in equipment shall be designed so that foreign objects inserted through these openings are deflected from energized parts. Paint enclosure ASTM D1535 light grey No. 61. Paint coating system shall comply with IEEE C57.12.28.

2.1.2 600 V Single Pole Connectors

Insulated connectors shall be rated for 600 volts, 690 amperes, 60 hertz, single pole, continuous duty operation. Connectors shall be compatible with Leviton and Duraline cam-type positive latching ball nose connectors. Insulation and protective caps shall be ethylene propylene thermoplastic rubber (EPTR) colored black phase A, white phase B, and red phase C, conforming to the following:

a. Constant Service Temperature Range: minus 81 degrees F to 275 degrees F

b. Flammability: UL 94 HB Rated

c. Electrical: UL Relative Thermal Index (RTI): 212 degrees F) minimum

d. Durometer Hardness: ASTM D2240, 55 - 65A

2.1.2.1 Panel Mount Connectors

Provide 15 degree angled, panel mount female connectors (receptacles) with threaded stud terminations. Each receptacle shall be provided with a protective cap attached via wirelon. Panel Mount Connectors (receptacles) indicated to have electric interlock switches shall have a thru-center plunger that engages a single-pole double-throw, water-tight aluminum housed "roller lever actuated" switch upon insertion of a connector plug. UL listed switch shall be electrically rated for 100,000 cycles at 10 amps, 125/250 VAC, and mechanically rated for 20,000,000 cycles.

2.1.2.2 Cable Mount In-Line Connectors

Male and female cable mount in-line connectors (plugs) shall be designed for terminating on 500 kcmil cables with a crimp-type connection. The connectors shall lock together so that they can not twist or turn loose unless a push button release mechanism is engaged. The insulated sleeve shall be mechanically secured to the connector contacts to give a minimum of 700 pounds shear force.

2.1.3 600 V Power Receptacle

Rated for 500 volts, 500 amperes, 60 hertz, three-pole, continuous duty operation. Power receptacle assembly shall conform to MIL-C-24368/2. Provide receptacle assembly with factory potted cable pigtails. Cable pigtails shall be a minimum of 4 feet in length and 3-1/c Type LSSHOF-500 cables conforming to MIL-DTL-24643/3. Provide each receptacle with provisions for interlocking the receptacle with its respective feeder circuit breaker so that breaker will trip automatically if an attempt is made to remove the plug from the receptacle and when the receptacle cover is opened.

2.1.4 Industrial Service Auxiliary Devices

Provide the following auxiliary devices for each industrial service power connection station circuit.

2.1.4.1 Shunt Trip Pushbutton Control

Provide NEMA Q600 rated, 30 millimeter, heavy duty industrial type, normally-open, momentary, red pushbutton behind a spring return cover, each circuited to shunt trip one circuit breaker.

2.1.4.2 Fusing

Provide a fuse block mounted in the enclosure containing one fuse per phase to protect the voltage input to thewatt hour meter and circuit breaker shunt trip.

2.1.4.3 Circuit Breaker

UL 489. 100 percent rated, non-fused, current limiting, molded case

circuit breaker, 480 VAC, 400 amperes, 3-pole, 200 kaic short circuit current interrupting rating, with a 480 V shunt trip.

2.1.4.4 Circuit Breaker Operating Mechanism

Provide flexible cable mechanism with flange mounted disconnect handle for each circuit breaker as indicated.

2.1.5 Metering Accessories

Provide watt-hour meter and current transformers for each industrial service power connection station circuit.

2.1.5.1 Watt-hour Meter

Provide a socket-mounted, electronic programmable outdoor watt-hour meter mounted on door of cabinet. Meter shall either be programmed at the factory or shall be programmed in the field. When field programming is performed, turn field programming device over to the Contracting Officer at completion of project. Meter shall be coordinated to system requirements and conform to ANSI C12.1.

a. Design: Provide watt-hour meter for use on a three-phase, 3-wire, 480 volt system with 3 current transformers. Include necessary KYZ pulse initiation hardware for Energy Monitoring and Control System (EMCS).

b. Class: 20; Form: 45S, accuracy: plus or minus 1.0 percent; Finish: Class II

c. Cover: Polycarbonate and lockable to prevent tampering and unauthorized removal.

d. Kilowatt-hour Register: Five digit electronic programmable type

e. Demand Register:

    1. Provide solid state.

    2. Meter reading multiplier: Indicate multiplier on the meter face.

    3. Demand interval length: Shall be programmed for 15 minutes with rolling demand up to six subintervals per interval.

f. Socket: ANSI C12.7. Provide NEMA Type 3R, box-mounted socket, ringless, having manual circuit-closing bypass and having jaws compatible with requirements of the meter. Cover unused hub openings with blank hub plates. Provide manufacturers standard enclosure color unless otherwise indicated.

2.1.5.2 Current Transformers

IEEE C57.13. Provide butyl-molded window type current transformers with 600 volt insulation, 10 kV BIL. Provide three current transformers with characteristics listed in the following table.

CT Ratio	RF	Meter Accuracy Class
400/5	4.0	0.3 thru B-0.2

2.1.5.3 Watt-hour Meter/Current Transformer Cabinet

Cabinet shall be NEMA 3R fabricated of 12 gauge stainless steel and shall have hinged front door with vault handle. Paint enclosure ASTM D1535 light grey No. 61. Paint coating system shall comply with IEEE C57.12.28.

2.1.6 Enclosure Configurations

a. Enclosures for ship service stations shall be configured as indicated. All three receptacles of the same circuit shall be mounted on a common plate. Each plate shall have handles on both ends and shall be bolted to the front cover so that it can be removed from the front without disconnecting the incoming circuit power cables. Each section shall include a full width ground bus. Each section shall have a hinged pad lockable door. Provide nameplates to identify each phase designation and each circuit number as indicated.

b. Enclosures for industrial service stations shall be configured as indicated. All three receptacles of the same circuit shall be mounted on a common plate. Each plate shall have handles on both ends and shall be bolted to the front cover so that it can be removed from the front without disconnecting the power cable. Include a full width internal ground bus and a ground bus with four NEMA spaced lug mounting holes on the exterior as indicated. Mount the circuit breakers, and current transformers on inside of enclosure. The handle for the circuit breaker operating mechanism shall be located on the rear flange. Mount watt-hour meters on rear hinged covers. Mount shunt trip pushbuttons on side cover as indicated.

2.2 5 KV POWER CONNECTION STATION

5 kV power connection station assemblies shall include enclosure, 5 kV power receptacles, dead-front high-voltage deadbreak junctions, and insulated high-voltage connectors. Each power connection station shall have the number of circuits indicated and each circuit shall provide three-phase, three-wire service.

2.2.1 Enclosure Integrity

IEEE C57.12.28 fabricated entirely of ASTM A167 type 304 or 304L stainless steel. All interior and exterior covers and doors shall be minimum 12 gauge stainless steel sheets. Unit shall have fixed top and open bottom with padlockable two-door front and removable center post. Side and rear covers shall be bolt-on. Doors shall be 36 inch wide with full height continuous hinge and door stops to allow doors to be secured open at 90 degrees. Paint enclosure ASTM D1535 light grey No. 61. Paint coating system shall comply with IEEE C57.12.28.

2.2.2 5 kV Cable Couplers

Provide high voltage cable couplers rated for 15,000 volts, 500 amperes, 60 hertz, three-phase, continuous duty operation, and configured with three

insulated phase contacts, one ground contact, and one isolated ground check contact. Couplers shall be aluminum with epoxy powder coating and include hypalon gaskets and seals, all stainless steel hardware and three-bolt quick flip or 90 degree turn connection feature. Receptacles shall be equipment mount type with provisions for terminating 750 kcmil cables and include Live End Covers.Provide one cable mount type plug with weatherproof cover and provisions for terminating750kcmil cables for each receptacle. Turn plugs over to the contracting officer. Coupler pairs shall have provisions for padlocking have a mechanical interlock that allows key release only after the coupler pair is locked.

a. Voltage ratings: Withstand voltages shall comply with IEEE 386 voltage ratings and characteristics of connectors rated 14.4 kV rms phase-to-phase.

b. Current ratings: Short-time current ratings shall comply with IEEE 386 current ratings and characteristics of 600 A connectors.

2.2.3 Separable Insulated Connectors and Accessories

IEEE 386. 5 kV, 95 kV BIL.

2.2.3.1 Deadbreak Junctions

Provide 600 A deadbreak junctions with two interfaces. Brackets shall be stainless steel.

2.2.3.2 Insulated High-Voltage Connectors

Provide 600 Ampere deadbreak connectors.

2.2.4 Flexible Power Cable

ASTM B33, NEMA WC 58/ICEA S-75-381. Flexible power cable Type SH, 5 kV single conductor.

2.2.5 Enclosure Configuration

Enclosures shall be configured as indicated. Include a full width ground bus. A power cable terminated with a 600-ampere deadbreak connector shall connect each phase of each receptacle to one of the 600-ampere one-piece deadbreak apparatus bushings of a deadbreak junction. The remaining apparatus bushing for each deadbreak junction shall be used for connection of the incoming circuit power cables terminated with 600-ampere deadbreak connectors. Provide nameplates to identify each phase designation and each circuit number.

2.3 SHIP SERVICE EMERGENCY TRIP PANEL

Provide a stainless steel NEMA 3R cabinet sized as necessary with a color red pushbutton cover mounted behind the front door. Pushbutton shall be rated for 10 amperes continuous at 600 volts, heavy duty, watertight, momentary contact, marked "SHIP SERVICE EMERGENCY TRIP".

2.4 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.

2.5 FIELD FABRICATED NAMEPLATES

ASTM D709. Provide laminated plastic nameplates for each equipment enclosure, relay, switch, and device; as specified or as indicated on the drawings. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic, 0.125 inch thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be one by 2.5 inches. Lettering shall be a minimum of 0.25 inch high normal block style.

2.6 WARNING SIGNS

Provide warning signs for the enclosures of electrical equipment having a nominal rating exceeding 600 volts.

a. When the enclosure integrity of such equipment is specified to be in accordance with IEEE C57.12.28, provide self-adhesive warning signs on the outside of the high voltage compartment door(s). Sign shall be a decal and shall have nominal dimensions of 7 by 10 inches with the legend "DANGER HIGH VOLTAGE" printed in two lines of nominal 2 inch high letters. The word "DANGER" shall be in white letters on a red background and the words "HIGH VOLTAGE" shall be in black letters on a white background. Decal shall be Panduit No. PPSO710D72 or approved equal.

2.7 SOURCE QUALITY CONTROL

2.7.1 Paint Coating System

Submit IEEE C57.12.28 paint coating system performance requirement tests.

2.7.2 600 V Single Pole Connector Compatibility Tests

Conduct the following tests in the sequence noted on a male in-line connector mated with a Leviton or Duraline female in-line connector and a female in-line connector mated with a Leviton or Duraline male in-line connector with each connector terminated on a bare 500 kcmil copper conductor. After completion of the tests, inspect assemblies. There shall be no evidence of damage to the connectors. Assemblies shall be satisfactory for immediate return to service at full ratings without maintenance or repair. Contracting Officer or his designated representative will witness the tests. A factory-certified report of the specified tests previously performed on identical units of each rating will be acceptable.

2.7.2.1 Impact Test

Drop each mated connector set in a horizontal position from a height of 36-inches onto a concrete floor 50 times.

2.7.2.2 Pull Strain Test

Apply a 500-lb straight pull on each mated connector set for a duration of 5-minutes.

2.7.2.3 Shear Test

Apply a 100-lb perpendicular pull on each mated connector set for a duration of 5-minutes.

2.7.2.4 Torque Test

Apply a 100 ft-lb torque on each mated connector set for a duration of 5-minutes.

2.7.2.5 Heat Rise Test

Apply 400 amperes through each mated connector set for duration of 30-minutes. Record temperature rise at surface of each mated connector set via infrared scanning equipment. Temperature rise shall be less than 45 degree C.

2.7.2.6 Moisture Resistance Test

Subject the mated connectors to a water spray maintained at 5-psi, with a collection rate of 18-in/hr, at a distance of 5-feet, for one hour. Verify that no water penetrated the connection.

2.7.2.7 Dielectric Voltage Withstand Test

Wrap the mated connectors in conductive foil and apply a test potential of 2200 VAC between the conductor and the foil for a period of 5-minutes. Dielectric breakdown shall constitute a failed test.

2.7.2.8 Insulation Resistance Test

Wrap the mated connectors in conductive foil and using a Megger insulation resistance tester with an open circuit output of 500 VDC, measure the insulation resistance between the conductor and foil. Resistance measurement shall be greater than 100 Megohms.

2.7.3 600 V Single Pole Connector Torque Test

Conduct a torque test on three male and three female cable mount in-line connectors as follows: With the metal connector part rigidly secured, apply a rotating (twisting) force of 700 lbs on the insulating sleeve. The insulating sleeve shall not break free and spin around the connector metal part. Contracting Officer or his designated representative will witness the tests. A factory-certified report of the specified tests previously performed on identical units of each rating will be acceptable.

2.7.4 Power Receptacle and Plug Assembly Tests

Conduct design, production, and quality assurance tests, as required by MIL-C-24368/1 and MIL-C-24368/2, at the manufacturer's plant during fabrication and assembly of power receptacle and plug assemblies. After completion of tests, inspect assemblies. There shall be no evidence of damage to the receptacle or plug assembly. Assemblies shall be satisfactory for immediate return to service at full ratings without maintenance or repair. Contracting Officer or his designated representative will witness the tests. A factory-certified report of the specified tests previously performed on identical units of each rating will be acceptable.

2.7.5 5 kV Cable Coupler Design Tests

Furnish reports which include results of AC withstand voltage, DC withstand voltage, impulse withstand voltage, short time current, and current cycling design tests performed in accordance with IEEE 386.

PART 3 EXECUTION

3.1 INSTALLATION

Electrical installations shall conform to IEEE C2, NFPA 70, and to the requirements specified herein.

3.2 POWER CONNECTION STATION GROUNDING

Ground in accordance with NFPA 70. Maximum resistance from assembly to ground shall be 3 ohms.

3.3 FIELD APPLIED PAINTING

Paint electrical equipment as required to match finish of adjacent surfaces or to meet the indicated or specified safety criteria.

3.4 FIELD FABRICATED NAMEPLATE MOUNTING

Provide number, location, and letter designation of nameplates as indicated. Fasten nameplates to the device with a minimum of two sheet-metal screws or two rivets.

3.5 WARNING SIGN MOUNTING

Provide the number of signs required to be readable from each accessible side, but space the signs a maximum of 30 feet apart.

3.6 FIELD QUALITY CONTROL

3.6.1 Performance of Acceptance Checks and Tests

Perform in accordance with the manufacturer's recommendations and include the following visual and mechanical inspections and electrical tests, performed in accordance with NETA ATS.

3.6.1.1 Power Connection Stations and Control Panels

a. Visual and mechanical inspection performed in accordance with inspection and test procedures for Switchgear and Switchboard Assemblies.

b. System function tests.

3.6.1.2 Current Transformers

a. Visual and mechanical inspection in accordance with inspection and test procedures for Instrument Transformers.

b. Electrical tests in accordance with inspection and test procedures for Instrument Transformers.

3.6.1.3 Watt-hour Meters

a. Visual and mechanical inspection in accordance with inspection and test procedures for Metering Devices.

b. Electrical tests in accordance with inspection and test procedures for Metering Devices.

3.6.1.4 Circuit Breakers

a. Visual and mechanical inspection in accordance with inspection and test procedures for Circuit Breakers, Air, Insulated-Case/Molded-Case.

b. Perform Electrical tests in accordance with inspection and test procedures for Circuit Breakers, Air, Insulated-Case/Molded-Case.

3.7 DEMONSTRATION

Upon completion of the work and at a time approved by the Contracting Officer, the Contractor shall provide instructions by a qualified instructor to the Government personnel in the proper operation and maintenance of the equipment. Government personnel shall receive training comparable to the equipment manufacturer's factory training. The duration of instruction shall be for not less than one 8 hour working day for instruction of operating and maintenance personnel.

-- End of Section --

SECTION 26 08 00

APPARATUS INSPECTION AND TESTING
08/08

PART 1 GENERAL

1.1 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 ELECTRICAL TESTING ASSOCIATION (NETA)

NETA ATS	(2013) Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems

1.2 RELATED REQUIREMENTS

Section 26 00 00.00 20 BASIC ELECTRICAL MATERIALS AND METHODS applies to this section with additions and modifications specified herein.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, the "DOR" designation following the "G" designation identifies that the submittal shall be reviewed by the Designer of Record (DOR). Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-06 Test Reports

Acceptance tests and inspections; G, DOR

SD-07 Certificates

Qualifications of organization, and lead engineering technician; G, DOR

Acceptance test and inspections procedure; G, DOR

1.4 QUALITY ASSURANCE

1.4.1 Qualifications

Contractor shall engage the services of a qualified testing organization to provide inspection, testing, calibration, and adjustment of the electrical distribution system and generation equipment listed in paragraph entitled "Acceptance Tests and Inspections" herein. Organization shall be independent of the supplier, manufacturer, and installer of the equipment. The organization shall be a first tier subcontractor. No work required by this section of the specification shall be performed by a second tier subcontractor.

a. Submit name and qualifications of organization. Organization shall have been regularly engaged in the testing of electrical materials,

devices, installations, and systems for a minimum of 5 years. The organization shall have a calibration program, and test instruments used shall be calibrated in accordance with NETA ATS.

b. Submit name and qualifications of the lead engineering technician performing the required testing services. Include a list of three comparable jobs performed by the technician with specific names and telephone numbers for reference. Testing, inspection, calibration, and adjustments shall be performed by an engineering technician, certified by NETA or the National Institute for Certification in Engineering Technologies (NICET) with a minimum of 5 years' experience inspecting, testing, and calibrating electrical distribution and generation equipment, systems, and devices.

1.4.2 Acceptance Tests and Inspections Reports

Submit certified copies of inspection reports and test reports. Reports shall include certification of compliance with specified requirements, identify deficiencies, and recommend corrective action when appropriate. Type and neatly bind test reports to form a part of the final record. Submit test reports documenting the results of each test not more than 10 days after test is completed.

1.4.3 Acceptance Test and Inspections Procedure

Submit test procedure reports for each item of equipment to be field tested at least 45 days prior to planned testing date. Do not perform testing until after test procedure has been approved.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 ACCEPTANCE TESTS AND INSPECTIONS

Testing organization shall perform acceptance tests and inspections. Test methods, procedures, and test values shall be performed and evaluated in accordance with NETA ATS, the manufacturer's recommendations, and paragraph entitled "Field Quality Control" of each applicable specification section. Tests identified as optional in NETA ATS are not required unless otherwise specified. Equipment shall be placed in service only after completion of required tests and evaluation of the test results have been completed. Contractor shall supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information necessary for an accurate test and inspection of the system prior to the performance of any final testing. Contracting Officer shall be notified at least 14 days in advance of when tests will be conducted by the testing organization. Perform acceptance tests and inspections on applicable equipment and systems specified in the following sections:

a. Section 33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION

3.2 SYSTEM ACCEPTANCE

Final acceptance of the system is contingent upon satisfactory completion

of acceptance tests and inspections.

3.3 PLACING EQUIPMENT IN SERVICE

A representative of the approved testing organization shall be present when equipment tested by the organization is initially energized and placed in service.

-- End of Section --

SECTION 26 08 10.00 25

COMMISSIONING OF ELECTRICAL SYSTEMS
03/13
NAVFAC SE VERSION

PART 1 GENERAL

1.1 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.

ASSOCIATED AIR BALANCE COUNCIL (AABC)

ACG Commissioning Guideline	(2005) Commissioning Guideline

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 81	(2012) Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)

NEBB Commissioning Standard	(2009) Procedural Standards for Whole Building Systems Commissioning of New Construction; 3rd Edition

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

NETA ATS	(2013) Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems

NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA)

NECA 90	(2009) Recommended Practice for Commissioning Building Electrical Systems

1.2 SUMMARY

1.2.1 General

The requirements of this section apply to all sections of Division 23.

The purpose of this Section is to define Contractor responsibilities in the commissioning process, which are being directed by the Government. Other electrical system testing is required under other Division 26 Specification Sections. National Electrical Installation Standards (NEIS) NECA 90 provides additional guidance for the commissioning of electrical systems.

This Section includes Commissioning process requirements for electrical systems, assemblies, components and equipment, and requires the participation of the Contractor, to ensure that the work has been completed as specified and that systems are functioning in the manner consistent with the Contract Documents as described herein, and as specified in the system

operating criteria for this project.

a. Commissioning will commence according to the approved construction schedule, after electrical system rough-in, and after the preliminary inspection punchlist items and commissioning deficiencies are completed by the Contractor and his subcontractors.

b. Construction phase commissioning process shall include the following:

1. Step One: Installation Verification

2. Step Two: System Startup

3. Step Three: Functional Performance Testing

The electrical commissioning process includes the following tasks:

a. Testing and startup of electrical equipment and systems.

b. Electrical equipment and system verification checks.

c. Assistance in functional performance testing to verify equipment and system performance.

d. Provide qualified personnel to assist in commissioning tests, including seasonal testing.

e. Complete and endorse construction phase checklists provided by Commissioning Authority (CxA) to assure equipment and systems are fully operational and ready for functional performance testing.

f. Provide equipment, materials, and labor necessary to correct deficiencies found during commissioning process and to fulfill contract and warranty requirements.

g. Provide operation and maintenance information and record drawings to Commissioning Authority for review verification and organization, prior to distribution.

h. Provide assistance to CxA to develop, edit, and document system operation descriptions.

i. Provide training for systems specified in this Section, coordinated with the CxA.

The commissioning process will also be used to develop test protocol and record the associated test data in an effort to advance the building electrical systems from a state of substantial completion to a full dynamic operation.

The commissioning process is also intended to assist the Government's operating and maintenance staff in the training and familiarization with new electrical systems and equipment. The Commissioning Plan and final Commissioning Report should also serve as tools to reduce post-occupancy critical systems operational difficulty or failure. Operational staff training is essential to the commission process and will run concurrently with Steps One through Three referenced above.

1.3 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

Commissioning Plan; G
Prefunctional Checklists; G
Functional Performance Test (FPT) procedures; G
Narrative descriptions of the design intent for each of the systems identified; G

SD-06 Test Reports

Commissioning Report; G

Commissioning Authority (CxA) shall prepare Commissioning Plan, Prefunctional Checklists, Functional Performance Test (FPT) procedures, narrative descriptions of the design intent for each of the systems identified, and the Commissioning Report, and execute and document results. All Prefunctional Checklists and tests must be documented using specific, procedural forms in Microsoft Word or Excel software developed for that purpose. Prior to testing, Contractor shall submit those forms to the Government for review and approval.

a. Contractor shall provide CxA with documentation required for Commissioning Work. At minimum, documentation shall include: detailed start-up procedures, full sequences of operation, Operating and Maintenance data and performance data, control drawings, and details of Government-contracted tests.

b. Contractor shall submit to CxA the manufacturers' installation and checkout materials actually shipped inside equipment and actual field checkout sheet forms used by factory or field technicians.

c. Contractor shall review and approve other relative documentation for impact on FPT's of the systems:

   1. Verify manufacturer's installation instruction are followed by completing the prefunctional checklists for all electrical equipment.

   2. Factory Performance Test Reports: Review and compile all factory performance data to assure that the data is complete prior to executing the FPT's.

   3. Completed equipment Start-up certification forms along with the manufacturer's field or factory performance and Start-up test documentation: Subcontractor performing the test will review the documentation prior to commencing with the scheduled FPT's. Government may require that system one-line diagrams and applicable Specification Section(s) be attached to the FPT documentation.

4. Operating and Maintenance (O&M) information per requirements of the Technical Specifications and Division 01 requirements: To validate adequacy and completeness of the FPT, the Contractor shall ensure that the O&M manual content, marked-up record Drawings and Specifications, component submittal drawings, and other pertinent documents are available at the Project Site for review.

1.4 SYSTEMS TO BE COMMISSIONED

1.4.1 Electrical (Division 26)

The following systems shall be commissioned as part of this project:

a. Utility Service Entrance Switchgear: Circuit breaker settings, metering, mimic diagram, gages, and controls.

b. Distribution and Branch Circuit Panelboards

c. Normal Power Distribution Systems: Building grounding system tests, coordination study review, major circuit breaker settings, meters and gages, and controls.

d. Lighting Fixtures and Controls: Occupancy sensors, and architectural dimming control system hardware/software/scene settings/zone settings/occupancy sensor interface/unoccupied cycle control.

e. Power Monitoring and Control Systems

1.4.2 Communications (Division 27)

The following systems shall be commissioned as part of this project:

a. Facility Telecommunications and Data Distributed Wiring Systems

1.5 COMMISSIONING RESPONSIBILITIES

1.5.1 Electrical Installer Commissioning Responsibilities

a. Attend commissioning meetings, preinstallation meetings and other project meetings scheduled to facilitate the commissioning process.

b. Provide manufacturer's data sheets and shop drawings for equipment to be commissioned. Provide instructions and demonstrations for Government personnel. Provide additional requested documentation to the CxA for the development of Prefunctional Checklists and Functional Performance Test procedures.

c. Ensure subcontractors perform assigned commissioning responsibilities as specified herein.

d. Ensure participation of equipment manufacturers in appropriate startup, testing, and training activities when required by individual equipment specifications and/or the Commissioning Plan.

e. Develop startup and initial checkout plan using manufacturer's startup procedures and prefunctional (construction) checklists for equipment and systems to be commissioned.

f. With input from the BAS Provider, clarify the operation and control of commissioned equipment in areas where the Specifications, BAS control drawings, or equipment documentation are not sufficient for writing detailed test procedures.

g. During verification check and startup process, execute electrical related portions of checklists for equipment and systems to be commissioned.

h. Perform and document completed installation checklists, startup checklists and reports, and system operational checkout procedures, providing copy to CxA.

i. Where specified in the technical sections, provide manufacturer's representatives to execute starting of equipment. Ensure representatives are available and present during agreed upon schedules and are in attendance for duration to complete tests, adjustments and problem-solving.

j. Coordinate with equipment manufacturers to determine specific requirements to maintain validity of warranties.

k. Provide personnel to assist CxA during equipment or system verification checks and functional performance tests.

l. Prior to functional performance tests, review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during tests.

m. Prior to startup, inspect, check, and verify correct and complete installation of equipment and system components for verification checks included in commissioning plan. When deficient or incomplete work is discovered, ensure corrective action is taken and re-check until equipment or system is ready for startup.

n. Provide factory supervised startup services for equipment and systems where specified. Coordinate work with manufacturer and CxA.

o. Perform verification checks and startup on equipment and systems as specified.

p. Assist CxA in performing functional performance tests on equipment and systems as specified.

q. Assist in performing operation and maintenance training sessions scheduled by the Contractor.

r. Conduct electrical system orientation and inspection.

1.5.2 Electrical Testing Agency (ETA) Commissioning Responsibilities:

When requested by Government, Contractor shall retain an independent Electrical Testing Agency (ETA) for the purpose of checking and testing of the electrical power distribution equipment per National Electrical Testing Association (NETA). Commissioning responsibiliteis shall include:

a. Attend commissioning meetings.

b. Obtain all required manufacturer's data to facilitate tests.

c. Provide assistance to the CxA in the completion of the specific prefunctional checklists and functional performance test procedures. Generally, ETA shall provide their standard forms to document the NETA tests to be incorporated into the Prefunctional Checklist and Functional Performance Tests record.

d. During related tests, execute and document the tests in the approved forms and/or test record.

e. Perform and clearly document all completed Start-up and system operational checkout procedures, providing a copy to the Contractor.

f. Clearly indicate any deficiencies identified during testing and add to an action list for resolution and tracking. The field technicians shall keep a running log of events and issues. Submit reports of discrepancies, deficient or uncompleted work by others, Contract interpretation requests and lists of completed tests to the Contractor at least twice a week and provide technical assistance in the resolution of deficiencies.

g. Provide skilled technicians to execute testing. Ensure that they are available and present during the agreed-upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem solving.

h. Perform thermographic imaging of loaded panel at time designated by Contractor.

1.6 SEQUENCING AND SCHEDULING

Begin the work described in this Section only after all work required in related Sections has been successfully completed, and all test and inspection reports and operation and maintenance manuals required in these Sections have been submitted and approved. Pre-functional (construction) checklists shall be performed for the installation of electrical equipment at appropriate times during the construction phase of the Contract.

PART 2 PRODUCTS

2.1 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.

2.2 TEST EQUIPMENT

Provide all specialized tools, test equipment and instruments required to execute Start-up, checkout, and testing of equipment.

All specialized tools, test equipment, and instruments required to execute Start-up, checkout, and testing of equipment shall be of sufficient quality and accuracy to test and/or measure system performance within specified tolerances. A testing laboratory must have calibrated test equipment within the previous twelve (12) months. Calibration shall be NIST traceable, and shall be in accordance with the requirements of the NEBB Commissioning Standard or the ACG Commissioning Guideline. Contractor

must calibrate test equipment and instruments according to manufacturer's recommended intervals and whenever the test equipment is dropped or damaged. Calibration tags must be affixed to the test equipment or certificates readily available.

Infrared Thermographic Scanner: Infrared scanning equipment shall be an AGA (or approved equal) thermovision set capable of viewing an entire bus or equipment assembly at one time and have a sensitivity of 0.2 degrees C with a liquid nitrogen reference.

PART 3 EXECUTION

3.1 GENERAL

The Contractor and his Subcontractors shall be responsible for performing procedures presented in the specifications, and as indicated on the contract drawings and as detailed in the Functional Performance Tests (FPT) procedures. Members of the designated Commissioning Team shall witness various portions of the commissioning process. Responsibilities for these activities are listed in the following paragraphs. Commissioning Team members shall sign-off on appropriate sections after verifying installation, operation, or documentation. Final sign-off shall be by the Government and the Commissioning Authority (CxA).

Any test ports, gauges, test equipment, etc., needed to accomplish the functional performance tests shall be provided by the Contractor and his Subcontractors.

The Contractor shall provide to the Commissioning Team documentation of calibration of controls. Documentation shall include dates, setpoints, calibration coefficients, control loop verification, and other data required to verify system check-out. Documentation shall be dated and initialed by field engineer or technician performing the work.

3.2 COMMISSIONING PLAN

The commissioning plan shall be developed by the CxA and submitted to the Government for approval. The approved commissioning plan shall outline the organization, scheduling, team members, and documentation pertaining to the overall commissioning process.

3.3 CONSTRUCTION CHECKLIST

A checklist shall be developed by the CxA for each component of commissioned equipment and systems to ensure that the specified equipment has been provided, is properly installed, and has been initially started and checked out adequately in preparation for full operation and functional testing (e.g., belt tension, fluids topped, labels affixed, gages in place, sensors calibrated, voltage balanced, rotation correct, etc.).

The CxA for this project shall develop 'Construction Checklists' for this project, which shall be reviewed and approved by the Government; and then provided to, and completed by the Contractor and his sub-contractors to ensure that all equipment and systems are installed properly; have been started up preliminarily, and are reading for commissioning and performance verification testing.

3.4 FUNCTIONAL PERFORMANCE TEST (FPT) PROCEDURES

The FPT procedures at a minimum shall consist of the following sections:

a. Narrative Description: Provide a narrative description of the design intent of each of the electrical systems to be tested, their intended modes and sequences of operation.

b. Testing Prerequisites: Provide verification and documentation that primary mechanical and controls systems that support or interact with the system that the FPT has been prepared for are completed, tested and operational.

c. Installation Verification: Provide verification that the system installation is completed and is ready for commissioning.

d. Commencement of Functional Performance Testing: Record the date and time of the start of system commissioning.

e. System Condition Prior to Staring Performance Testing: Record the current set points and parameters of the system at the start of commissioning.

f. Functional Performance Test: This section shall provide the following:

    1. Sequential steps required to set parameters and conditions required to test components and functions throughout intended ranges of operation.

    2. Full range of checks and tests carried out to determine if electric and pneumatic connections, components, subsystems, systems and interfaces between systems function in accordance with the contract documents and design intents.

    3. All modes and sequences of control operations, interlocks and conditional control responses and specified responses to abnormal emergency conditions.

g. End of Functional Performance Test: Record the date and time of the completion of system commissioning.

h. Field Notes: Provide a copy of the notes and remarks made and documented during system commissioning.

i. List systems modifications, not required by the Contract Documents, but provided by the Subcontractor. List other questions regarding such system modifications.

j. List problems discovered during Commissioning that were corrected.

k. List problems discovered during Commissioning that were not corrected.

l. List recommended party that should take action on these 'uncorrected' problems.

The CxA for this project shall develop 'Functional Performance Test' (FPT) procedures for this project, which shall be reviewed and approved by the Government; and then provided to, and completed by the Contractor and his sub-contractors, under the supervision of the CxA, to ensure that all

equipment and systems are installed properly; have been started up preliminarily, and are reading for commissioning and performance verification testing.

3.5 OPERATIONAL AND MAINTENANCE STAFF TRAINING

System narrative descriptions will be prepared by the CxA and supported by flow diagrams, one line diagrams, and appropriate specification sections for major systems to be commissioned. The CxA will coordinate "system description" meetings with members of facility management and maintenance department groups to review system description documentation. The meetings will provide an overview of major system features, components, and arrangements.

The Contractor, his sub-contractors and associated manufacturer's representatives shall provide the required training to the Government's operational staff after the system description meetings have occurred. These Contractor training sessions for Government personnel shall provide a more detailed analogy of systems operation and maintenance.

3.6 DOCUMENTATION

The Contractor and his installing subcontractors shall be responsible for collection of pertinent data during system installation, inspection and checkout; during system start-up; and during functional performance testing. The Contractor and his subcontractors shall submit to the CxA documentation of all construction inspections, startup procedures and results, as well as any tests performed prior to and after system start-up. Documentation shall also include the equipment manufacturer's start-up procedures as reviewed and approved by Commissioning Team, including startup reports for equipment and systems conducted by a factory-certified technician or engineer, as specified in the Division 26 Sections for this project.

Provide a title sheet for each section and list the following:

a. Section Title and Specification Section Name and Number requiring this submittal.

b. Project name, project number, and address.

c. Contractor and subcontractor names, addresses, and phone numbers.

d. Name, title, signature, and date of person making the submittal.

e. Table of Contents for each Section.

f. Name of Command, a blank line for signature, and the name and title of person accepting the submittal, and the date accepted by signature.

g. Name, address, and phone number of CxA. Include a blank line for signature; and date of person accepting the submittal.

Provide a Table of Contents for multiple submittals. List each submittal and page number. Number each page, centered on the bottom in sequential numerical order.

3.6.1 STEP ONE - INSTALLATION VERIFICATION

General Commissioning Responsibilities:

a. Before system start-up begins, the Commissioning Team shall conduct a final installation verification audit. The Contractor and his subcontractors shall be responsible for completion of work including change orders and punch list items to the Government's satisfaction. The audit shall include, but not be limited to, checking of:

   1. Provide documentation of all prestart-up tests performed, including manufacturer's factory tests.

   2. Verify integrated performance of all components, including control system components and all interlocks and interactions with other equipment and systems.

   3. Verify all alarm and high and low limit functions and messages generated on all points with alarm settings.

   4. All safety trips shall require a manual reset to allow a system restart.

   5. Verify shut down and restart capabilities both for scheduled and unscheduled events (e.g. power failure recovery and normal scheduled start/stop).

   6. Verify time of day schedules and setpoints.

   7. Verify all energy saving control strategies.

   8. Verify that monitoring system graphics are representative of the systems and that all points and control elements are in the same location on the graphic as they are in the field.

   9. Verify operator control of all commandable control system points including proper security level access.

b. If work is found to be incomplete, incorrect, or non-functional, the Contractor and his subcontractors shall correct the deficiencies before system start-up work proceeds.

3.6.2 STEP TWO - SYSTEM START-UP

General Commissioning Responsibilities: With the assistance of the CxA, a start-up plan shall be developed by the Contractor and his installing subcontractors. The start-up plan shall include all mechanical and electrical equipment. The contractor shall submit the equipment start-up plan to the Government by the Contractor and his installing subcontractors, for approval. Start-up plan shall include the following:

a. The CxA shall review the representative prefunctional checklists to provide guidance and comments for the startup plans.

b. The CxA shall obtain the equipment manufacturer's installation, startup and checkout data, including actual field checkout/startup sheets used by the equipment manufacturer's startup technicians from the Contractor.

c. The CxA shall copy all pages of the equipment manufacturer's

installation instructions and startup manuals with important instructional data and procedures from the startup and checkout manuals not covered elsewhere in the manufacturer's equipment installation and checkout sheets.

d. The pages referenced above, along with the representative startup data from the prefunctional checklist provided by the CxA, and the manufacturer's equipment installation checkout sheets become the basis for the equipment "Startup and Checkout Plan" for each individual piece of equipment, developed by the Contractor and his subcontractors.

e. For systems that may not have adequate manufacturer startup and checkout procedures, particularly for components being integrated with other equipment, the Contractor and his subcontractors shall provide the added necessary detail and documentation to the CxA for information and review, prior to execution.

f. The CxA shall review the individual equipment "Startup and Checkout Plans", compile this information into a "full Startup and Checkout Plan", and then transmit same to the Contractor. The Contractor will designate which trade or subcontractor is responsible to fill out each line item on the prefunctional (construction) checklists from the CxA, and support the startup and checkout of each piece of equipment. The Contractor shall then transmit the full start-up plan to the Subcontractors for their review and use.

3.6.2.1 Thermographic Scanning

a. Contractor shall provide thermographic scanning on all switchgear and distribution boards. In general, the thermographic scanning shall be made when the equipment is energized and is operating at its normal capacity. It is intended that the scan be made after the equipment has been in full operation; however, the Contractor, near the completion of the Project, will determine the exact time of conducting the scan. Some scanning for occupant-created load shall be performed during the Warranty Period as a Deferred Test.

b. Test equipment, miscellaneous tools, and materials shall be transported properly, moved, and set up by trained personnel. Equipment used in testing shall be capable of performing all recommended procedures required by the apparatus and related equipment. All test equipment shall have certification of calibration and be in working order.

c. All hot spots shall be marked, identified, and an infrared thermographic scanning report prepared and furnished to the Owner.

d. The report shall contain infrared photos of trouble spots with temperature readings.

e. The Contractor shall promptly report all sources of heating problems to the Owner for corrective action.

3.6.2.2 Grounding Systems

a. Perform three-point fall-of-potential test per Institute of Electrical and Electronics Engineers IEEE 81 on the main grounding electrode or system. Resistance shall be no greater than 5 ohms.

b. Perform the two-point method test per IEEE 81 to determine the ground

resistance between the main ground system and all major electrical equipment frames, system neutral, and/or derived neutral points. Resistance shall be no greater than 5 ohms.

3.6.2.3 High Voltage Primary Service Feeders

a. Start-up checklists: Perform the following final checks before Start-up:

1. Inspect underground duct banks.

2. Inspect cable and perform field testing on reels.

3. Inspect splicing and terminations.

b. Starting Procedures: Follow the manufacturer's written procedures and the following as a minimum:

1. Visually and mechanically inspect to include the following: Exposed cable, compression type terminations, splices where approved by the Engineer and the Owner, and fire proofing in manholes, cable vaults, and similar items.

2. Correct color code identification and phasing arrangements.

3. Perform shield continuity test.

4. Perform insulation resistance test on new and existing cables.

5. Perform high potential test on new cables only.

3.6.2.4 High Voltage Primary Disconnect and Grounding Switches

a. Provide the services of a factory trained manufacturer's representative to assist the Contractor in the installation and startup service of the equipment and to train Owner's personnel as specified.

b. Start-up checklists: Perform the following final checks before Start-up:

1. Inspect incoming power cable terminations.

2. Inspect transformer connections.

3. Inspect grounding.

4. Inspect electrical interlock wiring.

c. Starting Procedures: Follow the manufacturer's written procedures and the following as a minimum:

1. Visually and mechanically inspect to include the following: anchoring, grounding, oil level, torque of bus and cable connections, and mechanical operation of switch and operating mechanisms.

2. Perform contact resistance test.

3. Conduct and review oil sample tests.

4. Perform insulation resistance tests on switch and control wiring.

5. Perform electrical and mechanical (key) interlock system operations.

3.6.2.5 600V Network Protectors/480V Secondary Distribution

a. Provide the services of a factory trained manufacturer's representative to assist the Contractor in the installation and startup service of the equipment and to train Owner's personnel as specified.

b. Start-up checklists: Perform the following final checks before Start-up:

1. Inspect transformer connections.

2. Inspect 600V disconnect connections.

3. Inspect grounding.

4. Validate protector element installation (furnished loose).

5. Verify control interconnections.

6. Check calibration/setting of protective devices from system coordination study.

7. Verify calibration/setting of digital metering.

c. Starting Procedures: Follow the manufacturer's written procedures and the following as a minimum:

1. Visually and mechanically inspect to include the following: anchoring, grounding, torque of bus/cable connections, operational check of drawout mechanism, manual/electrical trip/close operations, contact closure using slow closing method, arc chute inspection, and installation verification using manufacturer's checklist.

2. Correct current transformer ratios.

3. Conduct contact resistance test.

4. Perform operational/functional tests of protective relaying.

5. Perform operational/functional tests of digital metering.

6. Perform electrical and mechanical (key) interlock system operational tests.

7. Conduct operational voltage testing with line voltage from transformer only and/or source feeder breaker open.

3.6.2.6 600V Disconnect Switches/480V Secondary Distribution

a. Provide the services of a factory trained manufacturer's representative to assist the Contractor in the installation and startup service of the equipment and to train Owner's personnel as specified.

b. Start-up checklists: Perform the following final checks before Start-up:

1. Inspect protector and bus duct connections

2. Inspect grounding.

3. Verify control interconnections

4. Check installation of warning nameplates.

c. Starting Procedures: Follow the manufacturer's written procedures and the following as a minimum:

1. Visually and mechanically inspect to include the following: anchoring, grounding, torque of bus/cable connections, and mechanical operation of switch and operating mechanisms.

2. Conduct insulation resistance tests on switch and control wiring.

3. Conduct contact resistance test.

3.6.2.7 600V Service Switchgear/480V Secondary Distribution

a. Provide the services of a factory trained manufacturer's representative to assist the Contractor in the installation and startup service of the equipment and to train Owner's personnel as specified.

b. Start-up checklists: Perform the following final checks before Start-up:

1. Inspect connections to main breakers.

2. Inspect grounding.

3. Inspect feeder connections to busways and cables.

4. Inspect installation of main, tie and feeder breaker elements.

5. Inspect control and alarm interconnections.

6. Check calibration/setting of trip devices using system coordination study.

7. Verify calibration/setting of digital metering.

c. Starting Procedures: Follow the manufacturer's written procedures and the following as a minimum:

1. Visually and mechanically inspect to include the following: anchoring, grounding, torque of feeder and incoming bus duct connections, feeder cable and integral main bus connections, switchgear section alignments, electrical clearances, mechanical operation of breaker/fuse drawout elements and operating mechanisms, manual trip function, main bus safety shutters, and installation verification using manufacturer's checklist.

2. Check current and potential instrument transformer ratios.

3. Conduct insulation resistance and over potential tests on each type of each breaker element contacts, switchgear control wiring, breaker element control wiring and each bus section.

4. Conduct resistance test through switchgear bus joints.

5. Conduct current test using primary or secondary current injection.

6. Conduct phasing test on triple-ended switchgear.

7. Conduct contact resistance test on each type breaker element.

8. Conduct ground resistance test.

9. Conduct operational/functional tests of protective relaying. Time-current tests shall be conducted and trip points shall be set per CxA's direction.

10. Conduct operational/functional tests of digital metering.

11. Perform electrical and mechanical (key) interlock system operational tests on generator and service switchgear.

3.6.2.8 600V Feeder and Subfeeders/480V Secondary Distribution

a. Provide the services of a factory trained manufacturer's representative to assist the Contractor in the installation and startup service of the equipment and to train Owner's personnel as specified.

b. Start-up checklists: Perform the following final checks before Start-up:

1. Inspect cable terminations.

c. Starting Procedures: Follow the manufacturer's written procedures and the following as a minimum:

1. Visually and mechanically inspect to include the following: large junction and pull boxes, supports of raceways and cable bus, and compression type terminations.

2. Correct identification and phasing arrangements.

3. Conduct continuity test of each feeder.

4. Conduct insulation resistance test of each feeder.

3.6.2.9 Distribution Transformers/480V Secondary Distribution

a. Provide the services of a factory trained manufacturer's representative to assist the Contractor in the installation and startup service of the equipment and to train Owner's personnel as specified.

b. Start-up checklists: Perform the following final checks before Start-up:

1. Inspect wiring connections.

2. Ensure taps are adjusted.

3. Inspect grounding.

c. Starting Procedures: Follow the manufacturer's written procedures and the following as a minimum:

1. Visually and mechanically inspect to include the following: mounting, grounding, electrical clearances, and K factor and/or isolating transformers are installed where required.

2. Perform insulation resistance, turns ratios, and polarity tests on each type /size of transformer.

3.6.2.10 Distribution and Branch Circuit Panelboards/480V Secondary Distribution

a. Provide the services of a factory trained manufacturer's representative to assist the Contractor in the installation and startup service of the equipment and to train Owner's personnel as specified.

b. Start-up checklists: Perform the following final checks before Start-up:

1. Inspect wiring connections.

c. Starting Procedures: Follow the manufacturer's written procedures and the following as a minimum:

1. Visually and mechanically inspect to include the following: mounting, separate ground and neutral connections per circuit, completed circuit directories, electrical clearances, KAIC ratings of panelboard and breakers.

2. Correct surge suppression devices installed.

3. Review current readings for each panelboard to ensure loads are balanced.

4. Conduct insulation resistance tests.

3.6.2.11 600V Branch Circuits/480/208/120V Secondary Distribution

a. Provide the services of a factory trained manufacturer's representative to assist the Contractor in the installation and startup service of the equipment and to train Owner's personnel as specified.

b. Start-up checklists: Perform the following final checks before Start-up:

1. Inspect wiring connections.

c. Starting Procedures: Follow the manufacturer's written procedures and the following as a minimum:

1. Visually and mechanically inspect to include the following: large junction and pull boxes, supports of raceways, and compression type terminations.

2. Correct identification and phasing arrangements.

3. Perform random continuity test of any branch circuit.

4. Receptacle Polarity Test: Test every receptacle installed or reconnected under this Contract with a receptacle circuit tester. Tester shall test for open ground, reverse polarity, open hot, open neutral, hot and ground reversed, hot or neutral and hot open. Rewire receptacles with faults and retest.

5. Ground-Fault Receptacle Circuit Interrupter Tests:

   (a) Test each receptacle or branch circuit breaker having ground-fault circuit protection to assure that the ground-fault circuit interrupter will not operate when subjected to a ground-fault current of less than 4 milliamperes and will operate when subjected to a ground-fault current exceeding 6 milliamperes.

   (b) Perform testing using an instrument specifically designed and manufactured for testing ground-fault circuit interrupters. "TEST" button operation will not be acceptable as a substitute for this test.

   (c) Replace receptacles that do not shutoff power with 5/1000 of an ampere within 1/40th of a second and retest. Submit test report signed by Test Engineer who performed this test.

3.6.2.12 Lighting Fixtures and Lighting Controls 480/277/208/120V Lighting

a. Provide the services of a factory trained manufacturer's representative to assist the Contractor in the installation and startup service of the lighting control system and to train Owner's personnel as specified.

b. Start-up checklists: Perform the following final checks before Start-up:

   1. Ensure all labeling is affixed and accurate.

   2. Verify quantity, type and location of fixtures.

   3. Verify type and location of switches.

   4. Ensure all terminations are tight.

   5. Check sensor placement is adequate for required duty.

   6. Ensure adequate access is provided to all panels and that documentation of that panel is provided in it.

   7. Ensure all circuits for the loads are energized and ready for testing.

c. Starting Procedures: Follow the manufacturer's written procedures and the following as a minimum:

   1. Test, calibrate, and set all digital and analog sensing, and actuating devices.

      (a) Calibrate each instrumentation device by making a comparison

between the graphic display and the reading at the device, using an instrument traceable to the National Bureau of Standards, which shall be at least twice as accurate as the device to be calibrated (e.g., if field device is +/-0.5 percent accurate, test equipment shall be +/-0.25 percent accurate over same range).

(b) Record the measured value and displayed value for each device in the Prefunctional Checklist.

(c) Check each digital control point by making a comparison between the control command at the control panel and the status of the controlled device.

(d) Check each digital input point by making a comparison of the state of the sensing device and the OI display.

(e) Record the results for each device in the Building Automation System Start-up checklist.

2. Verify operation of lighting controls (dimming, photo-control, regular switching).

3. Check loads on all breakers to ensure that the breaker is properly sized.

4. Enter all schedules per occupant's direction.

5. For operator interfaces, verify all elements on the graphics are functional and properly bound to physical devices and/or virtual points and that hot links or page jumps are functional and logical.

6. Output all specified reports for review and approval.

7. Verify the alarm printing and logging is functional and per requirements.

8. Validate all interfaces with other systems on a point by point basis.

3.6.2.13 Grounding/Building Grounding System

a. Starting Procedures: Follow the manufacturer's written procedures and the following as a minimum:

1. Conduct fall of potential ground resistance tests per IEEE 81 at each test well and at service equipment.

2. Conduct insulation resistance, short circuit, and ground tests of each motor.

3.6.3 STEP THREE - FUNCTIONAL PERFORMANCE TESTING

General Commissioning Responsibilities: Functional Performance Testing begins after operational testing, adjusting, and balancing of the systems have been completed by the Contractor and his subcontractors. Ideally, the Commissioning training for Government operators and maintenance personnel, including the description of the systems, as well as the hands-on training sessions will also have been completed.

a. When testing procedures for commissioned equipment are listed in NETA ATS for Electric Power Distribution Equipment and Systems the NETA test procedures shall be part of the testing requirements of this specification. Additional testing procedures may be listed in this specification.

b. For the conditions, sequences and modes tested, the equipment, integral components and related equipment shall respond to varying loads and changing conditions and parameters appropriately as expected, according to the sequences of operation, as specified, according to acceptable operating practice and the manufacturer's performance specifications. Verify that equipment operates within tolerances specified in: governing codes, acceptance criteria contained in the construction documents, manufacturer's literature and according to good operating practice.

c. Mechanical/Electrical Controls Sequences: Verify functionality and compliance with the design intent for each individual sequence module in the sequences of operation. Verify proper operation of all control strategies, energy efficiency and self-diagnostics features by stepping through each sequence and documenting equipment and system performance. Test every step in every written sequence and other significant modes, sequences and operational features not mentioned in written sequences; including startup, normal operation, shutdown, scheduled on and off, unoccupied and manual modes, safeties, alarms, over-rides, lockouts and power failure.

d. Systems shall accomplish their intended function and performance.

e. Resetting a manual safety shall result in a stable, safe, and predictable return to normal operation by the system.

f. Safety circuits and permissive control circuits shall function in all possible combinations of selector switch positions (hand, auto, inverter, bypass, etc.).

g. Scheduled Lighting Controls:

    1. Apply the applicable common testing requirements and acceptance criteria.

    2. Test Methods. Utilize active testing, and trending when available. If able to trend, trend all zones over a week period and follow trending guidelines.

    3. Sampling Strategy. Manually test 20 percent of the zones or at least four. If more than 10 percent or two zones fail, test another 10 percent sample. If the second sample fails the Subcontractor shall document retesting on all zones on their own using a Commissioning Authority approved form.

h. Occupancy Sensor Lighting Controls:

    1. Apply applicable common testing requirements and acceptance criteria.

    2. Test all units functions, including sensor sensitivity and time-to-OFF functions and ensure that sensor location is proper and won't be tripped inadvertently by other occupants and

movements outdoors, etc.

3. Test Methods: Utilize active test methods.

4. Sampling Strategy. Test 10 percent of the sensors or six, whichever is greater. If more than 10 percent or two sensors fail, test another 10 percent sample. If the second sample fails the Contractor shall document retesting on all units on their own using a Commissioning Authority approved form.

5. Additional Acceptance Criteria. Reasonable sensitivity, no inadvertent trips, lights go off within 15 seconds of design.

-- End of Section --

SECTION 26 42 13.00 20

CATHODIC PROTECTION BY GALVANIC ANODES
04/06

PART 1 GENERAL

1.1 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 WELDING SOCIETY (AWS)

AWS D3.6 (2010) Underwater Welding Code

1.2 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

Insulating flange sets

Anode junction boxes, bonding boxes and test stations

Joint bonds

SD-03 Product Data

Anodes; G

SD-07 Certificates

Qualifications of Corrosion Engineer; G

SD-11, Closeout Submittals

Initial Cathodic Protection System Field Test Report; G

1.3 Services of Corrosion Engineer

The Contractor shall obtain the services of a corrosion engineer to supervise, inspect and test the installation of the cathodic protection system(s). Corrosion Engineer refers to a registered professional engineer with certification of licensing that includes education and experience in cathodic protection of buried or submerged metal structures, or a person accredited or certified by the National Association of Corrosion Engineers at the level of Corrosion Specialist or Cathodic Protection Specialist. Such a person shall have not less than ten years experience in the cathodic protection of underground or submerged structures. The contractor shall submit evidence of the qualifications of corrosion engineer to the Contracting Officer for review and approval.

PART 2 PRODUCTS

2.1 ANODES

Provide anodes as shown on Contract Drawings.

PART 3 EXECUTION

3.1 ANODE INSTALLATION

Install anodes at locations shown on contract drawings. At attachment points, remove all marine growth and any coating to base metal of the sheet piles two inches beyond the dimensions of the steel core. Weld anode to new and existing sheet pile per AWS D3.6.

3.2 FIELD QUALITY CONTROL

Field tests shall be witnessed by the Contracting Officer or his designated representative. Advise the Contracting Officer 10 days prior to performing each field test. Quality control for the cathodic protection system shall consist of the following:

a. Initial field testing by the contractor upon construction.

3.2.1 Testing

3.2.1.1 Non-Destructive Testing of Anodes

Contractor shall perform the tests in the presence of the Contracting Officer. One anode of each type shall be chosen at random for non-destructive testing and shall be submerged in a container of fresh water for about 30 minutes. Contractor shall then measure the anode-to-water potential difference between a calibrated copper-copper sulfate reference electrode. Potential differences should generally be within the following ranges:

	minus 1.0 to minus 1.15 Volts
High potential Magnesium	minus 1.65 to minus 1.75 Volts
Standard Magnesium	minus 1.4 to minus 1.5 Volts
Zinc	minus 1.0 to minus 1.15 Volts

Failure of the test anode to conform to this specification can be cause for rejecting all anodes from the same lot as the test anode. The contractor shall mark all rejected anodes on the ends with a 6 inch high "X" using yellow spray paint. Failed anodes shall be removed from the job site by the end of the day. The contractor shall replace any rejected anodes at his expense. The destructive testing provision shall also apply to replacement anodes as well.

3.2.1.2 Initial Cathodic Protection System Field Testing

Systems shall be tested and inspected by the Contractor's corrosion engineer in the presence of the Contracting Officer's corrosion protection

engineer or an approved representative. Record test data, including date, time, and locations of testing and submit report to the Contracting Officer. Contractor shall correct and retest, at his expense, deficiencies in the materials and installation observed by these tests and inspections. Testing shall include the following measurements.

a. Base potential tests: Perform measurements at test stations and other locations suitable for test purposes, at intervals not exceeding 50 feet with readings at each end point and the midpoints as a minimum. The locations of these measurements shall be identical to the locations specified for potential measurements with anodes connected. Use the same measuring equipment that is specified for measuring protected potential measurements.

3.2.1.3 Initial Cathodic Protection System Field Test Report

The contractor shall submit a field test report of the cathodic protection system. All structure-to-electrolyte measurements, including initial potentials and anode outputs, shall be recorded on applicable forms. Identification of test locations, test station and anode test stations shall coordinate with the as-built drawings and be provided on system drawings included in the report. The contractor shall locate, correct, and report to the Contracting Officer any short circuits encountered during the checkout of the installed cathodic protection system.

-- End of Section --

SECTION 26 56 00.00 20

EXTERIOR LIGHTING
08/12

PART 1 GENERAL

1.1 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 B117	(2011) Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM E2129	(2010) Standard Practice for Data Collection for Sustainability Assessment of Building Products

ILLUMINATING ENGINEERING SOCIETY (IES)

IES HB-10	(2011) IES Lighting Handbook
IES LM-79	(2008) Electrical and Photometric Measurements of Solid-State Lighting Products
IES LM-80	(2008) Measuring Lumen Maintenance of LED Light Sources
IES RP-16	(2010; Addendum A 2008; Addenda B & C 2009) Nomenclature and Definitions for Illuminating Engineering
IES RP-8	(2000; Errata 2004; R 2005; Errata 2007) Roadway Lighting
IES TM-15	(2011) Luminaire Classification System for Outdoor Luminaires
IES TM-21	(2011) Projecting Long Term Lumen Maintenance of LED Light Sources

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 100	(2000; Archived) The Authoritative Dictionary of IEEE Standards Terms
IEEE C2	(2012; Errata 2012; INT 1 2012; INT 2 2012; INT 3 2012) National Electrical Safety Code
IEEE C62.41.2	(2002) Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(2008) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA ANSLG C78.377	(2011) American National Standard for Electric Lamps— Specifications for the Chromaticity of Solid State Lighting Products
NEMA C136.10	(2010) American National Standard for Roadway and Area Lighting Equipment-Locking-Type Photocontrol Devices and Mating Receptacles--Physical and Electrical Interchangeability and Testing
NEMA C136.31	(2010) American National for Roadway and Area Lighting Equipment - Luminaire Vibration
NEMA C82.77	(2002) Harmonic Emission Limits - Related Power Quality Requirements for Lighting Equipment
NEMA ICS 2	(2000; R 2005; Errata 2008) Standard for Controllers, Contactors, and Overload Relays Rated 600 V
NEMA ICS 6	(1993; R 2011) Enclosures
NEMA IEC 60529	(2004) Degrees of Protection Provided by Enclosures (IP Code)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2011; Errata 2 2012) National Electrical Code

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

Energy Star	(1992; R 2006) Energy Star Energy Efficiency Labeling System

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

47 CFR 15	Radio Frequency Devices

UNDERWRITERS LABORATORIES (UL)

UL 1310	(2011; Reprint Jul 2012) UL Standard for Safety Class 2 Power Units
UL 1598	(2008; Reprint Oct 2012) Luminaires
UL 773	(1995; Reprint Mar 2002) Standard for Plug-In, Locking Type Photocontrols for Use with Area Lighting

UL 773A	(2006; Reprint Mar 2011) Standard for Nonindustrial Photoelectric Switches for Lighting Control
UL 8750	(2007; Reprint Oct 2012) UL Standard for Safety Light Emitting Diode (LED) Equipment for Use in Lighting Products

1.2 RELATED REQUIREMENTS

Materials not considered to be luminaires or lighting equipment are specified in Section 33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION.

1.3 DEFINITIONS

a. Unless otherwise specified or indicated, electrical and electronics terms used in these specifications and on the drawings shall be as defined in IEEE 100 and IES RP-16.

b. For LED luminaire light sources, "Useful Life" is the operating hours before reaching 70 percent of the initial rated lumen output (L70) with no catastrophic failures under normal operating conditions. This is also known as 70 percent "Rated Lumen Maintenance Life" as defined in IES LM-80.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, the "DOR" designation following the "G" designation identifies that the submittal shall be reviewed by the Designer of Record (DOR). The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Photometric Plan; G, DOR

LED Luminaire Warranty; G, DOR

SD-02 Shop Drawings

Luminaire drawings; G, DOR

SD-03 Product Data

Local/Regional Materials

Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site. Indicate relative dollar value of local/regional materials to total dollar value of products included in project.

Environmental Data

Energy Efficiency

LED Luminaires; G, DOR

Luminaire Light Sources; G, DOR

Luminaire Ballasts, Generators and Power Supply Units (Drivers); G, DOR

Lighting contactor; G, DOR

Time switch; G, DOR

Lighting Control Relay Panel; G, DOR

Motion Sensor; G, DOR

Photocell; G, DOR

Concrete poles; G, DOR

Aluminum poles; G, DOR

Steel poles; G, DOR

Fiberglass poles; G, DOR

Brackets

Obstruction Marker Luminaires; G, DOR

SD-04 Samples

Fluorescent, and LED Luminaires; G, DOR

Submit one sample of each luminaire type, complete with light source and ballast or power supply unit. Submit one sample for each item other than luminaires. Sample will be returned to the Contractor for installation in the project work.

SD-05 Design Data

Design Data for luminaires; G, DOR

SD-06 Test Reports

LED Luminaire - IES LM-79 Test Report; G

LED Light Source - IES LM-80 Test Report; G

Operating test

Submit operating test results as stated in paragraph entitled "Field Quality Control."

SD-07 Certificates

Luminaire Useful Life Certificate; G

Submit certification from the manufacturer indicating the expected useful life of the luminaires provided. The useful life shall be

directly correlated from the IES LM-80 test data using procedures outlined in IES TM-21. Thermal properties of the specific luminaire and local ambient operating temperature and conditions shall be taken into consideration.

SD-08 Manufacturer's Instructions

Electronic Ballast Warranty

Operational Service

Submit documentation that includes contact information, summary of procedures, and the limitations and conditions applicable to the project. Indicate manufacturer's commitment to reclaim materials for recycling and/or reuse.

1.5 QUALITY ASSURANCE

1.5.1 Drawing Requirements

1.5.1.1 Luminaire Drawings

Include dimensions, effective projected area (EPA), accessories, and installation and construction details. Photometric data, including zonal lumen data, average and minimum ratio, aiming diagram, and computerized candlepower distribution data shall accompany shop drawings.

1.5.2 Photometric Plan

For LED luminaires, provide computer-generated photometric analysis of the "designed to" values for the "end of useful life" of the luminaire installation using a light loss factor of 0.7. Submittal shall include the following:

Horizontal illuminance measurements at finished grade, taken at maximum of every 10 feet.

Vertical illuminance measurements at 5 feet above finished grade.

Minimum and maximum footcandle level.

Average maintained footcandle level.

Maximum to minimum ratio for horizontal illuminance only.

1.5.3 Design Data for Luminaires

a. Provide distribution data according to IES classification type as defined in IES HB-10.

b. Shielding as defined by IES RP-8 or B.U.G. rating for the installed position as defined by IES TM-15.

c. Provide safety certification and file number for the luminaire family. Include listing, labeling and identification per NFPA 70 (NEC). Applicable testing bodies are determined by the US Occupational Safety Health Administration (OSHA) as Nationally Recognized Testing Laboratories (NRTL) and include: CSA (Canadian Standards Association), ETL (Edison Testing Laboratory), and UL (Underwriters Laboratories).

d. Provide long term lumen maintenance projections for each LED luminaire in accordance with IES TM-21. Data used for projections shall be obtained from testing in accordance with IES LM-80.

e. Provide wind loading calculations for luminaires mounted on poles. Weight and effective projected area (EPA) of luminaires and mounting brackets shall not exceed maximum rating of pole as installed in particular wind zone area.

1.5.4 LED Luminaire - IES LM-79 Test Report

Submit test report on manufacturer's standard production model luminaire. Submittal shall include all photometric and electrical measurements, as well as all other pertinent data outlined under "14.0 Test Report" in IES LM-79.

1.5.5 LED Light Source - IES LM-80 Test Report

Submit report on manufacturer's standard production LED package, array, or module. Submittal shall include:

a. Testing agency, report number, date, type of equipment, and LED light source being tested.

b. All data required by IES LM-80.

1.5.5.1 Test Laboratories

Test laboratories for the IES LM-79 and IES LM-80 test reports shall be one of the following:

a. National Voluntary Laboratory Accreditation Program (NVLAP) accredited for solid-state lighting testing as part of the Energy-Efficient Lighting Products laboratory accreditation program.

b. One of the qualified labs listed on the Department of Energy - Energy Efficiency & Renewable Energy, Solid-State Lighting web site.

c. A manufacturer's in-house lab that meets the following criteria:

1. Manufacturer has been regularly engaged in the design and production of high intensity discharge roadway and area luminaires and the manufacturer's lab has been successfully certifying these fixtures for a minimum of 15 years.

2. Annual equipment calibration including photometer calibration in accordance with National Institute of Standards and Technology.

1.5.6 Regulatory Requirements

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. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated.

1.5.7 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section.

1.5.7.1 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if the manufacturer has been regularly engaged in the design and production of high intensity discharge roadway and area luminaires for a minimum of 15 years. Products shall have been in satisfactory commercial or industrial use for 15 years prior to bid opening. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 15-year period.

1.5.7.2 Material and Equipment Manufacturing Date

Products manufactured more than 1 year prior to date of delivery to site shall not be used, unless specified otherwise.

1.6 SUSTAINABLE DESIGN REQUIREMENTS

1.6.1 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 500 mile radius from the project site, if available from a minimum of three sources.

1.6.2 Environmental Data

Submit Table 1 of ASTM E2129 for all lighting products.

1.6.3 Energy Efficiency

Comply with National Energy Policy Act. Submit documentation for Energy Star qualifications for equipment provided under this section. Submit data indicating lumens per watt efficiency and color rendition index of light source.

1.7 WARRANTY

The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.7.1 LED Luminaire Warranty

Provide Luminaire Useful Life Certificate.

The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

a. Provide a written five year on-site replacement warranty for material, fixture finish, and workmanship. On-site replacement includes transportation, removal, and installation of new products.

   1. Finish warranty shall include warranty against failure and against substantial deterioration such as blistering, cracking, peeling, chalking, or fading.

   2. Material warranty shall include:

      (a) All power supply units (drivers).

      (b) Replacement when more than 10 percent of LED sources in any lightbar or subassembly(s) are defective or non-starting.

b. Warranty period must begin on date of beneficial occupancy. Contractor shall provide the Contracting Officer signed warranty certificates prior to final payment.

1.7.2 Electronic Ballast Warranty

Furnish the electronic ballasts manufacturer's warranty. The warranty period shall not be less than five (5) years from the date of manufacture. Ballast assembly in the lighting fixture, transportation, and on-site storage shall not exceed twelve (12) months, thereby permitting four (4) years of the five (5) year warranty to be in service and energized. The warranty shall state that the malfunctioning ballast shall be exchanged by the manufacturer and promptly shipped to the using Government facility. The replacement ballast shall be identical to, or an improvement upon, the original design of the malfunctioning ballast.

The contractor is responsible for all costs related to the final desposition of faulty ballast that are replaced by the manufacturer.

1.8 OPERATIONAL SERVICE

Coordinate with manufacturer for maintenance agreement and take-back program. Collect information from the manufacturer about maintenance agreement and green lease options, and submit to Contracting Officer. Services shall reclaim materials for recycling and/or reuse. Services shall not deposit materials in landfills or burn reclaimed materials. Indicate procedures for compliance with regulations governing disposal of mercury. When such a service is not available, local recyclers shall be sought after to reclaim the materials.

PART 2 PRODUCTS

2.1 PRODUCT COORDINATION

Products and materials not considered to be luminaires, equipment or accessories are specified in Section 33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION.

2.2 LED LUMINAIRES

UL 1598, NEMA C82.77 and UL 8750. Provide luminaires as indicated in luminaire schedule and XL plates or details on project plans. Provide luminaires complete with light sources of quantity, type, and wattage indicated. All luminaires of the same type shall be provided by the same manufacturer.

2.2.1 General Requirements

a. LED luminaire housings shall be die cast or extruded aluminum. Housings for luminaires other than LED shall be die cast, extruded, or fabricated aluminum. Fabricated aluminum housings shall have all seams and corners internally welded to resist weathering, moisture and dust.

b. LED luminaires shall be rated for operation within an ambient temperature range of minus 22 degrees F to 122 degrees F.

c. Luminaires shall be UL listed for wet locations per UL 1598. Optical compartment for LED luminaires shall be sealed and rated a minimum of IP65 per NEMA IEC 60529.

d. LED luminaires shall produce a minimum efficacy of 60 lumens per watt driven at a maximum 600 mA, tested per IES LM-79. Theoretical models of initial raw LED lumens per watt are not acceptable.

e. Luminaires shall have IES distribution and NEMA field angle classifications as indicated in luminaire schedule on project plans per IES HB-10.

f. Housing finish shall be baked-on enamel, anodized, or baked-on powder coat paint. Finish shall be capable of surviving ASTM B117 salt fog environment testing for 2500 hours minimum without blistering or peeling.

g. Luminaires shall not exceed the following IES TM-15 Backlight, Uplight and Glare (B.U.G.) ratings:

    1. Maximum Backlight (B) rating shall be determined by lighting zone in which luminaire is placed.

    2. Maximum Uplight (U) rating shall be U0.

    3. Maximum Glare (G) rating shall be determined by lighting zone in which luminaire is placed.

h. Luminaires shall be fully assembled and electrically tested prior to shipment from factory.

i. The finish color shall be as indicated in the luminaire schedule or detail on the project plans.

j. Luminaire arm bolts shall be 304 stainless steel or zinc-plated steel.

k. Luminaire lenses shall be constructed of clear tempered glass or UV-resistant acrylic. Provide polycarbonate vandal-resistant lenses as indicated.

l. The wiring compartment on pole-mounted, street and area luminaires must

be accessible without the use of hand tools to manipulate small screws, bolts, or hardware.

m. Incorporate modular electrical connections, and construct luminaires to allow replacement of all or any part of the optics, heat sinks, power supply units, ballasts, surge suppressors and other electrical components using only a simple tool, such as a manual or cordless electric screwdriver.

n. Luminaires shall have a nameplate bearing the manufacturer's name, address, model number, date of manufacture, and serial number securely affixed in a conspicuous place. The nameplate of the distributing agent will not be acceptable.

p. Luminaire must pass 3G vibration testing in accordance with NEMA C136.31.

q. All factory electrical connections shall be made using crimp, locking, or latching style connectors. Twist-style wire nuts are not acceptable.

2.2.2 Luminaire Light Sources

2.2.2.1 LED Light Sources

a. Correlated Color Temperature (CCT) shall be in accordance with NEMA ANSLG C78.377:

Nominal CCT: 4000 degrees K: 3985 plus or minus 275 degrees K

b. Color Rendering Index (CRI) shall be:

Greater than or equal to 82 for 4000 degrees K light sources.

c. Color Consistency:

Manufacturer shall utilize a maximum 4-step MacAdam ellipse binning tolerance for color consistency of LEDs used in luminaires.

2.2.3 Luminaire Ballasts, Generators and Power Supply Units (Drivers)

2.2.3.1 LED Power Supply Units (Drivers)

UL 1310. LED Power Supply Units shall meet the following requirements:

a. Minimum efficiency shall be 85 percent.

b. Drive current per LED shall not exceed 600 mA, plus or minus 10 percent.

c. Shall be rated to operate between ambient temperatures of minus 22 degrees F and 104 degrees F.

d. Shall be designed to operate on the voltage system to which they are connected, typically ranging from 120 V to 480 V nominal.

e. Operating frequency shall be: 50 or 60 Hz.

f. Power Factor (PF) shall be greater than or equal to 0.90.

g. Total Harmonic Distortion (THD) current shall be less than or equal to

20 percent.

h. Shall meet requirements of 47 CFR 15, Class B.

i. Shall be RoHS-compliant.

j. Shall be mounted integral to luminaire. Remote mounting of power supply is not allowed.

k. Power supplies in luminaires mounted under a covered structure, such as a canopy, or where otherwise appropriate shall be UL listed with a sound rating of A.

l. Shall be dimmable, and compatible with a standard dimming control circuit of 0 - 10V or other approved dimming system.

m. Shall be equipped with over-temperature protection circuit that turns light source off until normal operating temperature is achieved.

2.2.4 LED Luminaire Surge Protection

Provide surge protection integral to luminaire to meet C Low waveforms as defined by IEEE C62.41.2, Scenario 1, Location Category C.

2.3 EXTERIOR LUMINAIRE CONTROLS

Controls shall comply with Section 9 of ASHRAE 90.1 - IP, . Provide a control system interface within each luminaire that is compatible with the energy management or control system used by the utility department in charge of the project area for control of site lighting.

2.3.1 Photocell

UL 773 or UL 773A. Photocells shall be hermetically sealed, silicon diode light sensor type, rated at 1000 watts, 277/208/120 volts, 50/60 Hz with single-pole, single-throw contacts. Photocell shall be designed to fail to the ON position. Housing shall be constructed of UV stabilized polypropylene, rated to operate within a temperature range of minus 40 to 158 degrees F. Photocell shall have a 1/2 in threaded base for mounting to a junction box or conduit. Provide fixed base type housing. Photocell shall be twist-lock receptacle type conforming to NEMA C136.10. Provide with solid brass prongs and voltage markings and color coding on exterior of housing. Photocell shall turn on at 1-3 footcandles and turn off at 3 to 15 footcandles. A time delay shall prevent accidental switching from transient light sources. Provide a directional lens in front of the cell to prevent fixed light sources from creating a turnoff condition. Provide photocell with joule metal oxide varistor (MOV) type surge protection.

2.3.2 Timeswitch

Timeswitch shall be an electronic type with a 24 hour, 7 day astronomic programming function that changes on/off settings according to seasonal variations of sunset and sunrise, providing a total of 56 on/off set points. Digital clock display format shall be AM/PM 12 hour or 24 hour type. Provide power outage backup for switch utilizing a alkaline batteries or lithium battery which provides coverage for a minimum of 7 days. Timeswitch shall provide control to 4 channels or loads. Contacts shall be rated for 30 amps at 120-277 VAC resistive load in a SPSTnormally open (NO) configuration. Provide switch with manual bypass or remote override control, daylight savings time automatic adjustment, EEPROM memory module, momentary

function for output contacts and ability for photosensor input.

Timeswitch shall be housed in a surface-mounted, lockable NEMA 1 enclosure constructed of painted steel or plastic polymer conforming to NEMA ICS 6.

2.3.3 Lighting Contactor

NEMA ICS 2. Provide a mechanically or electrically-held lighting contactor housed in a NEMA 1 and 3R enclosure conforming to NEMA ICS 6. Contactor shall have 4 poles, configured as normally open (NO). Contacts shall be rated 600 volts, 30 amperes for a resistive load. Coil operating voltage shall be 120-277 volts. Contactor shall have silver cadmium oxide double-break contacts and coil clearing contacts for mechanically held contactors and shall require no arcing contacts. Provide contactor with hand-off-automatic on-off selector switch. Provide contactor as specified above along with disconnect switch in integral NEMA 1 and 3R enclosure with flange-mounted handle to satisfy requirement for a "combination lighting contactor" when specified.

2.4 EQUIPMENT IDENTIFICATION

2.4.1 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.

2.4.2 Labels

Provide labeled luminaires in accordance with UL 1598 requirements. Luminaires shall be clearly marked for operation of specific light sources and ballasts according to proper light source type. The following light source characteristics shall be noted in the format "Use Only _____":

a. Light source tube diameter code (e.g. T-4, T-5, T-8), tube quantity configuration (e.g. twin, quad, triple), base type (e.g. G24q-2, GX 24 q-4), and nominal wattage for fluorescent and compact fluorescent luminaires.

b. Light source type, wattage, bulb type (e.g. ED17, BD56) and coating (clear or coated) for HID luminaires.

c. Start type (e.g. programmed-start, rapid-start, instant-start) for fluorescent and compact fluorescent luminaires.

d. ANSI ballast type (e.g. M98, M57) for HID luminaires.

e. Correlated color temperature (CCT) and color rendering index (CRI) for all luminaires.

Markings related to lamp type shall be clear and located to be readily visible to service personnel, but unseen from normal viewing angles when lamps are in place. Ballasts shall have clear markings indicating multi-level outputs and indicate proper terminals for the various outputs.

2.5 FACTORY APPLIED FINISH

Electrical equipment shall have factory-applied painting systems which

shall, as a minimum, meet the requirements of NEMA 250 corrosion-resistance test.

PART 3 EXECUTION

3.1 INSTALLATION

Electrical installations shall conform to IEEE C2, NFPA 70, and to the requirements specified herein.

3.1.1 Photocell Switch Aiming

Aim switch according to manufacturer's recommendations. Mount switch on or beside each luminaire when switch is provided in cast weatherproof aluminum housing with swivel arm.

3.1.2 GROUNDING

Ground noncurrent-carrying parts of equipment including metal poles, luminaires, mounting arms, brackets, and metallic enclosures as specified in Section 33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION. Where copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable for this purpose.

3.1.3 FIELD APPLIED PAINTING

Paint electrical equipment as required to match finish of adjacent surfaces or to meet the indicated or specified safety criteria.

3.2 FIELD QUALITY CONTROL

Upon completion of installation, verify that equipment is properly installed, connected, and adjusted. Conduct an operating test after 100 hours of burn-in time to show that the equipment operates in accordance with the requirements of this section.

-- End of Section --