Construction Contract No: N40085-
Specification No: 2016FDRPROJ

eProjects WO#s:

PIER 14 – 1397083
CEP111 BULKHEAD – 1556954
Q8 BULKHEAD – 1397085
PIER 04 – 1397089

PIER 14, CEP111 BULKHEAD, Q8 BULKHEAD, & PIER 04 FENDER SYSTEM REPAIRS

At the

Naval Station, Norfolk

DESIGNED BY:
NAVFAC MIDLANT; PWD NORFOLK; FACILITIES ENGINEERING
9324 VIRGINIA AVENUE
NORFOLK, VIRGINIA 23511-3095

SPECIFICATION PREPARED BY:

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Date: 07/28/16

SPECIFICATION APPROVED BY:

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7-28-16

Project Mgmt & Engineering Director: Jerry T. Haste, P.E.
For Commander, NAVFAC MID-ATLANTIC:
Date: 07/28/2016

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-- End of Project Table of Contents --

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LIST OF DRAWINGS

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

List of Contract Drawings is contained on the following NAVFAC Drawing Sheets:

BASE BID:

Pier 14 Fender System Repairs - #12,725,417 thru #12,725,433 which are Sheets (G001 thru MPPA101) for that particular set of contract drawings and pertaining to that facility.

OPTION 1:

CEP111 Fender System Repairs - #12,727,681 thru #12,727,690 which are Sheets (G001 thru MPPA101) for that particular set of contract drawings and pertaining to that facility.

OPTION 2:

Q8 Fender System Repairs - #12,727,691 thru #12,727,699 which are Sheets (G001 thru MPPA101) for that particular set of contract drawings and pertaining to that facility.

OPTION 3:

Pier 04 Fender System Repairs - #12,181,991 thru #12,182,000 which are Sheets (G001 thru MPPA101) for that particular set of contract drawings and pertaining to that facility.

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 reference drawings are intended only to reflect original construction and geotechnical information. The drawings are to only be used for reference pertaining to the original design and may not reflect the existing conditions found in the field. Drawings are the property of the Government and shall not be used for any purpose other than that intended by the contract. The drawings are provided in electronic PDF format.

Note: Some of pier have been renumbered since the time of their original construction. The original and current number system is as follows:

Current	**Original**
Pier 04	Pier 24
Pier 05	Pier 25

The reference drawings include:

Orignal Construction Drawings
Pier 04 - As Builts
Pier 14 - As Builts
Q8 Bkhd - As Builts

Most Recent Water Depths
FY2010 - Maintenance Dredging
FY2016 - Maintenance Dredging

1.3.2 Boring Logs

The Government does not guarantee that borings indicate actual conditions, except for the locations and the time that they were made.

CEP111 Boring Logs

-- End of Document --

SECTION 01 11 00

SUMMARY OF WORK

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
Salvage Plan; G
Preconstruction Fender System Survey; G

1.2 WORK COVERED BY CONTRACT DOCUMENTS

1.2.1 Project Description

The work includes the demolition and disposal the existing timber fender systems; the provision of timber fender system repairs to timber chocks, wales, and piles; the provision of prestressed concrete fender piles, composite fender piles, steel fender pile modules, foam filled fenders, and ladders, and incidental related work.

1.2.2 Location

The work shall be located on the Norfolk Naval Station at Pier 14, Pier 04, CEP111 Bulkhead and the Q8 Bulkhead as indicated on the contract drawings. The exact location will be shown by the Contracting Officer.

1.3 OCCUPANCY OF PREMISES

Bulkhead, piers, and buildings will be occupied during performance of work under this Contract.

Before work is started, arrange with the Contracting Officer a sequence of procedure, means of access, space for storage of materials and equipment, and use of roadways, parking areas, waterways, and approaches.

1.4 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.

1.5 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 48 hours 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.

Verify existing electrical and communication conduits and equipment which run on or along side of the bulkhead walls which may be affected by the demolition or repairs.

Identify and mark all other utilities not managed and located by the local utility companies including storm outfalls. Scan the construction site with Ground Penetrating Radar (GPR), electromagnetic, or sonic equipment, and mark the surface of the ground, concrete, and paved surface where existing underground utilities or utilities encased in pier structures are discovered. Verify the elevations of existing piping, utilities,and any type of underground or encased obstruction not indicated, or specified to be removed, that is indicated or discovered during scanning, in locations to be traversed by piping, ducts, and other work to be conducted or installed. Verify elevations before installing new work closer than nearest manhole or other structure at which an adjustment in grade can be made.

1.5.1 Notification Prior to Excavation

Notify the Contracting Officer at least 15 days prior to starting excavation work. The contractor will have to coordinate the temporary closure of parking areas with the Ship Support Officer through the Construction Manager.

1.5.2 **Welding, and Burning Permits**

ACTIVITY	**SUBMISSION DATE**
Burning Permits	**15 calendar days prior to work**
Welding and/or Hot Work Permits	**15 calendar days prior to work**

Permits shall be posted at a conspicuous location in the construction area.

Burning of trash or rubbish is not permitted at on project site.

1.6 SALVAGE MATERIAL AND EQUIPMENT

Items designated by the construction documents or indicated by the Contracting Officer to be salvaged and reinstalled shall remain the property of the Government. Segregate, itemize, deliver and off-load the salvaged property at the Government designated storage area located within 4 miles of the construction site until these items can be reinstalled by the contractor as part of this contract.

Provide a salvage plan, listing material and equipment to be salvaged, and their storage location. 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.

1.7 1.8 PRECONSTRUCTION SURVEYS

The contractor shall conduct a preconstruction fender system survey prior to demolition and construction. Refer to specification section SECTION 01 45 02, "NAVFAC QUALITY CONTROL."

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 14 00

WORK RESTRICTIONS

PART 1 GENERAL

1.1 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-01 Preconstruction Submittals

List of Contact Personnel; G

1.2 NOTIFICATIONS AND PERMITTING REQUIREMENTS

The Naval Station falls within the NSN Chambers Field Class D airspace. Restrictions apply to specific crane heights to protect flight operations and therefore notifications and approvals from the Federal Aviation Administration (FAA) and NSN Chambers Field Air Operations shall be required.

Construction at the Naval Station or adjacent waterways requires the notification, submission of permits, and approval Federal, State, and Local organization prior to beginning any operation that affects the waterways, river bottom, or generates underwater noise.

Prior to beginning any operation that that utilizes cranes or may generate underwater noise, ensure at all notifications have been made and all permits have been obtained.

1.3 SPECIAL SCHEDULING REQUIREMENTS

1.3.1 CONSTRUCTION PHASING OF THE WORK

At the time of award, the Contracting Officer shall identify which "Quadrant", in the BASE BID, the contractor shall begin his work.

The contractor shall coordinate with the Contracting Officer, the scheduling and phasing, of the demolistion and repairs for each awarded Option.

1.3.1.1 Piers

The Timber Fender Fender System Demolition and Repairs will be phased into two "Quadrants" (designated as the North Side and the South Side of each pier). To ensure contractor access to his work site and to minimize impact to naval operations. The width of each quadrant, for the contractor's work area, will be approximately 25 feet as measured from the outside of the pier curbing towards the pier centerline.

The contractor shall limit his operations to within the boundaries established by each designated "Quadrant" and shall complete all the required demolition and construction, to the acceptance of the Contracting

Officer, prior to commencing work in the next "Quadrant".

A 20'-0" wide vehicle/fire travel lane runs along the centerline of the pier shall remain unobstructed at all times and the contractor shall maintain a minimum clearance of 5 feet from edge of the designated vehicle/fire travel lane.

The contractor shall provide the Contracting Officer written notification, a minimum of 15 calendar days, prior to commencing construction on the subsequent "Quadrant" to allow for the government to coordinate and schedule naval vessel, equipment, and material relocations. Ship movements will not occur during weekends or Holidays, therefore for bidding purposes the contractor shall anticipate a (2) "work day" delay for all of his operations between the completion of one pier "Quadrant" and the commencement of work at the subsequent pier "Quadrant" to allow for the ship movements.

The contractor shall have to relocate his materials and equipment, from the pier and affected waterways, to allow for vessel relocation during the Quadrant change. Contractor's mobilization and demobilization costs, for each quadrant shift and time delay for naval vessel relocation, shall be included in the total contract price.

NOTE: The Contractor shall not proceed to the subsequent Quadrant until all fender system repairs have been inspected and all inspection reports have approved by the Contracting Officer.

1.3.1.2 Bulkheads

There will be no quadrant seperation for work along the bulkhead projects. The overall length of each project will be designated by the Station Foot Marks represented on the drawings. The width of the work area will be approximately 25 feet shoreside as measured from the outside of the bulkhead curbing.

The contractor shall provide the Contracting Officer written notification, a minimum of 30 calendar days, prior to commencing construction on each bulkhead to allow for the government to coordinate and schedule naval vessel, shore-side equipment, and material relocations.

The contractor shall schedule and coordinate his work, near the pier heads, so that vehicular traffic may enter and exit the pier gate during the all phases of construction.

1.3.2 **SPECIAL CONSTRUCTION SEQUENCING REQUIREMENTS**

1.3.2.1 **NAVAL BARGE FUELING AT CEP111**

At STA 2+00 there is a fueling station for naval fuel barges. The navy will be required to utilize this area during the duration of the demolition and repairs. Fueling operations average (1) day per week in which the area the barge is in will not be assessable to the contractor and shall have to work other adjacent area. No hot work or any operation which may create a fire hazard shall occur during the time of the fueling operation.

The barges range in size up to 175 feet and connect to the fueling station near the stern of the barge. The type of fuel product will determine which side of the barge will have to be adjacent to the bulkhead.

Currently a number of floating foam filled fenders have been placed against the existing seawall for berthing of the barges. The contractor shall coordinate the demolition and repairs of the fender system, through the Contracting Officer, to ensure fuel operations are not hindered during the project duration.

1.3.3 WORK STOPPAGE DURING HOLIDAYS

Due to Holiday Berthing, no demolition or construction work shall occur between the 15 November and January 15 of any calendar year that would affect ship berthing or naval operations on the piers. The contractor will have to completely vacated and remove all waterborne material storage and equipment from the waterways from the piers during the dates identified unless otherwise directed by the Contracting Officer. Bulkhead and Shore-side work may still occur so long as naval operations are not affected.

1.4 SPECIAL CONTRACT CONDITIONS

(a) The Contractor shall make provisions for the storage of equipment and materials on barges if there is not sufficient room along the pier quadrant or the bulkhead area assigned to the contractor while he's working. There will be a shore side Layton area made available for the contractor's office trailer upon award of the contract. The site will be identified after award of the contract and will be within (2) miles of the worksite. The contractor shall provide all security and fencing for his laydown area and shall provide all metering and utility hooks to his trailers. The site will have to be returned to their original condition upon completion of the contract.

(b) The adjacent Piers and Bulkheads shall remain in operation and the contractor shall conduct his operations so as to cause the least possible interference with normal naval operations. Only the "Quadrant" the contractor required to perform his work will be close to naval berthing operations.

(c) The contractor shall perform his field inspections and preconstruction surveys at his earliest convenience subject to bulkhead quadrant availably. The contractor shall have to coordinate these inspections with Port Operations through the Contracting Officer.

(d) During the contract period for this project additional construction contracts may be under construction which involve work by other contractors within and adjacent to this construction site. The contractor shall carefully schedule and coordinate his work with the other contracts so as to offer no interference or delay to the other contractors and so as not to damage or rework the work of other contractors.

(e) Interference with Navigation: The contractor shall conduct his operation so as to cause no interference with normal operations of the activity. Contractor's floating assets shall not affect ship berthing operations on adjacent piers and it may become necessary to shift or interrupt construction operations to accommodate the movement of vessels upon direction of the Contracting Officer.

Maintain complete control of the movement of floating equipment

and material. Loose floating equipment and material are not permitted. Secure floating equipment which may get loose and become a hazard to navigation.

In addition to "DFARS 252.236-7002, Obstruction of Navigable Waterways," obtain from the Port Operations Officer and the Security Office at the Naval Base via the Contracting Officer, permission to use waterways and the regulations and directives governing such usage. Submit a watercraft list with a description of crafts, including sizes, types, numbers and boat crew for approval. Contractor shall require a marine radio in order to remain in constant contact with Port Operations.

(f) Special Fire Provisions: The contractor will be furnished a list of fire and safety regulations pertaining to the station and the piers, and he shall conform to the requirements set forth at all times.

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

(h) Permission to interrupt any utility service shall be requested in writing at least fifteen business days in advance and approval of the Contracting Officer shall be received before any service is interrupted. Interruptions of utility services will be allowed only when they will cause no interference with the operations of the activity. All utility cutovers shall be made after normal working hours or on weekends; anticipated costs shall be included in the bid.

NOTE: Utilities identified in the contract documents or found during the contractor's inspections running along the bulkhead and underground, which are not identified as abandoned, or inactive, should assume to be live. If conditions are observed that may pose danger, report conditions to the Contracting Officer as soon as possible for direction.

i. Throughout the duration of this contract, there will be government activities on and adjacent to this site that will require the contractor to stop work and vacate his personnel and equipment from the site. These activities include, but are not limited to, ship movements, change of command ceremonies, fueling and movement of ammunition.

1.5 PIER AND BULKHEAD LOAD LIMITS

There are crane operational and weight handling restrictions on the piers and along the entire waterfront.

The contractor shall provide calculations, signed by a licensed professional engineer from the state of Virginia, when in the determination of the Contracting Officer, the placement of equipment or materials may be excessive or may approach the allowable pier or bulkhead loading.

All underwater debris removal, extraction of existing timber piles, and all pile driving and installation operations shall be accomplished from floating assets. The Contractor shall also make provisions for the storage of equipment and materials on barges or floats due to non-existent laydown

areas either on the pier or along the waterfront. The Contractor's floating assets shall not encroach upon adjacent piers, adjacent berths, or affect the movement of naval traffic between piers.

1.5.1 Pier Load Limits

There are crane operational and weight handling restrictions on the piers. The contractor shall not exceed a loading of 600 pounds per square foot on the pier. Crane outriggers or weight handling equipment stabilizer pads reactions shall not exceed 70,000 pounds. Vehicle and weight handling equipment axle loads shall not exceed AASHTO HS-20 load rating requirements.

1.5.2 Bulkhead Load Limits

The contractor shall not exceed a 200 pounds per square foot live load, within 15 feet of the bulkhead until all repairs have been completed. Vehicle and weight handling equipment axle loads shall not exceed AASHTO HS-20 load rating requirements.

1.6 CONTRACTOR ACCESS AND USE OF PREMISES

1.6.1 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 and personal protection equipment in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. The Contractor's equipment shall be conspicuously marked for identification

1.6.1.1 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.

1.6.1.2 Identification Badges and Installation Access

Application for and use of badges will be as directed. Obtain access to the installation by participating in the Navy Commercial Access Control System (NCACS), or by obtaining passes each day from the Base Pass and Identification Office. Costs for obtaining passes through the NCACS are the responsibility of the Contractor. One-day passes, issued through the Base Pass and Identification Office, will be furnished without charge. Furnish a completed EMPLOYMENT ELIGIBILITY VERIFICATION (DHS FORM I-9) form for all personnel requesting badges. This form is available at http://www.uscis.gov/portal/site/uscis by searching or selecting Employment Verification (Form I-9). Immediately report instances of lost or stolen badges to the Contracting Officer.

a. NCACS Program: NCACS is a voluntary program in which Contractor personnel who enroll, and are approved, are subsequently granted access to the installation for a period up to one year, or the length of the contract, whichever is less, and are not required to obtain a new pass from the Base Pass and Identification Office for each visit. The Government performs background screening and credentialing. Throughout the year the Contractor employee must continue to meet background

screening standards. Periodic background screenings are conducted to verify continued NCACS participation and installation access privileges. Under the NCACS program, no commercial vehicle inspection is required, other than for Random Anti-Terrorism Measures (RAM) or in the case of an elevation of Force Protection Conditions (FPCON). Information on costs and requirements to participate and enroll in NCACS is available at http://www.rapidgate.com or by calling 1-877-727-4342. Contractors should be aware that the costs incurred to obtain NCACS credentials, or costs related to any means of access to a Navy Installation, are not reimbursable. Any time invested, or price(s) paid, for obtaining NCACS credentials will not be compensated in any way or approved as a direct cost of any contract with the Department of the Navy.

b. One-Day Passes: Participation in the NCACS is not mandatory, and if the Contractor chooses to not participate, the Contractor's personnel will have to obtain daily passes, be subject to daily mandatory vehicle inspection, and will have limited access to the installation. The Government will not be responsible for any cost or lost time associated with obtaining daily passes or added vehicle inspections incurred by non-participants in the NCACS.

1.6.1.3 Personnel Entry Approval

Failure to obtain entry approval will not affect the contract price or time of completion.

1.6.1.4 No Smoking Policy

Smoking is prohibited on the pier, along the waterfront, and within or outside of all buildings on installations under the cognizance of NAVFAC except in designated smoking areas. This applies to existing piers, 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.

1.6.2 Working Hours

Regular working hours must consist of an period established or approved of by the Contractor Officer, excluding Government holidays.

1.6.3 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

1.6.4 Occupied Pier(s)

The Contractor shall be working on an existing pier which is occupied. Do not enter any areas of the pier or approach naval vessels without prior approval of the Contracting Officer.

1.6.5 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. Interruption to water, sanitary sewer, telephone service, electric service, fire alarm, and "pure" water shall be considered utility cutovers pursuant to the paragraph entitled "Work Outside Regular Hours." Contact Code 99 NRMD for additional guidance when working around "pure" water piping or connections.

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

1.7 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," and the following apply:

1.8 Naval Base, Norfolk, VA

a. Contractor registration. Register with the Base Police Truck Investigation Team, located behind pass and ID Office (Bldg CD-9) on Hampton Boulevard, Naval Air Station, Norfolk, VA 23511-5000, telephone number (757) 322-2979.

b. Storage and office trailer registration. Register storage and office trailers to be used on base with the truck investigation team. Trailers shall meet State law requirements and shall be in good condition.

(1) Trailers shall be lockable and shall be locked when not in use.

(2) Trailers shall have a sign in the lower left hand corner of left door of trailer with the following information: Company name, address, registration number of trailer or vehicle identification number, location on base, duration of contract or stay on base, contract number, local on-base phone number, off-base phone number of main office, and emergency recall person and phone number.

c. Equipment markings. Equipment owned or rented by the company shall have the company name painted or stenciled on the equipment in a conspicuous location. Rented equipment is to be conspicuously marked with a tag showing who rented the equipment. Register the equipment with the truck investigation team.

d. Procedure information. For additional information regarding registration procedures, contact the Officer in Charge of Construction at (757) 445-1463 or Base Police at (757) 444-8856.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 20 00.00 20

PRICE AND PAYMENT PROCEDURES

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

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 all demolition and repair work, downtime due to anticiplated delays due to berth changes, and include incidental work.

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. The Contractor's invoice, on NAVFAC Form 7300/30 furnished by the Government, showing in summary form, the basis for arriving at the amount of the invoice. Form 7300/30 shall include certification by Quality Control (QC) Manager as required by the contract.

b. The Estimate for Voucher/ Contract Performance Statement on NAVFAC Form 7300/31 furnished by the Government, showing in detail: the estimated cost, percentage of completion, and value of completed performance. Use NAVFAC LANT Form 4-330/110 (New 7/84) on NAVFAC LANT contracts when a Monthly Estimate for Voucher is required.

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

d. Contractor Safety Self Evaluation Checklist.

e. Other supporting documents as requested.

f. Updated copy of submittal register.

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

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

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

j. 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 the Continental United States. Other locations are subject to written approval by the Contracting Officer.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

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

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 800x600 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.

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.

For routine projects where the superintendent is permitted to also serve as the Quality Control (QC) Manager as established in Section 01 45 00.10 20 QUALITY CONTROL FOR MINOR CONSTRUCTION, the superintendent must have qualifications in accordance with that section.

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 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 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.

1.8.1 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.

1.9 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 16.00 20

SMALL PROJECT CONSTRUCTION PROGRESS SCHEDULES

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

Construction Schedule; G

SD-07 Certificates

Monthly Updates; G

1.2 ACCEPTANCE

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

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

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

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

c. Review of any schedule updates.

Submittal of the Baseline Schedule, and subsequent schedule updates, must be 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 must be accomplished, and accurately reflects the work that has been accomplished and how it was sequenced (as-built logic).

1.3 SCHEDULE FORMAT

1.3.1 Network Analysis Schedule (NAS)

Use the critical path method (CPM) to schedule and control project activities. Prepare and maintain project schedules using Primavera P6 or Microsoft Project 2010. Importing data into the scheduling program using data conversion techniques or third party software will be cause for rejection of the submitted schedule. Build the schedule as follows:

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

b. With the exception of the Contract Award and End Contract milestone activities, no activities must 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. Any such change must be documented in the milestone's "Notebook", including a date and explanation for the change. The ID number for a deleted activity must not be re-used for another activity.

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

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

1.3.1.1 Primavera P6 Settings and Parameters

Primavera P6 settings and parameters which must be used in preparing the Baseline Schedule are as follows. Deviation from these settings and parameters, without prior consent of the Contracting Officer, is cause for rejection of schedule submission.

a. General: Calendars and Activity Codes are defined or established at the "Project" level, not the "Global" level.

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

(1) Time periods for P6 must be set to 8.0 Hours/Day, 40.0 Hours/Week, 172.0 Hours/Month and 2000.0 Hours/Year.

(2) Use assigned calendar to specify the number of work hours for each time period: Must be checked.

c. Project Level, Dates Tab:

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

d. Project Level, Defaults Tab:

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

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

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

(4) Calendar: Set to "Standard 5 Day Workweek". Calendar must reflect Saturday, Sunday and all Federal holidays as non-work days. Alternative calendars may be used with Contracting Officer approval.

e. Project Level, Calculations Tab:

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

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

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

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

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

f. Project Level, Settings Tab:

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

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

1.3.1.2 Microsoft Project 2010 Settings and Parameters

The Network must have a minimum of 30 construction activities. No on-site construction activity must have durations in excess of 20 working days.

1.3.1.3 Cost Loading Microsoft Project 2010 Schedules

Assign material, labor and equipment costs to their respective Construction Activities. Material and equipment costs for which payment will be requested in advance of installation must be assigned to their respective procurement activity (i.e. the material/equipment on-site activity). Evenly disperse overhead and profit to each activity over the duration of the project. Cost loading must total to 100 percent of the value of the contract.

a. Submit an Earned Value Report with each schedule update showing activity budget, cost percent complete, earned amount and cost to complete as directed by the Contracting Officer.

b. With each schedule submission, provide a Schedule Variance control (SVC) diagram showing:

(1) Cash Flow S-Curves indicating planned project cost based on projected early and late activity finish dates.

(2) Earned Value to-date. Revise Cash Flow S-Curves when the contract is modified, or as directed by the Contracting Officer.

1.3.2 Schedule Submittals and Procedures

Submit Network Analysis Schedules (NAS) and updates in hard copy and on

electronic media that is acceptable to the Contracting Officer. Submit an electronic back-up of the project schedule in an import format compatible with the Government's scheduling program.

1.4 SCHEDULE MONTHLY UPDATES

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

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

(1) Progress made in each area of the project

(2) Critical Path

(3) Date/time constraint(s), other than those required by the contract

(4) Changes in the following; added or deleted activities, original and remaining durations for activities that have not started, logic, milestones, planned sequence of operations, and critical path

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

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

(7) Description of current and future schedule problem areas.

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

1.5 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. If the impact has not occurred within 30 calendar days, TIA procedure must be reduced to the most basic level possible to still reflect a reasonable assessment of the result of a delay, representing actual conditions as they occurred.

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 must not receive time extension.

(c) Compensable Delay: Government Responsibility - Contractor may receive compensable time extension.

(2) If a combination of delay types occurs, it is considered Concurrent Delay, which is defined in the following combinations:

(a) Excusable Delay and Compensable Delay results in Excusable Delay

(b) Excusable Delay and Inexcusable Delay results in Inexcusable Delay

(c) Compensable Delay and Inexcusable Delay results in Excusable Delay

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

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

1.6 3-WEEK LOOK AHEAD SCHEDULE

The Contractor must prepare and issue a 3-Week Look Ahead schedule to provide a more detailed day-to-day plan of upcoming work identified on the Construction Schedule. The work plans must be keyed to activity numbers when a NAS is required and updated each week to show the planned work for the current and following two-week period. Additionally, include upcoming outages, closures, preparatory meetings, and initial meetings. Identify critical path activities on the Three-Week Look Ahead Schedule. The detail work plans are to be bar chart type schedules, maintained separately from the Construction Schedule on an electronic spreadsheet program and printed on 8-1/2 by 11 inch sheets as directed by the Contracting Officer. Activities must not exceed 5 working days in duration and have sufficient level of detail to assign crews, tools and equipment required to complete the work. Three hard copies and one electronic file of the 3-Week Look Ahead Schedule must be delivered to the Contracting Officer no later than 8 a.m. each Monday and reviewed during the weekly CQC Coordination or Production Meeting.

1.7 CORRESPONDENCE AND TEST REPORTS:

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

1.8 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 requirement of this section.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

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

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

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

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

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

A submittal register showing items of equipment and materials for when submittals are required by the specifications is provided as "Appendix A - Submittal Register".

1.2 DEFINITIONS

1.2.1 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 start of construction (work).

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

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.

Interim "DD Form 1354" with cost breakout for all assets 30 days prior to facility turnover.

1.2.2 Approving Authority

Office or designated person authorized to approve submittal.

1.2.3 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.

1.3 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

1.4 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.4.1 Government Approved (G)

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled, "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.5 FORWARDING SUBMITTALS REQUIRING GOVERNMENT APPROVAL

1.5.1 Submittals Required from the Contractor

As soon as practicable after award of contract, and before procurement of fabrication, forward to the Commanding Officer, Navy Public Works Department, Attn: Code PRW215, Building A-81, 9324 Virginia Ave., Norfolk, Virginia 23511-3095, submittals required in the technical sections of this specification, including shop drawings, and product data. One copy of the transmittal form for all submittals shall be forwarded to the Resident

Officer in Charge of Construction.

Unless otherwise directed, submit all correspondence, submittal register, daily reports, submittals, shop drawings, and Requests for Information (RFI's) in PDF electronic format via e-mail or CD-ROM. Government e-mail services cannot receive attachments larger than 5 MB. All submittals smaller than 5 MB shall be submitted via e-mail. All submittals that are larger than 5 MB shall be submitted via CD-ROM or separated in parts smaller than 5 MB. All review comments, notations, and action items will be prescribed on the PDF submitted and returned electronically.

NOTE: Any submittal or shop drawing, which can not be clearly read or defined on a 8 1/2" x 14" piece of paper or is too large to send via e-mail shall be delivered by mail to all parties identified above. Submit paper copies in quantities and as directed in this specification section.

The Designer of Record will review and approve for the Contracting Officer those submittals reserved for Contracting Officer approval to verify submittals comply with the contract requirements.

1.6 PREPARATION

1.6.1 Transmittal Form

Transmit each submittal 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 entitled, "Identifying Submittals," of this section.

1.6.2 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.

1.6.3 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.

Present 8 1/2 by 11 inches sized shop drawings as part of the bound volume for submittals required by section. Present larger drawings in sets.

Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph entitled, "Identifying Submittals," of this section.

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.

Reserve a blank space, no smaller than 3 inches on the right hand side of each sheet for the Government disposition stamp.

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.

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

Present product data submittals for each section as a complete, bound volume. 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.

1.6.5 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.

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

Provide design data and certificates on 8 1/2 by 11 inches paper. Provide a bound volume for submittals containing numerous pages.

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

Provide reports on 8 1/2 by 11 inches paper in a complete bound volume.

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

1.6.8 Format of SD-10 Operation and Maintenance Data (O&M)

Comply with the requirements specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA for O&M Data format.

1.6.9 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.

1.7 QUANTITY OF SUBMITTALS

1.7.1 Number of Copies of SD-02 Shop Drawings

Unless submitted in electronic format. Submit six copies of submittals of shop drawings requiring review and approval only by QC organization and seven copies of shop drawings requiring review and approval by Contracting Officer or Approving Authority.

1.7.2 Number of Copies of SD-03 Product Data and SD-08 Manufacturer's Instructions

Submit in compliance with quantity requirements specified for shop drawings.

1.7.3 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.

1.7.4 Number of Copies SD-05 Design Data and SD-07 Certificates

Submit in compliance with quantity requirements specified for shop drawings.

1.7.5 Number of Copies SD-06 Test Reports and SD-09 Manufacturer's Field Reports

Submit in compliance with quantity and quality requirements specified for shop drawings other than field test results that will be submitted with QC reports.

1.7.6 Number of Copies of SD-10 Operation and Maintenance Data

Submit three copies of O&M Data to the Contracting Officer for review and approval.

1.7.7 Number of Copies of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

Unless otherwise specified, submit three sets of administrative submittals.

1.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.9 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 only where advantageous to Government.

1.9.1 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.

1.9.2 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.

1.9.3 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.

1.9.4 Review Schedule is Modified

In addition to normal submittal review period, a period of 15 working days will be allowed for consideration by the Government of submittals with variations.

1.10 SUBMITTAL REGISTER

Prepare and maintain submittal register, as the work progresses. Do not change data which is output in columns (c), (d), (e), and (f) as delivered by Government; retain data which is output in columns (a), (g), (h), and (i) as approved. A submittal register showing items of equipment and materials for which submittals are required by the specifications is provided as an attachment. This list may not be all inclusive and additional submittals may be required.

1.10.1 Use of Submittal Register

Submit submittal register. Submit with QC plan and project schedule. Verify that all submittals required for project are listed and add missing submittals. Coordinate and complete the following fields on the register submitted with the QC plan and the project schedule:

Column (a) Activity Number: Activity number from the project schedule.

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD No. and type, e.g. SD-02 Shop Drawings) required in each specification section.

Column (e): Lists one principal paragraph in specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting project requirements.

Column (f): Indicate approving authority for each submittal.

Column (g) Contractor Submit Date: Scheduled date for approving authority to receive submittals.

Column (h) Contractor Approval Date: Date Contractor needs approval of submittal.

Column (i) Contractor Material: Date that Contractor needs material delivered to Contractor control.

1.10.2 Contractor Use of Submittal Register

Update the following fields with each submittal throughout contract.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.

Column (l) List date of submittal transmission.

Column (q) List date approval received.

1.10.3 Approving Authority Use of Submittal Register

Update the following fields.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (l) List date of submittal receipt.

Column (m) through (p) List Date related to review actions.

Column (q) List date returned to Contractor.

1.10.4 Action Codes

Entries for columns (j) and (o), are to be used are as follows (others may be prescribed by Transmittal Form):

1.10.4.1 Government Review Action Codes

"A" - "Approved as submitted"; "Completed"

"B" - "Approved, except as noted on drawings"; "Completed"

"C" - "Approved, except as noted on drawings; resubmission required"; "Resubmit"

"D" - "Returned by separate correspondence"; "Completed"

"E" - "Disapproved (See attached)"; "Resubmit"

"F" - "Receipt acknowledged"; "Completed"

"G" - "Other (Specify)"; "Resubmit"

"X" - "Receipt acknowledged, does not comply with contract requirements"; "Resubmit"

1.10.5 Copies Delivered to the Government

Deliver one copy of submittal register updated by Contractor to Government with each invoice request. Deliver in electronic format, unless a paper copy is requested by Contracting Officer.

1.11 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. For submittals requiring review by fire protection engineer, allow review period, beginning when Government receives submittal from QC organization, of 30 working days for return of submittal to the Contractor.

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

1.11.1 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.

1.11.2 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.

1.11.3 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 entitled, "Approved/Accepted Submittals," of the section."

(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 **N40085-XX-X-XXXX**, 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 **N40085-XX-X-XXXX**, 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.

1.12 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 entitled, "Review Notations," of this section and with markings appropriate for action indicated.

Unless electronic format is utilized. Upon completion of review of submittals requiring Government approval, stamp and date approved submittals. 3 copies of the approved submittal will be retained by the Contracting Officer and 2 copies of the submittal will be returned to the Contractor.

1.12.1 Review 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.

1.13 DISAPPROVED OR REJECTED 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 clause entitled, "Changes," is to be given to the Contracting Officer. Contractor is responsible for the dimensions and design of connection details and construction of work. Failure to point out deviations may result in the Government requiring rejection and removal of such work at the Contractor's expense.

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

1.14 APPROVED/ACCEPTED 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.

1.15 APPROVED SAMPLES

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

Match the approved samples for materials and equipment incorporated in the

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

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

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

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

1.16 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained. No payment for materials incorporated in the work will be made if all required Designer of Record or required Government approvals have not been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.17 PROGRESS SCHEDULE

1.17.1 Project Network Analysis

Submit the initial progress schedule within 21 calendar days of notice to proceed. Schedule is to be updated and resubmitted monthly beginning 7 calendar days after return of the approved initial schedule. Updating to entail complete revision of the graphic and data displays incorporating changes in scheduled dates and performance periods. Redlined updates will only be acceptable for use as weekly status reviews.

Contractor to provide a single point contact from his on-site organization as his Schedule Specialist. Schedule Specialist is to have the responsibility of updating and coordinating the schedule with actual job conditions. Schedule Specialist to participate in weekly status meetings and present current information on the status of purchase orders, shop drawings, off-site fabrication, materials deliveries, Subcontractor activities, anticipated needs for Government furnished equipment, and any problem which may impact the contract performance period.

Include the following in the project network analysis:

a. Graphically display with the standard network or arrow diagram capable of illustrating the required data. Drafting to be computer generated on standard 24 by 36 inch (nominal size) drafting sheets or on small 11 by 17 inch minimum sheets with separate overview and detail breakouts. Provide a project network analysis that is legible with a clear, consistent method for continuations and detail referencing. Clearly delineate the critical path on the display. Clearly indicate the

contract milestone date on the project network analysis graphic display.

b. Data is to be presented as a separate printout on paper or, where feasible, may be printed on the same sheet as the graphic display. Data is to be organized in a logical coherent display capable of periodic updating.

c. Include within the data verbal activity descriptions with a numerical ordering system cross referenced to the graphic display. Additionally, costs (broken down into separate materials and costs), duration, early start date, early finish date, late start date, late finish date, and float are to be detailed for each activity. A running total of the percent completion based on completed activity costs versus total contract cost is to be indicated. A system for indicating scheduled versus actual activity dates and durations is also to be provided.

d. Sufficient detail to facilitate the Contractor's control of the job and to allow the Contracting Officer to readily follow progress for portions of the work should be shown within the schedule.

1.18 STATUS REPORT ON MATERIALS ORDERS

Within 15 calendar days after notice to proceed, submit, for approval by the Contracting Officer, an initial material status report on all materials orders. This report will be updated and re-submitted every 14 calendar days as the status on material orders changes.

Report to include list, in chronological order by need date, materials orders necessary for completion of the contract. The following information will be required for each material order listed:

a. Material name, supplier, and invoice number.

b. Bar chart line item or CPM activity number affected by the order.

c. Delivery date needed to allow directly and indirectly related work to be completed within the contract performance period.

d. Current delivery date agreed on by supplier.

e. When item d exceeds item c, the effect that delayed delivery date will have on contract completion date.

f. When item d exceeds item c, a summary of efforts made by the Contractor to expedite the delayed delivery date to bring it in line with the needed delivery date, including efforts made to place the order (or subcontract) with other suppliers.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Pier 14 & Pier 4 and Q8 & CEP11 Bulkheads

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 11 00	SD-01 Preconstruction Submittals															
			Salvage Plan	1.6	G													
			Preconstruction Fender System	1.7	G													
			Survey															
		01 14 00	SD-01 Preconstruction Submittals															
			List of Contact Personnel	1.6.1.1	G													
		01 20 00.00 20	SD-01 Preconstruction Submittals															
			Schedule of Prices	1.3	G													
		01 30 00	SD-01 Preconstruction Submittals															
			View Location Map	1.3	G													
			Progress and Completion	1.4	G													
			Pictures															
		01 32 16.00 20	SD-01 Preconstruction Submittals															
			Construction Schedule	1.2	G													
			SD-07 Certificates															
			Monthly Updates	1.4	G													
		01 33 00	SD-01 Preconstruction Submittals															
			Submittal Register	1.10	G													
		01 35 13	SD-01 Preconstruction Submittals															
			Existing Condition Survey -	3.5	G													
			Underwater Debris Survey															
			Heavy Equipment and Vehicle	3.5	G													
			List															
			Construction Operations Plan	3.5	G													
			Safety Plan	3.5	G													
			Schedule of Work	3.5	G													

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 35 13	Watercraft list	3.3	G													
			Contractor FAA Notification	3.2.1.1														
			FAA Form 7460-1	1.2.1.1	G													
			FAA Form 7460-1	3.2.1.2	G													
			FAA Form 7460-2	3.2.1.1	G													
			NSN Chambers Field Work Start	3.2.1.2	G													
			Request															
			NSN Chambers Field Work Start	3.2.1.2	G													
			Request															
		01 35 26	SD-01 Preconstruction Submittals															
			Accident Prevention Plan (APP)	1.8	G													
			Dive Plan	1.8.2.4	G													
			SD-06 Test Reports															
			Monthly Exposure Reports	1.4														
			Notifications and Reports	1.13														
			Accident Reports	1.13.2	G													
			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														

SUBMITTAL REGISTER

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 35 26	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 00.10 20	SD-01 Preconstruction Submittals															
			QC Plan	1.6	G													
			Underwater QC Specialist(UQC)		G													
			Concrete Repair QC (CQC)		G													
			SD-06 Test Reports															
			UQC Pile Inspection Report(s)		G													
			UQC Concrete Repairs/Grout	1.14.1	G													
			Curtain Inspection Report(s)															
			CQC Concrete Repairs	1.14.1	G													
			Inspection Report(s)															
		01 50 00	SD-01 Preconstruction Submittals															
			Construction site plan	1.4	G													
			SD-06 Test Reports															
			Backflow Preventer Tests	2.2.3	G													
			SD-07 Certificates															
			Backflow Tester	1.5.1	G													
			Backflow Preventers	1.5														
		01 57 19.00 20	SD-01 Preconstruction Submittals															
			Preconstruction Survey	1.5.1	G													

SUBMITTAL REGISTER

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 57 19.00 20	Solid Waste Management Plan	3.3	G													
			and Permit															
			Regulatory Notifications	1.5.2	G													
			Environmental Protection Plan	1.6	G													
			Storm Water Pollution Prevention	3.1.1	G													
			Plan															
			Storm Water Notice of Intent (for	3.1.1	G													
			NPDES coverage under the															
			general permit for construction															
			activities)															
			Dirt and Dust Control Plan	3.12.1														
			Contractor Hazardous Material	3.7.1	G													
			Inventory Log															
			SD-06 Test Reports															
			Laboratory Analysis	3.11.2.2														
			Disposal Requirements	3.13.2														
			Erosion and Sediment Control															
			Inspection Reports															
			Storm Water Inspection Reports															
			for General Permit															
			Solid Waste Management Report	3.3.1	G													
			SD-07 Certificates															
			Contractor 40 CFR employee	1.5.5	G													
			training records															
			ECATTS certificate of completion	1.4.1														
			SD-11 Closeout Submittals															

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		01 57 19.00 20	Storm Water Pollution Prevention	3.1.1.1	G													
			Plan compliance notebook															
			Waste Determination	3.4														
			Documentation															
			Disposal Documentation for	3.3.2.1														
			Hazardous and Regulated Waste															
			Contractor 40 CFR Employee	1.5.5														
			Training Records															
			Solid Waste Management Permit	3.3														
			Solid Waste Management Report	3.3.1														
			Contractor Hazardous Material	3.7.1	G													
			Inventory Log															
			Hazardous Waste/Debris	3.11.2														
			Management															
			Regulatory Notifications	1.5.2														
		01 57 19.01 20	SD-07 Certificates															
			Storm Water Notice of		G													
			Termination															
			Storm Drain/Sanitary Sewer		G													
			Discharge Approval															
			Waste Determination		G													
			Documentation															
			Monthly Project Waste Summary															
			Report															
			Landfill Disposal Form		G													
			Dangerous waste manifests		G													

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		01 57 19.01 20	Certificate of final disposal		G													
		01 74 19	SD-01 Preconstruction Submittals															
			Waste Management Plan	1.6	G													
			SD-11 Closeout Submittals															
			Records	1.7	G													
		01 78 00	SD-03 Product Data															
			As-Built Record of Materials	1.2.2														
			SD-11 Closeout Submittals															
			Record Drawings	1.2.1	G													
		02 32 00.22	SD-01 Preconstruction Submittals															
			Geotechnical Consultant	1.5.1	G													
			Bathymetric Survey Company	1.6.1	G													
			Underwater Dive Inspection	1.7.5	G													
			Team															
			SD-06 Test Reports															
			Geotechnical Report	1.5.3.2.2	G													
			Bathymetric Surveys	1.2	G													
			Existing Water Depth Survey	1.7.1														
			(Sounding)															
			Underwater Sheet Pile Gap	1.7.2	G													
			Inspection Survey															
			Underwater Debris and	1.7.3.1	G													
			Obstruction Survey															
			Post Construction Underwater	1.7.3.1.2	G													
			Survey and Inspections															

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		02 32 00.22	Underwater Material Deposit	1.7.3.1.3	G													
			Survey															
			Pre Construction Underwater	1.7.3.1.4	G													
			Material Deposit Survey															
			Post Construction Underwater	1.7.3.1.5	G													
			Material Deposit Survey															
			Construction Underwater Material	1.7.3.1.6	G													
			Deposit Survey															
			SD-03 Product Data															
			Permits, Certifications, and	1.10														
			Licenses															
			Schedule of Drilling, Sampling,	1.5.3.1	G													
			and Testing															
			Schedule for Bathymetric	1.8.1	G													
			Surveys and Inspections															
		02 41 00	SD-01 Preconstruction Submittals															
			Topside Existing Condition		G													
			Survey Report															
			Underwater Pre-Construction	1.10.2	G													
			Survey Report															
			Detailed Underwater	1.10.2.1	G													
			Pre-Construction Obstruction															
			Survey Report															
			Existing Conditions	1.10	G													
			Demolition Plan	1.2.1	G													
			Deconstruction Plan	1.2.1	G													

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		02 41 00	SD-07 Certificates															
			Notification	1.7	G													
			SD-11 Closeout Submittals															
			Receipts															
		03 30 00	SD-02 Shop Drawings															
			Fabrication Drawings	1.6.2.1														
			Reinforcing steel	1.6.2.1.2	G													
			Formwork															
			SD-03 Product Data															
			Portland Cement		G													
			Ready-Mix Concrete	2.1.14	G													
			Concrete Curing Materials	2.1.15	G													
			Reinforcement		G													
			Concrete Patch Material	2.1.8	G													
			Bonding Materials		G													
			SD-05 Design Data															
			mix design		G													
			SD-06 Test Reports															
			Concrete mix design	1.6.4.1	G													
			Fly ash	1.6.4.2														
			Pozzolan	1.6.4.2														
			Ground granulated blast-furnace	1.6.4.3														
			slag															
			Aggregates	1.6.4.5														
			Compressive strength tests	3.10.2.3														
			Slump															

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		03 30 00	Air Entrainment															
			SD-08 Manufacturer's Instructions															
			Fly ash	1.6.4.2														
			Ground granulated blast-furnace	1.6.4.3														
			slag															
			Welding Procedures	1.8														
			Welding Procedures	1.8														
			Steel Bar	2.1.10.3														
			Welder Qualifications	1.8														
		05 12 00	SD-02 Shop Drawings															
			Fabrication drawings	1.4.1	G													
			SD-03 Product Data															
			Welding electrodes and rods	2.2.1														
			Non-Shrink Grout	2.2.2	G													
			SD-07 Certificates															
			Steel	2.1														
			Galvanizing	2.3	G													
			Welding procedures and	1.4.2.1	G													
			qualifications															
			Galvanizing Repair Thickness	3.7.2	G													
			Results															
		05 13 00.20 21	SD-01 Preconstruction Submittals															
			Installer Qualifications	1.3.1.1	G													
			Quality Control Inspector	1.3.1.2	G													
			Qualifications															
			SD-03 Product Data															

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		05 13 00.20 21	Mechanical Anchors		G													
			Adhesive Anchors in Concrete	2.1.1.3	G													
			Non-Shrink, Non-Metallic Grout	3.1.3	G													
			SD-06 Test Reports															
			Quality Control Inspector Report	3.3.3	G													
			SD-07 Certificates															
			Post-Installed Anchors	2.1.1	G													
			SD-08 Manufacturer’s Instructions															
			Post-Installed Anchors	2.1.1	G													
			Non-Shrink, Non-Metallic Grout	3.1.3	G													
			Manufacturer's Material Safety	1.3														
			Data Sheets															
		05 51 33.00 21	SD-02 Shop Drawings															
			Ladders		G													
			SD-03 Product Data															
			Ladder Members		G													
			Lag Bolts and End Threaded		G													
			Rods															
			Welding electrodes and rods	2.1.3	G													
			SD-07 Certificates															
			Stainless Steel Members		G													
			Welding procedures and	1.3.1	G													
			qualifications															
			Welding Inspection Report	3.3.1	G													
		06 13 33	SD-02 Shop Drawings															
			timberwork	3.2														

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		06 13 33	Threaded Rods; straight and bent		G													
			SD-05 Design Data															
			Threaded Rods, Bolts, Nuts, &		G													
			Washers															
			SD-06 Test Reports															
			Timber preservative inspection	1.4.4	G													
			Delivery inspection list	1.4.5														
			Threaded Rods, Bolts, nuts, and		G													
			washers															
			Epoxy Anchor Gel		G													
			SD-07 Certificates															
			MSDS and CIS	1.4.3														
			Threaded Rods, Bolts, Nuts, &		G													
			Washers															
			Galvanizing		G													
			Galvanizing Repair Thickness	2.3.2	G													
			Results															
			Pesticide Applicator Company		G													
			Self-Certification															
			Best Management Practices	1.4.7	G													
			(BMPs															
		06 13 34	SD-02 Shop Drawings															
			Polymeric (Plastic) Sections		G													
			SD-03 Product Data															
			Polymeric (Plastic) Timber	1.8.1	G													
			Sections															

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		06 13 34	Polymeric (Plastic) Timber	1.8.2	G													
			Sections															
			SD-05 Design Data															
			Polymeric Timber Members		G													
			Polymeric Allowable bending		G													
			moment															
			Polymeric Allowable flexural		G													
			stress															
			Polymeric Maximum elastic		G													
			deflection															
			SD-06 Test Reports															
			Polymeric Material Test Reports		G													
			Polymeric Performance Test		G													
			Data															
			Polymeric Allowable flexural		G													
			stress															
			SD-07 Certificates															
			Polymeric (Plastic) Timber		G													
			Members															
		35 59 13.13	SD-01 Preconstruction Submittals															
			Fender Pile Installation	3.1.6	G													
			Procedures															
			SD-02 Shop Drawings															
			Piles	1.4.2	G													
			UHMWPE Inserts & Fasteners		G													
			UHMWPE	2.1.10	G													

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		35 59 13.13	UHMWPE	2.1.10.2	G													
			UHMWPE	2.1.10.2	G													
			Composite Blocking	2.1.12	G													
			Driving helmets, cap blocks, and	3.2.2														
			pile cushions															
			SD-03 Product Data															
			Admixtures	2.1.4	G													
			Air Entraining	2.1.4	G													
			Aggregates	1.5.3	G													
			Corrosion Inhibitors	1.5.7	G													
			Prestressing Steel	2.1.6	G													
			Reinforcing Steel	2.1.7	G													
			Reinforcement and Protective		G													
			Coating															
			Reinforcement supports		G													
			Composite Insert Protective	2.1.11.3	G													
			Coating															
			UHMWPE Panel Recess Sealant	2.1.13	G													
			SD-04 Samples															
			UHMWPE Inserts & Fasteners		G													
			SD-05 Design Data															
			Concrete mix design	2.2.1	G													
			SD-06 Test Reports															
			Aggregates	1.5.3														
			Fly ash and Pozzolan	1.5.4														
			Fly ash and Pozzolan	2.1.1.2														

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		35 59 13.13	Slag	2.1.1.3														
			Silica fume	1.5.5														
			Concrete	2.2														
			SD-07 Certificates															
			quality control procedures	2.4														
			equipment	3.2	G													
			Curing of piles	2.3.4														
			Silica fume manufacturer's	1.5.2														
			representative															
			Prestressing steel	2.1.6														
			cement	2.1.1.1														
			Concrete mix design	2.2.1	G													
			Reinforcing steel	2.1.7	G													
			Neoprene Pads	2.1.9	G													
			UHMWPE	2.1.10	G													
			UHMWPE	2.1.10.2	G													
			UHMWPE	2.1.10.2	G													
			UHMWPE Inserts & Fasteners		G													
			Bolts and Washers	2.1.11	G													
			Composite Blocking	2.1.12	G													
			Epoxy Pile Top Coat	3.1.7	G													
		35 59 13.14 20	SD-02 Shop Drawings															
			Polymeric piles	2.2	G													
			SD-03 Product Data															
			Polymeric piles	2.2	G													
			Pile driving equipment	3.1.3.1	G													

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		35 59 13.14 20	Driving helmet	3.1.3.1	G													
			Pile caps	3.1.3.1	G													
			Pile driving tips	3.1.3.1	G													
			Driving pads	3.1.3.1	G													
			Pile tops	2.7.3	G													
			Manufacturer's Warranty	2.9	G													
			Contractor's Warranty	2.10	G													
			SD-05 Design Data															
			Polymeric piles	2.2	G													
			Design calculations	2.3	G													
			Fender pile reaction load															
			Allowable bending moment															
			Allowable flexural stress	2.4.1														
			Maximum elastic deflection															
			Concrete mix design	2.6.3.4	G													
			SD-06 Test Reports															
			Material Test Reports	2.6.1	G													
			Performance Test Data	2.3	G													
			Allowable flexural stress	2.4.1														
			Maximum load	2.4.2														
			Delivery inspection list	1.4														
			SD-07 Certificates															
			Driving hammer	3.1.3.1	G													
			Polymeric piles	2.2	G													
			SD-11 Closeout Submittals															
			Pile records	3.3.3														

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		35 59 13.16	SD-05 Design Data															
			foam filled marine fenders		G													
			foam filled marine fenders	2.1.5	G													
			SD-06 Test Reports															
			Fender Compression Test	2.1.6.1	G													
			Fender cyclic-compression test	2.1.6.2	G													
			Fender sustained-load test	2.1.6.3	G													
			Fender pull-through test	2.1.6.4	G													
			Skin thickness core test	2.1.6.5	G													
			Isocynate Identification Testing	2.1.7	G													
			Connecting Chains and	2.1.8	G													
			Hardware															
			SD-08 Manufacturer's Instructions															
			Installation Instructions	1.4.3														
			SD-10 Operation and Maintenance															
			Data															
			Fender Manual	1.4.3														
		35 59 13.19 21	SD-03 Product Data															
			Fender	2.1														
			Threaded Rods	2.4.2	G													
			Hardware	2.3														
			SD-05 Design Data															
			curve	2.4.1														
			Dimension	2.1														
			Fender	2.1														
			Design	2.1														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Pier 14 & Pier 4 and Q8 & CEP11 Bulkheads

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		35 59 13.19 21	SD-06 Test Reports															
			Minimum Tensile Strength	2.2														
			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														
			Angular Fender Compression	2.4.2														
			Test															
			SD-08 Manufacturer’s Instructions															
			Installation	3.1														

SECTION 01 35 13

SPECIAL PROJECT PROCEDURES

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.

Code of Federal Regulations (UFC)

CFR Title 14 PART 77	(2015) Efficient Use, and Preservation of the Navigable Airspace

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1K	(2007; Rev K) Obstruction Marking and Lighting

Department of the Navy -
Naval Station Norfolk Operational Instruction

NAVSTANORVAINST 11130.1	(2014) Crane or Tall Structure Erection in Vicinity of Naval Station Norfolk (NSN) Chambers Field

1.2 GENERAL

1.2.1 Naval Station Norfolk Chambers Field (KNGU)

Naval Station Norfolk Chambers Field, consists of an 8,000-foot runway, a heliport, and 12 helipads, is located within Class D airspace. This airspace encompasses an area within a 4.3-nautical-mile (nm) radius from the center of Naval Station Airfield and extends upward to, but not including, 2,000 feet above ground level (AGL). General guidance concerning height ceiling restriction are included with the definitions unless more stringent requirements are identified by the FAA.

1.2.1.1 Notice of Proposed Construction or Alteration (FAA)

In accordance with 49 U.S.C., Section 44718 and CFR Title 14 PART 77, the contractor shall file notice and submit to the FAA a completed FAA Form 7460-1, Notice of Proposed Construction or Alteration.

The contractors operations may also be subject to the licensing requirements of the Federal Communications Commission (FCC), you must submit notice to the FAA on or before the date that the application is filed with the FCC.

Subpart B of part CRFR 77 identifies when construction or alteration requires or does not require notice.

Upon submission the FAA will conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable

Title 14 of the Code of Federal Regulations, part 77 to determine if the equipment or temporary structure exceeds obstruction standards and my pose a hazard to air navigation.

If the crane does not exceed any obstruction standards, a determination is issued and no coordination is necessary by the FAA. When a crane causes an increase in Instrument Flight Rules (IFR) minimums the lowest possible height will be determined and the the maximum permissible height for the crane, equipment, or temporary structures.

More information and forms are available in electronic and PDF format at the FAA regional offices and on the Internet at the following website:

https://oeaaa.faa.gov/oeaaa/external/portal.jsp

(a) The FAA encourages online submission. FAA notifications can be filed electronically at: https://oeaaa.faa.gov.

(b) If unable to file electronically, forward a paper copy of the FAA Form 7460-1 to the Mail Processing Center in Fort Worth, Texas (the address and the form are available on the website).

1.3 DEFINITIONS AND OBSTACLE HEIGHT - NSN CHAMBERS FIELD

a. "Primary" surface - The primary surface for KNUG is considered the runway lateral clearance zone. The runway lateral clearance zone is the horizontal distance which extends 750 feet perpendicularly from the runway centerline. Obstacle heights within the Primary zone are restricted to the ground surface level: 0-ft Above Ground Level (AGL).

b. "Approach-Departure Clearance" surface - The approach/departure clearance surface begins with the same elevation as the runway centerline at the runway end and slopes upward. The width of the imaginary surface is 1,500 feet at the runway end centered on the centerline and the surface widens to 9,000 feet. Obstacle heights within the Approach-Departure zone are restricted to the ground surface level: 0-ft Above Ground Level (AGL) and slopes upward at a 50:1 ratio (50 feet horizontal to 1 foot vertical) to a ceiling height of 500-ft AGL.

c. "Transitional" surface - The transitional surface begins at ground level along the width edge of the primary surface and along the approach-departure clearance lateral boundaries. The transitional surface slopes upward. The outer edge of the transitional surface abuts the Inner Horizontal Surface at 150-ft AGL and extends laterally 1,800 feet perpendicular from the extended runway centerline. Obstacle heights within the Transitional zone are restricted to the ground surface level: 0-ft Above Ground Level (AGL) and slopes upward at a 7:1 ratio (7 feet horizontal to 1 foot vertical) until it reaches the Inner Horizontal Zone ceiling of 150-ft AGL.

d. "Inner Horizontal" surface - The inner horizontal surface is the imaginary surface shaped like a race track which is measured and referenced from the runway ends and centerline extending outward from the transitional and approach-departure clearance surface boundaries at constant elevation of 150-feet AGL. The outer boundary of the inner horizontal surface is 7,500 feet

laterally from the runway centerline. Obstacle heights within the Inner Horizontal zone are restricted above a 150-ft AGL ceiling height.

e. "Conical" surface. The conical surface is a sloped imaginary surface shaped like a race track beyond the perimeter of the inner horizontal surface which slopes upward from 150-ft AGL. The outer boundary of the conical surface is 14,500 feet laterally from the runway centerline. Obstacle heights within the Conical zone are restricted beginning at 150-ft AGL and slope to 500-ft AGL at a 20:1 ratio (20 feet horizontal to 1 foot vertical).

f. Regardless of location any crane, equipment, or structure the exceeds a 150-ft AGL, notification and approval is required.

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. 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

Existing Condition Survey - Underwater Debris Survey; G

Heavy Equipment and Vehicle List; G
Construction Operations Plan; G
Safety Plan; G
Schedule of Work; G
Watercraft list; G
Contractor FAA Notification

FAA Form 7460-1; G
FAA Form 7460-2; G

(Provide copy of each to Construction Manager and Airfield Manager when submitting to FAA)

NSN Chambers Field Work Start Request; G

PART 2 PRODUCTS

2.1 OBSTRUCTION LIGHTS

Equipment markings and obstruction lights and must conform to FAA AC 70/7460-1K.

PART 3 EXECUTION

3.1 PERMITS AND NOTIFICATIONS TO BE OBTAINED BY THE GOVERNMENT

Federal, State, and Local agencies require specific permits or notifications prior to starting work which may affect the waterways, river bottom and marine life Permits. Pile removal or pile driving operations that directly affect the waterways or produce underwater noise shall not commence until all the government obtains the approval for the agencies

identified and the provides these documents to the Contractor.

The government shall be responsible for obtaining those required by the US Army Corps of Engineers (ACOE) & Virginia Marine Resources Commission (VMRC) - "Joint Permit" and those required by the National Oceeanic and Atmospheric Administration (NOAA) for the work indicated in the contract documents.

The contractor shall ensure that they receive all copies of the approved permits and notifications, for their records, and prior to start of any pile demolition or driving operations that creates underwater noise.

NOTE: The contractor shall allow the government 60 days, after award of the contract, for provision of the required permits and prior to beginning any pile removal or installation that would affect the waterways.

3.2 PERMITS AND NOTIFICATIONS TO BE OBTAINED BY CONTRACTOR

3.2.1 Notice of Proposed Construction or Alteration

Permits, licenses, and taxes. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful execution of the work.

NOTE: Because the government will not know prior to award the type and size of the contractor's proposed equipment, the contractor shall be responsible for the preparation, submission, and obtaining approval of all required FAA documentation, notification, and then be responsible to adhere to all FAA regulations and guidelines.

3.2.1.1 Contractor FAA Notification

The Contractor shall submit all Form 7460-1 and attachments directly to the FAA. Submission is required at least 45 days before the start date of the operations that may affect air traffic.

A supplemental notification FAA Form 7460-2 shall be required to be filed to the FAA, by the contractor, within 48 hours prior to start of the construction.

Failing to comply with the provisions of FAR Part 77 are subject to Civil Penalty under Section 902 of the Federal Aviation Act of 1958, as amended and pursuant to 49 U.S.C. Section 46301(a).

3.2.1.2 NSN Chambers Field Work Start Request

NAVSTANORVAINST 11130.1 establish standards and notification requirements for objects that may directly affect navigable airspace and to ensure flight safety at NSN Chambers Field. To ensure safety all construction project utilizing cranes, equipment, or the erection of temporary structures that may penetrate the defined imaginary surfaces or exceed the applicable height restrictions, the contractor shall provide notification to and receive approval from the NSN Air Operations Airfield Manager prior to beginning construction.

Submit to the NSN Airfield Manager, through the Construction Manager, a NSN Chambers Field Work Start Request which includes the approved FAA Form 7460-1, the operational area of the of the crane, equipment, or temporary structure, it's height, date(s), and times of erection or operations.

The Airfield Manager will review and coordinated with NSN Air Operations the proposed operation and air operations schedule and provide final guidance to ensure flight operations are not adversely impacted. Allow 10 working days for government review of each submittal.

Failure to coordinate with NSN Air Operations may result in suspension of crane operations until approved for flight safety.

3.3 HARBOR WATERWAY OPERATIONS

In addition to "DFARS 252.236-7002, Obstruction of Navigable Waterways," obtain from the Port Operations Officer at the Naval Base via the Contracting Officer, permission to use waterways and the regulations and directives governing such usage. Submit a watercraft list with a description of crafts, including sizes, types, numbers and boat crew for approval.

3.3.1 Hazards to Navigation

Maintain complete control of the movement of floating equipment and material. Loose floating equipment and material are not permitted. Keep in readiness at all times a powered craft capable of moving, securing and disposing of floating equipment which may get loose and become a hazard to navigation.

3.3.2 Work in Proximity to Piers

Accomplish all construction work on the pier with extreme care regarding Navy ship operations. Cooperate closely, and coordinate with the Port Operations Officer and the Contracting Officer. Park equipment in areas only designated by the Contracting Officer. Under no circumstances shall equipment be parked overnight or for any extended period of time in areas not designated by the Contracting Officer. Leave no material in areas where extreme care is to be taken regarding Navy operations.

3.1.2 Ship Operating Schedules

The Government will exert every effort to schedule ship operations so as to permit the maximum amount of time for the Contractor's activities; however, in the event of emergency, intense operational demands, adverse wind conditions, and other such unforeseen difficulties, the Contractor shall discontinue operations at the specified locations for the safety of the Contractor and military personnel and Government property.

3.1.2 Waterfront Port Security Barrier

The Naval Station Waterfront is protected by a waterside security barrier. It is opened only at specific times to allow naval or commercial traffic. Submit requests for barrier opening a minimum of 48 hour prior the requested operation and directly to the Ship Support Office (telephone: (757) 341-0801. Also notify the Construction Manager. Requests for opening the barrier shall not be made for during the weekends or Holidays. The Government will exert every effort to permit the maximum amount of time for the Contractor's activities; however, in the event of emergency, intense operational demands, adverse wind conditions, and other such unforeseen difficulties, the Government may not be able to open the barrier.

3.4 LIGHTING AND MARKINGS

In addition to "DFARS 252.236-7005, Airfield Safety Precautions," the following paragraphs apply. Standards, procedures, and types of equipment specified for marking and lighting structures are presented in Advisory Circular FAA AC 70/7460-1K.

Obstruction Marking and Lighting. These standards are the minimum acceptable level of conspicuity to warn pilots of the presence of structures. Lights must be operational during periods of reduced visibility, darkness, and shall mark stationary and mobile equipment directed by the Contracting Officer. Lights must be operational during periods of reduced visibility, darkness, and as directed by the Contracting Officer.

No separate payments will be made for lighting and protection necessitated by the safety provisions.

3.4.1 Daytime Markings

During daylight, mark stationary and mobile equipment with international orange and white checkered flags, mark the material, and work with yellow flags and in accordance with FAA AC 70/7460-1K or most recent update.

3.4.2 Nighttime Markings

During nighttime, which begins 2 hours before sundown and ends 2 hours after sunrise. Provide aviation red or high intensity white obstruction lights in according to FAA AC 70/7460-1K or most recent update. Equipment markings and obstruction lights and must conform to FAA AC 70/7460-1K.

3.5 SCHEDULE OF WORK

Schedule work to conform pier operating schedules. The Government will exert every effort to schedule their operations so as to permit the maximum amount of time for the Contractor's activities; however, in the event of emergency, intense operational demands, adverse wind conditions, and other such unforeseen difficulties, the Contractor must cease operations at the specified locations for the safety of the Contractor and military personnel and Government property.

Submit a schedule of the work to the Contracting Officer describing the work to be accomplished; the location of the work, and dates and hours during which the work is to be accomplished. Keep the approved schedule of work current, and notify the Contracting Officer of any changes prior to beginning each day's work.

Prior to commencement of work, submit the following to the Contracting Officer:

Existing Condition Survey - Underwater Debris Survey

Construction Operations Plan
Safety Plan
Heavy Equipment and Vehicle List

3.6 RADIO CONTACT

Provide necessary battery powered portable radios to stay in contact with

Port Control Tower. During work have an operator (who speaks fluent English) available for radio contact with the tower at all times. Radio frequency must be approved by the tower.

-- End of Section --

SECTION 01 35 26

GOVERNMENTAL SAFETY REQUIREMENTS

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 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 mishap resulting in no personal injury and zero property damage, but given a shift in time or position, damage or injury may have occurred (e.g., a worker falls off a scaffold and is not injured; a crane swings around to move the load and narrowly misses a parked vehicle).

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

Dive Plan; 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 the following 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 can be the SSHO on this project.

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.

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.

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 15 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 DIVE PLAN

Dive Operations shall follow the requirements of the latest version of the United States Army Corp EM 385 "SAFETY AND HEALTH REQUIREMENTS MANUAL". Safe Practices, Dive Operations Plan(s), AHA, Emergency Management, Dive Personnel Qualifications shall be developed and submitted by the contractor in the format provided in Section 30 of EM 385 manual. The Contractor shall address each of the elements/sub elements in the outline contained in Section 30.A.06-10, 30.A.16, 30.A.17, 30.A.18, and 30.A.19 in the order that they are provided in the manual.

Ensure that the submitting the "dive plan" is in accordance with the requirements pertained in EM 385, paying specific attention but not limited to, the following sections:

a. Section 30.A.06 - as it refers to 29 CFR 1910.410

Training documentation shall be in compliance with the OSHA Diving Standards 29 CFR 1910.410 and shall show that the dive team members have successfully completed training to the appropriate level (e.g., SSA diver's certificate, surface supplied mixed-gas diver certificate)

b. Section 30.A.14 - informs the contractor as to the submittal requirements.

The following documents are required for all Contractor diving operations. All documents will be reviewed and found acceptable by two of the following: DDC/ ADC/ DSR, prior to start of diving operations. Contractors shall submit the documents through the Contracting Officer. Additional documentation may be required depending on the scope of the diving operation:

a. Safe Practices Manual. Refer to "30.A.16"
b. Dive Operations Plan(s). Refer to "30.A.17"
c. AHA to cover all aspects of the job. Refer to "30.A.18"
d. Emergency Management Plan. Refer to "30.A.19".
e. Dive Personnel Qualifications. Refer to "30.A.06 - 10".

c. Section 30.A.17 - Dive Operations Plan

As a minimum the Dive Operations Plan will contain the following:

a. Date of dive plan submission

b. Name and contact information for diving supervisor preparing the dive plan

c. Names and duties of on-site dive team members, including diving supervisor

d. List of diving equipment to be used

e. Type of diving platform to be used

f. Detailed description of the mission; Identify how/ if work will be divided into separate tasks or phases of work

g. Date(s), time(s), duration, and location of operation

h. Diving mode used (SCUBA, SSA, and snorkeling) including a description of the backup air supply, as required

i. Nature of work to be performed by the divers, including tools used and materials to be handled or installed

j. Anticipated surface and underwater conditions, to include visibility, temperature, currents, etc. Thermal protection will be considered as appropriate

k. Maximum single dive bottom time for the planned depth of dive for each diver. Altitude adjustments to dive tables will be calculated for dives made at altitudes of 1000 ft (304.8 m) or more above sea level

l. Identification of topside assistance/support to the dive team (i.e., crane operator, lock operator, etc.)

m. Means of direct communication between the dive site and the project office, the lockmaster/USACE project manager, and the contracting officer (if applicable)

n. Plans submitted for Contractor operations shall also include the name of Contractor (and diving subcontractor if applicable), Contract number, and names and contact information for key personnel.

NOTE: If an item is not applicable because of the nature of the work performed, the Contractor shall state this exception and provide a justification.

NOTE: The dive plan will include the following statement:

"If for any reason the dive plan is altered in mission, depth, personnel, or equipment, the DDC will be contacted in order to review and accept the alteration prior to actual operation."

Note: The above review requirement is that two qualified USACE personnel independently evaluate the documents prior to acceptance. The ADC may substitute for either the DDC or DSR in the review and/or acceptance process if these personnel are not available at the time of review. For NAVFACMIDLANT contracts the "Contracting Officer" or the "Contract Safety Manager" shall act as the DDC and/or ADC and review the Contractor's Dive Plan.

Note: The EM 385 Section 30 "Check List" and EM 385 Dive QA "Check List" have been provided for additional assistance and are provided at the end of this section.

1.8.2.5 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).

1.8.2.6 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.

1.8.2.7 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.

1.8.2.8 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.

1.8.2.9 Lead Compliance Plan

Identify the safety and health aspects of lead work, and prepare in accordance with Section 02 83 13.00 20 LEAD IN CONSTRUCTION.

1.8.2.10 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 and place in

memory the emergency Fire Division phone number. 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 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 for all radiological materials and equipment containing ionizing radiation that are proposed for use on a government facility. The Navy 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 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. Contractors entering and working in confined spaces while performing shipyard industry work are required to follow the requirements of OSHA 29 CFR 1915 Subpart B.

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:

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

e. Personnel Floation 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 construction 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 14 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.

In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with USACE EM 385-1-1, Paragraphs 21.N through 21.N.04.

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

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

(1) For work within 6 feet of an edge, 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.

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. Prior to cranes entering federal activities, a Crane Access Permit must be obtained from the Contracting Officer. A copy of the permitting process will be provided at the Preconstruction Conference. Contractor's operator must remain with the crane during the spot check. Rigging gear must comply with OSHA, ASME B30.9 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 --

CONTRACT DIVING SECTION 30, CHECKLIST

Project: **Date:**

EM 385 sect. 30	Description	Compliant		Not Required
		Yes	No	
30.A.03	Diving shall not be used if the objective can be done safely and efficiently by another means			
30.A.04	Surface Supplied air (SSA) shall be used whenever possible in accordance with the practical constraints of diving operations			
30.A.05	Live boating will not be used without prior acceptance by DDC			
30.A.06	Training Documentation shall be in compliance with OSHA Diving Standards 29 CFR 1910.410 and show that training has been completed to a proper level. Such training shall be provided by:			
a.	Commercial diving school, military, federal school, Association of Commercial Diving Education (ACDE) accredited school			
b	In-house training program that meets the requirements of ANSI/ACDE-01			
c.	Scientific Diving specification.			
30.A.07	ACDE Certification Card			
30.A.08	Evidence that each dive team member has experience consistent with work being performed. Minimum of 1 year commercial diving experience.			
30.A.09	Certified photocopies of CPR, first aid, Oxygen systems training			
30.A.10	Certified and signed by a licensed physician that dive team members are medically fit to dive, must be accomplished within the past 12 months.			
30.A.11	No flying within 12 hours 24 hours after multiple repetitive dives			
30.A.12	Diving at altitude over 1000 ft			
30.A.13	Contract diving operations will be monitored and/or inspected by qualified Dive inspectors.			
a.	Qualified DDC, ADC, or DSR			
b.	Inspector shall conduct on-site monitoring/ inspections of pre-dive brief, equipment inspections, and initial dive			
30.A.14	All documents will be reviewed and found acceptable by two of the following DDC/ADC/DSR			
a	Contractor's Safe Practices Manual **30.A.16**			
b	Dive Operations Plan **30.A.17**			
c	AHA **30.A.18**			
d	Emergency Management Plan **30.A.19**			
e	Dive Personnel Qualifications **30.A.06-10**			
	NOTE: The above document review shall be approved by two qualified personnel before dive Plan is accepted. DDC, ADC or DSR must concur.			

EM 385 sect. 30	Description	Compliant		Not Required
		yes	no	
30.A.15	Developed and review **30.A. 17, 18 & 19 and personnel qualifications** for each separate diving operation and found acceptable prior to start of diving operation			
30.A.16	Safe practices manual available at all times to DDC or representative, dive team members at each dive location			
a	Safety procedures and checklist			
b	Team members assignments and responsibilities			
c	Equipment certification, procedures, inspection checklist			
d	Emergency procedures for fire, equipment failure, adverse weather conditions, medical illness or injury and specific procedures for:			
1.	Entrapped or fouled diver including fouled umbilical			
2.	Action upon loss of vital support equipment			
3.	Action upon loss gas supply			
4.	Action upon lost communications			
5.	Lost diver plan			
6.	Injured diver plan			
7.	Action upon discovery of fire			
8.	Diver blow up/over rapid ascent to the surface			
9.	Diver loss of consciousness			
10.	Injury/illness of member of surface crew with diver in the water			
e	Procedures for internal safety inspections			
f	Copy of OSHA 29 CFR 1910 Subpart T			
g	US Navy Standard Air Decompression Tables			
1.	No-Decompression Limits and Rep. Group Designation for No-D. air Dives			
2.	Residual Nitrogen Timetables for Repetitive. Air Dives			
3.	Standard Air Decompression Tables			
h	Sample diving log sheet			
i	Sample repetitive diving work sheet			
j	Outline of fitness for duty requirements for dive team members			
k	Outline of administrative and record procedures			

EM 385 sect. 30	Description	Compliant		Not Required
		yes	no	
30.A.17	Dive Plan: at a minimum will contain			
a	Date of dive plan submittal			
b	Name and contact information for diving supervisor preparing the dive plan;			
c	Names and duties of on-site dive team members, including diving supervisor;			
d	List of diving equipment to be used;			
e	Type of diving platform to be used;			
f	Detailed description of the mission; Identify how/ if work will be divided into separate tasks or phases of work;			
g	Date(s), time(s), duration, and location of operation;			
h	Diving mode used (SCUBA, SSA, and snorkeling) including a description of the backup air supply, as required;			
i	Nature of work to be performed by the divers, including tools used and materials to be handled or installed;			
j	Anticipated surface and underwater conditions, to include visibility, temperature, currents, etc. Thermal protection will be considered as appropriate;			
k	Maximum single dive bottom time for the planned depth of dive for each diver.			
l	Identification of topside assistance/support to the dive team (i.e., crane operator, lock operator, etc.);			
m	Means of direct communication between the dive site and the project office, the lockmaster/USACE project manager, and the contracting officer (if applicable			
n	Plans submitted for Contractor operations shall also include the name of Contractor (and diving subcontractor if applicable), Contract number, and names and contact information for key personnel.			
NOTE	Following statement: **If for any reason the dive plan is altered in mission, depth, personnel, or equipment, the DDC will be contacted in order to review and accept the alteration prior to actual operation.**			
30.A.18	Job specific Activity Hazard Analysis (AHA) Activity Hazard Analysis. An AHA represents the dive team's best effort to anticipate and mitigate or prevent the adverse effects of equipment failure, extreme weather/environmental conditions, or other hazardous/unexpected situations.			

EM 385 sect. 30	Description	Compliant		Not Required
		Yes	No	
30.A.19	Emergency management plan The minimum content of the plan will be as follows:			
a	Location and phone number of nearest operational recompression chamber if not located at the dive site and the Divers Alert Network (DAN) phone number (919-684-8111);			
b	Location, directions to and phone number(s) of nearest hospital(s) or available physicians capable of treating dive injuries;			
c	Location and phone number of nearest USCG Rescue Coordination Center where appropriate			
d	Description of emergency transport plan			
e	Description of an emergency victim transport plan including phone numbers of appropriate emergency transport services;			
f	Diver rescue procedures conducted by the dive team, including responsibilities of team members, best location(s) where injured divers may be removed from the water, and best location(s) for performing first aid/ stabilization prior to emergency medical assistance arrival.			
30.A.20*	Prior to the initial work on each dive operation, a Pre-Dive Conference shall be held with key personnel designated by the DDC to discuss the Dive Operations plan, AHA, and Emergency Plan and any modifications needed. For contractor operations, the pre-dive conference will also be attended by the USACE dive inspector or DDC and a representative of the Contractor with sufficient authority to implement any changes required by the USACE diving inspector or coordinator.			
30A.21*	Prior to each dive all dive team members will be present for **pre-job brief**			
a	Description of mission			
b	Diving apparatus/equipment and craft to be used;			
c	Maximum working depth with estimated bottom times and water temperatures;			
d	Names and duties of personnel on the team			
e	Discussion of AHA;			
f	Emergency procedures			
30.A.22	Post job Debrief including the phone number for DAN or local dive medical facility,			
30.A.23*	If dive mission is altered DDC shall be notified and review the new plan for approved prior to commencing diving operation			
30.A.24*	Divers shall not change location or enter the water without approval of Government representative.			

EM 385 sect. 30	Description	Compliant		Not Required
		Yes	No	
30.A.25 *	Dive log requirements as a minimum shall include:			
a	Full name			
b	Date, time and location of dive			
c	Maximum depth and bottom time			
d	Surface interval between dives			
e	Breathing medium and gear used			
f	Repetitive Group designator/ work sheet			
g	Underwater and surface conditions,			
h	Depth(s) and duration(s) of any decompression stops			
i	Date and time of last previous dive within 48 hrs			
j.	Name of Dive Supervisor(s) during dive,			
k	General description of work performed,			
l	For dives outside the no-decompression limits, deeper than 100 (30.5m) feet salt water (fsw), or using mixed-gas, include depth-time and breathing-gas profiles and decompression tables (including any modifications).			
30.A.26	Recorded information in the event of a depth related diving casualty			
a	Description of signs and symptoms			
b	Description and results of treatment			
c	Name, address, and phone number of attending physician			
30.A.27*	Pre-dive checks			
a	Sufficient air to complete assigned task			
b	Equipment checks prior to dive			
c	Safety equipment on dive site			
d	Lockout/tag out procedures are followed			
e	Crane communications are reviewed			
f	When applicable cutting and welding procedures are clearly reviewed			
g	When applicable blasting procedures are reviewed			
h	Pre-dive brief to include accident management plan, AHA, equipment checklist ,diving logs, diving conditions, and diving procedures			
i.	When applicable, man-baskets used for diver access shall be inspected and load tested prior to use.			
30.A.28	Copies of the dive log shall be submitted to the DDC after completion of the dive operation.			

*indicates items and action events that take place at the dive site

All documentation shall be reviewed and approved by DDC and ADC prior to commencing of diving operations. **Two party approval is required**

Local Requirements

		Yes	No	Not Required
1.	Before 1100 the day prior, dive contractor shall fax the Station's Port Operation with pertinent information to ensure diving operations gets added to Tugs Daily Work Sheet			
2.*	Before entering water Contractor shall call Port Operation and inform them of Location and pier of diving operation.			
3.*	All vessels on the particular pier shall be informed prior to entering the water.			
4.*	When completed vessels shall be notified and Port Operation notified			

Diving operations 30.B

EM 385 Section	Description	Compliant		Not Required
		Yes	No	
30.B.01	Staging areas for water entry and selected according to hazard analysis			
a.	ease of diver access to the water;			
b.	hazards to diver (currents, equipment, etc.) in route from surface to work area;			
c.	ability of standby diver to quickly access the water			
d.	if used as the topside dive team station, the ability to protect topside members and the standby diver from weather, operational, and other hazards;			
e.	whether topside equipment can be stowed safely and function properly;			
f.	If diver entry to water is remote from the staging area, the standby diver shall be placed at the water entry or immediately accessible to it.			
30.B.02	All Dive teams shall be manned in accordance with the criteria established in Appendix O.			
30.B.03	A standby diver will be provided whenever a diver(s) is in the water to serve as immediate emergency assistance to the primary diver(s). Un-tethered SCUBA divers, working in "buddy" pairs, shall have one standby at the surface for each pair. A standby will deploy only after the dive supervisor assesses the situation and instructs him/ her to do so.			
a.	The standby diver shall be fully equipped to dive and readily available the entire time the diver is in the water. The standby shall don all specific gear (suits, harnesses, and equipment) they will wear/ use and test all for proper operation before the primary diver leaves the surface. All gear shall be maintained operational and ready for immediate use for the duration of the dive. If any of the tested gear is exchanged or replaced during the dive, it shall be donned and tested by the standby.			
b.	The standby diver shall be dressed appropriately for the water and air temperature and remain fully suited up with helmet/ mask ready for immediate donning from the time the primary diver leaves the surface until reaching the work area/ working depth. At that point, the standby may remove the portions of his or her gear needed to prevent heat/ cold stress and prevent fatigue. If the AHA identifies a need for the standby to remain fully dressed to deploy, it will address measures that will be taken to control these hazards (i.e., standby in water at surface). Any gear that has been removed must be maintained ready for immediate donning and use, accessible to the standby at the entry to the water.			

EM 385 Section	Description	Compliant		Not Required
		Yes	No	
c.	If configuration of the surface staging area prevents safe, immediate entry of the standby into the water, the standby diver will be placed in the water fully dressed prior to the primary diver leaving the surface, and remain at the surface ready for deployment if needed.			
30.B.04	Dive operations that require surface decompression as an integral part of the dive operation shall have a trained competent person, NOTE INSTRUCTIONS			
30.B.05	Dive operations will be conducted in full coordination with external operations and processes that may impact the safety of the dive.			
a.	When the operation of machinery or release of hazardous energy will affect the diver or dive team safety, the dive supervisor will develop a Hazardous Energy Control Plan (see Section 12).			
b.	When water traffic, land-based traffic, industrial operations, heavy equipment operation, or other operations exist that present a hazard to the diver or dive team, the dive supervisor shall coordinate with the controlling authorities to minimize the hazards. NOTE: local requirements			
30B.06	Crane operations conducted to support diving operations shall follow the requirements of Section 16 of this manual. All working dives requiring communications between the divers and topside to direct crane load movements, etc., shall be performed in Surface Supplied Air mode. The crane operator will take direction from the tender or supervisor directly in communication with the diver. Crane operations where the load is placed or removed underwater shall be considered **Critical Lifts** and the diver/ load director will participate in the **Critical Lift Plan** development as outlined in Section 16.C.18.			
30.B.07	When dives will take place in an area or facility where potential or actual pressure differentials exist. Dive supervisor will develop specific plans and procedures. The plans and procedures shall be site-specific and include the following:			
a.	Identification of all potential exposure points			
b.	Means for identifying whether control structures/ mechanisms			
c.	Methods for checking pressure differential openings			
d.	Route diver will take from staging area to work area with specific designs to prevent diver and umbilical from uncontrolled pressure differential openings;			
e.	Procedures for immediate emergency pressure equalization or reduction,			
f.	Procedures for emergency diver extraction or rescue due to pressure differential exposure, including standby diver deployment precautions.			

SCUBA Diving 30.C

EM 385 Section	Description	Compliant		Not Required
30.C.01	SCUBA diving shall not be conducted	Yes	No	
a	At depths greater than 100 ft			
b	Outside the no-decompression limits unless a dual lock chamber is at the dive location with a trained competent operators			
c	Against currents exceeding one knot			
d	Enclosed or confined spaces			
e	Closed circuit or semi-closed circuit SCUBA			
f	Visibility less than 3 ft.			
g.	In areas where pressure differentials exist and it cannot be positively verified that all potential leaks have been eliminated;			
h.	When the diver does not have direct access to the surface.			
30.C.2	Specific operational requirements for SCUBA operations are as follows:			
a	Bailout bottle of minimum 30ft^3 with separate regulator			
b	Buoyancy compensation device capable of maintaining a diver at the surface with head up			
c	Submersible cylinder pressure gage			
d	Quick release weight belt			
e	Depth Gage and knife			
f	SCUBA cylinders shall comply			
	1. DOT 3AA and DOT 3AL Specifications			
	2. Identification stamped on shoulder			
	3.Annual visual inspection and 5 year hydrostatically inspected with test date stamped on cylinders			
g	Dive supervisor must have time keeping device			
h	Tethered SCUBA diver shall wear safety harness			

Surface Supplied Air (SSA) Operations 30.D				
EM 385 Section	Description	Compliance		Not Required
		Yes	No	
30.D.01	SSA dives shall not be conducted in greater than 190 ft.			
30.D.02	Only equipment and components specifically designed for diving can be used			
30.D.03	Dual-lock chamber available and ready to use on dive location when diving outside of the no-decompression limits or at depths greater than 100 ft. Sufficient oxygen shall be available to complete chamber operations.			
30.D.04	Dive bell when required			
30.D.05	Minimum SSA diving operational requirements			
a	Each diver shall be continuously tended while in the water regardless of depth			
b	Underwater tender at point of entry when working in underwater closed spaces			
c	Calculated air supply sufficient for each diver for duration of dive including decompression			
d	Separate reserve air supply come home bottle with minimum 30ft³ air supply. With sufficient capacity to recover the diver and complete emergency recompression (if required)			
e	Integrated secondary air supply in the event of loss of primary air			
f	Separate air supply when working deeper than 100 ft and outside of the No-D limits with heavy gear			
g	Electronic communication systems with an external speaker shall be incorporated in all SSA diving operations so the entire dive team can monitor communications. Communications devices shall be tested prior to each dive, maintained in an operable condition, and protected from damage during use and storage IAW the manufacturer's recommendations. All dive operations will be terminated in a safe, orderly fashion using line-pull signals if voice communications are lost. Defective electronic communication equipment shall not prevent a standby diver from deploying in an emergency if the dive supervisor determines it is safe for the diver to deploy and line-pull signals are used.			
	Mixed-Gas Diving 30.E			

Equipment Requirements 30.F

Equipment requirements shall be verbatim compliance but are specific to SSA or SCUBA
*** These items will be checked by DDC at the dive sight.**

EM 385 Section	Description	Compliant		Not required
		Yes	No	
30.F.01	Equipment modifications, repairs, tests, calibrations, or maintenance shall be recorded by means of a tagging or logging system, and include the date and nature of work performed and the name of the individual performing the work. **Submitted for review**			
30.F.02*	Air compressor systems used on-site as a direct source to supply air to SSA divers (Direct Source Compressors) shall be equipped with a volume tank with a check valve on the inlet side, a pressure gauge, a relief valve, and a drain valve.			
30.E.03	Direct Source compressors shall be of sufficient capacity to overcome any line loss or other losses and deliver a minimum 4.5 cfm (2.1 L/s) (actual) to each diver at the maximum diving depth. **Submitted calculations for review**			
30.F.04 *	All air compressor intakes shall be located away from/ upwind of areas containing exhaust or other contaminants. Compressors used in areas where there is known or suspected chemical air contamination (sandblasting operations, painting, etc.) shall be equipped with appropriate in-line air purifying absorbent beds and filters inserted into the supply line to assure breathing air quality. Oil -lubricated compressors containing a petroleum or potential CO-producing lubricant for the air pressurization pistons will not be used. Direct Source compressors shall be equipped specifically for their intended use and shall have a suitable approved means to regulate the pressure and a low air pressure alarm in the system. All monitor alarm systems shall be so designed and placed so that the dive supervisor will be made aware of the hazardous conditions. Direct Source compressors will have a Carbon Monoxide (CO) monitor with alarm in the following situations:			
a.	The compressor is powered by an internal combustion engine,			
b.	Compressors used in close proximity to internal combustion engines that may/ will be running during dive operations (boat motors, generators, cranes, etc.). Air intake pipes shall be placed away from/ upwind of the exhaust source.			

EM 385 Section	Description	Compliant		Not required
		Yes	No	
30.F.05	Air compressor systems will be tested by means of sampling at the connection to the distribution system. **Submitted for review**			
a	All air compressors with a working pressure greater than 500 psi will be tested every six months by an accredited testing laboratory. Compressors with a working pressure under 500 psi may be tested in-house with documentation every six months and must be tested by an accredited testing laboratory every two years. Lab accreditation shall be from ACGIH/ NVLAP, American Association of Laboratory Accreditation (A2LA – for environmental or calibration) or similar recognized accreditation. Purchased air must be certified by the supplier that it has been tested and meets the standards below			
b.	A copy of the certificate of analysis showing the breathing air meets the minimum acceptable criteria shall be provided to the GDA.			
c.	Air purity standards are as follows: (1) Air shall not contain a level of carbon monoxide greater than 20 ppm: (2) Air shall not contain a level of carbon dioxide greater than 1,000 ppm; (3) Air shall not contain a level of oil mist greater than 5 milligrams per cubic meter (mg/m3); (4) Air shall not contain a level of hydrocarbons other than methane greater than 25 ppm; and (5) Air shall not contain a noxious or pronounced odor.			
30. F.06*	Breathing supply hoses.			
a	Breathing air supply hoses shall meet the specifications listed in SAE 100-R-3, specific for SSA use, have a working pressure of the total breathing gas system, and have a rated bursting pressure at least four times the working pressure.			
b	Breathing air supply hoses shall have connectors made of corrosion resistant materials and have a working pressure at least equal to the working pressure of the hose to which they are attached: connectors must not be able to become accidentally disengaged.			
c	Umbilical's shall be marked in 10 ft (3 m) increments to 100 ft(30.5 m) (beginning at the divers end) and in 50 ft (15.2 m) increments thereafter.			

EM 385 Section	Description	Compliant		Not required
		Yes	No	
d	Umbilical's shall have a nominal breaking strength of 1000 lb, (453.6KG) and shall be made of kink resistant materials.			
e	Hoses must be tested at least annually to 1.5 times the working pressure.			
f	When hoses are not in use, their open ends must be closed by taping or other means.			
g	The umbilical assembly used for the standby diver must be of sufficient length to reach the primary diver at the furthest distance he can precede from the dive station or beyond.			
h.	Umbilical's shall be carefully tended to maintain them and the diver clear of hazards such as propellers (including those of ROV's) or intakes present in the diving zone so that the diver or umbilical cannot be drawn into them.			
30.F.07*	SSA and mixed-gas helmets and masks shall have a non-return valve at the attachment between the helmet or mask and hose which will close readily and also have an exhaust valve; helmets and masks shall have a minimum ventilation rate capacity of 4.5 CFM (2.1 L/s) (actual) at the depth at which they are operated. The use of Jack Brown masks is prohibited unless it incorporates electronic communication and a means of incorporating a diver carried bailout system.			
30.F.08*	SSA and mixed-gas helmets and masks must be capable of supporting a reserve breathing supply which can be immediately turned on by the diver in event of loss of air.			
30.F.09*	SSA and mixed-gas helmets and masks must be capable of supporting a two-way, diver-surface communication system.			
30.E.10 *	Weights and harnesses. Unless heavy gear is worn, each diver shall wear a safety harness with a positive buckling device, attachment point for the safety line, and a lifting point to distribute the pull force of the line over the diver's body while maintaining the body in a heads-up vertical position when unconscious or inert.			
30.F.11 *	The following emergency and first-aid equipment shall be located at all dive sites:			
a	A first-aid kit meeting the requirements of Section 3;			

EM 385 Section	Description	Compliant		Not required
		Yes	No	
b	An oxygen resuscitation system capable of delivering oxygen for a minimum of 30 minutes; and			
c	A stokes litter or backboard, with flotation capability.			
30.F.12 *	When diving from vessels, International alpha code and recreational dive flags with a minimum dimension of 23 in (58.4 cm) will be displayed a minimum of 3 ft (0.9 m) above the working surface at the dive location during diving operations. When diving from surfaces other than vessels in areas capable of supporting marine traffic, a rigid replica of the international code flag "A" at least one meter in height shall be displayed at the dive location in a manner which allows all-round visibility, and shall be illuminated during night diving operations.			
30.F.13*	Hand-held power tools shall be tested and certified to be safe for underwater use; these tools shall be de-energized at the surface before being placed into or retrieved from the water and shall not be supplied with power until requested by the diver.			
30.F.14	The use of one-atmosphere suits (e.g., Newt Suits) requires the specific approval of the MSC DDC and FOA DDC prior to the use of such equipment.			
	Scientific Snorkeling 30.G			
30.G.01	Must be approved by DDC			
30.G.02	Environmental assessment only. It will not be used for structural inspections or other work.			
30.G.03	An on-site snorkeling team shall be made up of no less than two persons: snorkeler, and observer/assistant. Additional site personnel may be required by the DDC or Safety Office Diving Safety Representative based on site hazards and conditions.			
30.G.04	Trained personnel or qualified as diving inspectors to offer quality insurance and oversight			
30.G.05	Surface snorkeling only. Must be tethered in water deeper than 5 ft. Maybe authorized for deeper than 5 ft. by DDC based on an acceptable AHA.			
a.	The snorkeler shall be tethered with a harness and a maximum of 40 feet (12.2m) of floating line;			
b.	The tether must be constantly tended from the shore or boat;			
c.	The snorkeler must wear a device providing a minimum of 15.5 pounds (7 kg) of positive buoyancy			
d.	There are no potential tether entanglement hazards in the snorkeling area			

EM 385 Section	Description	Compliant		Not required
		Yes	No	
30.G.06	All snorkelers and observers/assistants will be certified as skin divers (snorkelers) or open water divers by a nationally-recognized organization (e.g., Professional Association of Diving Instructors (PADI), National Association of Underwater Instructors (NAUI),			
30.G.07	Observer within 50ft with ring buoy on 70ft line			
30.G.08	Areas with extreme turbulence must be avoided			
30.G.09	Thermal Protection			
30.G.10	Certified and signed by a licensed physician that team members are medically fit, must be accomplished within the past 12 months			
30.G.11	All team members current CPR and first-aid qualified			
30.G.12	A first-aid kit meeting the requirements of 03.A.03.a will be available at each location where snorkeling is being performed. A means of securely transporting an unconscious person, such as a litter or stretcher, shall be provided when snorkeling is conducted in areas inaccessible to vehicles or boats.			
30.G.13	Means of Communications for emergency services			
30.G.14	Diving mask, snorkel and dive knife			
30.G.15	Snorkeling protocol			
a	AHA for each specific mission			
b	Maintenance of all records of physician letter, survey, AHA and Safe Practices manual			
30.G.16	Must wear appropriate environmental protection			

Notes:

30. A & B. Submitted for all dives.
30. C Submitted for SCUBA dives
30. D Submitted for Surface Supplied Air
30. F. Equipment requirements shall be verbatim compliance but are specific to SSA or SCUBA.

This checklist has been developed to aid and ensuring all line items is compliant as per the EM 385-1-1. This is a checklist tool and not intended for DDC review as compliant submittal.

DIVING OPERATION QUALITY ASSURANCE CHECK LIST

1. General Checks

a. Are the divers and diving supervisor the same personnel specified in the accepted Dive Operation Plan? Yes No

b. Does the diving supervisor have the following documents on the dive site for reference or review?

(1) Accepted Safe Practices Manual. Yes No
(2) Accepted Dive Operations Plan. Yes No
(3) Navy Dive Tables. N/A Yes No

c. Was a pre-dive conference held? Yes No

d. Were all dive team members present for the pre-dive conference? Yes No

e. Did the pre-dive conference cover the following topics?

(1) Description of mission and location, including drawings and/or photographs pertinent to the mission, equipment and materials that are to be installed as part of the mission. Yes No

(2) Description of diving apparatus/equipment craft to be used. Yes No

(3) Maximum working depth with estimated bottom times and water temperatures. Yes No

(4) Names and duties of personnel on the team (when possible, incorporate at least one person on the dive that has previously performed the same or similar mission). Yes No

(5) Discussion of Activity Hazard Analysis. Yes No

(6) Emergency procedures. Yes No

f. Are dive logs maintained on each diver? Yes No

g. Do the dive logs include the following?

(1) Full name. Yes No

(2) Date and location of dive. Yes No

(3) Maximum depth and bottom time. Yes No

(4) Surface interval between dives. Yes No

(5) Breathing medium and type of equipment used. Yes No

(6) Group classification at beginning and end of each dive. Yes No

(7) Water and ambient air temperature. Yes No

(8) Depth(s) and duration(s) of any decompression stops. N/A Yes No

(9) Date and time of last dive. Yes No

h. Does the contractor's manning levels meet or exceed the requirements for the dive mode employed as specified in EM 385-1-1, Appendix N? Yes No

i. Have Hazardous Energy Control procedures been met and has dive supervisor secured keys and tags for the clearance for lockout/tagout and hazardous energy control? N/A Yes No

j. Is the appropriate dive flag displayed at the dive location during diving operations? Yes No

2. Checks for SCUBA Mode Operations

a. Are all divers equipped with an alternate air source, e.g., a bailout bottle with a minimum of 30 cubic feet of air and separate regulator? Yes No

b. Are the divers utilizing buoyancy compensation devices? Yes No

c. Does the diver's cylinder pressure gauge work? Yes No

d. Is their weight belt the quick release type? Yes No

e. Is the diver equipped with a depth gauge and knife? Yes No

f. When tethering is required, are divers equipped with a safety harness with a positive buckling device, attached point for the safety line, and a lifting point to distribute the pulling force of the line over the diver's body? N/A Yes No

3. Surface Supplied Air Operations

a. Are divers continuously tended while in the water with one tender per diver? Yes No

b. When divers are conducting operations in physically confining spaces, is there a diver stationed at the underwater point of entry? N/A Yes No

c. Is there sufficient primary breathing air supply to support divers for the duration of the planned dive? Yes No

d. Is the standby diver dressed and readily available when a diver is in the water? Yes No

e. Does each diver have an alternate breathing air supply available? Yes No

f. Does the electronic communication system work correctly? Yes No

g. Does the diving supervisor clearly understand that all diving shall terminate if voice

communications are lost? Yes No

h. Surface supplied air helmets and masks must be capable of supporting reserve breathing supplies, which can be turned on by the diver, and a two-way diver-surface communication system. Does the contractor have these capabilities? (Jack Brown masks are prohibited.)
Yes No

4. Mixed-Gas Operations

a. Are divers continuously tended while in the water with one tender per diver?
Yes No

b. Is the standby diver dressed and readily available when a diver is in the water?
Yes No

c. When divers are conducting operations in physically confining spaces, is there a diver stationed at the underwater point of entry? N/A Yes No

d. Is there sufficient primary breathing air supply to support divers for the duration of the planned dive, including decompression? Yes No

e. Does each diver have a dive-location reserve breathing air supply available?
Yes No

5. Equipment Checks

a. Do compressor systems used to supply air to the divers function properly and are they equipped with a volume tank check valve on the inlet side, a pressure gauge, a relief valve, and a drain valve? N/A Yes No

b. Are compressor systems capable of delivering a minimum 4.5 cfm (actual) air to each diver at the maximum diving depth? N/A Yes No

c. Are air compressor intakes located away from areas containing exhaust or other contaminants? N/A Yes No

d. Are umbilicals marked in 10-foot increments to 100 feet (beginning at the diver end) and in 50-foot increments thereafter? Yes No

e. Does the nominal breaking breach strength of the umbilicals meet or exceed the 2650-pound requirement? Yes No

f. Did the contractor include a safety line of at least 3/8-inch synthetic material as an integral part of each umbilical? Yes No

6. Emergency and First Aid Equipment Checks

a. Is a first aid kit meeting the requirements of EM 385-1-1, Paragraph 3.B on the dive site?
Yes No

b. Is an oxygen resuscitation system capable of delivering oxygen for a minimum of 30 minutes on the dive site? Yes No

c. Is there a dive team member on site who has a current nationally recognized certification in first aid and CPR? Yes No

d. Does the contractor have a stokes litter or backboard with attached flotation device on the dive site? Yes No

IF THE ANSWER TO ANY OF THE ABOVE QUESTIONS IS *NO*, SUSPEND THE DIVE OPERATION AND RESOLVE THE ISSUE.

Dive Inspector _____ Date _____

Project _____

Diving Contractor _____ Dive Supervisor _____

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS

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.

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 BUREAU OF SHIPPING (ABS)
16855 Northchase Drive
Houston, TX 77060 USA
Ph: 281-877-5800
Fax: 281-877-5803
E:Mail: ABS-WorldHQ@eagle.org
Internet: http://www.eagle.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 SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)
1800 East Oakton Street
Des Plaines, IL 60018
Ph: 847-699-2929
Internet: http://www.asse.org

AMERICAN WATER WORKS ASSOCIATION (AWWA)
6666 West Quincy Avenue
Denver, CO 80235-3098
Ph: 303-794-7711
E-mail: distribution@awwa.org
Internet: http://www.awwa.org

AMERICAN WELDING SOCIETY (AWS)
13301 NW 47 Ave
Miami, FL 33054

Ph: 888-WELDING, 305-824-1177, 305-826-6192
Fax: 305-826-6195
E-mail: customer.service@awspubs.com
Internet: http://www.aws.org

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

ASME INTERNATIONAL (ASME)
Two Park Avenue, M/S 10E
New York, NY 10016-5990
Ph: 800-843-2763
Fax: 973-882-1717
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Fax: 847-517-1206
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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

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
445 and 501 Hoes Lane
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Ph: 732-981-0060 or 800-701-4333
Fax: 732-562-9667
E-mail: onlinesupport@ieee.org
Internet: http://www.ieee.org

INTERNATIONAL CODE COUNCIL (ICC)
500 New Jersey Avenue, NW
6th Floor, Washington, DC 20001
Ph: 800-786-4452 or 888-422-7233
E-mail: order@iccsafe.org
Internet: www.iccsafe.org

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
1300 North 17th Street, Suite 900
Arlington, VA 22209
Ph: 703-841-3200
Internet: http://www.nema.org/

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Quincy, MA 02169-7471
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Fax: 412-281-9992
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Internet: http://www.sspc.org

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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

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Internet: http://www.gpoaccess.gov

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

-- End of Section --

SECTION 01 45 00.10 20

QUALITY CONTROL FOR MINOR CONSTRUCTION

PART 1 GENERAL

All Prestressed Concrete Fender Piles are required to have an underwater inspection. An underwater inspection of contractor installed composite fender piles is not required unless there is a concern the pile had been damaged during it's installation.

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

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. 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-01 Preconstruction Submittals

QC Plan; G

Underwater QC Specialist(UQC); G

Concrete Repair QC (CQC); G

Submit a QC plan within 15 calendar days after receipt of Notice of Award.

SD-06 Test Reports

UQC Pile Inspection Report(s); G

UQC Concrete Repairs/Grout Curtain Inspection Report(s); G

CQC Concrete Repairs Inspection Report(s); G

Submit Weekly Underwater Quality Control Report and Weekly Concrete Repair Quality Control Report as the work progresses.

1.3 INFORMATION FOR THE CONTRACTING OFFICER (KO)

Prior to commencing work on construction, the Contractor can obtain a single copy set of the current report forms from the KO. 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 KO and the Engineer of Record:

a. 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. 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.

b. Contractor Production Report: Original and one copy by 10:00 AM the next working day week after each day that work is performed;

c. Preparatory Phase Checklist: Original attached to the original CQC Report and one copy attached to each copy;

d. Initial Phase Checklist: Original attached to the original CQC Report and one copy attached to each copy;

e. Field Test Reports: One copy, within two working days after the test is performed, attached to the CQC Report;

f. QC Meeting Minutes: One copy, within two working days after the meeting; and

g. 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 Manager, a QC plan, a Coordination and Mutual Understanding Meeting, QC meetings, three phases of control, submittal review and approval, testing, and 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 shall cover on-site and off-site work and shall be keyed to the work sequence. No 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 Preliminary Work Authorized Prior to Acceptance

The only 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.

1.4.2 Acceptance

Acceptance of the QC plan is required prior to the start of construction. The KO 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.

1.4.3 Notification of Changes

Notify the KO, in writing, of any proposed change, including changes in the QC organization personnel, a minimum of seven calendar days prior to a proposed change. Proposed changes shall be subject to the acceptance by the KO.

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. In addition to implementing and managing the QC program, the QC Manager may perform the duties of project superintendent. The QC Manager is required to attend the Coordination and Mutual Understanding Meeting, conduct the QC meetings, perform the three phases of control, 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 others. The QC Manager shall not be designated as the safety competent person as defined by EM 385-1-1.

1.5.1.2 Qualifications

An individual with a minimum of 10 years combined experience as a superintendent, inspector, QC Manager, project manager, or construction manager on similar size and type construction contracts which included the major trades that are part of this contract. The individual must be familiar with the requirements of the EM 385-1-1 and have experience in the areas of hazard identification and safety compliance.

1.5.1.3 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.

1.5.2 Alternate QC Manager Duties and Qualifications

Designate an alternate for the QC Manager 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 14 workdays during a calendar year. The qualification requirements for the Alternate QC Manager shall be the same as for the QC Manager.

1.5.3 QC Specialists Duties and Qualifications

Provide separate QC specialists at the work site for each of the areas of responsibilities, specified below, who shall assist and report to the QC Manager and who may perform production related duties but must be allowed sufficient time to perform their assigned quality control duties. QC specialists are required to attend the Coordination and Mutual understanding Meeting, QC meetings, and be physically present at the construction site to perform the three phases of control and prepare documentation for each definable feature of work in their area of responsibility at the frequency specified below:

Qualification/Experience in Area of Responsibility	**Area of Responsibility**
10 years Underwater Construction	Underwater Repairs
10 years Concrete Repair	Concrete Repairs

1.5.3.1 Underwater QC Specialist

Provide Underwater Quality Control Specialist (UWQCS) at the work site to perform underwater surveillance and inspection for the Contractor for the installation of the prestressed concrete piles and underwater concrete repairs.

The UWQCS shall identify any repair variations as they are relate to the contract drawings by performing a preconstruction below water inspection of the bulkhead, in areas designated for underwater concrete repairs identified on the contract drawings, those areas of spalling identified in the Underwater Sheet Pile Gap Inspection, and other related items prior to the contractor beginning any demolition or repairs. Repairs reflected on the contract drawings shall be validated and any additional repairs, identified by the CRQC during his inspection and which are not shown on the contract drawings, shall be brought to the attention of the Contracting Officer. The Contracting Officer will make the final determination for all repairs that will be accomplished within the allowable quantities identified within the contract documents and based upon a comparison of the contract drawings and CRQC's preconstruction inspection report.

The Specialist may be part of an individual dive team or may coordinate his inspections with the contractor's construction dive team. The Underwater QC Specialist divers must have current commercial diver's license, with a minimum of five (10) 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 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.

The UWQC Specialist, and his team if independent from the contactor, shall have no involvement with the design, preparation of Contract, or installation of the work and shall be an independent third party hired directly by the Prime Contractor and approved by the Contracting Officer.

1.5.3.2 Concrete Repair QC Specialist

Provide a Concrete Repairs QC Specialist (CRQC)at the work site to perform inspection and surveillance for the Contracting Officer for all concrete repairs. The CRQC shall have a minimum of ten (10) years experience with all of the repair methods identified in the contract and should have have ACI certification in concrete repair and shotcrete operations. The CRQC shall be thoroughly familiar with the design plans and specifications to sufficiently understand the engineering aspects of the concrete repairs and to be able to recognize and document potential problem areas such as improperly constructed or defective areas.

The CRQC shall identify any repair variations as they are relate to the contract drawings by performing an above water inspection of the pier sheet pile, sheet pile cap, seawall, beams, curbing, slabs, mooring fixtures and other related items prior to the contractor beginning any of his concrete demolition.

Repairs reflected on the contract drawings shall be validated and any additional repairs, identified by the CRQC during his inspection and which are not shown on the contract drawings, shall be brought to the attention of the Contracting Officer. The Contracting Officer will make the final determination for all repairs that will be accomplished within the allowable quantities identified within the contract documents and based upon a comparison of the contract drawings and CRQC's preconstruction inspection report.

The CRQC shall provide the Contracting Officer an overall written report containing the location and size of repairs identified from his original inspection and identify how they correlate with the original contract documents. As the repair work progresses, the CRQC shall assist the Contracting Officer with providing demolition and construction surveillance.

The CRQC shall provide all his own necessary equipment to conduct inspection and surveillance services, including but not limited to a boat, communication equipment, and photographic/video equipment.
The CRQC person shall be an independent third party hired directly by the prime contractor, and shall have no involvement with the design, preparation of contract documents, or actual repair work.

1.6 QC PLAN

1.6.1 Requirements

Provide, for acceptance by the KO, a QC plan submitted in a three-ring binder that covers both on-site and off-site work and includes the following with a table of contents listing the major sections identified with tabs.

I. QC ORGANIZATION: A chart showing the QC organizational structure and its relationship to the production side of the organization.

II. NAMES AND QUALIFICATIONS: In resume format, for each person in the QC organization. Include the CQM for Contractors course certification required by the paragraph entitled "Construction Quality Management Training".

III. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONAL: Of each person in the QC organization.

IV. 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.

V. 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 managing and implementing the QC program as described in this contract. Include in this letter the QC Manager's authority to direct the removal and replacement of non-conforming work.

VI. 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.

VII. TESTING LABORATORY INFORMATION: Testing laboratory information required by the paragraphs "Accredited Laboratories" or "Testing Laboratory Requirements", as applicable.

VIII. 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.

IX. PROCEDURES TO COMPLETE REWORK ITEMS: Procedures to identify, record, track and complete rework items.

X. DOCUMENTATION PROCEDURES: Use Government formats.

XI. LIST OF DEFINABLE FEATURES: A Definable Feature of Work (DFOW) is a task, which is separate and distinct from other tasks, has the same control requirements and work crews. The list shall be cross-referenced to the Contractor's Construction Schedule and the specification sections. For projects requiring a Progress Chart, the list of definable features of work shall include but not be limited to all items of work on the schedule. For projects requiring a Network Analysis Schedule, the list of definable features of work shall include but not be limited to all critical path activities.

XII. PROCEDURES FOR PERFORMING THREE PHASES OF CONTROL: For each DFOW provide Preparatory and Initial Phase Checklists. Each list shall include a breakdown of quality checks that will be used when performing the quality control functions, inspections, and tests required by the contract documents. The preparatory and initial phases shall be conducted with a view towards obtaining quality construction by planning ahead and identifying potential problems.

XIII. PERSONNEL MATRIX: Not Applicable.

XIV. PROCEDURES FOR COMPLETION INSPECTION: See the paragraph entitled "COMPLETION INSPECTIONS".

XV. TRAINING PROCEDURES AND TRAINING LOG: Not Applicable.

1.7 COORDINATION AND MUTUAL UNDERSTANDING MEETING

During the Pre-Construction conference and prior to the start of construction, discuss the QC program required by this contract. 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, and the coordination of the Contractor's management, production and the QC personnel. At the meeting, the Contractor will be required to explain how three phases of control will be implemented for each DFOW. Contractor's personnel required to attend shall include the QC Manager, project manager, and superintendent. Minutes of the meeting will be prepared by the QC Manager and signed by both the Contractor and the KO. The Contractor shall provide a copy of the signed minutes to all attendees. Repeat the coordination and mutual understanding meeting when a new QC Manager is appointed.

1.8 QC MEETINGS

After the start of construction, the QC Manager shall conduct QC meetings once a week or unless otherwise directed by the KO at the work site with the superintendent, QC Manager, and the foreman responsible for the ongoing and upcoming work. The QC Manager shall prepare the minutes of the meeting and provide a copy to the KO within two working days after the meeting. As a minimum, the following shall be accomplished 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 (RFIs, etc.);

f. Address items that may require revising the QC plan; and

g. Review Accident Prevention Plan (APP).

1.9 THREE PHASES OF CONTROL

The three phases of control shall adequately cover both on-site and off-site work and shall include the following for each DFOW.

1.9.1 Preparatory Phase

Notify the KO at least two work days in advance of each preparatory phase. Conduct the preparatory phase with the superintendent and the foreman responsible for the definable feature of work. Document the results of the preparatory phase actions in the daily CQC Report and in the QC checklist. Perform the following prior to beginning work on each definable feature of

work:

a. Review each paragraph of the applicable specification sections;

b. Review the contract drawings;

c. 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;

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

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

f. 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;

g. 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; and

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

1.9.2 Initial Phase

Notify the KO 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 foreman responsible for that DFOW. Observe the initial segment of the work to ensure that it complies with contract requirements. Document the results of the Initial Phase in the daily CQC Report and in the QC checklist. 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; and

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

1.9.3 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 and in the QC checklist:

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; and

e. Assure manufacturers representatives have performed necessary inspections, if required.

1.9.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted 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.

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

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

1.10 SUBMITTAL REVIEW AND APPROVAL

Procedures for submission, review, and approval of submittals are described in the submittal section of the specification.

1.11 TESTING

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

1.11.1 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 (i.e.; 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."

1.11.2 Laboratory Accreditation Authorities

Laboratory Accreditation Authorities include the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology, the American Association of State Highway and Transportation Officials (AASHTO), International Accreditation Services, Inc. (IAS), U. S. Army Corps of Engineers Materials Testing Center (MTC), the American Association for Laboratory Accreditation (A2LA), the Washington Association of Building Officials (WABO) (Approval authority for WABO is limited to projects within Washington State), and the Washington Area Council of Engineering Laboratories (WACEL) (Approval authority by WACEL is limited to projects within the EFA Chesapeake and Public Works Center Washington geographical area).

1.11.3 Capability Check

The KO 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.

1.11.4 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 KO 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 shall be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to the KO.

1.12 QC CERTIFICATIONS

1.12.1 Contractor Quality Control Report Certification

Each CQC Report shall contain the following statement: "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."

1.12.2 Invoice Certification

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

1.12.3 Completion Certification

Upon completion of work under this contract, the QC Manager shall furnish a certificate to the KO attesting that "the work has been completed, inspected, tested and is in compliance with the contract."

1.13 COMPLETION INSPECTIONS

1.13.1 Punch-Out Inspection

Near the completion of all work in a quadrant or any increment thereof established by a completion time stated in the Contract clause "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the QC Manager shall conduct an inspection of the work and develop a punch list of items which do not conform to the approved drawings and specifications. Include in the punch list any remaining items of the "Rework Items List", which were not corrected prior to the Punch-Out inspection. The punch list shall include the estimated date by which the deficiencies will be corrected. A copy of the punch list shall be provided to the KO. The QC Manager or staff shall make follow-on inspections to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government "Pre-Final Inspection".

1.13.2 Prestressed Concrete Fender Piles

All Prestressed Concrete Fender Piles shall be inspected and reports submitted to the Government within 14 calendar days of the completion of

the installation. The delay of an inspection beyond the 14 days shall require the removal of all marine growth prior to the actual inspection. Each Prestressed Fender Pile shall be inspected for damage, missing elements, and to ensure lifting loops have been removed and grouted and that all UHMW panels, bolts, and sealant have been properly installed.

Pile damage, defects, or missing elements, found during the inspection, shall be addressed by the contractor and the piling reinspected upon completion by the UWQC.

The contractor shall not proceed to the next Quadrant until all of the fender piles in the current Quadrant have been inspected and the reports submitted and approved by the Contracting Officer.

1.13.3 Pre-Final Inspection

The Government, QC manager, and Underwater QC Team will perform this inspection to verify that the fender modules are complete and ready for use prior to moving to the subsequent quadrant. Any damage or work required shall be completed prior to proceeding to the next work area. A Government pre-final punch list may be developed as a result of this inspection. The QC Manager shall ensure that all items on this list are corrected prior to notifying the Government that a "Final" inspection with the customer can be scheduled. Any items noted on the "Pre-Final" inspection shall be corrected in a timely manner and shall 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.

1.13.4 Final Acceptance Inspection

The QC Manager, the superintendent, or other Contractor management personnel and the KO will be in attendance at this inspection. Additional Government personnel may be in attendance. The final acceptance inspection will be formally scheduled by the KO based upon results of the "Pre-Final Inspection". Notice shall be given to the KO at least 14 days prior to the final inspection. The notice shall state that all specific items previously identified to the Contractor as being unacceptable will be complete by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the KO to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause "Inspection of Construction".

1.14 DOCUMENTATION

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 (KO)" shall 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 superintendent and the QC Manager must prepare and sign the Contractor Production and CQC Reports, respectively. The reporting of work shall be identified by terminology consistent with the construction schedule. In the "remarks" section in this report which will contain 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. For each remark given, identify the Schedule Activity No. that is associated with the remark.

1.14.1 QC Specialist Reports

Weekly written or electronic reports shall be provided to the Contracting Officer and Design Manager that provides a running total of the projected repair quantities, repairs currently under execution, and overall condition of the completed repairs. Three (3) hard copies of the weekly reports shall be provided to the Contracting Officer and (1) hard copy shall be provided directly to the Engineer of Record. Photographs and/or video of typical repair preparation, execution, and completed concrete repair shall be submitted along with the weekly reports.

The reports, including photographs, shall be submitted in "pdf" format. Typical examples, for the minimum requirements of the UWQCS and CRQC Specialist Reports, are provided at the end of this section and shall be used as reference templates.

NOTE: This information provided in the UWQC and CRQC specialist reports shall be used to assist the Contracting Officer with payment of invoicing. Payment of repairs quantities may be withheld until weekly reports have been validated by the Contracting Officer. Reports with errors and/or omissions will be returned to the contractor prior to Government validation.

UQCS Pile Inspection Report(s), UQC Concrete Repairs/Grout Curtain Inspection Report(s), and CQC Concrete Repairs Inspection Report(s) shall be provided for Government review within 20 calendar days of the individual pile installation or concrete repairs being performed.

QC reports shall include the same documentation requirements as the CQC Report for their area of responsibility.

Prepare each Pile Inspection Report and include photographs and videos. An example report is provided at the end of this section and reflects the minimum required information to be presented.

UWQC reports, signed and dated by the QC.

1.14.2 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 shall be readily available to the Government's Quality Assurance Team during all business hours.

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

b. All milestone inspections, arranged by Activity/Event Number.

c. A current up-to-date copy of the Testing and Plan 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. A current up-to-date copy of the Rework Items List.

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

1.14.3 As-Built Drawings

The QC Manager is required to review the as-built drawings, required by Section 01 78 00 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 number, modification number, RFI number, etc. The QC Manager shall initial each deviation or revision. Upon completion of work, the QC Manager shall submit a certificate attesting to the accuracy of the as-built drawings prior to submission to the KO.

1.15 NOTIFICATION ON NON-COMPLIANCE

The KO will notify the Contractor of any detected non-compliance with the foregoing requirements. The Contractor shall take immediate corrective action. If the contractor fails or refuses to correct the non-compliant work, the KO will issue a non compliance 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 KO may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall make no part of the time lost due to such stop orders the subject of claim for extension of time, for excess costs, or damages.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

CONTRACTOR PRODUCTION REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE		
CONTRACT NO.	TITLE AND LOCATION	REPORT NO.
CONTRACTOR	SUPERINTENDENT	MAX TEMP ☐ F ☐ C
AM	PM	MIN TEMP ☐ F ☐ C

WORK PERFORMED

Schedule Activity No.	WORK LOCATION AND DESCRIPTION	EMPLOYER	NUMBER	TRADE	HRS

SAFETY

WAS A JOB SAFETY MEETING HELD THIS DATE? (If YES attach copy of the meeting minutes)	☐ YES ☐ NO		
WERE THERE ANY LOST TIME ACCIDENTS THIS DATE? (If YES attach copy of completed OSHA report)	☐ YES ☐ NO		
WAS CRANE/MANLIFT/TRENCHING/SCAFFOLD/HV ELECT/HIGH WORK/HAZMAT WORK DONE? (If YES attach statement or checklist showing inspection performed.)	☐ YES ☐ NO		
WAS HAZARDOUS MATERIAL/WASTE RELEASED INTO THE ENVIRONMENT? (If YES attach description of incident and proposed action.)	☐ YES ☐ NO		

SCHEDULE ACTIVITY No.	LIST SAFETY ACTIONS TAKEN TODAY / SAFETY INSPECTIONS CONDUCTED	☐ SAFETY REQUIREMENTS HAVE BEEN MET

EQUIPMENT / MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB, (INDICATE SCHEDULE ACTIVITY NUMBER)

SCHEDULE ACTIVITY No.	Submittal #	Description of Equipment / Material Received

CONSTRUCTION AND PLANT EQUIPMENT ON JOB SITE TODAY, (INDICATE HOURS USED AND SCHEDULE ACTIVITY)

SCHEDULE ACTIVITY No.	Owner	Description of Equipment / Material Received	Hours Used

SCHEDULE ACTIVITY No.	REMARKS

CONTRACTOR / SUPERINTENDENT DATE

CONTRACTOR PRODUCTION REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

CONTRACT NO.	TITLE AND LOCATION	DATE / REPORT NO.

WORK PERFORMED

Schedule Activity No.	WORK LOCATION AND DESCRIPTION	EMPLOYER	NUMBER	TRADE	HRS

CONTRACTOR QUALITY CONTROL REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE

REPORT NO

PHASE	CONTRACT NO	CONTRACT TITLE

PREPARATORY

WAS PREPARATORY PHASE WORK PREFORMED TODAY? YES NO X

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL PREPARATORY PHASE CHECKLIST.

Schedule Activity No.	Definable Feature of Work	Index #

INITIAL

WAS INITIAL PHASE WORK PREFORMED TODAY? YES X NO

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL INITIAL PHASE CHECKLIST.

Schedule Activity No.	Definable Feature of Work	Index #

FOLLOW-UP

WORK COMPLIES WITH CONTRACT AS APPROVED DURING INITIAL PHASE? YES X NO ☐

WORK COMPLIES WITH SAFETY REQUIREMENTS? YES X NO ☐

Schedule Activity No.	Description of Work, Testing Performed & By Whom, Definable Feature of Work, Specification Section, Location and List of Personnel Present

REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)

Schedule Activity No.	Description

REWORK ITEMS CORRECTED TODAY (FROM REWORK ITEMS LIST)

Schedule Activity No.	Description

REMARKS (Also Explain Any Follow-Up Phase Checklist Item From Above That Was Answered "NO"), Manuf. Rep On-Site, etc.

Schedule Activity No.	Description

AUTHORIZED QC MANAGER AT SITE DATE

GOVERNMENT QUALITY ASSURANCE REPORT

DATE

QUALITY ASSURANCE REPRESENTATIVE'S REMARKS AND/OR EXCEPTIONS TO THE REPORT

Schedule Activity No.	Description

GOVERNMENT QUALITY ASSURANCE MANAGER DATE

CONTRACTOR QUALITY CONTROL REPORT

(CONTINUATION SHEET)

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE

REPORT NO.

PHASE	CONTRACT NO	CONTRACT TITLE

WORK COMPLIES WITH CONTRACT AS APPROVED DURING INITIAL PHASE? YES ☐ NO ☐

WORK COMPLIES WITH SAFETY REQUIREMENTS? YES ☐ NO ☐

FOLLOW-UP

Schedule Activity No.	Description of Work, Testing Performed & By Whom, Definable Feature of Work, Specification Section, Location and List of Personnel Present

REMARKS (Also Explain Any Checklist Item From Above That Was Answered "NO"), Manuf. Rep. On-Site, etc.

Schedule Activity No.	Description

PREPARATORY PHASE CHECKLIST

(CONTINUED ON SECOND PAGE)

CONTRACT NO	DEFINABLE FEATURE OF WORK	SPEC SECTION	DATE
		SCHEDULE ACT NO.	INDEX #

PERSONNEL PRESENT

GOVERNMENT REP NOTIFIED _____ HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/GOVERNMENT

SUBMITTALS

REVIEW SUBMITTALS AND/OR SUBMITTAL REGISTER. HAVE ALL SUBMITTALS BEEN APPROVED? YES ☐ NO ☐

IF NO, WHAT ITEMS HAVE NOT BEEN SUBMITTED? _____

ARE ALL MATERIALS ON HAND? YES ☐ NO ☐

IF NO, WHAT ITEMS ARE MISSING? _____

CHECK APPROVED SUBMITTALS AGAINST DELIVERED MATERIAL. (THIS SHOULD BE DONE AS MATERIAL ARRIVES.)

COMMENTS: _____

MATERIAL STORAGE

ARE MATERIALS STORED PROPERLY? YES ☐ NO ☐

IF NO, WHAT ACTION IS TAKEN? _____

SPECIFICATIONS

REVIEW EACH PARAGRAPH OF SPECIFICATIONS.

DISCUSS PROCEDURE FOR ACCOMPLISHING THE WORK.

CLARIFY ANY DIFFERENCES.

PRELIMINARY WORK & PERMITS

ENSURE PRELIMINARY WORK IS CORRECT AND PERMITS ARE ON FILE.

IF NOT, WHAT ACTION IS TAKEN? _____

REV DATE: 9/98 SHEET OF

PREPARATORY PHASE CHECKLIST

(CONTINUED FROM FIRST PAGE)

CONTRACT NO	DEFINABLE FEATURE OF WORK	SPEC SECTION	DATE
		SCHEDULE ACT NO.	INDEX #

TESTING

IDENTIFY TEST TO BE PERFORMED, FREQUENCY, AND BY WHOM.

WHEN REQUIRED?

WHERE REQUIRED?

REVIEW TESTING PLAN.

HAS TEST FACILITIES BEEN APPROVED?

SAFETY

ACTIVITY HAZARD ANALYSIS APPROVED? YES ☐ NO ☐

REVIEW APPLICABLE PORTION OF EM 385-1-1.

MEETING COMMENTS

NAVY/ROICC COMMENTS DURING MEETING.

OTHER ITEMS OR REMARKS

OTHER ITEMS OR REMARKS:

QC MANAGER DATE

REV DATE: 9/98 SHEET OF

INITIAL PHASE CHECKLIST

		SPEC SECTION	DATE
CONTRACT NO	DEFINABLE FEATURE OF WORK	SCHEDULE ACT NO.	INDEX #

PERSONNEL PRESENT

GOVERNMENT REP NOTIFIED _____ HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/GOVERNMENT

PROCEDURE COMPLIANCE

IDENTIFIY FULL COMPLIANCE WITH PROCEDURES IDENTIFIED AT PREPARATORY. COORDINATE PLANS, SPECIFICATIONS, AND SUBMITTALS.

COMMENTS: _____

PRELIMINARY WORK

ENSURE PRELIMINARY WORK IS COMPLETE AND CORRECT. IF NOT, WHAT ACTION IS TAKEN?

WORKMANSHIP

ESTABLISH LEVEL OF WORKMANSHIP.

WHERE IS WORK LOCATED? _____

IS SAMPLE PANEL REQUIRED? YES ☐ NO ☐

WILL THE INIITAL WORK BE CONSIDERED AS A SAMPLE? YES ☐ NO ☐

(IF YES, MAINTAIN IN PRESENT CONDITION AS LONG AS POSSIBLE AND DESCRIBE LOCATION OF SAMPLE)

RESOLUTION

RESOLVE ANY DIFFERENCES.

COMMENTS: _____

CHECK SAFETY

REVIEW JOB CONDITIONS USING EM 385-1-1 AND JOB HAZARD ANALYSIS

COMMENTS: _____

OTHER

OTHER ITEMS OR REMARKS

_____

QC MANAGER DATE

REV DATE: 9/98 SHEET OF

GOVERNMENT QUALITY ASSURANCE (QA) REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

CONTRACT NO	TITLE AND LOCATION	DATE REPORT NO

Status

WORKING ?	YES	NO	IF NO. WHY NOT:

WEATHER CONDITIONS:

Check Points

	YES	NO	REMARKS:
SUPERINTENDENT ON SITE			
QC MANAGER ON SITE			
QC REPORTS CURRENT			
AS-BUILTS CURRENT			
SUBMITTALS APPROVED FOR ONGOING WORK			
DEFICIENCY LIST REVIEWED			

WORK OBSERVED/DEFICIENCIES NOTED/SAFETY ISSUES DISCUSSED/QA TESTS AND RESULTS:

Schedule Activity No.	DESCRIBE OBSERVATIONS

MEETING/CONFERENCE NOTES (INCLUDING PARTICIPANTS):

Schedule Activity No.	NOTES

INSTRUCTIONS GIVEN OR RECEIVED/CONTROVERSIES PENDING:

Schedule Activity No.	INSTRUCTIONS/CONTROVERSIES

QA REPRESENTATIVE DATE SUPV INITIALS DATE

Rev Date: 9/98

REWORK ITEMS LIST

Contract No. and Title: _____

Contractor: _____

NUMBER	DATE IDENTIFIED	DESCRIPTION	CONTRACT REQUIREMENT (Spec. Section and Par. No., Drawing No. and Detail No., etc.)	ACTION TAKEN BY QC MANAGER	RESOLUTION	DATE COMPLETED

SHEET OF

TESTING PLAN AND LOG

CONTRACT NUMBER			PROJECT TITLE AND LOCATION							CONTRACTOR	
SPECIFICATION SECTION AND PARAGRAPH NUMBER	ITEM OF WORK	TEST REQUIRED	ACCREDITED/ APPROVED LAB		SAMPLED BY	TESTED BY	LOCATION OF TEST		DATE COMPLETED	DATE FORWARDED TO CONTR. OFF.	REMARKS
			YES	NO			ON SITE	OFF SITE			

REPORT

Of the

UNDERWATER QUALITY CONTROL INSPECTION

of the

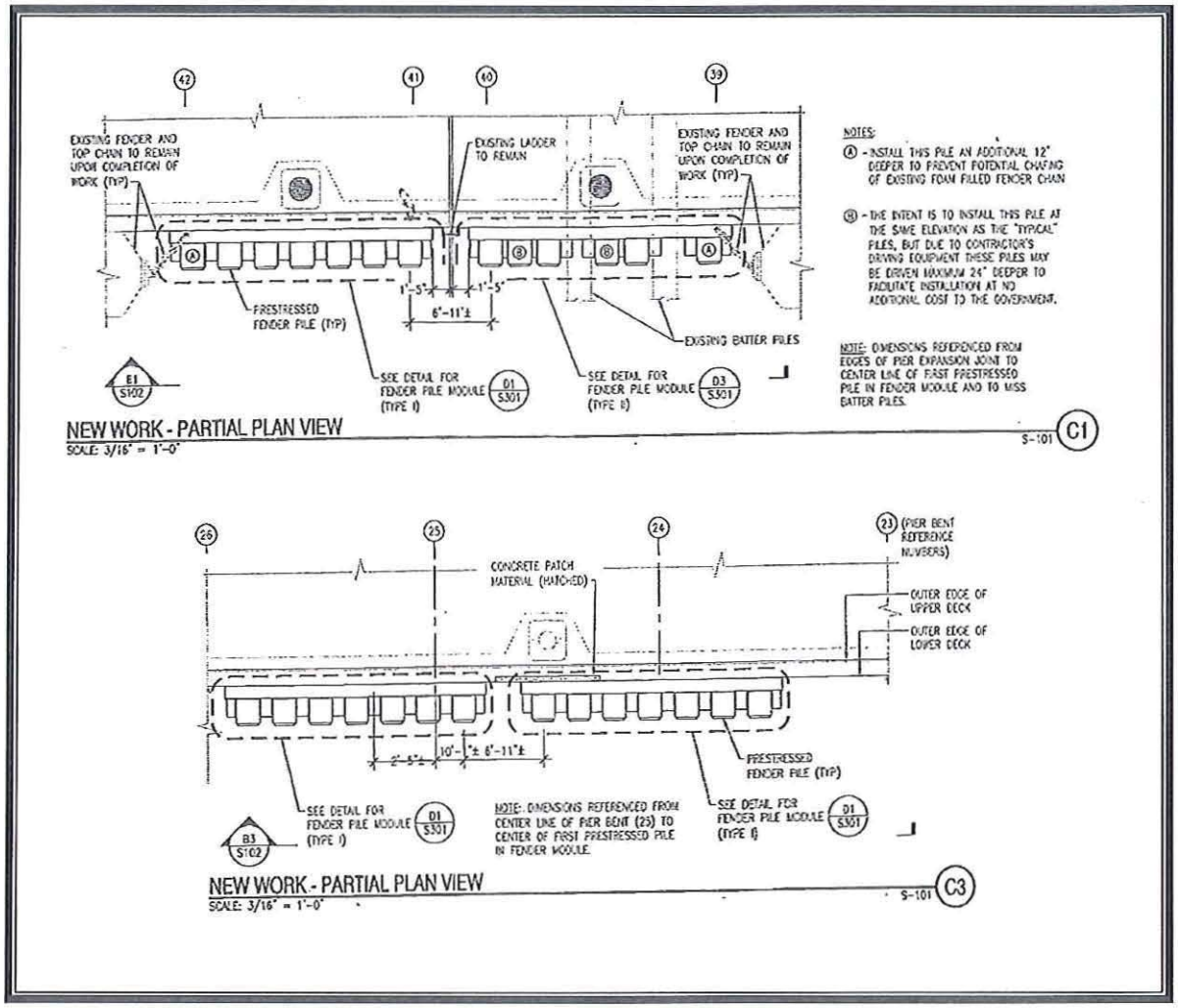
PIER 6 CVN FENDER SYSTEM

Naval Station Norfolk
Norfolk, Virginia

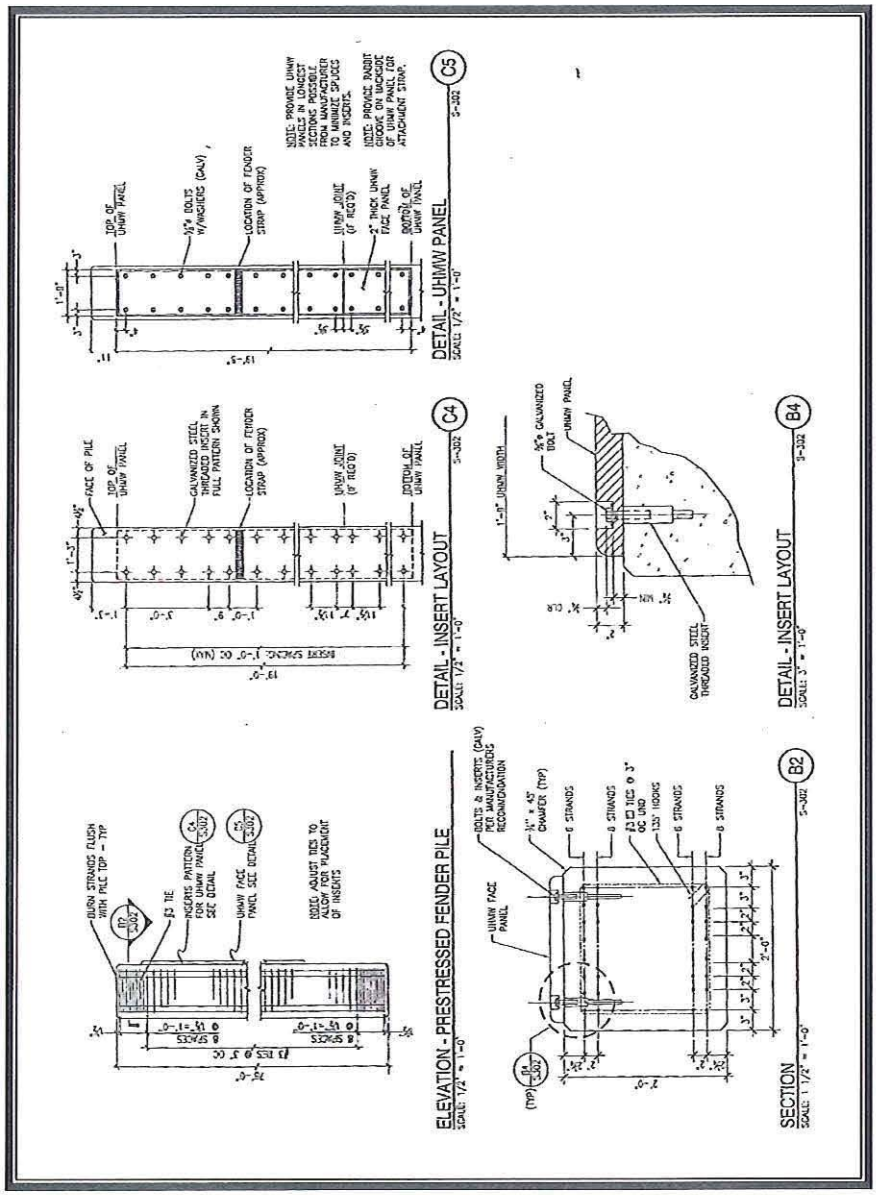
08 August 2011

A [redacted] Underwater Quality Control Team (UQCT) was deployed to Pier 6 at Naval Station Norfolk, Norfolk, Virginia, on Monday 08 August 2011.

A CVN Fender System had been recently installed by [redacted], [redacted] The fender piles are 24-inch square pre-stressed concrete. There are a total of twenty-seven piles in four locations on the south side of the pier. Location #1 consists of seven piles in the vicinity of pier bents 25 and 26. Location #2 consists of seven piles in the vicinity of pier bents 23 and 24. Location #3 consists of seven piles in the vicinity of pier bents 41 and 42. Location #4 consists of six piles in the vicinity of pier bents 39 and 40.



One face (the south face, after driving) of each pile contained forty (40) galvanized steel anchors for the mounting of a UHMW face panel. The UHMW panels are 1'-9" in width by 19'-8" in length by 2" thick.



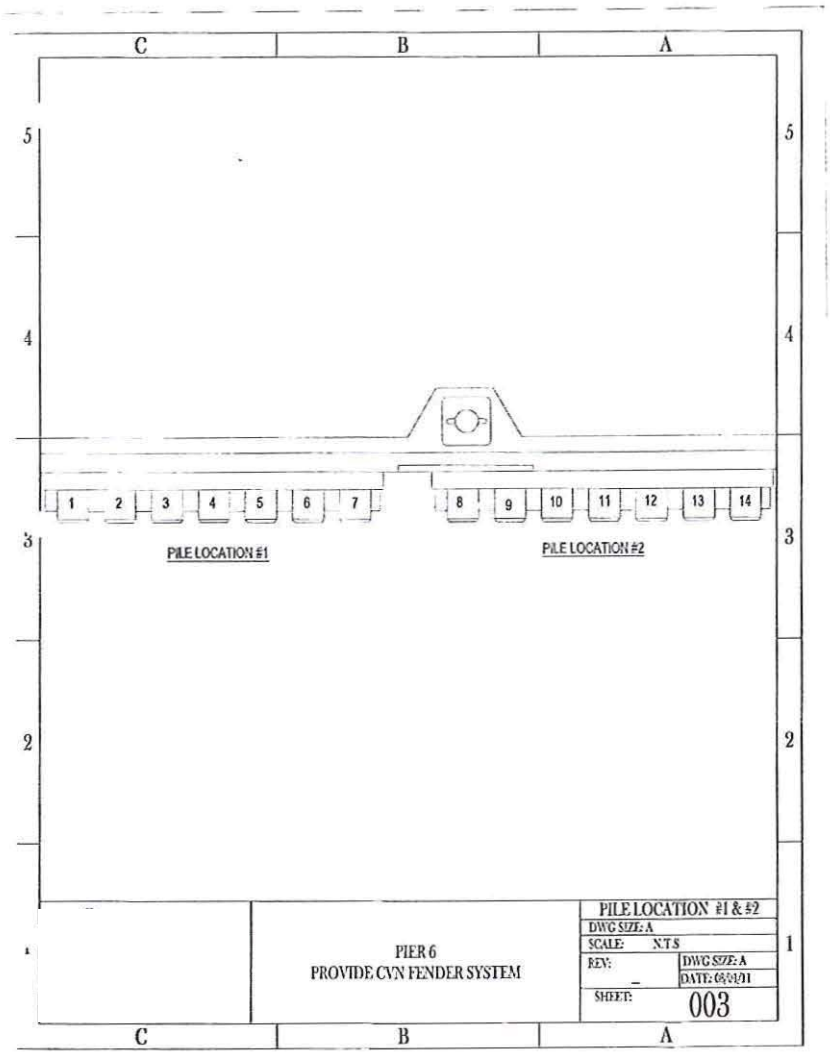
Scope of Work

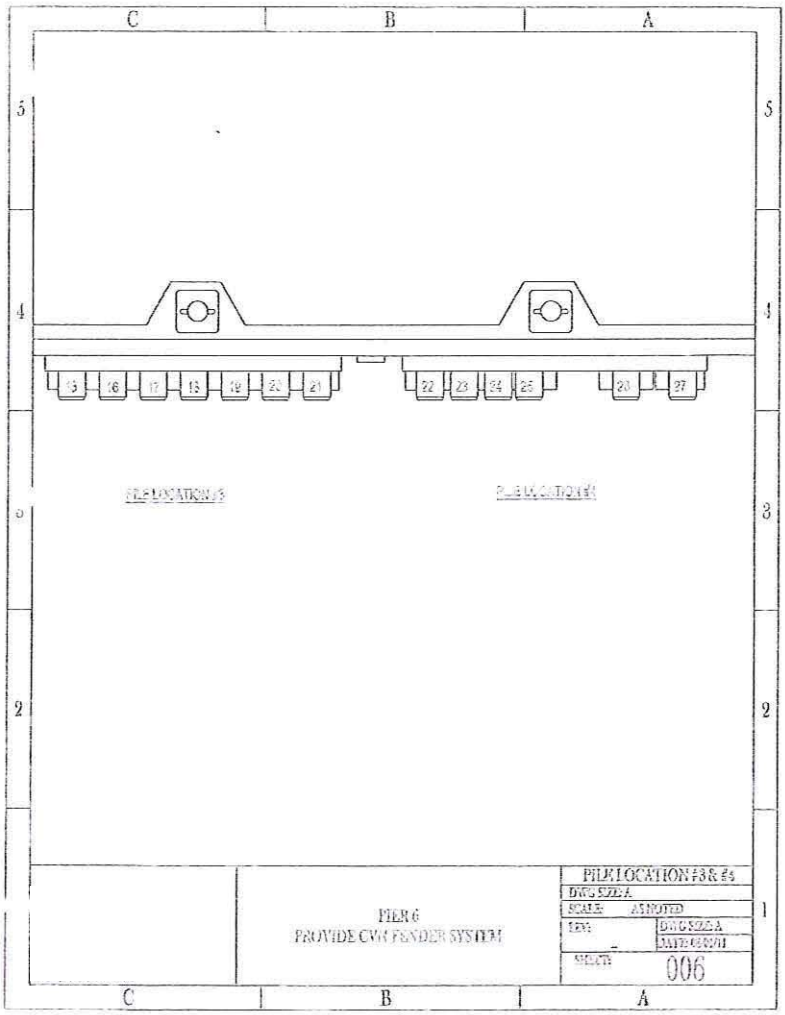
Inspect each fender pile for damage, missing elements, and to ensure lifting loops have been removed and grouted.

Prepare and submit a report including photographs and/or videos with the QC report.

Findings

The [redacted] numbering system for the pile locations and the individual fender piles was adopted for this report as follows:





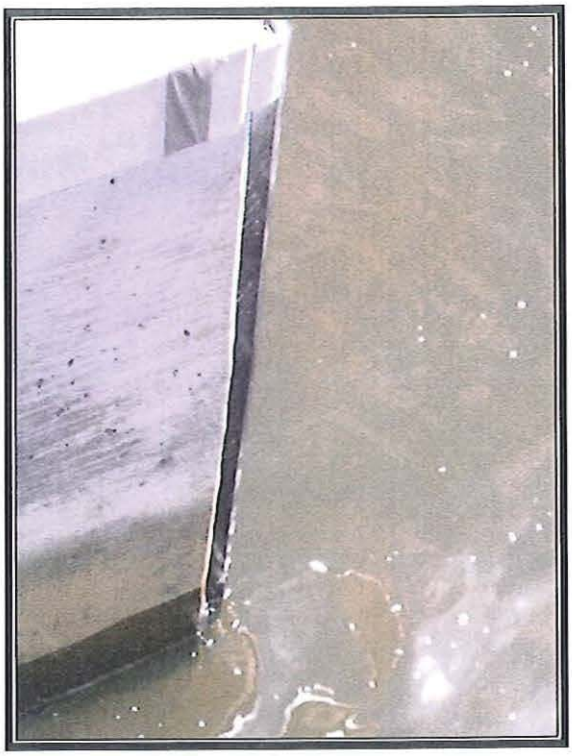
All twenty-seven pre-stressed concrete piles were found to be in good condition with no structural defects.

All twenty-seven UHMW panels were found to be in good condition with no defects. All mounting bolts for the UHMW panels were in place and tight.

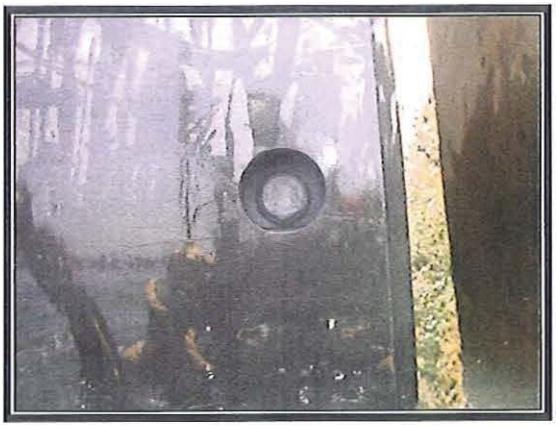
No lifting eye locations were visible on the concrete piles.

The southeast corner of pile #15 exhibited signs of a repair to the chamfered corner. This repair was consistent with damage that may occur during the casting process. The repair is satisfactory as evidenced in the following photographs:

Repair to southeast corner of pile #15 (Elev. +5.5 to +2.5)



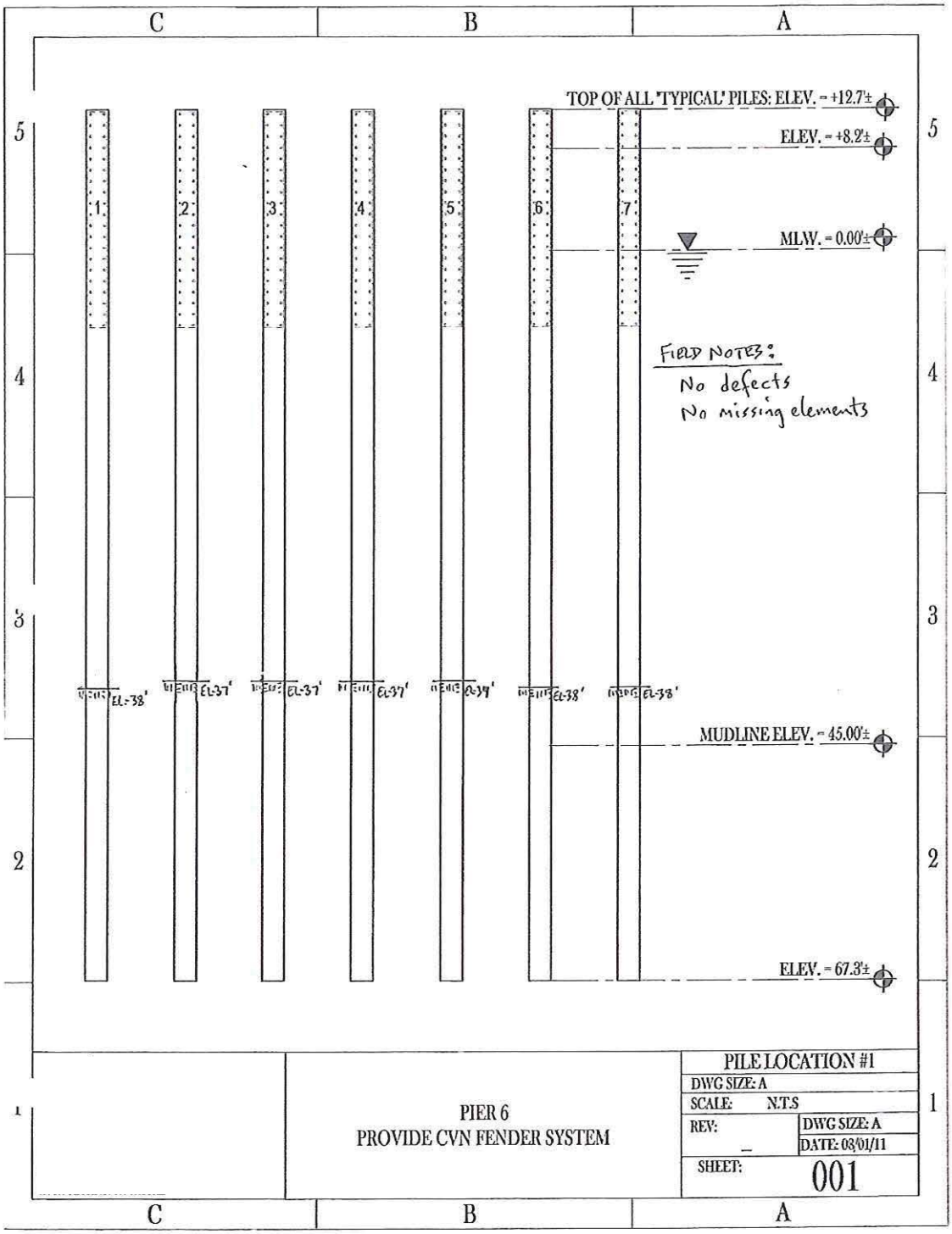
Undamaged pile corner (typ.)

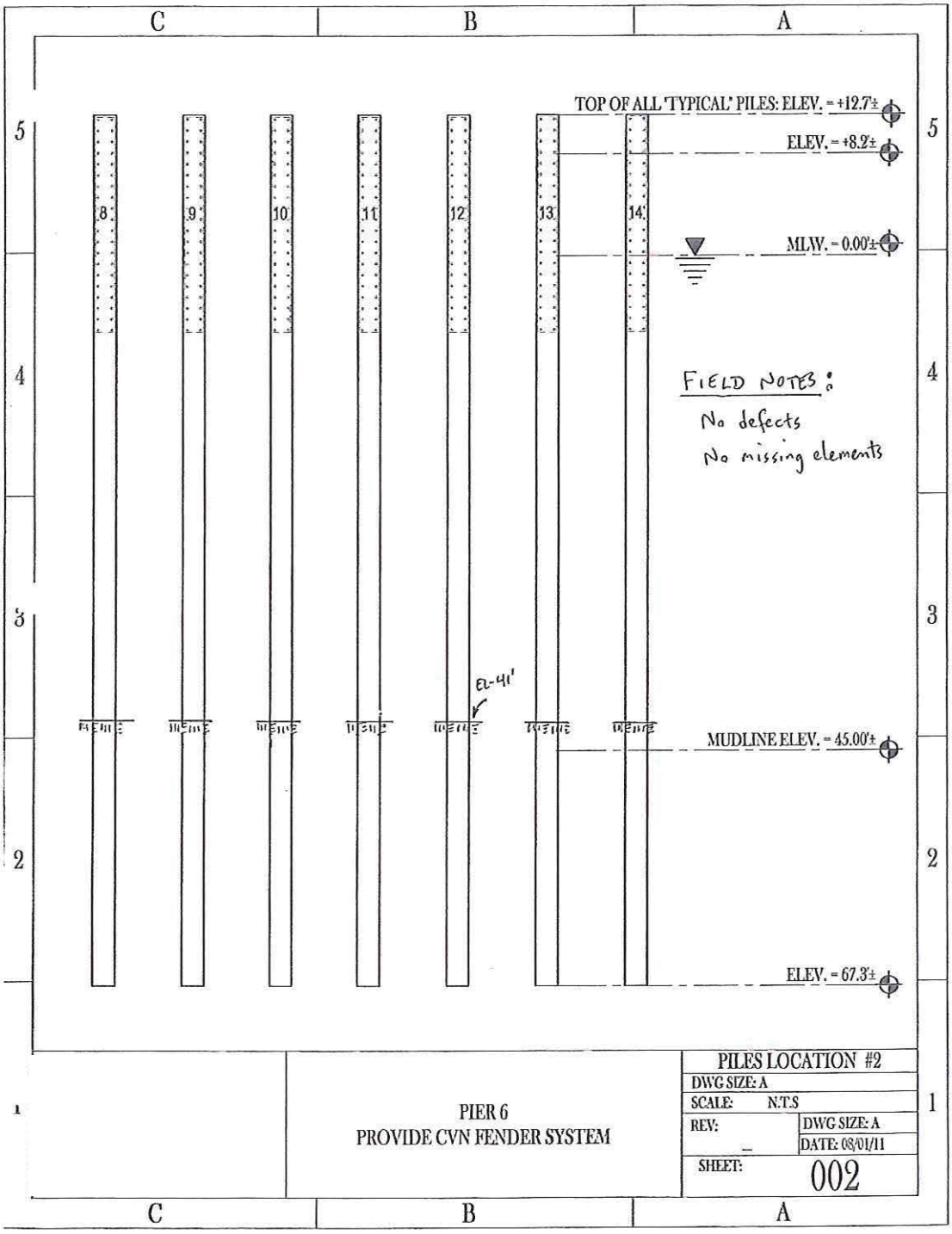


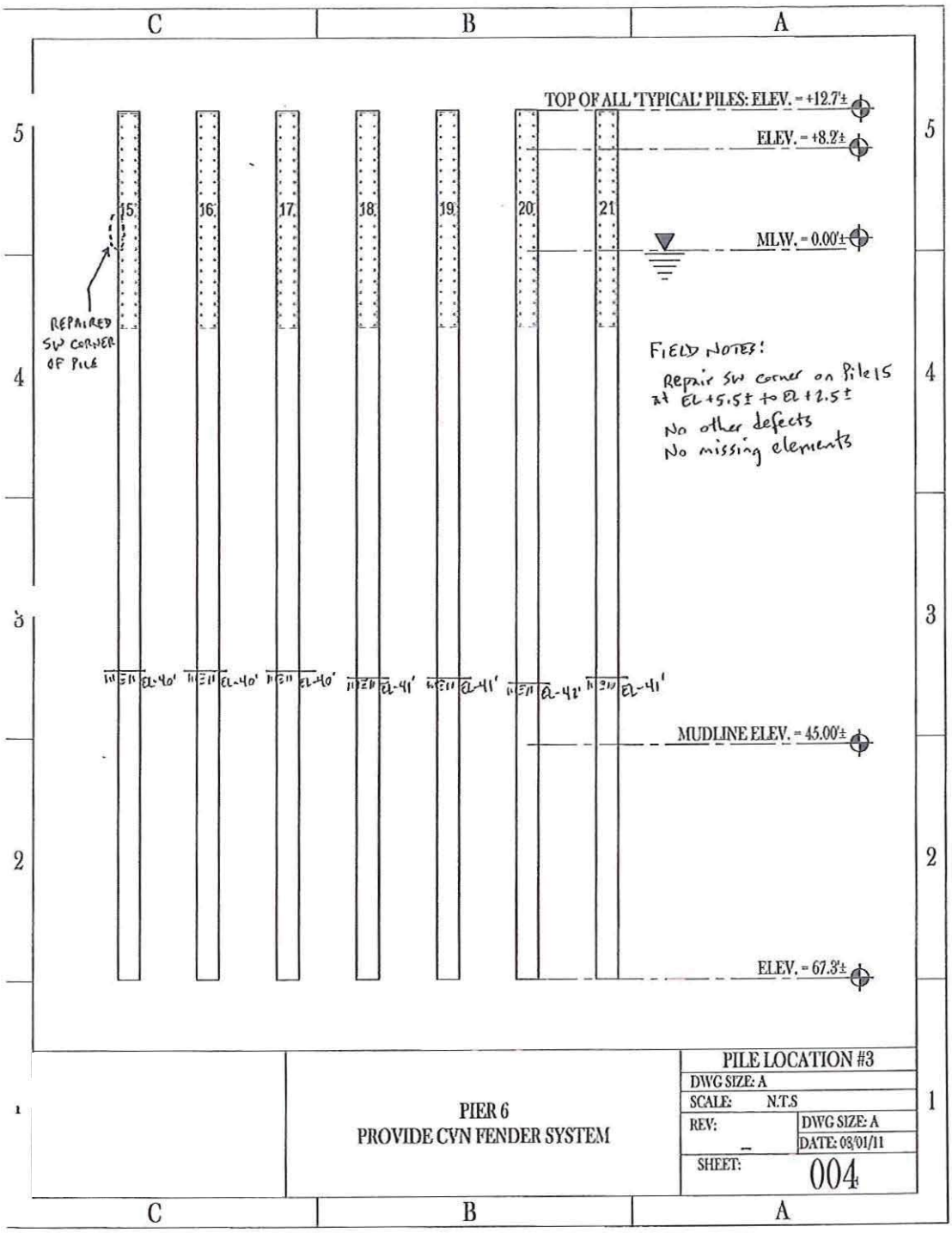
UHMW panel mounting bolt above water (typ.)

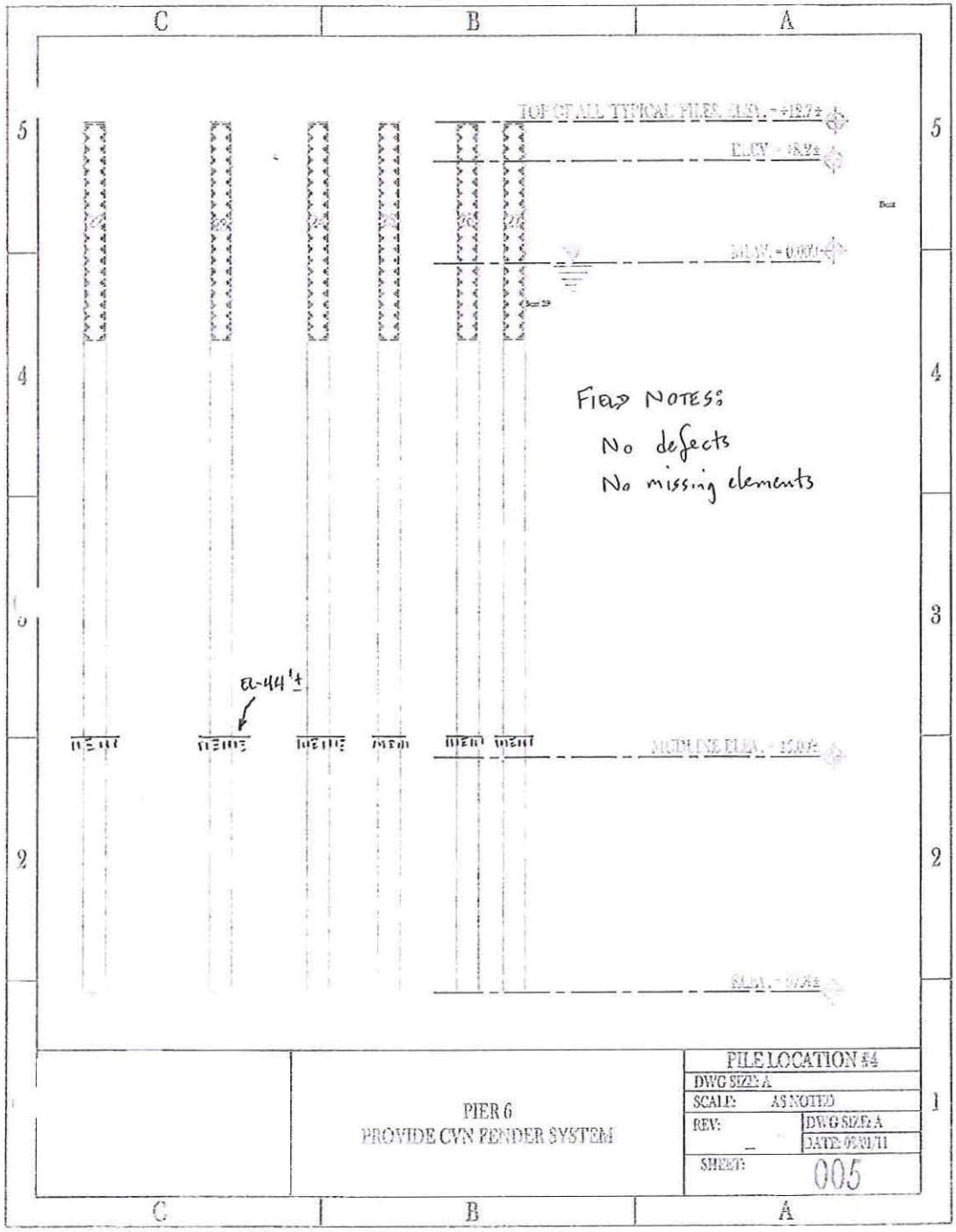
UHMW panel mounting bolt above water (typ.)

The following pages are the field notes taken during the inspection dives:


C
B
A
TOP OF ALL 'TYPICAL' PILES: ELEV. = +12.7'±
ELEV. = +8.2'±
MLW. = 0.00'±
1
2
3
4
5
6
7
FIELD NOTES:
No defects
No missing elements
EL-38'
EL-37'
EL-37'
EL-37'
EL-39'
EL-38'
EL-38'
MUDLINE ELEV. = 45.00'±
ELEV. = 67.3'±
PIER 6
PROVIDE CVN FENDER SYSTEM
PILE LOCATION #1
DWG SIZE: A
SCALE: N.T.S
REV:
DWG SIZE: A
DATE: 03/01/11
SHEET:
001


C
B
A
TOP OF ALL 'TYPICAL' PILES: ELEV. = +12.7'±
ELEV. = +8.2'±
MLW. = 0.00'±
8
9
10
11
12
13
14
FIELD NOTES:
No defects
No missing elements
EL-41'
MUDLINE ELEV. = 45.00'±
ELEV. = 67.3'±
5
4
3
2
1
PIER 6
PROVIDE CVN FENDER SYSTEM
PILES LOCATION #2
DWG SIZE: A
SCALE: N.T.S
REV:
DWG SIZE: A
DATE: 08/01/11
SHEET:
002


TOP OF ALL 'TYPICAL' PILES: ELEV. = +12.7'±
ELEV. = +8.2'±
MLW. = 0.00'±
15
16
17
18
19
20
21
REPAIRED SW CORNER OF PILE
FIELD NOTES:
Repair SW corner on Pile 15 at EL +5.5± to EL +2.5±
No other defects
No missing elements
EL-40'
EL-40'
EL-40'
EL-41'
EL-41'
EL-42'
EL-41'
MUDLINE ELEV. = 45.00'±
ELEV. = 67.3'±
PIER 6
PROVIDE CVN FENDER SYSTEM
PILE LOCATION #3
DWG SIZE: A
SCALE: N.T.S
REV: –
DWG SIZE: A
DATE: 08/01/11
SHEET: 004


C
B
A
5
4
3
2
1
TOP OF ALL TYPICAL PILES, ELEV. = +18.7±
ELEV = +8.9±
ELEV. = 0.00±
Field Notes:
No defects
No missing elements
El-44'±
MUDLINE ELEV. = -15.0±
ELEV. = -30.0±
PIER 6
PROVIDE CVN FENDER SYSTEM
PILE LOCATION #4
DWG SIZE: A
SCALE: AS NOTED
REV:
DWG SIZE: A
DATE: 05/01/11
SHEET: 005

Conclusions and Recommendations

All twenty-seven 24-inch square pre-stressed concrete piles were installed with no remarkable damage.

The UHMW panels were installed tight to the pile faces. There were no missing elements (bolts).

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

Requirements of this Section apply to, and are a component of, each section of the specifications.

1.2 REFERENCES

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

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511	(2007) Standard for Reduced-Pressure Principle Backflow Prevention Assembly

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (FCCCHR)

FCCCHR List	(continuously updated) List of Approved Backflow Prevention Assemblies
FCCCHR Manual	(1988e9) Manual of Cross-Connection Control

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241	(2013; Errata 2015) Standard for Safeguarding Construction,Alteration, and Demolition Operations
NFPA 70	(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

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. Submitted the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction site plan; G

SD-06 Test Reports

Backflow Preventer Tests; G

SD-07 Certificates

Backflow Tester Certification; G

Backflow Preventers Certificate of Full Approval

1.4 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 work site.

1.5 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.

1.5.1 Backflow Tester Certificate

Prior to testing, submit to the Contracting Officer certification issued by the State or local regulatory agency attesting that the backflow tester has successfully completed a certification course sponsored by the regulatory agency. Tester must not be affiliated with any company participating in any other phase of this Contract.

1.5.2 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.

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. Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer.

2.1.2 Project and Safety Signs

The requirements for the signs, their content, and location shall be provided by the Contracting Officer upon award of the contract. 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 Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. Whenever safe public access to 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.

2.2.2 Temporary Wiring

Provide temporary wiring in accordance with NFPA 241 and NFPA 70, Article 305-6(b), Assured Equipment Grounding Conductor Program. Include frequent inspection of all equipment and apparatus.

2.2.3 Backflow Preventers

Reduced pressure principle type conforming to the applicable requirements AWWA C511. Provide backflow preventers complete with 150 pound flanged bronze or brass mounted gate valve and strainer, 304 stainless steel or bronze, internal parts. The particular make, model/design, and size of backflow preventers to be installed must be included in the latest edition of the List of Approved Backflow Prevention Assemblies issued by the FCCCHR List and be accompanied by a Certificate of Full Approval from FCCCHR List. After installation conduct Backflow Preventer Tests and provide test reports verifying that the installation meets the FCCCHR Manual Standards.

PART 3 EXECUTION

3.1 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 LIGHTING AND MARKINGS

Refer to "DFARS 252.236-7005, Airfield Safety Precautions," and requirements of SECTION 01 35 15 "SPECIAL PROJECT PROCEDURES".

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

Reasonable amounts of utilities will be made available to the Contractor at the prevailing Government rates. These rates may be obtained upon application to the Commanding Officer, by way of the Contracting Officer.

The Contractor will be responsible for making connections, providing transformers and meters, and making disconnections; and for providing backflow preventer devices on connections to domestic water lines.

Under no circumstances will taps to base fire hydrants be allowed for obtaining domestic water.Carefully conserve any utilities furnished without charge.

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 that are self-contained units with both urinals and stool capabilities and approved by the Contracting Officer. The doors shall be self-closing. Ventilate the units to control odors and fumes. Clean and empty wastes into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility at least once a week or more often if required by the Contracting Officer. Locate the facility out of the public view.

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.

3.3.7 Telephone

Make arrangements and pay all costs for telephone facilities desired.

3.3.8 Fire Protection

Provide temporary fire protection equipment for the protection of personnel and property during construction. Remove debris and flammable materials daily to minimize potential hazards.

3.4 TRAFFIC PROVISIONS

3.4.1 Maintenance of Traffic

a. Conduct work so as not to obstruct pier traffic within the fire lane at any time. Obtain approval from the Contracting Officer prior to starting any activity that may obstruct traffic outside of the fire lane.

b. Provide, erect, and maintain, at contractors 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 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. Contractor is responsible for the repair of any damage 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.

3.4.4 Commercial Vehicles In/Out of NAVSTA/NAS Norfolk, VA

a. Definitions. Commercial vans and trucks are differentiated as follows:

(1) Closed truck. A truck enclosed on four sides, top, and bottom to which entry can be made only through end or side doors and to which a seal can be applied.

(2) Open truck. A truck which is either fully open, such as flatbed, or contained by wooden slats or sideboards; or any truck to which a seal cannot be applied.

(3) Commercial vehicles. A common contract or commercial truck without a decal issued by Norfolk, VA.

(4) Trailer. A non-self-propelled enclosed cargo container used for the transportation of goods, e.g., a trailer pulled by a truck.

b. Instructions and directions. Ensure that commercial trucks and trailers follow the instructions below to provide for effective control over their entry and exit from the base, movement within the base, and to reduce congestion both at the gates and within the base. In general, commercial trucks and common carriers are required to enter and exit through specified gates and process immediately to a truck control point for cargo manifest check. The driver shall be issued a Material Movement Control and Gate Pass, routing instructions, and directions to depart the base via a designated exit point where the pass is to be turned in.

(1) Common contract and commercial trucks going to the area of Building LP-84 (MAC Terminal), NAS Norfolk shall enter and exit Gate 22. Gate 22 hours of operations are 5:30 a.m. through 6:30 p.m. and 10:30 p.m. through 3:00 a.m., 7 days a week. The gate is closed on holidays.

(2) Other common contract and commercial trucks, except as noted below are allowed to enter the Naval Base through any Gate and exit through Gate 2.

(3) Common contract and commercial trucks which enter the base may depart through Gate 5, Gate 4, and Gate 22 only. The exit Truck Control Point at Gate 4 is operated from 7:00 a.m. to 5:00 p.m.

(4) For concrete and asphalt-carrying trucks, the Resident Officer in Charge of Construction (ROICC), Norfolk VA shall arrange entry and exit through any gate other than Gate 2.

(5) Contractor vehicles with black Norfolk Naval Base decals shall be granted routine access to the base at all times. These trucks shall not enter or exit the base through Gate 2. These trucks are subject to random checks and searches at exit gates like other personal and commercial vehicles to ensure that Government property is not being taken off the base without authorization and documentation.

c. Movement and Exit

(1) Material movement control and gate pass. A Material Movement Control and Gate Pass (5ND GEN 5510/1) is required for the removal of Government, public, or private property from NAVSTA and NAS Norfolk complex via commercial vans and truck.

(a) The Material Movement Control and Gate Pass shall be originated by the Naval Base Police Truck Control Officer, and shall be given to drivers of commercial trucks for retention during transit to intermediate stops and to the exit gates. The pass shall be presented by the driver to the Truck Control Officer at the exit truck stop. If the driver has more than one delivery or pickup point, the driver shall present the pass at each stop so the new activity may fill in appropriate information on the pass. A copy of the pass shall be retained by each activity after appropriate information has been entered; remaining copies of the pass shall be returned to the driver. Passes are subject to

review by the Naval Base Police Department during transit and within command areas by activity officials for verification of cargo content and to determine if drivers are transiting promptly and by the proper route. For trailers expecting to be picked up and depart outside normal working hours, pre-prepared passes shall be provided by the activity duty officer or authorized supervising person prior to close of working hours. Trucking companies expecting to pick up trailers after working hours should be instructed to pick up a Material Movement Control and Gate Pass from the responsible activity. The activity duty officer or official shall notify Base Police Headquarters to clear the truck for exit at Gate 5 if the seal and Material Movement Control and Gate Pass are in order.

(b) When filling out a Material Movement Control and Gate Pass, the last activity where business is conducted on the base is responsible to ensure that the original of the pass is given to the driver to turn in to the Truck Control officer at the truck control stops.

(c) The Material Movement Control and Gate Pass shall be turned in by the vehicle driver to a base police officer at a truck control stop when he departures from the base.

(d) Government or commercial vehicles departing Naval Base, Norfolk with Government, public, or private property shall possess a Material Movement Control and Gate Pass filled out by a naval officer or equivalent grade civilian within the driver's chain of command. The Material Movement Control and Gate Pass shall be inspected and verified during random gate departure searches.

(2) Car Seals

(a) Commercial, sealable, closed trailers and trucks, full, partially full, or empty, destined to leave the base shall be sealed upon departure from any activity. The seal number and trailer or truck number shall be entered on the Material Movement Control and Gate Pass.

(b) Commercial closed trailers and trucks received empty for loading with Government material shall have a Navy car seal affixed to cargo doors after loading and prior to departing through designated gates.

(c) Closed trailers and trucks which have been only partially loaded or off-loaded shall be sealed completely at the end of working hours with a Navy car seal.

(d) Application of Navy car seals is the responsibility of the activity in charge of loading and unloading of trailers and trucks.

(e) The Naval Base Police Department will conduct random checks of contents, seals, and forms of trailers and trucks on the Naval Base complex.

(f) A truck driver whose van or truck does not have a properly completed Material Movement Control and Gate Pass or car seal will be refused exit clearance.

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

If the contactor requires, he may provide and maintain an administrative field office facilities near the designated work site. Government office and warehouse facilities will not be available to the Contractor's personnel. The site for the field office shall not be on the pier, but will be within 2 miles of the work site as directed by the Contracting Officer.

3.5.3 Storage Area

Do not place or store Trailers, materials, or equipment on the pier unless directed by the Contracting Office. Upon Contractor's request, the Contracting Officer will designate an area for the Contractor's use for storage of trailers, equipment, and materials. This area will not be on the pier and will be 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 on the pier in preparation for the next day's work unless directed by the Contracting Officer. Park mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment at the end of each work day, at the location designated by the Contracting Officer, off the pier.

3.5.4 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.

3.5.5 Trailers or Storage Buildings

a. Trailers or storage buildings will be permitted, where space is available, subject to the approval of the Contracting Officer. The trailers or buildings shall be in good condition, free from visible damage rust and deterioration, and meet all applicable safety requirements. Trailers shall be roadworthy and comply with all appropriate state and local vehicle requirements. Failure to maintain storage trailers or buildings to these standards shall result in the removal of non-complying units at the Contractor's expense. A sign not smaller than 24 by 24 inches shall be conspicuously placed on the trailer depicting the company name, business phone number, and emergency phone number. Trailers shall be anchored to resist high winds and must meet applicable state of local standards for anchoring

mobile trailers. If located on the pier, the trailers shall not be anchored to the pier deck.

b. LANTNAVFACENGCOM Trailer Sign. A sign shall be mounted on the trailer or building that shows the company name, phone number, emergency phone number and conforms to the following requirements and sketch :

Graphic panel: Aluminum, painted blue

Copy: Screen painted or vinyl die-cut, white

Typeface: Univers 65 u/lc

See Sketch No. 01500 (graphic).

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.

3.5.7 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.

3.5.8 Weather Protection of Temporary Facilities and Stored Materials

Take necessary precautions to protect materials and equipment from damage.

3.5.8.1 Pier 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.

3.5.8.2 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) requirements, 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 pier. 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.

3.6 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 within the fenced area described above or at the supplemental storage area any materials resulting from demolition activities which are salvageable. Neatly stacked stored materials not in trailers, whether new or salvaged.

3.7 RESTORATION OF STORAGE AREA

Upon completion of the project remove the bulletin board, signs, barricades, 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 to the original or better condition, areas used by the Contractor for the storage of equipment or material, or other use. Gravel used to traverse grassed areas must be removed and the area restored to its original condition, including top soil and seeding as necessary.

-- End of Section --

CONTRACTOR HAZARDOUS MATERIAL INVENTORY LOG
(EPRCA)

PRIME COMPANY NAME: _____ CONTRACT NO: _____

PROJECT TITLE / LOCATION: _____

Material Name	Manufacturer	MSDS Number	State (i.e. Liquid, Solid, Gas)	Storage Quantity		Quality (lbs/gals) used in Calendar Year [ ]
				Average Daily	Max Daily	

Contractor(s) certifies that the hazardous material(s) removed from installation will be used/reused for its intended purpose.

_____ _____
Company Using Material Listed Above Company Representative's Signature

Submitted By: _____ Phone: _____ Fax: _____ Date: _____
Printed Name

Contracting Officer _____ Phone: _____ Fax: _____
or ROICC Representative

Page ____ of ____

CONTRACTOR HAZARDOUS MATERIAL INVENTORY LOG
(EPRCA)
Continuation Sheet

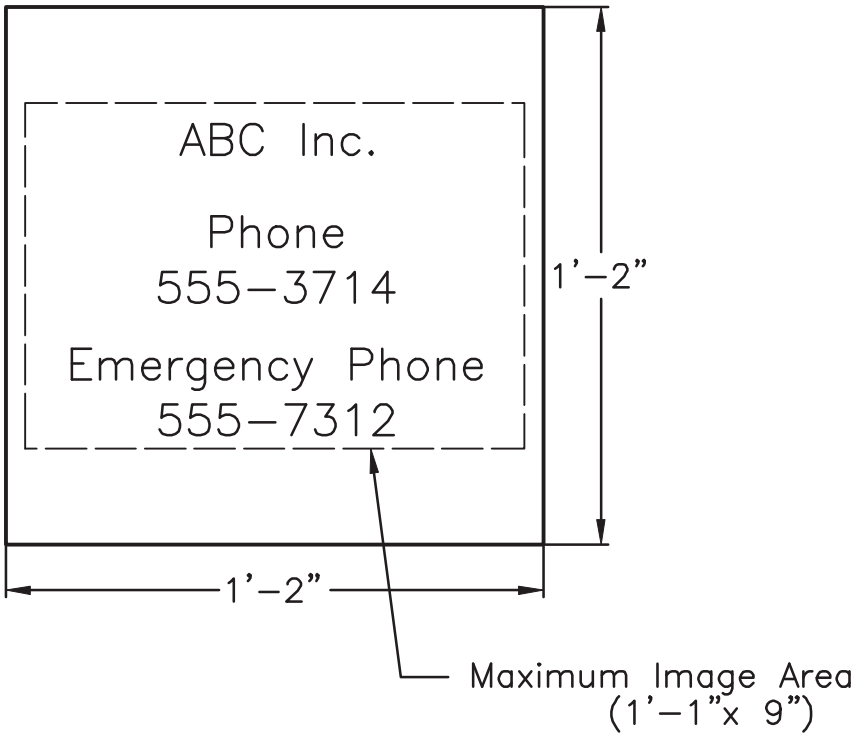
PRIME COMPANY NAME: _____ CONTRACT NO: _____

PROJECT TITLE / LOCATION: _____

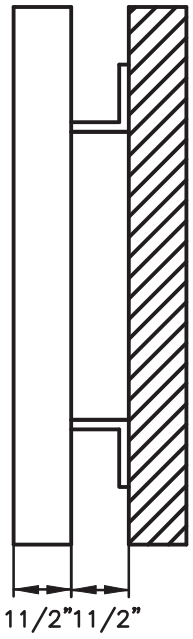
Material Name	Manufacturer	MSDS Number	State (i.e. Liquid, Solid, Gas)	Storage Quantity		Quality (lbs/gals) used in Calendar Year [ ]
				Average Daily	Max Daily	

Page ____ of ____

SIGN FACE



MOUNTING DETAIL



Sign requirements:

Graphic panel: Aluminum, painted blue
Copy: Screen painted or vinyl die–cut, white
Typeface: Univera 65 u/lc

SKETCH NO. SK–01500

SECTION 01 57 19.00 20

TEMPORARY ENVIRONMENTAL CONTROLS

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. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 530/F-93/004	(1993; Rev O; Updates I, II, IIA, IIB, and III) Test Methods for Evaluating Solid Waste (Vol IA, IB, IC, and II) (SW-846)
EPA 833-R-060-04	(2007) Developing Your Storm Water Pollution Prevention Plan, a Guide for Construction Sites

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

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
40 CFR 112	Oil Pollution Prevention
40 CFR 112.7	General Requirements for Spill Prevention, Control, and Countermeasure Plans
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 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program
40 CFR 271	Requirements for Authorization of State Hazardous Waste Programs
40 CFR 272	Approved State Hazardous Waste Management Programs
40 CFR 273	Standards For Universal Waste Management
40 CFR 279	Standards for the Management of Used Oil
40 CFR 280	Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST)
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 355	Emergency Planning and Notification
40 CFR 372-SUBPART D	Specific Toxic Chemical Listings
40 CFR 60	Standards of Performance for New Stationary Sources
40 CFR 63	National Emission Standards for Hazardous Air Pollutants for Source Categories
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
40 CFR 82	Protection of Stratospheric Ozone
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 Sediment

Soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.2 Solid Waste

Garbage, refuse, debris, sludge, or other discharged material, including solid, liquid, semisolid, or contained gaseous materials resulting from domestic, industrial, commercial, mining, or agricultural operations. Types of solid waste typically generated at construction sites may include:

a. Green waste: 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.

b. Surplus soil: 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.

c. Debris: Non-hazardous solid material generated during the construction, demolition, or renovation of a structure which exceeds 2.5 inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (e.g. cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. Inert materials may be reinforced with or contain ferrous wire, rods, accessories and weldments. 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.

d. Wood: Dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated and/or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included.

e. Scrap metal: 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.

f. Paint cans: Metal cans that are empty of paints, solvents, thinners and adhesives. If permitted by the paint can label, a thin dry film may remain in the can.

g. Recyclables: Materials, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable. Metal meeting the definition of lead contaminated or lead based paint contaminated may be included as recyclable if sold to a scrap metal company if they meet all state and local agency requirements. Paint cans may be included as

recyclable if sold to a scrap metal company if they meet all state and local agency requirements.

h. Hazardous Waste: By definition, to be a hazardous waste a material must first meet the definition of a solid waste. Hazardous waste and hazardous debris are special cases of solid waste. They have additional regulatory controls and must be handled separately. They are thus defined separately in this document.

Material not regulated as solid waste are: 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.

1.2.3 Hazardous Debris

As defined in Solid Waste paragraph, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) per 40 CFR 261; or debris that exhibits a characteristic of hazardous waste per 40 CFR 261.

1.2.4 Chemical Wastes

This includes salts, acids, alkalizes, herbicides, pesticides, and organic chemicals.

1.2.5 Garbage

Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

1.2.6 Hazardous Waste

Any discarded material, liquid, solid, or gas, which meets the definition of hazardous material or is designated hazardous waste by the Environmental Protection Agency or State Hazardous Control Authority as defined in 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 271, 40 CFR 272, 40 CFR 273, 40 CFR 279, and 40 CFR 280.

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:

a. Is regulated as a hazardous material per 49 CFR 173, or

b. Requires a Material Safety Data Sheet (MSDS) per 29 CFR 1910.120, or

c. During end use, treatment, handling, packaging, storage, transpiration, 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 instructions or directives, does not eliminate the need

for adherence to that hazard-specific guidance which takes precedence over this instruction for "control" purposes. Such material include 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). Nonetheless, the exposure may occur incident to manufacture, storage, use and demilitarization of these items.

1.2.8 Waste Hazardous Material (WHM)

Any waste material which because of its quantity, concentration, or physical, chemical, or infectious characteristics may pose a substantial hazard to human health or the environment and which has been so designated. Used oil not containing any hazardous waste, as defined above, falls under this definition.

1.2.9 Oily Waste

Those materials which are, or were, mixed with used oil and have become separated from that used oil. 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, used oil 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:

a. It is not prohibited in other State regulations or local ordinances

b. The amount generated is "de minimus" (a small amount)

c. It is the result of minor leaks or spills resulting from normal process operations

d. All free-flowing oil has been removed to the practical 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, a hazardous waste determination must be performed 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.

1.2.10 Regulated Waste

Those solid waste that have specific additional Federal, state, or local controls for handling, storage, or disposal.

1.2.11 Class I and II Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act and includes the following chemicals:

chlorofluorocarbon-11 (CFC-11)
chlorofluorocarbon-12 (CFC-12)
chlorofluorocarbon-13 (CFC-13)
chlorofluorocarbon-111 (CFC-111)
chlorofluorocarbon-112 (CFC-112)
chlorofluorocarbon-113 (CFC-113)
chlorofluorocarbon-114 (CFC-114)
chlorofluorocarbon-115 (CFC-115)
chlorofluorocarbon-211 (CFC-211)
chlorofluorocarbon-212 (CFC-212)
chlorofluorocarbon-213 (CFC-213)
chlorofluorocarbon-214 (CFC-214)
chlorofluorocarbon-215 (CFC-215)
chlorofluorocarbon-216 (CFC-216)
chlorofluorocarbon-217 (CFC-217)
chlorofluorocarbon-500 (CFC-500)
chlorofluorocarbon-502 (CFC-502)
chlorofluorocarbon-503 (CFC-503)
halon-1211
halon-1301
halon-2402
carbon tetrachloride
methyl bromide
methyl chloroform

Class II ODS is defined in Section 602(s) of The Clean Air Act and includes the following chemicals:

hydrochlorofluorocarbon-21 (HCFC-21)

hydrochlorofluorocarbon-22 (HCFC-22)
hydrochlorofluorocarbon-31 (HCFC-31)
hydrochlorofluorocarbon-121 (HCFC-121)
hydrochlorofluorocarbon-122 (HCFC-122)
hydrochlorofluorocarbon-123 (HCFC-123)
hydrochlorofluorocarbon-124 (HCFC-124)
hydrochlorofluorocarbon-131 (HCFC-131)
hydrochlorofluorocarbon-132 (HCFC-132)
hydrochlorofluorocarbon-133 (HCFC-133)
hydrochlorofluorocarbon-141 (HCFC-141)
hydrochlorofluorocarbon-142 (HCFC-142)
hydrochlorofluorocarbon-221 (HCFC-221)
hydrochlorofluorocarbon-222 (HCFC-222)
hydrochlorofluorocarbon-223 (HCFC-223)
hydrochlorofluorocarbon-224 (HCFC-224)
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hydrochlorofluorocarbon-234 (HCFC-234)
hydrochlorofluorocarbon-235 (HCFC-235)
hydrochlorofluorocarbon-251 (HCFC-251)
hydrochlorofluorocarbon-252 (HCFC-252)
hydrochlorofluorocarbon-253 (HCFC-253)
hydrochlorofluorocarbon-261 (HCFC-261)
hydrochlorofluorocarbon-262 (HCFC-262)

hydrochlorofluorocarbon-271 (HCFC-271)

1.2.12 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (e.g., thermostats) and lamps (e.g., 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.

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. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey; G

Solid Waste Management Plan and Permit; G

Regulatory Notifications; G

Environmental Protection Plan; G

Storm Water Pollution Prevention Plan; G

Storm Water Notice of Intent (for NPDES coverage under the general permit for construction activities); G

Dirt and Dust Control Plan

Contractor Hazardous Material Inventory LogG

SD-06 Test Reports

Laboratory Analysis

Disposal Requirements

Erosion and Sediment Control Inspection Reports

Storm Water Inspection Reports for General Permit

Solid Waste Management Report; G

SD-07 Certificates

Contractor 40 CFR employee training records; G

ECATTS certificate of completion

SD-11 Closeout Submittals

Some of the records listed below are also required as part of other submittals. For the "Records" submittal, maintain on-site a separate three-ring Environmental Records binder and submit at the completion of the project. Make separate parts to the binder corresponding to each of the applicable sub items listed below.

Storm Water Pollution Prevention Plan compliance notebook; G

Waste Determination Documentation

Disposal Documentation for Hazardous and Regulated Waste

Contractor 40 CFR Employee Training Records

Solid Waste Management Permit

Solid Waste Management Report

Contractor Hazardous Material Inventory Log; G

Hazardous Waste/Debris Management

Regulatory Notifications

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 normal 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. 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.

The Contractor may be required to promptly conduct tests and procedures for the purpose of assessing whether construction operations are in compliance with Applicable Environmental Laws. Analytical work shall be done by qualified laboratories; and where required by law, the laboratories shall be certified.

1.4.1 Environmental Compliance Assessment Training and Tracking System (ECATTS)

The QC Manager is responsible for environmental compliance on projects unless an Environmental Manager is named. The QC Manager (and alternative QC Manager) or Environmental Manager must complete ECATTS training 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 ECATTS training within 14 days of assignment to the project

Submit an ECATTS certificate of completion for personnel who have completed the required "Environmental Compliance Assessment Training and Tracking System (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 http://navfac.ecatts.com/. Obtain the password for registration from the Contracting Officer.

This training has been structured to allow contractor personnel to receive credit under this contract and also to carry forward credit to future contracts. Contractors shall ensure that the QC Manager (and alternate QC Manager) or 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 requires to re-take modules tailored to the state where the contract work is being performed.

ECATTS is available for use by all contractor and subcontractor personnel associated with this project. These other personnel are encouraged (but not required) to take the training and may do so at their discretion.

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, environmental programs and operational controls identified by the EMS. 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/or preventative actions. In addition, ensure that employees are aware of their roles and responsibilities under the EMS and how these EMS roles and responsibilities affect work performed under the contract.

Ensure that employees receive applicable environmental and occupational health and safety training, and keep up to date on regulatory required specific training for the type of work to be conducted onsite. All on-site Contractor personnel, and their subcontractor personnel, performing tasks that have the potential to cause a significant environmental impact shall be competent on the basis of appropriate education, training or experience. Upon contract award, the Contracting Officer's Representative will notify the installation's EMS coordinator to arrange EMS training. Refer to Section 01 57 19.01 20, SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for additional site specific EMS requirements related to construction. The installation's EMS coordinator will 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 EMS coordinator must retain associated records.

1.5 QUALITY ASSURANCE

1.5.1 Preconstruction Survey

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.

1.5.2 Regulatory Notifications

The Contractor is responsible for all regulatory notification requirements in accordance with Federal, State and local regulations. In cases where the Navy must also provide public notification (such as stormwater permitting), coordinate with the Contracting Officer. Submit copies of all regulatory notifications to the Contracting Officer 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, 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 activity; 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 activity environmental staff to discuss the proposed Environmental Protection Plan. Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, required permits, permit requirements, and other measures to be taken.

1.5.4 Environmental Manager

Appoint in writing an Environmental Manager for the project site. The Environmental Manager will be directly responsible for coordinating contractor compliance with Federal, State, local, and station requirements. The Environmental Manager will ensure compliance with Hazardous Waste Program requirements (including hazardous waste handling, storage, manifesting, and disposal); implement the Environmental Protection Plan; ensure that all environmental permits are obtained, maintained, and closed out; ensure compliance with Storm Water Program Management requirements; ensure compliance with Hazardous Materials (storage, handling, and reporting) requirements; and coordinate any remediation of regulated substances (lead, asbestos, PCB transformers). This can be a collateral position; however the person in this position must be trained to adequately accomplish the following duties: ensure waste segregation and storage compatibility requirements are met; inspect and manage Satellite Accumulation areas; ensure only authorized personnel add wastes to containers; ensure all Contractor personnel are trained in 40 CFR requirements in accordance with their position requirements; coordinate removal of waste containers; and maintain the Environmental Records binder and required documentation, including environmental permits compliance and close-out.

1.5.5 Contractor 40 CFR Employee Training Records

Prepare and maintain employee training records throughout the term of the contract meeting applicable 40 CFR requirements. Ensure every employee completes a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures compliance with Federal, State and local regulatory requirements for RCRA Large Quantity Generator. Provide a Position Description for each employee, by subcontractor, based on the Davis-Bacon Wage Rate designation or other

equivalent method, evaluating the employee's association with hazardous and regulated wastes. This Position Description will include training requirements as defined in 40 CFR 265 for a Large Quantity Generator facility. Submit these training records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

1.6 ENVIRONMENTAL PROTECTION PLAN (EPP)

Prior to initiating any work on site, meet with the Contracting Officer to discuss the proposed Environmental Protection Plan and develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, and other measures to be taken. The Environmental Protection Plan must incorporate construction related objectives and targets from the installation's Environmental Management System. Submit the Environmental Protection Plan in the following format and include the elements specified below.

a. Description of the Environmental Protection Plan

(1) General overview and purpose

(a) A brief description of each specific plan required by environmental permit or elsewhere in this contract.

(b) The duties and level of authority assigned to the person(s) on the job site that oversee environmental compliance.

(c) 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.

(d) Communication and training procedures that will be used to convey environmental management requirements to contractor employees and subcontractors.

(e) Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

(2) General site information

(3) A letter signed by an officer of the firm appointing the Environmental Manager and stating that he/she 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.

b. Management of Natural Resources

(1) Land resources

(2) Tree protection

(3) Replacement of damaged landscape features

(4) Temporary construction

(5) Stream crossings

(6) Fish and wildlife resources

(7) Wetland areas

c. Protection of Historical and Archaeological Resources

(1) Objectives

(2) Methods

d. Storm Water Management and Control

(1) Ground cover

(2) Erodible soils

(3) Temporary measures

(a) Mechanical retardation and control of runoff

(b) Vegetation and mulch

(4) Effective selection, implementation and maintenance of Best Management Practices (BMPs).

e. Protection of the Environment from Waste Derived from Contractor Operations

(1) Control and disposal of solid and sanitary waste. If Section 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT is included in the contract, submit the plan required by that section as part of the Environmental Protection Plan.

(2) Control and disposal of hazardous waste (Hazardous Waste Management Section)

This item will consist of the management procedures for all hazardous waste to be generated. The elements of those procedures will coincide with the Activity Hazardous Waste Management Plan. A copy of the Activity Hazardous Waste Management Plan will be provided by the Contracting Officer. As a minimum, include the following:

(a) Procedures to be employed to ensure a written waste determination is made for appropriate wastes which are to be generated;

(b) Sampling/analysis plan;

(c) Methods of hazardous waste accumulation/storage (i.e., in tanks and/or containers);

(d) Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted);

(e) Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal

Restrictions (40 CFR 268);

(f) Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and the like;

(g) Used oil management procedures in accordance with 40 CFR 279;

(h) Pollution prevention\hazardous waste minimization procedures;

(i) Plans for the disposal of hazardous waste by permitted facilities;

(j) Procedures to be employed to ensure all required employee training records are maintained.

f. Prevention of Releases to the Environment

(1) Procedures to prevent releases to the environment

(2) Notifications in the event of a release to the environment

g. Regulatory Notification and Permits

List what notifications and permit applications must be made. Some permits require up to 90 days to obtain. Demonstrate that those permits have been obtained or applied for by including copies of all applicable, environmental permits. The Plan will not be approved until all permits have been obtained.

h. Clean Air Act Compliance

(1) Identify air pollution generating equipment or processes that may require federal, state, or local permits under the clean air act.

(2) Identify portable and stationary internal combustion engines (ICE's) that will be supplied, utilized or serviced. Address compliance with 40 CFR 60 Subpart IIII, 40 CFR 63 Subpart ZZZZ, and local regulations as applicable. At minimum, include the make, model, serial number, manufacture date, size (engine bhp), and EPA emission certification status of each engine.

(3) Identify management practices to ensure that HVAC work involving refrigerants complies with 40 CFR 82 requirements.

(4) 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)

1.6.1 Environmental Protection Plan Review

Within thirty days after the Contract award date, submit the proposed Environmental Protection Plan for review and approval. Commencement of work will not begin until the environmental protection plan has been approved.

1.6.2 Licenses and Permits

Obtain licenses and permits pursuant to the "Permits and Responsibilities" FAR Clause 52.236-7.

The following permits will be obtained by the Contracting Officer and shall be provided to the contractor at their request:

a. ACOE Joint Permit & VMRC Permits

For permits obtained by the Contracting Officer, whether or not required by the permit, the Contractor is responsible for conforming to all permit requirements and performing all quality control inspections of the work in progress, and to submit notifications and certifications to the applicable regulatory agency via the Contracting Officer.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

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. Confine construction activities to within the limits of the work indicated or specified. If the work is near streams, lakes, or other waterways, conform to the national permitting requirements of the Clean Water Act.

Do not disturb fish and wildlife. 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 indicated or specified.

3.1.1 Storm Water Notice of Intent for Construction Activities and Storm Water Pollution Prevention Plan

Submit a Storm Water Notice of Intent (for NPDES coverage under the general permit for construction activities) and a Storm Water Pollution Prevention Plan (SWPPP) for the project to the Contracting Officer prior and gain approval prior to the commencement of work. The SWPPP must meet the requirements of the EPA or State general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Contracting Officer, to the appropriate Federal or State agency for approval, a minimum of 14 calendar days prior to the start of any land disturbing activities. Maintain an approved copy of the SWPPP at the construction on-site office, and continually update as regulations require, reflecting current site conditions. Additional requirements may be found in UFGS Section 01 57 19.01 20, SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

Coverage under this permit requires the contractor prepare a Storm Water Pollution Prevention Plan (SWPPP), prepare and submit a Registration Statement as a co-permittee with the Construction Officer, and provide the permit fee to the responsible state agency before any land disturbing activities begin. File for permit coverage on behalf of both the

Construction Officer and themselves, and file a Notice of Termination once construction is complete and the site is stabilized with a final sustainable cover.

Under the terms and conditions of the permit, the Contractor may be required to install, inspect, maintain best management practices (BMPs), and submit stormwater BMP inspection reports and stormwater pollution prevention plan inspection reports. Ensure construction operations and management are constantly in compliance with the terms and conditions of the general permit for storm water discharges from construction activities.

a. The SWPPP shall:

(1) Identify potential sources of pollution which may be reasonably expected to affect the quality of storm water discharge from the site.

(2) Describe and ensure implementation of practices which will be used to reduce the pollutants in storm water discharge from the site.

(3) Ensure compliance with terms of the EPA or State general permit for storm water discharge.

(4) Select applicable best management practices from EPA 833-R-060-04.

(5) Include a completed copy of the Registration Statement, BMP Inspection Report Template and Notice of Termination except for the effective date.

(6) Storm Water Pollution Prevention Measures and Notice of Intent 40 CFR 122.26, EPA 833-R-060-04. Provide a "Storm Water Pollution Prevention Plan" (SWPPP) for the project. The SWPPP will meet the requirements of the EPA or State general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Contracting Officer, to the appropriate Federal or State agency for approval, a minimum of 14 calendar days prior to the start of construction. A copy of the approved SWPPP will be kept at the construction on-site office, and continually updated as regulations require reflecting current site conditions.

3.1.1.1 Storm Water Pollution Prevention Plan Compliance Notebook

Create and maintain a three binder of documents that demonstrate compliance with the Stormwater Construction Activity permit. The binder shall include a copy of the permit Registration Statement, proof of permit fee payment, SWPPP and SWPPP update amendments, inspection reports, copies of correspondence with the list agency that issued the permit i.e. Virginia DCR and a copy of the permit Notice of Termination. At the completion of the project the folder shall become the property of the Government. Provide the compliance notebook to Contracting Officer. Provide an advance copy of the Registration Statement to the Contracting Officer immediately after the form is presented to the permitting agency.

3.1.2 Stormwater Drainage and Construction Dewatering

There will be no discharge of excavation ground water to the sanitary

sewer, storm drains, or to the river without prior specific authorization of the Environmental Division in writing. Discharge of hazardous substances will not be permitted under any circumstances.

Construction site runoff will be prevented from entering any storm drain or the river directly by the use of straw bales or other method suitable to the Environmental Division. Contractor will provide erosion protection of the surrounding soils.

Construction Dewatering shall not be discharged to the sanitary sewer. 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. Authorization for any contaminated groundwater release shall be obtained in advance from the base Environmental Officer. Discharge of hazardous substances will not be permitted under any circumstances.

3.2 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Carefully protect in-place and report immediately to the Contracting Officer historical and archaeological items or human skeletal remains discovered in the course of work. Upon discovery, notify the Contracting Officer. Stop work in the immediate area of the discovery until directed by the Contracting Officer to resume work. The Government retains ownership and control over historical and archaeological resources.

3.3 SOLID WASTE MANAGEMENT PLAN and PERMIT

Provide to the contracting officer written notification of the quantity of solid waste/debris that is anticipated 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 or as applicable, submit one copy of a State and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

3.3.1 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.

Include copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, the Contractor may submit a statement indicating the disposal location for the solid waste which is signed by an officer of the Contractor firm authorized to legally obligate or bind the firm. The sales documentation or Contractor certification will 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 by the Contractor for his own use, the Contractor will submit on the solid waste disposal report the information previously described in this paragraph. Prices paid or received will not be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

3.3.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers which 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. Recycling is encouraged and can be coordinated with the Contracting Officer and the activity recycling coordinator. Remove all solid waste (including non-hazardous debris) from Government property and dispose off-site at an approved landfill. Solid waste disposal off-site must comply with most stringent local, State, and Federal requirements including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage spent hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, as per environmental law.

3.3.2.1 Disposal Documentation for Hazardous and Regulated Waste

Manifest, pack, ship and dispose of hazardous or toxic waste and universal waste that is generated as a result of construction in accordance with the generating facilities generator status under the Recourse Conservation and Recovery Act. Contact the Contracting Officer for the facility RCRA identification number that is to be used on each manifest.

Submit a copy of the applicable EPA and or State permit(s), manifest(s), or license(s) for transportation, treatment, storage, and disposal of hazardous and regulated waste by permitted facilities. Hazardous or toxic waste manifest must be reviewed, signed, and approved by the Navy before the Contractor may ship waste. To obtain specific disposal instructions coordinate with the Activity Environmental office. Refer to Section 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for the Activity Point of Contact information.

3.3.2.2 Dumpsters

Equip dumpsters with a secure cover and paint the standard base color. Keep cover closed at all times, except when being loaded with trash and debris. Locate dumpsters behind the construction fence or out of the public view. Empty site dumpsters at least once a week. or as needed to keep the site free of debris and trash. If necessary, provide 55 gallon trash containers painted the darker base color to collect debris in the construction site area. Locate the trash containers behind the construction fence or out of the public view. Empty trash containers at least once a day. For large demolitions, large dumpsters without lids are acceptable but should not have debris higher than the sides before emptying.

3.4 WASTE DETERMINATION DOCUMENTATION

Complete a Waste Determination form (provided at the pre-construction conference) for all contractor derived wastes to be generated. Base the waste determination upon either a constituent listing from the manufacturer used in conjunction with consideration of the process by which the waste was generated, EPA approved analytical data, or laboratory analysis (Material Safety Data Sheets (MSDS) by themselves are not adequate). Attach all support documentation to the Waste Determination form. As a minimum, a Waste Determination form must be provided for the following wastes (this listing is not all inclusive): oil and latex based painting and caulking products, solvents, adhesives, aerosols, petroleum products,

and all containers of the original materials.

3.5 POLLUTION PREVENTION/HAZARDOUS WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of hazardous waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the Environmental Protection Plan. Consult with the activity Environmental Office for suggestions and to obtain a copy of the installation's pollution prevention/hazardous waste minimization plan for reference material when preparing this part of the plan. If no written plan exists, obtain information by contacting the Contracting Officer. Describe the types of the hazardous materials expected to be used in the construction when requesting information.

3.6 WHM/HW MATERIALS PROHIBITION

No waste hazardous material or hazardous waste shall be disposed of on government property. No hazardous material shall be brought onto government property that does not directly relate to requirements for the performance of this contract. The government is not responsible for disposal of Contractor's waste material brought on the job site and not required in the performance of this contract. The intent of this provision is to dispose of that waste identified as waste hazardous material/hazardous waste as defined herein that was generated as part of this contract and existed within the boundary of the Contract limits and not brought in from offsite by the Contractor. Incidental materials used to support the contract including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor. The list is illustrative rather than inclusive. The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or to the river or conduct waste treatment or disposal on government property without written approval of the Contracting Officer.

3.7 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Safety Plan. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. No hazardous material shall be brought onto government property that does not directly relate to requirements for the performance of this contract. Submit a MSDS and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on base. Typical materials requiring MSDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. Ensure that hazardous materials are utilized in a manner that will minimize the amount of hazardous waste that is generated. Ensure that all containers of hazardous materials have NFPA labels or their equivalent. Certify that all hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste per 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 Material Safety Data Sheets (MSDS), 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 MSDS for hazardous materials on site at all times. At the end of the project, provide the Contracting Officer with copies of all of these MSDS, 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.

Documentation for any spills/releases, environmental reports or off-site transfers may be requested by the Contracting Officer.

3.8 PETROLEUM PRODUCTS AND REFUELING

Conduct the fueling and lubricating of equipment and motor vehicles in a manner that protects against spills and evaporation. Manage all used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while on-site exhibits a characteristic of hazardous waste. Used oil containing 1000 parts per million of solvents will be considered a hazardous waste and disposed of at Contractor's expense. Used oil mixed with a hazardous waste will also be considered a hazardous waste.

3.8.1 Oily and Hazardous Substances

Prevent oil or hazardous substances from entering the ground, drainage areas, or navigable waters. In accordance with 40 CFR 112, surround all temporary fuel oil or petroleum storage tanks with a temporary berm or containment of sufficient size and strength to contain the contents of the tanks, plus 10 percent freeboard for precipitation. The berm will be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Provide general secondary containment for oil transfer operations as required by 40 CFR 112.7.

3.8.2 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, the contractor shall immediately notify the contracting officer. The contractor shall not disturb this material until authorized by the contracting officer.

3.9 FUEL TANKS

Petroleum products and lubricants required to sustain up to 30 days of construction activity may be kept on site. Storage and refilling practices shall comply with 40 CFR Part 112. Secondary containment shall be provided and be no less than 110 percent of the tank volume plus five inches of free-board. If a secondary berm is used for containment then the berm shall be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Drips pans are required and the tanks must be covered during inclement weather.

3.10 RELEASES/SPILLS OF OIL AND HAZARDOUS SUBSTANCES

Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage,

regulated gas, petroleum, lubrication oil, and other substances regulated by environmental law. Maintain spill cleanup equipment and materials at the work site. 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 Base or Activity Fire Department, the activity's Command Duty Officer, and the Contracting Officer. If the contractor's response is inadequate, the Navy may respond. If this should occur, the contractor will be required to reimburse the government for spill response assistance and analysis.

The Contractor is responsible for verbal and written notifications as required by the federal 40 CFR 355, State, local regulations and Navy Instructions. Spill response will be in accordance with 40 CFR 300 and applicable State and local regulations. Contain and clean up these spills without cost to the Government. If Government assistance is requested or required, the Contractor will reimburse the Government for such assistance. Provide copies of the written notification and documentation that a verbal notification was made within 20 days.

Maintain spill cleanup equipment and materials at the work site. Clean up all hazardous and non-hazardous (WHM) waste spills. The Contractor shall reimburse the government for all material, equipment, and clothing generated during any spill cleanup. The Contractor shall reimburse the government for all costs incurred including sample analysis materials, equipment, and labor if the government must initiate its own spill cleanup procedures, for Contractor responsible spills, when:

a. The Contractor has not begun spill cleanup procedure within one hour of spill discovery/occurrence, or

b. If, in the government's judgment, the Contractor's spill cleanup is not adequately abating life threatening situation and/or is a threat to any body of water or environmentally sensitive areas.

3.11 CONTROL AND MANAGEMENT OF HAZARDOUS WASTES

3.11.1 Facility Hazardous Waste Generator Status

Naval Station Norfolk is designated as a Large Quantity Generator. All work conducted within the boundaries of this activity must meet the regulatory requirements of this generator designation. Comply with all provisions of Federal, State and local regulatory requirements applicable to this generator status regarding training and storage, handling, and disposal of all construction derived wastes.

3.11.2 Hazardous Waste/Debris Management

Identify all construction activities which will generate hazardous waste/debris. Provide a documented waste determination for all resultant waste streams. Hazardous waste/debris will be identified, labeled, handled, stored, and disposed of in accordance with all 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.

Hazardous waste will also be managed in accordance with the approved Hazardous Waste Management Section of the Environmental Protection Plan. 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 will be identified as being generated by the Government.

Prior to removal of any hazardous waste from Government property, all hazardous waste manifests must be signed by activity personnel from the Station Environmental Office. No hazardous waste must be brought onto Government property. Provide to the Contracting Officer 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. For hazardous wastes spills, verbally notify the Contracting Officer immediately.

3.11.2.1 Regulated Waste Storage/Satellite Accumulation/90 Day Storage Areas

If the work requires the temporary storage/collection of regulated or hazardous wastes, the Contractor will request the establishment of a Regulated Waste Storage Area, a Satellite Accumulation Area, or a 90 Day Storage Area at the point of generation. The Contractor must submit a request in writing to the Contracting Officer providing the following information:

Contract Number	_____
Contractor	_____
Haz/Waste or Regulated Waste POC	_____
Phone Number	_____
Type of Waste	_____
Source of Waste	_____
Emergency POC	_____
Phone Number	_____
Location of the Site	_____

(Attach Site Plan to the Request)

Attach a waste determination form. Allow ten working days for processing this request. The designated area where waste is being stored shall be barricaded and a sign identifying as follows:

"DANGER - UNAUTHORIZED PERSONNEL KEEP OUT"

3.11.2.2 Sampling and Analysis of HW

a. Waste Sampling

Sample waste in accordance with EPA 530/F-93/004. Each sampled drum or container will be clearly marked with the Contractor's identification number and cross referenced to the chemical analysis performed.

b. Laboratory Analysis

Follow the analytical procedure and methods in accordance with the 40 CFR 261. The Contractor will provide all analytical results and reports performed to the Contracting Officer

c. Analysis Type

Identify waste hazardous material/hazardous waste by analyzing for the following properties as a minimum: ignitability, corrosiveness, total chlorides, BTU value, PCBs, TCLP for heavy metals, and cyanide.

3.11.2.3 Hazardous Waste Disposal

No hazardous, toxic, or universal waste shall be disposed or hazardous material abandoned on government property. And unless otherwise other wise noted in this contract, the government is not responsible for disposal of Contractor generated waste material. The disposal of incidental materials used to accomplish the work including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor. The list is illustrative rather than inclusive.

The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or water way or conduct waste treatment or disposal on government property without written approval of the Contracting Officer.

Control of stored waste, packaging, sampling, analysis, and disposal will be determined by the details in the contract. The requirements for jobs in the following paragraphs will be used as the guidelines for disposal of any hazardous waste generated.

a. Responsibilities for Contractor's Disposal

Contractor responsibilities include any generation of WHM/HW requiring Contractor disposal of solid waste or liquid.

(1) Provide all service necessary for the final treatment/disposal of the hazardous material/waste in accordance with all local, State and Federal laws and regulations, and the terms and conditions of the contract within sixty (60) days after the materials have been generated. These services will include all necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal, and/or transportation, including manifesting or completing waste profile sheets, equipment, and the compilation of all documentation is required).

(2) Contain all waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 272, 40 CFR 273, 40 CFR 279, 40 CFR 280, and 40 CFR 761.

(3) Obtain a representative sample of the material generated for each job done to provide waste stream determination.

(4) Analyze each sample taken and providing analytical results to the Contracting Officer. Provide two copies of the results.

(5) Determine the DOT proper shipping names for all waste (each container requiring disposal) and will demonstrate how this determination is developed and supported by the sampling and analysis requirements contained herein to the Contracting Officer.

Contractor Disposal Turn-In Requirements

For any waste hazardous materials or hazardous waste generated which requires the Contractor to dispose of, the following conditions must be complied with in order to be acceptable for disposal:

(1) Drums compatible with waste contents and drums meet DOT requirements for 49 CFR 173 for transportation of materials.

(2) Drums banded to wooden pallets. No more than three (3) 55 gallon drums to a pallet, or two (2) 85 gallon over packs.

(3) Band using 1-1/4 inch minimum band on upper third of drum.

(4) Recovery materials label (provided by Code 106.321) located in middle of drum, filled out to indicate actual volume of material, name of material manufacturer, other vendor information as available.

(5) Always have three (3) to five (5) inches of empty space above volume of material. This space is called 'outage'.

3.11.2.4 Universal Waste/e-Waste Management

Universal waste including but not limited to some mercury containing building products such florescent lamps, mercury vapor lamps, high pressure sodium lamps, CRTs, batteries, aerosol paint containers, electrical equipment containing PCBs, and consumed electronic devices, shall be managed in accordance with applicable environmental law and installation instructions.

3.11.3 Class I and II ODS Prohibition

Class I and II ODS in pure or blended form as defined and identified herein must not be used in the performance of this contract, nor be provided as part of the equipment except for the use of servicing existing government owned equipment. This prohibition will be considered to prevail over any other provision, specification, drawing, or referenced documents.

3.11.3.1 Recycling Requirements

Recycle used refrigerants and ozone depleting substances generated during the performance of this contract to the maximum extent practicable to minimize used refrigerant and ozone depleting substance disposal as HW.

Test, collect, transfer, recycle, and/or arrange for shipping and proper disposal of used refrigerants and ozone depleting substances generated during the performance of work under this contract. The Contractor is responsible for all associated costs.

Any and all Class I ODS and R-22 recovered by the Contractor as part of this contract shall be packaged and turned over to the Government for

recycling upon the completion of the work covered by this contract. The Contractor shall arrange for recycling of used refrigerants not turned over to the government, at a licensed refrigerant recycler approved by the Contracting Officer.

3.11.3.2 EPA Certification Requirements

Heating and air conditioning technicians must be certified through an EPA-approved program. Copies of certifications shall be maintained at the employees' place of business and be carried as a wallet card by the technician, as provided by environmental law. .

3.11.3.3 Accidental Venting of Refrigerant

Accidental venting of a refrigerant is a release and must be reported to the Contracting Officer

3.12 DUST CONTROL

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster.

3.12.1 Dirt and Dust Control Plan

Submit truck and material haul routes along with a plan for controlling dirt, debris, and dust on base 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.

3.13 ABRASIVE BLASTING

3.13.1 Blasting Operations

The use of silica sand is prohibited in sandblasting.

Provide tarpaulin drop cloths and windscreens to enclose abrasive blasting operations to confine and collect dust, abrasive, agent, paint chips, and other debris in accordance with the requirements specified. Perform work involving removal of hazardous material in accordance with 29 CFR 1910.

3.13.2 Disposal Requirements

Submit analytical results of the debris generated from abrasive blasting operations per Laboratory Analysis in paragraph SAMPLING AND ANALYSIS OF HW. Hazardous waste generated from blasting operations will be managed in accordance with paragraph CONTROL AND MANAGEMENT OF HAZARDOUS WASTE and with the approved HWMP. Disposal of non-hazardous abrasive blasting debris will be in accordance with paragraph CONTROL AND DISPOSAL OF SOLID WASTES.

3.14 NOISE

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives will not be 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.

3.15 MERCURY MATERIALS

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. 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.

Cleanup of a mercury spill shall not be recycled and shall be managed as a hazardous waste for disposal.

-- End of Section --

SECTION 01 57 19.01 20

SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS

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. If state or local references are not provided here, refer to Section 01 57 19.00 20 TEMPORARY ENVIRONMENTAL CONTROLS for appropriate references.

ASTM INTERNATIONAL (ASTM)

ASTM E2356	(2014) Standard Practice for Comprehensive Building Asbestos Surveys

STATE OF VIRGINIA ADMINISTRATIVE CODE (VAC)

9 VAC 25-850	Title 9, Agency 25, Chapter 850: Erosion And Sediment Control And Stormwater Management Certification Regulations
9 VAC 25-870	Title 9, Agency 25, Chapter 870: Virginia Stormwater Management Program (Vsmp) Regulation

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 833-R-060-04	(2007) Developing Your Storm Water Pollution Prevention Plan, a Guide for Construction Sites

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. 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:

Dirt and Dust Control Plan; G

Project Report

Waste Originator Training Certification; G

SD-07 Certificates

Storm Water Notice of Termination; G

Storm Drain/Sanitary Sewer Discharge Approval; G

Waste Determination Documentation; G

Monthly Project Waste Summary Report

Landfill Disposal Form; G

Dangerous waste manifests; G]

Certificate of final disposal; G

1.3 MID-ATLANTIC

1.3.1 Virginia

1.3.1.1 Definition and Disposal Requirements of Empty Paint Cans

Paint Cans: Paint cans that are empty (free of liquids and contains less than 1 inch of dried material) of paints, solvents, thinners and adhesives may be disposed of in dumpsters.

Metal paint cans that meet the empty standard can be placed in dumpsters marked "metal only"; plastic cans may be placed in solid waste dumpsters. Manage paint cans with liquid or more than 1 inch of solidified oil-based paint as a hazardous waste and properly label. Manage paint cans with excess water-based paint as non-hazardous waste. Contact NAVFAC MIDLANT Environmental Services for management requirements.

1.3.1.2 Construction Dewatering

There must be no release of construction discharge water to the stormwater system or into State waters without prior authorization in writing from the Environmental Division. Construction Dewatering must not be discharged to the sanitary sewer system. The discharge of hazardous substances is not permitted under any circumstances.

Construction site stormwater runoff must be treated through the use of proper erosion control measures or stormwater management practices prior to release from the construction site. Pollutants, including but not limited to chemicals, fuels, lubricants, sewage, paints, sedimentation, and other harmful materials must not be discharged into or alongside any River, Stream, or Impoundment, or into any channels leading to them. Contractors must implement appropriate erosion and sediment control measures to all disturbed areas or bare soils to prevent unauthorized offsite sedimentation. Denuded portions of a project which are at final grade or where work has temporarily ceased must have stabilization measures applied within 7 days.

1.3.1.3 Virginia Stormwater Management

Where land disturbance is equal to, exceeds one acre, prepare and submit a stormwater pollution prevention plan and comply with the requirements specified in the Virginia Stormwater Management Law and Regulations (Virginia Code: 9 VAC 25-870). Obtain Certificate of Competency in accordance with 9 VAC 25-850.

1.3.1.3.1 Storm Water General Permit for Construction Activities Registration Statement

In accordance with 9 VAC 25-870, submit a Registration Statement to the

State to obtain Virginia Stormwater Management Program General Permit coverage, and as required under the General Permit, develop a Storm Water Pollution Prevention Plan (SWPPP) for the project. The SWPPP must meet the requirements of the State General Permit for storm water discharges from construction activities. Submit the Registration Statement and appropriate permit fees to the appropriate State agency for approval a minimum of 15 calendar days prior to the start of any land disturbing activities. Maintain an approved copy of the SWPPP at the construction on-site office, and continually update as regulations require, reflecting current site conditions.

Coverage under this permit requires the contractor to prepare a SWPPP, prepare and submit a Registration Statement and provide the permit fee to the responsible state agency before any land disturbing activities begin. The Contractor must file for permit coverage on behalf of both them and the Construction Officer, and file a Notice of Termination once construction is complete and the site is stabilized with a final sustainable cover. Under the terms and conditions of the permit, the Contractor may be required to install, inspect, maintain best management practices (BMPs), and submit stormwater BMP inspection reports and stormwater pollution prevention plan inspection reports. Ensure construction operations and management are constantly in compliance with the terms and conditions of the general permit for storm water discharges from construction activities.

1.3.1.3.2 Storm Water Pollution Prevention Plan Notebook

Create and maintain a three-ring binder of documents that demonstrate compliance with the Stormwater Construction Activity permit. The binder must include a copy of the permit Registration Statement, proof of permit fee payment, SWPPP and SWPPP update amendments, inspection reports, copies of correspondence with the appropriate state agency and a copy of the permit Notice of Termination. At the completion of the project, the completed binder becomes the property of the Government. Provide the completed binder to the Contracting Officer. Provide an advance copy of the Registration Statement to the Contracting Officer immediately after the form is presented to the permitting agency.

The SWPPP must be consistent with the requirements of the General Permit, and at a minimum included:

a. Identify potential sources of pollution which may be reasonably expected to affect the quality of storm water discharge from the site.

b. Describe and ensure implementation of practices which must be used to reduce the pollutants in storm water discharge from the site.

c. Ensure compliance with terms of the State general permit for storm water discharges.

d. Select applicable best management practices from EPA 833-R-060-04 or appropriate State guidance documents.

e. Include a completed copy of the Registration Statement, State permit coverage letter, BMP Inspection Report Template and Notice of Termination except for the effective date.

f. Include copy of the approved Erosion and Sediment Control Plan and copy of the approved Stormwater Management Plan.

1.3.1.3.3 Stormwater General Permit Inspection Reports

Complete and document, in the Stormwater Pollution Prevention Plan Notebook, the Storm Water Inspection Reports as required by the State VSMP General Permit. The Stormwater inspections reports must include all items required by the General Permit and must be completed at the inspection frequency detailed in 9 VAC 25-870. Obtain certificate of competency in accordance with 9 VAC 25-850.

Asbestos Abatement and Notification Procedures

All structures must be surveyed for the presence of asbestos prior to demolition or renovation. A structure is defined as including any load bearing portion of a structure. Survey must be performed by a licensed, certified, accredited asbestos inspector in accordance with ASTM E2356.

Notify Environmental Protection Agency (EPA) and Virginia Department of Labor and Industry (VADOLI) at least 20 calendar days before start of asbestos abatement if asbestos is expected to total at least 260 LF, 160 SF, or 35 CF. Provide copies of notifications to the environmental office (Air Manager) through the Contracting Officer prior to beginning work. Make notifications for any project which includes asbestos abatement (and for all demolition projects, regardless of whether asbestos containing materials are present in the structure or facility) in accordance with paragraph DEMOLITION. Notification is not required if asbestos is non-friable asbestos containing roofing, flooring, or siding materials which when installed, encapsulated, or removed do not become friable. If the material is not in good shape, the matrix binding the asbestos fibers has deteriorated, or mechanical means are used for removal and result in more than incidental breakage, then notification is required. Activities such as grinding, mechanical chipping, sawing or drilling can make the asbestos containing material friable and would require notification.

1.3.1.4 Best Management Practices

Utilize Best Management Practices (BMPs) to ensure all EPA and VADOLI requirements are met, including: preventing airborne emissions via wetting asbestos prior to removal; using glove bags or containment; using HEPA filtered vacuum/ventilation systems; restricting access to asbestos control areas until thoroughly cleaned/inspected and acceptable air-samples received. Consideration should be given to other environmental program requirements such as Clean Water Act (CWA) requirements when making decisions in regard to BMPs.

1.3.1.5 Asbestos Waste Disposal

For asbestos waste disposal, phone the NAVFAC MIDLANT Environmental Service Desk to arrange pick up in your area. A manifest must be signed by this office prior to waste being removed from the installation. Provide copies of manifests and notifications to NAVFAC Mid-Atlantic EV Hazardous Waste Program Manager.

1.3.1.6 Hazardous Waste Requirements for Virginia Installations:

1.3.1.6.1 Demolition

Ensure facility has been surveyed for asbestos. Notify the Environmental Protection Agency (EPA) and Virginia Department of Labor and Industry (VADOLI) at least 10 working days before start of demolition. This

notification is required for all demolition, even if no asbestos is present. Follow asbestos notification requirements in accordance with paragraph ASBESTOS ABATEMENT AND NOTIFICATION PROCEDURES. Implement Best Management Practices (BMPs) to contain dust and debris emissions to the air.

Remove the following items from the site prior to demolition: PCB's, fluorescent bulbs, mercury and metal components (such as furnaces, ducts, and piping), and any hazardous materials. Manage all lead, fluorescent bulbs, mercury containing equipment, and any other waste as "hazardous or universal waste" as appropriate (see paragraph HAZARDOUS AND UNIVERSAL WASTE GENERATION). If the demolition activity encompasses the whole building (the building will be demolished to the ground), the resulting construction debris (including lead paint) requires Toxicity Characteristic Leaching Procedure (TCLP) analysis to make a waste determination and ensure proper management and disposal before it can be disposed as solid waste.

1.3.1.6.2 Excavation

If soil is to be reused on site, sampling is not required unless otherwise directed. Excavated soil may be re-used within the construction site with no testing necessary. Soil may be stockpiled until the end of the project, then re-used as much as possible prior to sampling/analysis for residual soil to be disposed of. Store all in a manner that prevents rain from infiltrating the soil matrix and preventing any runoff into the surrounding soil or pavement (e.g. store the soil on top of plastic sheets and covered with plastic sheets or in lined, covered dumpsters). If the soil is going to be relocated or disposed outside the construction site, sampling and analysis is required. Contact the installation HW Program Manager prior to disposal to determine the appropriate sampling/ test parameters. Soil disposal requirements will depend on test results. If soil is to be shipped to a destination outside the fire ant quarantine area (outside of James City County, York County, Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach or Williamsburg) it MUST have a valid inspection certificate issued by an Officer of the Plant Protection and Quarantine Program (PPQ) of the U.S. Department of Agriculture. Contact the EV Pest Management Coordinator for additional information.

Sub-surface archaeological resources can be encountered unexpectedly. During any soil disturbing activities, should historic or prehistoric artifacts, buried features, or structural foundations be discovered, halt the action and contact the NAVFAC MIDLANT Regional Historic Preservation Officer and the Contracting Officer immediately.

1.3.1.6.3 Painting and Paint Removal

Air drying cans for disposal is allowed only if liquid residue is less than 1 inch; keeping all paint or solvent containers closed and secured when not adding or removing material or waste. Waste paint chips/debris must be collected and sampled to determine proper disposal method. Contact the EV HW Program Manager for sampling requirements. If waste paint is determined to be hazardous, waste must be managed as hazardous and an appropriate accumulation area must be established. Contact the EV HW Program Manager for site setup.

Implement BMPs to contain dust and debris emissions to the air.

1.3.1.6.4 Dumpsters

Keep cover closed at all times, except when being loaded with trash and

debris. Empty site dumpsters at least once a week or as needed to keep the site free of debris and trash. Label trash containers to appropriately describe the contents.

1.3.1.7 Air Requirements:

1.3.1.7.1 Painting

Control volatile organic compound emissions by keeping all paint, solvent, and waste containers closed/secured except when adding or removing material or waste. Control air emissions via air drying cans for disposal only if liquid residue is less than 1 inch.

Control particulate matter emissions by using containment such as shrouds to contain overspray during spraying operations.

1.3.1.7.2 Paint Removal

Control dust, abrasive agent, paint chips, and other debris during abrasive blasting or similar operations that could emit dust/debris. Containment could include application of water and use of shrouding/containment. Consider other environmental program requirements such as Clean Water Act (CWA) requirements when making decisions in regard to BMPs.

1.3.1.8 Hazardous Material Management

At the end of the project, provide the Contracting Officer with 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.

1.3.1.9 Spill Response and Reporting

Spills include any spilling, leaking, pumping, emitting, discharging, injecting, escaping, leaching, disposing, or dumping of liquid or solid material that is not authorized in writing by the Contracting Officer. Report all Spills at Hampton Roads Navy installations to the appropriate installation ECC immediately upon discovery. The Responsible party will fund all clean up and disposal costs.

After notification of installation ECC, notify your Navy point of contact. Refer to the Activity Hazardous Material Reutilization, Hazardous Waste Minimization and Disposal Guide Appendix 3 for spill contact procedures. Refer to "Table 1 - Spill Reporting Contact Numbers" for the appropriate point of contact.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 74 19

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

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 E 1609	(2001) Development and Implementation of a Pollution Prevention Program

1.2 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 the Contractor shall: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse.

1.3 MANAGEMENT

Develop and implement a waste management program in accordance with ASTM E 1609 and as specified. 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 35 40.00 20 Environmental Management, 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.

1.4 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-01 Preconstruction Submittals

Waste Management Plan; G

SD-11 Closeout Submittals

Records; G

1.5 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 20 QUALITY CONTROL. At a minimum, environmental and waste management goals and issues shall be discussed at the following additional meetings:

a. Preconstruction meeting.

b. Regular QC meetings.

1.6 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.

1.7 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.

1.8 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 35 40.00 20 ENVIRONMENTAL MANAGEMENT. Separate materials by one of the following methods:

1.8.1 Source Separated Method.

Waste products and materials that are easily seperated and 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. Asphalt.

b. Concrete.

c. Metal (e.g. rebar, steel, iron, galvanized, stainless steel, aluminum).

(1) Ferrous.

(2) Non-ferrous.

d. Wood (nails and staples allowed).

e. Debris.

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

CLOSEOUT SUBMITTALS

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. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

As-Built Record of Materials

SD-11 Closeout Submittals

Record Drawings; G

1.2 PROJECT RECORD DOCUMENTS

1.2.1 Record Drawings

Drawings showing final as-built conditions of the project. This paragraph covers record drawings complete, as a requirement of the contract. The terms "drawings," "contract drawings," "drawing files," "working record drawings" and "final record drawings" refer to contract drawings which are revised to be used for final record drawings showing as-built conditions. The final CAD record drawings must consist of one set of electronic CAD drawing files in the specified format, 1 sets of prints, and one set of the approved working Record drawings.

1.2.1.1 Government Furnished Materials

One set of electronic CADD files in the specified software and format that reflects the original bid drawing, bid amendments not included, will be provided by the Government at the preconstruction conference for projects requiring CADD file record drawings.

1.2.1.2 Working Record and Final Record Drawings

Revise 2 sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. Keep these working as-built marked drawings current on a weekly basis and at least one set available on the jobsite at all times. Changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction must be accurately and neatly recorded as they occur by means of details and notes. Prepare final record (as-built) drawings after the completion of each definable feature of work as listed in the Contractor Quality Control Plan (Foundations, Utilities, Structural Steel, etc., as appropriate for the project). The working as-built marked prints and final record (as-built) drawings will be jointly

reviewed for accuracy and completeness by the Contracting Officer and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working and final record drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the record drawings. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of updated drawings. Show on the working and final record drawings , but not limited to, the following information:

a. The actual location, kinds and sizes of all sub-surface and above and below pier deck 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 to the pier structure.

c. Correct grade, elevations, cross sections, structures or utilities if any changes were made from contract plans.

d. 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 fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

e. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.

f. Changes or modifications which result from the final inspection.

g. Where contract drawings or specifications present options, show only the option selected for construction on the final as-built prints.

h. Modifications (include within change order price the cost to change working and final record drawings to reflect modifications) and compliance with the following procedures.

(1) Follow directions in the modification for posting descriptive changes.

(2) Place a Modification Delta at the location of each deletion.

(3) For new details or sections which are added to a drawing, place a Modification Delta by the detail or section title.

(4) For minor changes, place a Modification Delta by the area changed on the drawing (each location).

(5) For major changes to a drawing, place a Modification Delta by the title of the affected plan, section, or detail at each location.

(6) For changes to schedules or drawings, place a Modification Delta

either by the schedule heading or by the change in the schedule.

(7) The Modification Deltasize shall be 1/2 inch diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

1.2.1.3 Drawing Preparation

Modify the record drawings as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract set into agreement with approved working as-built prints, and adding such additional drawings as may be necessary. These working as-built marked prints must be neat, legible and accurate. These drawings are part of the permanent records of this project and must be returned to the Contracting Officer after approval by the Government. Any drawings damaged or lost by the Contractor must be satisfactorily replaced by the Contractor at no expense to the Government.

1.2.1.4 Computer Aided Design and Drafting (CADD) Drawings

Only employ personnel proficient in the preparation of CADD drawings to modify the contract drawings or prepare additional new drawings. Additions and corrections to the contract drawings must be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols must be the same as the original line colors, line weights, lettering, layering conventions, and symbols. If additional drawings are required, prepare them using the specified electronic file format applying the same graphic standards specified for original drawings. The title block and drawing border to be used for any new final record drawings must be identical to that used on the contract drawings. Accomplish additions and corrections to the contract drawings using CADD files. The Contractor will be furnished "as-designed" drawings in AutoCad format compatible with a Windows 7 operating system. Provide all program files and hardware necessary to prepare final record drawings. The Contracting Officer will review final record drawings for accuracy and return them to the Contractor for required corrections, changes, additions, and deletions.

a. Provide CADD "base" colors of red, green, and blue. Color code for changes as follows:

(1) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.

(2) Additions (Green) - Added items, lettering in notes and leaders.

(3) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.

b. Rename the Contract Drawing files in a manner related to the contract number (i.e., 98-C-10.DGN) as instructed in the Pre-Construction conference. Use only those renamed files for the Marked-up changes. All changes shall be made on the layer/level as the original item.

c. When final revisions have been completed, show the wording "RECORD DRAWINGS / AS-BUILT CONDITIONS" followed by the name of the Contractor in letters at least 3/16 inch high on the cover sheet drawing. Mark all other contract drawings either "Record" drawing denoting no revisions on the sheet or "Revised Record" denoting one or more

revisions. Date original contract drawings in the revision block.

d. Within 20 days after Government approval of all of the working record drawings for a phase of work, prepare the final CADD record drawings for that phase of work and submit two sets of blue-lined prints of these drawings for Government review and approval. The Government will promptly return one set of prints annotated with any necessary corrections. Within 10 days revise the CADD files accordingly at no additional cost and submit one set of final prints for the completed phase of work to the Government. Within 20 days of substantial completion of all phases of work, submit the final record drawing package for the entire project. Submit one set of electronic files on optical disk, two sets of blue-line prints and one set of the approved working record drawings. They must be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any transactions or adjustments necessary to accomplish this is the responsibility of the Contractor. The Government reserves the right to reject any drawing files it deems incompatible with the customer's CADD system. Paper prints, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit final record drawing files and marked prints as specified will be cause for withholding any payment due the Contractor under this contract. Approval and acceptance of final record drawings must be accomplished before final payment is made to the Contractor.

1.2.1.5 Payment

No separate payment will be made for record drawings required under this contract, and all costs accrued in connection with such drawings are considered a subsidiary obligation of the Contractor.

1.2.2 As-Built Record of Materials

Furnish one copy of preliminary record of materials used on the project 15 days prior to final inspection. This preliminary submittal will be reviewed and returned 5 days after final inspection with Government comments. Submit Two sets of final record of equipment and materials 10 days after final inspection. Key the designations to the related area depicted on the contract drawings. List the following data:

RECORD OF DESIGNATED MATERIALS DATA				
Description	Specification Section	Manufacturer	Composition and Size	Where Used

1.2.3 Final Approved Shop Drawings

Furnish final approved project shop drawings 30 days after transfer of the completed facility or completion of repairs.

1.3 WARRANTY MANAGEMENT

1.3.1 Performance Bond

The Contractor's 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 of the Contractor to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.4 CLEANUP

Leave premises "broom clean." Clean debris from drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 02 32 00.22

BATHYMETRIC SURVEYS

PART 1 GENERAL

1.1 SOIL BORINGS AND GEOTECHNICAL DATA INFORMATION

All available soil boring and geotechnical information has been provided with the reference and construction documents and serve as the basis of the design for the contract repairs. Prior to beginning construction work, the contractor shall obtain the services of an independent geotechnical firm to provide soil borings, sampling and testing, and laboratory reports to verify existing subsurface conditions.

1.2 BATHYMETRIC SURVEYS

All available information pertaining to the existing water depths along the bulkheads, existing underwater structures, and the locations of missing and damaged piles have been provided with the reference and contract documents.

1.3 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 D1586	(2011) Penetration Test and Split-Barrel Sampling of Soils
ASTM D2113	(2014) Rock Core Drilling and Sampling of Rock for Site Investigation
ASTM D2487	(2011) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D2488	(2009a) Description and Identification of Soils (Visual-Manual Procedure)

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-012 Preconstruction Submittals
- Geotechnical Consultant; G
- Bathymetric Survey Company; G
- Underwater Dive Inspection Team; G

SD-06 Test Reports
- Geotechnical Report; G
- Bathymetric Surveys; G

Existing Water Depth Survey (Sounding)
Underwater Sheet Pile Gap Inspection Survey; G
Underwater Debris and Obstruction Survey; G
Post Construction Underwater Survey and Inspections; G
Underwater Material Deposit Survey; G
Pre Construction Underwater Material Deposit Survey; G
Post Construction Underwater Material Deposit Survey; G
Construction Underwater Material Deposit Survey; G

SD-03 Product Data
Permits, Certifications, and Licenses
Schedule of Drilling, Sampling, and Testing; G
Schedule for Bathymetric Surveys and Inspections; G

1.5 SOIL BORING AND SAMPLING SYSTEM DESCRIPTION

Provide the data to determine the type, nature, and characteristics of subsurface materials and the extent and conditions of the various materials as they exist to the depths and at the locations specified. This is to be accomplished by means of auger borings or drive sample borings. This information is to aid the contractor in estimating potential settlement for the provisions of the stone fill and marine mattresses, refine his grout curtain mix design, aid with the contractor's ground anchor design, and incidental related work.

1.5.1 Geotechnical Consultant

The contractor shall employ the services of an independent licensed Geotechnical engineer and organization with at least 10 years experience specializing in Geotechnical engineering and experienced in soil mechanics who shall perform site investigations, soil borings, laboratory testing, and provide a soil's characteristic reports.

1.5.2 Borings and Sampling

Perform drilling and sampling in accordance with ASTM Standards and other standards, including but not limited to ASTM D 1587, ASTM D 1452, and ASTM D2113. Take soil samples at 5 feet intervals along the entire depth in each of the borings. Standard Penetration Tests (SPT) shall be performed in accordance with ASTM D1586.

Preserve samples as per ASTM Standards and prepare field boring logs under the supervision of the Geotechnical Engineer Consultant.

1.5.3 Sequencing and Scheduling

1.5.3.1 Schedule of Drilling, Sampling, and Testing

Prior to starting work, submit a plan for drilling, sampling, testing, and safety. The plan shall include, but shall not be limited to, the proposed method of drilling and sampling including a description of the equipment and sampling tools that will be used, a listing of any subcontractors to include a description of how the subcontractors will be used and a description of all methods and procedures that will be utilized to insure a safe operation and to protect the environment. No work shall be performed until this plan has been approved and no deviation from the approved plan will be permitted without prior approval by the Contracting Officer. The locations and boring depths are listed in the following schedule:

SCHEDULE OF DRILLING, SAMPLING AND TESTING			
LOCATION	NUMBER(S), SPACING, AND LOCATIONS OF BORINGS	DEPTH OF BORING BELOW GRADE OR MLLW	SPECIAL INSTRUCTIONS
Patriot's Point	(1) at the approximate center location for the ground anchors	Elevation -50.0' below existing ground/pavement surface	
CEP175 Waterside STA 8+00 to 18+00	(1) each at an approximate 200-foot spacing along the bulkhead for a total of (6) borings	Elevation -75.0' below MLLW	Obtain boring from an approximately 5 foot distance from the offshore face of the existing bulkhead
CEP175 Shore Side STA 8+00 to 18+00	(1) each at an approximate 200-foot spacing along the bulkhead for a total of (6) borings	Elevation -40.0' below Existing Pavement	Obtain boring along the anticipated path of the soil grout curtain. Excavation and core drilling through the relieving platforms will be required

1.5.3.2 Order of Work

The order in which the work is to be accomplished will be determined after contract award and based upon the contractor's approved construction schedule.

1.5.3.2.1 Soil Testing

Perform the following field or laboratory tests as appropriate on representative soil samples taken at adequate intervals to accurately characterize subsurface conditions encountered. Use this information to establish the Geotechnical design parameters and other information required for the design and construction of the Project. As a minimum perform tests in accordance with the applicable ASTM Specification and other recognized standards.

a. Soil classification: ASTM D2487, ASTM D2488.
b. Moisture content: ASTM D2216.

For Cohesive Soils:
a. Atterberg limits: ASTM D4318.
b. Unconfined compressive strength: ASTM D2166.
c. Consolidation: ASTM D2435.
d. Presence of organic or other deleterious materials.
e. Swelling: ASTM D4546.
f. Insitu density: ASTM D2167, ASTM D2922.

For granular soils
a. Grain-size distribution: ASTM D422.

b. Shear-strength.
c. Presence of organic or other deleterious materials.

1.5.3.2.2 Geotechnical Report

Provide a separate, signed independent Geotechnical report as required to determine existing soil conditions. The project specific foundation and soils (Geotechnical) investigation as required to comply with the Building Code of Virginia.

Provide boring logs plotted and graphically presented showing boring number, sampling method used, date of start and finish, surface elevations, description of soil and thickness of each stratum, depth to loss or gain of drilling fluid, number of blows per foot (N value) and, where applicable, depth to wet cave-in, depth to artesian head, depth to or elevation of groundwater during and after completion of boring (repeat observation after 24 hours) and presence of gases if observed. Note the location of strata containing organic materials, wet materials or other inconsistencies that might affect the design or construction of the proposed structure. Include representative profile(s) through the site reflecting subsurface conditions and results of all laboratory tests performed including test methods or standards used.

Analyze the information developed by the investigation all aspects of subsurface conditions which may affect the design and construction of the proposed structures.

1.6 BATHYMETRIC SURVEY SYSTEM DESCRIPTION

In order to aid the Contractor in placement of the stone bedding and marine mattress and the Contracting Officer to validate payment quantities for the associated "unit priced" bid items, the contractor shall provide pre and post construction bathymetric surveys. By-weekly bathymetric surveys will also be provided during the placement of the stone fill, in areas not yet in receipt of the mattress cover, to ensure fill material is not being lost due to erosion.

In addition, permit compliance requirements of the ACOE permit "Water Resource Policies and Authorities POLICY AND PROCEDURAL GUIDANCE FOR PROCESSING REQUESTS TO ALTER US ARMY CORPS OF ENGINEERS CIVIL WORKS PROJECTS PURSUANT TO 33 USC 408" requires assurance that the performance of this project does not result in any additional deposit of debris into the waterways that could become a hazard to navigation or future dredging operations. A pre construction underwater survey will be required to identify existing underwater debris fields conditions, and a post construction survey and report shall be required upon completion of all underwater work to ensure no additional debris has been deposited. The Government will forward to the responsible agency the final survey and report for contract compliance.

1.6.1 Bathymetric Survey Company

The Contractor shall employ an independent licensed Surveyor and organization with at least 10 years experience specializing in Bathymetric Surveys and underwater data and object identification who shall perform underwater site survey, water depth determinations, identification of debris fields and structures, and provide plot drawing surveys and reports during the performance of this contract.

1.6.2 Horizontal Datum

All positions will be referenced to the North American Datum of 1983 (NAD 83). This datum must be used throughout a survey project for everything that has a geographic position or for which a position is to be determined. In addition, all software used on a survey must contain the correct datum parameters.

1.6.2.1 Sounding Datum

All sounding data will be reduced to Mean Lower Low Water (MLLW). Heights of top of curb will be referenced to Mean High Water (MHW).

1.6.3 Horizontal Position Uncertainty

The Total Horizontal Uncertainty (THU) in position of soundings, at the 95 percent confidence level, will not exceed 10 feet. This accuracy requirement is independent of survey scale.

1.7 SURVEY REQUIREMENTS

1.7.1 Existing Water Depth Survey (Sounding)

Water Depths along the bulkhead shall be provided by a single beam survey-grade echo sounder operating at a minimum frequency of 200 kHz in order to capture a digital profile records as well as digitized depth information Digital depth data was logged directly to the navigation computer along with date, time, and position for post processing and mapping. For areas not accessible, readings along the bulkhead shall be preformed by weighted lines.

1.7.1.1 Calibrations

Provide a bar check calibration for speed of sound prior to commencing survey operations. Use variations between the true bar depth and the observed depth and adjust the sound velocity on the echo sounder until it read correctly.

1.7.1.2 Processing

Remove outliers and cross-reference against the echo sounder digital chart recordings. Reduced the sounding to MLLW using the predicted tidal data obtained from NOAA and exported as an XYZ file that can also be utilized by the government. Provide exported XYZ data contoured at one foot intervals for final charting, indexed every 5 feet.

1.7.2 Underwater Sheet Pile Gap Inspection Survey

Divers will be required to be employed for inspection.

1.7.2.1 1.6.2 Existing Sheetpile Gap Verification Report

Prior to beginning pressure injection grouting behind the bulkheads, the contractor shall conduct an underwater survey and inspection the the entire length and exposed height of the CP175 sheet pile bulkhead between STA 07+00 and 18+00 and the Z308 Bulkhead between STA 42+25 and STA 43+50 in order to document and report the presence of existing gaps and to location any other area in which fill may be being lost through the bulkhead fascia.

The inspection shall be preformed by an independent dive team along the outside of the bulkhead. The inspection shall consist of a visual inspection of the entire exposed face of the sheet pile bulkhead for open gaps, greater than 1" in width, between the individual concrete sheet pile sections, expansion joint locations, and identify any areas along the exposed face of the sheet pile in which there are observed open concrete spalls more than 3 inches deep, and all utility outfalls or other openings that may result in fill being lost from behind the bulkhead.

The dive inspector(s) shall probe all 1" gaps and/or opening greater with a thin bar, with a minimum length of 3 feet, determine if the gaps, joints, and/or openings, are allowing fill to the lost.

All joint, gap, and openings, and spalls shall be dimensioned, photographed, documented, and reported on scaled drawings to be utilized by the Contracting Officer and the Grouting Contractor for the placement and/or adjustment of the proposed grout curtain wall and for determination of concrete repairs.

Any additional openings, outside of the areas already in the contract, shall be reported to the Contracting Officers. The contractor shall submit (4) copies of all reports to the Contracting Officer.

Scaled drawings and a descriptive report which locates and describes all locations of potential fill loss and concrete spalls, found during the inspection, shall be provided to the Contracting Officer for his review and approval. The contracting Officer will then identify areas to be sealed, by the contractor, prior to beginning the grouting operation.

The Contracting Officer shall also utilize the report to determine underwater concrete spall repairs to be preformed by the contractor.

1.7.3 Underwater Debris and Material Placement Verification

1.7.3.1 Underwater Debris and Obstruction Survey

Side-scan sonar and divers will be required to be employed for these surveys and inspections.

1.7.3.1.1 Pre Construction Underwater Survey and Inspections

Prior to demolition, the contractor shall conduct an underwater survey and inspection of the work site to identify existing underwater debris, pile stubs found exposed above the river bottom, and the location and the of all existing fender piles along the bulkheads.

In addition, for areas in which the "prestressed concrete" fender piles are to be provided, the river bottom shall be probed for debris or broken piles, which may exist below the river bottom surface, that could affect the installation of these fender piles. Locations for prestressed fender piles shall be probed to a minimum depth of 15 feet for broken piles, timbers, debris, or rubble that could affect the installation.

Below grade probing, at locations for the composite fender piles, is not required.

Scaled drawings and a descriptive report which locates and describes all debris and piles found during his inspection shall be provided to the Contracting Officer for his review and approval prior to beginning

demolition.

The contractor shall document the location and condition of all exiting timber piles prior to their removal and all obstruction found during the inspection, in and around the work areas shall be identified. Items found adjacent to these areas, but not affecting the installation of the prestressed concrete piles, shall also be identified in the report.

The report shall contain a descriptive report of all possible obstructions uncounted at or below the mud line including actual dimensions to the location of the prestressed fender pilings to be installed.

The scaled survey results and written description report shall graphically depicts all existing fender piles and all items found during the survey and inspection. Included on the drawings will the relationship of all items found to the locations and position to existing piles identified in the contract documents sand to those piles identified in the contract to be provided. The report shall delineate those items which are required to be removed and those that would not affect the pile installation. All items in the original contract documents are required to be removed and disposed, the Contracting Officer will review the submission and identify those additional items, previously not included in the contract, that may be included for removal.

1.7.3.1.2 Post Construction Underwater Survey and Inspections

Upon completion of all the work a post construction inspection survey shall be required to ensure no additional debris has been deposited due to the demolition and or construction. Additional debris, not reflected on the preconstruction report, and determined to be material from this contract, shall be required to be removed by the contractor at no additional cost to the government.

A scaled drawings and a descriptive report for all debris found during his inspection shall be provided to the Contracting Officer for his review and approval prior to moving to the next work quadrant.

1.7.3.1.3 Underwater Material Deposit Survey

Side-scan sonar will be required to be employed for this survey.

Side Scan data recording are not expected to be provided in waters less than 5 feet deep or areas inaccessible by boat or the contractor's equipment. Locations will be assessed by the contractor and the Contracting Officer for safety, access, or where there is potential for damage to the bottom environment or equipment, before proceeding with any work. For those areas, the dive team shall perform these surveys and inspections.

1.7.3.1.4 Pre Construction Underwater Material Deposit Survey

Provide a pre construction profile survey of the river bottom features and contours for areas designated to receive stone fill and marine mattress by the use of a side scan sonar system and marine magnetometer.

Deployed a marine magnetometer was in order to confirm man-made objects versus natural objects.

Scaled drawings depicting the river bottom contours and a descriptive report describing conditions found in the area shall be provided to the

Contracting Officer for his review and approval prior to beginning the placement of materials.

1.7.3.1.5 Post Construction Underwater Material Deposit Survey

Upon completion of all the work a post construction inspection survey shall be required to ensure the proper placement of the fill material and marine mattress to the elevations and profile required in the contract.

A scaled drawings and a descriptive report shall be provided to the Contracting Officer for his review and approval prior to moving to the next work quadrant.

1.7.3.1.6 Construction Underwater Material Deposit Survey

During construction and placement of materials the contractor shall provide progress side-scan surveys of the work in progress. These surveys will be utilized by the Contracting Officer to valid the correct placement of the material and for invoice payments.

A scaled drawing identifying placement of materials shall be provided to the Contracting Officer for his review and approval.

1.7.4 Side Scan Sonar System Requirements

Provide a side scan sonar system shall consisted of a digital, dual-frequency, towfish interfaced to the topside data-logging computer with acquisition software. Deploy the towfish and traversed all accessible areas along the bulkhead work sites out to 25 feet from the face of the bulkheads and the bathymetric coverage of the vertical bulkhead face shall be within 1.5 feet of the water surface. In areas in which the marine mattresses will be provided, extend the subsurface survey out to 75 feet from the face of the bulkhead.

The surveys will be conducted with a minimum 400-kHz multi-beam side scan sonar. Minimum data density not to average less than 300 soundings per square foot along the vertical bulkhead surface and 90-100 soundings per square along the foot overall.

1.7.4.1 Processing

Utilize government compatible software to complete post-processing. Corrected for towfish altitude during data processing and edit navigation data for errant position fixes and velocity errors. Analyze each line for debris, piling, vegetation, stone deposits, marine mattress location, and any incidental object or obstruction that could affect the work.

1.7.4.2 Survey Crew and Equipment

The Lead Member of the Survey Crew shall have a minimum of (10) years experience with underwater inspection. The personnel make up of the crew shall comply with EM 385-1-1, OSHA, and all contract and local requirements for conduction their operations. The lead member must be 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 provide the surveys and conduct

surveillance and inspection services, including survey equipment, survey boat, and communication equipment. Diver(s) must be equipped to maintain two-way communication with QC and government personnel during all operations.

The Survey Crew shall be an independent third party hired directly by the Prime Contractor and approved by the Contracting Officer and shall have no involvement with the design, preparation of Contract, or installation of the work.

1.7.5 Underwater Dive Inspection Team

The Dive Team employed to perform the underwater surveys, inspections, and work progress surveillance for the Contractor must have current commercial diver's license, with a minimum of ten (10) years experience with underwater inspection. The personnel make up of the team shall comply with EM 385-1-1, OSHA and local requirements for Contract diving operations. The lead diver must be 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 surveys, inspections, and surveillance, 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 and the boat personnel my maintain contract with Port Operations.

The Dive Team shall be an independent third party hired directly by the Prime Contractor and approved by the Contracting Officer and have no involvement with the design, preparation of Contract, or installation of the work. The Dive Team member(s) may also perform the same functions required for the underwater QC if they meet those requirements.

1.8 SEQUENCING AND SCHEDULING

1.8.1 Schedule for Bathymetric Surveys and Inspections

Prior to starting work, submit a plan for each survey to be preformed and include a safety plan. The plan shall include, but shall not be limited to, the proposed methods for each survey and include a description of the survey equipment and watercraft that will be used, a listing of any subcontractors to include a description of how the subcontractors will be used and a description of all methods and procedures that will be utilized to insure a safe operation and to protect the environment. No work shall be performed until this plan has been approved and no deviation from the approved plan will be permitted without prior approval by the Contracting Officer. The locations and assumed methods for obtaining data are listed in the following schedule:

SCHEDULE OF BATHYMETRIC SURVEYS			
LOCATION	TYPE	DISTANCE OUT FROM THE FACE OF THE EXISTING BULKHEAD	SPECIAL INSTRUCTIONS

SCHEDULE OF BATHYMETRIC SURVEYS			
Patriots Point	Sounding (10 foot increment along the work area)	20 feet	Provide sounding in 5 foot increments out from to identify the extent of the existing rip-rap
CEP175 STA 1+00 to 24+98	Soundings (10 foot increment along the bulkhead)	Adjacent to the bulkhead	Measurements to identify existing river bottom for determination of the depth required for grout curtain wall
CEP175 STA 1+100 to STA 8+00	side-scan sonar/dive team	25 feet	Pre construction and post construction condition surveys for underwater debris and Permit Compliance
CEP175 STA 8+00 to 18+00	side-scan sonar/dive team	75 feet	Existing precondition survey for river bottom profile and existing debris and potential obstructions; during construction the verification of stone filler material and marine mattress placement; and post construction condition survey for quality assurance, underwater debris, and Permit Compliance
CEP175 STA 18+00 to STA 24+98	side-scan sonar/dive team	25 feet	Pre construction and post construction condition surveys for underwater debris and Permit Compliance
Z308 STA 43+25 to 45+50	Soundings (10 foot increment along the bulkhead)	Adjacent to the bulkhead	Measurements to identify existing river bottom for determination of the depth required for grout curtain wall
Z308 STA 37+00 to STA 49+00	side-scan sonar	25 feet	Pre construction and post construction condition surveys for underwater debris and Permit Compliance

1.9 ORDER OF WORK AND PERFORMANCE OF SURVEYS

The order in which the surveys will be accomplished will be determined after contract award and based upon the contractor's approved construction schedule.

1.10 QUALITY ASSURANCE

Comply with all Federal, State and local laws, regulations and ordinances relating to the performance of this work. Procure all required permits,

certifications and licenses required by Federal, State, and local law for the execution of this work. Submit copies of all permits, certifications, and licenses prior to starting work. This submittal shall also include a statement of the prior experience, in the type of work described in these specifications, of the person or persons designated to perform the work specified herein.

1.11 PROJECT/SITE CONDITIONS

1.11.1 Environmental Requirements

In order to prevent and to provide for abatement and control of any environmental pollution arising from Contractor activities in the performance of this contract, the Contractor and its subcontractors shall comply with all applicable Federal, State, and local laws, regulations, and ordinances concerning environmental pollution control and abatement.

a. The Contractor is responsible for keeping informed of all updates and changes in all applicable laws, regulations, and ordinances.

b. Do not pollute waterways or groundwater with drill fluids, fuels, oils, bitumens, calcium chloride, insecticides, herbicides, or other materials that may be harmful to the environment.

PART 2 PRODUCTS

2.1 SOIL REPORTS AND BATHYMETRIC SURVEYS

2.1.1 Survey Result Drawings, Findings, and Reports

Submit complete and legible copies of all surveys and reports for each preformed survey or inspection to the Contracting Officer within 5 working days of the completions of the work. Surveys and reports shall be signed by the organization who preformed the work.

The information provide with the survey and inspection reports shall reflect all aspects of underwater conditions that pertain to the construction.

Post Construction and Post Underwater Debris Verification Surveys and Report shall be submitted and approved by the Contracting Officer prior to moving to the next Work Quadrant.

PART 3 EXECUTION

Not Used.

-- End of Section --

SECTION 02 41 00

DEMOLITION AND DECONSTRUCTION

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

1.2 PROJECT DESCRIPTION

1.2.1 Demolition/Deconstruction Plan

Prepare a Demolition Plan and Deconstruction Plan and submit proposed salvage,demolition,deconstruction, 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

Demolition of any portion of the fender system shall not begin until the Contracting Officer has reviewed and approved of the Topside Existing Condition Survey Report and the Underwater Pre-Construction Obstruction Survey Reports for areas the contractor intends to begin his work.

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. The work includes demolition, deconstruction, salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. 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 or pavements to remain. 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 structural components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt outside of the designated work areas. Remove dust, dirt, and debris from work areas daily.

1.3.2 Weather Protection

Protect materials and in-place work from the weather at all times.

1.3.3 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.

1.3.4 Facilities

Protect electrical and mechanical services and utilities. 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.

1.3.4.1 Protection of Personnel

Before, during and after the demolition work the Contractor shall 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 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.

1.4 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.5 AVAILABILITY OF WORK AREAS

Areas in which the work is to be accomplished will be coordinated with the Contracting Officer.

1.6 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

Topside Existing Condition Survey Report; G

Underwater Pre-Construction Survey Report; G

Detailed Underwater Pre-Construction Obstruction Survey Report; G

Existing Conditions; G

Demolition Plan; G

Deconstruction Plan; G

SD-07 Certificates

Notification; G

SD-11 Closeout Submittals

Receipts

1.7 QUALITY ASSURANCE

Submit timely notification of deconstruction projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the State's environmental protection agency, local air pollution control district/agency, and 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.

1.7.1 Dust and Debris Control

Prevent the spread of dust and debris and avoid the creation of a nuisance or hazard to the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Sweep pavements as often as necessary to control the spread of debris.

1.8 PROTECTION

1.8.1 Traffic Control Signs

a. Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Notify the Contracting Officer prior to beginning such work.

b. Provide aviation obstruction lights in compliance with FAA AC

70/7460-1. Refer to SECTION 01 50 00, PARAGRAPH 3.2 for additional information.

1.8.2 Protection of Personnel

Before, during and after the demolition and deconstruction work continuously evaluate the condition of the elements being demolished and deconstructed and take immediate action to protect all personnel working in and around the project site. No area, section, or component of the fender system 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.

1.9 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.

1.10 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 in all areas of the work. Photographs sized 4 inch shall be taken to assist with identification of existing conditions along with documenting changed conditions on the drawings. Include in the record documents any possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing concrete 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.

1.10.1 Topside Existing Condition Survey Report

In addition to the photographs of the existing conditions a Topside Existing Condition Survey Report shall submitted that provides field verification and general field measurements that clearly define the following:

(a) The location and a quantity count of all existing timber piles and timber chocks and wales. Any changes due to damage, missing piles or timber components, or the addition of timber piles, chocks, or wales not reflected on the contract drawings shall be indicated in the report and reflected on the drawings.

(b) The location of all electrical conduits and junction boxes that may interfere with the repairs.

(c) Initial inspection of the the existing pier concrete edge beams and curbing and the bulkhead seawalls are to be inspected for damage. Damaged areas are to estimated which may require repairs prior to the installation of the prestressed fender pile modules or timber fender system repairs.

Note: These areas shall be approximated during the initial survey and will have to be reinspected upon the complete demolition of the existing fender system to provide an accurate pay quantity.

(d) Prior to preparation of the ladder shop drawings, field verify, measure and record existing conditions at all ladder Locations. Verification, locations and measurements for the Curbing, Edge Beam, Pile Cap, Piles, Seawall, and any existing concrete or pile jacket repairs shall be identified.

(e) Record existing conditions that reflect the condition of structures and other facilities adjacent to areas of alteration or removal.

1.10.2 Underwater Pre-Construction Survey Report

Prior to beginning demolition the contractor shall perform either a side scan or underwater dive survey along the work areas to locate and identify any existing pile stub which may be exposed above the mud line and record any large items of debris (larger than 3 cubic feet), that may be observed lying on the river bottom along the work area. Upon completion of all demolition and construction the contractor shall perform additional side scan sonar or underwater dive survey to ensure that no timber pile stub remains above 3'-0" of the river bottom and that no additional debris, as a result of this project, will remain. Any pile stub identified above 3'-0" of the river bottom, and as a result of this project shall be required to be extracted and properly disposed. Existing pile stubs identified under the initial inspection and within 3'-0” of the mud line and not affecting the work may remain. No debris shall be allowed to accumulate on the river bottom or waterways as a result of this project. Existing debris found during the initial inspection may remain if it does not affect the repairs unless directed by the contracting officer.

A written report including drawing(s) which graphically depicts the original timber piles and the locations of pile stubs or debris found during the initial inspection shall be provided to the Contracting Officer. The contractor may elect to identify items to be removed and disposed based upon the survey report's findings.

NOTE: The post construction survey and report are compliance requirements of the ACOE permit. The Government will forward to the responsible agency the final survey and report for contractor assurance that the performance of their operations did not result in any additional material being left in the waterways.

Reference: Water Resource Policies and Authorities "POLICY AND PROCEDURAL GUIDANCE FOR PROCESSING REQUESTS TO ALTER US ARMY CORPS OF ENGINEERS CIVIL WORKS PROJECTS PURSUANT TO 33 USC 408."

1.10.2.1 Detailed Underwater Pre-Construction Obstruction Survey Report

In addition to Underwater Pre-Construction Survey and prior to the installation of the prestressed concrete piles along Pier 14 and the FPU piles for the CEP111 Barge Bumper, the contractor shall employ divers to conduct a complete underwater inspection of the river bottom, probed to a minimum depth of 15 feet for broken piles, timbers, debris, and rubble at the proposed pile locations, including adjacent areas that could affect the installation of those piles.

The contractor shall document and verify the location and condition of all exiting timber piles and identify any additional underwater piling, pile stubs, debris, or unknown materials that may affect the pile installation.

Items found adjacent to these areas, but not affecting the installation of the, shall also be identified in the report, and correlated with other inspections and survey required with this contract.

A written report shall be submitted and include drawings which graphically depict the original timber piles, the piles being provide, and the relationship to any possible obstructions found at or below the mud line during their inspection. The condition of piles reflected on the contract drawings will also be correlated to any pile and pile stud found below the water line. The report shall delineate those items which are required to be removed and those that would not affect the pile installation. The Contracting Officer may then identify which items, not affecting the work, can will be removed.

The contracting Officer's approval is required prior to removal of any additional pile, pile stub, debris, or other underwater obstructions, which are found during this inspection.

An example, for minimum requirements of the graphical depiction survey results, is provided as attachment (1) and the end of this section.

1.10.3 Differing Site Conditions

All discrepancies found with the Topside Existing Condition Survey, the Underwater Pre-Construction Survey, and the Detailed Underwater Pre-Construction Obstruction Survey and the original contract drawings shall be annotated on the contract drawings and clearly define any changes and/or the condition of the timber piles as they relate to their location and classification (existing, damaged, missing). Piles reflected on the contract drawing, but not found during any of the surveys or inspections shall also be documented.

The survey reports shall be submitted to the Contracting Officer for his review and validate quantities. The Government will issue a modification pursuant to "FAR 52.236-2, Changes" and "FAR 52.236-3" as required.

PART 2 PRODUCTS

Not used.

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 and portions of existing structures to

elevations and limits indicated.

b. Demolish or Deconstruct structures in a systematic manner from the top of the structure to elevations identified. Deconstruct concrete and masonry walls in small sections. Remove structures in suitable methods as approved by the Contracting Officer.

c. Locate demolition and deconstruction equipment throughout the structure and remove materials so as to not impose excessive loads to existing structures and pavements.

3.1.2 Existing Timber Fender System

All existing timbers and piles have been treated with creosote, CC, or are dual treated. for bidding and disposal, contractors shall assume all timbers and piles have been dual treated with creosote and CCA and shall be properly disposed of in accordance with all local, state, and federal requirements. Provide protective equipment for personnel handling materials treated with oil-soluble or waterborne wood preservatives.

3.1.2.1 Existing Timber Fender Piles

Salvage timber piles as required for re-use. Completely extract all existing and damaged piles exposed above the waterline in areas indicated on the contract drawings. Piles identified as missing are assumed to be present but are currently broken below the water line. Any portion of existing, damaged, or missing piles and identified in the contract documents shall be completely extracted including any prortion of pile which may break or separate during their extraction. Only portions of piles, that will not affect the work, are completely buried, or with less than 3 feet of exposure from the river bottom may remain at the discretion of the Contracting Officer. Refer to the Bid Documents for estimated bid quantities. Final quantities shall be determined after review of the preconstruction survey and inspection results.

Any additional piles found, as a result of the preconstruction survey, and not previously indicated on the contract drawings as existing, broken or missing, shall be fully extracted as directed by the Contracting Officer.

Properly dispose of all piles and pile stubs not selected for salvage and reuse.

3.1.2.2 Timber Chocks and Wales

3.1.2.2.1 Timber Chocks and Wales to Remain

In areas where the existing timber fender system are identified to be partially demolished for construction of the foam filled fender modules, the remaining end portions of the cut timber chocks and wales shall be securely anchored to the pier as indicated on the contract drawings.

Provide timber blocking with adhesive anchors to secure each end wale section at each foam filled fender module location. For bidding purposes the contractor shall assume that each cut end of the existing fender system shall require this type of repair at each foam filled fender module and include provision of a through bolt to secure the remaining chock portion to the remaining wale section.

Provide bolts with washers under both nut and head. Provide timber

connectors and other metal fastenings of type and size indicated on the drawings. Refer to Specification SECTION 06 13 33 "PIER TIMBERWORK" for threaded fastener, bolt, nuts, and washer material requirements.

3.1.2.2.2 Timber Chocks and Wales

Demolish and remove from government property all chocks and wales as indicated. Existing timber blocking, spacers, rubber elements, and hardware associated with the fender system shall be included in the demolition and shall not be reused.

3.1.3 Concrete Surfaces and Curbing

NOTE: For bidding purposes, a unit priced bid item has been provided for preparation of the surface area behind the fender weldments and ladders. Refer to the Bid Schedule for estimated quantities of the existing surface area that may have to be demolished and repaired.

Upon removal of the timber fender system, the contractor shall identify with spay paint and measurements any area that appears to be questionable as to it's integrity and bring to the attention of the Contracting Officer. The Contracting Officer or his representative shall then inspect these areas and identify which type of repair shall be accomplished at the designated "unit price" item.

a. There are previous shotcrete repairs which will interfere with the proper installation of the new work. The shotcrete shall be assumed to be 0-3 inches thick and reinforced with 2x2 wire mesh. Any voids that may occur from the demolition operation shall be patched with an approved concrete repair material.

b. All deteriorated concrete required to be removed behind the fender weldments shall be demolished and the remaining surface repaired (depth may vary from the base design depth of 2-1/2" up to the entire depth).
c. The existing concrete and shotcrete compressive strengths varies between 2000 to 7000 psi. Cover to existing reinforcing steel is 1-1/2"+/-.

d. All exposed reinforcing steel shall be cleaned of all rust and corrosive products including oil, dirt, concrete fragments, laitance, loose scale, and other corrosive agents of any character that would destroy or inhibit the bond with the new concrete and cleaned by water blasting prior to the placement of the repairs. The Contractor shall take all steps necessary to prevent cutting or otherwise damaging existing reinforcing steel, including any vertical stirrups. Any such reinforcing damaged by the Contractor's operations shall be repaired or replaced at the Contractor's expense.

e. All exposed reinforcing bars shall be inspected. If the bars are deteriorated at any point where less than 75 percent of their original cross section remains, the Contractor shall notify the Contracting Officer for direction.

f. All reinforcing steel free to vibrate or otherwise move excessively shall be secured to adjacent bars or to the deck. Any areas of the prepared surface contaminated by oil or other materials detrimental to good bond as a result of the Contractor's operations shall be removed to such depth as may be required. Concrete clearance on reinforcing bars beyond that which is indicated is not required as long as the

concrete is sound.

3.1.3.1 Concrete Patching

Where removals leave holes and damaged surfaces exposed in the finished work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new work. Finished surfaces of patched area shall be flush with the adjacent existing surface and shall match the existing adjacent surface as closely as possible as to texture and finish. Patching shall be as specified and indicated, and shall be an approved patching material, applied in accordance with the manufacturer's printed instructions.

3.1.4 Utilities and Related Equipment

3.1.4.1 General Requirements

Do not interrupt existing utilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities used by the Government except when approved in writing and then only after temporary utility services have been approved and provided.

3.2 DISPOSITION OF MATERIAL

3.2.1 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.

3.2.2 Salvaged Materials

Remove materials that are indicated to be removed by the Contractor and that are to remain the property of the Government, and deliver to a storage site, as directed within 3 miles of the work site. Remove and transport salvaged items in a manner to prevent damage.

a. All foam filled fenders that are not reused shall be salvaged and remain government property.

b. All timber fender piling not being salvaged for reused shall shall become the property of the Contractor and be properly disposed of by the Contractor.

3.3 CLEANUP

Remove debris and rubbish from basement and similar excavations. Remove and transport the debris in a manner that prevents spillage on adjacent areas. Apply local regulations regarding hauling and disposal.

3.4 DISPOSAL OF REMOVED MATERIALS

3.4.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other unchallengeable materials resulting from removal operations with all applicable federal, state and local regulations as contractually specified. Storage of removed materials on the project site is prohibited.

3.4.2 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property.

3.4.3 Removal from Government Property

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from Government property for legal disposal. Dispose of waste soil as directed.

-- End of Section --

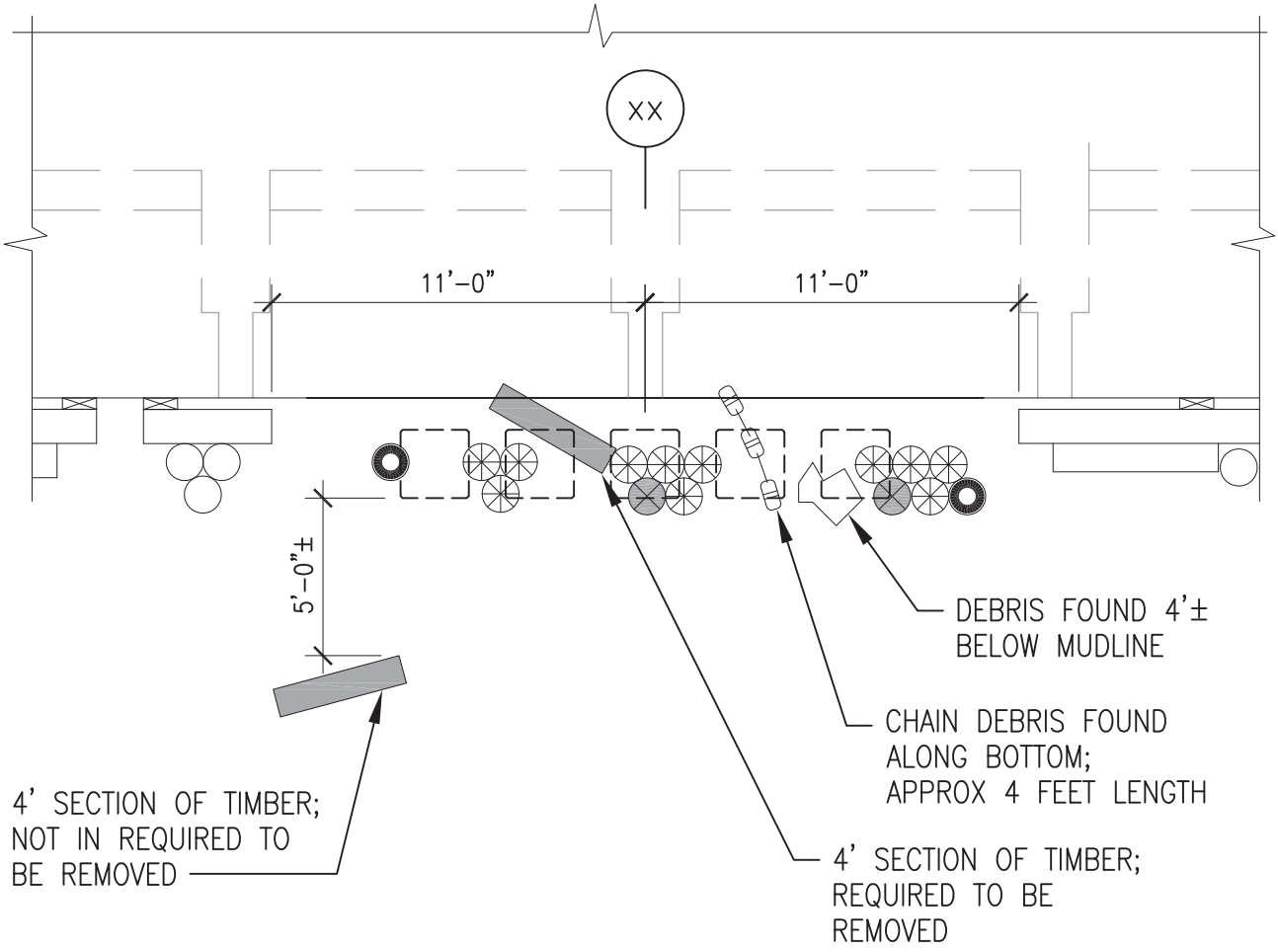
UNDERWATER PRECONSTRUCTION SURVEY

CONTRACT NO: _____ SHEET ___ OF ___

PIER: _____ DATE: _____

BENT NO: _____ DIVER: _____

WATER DEPTH: _____ QC MANAGER: _____



LEGEND

- TIMBER FOUND ON RIVER BOTTOM
- EXISTING TIMBER PILE, IDENTIFIED ON CONTRACT DRAWINGS, TO BE DEMOLISHED
- EXISTING MISSING TIMBER PILE, IDENTIFIED ON CONTRACT DRAWINGS, TO BE DEMOLISHED
- ADDITIONAL BROKEN TIMBER PILE, NOT IDENTIFIED ON CONTRACT DRAWINGS, BUT REQUIRED TO BE DEMOLISHED
- UNKNOWN DEBRIS FOUND BELOW RIVER BOTTOM
- PRESTRESSED FENDER PILE – TO BE PROVIDED

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

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.

ACI INTERNATIONAL (ACI)

ACI/MCP-1	(2010) Manual of Concrete Practice Part 1
ACI/MCP-2	(2010) Manual of Concrete Practice Part 2
ACI/MCP-3	(2010) Manual of Concrete Practice Part 3
ACI/MCP-4	(2010) Manual of Concrete Practice Part 4

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 182	(2005) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 347	(2004; Errata 2008; Errata 2012) Guide to Formwork for Concrete
ACI SP-66	(2004) ACI Detailing Manual

AMERICAN WELDING SOCIETY (AWS)

AWS D1.4/D1.4M	(2005) Structural Welding Code - Reinforcing Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 615/A 615M	(2009b) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM C 143/C 143M	(2009) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C 150/C 150M	(2009) Standard Specification for Portland Cement
ASTM C 156	(2009a) Standard Test Method for Water Retention by Concrete Curing Materials
ASTM C 171	(2007) Standard Specification for Sheet

	Materials for Curing Concrete
ASTM C 172	(2008) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C 173/C 173M	(2009) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 231	(2009a) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 233	(2007) Standard Test Method for Air-Entraining Admixtures for Concrete
ASTM C 295	(2008) Petrographic Examination of Aggregates for Concrete
ASTM C 309	(2007) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 31/C 31M	(2009) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C 33/C 33M	(2008) Standard Specification for Concrete Aggregates
ASTM C 39/C 39M	(2009a) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C 42/C 42M	(2004) Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C 618	(2008a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C 932	(2006) Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering
ASTM C 94/C 94M	(2009a) Standard Specification for Ready-Mixed Concrete
ASTM C 989	(2009a) Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1567	(2013) Standard Test Method for Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM E 329	(2009) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI 10MSP (2001; 27Ed) Manual of Standard Practice

1.2 DEFINITIONS

a. "Cementitious material" as used herein must include all portland cement, pozzolan, fly ash, ground granulated blast-furnace slag.

b. "Exposed to public view" means situated so that it can be seen from eye level from a public location after completion of the building. A public location is accessible to persons not responsible for operation or maintenance of the building.

c. "Chemical admixtures" are materials in the form of powder or fluids that are added to the concrete to give it certain characteristics not obtainable with plain concrete mixes.

d. "Workability (or consistence)" is the ability of a fresh (plastic) concrete mix to fill the form/mould properly with the desired work (vibration) and without reducing the concrete's quality. Workability depends on water content, chemical admixtures, aggregate (shape and size distribution), cementitious content and age (level of hydration).

1.3 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-02 Shop Drawings

Fabrication Drawings for concrete formwork must be submitted by the Contractor in accordance with paragraph entitled, "Shop Drawings," of this section, to include the following:

Reinforcing steel; G

Reproductions of contract drawings are unacceptable.

Provide erection drawings for concrete Formwork that show placement of reinforcement and accessories, with reference to the contract drawings.

SD-03 Product Data

Submit manufacturer's product data.

Portland Cement; G

Ready-Mix Concrete; G

Concrete Curing Materials; G

Reinforcement; G

Concrete Patch Material; G

Bonding Materials; G

SD-05 Design Data

Concrete mix design; G

Thirty days minimum prior to concrete placement, submit a mix design for each strength and type of concrete. Submit a complete list of materials including type; brand; source and amount of cement, fly ash, pozzolans, ground slag, and admixtures; and applicable reference specifications. If source material changes, resubmit mix proportion data using revised source material. Provide only materials that have been proven by trial mix studies to meet the requirements of this specification, unless otherwise approved in writing by the Contracting Officer. Indicate clearly in the submittal where each mix design is used when more than one mix design is submitted. Submit additional data regarding concrete aggregates if the source of aggregate changes. Submit copies of the fly ash and pozzolan test results, in addition. The approval of fly ash, and pozzolan test results must be within 12 months of submittal date. Obtain acknowledgement of receipt prior to concrete placement.

SD-06 Test Reports

Concrete mix design; G

Fly ash

Pozzolan

Ground granulated blast-furnace slag

Aggregates

Compressive strength tests

Slump

Air Entrainment

SD-07 Certificates

SD-08 Manufacturer's Instructions

Fly ash

Ground granulated blast-furnace slag

Welding Procedures must be in accordance with AWS D1.4/D1.4M.

Submit mill certificates for Steel Bar according to the paragraph entitled, "Fabrication," of this section.

Provide certificates for concrete that are in accordance with the paragraph entitled, "Classification and Quality of Concrete,"

of this section. Provide certificates that contain project name and number, date, name of Contractor, name of concrete testing service, source of concrete aggregates, material manufacturer, brand name of manufactured materials, material name, values as specified for each material, and test results. Provide certificates for Welder Qualifications that are in accordance with the paragraph entitled, "Qualifications for Welding Work," of this section.

Welding Procedures

SD-11 Closeout Submittals

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, STORAGE, AND HANDLING

Do not deliver concrete until forms, reinforcement, embedded items, and chamfer strips are in place and ready for concrete placement. ACI/MCP-2 for job site storage of materials. Protect materials from contaminants such as grease, oil, and dirt. Ensure materials can be accurately identified after bundles are broken and tags removed. Do not store concrete curing compounds or sealers with materials that have a high capacity to adsorb volatile organic compound (VOC) emissions. Do not store concrete curing compounds or sealers in occupied spaces.

1.5.1 Reinforcement

Store reinforcement of different sizes and shapes in separate piles or racks raised above the ground to avoid excessive rusting. Protect from contaminants such as grease, oil, and dirt. Ensure bar sizes can be accurately identified after bundles are broken and tags removed.

1.6 QUALITY ASSURANCE

1.6.1 Design Data

1.6.2 Drawings

1.6.2.1 Shop Drawings

Fabrication Drawings.

1.6.2.1.1 Formwork

ACI 347Include design calculations indicating arrangement of forms, sizes 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, pipework, conduit, sleeves, and other embedded items. Furnish drawings and descriptions of shoring and reshoring methods proposed for slabs, beams, and other horizontal concrete members.

1.6.2.1.2 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.

1.6.3 Control Submittals

1.6.3.1 Curing Concrete Elements

Submit proposed materials and methods for curing concrete elements.

1.6.3.2 Material Safety Data Sheets

Submit Material Safety Data Sheets (MSDS) for all materials that are regulated for hazardous health effects. Prominently post the MSDS at the construction site.

1.6.4 Test Reports

1.6.4.1 Concrete Mix Design

Submit copies of laboratory test reports showing that the mix has been successfully tested to produce concrete with the properties specified and that mix must be suitable for the job conditions. Include mill test and all other test for cement, aggregates, and admixtures in the laboratory test reports. Provide maximum nominal aggregate size, gradation analysis, percentage retained and passing sieve, and a graph of percentage retained verses sieve size. Submit test reports along with the concrete mix design. Obtain approval before concrete placement.

1.6.4.2 Fly Ash and Pozzolan

Submit test results in accordance with ASTM C 618. Submit test results performed within 6 months of submittal date. Update this report during construction as necessary to assure that the complementary cementing materials and supplementary cementing materials used on the projects meet the ASTM criteria and the report on file is never older than 6 months.

1.6.4.3 Ground Granulated Blast-Furnace Slag

Submit test results in accordance with ASTM C 989. Submit test results performed within 6 months of submittal date. Submit manufacturer's policy statement on slag use in concrete.

1.6.4.4 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.

1.6.4.5 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. Where there is potential for alkali-silica reaction, provide results of tests conducted in accordance with ASTM C1260 and ASTM C1567. 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.

1.7 QUALIFICATIONS FOR CONCRETE TESTING SERVICE

Perform concrete testing by an approved laboratory and inspection service experienced in sampling and testing concrete. Testing agency must meet the requirements of ASTM E 329.

1.8 QUALIFICATIONS FOR WELDING WORK

Welding procedures must be in accordance with AWS D1.4/D1.4M.

Verify that Welder qualifications are in accordance with AWS D1.4/D1.4M or under an equivalent qualification test approved in advance. Welders are permitted to do only the type of welding for which each is specifically qualified.

1.9 CONCRETE SAMPLING AND TESTING

Testing by the Contractor must include sampling and testing concrete materials proposed for use in the work and testing the design mix for each class of concrete. Perform quality control testing during construction.

Sample and test concrete aggregate materials proposed for use in the work in accordance with ASTM C 33/C 33M.

Sample and test portland cement in accordance with ASTM C 150/C 150M.

Sample and test air-entraining admixtures in accordance with ASTM C 233.

Testing must be performed by a Grade I Testing Technician.

PART 2 PRODUCTS

2.1 CONCRETE

2.1.1 Strength

ACI 201.2R and ACI 211.1.

2.1.2 Contractor-Furnished Mixture Proportions

a. Strength and Mixture Proportions and Water-Cementitious Materials Ratio. Strength requirements shall be based on 28-day compressive

strength determined on 6 by 12 inch cylindrical specimens in accordance with ASTM C 39/C 39M. The specified compressive strength of the concrete (f'c) for each portion of the structure shall meet the requirements in the contract documents.

b. The mixture proportions for marine concrete shall be developed by the Contractor to produce the design strength (f'c) and to provide durability, workability, and mixture consistency to facilitate placement, compaction into the forms and around reinforcement without segregation or bleeding. The requirements for durability consideration specified in Table 1 and subparagraph "g" below shall be incorporated in the mixture proportions.

Table 1 - Concrete Quality Requirements

Zone	Exposure Condition	Maximum W/CM	Minimum 28-day f'c	Maximum 28-day f'c
All concrete	All	0.40	4,000	5,000

c. One mechanism of material deterioration that results in cracking is the formation of expansive compounds formed either by aggregate reactivity to cement alkali or by chemical reactions between elements of seawater and the hydrated cement paste. As such the selection of aggregates (coarse and fine) shall present a low risk to producing expansive by-products due to chemical reactions. Maximum allowable expansion is 0.08 percent at 14 days per ASTM C 1260. If this is not met, then maximum allowable expansion for the proposed concrete mixture/s shall be 0.08 percent at 14 days per ASTM C 1567. All aggregate sources shall be tested. Also, provide documentation that the aggregate has no history of chemical deterioration in concrete. All data shall be no more than 180 days old at the time of submittal.

d. The maximum mass of fly ash, natural pozzolans, or ground granulated blast-furnace slag that is included in the calculation of water-to-cementitious materials ratio shall not exceed the following limits:

(1) Fly ash shall not be used for more than 40 percent by mass of the cementitious material. The fly ash and other pozzolans present in a Type IP or IPM blended cement, ASTM C 595, shall be included in the calculated percentage.

(2) The weight of ground granulated blast-furnace slag conforming to ASTM C 989 shall not exceed 50 percent of the weight of cement. The slag used in manufacture of a Type IS or ISM blended hydraulic cement conforming to ASTM C 595 shall be included in the calculated percentage. Higher percentage of ground granulated blast-furnace slag may be used if tests are made using actual job materials to ascertain the early and later age strengths and durability performance specified, and the use is approved by the Contracting Officer.

(3) The minimum amount of portland cement is 50 percent of the total mass of cementitious material.

e. Air Content. concrete that will be subject to destructive exposure (other than loading and wear in a passive environment)

such as freezing and thawing, severe weathering, or deicing chemicals shall be air entrained and shall conform to the air limits specified in ACI 301.

f. Slump. The concrete mixture shall be proportioned to have, at the point of deposit, a maximum slump of 4 inches as determined by ASTM C 143/C 143M. Where an ASTM C 494, Type F or G admixture is used, the slump after the addition of the admixture shall be no less than6 inches nor greater than 8 inches. Slump tolerances shall comply with the requirements of ACI 117.

2.1.3 Required Average Strength of Concrete

The minimum compressive strength (fcr) of the selected mixture shall equal or exceed the strength required under ACI 301 for laboratory mixture designs. The average compressive strength produced under field tests shall be the minimum compressive strength (fcr) required during construction.

2.2 MATERIALS

2.1.4 Cement

ASTM C 150, Type II, Type I/II and/or ASTM C 595, Type IP(MS) or IS(MS), and ASTM C 1157, Type MS blended cement except as modified herein. The use of Type I cement is not acceptable in a marine environment.

For Type II or blended-hydraulic cement, the tricalcium aluminate (C_3A) content shall not be less than 6 percent to provide protection for the reinforcement and shall not be more than 8 percent to obtain concrete that is resistant to sulfate attack. ACI recommends a maximum cement-alkali content of 0.60 percent, equivalent to Na_2O (sodium oxide) to avoid deterioration caused by ASR.

Cements marked Type I/II may be used provided that they comply with all criteria for ASTM C 150 Type II or blended-hydraulic cements listed above.

Blended cements shall consist of a mixture of ASTM C 150 cement and one of the following materials: ASTM C 618 pozzolan or fly ash, or ASTM C 989 ground granulated blast-furnace slag. Use one manufacturer for each type of cement, ground slag, fly ash, and pozzolan. Provide mill certificates for cementitious materials composition (cements, fly ash, pozzolans, etc.)

2.1.4.1 Fly Ash and Pozzolan

ASTM C 618, Type F Maximum of 1.5% available alkali, a maximum 6% loss on ignition, and a maximum of 8% (up to 10%) if a minimum replacement of 30%). Add with cement. Fly ash certificates shall include test results in accordance with ASTM C 618, including Available Alkalies indicated in the Supplementary Optional Chemical Requirements.

2.1.4.2 Ground Iron Blast-Furnace Slag (GGBFS)

ASTM C 989, Grade 120.

2.1.5 Water

Water shall comply with the requirements of ASTM C 94/C 94M and the chloride and sulfate limits in accordance with ASTM D 512 and ASTM D 516.

Mixing water shall not contain more than 500 parts per million of chlorides as Cl and not more than 100 parts per million of sulfates as SO_4. Water shall be free from injurious amounts of oils, acids, alkalies, salts, and organic materials. Where water from reprocessed concrete is proposed for use in the work, submit results of tests to verify that the treatment has negated adverse effects of deleterious materials.

2.1.6 Aggregates

ASTM C 33, except as modified herein.

a. The combined aggregates in the mixture (coarse, fine, and blending sizes) shall be well graded from the coarsest to the finest with not more than 18 percent nor less than 8 percent, unless otherwise permitted, of the combined aggregate retained on any individual sieve with the exceptions that the No. 50 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 blending sizes where necessary, to provide a well graded combined aggregate. Reports of individual aggregates shall include standard concrete aggregate sieve sizes including 1 1/2 inches, 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, ASTM C 227. Do not provide aggregates that react deleteriously with alkalies in cement. Refer to appendix, paragraph entitled "Test Method C227" of ASTM C 33 for expansion limits. Provide aggregate containing no deleterious material properties as identified by ASTM C 295.

c. Where a size designation is indicated, that designation indicates the nominal maximum size of the coarse aggregate.

d. Fine and coarse aggregates to be used in all concrete shall be evaluated and tested by the Contractor for alkali-aggregate reactivity in accordance with ASTM C 1260. The coarse and fine aggregates shall be evaluated separately, in accordance with ASTM C 1260, and in combination, which match the Contractor's proposed mix design proportioning, utilizing the modified version of ASTM 1260. The modified version of ASTM C 1260 shall utilize the Contractor's proposed low alkali Portland cement and Class "F" fly ash (or GGBFS or a combination of both) for the test proportioning. Test results of the combination shall have a measured expansion of less than 0.08 percent at 16 days. Should the test data indicate an expansion of greater than 0.08%, the aggregate(s) shall be rejected and the Contactor shall submit new aggregate sources for retesting.

e. Where historical data is used, provide aggregates from the same sources having the same size ranges as those used in the concrete represented by historical data. Even when historical data is used, the modified ASTM C1260 shall be completed per subparagraph (d) of this section.

f. Marine aggregate may be used when conforming to ASTM C 33 and if it originates from the up-current side of the land mass and it has been washed by the fresh water so that the total chloride and sulfate content of the concrete mixture does not exceed the limits

defined herein.

2.1.7 Admixtures

a. Provide chemical admixtures that comply with the requirements shown below and in accordance with manufacturer's recommendations, and appropriate for the climatic conditions and the construction needs. Do not use calcium chloride or admixtures containing chlorides from other than impurities from admixture ingredients.

b. Provide maximum concentrations of corrosion-inducing chemicals as shown in Table 2 below. For concrete that may be in contact with prestressing steel tendons, the concentration shall not exceed 60 percent of the limits given in Table 2. For the concentration in grout for prestressing ducts, do not exceed 25 percent of the limits in Table 2.

Table 2 - Limits on Corrosion-Inducing Chemicals

Chemical*	Limits, Percent**	Test Method
Chlorides	0.10	ASTM D 512
Fluorides	0.10	ASTM D 1179
Sulphites	0.13	ASTM D 1339
Nitrates	0.17	ASTM D 3867

* Limits refer to water-soluble chemicals
** Limits are expressed as a percentage of the mass of the total cementitious materials.

c. The total alkali content shall not increase the total sodium-oxide equivalent alkali content of the concrete by more than 0.5 lb/yd3.

2.1.7.1 Air Entraining Admixture

Provide air entraining admixtures conforming to ASTM C 260. Provide the admixture of such a type and dosage that the total air content in the hardened concrete can be readily maintained at 5.5 percent +/- 1.5 percent unless maximum aggregate size is greater than 1 1/2 inches. Then the total air content shall be lowered to 4.0 percent +/- 1.5 percent. Variation outside these ranges shall not be reason to reject the concrete batch in regions not subject to freeze-thaw conditions.

2.1.7.2 Accelerating

ASTM C 494, Type C.

2.1.7.3 Retarding

ASTM C 494, Type B, D, or G.

2.1.7.4 Water Reducing

ASTM C 494, Type A, E, or F.

2.1.7.5 High Range Water Reducer (HRWR)

ASTM C 494, Type F and ASTM C 1017.

2.1.8 Concrete Patch Material

Concrete patch material, for repair of areas resulting from shotcrete removal, shall consist of portland cement, fine and coarse aggregate, water, and polymer. Prepare existing concrete and provide concrete patch material in accordance with manufacturer's recommendations.
ASTM C 109/C 109M Minimum 28-day Compressive Strength 5,000 psi. ASTM C 882 Minimum 28-day Bond Strength 1,800 psi.

2.1.9 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: PS-1, B-B concrete form panels or better. Steel form surfaces shall not contain irregularities, dents, or sags.

2.1.9.1 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 trapped in pockets between the form and the concrete and some of the high water-cementitious materials ratio surface paste. Maximum use is three times. Provide forms with a form treatment to prevent bond of the concrete to the form.

c. As an alternate to using an absorptive wood form contact face as a form liner, use "Zendrain" or an approved equal in strict accordance with the manufacturer's recommendations.

2.1.10 Reinforcement

2.1.10.1 Reinforcing Bars

ACI 301 unless otherwise specified. ASTM A 615/A 615M and ASTM A 617/A 617M with the bars marked A, Grade60; or ASTM A 616/A 616M with the bars marked R, Grade 60.

2.1.10.2 Mechanical Reinforcing Bar Connectors

ACI 301. Provide 125 percent minimum yield strength of the reinforcement bar. Coat connectors in accordance with the same requirements as reinforcing bars.

2.1.10.3 Supports for Reinforcement

Supports include bolsters, chairs, spacers, and other devices necessary for proper spacing, supporting, and fastening reinforcing bars and wire fabric in place.

Provide wire bar type supports conforming to ACI/MCP-3, ACI/MCP-4 and CRSI 10MSP.

Legs of supports in contact with formwork must be hot-dip galvanized, or plastic coated after fabrication, or stainless-steel bar supports.

2.1.10.4 Wire

ASTM A 82 or ASTM A 496.

2.1.11 Materials for Curing Concrete

2.1.11.1 Impervious Sheeting

ASTM C 171; waterproof paper, clear or white polyethylene sheeting, or polyethylene-coated burlap.

2.1.11.2 Pervious Sheeting

AASHTO M 182.

2.1.12 Bonding Compound

ASTM C 881. Provide Type I for bonding hardened concrete to hardened concrete; Type II for bonding freshly mixed concrete to hardened concrete; and Type III as a binder in epoxy mortar or concrete, or for use in bonding skid-resistant materials to hardened concrete. Provide Grade 1 or 2 for horizontal surfaces and Grade 3 for vertical surfaces. Provide Class A if placement temperature is below 40 degrees F; Class B if placement temperature is between 40 and 60 degrees F; or Class C if placement temperature is above 60 degrees F.

2.1.13 Concrete Bonding Agent

Provide aqueous-phase, film-forming, nonoxidizing, freeze and thaw-resistant compound agent suitable for brush or spray application conforming to ASTM C 932.

2.1.14 Ready-Mix Concrete

Provide concrete that meets the requirements of ASTM C 94/C 94M.

Ready-mixed concrete manufacturer must provide duplicate delivery tickets with each load of concrete delivered. Provide delivery tickets with the following information in addition to that required by ASTM C 94/C 94M:

Type and brand cement

Cement content in 95-pound bags per cubic yard of concrete

Maximum size of aggregate

Amount and brand name of admixtures

Total water content expressed by water/cement ratio

2.1.15 Concrete Curing Materials

2.1.15.1 Absorptive Cover

Provide burlap cloth cover for curing concrete made from jute or kenaf, weighing 10 ounces plus or minus 5 percent per square yard when clean and dry, conforming to ASTM C 171, Class 3; or cover may be cotton mats as approved.

2.1.15.2 Moisture-Retaining Cover

Provide waterproof paper cover for curing concrete conforming to ASTM C 171, regular or white, or polyethylene sheeting conforming to ASTM C 171, or polyethylene-coated burlap consisting of a laminate of burlap and a white opaque polyethylene film permanently bonded to the burlap; burlap must conform to ASTM C 171, Class 3, and polyethylene film must conform to ASTM C 171. When tested for water retention in accordance with ASTM C 156, weight of water lost 72 hours after application of moisture retaining covering material must not exceed 0.039 gram per square centimeter of the mortar specimen surface.

2.1.15.3 Membrane-Forming Curing Compound

Provide liquid type compound conforming to ASTM C 309, Type 2, white, pigmented for exterior work.

2.2 Concrete Anchors

Refer to SECTION 05 13 00.21 20 POST INSTALLED CONCRETE ANCHORS for all adhesive and expansion type anchors.

PART 3 EXECUTION

3.1 EXAMINATION

Check field dimensions before beginning installation. If dimensions vary too much from design dimensions for proper installation, notify the Contracting Officer and wait for instructions before beginning installation.

3.2 PREPARATION

Determine quantity of concrete needed and minimize the production of excess concrete. Designate locations or uses for potential excess concrete before the concrete is poured.

3.2.1 General

Surfaces against which concrete is to be placed must be free of debris, loose material, standing water, snow, ice, and other deleterious substances before start of concrete placing.

Remove standing water without washing over freshly deposited concrete. Divert flow of water through side drains provided for such purpose.

3.2.2 Formwork

Complete and approve formwork. Remove debris and foreign material from interior of forms before start of concrete placing.

3.2.3 Edge Forms and Screed Strips for Slabs

Set edge forms or bulkheads and intermediate screed strips for slabs to obtain indicated elevations and contours in finished slab surface and must be strong enough to support vibrating bridge screeds or roller pipe screeds if nature of specified slab finish requires use of such equipment. Align concrete surface to elevation of screed strips by use of strike-off templates or approved compacting-type screeds.

3.2.4 Reinforcement and Other Embedded Items

Secure reinforcement, joint materials, and other embedded materials in position, inspected, and approved before start of concrete placing.

3.3 FORMS

ACI/MCP-2. Provide forms, shoring, and scaffolding for concrete placement. Set forms mortar-tight and true to line and grade. Chamfer above grade exposed joints, edges, and external corners of concrete 0.75 inch unless otherwise indicated. Provide formwork with clean-out openings to permit inspection and removal of debris. Forms submerged in water must be watertight.

3.3.1 General

Construct forms to conform, within the tolerances specified, to shapes dimensions, lines, elevations, and positions of cast-in-place concrete members as indicated. Forms must be supported, braced, and maintained sufficiently rigid to prevent deformation under load.

3.3.2 Design and Construction of Formwork

Provide formwork design and construction that conforms to ACI/MCP-2, Chapter 4.

Provide forms that are tight to prevent leakage of cement paste during concrete placing.

Support form facing materials by structural members spaced close to prevent deflection of form facing material. Fit forms placed in successive units for continuous surfaces to accurate alignment to ensure a smooth completed surface within the tolerances specified. Where necessary to maintain the tolerances specified, such as long spans where immediate supports are not possible, camber formwork for anticipated deflections in formwork due to weight and pressure of fresh concrete and to construction loads.

Chamfer exposed joints, edges, and external corners a minimum of 3/4 inch by moldings placed in corners of column, beam, and wall forms.

Provide shores and struts with a positive means of adjustment capable of taking up formwork settlement during concrete placing operations. Obtain adjustment with wedges or jacks or a combination thereof. When adequate foundations for shores and struts cannot be secured, provide trussed supports.

Provide forms that are readily removable without impact, shock, or damage to concrete.

3.3.3 Coating

Before concrete placement, coat the contact surfaces of forms with a nonstaining mineral oil, nonstaining 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.

3.3.4 Reshoring

Reshore concrete elements where forms are removed prior to the specified time period. Do not permit elements to deflect or accept loads during form stripping or reshoring. Forms on columns, walls, or other load-bearing members may be stripped after 2 days if loads are not applied to the members. After forms are removed, reshore slabs and beams over 10 feet in span and cantilevers over 4 feet for the remainder of the specified time period in accordance with paragraph entitled "Removal of Forms." Perform reshoring operations to prevent subjecting concrete members to overloads, eccentric loading, or reverse bending. Provide reshoring elements with the same load-carrying capabilities as original shoring and spaced similar to original shoring. Firmly secure and brace reshoring elements to provide solid bearing and support.

3.3.5 Reuse

Reuse forms providing the structural integrity of concrete and the aesthetics of exposed concrete are not compromised.

3.3.6 Forms for Standard Rough Form Finish

Give rough form finish concrete formed surfaces that are to be concealed by other construction, unless otherwise specified.

Form facing material for standard rough form finish must be the specified concrete form plywood or other approved form facing material that produces concrete surfaces equivalent in smoothness and appearance to that produced by new concrete form plywood panels.

For concrete surfaces exposed only to the ground, undressed, square-edge, 1-inch nominal thickness lumber may be used. Provide horizontal joints that are level and vertical joints that are plumb.

3.3.7 Forms for Standard Smooth Form Finish

Give smooth form finish concrete formed surfaces that are to be exposed to view or that are to be covered with coating material applied directly to concrete or with covering material bonded to concrete, such as waterproofing, dampproofing, painting, or other similar coating system.

Form facing material for standard smooth finish must be the specified overlaid concrete form plywood or other approved form facing material that is nonreactive with concrete and that produce concrete surfaces equivalent in smoothness and appearance to that produced by new overlaid concrete form plywood panels.

Maximum deflection of form facing material between supports and maximum deflection of form supports such as studs and wales must not exceed 0.0025 times the span.

Provide arrangement of form facing sheets that are orderly and symmetrical, and sheets that are in sizes as large as practical.

Arrange panels to make a symmetrical pattern of joints. Horizontal and vertical joints must be solidly backed and butted tight to prevent leakage and fins.

3.3.8 Form Ties

Provide ties that are factory fabricated metal, adjustable in length, removable or snap-off type that do allow form deflection or do not spall concrete upon removal. Portion of form ties remaining within concrete after removal of exterior parts must be at least 1-1/2 inches back from concrete surface. Provide form ties that are free of devices that leave a hole larger than 7/8 inch or less than 1/2 inch in diameter in concrete surface. Form ties fabricated at the project site or wire ties of any type are not acceptable.

3.3.9 Tolerances for Form Construction

Construct formwork to ensure that after removal of forms and prior to patching and finishing of formed surfaces, provide concrete surfaces in accordance with tolerances specified in ACI/MCP-1 and ACI/MCP-2.

3.3.10 Removal of Forms and Supports

After placing concrete, forms must remain in place for the time periods specified in ACI/MCP-4. Do not remove forms and shores (except those used for slabs on grade and slip forms) until the client determines that the concrete has gained sufficient strength to support its weight and superimposed loads. Base such determination on compliance with one of the following:

a. The plans and specifications stipulate conditions for removal of forms and shores, and such conditions have been followed, or

b. The concrete has been properly tested with an appropriate ASTM standard test method designed to indicate the concrete compressive strength, and the test results indicate that the concrete has gained sufficient strength to support its weight and superimposed loads.

Prevent concrete damage during form removal. Clean all forms immediately after removal.

3.3.10.1 Special Requirements for Reduced Time Period

Forms may be removed earlier than specified if ASTM C 39/C 39M test results of field-cured samples from a representative portion of the structure indicate that the concrete has reached a minimum of 85 percent of the design strength.

3.4 FORMED SURFACES

3.4.1 Preparation of Form Surfaces

Coat contact surfaces of forms with form-coating compound before reinforcement is placed. Provide a commercial formulation form-coating compound that does not bond with, stain, nor adversely affect concrete surfaces and impair subsequent treatment of concrete surfaces that entails bonding or adhesion nor impede wetting of surfaces to be cured with water or curing compounds. Do not allow excess form-coating compound to stand in puddles in the forms nor to come in contact with concrete against which fresh concrete is placed. Make thinning of form-coating compound with thinning agent of the type, in the amount, and under the conditions recommended by form-coating compound manufacturer's printed or written directions.

3.4.2 Tolerances

ACI/MCP-4 and as indicated.

3.4.3 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. Do not use material with raised grain, torn surfaces, worn edges, patches, dents, or other defects which can impair the texture of the concrete surface.

3.5 PLACING REINFORCEMENT AND MISCELLANEOUS MATERIALS

ACI/MCP-2. Provide bars, wire ties, supports, and other devices necessary to install and secure reinforcement. Reinforcement must not have rust, scale, oil, grease, clay, or foreign substances that would reduce the bond. Rusting of reinforcement is a basis of rejection if the effective cross-sectional area or the nominal weight per unit length has been reduced. Remove loose rust prior to placing steel. Tack welding is prohibited.

3.5.1 General

Provide details of reinforcement that are in accordance with ACI/MCP-3 and ACI/MCP-4 and as specified.

3.5.2 Reinforcement Supports

Place reinforcement and secure with galvanized or non corrodible chairs, spacers, or metal hangers. For supporting reinforcement on the ground, use concrete or other non corrodible material, having a compressive strength equal to or greater than the concrete being placed.

3.5.3 Splicing

As indicated. For splices not indicated ACI/MCP-2.

3.5.4 Cover

ACI/MCP-2 for minimum coverage, unless otherwise indicated.

3.5.5 Setting Miscellaneous Material

Place and secure anchors and 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.

3.5.6 Fabrication

Shop fabricate reinforcing bars to conform to shapes and dimensions indicated for reinforcement, and as follows:

Provide fabrication tolerances that are in accordance with ACI/MCP-1, ACI/MCP-2 and ACI/MCP-3.

Provide hooks and bends that are in accordance with ACI/MCP-3 and ACI/MCP-4.

Reinforcement must be bent cold to shapes as indicated. Bending must be done in the shop. Rebending of a reinforcing bar that has been bent incorrectly is not be permitted. Bending must be in accordance with standard approved practice and by approved machine methods.

Tolerance on nominally square-cut, reinforcing bar ends must be in accordance with ACI/MCP-3.

Deliver reinforcing bars bundled, tagged, and marked. Tags must be metal with bar size, length, mark, and other information pressed in by machine. Marks must correspond with those used on the placing drawings.

Do not use reinforcement that has any of the following defects:

a. Bar lengths, depths, and bends beyond specified fabrication tolerances

b. Bends or kinks not indicated on drawings or approved shop drawings

c. Bars with reduced cross-section due to rusting or other cause

Replace defective reinforcement with new reinforcement having required shape, form, and cross-section area.

3.5.7 Placing Reinforcement

Place reinforcement in accordance with ACI/MCP-3 and ACI/MCP-4.

For slabs on grade (over earth or over capillary water barrier) and for footing reinforcement, support bars or welded wire fabric on precast concrete blocks, spaced at intervals required by size of reinforcement, to keep reinforcement the minimum height specified above the underside of slab or footing.

For slabs other than on grade, supports for which any portion is less than 1 inch from concrete surfaces that are exposed to view or to be painted must be of precast concrete units, plastic-coated steel, or stainless steel protected bar supports. Precast concrete units must be wedge shaped, not larger than 3-1/2 by 3-1/2 inches, and of thickness equal to that indicated for concrete protection of reinforcement. Provide precast units that have cast-in galvanized tie wire hooked for anchorage and blend with concrete surfaces after finishing is completed.

Contractor must cooperate with other trades in setting of anchor bolts, inserts, and other embedded items. Where conflicts occur between locating reinforcing and embedded items, the Contractor must notify the Contracting Officer so that conflicts may be reconciled before placing concrete. Anchors and embedded items must be positioned and supported with appropriate accessories.

Provide reinforcement that is supported and secured together to prevent displacement by construction loads or by placing of wet concrete, and as follows:

Provide supports for reinforcing bars that are sufficient in number and sufficiently heavy to carry the reinforcement they support, and in

accordance with ACI/MCP-3, ACI/MCP-4 and CRSI 10MSP. Do not use supports to support runways for concrete conveying equipment and similar construction loads.

Equip supports on ground and similar surfaces with sand-plates.

Support welded wire fabric as required for reinforcing bars.

Secure reinforcements to supports by means of tie wire. Wire must be black, soft iron wire, not less than 16 gage.

With the exception of temperature reinforcement, tied to main steel approximately 24 inches on center, reinforcement must be accurately placed, securely tied at intersections with 18-gage annealed wire, and held in position during placing of concrete by spacers, chairs, or other approved supports. Point wire-tie ends away from the form. Unless otherwise indicated, numbers, type, and spacing of supports must conform to ACI/MCP-3.

Bending of reinforcing bars partially embedded in concrete is permitted only as specified in ACI/MCP-3 and ACI/MCP-4.

3.5.8 Spacing of Reinforcing Bars

Spacing must be as indicated. If not indicated, spacing must be in accordance with the ACI/MCP-3 and ACI/MCP-4.

Reinforcing bars may be relocated to avoid interference with other reinforcement, or with conduit, pipe, or other embedded items. If any reinforcing bar is moved a distance exceeding one bar diameter or specified placing tolerance, resulting rearrangement of reinforcement is subject to approval.

3.5.9 Concrete Protection for Reinforcement

Concrete protection must be in accordance with the ACI/MCP-3 and ACI/MCP-4.

3.5.10 Welding

Welding must be in accordance with AWS D1.4/D1.4M.

3.6 BATCHING, MEASURING, MIXING, AND TRANSPORTING CONCRETE

ASTM C 94/C 94M, and ACI/MCP-2, except as modified herein. Batching equipment must 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 ticket information for each load of ready mix concrete.

3.6.1 Measuring

Make measurements at intervals as specified in paragraphs entitled "Sampling" and "Testing."

3.6.2 Mixing

ASTM C 94/C 94M and ACI/MCP-2. Machine mix concrete. Begin mixing within 30 minutes after the cement has been added to the aggregates. Reduce mixing time and place concrete within 60 minutes if the air temperature is

greater than 84 degrees F except as follows: if set retarding admixture is used and slump requirements can be met, limit for placing concrete may remain at 90 minutes. Additional water may be added, provided that both the specified maximum slump and water-cement ratio are not exceeded. When additional water is added, an additional 30 revolutions of the mixer at mixing speed is required. Dissolve admixtures in the mixing water and mix in the drum to uniformly distribute the admixture throughout the batch.

3.6.3 Transporting

Transport concrete from the mixer to the forms as rapidly as practicable. Prevent segregation or loss of ingredients. Clean transporting equipment thoroughly before each batch. Do not use aluminum pipe or chutes. Remove concrete which has segregated in transporting and dispose of as directed.

3.7 PLACING CONCRETE

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, water, snow, and ice 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.

3.7.1 General Placing Requirements

Deposit concrete continuously or in layers of such thickness that no concrete is placed on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as specified. Perform concrete placing at such a rate that concrete which is being integrated with fresh concrete is still plastic. Deposit concrete as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation.

Concrete to receive other construction must be screeded to proper level to avoid excessive skimming or grouting.

Do not use concrete which becomes nonplastic and unworkable or does not meet quality control limits as specified or has been contaminated by foreign materials. Use of retempered concrete is permitted. Remove rejected concrete from the site.

3.7.2 Vibration

ACI/MCP-2. Furnish a spare, working, vibrator on the job site whenever concrete is placed. Consolidate concrete slabs greater than 4 inches in depth with high frequency mechanical vibrating equipment supplemented by hand spading and tamping. Consolidate concrete slabs 4 inches or less in depth by wood tampers, spading, and settling with a heavy leveling straightedge. Operate internal vibrators with vibratory element submerged in the concrete, with a minimum frequency of not less than 6000 impulses per minute when submerged. Do not use vibrators to transport the concrete in the forms. Insert and withdraw vibrators approximately 20 inches apart. Penetrate the previously placed lift with the vibrator when more

than one lift is required. Place concrete in 20 inch maximum vertical lifts. Use external vibrators on the exterior surface of the forms when internal vibrators do not provide adequate consolidation of the concrete.

3.7.3 Application of Bonding Compound

Provide a bonding compound for all fresh concrete to existing concrete. Surfaces must be roughened and cleaned of laitance, coatings, loose particles, and foreign matter. Roughen surfaces in a manner that exposes the aggregate uniformly and does not leave laitance, loosened particles of aggregate, nor damaged concrete at the surface. Apply a thin coat of compound to dry, clean surfaces. Scrub compound into the surface with a stiff-bristle brush. Place concrete while compound is stringy. Do not permit compound to harden prior to concrete placement. Follow all manufacturer's instructions regarding surface preparation, placement, safety, and health precautions.

3.7.4 Cold Weather

ACI/MCP-2. Do not allow concrete temperature to decrease below 50 degrees F Obtain approval prior to placing concrete when the ambient temperature is below 40 degrees F or when concrete is likely to be subjected to freezing temperatures within 24 hours. Cover concrete and provide sufficient heat to maintain 50 degrees F minimum adjacent to both the formwork and the structure while curing. Limit the rate of cooling to 37 degrees F in any 1 hour and 50 degrees F per 24 hours after heat application.

3.7.5 Hot Weather

Maintain required concrete temperature using Figure 2.1.5 in ACI/MCP-2 to prevent the evaporation rate from exceeding 0.2 pound of water per square foot of exposed concrete per hour. 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. Provide water hoses, pipes, spraying equipment, and water hauling equipment, where job site is remote to water source, to maintain a moist concrete surface throughout the curing period. Provide burlap cover or other suitable, permeable material with fog spray or continuous wetting of the concrete when weather conditions prevent the use of either liquid membrane curing compound or impervious sheets. For vertical surfaces, protect forms from direct sunlight and add water to top of structure once concrete is set.

3.7.6 Follow-up

Check concrete within 24 hours of placement for flatness, levelness, and other specified tolerances. Adjust formwork and placement techniques on subsequent pours to achieve specified tolerances.

3.7.7 Placing Concrete in Forms

Deposit concrete placed in forms in horizontal layers not exceeding 24 inches.

Remove temporary spreaders in forms when concrete placing has reached elevation of spreaders.

Consolidate concrete placed in forms by mechanical vibrating equipment

supplemented by hand spading, rodding, or tamping. Design vibrators to operate with vibratory element submerged in concrete and maintain a speed of not less than 9,000 impulses per minute when submerged in concrete. Provide vibrating equipment adequate in number of units and power of each unit to properly consolidate concrete. Vibration of forms and reinforcement is not be permitted. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced points not farther apart than visible effectiveness of machine. Do not insert vibrator into lower courses of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of concrete mix.

Do not start placing of concrete in supporting elements until concrete previously placed in columns and walls is no longer plastic and has been in place a minimum of 2 hours.

3.8 SURFACE FINISHES

3.8.1 Defects

Repair formed surfaces by removing minor honeycombs, pits greater than 1 square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with nonshrink 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 must not vary more than the allowable tolerances of ACI/MCP-4. Exposed surfaces must be uniform in appearance and finished to a smooth form finish unless otherwise specified.

3.8.2 Not Against Forms (Top of Curbs)

Surfaces not otherwise specified must be finished with wood floats to even surfaces. Finish must match adjacent finishes.

3.8.3 Formed Surfaces

3.8.3.1 Tolerances

ACI/MCP-1 and as indicated.

3.8.3.2 As-Cast Rough Form

Provide for surfaces not exposed to public view. Patch these holes and defects and level abrupt irregularities. Remove or rub off fins and other projections exceeding 0.25 inch in height.

3.8.3.3 Standard Smooth Finish

Finish must be as-cast concrete surface as obtained with form facing material for standard smooth finish. Repair and patch defective areas as specified; and all fins and remove other projections on surface.

3.8.4 Concrete Patch Material Finish

Provide finish that is smooth and flush with adjacent concrete.

3.9 CURING AND PROTECTION

ACI/MCP-2 unless otherwise specified. Begin curing immediately following form removal. Avoid damage to concrete from vibration created by blasting, pile driving, movement of equipment in the vicinity, disturbance of formwork or protruding reinforcement, and any other activity resulting in ground vibrations. Protect concrete from injurious action by sun, rain, flowing water, frost, 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. Do not use membrane-forming compound on surfaces where appearance would be objectionable, on any surface to be painted, where coverings are to be bonded to the concrete, or on concrete to which other concrete is to be bonded. If forms are removed prior to the expiration of the curing period, provide another curing procedure specified herein for the remaining portion of the curing period.

3.9.1 General

Protect freshly placed concrete from premature drying and cold or hot temperature and maintain without drying at a relatively constant temperature for the period of time necessary for hydration of cement and proper hardening of concrete.

Start initial curing as soon as free water has disappeared from surface of concrete after placing and finishing. Keep concrete moist for minimum 72 hours.

Final curing must immediately follow initial curing and before concrete has dried. Continue final curing until cumulative number of hours or fraction thereof (not necessarily consecutive) during which temperature of air in contact with the concrete is above 50 degrees F has totaled 168 hours. Alternatively, if tests are made of cylinders kept adjacent to the structure and cured by the same methods, final curing may be terminated when the average compressive strength has reached 70 percent of the 28-day design compressive strength. Prevent rapid drying at end of final curing period.

3.9.2 Moist Curing

Remove water without erosion or damage to the structure. Prevent water run-off.

3.9.2.1 Pervious Sheeting

Completely cover surface and edges of the concrete with two thicknesses of wet sheeting. Overlap sheeting 6 inches over adjacent sheeting. Provide sheeting that is at least as long as the width of the surface to be cured. During application, do not drag the sheeting over the finished concrete nor over sheeting already placed. Wet sheeting thoroughly and keep continuously wet throughout the curing period.

3.9.2.2 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 columns, walls, and other vertical structural elements from the top down with impervious sheeting; overlap and continuously tape sheeting joints; and introduce sufficient water to soak the entire surface prior to completely enclosing.

3.9.3 Liquid Membrane-Forming Curing Compound

Seal or cover joint openings prior to application of curing compound. Prevent curing compound from entering the joint. Apply in accordance with the recommendations of the manufacturer immediately after any water sheen which may develop after finishing has disappeared from the concrete surface. Provide and maintain compound on the concrete surface throughout the curing period. Do not use this method of curing where the use of Figure 2.1.5 in ACI/MCP-2 indicates that hot weather conditions cause an evaporation rate exceeding 0.2 pound of water per square foot per hour.

3.9.3.1 Application

Unless the manufacturer recommends otherwise, apply compound immediately after the surface loses its water sheen and has a dull appearance, and before joints are sawed. Mechanically agitate curing compound thoroughly during use. Use approved power-spraying equipment to uniformly apply two coats of compound in a continuous operation. The total coverage for the two coats must be 200 square feet maximum per gallon of undiluted compound unless otherwise recommended by the manufacturer's written instructions. The compound must form a uniform, continuous, coherent film that does not check, crack, or peel. Immediately apply an additional coat of compound to areas where the film is defective. Re-spray concrete surfaces subjected to rainfall within 3 hours after the curing compound application.

3.9.4 Curing Periods

ACI/MCP-2 except 21 days for concrete that is in full-time or intermittent contact with seawater or salt spray. 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 are subject to approval by the Contracting Officer.

3.9.5 Curing Methods

Accomplish curing by moist curing, by moisture-retaining cover curing, by membrane curing, and by combinations thereof, as specified.

Moist curing:

Accomplish moisture curing by covering concrete surface with specified absorptive cover for curing concrete saturated with water and keeping absorptive cover wet by water spraying or intermittent hosing. Place absorptive cover to provide coverage of concrete surfaces and edges with a slight overlap over adjacent absorptive covers.

Moisture-cover curing:

Accomplish moisture-retaining cover curing by covering concrete surfaces with specified moisture-retaining cover for curing concrete. Place cover directly on concrete in widest practical width, with sides and

ends lapped at least 3 inches. Weight cover to prevent displacement; immediately repair tears or holes appearing during curing period by patching with pressure-sensitive, waterproof tape or other approved method.

Membrane curing:

Accomplish membrane curing by applying specified membrane-forming curing compound to damp concrete surfaces as soon as moisture film has disappeared. Apply curing compound uniformly in a two-coat operation by power-spraying equipment using a spray nozzle equipped with a wind guard. Apply second coat in a direction at right angles to direction of first coat. Total coverage for two coats must be not more than 200 square feet per gallon of curing compound. Respray concrete surfaces which are subjected to heavy rainfall within 3 hours after curing compound has been applied by method and at rate specified. Maintain continuity of coating for entire curing period and immediately repair damage to coating during this period.

3.9.6 Curing Formed Surfaces

Accomplish curing of formed surfaces, including undersurfaces of girders, beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed before end of curing period, accomplish final curing of formed surfaces by any of the curing methods specified above, as applicable.

3.9.7 Temperature of Concrete During Curing

When temperature of atmosphere is 41 degrees F and below, maintain temperature of concrete at not less than 55 degrees F throughout concrete curing period or 45 degrees F when the curing period is measured by maturity. When necessary, make arrangements before start of concrete placing for heating, covering, insulation, or housing as required to maintain specified temperature and moisture conditions for concrete during curing period.

When the temperature of atmosphere is 80 degrees F and above or during other climatic conditions which cause too rapid drying of concrete, make arrangements before start of concrete placing for installation of wind breaks, of shading, and for fog spraying, wet sprinkling, or moisture-retaining covering of light color as required to protect concrete during curing period.

Changes in temperature of concrete must be uniform and not exceed 37 degrees F in any 1 hour nor 80 degrees F in any 24-hour period.

3.9.8 Protection from Mechanical Injury

During curing period, protect concrete from damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibration and from damage caused by rain or running water.

3.9.9 Protection After Curing

Protect finished concrete surfaces from damage by construction operations.

3.10 FIELD QUALITY CONTROL

3.10.1 Sampling

ASTM C 172. Collect samples of fresh concrete to perform tests specified. ASTM C 31/C 31M for making test specimens.

3.10.2 Testing

3.10.2.1 Slump Tests

ASTM C 143/C 143M. Take concrete samples during concrete placement. The maximum slump may be increased as specified with the addition of an approved admixture provided that the water-cement ratio is not exceeded. Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 20 cubic yards (maximum) of concrete.

3.10.2.2 Temperature Tests

Test the concrete delivered and the concrete in the forms. Perform tests in hot or cold weather conditions (below 50 degrees F and above 80 degrees F) for each batch (minimum) or every 20 cubic yards (maximum) of concrete, until the specified temperature is obtained, and whenever test cylinders and slump tests are made.

3.10.2.3 Compressive Strength Tests

ASTM C 39/C 39M. Make five test cylinders for each set of tests in accordance with ASTM C 31/C 31M. Take precautions to prevent evaporation and loss of water from the specimen. Test two cylinders at 7 days, two cylinders at 28 days, and hold one cylinder in reserve. Take samples for strength tests of each mix design of concrete placed each day not less than once a day, nor less than once for each 160 cubic yards of concrete. For the entire project, take no less than five sets of samples and perform strength tests for each mix design of concrete placed. Each strength test result must be the average of two cylinders from the same concrete sample tested at 28 days. If the average of any three consecutive strength test results is less than f'c or if any strength test result falls below f'c by more than 450 psi, take a minimum of three ASTM C 42/C 42M core samples from the in-place work represented by the low test cylinder results and test. Concrete represented by core test is considered structurally adequate if the average of three cores is equal to at least 85 percent of f'c and if no single core is less than 75 percent of f'c. Retest locations represented by erratic core strengths. Remove concrete not meeting strength criteria and provide new acceptable concrete. Repair core holes with nonshrink grout. Match color and finish of adjacent concrete.

3.10.2.4 Air Content

ASTM C 173/C 173M or ASTM C 231 for normal weight concrete. Test air-entrained concrete for air content at the same frequency as specified for slump tests.

3.10.2.5 Strength of Concrete Structure

Compliance with the following is considered deficient if it fails to meet the requirements which control strength of structure in place, including following conditions:

Failure to meet compressive strength tests as evaluated

Reinforcement not conforming to requirements specified

Concrete which differs from required dimensions or location in such a manner as to reduce strength

Concrete curing and protection of concrete against extremes of temperature during curing, not conforming to requirements specified

Concrete subjected to damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibration

Poor workmanship likely to result in deficient strength

3.10.2.6 Testing Concrete Structure for Strength

When there is evidence that strength of concrete structure in place does not meet specification requirements, make cores drilled from hardened concrete for compressive strength determination in accordance with ASTM C 42/C 42M, and as follows:

Take at least three representative cores from each member or area of concrete-in-place that is considered potentially deficient. Location of cores will be determined by the Contracting Officer.

Test cores after moisture conditioning in accordance with ASTM C 42/C 42M if concrete they represent is more than superficially wet under service.

Air dry cores, (60 to 80 degrees F with relative humidity less than 60 percent) for 7 days before test and test dry if concrete they represent is dry under service conditions.

Strength of cores from each member or area are considered satisfactory if their average is equal to or greater than 85 percent of the 28-day design compressive strength of the class of concrete.

Core specimens will be taken and tested by the Government. If the results of core-boring tests indicate that the concrete as placed does not conform to the drawings and specification, the cost of such tests and restoration required must be borne by the Contractor.

Fill core holes solid with patching mortar and finished to match adjacent concrete surfaces.

Correct concrete work that is found inadequate by core tests in a manner approved by the Contracting Officer.

3.11 INSTALLATION OF ANCHORAGE DEVICES

3.11.1 General

Anchorage devices and embedded items required for other work that is attached to, or supported by, set and build in cast-in-place concrete as part of the work of this section, using setting drawings, instructions, and directions for work to be attached thereto.

3.11.2 Placing Anchorage Devices

Anchorage devices and embedded items must be positioned accurately and supported against displacement. Fill openings in anchorage devices such as slots and threaded holes with an approved, removable material to prevent entry of concrete into openings.

-- End of Section --

SECTION 05 12 00

STRUCTURAL STEEL

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	(2005) Steel Construction Manual
AISC 326	(2009) Detailing for Steel Construction
ANSI/AISC 341	(2005; Suppl No. 1 2005) Seismic Provisions for Structural Steel Buildings
ANSI/AISC 360	(2005) Specification for Structural Steel Buildings

AMERICAN WELDING SOCIETY (AWS)

AWS A2.4	(2007) Standard Symbols for Welding, Brazing and Nondestructive Examination
AWS D1.1/D1.1M	(2010) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M	(2009) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 143/A 143M	(2007) Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
ASTM A153/A153M	(2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 500/A 500M	(2009) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 53/A 53M	(2007) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM C 1107/C 1107M	(2008) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

ASTM C 827	(2001a; R 2005) Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PA 2	(2012) Measurement of Dry Coating Thickness With Magnetic Gages
SSPC SP 6/NACE No.3	(2007) Commercial Blast Cleaning

1.2 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 shall be provided in accordance with ANSI/AISC 360 and ANSI/AISC 341 except as modified in this contract.

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-02 Shop Drawings

Fabrication drawings including description of connections; G

SD-03 Product Data

Welding electrodes and rods

Non-Shrink Grout; G

SD-07 Certificates

Steel

Galvanizing; G

Welding procedures and qualifications; G

Galvanizing Repair Thickness Results; G

1.4 QUALITY ASSURANCE

1.4.1 Drawing Requirements

Submit fabrication drawings for approval prior to fabrication. Prepare in accordance with AISC 326 and AISC 325. Fabrication drawings shall not be reproductions of contract drawings. 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, if required, shall be designed and sealed by a registered professional engineer and submitted for record purposes, with calculations, as part of the drawings. Member substitutions of details shown on the contract drawings shall be clearly highlighted on the fabrication drawings. Sign and seal fabrication drawings by a professional engineer registered for any member substitution changes, deviations, or variance requests. Explain the reasons for any deviations from the contract drawings.

1.4.2 Certifications

1.4.2.1 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 shall 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 STEEL

2.1.1 Structural Steel

ASTM A 36/A 36M.

2.1.2 Structural Steel Tubing

ASTM A 500/A 500M, Grade B.

2.1.3 Steel Pipe

ASTM A 53/A 53M, Type E or S, Grade B, weight class STD (Standard) and X strong.

2.2 STRUCTURAL STEEL ACCESSORIES

2.2.1 Welding Electrodes and Rods

AWS D1.1/D1.1M.

2.2.2 Non-Shrink Grout

ASTM C 1107/C 1107M, with no ASTM C 827 shrinkage. Grout shall be nonmetallic.

2.2.3 Fasteners

Refer to Specification SECTION 06 13 33 "PIER TIMBERWORK" for threaded fastener, bolt, nuts, and washer material requirements.

2.2.4 Concrete Anchors

Refer to Specification SECTION 05 13 00.20 21 "POST-INSTALLED CONCRETE ANCHORS" for concrete adhesive anchor material requirements.t

2.3 GALVANIZING

All steel material shall be hot-dipped galvanized in conformance to ASTM A 123/A 123M or ASTM A 153/A 153M after fabrication.

2.4 FABRICATION

2.4.1 Cleaning

SSPC SP 6/NACE No.3, Maintain steel surfaces free from rust, dirt, oil, grease, and other contaminants through final assembly.

2.5 DRAINAGE HOLES

Drain holes shall be drilled to eliminate water traps and allow for interior galvanization of tubular members. Hole diameters and location shall be as indicated on the detail drawings. In the event the galvanizer may require additional drainage, the maximum dimension in any direction for an opening or drain hole shall be 1" with locations requiring prior approval of the Contracting Officer. Hole or opening and their location shall not affect the structural integrity of the fabrication.

PART 3 EXECUTION

3.1 FABRICATION

Fabrication shall be in accordance with the applicable provisions of AISC 325. Fabrication and assembly shall be done in the shop to the greatest extent possible. Punch, subpunch and ream, or drill bolt and pin holes perpendicular to the surface of the member. Splices not indicated require the approval of the Contracting Officer. Galvanize after completion of the fabrication.

3.2 ERECTION

Erection of shall be in accordance with the applicable provisions of AISC 325.

3.3 STORAGE

Material shall be stored out of contact with the ground in such manner and location as will minimize deterioration.

3.4 CONNECTIONS

3.4.1 Concrete Anchors

Anchors shall be tightened to a "snug tight" fit. "Snug tight" is the tightness that exists when plies in a joint are in firm contact. If firm contact of joint plies cannot be obtained with the full effort of a man using a spud wrench, contact the Contracting Officer for further instructions. Do not tighten anchor bolts with impact torque wrenches. Holes shall not be cut or enlarged by burning. Bolts, nuts, and washers shall be clean of dirt and rust, and lubricated immediately prior to

installation.

3.4.2 Common Grade Bolts

ASTM A 307 bolts shall be tightened to a "snug tight" fit. "Snug tight" is the tightness that exists when plies in a joint are in firm contact. If firm contact of joint plies cannot be obtained with a few impacts of an impact wrench, or the full effort of a man using a spud wrench, contact the Contracting Officer for further instructions.

3.5 GAS CUTTING

Use of gas-cutting torch in the field for correcting fabrication errors shall not be permitted.

3.6 WELDING

Perform welding, welding inspection, and corrective welding, in accordance with AWS D1.1/D1.1M. Use continuous welds on all exposed connections. Grind visible welds smooth in the finished installation.

Provide qualified welders, welding operators, and tackers.

The Contractor shall 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 shall be submitted for approval.

3.7 GALVANIZING REPAIR

3.7.1 Limitiations for Field Repairs

Repair of galvanized material shall be defined by the size size of the area outlined in the product galvanizing specifications (ASTM A 123/A 123M and ASTM A153/A153M). The allowable surface area for repair shall be not more than ½ of 1% of the accessible surface area to be coated on that article, or 36 in^2 per ton of piece-weight, whichever is less.

3.7.2 Repair of Zinc-Coated Surfaces

Prepare, clean, and repair damaged surfaces as a result of handling, transporting, or bolting with a galvanized repair method specifically designed for the repair and conforming to ASTM A780/A780M. Touch-up materials are required to meet a coating thickness of at least 2.0 mils (50.8 µm) for one application, and the final coating thickness of the repair area is dictated by the material used to do the repair.

Field cutting or welding repairs shall require prior approval of the Contracting Officer and may require the component to be regalvanized at the contractors expense.

Repair paints and limits of acceptiable repair shall be identified by the galvanizer. The coating thickness for the use of a "paint" repair shall be 50% more than the surrounding coating thickness, but not greater than 4.0 mils (100 µm). Thickness measurements with either a magnetic, electromagnetic, or eddy-current gage to ensure that the applied coating is as specified in accordance with SSPC PA 2 shall be provided for each repair.

"Zinc-Based Solder" repair coating thickness shall meet the specification requirement for the material category of the part with a maximum thickness of 4 mils (100 µm). inc-based solder products closely match the surrounding zinc and blend in well with the existing coating appearance.

"Zinc Spray" repairs shall have a zinc coating thickness at least as thick as that required in ASTM A 123/A 123M for the material category.

Measure the repair thinckness for "Zinc-Based Solder" and "Zinc Spray" as prescribed by one of the non destructive methods identified in ASTM A 123/A 123M.

Submit all Galvanizing Repair Thickness Results to the Contracting Officer for review.

3.8 FIELD QUALITY CONTROL

Perform field tests, and provide labor, equipment, and incidentals required for testing. The Contracting Officer shall be notified in writing of defective welds, bolts, nuts, and washers within 7 working days of the date of weld inspection.

3.8.1 Welds

3.8.1.1 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. Welding inspectors shall visually inspect and mark welds, including fillet weld end returns.

3.8.2 Testing for Embrittlement

ASTM A 143/A 143M for steel products hot-dip galvanized after fabrication.

-- End of Section --

SECTION 05 13 00.20 21

POST-INSTALLED CONCRETE ANCHORS

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 basic designation only.

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 355.2	(2007) Qualification of Post-Installed Mechanical Anchors in Concrete and Commentary
ACI 355.4	(2011) Qualification of Post-Installed Adhesive Anchors in Concrete (ACI 355.4) and Commentary

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M	(2013) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153/A 153M	(2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 240/A 240M	(2010b) Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A 563	(2007a) Standard Specification for Carbon and Alloy Steel Nuts
ASTM C882/C882M	(2013a) Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear
ASTM D638	(2010) Standard Test Method for Tensile Properties of Plastics
ASTM F 1554	(2007a)Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
ASTM F 2329	(2013) Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners

ASTM F 593	(2002; R 2008) Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM F 594	(2009) Standard Specification for Stainless Steel Nuts
ASTM F 844	(2007a) Washers, Steel, Plain (Flat), Unhardened for General Use

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC	(2012) International Building Code

U.S. ARMY CORPS OF ENGINEERS (USACE)

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

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

Installer Qualifications; G
Quality Control Inspector Qualifications; G

SD-03 Product Data

Mechanical Anchors; G
Adhesive Anchors in Concrete; G
Non-Shrink, Non-Metallic Grout; G

SD-06 Test Reports

Quality Control Inspector Report; G

SD-07 Certificates

Post-Installed Anchors; G

SD-08 Manufacturer's Instructions

Post-Installed Anchors; G

Non-Shrink, Non-Metallic Grout; G

Manufacturer's Material Safety Data Sheets

1.3 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 and other potentially hazardous materials.

1.3.1 Qualifications

The submittals shall identify individuals who will be working on this contract and their relevant experience and training. Do not make changes in approved personnel without prior approval of the Contracting Officer.

1.3.1.1 Installer Qualifications

Each worker engaged in the installation of post-installed anchors shall have satisfactorily completed an instruction program through the manufacturer or manufacturer's representative for all anchoring products they will install. Training shall consist of a review and performance test of the complete installation process, to include but not limited to:

(1) Hole drilling procedure
(2) Hole preparation & cleaning technique
(3) Adhesive injection technique & dispenser training / maintenance
(4) Anchor/threaded rod preparation and installation
(5) Rebar dowel preparation and installation
(6) Proof loading/torqueing
(7) Installation in horizontal and upward orientations

Submit certification for each worker showing that they have completed the above training within 12 months prior to onsite work. Certification shall include manufacturer's name, instructor's name and qualifications, trainee's name, list of instruction received, confirmation of successful performance tests and date.

1.3.1.2 Quality Control Inspector Qualifications

The Contractor shall retain the services of a third party special inspector independent of the installing contractor and manufacturer. The individuals who shall perform special inspections for post installed anchors shall meet all Installer Qualification requirements and shall have a minimum of 1 year of experience as a quality control inspector on previous projects involving similar scope of work. Submit resumes, pertinent information, past experience, and training.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Packing, Shipping, Handling, and Unloading

Deliver products to job site in manufacturer's or distributor's original packaging undamaged, complete with installation instructions. Inspect materials delivered to site for damage. Unload and store with minimal handling.

1.4.2 Storage

Protect, store, and handle materials in accordance with manufacturer's recommendations to prevent damage or deterioration. Do not allow chemical materials to freeze. Remove materials that have not be stored in accordance with the manufacturer's recommendations, including expired materials, from the job site.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Post-Installed Anchors

Provide anchors of the type, embedment, and diameter indicated on contract drawings. Minimum concrete spacing and edge distances shall be as shown on contract drawings. Design values listed shall be as tested according to ASTM E488/E488M. Minimum allowable tension and shear values shall be as indicated on contract drawings.

2.1.1.1 Certification

Submit product information with recommended design values and physical characteristics for each type anchor shown on the drawings.

Provide certified test reports showing compliance with specified performance characteristics and physical properties. Anchors shall have one of the following certifications:

(1) Evaluation Report indicating conformance with ACI 355.2 or 355.4, as applicable
(2) ICC ES Evaluation Report indicating conformance with current applicable ICC ES Acceptance Criteria

2.1.1.2 Mechanical and Adhesive Anchors

Anchors shall have been tested and qualified for performance in cracked and uncracked concrete in accordance with ACI 355.2.

Fastener Materials

2.1.1.2.1 Carbon Steel

Anchor bolts and rods shall meet the requirements of ASTM F 1554, threaded rods ASTM F 2329 Grade 36, nuts shall meet the requirements of ASTM A 563, and washers shall meet the requirements of ASTM F 844. ASTM A 563 for tapping galvanized nuts. Provide bolts with washers under both nut and head. Hot dip galvanize all materials.

2.1.1.2.1.1 Galvanization

Fasteners shall all be Hot-dipped galvanized in accordance with ASTM F 2329 and washers shall be Hot Dipped Galvanized in accordance with ASTM A 123/A 123M or ASTM A 153/A 153M.

2.1.1.2.2 Stainless Steel Anchors

Provide bolts and threaded rods conforming to ASTM F 593, Alloy Group 2 (316L). Nuts and coupler nuts shall conform to ASTM F 594, Alloy Group 2 (316L). Plate or cut washers shall conform to ASTM A 240/A 240M, Grade 316L. Provide bolts with washers under both nut and head. Provide of type and size indicated on the drawings.

2.1.1.3 Adhesive Anchors in Concrete

Provide a high-strength two component epoxy adhesive anchoring gel meeting ASTM C 881, Types I, II, IV, and V, Grade 3, Classes B and C. A two

component, 100% solids (containing no solvents), non-sag paste and insensitive to moisture non-soluble in water.

1,800 psi minimum bond Strength of fully cured adhesive when tested in accordance with ASTM C882/C882M at 23^0F, 40^0F and 60^0F. 6,300 psi minimum tensile strength at 7 days when tested in accordance with ASTM D638.

ASTM D 695 minimum compressive strength: 10,000 psi.

For extreme cold weather provide a two-component acrylic based system meet the requirements of ASTM C-881 for Type I and IV, Grade 3, Class A, B and C and shall develop a minimum 10,000 psi compressive yield strength after 7 day cure. Core temperatured of concrete shall me monitored and minumum core temperaturer shall not fall below 25 degrees (F) until epoxy has fully cured.

Anchors shall have been tested and qualified for performance in cracked and uncracked concrete, horizontal and overhead applications, and long term creep in accordance with ACI 355.4.

Anchors shall be suitible and tested for installation and performance in submerged conditions.

2.2 EQUIPMENT

Assemble at the site of the work, sufficient equipment that is dependable, appropriate and adequate to accomplish the work specified. Maintain the equipment in good working condition.

PART 3 EXECUTION

3.1 ANCHORING AND REINFORCING

Anchor capacity is dependent upon spacing between adjacent anchors and proximity of anchors to edges of concrete. Install anchors in accordance with the spacing and edge clearances indicated on the drawings. Anchor capacity is also highly dependent on proper installation. Follow all manufacturer's recommended installation instructions.

3.1.1 Drilling and Installing Anchors and Dowels

Drill holes for dowels and anchors using drilling equipment and bits suitable for the intended purpose, in accordance with Manufacturer's published installation instructions. Diameter of holes shall be as recommended by the anchor manufacturer. Unless otherwise shown on the Drawings, all holes shall be drilled perpendicular to the concrete surface. Unless otherwise specified, do not drill holes in concrete until it has achieved it's full design strength.

Clean holes, place grout, and install dowels and anchors in accordance with anchor manufacturer's recommendations. Remove excess grout after the dowel or anchor has been set in place. Remove spills on adjacent surfaces. Protect threads from damage during anchor installation. Ensure proper embedment and placement in accordance with contract documents and all other work. Do not disturb or load anchors before manufacturer specified cure time has elapsed.

Adhesives must be stored at temperatures prescribed by the manufacturer and must not be used beyond the expiration date.

3.1.2 Drilling and Installing

Drill holes for dowels and anchors using drilling equipment and bits suitable for the intended purpose, in accordance with Manufacturer's published installation instructions. Diameter of holes shall be as recommended by the anchor manufacturer. Unless otherwise shown on the Drawings, all holes shall be drilled perpendicular to the concrete surface. Unless otherwise specified, do not drill holes in concrete until it has achieved it's full design strength.

Clean holes, install and set dowels and anchors in place in accordance with the manufacturer's recommendations. Protect threads from damage during anchor installation. Ensure proper embedment and placement in accordance with contract documents and all other work.

3.1.3 Unused or Repairs to Drilled Holes

Any holes made for anchors and dowels that are not used shall be filled with non-shrink, non metallic grout suitable for the orientation and size of hole and have a minimum compressive strength of 4000 psi. Repair must completely fill hole and be flush with existing concrete or masonry. Place in accordance with manufacturer's recommended instructions. Final anchor positions shall not be within 1 inch of repair patches.

3.2 EMBEDDED ITEMS

Existing reinforcing bars or other embedded items in the concrete structure may conflict with specific anchor locations. Existing reinforcing and embedded items shall not be damaged during installation of post installed anchors.

The contractor shall review the existing structural drawings and shall undertake to locate the position of the reinforcing bars at the locations of the concrete anchors by non-destructive, X-Ray, or other means. Structural integrity of existing concrete shall not be impaired by investigating method.

3.3 TESTS AND INSPECTIONS

3.3.1 Mechanical Anchors and Adhesive Dowels and Anchors

For mechanical anchors and adhesive anchors, periodic special inspections are required in accordance with ICC IBC. Where adhesive anchors are installed in horizontal or upward orientations under sustained tension loads, continuous special inspection is required in accordance with ICC IBC. Special inspector shall make certain that Manufacturer's printed installation instructions and contract document requirements are met.

The Quality Control Special Inspector shall test the first three anchors of each type and a minimum of 10% of randomly selected anchors. Tension testing shall be performed in accordance with ASTM E488/E488M. Use incremental loading for tensile test. Maintain proof load for a minimum of 10 seconds. Consider anchors to have failed if displacement exceeds D/10, where D is the nominal anchor diameter or if any of the failure modes of paragraph 12.2 occur.

Adhesive anchors and capsule anchors shall not be torque tested. For mechanical anchors, torque shall be applied with a calibrated torque wrench.

Proof loads shall be the minimum of the value shown on the Drawings or in the table below:

ANCHOR	EMBEDMENT	TENSION PROOF LOAD
	(inches)	(pounds)
Adhesive & Wedge anchors, 3/4" diameter	6"-8"	3,500
Adhesive anchor, 3/4" diameter threaded rod	8"-10"	3,500
Adhesive anchor, 1"	8"-10"	6,000

3.3.2 Action Required

If any of the tested anchors fail to achieve the specified torque or proof load within the limits of the contract documents, test a minimum of two adjacent anchors or dowels for each anchor or dowel that fails. Additional tests and repairs shall be at no cost to the government.

Remove and replace misplaced or malfunctioning anchors. Fill empty anchor holes and patch failed anchor locations in accordance with section titled "Unused or Repairs to Drilled Holes". Anchors that fail to meet proof load or installation requirements shall be regarded as malfunctioning. Do not reuse holes unless specifically allowed by manufacturer's published instructions and approved by the quality control special inspector. Proof load test the replacement anchor.

3.3.3 Quality Control Inspector Report

Report the results of all tests and inspections conducted at the project site. Report shall be submitted at least weekly. Submit report as an electronic PDF file to the Contracting Officer for review by the Engineer of Record. Report shall include that the work covered by the report has been performed and that the materials used and the installation procedures used conform with the approved contract documents and the manufacturer's published installation instructions. Test results shall indicate exact location of anchor tested, outcome of test, inspector's name, and date of test. Where failures occur, report shall include reason for failure and repair steps taken.

3.4 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.

-- End of Section --

SECTION 05 51 33.00 21

STAINLESS STEEL LADDERS

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 D1.6/D1.6M	(2007) Structural Welding Code - Stainless Steel

ASTM INTERNATIONAL (ASTM)

ASTM E 140	(2007) Standard Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, and Scleroscope Hardness
ASTM A276	(2010) Standard Specification for Stainless Steel Bars and Shapes
ASTM A312/A312M	(2012) Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
ASTM A380	(2006) Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
ASTM C 633	(2008) Standard Test Method for Adhesion or Cohesion Strength of Thermal Spray Coatings
ASTM D2047	(2011) Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine
ASTM E 384	(2011) Standard Test Method for Knoop and Vickers Hardness of Materials
ASTM F1166	(2007) Standard Practice for Human Engineering Design for Marine Systems, Equipment, and Facilities

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

29 CFR 1910.27	Fixed Ladders

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. 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

Ladders, installation drawings; G

SD-03 Product Data

Ladder Members; G

Lag Bolts and End Threaded Rods; G

Welding electrodes and rods; G

SD-06 Test Reports

SD-07 Certificates

Stainless Steel Members; G

Welding procedures and qualifications; G

Welding Inspection Report; G

1.3 QUALIFICATION OF WELDERS

Qualify welders in accordance with AWS D1.6/D1.6M. Use procedures, materials, and equipment of the type required for the work.

1.3.1 Welding Procedures and Qualifications

Prior to commencing fabrication, 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 in accordance with the requirements of AWS D1.6/D1.6M, Section 4.

If the qualification date of the welding operator is more than one-year old, the welding operator's qualification certificate shall 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.

The Contractor shall 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 shall be submitted for approval.

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 Stainless Steel Ladder Members

2.1.1 Shapes, Plates, and Bars

ASTM A276, type 316L.

2.1.2 Pipe And Tube

ASTM A312/A312M, grade 316L.

2.1.3 Ladder Rungs

ASTM A276, grade 316L. 1" diameter solid, slip resistant, ladder rungs.

Stainless steel surface on stainless steel substrate. Grade #2 - Medium, incorporate an anti-slip stainless steel surface covering 100% of substrate consisting of a random hatch matrix with a surface hardness between 55 - 63 on the Rockwell "C" scale ASTM E 140 and ASTM E 384 and a surface to substrate bond strength ASTM C 633 of at least 4,000 psi. The non-slip surface shall have a ASTM D2047 minimum static coefficient of friction of 0.7.

2.3 Welding Electrodes and Rods

AWS D1.6/D1.6M E/ER 316L filler metal.

PART 3 EXECUTION

3.1 FABRICATION

Fabricate ladders for the locations shown, with dimensions, spacing, members, details, and anchorages as indicated. Comply with requirements of and 29 CFR 1910.27 and ASTM F1166; where conflicts occur, comply with the more stringent requirements.

3.1.1 Workmanship

Metalwork must be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching must produce clean true lines and surfaces. Continuously weld along the entire area of contact. Do not tack weld exposed connections of work in place. Grid smooth exposed welds. Provide smooth finish on exposed surfaces of work in place, unless otherwise approved. Where tight fits are required, mill joints. Cope or miter corner joints, well formed, and in true alignment. Install in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

3.1.2 Welding

Perform welding, welding inspection, and corrective welding, in accordance with AWS D1.6/D1.6M. Use continuous welds on all exposed connections. Grind visible welds smooth in the finished installation.

3.1.2.1 Passivation

Anneal after welding to dissolve any chromium carbides. Provide cleaning, descaling/pickling, and passivation in accordance with ASTM A380 to restore maximum corrosion resistance.

3.2 GENERAL INSTALLATION REQUIREMENTS

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 will be cause for rejection. Conceal fastenings where practicable. Thickness of metal and details of assembly and supports must provide strength and stiffness. Formed joints exposed to the weather to exclude water.

3.2.1 Lag Bolts and End Threaded Rods

ASTM 316L for lag bolts and end threaded rods where indicated. 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. Score exposed threads or provide other measures to ensure nuts do not back off.

3.2.2 Nuts

ASTM A 194, Grade and Style for applicable ASTM 316L bolt standard recommended.

3.2.3 Washers

ASTM 316 washers for ASTM 316L Lag Bolts and Threaded Rods.

3.2.3.1 Galvanized Fasteners

Refer to Specification SECTION 06 13 33 "PIER TIMBERWORK" for hot-dipped galvanized threaded fastener, bolt, nuts, and washer material requirements where indicated. Due to dissimilar metals, ensure there is no contact between stainless steel and galvanized elements.

3.2.3.2 Concrete Anchors

Refer to SECTION 05 13 00.20 21 POST-INSTALLED CONCRETE ANCHORS.

3.3 FIELD QUALITY CONTROL

Perform field tests, and provide labor, equipment, and incidentals required for testing. The Contracting Officer shall be notified in writing of defective welds within 7 working days of the date of weld inspection.

3.9.1 Welds

3.3.1 Visual Inspection

AWS D1.1/D1.1M. Furnish the services of AWS-certified welding inspectors for fabrication inspection and testing and verification inspections. Welding inspectors shall visually inspect and mark welds, including fillet weld end returns. Provide Welding Inspection Report and any required corrective actions.

-- End of Section --

SECTION 06 13 33

PIER TIMBERWORK

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 M2	***(2015) Standard for Inspection of Treated Wood Products***
AWPA M4	(2015) Standard for the Care of Preservative-Treated Wood Products
AWPA M6	(2013) Brands Used on Preservative Treated Materials
AWPA P5	(2015) Standard for Waterborne Preservatives
AWPA P23	***(2010) Standard for Chromated Copper Arsenate Type C (CCA-C)***
AWPA T1	***(2015) Use Category System: Processing and Treatment Standard***
AWPA U1	(2015) Use Category System: User Specification for Treated Wood

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 A47/A47M	***(1999; R 2009) Standard Specification for Ferritic Malleable Iron Castings***
ASTM A563	***(2007a) Standard Specification for Carbon and Alloy Steel Nuts***

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS RR-W-410	*(Rev G) Wire Rope and Strand*

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

40 CFR 171 ***Certification of Pesticide Applicators***

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PA 2 ***(2012) Measurement of Dry Coating Thickness With Magnetic Gages***

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

Pier timberwork

Submit drawings of treated timber showing dimensions of cut, framed, or bored timbers.

Threaded Rods; straight and bent; G

Drawings of threaded rod fabrication

SD-05 Design Data

Threaded Rods, Bolts, Nuts, & Washers ; G

SD-06 Test Reports

Timber preservative inspection; G

Delivery inspection list

Threaded Rods, Bolts, nuts, and washers; G

Epoxy Anchor Gel for Anchor Rods; G

Supply 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.

SD-07 Certificates

MSDS and CIS

Threaded Rods, Bolts, Nuts, & Washers ; G

Galvanizing; G

Galvanizing Repair Thickness Results; G

Pesticide Applicator Company Self-Certification; G

Best Management Practices (BMPs; G

1.3 DELIVERY AND STORAGE

Handle and store piles in accordance with AWPA M4. Follow precautions identified in MSDS or CIS provided by the supplier of treated wood products.

Open-stack untreated timber and lumber material on skids at least 12 inches aboveground, in a manner that will prevent warping and allow shedding of water. Close-stack treated timber and lumber material in a manner that will prevent long timbers or preframed material from sagging or becoming crooked. Keep ground under and within 5 feet of such piles free of weeds, rubbish, and combustible materials. Protect materials from weather. Handle treated timber with ropes or chain slings without dropping, breaking outer fibers, bruising, or penetrating surface with tools. Do not use cant dogs, peaveys, hooks, or pike poles. Protect timber and hardware from damage.

1.4 QUALITY ASSURANCE

1.4.1 Treatment Plant

Ensure treatment plants comply with quality control procedures in AWPA M3

1.4.2 Timber Grading

Comply with PS 20 and grading rules of lumber grading agencies certified by American Lumber Standards Committee Board of Review as applicable

1.4.3 MSDS and CIS

Provide Material Safety Data Sheets (MSDS) and Consumer Information Sheets (CIS) associated with timber pile preservative treatment. Contractor shall comply with all safety precautions indicated on MSDS and CIS.

1.4.4 Timber Preservative Inspection

The Contractor shall be responsible for the quality of treated wood products. The Contractor shall provide the Contracting Officer's Representative (COR) with the inspection report of an independent inspection agency, approved by the Contracting Officer, that the offered products comply with applicable AWPA standards.

Certification of treatment compliance by the independent agency shall be provided. Submit the inspection report and letter of certification, for approval by the Contracting Officer, that offered products complying with applicable AWPA Standards. Identify treatment on each piece by the quality mark of an agency accredited by the Board of Review of the American Lumber Standard Committee.

Furnish the following compliance certificates to the Contracting Officer upon delivery of the materials to the jobsite:

> ***(a) Verification of compliance with grading rules and species of timber and lumber. Provide certification by an agency accepted as competent by the American Lumber Standards Committee (ALSC).***
>
> ***(b) Lot certification of each charge for preservative, penetration in inches, and retention in pounds per cubic foot (assay method) by a qualified independent inspection and testing agency. In***

addition, have the producer of the treated products provide written certification that Best Management Practices (BMP's) in accordance with "Best Management Practices for Treated Wood in Western Aquatic Environments," published by the Western Wood Preservation Institute (WWPI) were followed, including a description and appropriate documentation of the applicable BMP's used.

1.4.5 Delivery Inspection List

Field inspect and submit a verification list of each treated timber member and each strapped bundle of treated lumber indicating the wording and lettering of the quality control markings, the species and the condition of the wood. Do not incorporate materials damaged in transport from plant to site. Inspect all preservative-treated wood, visually to ensure there are no excessive residual materials or preservative deposits. Material shall be clean and dry or it will be rejected due to environmental concerns.

1.4.6 Pesticide Applicators

Provide the Contracting Officer, a statement signed by the responsible site supervisor or higher company representative, certifying that the contractor will comply with all pesticide label instructions. The certification should identify by name all individuals (applicators) who will be working with wood preserving pesticide products on site.

1.4.7 Best Management Practices (BMPs)

The producer of the treated wood products shall provide certification that WWPI Best Management Practices (BMPs) for the use of Treated Wood in Aquatic and Wetland Environments were utilized including a written description and appropriate documentation of the BMPs utilized.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Lumber and Timbers

2.1.1.1 Solid Sawn

Provide solid sawn lumber and timbers of stress-rated Southern Pine or Douglas Fir-Larch with a stress rating of 1200 psi minimum, and identified by the grade mark of a recognized association or independent inspection agency using the specific grading requirements of an association recognized as covering the species used. Lumber and timbers shall have a preservative treatment in accordance with AWPA T1, AWPA U1 and AWPA P5 using water-borne preservative.

The association or independent inspection agency shall be certified by the Board of Review, American Lumber Standards Committee, to grade the species used. Contractor shall be responsible for the quality of the treated product.

For secondary members use lumber or timbers rated No. 1 or better. Use commercial grade lumber for decking members.

2.1.1.2 Preservative Treatment

2.1.1.2.1 General

Each piece of treated lumber or timber shall be branded, by the producer, in accordance with AWPA M6.

Chromated zinc chlorides, pentachlorophenol-ammoniacal systems, and alkyl ammonium compounds will not be allowed.

Dry after treatment to a maximum moisture content of 19%.

The Contractor shall be responsible for the provision and quality of treated wood products.

2.1.1.2.2 Salt Water Splash Zone

Preservative Treatment of fender system, chocks, wales, and blocking uses (UC4B) in accordance with the U.S. EPA Supplemental label requirements for forest products treated with CCA. Pressure treat softwood lumber, timber with 0.60 lb/cu ft retention of CCA type C in accordance with AWPA U1, AWPA P5 and AWPA P23.

2.1.1.2.3 Immersion or In Contact with Salt Water

Preservative Treatment of lumber for bracing or in contact with salt water (UC5B) in accordance with the U.S. EPA Supplemental label requirements for forest products treated with CCA. Pressure treat softwood lumber, timber with 2.50 lb/cu ft retention of CCA type C in accordance with AWPA U1, AWPA P5 and AWPA P23.

2.1.1.3 Inspection and Acceptance

A third-party accredited agency shall submit documentation verifying that the wood preservative retention and penetration values comply with AWPA U1. Inspect treated timber products according to AWPA M2. The Inspector will test before, during, and after treating. Determine the level of preservative retention by testing the 0.6 to 1.5 inch assay zone.

2.1.1.3.1 Preservative Penetration

Ensure the preservative penetrates at least 3 in or 90 percent of the sapwood for all lumber. One retreatment will be allowed if the initial treatment does not meet requirements for retention, penetration, or appearance.

2.1.1.3.2 Retention

Determine the level of preservative retention by testing to 1.5 inch assay zone.

2.1.1.3.3 Preservative Fixation Rate

AWPA E19, Standard method for Determining Preservative Fixation of Waterborne Wood Preservatives.

2.1.1.3.3.1 CCA-C Fixation

Evaluating the completeness of CCA-C fixation, by the chromotropic acid

test (AWPA Method A3, Section 11 (AWPA 2000)). Remove an increment core from the treated wood and applying an indicator solution. If the core turns a pinkish color then hexavalent chromium is present and the sample fails because the fixation process is not complete.

Instructions for the use of this method in the inspection of poles have recently been included in AWPA standards (AWPA Standard M2, Part A, Section 4.5 (AWPA 2000)).

2.1.1.3.4 Reporting

Submit reports in accordance with AWPA M2 of the treating process and results of the inspection that confirm treatment was completed according to these Specifications.

2.1.2 Hardware

For the timber fender system which is to remain, repaired, or to be provided supply hot-dipped galvanized bolts and rods with necessary nuts and washers, timber connectors, nails and other fastenings to secure to the pier. Provide cast-iron ogee, malleable iron washers, or plate or cut washers where indicated. Provide bolts with washers or ogee washers under nut and head as indicated. Provide timber connectors and other metal fastenings of type and size shown.

2.1.2.1 Threaded Rods, Bolts, & Nuts

Provide bolts ASTM A 307, Grade C, ASTM A 36/A 36M or ASTM F 1554, Grade 36; for bolts, anchor rods, and end threaded rods. 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. Provide timber connectors and other metal fastenings of type and size indicated on the drawings.

Score exposed threads or provide other measures to ensure nuts do not back off.

2.1.2.1.1 Nuts

ASTM A 563, Grade and Style for applicable ASTM bolt standard recommended.

2.1.2.2 Lag Bolts

Provide bolts ASTM A 307, Grade A.

2.1.2.3 Screw Withdrawal

350 lbs in accordance with ASTM D6117.

2.1.2.4 Nails

Use nails of standard form ASTM F 1667.

2.1.2.4.1 Nail Withdrawal

150 lbs in accordance with ASTM D6117.

2.1.2.4.2 Washers

Provide cast-iron ogee conforming to ASTM A48/A48M, malleable iron washers shall conform to ASTM A47/A47M, plate or cut washers shall conform to ASTM F844. Provide "Dock Washers" for all "oversized" holes.

2.1.2.5 Wire Rope and Fittings

FS RR-W-410, Type III, Class 2 or 3. Provide staples of 0.375 inch diameter hot-dipped galvanized steel at least 5 inches long. Provide clips or clamps of zinc-coated steel.

2.1.2.6 Concrete Anchors

Refer to Specification SECTION 05 13 00.20 21 "POST-INSTALLED CONCRETE ANCHORS" for concrete adhesive anchor material requirements.t

2.2 FABRICATION FINISHES

2.2.1 Zinc-Coating

Hot-dip galvanize all threaded fastener, bolts, rods, nuts, and washers hardware in conformance with the following applicable standards: ASTM F2329, ASTM A123/A123M, and ASTM A153/A153M, unless specified otherwise galvanize after fabrication where practicable. Nuts must be tapped oversize prior to galvanization in accordance with ASTM A563.

NOTE: Zinc plating or electrodeposited coatings on threaded fasteners and washers shall not be accepted.

2.3 GALVANIZING REPAIR

2.3.1 Limitations for Field Repairs

Repair of galvanized material shall be defined by the size size of the area outlined in the product galvanizing specifications (ASTM A 123/A 123M and ASTM A153/A153M). The allowable surface area for repair shall be not more than ½ of 1% of the accessible surface area to be coated on that article, or 36 in^2 per ton of piece-weight, whichever is less.

2.3.2 Repair of Zinc-Coated Surfaces

Prepare, clean, and repair damaged surfaces as a result of handling, transporting, or bolting with a galvanized repair method specifically designed for the repair and conforming to ASTM A780/A780M. Touch-up materials are required to meet a coating thickness of at least 2.0 mils (50.8 µm) for one application, and the final coating thickness of the repair area is dictated by the material used to do the repair.

Field cutting or welding repairs shall require prior approval of the Contracting Officer and may require the component to be regalvanized at the contractors expense.

Repair paints and limits of acceptable repair shall be identified by the galvanizer. The coating thickness for the use of a "paint" repair shall be 50% more than the surrounding coating thickness, but not greater than 4.0 mils (100 µm). Thickness measurements with either a magnetic, electromagnetic, or eddy-current gage to ensure that the applied coating is as specified in accordance with SSPC PA 2 shall be provided for each repair.

"Zinc-Based Solder" repair coating thickness shall meet the specification requirement for the material category of the part with a maximum thickness of 4 mils (100 µm). inc-based solder products closely match the surrounding zinc and blend in well with the existing coating appearance.

"Zinc Spray" repairs shall have a zinc coating thickness at least as thick as that required in ASTM A 123/A 123M for the material category.

Measure the repair thickness for "Zinc-Based Solder" and "Zinc Spray" as prescribed by one of the non destructive methods identified in ASTM A 123/A 123M.

Submit all Galvanizing Repair Thickness Results to the Contracting Officer for review.

PART 3 EXECUTION

3.1 CONSTRUCTION

Cut, bevel, and face timbers prior to plant preservative treatment. All exposed connections or adjoining members, counter-sink all bolt heads. In addition to the contract clause entitled "Accident Prevention" provide protective equipment for personnel fabricating, field treating, or handling materials treated with oil-soluble or waterborne wood preservatives. Refer to paragraph entitled "MSDS and CIS."

3.1.1 Fender System Repairs

Reattach those fender piles which are to remain. Match the existing adjacent, undamaged fender/wale installation. Face fender piles to receive chocks as required. Use only full-length timbers for chocks and tightly fit against fender piles. Face fender piles to provide a flat bearing against wales. Splice wales and provide all repairs to existing and new timber members as identified in the contract documents. Bevel or flat cut tops of fender piles as indicated. Provide additional blocking at ends of wales to prevent cantilevered sections.

3.1.2 Fastening

Vertical bolts shall have nuts on the lower end. Where bolts are used to fasten timber to timber, timber to concrete, or timber to steel, bolt members together when they are installed and retighten immediately prior to final acceptance of contract. Final tighten all nuts to provide proper bearing and snug tight condition. Snug tight is defined as sufficient tightness to bring faces of members into firm contact with each other.

Provide bolts having sufficient additional threading to provide at least 3/8 inch per foot thickness of timber for future retightening on cut off excess. After final tightening, check or burr all bolts effectively with a pointing tool to prevent loosening of the nuts.

3.1.3 Holes for Bolts, Dowels, Rods & Lag Screws

Bore all holes before preservative treating the wood. Bore holes for round drift bolts and dowels 1/16 inch smaller in diameter than that of the bolt or dowel to be used. Ensure that the diameter of holes for square drift bolts or dowels is equal to the side dimension of the bolt or dowel.

Bore holes for machine bolts 1/16 inch larger than the diameter, except when galvanized bolts are specified. In this case, drill all holes 1/8 inch greater than the bolt size.

Bore holes for lag screws 1/16 inch larger for the shank portion of the lag screw and drill the remainder of the hole approximately 75 percent of the shank diameter to a depth of 1 inch less than the length of the screw.

FIELD TREATMENT

3.2 Timberwork

Field treat cuts, bevels, notches, counterboring, refacing and abrasions made in the field in treated piles and timbers with a compatible preservative material in accordance with AWPA M4, MSDS and CIS.

Carefully trim all vertical and horizontal countersinking recesses made in treated material with preservative so that the solution saturates the entire area surrounding the hole. Fill with a copper naphthenate solution containing 2 percent or more copper metal or with a preservative allowed for field applications under AWPA M4 after placing the bolt or screw. Apply the preservative in 3 applications; wait at least 2 hours between applications.

In addition, all bored holes for connectors or bolts shall be treated by pumping coal-tar roofing cement meeting ASTM-D 4022 into holes using a grease gun or similar device.

Wood preservatives are restricted use pesticides and shall be applied according to applicable standards. Trim cuts and abrasions before field treatment. Paint depressions or openings around bolt holes, joints, or gaps including recesses formed by counterboring, with same preservative treatment.

3.3 On Site Application of Wood Preservatives

All on site application of wood preservatives must be performed by a person certified through an EPA approved training program for the application of wood treatment products in accordance with 40 CFR 171, regulated under 7 U.S.C.A. Sections 136 to 136y, Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). On site treatment shall also be in accordance with AWPA M4, Sections 1.5, 2.2, 2.3, and 3.1.

-- End of Section --

SECTION 06 13 34

PIER POLYMERIC TIMBER

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 D1435	(2005) Standard Practice for Outdoor Weathering of Plastics
ASTM D1972	(1997; R 2005) Standard Practice for Generic Marking of Plastic Products
ASTM D2344/D2344M	(2000; R 2006) Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates
ASTM D6109	(2010) Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber and Related Products
ASTM D6111	(2009) Standard Test Method for Bulk Density and Specific Gravity of Plastic Lumber and Shapes by Displacement
ASTM D696	(2008) 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 D883	(2011) Terminology Relating to Plastics

1.2 Glossary

See ASTM D883 for standard terminology related to plastics.

Extrusion - A manufacturing process where molten polymer is forced through a die of a desired shape, to encapsulate fiberglass reinforced plastic or steel bars, which run continuously throughout the length of the product without joints.

FRP - Fiber reinforced polymer. A polymer matrix, either thermoset or thermoplastic, reinforced with a fiber or other material with a sufficient aspect ratio (length to thickness) to provide a discernable reinforcing function in one or more directions.

GFRP - Glass fiber reinforced plastic. A composite made from fiberglass reinforcement in a plastic (polymer) matrix.

Polymer - Any of numerous natural and synthetic compounds of usually high molecular weight consisting of up to millions of repeated linked units, each a relatively light and simple molecule.

Pultrusion - A continuous process for manufacturing composites that have a cross sectional shape. The process consists of pulling a fiber reinforcing material through a resin impregnation bath and through a shaping die, where the resin is subsequently cured.

Resin - Any of numerous physically similar polymerized synthetics or chemically modified natural resins. Two main types of polymers used for resins include thermoset and thermoplastic materials.

Thermoset Plastics (thermosets) - Refer to a range of polymer materials that once cured do not flow, or melt when heated. Thermoset materials are transformed, through the addition of energy, to a stronger substance. Thermoset materials are usually liquid or malleable prior to curing, and designed to be molded into their final form, or used as adhesive. Thermoset polymer resins can be transformed into plastics or rubbers by cross-linking. A thermoset material cannot be melted and re-molded after it is cured. Thermoset materials are generally stronger than thermoplastic materials. They are also better suited to high temperature applications. They are not easily recyclable like thermoplastics, which can be melted and re-molded. Examples of thermoset plastics include: natural rubber, Bakelite, Urea-Formaldehyde, Melamine, Polyester Resin, and Epoxy Resin.

Thermoplastics - Most thermoplastics are high molecular weight polymer chains, mostly joined through weak dispersion forces and more rarely dipole-dipole interactions. Thermoplastic polymers are usually contrasted with thermosetting polymers, which cannot go through melt/freeze cycles. Many thermoplastic materials are addition polymers (chain growth polymers), such as polyethylene and polypropylene.

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. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Polymeric (Plastic) Sections members; G

Drawings of timber sections, shop fabrication, and field erection details; including methods of fastening.

SD-03 Product Data

Polymeric (Plastic) Timber Sections members; G

SD-05 Design Data

Polymeric Timber Members; G

Polymeric Allowable bending moment; G

Polymeric Allowable flexural stress; G

Polymeric Maximum elastic deflection; G

SD-06 Test Reports

Polymeric Material Test Reports; G

Polymeric Performance Test Data; G

Polymeric Allowable flexural stress; G

SD-07 Certificates

Polymeric (Plastic) Timber Members; G

1.4 DELIVERY, STORAGE, AND PROTECTION

Protect all steel from corrosion, deformation, and other types of damage. Store items in an enclosed area free from contact with soil and weather. Remove and replace damaged items with new items.

1.5 DELIVERY AND STORAGE

Deliver materials to the site in an undamaged condition. Store, protect, handle, and install elements in accordance with manufacturer's instructions and as specified. Store materials off the ground to provide proper ventilation, with drainage to avoid standing water, and protection against ground moisture and dampness. Adhere to requirements for stacking, lifting, bracing, cutting, notching, and special fastening requirements. Remove defective and damaged materials and provide new materials.

1.6 GRADING AND MARKING

1.6.1 Polymeric (Plastic) Lumber

Label plastic products to be incorporated into the project in accordance with ASTM D1972; High Density Polyethylene (HDPE).

1.7 SIZES AND SURFACING

Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced. Other measurements are IP or SI standard.

1.8 QUALITY ASSURANCE

1.8.1 Drawing Requirements

For Polymeric (Plastic) Timber Sections. Fabrication drawings shall not be reproductions of contract drawings. Include complete information for the fabrication and erection of the structure's components, including the location, type, and size of bolts, member sizes and lengths, connection details, blocks, copes, and cuts. Member substitutions of details shown on the contract drawings shall be clearly highlighted on the fabrication

drawings. Explain the reasons for any deviations from the contract drawings. Do not proceed with modifications until the submittal has been approved.

1.8.2 Data Required

Submit drawings for all proposed Polymeric (Plastic) Timber Sections. Do not proceed with modifications until the submittal has been approved.

1.8.3 Plastic Lumber Performance

Plastic lumber intended for use in exterior applications shall have no fading or discoloration and no change in dimensional stability as tested in accordance with ASTM D1435 for a period of 5 years.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Plastic Lumber

HDPE lumber shall contain a minimum of 75 percent recycled content, with a minimum of 25 percent post-consumer recycled content. Mixed plastics and cellulose lumber shall contain a minimum of 100 percent recycled content, with a minimum of 50 percent post-consumer recycled content. HDPE/fiberglass lumber shall contain a minimum of 95 percent recycled content with a minimum of 75 percent post-consumer recycled content. Plastic lumber shall be reinforced with (4) 1" diameter reinforcing elements to act compositely. Splices will not be permitted.

2.1.1.1 Shear Parallel to Length

Maximum 1,000 psi in accordance with ASTM D2344/D2344M.

2.1.1.2 skin/core 40-65 lbs/cu.ftDensity

Minimum Skin/Core density of 40-65 lbs/cu.ft in accordance with ASTM D6111.

2.1.1.3 Compressive Strength

Compressive modulus of skin/core 75,000 psi/45,000 psi elasticity in accordance with ASTM D 695.

2.1.1.4 Flexural Strength

Minimum 2,000 psi in accordance with ASTM D6109.

2.1.1.5 Tensile Strength

Minimum 1,250 psi in accordance with ASTM D198.

2.1.1.6 Coefficient of Thermal Expansion

Maximum 0.000080 in/in/degree F in accordance with ASTM D696.

2.1.2 Fasteners

NOTE: Refer to Specification SECTION 06 13 33 "PIER TIMBERWORK" for threaded fastener, bolt, nuts, and washer material requirements.

PART 3 EXECUTION

3.1 WORKMANSHIP

Provide plastic timber sections as indicated, set accurately to the required lines and levels, and secure in place. Dress to the sizes indicated, and bevel edges. Bore, countersink, and bolt timbers in place. 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.

3.1.1 Installation Tolerances

Installation of all embedded items, fabrication of all steel elements, and plastic timber sections shall ensure that all members are interchangeable at all locations. Adjustments in tolerance shall only occur in plastic timber holes for which the maximum tolerance is +1/8" in the hole diameter identified. Fill counter sink holes with sealant to ensure galvanized material and stainless steel material are not in contact.

3.3 FIELD QUALITY CONTROL

3.2 Plastic Timber Sections

3.2.1 Inspections

Inspect timber sections when delivered and a minimum of four weeks after all holes and cuts have been made and then again immediately prior to final installation. When Government inspections result in product rejection, the Contractor shall promptly segregate and remove rejected material from the premises. The Government may also charge the Contractor an additional cost of inspection or testing when prior rejection makes reinspection or retesting necessary.

3.2.1.1 Straightness

Each fabricated timber section shall be measured for straightness prior to installation by placing a straight line from the center of the top and edge center lines. The line shall lie entirely within a 1/4 inch. Timber sections not meeting with criteria shall be rejected.

3.2.1.2 Cracks and Defects

Each timber section shall be inspected for cracks and defects prior to installation. After the timber has been installed and all connections to the structure are completed, each timber section shall again be inspected for cracks and defects. The Contractor shall notify the Contracting Officer of any cracking or other defects observed, and await direction. The Contracting Officer may reject any timber section with any found defect measuring greater than 1/32 inch in width or 1 inch in length. The Contractor shall be responsible for all costs incurred to replace the rejected timber sections.

-- End of Section --

SECTION 35 59 13.13

PRESTRESSED CONCRETE FENDER PILING

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 211.1	(1991; R 2009) Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
ACI 212.3R	(2004) Chemical Admixtures for Concrete
ACI 214R	(2011) Evaluation of Strength Test Results of Concrete
ACI 318M	(2011; Errata 2011; Errata 2012) Building Code Requirements for Structural Concrete & Commentary
ACI SP-66	(2004) ACI Detailing Manual

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 182	(2005; R 2009) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats

AMERICAN WELDING SOCIETY (AWS)

AWS A5.4/A5.4M	(2006) Specification for Stainless Steel Electrodes for Shielded Metal Arc Welding
AWS D1.4/D1.4M	(2011) Structural Welding Code - Reinforcing Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 240/A 240M	(2010b) Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A 416/A 416M	(2006) Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
ASTM A 615/A 615M	(2009) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete

	Reinforcement
ASTM C 1202	(2009) Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration
ASTM C 1218/C 1218M	(1999; R 2008) Standard Specification for Water-Soluble Chloride in Mortar and Concrete
ASTM C 1240	(2005) Standard Specification for Silica Fume Used in Cementitious Mixtures
ASTM C 1260	(2007) Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C 136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C 143/C 143M	(2010) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C 150/C 150M	(2009) Standard Specification for Portland Cement
ASTM C 1567	(2008) Standard Test Method for Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C 171	(2007) Standard Specification for Sheet Materials for Curing Concrete
ASTM C 172	(2008) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C 260	(2006) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C 309	(2007) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 31/C 31M	(2010) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C 311	(2007) Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete
ASTM C 33/C 33M	(2011) Standard Specification for Concrete Aggregates
ASTM C 39/C 39M	(2005e1e2) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C 494/C 494M	(2008a) Standard Specification for

	Chemical Admixtures for Concrete
ASTM C 618	(2008a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C 666/C 666M	(2003; R 2008) Resistance of Concrete to Rapid Freezing and Thawing
ASTM C 989	(2009a) Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
ASTM D 1894	(2008) Static and Kinetic Coefficients of Friction of Plastic Film and Sheeting
ASTM D 2240	(2005) Standard Test Method for Rubber Property - Durometer Hardness
ASTM D 256	(2006e1) Determining the Izod Pendulum Impact Resistance of Plastics
ASTM D 4020	(2005) Ultra-High-Molecular-Weight Polyethylene Molding and Extrusion Materials
ASTM D 570	(1998; R 2005) Standard Test Method for Water Absorption of Plastics
ASTM C 595	(2007) Standard Specification for Blended Hydraulic Cements
ASTM D 638	(2003) Standard Test Method for Tensile Properties of Plastics
ASTM D 7290	(2011) Standard Practice for Evaluating Material Property Characteristic Values for Polymeric Composites for Civil Engineering Structural Applications
ASTM D 792	(2008) Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D 2000	(2008) Standard Classification System for Rubber Products in Automotive Applications
ASTM F 593	(2002; R 2008) Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM F 594	(2009) Standard Specification for Stainless Steel Nuts

PRECAST/PRESTRESSED CONCRETE INSTITUTE (PCI)

PCI MNL-116	(1999) Manual for Quality Control for Plants and Production of Structural Precast Concrete Products

1.2 SPECIAL REQUIREMENTS

(a) Provide 316L Stainless Steel material for the UHMWPE Panel Inserts Assemblies & UHMWPE Fasteners for all piles along the South of Pier 14 as identified in DETAIL A2/S305 - INSERT (316L STAINLESS STEEL); NAVFAC DWG 12,275,428 and the specifications.

(b) Provide all composite material for the UHMWPE Panel Insert Assemblies and UHMWPE Fasteners for all piles along the North Side of Pier 14 as identified in DETAIL A4/S305 - INSERT (COMPOSITE MATERIAL); NAVFAC DWG 12,275,428 and the specifications.

Note: The 3" composite sleeve nut is may not be an off-the-shelf item and may be required to be manufactured and tested.

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. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals
Fender Pile Installation Procedures; G

SD-02 Shop Drawings
Piles; G
UHMWPE Inserts & Fasteners (Stainless and Composite); G

Submit (1) fabricated insert of each for Contracting Officers inspection and approval.

UHMWPE Rubbing Strips; G
Composite Blocking; G
Driving helmets, cap blocks, and pile cushions

SD-03 Product Data
Admixtures; G
Air Entraining; G
Aggregates; G
Corrosion Inhibitors; G
Prestressing Steel; G
Reinforcing Steel; G
Reinforcement and Protective Coating; G
Reinforcement supports; G
Composite Insert Protective Coating; G
UHMWPE Panel Recess Sealant; G

SD-04 Samples
UHMWPE Inserts & Fasteners (Stainless and Composite); G

SD-05 Design Data
Concrete mix design; G
Submit a concrete mix design before concrete is placed, for each type of concrete used for the piles.

SD-06 Test Reports

Aggregates
Fly ash and Pozzolan
Ground Slag
Silica fume
Concrete
Submit concrete cylinder compressive strength test results.

SD-07 Certificates
Precasting manufacturer's quality control procedures
Suitability of pile driving equipment; G
Curing of piles
Silica fume manufacturer's representative
Prestressing steel
Portland cement
Concrete mix design; G
Reinforcing steel; G
Neoprene Pads; G
UHMWPE Rubbing surface and Fender Module Bearing Pad; G
UHMWPE Inserts & Fasteners; (Stainless and Composite) G
Bolts and Washers; G
Composite Blocking; G
Epoxy Pile Top Coat; G

1.4 REQUIREMENTS

1.4.1 Piling Lengths and Quantity

Provide prestressed pretensioned concrete piles. Base bids upon the number, size, and length of piles as indicated. Adjustments in the contract price will not be made for cutting off piles or for broken, damaged, or rejected piles.

1.4.2 Piles

Prepare in accordance with ACI SP-66. Indicate placement of reinforcement including tendons. Indicate location of special embedded or attached lifting devices, employment of pick-up points, support points other than pick-up points, and any other methods of pick-up. **Provide certification of a professional engineer registered in any jurisdiction, that layout and details of reinforcement, tendons, and inserts conform with that shown on the structural design drawings.**

1.4.3 Driving Helmets, Cap blocks, and Pile Cushions

Show details of driving helmets, cap blocks, and pile cushions.

1.5 QUALITY ASSURANCE

1.5.1 Quality Control Procedures

Submit 2 copies of precasting manufacturer's quality control procedures established in accordance with PCI MNL-116.

1.5.1.1 Curing of Piles

Submit proposed materials and methods.

1.5.2 Silica Fume Manufacturer's Representative

Provide statement that the manufacturer's representative will be present at plant to ensure proper mix, including high range water reducer (HRWR), and batching methods.

1.5.3 Aggregates

Prior to pile fabrication, submit certified test reports for the following tests specified in ASTM C 33/C 33M:

a. Grading
b. Amount of material finer than No. 200 sieve
c. Organic impurities
d. Soundness
e. Clay lumps and friable particles
f. Coal and lignite
g. Weight of slag
h. Abrasion of coarse aggregate
i. Fineness modulus
j. Reactive aggregates
k. Freezing and thawing

1.5.4 Fly Ash and Pozzolan

Furnish fly ash and pozzolan test results performed within 1 year of submittal date. Sampling and testing shall be in accordance with ASTM C 311.

1.5.5 Silica Fume

Furnish silica fume test results performed within 1 year of submittal date. Sampling and testing shall be in accordance with ASTM C 311.

1.5.6 Portland Cement

Certification identifying cement; brand name, type, mill location, quantity to be used, size of lot represented by quality control sample, lot number, and destination of shipment.

1.5.7 Corrosion Inhibitor

Submit test results in accordance with ASTM C1581/C1581M and manufacturer's literature and test reports for corrosion inhibitors. Submitted data shall be based upon tests performed within 3 years 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 4 years old prior to use in the work.

1.5.8 Concrete Mix Design

Certify, using a Government-approved independent commercial testing laboratory, that proportioning of mix is in accordance with ACI 211.1 or ACI 318M for specified strength and is based on aggregate data which has been determined by laboratory tests during last 12 months.

1.6 DELIVERY, STORAGE, AND HANDLING

Piles shall be stored, handled, and transported in accordance with PCI MNL-116 except as follows. Methods used for handling and storage of

piles shall be such that the piles are not subjected to excessive bending stress, cracking, spalling, or other damage.

1.7 PILE DAMAGE

The Contractor shall inspect each pile for sweep and structural damage such as cracking and spalling before transporting them to the project site, immediately prior to placement in the driving leads, and after completion of the installation. Any unusual cracks (cracks other than crazing, surface drying, shrinkage cracks and end cracks), spalls, or chipped areas shall be brought to the attention of the Contracting Officer.

Piles which are damaged during delivery, storage, handling, or installation to the extent they are rendered unsuitable for the work, in the opinion of the Contracting Officer, shall be rejected and removed from the project site, or dependant upon the extent of the damage, may be repaired, if approved by the Contracting Officer, at no cost to the Government.

1.7.1 Non-Repairable Cracks

Piles with cracks equal to or greater than 0.06 inches shall be rejected.

1.7.2 Repairable Cracks

Piles with cracks less than 0.06 inches but greater than 0.006 inches shall be rejected unless the contractor submits and the Contracting Officer approves of a pile repair which shall repair deficient pile ensuring that the piles original design capacity has be restored and will be maintained to that of an undamaged pile, and ensure that the repair does not hinder that of the piles intented function. Long term durability of the repair in a marine environment shall also be taken in consideration. The contractor shall submit the design, plans, materials, and procedures and a proposed repair will not guarantee acceptance by the government.

1.7.3 Minor Cracks

Piles with cracks less than 0.006 inches are not required to be repaired.

1.8 Pile Sweep

Sweep shall be limited to 1/8 inch per 10 feet over the length of the pile. Piles having excessive sweep shall be rejected.

1.9 Concrete Spalls and Chips

Piles with concrete spalling or section loss deeper than 1.0 inch found below elevation 8.5' will be rejected. Similar with that of a "repairable crack", spalls less than 1.0 in depth but greater than 1/4" in depth found below elevation 8.5' shall be rejected unless the contractor proposes an acceptable repair, at no additional cost. All concrete spalls and section loss found above elevation 8.5' shall be repaired.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cementitious Materials

Cementitious materials shall be portland cement, blended cement or portland

cement in combination with natural pozzolan or fly ash or ground granulated blast furnace slag and conforms to appropriate specifications listed below.

2.1.1.1 Cement

ASTM C 150/C 150M Type II or III with a maximum alkali content of 0.40; or ASTM C 595, Type IP(MS) or IS(MS) blended cement except as modified herein. The blended cement shall consist of a mixture of ASTM C 150/C 150M cement (with alkali content not exceeding 0.40 percent and one of the following materials: ASTM C 618 pozzolan or fly ash, or ASTM C 989 ground iron blast-furnace slag, or ASTM C 1240 silica fume. If no satisfactory test results are available (made within the past year) to prove that the cement alkali content is less than 0.40, then cement with a maximum 0.60 percent alkali shall be used. Cement certificates shall include test results in accordance with ASTM C 150/C 150M, including equivalent alkalies indicated in the optional chemical requirements. Use cement with a tricalcium aluminate ($3CaO.Al_2O_3$) content of less than 8 percent. Type III shall not be used in conjunction with silica fume without prior approval of the contracting officer.

2.1.1.2 Fly Ash and Pozzolan

ASTM C 618, Class N, or F except that the maximum total alkalies shall be 3 percent. If the aggregates are reactive the maximum calcium oxide content shall be 13.0 percent. Class C shall not be used.

2.1.1.3 Ground Iron Blast-Furnace Slag

ASTM C 989, Grade 120.

2.1.1.4 Silica Fume

ASTM C 1240, provide silica fume that is a by-product of silicon or ferrosilicon production. Provide percent by weight of the total cementitious materials as indicated in table below.

2.1.1.5 Supplemental Cementitious Materials (SCM) Content

The concrete mix shall contain one of the four SCMs listed below, or a linear combination thereof.

SUPPLEMENTARY CEMENTITIOUS MATERIALS CONTENT

SCM	Minimum Content	Maximum Content
Class N Pozzolan or Class F Fly Ash with with SiO2 plus Al2O3 plus Fe2O3 greater than 70 percent	25 percent	35 percent
Class N Pozzolan or Class F Fly Ash with with SiO2 plus Al2O3 plus Fe2O3 greater than 80 percent	20 percent	35 percent
Class N Pozzolan or Class F Fly Ash with with SiO2 plus Al2O3 plus Fe2O3		

SUPPLEMENTARY CEMENTITIOUS MATERIALS CONTENT

SCM	Minimum Content	Maximum Content
greater than 90 percent	15 percent	35 percent
GGBF Slag	30 percent	50 percent
Silica Fume	5 percent	10 percent

2.1.2 Water

Water shall be fresh, clean, and potable; free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances deleterious to concrete or steel.

2.1.3 Aggregates

ASTM C 33/C 33M, except as modified herein. Provide aggregate free from any substance which may be deleteriously reactive with alkalies in cement in an amount sufficient to cause excessive expansion of concrete. Do not mix, store in same stockpile, or use fine aggregates from different sources of supply in same concrete mix or same structure without approval. The fineness modulus of fine aggregate shall be not less than 2.40 or greater than 3.0. For piles that will be exposed to freezing and thawing, fine and coarse aggregate subjected to five cycles of the sodium sulfate soundness test shall show a loss not greater than 10 percent. If the selected aggregates fail the soundness test, the Contractor may use the aggregate source, provided concrete specimens made with the aggregates to be used for the piles shall have a durability factor of not less than 80 based on 300 cycles of freezing and thawing when tested in accordance with ASTM C 666/C 666M. Prior to pile fabrication, submit certified test reports for the following tests specified in ASTM C 33/C 33M:

a. Grading
b. Amount of material finer than No. 200 sieve
c. Organic impurities
d. Soundness
e. Clay lumps and friable particles
f. Coal and lignite
g. Weight of slag
h. Abrasion of coarse aggregate
i. Fineness modulus
j. Reactive aggregates
k. Freezing and thawing

2.1.3.1 Alkali-Silica Reactivity (ASR)

Fine and coarse aggregates to be used in all concrete shall be evaluated and tested by the Contractor for alkali-aggregate activity.

The fine and coarse aggregates shall be evaluated separately, using ASTM C 1260. Test results of the individual aggregates shall have a measured expansion equal to or less than 0.08 percent at 16 days after casting. Should the test data indicate an expansion of greater than 0.08 percent, the aggregates(s) shall be rejected or additional testing, using ASTM C 1567 shall be performed as follows: utilize the Contractor's proposed low alkali portland cement blended cement and SCM in combination

with the proposed aggregate for the test portioning. The SCM quantity shall be determined that will meet all the requirements of these specifications and that will lower the ASTM C 1567 expansion to equal or less than 0.08 percent at 16 days after casting.

If the above option does not lower the expansion to less than 0.08 percent at 16 days after casting, reject the aggregate(s) and submit new aggregate sources for retesting. Submit the results of testing to the Contracting Officer for evaluation and acceptance.

2.1.4 Admixtures

Chemical admixtures shall conform to ASTM C 494/C 494M, Type B. Air Entraining admixture shall conform to ASTM C 260. Do not use admixtures containing chlorides.

2.1.5 Corrosion Inhibitors

Provide a corrosion inhibitor which shall be be 30 percent water solution of calcium nitrite. Allow for the free water in the admixture within the total water in concrete mixture. Accelerating and set adjusted versions are acceptable, however, the concrete set time effects and mixture workability shall be considered. Refer to admixture manufacturer recommendations for dosage typically range from 2.0 to 6.0 gallons per cubic yard for chloride protection levels.

2.1.6 Prestressing Steel

Use seven-wire stress-relieved or low-relaxation strand conforming to ASTM A 416/A 416M, Grade 270 psi. Use prestressing steel free of grease, oil, wax, paint, soil, dirt, and loose rust. Do not use prestressing strands or wire having kinks, bends, or other defects.

2.1.7 Reinforcing Steel

ASTM A 615/A 615M, Grade 60. Weld reinforcing steel in accordance with AWS D1.4/D1.4M.

2.1.8 Ties

Steel, ASTM A 615/A 615M for ties.

2.1.9 Neoprene Pads

ASTM D 2000, Type BC. Minimum Tensile Strength 1500 psi. Durometer Hardness Shore A:40.

2.1.10 Ultrahigh Molecular Weight Polyethylene (UHMWPE)

2.1.10.1 General

Provide UV Resistant rubbing strips and fender module bearing pad for fender pile dimensions as indicated. Material shall be provided in the longest lengths available to minimize joints. Additional inserts and bolts shall be provided at all joint locations. Joint locations shall be approved by the Contracting Officer.

a. Materials including additives shall be traceable by original lot number.

b. Materials used shall be FDA approved or otherwise harmless to marine life.

c. Fabricated form shall be virgin resin or a blend of virgin and recycled material of the original resin. Maximum percentage of recycled material shall not exceed 20%.

2.1.10.2 Resin

a. ASTM D 4020. Virgin or a mechanical blend of Virgin UHMWPE resin and recycled pulverized UHMWPE, consisting of homopolymer of ethylene and having an intrinsic viscosity (IV) between 22.0 and 28.0 dl/g.

b. Resin shall be oil and moisture free (0.2 percent weight maximum).

2.1.10.3 Composition and Fabricated Form

a. Resin shall comprise a minimum 95.0 percent by weight concentration in the formulation.

b. The finished form shall maintain ultraviolet stability for a minimum of 25 years and be free of saltwater or petroleum product leachable materials.

c. No unfused areas or light patches greater than No. 50 sieve shall be in the final fabricated form.

d. The fabricated form shall have the following properties:

Density (ASTM D 792)	57.5 - 58.7 lb/cu.ft
Tensile Strength (ASTM D 638)	37.5 MPa min
Flexural Yield Strength (ASTM D 790)	24.5 MPa min
Elongation @ Break (ASTM D 638)	250 - 300 percent
Impact Strength (ASTM D 256)	
Test Method A, Izod	No-break for all five determinations in sample
Hardness (ASTM D 2240), minimum	Shore D 65 - 68
Coefficient of Friction (ASTM D 1894)	
Static, maximum	0.17
Dynamic, maximum	0.15
Water Absorption (ASTM D 570)	Nil
Abrasion Index (relative to steel = 100)	10 - 13

e. Color shall be black.

2.1.11 Threaded Inserts, Bolts and Washers

Threaded Inserts, Bolts, and Washers; Fabricate with all 316L Stainless Steel or all composite material for the attachment of UHMWPE Panels. Ensure proper thread engagement for anchor bolt into the stainless steel coupler nut or composite sleeve nut prior to tack welding for stainless steel and epoxy bonding for composite materials. Ensure minimum bolt thread engagement for UHMWPE panel bolts and coupler nuts or sleeve nuts are as indicated.

2.1.11.1 Stainless Steel Insert Assemblies

Provide bolts and threaded rods conforming to ASTM F 593, Alloy Group 2 (316L). Nuts and coupler nuts shall conform to ASTM F 594, Alloy Group 2 (316L). Plate or cut washers shall conform to ASTM A 240/A 240M, Grade 316L. Provide bolts with washers under both nut and head. Provide of type and size indicated on the drawings.

Do not place insert in contact with any prestressing or reinforcing steel.

2.1.11.1.1 Stainless Steel Electrodes

AWS A5.4/A5.4M, E316L-17 for all tack welds.

2.1.11.2 Composite Insert Assemblies

Studs/threaded rods shall be high strength Fiber Reinforced Polymer (FRP), pultruded with Eglass reinforcements and a Vinyl Ester resin matrix made of alkali-resistant glass. The rods are then milled to establish Unified National Coarse (UNC) threads. Nuts and Coupler Nuts shall be molded flanged hex nuts to the minimum dimensions shown in the contract drawings. Flanged hex nuts shall be molded with polyurethane resin with glass reinforcement. The studs and nuts have UV inhibitors to provide resistance to ultraviolet degradation and corrosion and be comparable with concrete for total embedment.

The ultimate thread shear strength, flexural strength, flexural modulus and double shear values shall be testing in accordance with the requirements of ASTM D 7290 and meet the following minimum requirement:

Physical/Mechanical Properties	ASTM Test	Minimum
Ultimate Thread Shear Strength		2,575 lbs
Flexural Strength	D790	50,000 psi
Flexural Modulus	D790	2.0×10^6 psi
Ultimate Double Shear Strength	B565	7,000 lb
Water Absorption 24 hr Immersion	D570	1%
Coefficient of Thermal Expansion (LW)	D696	5.0×10^{-6} in/in/°F
Maximum Recommended Torque Strength (Lubrication per manufacturer's recommendations)		16 ft-lb (Provide

2.1.11.2.1 Threaded Parts

Ensure that nuts and studs are well lubricated prior to installation. Provide a light oil, dry lubricant, or silicone spray on threaded parts where nuts may be removed.

For assemblies in which the nut will not be removed, the stud/nut assembly shall be coated with an adhesive or resin per the manufacturer's recommendations and the entire nut and exposed threads coated after the proper torque values have been obtained.

A torque wrench with a standard six point socket shall be utilized and must make full contact with all nut edges. Partial contact will cause the corners to fracture, affecting the performance of the stud/nut assembly.

2.1.11.3 Composite Insert Protective Coating

After the fabrication composite insert, provide a protective coating to the portion of the insert assembly that will be embedded in the concrete for additional alkali protection of the composite material. Provide a minimum 1 mil or heavier thickness per the composite insert manufacturer's recommendations of a sprayed-on coating of polyurethane, resin, or adhesive.

2.1.12 Composite Blocking

Blocking shall be solid, single thickness, of a wood-polymer composite or polymer lumber which may consist of a maximum of 50% wood fibers by weight, with the remainder of the material being a thermoplastic polymer plastic or entirely of thermoplastic polymer plastic material. The material shall be manufactured by a continuous extrusion process to produce comparable blocking size identified. Submit color for Contracting Officer approval.

Minimum Design Characteristics:

Static Coefficient of Friction - Wet (d)
ASTM F 1679 0.70/0.75

Fungus Resistance (White & Brown Rot)
ASTM D 1413 rating = No Decay

Termite Resistance (e)
AWPA E1-72 rating = 9.6

Specific Gravity (typical)
ASTM D 2395 0.91 to 0.95

	Ultimate (typical) Values	**Design Values**
Compression Parallel (f)(g) ASTM D 198	1800 psi	550 psi
Compression Perpendicular (f)(h) ASTM D 143	1940 psi	625 psi
Tensile Strength (f) ASTM D 198	850 psi	250 psi
Shear Strength (f) ASTM D 143	560 psi	200 psi
Modulus of Rupture (f) ASTM D 4761	1420 psi	250 psi
Modulus of Elasticity (f) ASTM D 4761	175,000 psi	100,000 psi

2.1.13 UHMWPE Panel Recess Sealant

Upon completion of securing the UHMWPE Panel to the prestressed concrete pile, completely fill and seal the fastener recess flush with the surface of the UHMWPE panel with a flexible high performance, one part, polyurethane adhesive sealant specifically designed for above and below water applications. The sealant shall ensure that the stainless steel bolt or composite stud/nut does not loosen. The sealant color shall be clear or

black.

2.2 CONCRETE

2.2.1 Contractor-Furnished Concrete Mix Design

Concrete shall have a minimum specified compressive strength, f'c, of 8,000 psi at 28 days. The minimum cementitious materials content shall be 600 pounds per cubic yard of concrete. The design shall be prepared in accordance with ACI 211.1 or ACI 318M. The mix design shall be based on current materials previously evaluated by the concrete producer whose established methods of statistical quality control is in conformance with ACI 318M. In the absence of such data, the Contractor shall sample and test the aggregates for the design of concrete.

2.2.2 Concrete Mix Design Proportioning

a. Water and cement ratio shall be equal to or less than 0.40. If fly ash is used, the water and cement ratio shall be calculated as the weight of water divided by the weight of cement plus 60 percent of the weight of fly ash. If silica fume is used, the water and cement ratio shall be calculated as the weight of water divided by the weight of cement plus the weight of silica fume.

b. Maximum aggregate size shall not exceed 3/4 inch.

c. Air-entrainment shall be 4.5 to 7.5 percent. Determine air void structure in accordance with ACI 212.3R. Spacing factor shall be less than 0.01 inch, the specific surface area shall be greater than 600 square inches per cubic inch of air void volume, and the number of air voids per inch of traverse shall be significantly greater than the numerical value of the percentage of air in the concrete.

2.2.3 Trial Mixtures

Trial mixtures having proportions and consistencies of the proposed mix design shall be made to document the Contractor's ability to produce workable concrete which does not segregate or show excessive slump loss characteristics.

2.3 FABRICATION OF PRETENSIONED PILES

Piles shall be pretensioned concrete piles. Workmanship shall conform to standard commercial practice in prestressing plants.

2.3.1 Formwork

Provide forms of metal, braced and stiffened against deformation, accurately constructed, watertight, and supported on unyielding casting beds. Forms shall permit movement of pile without damage during release of the prestressing force. Make piles to dimensional tolerances in accordance with PCI MNL-116 and as follows:

a. Length: 3/8 inch per 10 feet.

b. Cross section: plus 1/2 inch to minus 1/4 inch.

c. Deviation from straight lines: not more than 1/8 inch per 10 feet of length.

d. Pile head: plus or minus 1/4 inch per foot of head dimension from true right angle plane. Surface irregularities: plus or minus 1/8 inch.

e. Location of reinforcing steel

(1) Main reinforcement: 1/8 to 1/4 inch from position designated on drawings.

(2) Spacing of spiral: plus or minus 1/2 inch from position designated on drawings.

2.3.2 Pretensioning

Measure tension to which steel is to be pretensioned by jack pressure read on a calibrated gage and verify by elongation of steel. Use gage calibrated within last year by a laboratory approved by Contracting Officer. Provide means for measuring elongation of steel to nearest 1/8 inch. When difference between results of measurement and gage reading is more than 5 percent, determine cause of discrepancy and correct. Give tensioning steel a uniform prestress prior to being brought to design prestress. Induce same initial prestress in each unit when several units of prestressing steel in a pile are stretched simultaneously.

2.3.3 Casting

2.3.3.1 Conveying

Clean conveying equipment thoroughly before each run. Convey concrete from mixer to forms as rapidly as practicable by methods which will not cause segregation or loss of ingredients. Deposit concrete as nearly as practicable to its final position. During placing, make any free vertical drop of the concrete less than 3 feet. Remove concrete which has segregated in conveying or placing.

2.3.3.2 Placing and Casting

Perform concrete casting within 3 days after pretensioning steel; however, do not deposit concrete in forms until placement of reinforcement and anchorages have been inspected and approved by pile manufacturer's quality control representative. Produce each pile of dense concrete straight with smooth surfaces with reinforcement retained in its proper position during fabrication. Use vibrator with heads smaller than the minimum distance between steel for pretensioning. Make surface of pile ends perpendicular to axis of pile. Chamfer, a minimum of 3/4 inch, ends of piles and corners of square piles.

2.3.4 Curing of Piles

Cure piles using moist or accelerated curing.

2.3.4.1 Moist Curing

a. Impervious sheeting: ASTM C 171; waterproof paper, clear or white polyethylene sheeting, or polyethylene-coated burlap.

b. Pervious sheeting: AASHTO M 182.

c. Liquid membrane-forming compound: ASTM C 309, white pigmented, Type 2,

Class B.

2.3.4.2 Accelerated Curing

After placement of concrete, moist cure for a period of 4 hours. Follow by accelerated curing until concrete has reached specified release strength. Enclose casting bed for accelerated curing with a suitable enclosure. During application of steam or heat, increase the air temperature at a rate not to exceed 40 degrees F per hour. Cure at a maximum temperature of 150 degrees F until concrete has reached specified release strength. Reduce temperature at a rate not to exceed 20 degrees F per hour until a temperature of 20 degrees F above ambient air temperature is reached. After accelerated curing, moist cure using either water or membrane curing until a total accelerated and moist curing time of 72 hours is achieved.

2.3.5 Detensioning

Perform releasing of prestressed steel in pretensioned piles in such an order that eccentricity of prestress will be minimized. Gradually release tension in strands from anchorage. Detension after approval by pile manufacturer's quality control representative. Perform transfer of prestressing force when concrete has reached a minimum compressive strength of 5,600 psi.

2.3.6 Marking

Mark pile to identify in-place impact face. Marking shall be clearly visible during driving.

2.4 PRODUCT QUALITY CONTROL

Where piling is manufactured in a plant with an established quality control program as attested to by a current certification in the PCI Certification Program for Quality Control, perform product quality control procedures in accordance with PCI MNL-116. Where piling is manufactured by specialists or in plants not currently enrolled in the PCI Certification Program for Quality Control, set up a product quality control system in accordance with PCI MNL-116 and perform concrete and aggregate quality control testing using an independent commercial testing laboratory approved by the Contracting Officer in accordance with the following.

2.4.1 Aggregate Tests

Take samples of fine and coarse aggregate at the concrete batch plant and test. Perform mechanical analysis (one test for each aggregate size) in accordance with ASTM C 136 including determination of the specific gravity. Tabulate the results of the tests in accordance with ASTM C 33/C 33M.

2.4.2 Strength Tests

Sample concrete in accordance with ASTM C 172 at the time the concrete is deposited for each production line. Compression tests shall conform to methods of ASTM C 39/C 39M and ASTM C 31/C 31M. Perform slump tests in accordance with ASTM C 143/C 143M. Mold at least six cylinders per day or for every 20 cubic yards of concrete placed, whichever is greater. Test two cylinders of the set at 7 days of 14 days, or at a time for establishing transfer of prestressing force (release strength) and removal of pile from forms. Perform strength tests 28 days after molding using the

remaining cylinders of the set. Cure the cylinders in the same manner as the piles and place at the point where the poorest curing conditions are offered. This is the coolest point in the bed for steam curing. Cylinders to be tested at 28 days shall be moist cured.

2.4.3 Changes in Proportions

If, after evaluation of strength test results, the compressive strength is less than the specified compressive strength, make adjustments in the proportions and water content and changes in the temperature, moisture, and curing procedures as necessary to secure the specified strength. Submit changes to the Contracting Officer in writing.

2.4.4 Compressive Strength Test Results

Evaluate compression test results at 28 days in accordance with ACI 214R using a coefficient of variation of 10 percent. Evaluate the strength of concrete by averaging the test results (two specimens) of each set (four specimens) of standard cylinders tested at 28 days. Not more than 10 percent of the individual specimens tested shall have an average compressive strength less than specified average compressive strength.

2.4.5 Chloride Ion Concentration

Sampling and determination of water soluble chloride ion content in accordance with ASTM C 1218/C 1218M. Maximum water soluble chloride ion concentrations in hardened concrete at ages from 28 to 42 days contributed from the ingredients including water, aggregates, cementitious materials, and admixtures shall not exceed 0.06 percent by weight of cement.

2.4.6 Chloride Ion Penetration

To ensure the durability of concrete in marine environment, concrete shall be proportioned to have the chloride ion penetration test in accordance with ASTM C 1202, and be below 3000 coulombs for concrete specimens tested at 56 days.

PART 3 EXECUTION

3.1 PILE DRIVING

3.1.1 Driving Piles

Piles shall not be driven until 100 percent of design strength has been attained and until at least 14 days after detensioning. Drive piles to the indicated tip elevation and to the minimum embedment depth shown on the drawings. Pile driving shall be conducted as one continuous operation. During the initial driving and until the pile tip has penetrated beyond layers of very soft soil or below the bottom of prejetted or preformed holes, use a reduced rated driving energy of the hammer of not more than 15,000 foot-pounds per blow or as otherwise directed by the Contracting Officer, to prevent high tension-wave driving stresses which could damage the pile. Resistance criterion shall be 20 blows for one foot for the last 2-5 feet of installation to set the pile and prevent settlement. The Contracting Officer may modify the criteria based upon the actual hammer being used and its rated energy and its compatibility as verified by a pile test program. If a pile fails to reach the indicated butt elevation or minimum embedment, the Contractor shall notify the Contracting Officer and perform corrective measures as directed. Provide hearing protection when

noise levels exceed 140 dB.

3.1.2 Pile Driving Leads and Templates

Piles shall be driven with the hammer positioned in a fixed or swinging lead. "Free hammer" will not be permitted. Swinging lead shall be used only in conjunction with a template system to spot the piles.

3.1.3 Installation of Piles

Take care to avoid damage to piles during handling, when placing the pile in leads, and during pile-driving operations. Inspect piles when delivered, when in leads immediately before driving, and after installation. Notify the Contracting Officer of any unusual cracks and perform corrective measures as directed. Laterally support piles during driving, but allow rotation in leads. Take special care to maintain the pile orientation during driving. Square the top of the pile to the longitudinal axis of the pile. Maintain axial alignment of pile hammer with that of pile.

3.1.4 Tolerances in Driving

Drive piles with a variation of not more than one percent from vertical for plumb piles. Maximum Allowable Rotation: 1 degree of horizontal pile face to the pier. Maintain and check axial alignment of pile and leads at start of pile driving and when the pile top is approximately 5 feetabove the indicated elevation. Make intermediate checks of pile alignment if there is evidence of pile drifting. If subsurface conditions cause pile drifting beyond the allowable axial alignment tolerance, notify the Contracting Officer and perform corrective measures as directed. Place butts within 2 inches of the location indicated. Manipulation of pile within specified tolerances is permitted, but do not manipulate piles more than one percent of their exposed length above the mud line. Check piles for heave. Redrive, to the indicated elevation, piles found to be heaved.

3.1.5 Jetting of Piles

Water jetting shall not be permitted for the primary method of opening of holes for the fender pile installation, but may be used to assist driving piles through strata that cannot be penetrated practicably by use of the hammer alone in the preformed holes. Driving shall be restricted to a static weight while water is being injected to prevent inducing tensile stresses in the piles which damage the concrete. Discontinue jetting when the pile tip is approximately 2-5 feet above the indicated pile tip elevation. Drive pile the final 2-5 feet of penetration. Jetting method and equipment shall be approved by the Contracting Officer prior to commencing jetting operation. Measures, including use of a silt curtain, shall be employed to contain turbid water created by jetting piles if silt is observed in the water.

3.1.6 Pre-drilling or Pre-probing of Piles

Predrilled or pre-probed holes at all fender pile locations, the diameter of the hole or width of the probe shall be determined by the contractor and based upon soil conditions encountered. The hole shall be kept open until the pile is inserted and advanced to the bottom of the hole. Piles shall be installed in holes immediately after pre-drilling/pre-probing to minimize the potential for sloughing and collapse of the hole. Only employ water jetting in association with this operation as required to install the

pile to the required tip elevation. Discontinue hole at a depth 2-5 feet from the indicated tip elevation and achieve the remaining penetration by driving. Before starting the driving of the final feet, firmly seat the pile in place by the application of a number of reduced-energy hammer blows. The depth of pre-drilled/pre probed hole may be adjusted, at no cost to the government, upon submission of the Fender Pile Installation Procedures and approved of the Contracting Officer.

3.1.7 Patching

a. Embedded Lifting Loops. Provide a one inch minimum conical depression around embedded lifting loops. Cut off lifting loops at bottom of depression and patch depression with epoxy mortar.

b. Pile Butt. Apply 16 mil minimum thick Epoxy Pile Top Coat to the tops of all piles after the concrete patch repair of defects due to driving. Material shall be a 2 component, 100% solids, flexibilized epoxy coating meeting the following minimum requirements:

Compressive Strength (ASTM D 695)	6,000 psi min @ 7 days
Tensile Strength (ASTM D 638)	2,000 psi min @ 7 days 20-30% elongation
Hardness Shore D (ASTM D 2240)	74

3.2 EQUIPMENT

3.2.1 Pile Hammers

Furnish a hammer having a capacity at least equal to the hammer manufacturer's recommendation for the total weight of pile and character of subsurface material to be encountered. Obtain the required driving energy of the hammer, except for diesel hammers, by use of a heavy ram and a short stroke with low-impact velocity. The pile hammer shall be capable of operating at a reduced energy level (1/2 to 2/3 of rated energy level) during seating of the piles in preformed holes and when driving through soft or loose materials. The driving energy of the hammer, at final driving, shall be not less than 30,000 foot-pounds. At final driving, operate the pile hammer in accordance with the manufacturer's recommendation. At final driving, operate diesel-powered hammers at the rate recommended by the manufacturer for hard driving. Maintain sufficient pressure at the steam hammer so that (1) for double-acting hammer, the number of blows per minute during and at the completion of driving of a pile is equal approximately to that at which the hammer is rated; (2) for single-acting hammer, there is a full upward stroke of the ram; and (3) for differential-type hammer, there is a slight rise of the hammer base during each downward stroke.

3.2.2 Driving Helmets, Cap blocks, and Pile Cushions

3.2.2.1 Driving Helmets or Caps and Pile Cushions

Use a steel driving helmet or cap, including a pile cushion between top of pile and driving helmet or cap, to prevent impact damage to pile. The driving helmet or cap-and-pile cushion combination shall be capable of

protecting the head of the pile, minimize energy absorption and dissipation, and transmit hammer energy uniformly over the top of the pile. The driving helmet or cap shall fit sufficiently loose around the top of the pile so that the pile may be free to rotate without binding within the driving helmet. The Contractor shall demonstrate to the satisfaction of the Contracting Officer that the equipment to be used on the project performs the above function. The pile cushion shall be of laminated construction using softwood boards with the grain parallel to the end of the pile. The thickness of the pile cushion shall be 12 inches minimum. The cushion shall not be changed near the end of driving. Replace the pile cushion when it has become compressed beyond two-thirds of its original thickness, charred, or burned, or has become spongy or deteriorated in any manner. Use new cushions for initial driving of each pile. During redriving or restriking of piles, a used cushion assembly shall be used. The Contractor shall submit to the Contracting Officer at least 2 weeks before the start of pile driving operations detailed drawings of the driving helmet and pile cushion to be used.

3.2.2.2 Hammer Cushion or Cap block

Use a hammer cushion or cap block between driving helmet or cap and hammer ram consisting of aluminum and micarta (or equal) discs stacked alternately in a steel housing. Use steel plates at top and bottom of cap block. Replace aluminum or micarta discs that have become damaged, split, or deteriorated in any manner. Do not use small wood blocks, wood chips, rope, or other materials that permit excessive loss of hammer energy.

3.3 FIELD QUALITY CONTROL

3.3.1 Pile Records

For each pile, keep a record of the number of blows required for each 0.985 feet of penetration and the number of blows for the last 6 inch penetration or fraction thereof. Include in the record the beginning and ending times of each operation during driving of pile, type and size of the hammer used, rate of operation, stroke or equivalent stroke for diesel hammer, type of driving helmet, and type and dimension of the hammer cushion (cap block) and pile cushion used. Record re-tap data and any unusual occurrence during driving of the pile. Include in the record performance characteristics of jet pump, unassisted penetration of pile, jet-assisted penetration of pile, and tip elevation before driving and at end of driving. Notify Contracting Officer 10 days prior to driving of piles. Submit complete and accurate records of installed piles to Contracting Officer within 15 calendar days after completion of the pile driving. Make pile-driving records available to the Contracting Officer at the job site within 24 hours of each day's pile driving. A preprinted form for recording pile driving data is included at the end of this section.

PILE DRIVING LOG

CONTRACT NO._____ CONTRACT NAME_____
CONTRACTOR_____ TYPE OF PILE_____
PILE LOCATION_____ PILE SIZE: BUTT/TIP: _____ LENGTH_____
GROUND ELEVATION_____ CUT OFF ELEVATION_____
PILE TIP ELEVATION_____ VERTICAL (_____) BATTER 1 ON (_____)
SPLICES ELEVATION_____ COMPANY_____

HAMMER: MAKE & MODEL_____ WT. RAM_____
STROKE_____ RAM RATED ENERGY_____
DESCRIPTION & DIMENSIONS OF DRIVING CAP_____
CUSHION MATERIALS & THICKNESS_____

INSPECTOR_____

"DEPTH" COLUMN OF PILE DRIVING RECORD REFERENCED TO:
_____ CUT-OFF ELEVATION
_____ FINISH FLOOR ELEVATION

TIME: START DRIVING_____ FINISH DRIVING_____ DRIVING TIME_____
INTERRUPTIONS (TIME, TIP ELEV. & REASON)_____
JET PRESSURE & ELEVATIONS_____

_____

DRIVING RESISTANCE

DEPTH FT.	NO. OF BLOWS	DEPTH FT.	NO. OF BLOWS	DEPTH FT.	NO. OF BLOWS
0	_____	18	_____	36	_____
1	_____	19	_____	37	_____
2	_____	20	_____	38	_____
3	_____	21	_____	39	_____
4	_____	22	_____	40	_____
5	_____	23	_____	41	_____
6	_____	24	_____	42	_____
7	_____	25	_____	43	_____
8	_____	26	_____	44	_____
9	_____	27	_____	45	_____
10	_____	28	_____	46	_____
11	_____	29	_____	47	_____
12	_____	30	_____	48	_____
13	_____	31	_____	49	_____
14	_____	32	_____	50	_____
15	_____	33	_____	51	_____
16	_____	34	_____	52	_____
17	_____	35	_____	53	_____

SHEET 1 OF 2

PILE DRIVING LOG

54	_____	77	_____	99	_____
55	_____	78	_____	100	_____
56	_____	79	_____	101	_____
57	_____	80	_____	102	_____
58	_____	81	_____	103	_____
59	_____	82	_____	104	_____
60	_____	83	_____	105	_____
61	_____	84	_____	106	_____
62	_____	85	_____	107	_____
63	_____	86	_____	108	_____
64	_____	87	_____	109	_____
65	_____	88	_____	110	_____
66	_____	89	_____	111	_____
67	_____	90	_____	112	_____
68	_____	91	_____	113	_____
69	_____	92	_____	114	_____
70	_____	93	_____	115	_____
71	_____	94	_____	116	_____
72	_____	95	_____	117	_____
73	_____	96	_____	118	_____
74	_____	97	_____	119	_____
75	_____	98	_____	120	_____
76	_____				

DRIVING RESISTANCE IN BLOWS PER INCH FOR LAST FOOT OF PENETRATION:

DEPTH_____ DEPTH_____

1"___2"___3"___4"___5"___6"___7"___8"___9"___10"___11"___12"___

ELEV._____ ELEV._____

REMARKS_____

_____

CUT OFF ELEVATION: FROM DRAWING _____

TIP ELEVATION = GROUND ELEVATION - DRIVEN DEPTH = _____

DRIVEN LENGTH = CUT OFF ELEVATION - TIP ELEVATION = _____

CUT OFF LENGTH = PILE LENGTH - DRIVEN LENGTH = _____

SHEET 2 OF 2

-- End of Section --

SECTION 35 59 13.14 20

POLYMERIC FENDER PILES

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 CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 211.1	(1991; R 2009) Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete
ACI 318	(2014; Errata 1-2 2014; Errata 3-4 2015) Building Code Requirements for Structural Concrete and Commentary

ASTM INTERNATIONAL (ASTM)

ASTM C496/C496M	(2011) Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
ASTM D2310	(2006; R 2012) Machine-Made "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe
ASTM D2996	(2015) Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe
ASTM D4329	(2013) Standard Practice for Fluorescent UV Exposure of Plastics
ASTM D570	(1998; E 2010; R 2010) Standard Test Method for Water Absorption of Plastics
ASTM D6109	(2013) Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber and Related Products
ASTM D6662	(2013) Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards
ASTM D7258	(2014) Standard Specification for Polymeric Piles
ASTM D7290	(2006) Standard Practice for Evaluating Material Property Characteristic Values for Polymeric Composites for Civil Engineering Structural Applications

ASTM D746	(2014) Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
ASTM D792	(2013) Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D883	(2011) Terminology Relating to Plastics

1.2 Glossary

See ASTM D883 for standard terminology related to plastics.

Extrusion - A manufacturing process where molten polymer is forced through a die of a desired shape, to encapsulate fiberglass reinforced plastic or steel bars, which run continuously throughout the length of the product without joints.

FRP - Fiber reinforced polymer. A polymer matrix, either thermoset or thermoplastic, reinforced with a fiber or other material with a sufficient aspect ratio (length to thickness) to provide a discernable reinforcing function in one or more directions.

Polymer - Any of numerous natural and synthetic compounds of usually high molecular weight consisting of up to millions of repeated linked units, each a relatively light and simple molecule.

Polymeric Pile - Piling products characterized by the use of polymers, where by (1) the pile strength or stiffness requires the inclusion of the polymer or (2) a minimum of 50 percent of the weight or volume is derived from the polymer. Polymeric piles may be reinforced by composite design for increased stiffness or strength.

Pultrusion - A continuous process for manufacturing composites that have a cross sectional shape. The process consists of pulling a fiber reinforcing material through a resin impregnation bath and through a shaping die, where the resin is subsequently cured.

Resin - Any of numerous physically similar polymerized synthetics or chemically modified natural resins. Two main types of polymers used for resins include thermoset and thermoplastic materials.

Thermoset Plastics (thermosets) - Refer to a range of polymer materials that once cured do not flow, or melt when heated. Thermoset materials are transformed, through the addition of energy, to a stronger substance. Thermoset materials are usually liquid or malleable prior to curing, and designed to be molded into their final form, or used as adhesive. Thermoset polymer resins can be transformed into plastics or rubbers by cross-linking. A thermoset material cannot be melted and re-molded after it is cured. Thermoset materials are generally stronger than thermoplastic materials. They are also better suited to high temperature applications. They are not easily recyclable like thermoplastics, which can be melted and re-molded. Examples of thermoset plastics include: natural rubber, Bakelite, Urea-Formaldehyde, Melamine, Polyester Resin, and Epoxy Resin.

Thermoplastics - Most thermoplastics are high molecular weight polymer chains, mostly joined through weak dispersion forces and more rarely

dipole-dipole interactions. Thermoplastic polymers are usually contrasted with thermosetting polymers, which cannot go through melt/freeze cycles. Many thermoplastic materials are addition polymers (chain growth polymers), such as polyethylene and polypropylene.

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-02, Shop Drawings

Polymeric piles; G

SD-03, Product Data

Polymeric piles; G

Include dimensions, material specifications, and method of manufacture.

Pile driving equipment; G

Driving helmet; G

Pile caps; G

Pile driving tips; G

Driving pads; G

Pile tops; G

Manufacturer's Warranty; G

Contractor's Warranty; G

SD-05 Design Data

Polymeric piles; G

Design calculations; G

Fender pile reaction load

Allowable bending moment

Allowable flexural stress

Maximum elastic deflection

Concrete mix design; G

SD-06, Test Reports

Material Test Reports; G

Performance Test Data; G

Allowable flexural stress

Maximum load

Delivery inspection list

Field inspect and submit a verification list of each pile indicating the condition of the polymeric. Do not incorporate materials damaged in transport from plant to site.

SD-07, Certificates

Driving hammer; G

Polymeric piles; G

SD-11, Closeout Submittals

Pile records

Submit the close out version of the pile driving records in a type written format within 14 calendar days after completion of driving.

1.4 DELIVERY, STORAGE, AND HANDLING

The Contractor shall inspect each pile, upon delivery, for surface damage, cracks, blemishes, scaring and straightness. The condition of each pile shall be recorded and the delivery inspection list shall be submitted to the Contracting Officer. The Contractor shall handle the piles with ropes or nylon slings without dropping, breaking, bruising or penetrating outer surface with tools. Do not use cant dogs, peaveys, hooks or pikepoles. Protect piles from damage. Store piles above the ground on blocking which is shaped or padded and prevent scaring or sagging of the piles. Storage racks shall be arranged to permit air circulation and shall be covered.

1.5 BASIS OF BIDS

1.5.1 Fender Piles

Base bids on the number, circumference, and length of piles as indicated. Should the total number of piles vary from that specified as the basis for bidding, the Contract price will be adjusted in accordance with Contract Clause entitled "Changes". Adjustment in Contract price will not be made for cutting off piles, for any portion of a pile remaining above the cutoff elevation, or for broken, damaged or rejected piles.

PART 2 PRODUCTS

2.1 PILE CLASSIFICATION

4. Type 4 - Polymeric with reinforcement in the form of non-metallic bars or cages (COMPOSITE FENDER PILE).

5. Type 5 - Polymeric composite tube with optional concrete core (FRP FENDER PILE)

2.2 POLYMERIC PILES

Provide polymeric piles manufactured as specified. All polymeric fender piles of a particular type shall be the product of a single manufacturer. Each pile shall be permanently tagged with the pile's serial number, date of fabrication and manufacturer's name. The stamp or tag shall be placed two to four feet from the top of the pile and shall be visible after installation. The tags shall not be placed on the outer face (berthing side) of the pile. Piles shall be in one piece. Splices will not be permitted, unless approved by the Contracting Officer. Provide pile driving tips, when required, per Manufacturer's recommendations. All polymeric fender piles shall be delivered to the job site complete and ready to drive. Pile diameter shall be as indicated.

2.3 PERFORMANCE REQUIREMENTS

The cross-sectional dimensions of piles shall be determined on the basis of the ability to perform satisfactorily under the physical loading and environmental conditions imposed. The Contractor shall submit the Performance Test Data and or Design Calculations to substantiate the performance.

2.4 PERFORMANCE CHARACTERISTICS

Each fender pile shall have the following performance characteristics, Type 4 ASTM D6109; Type 5 ASTM D7290:

PERFORMANCE REQUIREMENTS	
PILE TYPE	MINIMUM MOMENT CAPACITY (kip-ft
4	300
5	425

2.4.1 Allowable Flexural Stress

Contractor shall calculate allowable flexural stress. A factor of safety of 2 shall be used when comparing to allowable flexural stress derived from test procedures specified in ASTM D7258.

2.4.2 Crushing Resistance

Contractor shall determine maximum reaction load at top of pile connection point with pier/wharf. A factor of safety of 3 shall be used for crushing when comparing to maximum load derived from test procedures specified in ASTM C496/C496M.

2.5 SIZE TOLERANCES

2.5.1 Circular Piles

The tolerance against the specified diameter shall be plus or minus 3 percent. The maximum eccentricity (out of roundness)at any cross-section is e=0.2 when calculated as follows:

e=(square root of (a^2-b^2)) divided by a; where 2a = major diameter and 2b = minor diameter

SPECIAL NOTE: It is critical that the Contractor verify diameter of Type 5 Pile for CEP111 Barge Bumper and coordinate with the weldment fabrication and HYDE wear Sleeve provider. The contractor shall provide any adjustments, required with the fabrication of the weldment, to ensure the piles will fit in the bumper weldment sleeves and that the HDPE wear sleeve can be fitted over the piles as reflected on the contract drawings.

2.6 MATERIALS

2.6.1 Physical Properties

The physical properties for each type of material shall be as follows: The Contractor shall submit Material Test Reports, as applicable, for each type of material.

Physical Properties of Polymeric Material		
Property	Type 4	Type 5
Density ASTM D792 lb/ft^3	34-50 core	140 min.
Water Absorption ASTM D570	<3 percent	<3 percent
Brittleness ASTM D746 at minus 40 degrees F	No Break	No Break
Ultraviolet ASTM D4329 Change in Shore D Durometer Hardness after 500 hours Exposure	<or= 10 percent	<or= 10 percent
Weatherability ASTM D6662 Change in Flexural Modulus and Strength after 2000 hours Exposure	<or= 10 percent	<or= 10 percent
Laminate Void Content percent	n/a	minus 2

2.6.2 Type 4 Polymeric Piles

Minimum Size and Reinforcing Requirement: 16" outside diameter with (16) 1.25" vertical fiberglass reinforcing bars. Length requirement as indicated.

2.6.2.1 Placement of Reinforcing

Longitudinal reinforcement shall remain within 5 percent of the specified radial location as measured from centroid of the cross-section of the pile. Longitudinal reinforcement shall not twist more than 5 degrees over

any 20 foot section of the pile. The minimum cover shall be 1 inch.

2.6.3 Type 5 Polymeric Piles

Minimum Size and Wall Thickness Requirement: 16" outside diameter with 0.5 inch wall thickness. Length requirement as indicated.

2.6.3.1 Polymeric Composite Tube

The polymeric composite pile shall be comprised of material which provides the tube strength. The polymeric material shall be "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin). The tube shall be manufactured in accordance with ASTM D2996 and ASTM D2310.

Provide a minimum 1.5 inch thick x 4 inch long filament wound collar, bonded to the pile at the elevation required to act as "stop" for the HDPE wear sleeve.

2.6.3.1.1 Other Resin Additives

Other materials such as additives, UV inhibitors, fillers and pigments that are appropriate with the vinyl ester resin are permitted to meet requirements such as color and environmental protection.

2.6.3.2 Outer Surface

The outer surface is to provide a protective barrier as well as wear and impact resistance and shall be comprised of a suitable, high impact, marine grade coating. It shall provide an ultraviolet and chemical resistant barrier of at least 0.03 inch thickness and be of a black opaque color.

2.6.3.3 Inner Surface

The inner surface shall be comprised of a pure polymeric liner layer of at least 0.025 inch thickness for alkalinity resistance. The inner surface shall be roughened or wrinkled to provide adhesion of the inner shell to the concrete fill.

2.6.3.4 Concrete Fill

The concrete fill is to be provided per the pile manufacturer's recommendations. Concrete shall be secured and engaged within the polymeric composite tube and act compositely. The concrete fill shall have a minimum 28-day compressive strength of 6,000 psi. Core concrete shall be expansive in nature and must set to a permanent positive stress, with a minimum outward expansion of 20 psi. Submit a concrete mix design certifying that the proportioning of the mix is in accordance with ACI 211.1or ACI 318 for specified strength and is based upon aggregate data which has been determined by laboratory tests during the last twelve months. All material to be provided by an approved batch plant.

2.7 PILE FINISHING

2.7.1 Polymeric Pile Protection

If the materials are reactive to seawater, the pile shall be protected by encasement in an abrasion resistant polymer. The protective encasement shall extend, as a minimum, from 2 feet below the lowest low water to 2 feet above the highest high water, unless indicated otherwise.

2.7.2 Surface Condition

The pile surface exhibiting roughness or corrugations due to manufacturing processes, shall not have depressions or projections greater than 1/2 inch and less than 9 in^2 in surface area. The surface of the pile shall contain no cracks or splits, in any orientation.

2.7.3 Pile Tops

2.7.3.1 Type 4 Piles

Piles shall be initially cut at the required elevations. Due to shrinkage/creep, a second cut of just the reinforcing bars will be required at the end of the project to ensure the reinforcement remains flush with the top of the piles.

2.7.3.2 Type 5 Piles

Piles shall be ordered a minimum of 12 inches longer than required to allow for damage during installation so that they may be then cut to the required elevation. All cut edges holes and abrasions shall be sealed with a resin or compatible coating with the resin matrix used for production of the piles.

2.8 SOURCE QUALITY CONTROL

2.8.1 Plant Inspection

The Contracting Officer reserves the right to perform plant inspection of the polymeric pile manufacturing process. Provide the Contracting Officer with a minimum 2-week advance notice, indicating the date manufacturing is to start, and tests that are to be conducted. Allow the Contracting Officer unlimited access to the plant and inspection privileges for each facet of the manufacturing process.

2.8.2 Curing

2.8.2.1 Type 4 Polymeric Piles

The polymeric piles shall cure at the plant a minimum of three weeks prior to shipment to the site.

2.8.2.2 Type 5 Polymeric Piles

If provided, concrete filled piles shall be filled with concrete prior to driving. Support the pile to prevent sag during concrete placement and curing. The Type 5 polymeric piles shall cure a minimum of one week prior to placement of the concrete fill. Piles shall be moved to curing table within 20 minutes of wet concrete placement. Do not handle or transport piles for seven days or until concrete has reached 2,500 psi strength. Drive piles after full strength has been obtained or after 28 days of curing.

2.9 MANUFACTURER'S WARRANTY

In addition to the Manufacturer's standard one year warranty, the Manufacturer shall warranty all polymeric piles to be free from defects in materials and workmanship for a period of ten years. The Contracting

Officer has the right to require complete replacement of any pile with material or workmanship defects. The Manufacturer shall cover all construction costs related to the repair or replacement of the defective piles. This warranty need not cover repairs required as a result of normal wear and tear, misuse, mishandling, extreme weather or other acts of God, failure to perform routine maintenance, non-recommended or improperly executed alterations by anyone other than the Manufacturer, tampering, loading of the pile beyond its rated capacity, improper installation, or other use inconsistent with Manufacturer's specifications.

2.10 CONTRACTOR'S WARRANTY

The Contractor shall warranty all polymeric piles to be free from defects in materials caused by mishandling prior to installation and improper installation for a period of 5 years. The Contracting Officer has the right to require complete replacement of any pile deemed by the Contracting Officer to have defects due to mishandling or improper installation. The Contractor shall cover all construction costs related to the repair or replacement of the defective piles.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Polymeric Piles

3.1.1.1 On Site Storage

Piles shall be stored and continually supported in a manner which minimizes creep, saddling and sag.

3.1.2 Preexcavation

3.1.2.1 Jetting of Piles

Jetting of piles shall not be permitted without the approval of the Contracting Officer. If elected to be utilized, the contractor shall ensure that the existing fill along the bulkheads is not adversely disturbed due to historical scour and erosion and limited embedment of the sheet pile.

3.1.2.2 Spudding of Piles

Spudding of piles shall be required for the Type 5 piles due to fit requirements of the bumper assembly. Limit to an elevation 5 feet above the specified pile tip elevation. Spudding of Type 4 pile shall also be required along the bulkheads and pier for area in which piles may not reach the required tip elevation without assistance.

3.1.2.3 Predrilling of Piles

Predrilling of piles is permitted in lieu of spudding to the elevations indicated.

3.1.3 Driving Piles

3.1.3.1 Equipment

Pile driving equipment shall be an air, steam, or diesel powered hammer,

and be of an approved type by the Polymeric Pile manufacturer. The driving hammer shall have a capacity at least equal to the hammer Manufacturer's recommendation for the total weight of pile and character of subsurface material to be encountered. Provide driving helmet, pile caps, pile driving tips and driving pads as recommended by the pile Manufacturer for the polymeric piles. If a pile fails to reach the indicated tip elevation, after employment of spudding and/or predrilling, notify Contracting Officer, provide pile record and perform corrective measures as directed. Provide hearing protection when noise levels exceed 140 dB.

3.1.3.2 Protection of Piles

Square the heads and tips of piles to the driving axis. Laterally support piles during driving, but do not unduly restrain piles from rotation in the leads. The use of swinging or hanging leads shall be at Contractor's risk. Any damage incurred by such use shall be repaired by the Contractor at the Contractor's expense.

3.1.3.3 Tolerances in Driving

3.1.3.3.1 Type 4

Piles shall be driven in the locations indicated. Each fender pile, at its contact with the design river bottom or river bottom elevation indicated in the construction documents, shall be placed a maximum of 0.5 inch per foot of free pile length (length in feet above the average soil contact line at each pile)in a direction parallel to the pier face and 0.125 inch per foot of the free pile length in a direction perpendicular to the pier face. Remove and replace with new piles those damaged, mislocated, driven below the design cutoff, or driven out of alignment.

3.1.3.3.2 Type 5

Drive piles with a variation of not more than one-half percent from vertical for plumb piles. Maintain and check axial alignment of pile and leads at start of pile driving and when the pile top is approximately 10 feet above the indicated elevation. Make intermediate checks of pile alignment if there is evidence of pile drifting. If subsurface conditions cause pile drifting beyond the allowable axial alignment tolerance, notify the Contracting Officer and perform corrective measures as directed. Place butts within 1/2 inches of the location indicated. Manipulation of pile within specified tolerances is no permitted if it will adversely affect the attachment of the bumper weldment or HDPE sleeves. Do not manipulate piles more than one percent of their exposed length above the river bottom. Check piles for heave. Redrive, to the indicated elevation, piles found to be heaved.

3.1.4 Buoyant Piles

After driving buoyant piles, the contractor shall provide temporary framing or weights to prevent the pile from floating up out of the ground. The temporary framing or weights shall remain in place until the pile is secured in place. If there is sufficient friction provided by the soil to prevent the pile from floating, the Contractor may, at his own risk, waive the temporary framing or weight requirement.

3.1.5 Pile Cut-Off

Each polymeric pile provided shall be a minimum of 12 inches longer than

the specified length to allow the top to be cut-off if it is damaged during driving. Cut off piles with a smooth level cut using pneumatic tools, sawing, or other suitable methods per the polymeric pile Manufacturer's recommendations. Use of explosives for cutting is not permitted. Pile heads at cut-off shall be level and sound. The Contractor shall cut off piles at no additional cost to the Government.

3.1.6 Fastening

Fasten the polymeric piles to the existing pier as indicated.

3.2 FIELD TREATMENT

3.2.1 Polymeric Work

Field treat cuts, bevels, notches, refacing and abrasions made in the field in accordance with the Manufacturer's recommendations.

3.3 FIELD QUALITY CONTROL

3.3.1 Inspections

Inspect piles when delivered and when in the leads immediately before driving. Secure piles in their proper alignment.

When Government inspections result in product rejection, the Contractor shall promptly segregate and remove rejected material from the premises. The Government may also charge the Contractor an additional cost of inspection or testing when prior rejection makes reinspection or retesting necessary.

3.3.1.1 Straightness

Each pile shall be measured for straightness prior to driving by placing a straight line from the center of the top to the center of the tip. The line shall lie entirely within a 5 inch diameter circle centered at the centerline of the pile, when it is suspended from the head. The piles shall also be free of short crooks that deviate more than 2 inch from straightness along its overall length. Piles not meeting with criteria shall be rejected.

3.3.1.2 Cracks and Defects

Each pile shall be inspected for cracks and defects prior to driving. After the piles are installed and all connections to the structure are completed, each pile shall again be inspected for cracks and defects. The Contractor shall notify the Contracting Officer of any cracking or other defects observed, and await direction. The Contracting Officer may reject any piles with defects. The Contractor shall be responsible for all costs incurred to replace the rejected piles.

3.3.2 Pile Driving Inspection

The Contractor shall perform special inspection of the pile installation. The Contractor shall employ approved Special Inspectors as required in the paragraph entitled "QC Specialist Duties and Qualifications" in Section 01 45 00.00 20 QUALITY CONTROL.

3.3.3 Pile Records

For each pile, keep a record of the number of blows required for each foot of penetration and the number of blows for the last 6 inch penetration or fraction thereof for impact driving. Include in the record the beginning and ending times of each operation during driving of pile, type and size of the hammer used, rate of operation, stroke or equivalent stroke for diesel hammer, type of driving helmet, and type and dimension of the hammer cushion (capblock) and pile cushion used. Record re-tap data and any unusual occurrence during driving of the pile. Include in the record performance characteristics of jet pump, unassisted penetration of pile, jet-assisted penetration of pile, and tip elevation before driving and at end of driving. Notify Contracting Officer 10 days prior to driving of piles. Submit complete and accurate records of installed piles to Contracting Officer within 15 calendar days after completion of the pile driving. Make pile-driving records available to the Contracting Officer at the job site within 24 hours of each day's pile driving. A preprinted form for recording pile driving data, the Pile Driving Log, is included at the end of this section.

PILE DRIVING LOG

CONTRACT NO._____ CONTRACT NAME_____
CONTRACTOR_____ TYPE OF PILE_____
PILE LOCATION_____ PILE SIZE: BUTT/TIP: _____ LENGTH_____
GROUND ELEVATION_____ PILE TOP ELEVATION_____
PILE TIP ELEVATION_____ COMPANY_____

HAMMER: MAKE & MODEL_____ WT. RAM_____
STROKE_____ RAM RATED ENERGY_____
DESCRIPTION & DIMENSIONS OF DRIVING CAP_____
CUSHION MATERIALS & THICKNESS_____

INSPECTOR_____

"DEPTH" COLUMN OF PILE DRIVING RECORD REFERENCED TO MUDLINE ELEVATION

TIME: START DRIVING_____ FINISH DRIVING_____ DRIVING TIME_____
INTERRUPTIONS (TIME, TIP ELEV. & REASON)_____
JET PRESSURE & ELEVATIONS_____

DRIVING RESISTANCE

DEPTH FT.	NO. OF BLOWS	DEPTH FT.	NO. OF BLOWS	DEPTH FT.	NO. OF BLOWS	DEPTH FT.	NO. OF BLOWS
0	_____	10	_____	20	_____	30	_____
1	_____	11	_____	21	_____	31	_____
2	_____	12	_____	22	_____	32	_____
3	_____	13	_____	23	_____	33	_____
4	_____	14	_____	24	_____	34	_____
5	_____	15	_____	25	_____	35	_____
6	_____	16	_____	26	_____	36	_____
7	_____	17	_____	27	_____	37	_____
8	_____	18	_____	28	_____	38	_____
9	_____	19	_____	29	_____	39	_____

REMARKS_____

_____

_____

_____

PILE TOP ELEVATION: FROM DRAWING _____

TIP ELEVATION = GROUND ELEVATION - DRIVEN DEPTH = _____

DRIVEN LENGTH = PILE TOP ELEVATION - TIP ELEVATION = _____

CUT OFF LENGTH = PILE LENGTH - DRIVEN LENGTH = _____

-- End of Section --

SECTION 35 59 13.16

MARINE FENDERS

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 BUREAU OF SHIPPING (ABS)

ABS 2	(1995) Building and Classing Steel Vessels

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2006; Errata 2006) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M	(2002) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153/A 153M	(2005) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM D 1052	(2005) Measuring Rubber Deterioration-Cut Growth Using Ross Flexing Apparatus
ASTM D 1630	(2006) Rubber Property - Abrasion Resistance (Footware Abrader)
ASTM D 1667	(2005) Flexible Cellular Materials - Poly (Vinyl Chloride) Foam (Closed-Cell)
ASTM D 2240	(2005) Standard Test Method for Rubber Property - Durometer Hardness
ASTM D 3575	(2000e1) Flexible Cellular Materials Made From Olefin Polymers
ASTM D 412	(2006a) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D 470	(2005) Crosslinked Insulations and Jackets for Wire and Cable
ASTM F 2192	(2005) Standard Test Method for Determining and Reporting the Berthing Energy and Reaction of Marine Feeders

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS RR-C-271 (Rev D; Am 1) Chains and Attachments, Welded and Weldless

1.2 SYSTEM DESCRIPTION

1.2.1 Foam-Filled Fenders

Foam-Filled fenders are fenders typically manufactured by wrapping closed cell foam with a nylon reinforcement embedded in a polyurethane coating. The fenders typically used for fendering have an internal chain, though fenders having an external chain/tire netting have also been used. The fenders are typically used for berthing of medium to large vessels; vessels with considerable hull curvature; and at berths that support various ship types and sizes. The fenders can be used as stand-alone fenders, fendering between ships, or between a ship and a berthing structure.

1.2.2 Design Requirements

The Contractor shall provide a fender of his own design which is configured as required by paragraph entitled "Configuration." The Contractor's design shall utilize the products and materials as specified to provide a fender which will meet the general intent of use and the minimum testing requirements. In addition, the Contractor's design shall be adequate to assure a usable ten-year fender life, without major damage. Wherever minimum limits are given in paragraph entitled "Configuration," the Contractor shall construe these minimums to be lower construction limits on his design. These construction minimums shall be exceeded wherever required by the Contractor's design in order to meet the provisions of this specification.

1.2.3 Intent of Use

The intended use of this fender is that the fender shall be mounted to the pier as indicated on the drawings. The vessel shall be assumed to dock and undock at least 120 times during the fender's 10-year life and will be assumed to impart the energy specified in paragraph entitled "Performance Requirements" to fenders at each docking occurrence. The vessel will approach the berth, contact the fender, and then be positioned longitudinally along the berth to reach its moored position. Each berthing operation will impart the specified energies and forces to each fender including the longitudinal forces specified in paragraph entitled "Fender Pull-Through Test." While moored at a berth, the vessel will impart lateral forces to each fender equal to the sustained loads specified in paragraph entitled "Fender Sustained-Load Test" for a minimum of 200 times for 24 hours each occurrence during its 10-year life.

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.The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

FOAM-FILLED FENDERS

Resilient, foam-filled marine fenders; G

Prior to fabrication, copies of the manufacturer's catalog data including reaction, energy and percent compression curves, dimensions material specifications, and method of manufacture shall be submitted for approval. Include dimensions, material specifications, and method of manufacture.

SD-05 Design Data

FOAM-FILLED FENDERS

Design data for foam filled marine fenders; G

Submit rated performance data (RPD) and published performance curves per ASTM F 2192.

SD-06 Test Reports

FOAM-FILLED FENDERS

Fender Compression Test; G

Fender cyclic-compression test; G

Fender sustained-load test; G

Fender pull-through test; G

Skin thickness core test G

Isocynate Identification Testing; G

Connecting Chains and Hardware; G

Submit copies of reports of tests specified herein. The tests shall have been performed within three years of submittal of the reports for approval. Also, submit reports for tests specified in referenced documents which are applicable to the particular material furnished for use.

SD-08 Manufacturer's Instructions

Installation Instructions

Provide installation instructions for each fender type.

SD-10 Operation and Maintenance Data

Fender Manual

Provide fender manual for each fender type.

1.4 DELIVERY, HANDLING AND STORAGE

Fenders shall be undamaged when delivered and shall be handled and stored so as to prevent damage, such as bending or abrading end fittings, cutting of rubber, or damage to coating of hardware. Protect fenders from exposure to damaging liquids, oils, greases and extended exposure to sunlight.

1.4.1 Rejection

Fenders that are delivered to the site in a damaged condition or that are not in conformance with this specification are subject to rejection. Any rejected materials shall be replaced with suitable materials, at no additional cost to the Government.

1.4.2 Fender Marking

Unless otherwise specified, all fenders shall be identified in readable characters at least 1 in. high, either directly or on corrosion- and sunlight resistant permanently attached tags. The markings shall include the following:

a. full or abbreviated manufacturer name,

b. fender size model or part number designation,

c. fender serial number,

d. ASTM designation (including type, grade and class) or ISO number and year, as applicable,

e. initial or rated internal pressure (pneumatic and hydro-pneumatic fenders only,

f. rated performance (energy and reaction), and

g. type of reinforcement layer (pneumatic and hydro-pneumatic fenders only,) and

h. The navy shall provide a "Navy" Identification number that shall be included with above mentioned data.

1.4.3 Fender Instructions and Manual

Provide installation instructions and a fender manual describing maintenance requirements for each fender type.

1.4.4 Handling Coated Material

Store, handle and place coated material in a manner that will minimize damage to the coating and will not reduce its effective protective value. Repair damaged surfaces as directed and per the Manufacturer's recommendations. Handle coated work which is flexible in a manner that will prevent flexing sufficient to crack coating, especially when temperature is below 40 degrees F. Do not place coated surfaces on strips or skids until coating has hardened thoroughly. Wide fabric slings used for lifting, and strips, slings, blocks, skids, cradles, and other supports shall provide ample bearing areas. In transporting, fasten and protect coated materials in a manner that will prevent movement and preclude chafing and rubbing, and when unloading, do not dump or drop. Place coated material in position carefully on suitably prepared beds and with a minimum of handling.

1.5 QUALITY ASSURANCE

1.5.1 Elastomer Skin

The elastomer skin of the fender shall be free from cracks, burrs, warpage, checks, chipped or blistered surfaces, and shall have a smooth surface.

1.5.2 Foam Core

The foam core shall be homogeneous and of one piece heat laminated construction and shall not be in chip or granular form. The use of adhesive to bond the foam together is not acceptable. The form core shall not contain scraps, strips, or sheets of foam either rolled or stuffed into the required shape unless pieces are laminated together with heat in layers of uniform patterns to form a homogeneous, one piece core. Homogeneous foam rings of adequate thickness to insure performance of the fender are acceptable provided the Contractor can show a minimum 5-year performance of similar fenders. Tests shall be carried out on every batch of foam delivered, and shall be in accordance with ASTM D3575.

All foam used shall be traceable to the manufacturer of the foam, by means of production date and lot number, or other positive means. Production/Quality Control records of the fender manufacturer shall record this information for each fender manufactured. The fender manufacturer's records must be able to trace all foam used in every fender back to the manufacturer of the foam, and identify the date the foam was manufactured and tested.

The manufacturer of the foam shall provide certified test reports for each lot of foam delivered, and these records must be maintained by the fender manufacturer for a period of ten years. The fender manufacturer shall retain samples from each lot of foam used in the fenders. The samples shall be retained for a period of 5 years, and shall be subject to re-tests at the request of the purchaser of the fenders.

1.5.3 Steel Fabrication

The steel used in fabrication shall be free from kinks, sharp bends, and other conditions which would be detrimental to the finished product. Manufacturing processes shall not reduce the strength of the steel to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. Make bends by controlled means to insure uniformity of size and shape.

1.5.4 Welding

AWS D1.1/D1.1M. Welds shall be of sufficient size and shape to develop the full strength of the parts connected by the welds. Welds shall transmit stress without permanent deformation or failure when the parts connected by the weld are subjected to proof and service loadings.

1.6 FOAM-FILLED FENDERS, PNEUMATIC AND HYDRO-PNEUMATIC FENDERS - WARRANTY

Furnish the manufacturer's warranty. The warranty shall be issued directly to the Government and shall not be limited in dollar value. The warranty period shall be not less than 10 years from the date of Government acceptance of the work.

PART 2 PRODUCTS

2.1 FOAM-FILLED FENDERS

2.1.1 Configuration

Fenders shall have cylindrical mid-bodies with conical or hemispherical shaped ends terminating in an end fitting on the cylinder's centerline at each end. The diameter of the mid-body shall be 96 inches minimum, and the length of the mid-body shall be 97 inches minimum. If conical ends are provided, they shall have an angle of 60 to 75 degrees, when measured from the central axis of the fender. The fittings at either end shall be connected through the center of the fender by a chain, shall terminate in a clevis fitting sized for a 2 inch shackle and shall swivel to allow the end fitting to rotate freely on the axis of the fender. The length of the fender from eye to eye of the end fittings shall be a minimum of 168 inches. Design end fitting as small as possible to transmit the ultimate load of the shackle to the fender. End fitting shall be sized so as not to contact loading surfaces when the fender is compressed to 30 percent of its original diameter (70 percent compression). Fill interior of the fender with energy absorbing closed-cell foam as specified. The use of chipped or particulate foam is not acceptable.

2.1.2 Foam Core

The energy absorbing foam core shall be a closed-cell cross-linked polyethylene foam with the following properties:

a. Density, ASTM D 1667, 3.5 to 5.0 lbs/ft^3

b. Tensile strength, ASTM D 3575 or ASTM D 412, 60 psi minimum

c. Elongation (ultimate), ASTM D 3575 or ASTM D 412, 140 percent minimum

d. Water absorption percent volume after 24 hour exposure, ASTM D 1667, 5.0 percent maximum

e. Continuous service temperature, -65 to +120 degrees F

f. 25 percent compressive set, ASTM D 1667, 8 percent maximum *

g. 50 percent compressive set, ASTM D 3575, 12 percent maximum *

* Contractor option: Compressive Set of foam core material shall be based on either the 25 percent or the 50 percent requirement listed.

2.1.3 Fender Skin

The outer fender skin shall be minimum 1.50 inches thick and constructed of elastomer as specified. Filament reinforcing is required. Twelve separate filament reinforcing wraps shall be applied as specified under Filament Wrap. The filament wraps shall be evenly distributed in the inner 80 percent to 90 percent of the coating thickness. The outer 10 percent to 20 percent of elastomer shall have no filament reinforcing. The elastomer and filaments shall be applied in a continuous manner to assure adhesion between the various layers. The connection of the skin to the end fittings shall be designed and sized to transmit twice the safe tensile capacity of the chain into the fender skin.

2.1.3.1 Elastomer

The elastomer used in the fender skin shall be 100 percent PTMEG (polytetramethyleneether glycol) polyether urethane elastomer, ultraviolet stabilized with 2.5 percent carbon black or equivalent, with the following unreinforced properties:

a. Shore A. hardness, ASTM D 2240, 75 to 95.

b. Tensile strength, ASTM D 412, 2000 psi minimum.

c. Elongation (ultimate), ASTM D 412, 300 percent minimum.

d. Tear strength, ASTM D 470, 180 lbs/inch minimum.

e. Flex life (Ross), ASTM D 1052, 10,000 cycles minimum.

f. Abrasion resistance (NBS), ASTM D 1630, 100 minimum.

2.1.3.2 Filament Wrap

Construct each filament reinforcing wrap of continuous filaments applied in a helical pattern, at a helix angle of 45 to 60 degrees to the longitudinal axis of the buoy. A wrap shall consist of two such filament helixes of equal but opposing helix angles. The spacing between the filaments in the same helix shall be no more than 1/8 inch, measured in a direction parallel to the longitudinal axis of the fender. Each wrap shall extend along the entire longitudinal axis of the fender and shall also encase the fender end fittings and secure them to the fender body. The reinforcing filaments shall be nylon tire cord of 2520 denier weight with the following properties:

a. Tensile Strength (single filament), 51 lbf

b. Elongation (ultimate), 16 percent

c. Filament spacing, 0.16 maximum

d. Helix angle, 45-60 degrees

2.1.3.3 Color

Fender skin color shall be black throughout the entire thickness. Galvanized hardware shall be unpainted.

2.1.3.4 Repairability

The fender casing shall be repairable in the event of tears or punctures in the elastomer skin. The repaired area shall have not less than 90 percent of the properties as specified in paragraph entitled "Elastomer." Required repair materials shall be readily available from the fender manufacturer.

2.1.4 Internal Hardware

The internal chain connecting the two end fittings and the two end fittings shall be galvanized in accordance with ASTM A123/A123M or ASTM A153/A153M as appropriate. The chain and end clevis fitting shall have a minimum ultimate tensile capacity of 144,000 pounds. The internal chain and end

clevis fitting shall have a minimum ultimate tensile capacity of 130,000 pounds. Shackles shall be 2 inches and shall have a minimum ultimate tensile capacity of 70,000 pounds.

2.1.5 Performance Requirements

Each foam-filled fender shall have the following performance characteristics:

SIZE	ENERGY ABSORPTION at 60% compression	REACTION FORCE at predicted energy attainment
8'diameter x 14'	619 ft-kips	288 kips

The resilient, foam filled marine fenders shall be designed so that when compressed across its diameter by two parallel flat plates extending the full length and width of the fender, the fender shall absorb 619,000 foot-pounds of energy ±15 percent when 60 percent compressed (i.e. to a dimension of 40 percent of its original diameter) with a corresponding load of not more than 288,000 pounds ±15 percent. The fender shall also be designed to withstand a sustained reaction force of 242,000 pounds for a duration of not less than 24 hours each occurrence for at least 200 occurrences during its 10-year predicted life.

2.1.6 Source Quality Control

2.1.6.1 Fender Compression Test

Compress fender along its diameter between two parallel flat plate surfaces to a compressed dimension of 40 percent of its original diameter. Record load and the corresponding deflection at one inchincrements and plot as a graph of load versus deflection. The load-deflection curve shall then be integrated to generate an energy-deflection curve for the fender. The fender shall meet the energy and force performance requirements of the paragraph entitled "Performance Requirements." After compression of the fender to 40 percent of its original diameter (60 percent compression) the fender shall rebound to 90 percent of its original diameter within two minutes after the load is removed, and to 95 percent of its original diameter within 30 minutes after the load is removed.

2.1.6.2 Fender Cyclic-Compression Test

Compress the fender along its diameter between two parallel flat plate surfaces to a compressed dimension of 40 percent of its original diameter. Repeat the compression and release cyclic loadings for a minimum of 10 full cycles of compression. Permanent deformation, cracking, or tearing of the fender skin, fender core, or end fittings shall constitute failure of this test.

2.1.6.3 Fender Sustained-Load Test

Apply a 242,000 pound compressive load and hold this load for 24 hours. Record load and deflection each hour. Immediately after release of the load, measure rebound of the fender. Continue to record fender rebound for 24 hours. Failure of the fender or foam core to rebound to 90 percent of its original diameter after 24 hours shall constitute failure of this test. If the foam core is not bonded to the skin of the fender, devise and execute a means for measuring rebound of the foam core and for measuring the void between the foam core and the skin. The maximum rate of

compression per minute shall be 20 percent of the total reaction force at 60 percent compression. The full compression cycle, not including rebound, shall take a minimum of 5 minutes.

2.1.6.4 Fender Pull-Through Test

Devise and perform a test which will measure the resistance of the end fittings and internal chain to pull through the longitudinal axis of the fender. Failure of the chain, end fittings, or skin to resist at least 70,000 pounds of pull-through tension shall constitute failure of this test. After loading, evidence of permanent deformation, cracking, or tearing of the fender or end fittings shall also constitute failure of this test.

2.1.6.5 Skin Thickness Core Test

After delivery of all of the fenders to the construction site and before fender installation, perform a minimum of 3 skin thickness tests per fender for each of 2 fenders to be selected at random by the Contracting Officer. Test locations on the fenders will be selected by the Contracting Officer. Each test shall consist of taking a 1/4 inch diameter (minimum) to 1/2 inch diameter (maximum) core from the fender skin which can be removed from the skin and examined for thickness of elastomer and placement of reinforcing (when reinforcing is required). Take skin thickness measurements from the core sample and record measurements noting placement of reinforcing. Where the skin thickness measurement is less than the specified minimum, or the minimum required by the Contractor's design (whichever is greater) by more than 10 percent, reject the fender. In addition, if the average of skin thickness tests for one fender is not equal to or greater than the specified minimum, or the minimum required by the Contractor's design (whichever is greater), reject the fender. If tested fender is rejected, at the option of the Contracting Officer, the Contractor shall then conduct thickness tests for additional fenders. Replace rejected fenders with fenders meeting the provisions of this specification. Test replacement fenders for skin thickness as specified herein. Skin thickness tests will be witnessed by the Contracting Officer.

The Contractor shall notify the Contracting Officer 10 working days prior to conducting skin thickness tests. After skin thickness testing, patch core holes with elastomer of the same composition and thickness as the specified elastomer skin. Nylon reinforcing is not required in core hole patches.

2.1.7 Isocynate Identification Testing

Concurrent with the core sampling required, a fender skin sample shall be taken for the purpose of isocynate identification. One skin sample shall be submitted for each of the 2 fenders selected at random by the Contracting Officer. A skin sample shall consist of 3 each, 1 inch diameter pieces. These samples shall be removed from the fender and replaced with pre-fabricated plugs of urethane (equal to that of the of the fender skin) supplied by the manufacturer. The manufacturer, or his assigned agent shall insert and seal the replacement plugs.

The samples shall be sent, by the Contracting Officer, to TRI/Austin, Inc., 415 Crystal Creek Drive, Austin, TX 78746 (phone 512-263-2101) or an equivalent, approved testing facility. A test to determine the isocynate base for the urethane skin shall be conducted on the samples (TRI Test Number N7901-A). The procedure for testing is as follows:

1. The polyurethane is thermally decomposed by heating a small amount in a test tube.

2. The evolved fumes are absorbed onto filter paper that has been treated with a solution of 4-nitrobenzene diazofluoroborate in methanol.

3. Characteristic color changes are indicative of the different diisocyanates:

Color	Diisocyanate
Violet	1,5-naphthalene
Red-Brown	2,4- and 2,6-toluene dimerized 2,4-toluene
Yellow	4,4-Diphenylmethane

The test results must indicate that a toluene diisocyanate base exists or the fender shall be rejected.

2.1.8 Connecting Chains and Hardware

The connecting chain, swivel and shackles shall be galvanized in accordance with ASTM A 123/A 123M or ASTM A 153/A 153M, as appropriate. The hardware shall be as follows:

Item	Type
Chain	ABS 2, Grade 2 or 3, Stud Link or Open Link
Shackle	FS RR-C-271, Type IVA, Class 3, Grade A
Swivel	FS RR-C-271, Type VII, Class 2

All connecting bolts and pins shall be of mild steel, matching the properties of the shackle bow. For Class 3 shackles, the bolt or pins shall be secured in place with stainless steel (Type 316) cotter pins or locking pins.

PART 3 EXECUTION

3.1 FOAM-FILLED FENDERS

Install fenders as indicated on the drawings and in accordance with the manufacturer's specifications and shop drawings. Bolts shall be tightened an additional 1/3 turn of the nut, from the snug tight condition, and secured with cotter pins.

3.2 WELDING

Welding shall be performed in accordance with AWS D1.1/D1.1M.

3.3 CONNECTIONS

3.3.1 Antiseize Compound

Coat threads of bolts prior to applying washers and nuts. Recoat bolt thread projection beyond nut after tightening.

-- End of Section --

SECTION 35 59 13.19 21

BUCKLING RUBBER FENDERS

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.

ASME INTERNATIONAL (ASME)

ASME B18.22.1	(1965; R 2008) Plain Washers

ASTM INTERNATIONAL (ASTM)

ASTM A 307	(2012) Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
ASTM A47/A47M	(1999; R 2009) Standard Specification for Ferritic Malleable Iron Castings
ASTM D 1171	(1999; R 2007) Rubber Deterioration - Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens)
ASTM D 2000	(2008) Standard Classification System for Rubber Products in Automotive Applications
ASTM D 395	(2003; R 2008) Standard Test Methods for Rubber Property - Compression Set
ASTM D 412	(2006ae1e2) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D 471	(2006; R 2008) Standard Test Method for Rubber Property - Effect of Liquids
ASTM D 573	(2004) Standard Test Method for Rubber - Deterioration in an Air Oven
ASTM D 575	(1991; R 2007) Rubber Properties in Compression
ASTM D 624	(2000; R 2007) Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
ASTM D 746	(2007) Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact

U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-PRF-907 (Rev F) Antiseize Thread Compound, High Temperature

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-03 Product Data
- Fender
- Threaded Rods; G
- Hardware

SD-05 Design Data
- Reaction--energy--percent compression curve
- Dimension
- Fender material specifications
- Design calculations

SD-06 Test Reports
- Minimum Tensile Strength
- Shore Hardness (Durometer)
- Modulus at 400 Percent Elongation
- Maximum Compression Set
- Tear Resistance
- Minimum Elongation
- Ozone Resistance
- Low Temperature Impact Resistance
- Water Absorption
- Heat Resistance
- Compression Deflection Resistance
- Fender Compression Test
- Angular Fender Compression Test

Tests shall have been performed on the specified fender within 5 years of submittal of the reports for approval. Test reports shall be accompanied by notarized certificates from the manufacturer certifying that the tested material is of the same type, quality, manufacture and make as that proposed to be supplied.

SD-08 Manufacturer's Instructions
- Installation Instructions

1.3 DELIVERY HANDLING AND STORAGE

Fenders shall be undamaged when delivered and shall be handled and stored so as to prevent damage, such as bending or abrading end fittings, cutting of rubber, or damage to coating of hardware. Protect fenders from exposure to damaging liquids, oils, greases and extended exposure to sunlight.

PART 2 PRODUCTS

2.1 CONFIGURATION

Fender shall be extruded and shall be continuous in the length indicated. The fenders shall have a truncated "A" cross section shape and be attached to the structure at the base, the widest dimension, of the square. The connecting hardware shall be fully exposed. No encased hardware or molded fenders shall be allowed. The fender and hardware shall be designed and factory tested to the loads per linear foot of fender specified in paragraph entitled "PERFORMANCE," for angles of approach of 0 and 15 degrees. Fender anchor bolts and method of anchorage shall be of the size and spacing required by the manufacturer's design and testing; however, the size and spacing of anchor bolts indicated on the drawings shall be construed to be the minimum required, unless exceeded by the requirements of the fender manufacturer's design.

2.2 ELASTOMER

The elastomer shall be the ethylene propylene dimonomer (EPDM), as specified in ASTM D 2000, with the following properties:

ELASTOMER PROPERTY REQUIREMENTS

Minimum Tensile Strength (ASTM D 412)	2000 psi
Shore Hardness (Durometer) (ASTM D 412)	70 ± 5
Modulus at 400 Percent Elongation (ASTM D 412)	900 psi
Maximum Compression Set (ASTM D 395 Method B, Maximum Percent 22 Hr. at 158 Degrees F	25 Percent
Tear Resistance (ASTM D 624; DIE B Min. 150 lb/in)	200 lb/in.
Minimum Elongation (ASTM D 412)	300 Percent
Ozone Resistance (ASTM D 1171 Exposure Method B; 70h Bent Loop at 100 Degrees F; 50pphm)	80 H ±
Low Temperature Impact Resistance (ASTM D 746 Procedure B; Non-Brittle at -67 Degrees F)	-40 Degrees F
Water Absorption (ASTM D 471 Method B; 70h at 212 Degrees F.; Volume Change ±5 Percent	10.0 Percent
Heat Resistance (ASTM D 573; 70h at 212 Degrees F Ch Tensile, Elong. -25 Percent,	Shall exceed requirements

ELASTOMER PROPERTY REQUIREMENTS

Hardness +10	
Compression Deflection Resistance (ASTM D 575 Method B; 3 S Dwell at 73 Degrees F	Shall exceed requirements

2.3 HARDWARE

2.3.1 Plates and Angles

ASTM A36, for steel for plates, angles, and miscellaneous hardware required to attach the fenders to the structure.

2.3.2 Nuts, Bolts, and Washers

ASTM F 593 or ASTM F 594, Group 2 (316 alloy) stainless steel for nuts and bolts. ASME B18.22.1 for washers, except fabricate washers of 316 alloy stainless steel.

2.3.3 Antiseize Compound

MIL-PRF-907.

2.4 PERFORMANCE

Buckling Type Fender: When vertically compressed to 57.5% compression, one element shall absorb 14,000 foot-pounds of energy with a corresponding load of 32,000 pounds.

2.4.1 FENDER COMPRESSION TEST

Compress fender between two parallel flat plate surfaces to a compressed dimension of 47.5 percent of its original height. Record load and the corresponding deflection at 1/4 inch increments and plot as a graph of load versus deflection. The Load-Deflection curve shall then be integrated to generate an Energy-Deflection curve for the fender. After compression of the fender to 47.5 percent of its original height, the fender shall be rebound to 98 percent of its original height within ten minutes after the load is removed.

2.4.2 ANGULAR FENDER COMPRESSION TEST

Compress fender between two flat plate surfaces, at an angle of 15 degrees to each other, to a compressed dimension of 40 percent of its original height. Record load and the corresponding deflection at 1/4 inch increments and plot as a graph of load versus deflection. The Load-Deflection curve shall then be integrated to generate an Energy-Deflection curve for the fender. After compression of the fender to 47.5 percent of its original height, the fender shall rebound to 98 percent of its original height within 10 minutes after the load is removed.

2.4.3 Threaded Rods, Bolts, & Nuts

Provide bolts ASTM A 307, Grade C, ASTM A 36/A 36M or ASTM F 1554, Grade 36; for bolts, anchor rods, and end threaded rods. 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. Provide timber connectors and other metal fastenings of type and size indicated on the drawings.

Score exposed threads or provide other measures to ensure nuts do not back off.

2.4.3 Nuts

ASTM A 563, Grade and Style for applicable ASTM bolt standard recommended.

2.4.4 Washers

Provide cast-iron ogee conforming to ASTM A48/A48M, malleable iron washers shall conform to ASTM A47/A47M, plate or cut washers shall conform to ASTM F844. Provide "Dock Washers" for all "oversized" holes.

2.4.5 Concrete Anchors

Refer to Specification SECTION 05 13 00.20 21 "POST-INSTALLED CONCRETE ANCHORS" for concrete adhesive anchor material requirements.t

PART 3 EXECUTION

3.1 INSTALLATION

Install the fenders in the position and at the spacing indicated on the drawings.

3.1.1 Manufacturer's Recommendations

All fenders, fender panels, and chain brackets to be installed in accordance with manufacturers recommendations using stainless steel grade 316 embedded cast-in anchors, anchor bolts and washers. Anchor bolt dimensions, quantities and locations shown are the minimum acceptable. Score threads after installation.

3.1.2 Clash Prevention

Coordinate with fender supplier, steel reinforcement fabricator, precast concrete supplier and formwork supplier to avoid clashes between anchors and reinforcement.

-- End of Section --