

SECTION 02480

AQUAGATE PLACEMENT

PART 1 - GENERAL

1.01. SUBMITTALS

- A. AquaGate Placement Work Plan as detailed in Part 3.01 of this specification section.
- B. Contractor's Construction Schedule.
- C. Daily Reports as described in Part 3.02 of this specification section.
- D. Environmental Protection Plan (EPP) including Spill Contingency Plan, as described in Part 1.06 of this specification section.

1.02. DESCRIPTION OF THE WORK

- A. The objective of the Work is to place the AquaGate product as uniformly as practicable over the placement area in order to demonstrate and validate the placement and distribution in deep water areas with vessel traffic of reactive amendments for treatment of contaminated sediment in an active Department of Defense (DoD) harbor setting.
- B. The Work includes placement of AquaGate in berth and under pier areas, as shown in the Contract Drawings.
- C. Construction will be during daylight low tides, targeted for August 2012.

1.03. MOBILIZATION/DEMobilIZATION

- A. Mobilization and demobilization shall include supplying all equipment and supplies necessary to perform the Work.
- B. Mobilization includes but is not limited to transportation and other costs incidental to delivery of the equipment and materials to the general work area in condition ready for operation. AquaGate materials will be provided to the Contractor at the Contractor's designated location (delivered by truck) for Contractor to load onto barge.
- C. Mobilization includes preparation of all reports, schedules, and plans required prior to start of the Work.
- D. Demobilization includes but is not limited to cleanup of the site and removal of the equipment from the work site after completion of the work.

1.04. AQUAGATE CAP PLACEMENT

- A. AquaGate placement shall be performed to the horizontal and vertical extents shown on the Contract Drawings which includes both open berth area and under pier area. Based on site investigations to be performed, a determination will be made regarding application over areas with steep slopes. Contract Drawings will be updated to indicate horizontal extent of placement if warranted.
- B. AquaGate shall be placed using a conveyor belt-type equipment to evenly broadcast material from a barge in a controlled and measurable fashion.
- C. The Contractor's AquaGate Placement Work Plan shall fully describe material placement methodology, material volume control, horizontal positioning during placement and the

Contractor's methodology to verify material thickness during placement.

- D. The Owner may place rain gauge buckets to measure placement thickness or use divers to observe AquaGate placement thickness on the bottom surface. The Owner will visually observe quantity of material and apparent uniformity of placement.

1.05. **JOB CONDITIONS**

A. Location

The Work is located in Sinclair Inlet adjacent to and under Pier 7 of the Puget Sound Naval Ship Yard and Intermediate Maintenance Facility (PSNS&IMF; Bremerton, WA). The site is part of the Bremerton Naval Complex (BNC), which is located in the city of Bremerton, Kitsap County, Washington

B. Site Geology/Hydrogeology

1. The shoreline is an industrial waterfront, armored with quay walls and riprap, with several large over-water structures within an active Naval Shipyard.
2. Recent bathymetric survey data shows water depths generally in the berth range between 40 to 50 feet MLLW. Offshore of the site, water depths are generally 50 feet MLLW.
3. Nearshore sediment along the north shore of Sinclair Inlet and in the central inlet are dominated by silt and clay.
4. Tidal currents and winds are the primary sources of water circulation in Sinclair Inlet.
 - a. Weak tidal currents move water in and out of the inlet with a maximum velocity of 0.2 to 0.3 knots. Analysis of tidal currents in 1994 indicated residual current speeds of less than 0.2 knots (10 cm/s) for more than 90 percent of the time, regardless of site location, water depth, or season. Residual current speeds higher than 0.2 knots were rare, and speeds higher than 0.4 knots occurred less than 0.5 percent of the time.
 - b. Surface currents generally flow out of the inlet, although surface current flow into the inlet has been observed during summer months.
 - c. Near-bottom currents primarily flow into the inlet, regardless of season. Currents are generally not capable of resuspending bottom sediments.
 - d. Various studies have noted a predominantly clockwise gyre in the inlet that tends to redeposit most suspended sediment in the inlet.
5. The prevalent southwesterly winds push surface waters out of the inlet, bringing deep water to the surface for replacement. Observations during the winter and summer of 1994 showed that winds having sustained speeds of 9 or 10 mph from the southwest generated near- surface and mid-level currents out of and into the inlet, respectively. Wave climate in the inlet is dictated by wind-generated waves and vessel wakes. Vessel traffic ranges from small recreational and commercial fishing vessels to occasional larger tug and Navy ship traffic. Wind action in Sinclair Inlet generally creates a wave height range of 0.5 to 2.5 feet. Maximum wave heights are generated with winds from the southwest.

C. Contaminant Distribution

1. Pier 7 lies within an area known as Operable Unit B Marine (OUB Marine) that was previously subject to a Superfund sediment cleanup (USEPA 2000).
2. The areas within OUB Marine were found to have elevated PCB and mercury levels in

sediment.

D. Debris

Significant debris should be expected in the placement areas. Debris is defined as any material other than sediment, such as logs, wood, metal, wire rope, cable, chain, steel bands, anchors, urban trash, etc. AquaGate material shall be placed over and around debris to the extent practicable.

E. Berth Area Use

Submarines are partially deconstructed in the berth adjacent to Pier 7 prior to moving into dry pier at the head of the berth. The submarine currently berthed within the placement area is scheduled to be moved into dry pier around the end of June 2012. Another submarine is scheduled to move into the berth area in October 2012.

F. Under Pier Area

1. The under pier placement area is shown on the Contract Drawings.
 - a. Placement area extends from Ballard 20 toward offshore and extends approximately half way under the pier, see Contract Drawings.
 - b. The pier deck elevation, the fender piling openings in this area and the under pier structural pilings spacing are shown on the Contract Drawings. Actual field dimensions may vary slightly.
2. Due to restrictions caused by fender piling and structural piling, all under pier areas are not equally accessible. Contractor shall modify placement method as appropriate in areas of limited access to achieve uniform placement to extent practicable. This could require some limited hand placement such as using hand-held buckets from a small skiff.

1.06. **ENVIRONMENTAL PROTECTION PLAN AND SPILL CONTINGENCY PLAN**

- A. The Contractor shall prepare a brief Environmental Protection Plan as part of their submittals.
 1. This plan shall address all steps to be taken to protect the environment during performance of the work.
 2. This plan shall include but not be limited to equipment maintenance and fueling procedures, description of spill control equipment and its location and usage.
 3. This plan shall include reporting systems to be followed in the event of a spill or visible sheen on the water.
- B. The Contractor shall prepare a spill contingency plan as part of the Environmental Protection Plan. The spill contingency plan shall conform to federal and State of Washington requirements.
- C. In the event of a spill, the Contractor shall conform to reporting systems established by the Environmental Protection Plan.

1.07. **MISPLACED MATERIAL**

- A. Should the Contractor, during the execution of the work, lose, dump, throw overboard, sink or misplace anything whether it is material (includes sediment, debris etc) or equipment, barge, machinery, or an appliance, the Contractor shall promptly recover and remove the same and restore the area as appropriate.

- B. The Contractor shall give verbal notice to ENGINEER before the end of the shift in which misplaced material occurs, followed by written confirmation of the description and location of such material or equipment and shall mark and buoy same until they are removed.
- C. Should the Contractor refuse, neglect, or delay compliance with this requirement, such material or equipment may be removed by the Owner, and the cost of such operations may be deducted from any money due to the Contractor.

1.08. **PERMITS**

This Work at the Bremerton Naval Complex (Pier 7) is being conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). Implementation of the CERCLA remediation process is outlined in Title 40 of the Code of Federal Regulations (40 CFR) Part 300, National Oil and Hazardous Substance Contingency Plan (NCP).

PART 2 - PRODUCTS

2.01. **AQUAGATE MATERIALS**

- A. AquaGate Material is the product AquaGate+PAC as described in the manufacturer's specification sheet. AquaGate is manufactured by AquaBlok Ltd., Toledo, Ohio.
- B. AquaGate is a manufactured composite particle using a crushed stone core coated with a combination of bentonite-based clay and powder activated carbon materials. The anticipated formulation for this project is approximately 2-5% (by weight) PAC (powder activated carbon), 5-10% clay (calcium bentonite) and 85% aggregate (1/4"-3/8"). After placement in the water, the powder activated carbon falls from the core and mixes naturally with the bottom sediment. The dry bulk density is 85-90 lbs/cf.
- C. AquaGate Material will be provided to the Contractor at Contractor's designated location (delivered by truck). Material will be packaged in super sacks (bulk bags) of approximately 2,400 lb weight. The AquaGate material is highly water sensitive. The bulk bags are water resistant, but not water proof, care needs to be taken to protect the material from water damage at all times. Contractor will be responsible for acceptance and off-loading of material shipped from the manufacturer and the transfer of the material to the project installation site.

PART 3 - EXECUTION

3.01. **AQUAGATE PLACEMENT WORK PLAN**

- A. More than 10 calendar days prior to start of work, the Contractor shall submit to ENGINEER, for approval, a detailed, written project AquaGate Placement Work Plan. As a minimum, the plan shall contain the following:
 - 1. Order in which the work is to be performed including: the work sequence; number, types and capacity of equipment to be used; hours of operation; and the time required to complete each activity.
 - 2. List of key personnel and supervisory chain for approval by ENGINEER.
 - 3. Methods, procedures and equipment to be used for the following activities:

- a. Mobilization of equipment to the site
 - b. AquaGate placement including material handling and placement verification methods
 - c. Refueling procedures and estimated frequency for each piece of equipment
 - d. Site clean-up and restoration
4. Layout of the work and positioning of placement equipment and environmental monitoring, including an Environmental Protection Plan with procedures for emergency spill containment and removal operations.
 5. A copy of the Contractor's intended daily report format for approval by ENGINEER.

3.02. **REPORTING**

A. Daily Reports

1. The Contractor shall prepare and maintain daily reports of operations and furnish an electronic copy to ENGINEER by 3 pm on the day after the date of the report.
2. On a weekly basis, the Contractor shall submit hard copies of that week's daily reports signed by their onsite Project Manager.
3. Information to be included as a minimum in the daily report will be the date, period covered by the report, equipment used, description of activity, location of activity, quantity of material placed that day and to date, downtime and delays to the operation, safety, and other relevant comments concerning the conduct of the operation. The report shall include the results of all inspections, surveys and monitoring activities, including thickness measurements of placements.

3.03. **QUALITY CONTROL**

A. Layout of Work

1. The Contractor shall lay out the work from horizontal and vertical control points indicated on the Contract Drawings and shall be responsible for all measurements taken from these points. The contractor will be provided with digital copy of the project plans for their use.
2. The Contractor shall furnish all ranges, buoys and other markers necessary to define the work and to facilitate inspection.
3. It shall be the responsibility of the Contractor to maintain all points established for the work until authorized to remove them. If such points are destroyed by the Contractor or disturbed through its negligence prior to authorize removal, they shall be replaced by the Contractor at its own expense.

- #### B. The contractor shall propose a methodology for maintaining horizontal positioning during all placement operations and for verifying placed cap thickness during placement.

3.04. **CONDUCT OF AQUAGATE PLACEMENT**

A. AquaGate Placement

1. All equipment and materials shall access the site from the water to limit disruption to base operations.

- a. Any other access shall be approved by the Owner or the Owner's Designee.
 - b. Supervision and support personnel may be located on the pier.
 - c. All installation and placement quality control efforts shall be performed from the application barge(s).
2. The Contractor shall employ placement methods and equipment designed to reduce impacts to water quality.
 3. The Contractor shall handle and place AquaGate per the manufacturer's recommendations.
 4. The Contractor shall avoid excessive or rough re-handling of AquaGate, which can cause the coating to abrade or crack from the core.
 5. The Contractor shall keep AquaGate dry until placement.
 6. The Contractor shall place AquaGate so that:
 - a. A nominal 2 inch of cover is achieved over the placement area (approximately 15 lb/SF application rate).
 - b. The AquaGate placement is as uniform as practicable over the placement area.
 7. The Contractor shall broadcast AquaGate over the placement area using articulated, extendable conveyor belt-type equipment operating from a suitable sized barge.
- B. AquaGate Under Pier Placement
1. The Contractor shall perform Work during day light low tides to improve under pier access.
 2. The Contractor may need to employ a diffuser or baffle plate at the end of the conveyor to:
 - a. Improve placement around pilings or to minimize any shadowing effect that may take place.
 - b. Distribute AquaGate materials over a wider swath.
 - c. Reduce windrowing.
 3. The Contractor may be required to hand place AquaGate material in locations that the broadcast conveyor cannot reach, such as behind pilings.

3.05. **HAZARDOUS MATERIAL**

The Owner does not expect hazardous material to be within the capping area. If such material is encountered, the Contractor shall immediately notify Owner or Owner's Designee to determine the course of action to be taken.

3.06. **FINAL EXAMINATION AND ACCEPTANCE**

The Work will be considered to be complete when the Contractor has placed all of the provided material within the extents shown on the Contract Drawings in as uniform a manner as practicable. Contractor shall subdivide placement area into subareas for material placement and quantity tracking.

END OF SECTION

ATTACHMENT A

AquaGate Material Spec Sheet

AquaGate+PAC™

Background

AquaGate+PAC (Powdered Activated Carbon) is a patented, composite-aggregate technology resembling small stones typically comprised of a dense aggregate core, clay or clay-sized materials, polymers, and fine-grained activated carbon additives.

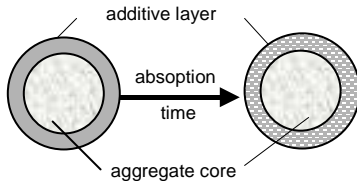


Figure 1. Configuration of PAC-coated particle.

AquaGate+PAC serves as a delivery mechanism to reliably place reactive capping materials into aquatic environments.



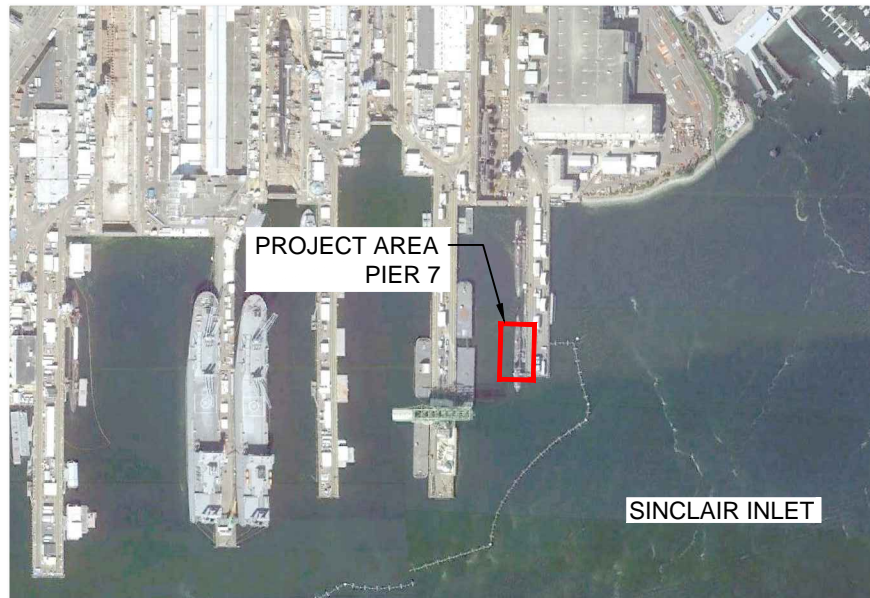
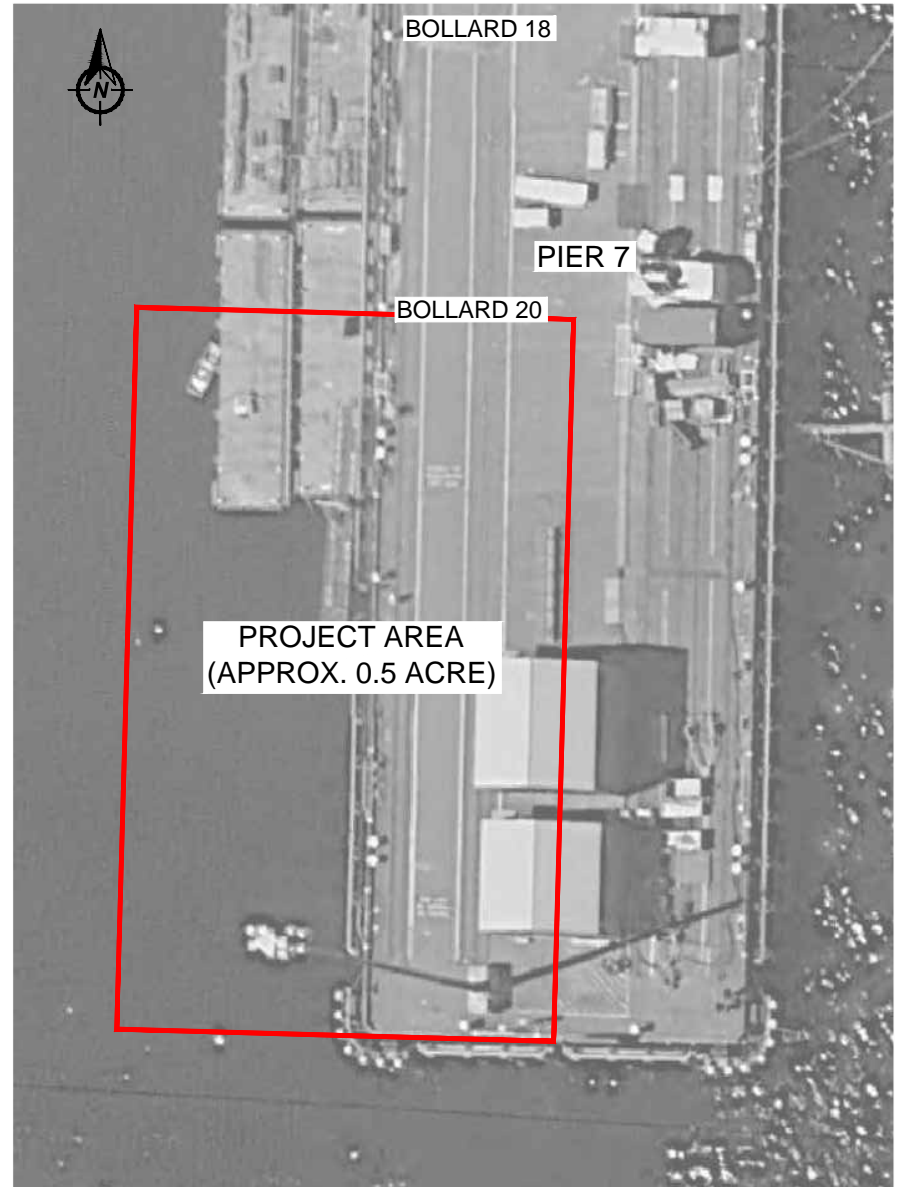
Product Specifications

Aggregate:	Nominal AASHTO #8 (1/4-3/8") or custom-sized to meet project-specific need * Limestone or non-calcareous substitute, as deemed project-appropriate
Clay:	Bentonite (or montmorillonite derivative) * Typically 5 – 10% by weight
Activated Carbon:	Powdered – Iodine Number 800 mg/g (minimum) <ul style="list-style-type: none"> ○ 99% (minimum) through 100 mesh sieve ○ 95% (minimum) through 200 mesh sieve ○ 90% (minimum) through 325 mesh sieve * Typically 2 – 5% by weight
Binder:	Cellulosic polymer
Permeability:	1×10^{-1} to 1×10^{-2} cm/sec
Dry Bulk Density:	85 – 90 lbs/ft ³

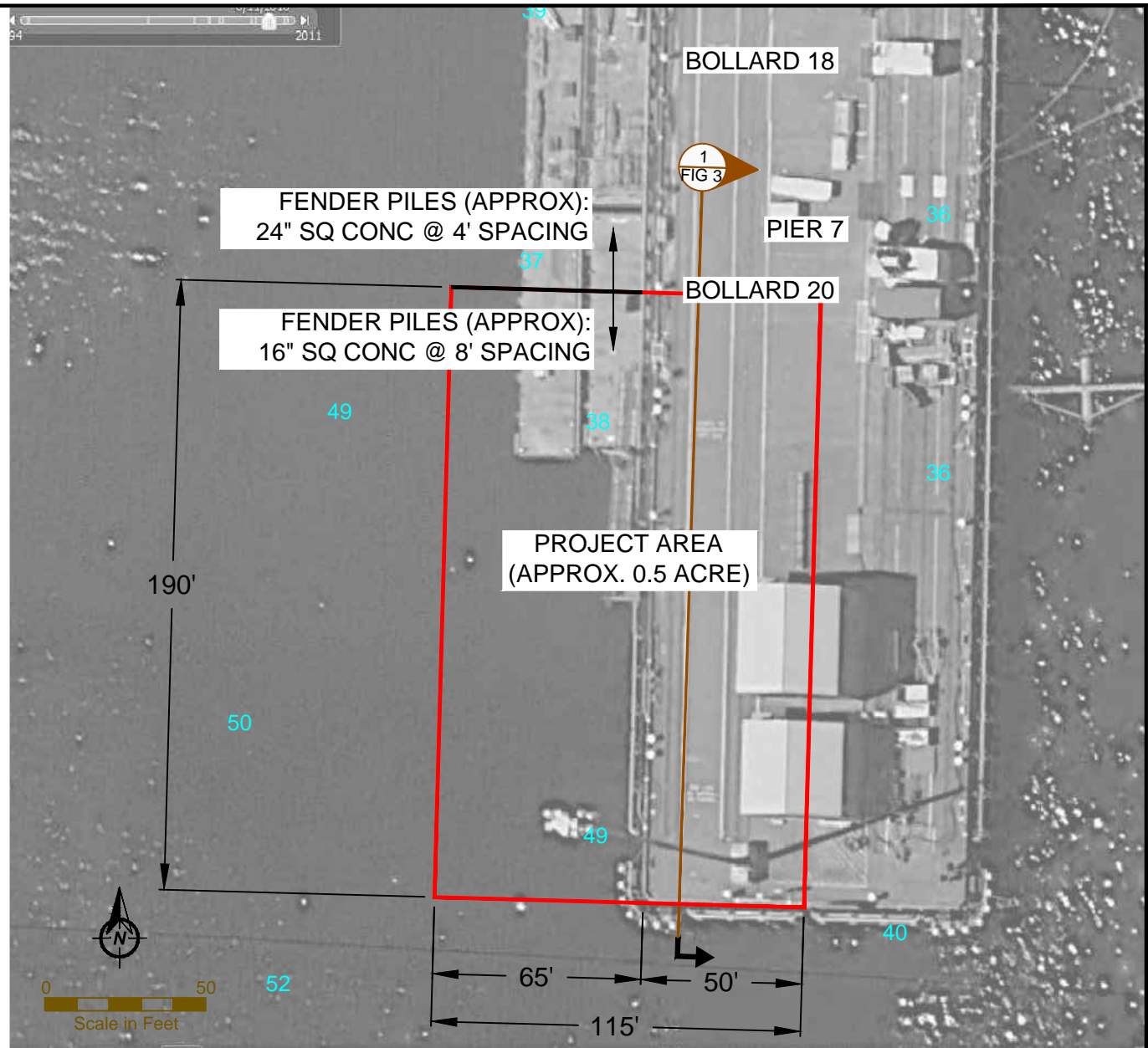


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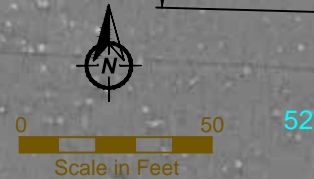


SPAWAR Systems Center Pacific		Figure 1
PSNS Bremerton Reactive Amendment Treatability Study Vicinity Map		
Dalton, Olmsted & Fuglevand, Inc.		
		May 02, 2012



LEGEND

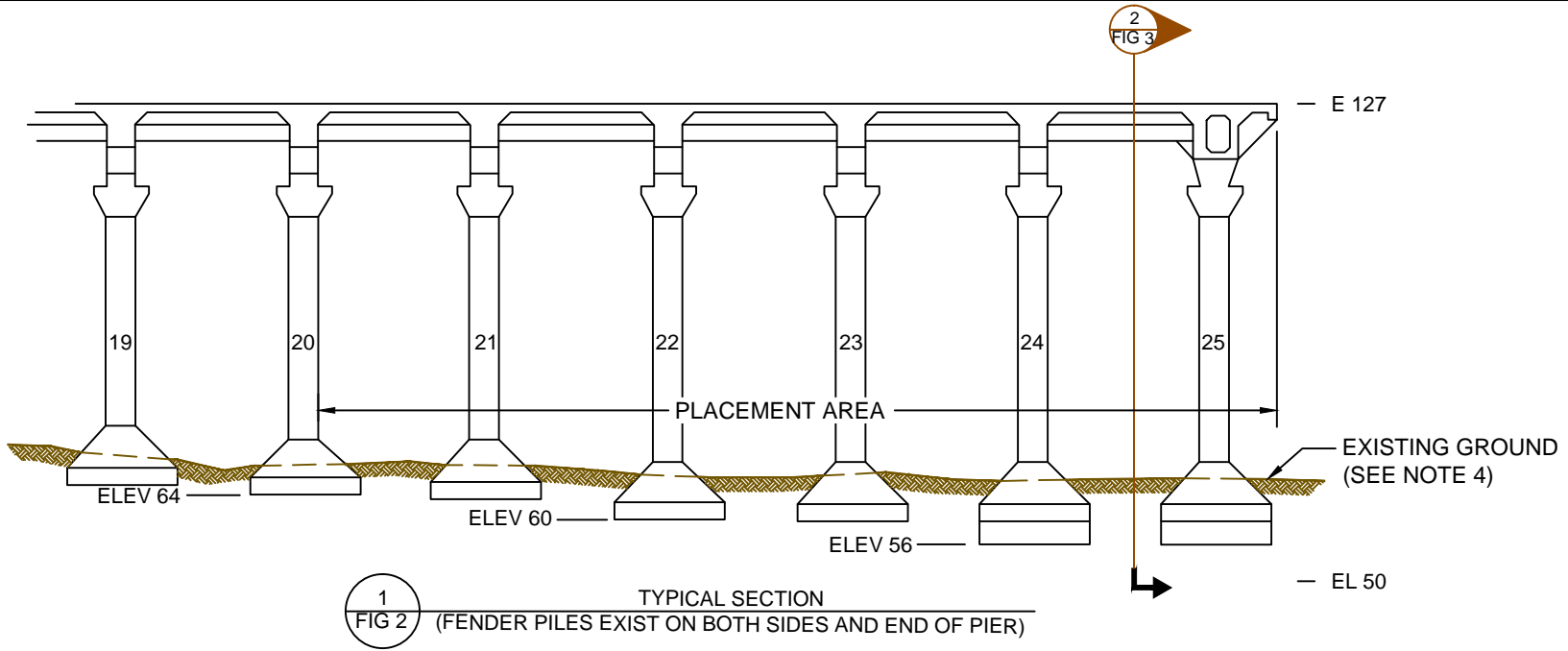
50 DEPTH SOUNDING IN FT MLLW, NOAA SURVEY, MAY 2007.



NOTES:

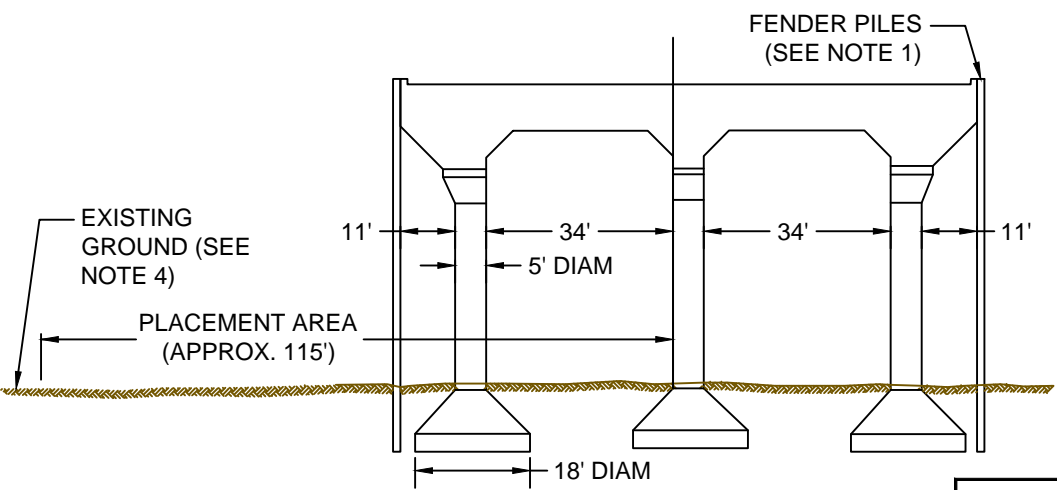
1. HORIZONTAL DATUM: WA STATE PLANE NORTH ZONE NAD83. VERTICAL DATUM: MLLW.
2. ELEVATIONS ARE BASED ON EXISTING DRAWINGS. ELEVATIONS SHALL BE FIELD VERIFIED.
3. CONTRACTOR SHALL VERIFY ALL ELEVATIONS, DIMENSIONS AND EXISTING CONDITIONS IN THE FIELD BEFORE PROCEEDING.

SPAWAR Systems Center Pacific	Figure 2
PSNS Bremerton Reactive Amendment Treatability Study Plan View	
Dalton, Olmsted & Fuglevand, Inc.	
May 02, 2012	



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FIG 2 TYPICAL SECTION
(FENDER PILES EXIST ON BOTH SIDES AND END OF PIER)

- NOTES:
1. FENDER PILES TYPICAL SPACING: COLUMNS 20 TO 25: APPROX. 16" SQ CONC/APPROX. 8' OPENINGS BETWEEN PILES; COLUMNS 19 TO 20: APPROX. 24" SQ CONC/APPROX. 4' OPENINGS BETWEEN PILES.
 2. VERTICAL DATUM: EHW = 124.8', MHW = 120.0' MLLW = 109.4' ELW = 105.0'. BASED ON "FITTING OUT PIER NO. 7" PUBLIC WORKS PLANS 4/3/1941.
 3. PIER DETAILS SHOWN BASED ON PLANS BY PSNS INCLUDING "FITTING OUT PIER NO. 7, GENERAL PLAN, TYPICAL SECTION, LOADING & LOCATION PLAN 4/3/1941".
 4. BASED ON REFERENCED PLAN. CURRENT EXISTING GRADE MAY BE DIFFERENT.
 5. CONTRACTOR TO UNIFORMLY PLACE AQUAGATE MATERIAL OVER PLACEMENT AREA AT AN APPLICATION RATE EQUIVALENT TO A 2" LAYER OF MATERIAL OVER THE PLACEMENT AREA. CONTRACTOR TO PROTECT ALL EXISTING STRUCTURES DURING PLACEMENT.



2
FIG 3 TYPICAL SECTION

SPAWAR Systems Center Pacific		Figure 3
PSNS Bremerton Reactive Amendment Treatability Study		
Typical Sections		
Dalton, Olmsted & Fuglevand, Inc.		May 02, 2012