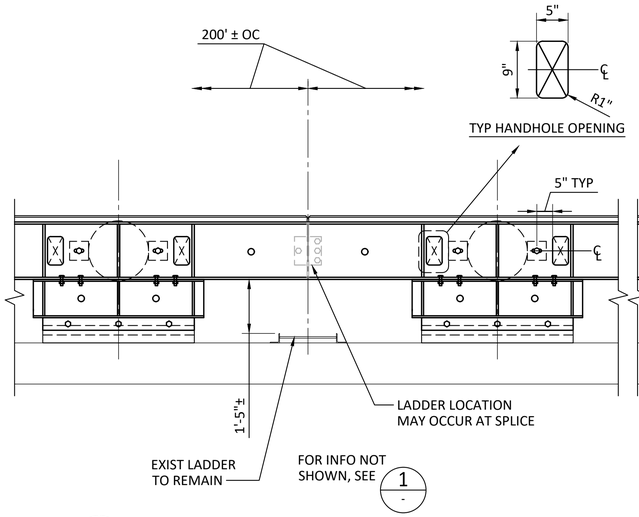
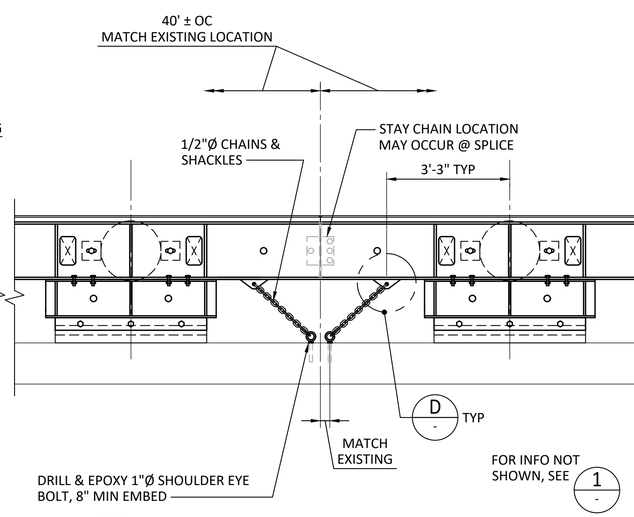
BINDING EDGE



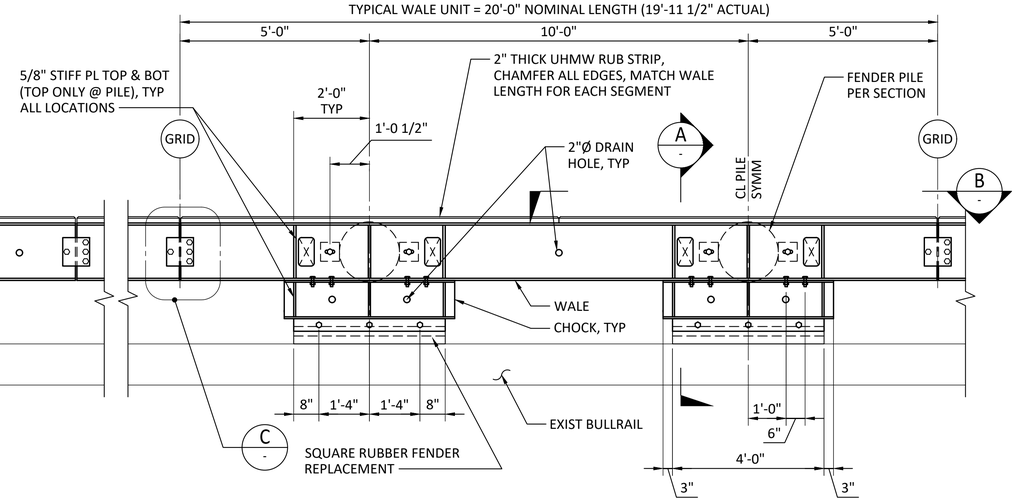
3 S1.0 PLAN - WALE AND PILE AT LADDER

SCALE: 1/2"=1'-0"



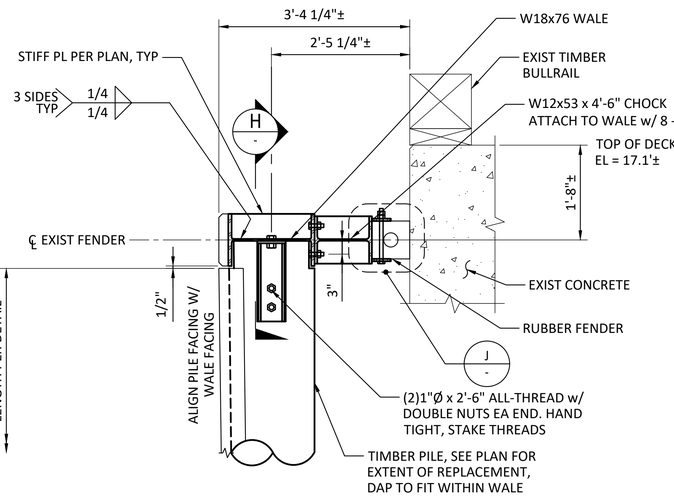
2 S1.0 PLAN - WALE AND PILE AT STAY CHAINS

SCALE: 1/2"=1'-0"



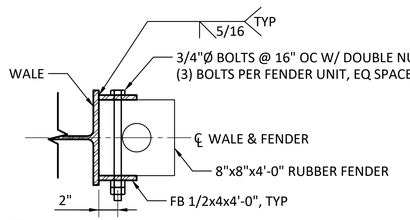
1 S1.0 PLAN - TYPICAL WALE AND PILE

SCALE: 1/2"=1'-0"



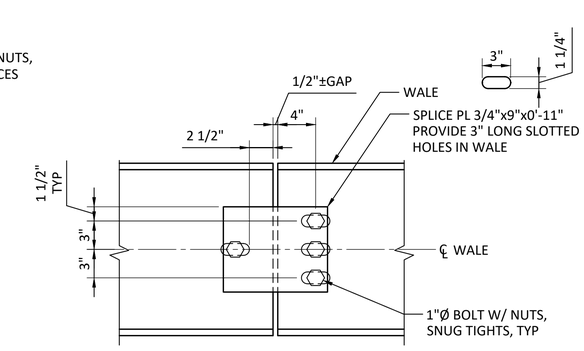
A - SECTION - TYPICAL WALE AND PILE

SCALE: 3/4"=1'-0"



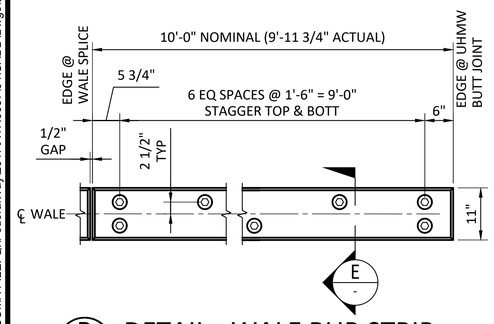
J - SECTION - RUBBER FENDER

SCALE: 1 1/2" = 1'-0"



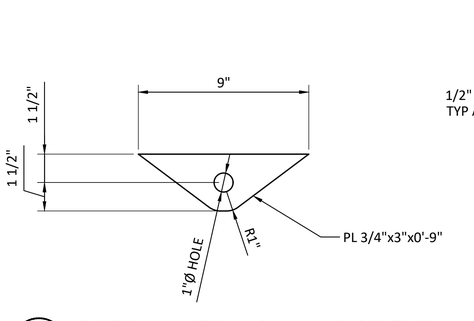
C - DETAIL - WALE SPLICE

SCALE: 1 1/2" = 1'-0"



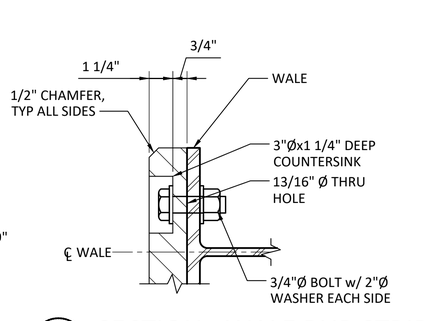
B - DETAIL - WALE RUB STRIP

SCALE: 3/4" = 1'-0"



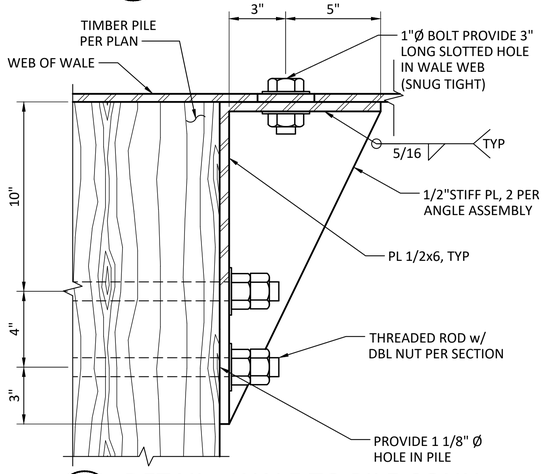
D - DETAIL - STAY CHAIN PADEYE

SCALE: 3" = 1'-0"



E - SECTION - WALE RUB STRIP

SCALE: 3" = 1'-0"



H - DETAIL - WALE TO PILE CONN

SCALE: 3" = 1'-0"

1/2" = 1'-0" — 2 0 2 4 — scale feet
3/4" = 1'-0" — 1 0 1 2 — scale feet
1-1/2" = 1'-0" — 8 0 8 16 — scale inches
3" = 1'-0" — 4 0 4 8 — scale inches

Port of Tacoma
P.O. BOX 1837 TACOMA, WA 98401 2535583841
BergerABAM
33301 9th Avenue South, Suite 300
Federal Way, Washington 98003-2600
(206) 431-2300 Fax: (206) 431-2250

MARK:	REVISION:	BY:	APPR:	DATE:

APPROVED:

JV
DIRECTOR ENG. DATE

TTS 6/1/2018
CHECKED BY DATE
MAD 6/1/2018
PROJ. ENGR DATE
tj.schilling May 31, 2018

PORT OF TACOMA
PIER 7 BERTHS A-D FENDER REHABILITATION
WALE ASSEMBLY DETAILS

6527
EXH-02
OF 1

CONT/CONS:	070390	TOWNSHIP: 21	RANGE: 03
M. ID:	201048.01	DAT-HRZ: NAD 83-07	VERT: NOS TIDAL (MLLW=0.0)
PHASE:	FOR BID	PARCEL: 2275200633	DRAWING SCALE: AS SHOWN

SECTION:	34
PRINTED BY:	tj.schilling May 31, 2018
PORT ADDRESS:	ONE SITCUM WAY
	TACOMA, WA 98421-2300

PORT OF TACOMA FILE: Q:\FederalWay\2017\A17.009704\CADD\Dwgs\04_EXHIBIT-02

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. All metal fabrications are indicated on the drawings and in the specifications. The work shall consist of furnishing all materials, labor, and equipment for fabricating, in accordance with the drawings, notes, and the specifications.

1.02 REFERENCE STANDARDS

A. American Institute of Steel Construction (AISC), Specification for Structural Steel Buildings, 2010.

B. American Institute of Steel Construction (AISC), Code of Standard Practice for Steel Buildings and Bridges, 2010.

C. American Society for Testing Materials (ASTM), Standard Specifications and Standard Test Methods, designated by basic reference in this section (use the most current edition at the time of bid unless otherwise indicated).

1.03 QUALITY ASSURANCE

A. Demonstrate that the fabricator has a minimum of five (5) years' experience fabricating and working with similar metals and configurations, including cutting, bending, forming, welding, and finishing.

1.04 SUBMITTALS

A. Detailed and coordinated shop drawings indicating all shop and erection details, including cuts, copes, connections, holes, fasteners, material specifications, welds, surface preparations, quantities, and finishes.

B. Documentation that the fabricator has the qualifications and experience described above.

PART 2 – PRODUCTS

2.01 GENERAL

A. All products shall be new, free from oxidation, corrosion, and defects, and shall be of the specified quality.

B. Protect all materials and fabrications before, during, and after installation from damage. Protect the installed work of other trades from damage.

C. Protect coatings from damage by use of padded slings and straps.

D. In the event of damage, immediately make all repairs and replacements as per the manufacturer's written recommendations and as approved by the Engineer at no additional cost to the Port.

2.02 STRUCTURAL STEEL

A. Wide flange shapes: ASTM A 992.

B. Plates and bars: ASTM A 572, Grade 50, unless noted otherwise.

2.03 BOLTS, NUTS, WASHERS AND CHAINS

A. High strength bolts: ASTM A3125, Grade A325.

B. Threaded rods: ASTM A36.

C. Heavy Hex Nuts: ASTM A 563, suitable for grade of bolt.

D. Washers: ASTM F 844, wide series, maximum thickness, ASTM F436 for high strength bolts.

E. Chains: galvanized Grade 3

1. Provide galvanized, drop-forged shackles with a working load limit greater than the chain using a minimum safety factor of 2.0 on chain working loads. Size shackles to connect all items and include a galvanized bolt, nut, and cotter pin.

2. Provide galvanized, drop-forged eyebolts with working load limit greater than the chain using a minimum safety factor of 2.0 on chain working loads.

F. Hot dip galvanize all bolts, nuts, and washers.

2.04 UHMW-PE RUB STRIPS

A. Complete fabrication as required, this includes but is not limited to chamfering edges, drilling bolts holes and recessing/counter boring bolts holes as indicated on the contract drawings.

B. Ultra high molecular weight polyethylene (UHMW-PE) shall have the following minimum properties (+/- 10 percent)

1. Specific gravity of 0.93 g/cm^3 per ASTM D 792.

2. Tensile strength of 5,200 psi per ASTM D 638.

3. IZOD impact, double notch of 23-29 ft-lbs/notch per ASTM D 256A.

4. Abrasion of 10 per sand slurry test.

5. Water absorption of NIL per ASTM D 570

6. Ultraviolet stabilized with 2.5 percent carbon black or equivalent conforming to ASTM D 4020.

7. Maximum coefficient of friction of 0.20 per ASTM D 1894.

8. Thermal expansion of $9.0x10^{-5}$ in/in/F per ASTM D 648.

9. Color: Black.

C. Recess and counterbore all fasteners as shown in the drawings.

D. Fasteners shall be hot dipped galvanized.

E. All materials shall be inert.

F. All materials shall be UV resistant.

2.05 SQUARE RUBBER FENDERS

A. Natural rubber or styrene butadiene rubber meeting the dimensions shown on the drawings and conforming to the following:

Property	Test Standard	Condition	Requirement
Tensile Strength	ASTM D 412, Die C ISO 37, 188	Original Aged for 96 hours at 70° C	16 MPa (min) 12.8 MPa (min)
Elongation at Break	ASTM D 412, Die C ISO 37, 188	Original Aged for 96 hours at 70° C	350% (min) 280% (min)
Hardness	ASTM D 2240	Original Aged for 96 hours at 70° C	78° Shore A (max) Original value + 8° points increase
Compression Set	ASTM D 395, Method B	Aged for 22 hours at 70° C	30% (max)
Tear Resistance	ASTM D 624, Die B	Original	70 kN/m (min)
Ozone Resistance	ASTM D 1149	50 pphm at 20% strain at 40° C for 100 hours	No visible cracking
Seawater Resistance	DIN 86076	28 days at 95° C ± 2°C	Shore A +/-10° Vol. +10%,-5%
Abrasion Resistance	DIN 53516	Original	100 mm^3 (max)

B. Test results furnished under different specifications than those listed above shall be accompanied by the fender manufacturer's documentation explaining how the furnished test results meet or exceed the test requirements listed above. Test results without this documentation shall be out of compliance with the section and will be rejected by the Engineer.

2.06 OTHER MATERIALS

A. All other materials not specifically described but required shall be proposed by the Contractor, new, free of corrosion, and subject to the approval of the Engineer.

PART 3 – EXECUTION

3.01 PREPARATORY REVIEW

A. Verify that the work can be fabricated and installed in accordance with the drawings, specifications, and reference standards. Immediately report discrepancies to the Engineer and do not proceed with fabrication or installation until discrepancies are resolved and direction is provided.

3.02 FABRICATION

A All steel shall be fabricated in accordance with the approved shop drawings and reference standards.

B Shop-fabricate and preassemble all items complete for installation to the extent

practicable to minimize field assembly after all components have been coated. Preassembly includes bolting the chocks to the wales, bolting the rubber fender to the chocks and bolting the UHMW-PE rub strips to the wales.

C Drill or punch all holes required for attachments and bolted connections including those of other trades. Burned holes are not acceptable.

D Welding of all metal fabrications shall conform to AWS D1.1.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

The work includes furnishing all materials, labor, equipment, and accessories for preparing and providing the required finished protective coatings on the fabrications and items identified on the drawings and in the specifications.

1.02 REFERENCE STANDARDS

Publications from the following organizations form a part of this Section to the extent indicated by the references thereto, and these publications are referred to by basic designation only. Use the most current edition of each publication available at the time of bid unless otherwise indicated.

A. Society for Protective Coatings (SSPC), SSPC Painting Manual, Volume I, 4th Edition, “Good Painting Practice”.

B. SSPC Painting Manual, Volume II, 2008 Edition, “Systems and Specifications”.

C. SSPC, “Procedure for Determining Conformance to Dry Coating Thickness Requirements”, SSPC-PA2.

D. U.S. National Archives and Records Administration (NARA), Code of Federal Regulations (CFR).

1.03 QUALITY ASSURANCE

A. All coating preparation and applications shall be by qualified and experienced personnel having demonstrated at least five (5) years of experience in coating applications for marine structures.

B. Conform to all manufacturers’ specifications and recommendations for achieving published results with each product, application, and condition. If manufacturers’ specifications or recommendations differ from those in these specifications, report the discrepancy to the Engineer and obtain further direction before proceeding.

C. The Contractor shall retain and pay for a coating specialist to inspect all phases of steel surface preparations and coating applications. The specialist shall be a Level 1 NACE certified coating inspector to perform the inspections indicated and in addition the field tests required by the coating manufacturer.

D. The Engineer may inspect coatings and touch-ups at its discretion. Provide access to the Engineer for these inspections and at no additional cost to the Port..

1.04 SUBMITTALS

A. A complete list of products and product descriptions proposed for use as coating systems.

1. Provide manufacturer product data and accessories, including specifications, physical characteristics, and performance data.

2. Manufacturer instructions and directions for application of the coating systems.

3. Manufacturer instructions and procedures for use in performing field repairs and touch-ups to the coating systems.

4. Use the same manufacturer's products for all coats unless otherwise approved by the Engineer.

B. Documentation that key personnel of the coating applicator have at least the minimum experience and certifications. Demonstrate consistent experience applying the proposed coating systems under similar conditions. List information by individual and include the following.

1. Position or responsibility
2. Employer (if other than the contractor)
3. Name of facility owner
4. Mailing address and telephone number of facility owner
5. Name of contact reference in facility owner's organization
6. Location, size, and description of structure
7. Dates work was performed
8. Description of work performed on structure

C. Samples of all paints and finishes proposed for use.

D. Schedule of coating operations with dates and items listed.

E. Measurement reports of dry paint thickness on metal surfaces according to SSPC-PA2.

F. Steel surface preparation and coating application inspection reports.

1.05 PRODUCT HANDLING

A. Deliver paint and associated materials in undamaged and unopened containers bearing labels of the manufacturer, which indicate the contents and directions for use, storage, and handling. Store materials in a location where the ambient temperature and humidity is not outside the ranges recommended by the manufacturer.

B. Prevent fire. Open containers of inflammable materials only as needed. Keep rubbing cloths, oily rags, etc., in tightly closed metal containers, or remove from the job site daily. Benzene, gasoline, or distillates shall not be stored on the job site.

C. Do not damage the coating materials before, during, or after installation and prevent damage to the installed work and materials of other trades.

D. In the event of damage, immediately make all repairs and replacements as directed by the Engineer according to the manufacturer's recommendations and procedures at no additional cost to the Port.

1.06 COATING HAZARDS

Specified coatings may have potential health hazards if ingested or improperly handled. The coating manufacturer's written safety precautions shall be followed throughout mixing, application, and curing of the coatings. During all cleaning, cleanup, surface preparation, and coating applications phases, ensure that employees are protected from toxic and hazardous chemical agents which exceed concentrations in 29 CFR 1910.1000. Comply with respiratory protection requirements in 29 CFR 1910.134.

PART 2 – PRODUCTS

2.01 COATING SYSTEMS

A. Manufacturers: International Marine Coatings of AkzoNobel (1-206-763-5884), or approved equal.

B. Coating systems selected for each type of finish surface shall be products of a single manufacturer. Coating materials shall be suitable for corrosion protection in an aggressive marine environment.

C. Materials not specifically noted but required for the work, such as thinners, or other materials, shall be products of the approved paint manufacturer or compatible products accepted by the coating manufacturer.

D. Paint products for coating systems shall be mixed according to the manufacturer's directions. Do not deviate except with written approval of the Engineer.

2.02 SUBSTITUTIONS

A. Manufacturer-specific coating systems are referenced in this specification. The manufacturer's product identification numbers indicate the product type, quality, and performance required for a specific application. Bids shall be based upon the manufacturer-specific coating systems referenced herein.

B. Submit in writing a request to the Engineer for review and approval prior to material procurement. Substantiating technical data and documentation are required.

C. Proposed coating system substitutions will be reviewed and evaluated, subject to the approval of the Engineer, based on equivalency to the coating systems referenced in this herein. Substitute coating system data and documentation that does not demonstrate equivalency will not be approved.

D. Approved substitutions shall be at no additional cost to the Port.

2.03 COLOR SCHEDULE

A. Black: Fabricated wale assemblies (steel wide flange shapes, and stiffeners), loose material (chain pad eye tabs, pile connection brackets, splice plates)

2.04 COATING SCHEDULE

A. Non-galvanized surfaces to be painted or coated.

1. Solvent cleaned to remove contaminants using a biodegradable, water soluble, cleaner in conformance with SSPC-SP1.

2. Solvent cleaned surfaces shall receive a light, sweeping abrasive sand blast to create a toothed surface profile in accordance with SSPC-SP6.

3. Primer: Interzone 954 modified epoxy barrier coat by International Marine Coatings of AkzoNobel or approved equal, applied to a minimum dry film thickness of 15 mils on all surfaces.

4. Top coat: Interthane 990 acrylic polyurethane by International Marine Coatings of AkzoNobel or approved equal, applied to a minimum dry film thickness of 2.5 mils on all surfaces.

PART 3 – EXECUTION

3.01 GENERAL

A. Apply paints and coatings in accordance with the manufacturer's recommendations for each application. Adhere to the manufacturer's provisions, directions, and procedures for the following.

1. Surface preparation
2. Ambient temperature and humidity monitoring
3. Mixing techniques
4. Minimum and maximum thickness per coat to achieve total thickness
5. Minimum time between coats

B. Use clean equipment and brushes. Spread materials evenly without runs, drips, sags, laps, brush marks, variations in color, texture, or sheen, and without "holidays".

C. Vary color or sheens between coats and apply all coats to uniform thicknesses. Refinish any work determined defective or damaged, and repair all defective or damaged work at no additional cost to the Port. Leave finished surfaces clean, completely covered, and uniform in appearance.

3.02 APPLICATION

A. The location, lettering size, and style of the surface regulatory markings shall be as indicated on the drawings and in the specifications.

B. Number of coats as specified herein.

C. Thickness of coats: Use ample undiluted materials; apply in uniform thickness over entire areas; do not exceed manufacturer's recommended spreading rate per gallon.

D. Tint prime coats if necessary to obtain uniform finish coats.

3.03 TOUCHUP PAINTING

A. Paint film damaged due to field welding or other Contractor activities shall be immediately restored to its original thickness after thorough cleaning and necessary surface preparation according to the written manufacturer's recommendations.

B. Touchup painting shall be at the Contractor's expense.

3.04 INSPECTION

A. The Contractor shall perform measurements of dry paint thickness on all metal surfaces by means of magnetic gages as described in SSPC-PA2.

B. Copies of the measurement reports shall be provided to the Engineer.

C. The Engineer or its designee may perform verification testing/inspection at its own expense. The Contractor shall make arrangements (if necessary) for these tests/ inspections at all facilities performing coating applications and give the Engineer a notice of at least 14 days in advance of the beginning of coating operations.

END OF SECTION