

PORT OF PORT ARTHUR
NAVIGATION DISTRICT OF JEFFERSON COUNTY, TEXAS

ADDENDUM 1

TO CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS FOR THE
CONSTRUCTIOIN OF

IMPROVEMENTS TO CATHODIC PROTECTION SYSTEM
FOR BULKHEAD AT BERTHS 3 AND 4

POPA FILE: 8.329

June 2020

Commissioners:

Norris Simon, Jr., President
John Comeaux, Vice President
Randy T. Martin, Secretary/Treasurer
Raymond Johnson
Linda Turner Spears

Larry A. Kelley, Jr., Executive Port Director / CEO



Prepared By:
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Port Arthur, TX 77640
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ADDENDUM NO. 1

This Addendum is hereby made part of the Contract Documents to the same extent as though it were originally included therein.

Revised documents included in this addendum replace previous versions. Please remove superseded documents in big package and replace with revised documents included in this addendum.

Bid due date has not changed and will be June 24th at 9:00AM local time.

CONTRACT DOCUMENTS

Changes to the contract documents are described below:

1. All bids shall be provided based on current design shown. No qualified bids will be accepted. Any requested alternates or changes to design shall be submitted to Owner and Engineer in writing with support documentation for approval prior to construction.
2. All connections between electrical service and new rectifiers shall be made with rigid conduit meeting all local electrical codes.
3. Any concrete removal needed for installation shall be repaired in accordance with ACI 563-18: Specifications for Repair of Concrete in Buildings and ACI 546R-14 Guide to Concrete Repair. Concrete trenches shall be saw cut 1" deep and then chipped out, taking care not to damage rebar. Any damaged or removed rebar shall be replaced in accordance with ACI guidelines.
4. New rectifiers specified in section 5.6 of "SOIL SIDE IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM SPECIFICATIONS" shall be manufactured by Universal Rectifiers, Inc., or approved equal.
5. The "STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR ON THE BASIS OF A STIPULATED PRICE" has been revised. The new document has been attached as part of this Addendum.
6. The "PORT OF PORT ARTHUR NAVIGATION DISTRICT OF JEFFERSON COUNTY, TEXAS CONTRACTOR INSURANCE REQUIREMENTS" has been revised. The new document has been attached as part of this Addendum.
7. The PORT OF PORT ARTHUR IMPROVEMENTS TO CATHODIC PROTECTION OF BULKHEAD AT BERTHS 3 AND 4 Construction Drawings have been revised. The new document has been included in this Addendum. Changes include modification to the locations of the new rectifiers as shown in CP-2, modification to the elevations for the bottom of the anodes as shown on drawings CP-11 and distance from column to

deep wells in RUBB have increased to 10 ft. The new document has been attached as part of this Addendum.

8. The "BID SCHEDULE" has been modified. The new document has been attached as part of this this Addendum.
9. Geotechnical report by Gore Engineering, Inc. dated February 1994 has been included for information purposes regarding drilling. It can be downloaded at the following address: <https://portpa.com/public-notice-improvements-to-cathodic-protection-system-for-bulkhead-construction-project/>
10. The Specifications for Waterside Anodes and Specifications for Landside Anodes have been modified. Revised specifications with changes, as described below, have been attached as part of this Addendum.
11. Construction drawings of the Port's existing structures have been included for information purposes. They can be downloaded at the follow address: <https://portpa.com/public-notice-improvements-to-cathodic-protection-system-for-bulkhead-construction-project/>

CLARIFICATIONS TO GENERAL QUESTIONS

The following clarifications are responses to questions raised by contractors and vendors regarding the Contract Documents.

Question 1:

Will the Port provide access under the wharf? What is the clearance under the dock?

Answer 1:

No. The Contractor is responsible for provided all equipment and personnel necessary to access the areas and install the work. This is included but not limited to small vessels, work platforms, ladders, and other devices to access the waterside and landside areas. The Port will not provide any equipment, vehicles, materials, or personnel for the Contractor's use. The space between the top of water and underside of the Wharf varies due to changes in the river's water level. The estimated clearance is between 9 ft and 11 ft but could vary additionally. Clearance between the water and the top of concrete to access the area under the wharf may be less.

Question 2:

Is there available soil information on the project to use for drilling purposes?

Answer 2:

The available geotechnical report has been included in the Addendum. The Contractor is responsible for all means and methods for drilling and installing the deep well anodes to their final configuration shown on the drawings. Any necessary drilling mud, temporary casing, or other methods needed to maintain the hole while drilling is the responsibility of the Contractor. Any permanent casing not shown on the Construction Drawings must be approved by the Engineer prior to installation.

Question 3:

For each of the six soil-side deep anode beds designed by Vector, may we propose the following as an alternate work approach? We propose to install a 10-inch-diameter bore to 260 feet total depth for each new anode bed, with each location to be just to northwest of the soil-side rectifier locations (final locations to be verified with Port of Port Arthur and Collins Engineers personnel). These beds will be placed in asphalt drive/parking area, and relatively close to the existing deep anode beds; the #5 bed should be placed 150 feet or more to southwest, to get additional separation from the #4 bed location. In this way, cabling can be run underground from anode junction box (to be set under each rectifier location, in same fashion as existing junction boxes) to each new anode bed. New 1/0 copper cable will be run as header cable from rectifier positive to anode junction box. A total of 15 new high-silicon cast iron (HSCI) anodes, of three-inch-diameter by 84-inch length, will be set in each anode bed, with coke breeze pumped in from 260 feet back to 40 feet of depth. Anode lead wires and vent pipe will be run back to rectifier location and properly terminated. Total current output possible from this bed configuration, over 15-year service life, should be 100 amperes DC if not more. All ditching from rectifier area to anode bed will be taken at least 24 inches deep, and wiring will be run in two-inch-diameter plastic conduits that are joined to steel conduit when it comes above-grade at each rectifier location;

Answer 3:

No. Please bid the project as designed.

Question 4:

As part of this same alternate anode bed installation approach, may we use two roll-off boxes per anode bed installation, to manage drilling fluids and cuttings generated by mud-rotary drilling? Specifications call for Contractor to manage and dispose of drilling wastes, but we want to have more detail described. Depending on the behavior of "heaving sands," roll-off boxes might need pumping and hauling multiple times during drilling of one anode bed. For this reason, we are proposing the possible additional work step, just below, of building and driving steel casing to keep a particular hole open and allow good-quality anode bed completion;

Answer 4:

Contractor shall develop their own plan for managing and disposing of drilling wastes. This proposed method is acceptable as long as the placement of both roll-off boxes does not impact port operations. The Port will allow on-site disposal of drill cuttings in the area shown below, so long as it is distributed in the area as to not impact drainage or cause ponding.



Question 5:

If geologic formation in any new bore is too unstable, may we add steel casing in the following manner? Our crew will add 258 feet (plus or minus) of 10-inch, Schedule 30 carbon steel pipe, welded together at each 20-foot joint section. Vertical slots will be torch-cut in this casing wall on five-foot staggered intervals to allow moisture ingress over time, and it will then be driven into the ground to total depth. Once sand and other material is cleaned out of interior, anode string with vent pipe will be set, and coke breeze pumped. At top of the steel casing, two #8-gauge positive bond wires will be CAD-welded to this casing, so it is driven anodic and acts as anode material early in the anode bed's life. These bond wires will be tied back to anode junction box positive bus. Steel pipe around each bond will be coated for approximately one foot to allow bonds to pass current for as long as possible. Each steel casing will be terminated at least two feet below grade, so as not to pose a traffic or pavement-finish concern;

Answer 5:

That alternative is acceptable, however, the Contractor must submit drawings for their alternate plan for review by the Port and Engineer prior to construction, to ensure that it provides the same functionality as the designed system.

Question 6:

Pertaining to the testing of soil-side CP systems once all new anode beds are operating (using four existing rectifiers and mounting two new soil-side rectifiers), may we propose that our in-house NACE-Certified Cathodic Protection (CP) Specialists oversee all testing and reporting? This should represent cost savings to the Port, rather than a third-party CP Specialist having to be contracted.

Answer 6:

Yes, the specifications have been updated to reflect this change.

Question 7:

The Vector design calls for each new rectifier base to be set eight feet above grade, with final position to be validated by Port and Collins Engineers personnel. Would it make sense to attempt a relocation of existing rectifiers to this same height, rather than have them eight feet above grade at base? Or, if high water from tropical storms might be an issue, should new rectifiers also be set eight feet high and higher?

Answer 7:

Rectifiers may be installed at the same or similar height as existing rectifiers.

Question 8:

As alternate to design, may we propose to run 1/0 stranded copper cable from soil-side rectifiers to the bond wire attachment points at sheet pile wall, to decrease the electrical resistance of these long wire runs, and allow more current flow to sheet pile metal from each CP system? This will cost more than the initial Vector specifications at 5.3, 5.4 and 6.12.3 (which calls for #2 cable for two new rectifier negative cable runs, and each to be placed inside new 1.5-inch Schedule 80 PVC conduit, or if replacing existing cabling). With a 1.5-inch existing conduit in place, pulling a second #2 cable along existing wires, with thick HMWPE insulation on each, is likely not going to work;

Answer 8:

Yes, drawings and specifications have been updated to reflect change.

Question 9:

For the two new wire runs, may we also recommend an alternate for conduit sizing, with an increase from 1.5-inch to two-inch-diameter, Schedule 80 PVC? And does anyone have concern about PVC conduit becoming brittle over time, in what may be high-temperature conditions under the warehouse roof-lines?

Answer 9:

Yes, an increase of conduit size is fine. Drawings and specifications have been updated to reflect change. Any brittleness of the PVC over time is not an issue.

Question 10:

For water-side anode work, may we propose an alternate installation, to use 1/0 stranded copper cable for the header cable wires, instead of the #2 stranded copper specified by Vector at 5.2.2 and elsewhere? For same reason as expressed earlier, the protective CP current loads plus cable heating cause us to recommend larger cables to reduce electrical resistance, and deliver more CP current to sheet pile metal on the water side.

Answer 10:

Yes, the drawings and specification have been updated to reflect change.

Question 11:

If existing conduits are in use, and the 1/0 wire cannot be successfully pulled through them, may we then propose an alternate approach for installation of two-inch conduits? This bears further discussion, as rigid steel conduit is called for all above-grade installations by Vector. Given the exposures under wharf, the rigid steel, even when galvanized, might corrode quite rapidly;

Answer 11:

There is no conduit under the wharf.

Question 12:

Pertaining to testing of all CP systems, once everything is commissioned, may we propose this alternate approach considering Vector's specification for testing (See 6.10.3, as example)? We will perform the "E Log I" testing, also called Tafel Slope analysis, through the synchronized interruption of all soil-side rectifiers at one time, and as a separate test, all water-side rectifiers at one time. The Vector specifications call for this testing to be done per rectifier, but this would only be practical if a single rectifier is energized at a time, and all others are left off. It is important, as end goal, to optimize the total CP system output for the soil side, and for the water side, and possibly make some individual rectifier adjustments as part of that. But testing at a single rectifier, in "isolation" and with all others turned off, does not get one to the end goal. This simplification will save the Port money as well.

Answer 12:

Yes, that methodology is acceptable. The specification has been updated to reflect this change.

END OF ADDENDUM NO. 1

BID

TO: Port of Port Arthur
221 Houston Avenue
P. O. Box 1428
Port Arthur, Texas 77641

Proposal of _____
(hereinafter called "BIDDER"), organized and existing under the laws of the State of _____, doing business as a * _____ and acting by and through _____. To the Port of Port Arthur Navigation District of Jefferson County, Texas (hereinafter called "OWNER").

In compliance with your Advertisement For Bids, BIDDER hereby proposes to perform all work for the construction of:

CONSTRUCTION OF
IMPROVEMENTS TO CATHODIC PROTECTION SYSTEM FOR
BULKHEAD AT BERTHS 3 AND 4
FILE NO. 8.329

in accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below, and to enter into Contract for same within the time specified in CONTRACT DOCUMENTS.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID, each party thereto certifies as to his own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

Bidder hereby agrees to commence WORK under this contract on or before a date to be specified in the Notice to Proceed and to fully complete the PROJECT within _____ consecutive calendar days. BIDDER further agrees to pay as liquidated damages, the sum of \$500.00 for each consecutive calendar day thereafter as provided in Section 80-08 of the General Conditions.

Enclosed is Bid Security as required.

BIDDER acknowledges receipt of the following ADDENDUM:

* Insert "a corporation," "a partnership," or "an individual", as applicable.

REVISED BID SCHEDULE

BIDDER agrees to perform all the work described in the Contract Documents for the following unit prices or lump sum:

ITEM NO.	APPROX. QTY.	UNIT	DESCRIPTION OF ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	TOTAL AMOUNT
1.	1	L.S.	Mobilization, Bonds and Insurance (Cannot Exceed 5% of "Total Amount Base Bid") complete in place. @_____		
			Per Lump Sum	\$_____	\$_____
2.	2	Each	All material labor and equipment necessary to furnish and install new rectifiers. Item includes associated wiring complete in place. @_____		
			Per Each	\$_____	\$_____
3.	3	Each	All material labor and equipment necessary to furnish and install new land side wells to a tip elevation of -210 ft. and anodes to a tip elevation of -200 ft. Item includes associated wiring complete in place. @_____		
			Per Each	\$_____	\$_____

8.	800	Ft.	All material, labor and equipment necessary for removal and replacement of anode header wire, complete in place, when ordered by engineer.
			@ _____

			Per Foot \$ _____ \$ _____

TOTAL AMOUNT BASE BID \$ _____

(TOTAL AMOUNT BASE BID WRITTEN IN WORDS)

BASE BID

Non-Consumable Material and Equipment	\$ _____
Skill, Labor and Consumable Material & Equipment	\$ _____
Total Amount Base Bid	\$ _____

The prices mentioned herein shall be full compensation for furnishing all materials, equipment, labor and all other expenses necessary to perform the work in accordance with these Specifications and Contract Documents.

Amounts are to be given in words and in numbers and the amount shown in words shall govern in the event a discrepancy occurs.

RESPECTFULLY SUBMITTED,

DATE

SIGNATURE

ADDRESS

TITLE

CITY, STATE & ZIP

LICENSE NUMBER (IF APPLICABLE)

(SEAL – if BID is by a Corporation)

ATTEST:_____

PORT OF PORT ARTHUR NAVIGATION DISTRICT OF JEFFERSON COUNTY, TEXAS CONTRACTOR INSURANCE REQUIREMENTS

A. In General.

The Contractor shall purchase and continuously maintain in full force and effect for the policy periods specified below the insurance policies specified in this Section. The Contractor shall forward updated certificates of Insurance and endorsements(s) when policies are renewed or changed. The insurance required hereunder shall not be interpreted to relieve the Contractor of any obligations under the Contract. The Contractor shall remain fully liable for all deductibles and amounts in excess of the coverage actually realized.

1. Commercial General Liability Insurance.

The Contractor shall provide and maintain Commercial General Liability Insurance insuring against claims for bodily injury, property damage, personal injury and advertising injury that shall be no less comprehensive and no more restrictive than the coverage provided by Insurance Services Office (ISO) form for Commercial General Liability (CG 00-01-10-01). By its terms or appropriate endorsements such insurance shall include the following coverage, to wit: Bodily Injury, Property Damage, Fire Legal Liability (not less than the replacement value of the portion of the premises occupied), Personal Injury, Blanket Contractual, Independent Contractors, Premises Operations, Products and Completed Operations (for a minimum of two (2) years following Final Completion of the Project). The policy cannot be endorsed to exclude the perils of explosion (x), collapse (c) and underground (u) exposures without the specific written approval of the Owner.

If Commercial General Liability Insurance or other form with a general aggregate limit and products and completed operations aggregate limit is used, then the aggregate limits shall apply separately to the Project, or the Contractor may obtain separate insurance to provide the required limit which shall not be subject to depletion because of claims arising out of any other project or activity of the Contractor. Any such excess insurance shall be at least as broad as the Contractor's primary insurance. The coverage shall be primary and non-contributory. General Aggregate limit applies per Project for construction projects.

The Port of Port Arthur Navigation District shall be named as an Additional Insured under the Commercial General Liability policy of insurance per standard ISO endorsement forms 2010 (04/13) for ongoing operations and 2037 (04/13) for products/completed operations, or their equivalent for any and all losses to the extent caused by Contractor, its subcontractors, agents, vendors, or any other person or entity in privity with it.

The Contractor shall have its insuring company waive all rights of subrogation against Port of Port Arthur per standard ISO form CG 2404 or equivalent.

Scope of Coverage:	Non-Project Specific
Type of Coverage:	Occurrence Basis
Amount of Coverage:	\$1,000,000 per occurrence \$2,000,000 aggregate
Policy Period:	Annual Policy
Named Insured:	Contractor
Additional Insured Parties:	Port of Port Arthur Navigation District
Aggregate per Project Endorsement	

2. Owner's & Contractors Protective Liability.

The contractor shall purchase and maintain at its own expense, Owner's & Contractors Protective Liability coverage naming the Port, it's officers, agents and employees as insured in the same amount and coverage as provided for in the contractors Commercial General Liability Policy.

3. Automobile Liability Insurance.

The Contractor shall provide Comprehensive Automobile Liability Insurance insuring against claims for bodily injury and property damage and covering the ownership, maintenance or use of any auto or all owned/leased and non-owned and hired vehicles (Symbols 1 or 2, 8 and 9) used in the performance of the Work, both on and off the Project Site, including loading and unloading. The coverage shall be provided by Insurance Services Office form for Commercial Auto Coverage (CA-00-01-10-01) or equivalent.

Scope of Coverage:	Non-Project Specific
Type of Coverage:	Occurrence Basis
Amount of Coverage:	\$1,000,000 per occurrence
Policy Period:	Annual Policy
Named Insured:	Contractor

Contractor shall have his insuring company provide a Waiver of Subrogation in favor of Port of Port Arthur per standard ISO form or the equivalent.

4. Workers' Compensation and Employer's Liability Insurance.

The Contractor shall provide Worker's Compensation Insurance sufficient to meet its statutory obligation to provide benefits for employees with claims of bodily injury or occupational disease (including resulting death).

Policy Period:	Annual Policy
Named Insured:	Contractor

- a) The Contractor shall provide Employer Liability Insurance covering its legal obligation to pay damages because of bodily injury or occupational disease (including resulting death) sustained by an employee.

Scope of Coverage:	Non-Project Specific
Type of Coverage:	Occurrence Basis
Amount of Coverage:	\$1,000,000 bodily injury by accident \$1,000,000 bodily injury by disease \$1,000,000 policy limit
Policy Period:	Annual Policy
Named Insured:	Contractor

- b) The Contractor shall provide Longshore & Harbor Workers coverage if any employees are determined to be eligible benefits.
- c) The Contractor shall have its insuring company waive all right of subrogation against Port of Port Arthur per standard for WC 420304 A or equivalent.

5. Marine Operations.

If any operation involves the use of any form of watercraft, additional coverage may be required of Contractors as follows:

- a) In the event the User is required to provide coverage pursuant to this section, such insurance on waterborne vessels shall comply with the following requirements:
- 1) If the User uses a chartered waterborne vessel in the operation hereunder, the User shall provide Certificates of Insurance evidencing that the User has procured Charter's Legal Liability Insurance, including full Maritime Employers Liability and Collision and Tower's Liability, covering bodily injury and property damage with a combined single limit of at least \$1,000,000 or the value of the vessel, whichever is greater.
 - 2) If the User uses an owned waterborne vessel in the operations hereunder, the User shall provide Certificates of Insurance evidencing that the User has procured Hull and Machinery Insurance, including full Collision and Tower's Liability and protection and Indemnity Insurance (including crew) covering bodily injury and property damage, each with a combined single limit of at least \$1,000,000 or the value of the vessel, whichever is greater.
 - 3) Port of Port Arthur will be named additional insured and right of subrogation will be waived in favor of Port of Port Arthur by endorsement acceptable to the Port risk manager.

6. Umbrella/Excess Liability.

- a) The Contractor shall provide Umbrella/Excess Liability insurance limits as follows:
 - 1) For contract amount under \$5,000,000; At least \$5,000,000 limit
 - 2) For contract amount from \$5,000,000 to \$25,000,000; At least \$10,000,000 limit
 - 3) For contract amount from \$25,000,000 to \$50,000,000; At least \$50,000,000 limit
 - 4) For contract amount over \$50,000,000; At least \$50,000,000 limit
- b) Port of Port Arthur shall be named as additional insured and the insuring carrier shall waive its rights of subrogation in favor of Port of Port Arthur.

7. Port of Port Arthur Navigation District-Owned Property:

Unless otherwise provided in the Contract Documents, the Contractor shall purchase and maintain property insurance (Builder's Risk) upon the work at the site to the full insurable value. This insurance shall include the interest of the Owner, Owner's Designated Representative, Contractor, and Subcontractors of any tier. Coverage shall be written on forms to include fire, extended coverage and special form including theft. Contractor is responsible for the deductible for any claim made against the policy. A separate certificate of insurance evidencing the coverage required herein shall be provided to the Owner.

8. Installation Floater Insurance.

The Contractor shall provide and maintain Installation Floater Insurance insuring against damage or destruction of the materials or equipment in transit to, or stored on or off the Project Site which is to be used in the Work. A separate Certificate of Insurance evidencing the coverage required herein shall be provided to the Owner.

Scope of Coverage:	Non-Project Specific
Type of Coverage:	Occurrence Basis
Amount of Coverage:	TBD
Policy Period:	Effective until final completion of the Project
Named Insured:	Contractor
Additional Insured Parties:	Port of Port Arthur

9. Pollution Liability Insurance.

The contractor shall provide and maintain first party cleanup and third party liability for all pollutants involved in its operations. Limits will be specified by Port risk management based on scope of the project. Port of Port Arthur is to be named additional insured to this coverage.

10. Professional Liability Insurance.

The contractor shall provide and maintain professional liability insurance for any services that are deemed professional in nature. Limits will be specified by Port risk management based on scope of the project.

B. Acceptable Insurance Company.

The insurance company providing any of the insurance coverage required herein shall have a Best Key Rating of A, with a Financial Strength of VII or higher, (i.e. A VII, A VIII, A IX, A X, etc.) and shall be subject to approval by the Owner. Each insurance company's rating as shown in the latest Best's Key Rating Guide shall be fully disclosed and entered on the required certificate of insurance.

C. Premiums, Deductibles and Self-Insured Retentions.

The Contractor shall be responsible for payment of premiums for all of the insurance coverages required. The Contractor further agrees that for each claim, suit or action made against insurance provided hereunder, with respect to all matters for which the Contractor is responsible hereunder, the Contractor shall be solely responsible for all deductibles and self-insured retentions. Any deductibles or self-insured retentions over \$25,000 in the Contractor insurance must be declared and approved in writing by Port of Port Arthur risk management.

D. Certificate of Insurance.

The Contractor will deliver to the Port of Port Arthur Navigation District the required certificates, which must be signed by the authorized representative of the insurance company shown on the certificate with proof that such person is an authorized representative thereof, and is authorized to bind the named underwriter(s) and company to the coverage, limits and termination provisions shown thereon. All endorsements shall be attached to the certificates of insurance when submitted to the Port of Port Arthur.

E. Renewal Policies.

The Contractors shall promptly deliver to the Port of Port Arthur Navigation District a certificate of insurance with respect to each renewal policy, as necessary to demonstrate the maintenance of the required insurance coverage for the terms specified herein. Such certificate shall be delivered to the Owner not less than 30 days prior to the expiration date of any policy and bear a notation evidencing payment of the premium thereof.

F. Cancellation and Modification of Insurance Coverages.

The Contractor shall be responsible to immediately notify the Owner in writing of any changes or cancellations of its insurance, or may be found in breach of the contract and the contract could be terminated. This notice requirement does not waive the insurance requirements contained herein.

G. No Recourse.

There shall be no recourse against Port of Port Arthur Navigation District for the payment of premiums or other amounts with respect to the insurance required from the Contractor.

H. Endorsements and Waivers.

All insurance policies required hereunder shall contain or be endorsed to contain the following provisions:

1. For claims covered by the insurance specified herein, said insurance coverage shall be primary insurance with respect to the insured, additional insured parties, and their respective members, directors, officers, employees and agents and shall specify that coverage continues notwithstanding the fact that the Contractor has left the Project site. Any insurance or self-insurance beyond that specified in the Contract that is maintained by an insured, additional insured, or their members, directors, officers, employees and agents should be primary and non-contributory.
2. The insurance shall apply separately to each insured and additional insured party against whom a claim in made or suit is brought, except with respect to the limits of the insurer's liability.
3. Contractor shall have its insuring company provide a Waiver of Subrogation in favor of Port of Port Arthur per standard ISO form or the equivalent for all applicable coverages required hereunder.

I. Failure to Provide or Maintain Insurance Coverages.

The Contractor's failure to provide or maintain any of the insurance coverage required herein shall constitute a breach of the Contract. The Owner may take whatever action is necessary to maintain the current policies in effect (including the payment of any premiums that may be due and owing by the Contractor) or procure substitute insurance. The Contractor is responsible for any costs incurred by the Owner in maintaining the current insurance coverage in effect, or providing substitute insurance, and such costs may be deducted from any sums due and owing the Contractor.

AGREEMENT

between

PORT OF PORT ARTHUR NAVIGATION DISTRICT
OF JEFFERSON COUNTY, TEXAS

("OWNER")

and

("CONTRACTOR")

**STANDARD FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR
ON THE BASIS OF A STIPULATED PRICE**

THIS AGREEMENT is dated as of the ____ day of _____, 2020 by and between the Port of Port Arthur Navigation District of Jefferson County, Texas (hereinafter called "OWNER") and _____ (hereinafter called "CONTRACTOR").

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK.

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

- 1.1 The Work of this project comprises the construction of the Port of Port Arthur Improvements to Cathodic Protection System for Bulkhead at Berths 3 & 4 Project consisting of the installation of new cathodic protection elements (the "Project"), as more particularly described in the attached Exhibits ____.

Article 2. CONTRACT TIME.

- 2.1 The field Work will be substantially completed within _____ consecutive calendar days from the date when the Contract Time commences to run as provided in paragraph 80-02 of the General Conditions. OWNER desires the Work to start as soon as practical with prior agreement from CONTRACTOR.

Article 3. CONTRACT PRICE.

- 3.1 CONTRACTOR and any Subcontractors shall pay prevailing wages according to the Davis Bacon Act.
- 3.2 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents in current funds as follows:

Article 4. PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Section 90 of the General Conditions. Applications for Payment will be processed by ENGINEER as provided in General Conditions.

- 4.1 *Progress Payments.* OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR'S Applications for Payment as recommended by ENGINEER, on or about seven (7) days following the third (3rd) Wednesday of each month during construction as provided below. All progress payments will be done on the basis of the progress of the Work in accordance with Section 90 of the General Conditions.
- 4.2 *Retainage.* OWNER shall retain 10% of all progress payments otherwise due and payable under the terms of this Agreement. Retainage shall be paid as a part of the Final Payment, as defined in these Contract Documents.
- 4.3 *Final Payment.* Upon final completion and acceptance of the Work in accordance with Section 90 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said paragraph 90-09.
- 4.4 *Interest.* All monies not paid when due as provided in Section 90 of the General Conditions shall bear interest at the maximum rate allowed by law. Retainage shall not be considered due until Final Payment is due, and shall not bear interest until Final Payment is due.
- 4.5 *Affidavits Regarding Title.* OWNER may require CONTRACTOR to sign an affidavit attesting to CONTRACTOR'S title to work covered by each payment according to Section 90 of the General Conditions.

Article 5. INSURANCE.

- 5.1 At all times during the performance of this Agreement, CONTRACTOR will, at its own expense, and CONTRACTOR'S subcontractors will, at their own or at CONTRACTOR'S expense, carry the insurance coverage as detailed on Exhibit 1, Port Insurance Requirements, which is attached hereto and incorporated by reference herein for all purposes. CONTRACTOR will, at its own expense, furnish to OWNER certificates attesting to the fact that such policies are in effect. All insurance shall be with an insurance company authorized to do business in the State of Texas. OWNER shall be additional insured on all policies, excluding Worker's Compensation/Employer's Liability. Insurance shall be made on an "occurrence form" rather than a "claims made form."
- 5.2 Insurance policies covering CONTRACTOR and naming OWNER as additional insured and evidencing the required coverages shall be delivered to OWNER prior to commencement of the Work under this Agreement. Such policies shall provide that any change restricting or reducing coverage or any cancellation shall not be valid as respects the OWNER'S interest therein until OWNER has received 30 days' notice in writing of such change or cancellation.

- 5.3 Any and all deductibles in the above described insurance policies shall be assumed by, for the account of and at CONTRACTOR'S sole risk.
- 5.4 Each policy shall be endorsed to provide waiver of subrogation rights in favor of OWNER, its subsidiaries and affiliates and all other parties owning an interest in the property on which Work covered by this Agreement is to be performed. CONTRACTOR agrees to waive and agrees to have its insurer waive any rights of subrogation as respects deductibles under such policies and as respects damages to equipment, including the loss of use thereof, whether insured or not.
- 5.5 Failure of CONTRACTOR to keep the required insurance policies in full force and effective hereunder shall constitute a breach of this Agreement and OWNER shall have the right, in addition to any other rights, to immediately cancel and terminate this Agreement.
- 5.6 Nothing contained in these provisions relating to coverage and amounts set out herein shall operate as a limitation of CONTRACTOR'S liability in tort or contracted for under the terms of this Agreement.
- 5.7 CONTRACTOR shall also file with the OWNER valid policies of Insurance on like form for all consultants or subcontractors. Similar insurance shall be provided by or on behalf of all consultants or subcontractors to cover their operations under the Agreement. In the event a consultant or subcontractor is unable to furnish insurance as required under the Contract, then the available insurance limits and coverages may be reviewed by the OWNER and insurance requirements may be amended. Such review and amendment will not be unreasonably withheld.
- 5.8 CONTRACTOR shall promptly report to OWNER all accidents occurring to CONTRACTOR employees or any other parties or property.

Article 6. CONTRACTOR'S REPRESENTATIONS.

In order to induce OWNER to enter into the Agreement CONTRACTOR makes the following representations:

- 6.1 CONTRACTOR has familiarized itself with the nature and extent of the Contract Documents, Work, site locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance of furnishing of Work.
- 6.2 CONTRACTOR has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in these Contract Documents and the technical data contained in such reports and drawings, upon which CONTRACTOR is entitled to rely.

- 6.3 CONTRACTOR has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities are or will be required by CONTRACTOR in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with other terms and conditions of the Contract Documents.
- 6.4 CONTRACTOR has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.
- 6.5 CONTRACTOR has given ENGINEER written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.
- 6.6 Any obstruction to pile driving, which is not shown on the above documents, shall be considered a changed condition and the CONTRACTOR shall seek guidance from the ENGINEER on how to proceed.

Article 7. CONTRACT DOCUMENTS.

The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR concerning the Work consist of the following:

- 7.1 This Agreement (pages 1 to _____, inclusive).
- 7.2 Notice to Bidders of Mandatory Pre-bid Conference Call issued by OWNER.
- 7.3 The Contractor's accepted Bid and Bonds required by these Contract Documents, attached hereto as Exhibit _____.
- 7.4 Construction Specifications manual entitled Port of Port Arthur Construction of Improvements to Cathodic Protection System for Bulkhead at Berths 3 & 4 dated April, 2020.
- 7.5 Drawings bearing the following title: "Construction of Improvements to Cathodic Protection System for Bulkhead at Berth 3 and 4" and dated March 2020.
- 7.6 The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other

documents amending, modifying, or supplementing the Contract Documents pursuant to the General Conditions.

- 7.7 The documents listed in Article 7 above are attached to this Agreement (except as expressly noted otherwise above).

There are no Contract Documents other than those listed above in this Article 7. The Contract Documents may only be amended, modified, or supplemented in a written instrument signed by both OWNER and CONTRACTOR.

Article 8. Termination.

The obligation to provide further services under this Agreement may be terminated:

- 8.1 *For cause*, by either party upon thirty days' written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof through no fault of the terminating party. Notwithstanding the foregoing, this Agreement will not terminate as a result of such substantial failure if the party receiving such notice begins, within five days of receipt of such notice, to correct its failure to perform and proceeds diligently to cure such failure within no more than thirty days of receipt thereof; provided, however, that if and to the extent such substantial failure cannot be reasonably cured within such thirty day period, and if such party has diligently attempted to cure the same and thereafter continues diligently to cure the same, then the cure period provided from herein shall extend up to, but in no case more than, sixty days after the date of receipt of the notice.
- 8.2 *For convenience*, by the Port effective upon the receipt of notice by Contractor.
1. Upon 15 days' written notice to Contractor, Owner may, without cause and without prejudice to any other right or remedy of Owner, elect to terminate the Contract. In such case, Contractor shall be paid (without duplication of any items) for:
 - a) Completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - b) Expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - c) Reasonable and actual expenses directly attributable to termination.

2. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

Article 9. Dispute Resolution

- 9.1 The Port and Contractor agree to negotiate in good faith upon receipt of any notice of a dispute between them prior to exercising their rights under this Agreement or under applicable law.
- 9.2 The Port and Contractor agree that they shall first submit any and all unsettled claims, counterclaims, disputes, and other matters in question between them arising out of or relating to this Agreement or the breach thereof (“disputes”), to mediation.
- 9.3 This Agreement is to be governed by the laws of the State of Texas. Venue of any action arising out of or in any manner connected with this Agreement shall be in Jefferson County, Texas.

Article 10. MISCELLANEOUS.

- 10.1 Terms used in this Agreement which are defined in Section 10 of the General Conditions will have the meanings indicated in the General Conditions.
- 10.2 No assignment by a party hereto of any rights under or interest in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.
- 10.3 OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representative in respect of all covenants, agreements and obligations contained in the Contract Documents.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement in triplicate. One counterpart each has been delivered to OWNER, CONTRACTOR and ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or by ENGINEER on their behalf.

This Agreement will be effective on _____, 2020.

OWNER Port of Port Arthur
 Navigation District of
 Jefferson County, Texas

CONTRACTOR _____

By: _____

By: _____

Address for giving notices:

221 Houston Avenue
PO Box 1428
Port Arthur, TX 77641

Address for giving notices:

License No. _____

SOIL SIDE IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM SPECIFICATIONS
FOR
PORT OF PORT ARTHUR – BERTH 3 & 4

1. GENERAL

1.1. Related Documents

- 1.1.1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2. Scope

- 1.2.1. The work consists of furnishing all labor, equipment and materials, and performing all operations necessary to complete the following:
- 1.2.1.1. Install six deep well linear anode cathodic protection systems to cathodically protect the steel bulkhead wall associated with Berth 3 and 4 at the Port of Port Arthur in Port Arthur, Texas.
 - 1.2.1.2. There are four existing air-cooled rectifiers. All rectifiers were checked on August 8, 2019 and they have been reported as serviceable.
 - 1.2.1.2.1. It is the contractor's responsibility to verify the rectifiers are serviceable and fix any identified issues.
 - 1.2.1.3. There are to be two new air-cooled rectifiers installed as part of this work.
 - 1.2.1.4. There is an existing active cathodic protection (CP) system along the soil-side of the bulkhead wall. The Contractor is responsible for removing any components of the old system as required to complete this work.
 - 1.2.1.4.1. This includes but is not limited to wire, anodes and other CP components.
 - 1.2.1.5. There is an existing negative header cable for each rectifier. The header cable runs from each rectifier to the bulkhead wall. This exists for all 4 rectifiers. It is the responsibility of the Contractor to inspect and verify header cable integrity.
 - 1.2.1.5.1. The Contractor shall submit a testing procedure to verify the adequacy of reusing the existing header wires, to be approved by the Engineer.
 - 1.2.1.6. The contractor may reuse other components of the existing CP if those parts are deemed to be serviceable and will last for at least another 15 years.
 - 1.2.1.6.1. The Contractor shall submit to the Owner a list of any parts to be reused along with a procedure to verify the adequacy of reusing the existing part.
 - 1.2.1.7. Energize, adjust, and inspect the cathodic protection system after installation.
 - 1.2.1.8. The cathodic protection systems shall be installed, energized and tested by a Contractor regularly engaged in the field of cathodic protection and have an accepted and successful documented history of system installations.
 - 1.2.1.8.1. The Contractor will provide all labor, materials, and supervision for the installation of the cathodic protection system.
 - 1.2.1.8.2. The Contractor must have at least five (5) years of verifiable experience in the installation of marine CP systems.
 - 1.2.1.9. The Contractor shall maintain at all times during construction work, a qualified Project Manager on-site to direct the construction activities, and to interface with the Owner and the Engineer, as required.
 - 1.2.1.10. Contractor to make themselves available for weekly meetings with the Port and the Port's representatives.
 - 1.2.1.11. The on-site Project Manager shall have at minimum the following credentials:
 - 1.2.1.11.1. National Association of Corrosion Engineer Cathodic Protection Technician
 - 1.2.1.11.2. The Project Manager must have five (5) years of experience in installing and servicing CP systems on marine structures.
 - 1.2.1.12. The contractor shall secure the services of a National Association of Corrosion Engineers (NACE) certified CP Specialist (CPS).

- 1.2.1.13. Contractor shall provide Quality Assurance for every phase of the CP installation. Submit QA/QC plan prior to commencing the CP work. Plan shall address all required tasks to be performed by the CPS as well as test methods and testing instrumentation to be used.
- 1.2.2. The owner shall be responsible for furnishing and/or installing the following:
 - 1.2.2.1. A storage area for materials.
- 1.2.3. Details of proposed departures due to actual field conditions and/or other causes shall be submitted to the Engineer for approval prior to any construction deviation being taken.

2. REFERENCES

2.1. American Society for Testing Materials (ASTM)

- 2.1.1. D1248, Polyethylene Insulation

2.2. Institute of Electronic and Electrical Engineers (IEEE)

- 2.2.1. Standards and Specifications

2.3. Underwriters Laboratories, Inc. (UL)

- 2.3.1. UL-63, Thermoplastic Insulated Wires
- 2.3.2. UL-467 Bonding and Grounding Equipment
- 2.3.3. UL-486, Wire connectors and Solderless Lugs for Use with Copper Conductors
- 2.3.4. UL-510. Insulating Tape

2.4. NFPA 70 – National Electric Code

2.5. National Electric Manufacturers' Association (NEMA)

- 2.5.1. ICS, Enclosures for Industrial Controls and Systems
- 2.5.2. MR 20, Semiconductor Rectifier Cathodic Protection Units

2.6. NACE International

- 2.6.1. SP0169, Recommended Practice "Control of External Corrosion on Underground or Submerged Metallic Piping Structures"
- 2.6.2. SP0572, Recommended Practice "Design, Installation, Operation and Maintenance of Impressed Current Deep Ground Beds"

2.7. State of Texas

- 2.7.1. Administrative Code, Rule 3.99 Title 16, Part 1, Chapter 3 Cathodic Protection Well

3. Submittals

- 3.1. The following submittals shall be submitted by the Contractor to the Engineer for review with the bid.
 - 3.1.1. Qualifications for;
 - 3.1.1.1. Contractor conducting the installation
 - 3.1.1.1.1. Contractor shall submit qualifications and job reference list and client contact information.
 - 3.1.1.2. Contractor's on-site Project Manager
 - 3.1.1.2.1. NACE certification and resume
 - 3.1.1.3. Corrosion Specialist
 - 3.1.1.3.1. NACE certification and resume
- 3.2. The following submittals shall be submitted by the Contractor to the Engineer for review and approval prior to commencing any work:
 - 3.2.1. Materials
 - 3.2.1.1. Submit manufacture's documentation regarding materials to be used on this project.
 - 3.2.2. Protocols for conducting
 - 3.2.2.1. Evaluation of existing CP components that are to be reused
 - 3.2.2.2. Bulkhead wall electrical continuity testing
 - 3.2.2.3. Potential survey
 - 3.2.2.4. Testing and energization
 - 3.2.3. After completion contractor shall submit
 - 3.2.3.1. As built plans, testing and adjustment reports.
 - 3.2.3.1.1. As built shall be maintained and on-site as construction progresses.

4. PERMITS

- 4.1. Prior to the start of construction, the Contractor shall apply to the proper authorities for the Colonial Terminal Logistics (CTL) permit required for installation of the cathodic protection system.
- 4.2. The contractor shall dial 811 to contact either Texas 811 or Lone Star 811 One-Call center in the state of Texas prior to construction to locate any existing utilities within the work area. Existing utilities include, but are not limited to, water lines, gas lines, telephone, street lights, sewer and storm drains and overhead and underground electric utilities.
 - 4.2.1. Contractor to note any identified utilities on the as-built plans

5. MATERIALS

5.1. Impressed current anodes

- 5.1.1. Description: The anodes shall be a 200 ft continuous mixed metal oxide (MMO) coated titanium anode. The anode shall be capable of a minimum current output of 450 mA/linear ft for 20 years of service.
 - 5.1.1.1. Matcor's Durammo Deep Anode system or approved equal.

5.1.2. The primary anode will incorporate a continuous titanium substrate with a thermally applied inert dimensionally stable, catalyzed, electrically conductive iridium/tantalum composition mixed metal oxide coating.

5.1.3. Anode substrate: The substance shall be titanium, certified to conform to Grade 1 as defined within specification reference ASTM B-338, ASTM B-265, Din 3.7025, 3.7035.

5.1.3.1.	Grade 1	(%)
5.1.3.1.1.	Nitrogen	max 0.03
5.1.3.1.2.	Carbon	max 0.08
5.1.3.1.3.	Hydrogen	max 0.015
5.1.3.1.4.	Iron	max 0.3
5.1.3.1.5.	Oxygen	max 0.18
5.1.3.1.6.	Residuals	max each 0.1
5.1.3.1.7.	Residuals	max total 0.4
5.1.3.1.8.	Titanium	balance

5.2. Backfill

5.2.1. SC 3 calcined petroleum coke, as manufactured by Loresco Inc., or approved equal, shall be used to backfill the impressed current anodes. Anode backfill shall conform to the following:

5.2.1.1. Typical Composition

Component	Percentage
Carbon	99.35
Ash	0.6
Volatiles	0
Moisture	0.05

5.3. Well Hardware

5.3.1. The deep well anode shall be equipped with a Schedule 40 PVC casing.

5.3.2. The casing shall be 8 inches diameter, and 10 feet long minimum.

5.3.3. Casing sealant shall be Bentonite Product NSF 61 approval.

5.3.4. The casing end shall be terminated with an 8" diameter, Schedule 40 PVC cap. B.

5.3.5. PVC vent pipe shall be used from the bottom of the linear anode to the surface for dissipating gases.

5.3.6. The plastic vent pipe shall be 1-inch diameter slotted piping.

5.3.7. The plastic vent pipe shall extend above the well cap and the vent outlet shall be screened and installed in an inverted manner.

5.4. Anode header wire

5.4.1. #1/0 **HMWPE** with red insulation

5.5. Negative header wire

5.5.1. #1/0 **HMWPE** with black insulation

5.6. Rectifiers

5.6.1. There are 4 existing air-cooled rectifiers

5.6.1.1. DC rated for 30 V and 150 Amps

5.6.1.2. AC input is 3 Phase

5.6.2. Contractor is required to install 2 new rectifiers as part of this work and any existing defective rectifiers

5.6.2.1. DC rated for 30 V and 150 Amps

5.6.2.2. AC input is 3 Phase

- 5.6.2.3. Voltage adjustment utilizing coarse and fine taps
- 5.6.2.4. AC circuit breaker to provide overload and short circuit protection.
- 5.6.2.5. Enclosure shall be galvanized steel per ASTM-123
- 5.6.2.6. Rectifier shall have analog ammeter and voltmeter
- 5.6.2.7. All rectifier units shall bear the manufacturers nameplate and not be re-branded

5.7. Conduits and fittings

- 5.7.1. The minimum conduit size shall be 1 inch unless otherwise indicated. Refer to NFPA 70 (NEC) for additional conduit size requirements.
- 5.7.2. Conduit and fittings placed below grade shall be PVC, Schedule 40.
- 5.7.3. Conduit and fittings placed above grade shall be rigid steel. Rigid Steel conduit shall be galvanized conforming to UL 6.
- 5.7.4. For buried conduit a warning tape shall be buried above it. The warning and identification tape shall be an inert plastic film designed for prolonged underground use. The tape shall be a minimum of 3 inches wide and a minimum of 4 mils thick. The tape shall be continuously printed over the entire length with the wording "CAUTION: CATHODIC PROTECTION CABLE BURIED BELOW". The wording shall be printed using bold black letters. The color of the tape shall be red.

5.8. Exothermic welds

- 5.8.1. Exothermic welds shall be in accordance with the manufacturer's recommendations.
- 5.8.2. Exothermic welds shall be Cadweld, as manufactured by Erico Products, Inc. or Thermoweld as manufactured by continental Industries, Inc. Or approved equivalent.

6. EXECUTION

6.1. Construction Coordination Schedule Sequencing

- 6.1.1. The Contractor shall coordinate his/her work to maintain an open and accessible trafficway for all Port roadways.
- 6.1.2. The Contractor shall not interfere with Owner's operations and schedule work around vessels at the berths.

6.2. Storage

- 6.2.1. All materials and equipment to be used in construction shall be stored in such a manner to be protected from detrimental effects from the elements.

6.3. Inspection

- 6.3.1. Identify location of bulkhead wall tie backs and verify that well is centered between the tieback
 - 6.3.1.1. Tiebacks are at approximate 8 ft spacing

6.4. Electrical continuity verification

- 6.4.1. Contractor shall verify all sheet piles in the bulkhead wall are electrically continuous.
 - 6.4.1.1. If sheet piles are found to be electrically isolated then continuity corrections are to be made by Contractor
 - 6.4.1.2. Contractor shall submit procedure for electrical continuity testing and continuity corrections to Engineer for approval
- 6.4.2. Contractor shall submit report detailing results of electrical continuity testing to Engineer.

6.5. Pre-installation structure-to-soil potential measurements of the bulkhead wall.

- 6.5.1. The Contractor shall measure potentials along the bulkhead wall with an Owner in attendance.
- 6.5.2. The measurements shall be conducted every 50 feet along bulkhead wall length.
- 6.5.3. Measurements shall be conducted by placing the reference electrode connected to the negative terminal of the multi-meter on the surface of the concrete slab, while the lead from the positive terminal of the multi-meter is connected to the piling.
- 6.5.4. Contractor shall use a copper-copper sulfate reference electrode.
- 6.5.5. Contractor shall submit pre-installation potential measurement report to Engineer.

6.6. Well Drilling

- 6.6.1. The Contractor shall obtain and pay for all fees and permits required for well drilling (if any).
- 6.6.2. The Contractor shall protect the well bore from the intrusion of contaminants into the hole at all times.
- 6.6.3. The Contractor is responsible for the cost of all cleanup associated with contamination of the well and/or job site resulting from the Contractor's work.
- 6.6.4.3. Fresh water shall be circulated from the bottom of the hole to clear the well of drilling mud and cuttings after the well is drilled.
- 6.6.5.4. Loading of anodes and other equipment in the well shall be done in the presence of the CPS. Loading of the anodes into the well shall be a continuous operation from start of loading anode to completion of backfilling.
- 6.6.6.5. The well shall be covered with a steel trench plate whenever the well is left unattended.

6.7. Well Casing

- 6.7.1.1. The contractor shall install 8" diameter PVC Sch 40 casing with cap.

6.8. Vent Pipe

- 6.8.1.1. The bottom of the vent pipe shall be securely capped.
- 6.8.2.2. The top of the vent pipe shall be temporarily sealed during the coke breeze loading process. Any foreign material entering the vent pipe shall be removed.

6.9. Loading the Anode

- 6.9.1. The CPS shall visually inspect the anode lead for abrasion or other damage as the anode is lowered into place. A damaged anode is not acceptable and shall not be installed.

6.10. Coke Breeze Backfill

- 6.10.1. Coke backfill shall be placed using a slurry pump which pumps the coke into the bottom of the hole, filling the well from the bottom up.
- 6.10.2. Coke shall not be pumped through the vent pipe.
- 6.10.3. Coke breeze shall be mixed with water when introduced into the hole to prevent bridging or the creation of voids. At the time of introduction of the backfill, the hole shall contain sufficient water to minimize bridging and the rate of introduction of the backfill shall be controlled to minimize the possibility of bridging. In the event that voids or bridging does occur, the Contractor shall correct the deficiency to the satisfaction of the CPS.
- 6.10.4. Coke breeze shall be placed in the hole at a steady rate to ensure that the coke breeze does not bridge or block the hole. The hole shall be kept completely full of water during placement of backfill.
- 6.10.5. Coke shall be allowed 24 hours to settle. After 24 hours, the coke column shall be topped off as required to achieve the specified coke column length.
- 6.10.6. The contractor shall record the total weight of coke breeze placed in each anode well.

6.11. Disposal of drilling fluids, cuttings and mud:

- 6.11.1. Drilling mud and cuttings shall be disposed of by the Contractor at a suitable disposal site.

6.12. Negative Structure Connection

- 6.12.1. The four existing rectifiers have negative structure connections.
 - 6.12.1.1. The contractor is responsible for verifying these are electrically continuous with the structure and repair if necessary.
- 6.12.2. The two additional rectifiers to be installed will require an individual negative structure connection.
- 6.12.3. The structure leads are to be No. 2 AWG, stranded, copper, single conductor with high molecular weight polyethylene insulation (HMWPE).
- 6.12.4. The test leads are to be thermite welded to a 4" x 4" x 1/4" thick steel plate. Prior to the thermite welding process, the 4" square plate shall be cleaned to SP 10 near-white blast cleaning.
- 6.12.5. The bulkhead wall where the plate is to be welded shall be cleaned to SP 10 near-white blast cleaning.
- 6.12.6. The area on the bulkhead wall that is to be cleaned shall be an area that is a minimum of 12" square.
- 6.12.7. The 4" square plate is to be double pass welded a full 360 degrees around the plate to the bulkhead wall face. The plate is to be centered in the 12" square blasted area.
- 6.12.8. The entire area on the bulkhead wall cleaned and the welded steel plate are to be coated with Alocit 28.15 to a 24-mil thickness, or approved equal.
 - 6.12.8.1. The coating shall be applied by a factory certified applicator.

6.13. Hot Work

- 6.13.1. Hot work is defined as any work activity which could serve as an ignition source for any flammable material. Examples of hot work include, but are not limited to, welding, brazing, burning, grinding, saw cutting, sandblasting, chiseling concrete, or other impact cutting; pneumatic or electric powered drilling; open flames; use of explosive ramsets; use of non-explosion proof electrical equipment (heaters, electric tools, motors and lights) and operating motorized equipment.
- 6.13.2. The contractor Shall notify the Owner at least 24 hours in advance of the time that a hot work permit is needed for each work site.
- 6.13.3. It is a standard safety policy that no hot work will be allowed within 500 feet of any diesel ship during loading operations. This minimum distance may be increased by the Owner whenever a reasonable possibility exists that an external source of hydrocarbon, usually from upwind or from nearby diesel loading operations, could cause a change in conditions which could create an immediate hazard or unsafe condition.
- 6.13.4. The Contractor shall schedule all hot work around the diesel loading operations for which a daily ship schedule is available from the Owner. No hot work will be allowed in the area affected by the loading of petroleum ships.
- 6.13.5. In the event that the Contractor is working in an area which becomes hazardous or unsafe, they will immediately shut down all work when so directed by the Owner or its Engineer. The Contractor shall coordinate their work schedule closely with the Port's shipping schedule. Port operations take precedence over construction work.

6.14. Rectifier

- 6.14.1. Coordinate location and mounting of the two new rectifiers with Port
 - 6.14.1.1. Submit to Engineer shop drawing indicating rectifier mounting procedure

6.14.2. Contractor to provide 3 phase power to both of the new rectifiers.

6.14.2.1. Contractor's electrician shall coordinate power needs for new rectifiers with Owner

6.15. Interference

6.15.1. In case of interference with other work or incompatible locations with respect to equipment or structures, the Contractor shall furnish all labor and materials necessary to resolve the interference and complete the work in an acceptable manner. Contractor with support from CPS shall submit locations of interference and proposed resolution to Owner for review and approval prior to commencing deviation from contract documents

6.16. Energizing and Testing

6.16.1. Upon completion of the installation, the contractor shall provide testing of the completed system by the CPS to ensure conformance with the Contract Documents and NACE SP0169.

6.16.2. Measure and record the energized bulkhead to soil potentials at intervals of 50 feet along the wall.

6.16.3. Perform E log I testing of each rectifier

6.16.4. The Contractor shall provide a written report, prepared by the CPS, documenting the results of the testing and recommending corrective work, as required to comply with the Contract Documents. The contractor is responsible for any required corrective action. The CPS shall review and approve any corrective actions. The written report shall be submitted to the Owner for review and approval before acceptance of the CP system.

7. Final Testing

7.1. Upon completion of the installation, the contractor shall provide testing of the completed system by the CPS to ensure conformance with the Contract Documents and NACE SP0169.

7.2. Measure and record the energized bulkhead to soil potentials at intervals of 50 feet along the wall.

7.3. Perform E log I testing of ICCP system.

7.4. The Contractor shall provide a written report, prepared by the CPS, documenting the results of the testing and recommending corrective work, as required to comply with the Contract Documents. The contractor is responsible for any required corrective action. The CPS shall review and approve any corrective actions. The written report shall be submitted to the Owner for review and approval before acceptance of the CP system and contract time stops.

7.5. The CPS shall return to site to perform testing in accordance with NACE SP0169 to verify that the CP system is providing cathodic protection per the criteria identified in section 6 of NACE SP0169. Return visit should be at minimum 60 days after system activation but not more than 90 days. If the system is not meeting NACE criteria, CPS will determine why and make necessary adjustments with support from the contractor as needed.

8. Report

8.1. The CP Specialist shall submit a Final Report showing all test data and energizing parameters, including but not limited to static and energized potentials using portable reference electrodes, anode to cathode resistance, depolarization test, and E log I curves.

8.2. In the final report, the CPS shall note any unapproved deviations from the Contract Documents that pertain to the CP system, along with the approved RFI's and submittals for the approved deviations. The CPS shall submit a notarized document and final report certifying the proper installation and operation of the CP system. The Project shall not be considered completed until such documentation is submitted and approved by the Engineer. The report and all data shall be in pdf format and be submitted to the Engineer

9. METHOD OF MEASUREMNT

9.1. The quantity of the CP system to be paid with a unit price contract

10. BASIS OF PAYMENT

10.1. Cost shall include all equipment, labor and materials to install the cathodic protection including continuity test and corrections, electrical work, and all other incidentals necessary to install and energize the cathodic protection system. Payment is full compensation for this operation including materials and/or incidentals related to this work.

END OF SECTION

WATERSIDE IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM SPECIFICATIONS
FOR
PORT OF PORT ARTHUR – BERTH 3 & 4

1. GENERAL

1.1. Related Documents

- 1.1.1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections as well as insurance required for waterborne activities, apply to this Section.

1.2. Scope

- 1.2.1. The work consists of furnishing all labor, equipment and materials, and performing all operations necessary to complete the following:

- 1.2.1.1. Install a waterside cathodic protection system to cathodically protect the steel AZ bulkhead wall associated with Berth 3 and 4 at the Port of Port Arthur (Port) in Port Arthur.

- 1.2.1.2. There are six existing air-cooled rectifiers for the water side anodes. All rectifiers were checked on August 8, 2019 and they have been reported as serviceable. The contractor is to service the rectifiers and use them to operate the newly installed anodes.

- 1.2.1.2.1. It is the contractor's responsibility to verify the rectifiers are serviceable and fix any identified issues.

- 1.2.1.2.2. Any identified issues be immediately brought to the Port Engineer's attention.

- 1.2.1.3. There is an existing active cathodic protection (CP) system along the water-side of the bulkhead wall. The Contractor is responsible for removing any components of the old system as required to complete this work.

- 1.2.1.3.1. This includes but is not limited to wire, anodes and other CP components.

- 1.2.1.4. There is an existing negative header cable for each rectifier. The header cable runs from each rectifier to the bulkhead wall. This negative header wire exists for all 6 rectifiers. It is the responsibility of the Contractor to inspect and verify header cable integrity.

- 1.2.1.4.1. The Contractor shall submit a testing procedure to verify the adequacy of reusing the existing header wires, to be approved by the Engineer.

- 1.2.1.4.2. Any identified issues be immediately brought to the Engineer's attention.

- 1.2.1.5. The contractor may reuse other components of the existing CP system if those parts are deemed to be serviceable and be certified to last for at least another 15 years.

- 1.2.1.5.1. The Contractor shall submit to the Owner a list of any parts to be reused along with a procedure to verify the adequacy of reusing the existing part.

- 1.2.1.6. Energize, adjust, and inspect the cathodic protection system after installation.

- 1.2.1.7. The cathodic protections systems shall be installed, energized and tested by a Contractor regularly engaged in the field of cathodic protection and have an accepted and successful documented history of system installations.

- 1.2.1.7.1. The Contractor will provide all labor, materials, and supervision for the installation of the cathodic protection system.

- 1.2.1.7.2. The Contractor must have at least five (5) years of verifiable experience in the installation of marine CP systems.

- 1.2.1.8. The Contractor shall maintain, at all times during construction work, a qualified Project Manager on-site to direct the construction activities, and to interface with the Owner and the Engineer, as required.
- 1.2.1.9. Contractor to make themselves available for weekly meetings with the Port and the Port's representatives.
- 1.2.1.10. The on-site Project Manager shall have at minimum the following credentials:
 - 1.2.1.10.1. National Association of Corrosion Engineer Cathodic Protection Technician
 - 1.2.1.10.2. The Project Manager must have five (5) years of experience in installing and servicing CP systems on marine structures.
- 1.2.1.11. The contractor shall secure the services of a National Association of Corrosion Engineers (NACE) certified CP Specialist (CPS).
- 1.2.1.12. Contractor shall provide Quality Assurance for every phase of the CP installation. Submit QA/QC plan prior to commencing the CP work. Plan shall address all required tasks to be performed by the CPS as well as test methods and testing instrumentation to be used.
 - 1.2.1.12.1. The QA/QC plan must be reviewed and approved by the Port prior to commencing any work.
- 1.2.2. The owner shall be responsible for furnishing and/or installing the following:
 - 1.2.2.1. A storage area for materials.
- 1.2.3. Details of proposed departures due to actual field conditions and/or other causes shall be submitted to the Engineer for approval prior to any construction deviation being taken.

2. REFERENCES

2.1. American Society for Testing Materials (ASTM)

- 2.1.1.D1248, Polyethylene Insulation
- 2.1.2.A518, Standard Specification for Corrosion-Resistant High-Silicon Iron Castings (Grade 3)

2.2. Institute of Electronic and Electrical Engineers (IEEE)

- 2.2.1. Standards and Specifications

2.3. Underwriters Laboratories, Inc. (UL)

- 2.3.1. UL-63, Thermoplastic Insulated Wires
- 2.3.2. UL-467 Bonding and Grounding Equipment
- 2.3.3. UL-486, Wire connectors and Solderless Lugs for Use with Copper Conductors
- 2.3.4. UL-510. Insulating Tape

2.4. NFPA 70 – National Electric Code

2.5. National Electric Manufacturers' Association (NEMA)

- 2.5.1. ICS, Enclosures for Industrial Controls and Systems
- 2.5.2. MR 20, Semiconductor Rectifier Cathodic Protection Units

2.6. NACE International

- 2.6.1. SP0169, Recommended Practice "Control of External Corrosion on Underground or Submerged Metallic Piping Structures"
- 2.6.2. SP0572, Recommended Practice "Design, Installation, Operation and Maintenance of Impressed Current Deep Ground Beds"

3. SUBMITTALS

- 3.1. The following submittals shall be submitted by the Contractor to the Engineer for review with the bid.
 - 3.1.1. Qualifications for;
 - 3.1.1.1. Contractor conducting the installation
 - 3.1.1.1.1. Contractor shall submit qualifications and job reference list and client contact information.
 - 3.1.1.2. Contractor's on-site Project Manager
 - 3.1.1.2.1. NACE certification and resume
 - 3.1.1.3. Corrosion Specialist
 - 3.1.1.3.1. NACE certification and resume
- 3.2. The following submittals shall be submitted by the Contractor to the Engineer for review and approval prior to commencing any work:
 - 3.2.1. Materials
 - 3.2.1.1. Submit manufacture's documentation regarding materials to be used on this project.
 - 3.2.2. Protocols for conducting
 - 3.2.2.1. Evaluation of existing CP components that are to be reused
 - 3.2.2.2. Bulkhead wall electrical continuity testing
 - 3.2.2.3. Potential survey
 - 3.2.2.4. Testing and energization
 - 3.2.3. After completion contractor shall submit
 - 3.2.3.1. As built plans, testing and adjustment reports.
 - 3.2.3.1.1. As built shall be maintained and on-site as construction progresses.

4. PERMITS

- 4.1. Prior to the start of construction, the Contractor shall apply to the proper authorities for permits required for installation of the cathodic protection system.
- 4.2. The contractor shall dial 811 to contact either Texas811 or Lone Star 811 One-Call center in the state of Texas prior to construction to locate any existing utilities within the work area. Existing utilities include, but are not limited to, water lines, gas lines, telephone, street lights, sewer and storm drains and overhead and underground electric utilities.
 - 4.2.1. Contractor to note any identified utilities on the as-built plans

5. MATERIALS

5.1. Impressed current anodes

- 5.1.1. Description: The anodes shall be 110 lb solid High Silicon Cast Iron (HSCI) manufactured by Anotec or approved equal for hanging anodes under dock.
- 5.1.2. Anode composition

	Minimum (%)	Maximum (%)
Silicon	14.20	14.75
Chromium	3.25	5.00
Carbo	0.70	1.10
Manganese		1.50
Copper		0.50

Molybdenum		0.20
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5.2. Anode header wire

5.2.1. The existing header wire needs to be removed and replaced

5.2.2. #1/0 HMWPE with red insulation

5.3. Conduits and fittings

5.3.1. The minimum conduit size shall be 1 inch unless otherwise indicated. Refer to NFPA 70 (NEC) for additional conduit size requirements.

5.3.2. Conduit and fittings placed below grade shall be PVC, Schedule 40.

5.3.3. Conduit and fittings placed above grade shall be rigid steel. Rigid Steel conduit shall be galvanized conforming to UL 6.

5.3.4. For buried conduit a warning tape shall be buried above it. The warning and identification tape shall be an inert plastic film designed for prolonged underground use. The tape shall be a minimum of 3 inches wide and a minimum of 4 mils thick. The tape shall be continuously printed over the entire length with the wording "CAUTION: CATHODIC PROTECTION CABLE BURIED BELOW".

5.4. Exothermic welds

5.4.1. Exothermic welds shall be in accordance with the manufacturer's recommendations.

5.4.2. Exothermic welds shall be Cadweld, as manufactured by Erico Products, Inc. or Thermoweld as manufactured by continental Industries, Inc. Or approved equivalent.

5.5. Rectifiers

5.5.1. There are 4 existing air-cooled rectifiers

5.5.1.1. DC rated for 30 V and 150 Amps

5.5.1.2. AC input is 3 Phase

6. EXECUTION

6.1. Construction Coordination Schedule Sequencing

6.1.1. The Contractor shall coordinate his/her work to maintain an open and accessible trafficway for all Port roadways.

6.1.2. The Contractor shall not interfere with Port operations and schedule work around vessels at the berths. Port operation supersede contractors operations.

6.2. Storage

6.2.1. All materials and equipment to be used in construction shall be stored in such a manner to be protected from detrimental effects from the elements.

6.3. Existing Cathodic Protection System

6.3.1. The contractor shall deenergize the active CP system and lockout the electrical components.

6.3.2. It is the Contractor's responsibility to ensure that the system is deenergized and safe to work.

6.4. Preinstallation Testing

6.4.1. Measure and record native bulkhead wall to water potentials at intervals of 50 feet along the wall.

6.4.1.1. Perform with an Owner representative in attendance.

6.4.2. Confirm electrical continuity of the bulkhead wall and make any corrections necessary.

6.5. Anode Installation

- 6.5.1. Hang the anodes from the underside of pier
- 6.5.2. The CPS shall visually inspect the anode lead wire for abrasion or other damage to the insulation and wire. Anodes with damaged insulation or wire are not acceptable and shall not be installed. Splices are not allowed on the anode wire.
- 6.5.3. Remove the existing anode header wire and replace with new header wire.
- 6.5.4. Cadweld all hanging anodes to new header wire.

6.6. Negative Structure Connection

- 6.6.1. The six existing rectifiers have negative structure connections.
 - 6.6.1.1. The contractor is responsible for verifying these are electrically continuous with the structure and repair if necessary.
- 6.6.2. If replacement negative structure connections are necessary:
 - 6.6.2.1. The structure leads are to be No. 2 AWG, stranded, copper, single conductor with high molecular weight polyethylene insulation (HMWPE).
 - 6.6.2.2. The test leads are to be thermite welded to a 4" x 4" x 1/4" thick steel plate. Prior to the thermite welding process, the 4" square plate shall be cleaned to SP 10 near-white blast cleaning.
 - 6.6.2.3. The bulkhead wall where the plate is to be welded shall be cleaned to SP 10 near-white blast cleaning.
 - 6.6.2.4. The area on the bulkhead wall that is to be cleaned shall be an area that is a minimum of 12" square.
 - 6.6.2.5. The 4" square plate is to be double pass welded a full 360 degrees around the plate to the bulkhead wall face. The plate is to be centered in the 12" square blasted area.
 - 6.6.2.6. The entire area on the bulkhead wall cleaned and the welded steel plate are to be coated with Alocit 28.15 to a 24-mil thickness, or approved equal.
 - 6.6.2.6.1. The coating shall be applied by a factory certified applicator.

6.7. Hot Work

- 6.7.1. Hot work is defined as any work activity which could serve as an ignition source for any flammable material. Examples of hot work include, but are not limited to, welding, brazing, burning, grinding, saw cutting, sandblasting, chiseling concrete, or other impact cutting; pneumatic or electric powered drilling; open flames; use of explosive ramsets; use of non-explosion proof electrical equipment (heaters, electric tools, motors and lights) and operating motorized equipment.
- 6.7.2. The contractor Shall notify the Owner at least 24 hours in advance of the time that a hot work permit is needed for each work site.
- 6.7.3. It is a standard safety policy that no hot work will be allowed within 500 feet of any diesel ship during loading operations. This minimum distance may be increased by the Owner whenever a reasonable possibility exists that an external source of hydrocarbon, usually from upwind or from nearby diesel loading operations, could cause a change in conditions which could create an immediate hazard or unsafe condition.
- 6.7.4. The Contractor shall schedule all hot work around the diesel loading operations for which a daily ship schedule is available from the Owner. No hot work will be allowed in the area affected by the loading of diesel ships.
- 6.7.5. In the event that the Contractor is working in an area which becomes hazardous or unsafe, they will immediately shut down all work when so directed by the Owner. The Contractor shall coordinate their work schedule closely with the Owner's shipping schedule.

6.8. Interference

6.8.1. In case of interference with other work or incompatible locations with respect to equipment or structures, the Contractor shall furnish all labor and materials necessary to resolve the interference and complete the work in an acceptable manner. Contractor with support from CPS shall submit locations of interference and proposed resolution to Owner for review and approval prior to commencing deviation from contract documents

6.9. Exothermic Welds

6.9.1. All anode wires shall be connected to the primary header wire through exothermic welding.

6.9.2. Coating materials shall be removed from the surface over an area of sufficient size to make the connection. The surface shall be cleaned to bare metal by grinding or filing prior to welding the conductor. Only enough insulation shall be removed such that the copper conductor can be placed in the welding mold.

6.9.3. The Contractor shall be responsible for testing all test lead and bond wire welds.

6.9.4. After the weld has cooled, all slag shall be removed and the metallurgical bond shall be tested for adherence by the Contractor. A 22-ounce hammer shall be used for adherence testing by striking a blow to the weld. Care shall be taken to avoid hitting the wires. All defective welds shall be removed and replaced at Contractor's expense.

6.9.5. All exposed surfaces of the copper and steel shall be covered with insulating materials.

6.10. Final Testing

6.10.1. Upon completion of the installation, the contractor shall provide testing of the completed system by the CPS to ensure conformance with the Contract Documents and NACE SP0169.

6.10.2. Measure and record the energized bulkhead to water potentials at intervals of 50 feet along the wall.

6.10.3. Perform E log I testing **the ICCP system**

6.10.4. The Contractor shall provide a written report, prepared by the CPS, documenting the results of the testing and recommending corrective work, as required to comply with the Contract Documents. The contractor is responsible for any required corrective action. The CPS shall review and approve any corrective actions. The written report shall be submitted to the Owner for review and approval before acceptance of the CP system and contract time stops.

6.10.5. The CPS shall return to site to perform testing in accordance with NACE SP0169 to verify that the CP system is providing cathodic protection per the criteria identified in section 6 of NACE SP0169. Return visit should be at minimum 60 days after system activation but not more than 90 days. If the system is not meeting NACE criteria, CPS will determine why and make necessary adjustments with support from the contractor as needed.

6.11. Report

6.11.1. The CP Specialist shall submit a Final Report showing all test data and energizing parameters, including but not limited to static and energized potentials using portable reference electrodes, anode to cathode resistance, depolarization test, and E log I curves.

6.11.2. In the final report, the CPS shall note any unapproved deviations from the Contract Documents that pertain to the CP system, along with the approved RFI's and submittals for the approved deviations. The CPS shall submit a notarized document and final report certifying the proper installation and operation of the CP system. The Project shall not be considered completed until such documentation is submitted and approved by the Engineer. The report and all data shall be in pdf format and be submitted to the Engineer

7. METHOD OF MEASUREMENT

7.1. The quantity of the CP system to be paid with a unit price contract

8. BASIS OF PAYMENT

- 8.1. Cost shall include all equipment, labor and materials to install the cathodic protection including continuity test and corrections, electrical work, and all other incidentals necessary to install and energize the cathodic protection system. Payment is full compensation for this operation including materials and/or incidentals related to this work.

END OF SECTION

PORT OF PORT ARTHUR CONSTRUCTION OF IMPROVEMENTS TO CATHODIC PROTECTION SYSTEM FOR BULKHEAD AT BERTHS 3 AND 4

PORT ARTHUR, TX

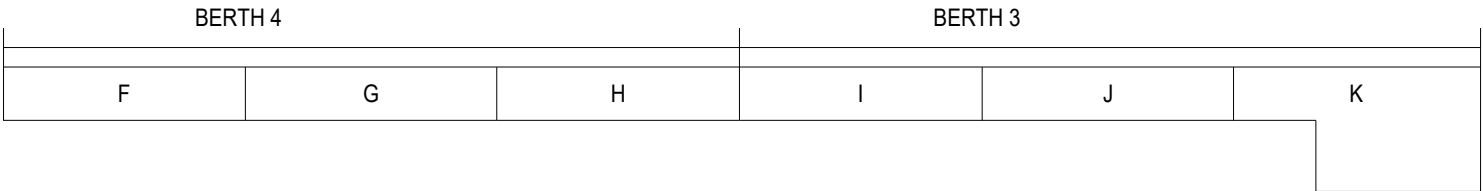
JUNE 2020



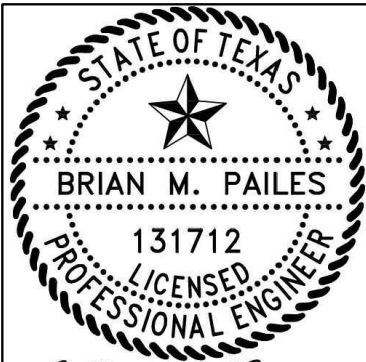
LOCATION MAP: PORT ARTHUR, TX



VICINITY MAP



INDEX TABLE	
SHEET NO.	SHEET TITLE
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Brian M. Pailes

DATE: 6-19-2020

**COLLINS
ENGINEERS**

TEXAS FIRM# 9791
501 PROCTER ST., SUITE 321
PORT ARTHUR, TX 77640
(409) 895-2550

LOCATION
PORT ARTHUR, TX 77640
PORT OF PORT ARTHUR

DRAWN BY
S.Y.

CHECKED BY
B.P.

DATE
3-20-2020

PROJECT NO.
F19037TX

FIRM NO.
9791

FIGURE NO.
N/A

DRAWING REVISIONS		
#	DATE	DESCRIPTION
0	12/10/19	S.Y. INITIAL DRAWINGS
1	6/10/20	S.Y. REVISION 1
2	6/19/20	S.Y. REVISION 2



**PORT OF PORT ARTHUR
CATHODIC PROTECTION
OF BERTHS 3 AND 4**
PORT ARTHUR, TX

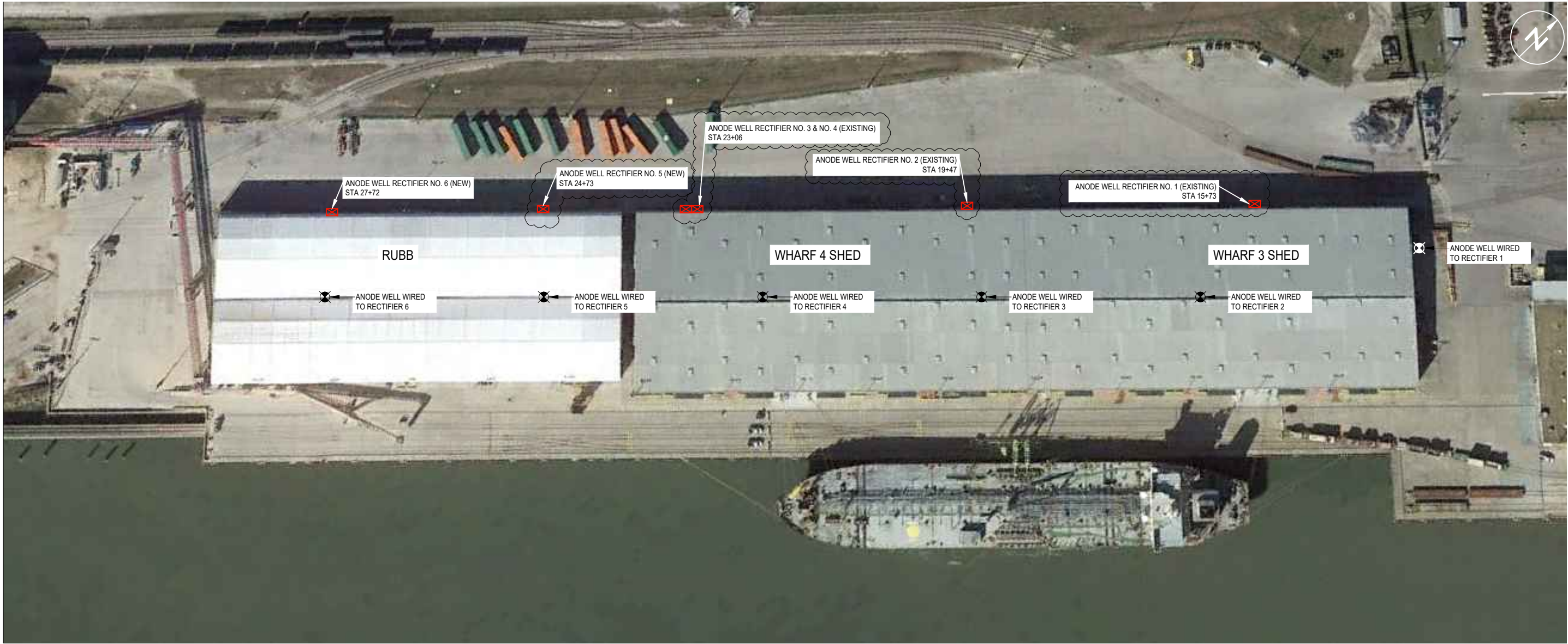
COVER SHEET

VECTOR CORROSION
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TAMPA, FL 33610
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FL CA # 30851

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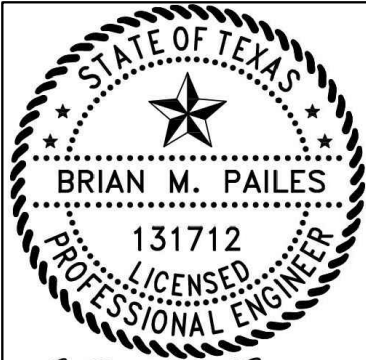
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CP-1



1 OVERALL PLAN VIEW
BERTHS 3 AND 4 SOIL DEEP WELL ANODE LAYOUT
SCALE: N.T.S

- NOTE:**
- ALL ANODE WELL AND RECTIFIER LOCATIONS ARE AN APPROXIMATION, REFER TO SPECIFICATIONS FOR MORE INFORMATION. CONTRACTOR SHALL COORDINATE WITH COLLINS REPRESENTATIVE FOR EXACT LOCATIONS.
 - PROPOSED ANODE LOCATIONS MAY REQUIRE ADJUSTMENTS IN FIELD AS NECESSARY.
 - ALL EXISTING RECTIFIERS ARE IN SERVICEABLE CONDITIONS BASED ON PREVIOUS PORT FINDINGS.
 - FOR WATER SIDE ANODES REFER TO SPECIFICATION SECTION 5.5
 - FOR SOIL SIDE ANODES REFER TO SPECIFICATION SECTION 5.6.
 - CONTRACTOR SHALL BE RESPONSIBLE FOR LAYOUT OF STATIONING AND VERIFICATION OF LOCATION OF EXISTING EQUIPMENT.



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**PORT OF PORT ARTHUR
CATHODIC PROTECTION
OF BERTHS 3 AND 4**
PORT ARTHUR, TX

BERTHS 3 AND 4 ANODE
LAYOUT OVERVIEW

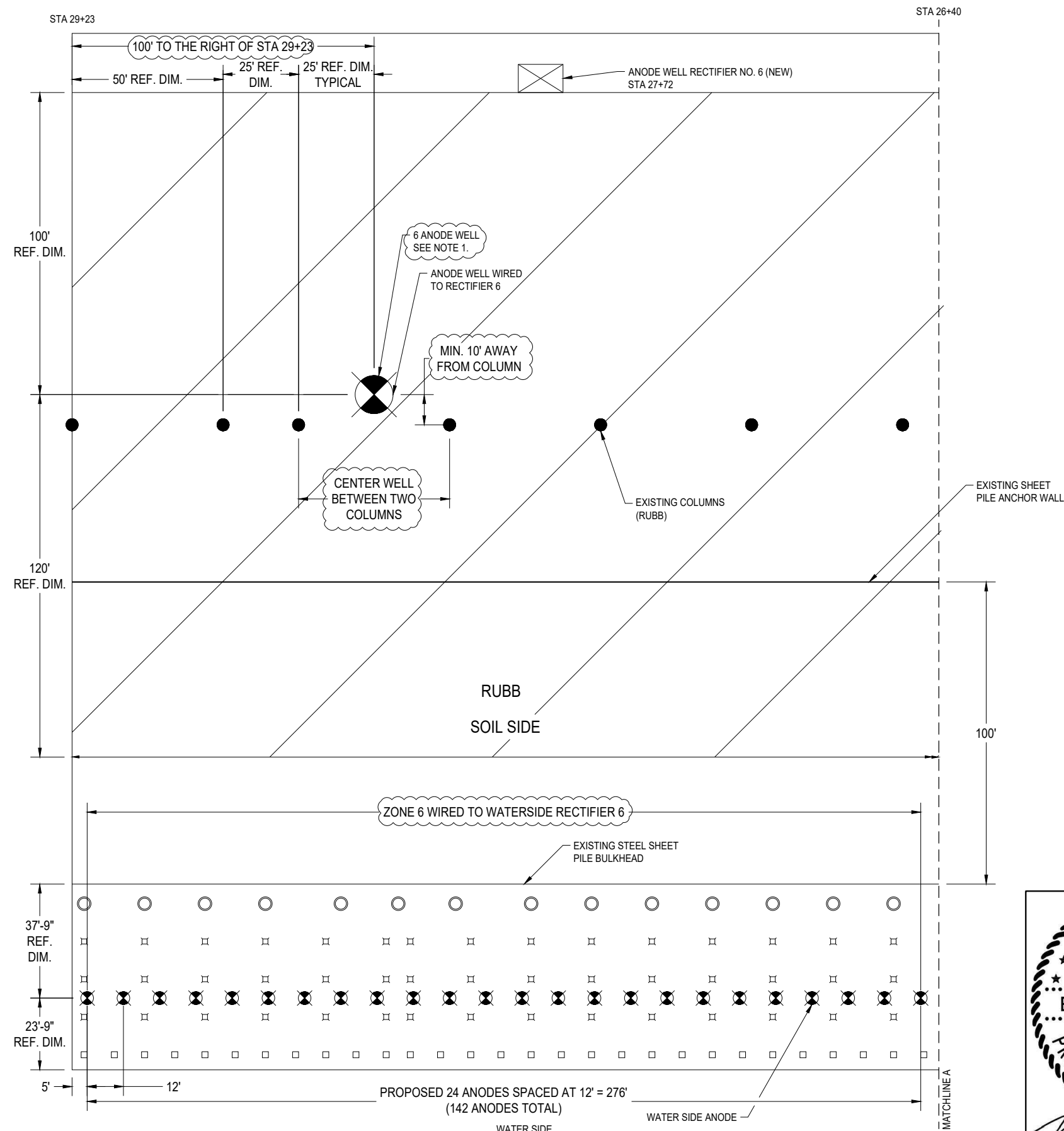
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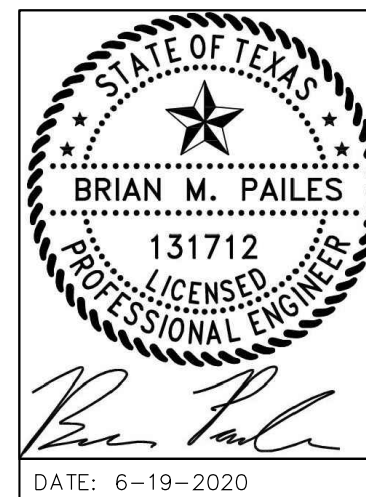
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DRAWING NO.

CP-2



1 PLAN VIEW
BERTHS 3 AND 4 SOIL SIDE AND WATER SIDE ANODE LAYOUT
SCALE: N.T.S



DATE: 6-19-2020

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TEXAS FIRM# 9791
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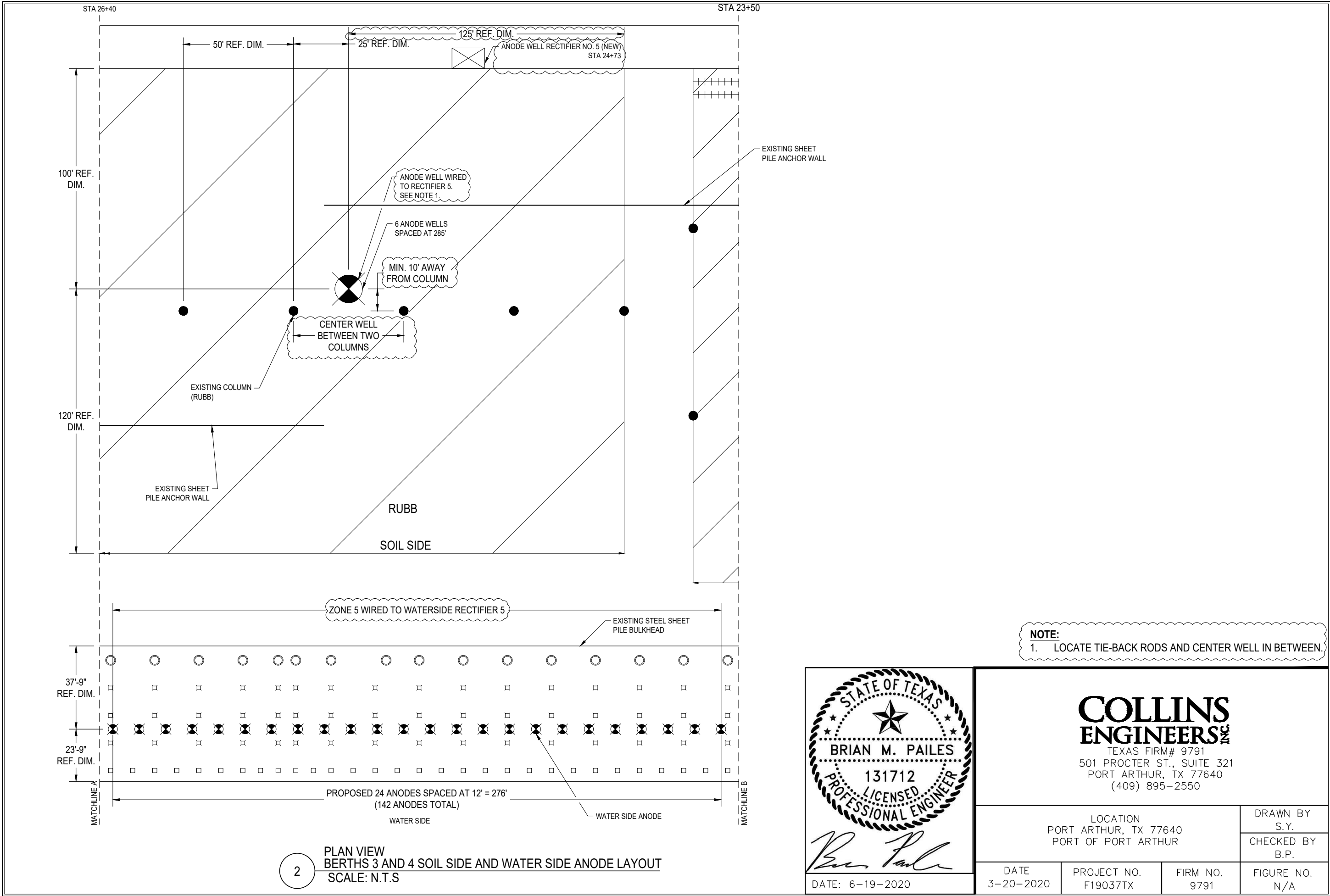
**PORT OF PORT ARTHUR
CATHODIC PROTECTION
OF BERTHS 3 AND 4**
PORT ARTHUR, TX

**BERTHS 3 AND 4 PLAN VIEW -
ANODE LAYOUT (1 OF 6)**

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PROJECT NO.
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DRAWING NO.
CP-3



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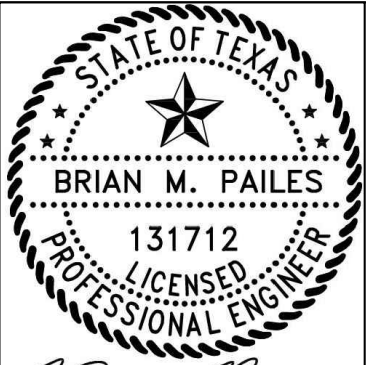
PORT OF PORT ARTHUR
CATHODIC PROTECTION
OF BERTHS 3 AND 4
PORT ARTHUR, TX

BERTHS 3 AND 4 PLAN VIEW -
ANODE LAYOUT (2 OF 6)

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PROJECT NO.
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DRAWING NO.
CP-4



Brian Pailes

DATE: 6-19-2020

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LOCATION
PORT ARTHUR, TX 77640
PORT OF PORT ARTHUR

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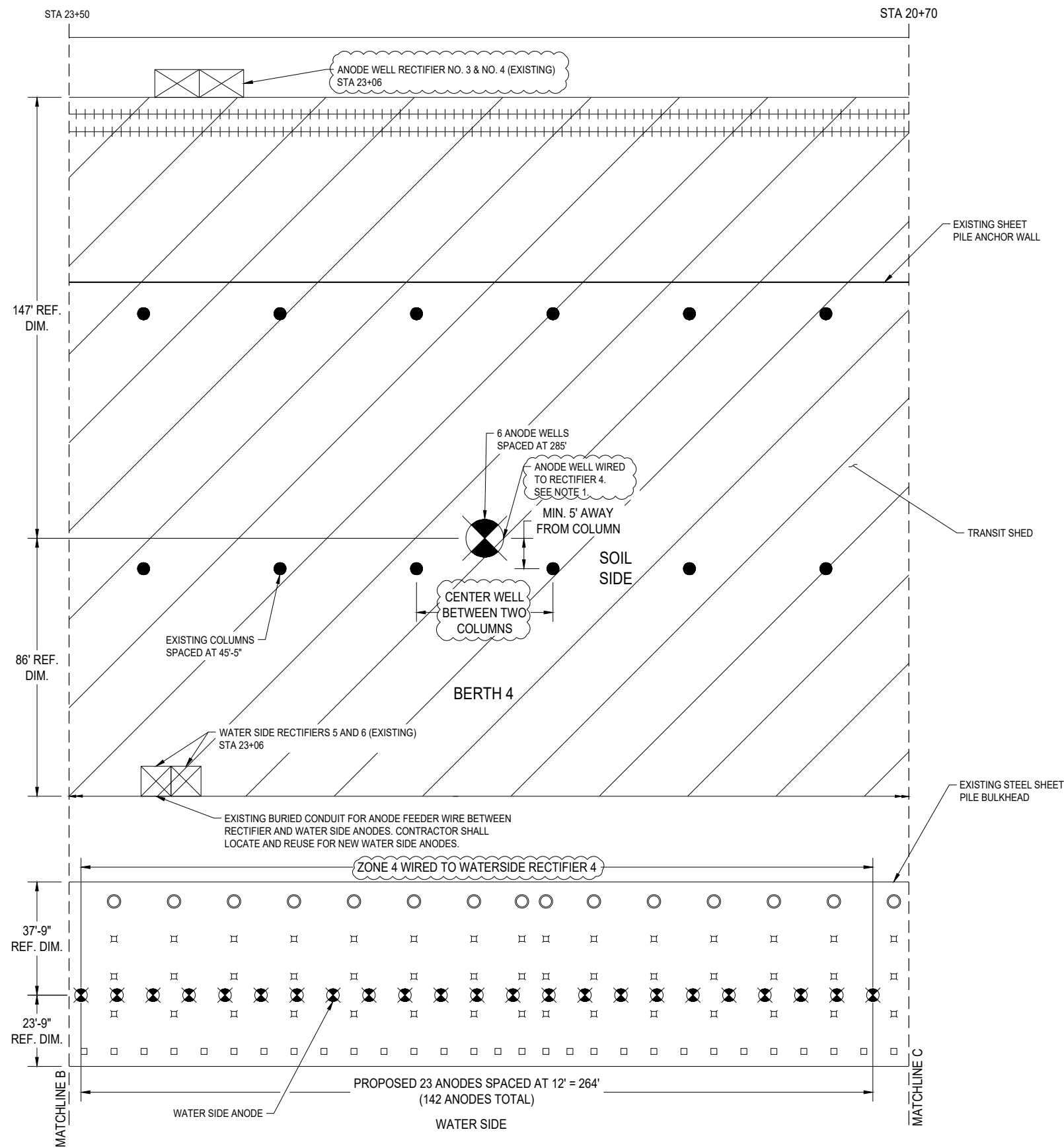
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DATE
3-20-2020

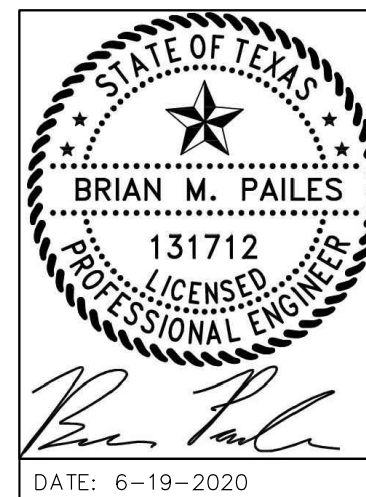
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FIRM NO.
9791

FIGURE NO.
N/A



3 PLAN VIEW
BERTHS 3 AND 4 SOIL SIDE AND WATER SIDE ANODE LAYOUT
SCALE: N.T.S



NOTE:
1. LOCATE TIE-BACK RODS AND CENTER WELL IN BETWEEN.

COLLINS ENGINEERS^{PC}
TEXAS FIRM# 9791
501 PROCTER ST., SUITE 321
PORT ARTHUR, TX 77640
(409) 895-2550

LOCATION
PORT ARTHUR, TX 77640
PORT OF PORT ARTHUR

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DATE
3-20-2020

PROJECT NO.
F19037TX

FIRM NO.
9791

FIGURE NO.
N/A

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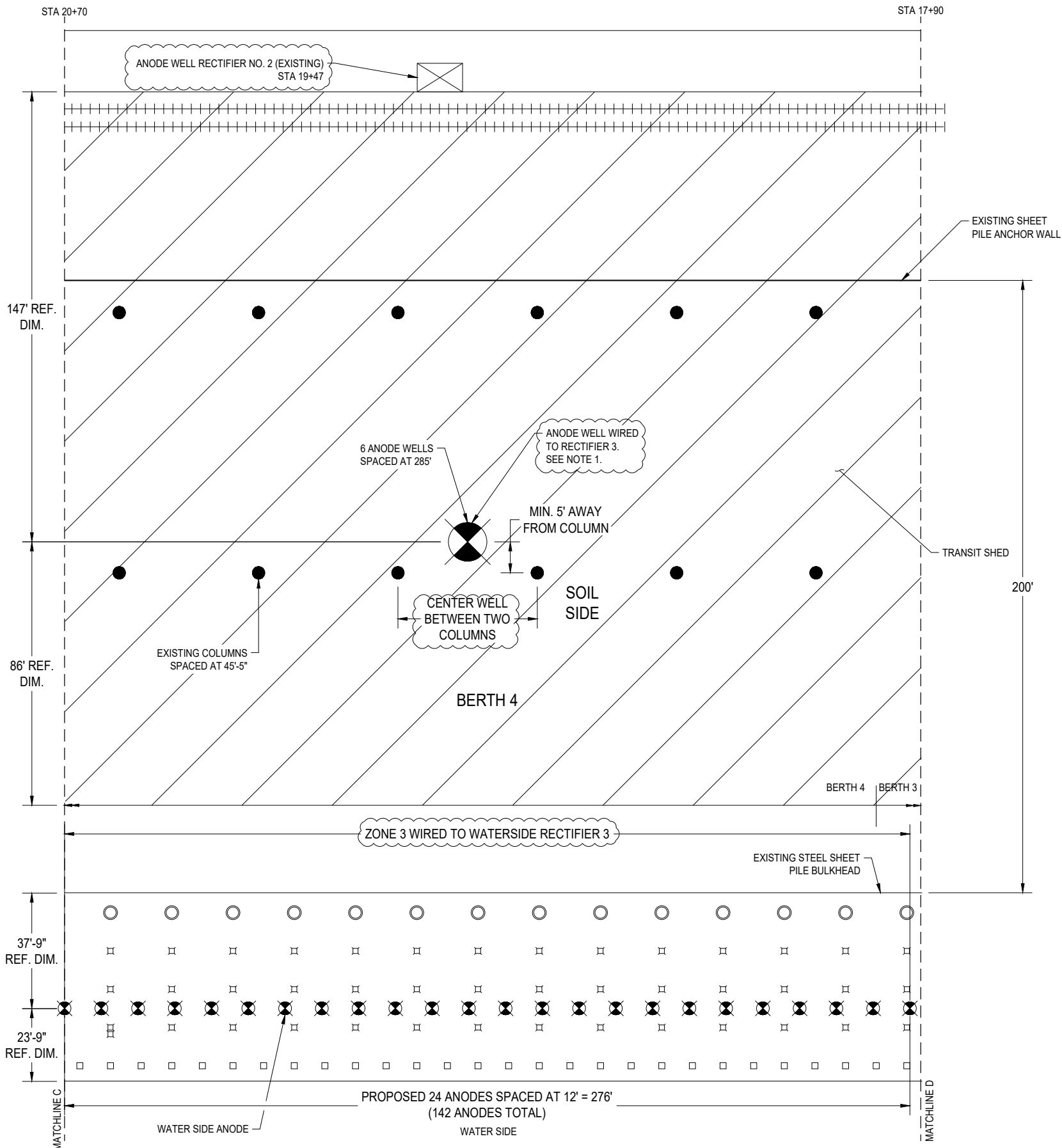
**PORT OF PORT ARTHUR
CATHODIC PROTECTION
OF BERTHS 3 AND 4**
PORT ARTHUR, TX

BERTHS 3 AND 4 PLAN VIEW -
ANODE LAYOUT (3 OF 6)

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PROJECT NO.
F19037TX

DRAWING NO.
CP-5



4 PLAN VIEW
BERTHS 3 AND 4 SOIL SIDE AND WATER SIDE ANODE LAYOUT
SCALE: N.T.S

NOTE:
1. LOCATE TIE-BACK RODS AND CENTER WELL IN BETWEEN.

STATE OF TEXAS

BRIAN M. PAILES

131712

PROFESSIONAL ENGINEER

DATE: 6-19-2020

COLLINS ENGINEERS

TEXAS FIRM# 9791

501 PROCTER ST., SUITE 321

PORT ARTHUR, TX 77640

(409) 895-2550

LOCATION

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PORT OF PORT ARTHUR

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DATE

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PROJECT NO.

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FIRM NO.

9791

FIGURE NO.

N/A

DRAWING REVISIONS			
#	DATE	BY	DESCRIPTION
0	12/10/19	S.Y.	INITIAL DRAWINGS
1	6/10/20	S.Y.	REVISION 1
2	6/19/20	S.Y.	REVISION 2



**PORT OF PORT ARTHUR
CATHODIC PROTECTION
OF BERTHS 3 AND 4**

PORT ARTHUR, TX

**BERTHS 3 AND 4 PLAN VIEW -
ANODE LAYOUT (4 OF 6)**

VECTOR CORROSION
SERVICES, INC.

8413 LAUREL FAIR CIRCLE

SUITE 200B

TAMPA, FL 33610

(813) 501-0050

WWW.VCSERVICES.COM

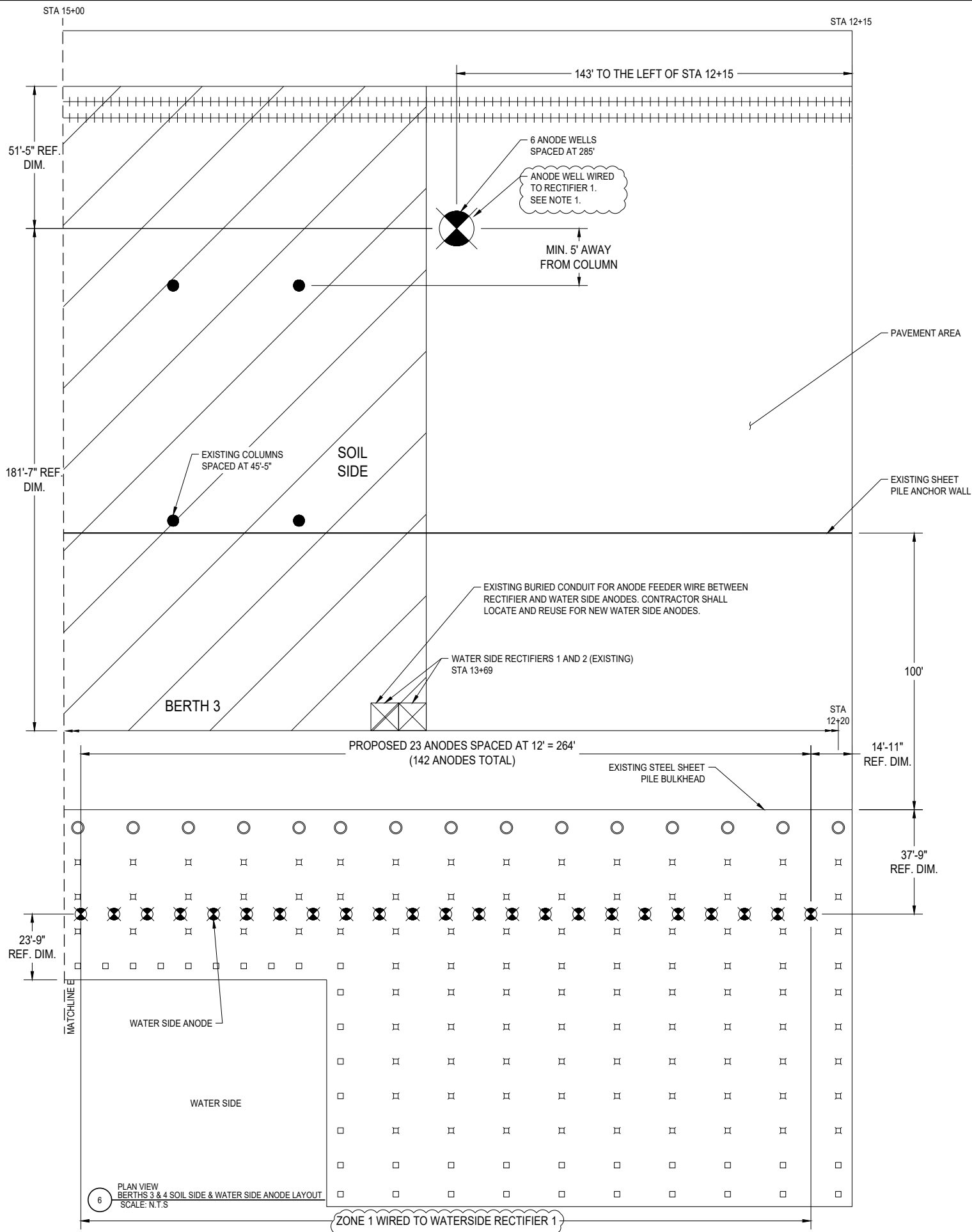
FL CA # 30851

PROJECT NO.

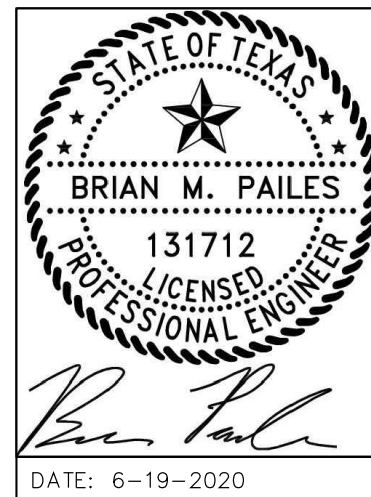
F19037TX

DRAWING NO.

CP-6



NOTE:
1. LOCATE TIE-BACK RODS AND CENTER WELL IN BETWEEN.



COLLINS ENGINEERS
TEXAS FIRM# 9791
501 PROCTER ST., SUITE 321
PORT ARTHUR, TX 77640
(409) 895-2550

LOCATION
PORT ARTHUR, TX 77640
PORT OF PORT ARTHUR

DRAWN BY
S.Y.
CHECKED BY
B.P.

DATE 3-20-2020	PROJECT NO. F19037TX	FIRM NO. 9791	FIGURE NO. N/A
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DRAWING REVISIONS			
#	DATE	BY	DESCRIPTION
0	12/10/19	S.Y.	INITIAL DRAWINGS
1	6/10/20	S.Y.	REVISION 1
2	6/19/20	S.Y.	REVISION 2



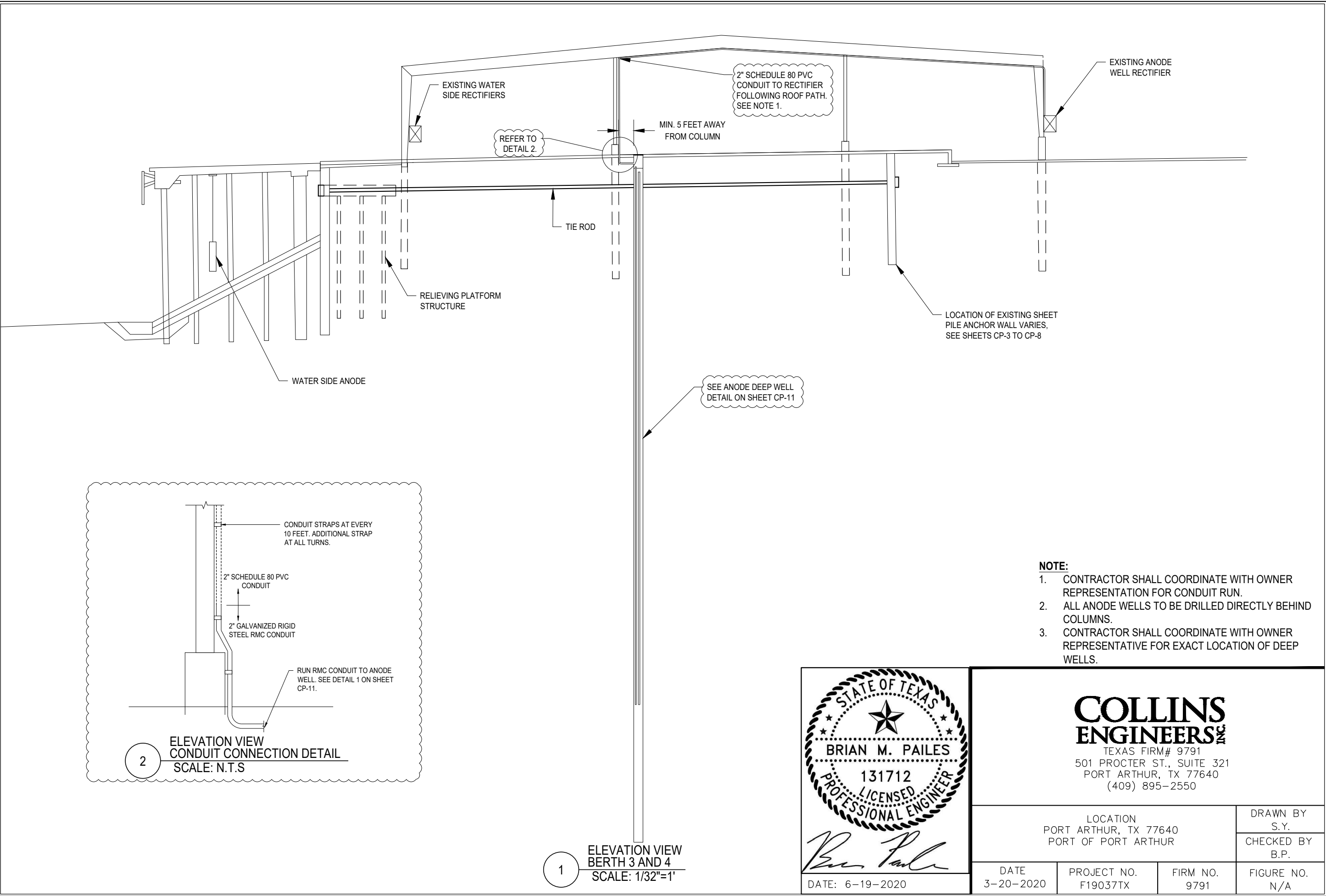
**PORT OF PORT ARTHUR
CATHODIC PROTECTION
OF BERTHS 3 AND 4**
PORT ARTHUR, TX

**BERTHS 3 AND 4 PLAN VIEW -
ANODE LAYOUT (6 OF 6)**

VECTOR CORROSION
SERVICES, INC.
8413 LAUREL FAIR CIRCLE
SUITE 200B
TAMPA, FL 33610
(813) 501-0050
WWW.VCSERVICES.COM
FL CA # 30851

PROJECT NO.
F19037TX

DRAWING NO.
CP-8



DRAWING REVISIONS			
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2	6/19/20	S.Y.	REVISION 2



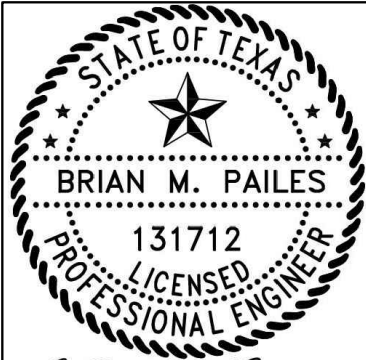
PORT OF PORT ARTHUR
CATHODIC PROTECTION
OF BERTHS 3 AND 4
PORT ARTHUR, TX

BERTH 3 AND 4 TYPICAL
ELEVATION VIEW

VECTOR CORROSION
SERVICES, INC.
8413 LAUREL FAIR CIRCLE
SUITE 200B
TAMPA, FL 33610
(813) 501-0050
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FL CA # 30851

PROJECT NO.
F19037TX

DRAWING NO.
CP-9



Brian M. Pailes

DATE: 6-19-2020

**COLLINS
ENGINEERS**

TEXAS FIRM# 9791
501 PROCTER ST., SUITE 321
PORT ARTHUR, TX 77640
(409) 895-2550

LOCATION
PORT ARTHUR, TX 77640
PORT OF PORT ARTHUR

DRAWN BY
S.Y.

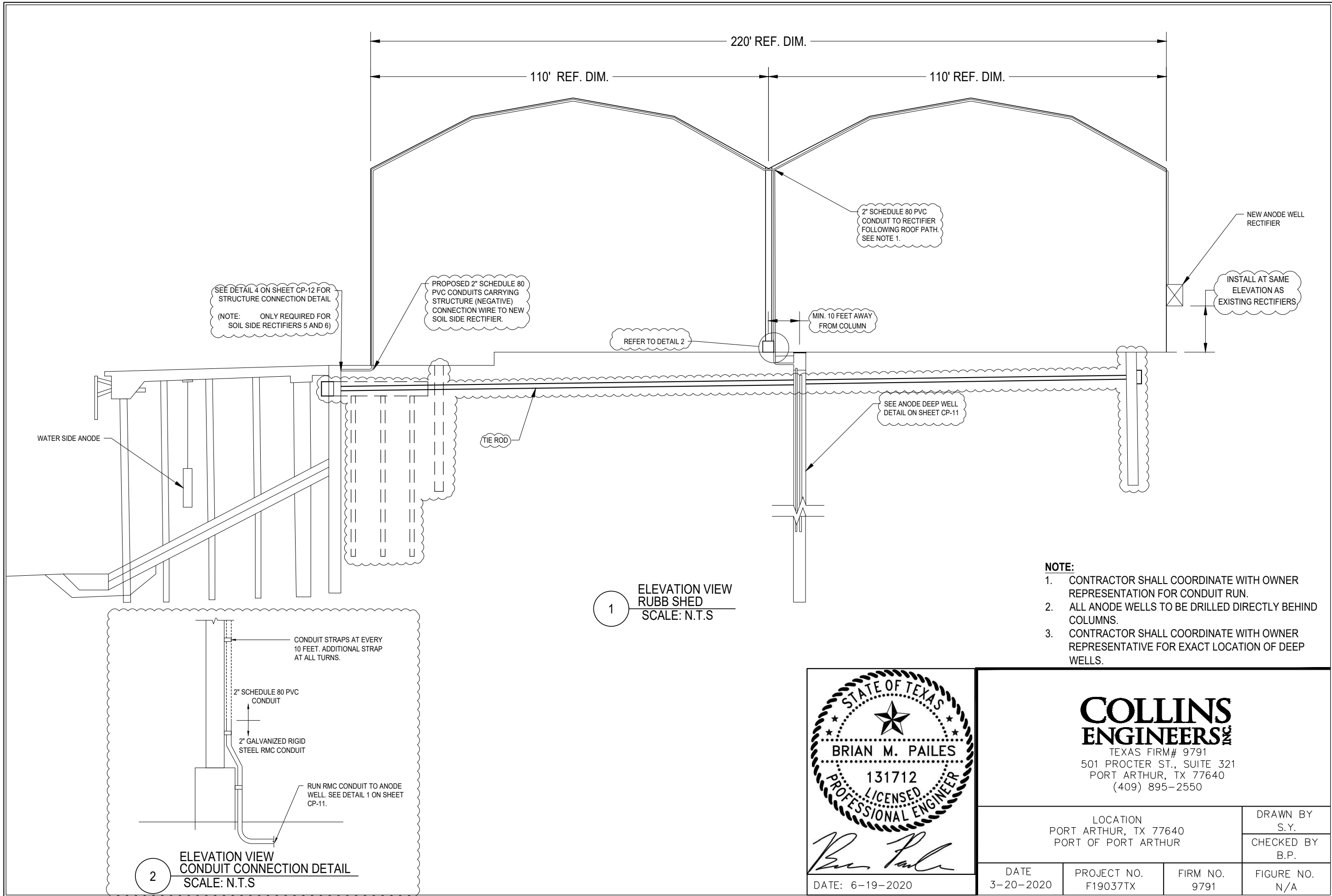
CHECKED BY
B.P.

DATE
3-20-2020

PROJECT NO.
F19037TX

FIRM NO.
9791

FIGURE NO.
N/A



DRAWING REVISIONS			
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1	6/10/20	S.Y.	REVISION 1
2	6/19/20	S.Y.	REVISION 2



PORT OF PORT ARTHUR
CATHODIC PROTECTION
OF BERTHS 3 AND 4
PORT ARTHUR, TX

TYPICAL ELEVATION OF RUBB

VECTOR CORROSION SERVICES, INC. 8413 LAUREL FAIR CIRCLE SUITE 200B TAMPA, FL 33610 (813) 501-0050 WWW.VCSERVICES.COM FL CA # 30851			
PROJECT NO. F19037TX			
DRAWING NO. CP-10			

- NOTE:
- CONTRACTOR SHALL COORDINATE WITH OWNER REPRESENTATION FOR CONDUIT RUN.
 - ALL ANODE WELLS TO BE DRILLED DIRECTLY BEHIND COLUMNS.
 - CONTRACTOR SHALL COORDINATE WITH OWNER REPRESENTATIVE FOR EXACT LOCATION OF DEEP WELLS.



DATE: 6-19-2020

COLLINS ENGINEERS

TEXAS FIRM# 9791
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PORT ARTHUR, TX 77640
(409) 895-2550

LOCATION
PORT ARTHUR, TX 77640
PORT OF PORT ARTHUR

DRAWN BY
S.Y.

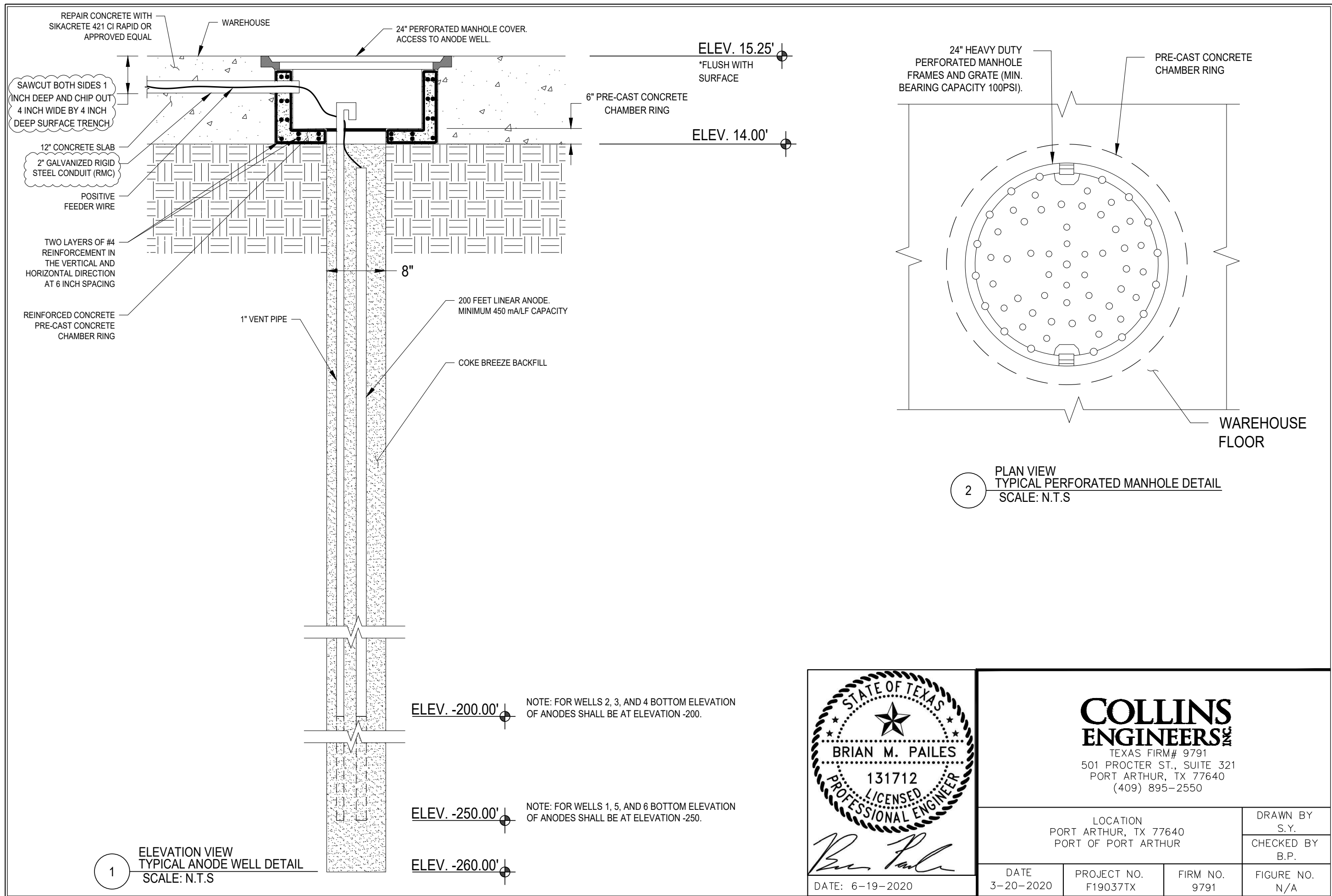
CHECKED BY
B.P.

DATE
3-20-2020

PROJECT NO.
F19037TX

FIRM NO.
9791

FIGURE NO.
N/A



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**PORT OF PORT ARTHUR
CATHODIC PROTECTION
OF BERTHS 3 AND 4**
PORT ARTHUR, TX

TYPICAL ANODE WELL DETAIL



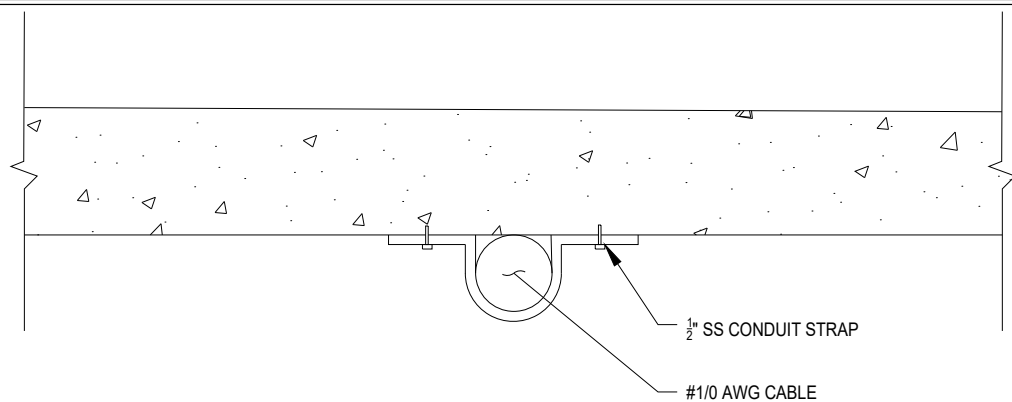
COLLINS ENGINEERS
TEXAS FIRM# 9791
501 PROCTER ST., SUITE 321
PORT ARTHUR, TX 77640
(409) 895-2550

LOCATION PORT ARTHUR, TX 77640 PORT OF PORT ARTHUR		DRAWN BY S.Y.
DATE 3-20-2020		CHECKED BY B.P.
PROJECT NO. F19037TX	FIRM NO. 9791	FIGURE NO. N/A

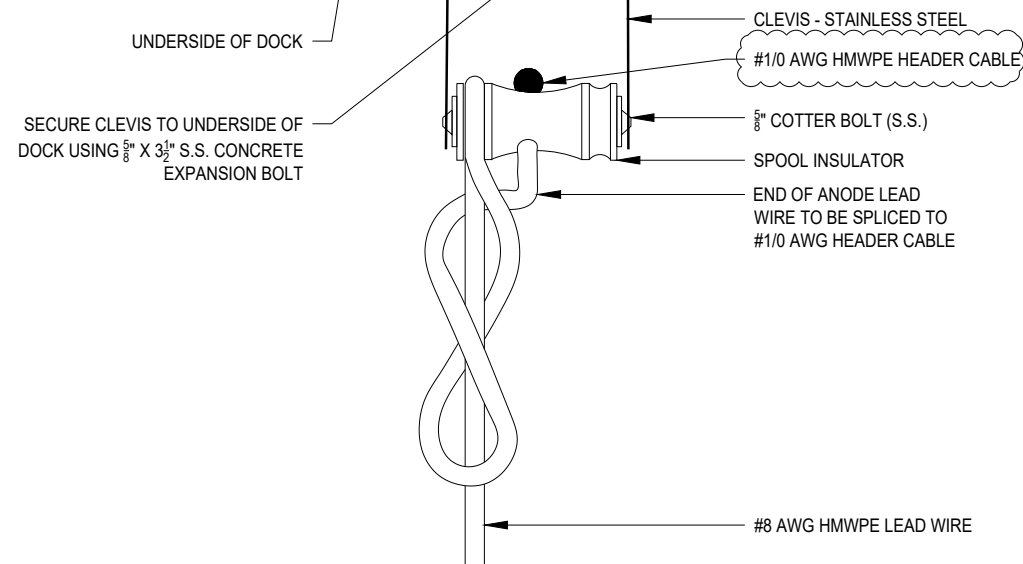
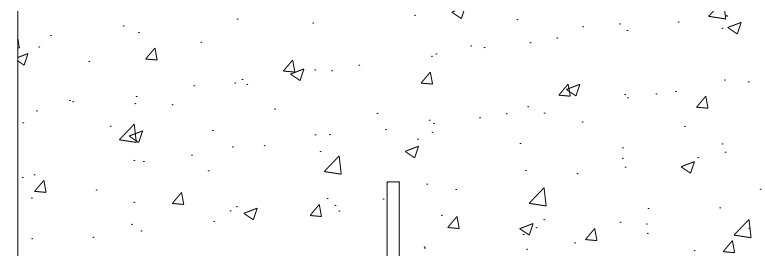
VECTOR CORROSION SERVICES, INC.
8413 LAUREL FAIR CIRCLE
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TAMPA, FL 33610
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WWW.VCSERVICES.COM
FL CA # 30851

PROJECT NO.
F19037TX

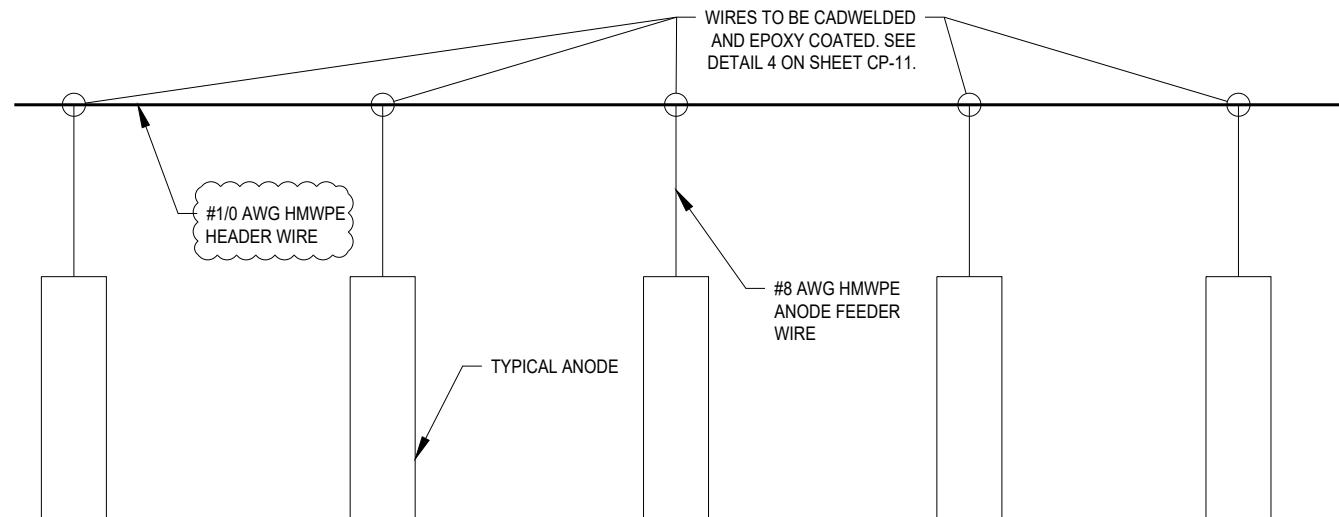
DRAWING NO.
CP-11



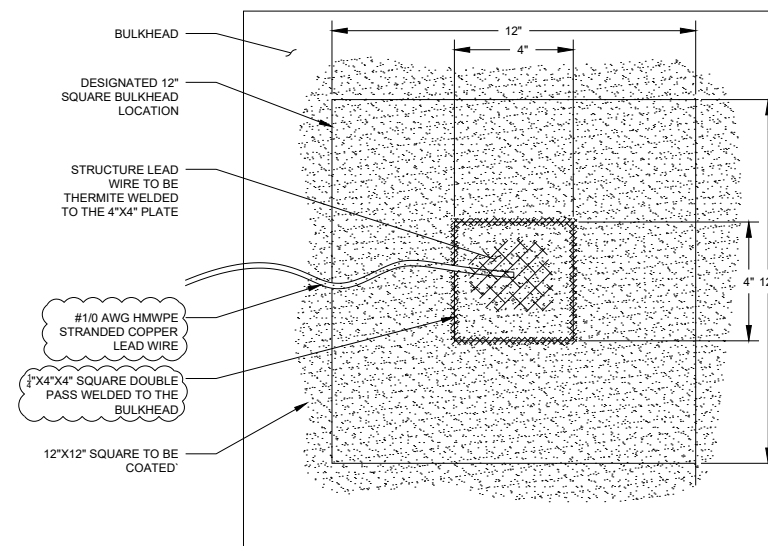
1 1/2" STAINLESS STEEL CONDUIT STRAP AND ANCHOR BOLTS DETAIL
SCALE: N.T.S



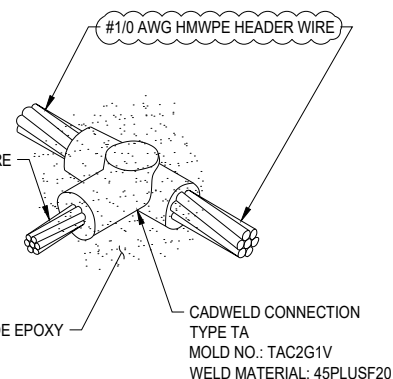
2 CONCRETE MOUNTED ANODE/HEADER CABLE SUPPORT FOR SUSPENDED ANODE (FRONT VIEW)
SCALE: N.T.S



3 TYPICAL ANODE FEEDER WIRE TO ANODE HEADER WIRE CONNECTION DETAIL
SCALE: N.T.S

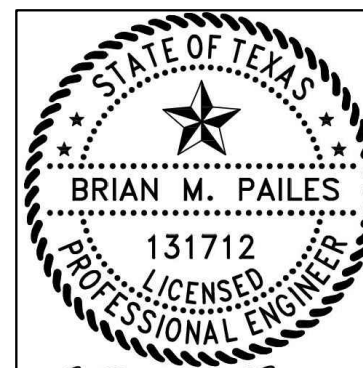


4 TYPICAL STRUCTURE CONNECTION DETAIL
SCALE: N.T.S



5 UNBALANCED TYPE-T CADWELD CONNECTIONS
SCALE: N.T.S

NOTE:
1. ALL EXISTING ANODE HEADER WIRES SHALL BE REMOVED AND REPLACED.



DATE: 6-19-2020

COLLINS ENGINEERS
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3-20-2020

PROJECT NO.
F19037TX

FIRM NO.
9791

FIGURE NO.
N/A

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**PORT OF PORT ARTHUR
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PORT ARTHUR, TX

TYPICAL ANODE CONNECTION
DETAILS

VECTOR CORROSION
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PROJECT NO.
F19037TX

DRAWING NO.
CP-12