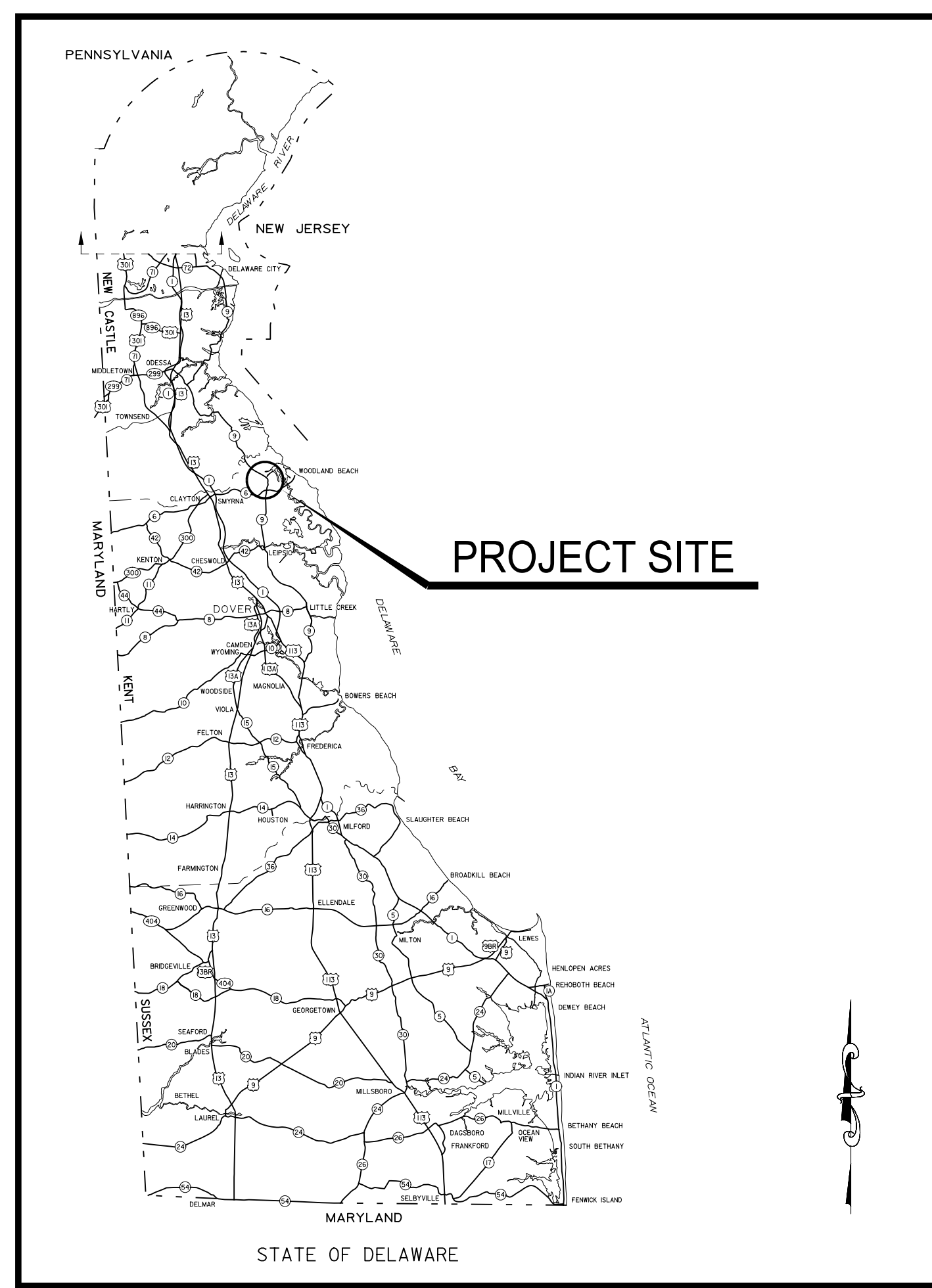
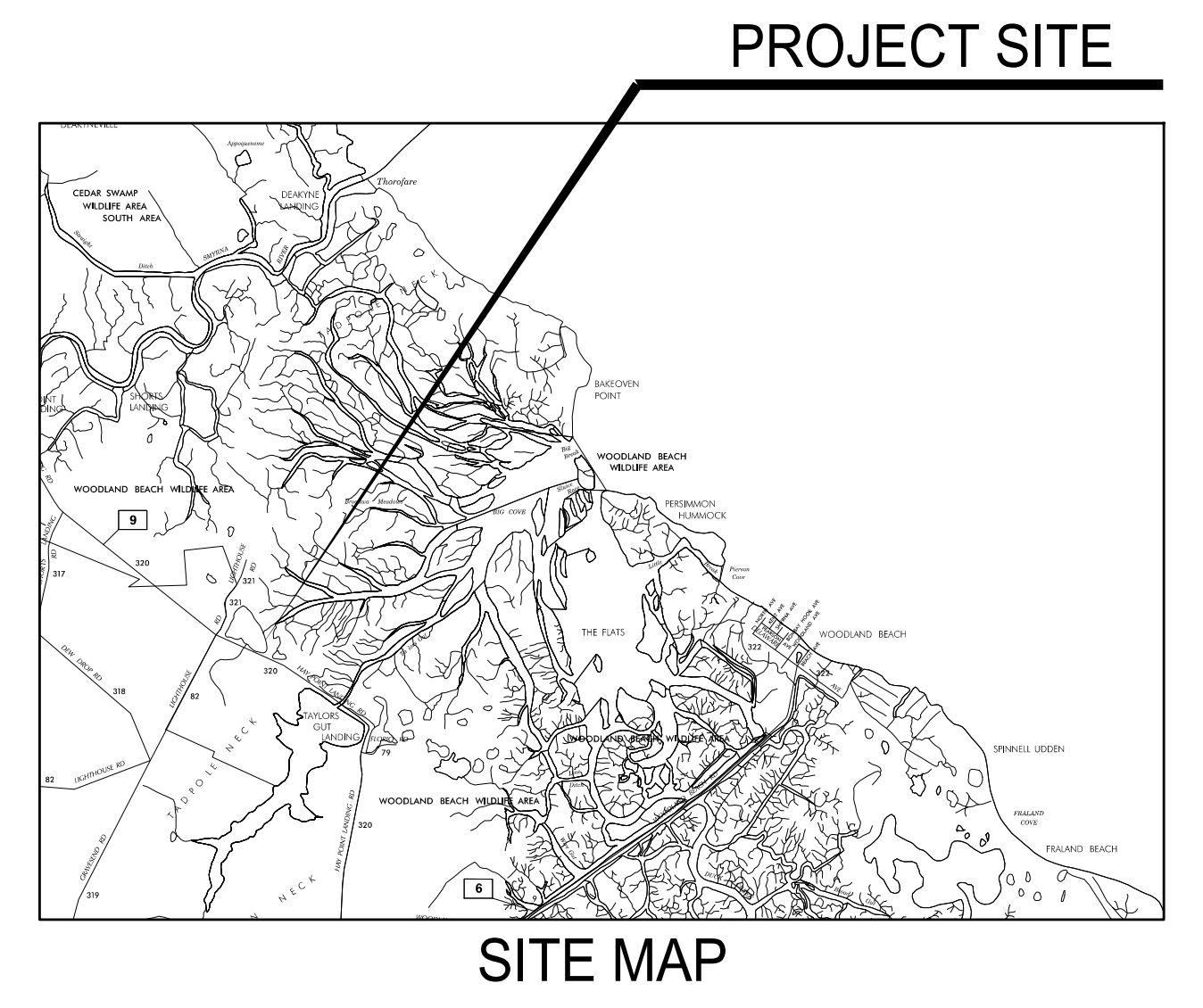


STATE OF DELAWARE
 DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
 DIVISION OF FISH & WILDLIFE

Aquatic Resources Education Center MALLARD LODGE BOARDWALK AND TRAIL REHABILITATION

CONTRACT NO. NAT20003-ARECBDWLK
 100% PLANS
 JANUARY 31, 2025



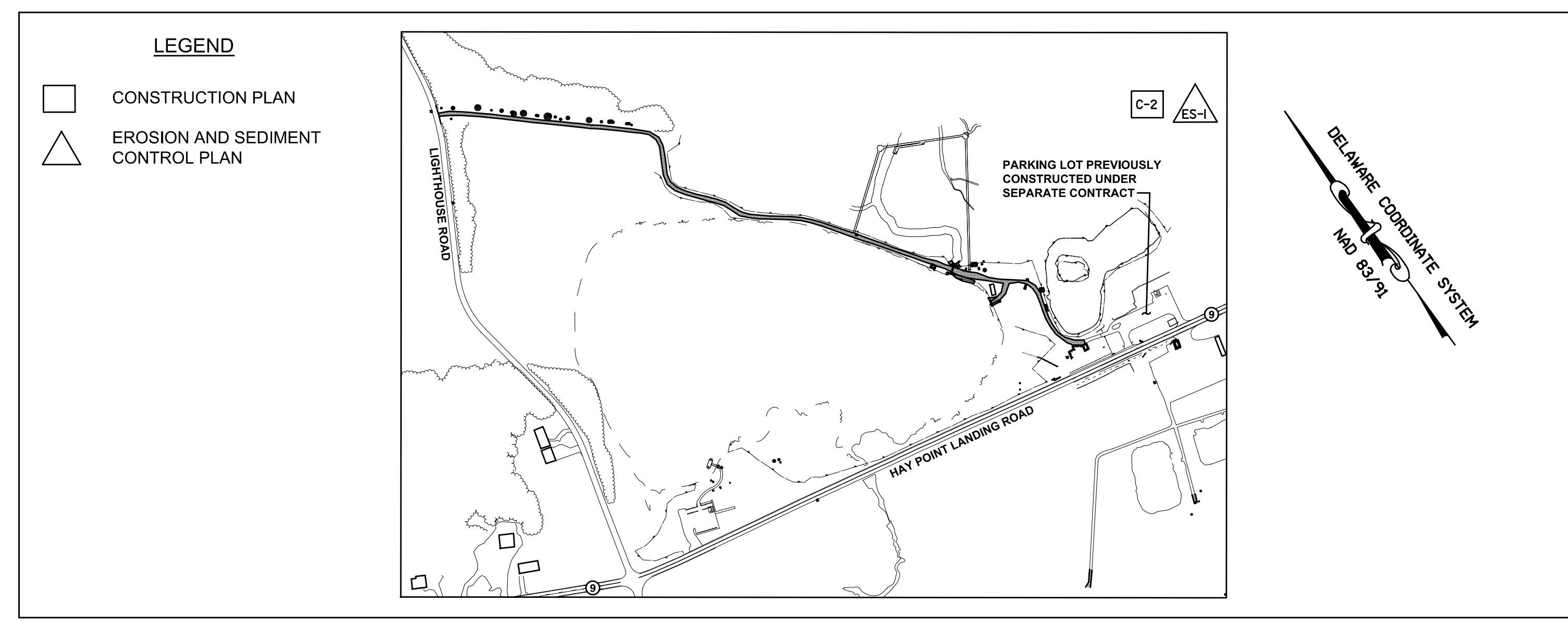
LOCATION MAP

INDEX OF SHEETS

SHEET NO.:	TITLE
C-1	GENERAL NOTES & TYPICAL SECTION
C-2	CONSTRUCTION PLAN
C-3	CONSTRUCTION DETAILS
S-1	STRUCTURAL GENERAL NOTES
S-2	BOARDWALK AND BRIDGE SECTIONS
S-3	MONITORING PLATFORM AND APPROACH RAMP PLAN
S-4	MONITORING PLATFORM APPROACH RAMP SECTIONS
S-5	MONITORING PLATFORM SECTIONS
S-6	MONITORING PLATFORM PROFILE AND DETAILS
S-7	RAILING DETAILS (TYPE 1)
S-8	RAILING DETAILS (TYPE 2)
ES-1 TO ES-4	EROSION AND SEDIMENT CONTROL PLANS AND DETAILS

FOR INFORMATION ONLY

SHEET NO.:	TITLE
	GREENWAYS BOARDWALK - AQUATIC RESOURCE EDUCATION CENTER WOODLAND BEACH WILDLIFE AREA (ORIGINAL CONSTRUCTION DRAWINGS)



SHEET INDEX
 SCALE: 1"=300'

OWNER INFORMATION

OWNER: STATE OF DELAWARE
 89 KINGS HIGHWAY
 DOVER, DELAWARE 19901

PROPERTY ADDRESS: 4876 HAY POINT LANDING ROAD
 SMYRNA, DELAWARE 19977

TAX PARCEL #: 1-00-00400-01-0500-00001
 1-00-00400-01-0200-00001

DESIGNER/APPLICANT: RK&K
 700 E. PRATT STREET, SUITE 150
 BALTIMORE, MARYLAND 21202

PREPARED BY
 THE CONSULTING FIRM OF

RK&K RUMMEL, KLEPPER & KAHL, LLP
 CONSULTING ENGINEERS
 700 E. PRATT STREET, SUITE 500
 BALTIMORE, MD 21202

Matthew C. Kahl
 PROJECT MANAGER 01-31-2025
 DATE

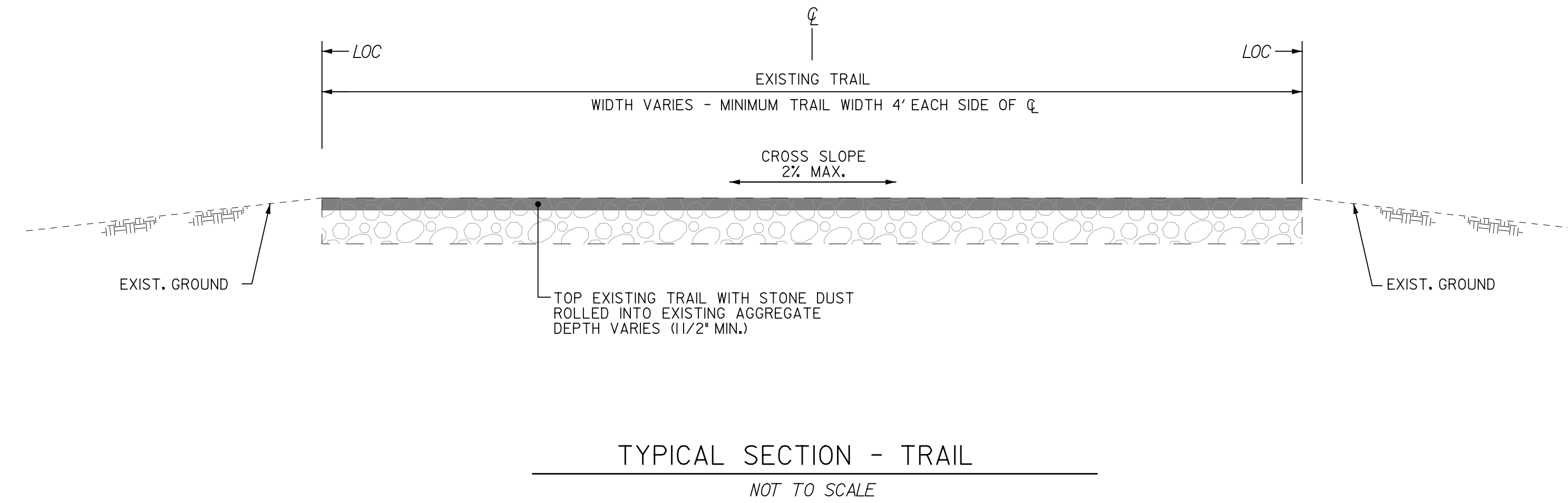
PREPARED FOR:
 DELAWARE DIVISION OF FISH & WILDLIFE
 89 KINGS HIGHWAY
 DOVER, DELAWARE 19901
 PHONE: 302-739-9910
 FAX: (302) 739-7026

DATE: JANUARY 31, 2025

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GENERAL NOTES

1. BEFORE EXCAVATION IS STARTED IN AREAS OF UNDERGROUND UTILITIES, THE CONTRACTOR SHALL GIVE NOTIFICATION BY TELEPHONE, CALLING "MISS UTILITY", TEL. (800) 282-8555. THE CONTRACTOR IS ADVISED THAT MISS UTILITY HAS REFUSED TO LOCATE UTILITIES ON STATE PROPERTY IN SOME INSTANCES. THE CONTRACTOR SHALL VERIFY EXACT LOCATIONS OF ALL UTILITIES IN THE FIELD BY EMPLOYING A PROFESSIONAL UTILITY LOCATOR TO FIELD LOCATE EXISTING UTILITIES PRIOR TO ANY EXCAVATION. EXISTING UTILITIES ARE SHOWN ON THE DRAWINGS BASED ON THE BEST INFORMATION AVAILABLE, HOWEVER THIS INFORMATION HAS NOT BEEN FIELD VERIFIED AND IS NOT GUARANTEED. ALL EXISTING UTILITIES SHALL BE PROTECTED AND TEMPORARILY SUPPORTED OR RELOCATED AS NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH THE PERTINENT UTILITY COMPANY REQUIREMENTS. ALL COSTS SHALL BE INCLUDED IN THE CONTRACT.
2. THE CONTRACTOR SHALL DESIGNATE A PERSON WHO SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING THE EROSION AND SEDIMENT CONTROL PLANS, AND A PERSON WHO SHALL BE RESPONSIBLE FOR WORK SAFETY.
3. THE CONTRACTOR IS RESPONSIBLE FOR SECURING THE AREA WITHIN THE LIMITS OF CONSTRUCTION TO PROHIBIT PUBLIC ACCESS UNTIL COMPLETION OF THE PROJECT. THE CONTRACTOR'S PROCEDURE/METHOD FOR LIMITING ACCESS SHALL BE REVIEWED BY AND COORDINATED WITH THE OWNER PRIOR TO THE START OF WORK. THE COST SHALL BE INCLUDED IN THE CONTRACT.
4. THE LIMIT OF CONSTRUCTION SHALL BE AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL NOT WORK OR TRESPASS OUTSIDE OF THE LIMIT OF CONSTRUCTION AS SHOWN ON THE PLANS UNLESS OTHERWISE APPROVED BY THE OWNER.
5. APPROVED COVERS TO PREVENT MATERIAL FROM LEAVING THE TRUCKS MUST BE INSTALLED OVER ALL LOADED TRUCKS HAULING BORROW, EXCAVATED MATERIALS, AND/OR FINE AGGREGATES TO OR FROM THE PROJECT SITE OVER STATE MAINTAINED ROADS. THE TRUCKS SHALL BE FULLY COVERED AND THE COVERS SHALL BE TIED ON THE REAR AND BOTH SIDES TO PREVENT MATERIAL FROM LEAVING THE TRUCK DURING HAULING.
6. IN CASE OF CONFLICT BETWEEN THE "MANUFACTURER'S RECOMMENDATIONS" FOR AN APPROVED MATERIAL AND THE GOVERNING "CONTRACT SPECIFICATIONS" FOR THE MATERIAL, THE MORE RESTRICTIVE OF THE TWO SHALL PREVAIL UNLESS OTHERWISE DIRECTED BY THE OWNER.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING, BY SURVEY, ALL POINTS AND LIMIT OF CONSTRUCTION LINES NECESSARY FOR CONSTRUCTION OF THE PROJECT. THE CONTRACTOR SHALL ENGAGE A PROFESSIONAL LAND SURVEYOR, REGISTERED IN THE STATE OF DELAWARE, TO PERFORM REQUIRED SURVEYING SERVICES. THE COST OF ALL SURVEY STAKEOUT WORK SHALL BE INCLUDED IN THE CONTRACT.
8. THE CONTRACTOR SHALL SUBMIT A STAGING PLAN TO THE OWNER FOR APPROVAL PRIOR TO CONSTRUCTION OF THE PROJECT. THE STAGING PLAN SHALL INCLUDE SITE LOCATION, EROSION AND SEDIMENT CONTROLS, AND ALL OTHER INCIDENTALS, AS DIRECTED BY THE OWNER. ALL COSTS ASSOCIATED WITH PREPARING AND IMPLEMENTING THE STAGING PLAN SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
9. ALL CONSTRUCTION ACCESS SHALL USE THE STABILIZED CONSTRUCTION ENTRANCE. CONSTRUCTION, MAINTENANCE, CLEANING, RE-COMPACTING, REMOVAL AND REPLACEMENT OF THE BASE COURSE MATERIALS FOR THE STABILIZED CONSTRUCTION ENTRANCE SHALL BE IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN AS DIRECTED BY THE CERTIFIED CONSTRUCTION REVIEWER AND THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR CLEANING THE ROAD AT THE CONSTRUCTION ENTRANCE AT THE END OF EACH WORKING DAY.
10. THE CONTRACTOR MAY STORE OR STOCKPILE EQUIPMENT OR MATERIALS ON THE PROJECT SITE IN THE CONSTRUCTION STAGING AREA SHOWN ON THE PLAN. SILT FENCE SHALL BE PLACED AROUND THE STOCKPILE AREAS AS DIRECTED BY THE OWNER. THE COST OF EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INCLUDED IN THE CONTRACT.
11. UPON COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL FULLY RESTORE ALL AREAS USED FOR STAGING OPERATIONS, INCLUDING SOIL STOCKPILE AREAS, TO ITS ORIGINAL CONDITION TO THE SATISFACTION OF THE OWNER. ALL COSTS ASSOCIATED WITH RESTORATION OF THE STAGING AREA SHALL BE INCLUDED IN THE CONTRACT.
12. THE CONTRACTOR SHALL PROVIDE NECESSARY RESTROOM FACILITIES FOR WORKERS DURING CONSTRUCTION.
13. THE DATUM USED ON THIS PROJECT IS HORIZONTAL NAD 83/91 AND VERTICAL NGVD 88.
14. ALL SIGNS AND POSTS SHALL BE IN ACCORDANCE WITH THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (DEMUTCD), CURRENT EDITION, UNLESS OTHERWISE NOTED ON THE PLANS.
15. ALL CONSTRUCTION IS TO BE IN ACCORDANCE WITH THE LATEST DELDOT STANDARDS, SPECIFICATIONS AND DETAILS. UNLESS OTHERWISE NOTED ON THE PLANS OR IN THE SPECIFICATIONS FOR THIS PROJECT AND AS FOLLOWS. FOR THIS PROJECT, DIVISION 100 GENERAL PROVISIONS IN THE DELDOT STANDARD SPECIFICATIONS DOES NOT APPLY. THERE WILL BE NO MEASUREMENT FOR PAYMENT EXCEPT WHERE SPECIFICALLY STATED IN THE PLANS AND SPECIFICATIONS FOR THIS PROJECT.
16. THE BUILDING PERMIT SHALL BE SECURED BY THE CONTRACTOR. COST OF THE PERMIT SHALL BE REIMBURSED BY THE OWNER.
17. THE MAXIMUM SLOPE OF THE TRAIL IN THE DIRECTION OF TRAVEL SHALL NOT EXCEED 5% AT ANY LOCATION.
18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND PROPERLY DISPOSING OF ALL SPOILS FROM THE SITE.
19. THIS PROJECT IS SUBJECT TO THE BUILD AMERICA, BUY AMERICA ACT (BABA), ENACTED AS PART OF THE BIPARTISAN INFRASTRUCTURE LAW (BIL) REQUIRES IRON, STEEL, MANUFACTURED PRODUCTS, AND CONSTRUCTION MATERIALS USED IN INFRASTRUCTURE PROJECTS FUNDED BY FEDERAL FINANCIAL ASSISTANCE TO BE PRODUCED IN THE UNITED STATES. ALL MATERIALS THAT WILL BE PERMANENTLY INCORPORATED INTO THIS PROJECT WILL MEET THE BABA MATERIAL REQUIREMENTS. THE CONTRACTOR IS REQUIRED TO CERTIFY AND PROVIDE DOCUMENTATION THAT ALL IRON, STEEL, MANUFACTURED PRODUCTS AND CONSTRUCTION MATERIALS ARE COMPLIANT WITH BABA REQUIREMENTS. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

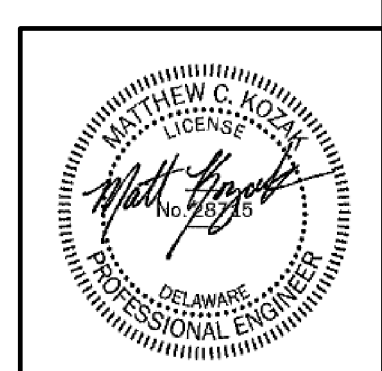


DATE:	DESCRIPTION:

**AQUATIC RESOURCES EDUCATION CENTER
MALLARD LODGE
BOARDWALK & TRAIL REHABILITATION
GENERAL NOTES & TYPICAL SECTION**

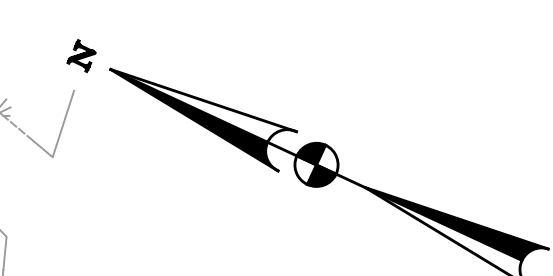
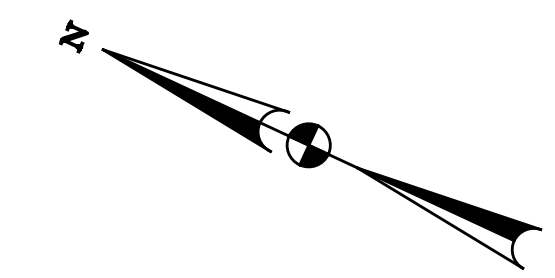
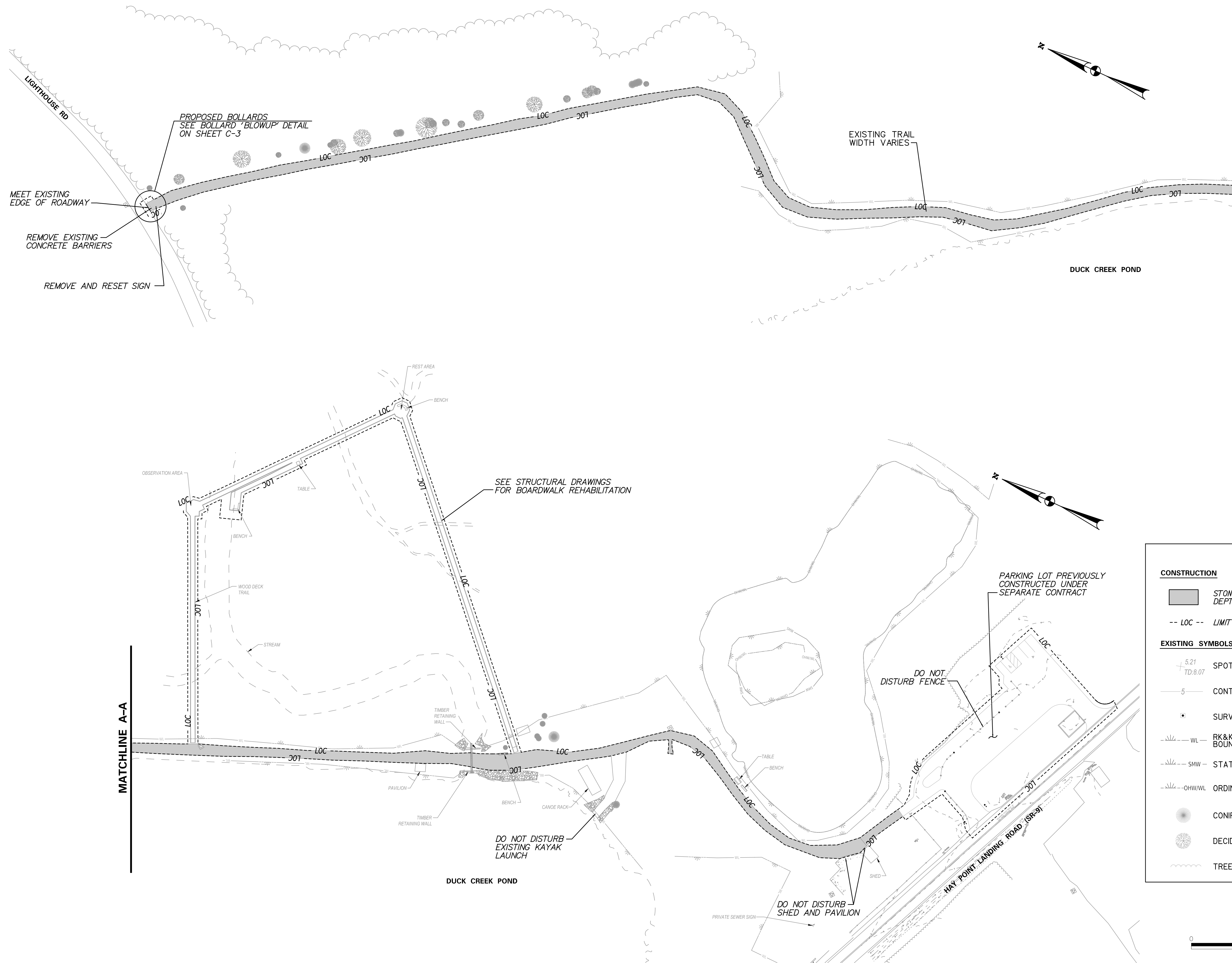


DESIGNED BY: RKK
DRAWN BY: RKK
BUILDING NO.: N/A
DATE: JANUARY 31, 2025
SCALE: NOT TO SCALE
SHEET NO.: C-1
DFW PROJECT #: N/A
CONTRACT #: NAT20003-ARECBDWLK

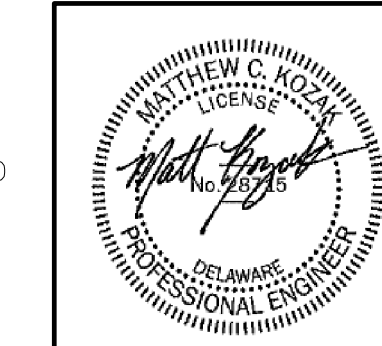
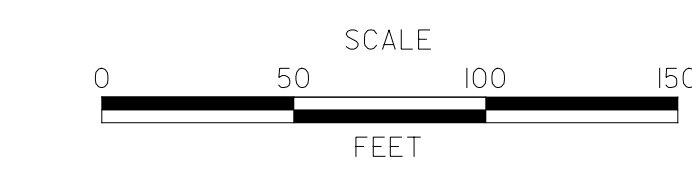


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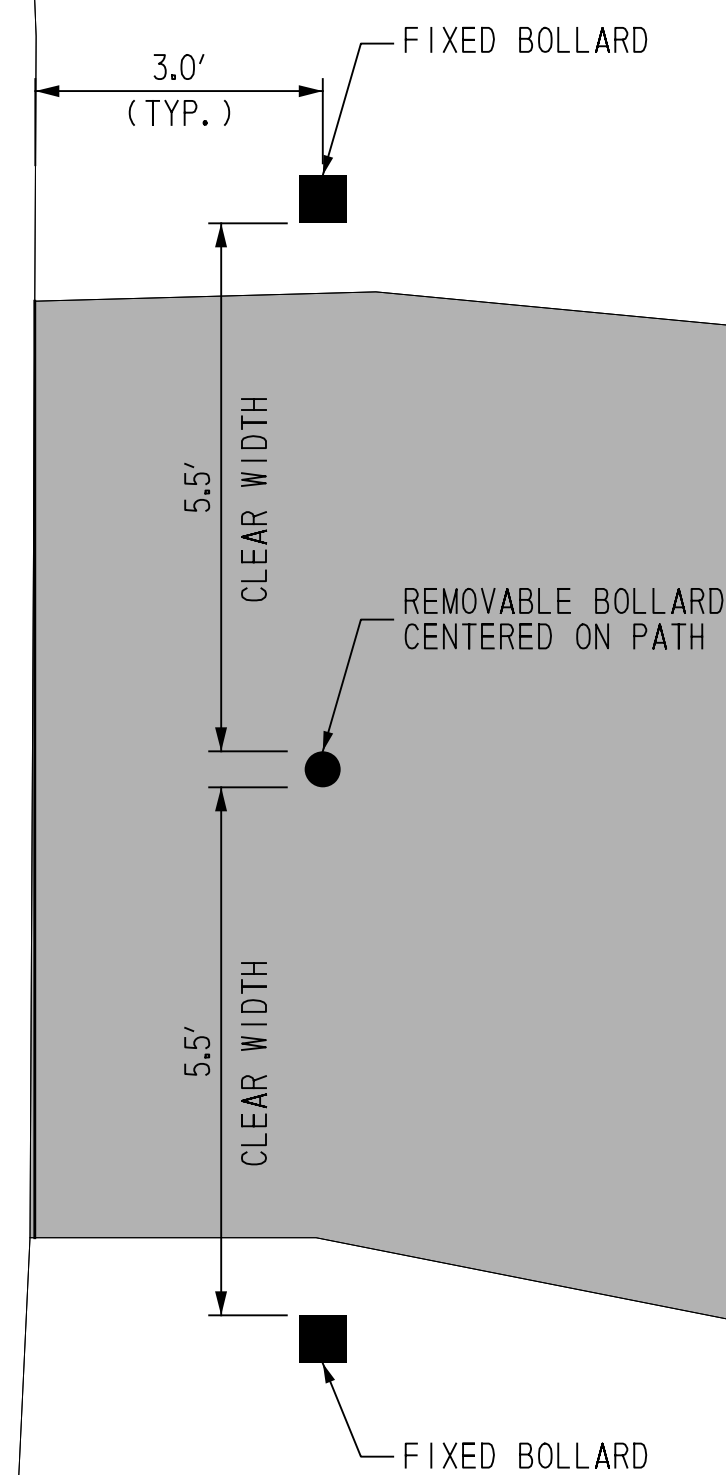
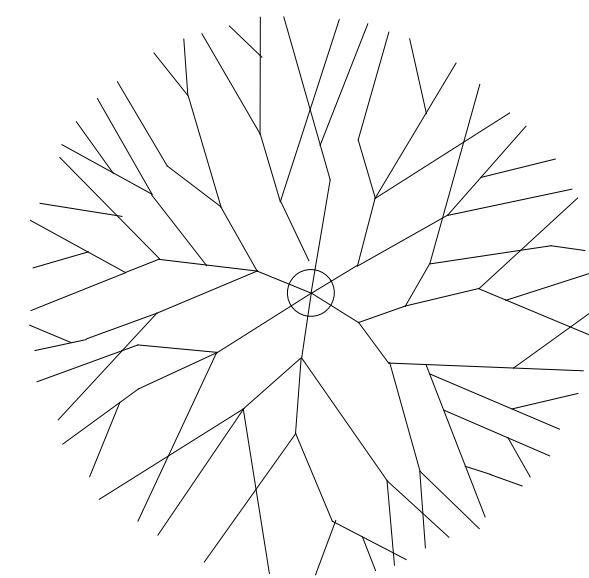
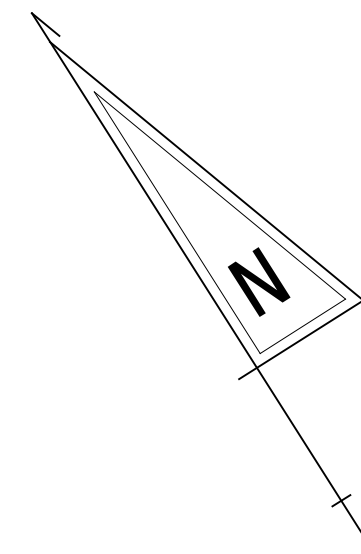
LEGEND	
CONSTRUCTION	
	STONE DUST ROLLED INTO EXISTING AGGREGATE DEPTH VARIES (1/2" MIN)
	LOC -- LIMIT OF CONSTRUCTION
EXISTING SYMBOLS	
	5.21 TD:8.07 SPOT ELEVATION
	5 CONTOUR LINE
	SURVEY TRAVERSE POINT
	WL RK&K DELINEATED WETLAND BOUNDARY
	SMW STATE MAPPED WETLAND
	OHWWL ORDINARY HIGH WATER/WETLAND
	CONIFEROUS TREE- 6" AND LARGER
	DECIDUOUS TREE- 6" AND LARGER
	TREELINE



BY:	
DESCRIPTION:	
DATE:	
AQUATIC RESOURCES EDUCATION CENTER MALLARD LODGE BOARDWALK & TRAIL REHABILITATION	
CONSTRUCTION PLAN	
DESIGNED BY:	RKK
DRAWN BY:	RKK
BUILDING NO.:	N/A
DATE:	JANUARY 31, 2025
SCALE:	1" = 50'
SHEET NO.:	C-2
DFW PROJECT #:	N/A
CONTRACT #:	NAT20003-ARECBDWLK

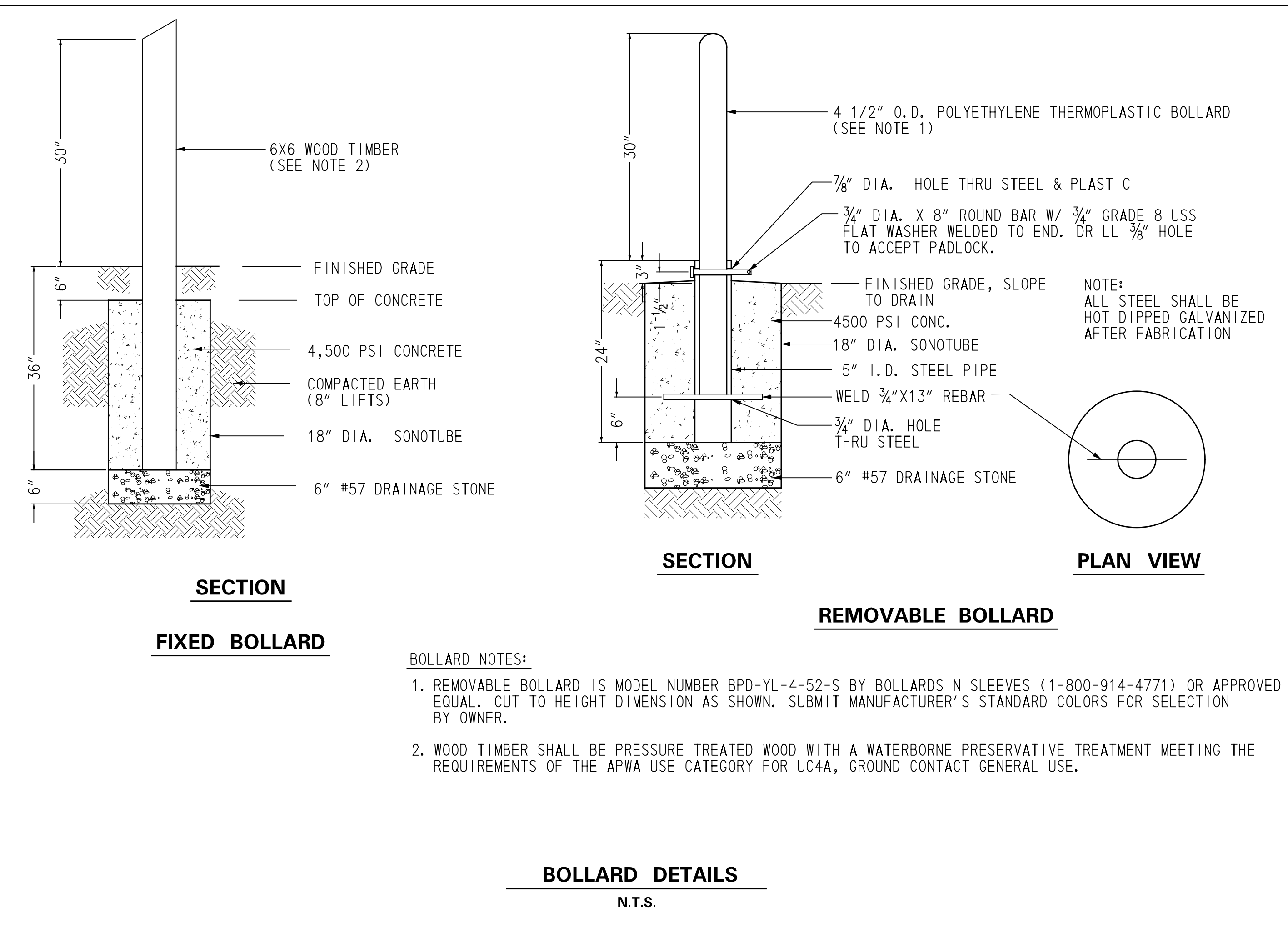
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LIGHTHOUSE RD




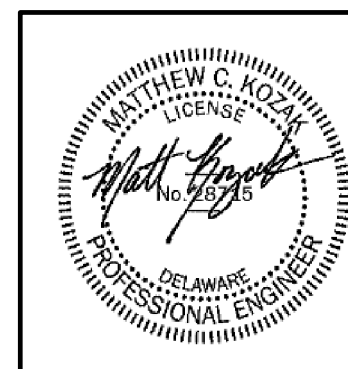
BOLLARD 'BLOWUP' DETAIL
N.T.S.

NOTE:
SEE BOLLARD DETAILS THIS SHEET



BOLLARD DETAILS
N.T.S.

BY:	
DESCRIPTION:	
DATE:	
AQUATIC RESOURCES EDUCATION CENTER MALLARD LODGE BOARDWALK & TRAIL REHABILITATION	
CONSTRUCTION DETAILS	
	
DESIGNED BY:	RKK
DRAWN BY:	RKK
BUILDING NO.:	N/A
DATE:	JANUARY 31, 2025
SCALE:	NOT TO SCALE
SHEET NO.:	C-3
DFW PROJECT #:	N/A
CONTRACT #:	NAT20003-ARECBDWLK



STRUCTURAL GENERAL NOTES

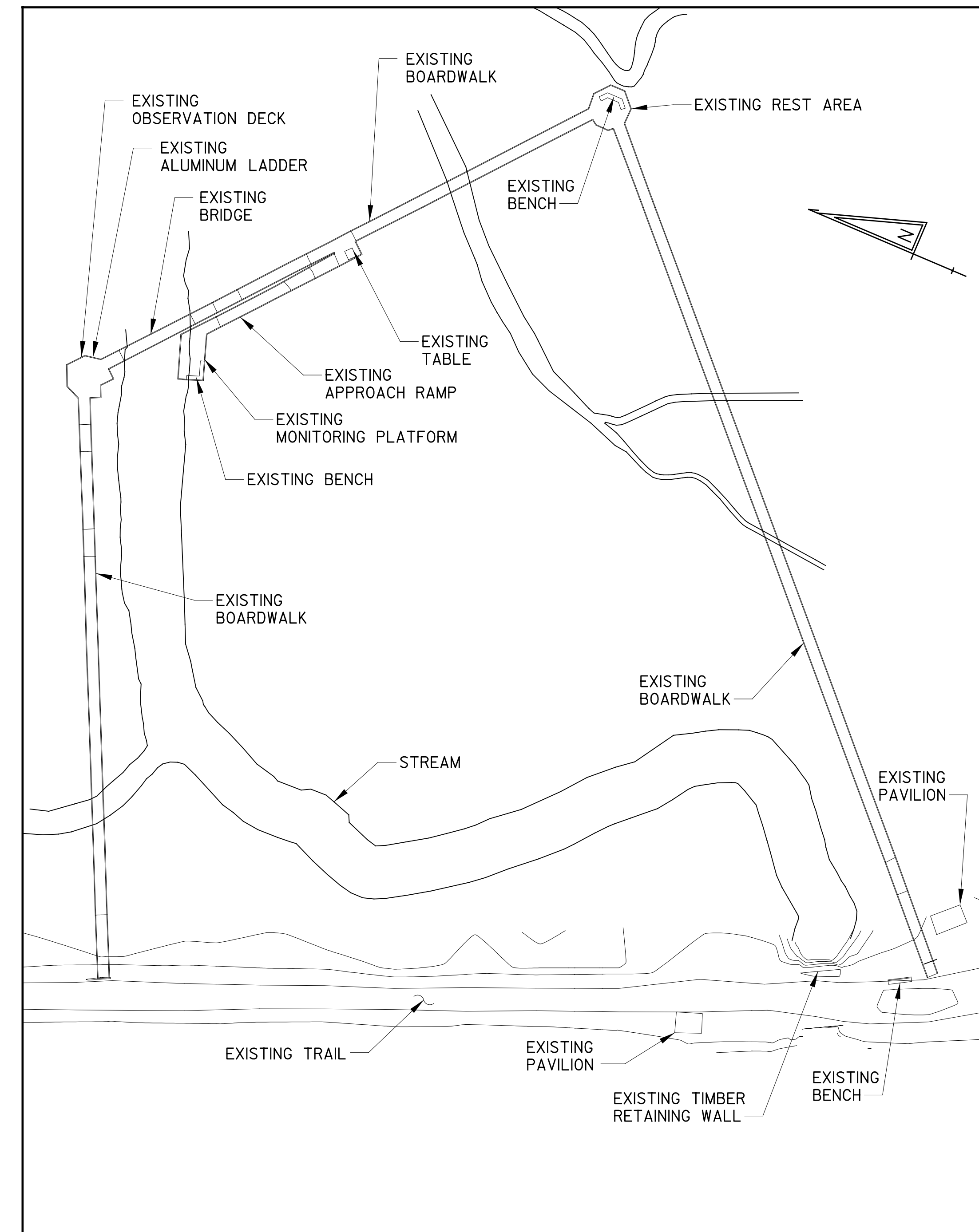
- I. NEW DESIGN
 - A. THE FOLLOWING DESIGN CODES WERE USED FOR ALL NEW STRUCTURAL DESIGN:
 1. INTERNATIONAL BUILDING CODE (IBC) DATED 2021.
 2. NATIONAL DESIGN SPECIFICATION (NDS) FOR WOOD CONSTRUCTION, 2018 EDITION.
 - B. DESIGN IS BASED ON THE LRFD DESIGN METHOD.
 - C. PEDESTRIAN LOAD: 100 PSF.
 - D. VEHICLE LOAD: NONE.
2. WOOD FRAMING
 - A. ALL MEMBERS SHALL BE FRAMED, ANCHORED, TIED AND BRACED IN ACCORDANCE WITH GOOD CONSTRUCTION PRACTICE AND APPLICABLE CODES.
 - B. ALL WOOD FRAMING, INCLUDING PILE CAPS, JOISTS, AND BLOCKING, SHALL BE SOUTHERN YELLOW PINE, NO. 2 OR BETTER. REFER TO WOOD PRESERVATIVE TREATMENT REQUIREMENTS BELOW.
 - C. NAILED CONNECTIONS SHALL BE PERMITTED EXCEPT WHERE NOTED OTHERWISE.
3. WOOD DECKING
 - A. ALL WOOD DECKING SHALL BE SOUTHERN YELLOW PINE NO.2 OR BETTER, 2x8, S4S. LAY DECKING CONTINUOUS EDGE TO EDGE UNLESS KILN DRIED AFTER TREATMENT, IN WHICH CASE DECKING SHALL BE PLACED WITH 1/8" GAPS.
 - B. REFER TO WOOD PRESERVATIVE TREATMENT REQUIREMENTS BELOW.
 - C. CONNECTIONS SHALL BE #10 X 3" LONG TYPE 316 STAINLESS STEEL SCREWS INSTALLED FLUSH WITH THE SURFACE OF THE DECKING. PREDRILL FOR SCREWS TO AVOID SPLITTING.
4. PULTRUDED FIBERGLASS I-BAR GRATING
 - A. I-BAR GRATING SHALL BE STRONGWELL DURAGRID I-4000 1/2" INCH OR APPROVED EQUAL.
 - B. GRATING PANELS SHALL BE MADE OF 1/2" INCH DEEP PULTRUDED I-BARS SPACED AT 1" INCH ON CENTER. THE CROSS-RODS SHALL BE SPACED A MAXIMUM OF 12". RESIN SHALL BE POLYESTER. THE TOP OF THE PANELS SHALL BE COVERED WITH A BONDED GRIT ANTI-SKID SURFACE WITH A UV RESISTANT URETHANE TOP COAT. COLOR SHALL BE MANUFACTURER'S STANDARD GRAY. INSERT HOLD DOWN FASTENERS PER MANUFACTURER'S RECOMMENDATIONS. ALL FASTENERS SHALL BE TYPE 316 STAINLESS STEEL.
 - C. CONTRACTOR SHALL SUBMIT THE I-BAR GRATING LAYOUT AND MANUFACTURER'S SAMPLE FOR REVIEW AND APPROVAL. I-BAR GRATING PANELS SHALL HAVE CONTINUOUS BEARING BARS ACROSS THE MONITORING PLATFORM. LONGITUDINAL JOINTS IN THE I-BAR PANELS WILL NOT BE ALLOWED ON THE MONITORING PLATFORM.
5. WOOD PRESERVATIVE TREATMENT
 - A. ALL TIMBER MEMBERS SHALL BE PRESSURE TREATED WITH A WATERBORNE PRESERVATIVE TREATMENT. THE PRESERVATIVE MAY BE EITHER AWPA APPROVED OR APPROVED VIA THE INTERNATIONAL CODE COUNCIL - EVALUATION SERVICE (ICC-ES). TREATMENT SHALL INCLUDE A WATER REPELLENT ADDITIVE. TREATMENT SHALL MEET THE REQUIREMENTS OF THE FOLLOWING AWPA USE CATEGORIES:
 1. RAILING - UC3B, ABOVE GROUND EXPOSED
 2. FRAMING - UC4A, GROUND CONTACT GENERAL USE
 3. PIER CAPS - UC4B, GROUND CONTACT HEAVY DUTY
 - B. THE CONTRACTOR SHALL SUBMIT THE PRESERVATIVE MATERIALS INTENDED FOR USE FOR REVIEW AND APPROVAL. THE SUBMITTAL SHALL INCLUDE THE RETENTION LEVEL AND DOCUMENTATION OF AWPA OR ICC APPROVAL.
 - C. ALL HOLES, CUTS, AND INJURIES SUCH AS ABRASIONS OR HOLES FROM REMOVAL OF NAILS AND SPIKES WHICH MAY PENETRATE THE TREATED ZONE SHALL BE FIELD TREATED. AN AWPA OR ICC-ES ACCEPTED COMPATIBLE PRESERVATIVE SYSTEM SHALL BE USED FOR TREATMENT. FIELD TREATMENT PRESERVATIVES SHALL BE APPLIED IN ACCORDANCE WITH THE PRODUCT LABEL. THE APPLICATION METHOD SHALL COAT ANY SURFACE THAT IS EXPOSED BY DAMAGE OR FIELD FABRICATION WHILE NOT USING EXCESSIVE PRESERVATIVE. ANY EXCESS PRESERVATIVE NOT ABSORBED BY THE WOOD PRODUCT SHALL BE CLEANED FROM THE SURFACE PRIOR TO USE OF THE PRODUCT. CAREFUL ATTENTION SHOULD BE GIVEN TO MATERIALS PLACED IN AQUATIC ENVIRONMENTS. THESE MATERIALS SHALL NOT BE USED UNLESS THE FIELD TREATED SURFACE IS CLEAN, DRY, AND FREE OF EXCESS PRESERVATIVE.
6. STRUCTURAL STEEL AND MISCELLANEOUS METALS
 - A. STEEL FOR MISCELLANEOUS SHAPES, PLATES, AND ASSEMBLIES SHALL BE ASTM A36.
 - B. ELECTRODES FOR FIELD AND SHOP WELDING SHALL BE E70.
 - C. ALL BOLTS SHALL BE ASTM A307.
 - D. ALL STEEL, BOLTS, SPIKES, NAILS, AND OTHER HARDWARE SHALL BE HOT DIP GALVANIZED PER ASTM A123 AND A153 UNLESS NOTED OTHERWISE.
7. STRAPS AND HANGERS
 - A. STRAPS AND HANGERS SHALL BE HOT DIP GALVANIZED PER ASTM A123 AND A153 WHEN AVAILABLE. WHEN NOT AVAILABLE FOR A PARTICULAR PRODUCT, COIL GALVANIZING PER ASTM A653 G185 IS ACCEPTABLE. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. ALL FASTENERS SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A153. SIZE AND NUMBER PER MANUFACTURER'S RECOMMENDATIONS. SIMPSON PRODUCTS CALLED OUT ON THE PLANS MAY BE REPLACED WITH APPROVED EQUALS.
8. COMPOSITE BOARDS
 - A. COMPOSITE BOARDS SHALL BE SELECTED FROM THE FOLLOWING APPROVED LIST:
 1. BEDFORD TECHNOLOGIES FIBERFORCE, WORTHINGTON, MN
 2. RENEW PLASTICS TRIMAX STRUCTURAL LUMBER, LUXEMBURG, WI
 3. TANGENT TECHNOLOGIES, LLC POLYFORCE STRUCTURAL PLASTIC LUMBER, AURORA, IL
 - B. COMPOSITE BOARDS SHALL BE IN 'WEATHERED WOOD' COLOR. CONTRACTOR TO SUBMIT SAMPLE FOR REVIEW AND APPROVAL.
 - C. COMPOSITE BOARDS SHALL BE USED FOR RAILING TOP RAIL. SEE PLANS FOR DETAILS.
 - D. FOLLOW ALL MANUFACTURER'S INSTALLATION RECOMMENDATIONS.
9. CONCRETE AND REINFORCING STEEL
 - A. CONCRETE SHALL BE DELDOT CLASS A (f'c=4500 PSI).
 - B. REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60.
 - C. CHAMFER ALL EXPOSED EDGES OF SUBSTRUCTURE CONCRETE 3/4" X 3/4", UNLESS NOTED OTHERWISE.
 - D. ALL KEYS ARE NOMINAL SIZE.
10. ORIGINAL CONSTRUCTION DRAWINGS
 - A. ORIGINAL CONSTRUCTION DRAWINGS ARE PROVIDED FOR REFERENCE. NO RESPONSIBILITY FOR THEIR ACCURACY IS ASSUMED BY THE OWNER.

- II. EXISTING STRUCTURE
 - A. ALL DIMENSIONS AFFECTED BY THE GEOMETRICS AND/OR LOCATION OF THE EXISTING STRUCTURE SHALL BE CHECKED IN THE FIELD BY THE CONTRACTOR BEFORE ANY CONSTRUCTION IS DONE AND BEFORE ANY REINFORCING STEEL, ETC., IS ORDERED OR FABRICATED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SUPPLY THE ENGINEER WITH ALL FIELD DIMENSIONS REQUIRED TO CHECK DETAIL DRAWINGS. THE * MARKS SHOWN WITH DIMENSIONS AND STATIONS DO NOT INDICATE ANY DEGREE OF PRECISION. THESE MARKS (*) INDICATE EXISTING DIMENSIONS AND STATIONS THAT MAY VARY AND DO REQUIRE FIELD VERIFICATION BY THE CONTRACTOR.
 - B. PORTIONS OF EXISTING STRUCTURES SHOWN HATCHED ARE TO BE REMOVED.
 - C. THE CONTRACTOR SHALL PERFORM ALL WORK WITH CARE TO ENSURE THE EXISTING STRUCTURE TO REMAIN IS NOT DAMAGED DURING CONSTRUCTION OPERATIONS. IF THE EXISTING STRUCTURE AS WELL AS EXISTING STRUCTURES WITHIN LOC/PROXIMITY OF THE SITE WORK IS DAMAGED BY THE CONTRACTOR, IT SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER, AT NO ADDITIONAL COST TO DNREC. CONTRACTOR SHALL BE AWARE OF THE LIMITED LOAD CAPACITY OF THE EXISTING STRUCTURE AND SELECT CONSTRUCTION METHODS AND EQUIPMENT THAT DO NOT DAMAGE THE EXISTING STRUCTURE.

SCOPE OF WORK

1. REMOVE AND REPLACE EXISTING DECKING IN-KIND, EXCEPT WHERE NOTED OTHERWISE.
2. REMOVE AND REPLACE RAILING THROUGHOUT. REPLACEMENT RAILING SHALL BE TYPE 1 OR TYPE 2 AS FOLLOWS:
 - A. TYPE 1 RAILING (SEE DWG. NO. S-7) - BOARDWALK, BRIDGE, APPROACH RAMP, AND MONITORING PLATFORM.
 - B. TYPE 2 RAILING (SEE DWG. NO. S-8) - OBSERVATION DECK AND REST AREA.
3. ON THE MONITORING PLATFORM, REPLACE THE EXISTING REMOVABLE ALUMINUM RAILING IN-KIND.
4. RAISE ELEVATION OF EXISTING MONITORING PLATFORM AND MODIFY EXISTING APPROACH RAMP.
5. REMOVE TWO EXISTING BENCHES AND ONE EXISTING TABLE AND REPLACE IN-KIND.
6. REMOVE EXISTING LADDER.
7. CONTINGENT STRINGER AND PILE CAP REPLACEMENT.

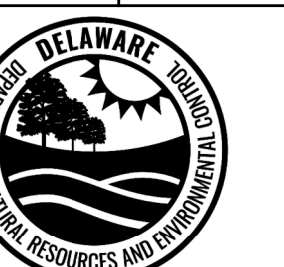
NOTE:
THIS IS INTENDED TO BE A SUMMARY AND MAY NOT BE ALL-INCLUSIVE. REFER TO PLANS FOR DETAILS.



SITE MAP
N.T.S.

BY: _____
DESCRIPTION: _____
DATE: _____

AQUATIC RESOURCES EDUCATION CENTER MALLARD LODGE BOARDWALK & TRAIL REHABILITATION STRUCTURAL GENERAL NOTES



DESIGNED BY:
RKK

DRAWN BY:
RKK

BUILDING NO.:
N/A

DATE:
JANUARY 31, 2025

SCALE:
NOT TO SCALE

SHEET NO.:
S-1

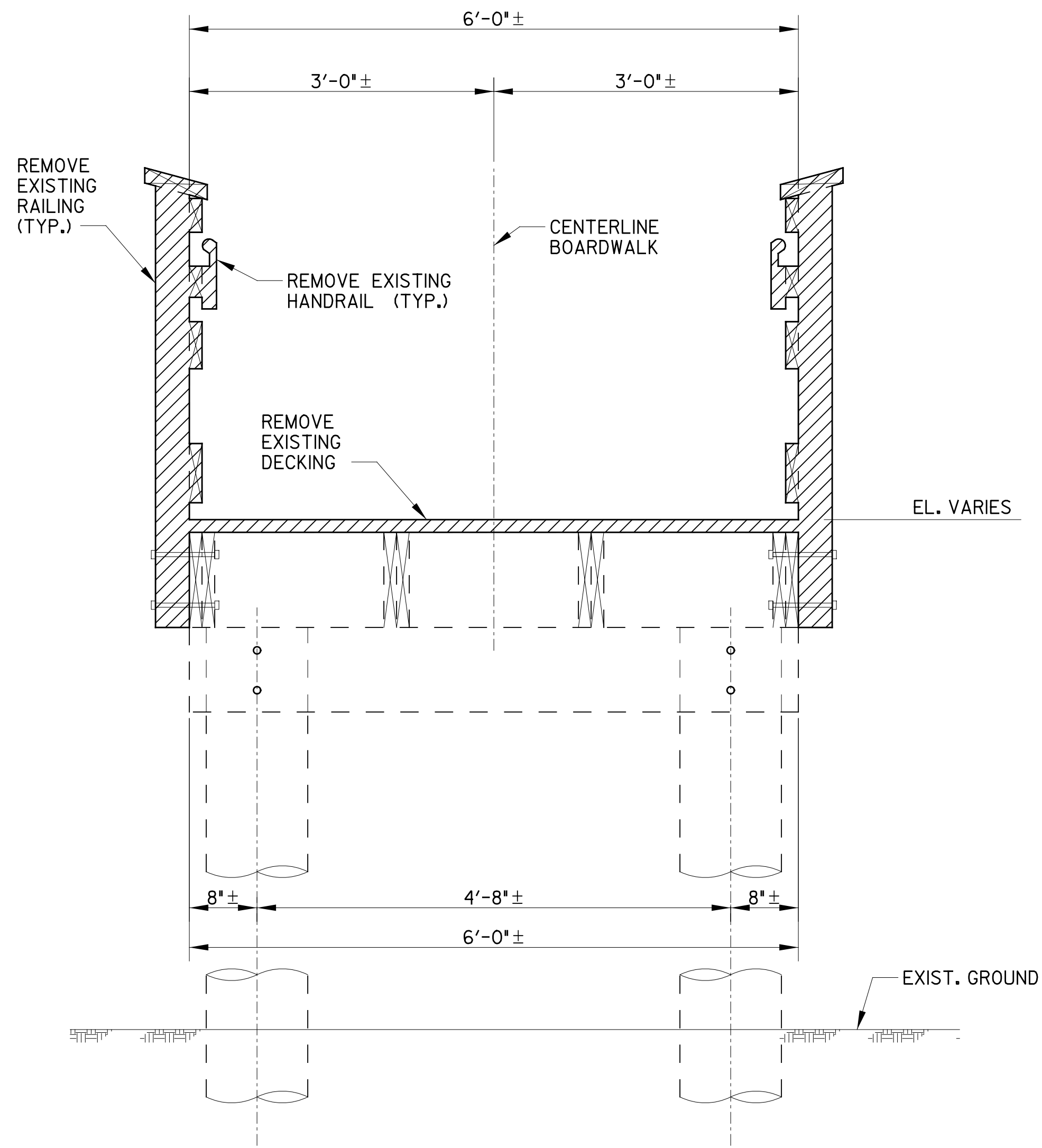
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CONTRACT #:
NAT20003-ARECBDWLK



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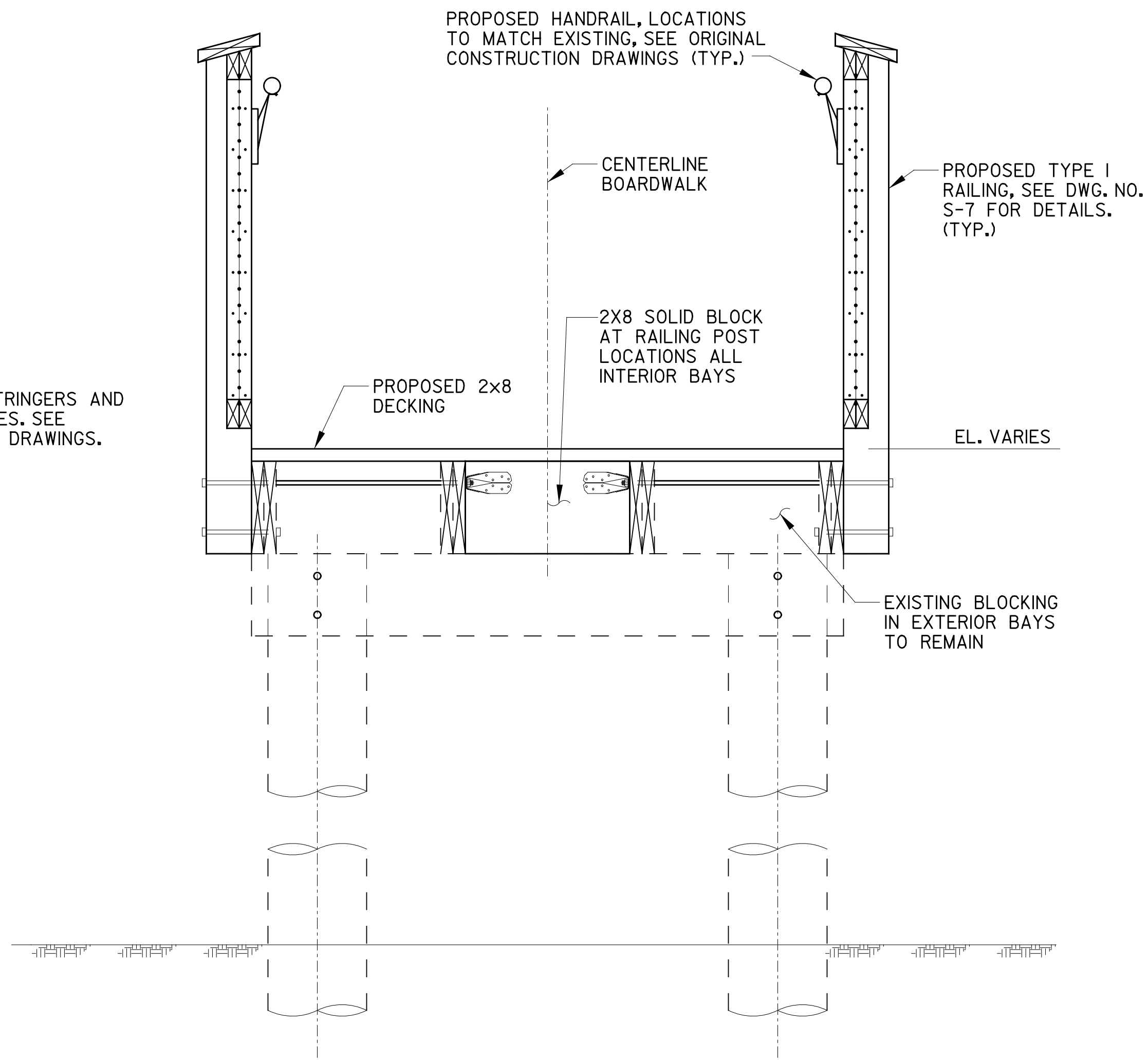
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BOARDWALK SECTION - REMOVAL

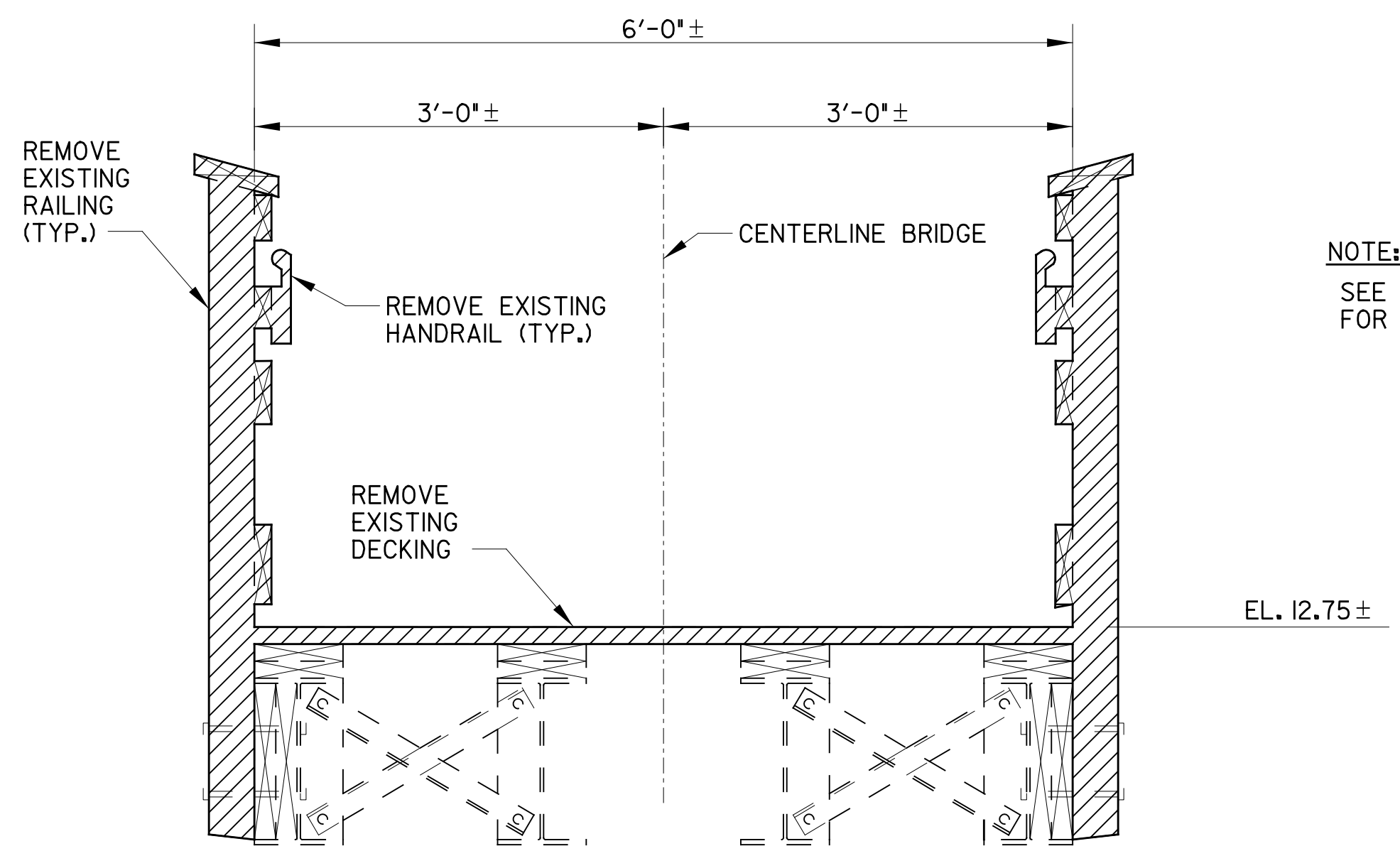
SCALE: 1"=1'-0"

NOTE:
EXISTING NUMBER OF STRINGERS AND STRINGER SPACING VARIES. SEE ORIGINAL CONSTRUCTION DRAWINGS.



BOARDWALK SECTION - PROPOSED

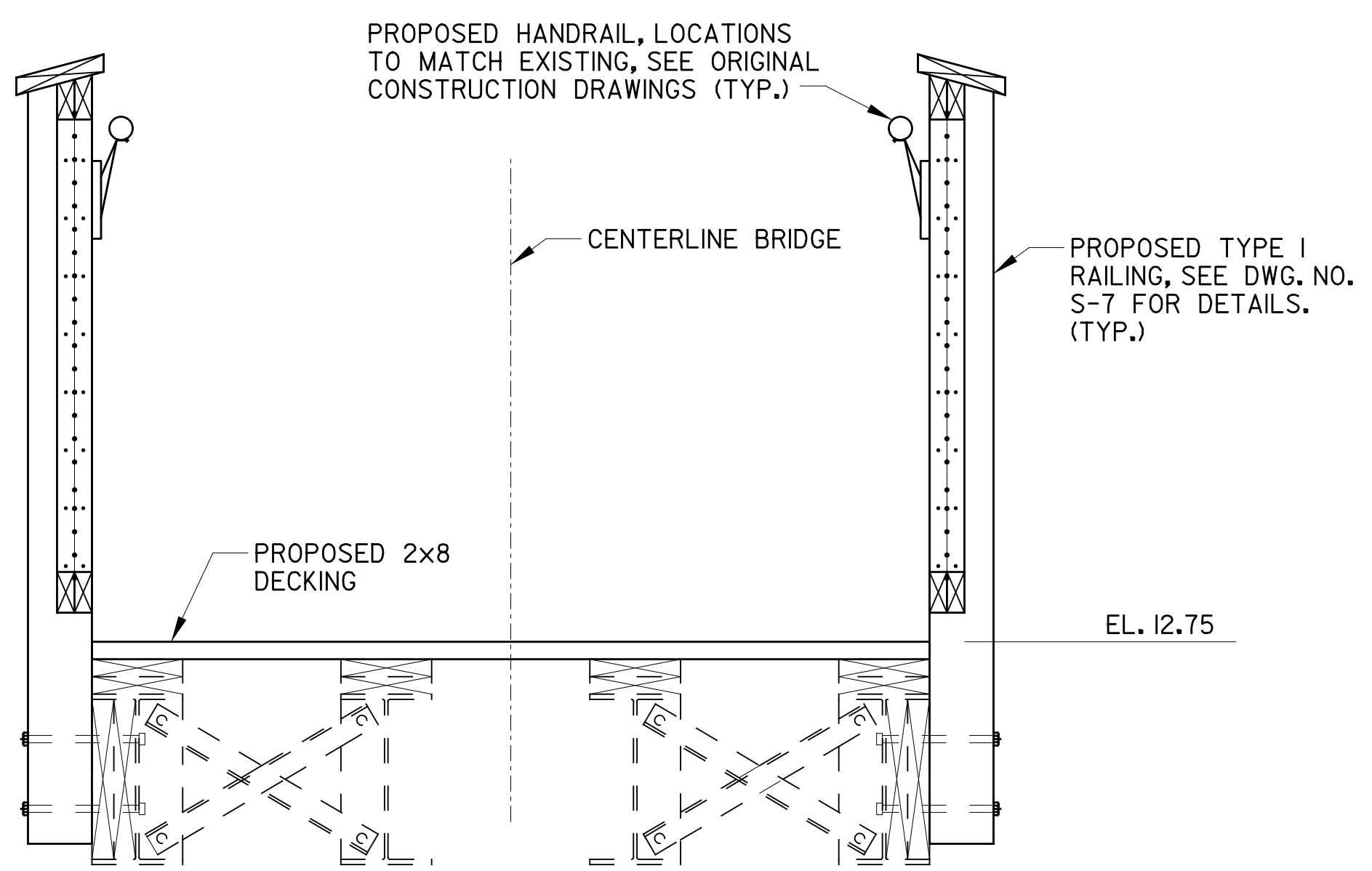
SCALE: 1"=1'-0"



BRIDGE SECTION - REMOVAL

SCALE: 1"=1'-0"

NOTE:
SEE ORIGINAL CONSTRUCTION DRAWINGS FOR BRIDGE LOCATION.



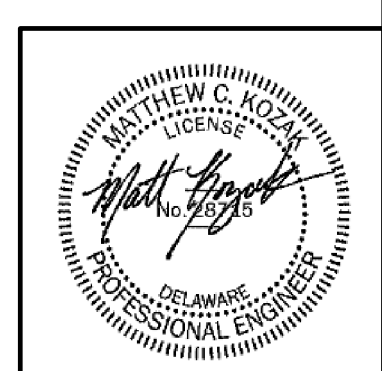
BRIDGE SECTION - PROPOSED

SCALE: 1"=1'-0"

NOTES:

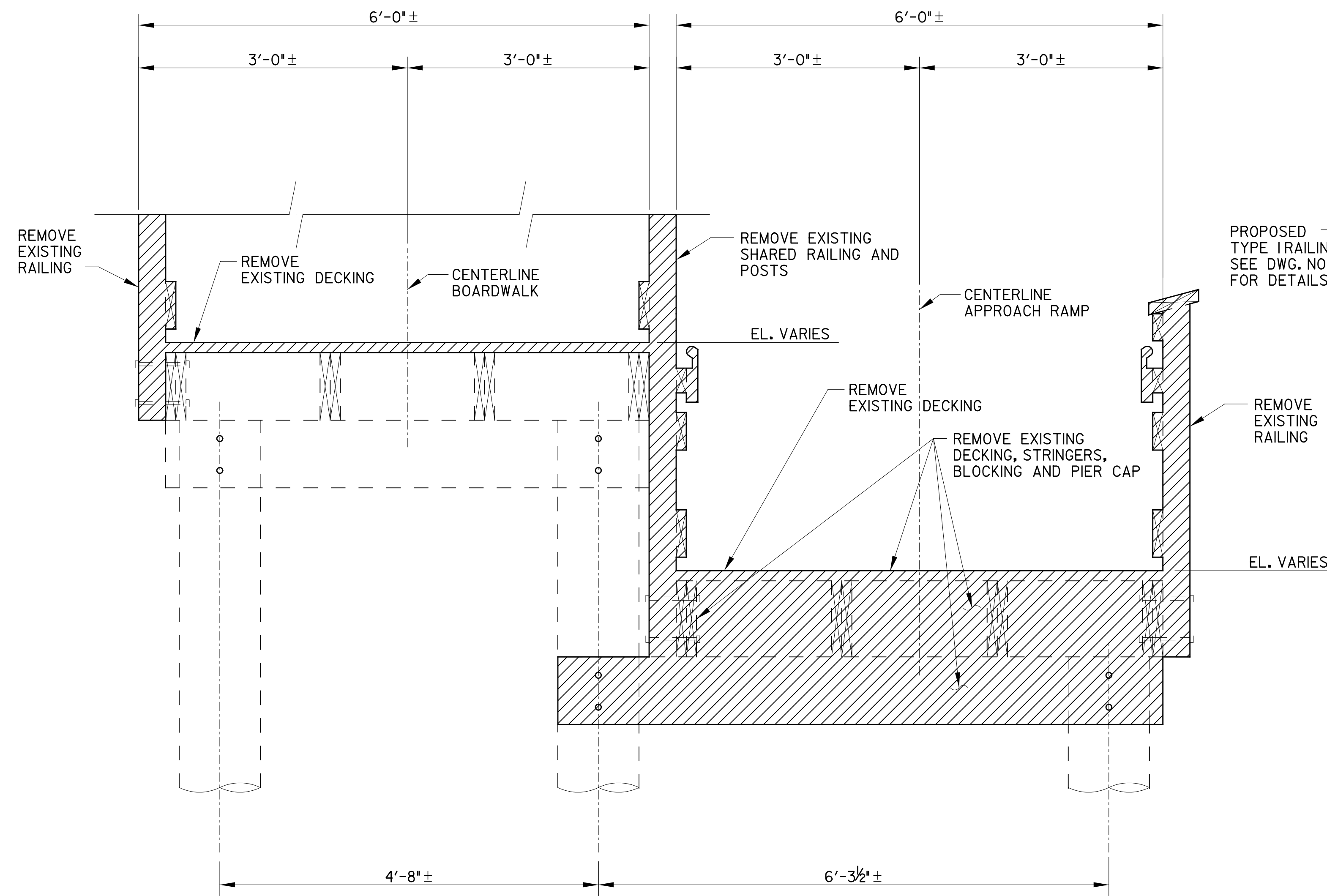
- 1. SEE ORIGINAL CONSTRUCTION DRAWINGS PROVIDED FOR REFERENCE FOR DETAILS OF EXISTING STRUCTURE. SEE ALSO STRUCTURAL GENERAL NOTES ON DWG. NO. S-1.

STRUCTURE REMOVAL



BY:		DESCRIPTION:	
DATE:		DATE:	
AQUATIC RESOURCES EDUCATION CENTER MALLARD LODGE BOARDWALK & TRAIL REHABILITATION		BOARDWALK AND BRIDGE SECTIONS	
DESIGNED BY: RKK			
DRAWN BY: RKK			
BUILDING NO.: N/A			
DATE: JANUARY 31, 2025			
SCALE: AS NOTED			
SHEET NO.: S-2			
DFW PROJECT #: N/A			
CONTRACT #: NAT20003-ARECBDWLK			

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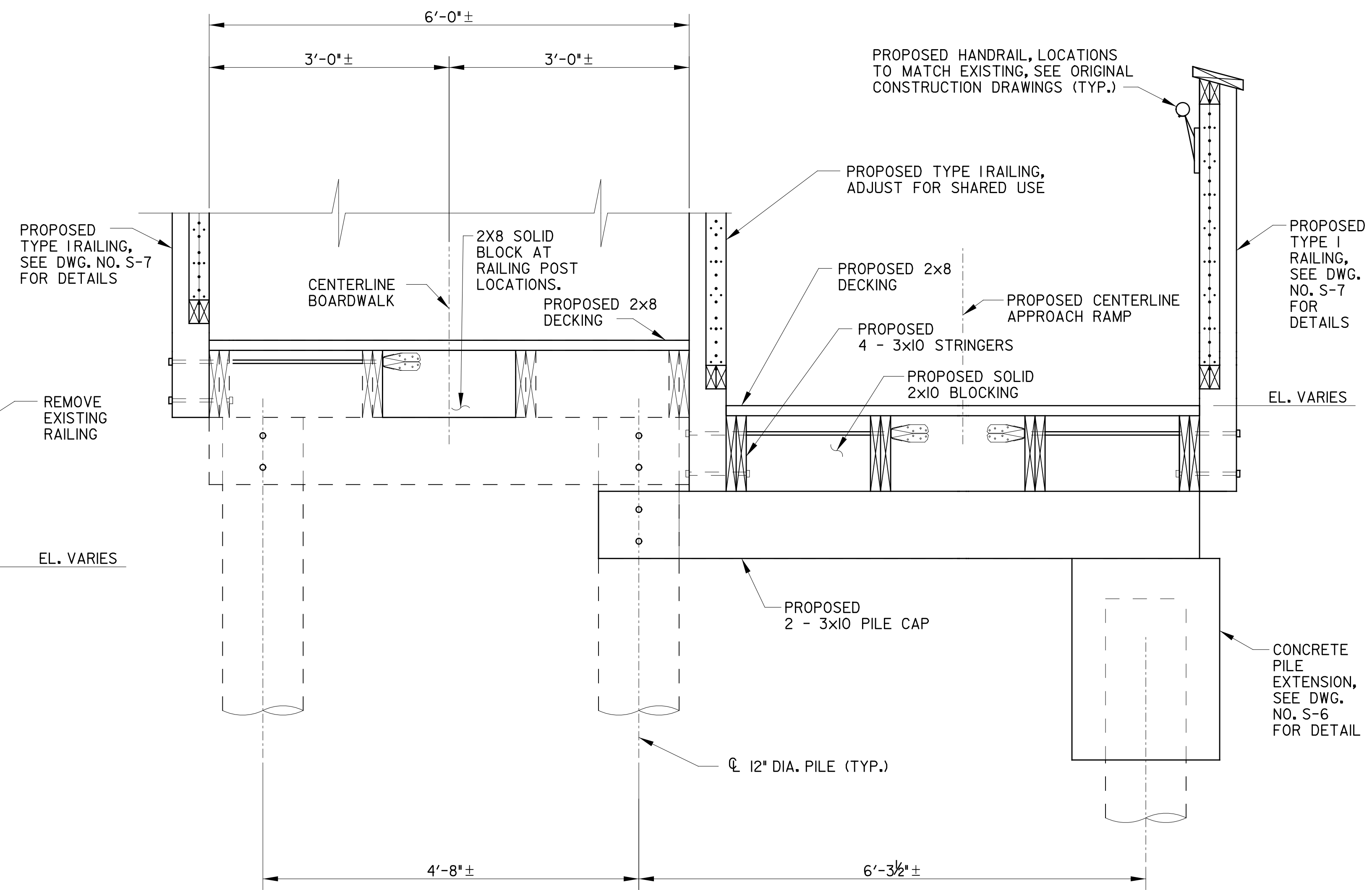


SECTION A-A - REMOVAL

SCALE: 1"=1'-0"

NOTE:

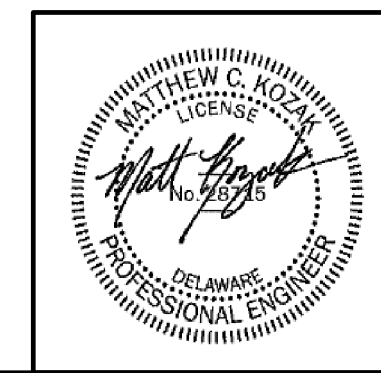
- SEE ORIGINAL CONSTRUCTION DRAWINGS PROVIDED FOR REFERENCE FOR DETAILS OF EXISTING STRUCTURE. SEE ALSO STRUCTURAL GENERAL NOTES ON DWG. NO. S-1.



SECTION A-A - PROPOSED

SCALE: 1"=1'-0"

STRUCTURE REMOVAL



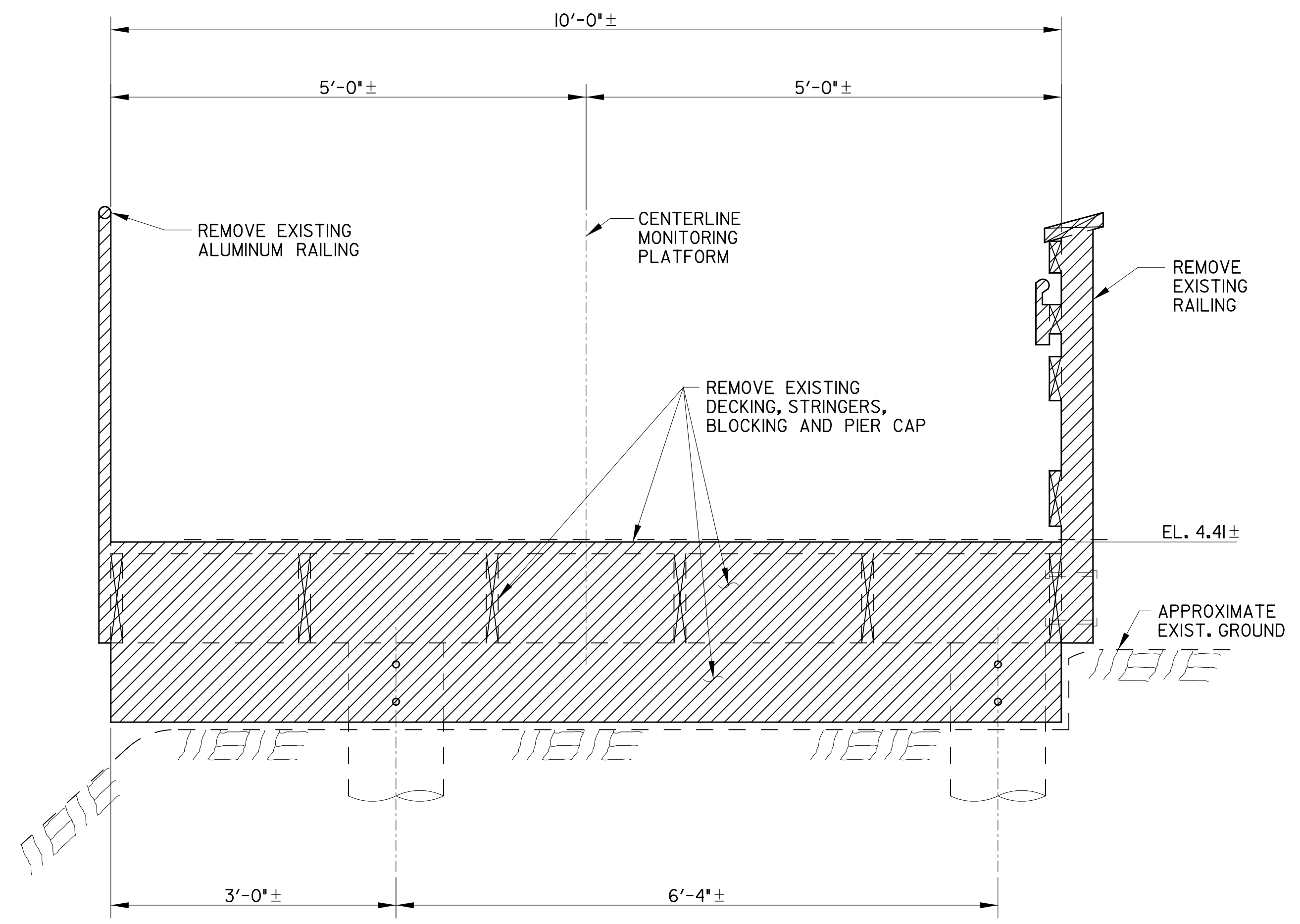
BY: _____
DATE: _____

DESCRIPTION: _____
**AQUATIC RESOURCES EDUCATION CENTER
 MALLARD LODGE
 BOARDWALK & TRAIL REHABILITATION
 MONITORING PLATFORM APPROACH RAMP
 SECTIONS**

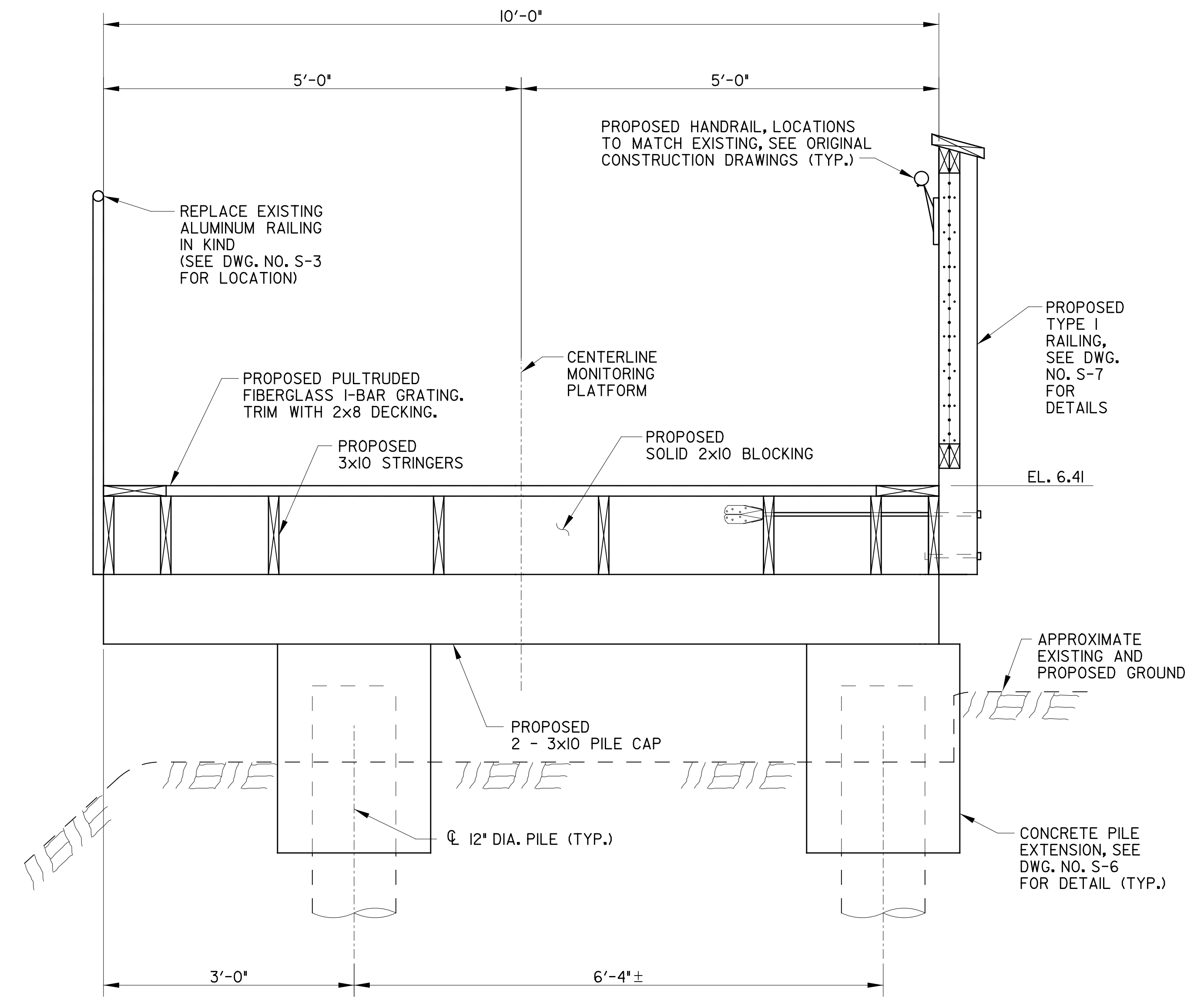


DESIGNED BY: RKK
 DRAWN BY: RKK
 BUILDING NO.: N/A
 DATE: JANUARY 31, 2025
 SCALE: AS NOTED
 SHEET NO.: **S-4**
 DFW PROJECT #: N/A
 CONTRACT #: NAT20003-ARECBDWLK

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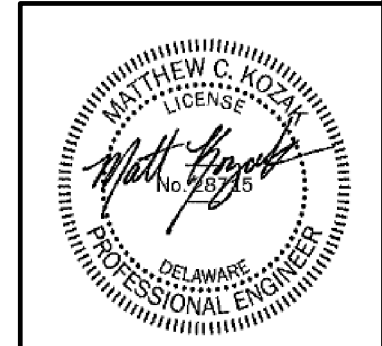


SECTION B-B - REMOVAL
SCALE: 1"=1'-0"



SECTION B-B - PROPOSED
SCALE: 1"=1'-0"

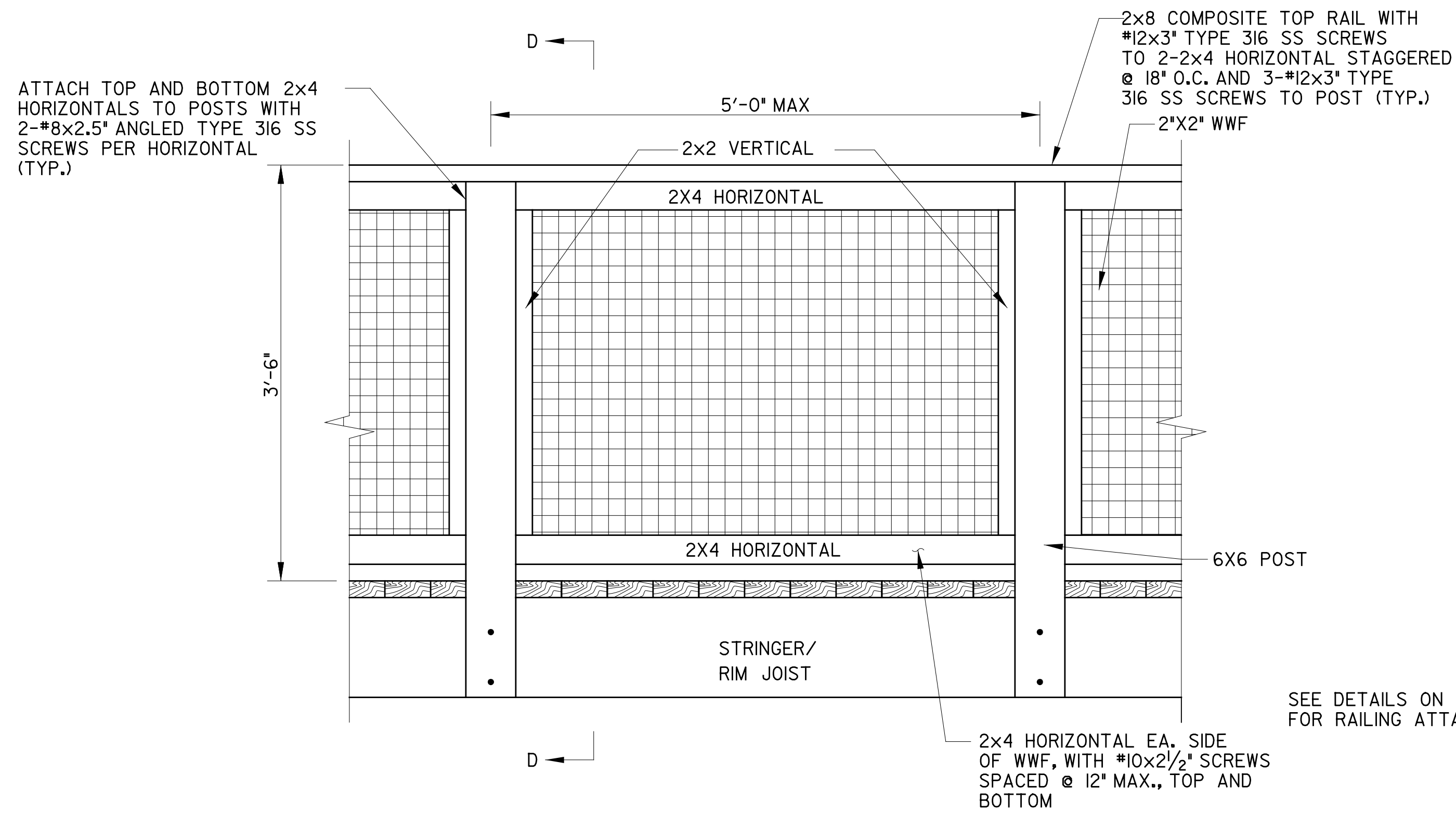
STRUCTURE REMOVAL



BY:	
DATE:	
DESCRIPTION:	

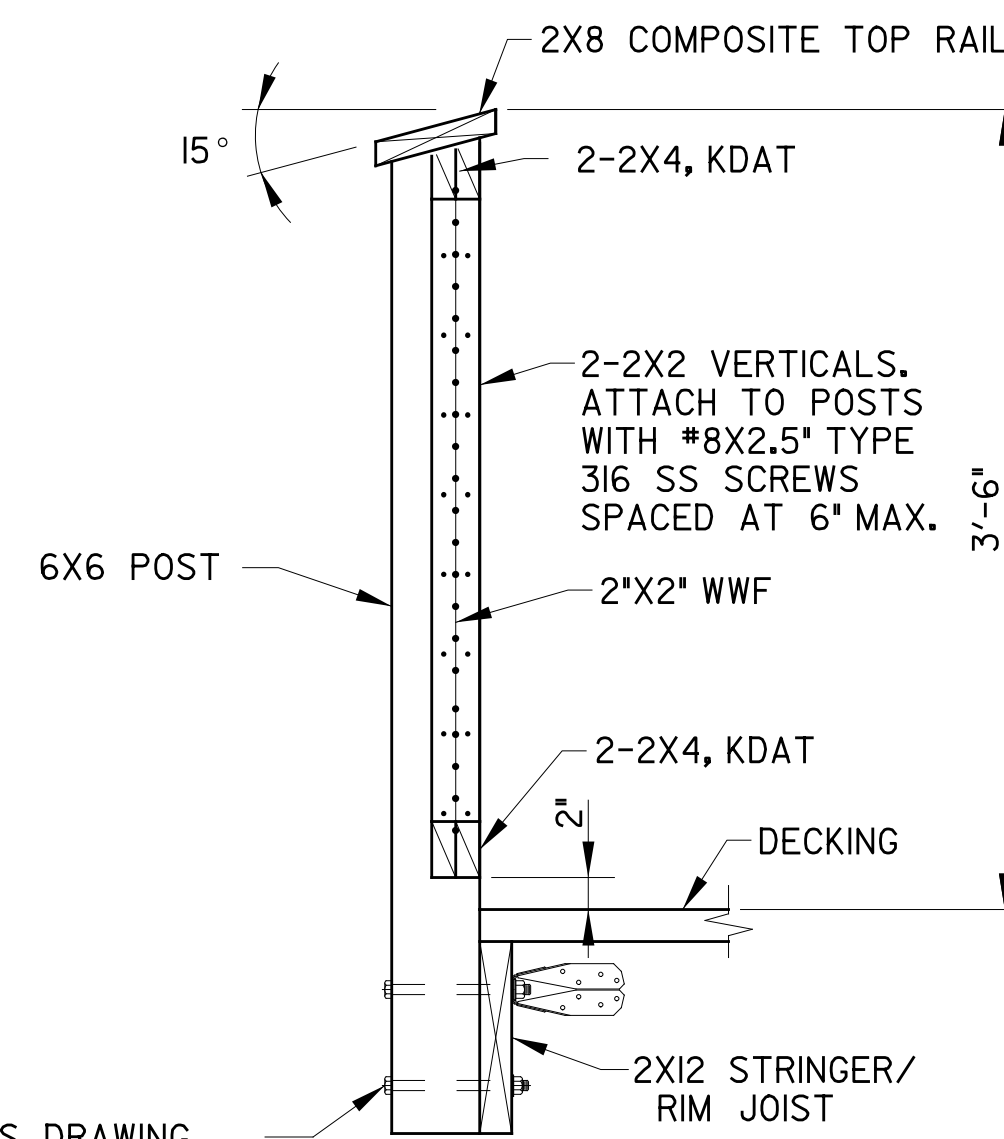
**AQUATIC RESOURCES EDUCATION CENTER
MALLARD LODGE
BOARDWALK & TRAIL REHABILITATION
MONITORING PLATFORM
SECTIONS**

DESIGNED BY: RKK
DRAWN BY: RKK
BUILDING NO.: N/A
DATE: JANUARY 31, 2025
SCALE: AS NOTED
SHEET NO.: S-5
DFW PROJECT #: N/A
CONTRACT #: NAT20003-ARECDBWLK



TYPICAL TYPE I RAILING ELEVATION

SCALE: 1"=1'-0"



TYPICAL TYPE I RAILING SECTION D-D

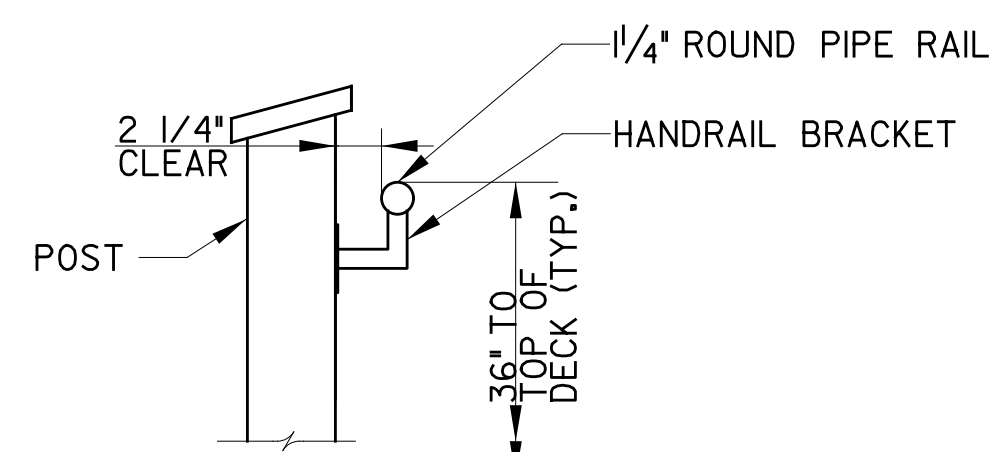
SCALE: 1"=1'-0"

RAILING NOTES:

1. THE WIRE MESH SHALL BE 2"x2" WWF WITH 0.12 WIRE DIAMETER AND SHALL BE HOT-DIP GALVANIZED. 2"x2" WWF TO EXTEND TO OUTER EDGES OF HORIZONTALS AND VERTICALS TO ENGAGE SCREWS.
2. THE WIRE MESH SHALL BE ATTACHED TO THE HORIZONTAL 2x4 TOP AND BOTTOM WITH HOT-DIP GALVANIZED 18 GAUGE WIRE STAPLES WITH MINIMUM 1/2" LEGS AT 12" CENTER TO CENTER.
3. 2x4 HORIZONTALS SHALL BE KILN DRIED AFTER TREATMENT (KDAT)
4. RAILING POST CONNECTION CONFIGURATIONS FOR WHICH A DETAIL HAS NOT BEEN PROVIDED SHALL BE SECURELY BRACED AND CONNECTED USING METHODS SIMILAR TO THOSE SHOWN HERE. CONNECTIONS SHALL INCLUDE BEARING PLATES TO PROVIDE A LARGE BEARING AREA UNDER THE BOLT HEADS AND TENSION HOLDDOWNS TO TRANSMIT PRYING FORCES INTO THE JOISTS/ BLOCKING THROUGH SHEAR IN THE FASTENERS. IN NO CASE SHALL RAILING POSTS BE CONNECTED ONLY TO THE RIM JOIST.
5. RAILING POST LOCATIONS ARE SHOWN ON THE ORIGINAL CONSTRUCTION DRAWINGS AND ARE APPROXIMATE. CONTRACTOR SHALL DETERMINE FINAL LAYOUT BASED ON FIELD CONDITIONS IN ACCORDANCE WITH THE SPACING REQUIREMENTS ON THIS DRAWING. THE RAILING SHALL NOT ALLOW PASSAGE OF A 4" SPHERE AT ANY POINT.
6. HANDRAILS SHALL BE PLACED IN LOCATIONS TO MATCH EXISTING AND SHALL RETURN TO THE RAILING AT EACH END.
7. TYPE I RAILING SHALL BE USED ON THE BOARDWALK, BRIDGE, APPROACH RAMP, AND MONITORING PLATFORM. SEE DWG. NO. S-1 FOR ADDITIONAL INFORMATION.

SEE DETAILS ON THIS DRAWING FOR RAILING ATTACHMENTS

TYPICAL TYPE I RAILING DETAILS

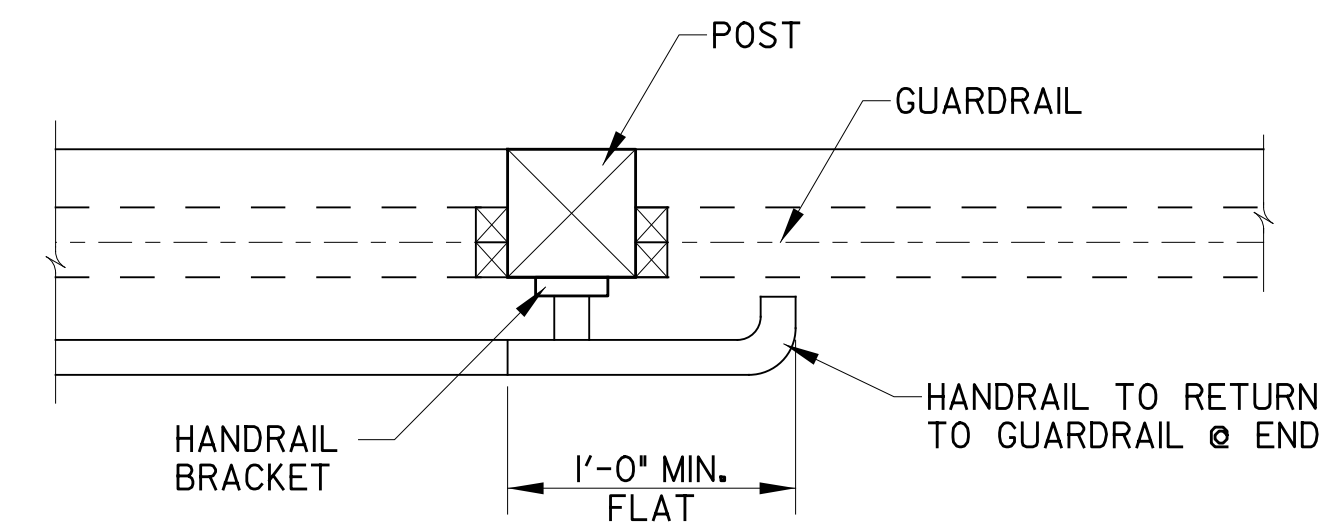


HANDRAIL DETAIL

SCALE: 1"=1'-0"

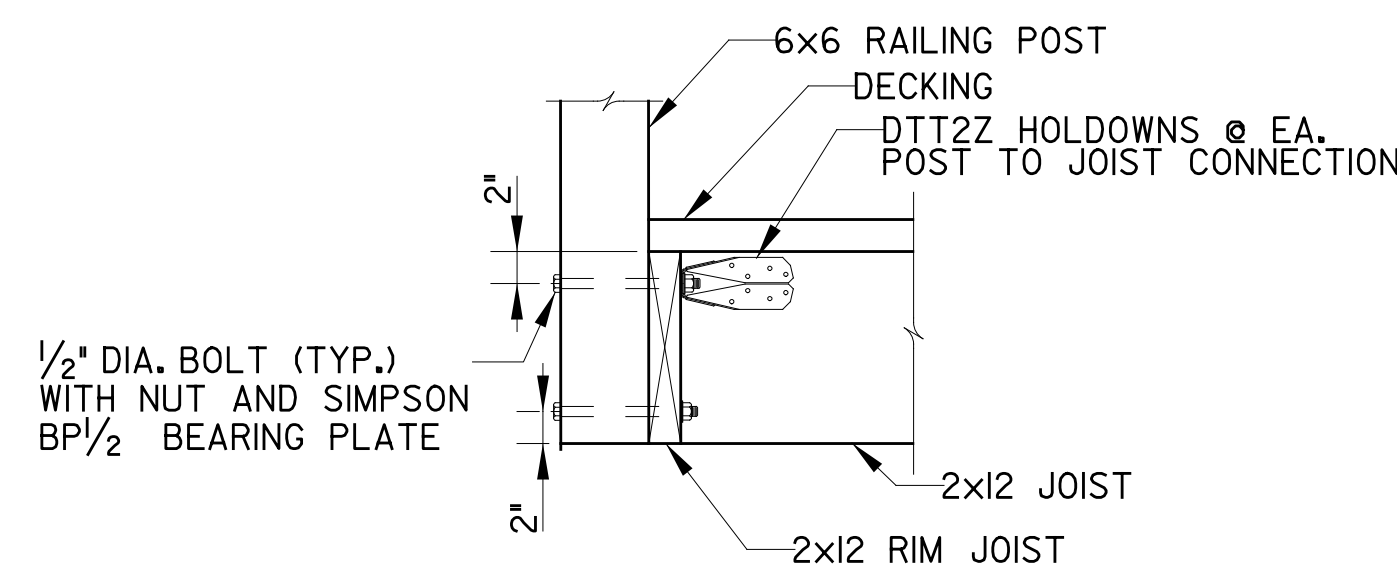
HANDRAIL NOTES:

1. PIPE RAIL - ASTM A53, TYPE F OR S, GRADE A, SCHEDULE 40, GALVANIZED.
2. HANDRAIL BRACKET - PRE-MANUFACTURED, EXTERIOR USE, GALVANIZED STEEL WALL/POST MOUNT BRACKET MEETING DIMENSIONAL REQUIREMENTS FOR HANDRAIL ATTACHMENT IN ACCORDANCE WITH ADA AND NFPA. FASTENERS - STAINLESS STEEL; SIZE, TYPE, AND NUMBER PER MANUFACTURER'S RECOMMENDATIONS.
3. GALVANIZING - HOT DIP PER ASTM A123 OR A153. TOUCH UP - ZINC DUST COATING (MIL-P-26915).
4. SUBMIT HANDRAIL COMPONENTS FOR REVIEW AND APPROVAL.



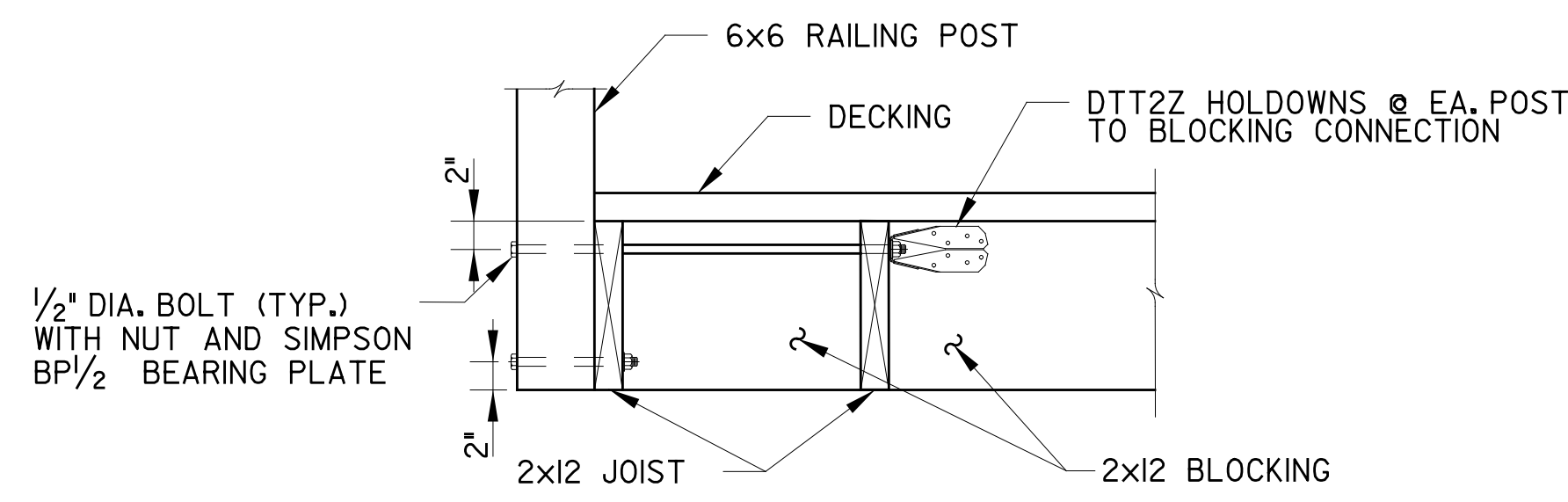
PLAN DETAIL @ HANDRAIL END RETURN

SCALE: 1"=1'-0"



TYPICAL RAILING ATTACHMENT TO RIM JOIST DETAIL

SCALE: 1"=1'-0"



TYPICAL RAILING ATTACHMENT TO EXTERIOR JOIST OR STRINGER DETAIL

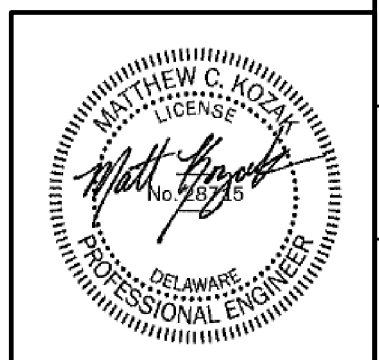
SCALE: 1"=1'-0"

BY:	
DESCRIPTION:	
DATE:	

AQUATIC RESOURCES EDUCATION CENTER
MALLARD LODGE
BOARDWALK & TRAIL REHABILITATION
RAILING DETAILS (TYPE 1)

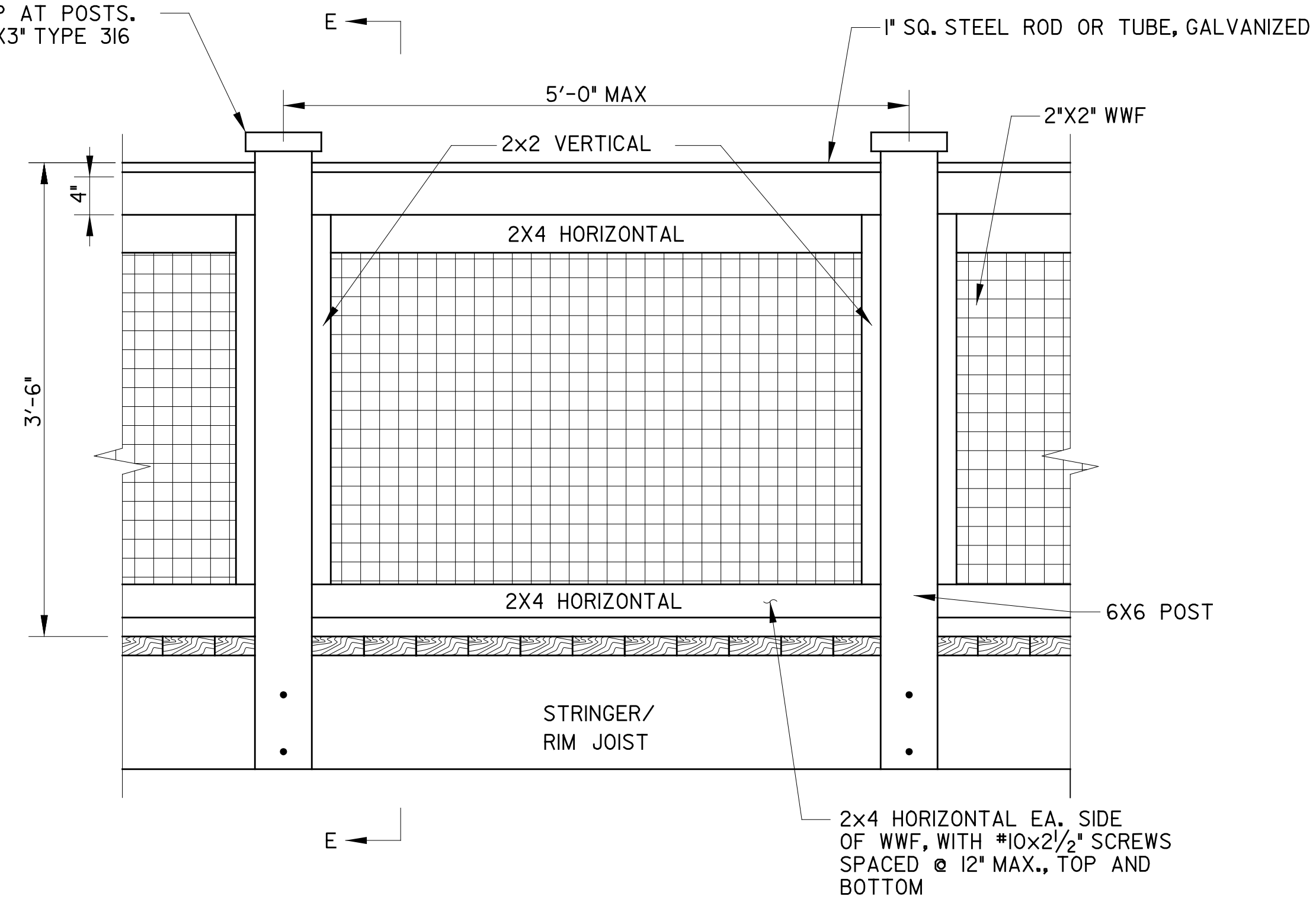


DESIGNED BY:	RKK
DRAWN BY:	RKK
BUILDING NO.:	N/A
DATE:	JANUARY 31, 2025
SCALE:	AS NOTED
SHEET NO.:	S-7
DFW PROJECT #:	N/A
CONTRACT #:	NAT20003-ARECBDWLK



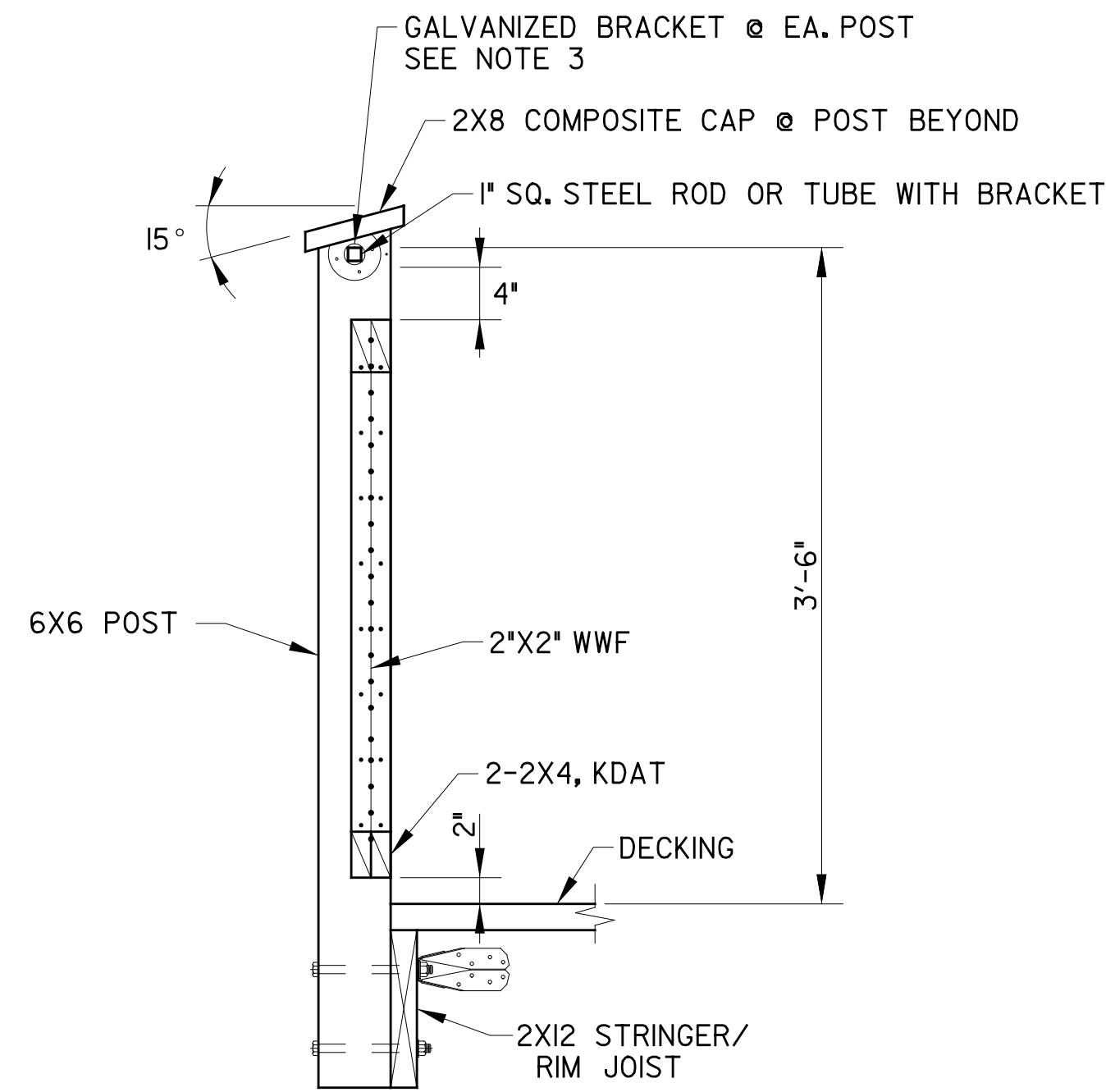
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2x8" COMPOSITE CAP AT POSTS.
ATTACH WITH 2-#12X3" TYPE 316
SS SCREW (TYP)



TYPICAL TYPE 2 RAILING ELEVATION

SCALE: 1"=1'-0"



TYPICAL TYPE 2 RAILING SECTION E-E

SCALE: 1"=1'-0"

TYPICAL TYPE 2 RAILING DETAILS

RAILING NOTES:

1. SEE DWG. NO. S-7 FOR RAILING NOTES AND COMMON DETAILS NOT SHOWN ON THIS DRAWING.
2. TYPE 2 RAILING SHALL BE USED ON THE OBSERVATION DECK AND REST AREA. SEE DWG. NO. S-1 FOR ADDITIONAL INFORMATION.
3. GALVANIZED STEEL BRACKETS SHALL BE PROVIDED AT POSTS TO RESTRICT LATERAL MOVEMENT OF THE 1" STEEL ROD OR TUBE.

BY: _____
DESCRIPTION: _____
DATE: _____

AQUATIC RESOURCES EDUCATION CENTER
MALLARD LODGE
BOARDWALK & TRAIL REHABILITATION
RAILING DETAILS (TYPE 2)



DESIGNED BY:

RKK

DRAWN BY:

RKK

BUILDING NO.:

N/A

DATE:

JANUARY 31, 2025

SCALE:

AS NOTED

SHEET NO.:

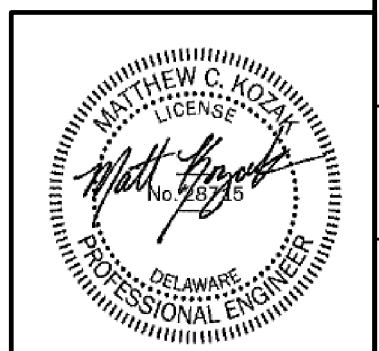
S-8

DFW PROJECT #:

N/A

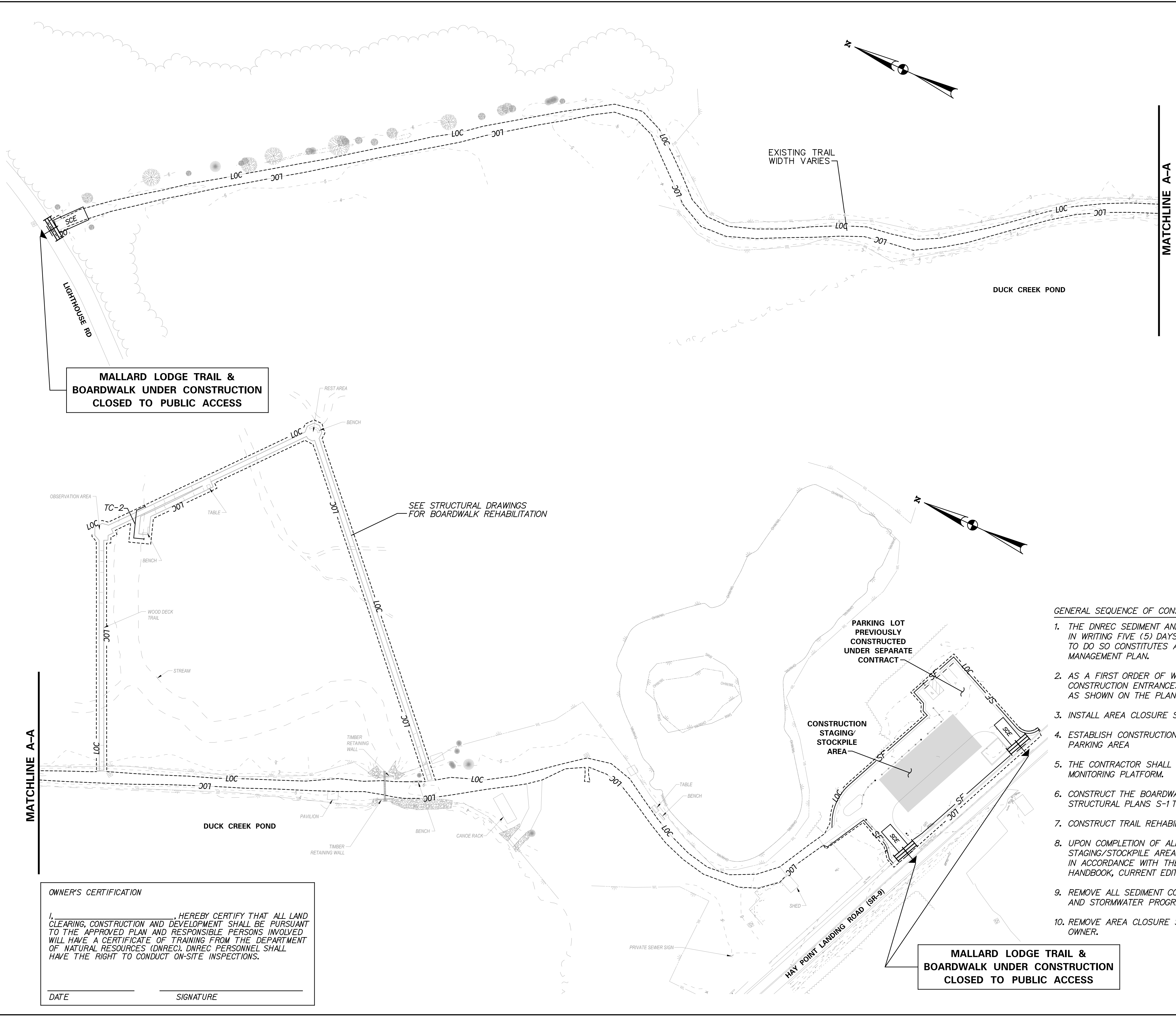
CONTRACT #:

NAT20003-ARECBDWLK



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LEGEND

EROSION & SEDIMENT CONTROL DEVICES

- CONSTRUCTION STAGING/STOCKPILE AREA
- SCE STABILIZED CONSTRUCTION ENTRANCE
- SF SILT FENCE
- LOC LIMIT OF CONSTRUCTION
- CONSTRUCTION SIGN
- TYPE 3 BARRICADE
- TC-2 TURBIDITY CURTAIN

EXISTING SYMBOLS

- SPOT ELEVATION (5.21 TD:8.07)
- CONTOUR LINE (-5-)
- SURVEY TRAVERSE POINT
- RK&K DELINEATED WETLAND BOUNDARY (WL)
- STATE MAPPED WETLAND (SMW)
- ORDINARY HIGH WATER/WETLAND (OHW/WL)
- CONIFEROUS TREE- 6" AND LARGER
- DECIDUOUS TREE- 6" AND LARGER
- TREELINE

BY:	
DESCRIPTION:	
DATE:	

**AQUATIC RESOURCES EDUCATION CENTER
MALLARD LODGE
BOARDWALK & TRAIL REHABILITATION
EROSION AND SEDIMENT CONTROL PLAN**

DESIGNED BY: RKK

DRAWN BY: RKK

BUILDING NO.: N/A

DATE: JANUARY 31, 2025

SCALE: 1" = 50'

SHEET NO.: **ES-1**

DFW PROJECT #: N/A

CONTRACT #: NAT20003-ARECBDWLK

**MALLARD LODGE TRAIL & BOARDWALK UNDER CONSTRUCTION
CLOSED TO PUBLIC ACCESS**

SEE STRUCTURAL DRAWINGS FOR BOARDWALK REHABILITATION

PARKING LOT PREVIOUSLY CONSTRUCTED UNDER SEPARATE CONTRACT

CONSTRUCTION STAGING/STOCKPILE AREA

**MALLARD LODGE TRAIL & BOARDWALK UNDER CONSTRUCTION
CLOSED TO PUBLIC ACCESS**

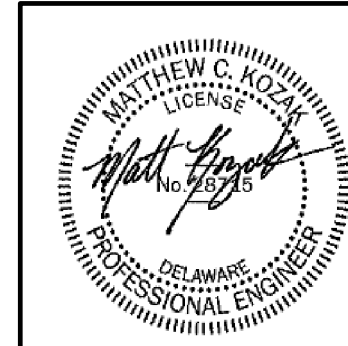
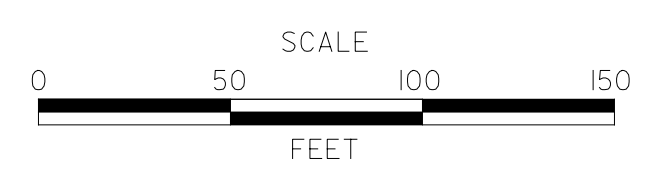
GENERAL SEQUENCE OF CONSTRUCTION:

1. THE DNREC SEDIMENT AND STORMWATER MANAGEMENT PROGRAM MUST BE NOTIFIED IN WRITING FIVE (5) DAYS PRIOR TO COMMENCING WITH CONSTRUCTION. FAILURE TO DO SO CONSTITUTES A VIOLATION OF THE APPROVED SEDIMENT AND STORMWATER MANAGEMENT PLAN.
2. AS A FIRST ORDER OF WORK, THE CONTRACTOR SHALL INSTALL STABILIZED CONSTRUCTION ENTRANCES AND ALL OTHER EROSION AND SEDIMENT CONTROL DEVICES AS SHOWN ON THE PLANS.
3. INSTALL AREA CLOSURE SIGNS AND BARRICADES AS SHOWN ON PLANS.
4. ESTABLISH CONSTRUCTION STAGING/STOCKPILE AREA ON RECENTLY INSTALLED STONE PARKING AREA
5. THE CONTRACTOR SHALL DEMO THE EXISTING BOARDWALK DECK, RAILING AND MONITORING PLATFORM.
6. CONSTRUCT THE BOARDWALK REHABILITATION IMPROVEMENTS IN ACCORDANCE WITH STRUCTURAL PLANS S-1 THROUGH S-8.
7. CONSTRUCT TRAIL REHABILITATION IMPROVEMENTS.
8. UPON COMPLETION OF ALL WORK, THE CONTRACTOR SHALL RESTORE THE CONSTRUCTION STAGING/STOCKPILE AREA TO ITS ORIGINAL CONDITION, AND STABILIZE ALL WORK AREAS IN ACCORDANCE WITH THE PLANS AND THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, CURRENT EDITION.
9. REMOVE ALL SEDIMENT CONTROL DEVICES AFTER APPROVAL BY DNREC'S SEDIMENT AND STORMWATER PROGRAM.
10. REMOVE AREA CLOSURE SIGNS AND BARRICADES FOLLOWING PROJECT ACCEPTANCE BY OWNER.

OWNER'S CERTIFICATION

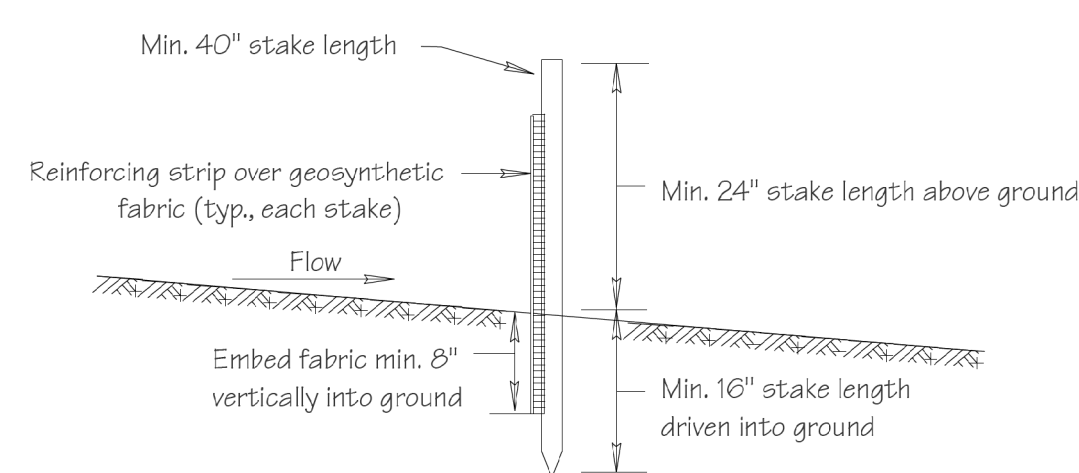
I, _____, HEREBY CERTIFY THAT ALL LAND CLEARING, CONSTRUCTION AND DEVELOPMENT SHALL BE PURSUANT TO THE APPROVED PLAN AND RESPONSIBLE PERSONS INVOLVED WILL HAVE A CERTIFICATE OF TRAINING FROM THE DEPARTMENT OF NATURAL RESOURCES (DNREC). DNREC PERSONNEL SHALL HAVE THE RIGHT TO CONDUCT ON-SITE INSPECTIONS.

DATE _____ SIGNATURE _____

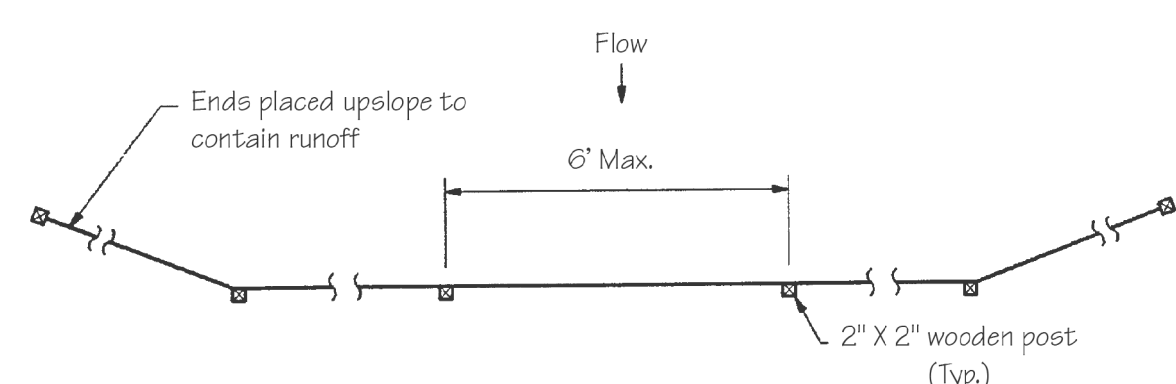


Standard Detail & Specifications

Silt Fence



Section



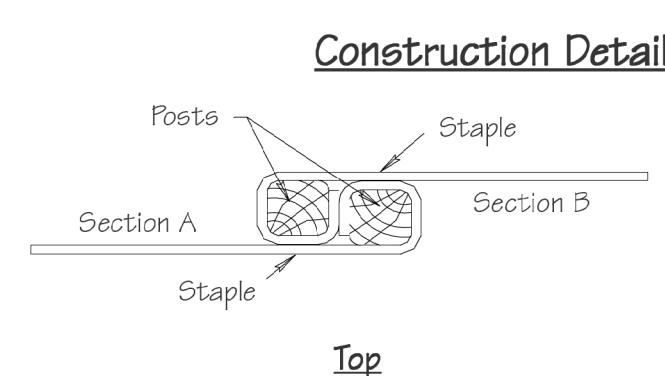
Plan

DATA
Max. controlled slope

Source: Adapted from MD Stds. & Specs. for ESC	Symbol: SF	Detail No. DE-ESC-3.1.2.1 Sheet 1 of 2 Effective July 2023
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Standard Detail & Specifications

Silt Fence



Method for joining continuous sections

Construction Notes:

1. Geosynthetic fabric to be fastened securely to fence posts with wire ties or staples.
2. When two sections of filter cloth adjoin each other they shall be overlapped by six inches and folded.
3. Maintenance shall be performed as needed and material removed when "bulges" develop in the silt fence.

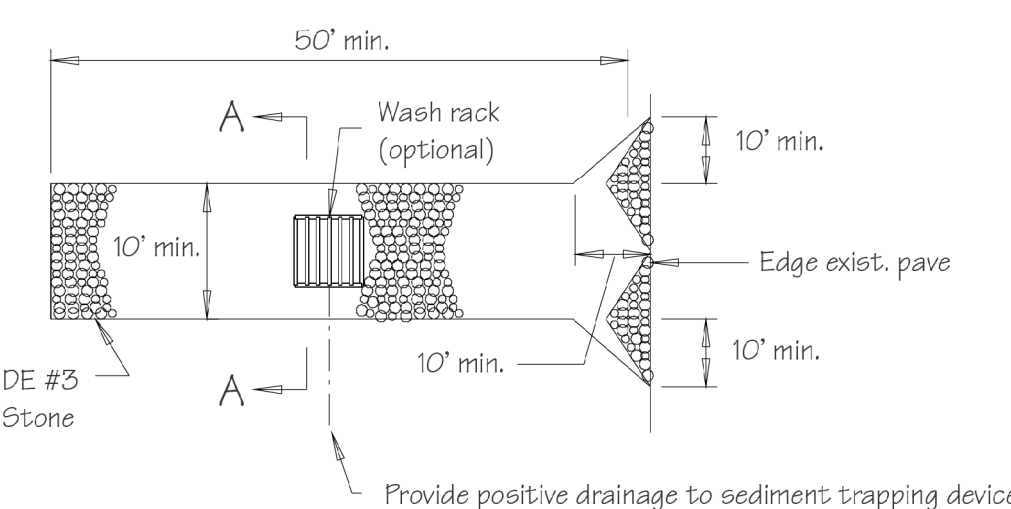
Materials:

1. **Stakes:** Steel (either T or U) or 2" x 2" hardwood
2. **Geosynthetic Fabric:** Type GD-1
3. **Reinforcing strip:** Wooden lath or plastic strip

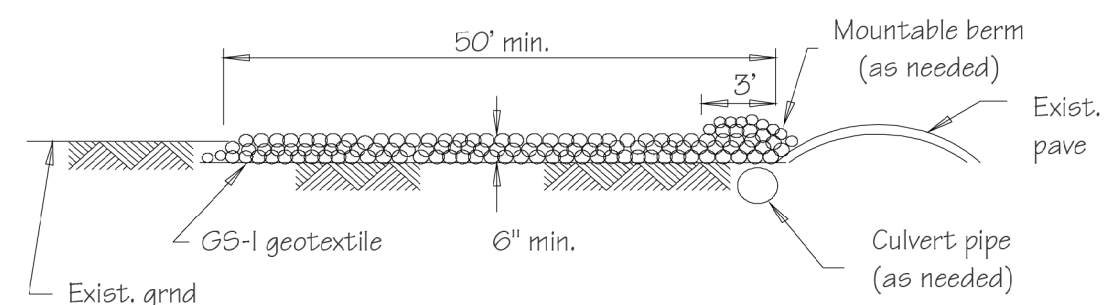
Source: Adapted from MD Stds. & Specs. for ESC	Symbol: SF	Detail No. DE-ESC-3.1.2.1 Sheet 2 of 2 Effective July 2023
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Standard Detail & Specifications

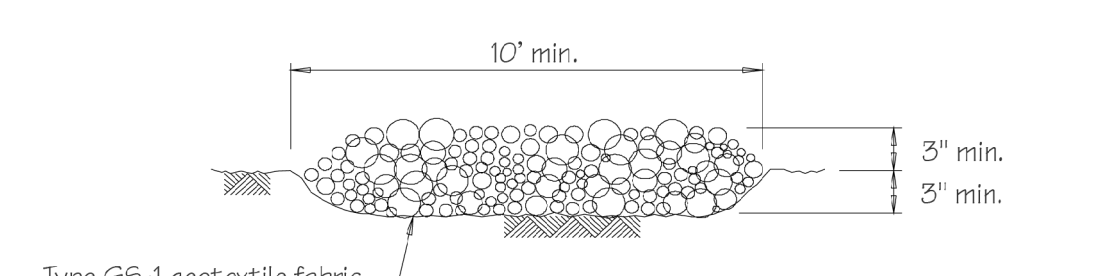
Stabilized Construction Entrance



Plan



Profile

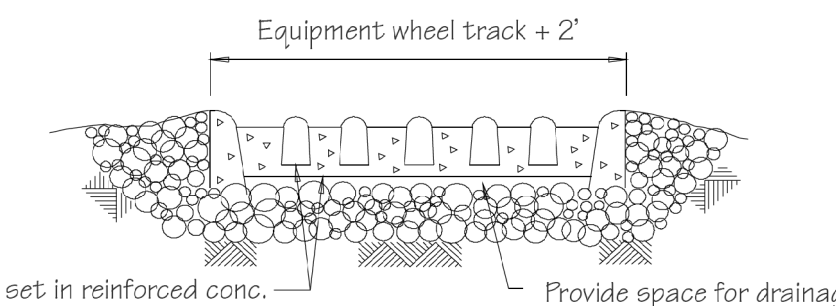


Section A-A (Std.)

Source: Adapted from VA ESC Handbook	Symbol: SCE	Detail No. DE-ESC-3.4.7 Sheet 1 of 2 Effective July 2023
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Standard Detail & Specifications

Stabilized Construction Entrance



Section A-A (Opt.)

Construction Notes:

1. **Stone size** - Use DE #3 stone.
2. **Length** - As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum length would apply).
3. **Thickness** - Not less than size (6) inches.
4. **Width** - Ten (10) foot minimum, but not less than the full width at points where ingress or egress occurs.
5. **Geotextile** - Type GS-1; placed over the entire area prior to placing of stone.
6. **Surface Water** - All surface water flowing or diverted toward construction entrances shall be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.
7. **Maintenance** - The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanup of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately.
8. **Washing** - Vehicle wheels shall be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device.
9. **Inspection** - Periodic inspection and needed maintenance shall be provided after each rain.

Source: Adapted from VA ESC Handbook	Symbol: SCE	Detail No. DE-ESC-3.4.7 Sheet 2 of 2 Effective July 2023
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Standard Detail & Specifications

Construction Site Pollution Prevention

Delaware NPDES Discharge Permit
General Permit for Discharge of Stormwater from Construction Activities

((Project Name))
((NOI Permit Number))
((Agency Plan Approval ID))
((Contact Name & Number for Additional Site Information))
((Contact Name & Number to Obtain Copy of Approved Plan))

If you observe indicators of stormwater pollutants in the discharge or in the receiving waterbody, call the DNREC Spill Notification 24 HR Hotline at
1-800-662-8802

Example Construction General Permit (CGP) Signage

- NOTES:**
1. Minimum sign size 2' x 2'
 2. Minimum text size 1"
 3. Sign must be posted at a safe, publicly accessible location close to construction site
 4. Sign must be visible from the public road nearest the active construction site
 5. Signs posted within a DelDOT or other public road right-of-way (ROW) must be in accordance with all local and/or State requirements in regards to safety, location, orientation, etc.

Source: Delaware ESC Handbook	Symbol:	Detail No. DE-ESC-3.6.1 Sheet 1 of 4 Effective July 2023
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Standard Detail & Specifications

Construction Site Pollution Prevention

Notes:

The Construction Site Pollution Prevention Plan includes the following elements:

1. Material Inventory

Document the storage and use of the following materials:

- a. Concrete
- b. Detergents
- c. Paints (enamel and latex)
- d. Cleaning solvents
- e. Pesticides
- f. Wood scraps
- g. Fertilizers
- h. Petroleum based products

2. Good housekeeping practices

- a. Store only enough product required to do the job.
- b. Store all materials in a neat, orderly manner in their original labeled containers and covered.
- c. Do not mix different substances.
- d. When possible, use all of a product prior to disposal of the container.
- e. Manufacturers' instructions for disposal should be strictly adhered to.
- f. Designate someone to inspect all BMPs daily.

3. Waste management practices

- a. Collect and store all waste materials in securely lidded dumpsters in a location that does not drain to a waterbody.
- b. Salvage and/or recycle waste materials whenever possible.
- c. The dumpsters shall be emptied a minimum of twice per week, or more if necessary. The licensed trash hauler is responsible for cleaning out dumpsters.

Source: Adapted from USEPA Pub. 840-B-92-002	Symbol:	Detail No. DE-ESC-3.6.1 Sheet 2 of 4 Effective July 2023
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Standard Detail & Specifications

Construction Site Pollution Prevention

Notes (cont.)

- d. Dispose of all trash in accordance with all applicable Delaware laws.
 - e. Littering is strictly prohibited. Trash cans should be placed at all lunch spots and recycle bins should be placed near the construction trailer.
 - f. If fertilizer bags can not be stored in a weather-proof location, they should be kept on a pallet and covered with plastic sheeting which is overlapped and anchored.
- 4. Equipment maintenance practices**
- a. If possible, equipment should be taken to off-site commercial facilities for washing and maintenance.
 - b. If performed on-site, wash vehicles with high-pressure water spray without detergents in an area contained by an impervious berm.
 - c. Use drip pans for all equipment maintenance.
 - d. Inspect equipment for leaks on a daily basis.
 - e. Direct washout from concrete trucks into a temporary pit for hardening and proper disposal.
 - f. Equip fuel nozzles with automatic shut-off valves.
 - g. Dispose of all used products such as oil, antifreeze, solvents and tires in accordance with manufacturers' recommendations and local, state and federal laws and regulations.
- 5. Spill prevention practices**
- a. Identify potential spill areas and contain them in covered areas with no connection to the storm drain system.
 - b. Post warning signs in hazardous material storage areas.
 - c. Perform preventive maintenance on all tanks, valves, pumps, pipes and other equipment as necessary.
 - d. Prioritize low or non-toxic substances for use.

Source: Adapted from USEPA Pub. 840-B-92-002	Symbol:	Detail No. DE-ESC-3.6.1 Sheet 3 of 4 Effective July 2023
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Standard Detail & Specifications

Construction Site Pollution Prevention

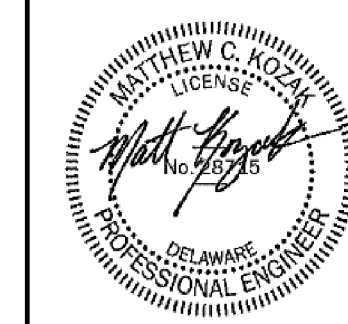
Notes (cont.)

- e. Prominently post contact information for reporting spills through the DNREC 24-Hour Toll Free Number.
- 6. Education**
- a. Include Best Management Practices (BMPs) for construction site pollution control as part of regular progress meetings.
 - b. Information regarding waste management, equipment maintenance and spill prevention should be prominently posted in the construction trailer.

CONTACT INFORMATION

DNREC 24-Hour Toll Free Number 800-662-8802
DNREC Solid & Hazardous Waste Management Section 302-739-9403

Source: Adapted from USEPA Pub. 840-B-92-002	Symbol:	Detail No. DE-ESC-3.6.1 Sheet 4 of 4 Effective July 2023
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BY:		DESCRIPTION:		DATE:	
BY:					
AQUATIC RESOURCES EDUCATION CENTER MALLARD LODGE BOARDWALK & TRAIL REHABILITATION EROSION AND SEDIMENT CONTROL DETAILS					
DESIGNED BY: RKK					
DRAWN BY: RKK					
BUILDING NO.: N/A					
DATE: JANUARY 31, 2025					
SCALE: NOT TO SCALE					
SHEET NO.: ES-2					
DFW PROJECT #: N/A					
CONTRACT #: NAT20003-ARECBDWLK					

1/28/2025 3:51:04 PM \\ad.rkk.com\fs\Cloud\Projects\2015\15010_dnrecFW\TASK 7 - AREC Trails\CADD\Mallard_Rehab\Plans\es02_Mallard_Trail.dgn

Standard Detail & Specifications Dust Control

Temporary Methods:

- Mulches - See DE-ESC-3.4.5, Standard Detail and Specifications for Mulching.
- Vegetative cover - See DE-ESC-3.4.3, Std. Detail and Specifications for Vegetative Stabilization.
- Adhesives - Use on mineral soils only (not effective on muck soils). Keep traffic off these areas. The following table may be used for general guidance.

Type of Emulsion	Water Dilution	Type of Nozzle	Apply Gal./Ac.
Latex emulsion	12.5:1	Fine spray	235
Resin-in-water emulsion	4:1	Fine spray	300
Acrylic emulsion (non-traffic)	7:1	Coarse spray	450
Acrylic emulsion (traffic)	3.5:1	Coarse spray	350

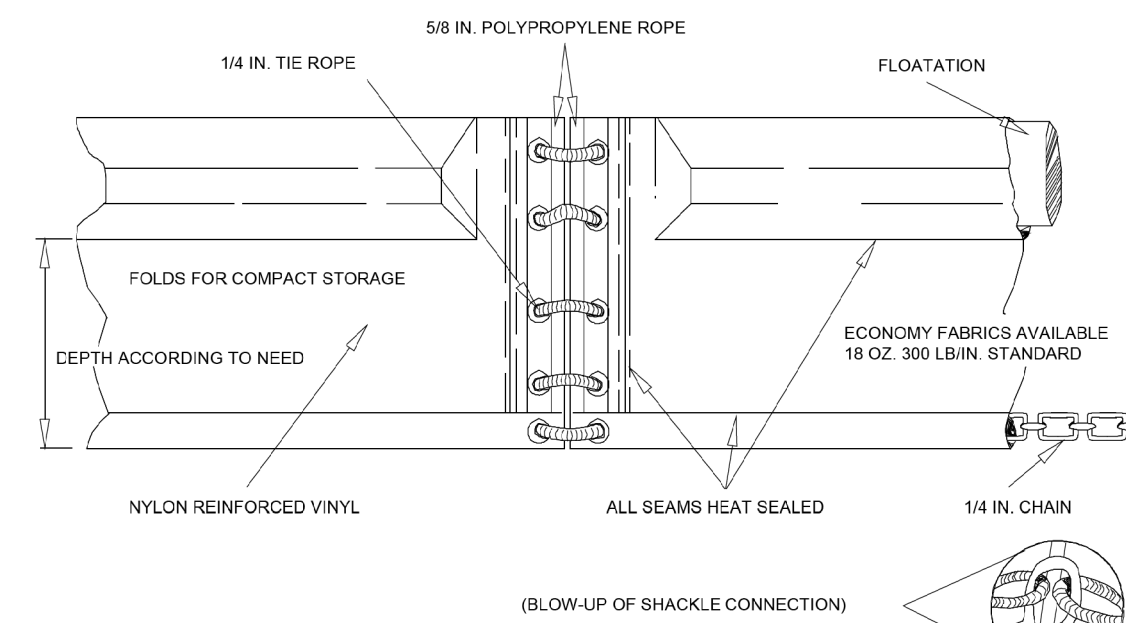
- Tillage - For emergency temporary treatment, scarify the soil surface to prevent or reduce the amount of blowing dust until a more appropriate solution can be implemented. Begin the tillage operation on the windward side of the site using a chisel-type plow for best results.
- Sprinkling - Sprinkle site with water until the surface is moist. Repeat as needed.
- Calcium Chloride - Apply as flakes or granular material with a spreader at a rate that will keep the soil surface moist. Re-apply as necessary.
- Barriers - Place barriers such as solid board fences, snow fences, hay bales, etc. at right angles to the prevailing air currents at intervals of approx. 10X their height.

Permanent Methods:

- Vegetative cover - See DE-ESC-3.4.3, Std. Detail and Specifications for Vegetative Stabilization.
- Stone - Apply layer of crushed stone or coarse gravel to protect soil surface.

Source: Adapted from VA ESC Handbook	Symbol: TC-(1/2/3) (Std/Alt)	Detail No. DE-ESC-3.4.8 Sheet 1 of 1 Effective July 2023
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Standard Detail & Specifications Turbidity Curtain

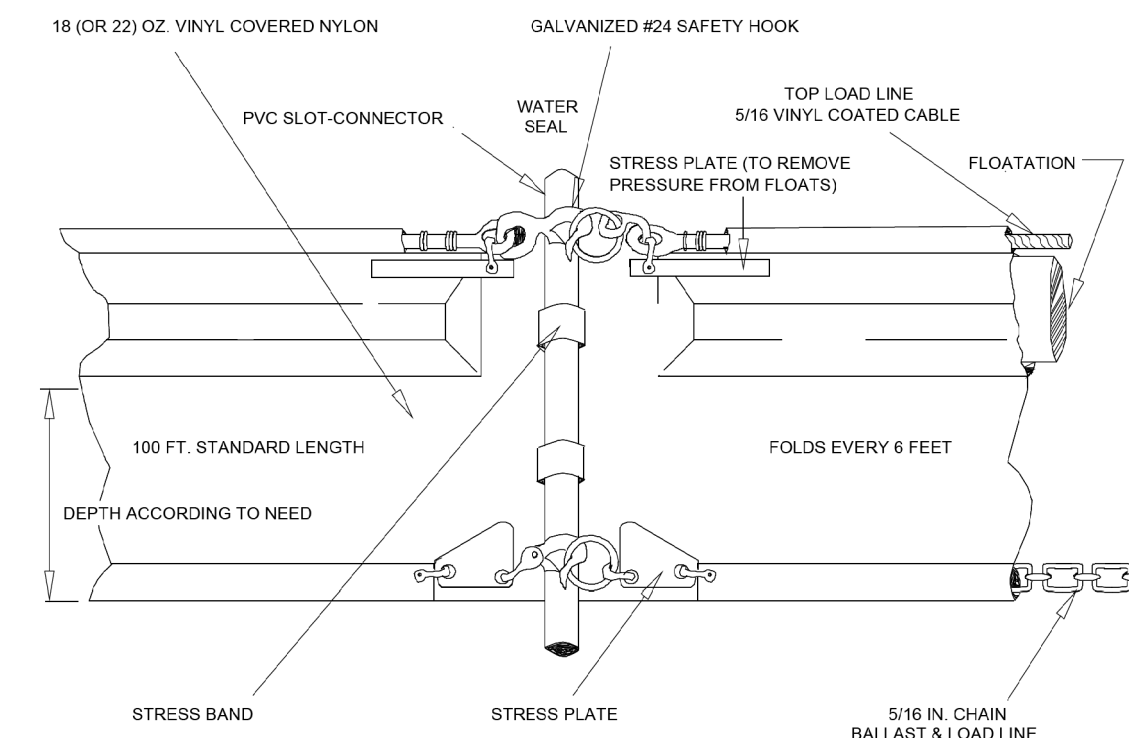


Typical Section - Type 1

DATA
Curtain type (1, 2, or 3)
Layout (Std. or Alt.)

Source: Adapt. from Amer. Boom and Barrier Corp.	Symbol: TC-(1/2/3) (Std/Alt)	Detail No. DE-ESC-3.5.3 Sheet 1 of 8 Effective July 2023
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Standard Detail & Specifications Turbidity Curtain

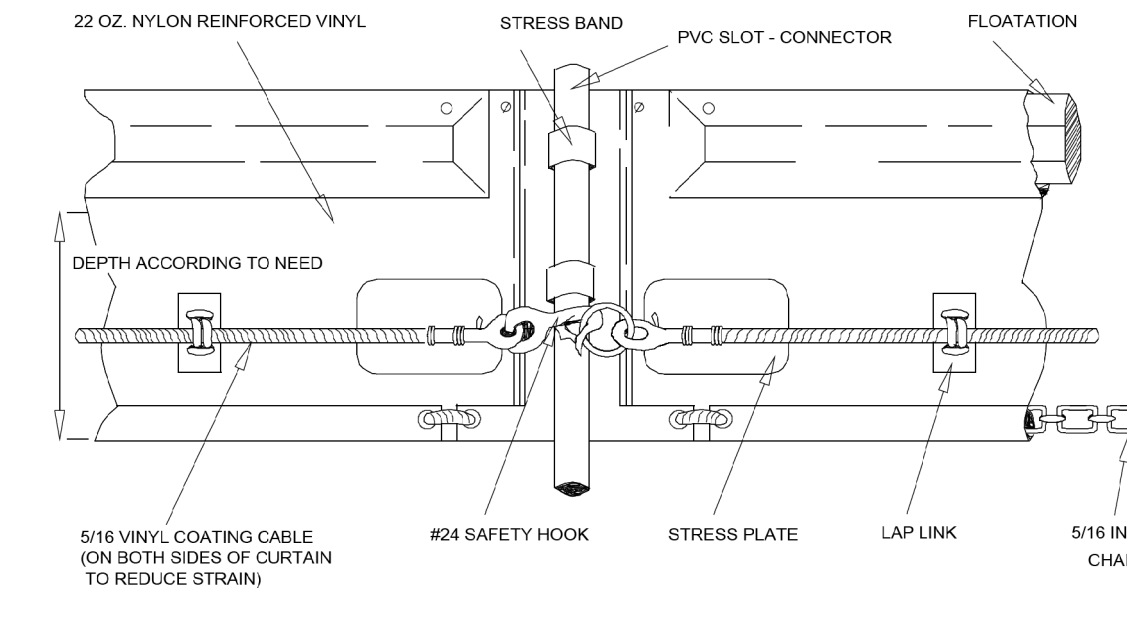


Typical Section - Type 2

DATA
Curtain type (1, 2, or 3)
Layout (Std. or Alt.)

Source: Adapt. from Amer. Boom and Barrier Corp.	Symbol: TC-(1/2/3) (Std/Alt)	Detail No. DE-ESC-3.5.3 Sheet 2 of 8 Effective July 2023
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Standard Detail & Specifications Turbidity Curtain



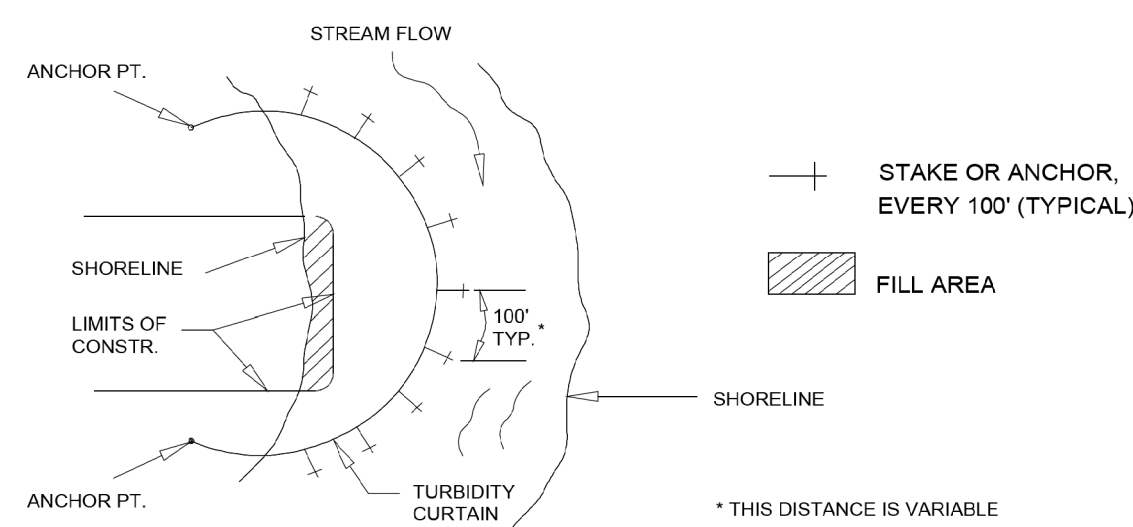
Typical Section - Type 3

DATA
Curtain type (1, 2, or 3)
Layout (Std. or Alt.)

Source: Adapt. from Amer. Boom and Barrier Corp.	Symbol: TC-(1/2/3) (Std/Alt)	Detail No. DE-ESC-3.5.3 Sheet 3 of 8 Effective July 2023
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Standard Detail & Specifications Turbidity Curtain

NOTE: The standard layout shown is intended for use in streams, ponds and other non-tidal waters

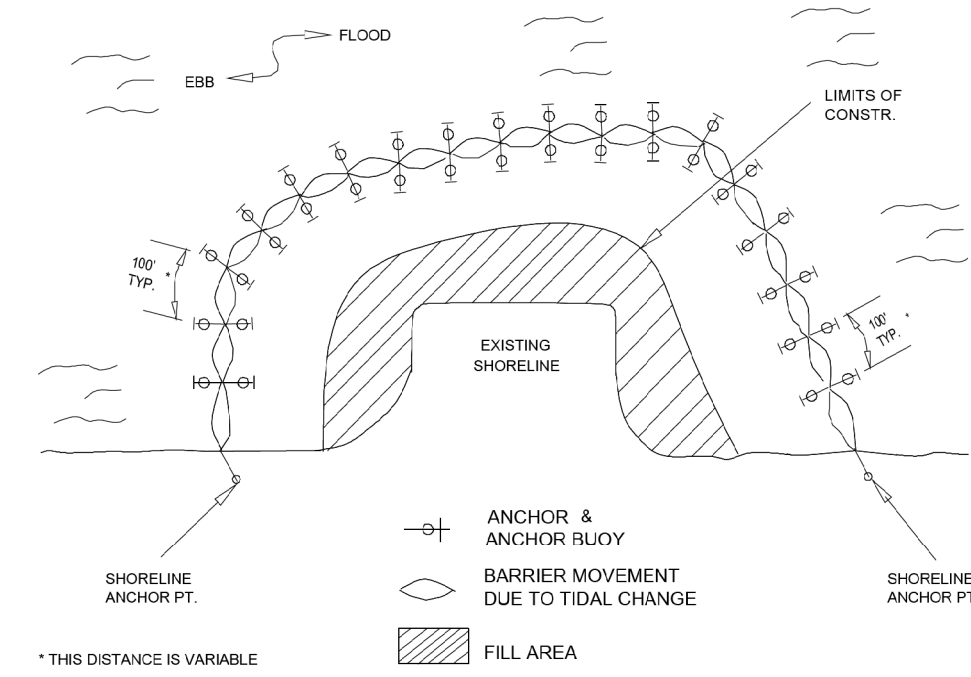


Plan - Std. Layout

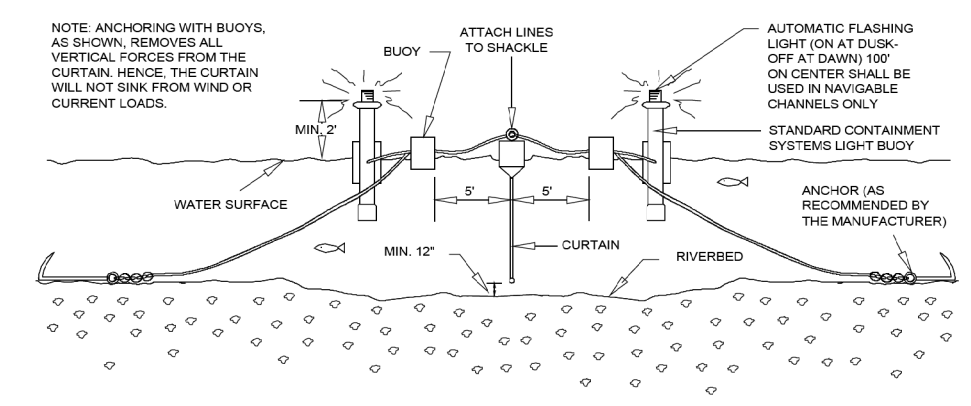
Source: Adapt. from Amer. Boom and Barrier Corp.	Symbol: TC-(1/2/3) (Std/Alt)	Detail No. DE-ESC-3.5.3 Sheet 4 of 8 Effective July 2023
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Standard Detail & Specifications Turbidity Curtain

NOTE: The alternative layout shown is intended for tidal waters and/or heavy wind and wave action



Plan - Alt. Layout



Additional Requirements for Navigable Waters

Source: Adapt. from Amer. Boom and Barrier Corp.	Symbol: TC-(1/2/3) (Std/Alt)	Detail No. DE-ESC-3.5.3 Sheet 5 of 8 Effective July 2023
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Standard Detail & Specifications Turbidity Curtain

Construction Notes:

- Materials**
 - Barriers should be a bright color (yellow or "international" orange are recommended) that will attract the attention of nearby boaters.
 - The curtain fabric shall meet manufacturer's recommendations for the application.
 - Seams in the fabric shall be either vulcanized welded or sewn and shall develop the full strength of the fabric.
 - Floating devices shall be flexible, buoyant units contained in an individual floatation sleeve or collar attached to the curtain. Buoyancy provided by the floatation units shall be sufficient to support the weight of the curtain and maintain a freeboard of at least 3 inches above the water surface level.
 - Load lines must be fabricated into the bottom of all floating turbidity curtains. Type II and Type III must have load lines also fabricated into the top of the fabric. The top load line shall consist of woven webbing or vinyl-sheathed steel cable and shall have a break strength in excess of 10,000 pounds. The supplemental (bottom) load line shall consist of a chain incorporated into the bottom hem of the curtain of sufficient weight to serve as ballast to hold the curtain in a vertical position. Additional anchorage shall be provided as necessary. The load lines shall have suitable connecting devices which develop the full breaking strength for connection to load lines in adjacent sections as shown in the detail.
 - External anchors may consist of wooden or metal stakes (2- x 4-inch or 2-1/2-inch minimum diameter wood or 1.33 lbs/linear foot steel) when Type I installation is used; when Type II or Type III installations are used, bottom anchors should be used.
 - Bottom anchors must be sufficient to hold the curtain in the same position relative to the bottom of the watercourse without interfering with the action of the curtain. The anchor may dig into the bottom (grappling hook, plow or fluke-type) or may be weighted (mushroom type) and should be attached to a floating anchor buoy via an anchor line. The anchor line should then run from the buoy to the top load line of the curtain. When used with Type III installations, these lines must contain enough slack to allow the buoy and curtain to float freely with tidal changes without pulling the buoy or curtain down and must be checked regularly to make sure they do not become entangled with debris. As previously noted, anchor spacing will vary with current velocity and potential wind and wave action; manufacturer's recommendations should be followed. See detail for orientation of external anchors and anchor buoys for tidal installations.

Source: Adapt. from Amer. Boom and Barrier Corp.	Symbol: TC-(1/2/3) (Std/Alt)	Detail No. DE-ESC-3.5.3 Sheet 6 of 8 Effective July 2023
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Standard Detail & Specifications Turbidity Curtain

Construction Notes (cont.)

- Installation**
 - In the calm water of lakes or ponds (Type I installation) it is usually sufficient to set the curtain end stakes or anchor points (using anchor buoys if bottom anchors are employed), then tow the curtain in the furled condition out and attach it to the stakes or anchor points. Following this, any additional stakes or buoyed anchors required to maintain the desired location of the curtain may be set and these anchor points made fast to the curtain. Only then shall the furling lines be cut to allow the curtain skirt to drop.
 - In rivers or in other moving waters (Type II and Type III installations) it is important to set all curtain anchor points. Care must be taken to ensure that anchor points are of sufficient holding power to retain the curtain under the existing current conditions, prior to putting the furled curtain into the water. Anchor buoys should be employed on all anchors to prevent the current from submerging the floatation at the anchor points. If the curtain is being installed into tidal areas which would be subject to currents in both directions, anchors should be provided on both sides of the curtain. This will minimize curtain movement and prevent the curtain from overrunning the anchors during tide reversals. After the anchors have been secured, the furled curtain should be secured to the upstream anchor point and then sequentially attached to each next downstream anchor point until the entire curtain is in position. Before unfurling, the "lay" of the curtain should be assessed and any necessary adjustments made to the anchors. Once the location has been deemed adequate, the furling lines may be cut to allow the skirt to drop.
 - Anchor lines should be attached to the floatation device, not to the bottom of the curtain. The anchoring line attached to the floatation device on the downstream side will provide support for the curtain. Attaching the anchors to the bottom of the curtain could cause premature failure of the curtain due to the stresses imparted on the middle section of the curtain.
 - Turbidity curtain shall not be installed across channel flows unless there is a danger of causing sediment deposition to occur in the middle of a watercourse, thereby blocking access or creating a sand bar. In such situations, the curtain may be installed so as to form a long-sided, sharp "V" to deflect clean water around a work site, confining most of the silt-laden water to the work area inside the "V" and directing it to the shoreline. In no case shall the curtain be installed perpendicular to the channel flow.

Source: Adapt. from Amer. Boom and Barrier Corp.	Symbol: TC-(1/2/3) (Std/Alt)	Detail No. DE-ESC-3.5.3 Sheet 7 of 8 Effective July 2023
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BY: _____
DATE: _____

DESCRIPTION:
AQQUATIC RESOURCES EDUCATION CENTER
MALLARD LODGE
BOARDWALK & TRAIL REHABILITATION
EROSION AND SEDIMENT CONTROL DETAILS



DESIGNED BY: RKK
DRAWN BY: RKK
BUILDING NO.: N/A
DATE: JANUARY 31, 2025
SCALE: NOT TO SCALE
SHEET NO.: ES-3
DFW PROJECT #: N/A
CONTRACT #: NAT20003-ARECBDWLK



Standard Detail & Specifications
Turbidity Curtain

Construction Notes (cont.)

- 3. Maintenance**
- a. The individual(s) identified on the plan as responsible for maintenance of the curtain shall do so for the duration of the project in order to ensure the continuous protection of the watercourse.
 - b. Should repairs to the geotextile fabric become necessary, repair kits are generally available from the manufacturer. The manufacturer's instructions must be followed to ensure the adequacy of the repair.
 - c. When the curtain is no longer required as determined by the inspector, the curtain and related components shall be removed in such a manner as to minimize turbidity. Remaining sediment shall be sufficiently settled before removing the curtain. Sediment may be removed and the original depth (or plan elevation) restored. Any spoils must be taken to an approved upland disposal area and stabilized in accordance with the approved plan.
- 4. Removal**
- a. Care shall be taken to protect the skirt from damage as the turbidity curtain is dragged from the watercourse.
 - b. The site selected to bring the curtain ashore should be free of sharp rocks, broken cement, debris, etc. so as to minimize damage when hauling the curtain over the area.
 - c. If the curtain has a deep skirt, it can be further protected by running a small boat along its length with a crew installing furling lines before attempting to remove the curtain from the water.

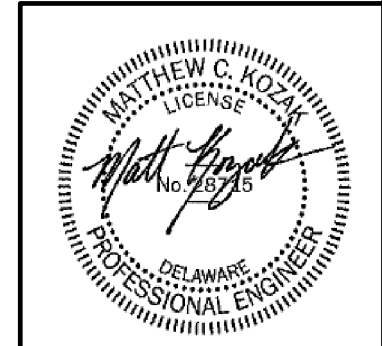
Source: Adapt. from Amer. Boom and Barrier Corp.	Symbol: TC-(1/2/3) (Std/Alt)	Detail No. DE-ESC-3.5.3 Sheet 8 of 8 Effective July 2023
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BY:	
DESCRIPTION:	
DATE:	

**AQUATIC RESOURCES EDUCATION CENTER
MALLARD LODGE
BOARDWALK & TRAIL REHABILITATION
EROSION AND SEDIMENT CONTROL DETAILS**



DESIGNED BY:	RKK
DRAWN BY:	RKK
BUILDING NO.:	N/A
DATE:	JANUARY 31, 2025
SCALE:	NOT TO SCALE
SHEET NO.:	ES-4
DFW PROJECT #:	N/A
CONTRACT #:	NAT20003-ARECBDWLK

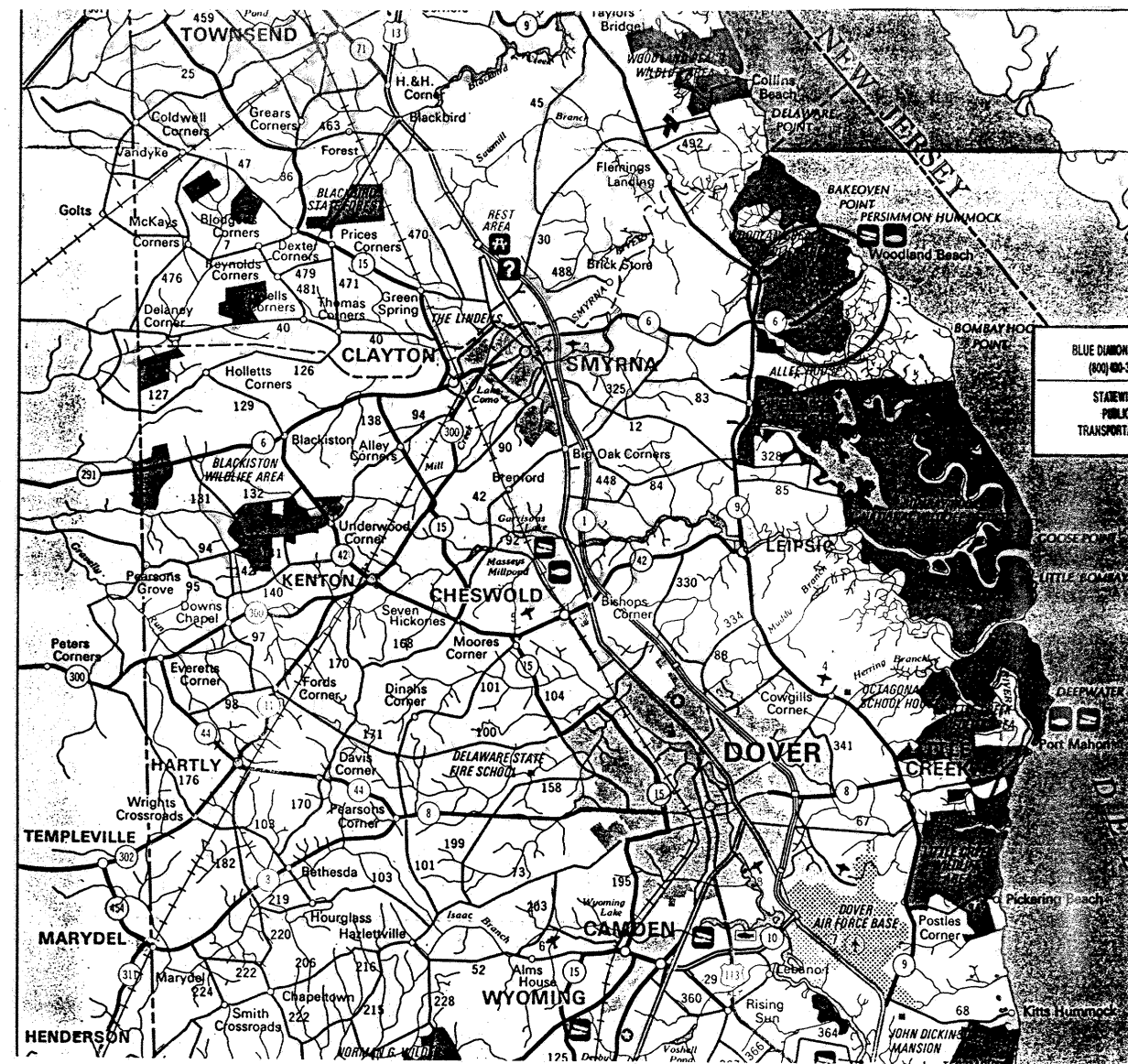


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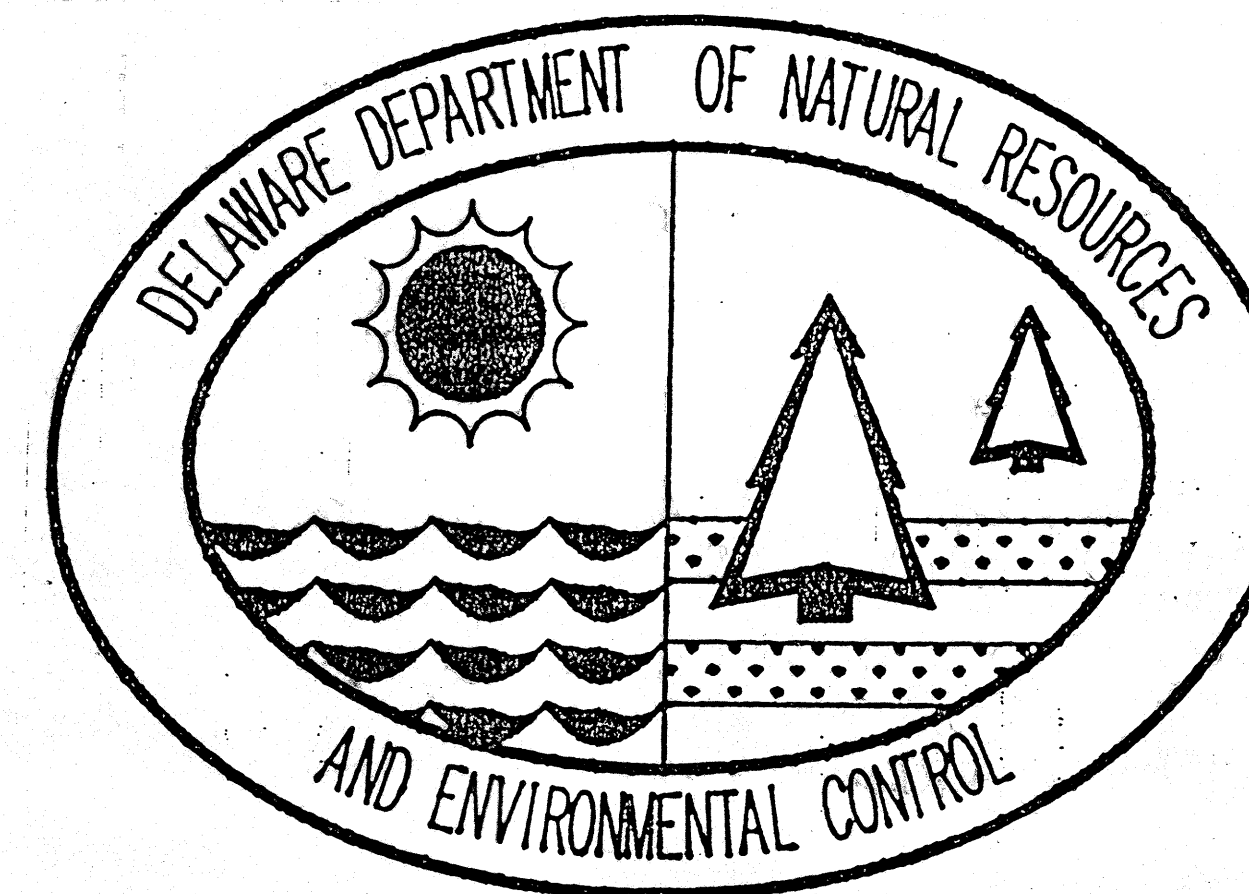
THE FOLLOWING SHEETS ARE FOR INFORMATION ONLY

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
DIVISION OF FISH & WILDLIFE

GREENWAYS BOARDWALK
AQUATIC RESOURCE EDUCATION CENTER
WOODLAND BEACH WILDLIFE AREA



VICINITY MAP

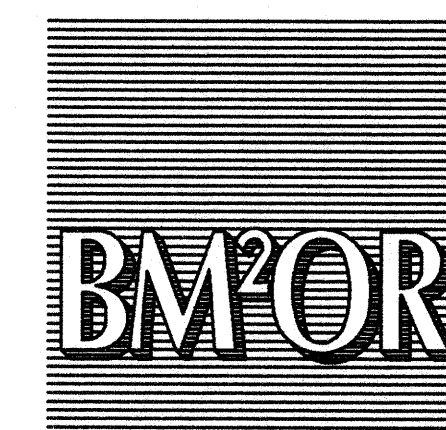


STRUCTURAL ENGINEER

**GREDELL
& ASSOCIATES**
STRUCTURAL ENGINEERS

702 N. WEST STREET • WILMINGTON, DELAWARE 19801 • 302-429-7400
8 THE GREEN • DOVER, DELAWARE 19901 • 302-734-7400

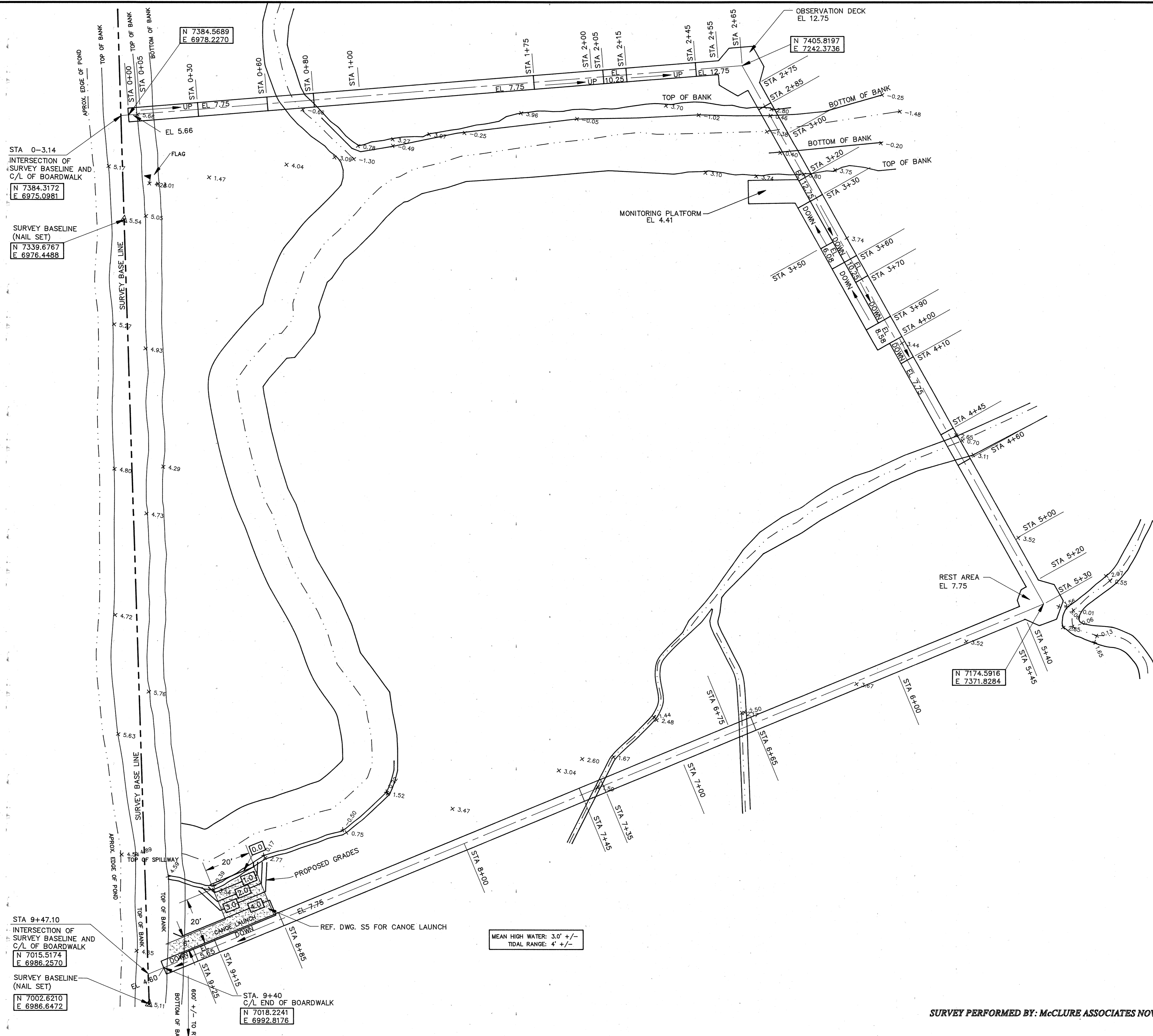
CIVIL ENGINEER



BECKER
MORGAN
MOORE
OLDS &
RICHTER INC

ARCHITECTURE ENGINEERING LAND PLANNING INTERIOR DESIGN
3 SOUTH AMERICAN AVENUE P.O. BOX 1326 DOVER, DELAWARE 19903 302.734.7950 FAX: 302.734.7965

LARGE POND



STA 0-3.14
INTERSECTION OF
SURVEY BASELINE AND
C/L OF BOARDWALK
N 7384.3172
E 6975.0981

SURVEY BASELINE
(NAIL SET)
N 7339.6767
E 6976.4488

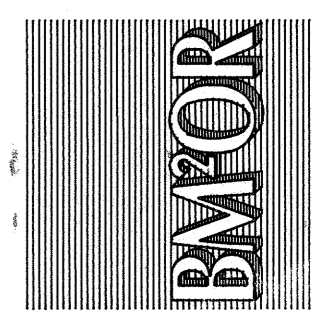
STA 9+47.10
INTERSECTION OF
SURVEY BASELINE AND
C/L OF BOARDWALK
N 7015.5174
E 6986.2570

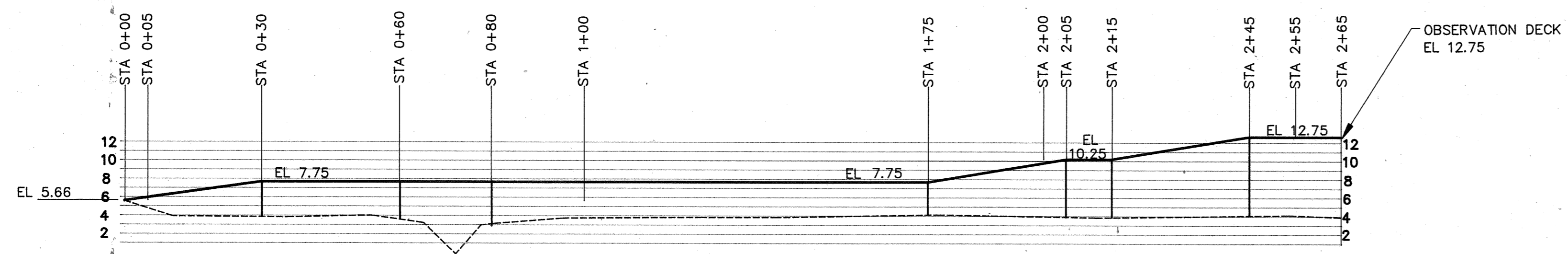
SURVEY BASELINE
(NAIL SET)
N 7002.6210
E 6986.6472

STA. 9+40
C/L END OF BOARDWALK
N 7018.2241
E 6992.8176

MEAN HIGH WATER: 3.0' +/-
TIDAL RANGE: 4' +/-

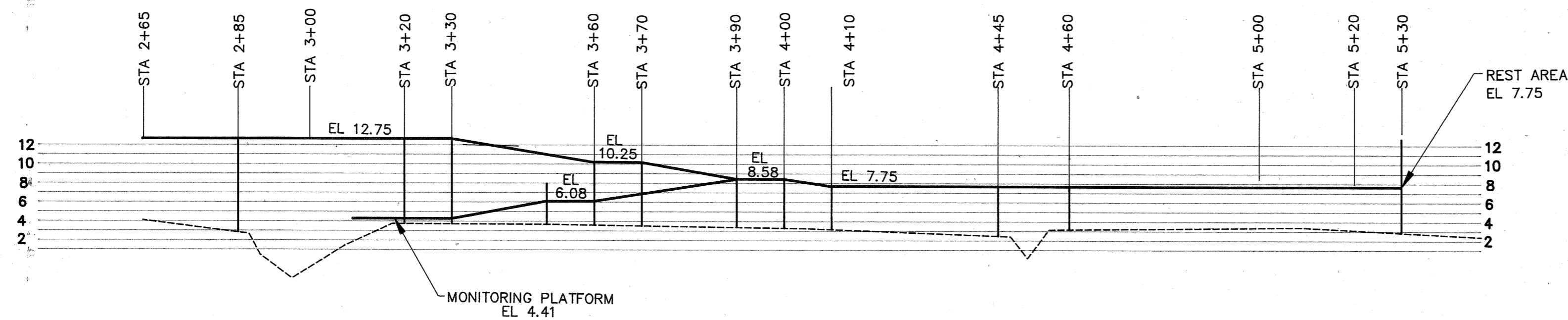
SURVEY PERFORMED BY: McCLURE ASSOCIATES NOV. 2, 1994

ISSUED: 5/24/95		
NO.	DATE	ITEM
REVISIONS		
 BECKER MORGAN MOORE OLDS & RICHTER INC ARCHITECTURE ENGINEERING LAND PLANNING 3 SOUTH AMERICAN AVENUE P.O. BOX 1305 DOWEL, DELAWARE 19933 INTERIOR DESIGN 302.324.1955 FAX 302.324.1965		
AQUATIC RESOURCES EDUCATION CENTER SALT MARSH BOARDWALK PROJECT DUCK CREEK HUNDRED KENT COUNTY DELAWARE		
BYFOR	94242	C-1
SCALE	1" = 20'	
DATE	5/24/95	



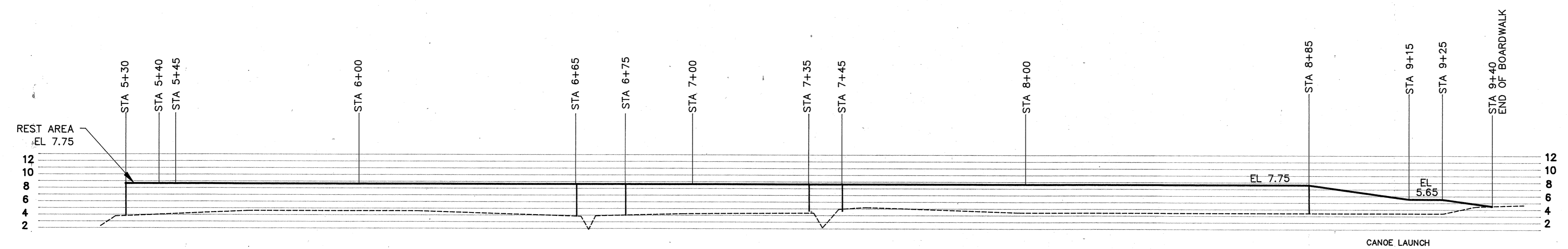
BOARDWALK STA. 0+00 TO 2+65

SCALE: HORIZ. 1"=20'
VERT. 1"=10'



BOARDWALK STA. 2+65 TO 5+30

SCALE: HORIZ. 1"=20'
VERT. 1"=10'



BOARDWALK STA. 5+30 TO 9+40

SCALE: HORIZ. 1"=20'
VERT. 1"=10'

ISSUED: 6/24/95

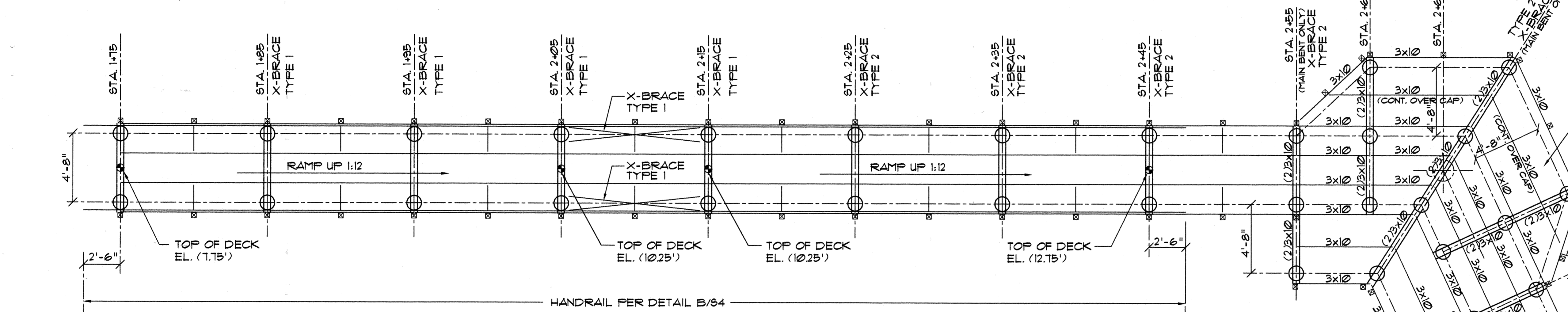
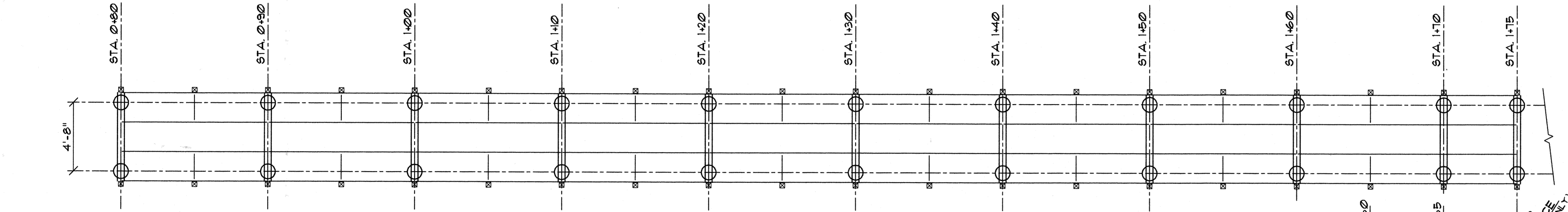
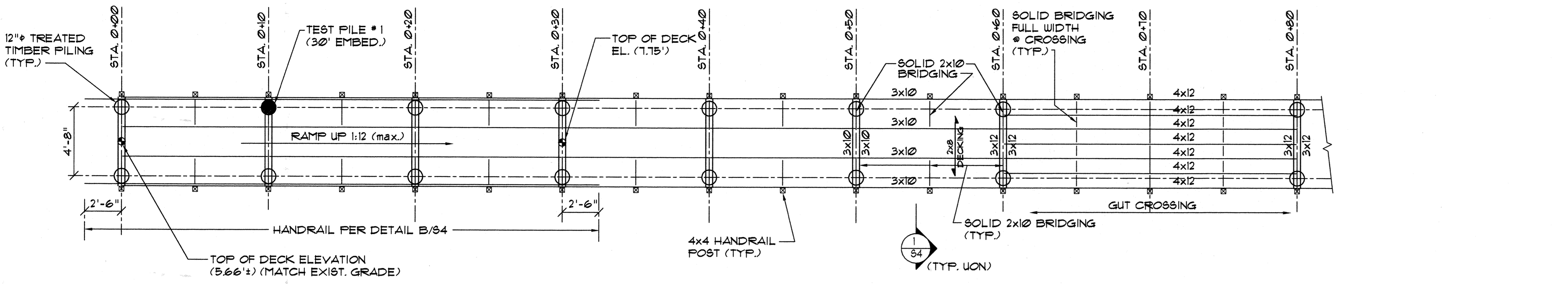
NO.	DATE	ITEM

REVISIONS

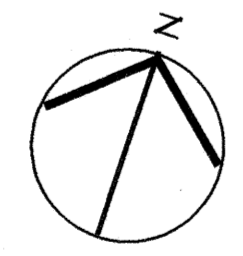
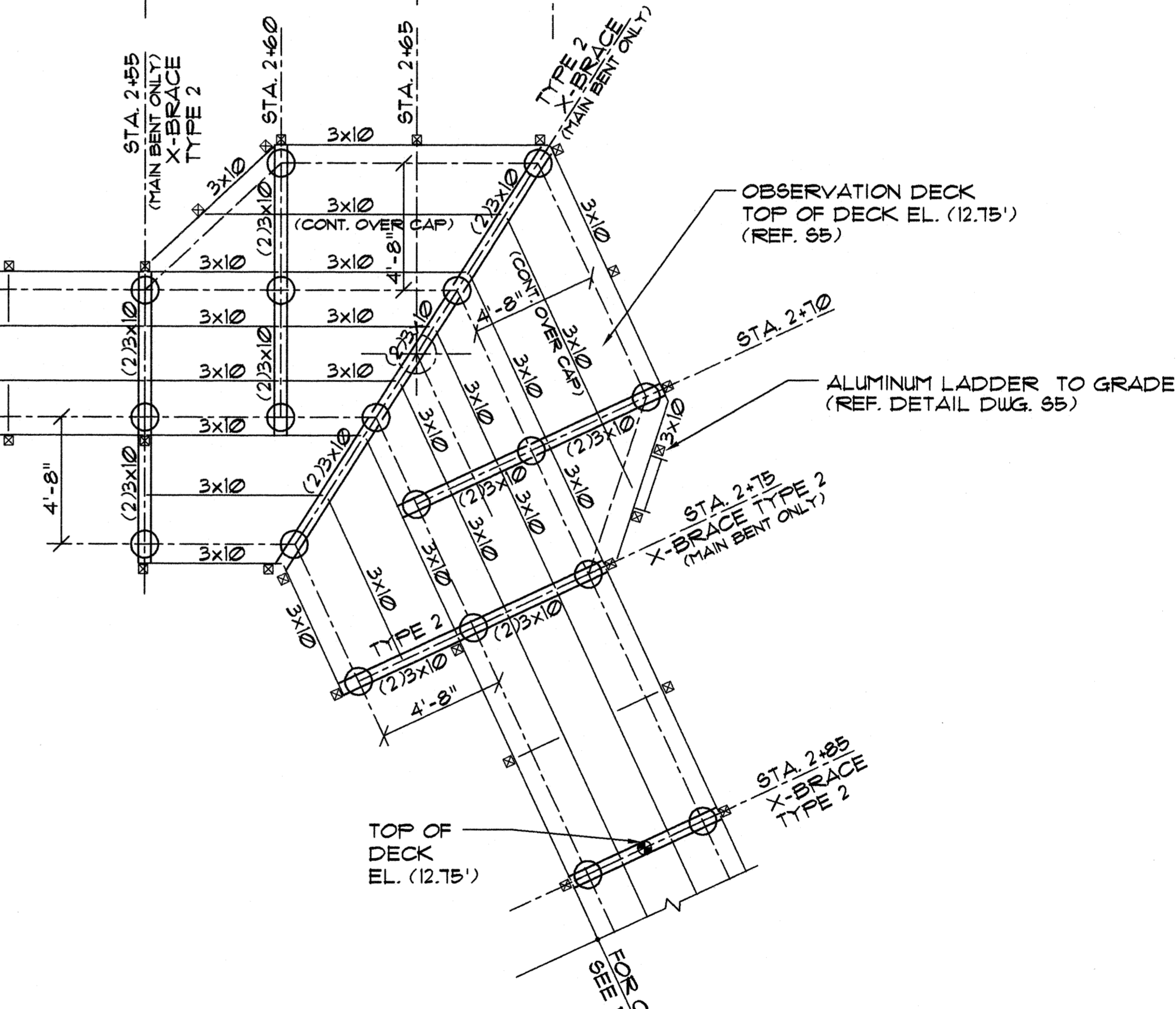
BECKER MORGAN MOORE OLDS & RICHTER INC
ARCHITECTURE ENGINEERING LAND PLANNING INTERIOR DESIGN
33001 PEBBLE BEACH BLVD. SUITE 1000, PEPPER HARBOR, CA 94963
302.241.7000 FAX 302.241.7060

AQUATIC RESOURCES EDUCATION CENTER
SALT MARSH BOARDWALK PROJECT
DUCK CREEK HUNDRED
KENT COUNTY
DELAWARE

PROFILE SHEET



- GENERAL NOTES:**
- DESIGN LIVE LOADS = 100 PSF.
 - A SUBSURFACE EVALUATION AND GEOTECHNICAL ENGINEERING REPORT HAS BEEN PREPARED FOR THIS PROJECT BY CAPITAL ENGINEERING SERVICES AND IS INCLUDED IN THE PROJECT MANUAL. ALL PILES TO BE DRIVEN TO A 10 TON SAFE BEARING CAPACITY. FOR BIDDING PURPOSES, ALL PILES TO HAVE A TIP ELEVATION OF MINUS 21' (+ 25' EMBEDMENT BELOW EXISTING GRADE) EXCEPT FOUR PILES AT STATION 2+85 AND 3+20 WHICH SHALL HAVE A TIP ELEVATION OF MINUS 26'. PRODUCTION PILE LENGTHS TO BE VERIFIED BY (2) 30' TEST PILES.
 - WHERE THE BOARDWALK CROSSES AN EXISTING STREAM OR GUT, THE CONTRACTOR SHALL MAKE SMALL ADJUSTMENTS IN THE PILE BENT LOCATIONS AS NECESSARY TO KEEP THE PILING OUTBOARD OF THE UPPER BANK LINE. MAKE FRAMING ADJUSTMENTS TO SUIT PILE BENT LOCATIONS. NOTIFY ENGINEER IF BENT SPACINGS DIFFER FROM THOSE SHOWN BY MORE THAN 2'-0".
 - THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING, PLACING AND REMOVING ALL TEMPORARY MATS OR OTHER MEANS REQUIRED TO SUPPORT PILE DRIVING AND OTHER HEAVY EQUIPMENT. A 20' WIDE (MAXIMUM) WIDTH OF DISTURBANCE IS ALLOWED. IF OTHER MEANS OF SUPPORT ARE REQUIRED (IN ADDITION TO 20' WIDE MATS) THE CONTRACTOR SHALL PROVIDE SUCH AT NO ADDITIONAL COST TO THE OWNER, UPON WRITTEN APPROVAL BY THE OWNER.
 - REFERENCE SHEET 85 FOR X-BRACING DETAILS.
 - COMPLETE WRITTEN TECHNICAL SPECIFICATIONS ARE INCLUDED IN THE PROJECT MANUAL.



BOARDWALK FRAMING PLANS
(NORTH SECTION)

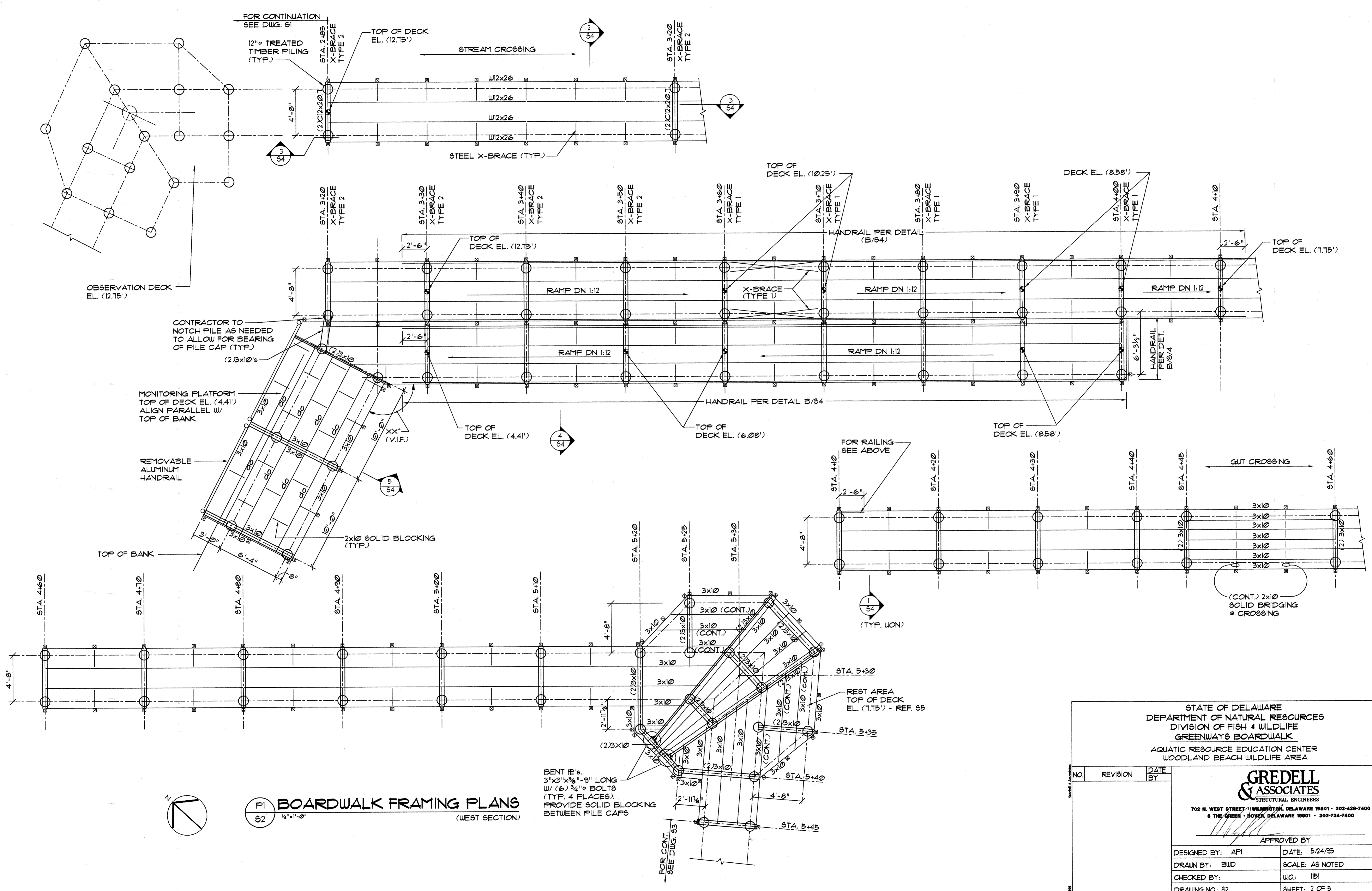
STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH & WILDLIFE
GREENWAYS BOARDWALK
AQUATIC RESOURCE EDUCATION CENTER
WOODLAND BEACH WILDLIFE AREA

NO.	REVISION	DATE BY

GREDELL & ASSOCIATES
STRUCTURAL ENGINEERS
702 N. WEST STREET, WILMINGTON, DELAWARE 19801 • 302-429-7400
8 THE GREEN, DOVER, DELAWARE 19901 • 302-734-7400

APPROVED BY: *[Signature]*

DESIGNED BY: API	DATE: 5/24/95
DRAWN BY: BUD	SCALE: AS NOTED
CHECKED BY:	W.O.: 1151
DRAWING NO.: 81	SHEET: 1 OF 5



PI BOARDWALK FRAMING PLANS
 (WEST SECTION)
 1/4" = 1'-0"

BENT PLATE
 3"x3"x3/8"-9" LONG
 W/ (6) 3/4" BOLTS
 (TYP. 4 PLACES)
 PROVIDE SOLID BLOCKING
 BETWEEN PILE CAPS

STATE OF DELAWARE
 DEPARTMENT OF NATURAL RESOURCES
 DIVISION OF FISH & WILDLIFE
 GREENWAYS BOARDWALK
 AQUATIC RESOURCE EDUCATION CENTER
 WOODLAND BEACH WILDLIFE AREA

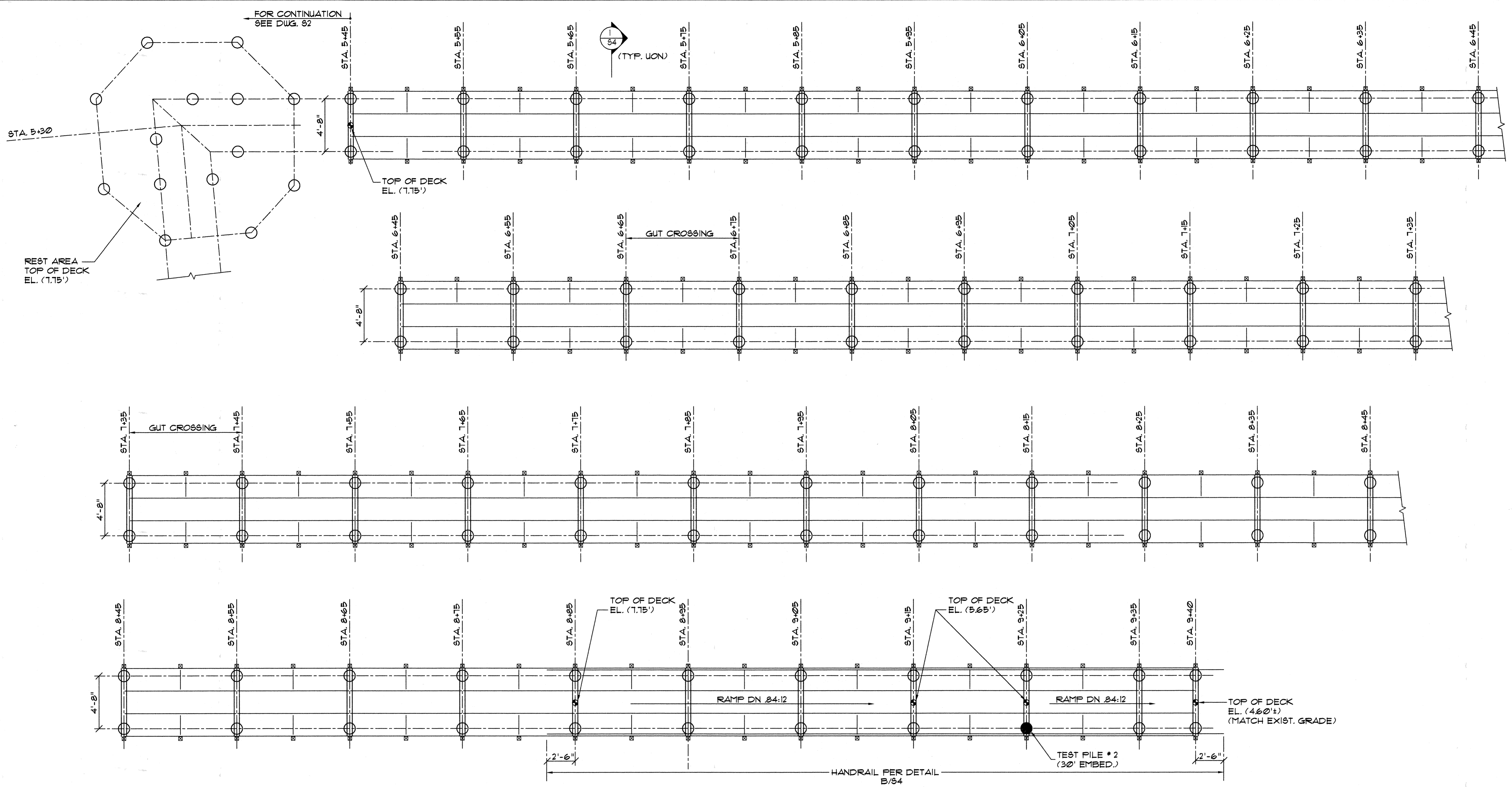
GREDELL & ASSOCIATES
 STRUCTURAL ENGINEERS

702 N. WEST STREET - WILMINGTON, DELAWARE 19801 - 302-429-7400
 8 THE GREEN - DOVER, DELAWARE 19901 - 302-734-7400

APPROVED BY

DESIGNED BY: API	DATE: 5/24/95
DRAWN BY: BUD	SCALE: AS NOTED
CHECKED BY:	W.O.: 1151
DRAWING NO: 52	SHEET: 2 OF 5

NO.	REVISION	DATE BY



STA. 5+30

FOR CONTINUATION
SEE DWG. S2

REST AREA
TOP OF DECK
EL. (1.75')

TOP OF DECK
EL. (1.75')

(TYP. UON)

GUT CROSSING

GUT CROSSING

TOP OF DECK
EL. (1.75')

TOP OF DECK
EL. (5.65')

RAMP DN 84:12

RAMP DN 84:12

TOP OF DECK
EL. (4.60'±)
(MATCH EXIST. GRADE)

TEST FILE # 2
(30' EMBED.)

HANDRAIL PER DETAIL
B/64



PI BOARDWALK FRAMING PLANS
(SOUTH SECTION)
1/2"=1'-0"

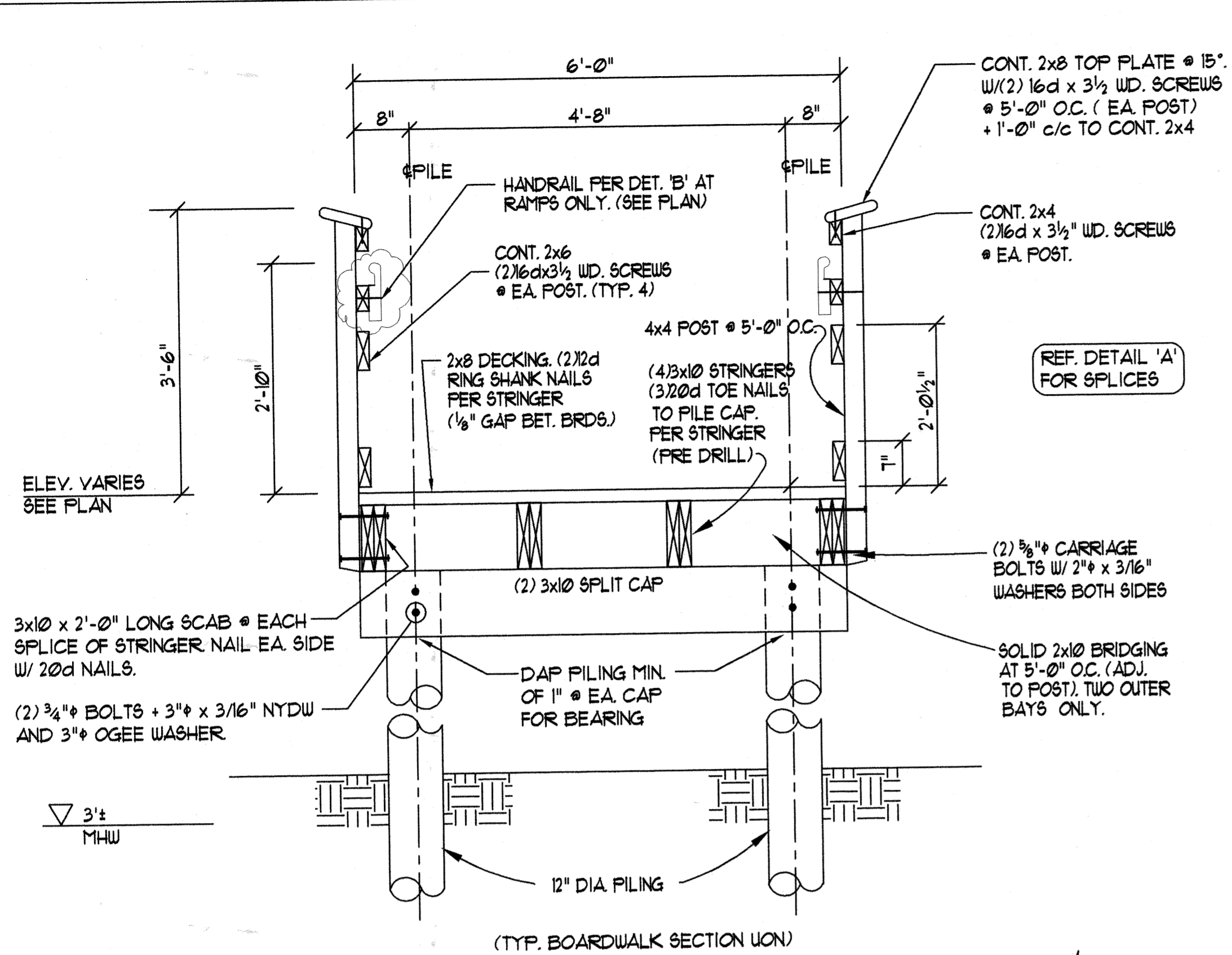
STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH & WILDLIFE
GREENWAYS BOARDWALK
AQUATIC RESOURCE EDUCATION CENTER
WOODLAND BEACH WILDLIFE AREA

NO.	REVISION	DATE BY

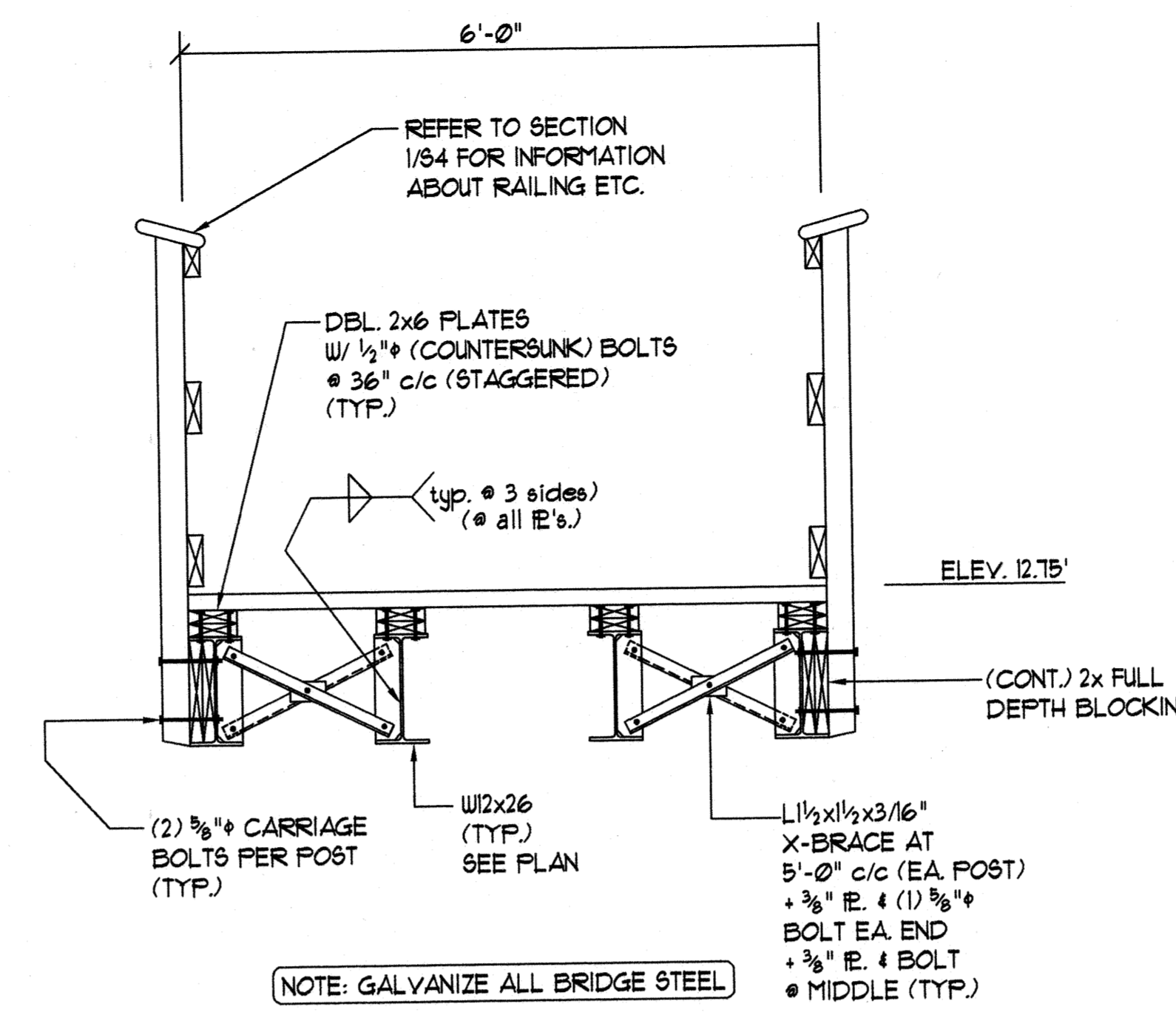
GREDELL & ASSOCIATES
STRUCTURAL ENGINEERS
702 N. WEST STREET • WILMINGTON, DELAWARE 19801 • 302-428-7400
8 THE GREEN • DOVER, DELAWARE 19901 • 302-734-7400

APPROVED BY: *[Signature]*

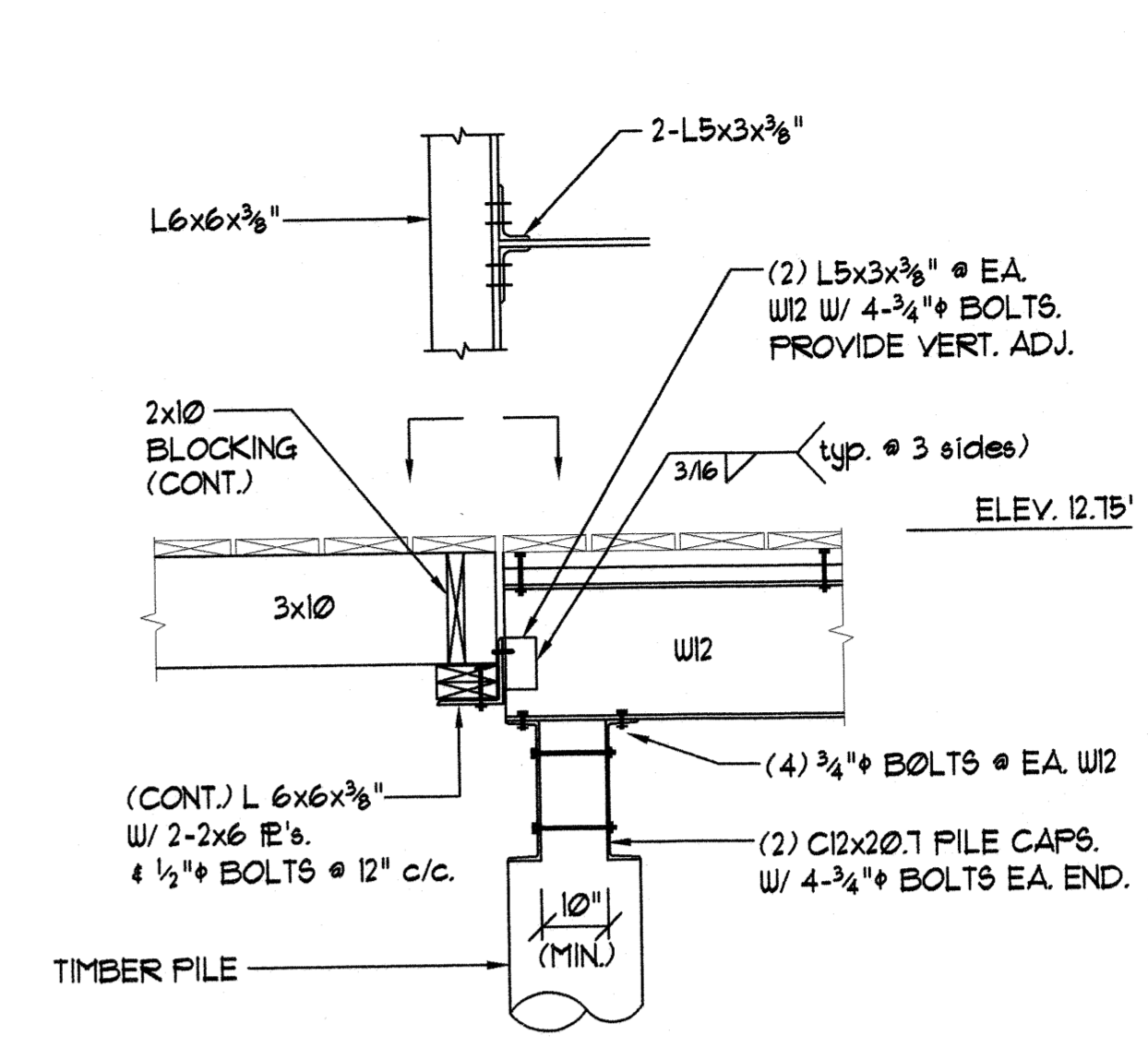
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DRAWN BY: BWD	SCALE: AS NOTED
CHECKED BY:	W.O.: 1151
DRAWING NO.: 63	SHEET: 3 OF 5



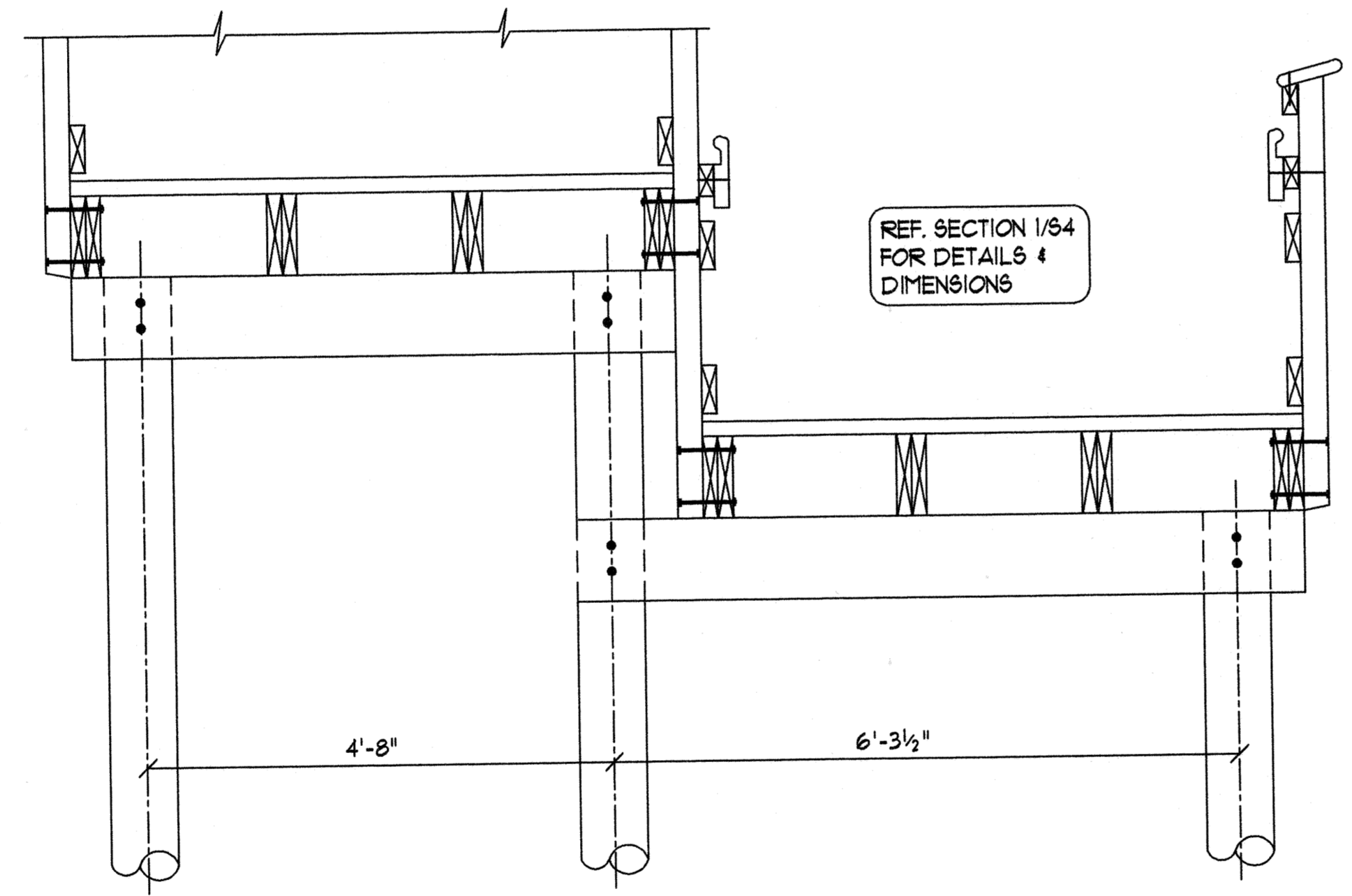
1 SECTION (BRIDGE)
 3/4" = 1'-0"



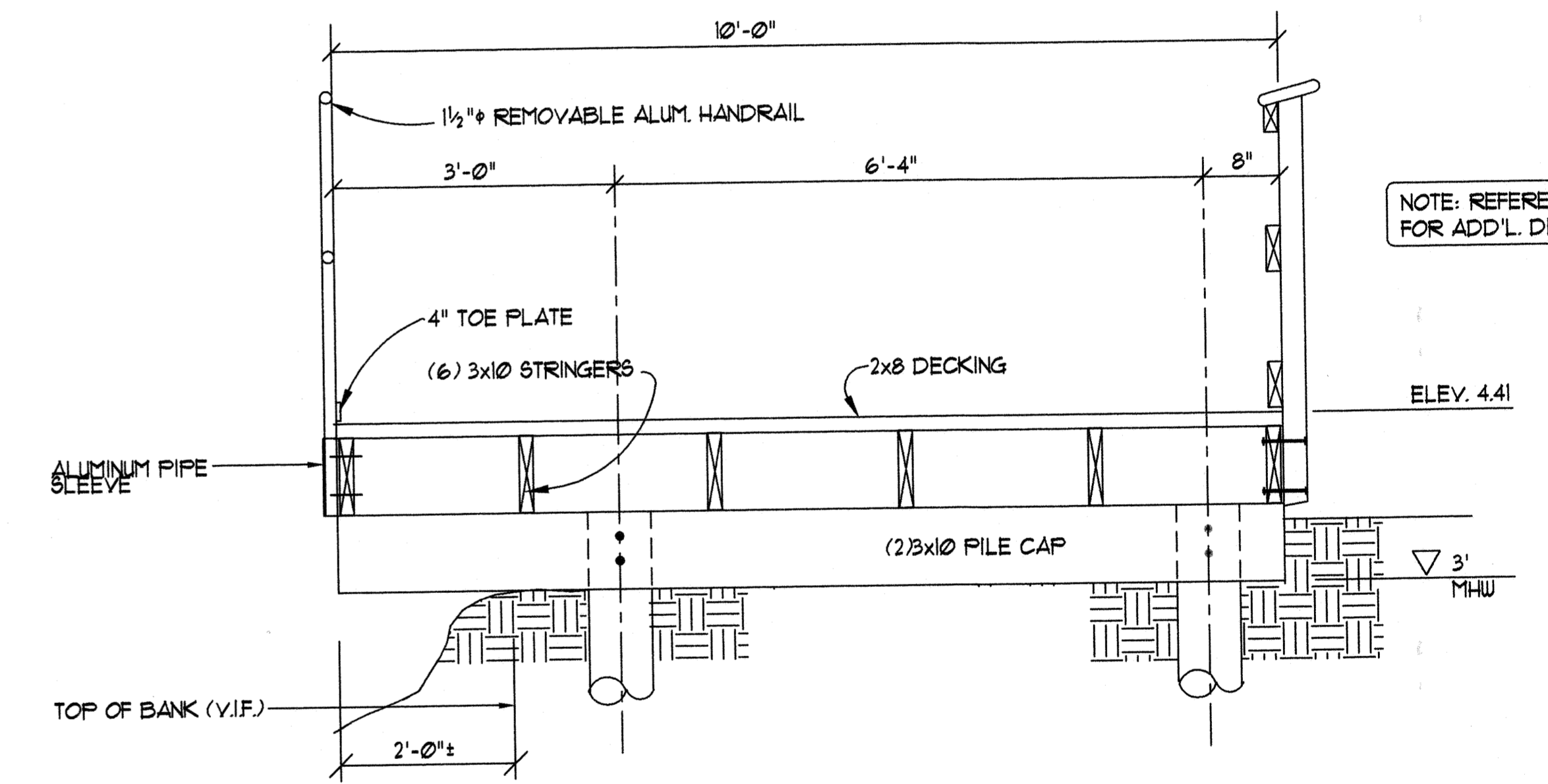
2 SECTION (BRIDGE)
 3/4" = 1'-0"



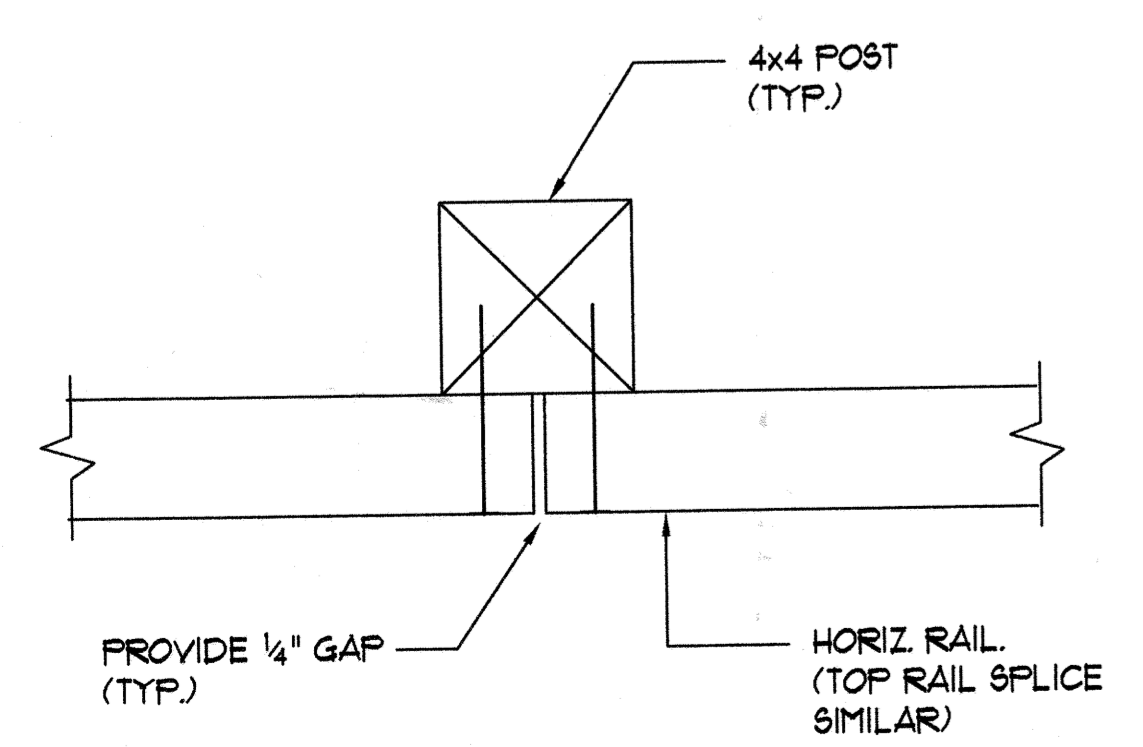
3 SECTION (BRIDGE)
 1 1/2" = 1'-0"



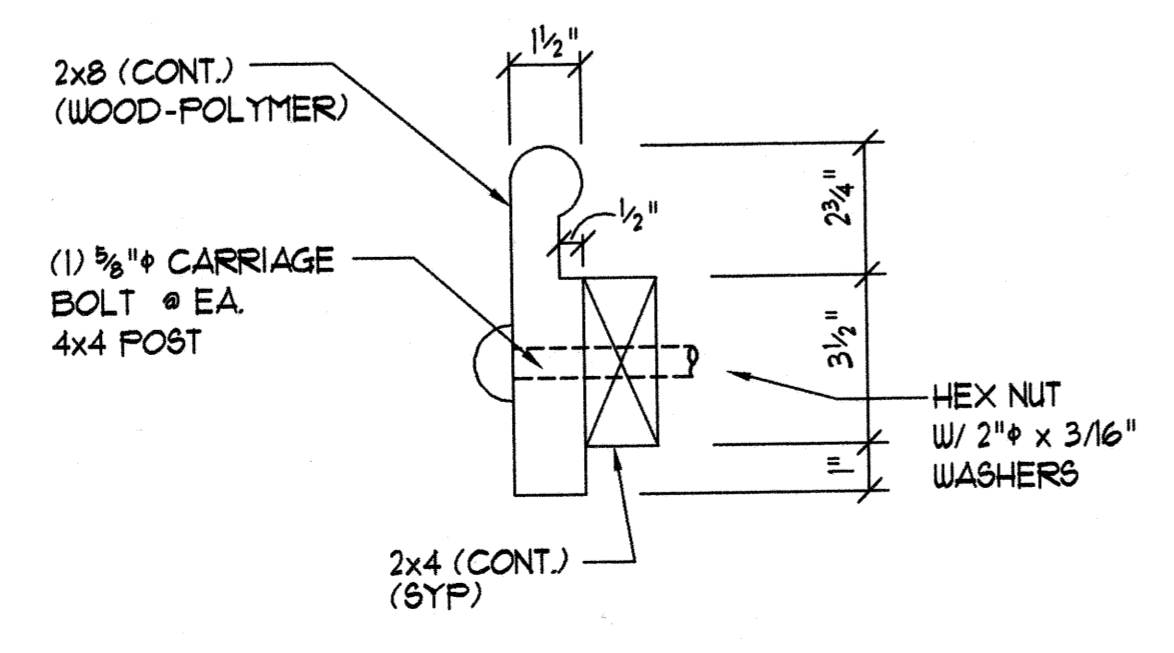
4 SECTION (BRIDGE)
 3/4" = 1'-0"



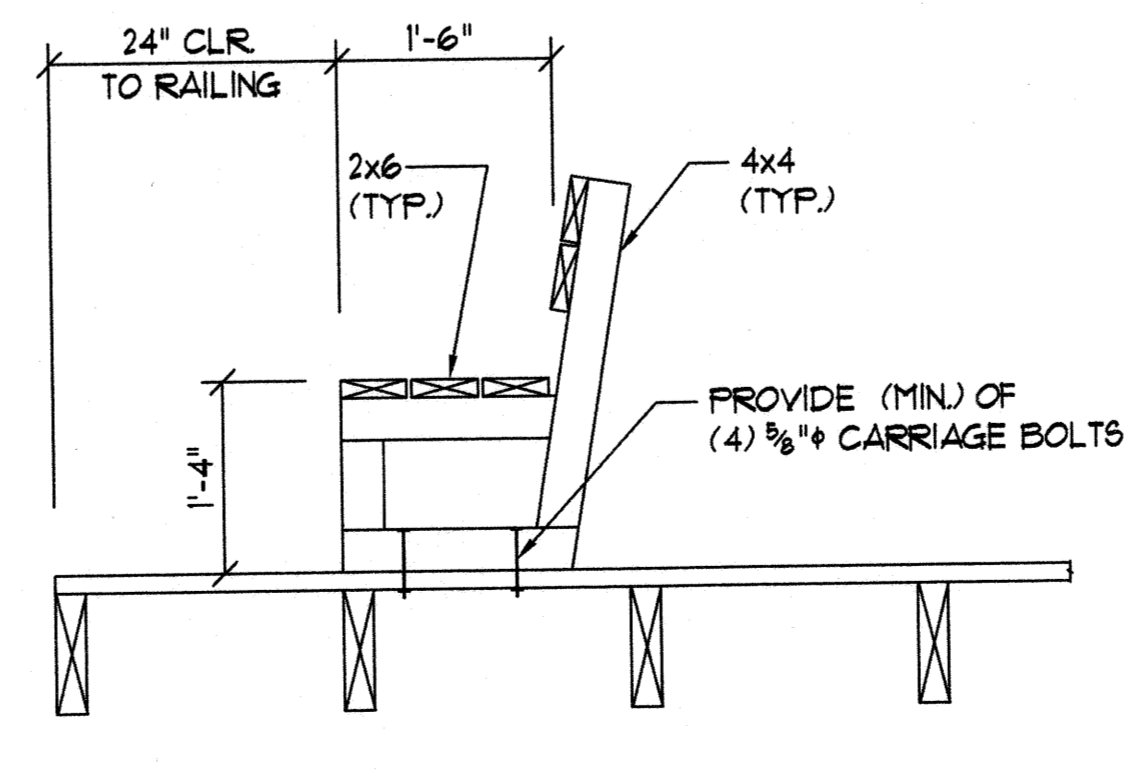
5 SECTION (MONITORING PLATFORM)
 3/4" = 1'-0"



A DETAIL (SPLICE)
 3" = 1'-0"



B DETAIL (HANDRAIL)
 3" = 1'-0"



C DETAIL (BENCH)
 3/4" = 1'-0"

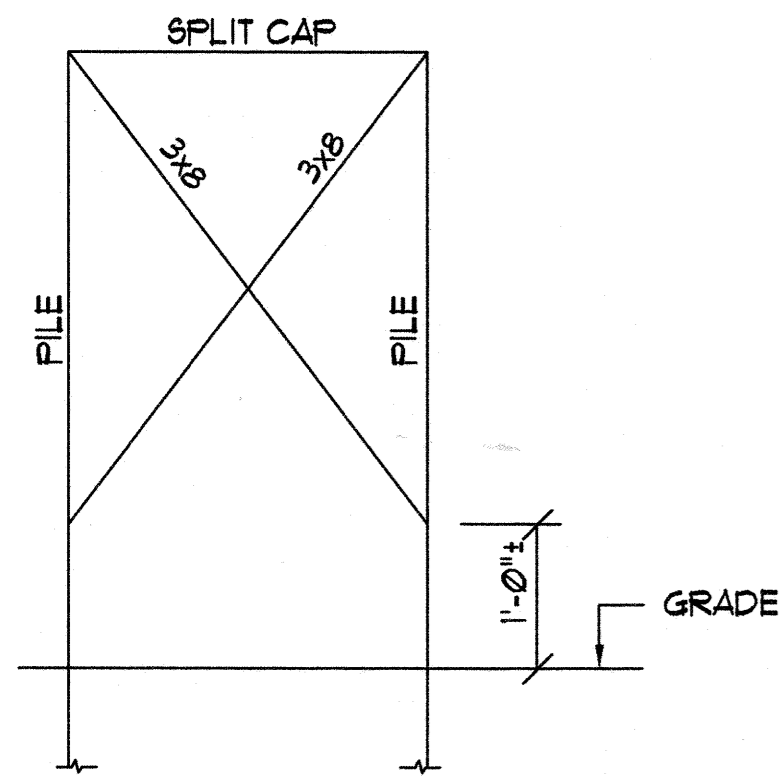
STATE OF DELAWARE
 DEPARTMENT OF NATURAL RESOURCES
 DIVISION OF FISH & WILDLIFE
GREENWAYS BOARDWALK
 AQUATIC RESOURCE EDUCATION CENTER
 WOODLAND BEACH WILDLIFE AREA

GREDELL & ASSOCIATES
 STRUCTURAL ENGINEERS
 702 N. WEST STREET - WILMINGTON, DELAWARE 19801 - 302-428-7400
 8 THE GREEN - DOVER, DELAWARE 19901 - 302-734-7400

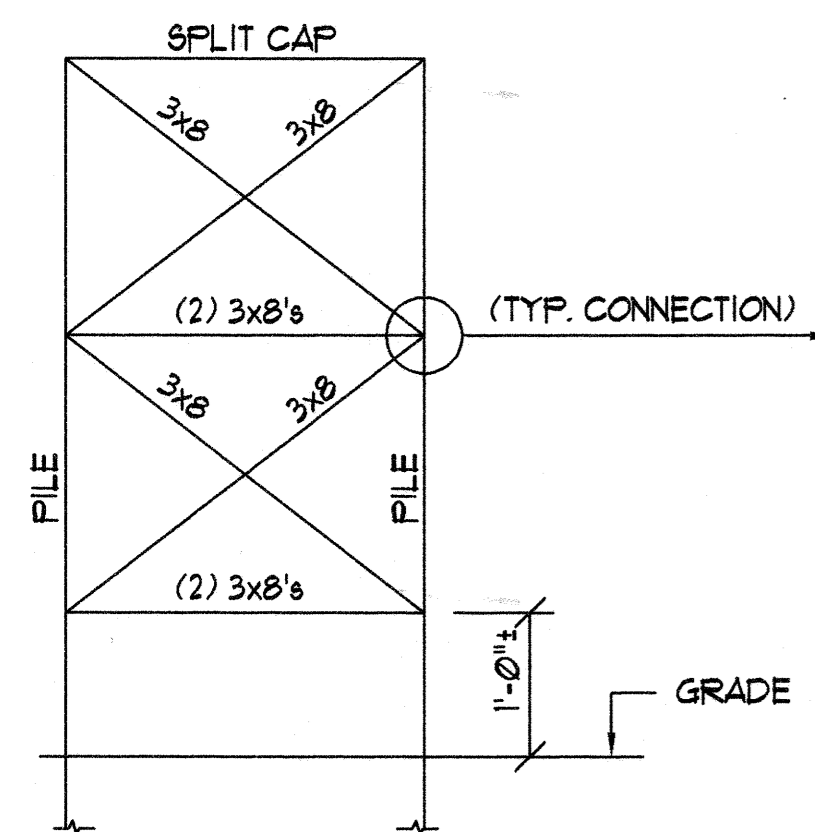
NO.	REVISION	DATE BY			

APPROVED BY: _____

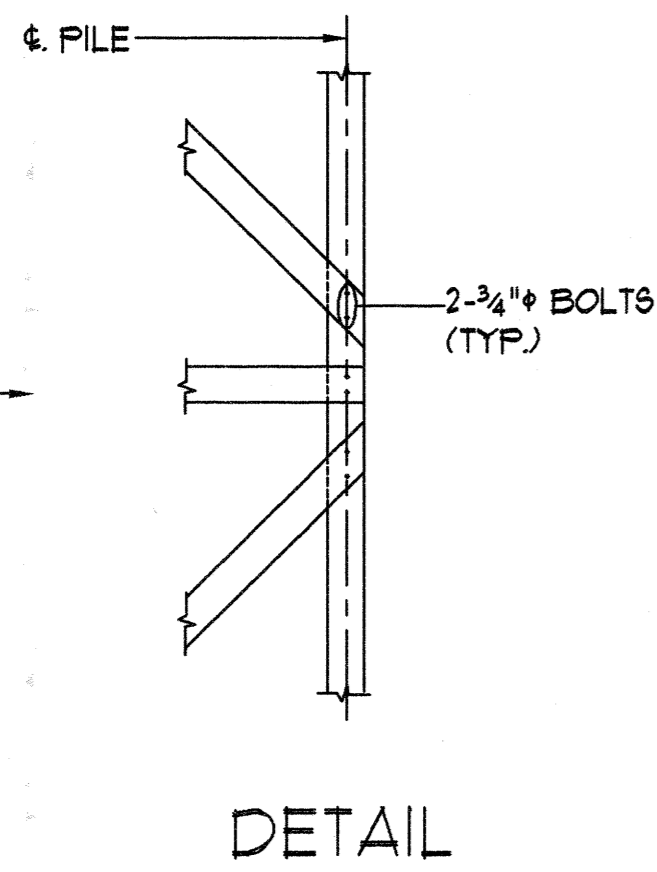
DESIGNED BY: API	DATE: 5/24/95
DRAWN BY: BWD	SCALE: AS NOTED
CHECKED BY:	W.O.: 1151
DRAWING NO.: S4	SHEET: 4 OF 5



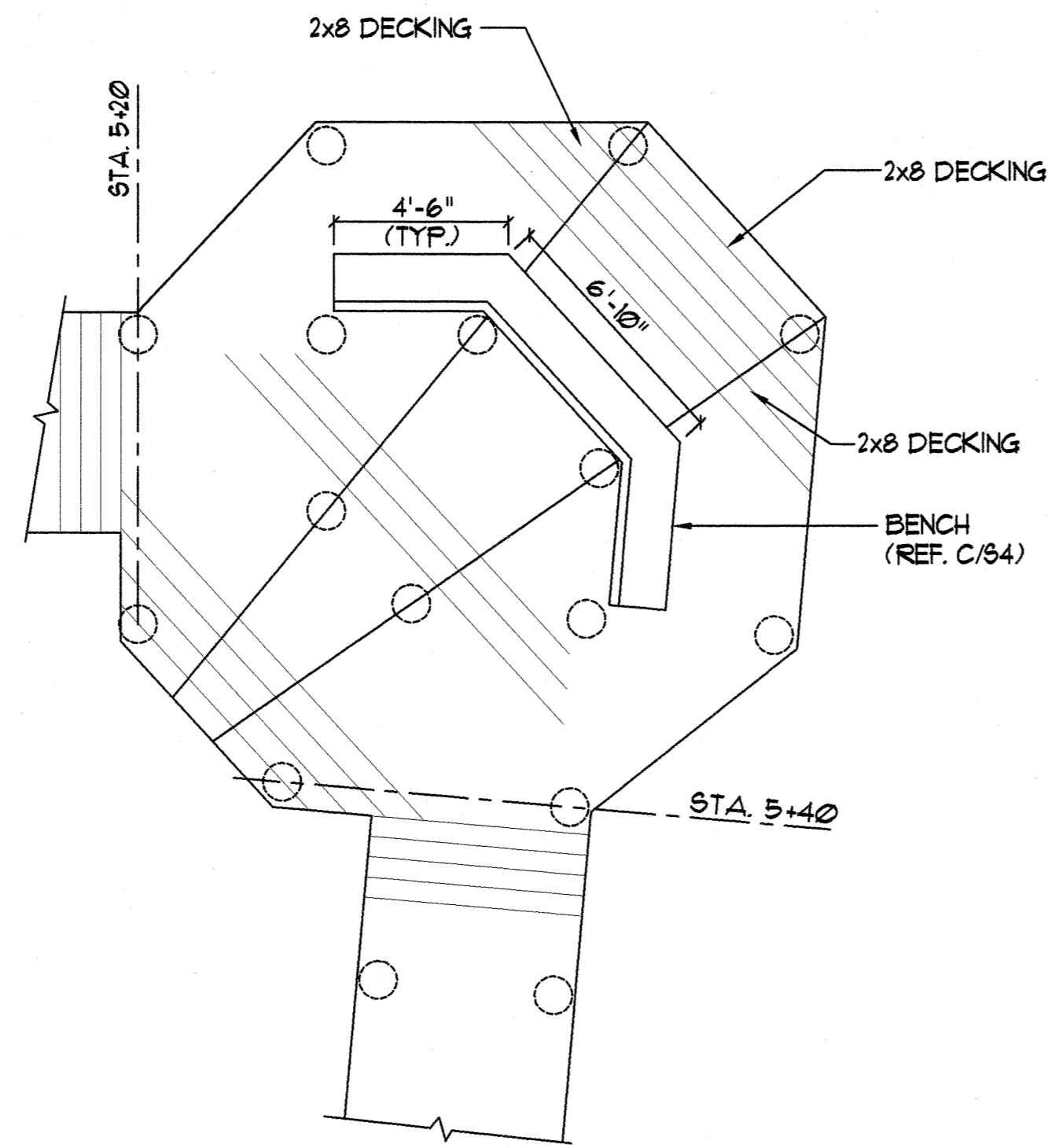
X-BRACE TYPE 1



X-BRACE TYPE 2

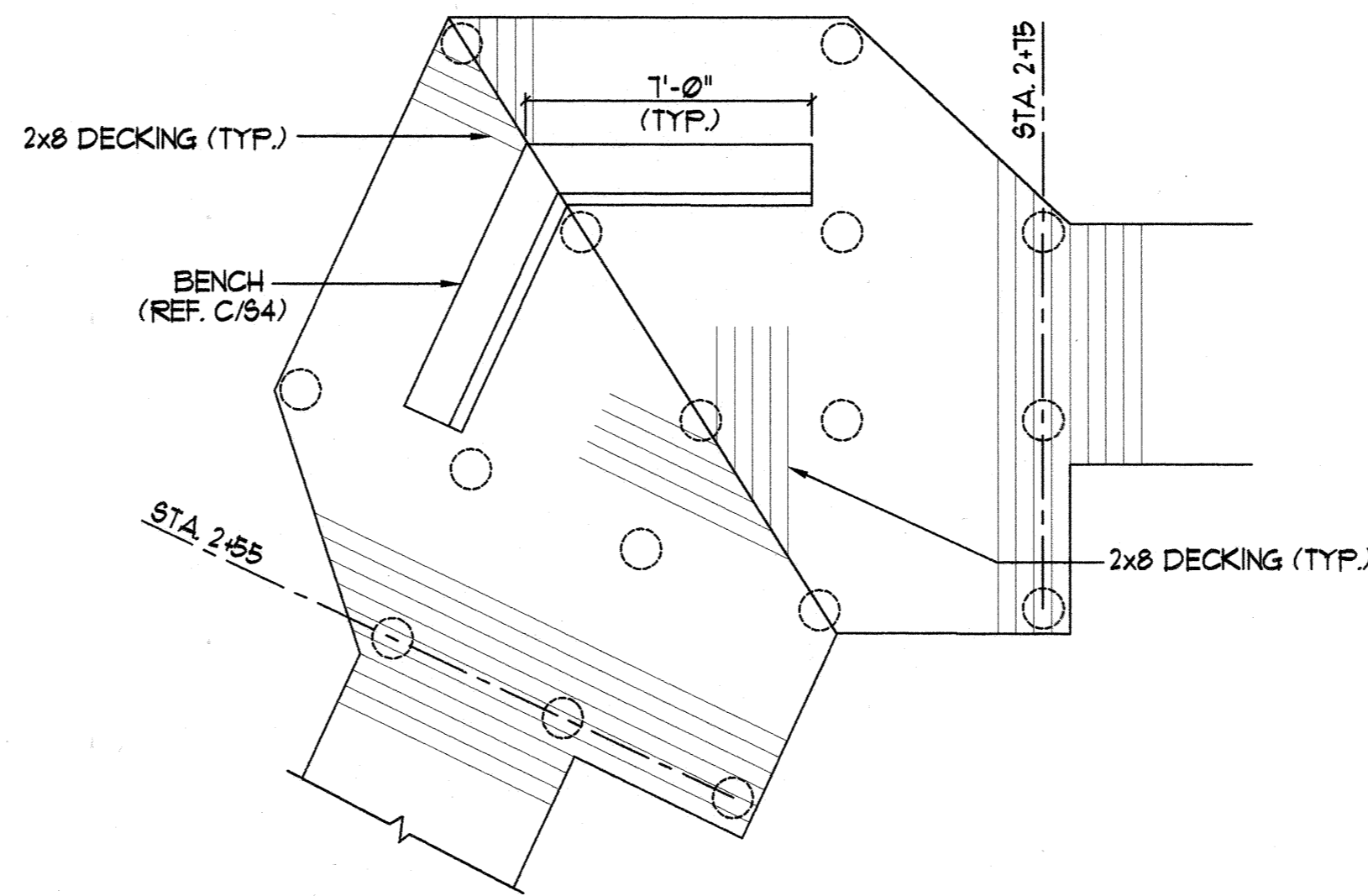


DETAIL



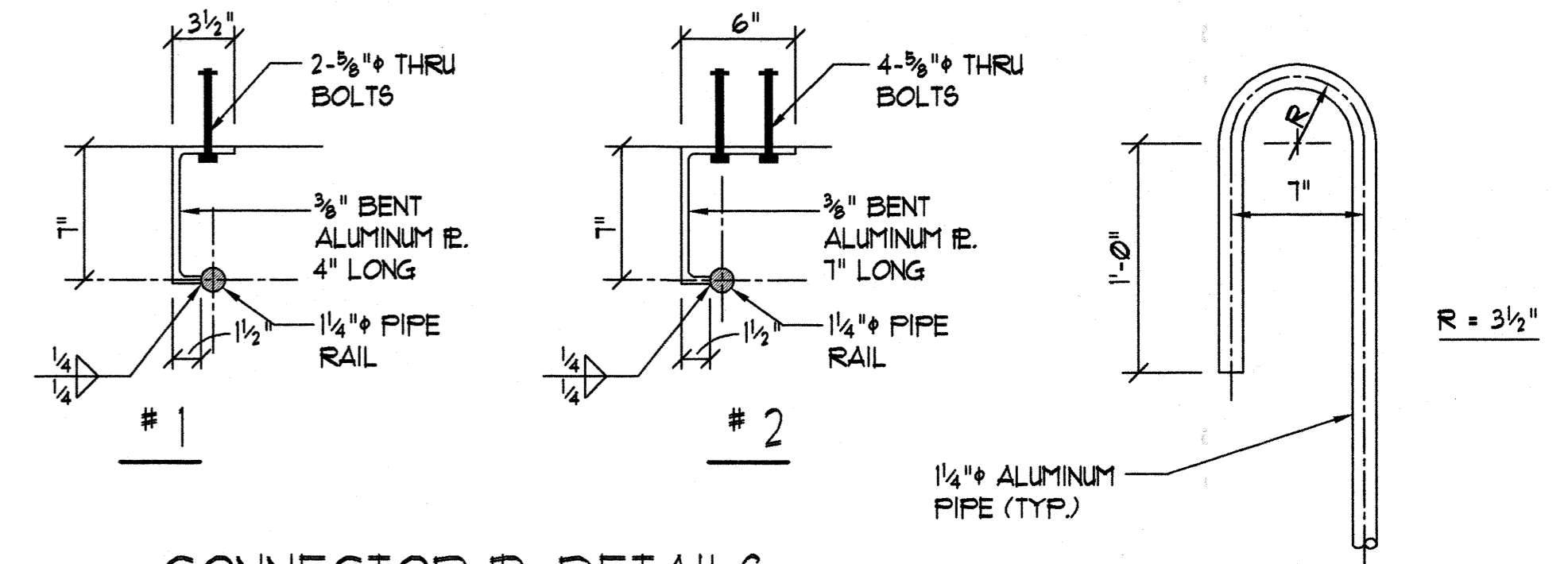
(FOR RAILING & POSTS REFER TO DWG 52)

REST AREA EL. 7.75'
1/4"=1'-0"



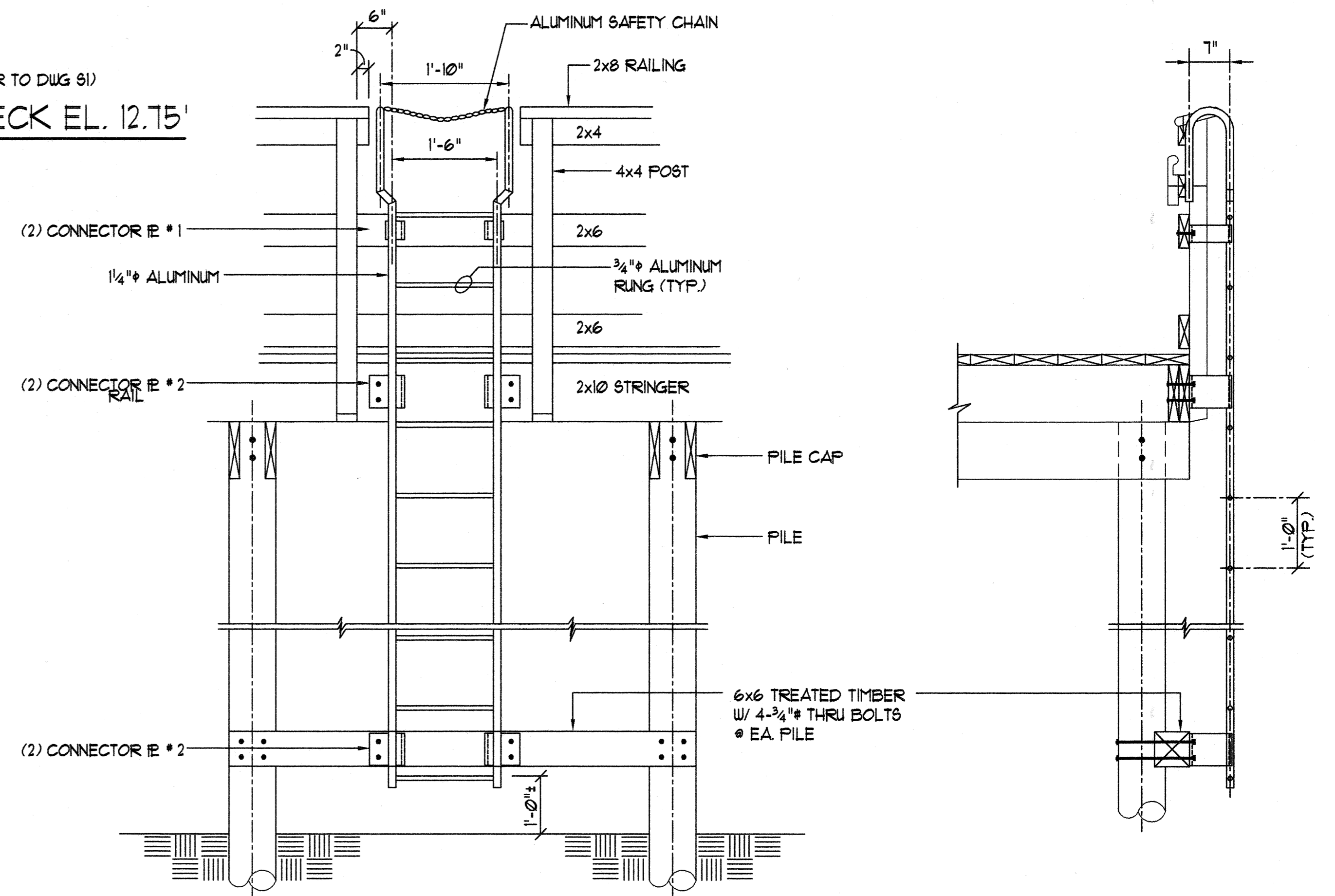
(FOR RAILING & POSTS REFER TO DWG 51)

OBSERVATION DECK EL. 12.75'
1/4"=1'-0"



CONNECTOR & BENT RAIL DETAILS
1/2"=1'-0"

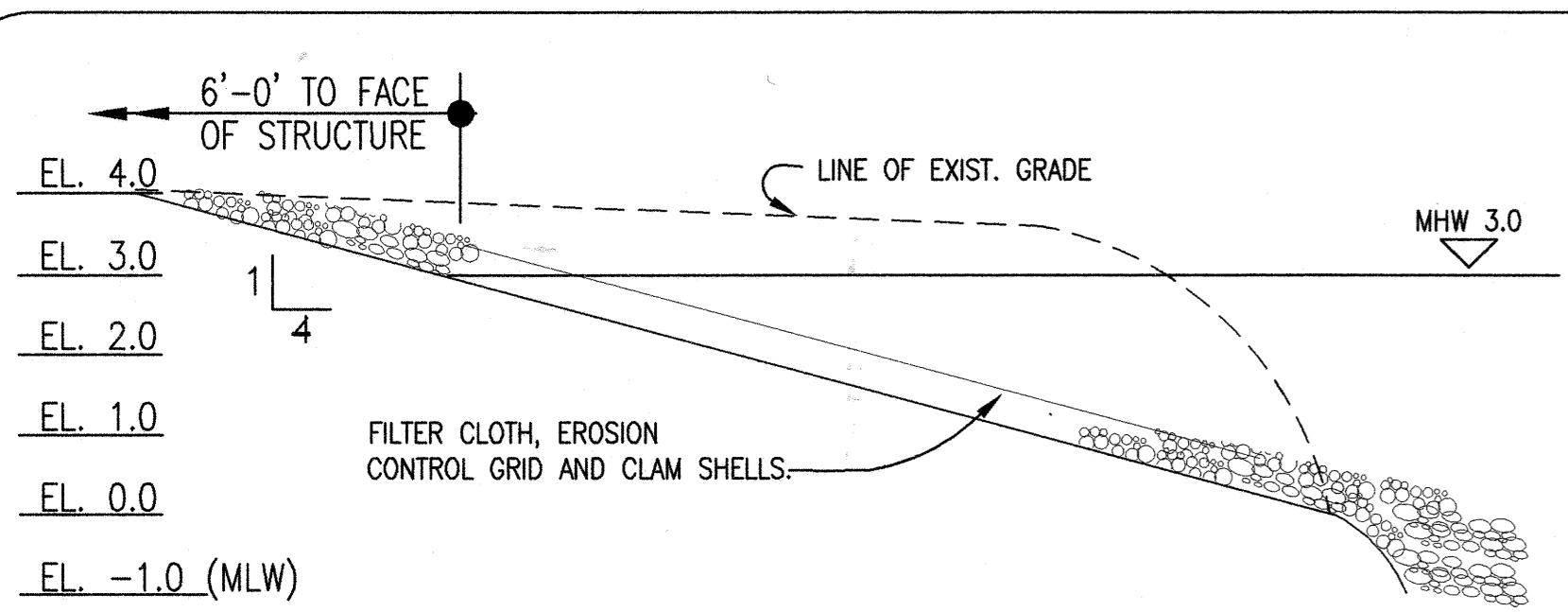
BENT RAIL DETAIL
1/2"=1'-0"



ALL RUNGS TO HAVE NON-SLIP GRIP SURFACE

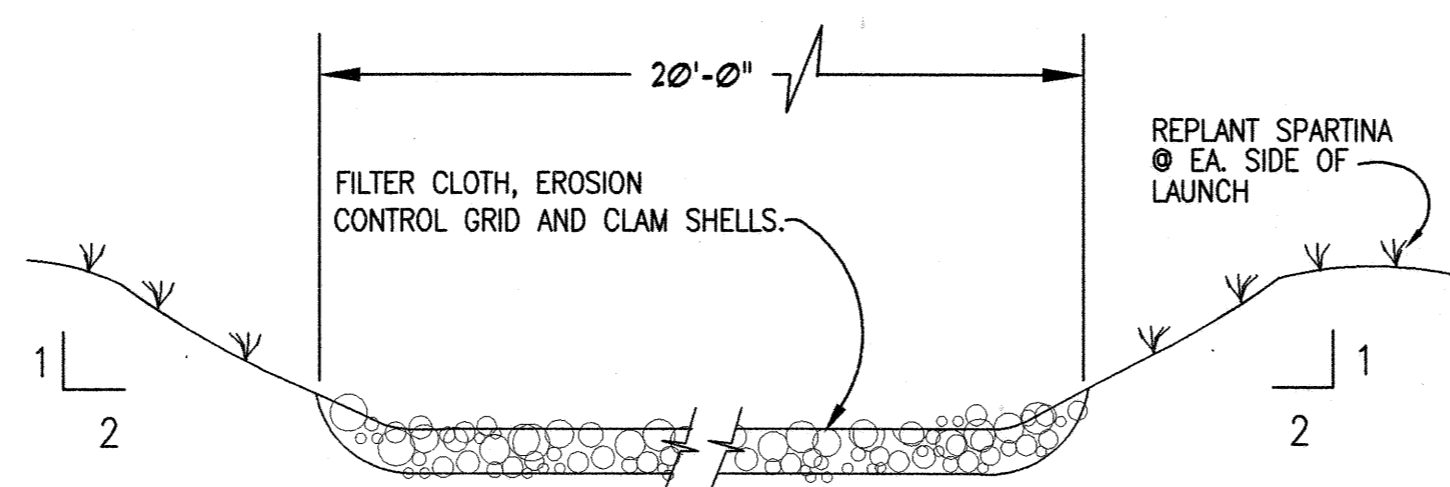
LADDER DETAIL
3/4"=1'-0"

CANOE LAUNCH



LONGITUDINAL SECTION
NO SCALE

NOTE: PROVIDE 6'-0" WIDE WALK FROM EXIST. BERM TO CANOE LAUNCH OF SAME CONSTRUCTION (SEE SITE PLAN)



TRANSVERSE SECTION
NO SCALE

STATE OF DELAWARE DEPARTMENT OF NATURAL RESOURCES DIVISION OF FISH & WILDLIFE GREENWAYS BOARDWALK AQUATIC RESOURCE EDUCATION CENTER WOODLAND BEACH WILDLIFE AREA		
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DESIGNED BY: API	DATE: 5/24/95	
DRAWN BY: BWD	SCALE: AS NOTED	
CHECKED BY:	W.O.: 1151	
DRAWING NO.: S5	SHEET: 5 OF 5	