

# RAW WATER CANAL IMPROVEMENTS

PREPARED FOR

## BEAUFORT-JASPER WATER & SEWER AUTHORITY

6 SNAKE ROAD  
OKATIE, SC 29909



**PROJECT DATA:**

- OWNER/DEVELOPER:  
BEAUFORT-JASPER WATER & SEWER AUTHORITY  
6 SNAKE ROAD  
OKATIE, SC 29909  
PHONE: 843-987-8062
- 24 HOUR CONTACT:  
NAME: BRIAN CHEMSAK  
PHONE: 843-987-8062

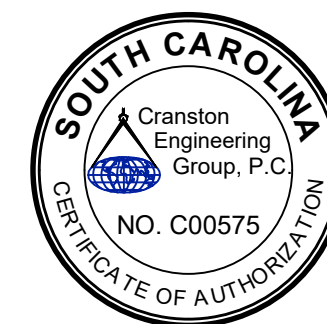
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PREPARED BY

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5/14/2020

**BID SET**



**LEGEND**

	MAJOR CONTOUR (EXISTING)		PROPOSED REDUCER
	MINOR CONTOUR (EXISTING)		EXISTING POST INDICATOR
	MAJOR CONTOUR (PROPOSED)		PROPOSED POST INDICATOR
	MINOR CONTOUR (PROPOSED)		EXISTING SANITARY TAP
	EXISTING BOUNDARY		EXISTING SANITARY CLEAN OUT
	EXISTING ADJOINER		EXISTING WATER VALVE
	PERMANENT EASEMENT		PROPOSED WATER GATE VALVE
	TEMPORARY EASEMENT		PROPOSED SANITARY GATE VALVE
	25' BUFFER		PROPOSED SANITARY VALVE
	ENVIRONMENTALLY SENSITIVE AREA		EXISTING GAS METER
	EDGE OF WATER		PROPOSED GAS METER
	TREE LINE		EXISTING GAS VALVE
	EXISTING OVERHEAD UTILITY (UNSPECIFIED)		PROPOSED GAS VALVE
	EXISTING UNDERGROUND POWER		BORING
	PROPOSED UNDERGROUND POWER		BENCHMARK
	EXISTING OVERHEAD POWER		AIR CONDITIONER
	PROPOSED OVERHEAD POWER		BACKFLOW PREVENTER
	EXISTING UNDERGROUND TELEPHONE		BOLLARD
	PROPOSED UNDERGROUND TELEPHONE		CONCRETE DUMPSTER PAD
	EXISTING OVERHEAD TELEPHONE		CLEAN OUT
	PROPOSED OVERHEAD TELEPHONE		CONCRETE PAD
	EXISTING UNDERGROUND CABLE		CORRUGATED METAL PIPE
	PROPOSED UNDERGROUND CABLE		CORRUGATED PLASTIC PIPE
	EXISTING FIBEROPTIC		CHILLED WATER
	PROPOSED FIBEROPTIC		DROP INLET
	EXISTING GAS		DUCTILE IRON PIPE
	PROPOSED GAS		DOUBLE WING DRAP
	EXISTING WATER		ELECTRICAL BOX
	PROPOSED WATER		ELECTRICAL FEED
	EXISTING SANITARY SEWER		ELECTRICAL OUTLET
	PROPOSED SANITARY SEWER		FOUNTAIN
	FENCE: EXISTING		FIBEROPTIC BOX
	FENCE: PROPOSED		FIBEROPTIC MONUMENT
	FENCE: EXISTING CHAINLINK		FIBEROPTIC PULLBOX
	FENCE: PROPOSED CHAINLINK		FIRE HYDRANT
	FENCE: EXISTING STONE		FLAG POLE
	FENCE: PROPOSED STONE		GAS METER
	FENCE: EXISTING WIRE		GUY POLE
	FENCE: PROPOSED WIRE		GUY WIRE
	EXISTING GUARDRAIL		GRATE TRAP
	PROPOSED GUARDRAIL		GAS VALVE
	ORANGE BARRIER FENCE OR C-POP SILT FENCE		GAS VENT PIPE
	SILT FENCE		HOOD BACK TRAP
	EXISTING BUILDING		IRRIGATION CONTROL VALVE
	PROPOSED BUILDING		INVERT ELEVATION
	EXISTING CONCRETE/PAVING		LIGHT POLE
	PROPOSED CONCRETE AND/OR PAVING		MAIL BOX
	EXISTING ASPHALT PAVING		MONITORING WELL
	PROPOSED ASPHALT PAVING		OPEN TOP FOUND
	EXISTING GRAVEL PAVING OR RIP-RAP		POWER METER
	PROPOSED GRAVEL PAVING OR RIP-RAP		POWER OUTLET
	EXISTING BRICK PAVING		POWER POLE
	PROPOSED BRICK PAVING		POLYVINYLCHLORIDE PIPE
	EXISTING UTILITY POLE		REINFORCED CONCRETE PIPE
	PROPOSED UTILITY POLE		REDUCED PRESSURE ZONE BACKFLOW PREVENTER
	EXISTING STRAIN POLE		SANITARY SEWER
	PROPOSED STRAIN POLE		STORM DRAIN
	EXISTING GUY WIRE		SPRINKLER HEAD
	PROPOSED GUY WIRE		STORM BOX
	EXISTING ELECTRIC LIGHT		SINGLE WING TRAP
	EXISTING LIGHT POLE		TRUNCATED DOME
	PROPOSED LIGHT POLE		TELEPHONE PEDESTAL
	EXISTING MANHOLE		TELEPHONE PULLBOX
	PROPOSED MANHOLE		TRAFFIC SIGNAL BOX
	EXISTING FIRE HYDRANT		TRAFFIC SIGNAL CABINET
	PROPOSED FIRE HYDRANT		TRAFFIC SIGNAL POLE
	EXISTING IRRIGATION VALVE		WATER METER
	PROPOSED IRRIGATION VALVE		WATER VALVE
	EXISTING WATER METER		WATER VALVE BOX
	PROPOSED WATER METER		WATER VAULT

**GENERAL CONSTRUCTION NOTES**

- COORDINATE ROAD CLOSINGS AND DETOURS WITH BEAUFORT COUNTY AND JASPER COUNTY SCDOT OFFICES.
- CERTIFIED FLAGGERS AND/OR ARROW BOARDS WILL BE REQUIRED TO MAINTAIN TRAFFIC CONTROL WHILE WORKING WITHIN THE LIMITS OF PUBLIC OR PRIVATE ROADWAYS.
- DATE OF SURVEY - AUGUST 2019 BY CRANSTON ENGINEERING GROUP, P.C.
- THE DATA, TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS, OR INDICATED IN ANY WAY THEREBY, WHETHER BY DRAWINGS OR NOTES OR ANY OTHER MANNER, THE SAME ARE SHOWN AS INFORMATION ONLY AND ARE NOT GUARANTEED.
- THE CONTRACTOR WILL IMMEDIATELY NOTIFY THE OWNER IN THE EVENT THAT PREVIOUSLY UNKNOWN HISTORICAL OR ARCHEOLOGICAL SITES ARE DISCOVERED DURING CONSTRUCTION. NO ADDITIONAL WORK IN SUCH AREAS WILL BE ALLOWED UNTIL AUTHORIZED.
- ALL STRUCTURES, TREES, AND SHRUBS WHICH ARE WITHIN THE DESIGNATED CONSTRUCTION EASEMENT, BUT OUTSIDE THE LIMITS OF CONSTRUCTION SHALL NOT BE DISTURBED UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER.
- CONTRACTOR IS TO CLEAN ALL STORM WATER INLETS AND PIPE AT THE COMPLETION OF CONSTRUCTION TO REMOVE ANY SILT AND DEBRIS. THE CLEANING OF DROP INLETS, CULVERTS, AND PIPES (EXISTING AND PROPOSED) SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT. NO ADDITIONAL PAYMENT WILL BE MADE THEREFOR.
- UNSATURABLE AND SURPLUS EXCAVATION MATERIAL NOT REQUIRED FOR FILL SHALL BE DISPOSED OF OFFSITE UNLESS ONSITE WASTE OR SPOIL AREAS ARE PROVIDED.
- EXACT LOCATIONS OF PROPOSED WATER AND SEWER MAINS SHALL BE DETERMINED DURING CONSTRUCTION. FINAL PLACEMENT SHALL BE COORDINATED BY THE CONTRACTOR AND LOCATED IN SUCH A MANNER AS TO NOT CONFLICT WITH THE OTHER UTILITIES WITHIN THE RIGHT-OF-WAY OR EASEMENTS.
- THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE EXACT LOCATION, SIZE AND MATERIAL OF ANY EXISTING WATER OR SEWER FACILITIES PROPOSED FOR CONNECTION OR USE BY THIS PROJECT. THE CONTRACTOR SHALL VERIFY ALL INVERT ELEVATIONS (I.E.) OF EXISTING PIPES BEFORE BEGINNING CONSTRUCTION.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY AND DETERMINE ALL PERTINENT GRADES PRIOR TO INSTALLATION.
- A PRE-CONSTRUCTION CONFERENCE SHALL BE HELD WITH THE BEAUFORT-JASPER WATER & SEWER AUTHORITY PRIOR TO BEGINNING CONSTRUCTION. THIS MEETING SHALL BE SCHEDULED AT THE TIME THE NOTIFICATION OF WORK COMMENCEMENT IS GIVEN.
- ALL DRAINAGE EASEMENTS AND DISTURBED AREAS MUST BE GRASSED AND/OR RIP-RAPPED AS REQUIRED TO CONTROL EROSION.
- THE CONTRACTOR WILL BE REQUIRED TO HAVE ON SITE A COPY OF SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION'S STANDARD SPECIFICATIONS AND CONSTRUCTION STANDARD DETAILS, CURRENT EDITION.
- ANY ENCROACHMENT INTO THE RIGHT-OF-WAY WHICH POSES A RESTRICTION TO TRAFFIC FLOW OR ENDANGERS THE MOTORING PUBLIC SHALL REQUIRE A TRAFFIC CONTROL PLAN PRIOR TO APPROVAL OF PLAN.
- ALL UNDERGROUND UTILITIES SHALL BE FIELD LOCATED AND MARKED BEFORE BEGINNING CONSTRUCTION.
- NO EXTRA PAYMENT WILL BE MADE FOR REPAIRS TO DAMAGE OF EXISTING UTILITIES.
- CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES, ABOVE GROUND OR UNDERGROUND, POWER POLES, ETC.; CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES WITH APPROPRIATE UTILITIES PRIOR TO OR DURING CONSTRUCTION.
- NOTIFY BEAUFORT-JASPER WATER & SEWER AUTHORITY BEFORE DIGGING NEAR WATER AND SANITARY SEWER LINES.
- THE CONTRACTOR SHALL CONTACT THE UTILITIES PROTECTION INC. "CALL BEFORE YOU DIG" SERVICE, 811 IN ORDER TO LOCATE UTILITIES PRIOR TO STARTING ANY EXCAVATION OR CONSTRUCTION.
- ALL KNOWN UTILITY FACILITIES ARE SHOWN SCHEMATICALLY IN PLANS, AND ARE NOT NECESSARILY ACCURATE IN LOCATION AS TO PLAN OR ELEVATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD LOCATE ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION.
- THE CONTRACTOR WILL NOT BE PAID FOR DELAYS OR EXTRA EXPENSE CAUSED BY UTILITY FACILITIES, OBSTRUCTIONS, OR ANY OTHER ITEMS NOT REMOVED OR RELOCATED TO CLEAR CONSTRUCTION IN ADVANCE OF HIS WORK.
- CONTRACTOR TO VERIFY IE AND LOCATION OF ALL EXISTING UNDERGROUND UTILITIES AND PIPES BEFORE COMMENCING CONSTRUCTION, INCLUDING TEST DIGGING, WELL IN ADVANCE OF PIPE LAYING ACTIVITIES.

**OWNER**

BEAUFORT-JASPER WATER & SEWER AUTHORITY  
 6 SNAKE ROAD  
 OKATIE, SC 29909

**ENGINEER OF RECORD**

MATT RANDALL, P.E.  
 CRANSTON ENGINEERING GROUP P.C.  
 (843) 352-7770

**UTILITIES:**

**ELECTRIC:**  
 PALMETTO ELECTRIC COOPERATIVE, INC.  
 813-726-5551

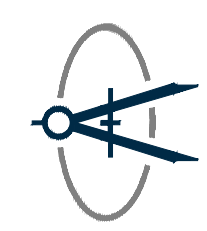
DOMINION ENERGY  
 SERVICE CONTACT: 843-815-8816  
 REPORT OUTAGE: 1-888-333-4465

**GAS**

AMERIGAS  
 1-800-26374427

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**BID SET**

REV #	DATE	DESCRIPTION

**RAW WATER CANAL IMPROVEMENTS**

**LEGEND & GENERAL NOTES**

DRAWN BY:	RJE
CHECKED BY:	---
APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	---
JOB No.	2018-0640
DRAWING No.	G2.0



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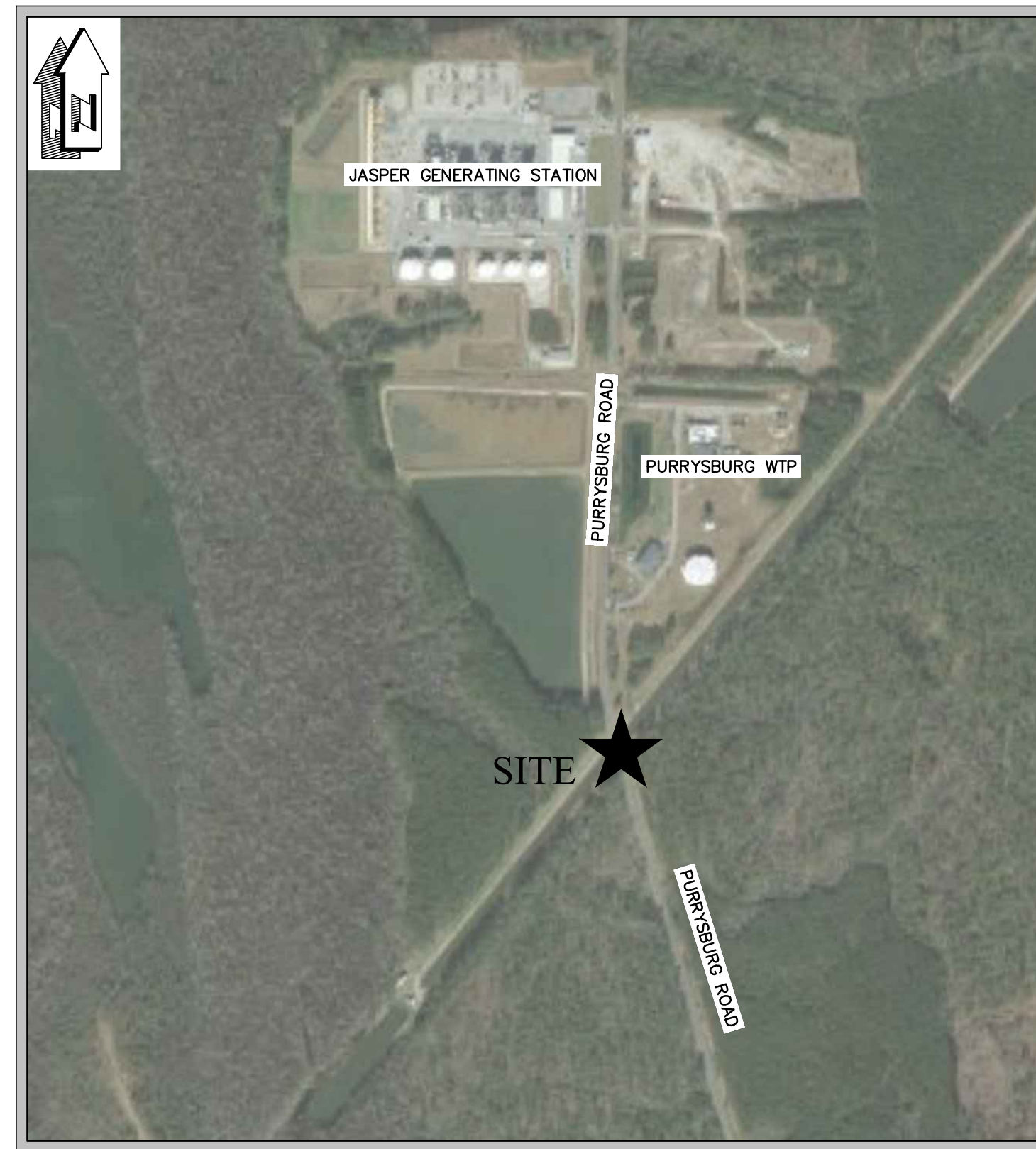


# DIVISION 1 RIVER PUMP STATION & PURRYSBURG ROAD CANAL CROSSING

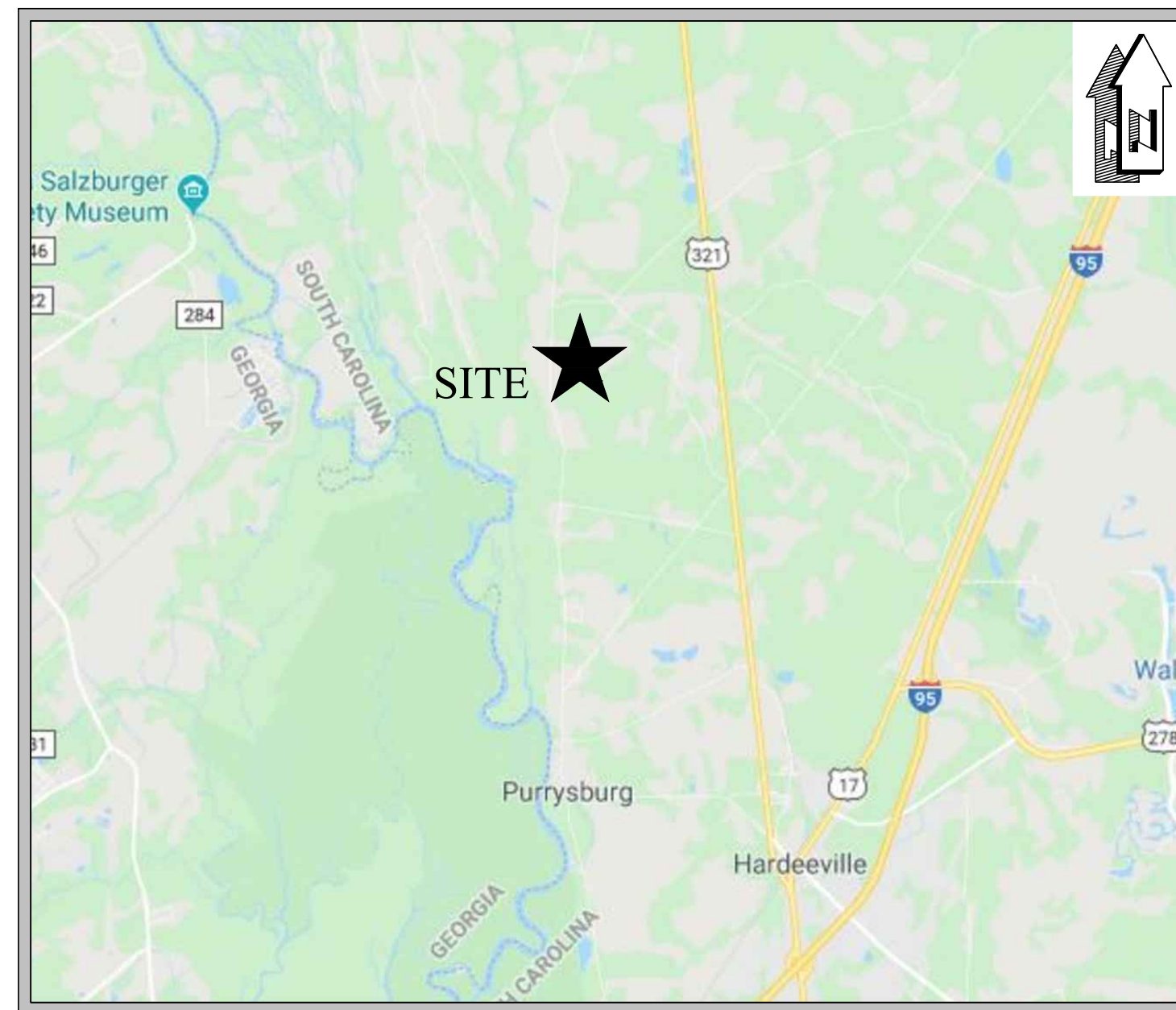
PREPARED FOR

**BEAUFORT-JASPER WATER & SEWER AUTHORITY**

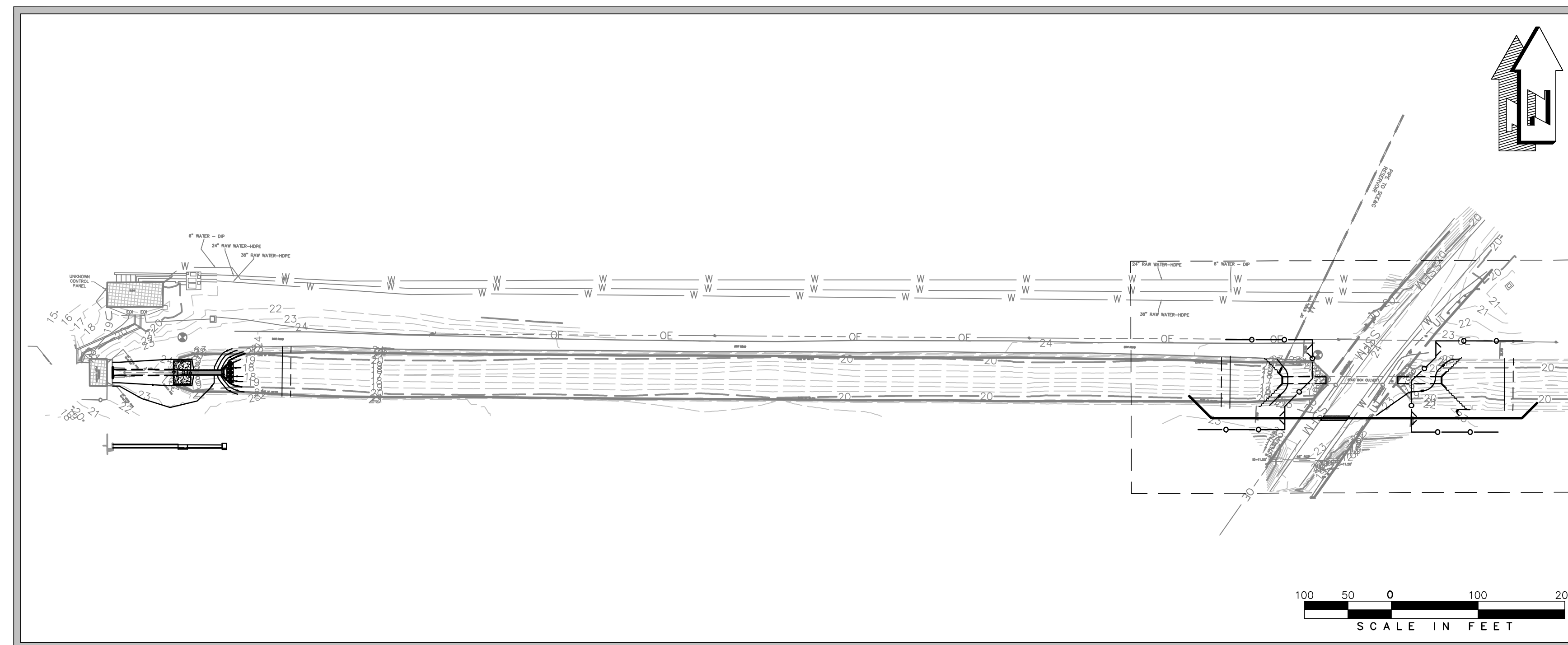
6 SNAKE ROAD  
OKATIE, SC 29909



VICINITY MAP  
N.T.S.



LOCATION MAP  
N.T.S.



5/14/2020

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BEAUFORT-JASPER WATER & SEWER AUTHORITY  
6 SNAKE ROAD  
OKATIE, SC 29909  
PHONE: 843-987-8062
- 24 HOUR CONTACT:  
NAME: BRIAN CHEMSAK  
PHONE: 843-987-8062

Subset Plan Index	
Sheet Number	Sheet Title
C1.0	SUBSET TITLE SHEET
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C3.0	SEDIMENT & EROSION CONTROL PLAN
C3.1	SEDIMENT & EROSION CONTROL PLAN
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C4.1	DEMOLITION PLAN
C5.0	SITE PLAN
C5.1	SITE PLAN
C6.0	CIVIL DETAILS
C6.1	CIVIL DETAILS
C6.2	CIVIL DETAILS

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**RAW WATER CANAL IMPROVEMENTS**

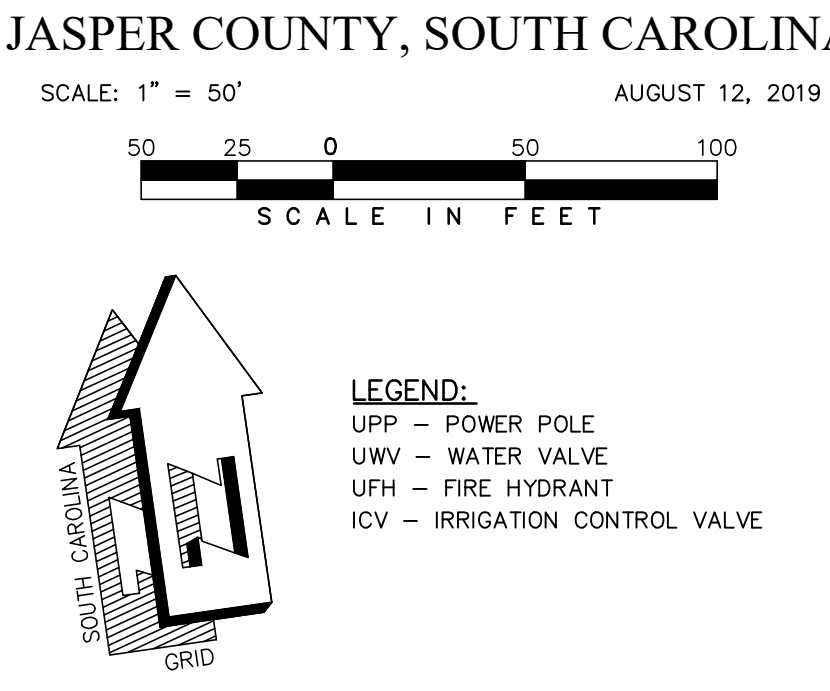
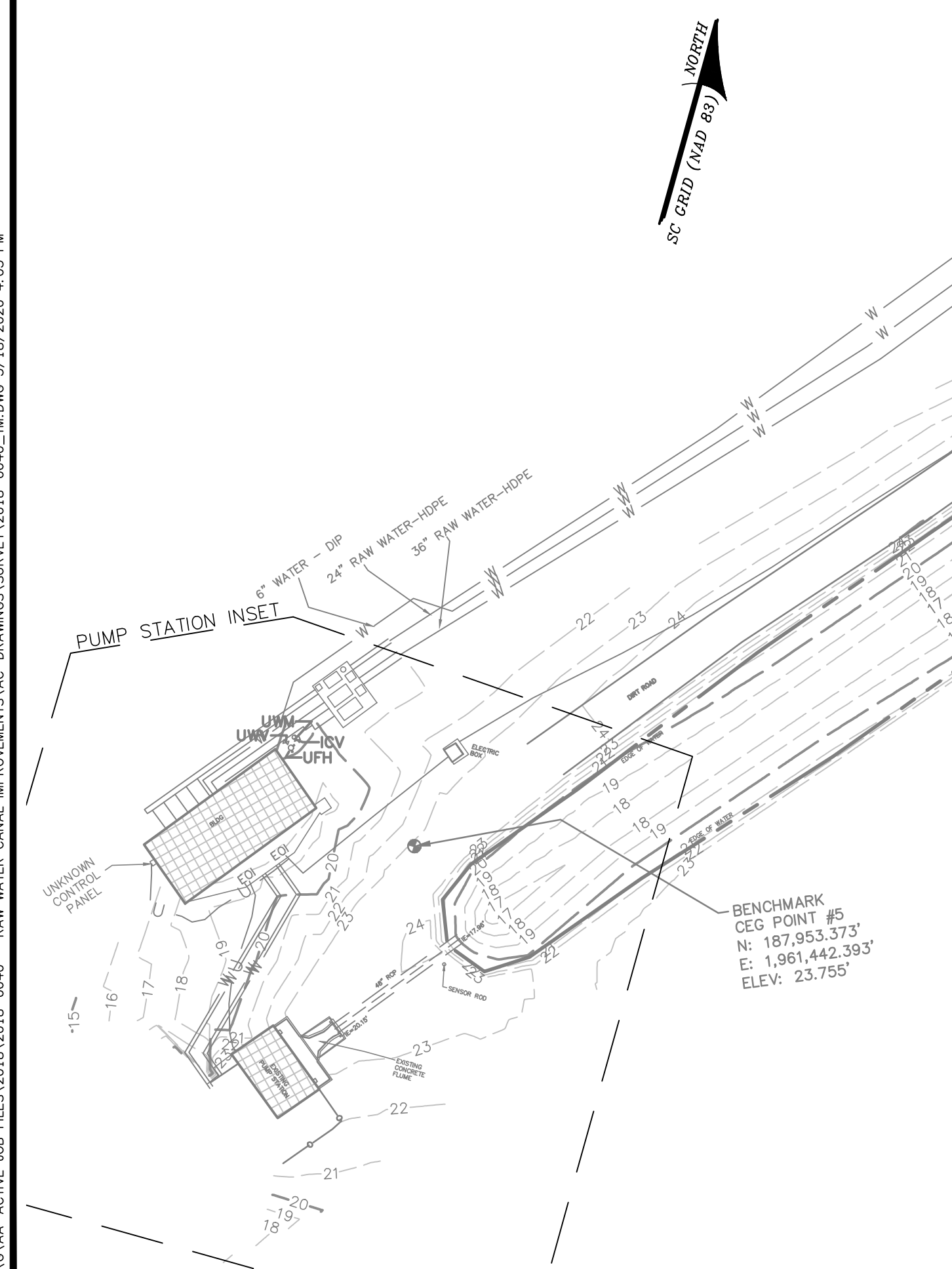
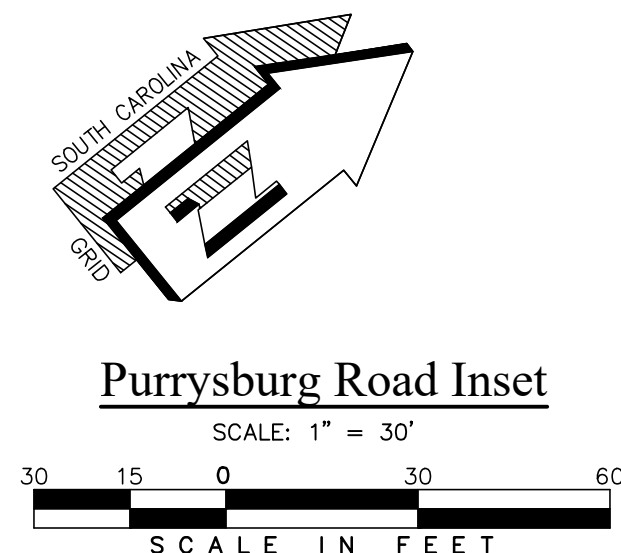
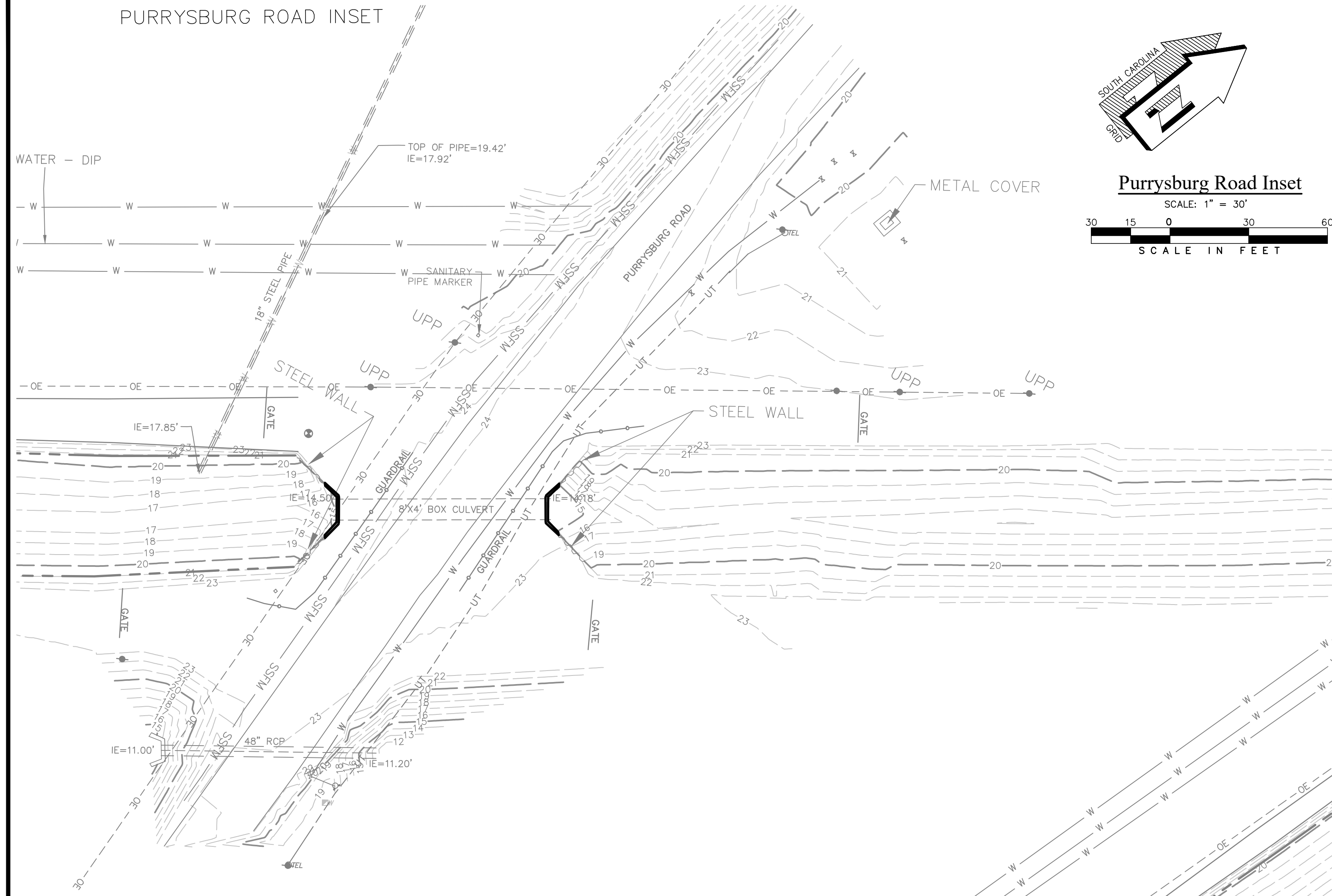
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**SUBSET TITLE SHEET**

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CHECKED BY:	---
APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	C1.0

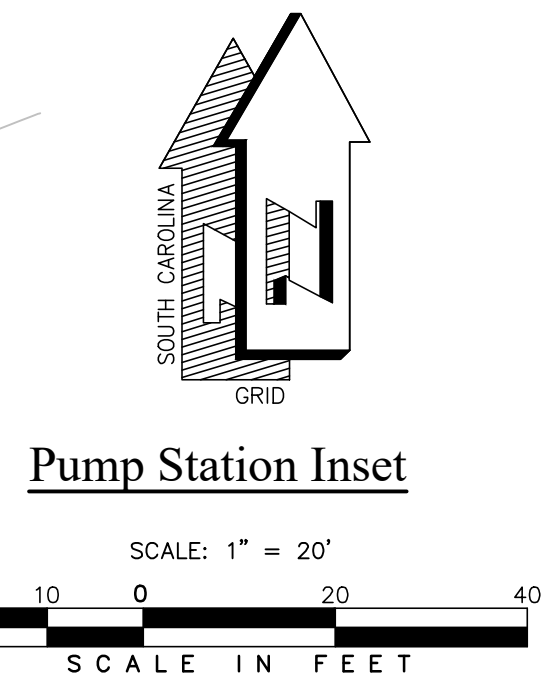
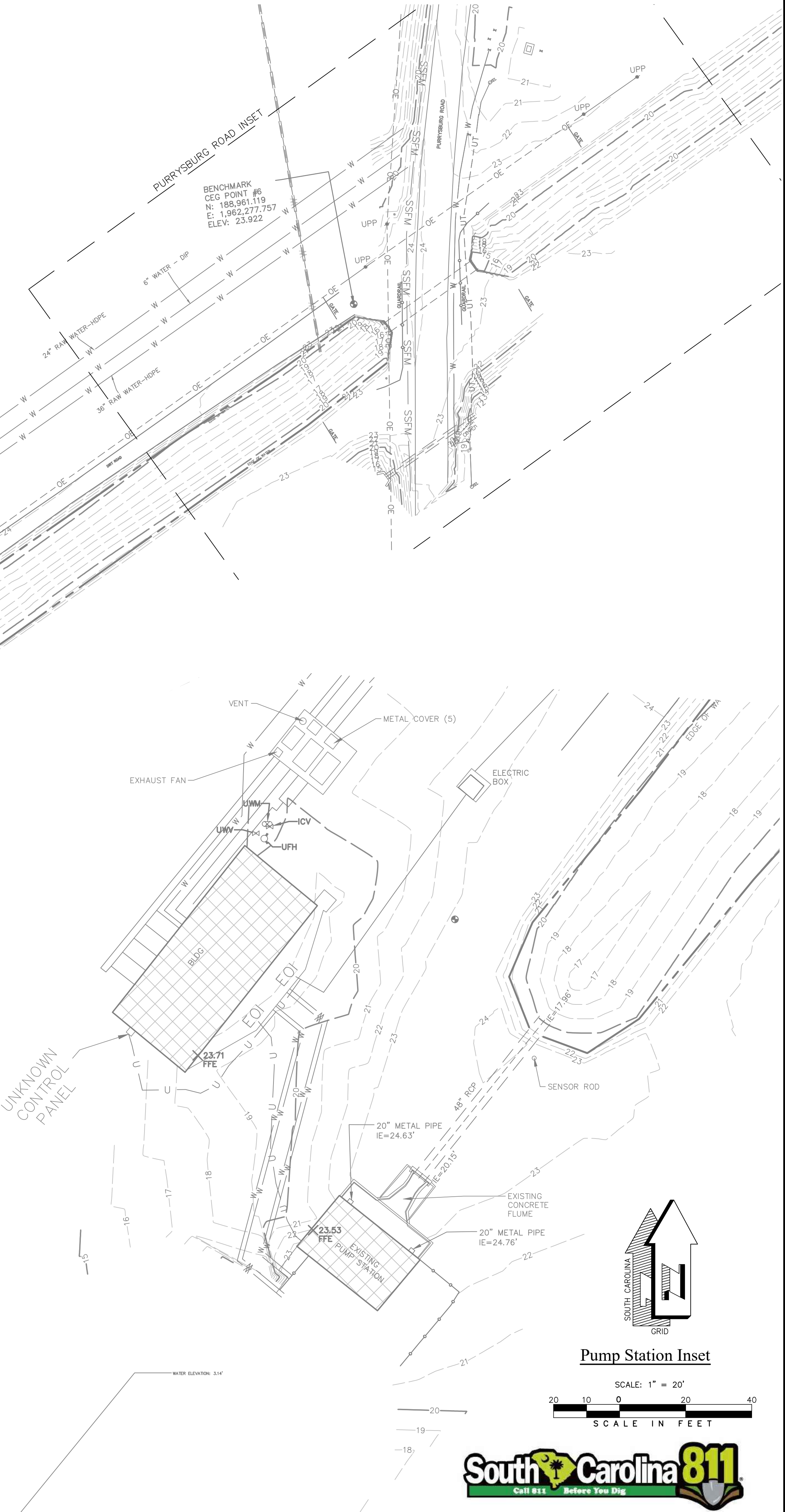


PURRYSBURG ROAD INSET



- LEGEND:  
 UPP - POWER POLE  
 UWV - WATER VALVE  
 UFH - FIRE HYDRANT  
 ICV - IRRIGATION CONTROL VALVE

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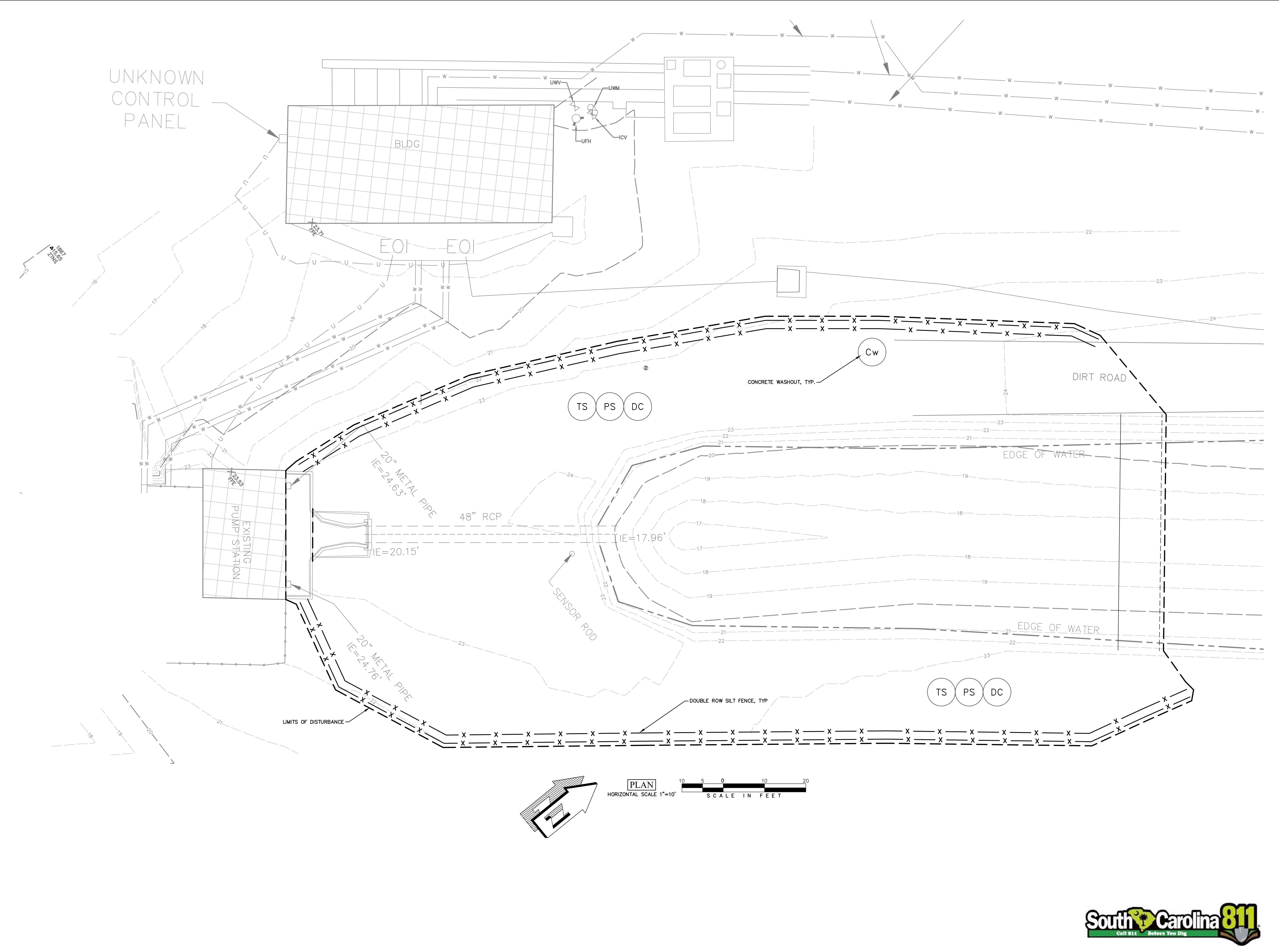
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REV #	DATE	DESCRIPTION

**RAW WATER CANAL IMPROVEMENTS**  
**RIVER PUMP STATION & PURR.**  
**ROAD CANAL CROSSING**  
**EXISTING CONDITIONS**

DRAWN BY: RJE  
 CHECKED BY: -  
 APPROVED BY: MER  
 DATE: 5/14/2020  
 SCALE:  
 JOB No. 2018-0640  
 DRAWING No. C2.0  
 2018-0640

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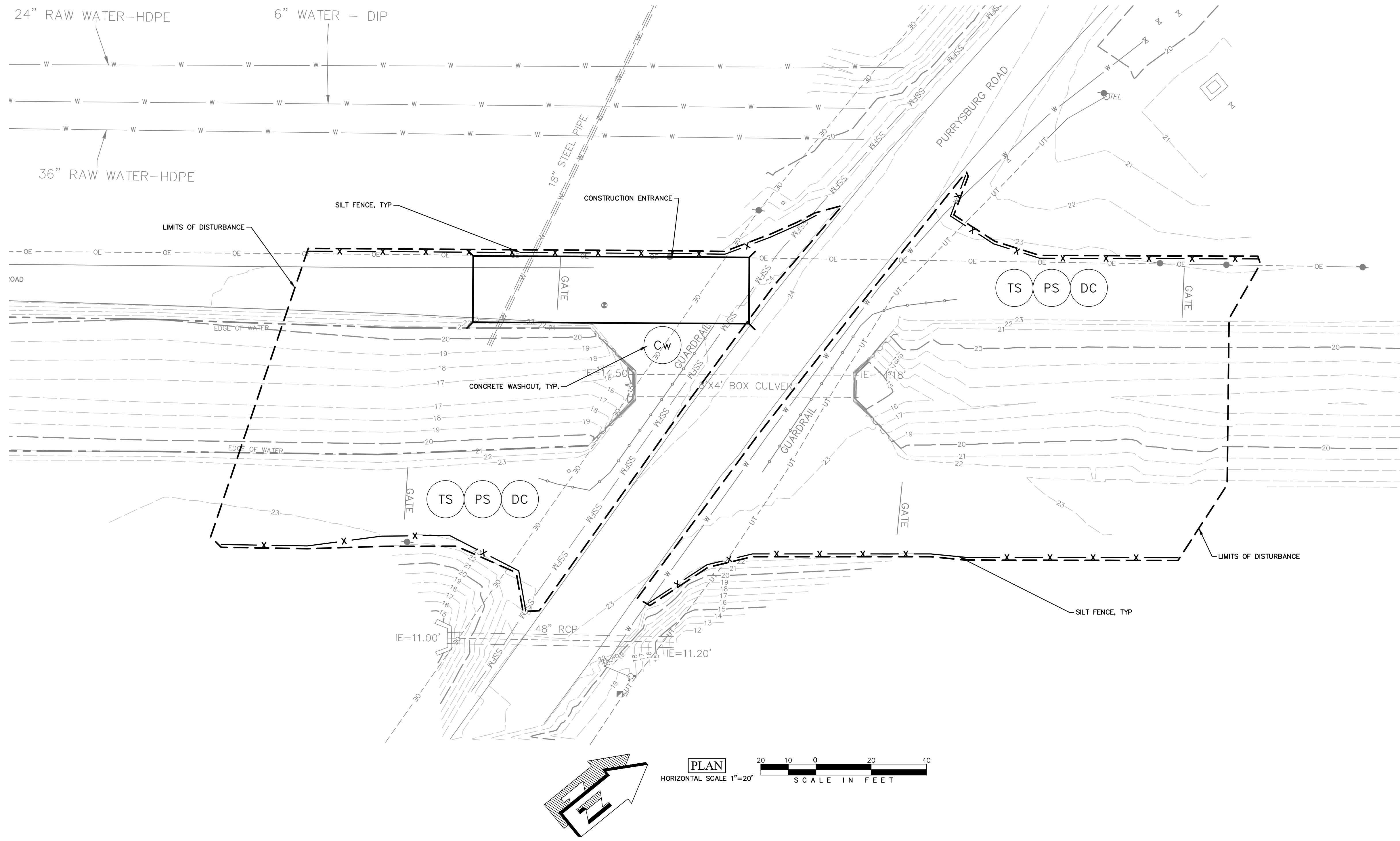
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**RAW WATER CANAL IMPROVEMENTS**  
**RIVER PUMP STATION & PURR. ROAD CANAL CROSSING**  
**SEDIMENT & EROSION CONTROL PLAN**

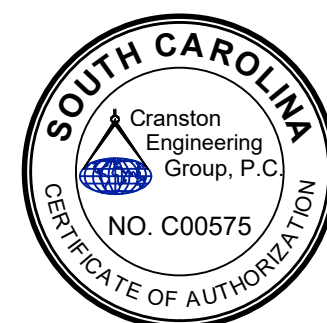
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DATE:	5/14/2020
SCALE:	1" = 20'
JOB No.	2018-0640
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24" RAW WATER-HDPE  
6" WATER - DIP  
36" RAW WATER-HDPE

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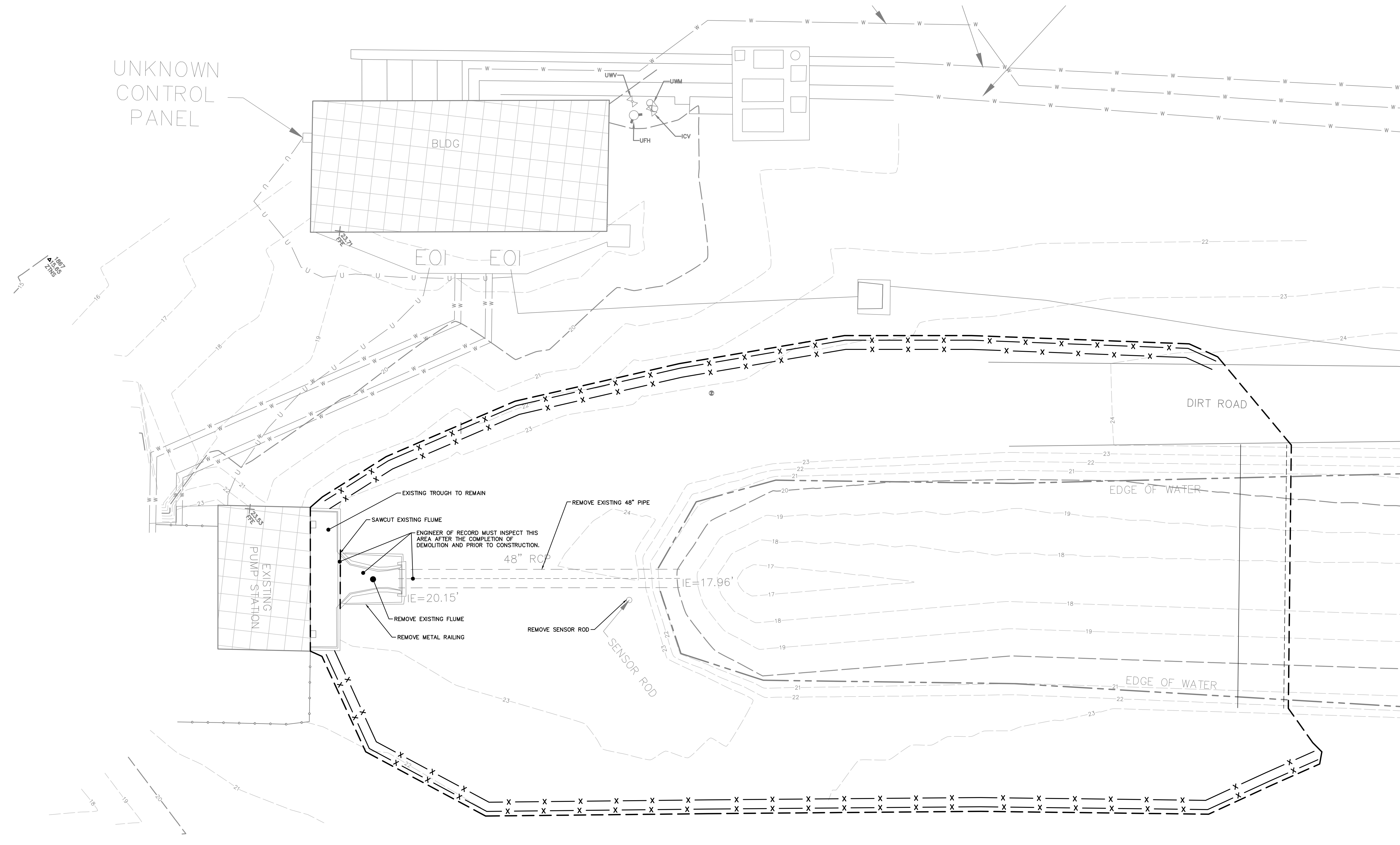
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**RAW WATER CANAL  
IMPROVEMENTS  
RIVER PUMP STATION & PURR.  
ROAD CANAL CROSSING  
SEDIMENT & EROSION CONTROL  
PLAN**

DRAWN BY:	RJE
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DRAWING No.	C3.1



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UNKNOWN CONTROL PANEL

BLDG

EOI EOI

DIRT ROAD

EDGE OF WATER

EDGE OF WATER

EXISTING PUMP STATION

EXISTING TROUGH TO REMAIN  
SAWCUT EXISTING FLUME  
ENGINEER OF RECORD MUST INSPECT THIS AREA AFTER THE COMPLETION OF DEMOLITION AND PRIOR TO CONSTRUCTION.  
REMOVE EXISTING FLUME  
REMOVE METAL RAILING

REMOVE EXISTING 48" PIPE  
48" RCP  
REMOVE SENSOR ROD  
SENSOR ROD

PLAN  
HORIZONTAL SCALE 1"=10'



GENERAL NOTES  
1. CONTRACTOR TO FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

**BYPASS PERFORMANCE SPECIFICATION**  
 1. MINIMUM CAPACITY SCHEDULE  
 1.1. BYPASS TO PROVIDE THE MINIMUM FLOW RATE AS OUTLINED BELOW. MINIMUM VARIES BASED ON TIME OF YEAR.  
 1.1.1. NOVEMBER - APRIL: 12 MGD (10,000 GPM)  
 1.1.2. MAY - OCTOBER: 22 MGD (18,500 GPM)  
 2. BACKUP BYPASS TO REMAIN ONSITE DURING ALL HOURS OF BYPASS OPERATION.



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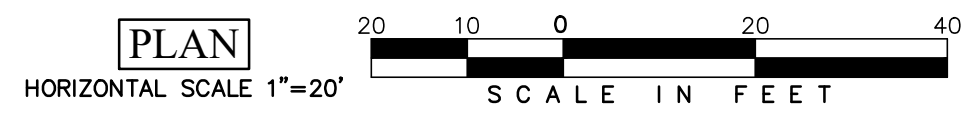
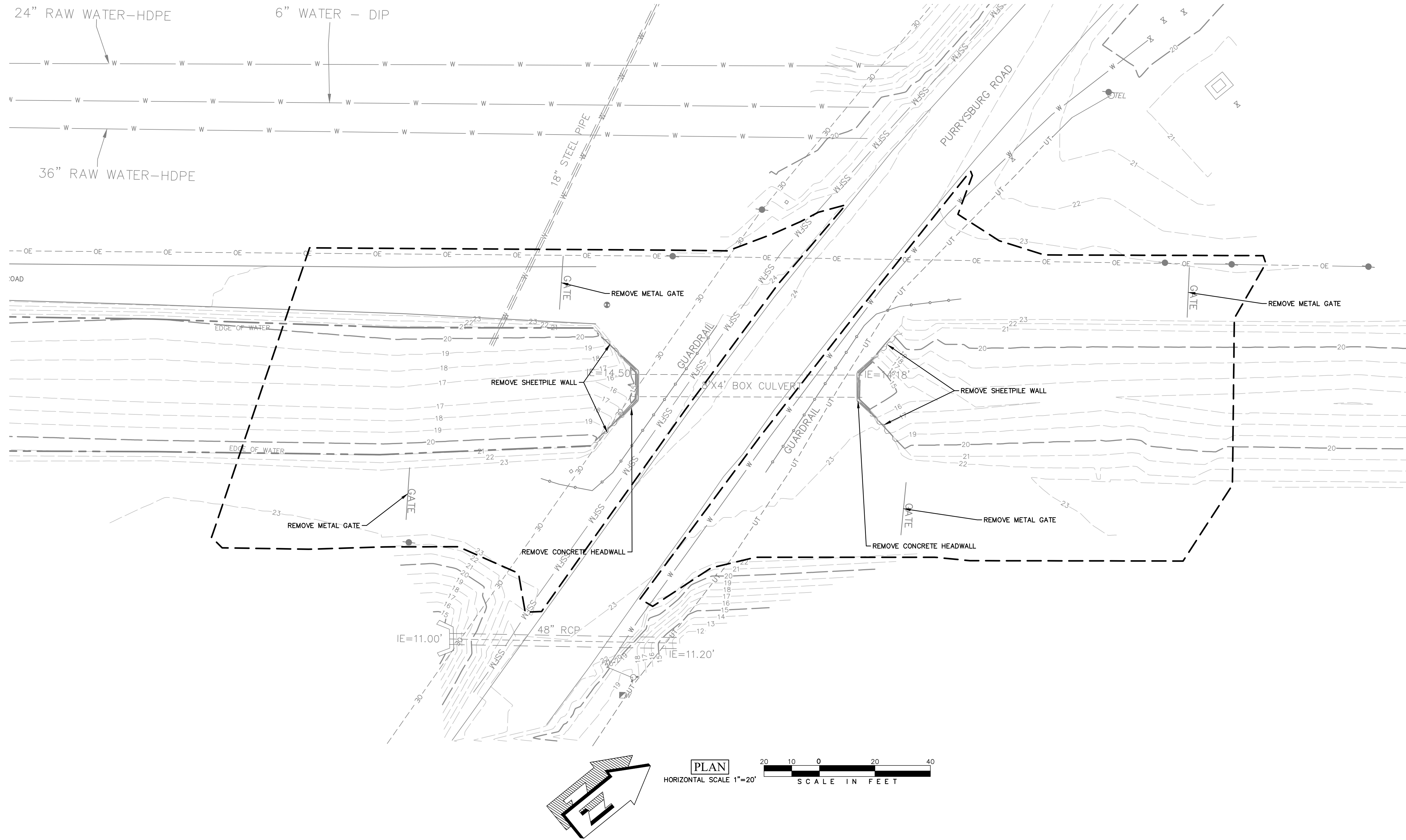
**BID SET**

REV #	DATE	DESCRIPTION

**RAW WATER CANAL IMPROVEMENTS**  
**RIVER PUMP STATION & PURR. ROAD CANAL CROSSING**  
**DEMOLITION PLAN**

DRAWN BY:	RJE
CHECKED BY:	---
APPROVED BY:	MER
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SCALE:	1" = 20'
JOB No.	2018-0640
DRAWING No.	C4.0





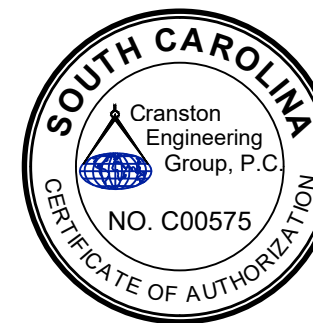
- GENERAL NOTES**
- CONTRACTOR TO FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
  - ALL WORK WITHIN SCDOT RIGHT OF WAY TO ADHERE TO SCDOT SPECIFICATIONS AND DETAILS.

- BYPASS PERFORMANCE SPECIFICATION**
- MINIMUM CAPACITY SCHEDULE
    - BYPASS TO PROVIDE THE MINIMUM FLOW RATE AS OUTLINED BELOW. MINIMUM VARIES BASED ON TIME OF YEAR.
      - NOVEMBER – APRIL: 12 MGD (10,000 GPM)
      - MAY – OCTOBER: 22 MGD (18,500 GPM)
  - BACKUP BYPASS TO REMAIN ONSITE DURING ALL HOURS OF BYPASS OPERATION.



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**RAW WATER CANAL IMPROVEMENTS  
RIVER PUMP STATION & PURR.  
ROAD CANAL CROSSING  
DEMOLITION PLAN**

DRAWN BY:	RJE
CHECKED BY:	---
APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	1" = 20'
JOB No.	2018-0640
DRAWING No.	C4.1

UNKNOWN  
CONTROL  
PANEL

BYPASS PERFORMANCE SPECIFICATION  
1. MINIMUM CAPACITY SCHEDULE  
1.1. BYPASS TO PROVIDE THE MINIMUM FLOW RATE AS OUTLINED BELOW. MINIMUM VARIES BASED ON TIME OF YEAR.  
1.1.1. NOVEMBER – APRIL: 12 MGD (10,000 GPM)  
1.1.2. MAY – OCTOBER: 22 MGD (18,500 GPM)  
2. BACKUP BYPASS TO REMAIN ONSITE DURING ALL HOURS OF BYPASS OPERATION.

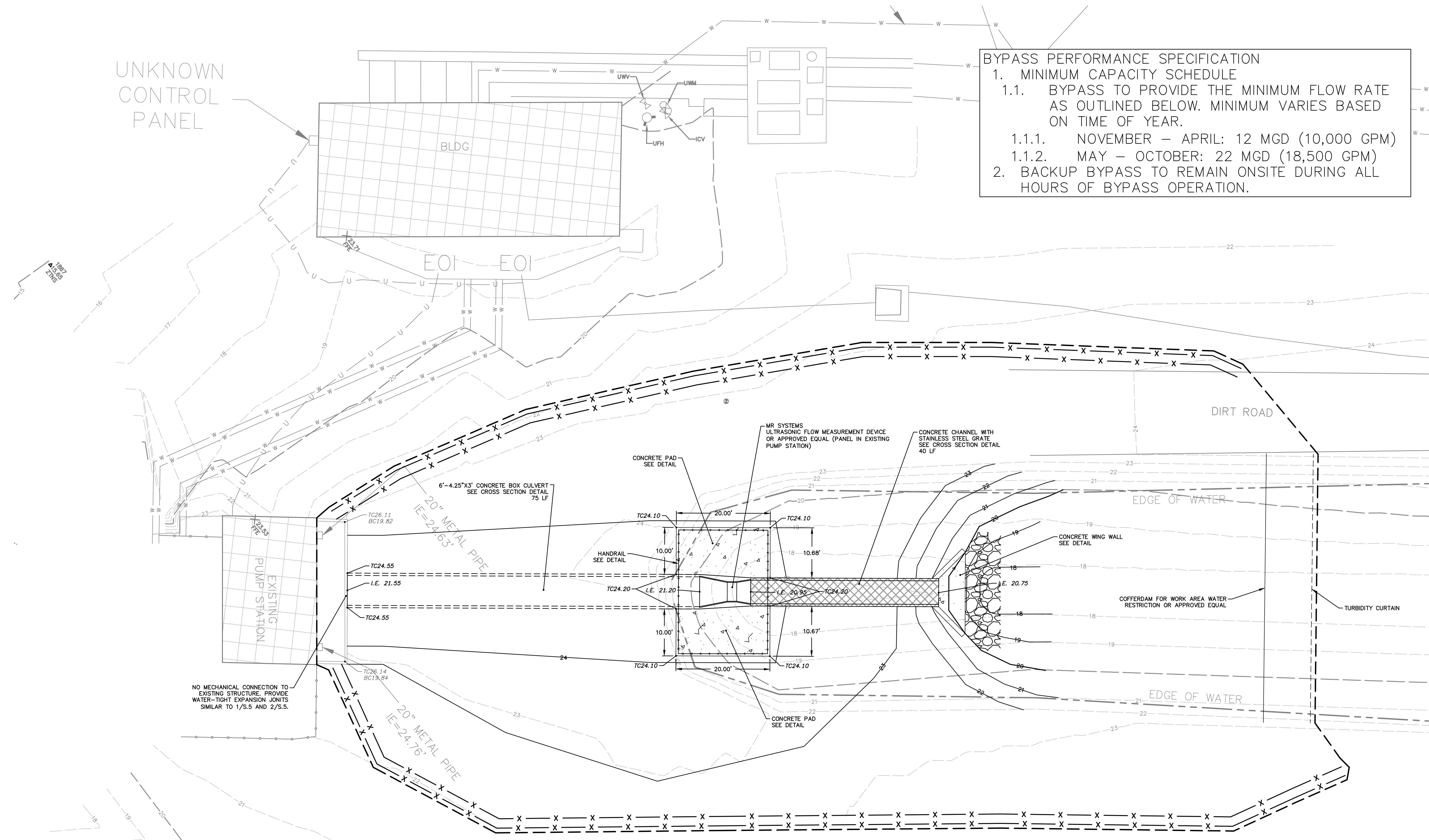


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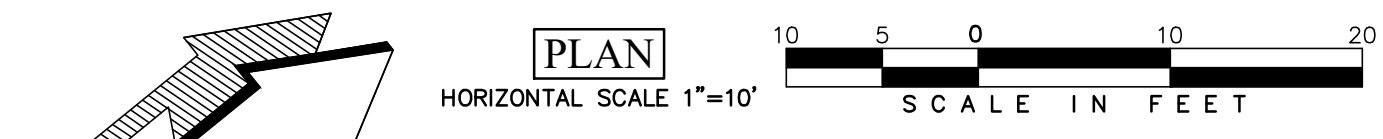
REV #	DATE	DESCRIPTION

RAW WATER CANAL IMPROVEMENTS  
RIVER PUMP STATION & PIRR. ROAD CANAL CROSSING  
SITE PLAN

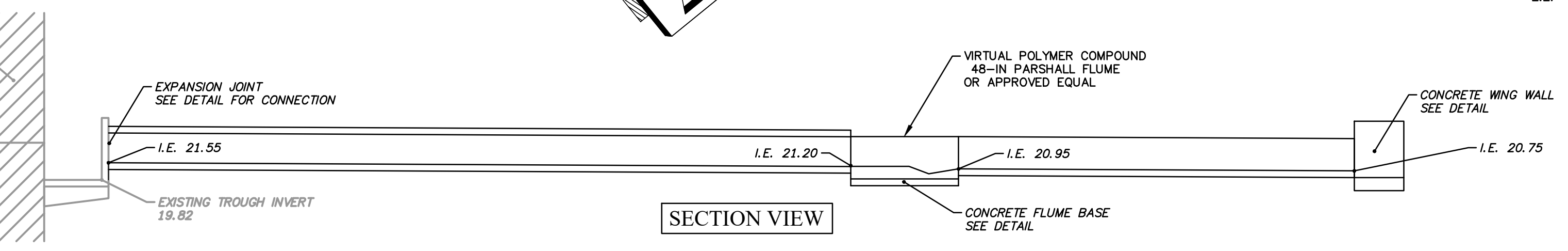
DRAWN BY:	RJE
CHECKED BY:	---
APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	C5.0



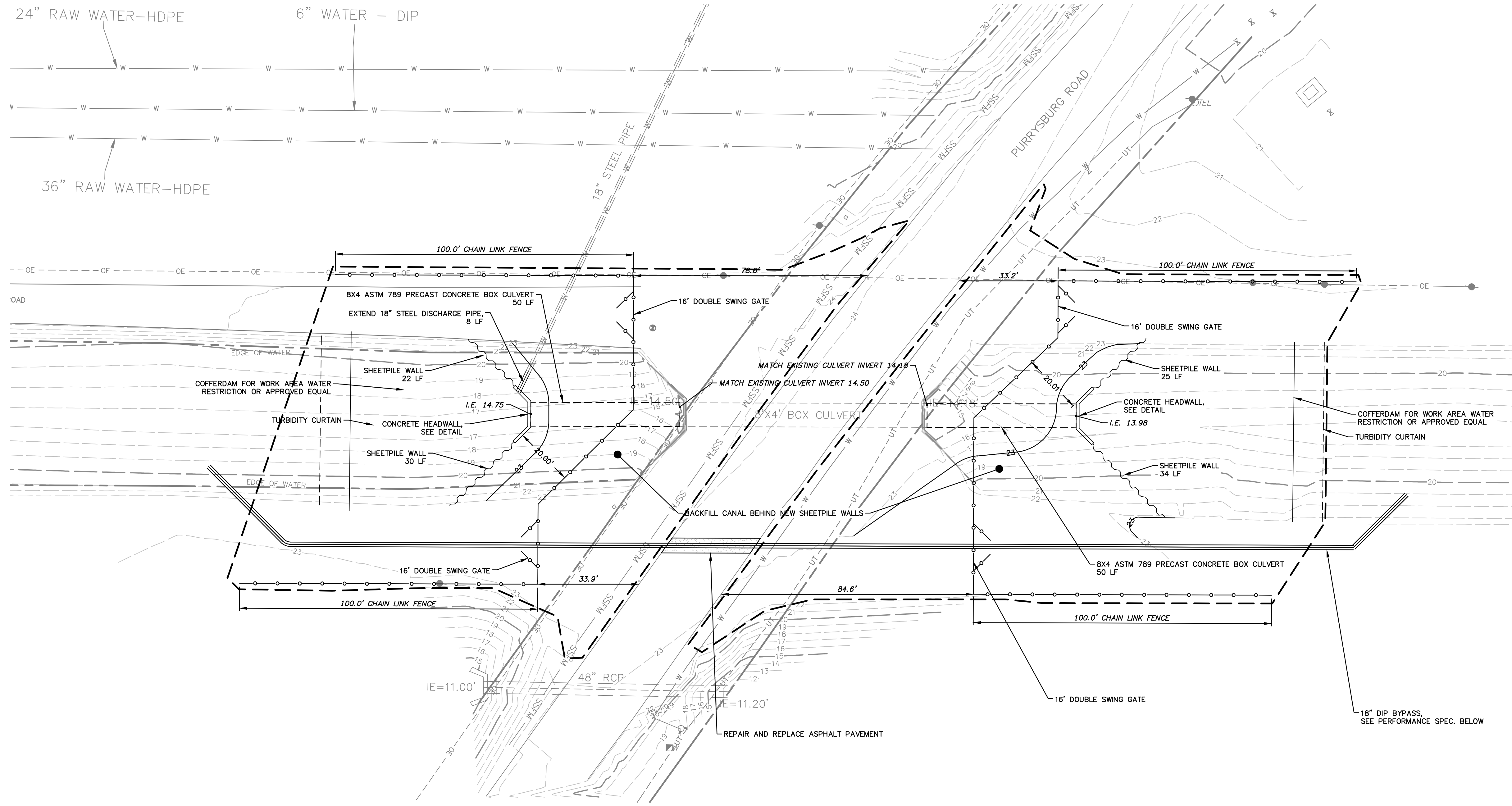
NO MECHANICAL CONNECTION TO EXISTING STRUCTURE. PROVIDE WATER-TIGHT EXPANSION JOINTS SIMILAR TO 1/S.5 AND 2/S.5.



- GENERAL NOTES**
- CONTRACTOR TO PROVIDE COFFERDAM PLAN(S) TO BJWSA/ENGINEER 14 DAYS PRIOR TO START DATE. COFFERDAM PLAN(S) TO BE APPROVED BY BJWSA/ENGINEER BEFORE CONSTRUCTION BEGINS. COFFERDAM PLAN(S) TO BE SIGNED AND SEALED BY STRUCTURAL ENGINEER REGISTERED IN THE STATE OF SOUTH CAROLINA IF STRUCTURAL DESIGN OF COFFERDAM IS NECESSITATED.
  - CONTRACTOR TO PROVIDE BYPASS PLAN(S) TO BJWSA/ENGINEER XX DAYS PRIOR TO START DATE. BYPASS PLAN(S) TO BE APPROVED BY BJWSA/ENGINEER BEFORE CONSTRUCTION BEGINS.
  1. BYPASS PUMPING OF CANAL TO ACHIEVE MINIMUM FLOW RATE OF 8,000 GPM.
  2. BACK-UP BYPASS PUMP TO BE PROVIDED AT EACH LOCATION OF CANAL BYPASS.



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**BYPASS PERFORMANCE SPECIFICATION**

1. MINIMUM CAPACITY SCHEDULE
  - 1.1. BYPASS TO PROVIDE THE MINIMUM FLOW RATE AS OUTLINED BELOW. MINIMUM VARIES BASED ON TIME OF YEAR.
    - 1.1.1. NOVEMBER – APRIL: 12 MGD (10,000 GPM)
    - 1.1.2. MAY – OCTOBER: 22 MGD (18,500 GPM)
  2. BACKUP BYPASS TO REMAIN ONSITE DURING ALL HOURS OF BYPASS OPERATION.

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# BID SET

REV #	DATE	DESCRIPTION

**RAW WATER CANAL IMPROVEMENTS**  
**RIVER PUMP STATION & PURR. ROAD CANAL CROSSING**  
**SITE PLAN**

DRAWN BY:	RJE
CHECKED BY:	---
APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	1" = 20'
JOB No.	2018-0640
DRAWING No.	C5.1





**BID SET**

REV #	DATE	DESCRIPTION

RAW WATER CANAL  
IMPROVEMENTS  
RIVER PUMP STATION & PIRR.  
ROAD CANAL CROSSING  
CIVIL DETAILS

DRAWN BY:	RJE
CHECKED BY:	---
APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	NTS
JOB No.	2018-0640
DRAWING No.	C6.0

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.			

**TABLE 1 - PARAPET DIMENSIONS**

S	K	m	n	P
4'	2"	1'-6"	9"	5'-0"
5'	2"	1'-6"	8"	6'-0"
6'	3"	1'-7"	7"	7'-2"
7'	4"	1'-8"	7"	8'-4"
8'	4"	1'-8"	7"	9'-4"
9'	5"	1'-9"	6"	10'-6"
10'	6"	1'-10"	5"	11'-8"

**TABLE 2 - WINGWALL DIMENSIONS, ANCHOR SPACINGS, WINGWALL & APRON REINFORCING**

CULVERT HEIGHT (RISE)	APRON DIMENSIONS		MAX. SPACINGS (INCHES) FOR WINGWALL TO APRON ANCHOR CONNECTIONS EACH WING - SEE NOTE #3										STEEL AREAS SQ. IN./LIN. FT.				
	H	A	L	h <sub>1</sub>	h <sub>2</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	D <sub>7</sub>	D <sub>8</sub>	D <sub>9</sub>	D <sub>10</sub>	R <sub>1</sub>	R <sub>2</sub>
3'	6"	6'-8"	2'-8"	1'-6"	48"	66"										0.19	0.19
4'	8"	9'-2"	3'-8"	1'-6"	48"	66"										0.19	0.19
5'	8"	9'-2"	3'-8"	2'-6"	48"	66"										0.19	0.19
6'	12"	13'-4"	5'-4"	1'-10"	31"	48"	66"									0.20	0.19
7'	12"	13'-4"	5'-4"	2'-10"	20"	31"	48"	66"								0.32	0.19
8'	16"	18'-4"	7'-4"	1'-10"	15"	20"	31"	48"	66"							0.48	0.19
9'	16"	18'-4"	7'-4"	2'-10"	12"	12"	15"	15"	20"	31"	48"	66"				0.68	0.19
10'	16"	18'-4"	7'-4"	3'-10"	12"	12"	12"	12"	15"	15"	20"	31"	48"			0.93	0.19

STEEL AREAS FOR R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub> & R<sub>6</sub> SHALL BE THE SAME AS FOR R<sub>2</sub>

**TABLE 3 - TOEWALL WIDTHS**

S	H	W (±1/4")
3'	3	13'-7 1/2"
4'	4	15'-7 1/2"
5'	5	15'-7 1/2"
6'	6	19'-7 1/2"
7'	7	22'-7 1/2"
8'	8	23'-7 1/2"
9'	9	28'-7 1/2"
10'	10	29'-7 1/2"

**GENERAL NOTES:**

- SPECIFICATION: GA. STANDARD, CURRENT EDITION & SUPPLEMENTS THERETO.
- MATERIALS FOR PRECAST PARAPETS, PRECAST WINGWALLS AND PRECAST APRONS SHALL BE 5000 P.S.I. CONCRETE (SEC. 500) AND WELDED WIRE FABRIC OR GRADE 60 REBARS. CAST-IN-PLACE CONSTRUCTION SHALL BE CLASS "A" CONCRETE AND GRADE 40 REBARS.
- ALL PRECAST WINGWALLS (BOTH INLET & OUTLET) REQUIRE 8" THICK REINFORCED CONCRETE APRONS FOR ANCHOR CONNECTIONS. APRONS MAY BE PRECAST OR CAST IN PLACE. SPACINGS (IN TABLE 2) FOR WINGWALL TO APRON CONNECTIONS ARE MAXIMUM AND MAY BE REDUCED DUE TO WING LENGTH, APRON JOINTS, ETC. EACH APRON SECTION MUST HAVE A MINIMUM OF 2 CONNECTIONS ON EACH SIDE OR AS REQUIRED BY TABLE 2, WHICHEVER IS MORE.
- OUTLET BAFFLES SHALL BE CL. A CONCRETE MIN. REINFORCED WITH NO. 4 REBARS. BAFFLES MAY BE FIELD CAST ONTO NO. 4 REBARS GROUTED 6" MIN. INTO APRON OR PRECAST BAFFLES MAY BE SECURED TO APRON BY GROUTING BARS EXPOSED FROM BAFFLES INTO APRON 6" MIN. OR SECURED WITH NO. 4 GALV. EXPANSION ANCHOR BOLTS. 2 DOWEL CONNECTIONS OR 2 ANCHORS SHALL BE REQUIRED FOR EACH SEPARATE BAFFLE OR BAFFLES MAY BE CONSTRUCTED MONOLITHIC WITH APRON.
- SEE STANDARD 2530P FOR DETAILS OF PRECAST BOX CULVERTS AND CONNECTOR BOXES TYPE P & TYPE C
- LIFTING HOLES AND HANDLING DEVICES SHALL BE ACCORDING TO GA. STD. SPECIFICATIONS AND MAY VARY PER MANUFACTURER. PRECAST SECTIONS ARE NOT TO BE LIFTED BY OR THRU THE PIPE SLEEVE INSERTS.
- PRECAST ENDS ARE STANDARD ALTERNATES FOR SINGLE OR FOR MULTIPLE LINE PRECAST BOX CULVERT BARRELS NORMAL TO THE ROADWAY. SKEWED INSTALLATIONS MAY HAVE PRECAST ENDS WHERE ROADSIDE GEOMETRICS ARE COMPATIBLE. THE ALLOWANCE OF PRECAST ENDS WITH SKEWED PRECAST BARRELS, EITHER SINGLE OR MULTIPLE LINE, SHALL BE AS SHOWN IN THE PLANS OR APPROVED BY THE ENGINEER FOR A GIVEN LOCATION. CAST-IN-PLACE ENDS (SEE SEPARATE STANDARDS) SHALL BE USED FOR EITHER SKEWED OR NON-SKEWED PRECAST BARRELS WHERE PRECAST ENDS ARE NOT USED.

\*NOTE: WIDTHS ARE FOR SINGLE LINES; FOR MULTIPLE LINES ADD S + 2T + "X" FOR EACH ADDITIONAL LINE; WHERE S = CLEAR SPAN, T = WALL THICKNESS, & "X" = SPACE BETWEEN LINES.

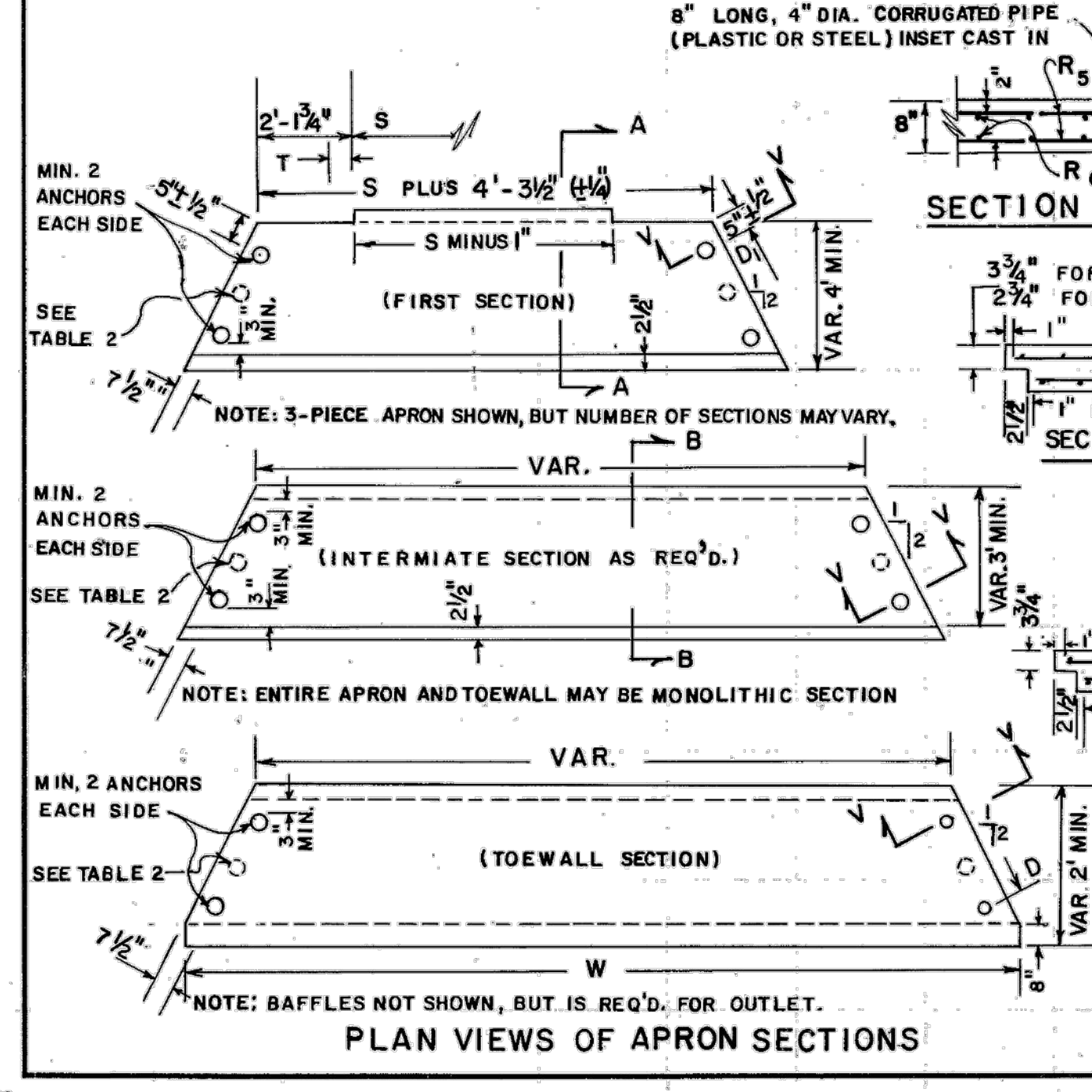
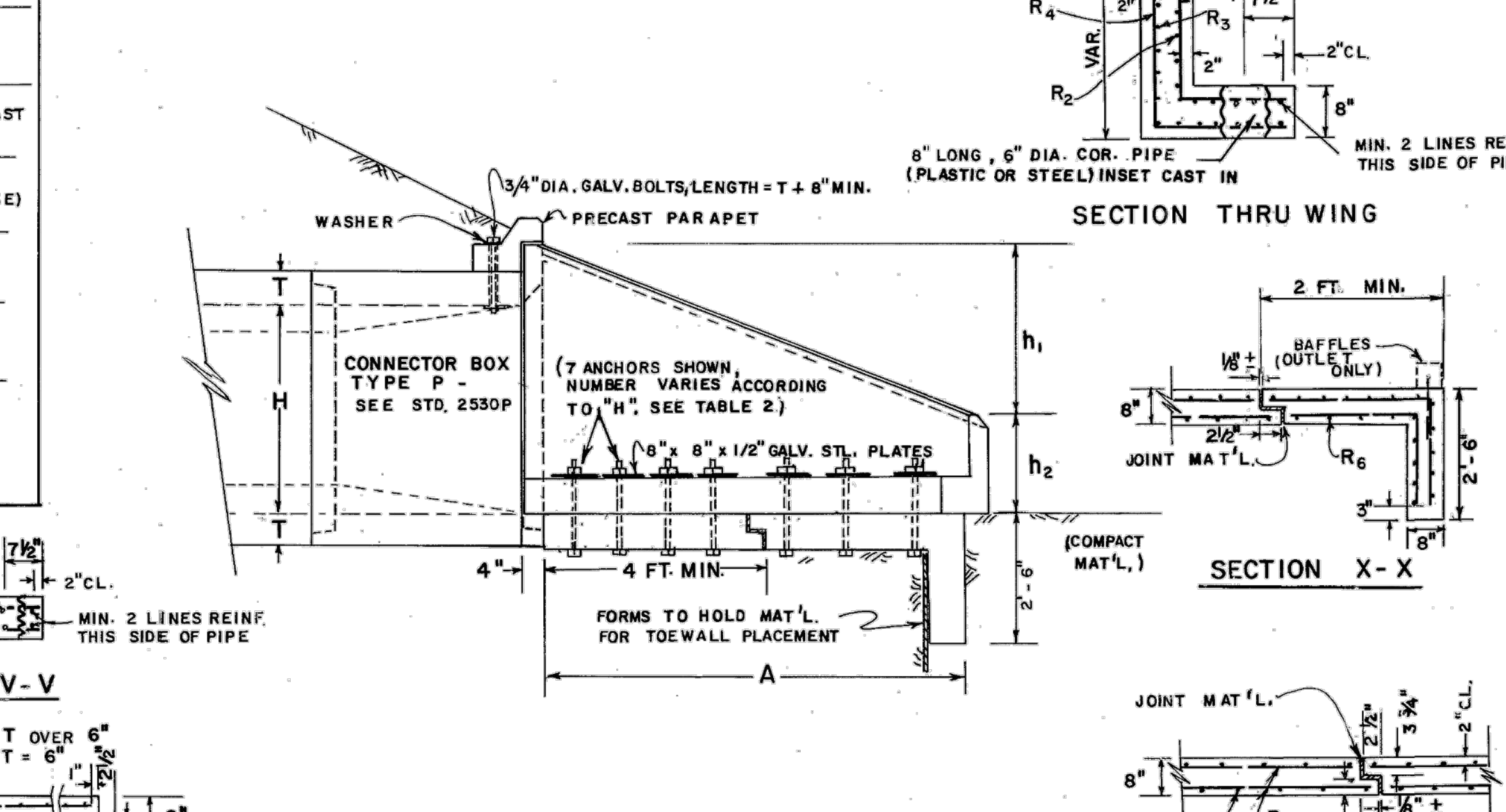
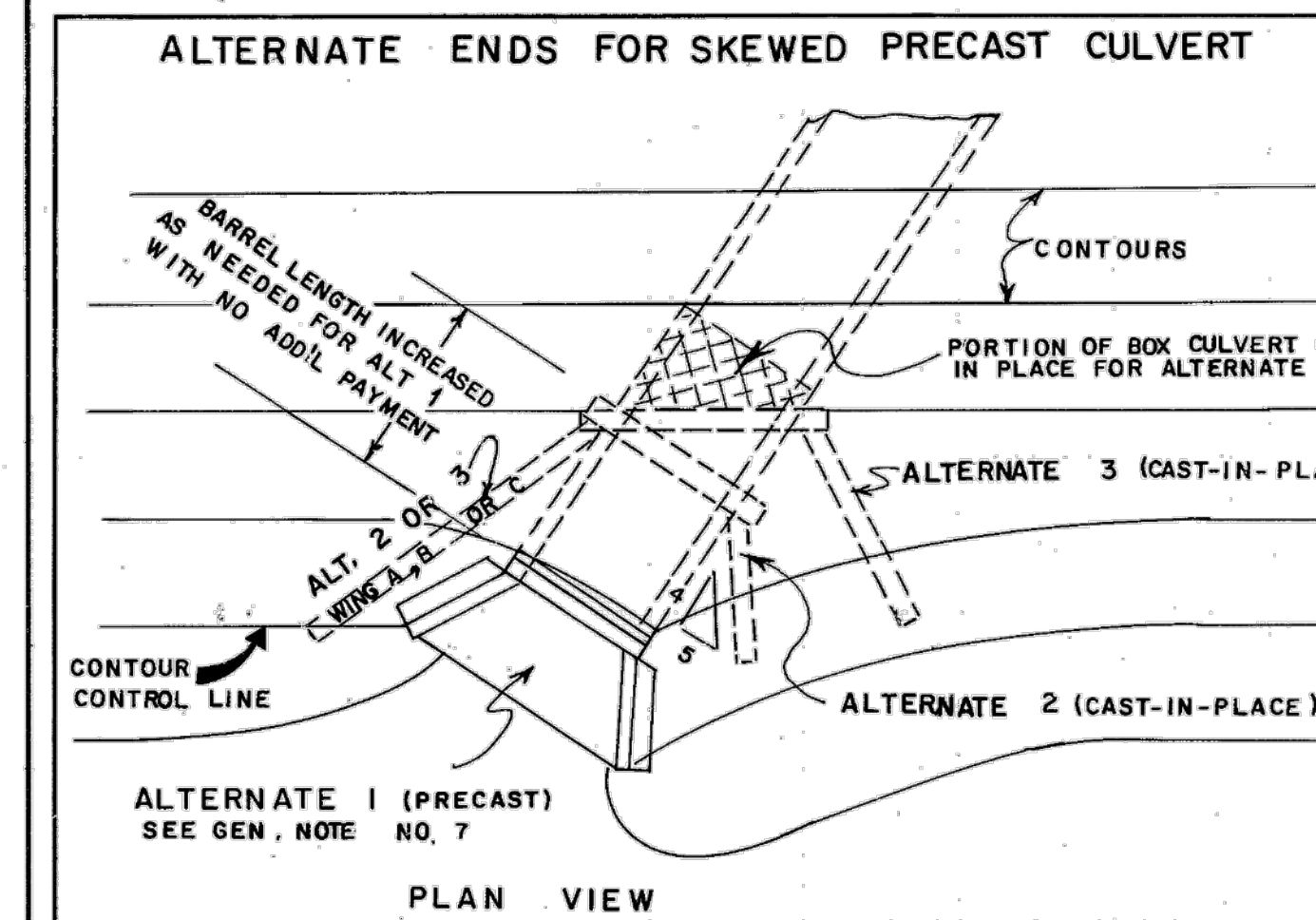
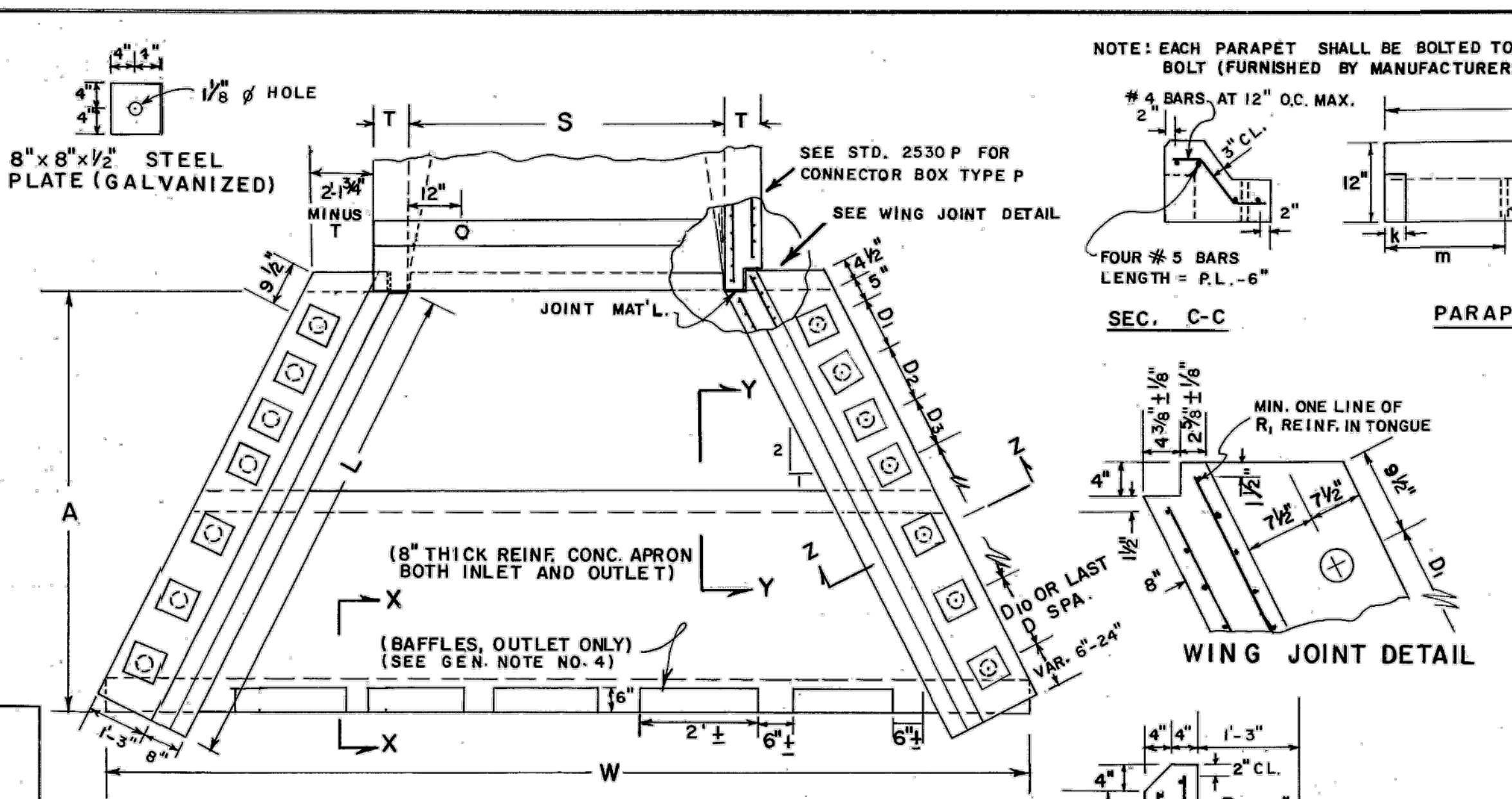
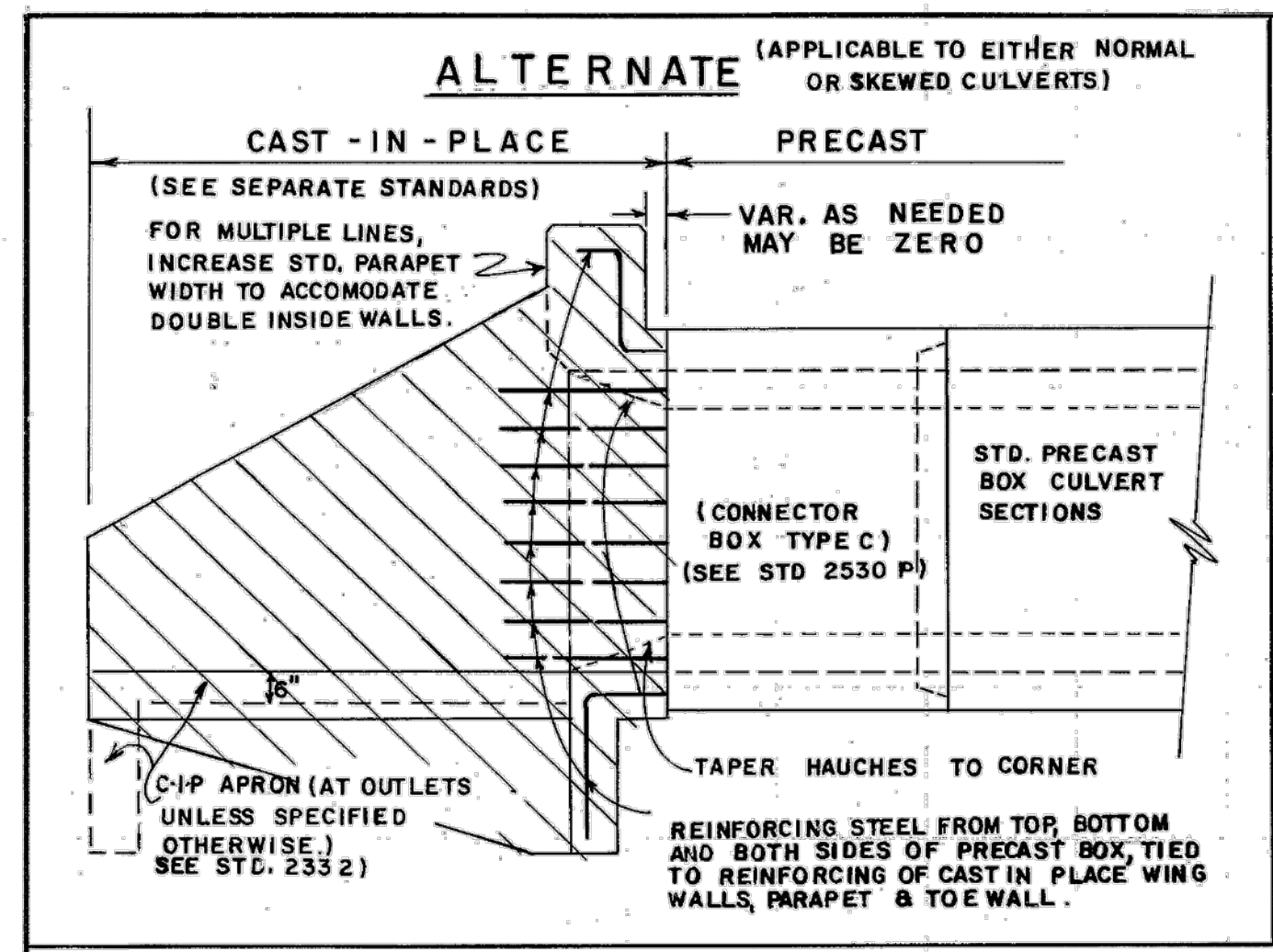
DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA

**STANDARD**  
PRECAST BOX CULVERT ENDS  
WINGWALLS, PARAPETS, TOEWALLS & APRONS

NO SCALE  
MARCH, 1985

DES. R.M.U. (SUBMITTED) *Handwritten Signature*  
DRW. R.M.U. STATE ROAD & AIRPORT DESIGN ENGR.  
TR. G.M.E. (APPROVED) *Handwritten Signature*  
CHK. R.K.C. STATE HIGHWAY ENGINEER

NUMBER  
**2535 P**



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**REFERENCES**

**NATIONAL DOCUMENTS**

1.0 NOTES  
 1.1 ALL DIMENSIONS SHALL CONFORM WITH THE LATEST EDITION OF THE SCOT STANDARD SPECIFICATIONS OF HIGHWAY CONSTRUCTION, PAVES AND SPECIAL PROVISIONS.

**SCOT DOCUMENTS**

1.1 DESIGN MEMORANDUM DM003

**RELATED DRAWINGS & REVIEWS**

722-105-01  
 722-105-02

**PRECONSTRUCTION SUPPORT ENGINEER**

**SOUTH CAROLINA**  
 REGISTERED PROFESSIONAL ENGINEER  
 NO. 8858  
 ELMAN SYLVESTER

DATE: MAY 27, 2010

**SCDOT**  
 SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DESIGN STANDARDS OFFICE  
 909 PARK STREET  
 ROOM 405  
 COLUMBIA, SC 29201

722-105-01  
 DEFECTIVE LETTER DATE: JANUARY 2011 (THIS DRAWING IS NOT TO SCALE)

**REFERENCES**

**NATIONAL DOCUMENTS**

10.0 PAY ITEM 20209005: CULVERT EXTENSION PREPARATION

10.1 FOR EXTENSION OR MODIFICATIONS, CONTRACTOR SHALL REMOVE AND DISPOSE OF PORTIONS OF THE EXISTING STRUCTURE... CONTRACTOR SHALL REPLACE OR REPAIR TO THE SATISFACTION OF THE ENGINEER ANY AND ALL PORTIONS OF THE EXISTING STRUCTURE THAT ARE DAMAGED BY CARELESSNESS AND/OR NEGLIGENCE WITHOUT CHARGE TO THE SCOT.

10.2 CONTRACT SURFACE OF EXISTING CONCRETE TO BE CLEAN, FREE OF "LANSERS", AND INTENTIONALLY ROUGHENED TO AN AMPLITUDE OF 1/4" AT ALL LOCATIONS CONNECTED TO NEW CAST IN PLACE CONCRETE.

**SCOT DOCUMENTS**

SECTION 10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

11.1 ALL PRECAST CONCRETE SHALL BE MINIMUM CONCRETE CLASS 5000 (40' x 4000 psi)

11.2 FOR PRECAST BOX CULVERTS, REINMENT SECTIONS TO CONFORM WITH LATEST EDITION OF THE SCOT STANDARD SPECIFICATIONS OF HIGHWAY CONSTRUCTION.

11.3 END OF PRECAST CULVERT SHALL BE EAST SQUARE, AS SHOWN ON CULVERT DESIGN DRAWING, IN LINE OF A TOWNSHIP OR BOUNDARY, AND 3' CLEAR OF ADJECTIVELY BOUNDED DOWEL. SHALL BE CUT TO DETAILED TO SHOW. SHALL BE TAKEN ON PRECAST CURB AND END OF PRECAST CURB SHALL BE BASED ON REINMENT ANCHOR MANUFACTURER'S RECOMMENDATIONS FOR DEFORMED BARS SIZE DESCRIBED IN REINMENT ANCHOR NOTES OR IN PLANS.

11.4 ALL COSTS OF EXISTING AND PLACING ADJECTIVELY BOUNDED DOWELS IN NEW PRECAST SECTIONS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE PC BOX CULVERT PAY ITEM FOR PRECAST BOX CULVERT SECTIONS.

12.0 PAY ITEM 7011402 CONCRETE FOR STRUCTURES CLASS 4000 (40' x 4000 psi)

12.1 ALL CAST IN PLACE CONCRETE SHALL BE MINIMUM CONCRETE CLASS 4000 (40' x 4000 psi).

12.2 ALL COSTS, BOTH DIRECT AND INDIRECT, NECESSARY TO PERFORM THE WORK AS CALLED FOR ON CULVERT SHEETS INCLUDING REMOVAL OF WELLS FOR UTILITIES, TOP WINDWALLS AND CATCH BASINS ARE TO BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE FOR STRUCTURES CLASS 4000 (CONVERT), UNLESS OTHERWISE NOTED.

12.3 CONTRACTOR CUT-OFF WALLS SHALL BE TO A DEPTH SUFFICIENT TO REST ON SAND AND/OR COMPACTED MATERIAL. MINIMUM BARRIER BETWEEN SLABS AND TENDING SHALL BE 2 FEET, AND MAY BE INCREASED AT THE DISCRETION OF THE SUPERVISING ENGINEER.

12.4 CONCRETE CUT-OFF WALLS SHALL BE CAST TO A FINISH SUFFICIENT TO REST ON SAND AND/OR COMPACTED MATERIAL. MINIMUM BARRIER BETWEEN SLABS AND TENDING SHALL BE 2 FEET, AND MAY BE INCREASED AT THE DISCRETION OF THE SUPERVISING ENGINEER.

12.5 FOR SEAM CUT-OFF WALLS, NON WEATHERED CONCRETE HAS BEEN ADDED TO THE CAST IN PLACE CONCRETE CLASS 4000 (CONVERT) SPECIFIED TO PROTECT FROM WEATHERING. REINFORCEMENT SHALL BE AS SHOWN IN THE PLANS. IF THE ENGINEER DETERMINES THAT A DESIGN CUT-OFF WALL IS REQUIRED, CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL DETAILS FOR FORM WORK AND WORKMANSHIP. IF NECESSARY, SHALL BE APPROVED BY THE ENGINEER AND PAID FOR AS EXTRA WORK.

13.0 PAY ITEM 7011100 REINFORCING STEEL FOR STRUCTURES (ROADWAY)

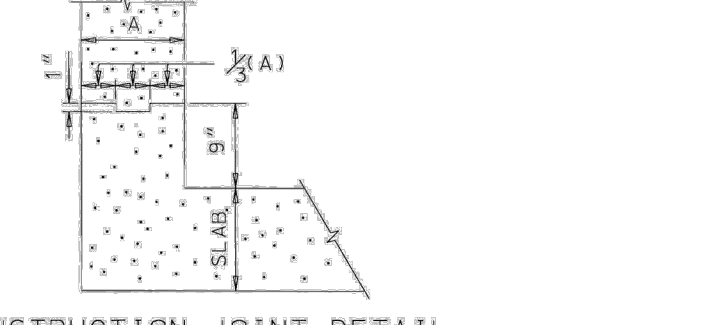
13.1 REINFORCING STEEL SHALL EITHER CONFORM TO ASTM A615 OR ASTM A618 AS FOLLOWS FOR WELDED WIRE FABRIC OR CONFORM TO CONTRACTOR'S SPECIFICATION AT 50% OF 1.10" AND SHALL BE A MINIMUM GAGE 60 FOR ALL OTHER REINFORCEMENT.

13.2 CONTRACTOR SHALL CUT AND BEND ANY REINFORCING BARS AS NECESSARY TO CARRY OUT WORK AS CALLED FOR ON THE INDICATED CURB ENDING DETAILS AND REINFORCING BARS AS SHOWN ON THE INDICATED CURB ENDING DETAILS AND REINFORCING BARS AS SHOWN ON THE INDICATED CURB ENDING DETAILS. CONTRACTOR SHALL VERIFY ALL REINFORCEMENT SHALL BE SUBMITTED TO THE SCOT SUPPLEMENTAL SPECIFICATIONS ENGINEER FOR REVIEW. ALL REBAR SCHEDULES SHALL BE SUBMITTED TO THE SCOT SUPPLEMENTAL SPECIFICATIONS ENGINEER FOR REVIEW.

13.3 STEEL MANUFACTURING PROCESSES, INCLUDING APPLICATION OF COATINGS FOR THESE MATERIALS, MUST OCCUR IN THE UNITED STATES. CONTRACTOR'S MANUFACTURING PROCESS INCLUDING ALL PROCESSES WHICH PROTECT OR ENHANCE THE VALUE OF THE MATERIAL TO WHICH THE COATING IS RELATED.

14.0 PAY ITEM 2021000 REMOVAL OF STRUCTURES AND RECONSTRUCTIONS

14.1 WHEN ABANDONED STRUCTURES ARE PRESENT THAT INTERFERE WITH THE CONSTRUCTION OF THE NEW CULVERT, CONTRACTOR SHALL REMOVE AND DISPOSE OF SUCH STRUCTURES. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF STRUCTURES AND RESTORATION TO THE ORIGINAL CONDITION OR BETTER. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF EXISTING STRUCTURES THAT ARE DAMAGED BY CARELESSNESS AND/OR NEGLIGENCE WITHOUT CHARGE TO THE SCOT.



**REFERENCES**

**NATIONAL DOCUMENTS**

SECTION 10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

**SCOT DOCUMENTS**

SECTION 10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

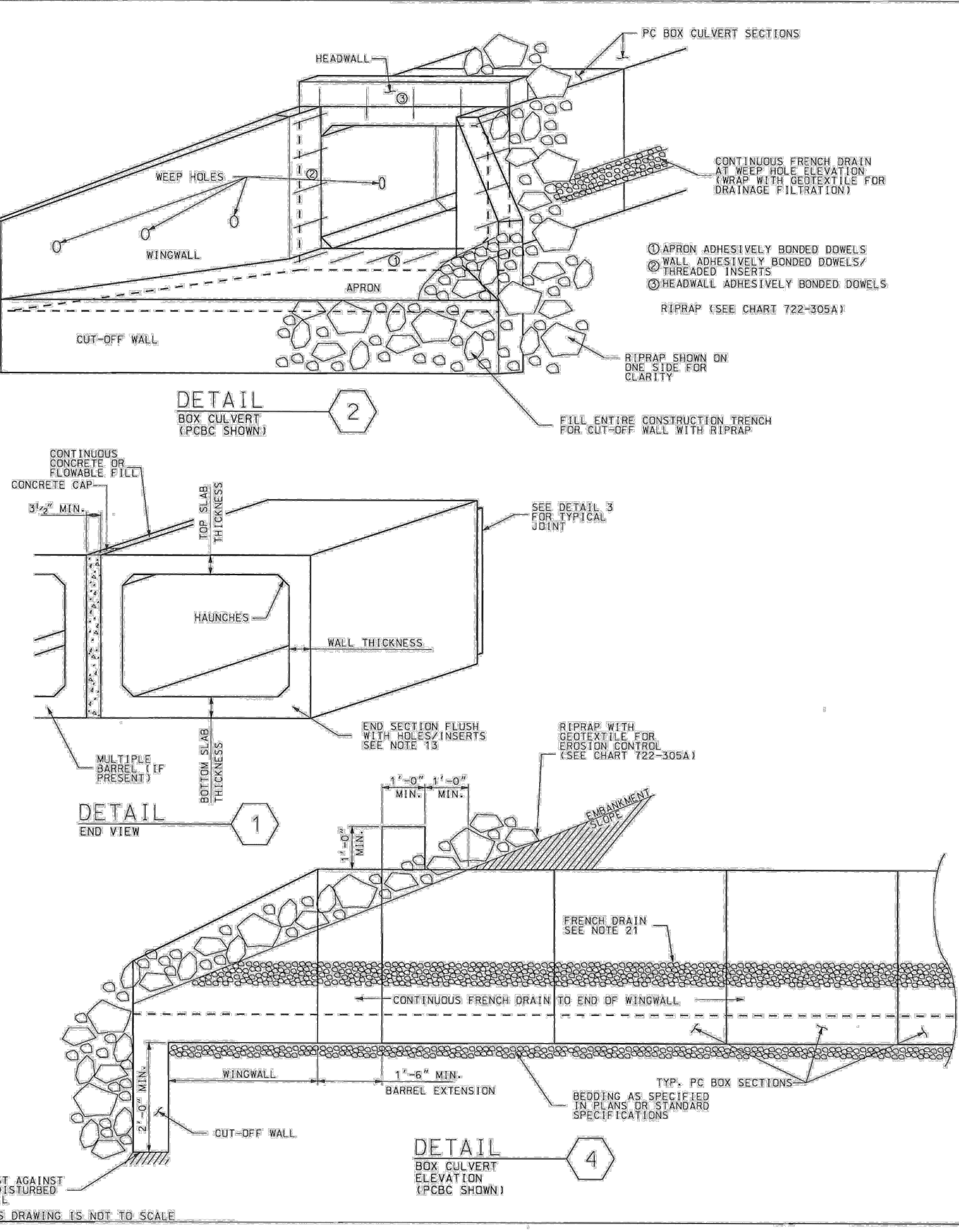
**PRECONSTRUCTION SUPPORT ENGINEER**

**SOUTH CAROLINA**  
 REGISTERED PROFESSIONAL ENGINEER  
 NO. 8858  
 ELMAN SYLVESTER

DATE: JANUARY 27, 2010

**SCDOT**  
 SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DESIGN STANDARDS OFFICE  
 909 PARK STREET  
 ROOM 405  
 COLUMBIA, SC 29201

722-305-00  
 DEFECTIVE LETTER DATE: MAY 2010 (THIS DRAWING IS NOT TO SCALE)



**REFERENCES**

**NATIONAL DOCUMENTS**

SECTION 10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

**SCOT DOCUMENTS**

SECTION 10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

1.0 NOTES  
 1.1 ALL DIMENSIONS, DESIGN, MANUFACTURING, TESTING, GEOMETRY, AND PRODUCT PERFORMANCE FOR PRECAST CONCRETE SHALL BE IN ACCORDANCE WITH ASTM D 289 OR M 213 OR ASTM C 1433 OR C 1577 EXCEPT AS NOTED.

1.2 FABRICATION AND INSTALLATION SHALL COMPLY WITH THE SCOT STANDARD SPECIFICATIONS.

1.3 WHEN LINED DESIGN IS SPECIFIED, DESIGN PRECAST RING USING ACHSIO LIFTED BRIDGE DESIGN SPECIFICATIONS, CURRENT EDITION.

1.4 REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH ASTM A 615, A 618, A 618-3, OR ASTM C 1577 MAY BE USED FOR PRECAST CONCRETE UNLESS OTHERWISE SPECIFIED IN THE PLANS.

1.5 CONCRETE FOR PRECAST SHALL BE MINIMUM CLASS 5000 MEETING THE REQUIREMENTS OF SECTION 10.10 OF THE SCOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (LATEST EDITION). CONCRETE FOR PRECAST CURBS SHALL BE IN ACCORDANCE WITH ASTM D 289 OR M 213 OR ASTM C 1433 OR C 1577 EXCEPT AS NOTED.

1.6 REINFORCEMENT STEEL SHALL BE ASTM A 615, A 618, A 618-3, OR ASTM C 1577 EXCEPT AS NOTED.

1.7 MANUFACTURERS WISHING TO SUPPLY PRECAST FOR USE ON SCOT PROJECTS SHALL FELLOW REQUIREMENTS OF SCOT QUALIFIED PRODUCT LIST 14.

1.8 SEE ALSO STANDARD DRAWINGS 722-105-01 & 722-105-02 BOX CULVERT MISCELLANEOUS DATA SHEET.

2.0 DESIGN  
 2.1 SEE PROJECT PLANS FOR CULVERT DESIGN REQUIREMENTS. ALL BOX CULVERTS REQUIRE DESIGN.

2.2 DESIGN ALL BOX CULVERT COMPONENTS USING THE MOST CONSERVATIVE COMBINATION OF FACTORS PERMITTED BY DESIGN CRITERIA. ALL BOX CULVERTS SHALL BE DESIGNED TO CARRY THE FULL DESIGN LOADS WITHOUT EXCESSIVE DEFLECTION, CRACKING, OR OVERSTRESSING. ALL BOX CULVERTS SHALL BE DESIGNED TO WITHSTAND THE FULL DESIGN LOADS WITHOUT EXCESSIVE DEFLECTION, CRACKING, OR OVERSTRESSING.

2.3 REINFORCEMENT BARS SHALL BE INSTALLED WITH A MINIMUM GAP OF 1/2" BETWEEN WALLS OF ADJECTIVELY BOUNDED DOWELS. THIS GAP SHALL BE FILLED WITH FLEXIBLE JOINT SEALANT AND THEN EXPANDED FOAM SHALL BE USED TO PROVIDE PROTECTION FROM SOIL PENETRATION. CONCRETE SHALL BE USED FOR ENTIRE CAP IF DESIRED.

2.4 TYPICAL DETAILS SHOWN MAY BE APPLIED TO PRECAST AND CAST IN PLACE CONSTRUCTION.

3.0 INSTALLATION  
 3.1 PREPARE BED FOR CULVERT SECTIONS AS INDICATED IN SECTION 722 OF THE SCOT STANDARD SPECIFICATIONS OR AS INDICATED IN THE PLANS.

3.2 CONSTRUCT PILES SECTIONS BEGINNING AT THE OUTLET END OF THE CULVERT. INSTALL GROOVE ENDS TO PROVIDE PROTECTION FROM WEATHERING. CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 722.

3.3 FOR PRECAST APPLY JOINT SEALANT IN ACCORDANCE WITH ASTM D 289 AND MANUFACTURER'S RECOMMENDATIONS. SOME INSTALLATION OF PILES SECTIONS IN ACCORDANCE WITH SECTION 722.

3.4 CONSTRUCT WINDWALLS, HEADWALLS, APRONS, AND CUT-OFF WALLS.

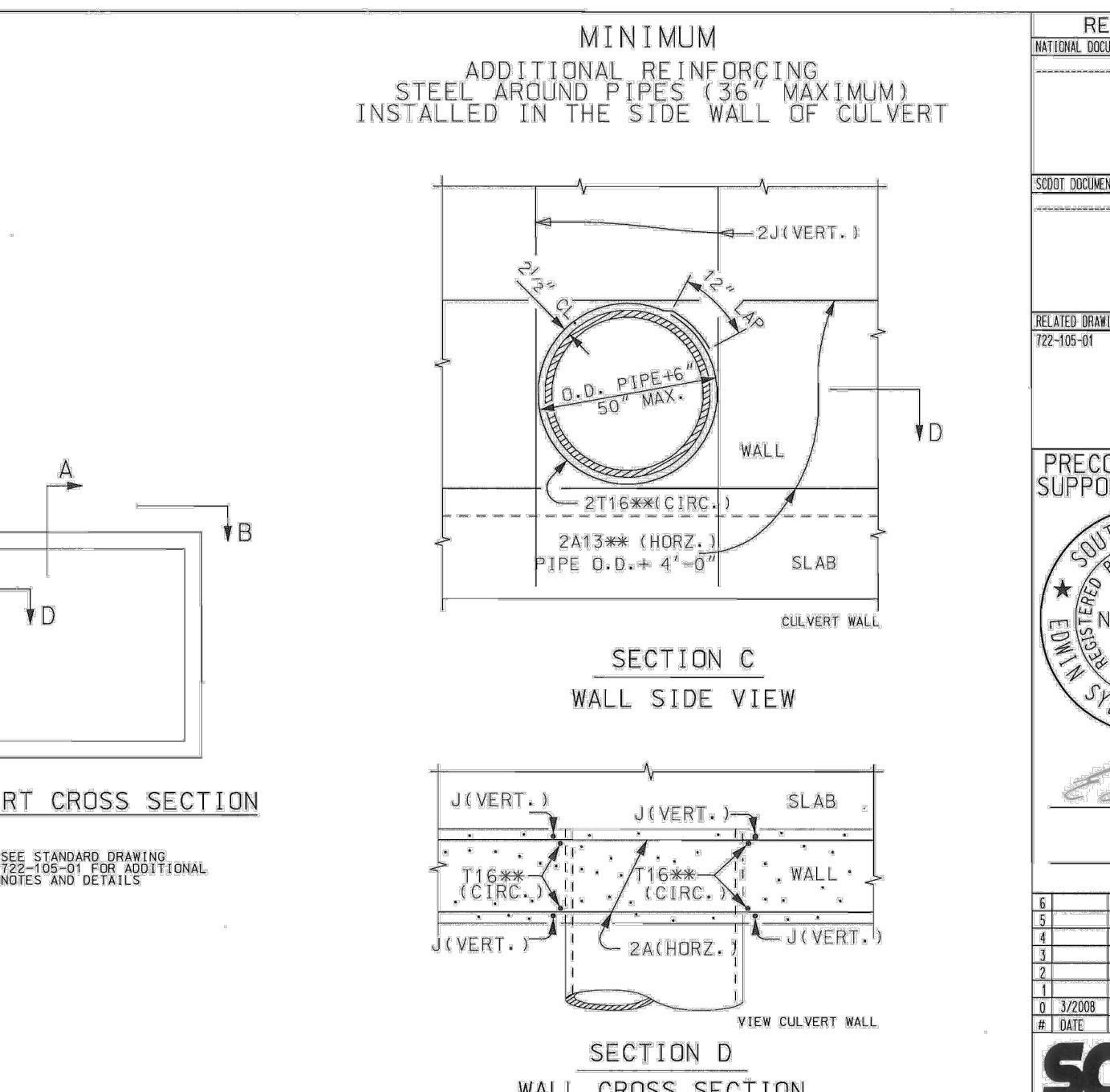
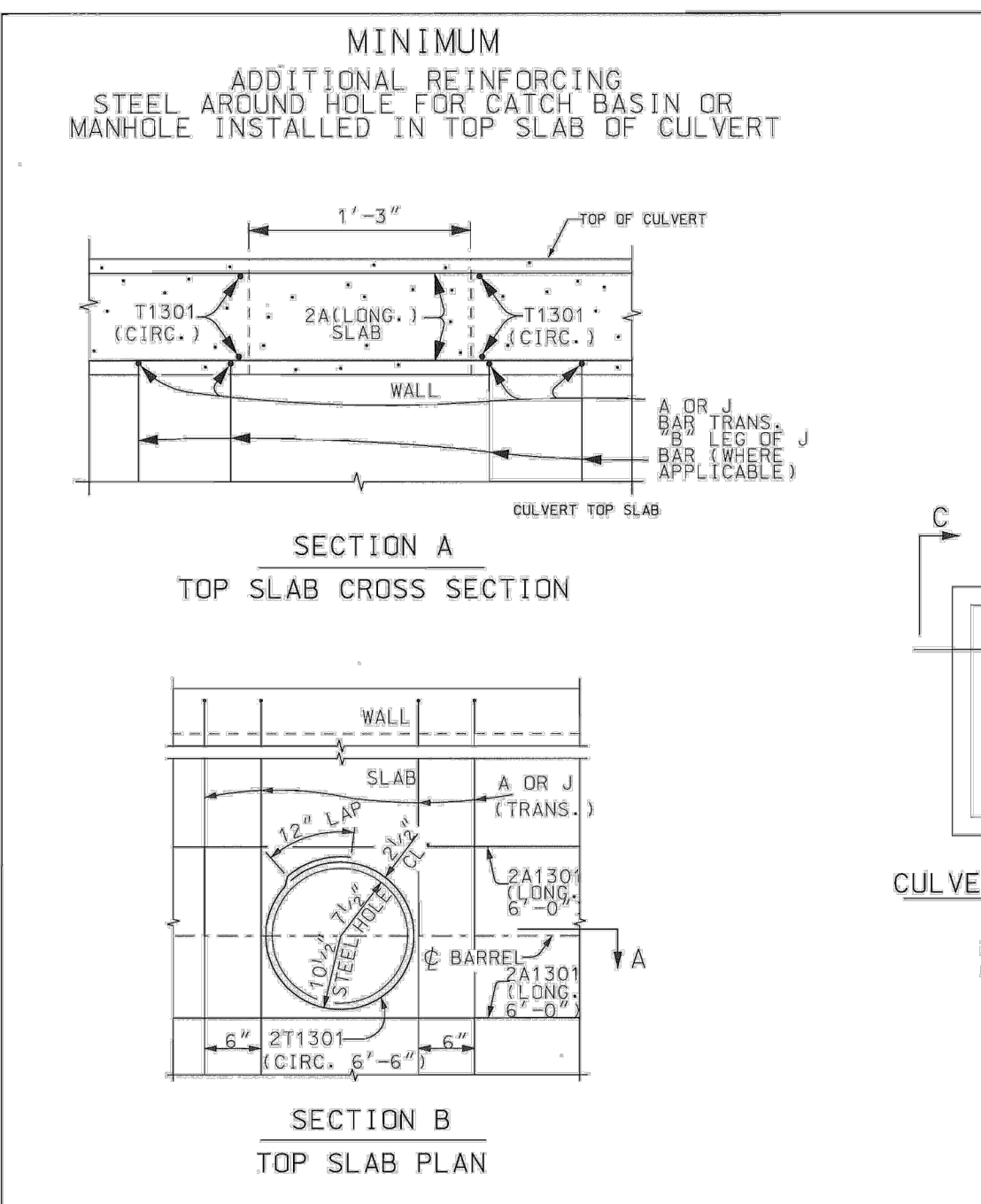
3.5 BACKFILL AS REQUIRED, INSTALLING FRENCH DRAINS AT WELLS HOLES ELEVATIONS. SEE SCOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION SECTION 722.

3.6 TAKE CARE TO AVOID DAMAGE TO THE CULVERT SECTIONS DURING HANDLING, INSTALLATION, AND BACKFILLING OF SECTIONS.

3.7 MULTIPLE BARREL PILES SECTIONS SHALL BE INSTALLED WITH A MINIMUM GAP OF 1/2" BETWEEN WALLS OF ADJECTIVELY BOUNDED DOWELS. THIS GAP SHALL BE FILLED WITH FLEXIBLE JOINT SEALANT AND THEN EXPANDED FOAM SHALL BE USED TO PROVIDE PROTECTION FROM SOIL PENETRATION. CONCRETE SHALL BE USED FOR ENTIRE CAP IF DESIRED.

4.0 PAY ITEMS  
 SEE PROJECT PLANS FOR CULVERT SHEETS AND REQUIRED PAY ITEMS.

TABLE 722-305A		MINIMUM RIRIPAP	
MINIMUM	1.50	MINIMUM	1.50
B	0.75	UP TO 36	1.50
C	1.30	UP TO 36	1.50



**REFERENCES**

**NATIONAL DOCUMENTS**

SECTION 10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

**SCOT DOCUMENTS**

SECTION 10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

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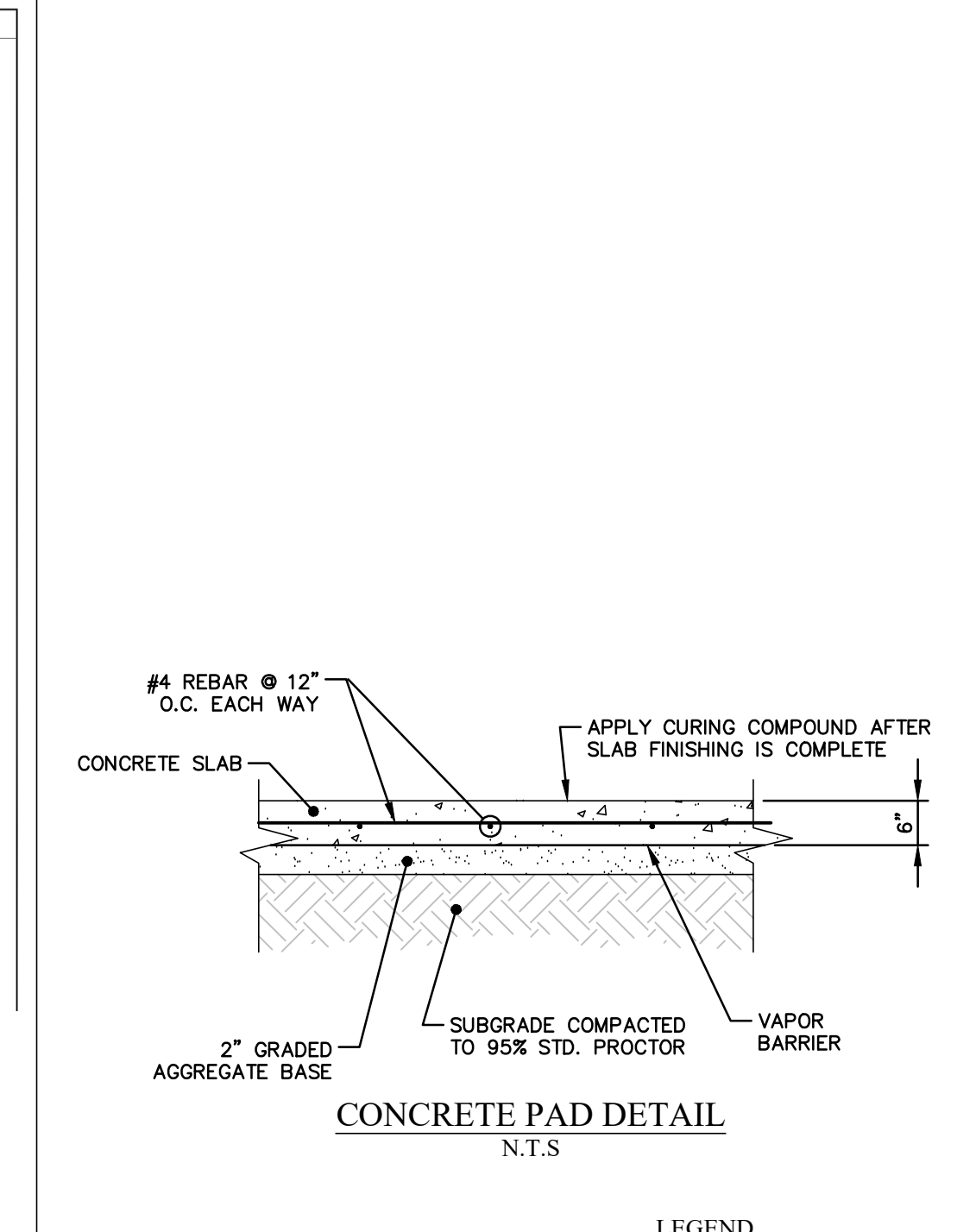
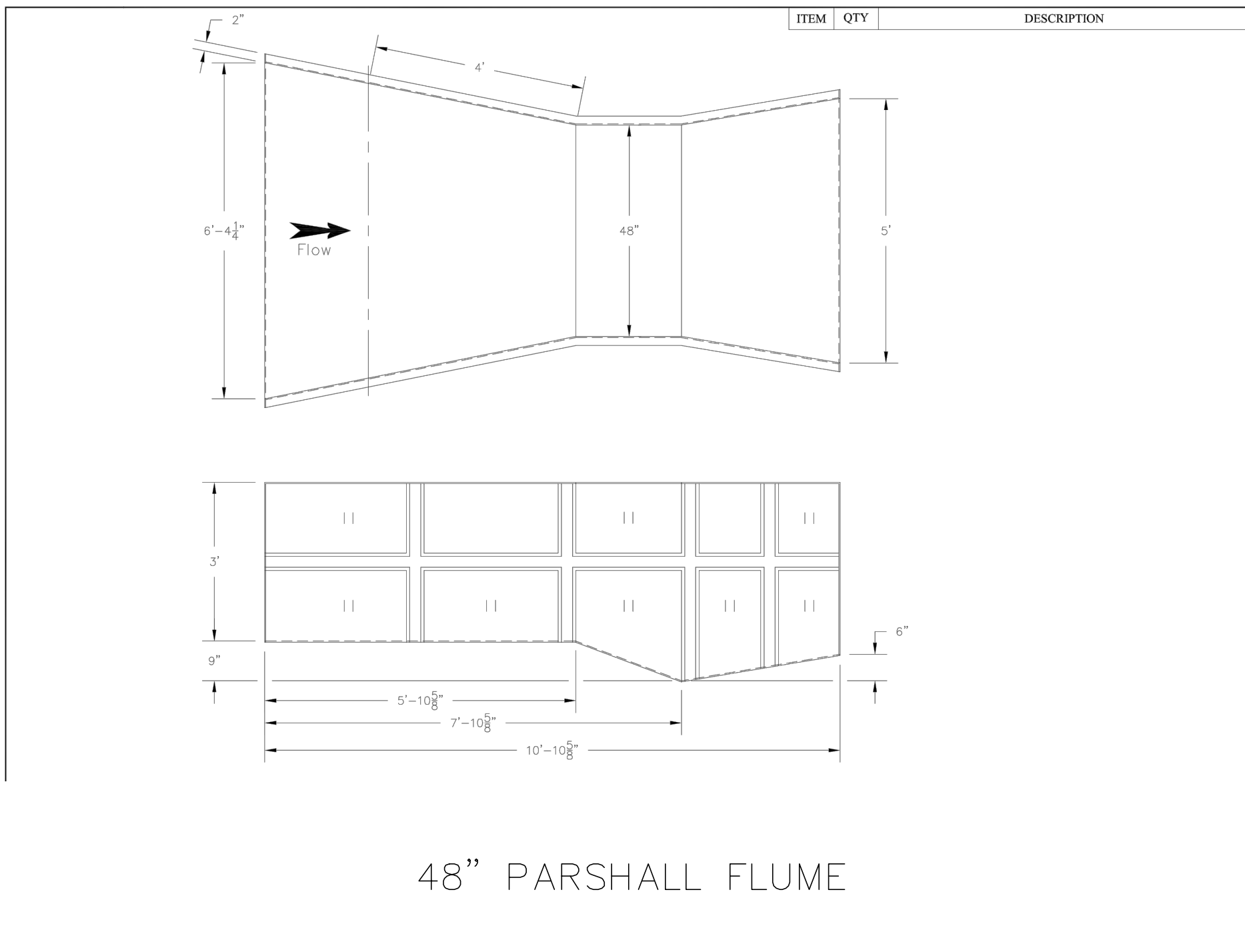
**PRECONSTRUCTION SUPPORT ENGINEER**

**SOUTH CAROLINA**  
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 NO. 8858  
 ELMAN SYLVESTER

DATE: MARCH 3, 2008

**SCDOT**  
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 COLUMBIA, SC 29201

722-105-02  
 DEFECTIVE LETTER DATE: MAY 2010



**REFERENCES**

**NATIONAL DOCUMENTS**

SECTION 10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

**SCOT DOCUMENTS**

SECTION 10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

10.10-10.12: BOX CULVERT PRECAST SPECIFICATION FOR ROADWAY CONSTRUCTION

1.0 NOTES  
 1.1 ALL DIMENSIONS, DESIGN, MANUFACTURING, TESTING, GEOMETRY, AND PRODUCT PERFORMANCE FOR PRECAST CONCRETE SHALL BE IN ACCORDANCE WITH ASTM D 289 OR M 213 OR ASTM C 1433 OR C 1577 EXCEPT AS NOTED.

1.2 FABRICATION AND INSTALLATION SHALL COMPLY WITH THE SCOT STANDARD SPECIFICATIONS.

1.3 WHEN LINED DESIGN IS SPECIFIED, DESIGN PRECAST RING USING ACHSIO LIFTED BRIDGE DESIGN SPECIFICATIONS, CURRENT EDITION.

1.4 REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH ASTM A 615, A 618, A 618-3, OR ASTM C 1577 EXCEPT AS NOTED.

1.5 CONCRETE FOR PRECAST SHALL BE MINIMUM CLASS 5000 MEETING THE REQUIREMENTS OF SECTION 10.10 OF THE SCOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (LATEST EDITION). CONCRETE FOR PRECAST CURBS SHALL BE IN ACCORDANCE WITH ASTM D 289 OR M 213 OR ASTM C 1433 OR C 1577 EXCEPT AS NOTED.

1.6 REINFORCEMENT STEEL SHALL BE ASTM A 615, A 618, A 618-3, OR ASTM C 1577 EXCEPT AS NOTED.

1.7 MANUFACTURERS WISHING TO SUPPLY PRECAST FOR USE ON SCOT PROJECTS SHALL FELLOW REQUIREMENTS OF SCOT QUALIFIED PRODUCT LIST 14.

1.8 SEE ALSO STANDARD DRAWINGS 722-105-01 & 722-105-02 BOX CULVERT MISCELLANEOUS DATA SHEET.

2.0 DESIGN  
 2.1 SEE PROJECT PLANS FOR CULVERT DESIGN REQUIREMENTS. ALL BOX CULVERTS REQUIRE DESIGN.

2.2 DESIGN ALL BOX CULVERT COMPONENTS USING THE MOST CONSERVATIVE COMBINATION OF FACTORS PERMITTED BY DESIGN CRITERIA. ALL BOX CULVERTS SHALL BE DESIGNED TO CARRY THE FULL DESIGN LOADS WITHOUT EXCESSIVE DEFLECTION, CRACKING, OR OVERSTRESSING. ALL BOX CULVERTS SHALL BE DESIGNED TO WITHSTAND THE FULL DESIGN LOADS WITHOUT EXCESSIVE DEFLECTION, CRACKING, OR OVERSTRESSING.

2.3 REINFORCEMENT BARS SHALL BE INSTALLED WITH A MINIMUM GAP OF 1/2" BETWEEN WALLS OF ADJECTIVELY BOUNDED DOWELS. THIS GAP SHALL BE FILLED WITH FLEXIBLE JOINT SEALANT AND THEN EXPANDED FOAM SHALL BE USED TO PROVIDE PROTECTION FROM SOIL PENETRATION. CONCRETE SHALL BE USED FOR ENTIRE CAP IF DESIRED.

2.4 TYPICAL DETAILS SHOWN MAY BE APPLIED TO PRECAST AND CAST IN PLACE CONSTRUCTION.

3.0 INSTALLATION  
 3.1 PREPARE BED FOR CULVERT SECTIONS AS INDICATED IN SECTION 722 OF THE SCOT STANDARD SPECIFICATIONS OR AS INDICATED IN THE PLANS.

3.2 CONSTRUCT PILES SECTIONS BEGINNING AT THE OUTLET END OF THE CULVERT. INSTALL GROOVE ENDS TO PROVIDE PROTECTION FROM WEATHERING. CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 722.

3.3 FOR PRECAST APPLY JOINT SEALANT IN ACCORDANCE WITH ASTM D 289 AND MANUFACTURER'S RECOMMENDATIONS. SOME INSTALLATION OF PILES SECTIONS IN ACCORDANCE WITH SECTION 722.

3.4 CONSTRUCT WINDWALLS, HEADWALLS, APRONS, AND CUT-OFF WALLS.

3.5 BACKFILL AS REQUIRED, INSTALLING FRENCH DRAINS AT WELLS HOLES ELEVATIONS. SEE SCOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION SECTION 722.

3.6 TAKE CARE TO AVOID DAMAGE TO THE CULVERT SECTIONS DURING HANDLING, INSTALLATION, AND BACKFILLING OF SECTIONS.

3.7 MULTIPLE BARREL PILES SECTIONS SHALL BE INSTALLED WITH A MINIMUM GAP OF 1/2" BETWEEN WALLS OF ADJECTIVELY BOUNDED DOWELS. THIS GAP SHALL BE FILLED WITH FLEXIBLE JOINT SEALANT AND THEN EXPANDED FOAM SHALL BE USED TO PROVIDE PROTECTION FROM SOIL PENETRATION. CONCRETE SHALL BE USED FOR ENTIRE CAP IF DESIRED.

4.0 PAY ITEMS  
 SEE PROJECT PLANS FOR CULVERT SHEETS AND REQUIRED PAY ITEMS.

**LEGEND**

PART #	DESCRIPTION	QTY
1	STRAIGHT PLUG	2
2	BOTTOM HINGE	2
3	TOP HINGE	2
4	CORNER ELBOW	8
5	PLUNGER RIB	1
6	LATCH FORK	2
7	FORK CATCH	2
8	PLUNGER ROD CATCH	1
9	LOCK KEEPER GUIDE	1
10	LOCK KEEPER	1
11	ORNAMENTAL TOPS	6
12	TRUSS RODS	4
13	STRETCHER BAR	4
14	HOOK BOLTS	12

**NOTES**  
 1. THE FENCE SHALL BE #9 GAGE FENCE FABRIC, STANDARD 2-INCH CHAIN LINK DIAMOND MESH.  
 2. ALL FENCE COMPONENT MATERIALS SHALL BE EITHER HOT DIPPED GALVANIZED STEEL OR IRON.  
 FENCE FABRIC SHALL BE ALUMINUM COATED.

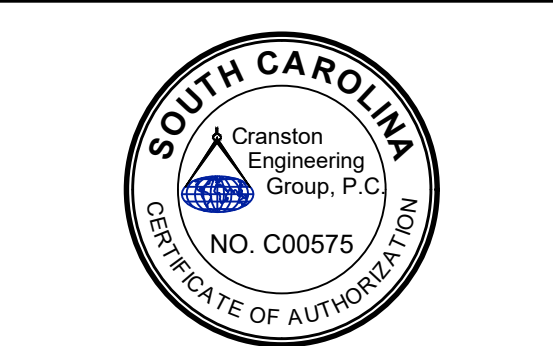
**CHAIN LINK FENCE & GATE**



**CRANSTON**  
 ENGINEERING

**ENGINEERS - PLANNERS - SURVEYORS**

14 Westbury Park Way, Suite 202  
 Bluffton, South Carolina 29910  
 Telephone 843-815-3191  
 CranstonEngineering.com



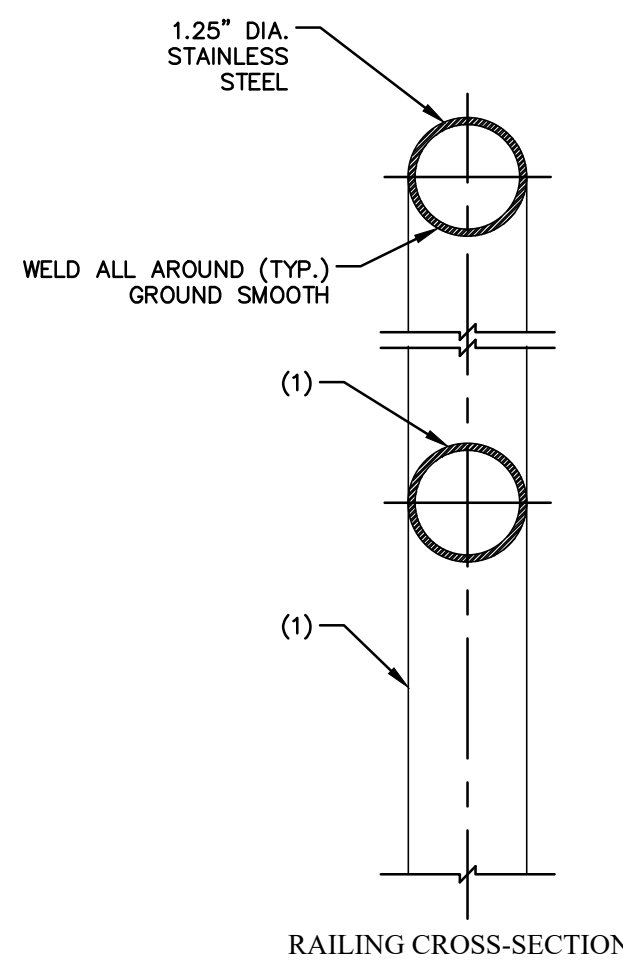
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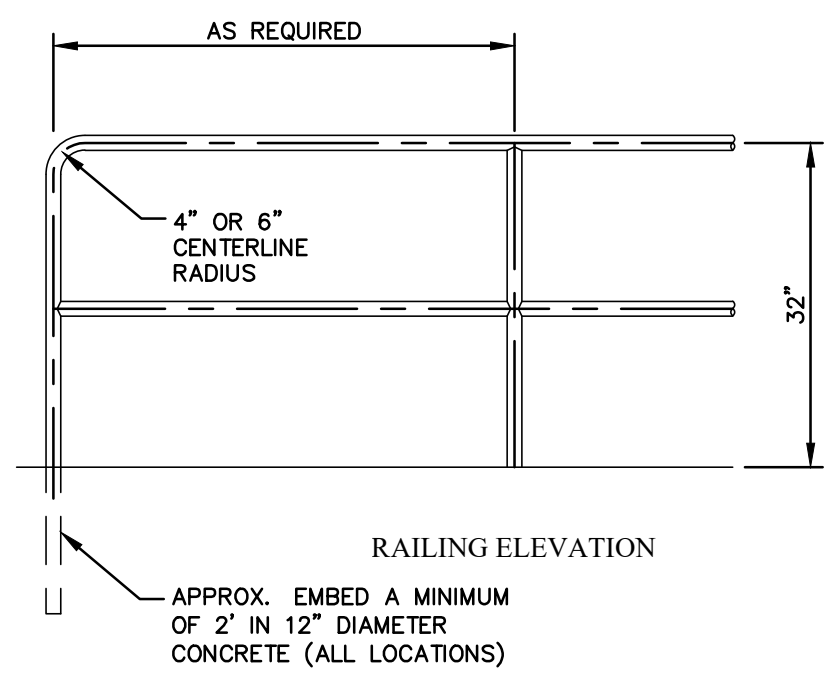
**RAW WATER CANAL IMPROVEMENTS**  
**RIVER PUMP STATION & PIRR. ROAD CANAL CROSSING**  
**CIVIL DETAILS**

DRAWN BY: RJE  
 CHECKED BY: ---  
 APPROVED BY: MER  
 DATE: 5/14/2020  
 SCALE: ---  
 JOB No: 2018-0640  
 DRAWING No: C6.1

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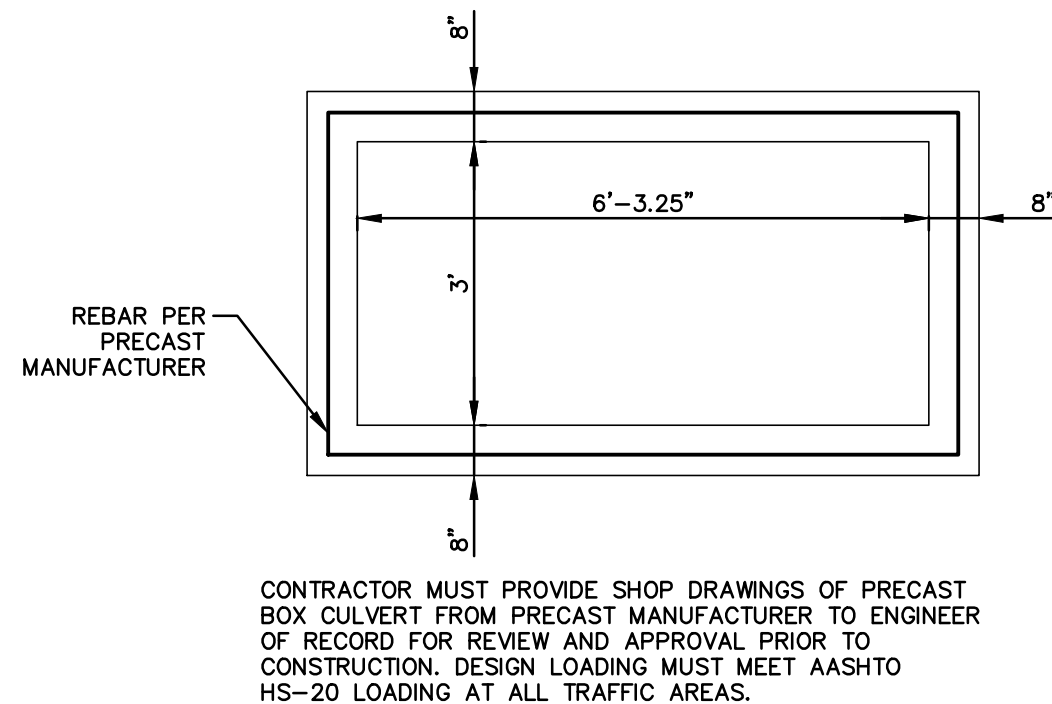


NOTE:  
CONTRACTOR TO PROVIDE HANDRAIL  
SHOP DRAWINGS BEFORE FABRICATION

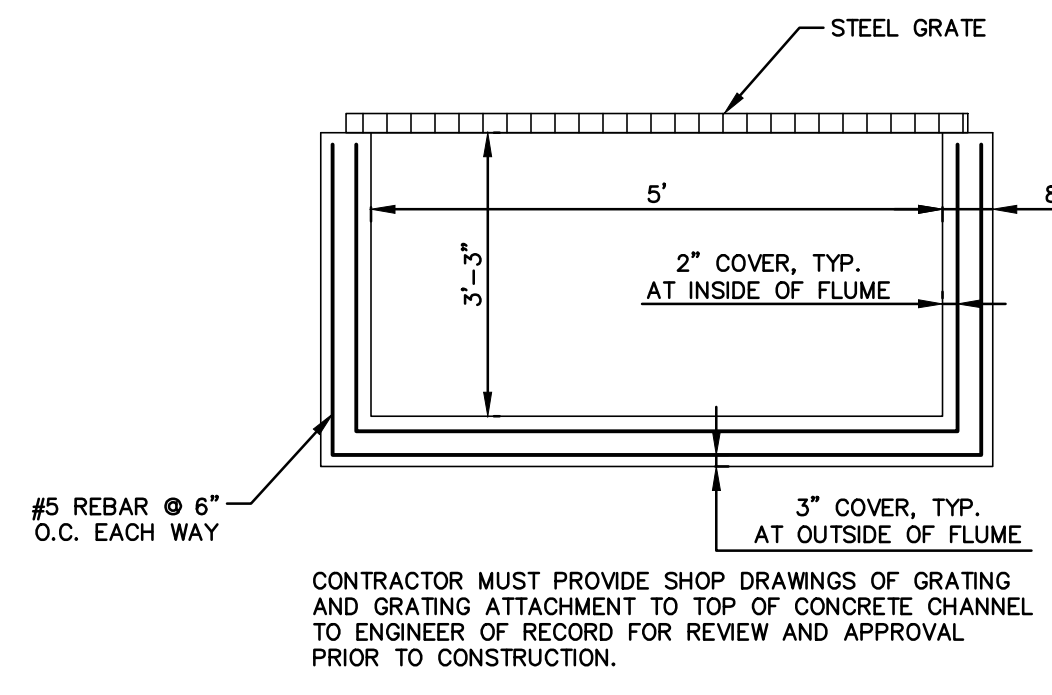


RAILING CROSS-SECTION

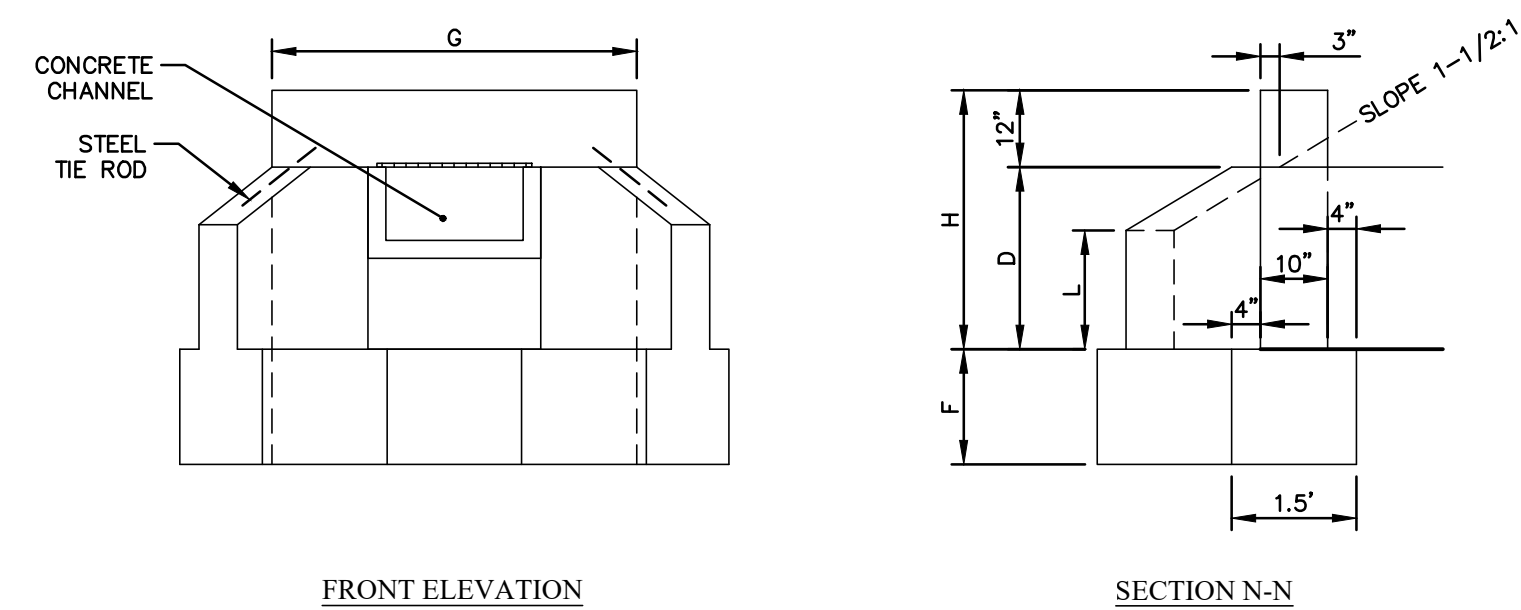
HANDRAIL DETAIL  
N.T.S.



PRECAST BOX CULVERT (UPSTREAM FLUME)  
SECTION VIEW  
N.T.S.



CAST-IN-PLACE CONCRETE CHANNEL (DOWNSTREAM FLUME)  
SECTION VIEW  
N.T.S.

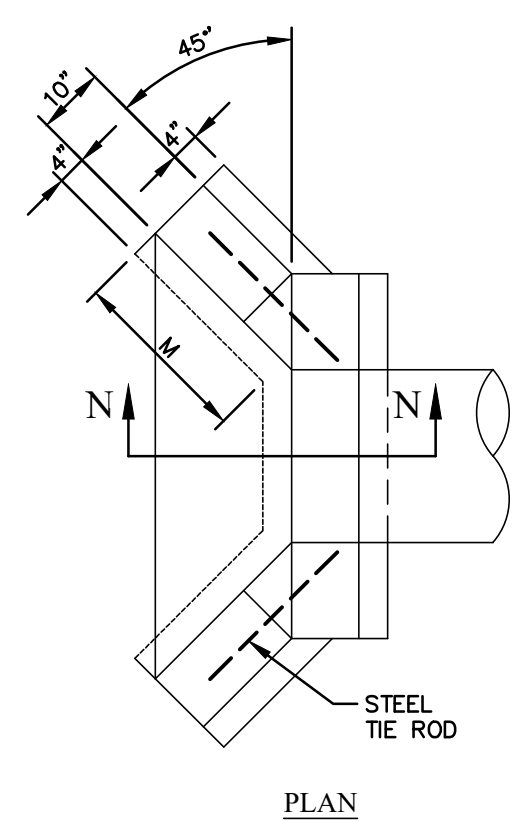


FRONT ELEVATION

SECTION N-N

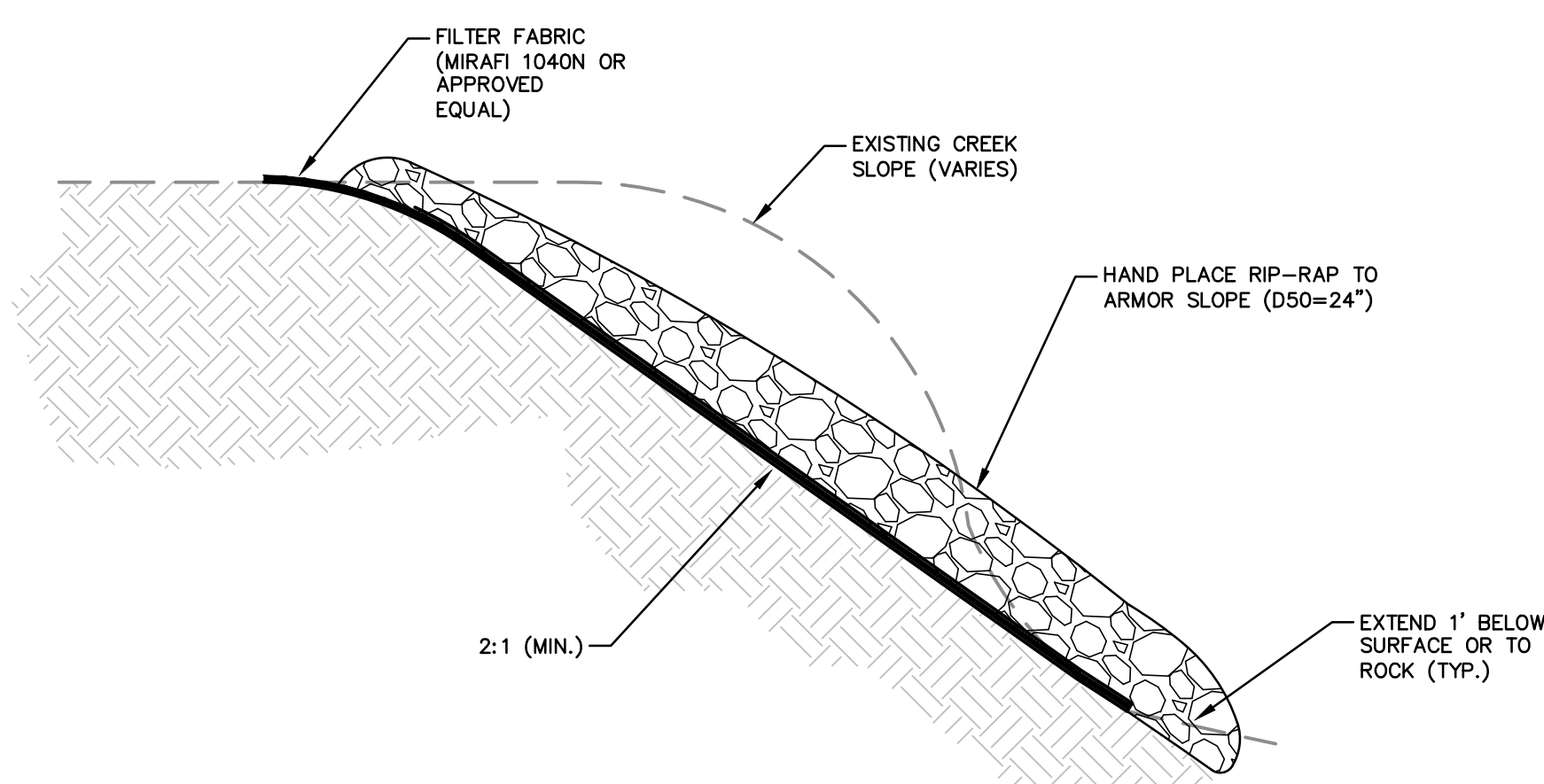
45° WINGS  
DIMENSIONS

OPENING		WALL		FOOTING	
D	H	G	L	M	F
48"	5'0"	6'4"	2'6"	4'0"	2'0"



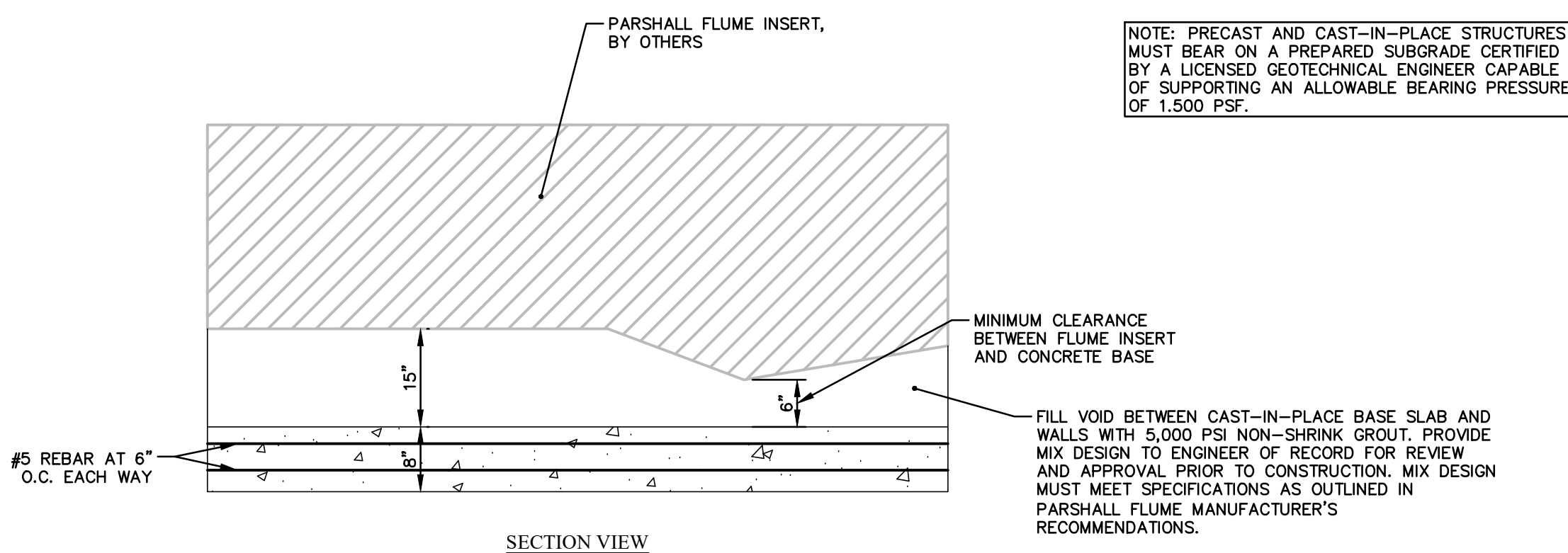
PLAN

POURED IN PLACE WINGED HEADWALL  
N.T.S.

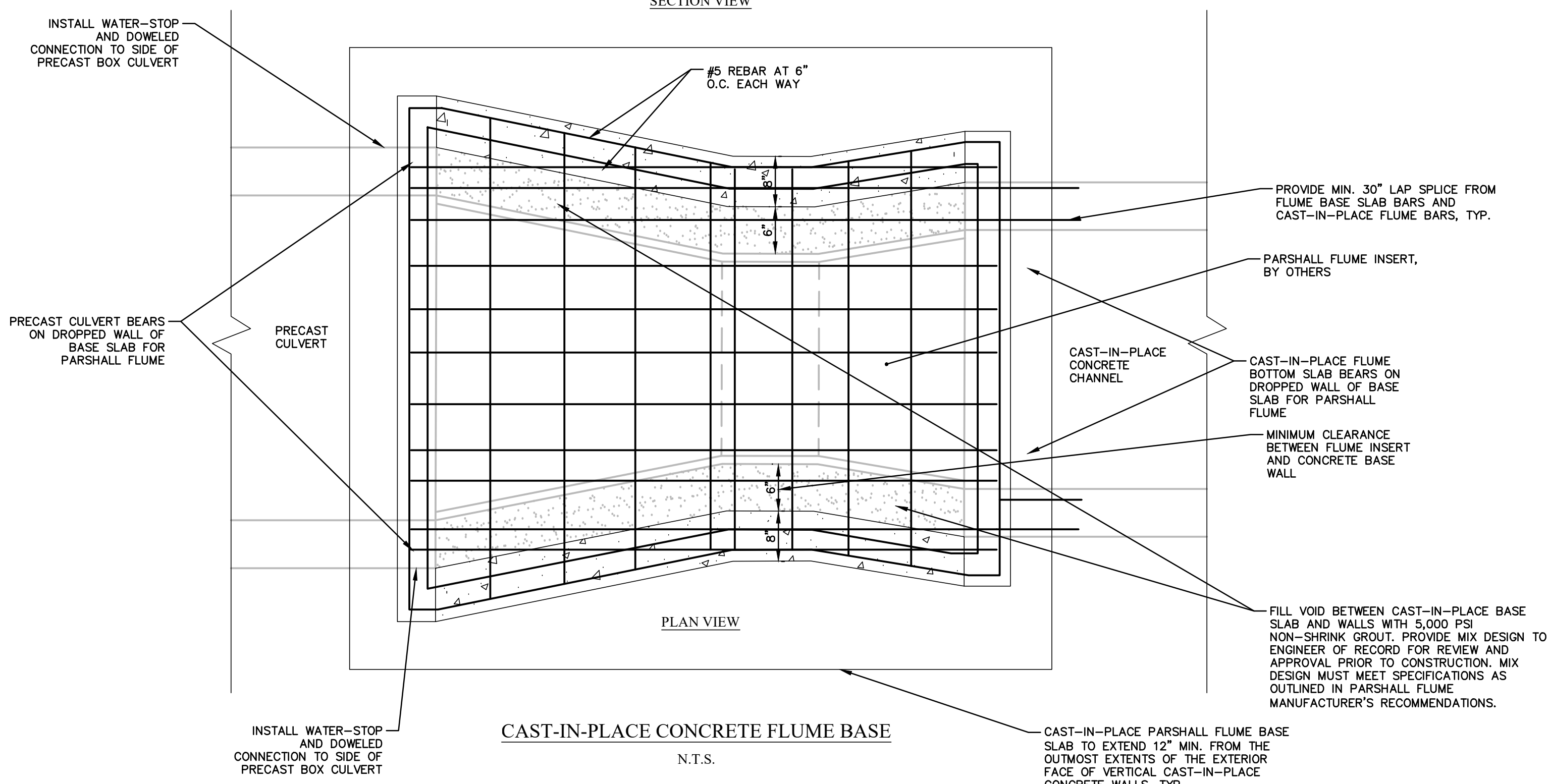


RIP-RAP PROTECTION DETAIL  
N.T.S.

- NOTES:
1. KEY IN UPSTREAM EDGE OF STONE ARMORING TO PROTECT AGAINST UNDERMINING SCOUR FROM FLOODWATERS.
  2. CONTRACTOR SHOULD MATCH LOOK AND INSTALLATION STYLE OF EXISTING RIP-RAP PROTECTION ON SITE.
  3. PROPOSED SLOPE IS TO BE LAID BACK AT MINIMUM 2:1 SLOPE UNLESS OTHERWISE NOTED.
  4. RIP-RAP SHALL BE INSTALLED TO A DEPTH OF APPROXIMATELY 2'.



SECTION VIEW



CAST-IN-PLACE CONCRETE FLUME BASE  
N.T.S.



# BID SET

REV #	DATE	DESCRIPTION

RAW WATER CANAL  
IMPROVEMENTS

RIVER PUMP STATION & PURR.  
ROAD CANAL CROSSING

CIVIL DETAILS

DRAWN BY:	RJE
CHECKED BY:	---
APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	---
JOB No.	2018-0640
DRAWING No.	C6.2



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# DIVISION 2 AERIAL FLUME REPAIRS

PREPARED FOR  
**BEAUFORT-JASPER WATER & SEWER AUTHORITY**

6 SNAKE ROAD  
OKATIE, SC 29909

**PROJECT DATA:**

1. OWNER/DEVELOPER:  
BEAUFORT-JASPER WATER & SEWER AUTHORITY  
6 SNAKE ROAD  
OKATIE, SC 29909  
PHONE: 843-987-8075
- 24 HOUR CONTACT:  
NAME: MR. BRIAN CHEMSAK  
PHONE: (843)-987-8062



**LOCATION MAP**  
N.T.S.



**VICINITY MAP**  
N.T.S.

Subset Plan Index	
Sheet Number	Sheet Title
C7.0	SUBSET TITLE SHEET
S1.1	STRUCTURAL NOTES
S1.2	CONCRETE FLUME PILE & BOTTOM SLAB RETROFIT PLAN
S1.3	CONCRETE FLUME SIDE WALL & HEADWALL RETROFIT PLAN
S1.4	STRUCTURAL DETAILS
S1.5	STRUCTURAL DETAILS



**BID SET**

REV.	DATE	DESCRIPTION
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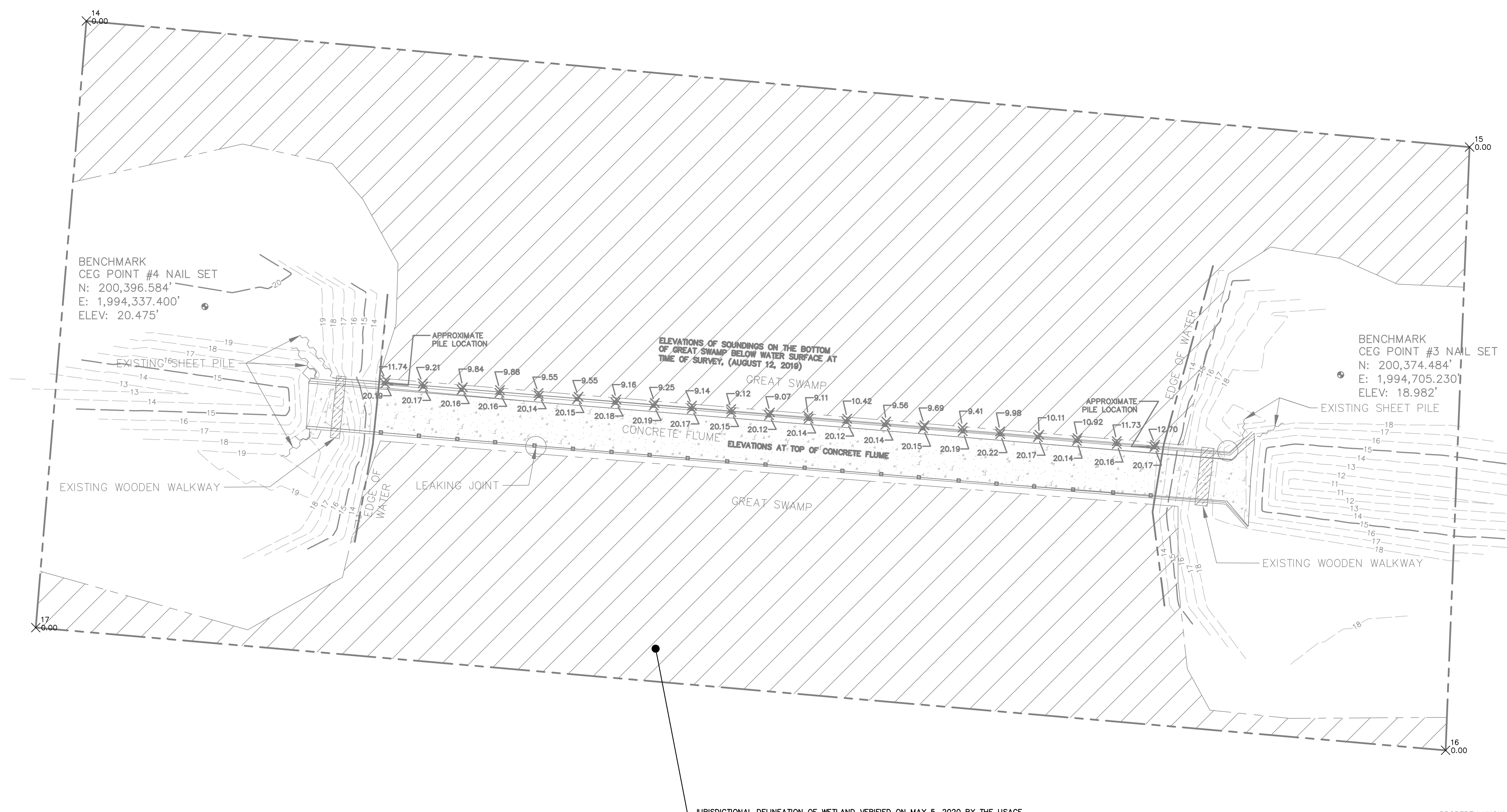
**RAW WATER CANAL  
IMPROVEMENTS**

**AERIAL FLUME REPAIRS**

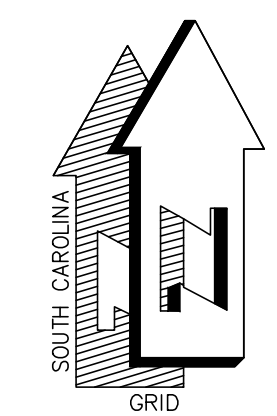
**SUBSET TITLE SHEET**

DRAWN BY: TJC  
CHECKED BY: JAB  
APPROVED BY: JRE  
DATE: 05-14-2020  
SCALE: AS SHOWN  
JOB No. 2018-0640  
DRAWING No.

**C7.0**



PROPERTY KNOWN AS FLUME AREA  
 JASPER COUNTY, SOUTH CAROLINA  
 SCALE: 1" = 30' AUGUST 12, 2019



**LEGEND**

WETLAND AREA

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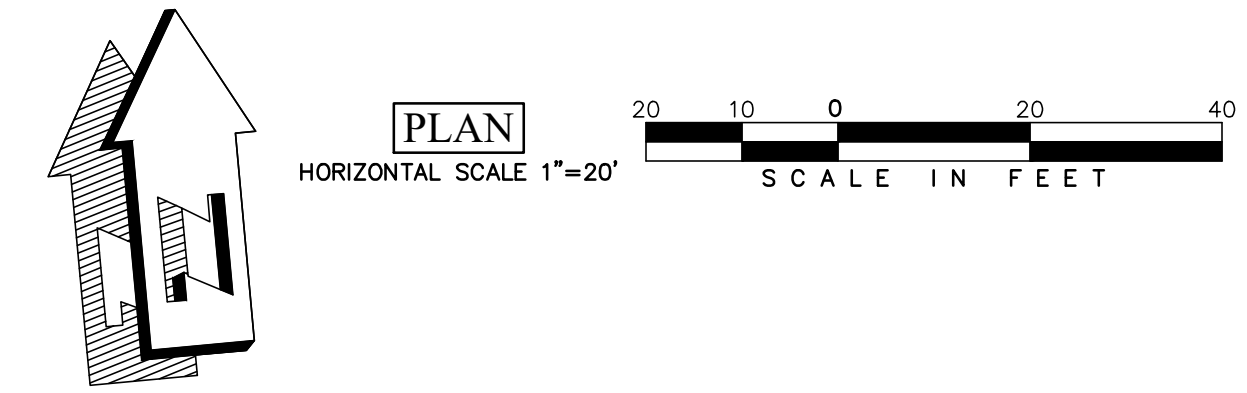
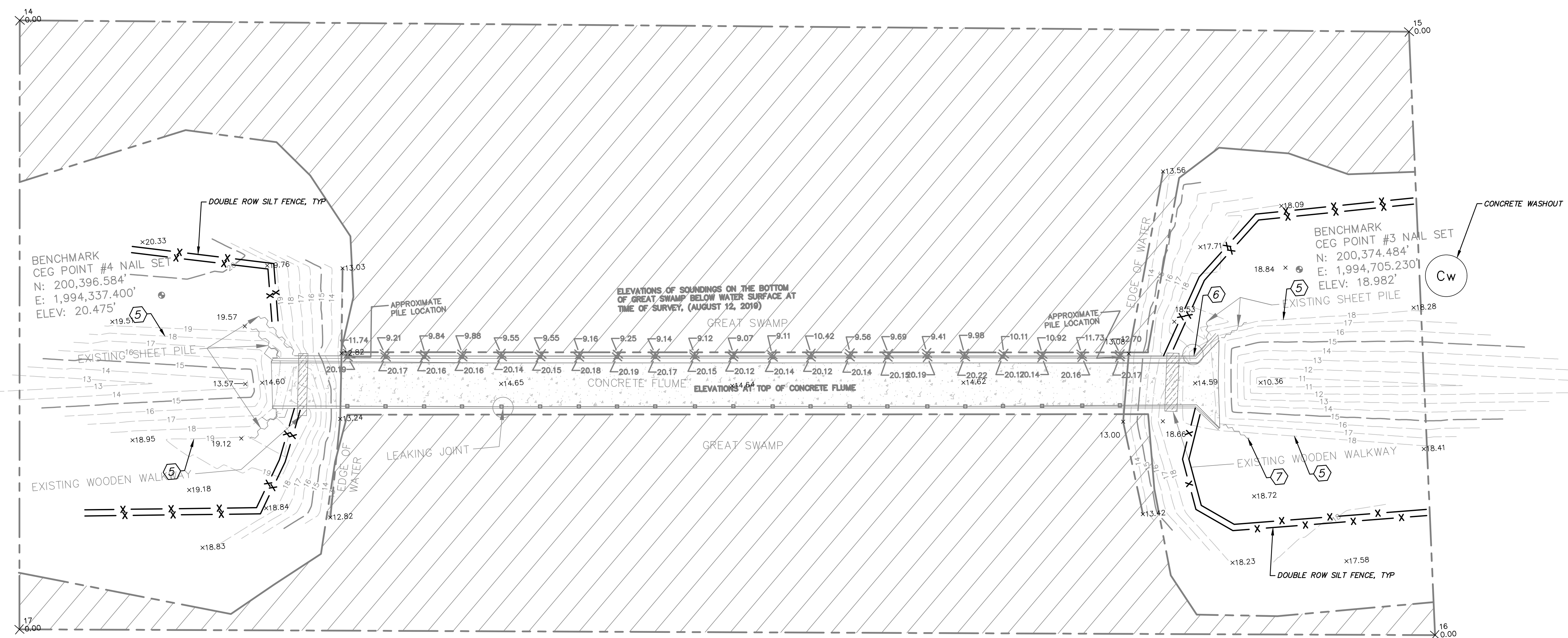
REV #	DATE	DESCRIPTION

RAW WATER CANAL IMPROVEMENTS
AERIAL FLUME REPAIRS
EXISTING CONDITIONS

DRAWN BY:	RJE
CHECKED BY:	---
APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	
JOB No.	2018-0640
DRAWING No.	C8.0





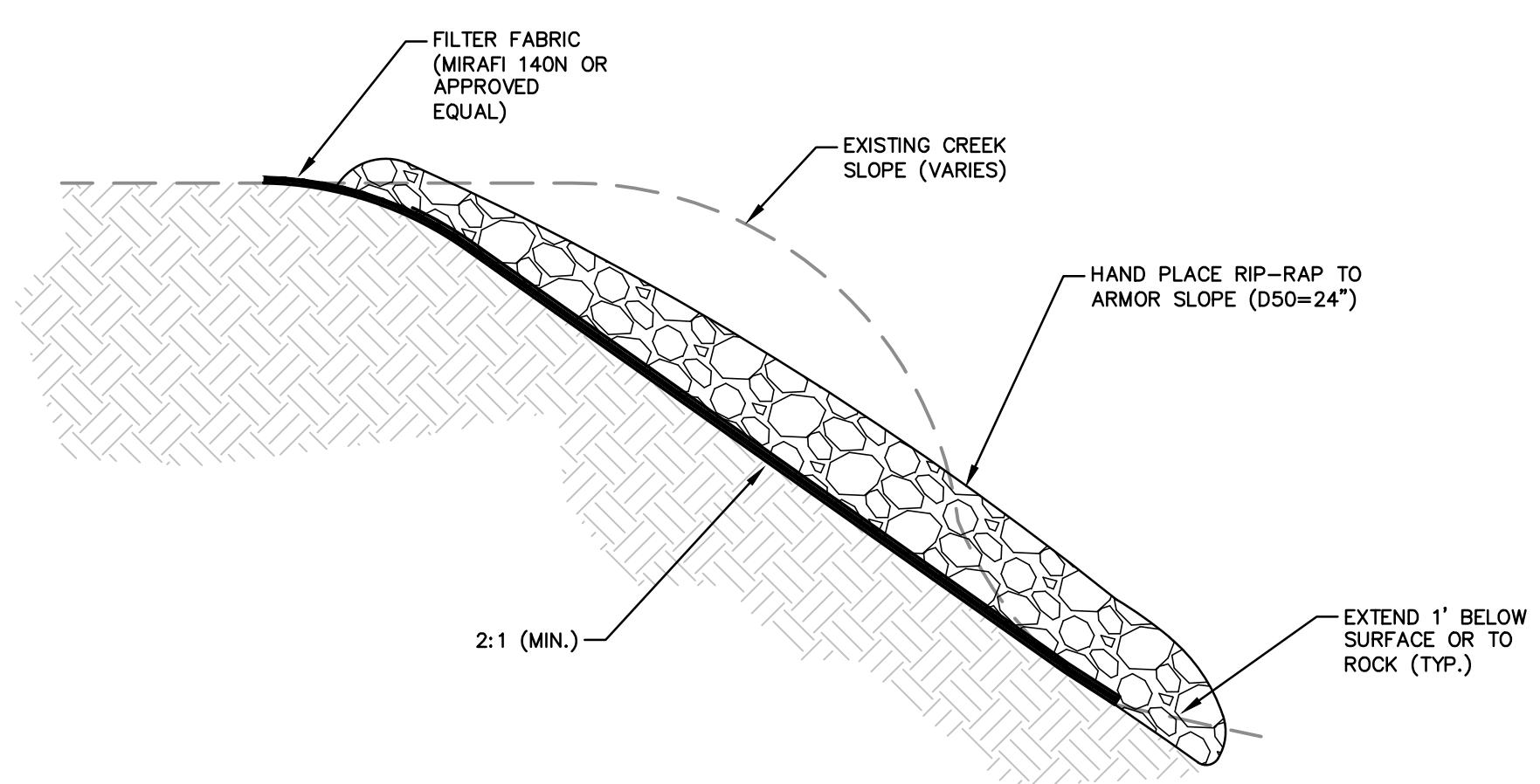


**NO CLEARING, FILL, DREDGING, OR OTHER IMPACTS TO OCCUR WITHIN WETLAND AREA**

- GENERAL NOTES**
- CONTRACTOR TO PROVIDE BYPASS PLAN(S) TO BWSA/ENGINEERING 14 DAYS PRIOR TO START DATE. BYPASS PLAN(S) TO BE APPROVED BY BWSA/ENGINEER BEFORE CONSTRUCTION BEGINS.
    - BYPASS PUMPING OF CANAL TO ACHIEVE MINIMUM FLOW RATE OF 12 MGD.
    - BACK-UP BYPASS PUMP TO BE PROVIDED AT EACH LOCATION OF CANAL BYPASS.
  - JURISDICTIONAL DELINEATION OF WETLAND VERIFIED ON MAY 5, 2020 BY THE USACE.
  - CONSTRUCTION ENTRANCE(S) TO BE PROVIDED AT NEAREST PUBLIC ROAD CONNECTION ACCESS POINTS.

- REPAIR NOTES:**
- BASE BID**
- (5)** SLOPE STABILIZATION FOR 20 FT MINIMUM HORIZONTAL DISTANCE FROM END OF FLUME. REFER TO CONSTRUCTION DETAIL THIS SHEET.
- BASE BID**
- (6)** BACKFILL EXISTING WASHOUT AREA BEHIND FLUME WALL WITH FLOWABLE FILL IN ACCORDANCE WITH SCDOT SC-M-210. CONTRACTOR TO PROVIDE MIX DESIGN TO ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
  - (7)** INSTALL 10 LINEAR FEET OF NEW SHEET PILE HEADWALL, TO MATCH EXISTING SHEET PILE TYPE CURRENTLY INSTALLED AT THE PROJECT SITE. INSTALL TO A DEPTH OF 27'-0" FEET BELOW EXISTING GRADE OR TO REFUSAL.

- BYPASS PERFORMANCE SPECIFICATION**
- MINIMUM CAPACITY SCHEDULE
    - BYPASS TO PROVIDE THE MINIMUM FLOW RATE AS OUTLINED BELOW. MINIMUM VARIES BASED ON TIME OF YEAR.
      - NOVEMBER – APRIL: 12 MGD (10,000 GPM)
      - MAY – OCTOBER: 22 MGD (18,500 GPM)
  - BACKUP BYPASS TO REMAIN ONSITE DURING ALL HOURS OF BYPASS OPERATION.



**RIP-RAP PROTECTION DETAIL**  
N.T.S.

- NOTES:**
- KEY IN UPSTREAM EDGE OF STONE ARMORING TO PROTECT AGAINST UNDERMINING SCOUR FROM FLOODWATERS.
  - CONTRACTOR SHOULD MATCH LOOK AND INSTALLATION STYLE OF EXISTING RIP-RAP PROTECTION ON SITE.
  - PROPOSED SLOPE IS TO BE LAID BACK AT MINIMUM 2:1 SLOPE UNLESS OTHERWISE NOTED.
  - RIP-RAP SHALL BE INSTALLED TO A DEPTH OF APPROXIMATELY 2'.



**BID SET**

REV #	DATE	DESCRIPTION

RAW WATER CANAL IMPROVEMENTS	AERIAL FLUME REPAIRS	SITE PLAN
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DRAWN BY:	RJE
CHECKED BY:	---
APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	C9.0



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# STRUCTURAL NOTES

## GENERAL REQUIREMENTS

- WHERE A SECTION OR DETAIL IS SHOWN FOR ONE CONDITION, IT SHALL APPLY TO ALL SIMILAR CONDITIONS.
- THE DESIGN ADEQUACY AND SAFETY OF ERECTION BRACING, SHORING, TEMPORARY SUPPORTS, ETC. SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- DO NOT SCALE DRAWINGS. FOLLOW DIMENSIONS SHOWN ON PLANS.
- CONTRACTOR SHALL COORDINATE AND VERIFY ALL DIMENSIONS AND ELEVATIONS SHOWN HEREIN WITH FIELD CONDITIONS PRIOR TO CONSTRUCTION OR MATERIAL PURCHASE AND SHALL NOTIFY ENGINEER IN WRITING OF DISCREPANCIES.
- DIMENSIONS INDICATED RELATIVE TO EXISTING STRUCTURE ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION OR MATERIALS PURCHASE. CONTRACTOR SHALL NOTIFY ENGINEER IN WRITING OF DISCREPANCIES.
- SPECIFIED ANCHOR SYSTEMS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. SPECIAL ATTENTION SHALL BE GIVEN TO THE DRILLING, CLEANING, AND PREPARATION OF HOLES. WHERE ADHESIVE ANCHORS ARE SHOWN, SPECIAL ATTENTION SHALL BE GIVEN TO THE REQUIRED MIXING, APPLICATION, AND CURING TIME OF ADHESIVE TYPE SPECIFIED.

## REINFORCING STEEL

- ALL REINFORCING STEEL SHALL BE ASTM A615, GRADE 60, UNLESS NOTED OTHERWISE.
- ALL WELDED WIRE FABRIC SHALL BE ASTM A185, 70 KSI MINIMUM YIELD STRENGTH.
- ADDITIONAL REINFORCING AND THAT QUANTITY OF REINFORCING OCCURRING AT OPENINGS SHALL BE PLACED EQUALLY EACH SIDE OF OPENINGS AS DETAILED.
- HOOKS IN REINFORCING ARE IN ADDITION TO LENGTH SHOWN.
- REINFORCING IS TO BE SUPPORTED IN FORMS AND SPACED WITH WIRE BAR SUPPORTS ACCORDING TO CRSI "PLACING REINFORCING BARS" UNLESS NOTED OTHERWISE.
- MINIMUM REINFORCING STEEL CLEAR COVERS ARE AS FOLLOWS:
  - CONCRETE CAST DIRECTLY AGAINST EARTH.....3"
  - INTERIOR SLABS.....1"
  - INTERIOR BEAMS AND COLUMNS.....1 1/2"
  - EXTERIOR BEAMS AND COLUMNS.....2"
  - EXTERIOR SLABS.....1 1/2"
- UNLESS NOTED OTHERWISE, ALL BAR REINFORCING LAP SPLICES SHALL HAVE A MINIMUM LAP LENGTH OF 48 BAR DIAMETERS.

## SUBGRADE PREPARATION

- CONTRACTOR SHALL STRIP AND REMOVE ALL VEGETATION, TOPSOIL, ROOTS, AND ORGANIC SOILS FROM THE CONSTRUCTION AREA FOR A DISTANCE OF AT LEAST 5' BEYOND THE EXTENT OF THE STRUCTURE LIMITS. THE DEPTH OF STRIPPING SHALL BE THAT REQUIRED TO REMOVE SIGNIFICANT ROOT ZONES, SMALL TREE STUMPS, AND OTHER UNACCEPTABLE MATERIALS, BUT IN NO CASE SHALL IT BE LESS THAN 12".
- AFTER TOPSOILS, ETC. WITHIN AND TO A POINT 5' OUTSIDE THE WALL CONSTRUCTION AREA HAVE BEEN REMOVED FROM THE SITE, THE UPPER 24" OF EXPOSED SOILS SHALL BE COMPACTED TO A MINIMUM DENSITY OF 95% STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698).
- COMPACTION TESTING SHALL BE PERFORMED UNDER THE OBSERVATION OF AN APPROVED TESTING LABORATORY SUPERVISED BY A GEOTECHNICAL ENGINEER. UNDERCUT, BACKFILL, AND COMPACT AREAS WHICH PUMP, DEFLECT, OR RUT EXCESSIVELY OR WHICH DO NOT STABILIZE AFTER SUCCESSIVE PASSES OF COMPACTION EQUIPMENT.
- AFTER COMPLETION OF DENSIFICATION OF EXISTING SOILS, PLACE STRUCTURAL FILL FOR BUILDING AND PAVEMENT AREAS IN THIN (8" TO 10") LIFTS COMPACT TO A MINIMUM DENSITY OF 95% STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698). MATERIAL USED AS STRUCTURAL FILL SHALL BE NON-PLASTIC GRANULAR MATERIAL CONTAINING LESS THAN 15% FINES PASSING THROUGH THE NO. 200 SIEVE AND FREE OF ORGANICS, BOULDERS, OR OTHER DELETERIOUS MATERIALS.

## FOUNDATIONS

- ALL FOUNDATION FILL SUBGRADE SOILS SHALL BE COMPACTED AS FOLLOWS: (REF. ASTM D1557) (OR UNLESS OTHERWISE NOTED IN BJWSA TECHNICAL SPECIFICATIONS)
  - 95% MODIFIED PROCTOR FOR GREATER THAN 18" BELOW FINAL FILL.
  - 98% MODIFIED PROCTOR FOR THE UPPER 18" BENEATH BUILDINGS AND PAVEMENTS.
- SOILS TESTING LABORATORY SHALL CONDUCT COMPACTION TESTS IN ACCORDANCE WITH ASTM D698. RATE OF COMPACTION SHALL BE AS FOLLOWS:
  - ONE TEST FOR EACH SPREAD FOOTING;
  - ONE TEST FOR EACH 50 LINEAR FEET OF CONTINUOUS FOOTING;
  - ONE TEST FOR EACH 1000 S.F. OF SLAB.
- FOUNDATIONS HAVE BEEN DESIGNED FOR 1,500 PSF MINIMUM ALLOWABLE SOIL BEARING PRESSURE.
- REMOVE ALL WATER SOFTENED SOILS FROM FOOTING EXCAVATIONS PRIOR TO PLACING CONCRETE. FILL REMAINING VOIDS WITH ADDITIONAL CONCRETE.
- SUPPORT ALL BOTTOM REINFORCEMENT IN FOUNDATION WITH STANDEES OR WHOLE CONCRETE BRICKS AT 48" O.C. MAX. REQUIRED CONCRETE COVER SHALL BE MAINTAINED AT ALL TIMES.
- ALL FOOTING, PIER, AND OTHER FOUNDATION REINFORCING SHALL BE TIED IN PLACE PRIOR TO POURING CONCRETE.
- WHERE FINISHED GRADES DIFFER ON OPPOSITE SIDES OF FOUNDATION WALLS, PROVIDE TEMPORARY BRACING. PREVENT LATERAL MOVEMENT UNTIL ALL ADJACENT FILLING, COMPACTION, FLOOR SLABS, AND FRAMING AT NEXT LEVEL OVER HAS BEEN COMPLETED.
- UNLESS INDICATED ON FOUNDATION PLAN, VERTICAL STEPS IN FOOTINGS TO BE MAXIMUM 2'-0" VERTICAL SPACED NO LESS THAN 4'-0" O.C. HORIZONTALLY TO MAINTAIN MINIMUM 12" COVER BELOW FINISHED EARTH GRADE.
- CONSTRUCTION JOINTS IN CONTINUOUS FOOTINGS TO BE FORMED VERTICALLY IN ACCORDANCE WITH FOUNDATION DETAILS IN PLANS.

## CAST-IN-PLACE REINFORCED CONCRETE

- THE FOLLOWING ACI STANDARDS (LATEST EDITION) APPLY:
  - ACI 318 - CODE
  - ACI 315 - DETAILING
  - ACI 301 - SPECIFICATIONS
  - ACI 304 - PLACING
  - ACI 347 - FORMWORK
  - ACI 211.1 - MIX PROPORTIONING
  - ACI 305 - HOT WEATHER CONCRETING
  - ACI 306 - COLD WEATHER CONCRETING
- ALL CONCRETE SHALL BE NORMAL WEIGHT CONCRETE (145 PCF) WITH MIXES MEETING THE FOLLOWING CRITERIA (UNLESS OTHERWISE NOTED IN BJWSA TECHNICAL SPECIFICATIONS):

STRUCTURAL ELEMENT	28 DAY COMPRESSIVE STRENGTH
FOOTINGS, GRADE BEAMS & FOUNDATION WALLS	3,000 PSI
SLAB ON GRADE	3,000 PSI
ELEVATED SLABS & BEAMS	4,000 PSI
COLUMNS	4,000 PSI

- SLUMP SHALL NOT EXCEED 5". SLUMP TESTS SHALL BE PERFORMED ON EACH TRUCK LOAD AND CONFORM TO ASTM C143.

## WOOD SUPPORT PILES:

- NO PROPOSED WORK.

## (BID ALTERNATE)

### EXISTING CONCRETE PIPE CAPS

- EXTERIOR SURFACES SHALL BE PARGED WITH A.W. COOK VERTICAL REPAIR MORTAR (OR APPROVED EQUAL), IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS, TO PROVIDE A SMOOTH EXTERIOR FINISH.

### BASE BID:

#### EXISTING CONCRETE FLUME BASE SLAB - CONCRETE SPALL AREAS

- ALL CONCRETE SPALL AREAS SHALL BE REPAIRED WITH A.W. COOK UNIVERSAL POLYMER CONCENTRATE (OR APPROVED EQUAL), IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS, AND WITH DETAIL 2/SI.5. EXISTING REBAR SHALL BE CLEANED AND COATED WITH SHERWIN WILLIAMS MACROPOXY 5500 LT, AND EXISTING CONCRETE SURFACE SHALL BE CLEANED AND PREPARED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

## (BID ALTERNATE)

### EXISTING FLUME BASE SLAB - EXPOSED CONCRETE SURFACES

- ALL CONCRETE SURFACES THAT ARE NOT COATED WITH A WATERPROOF LINING SHALL BE COATED WITH SHERWIN WILLIAMS H&C HYDRO-DEFINED SILANE SL-40 (OR APPROVED EQUAL) IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

### BASE BID:

#### EXISTING CONCRETE FLUME SIDE WALLS

- ALL CONCRETE SURFACES THAT ARE NOT COATED WITH A WATERPROOF LINING SHALL BE COATED WITH SHERWIN WILLIAMS H&C HYDRO-DEFINED SILANE SL-40 (OR APPROVED EQUAL), IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

### BASE BID

#### FLUME INTERIOR WATER PROOF LINING

- EXISTING FLUME BOTTOM AND SIDE WALLS SHALL BE WATERPROOFED USING SHERWIN WILLIAMS POLY-COTE 115 @ 125 MILS DFT WITH SHERWIN WILLIAMS PRIMER MACROPOXY 5500LT WITH SAND (OR APPROVED EQUAL) INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

SHERWIN WILLIAMS - PROTECTIVE AND MARINE DIVISION  
 MR. ALAN HAYNES  
 EMAIL: ALLAN.C.HANES@SHERWIN.COM  
 PHONE: (843)-214-3265

EXISTING WATERPROOF LINING SYSTEM SHALL BE REMOVED AND EXISTING SURFACE SHALL BE PREPARED TO ACCEPT NEW WATERPROOFING LINING IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

### BASE BID:

#### PEDESTRIAN ACCESS BRIDGES

- ALL PEDESTRIAN ACCESS BRIDGES TO BE FABRICATED BY "GATOR BRIDGE", (OR APPROVED EQUAL), 2880 MELLONVILLE AVE, SANFORD, FL 32773, PH (407)-323-0190. GATOR BRIDGE

DESIGN ENGINEER: CMI LIMITED CO.  
 REESE PATTEN  
 EMAIL: RPATTEN@CMLC.COM  
 PHONE: (770)-850-4096

CONTRACTOR SHALL COORDINATE WITH BEAUFORT-JASPER WATER & SEWER AUTHORITY (BJWSA) FOR SPECIFIC DIMENSIONAL AND CONSTRUCTION REQUIREMENTS AND OBTAIN APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR SHALL FURNISH SHOP DRAWINGS AND STAMPED CALCULATIONS WITH THE SEAL OF REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE OF SOUTH CAROLINA PRIOR TO FABRICATION TO CRANSTON ENGINEERING FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

### BASE BID:

#### EXPANSION JOINT REPLACEMENT (VERTICAL-FLUME SIDE WALLS)

- REPLACE ALL EXISTING EXPANSION JOINTS WITH EMSEAL "SUBMERSEAL" FOR POTABLE AND DRINKING WATER APPLICATIONS (OR APPROVED EQUAL) IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

### BASE BID:

#### EXPANSION JOINT REPLACEMENT (HORIZONTAL-BASE SLAB)

- SITURA "AQUALINE" EXPANSION JOINT FOR POTABLE AND DRINKING WATER APPLICATIONS (OR APPROVED EQUAL) IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.



# BID SET

REV.	DATE	DESCRIPTION
0	05-14-2020	BID SET

RAW WATER CANAL IMPROVEMENTS

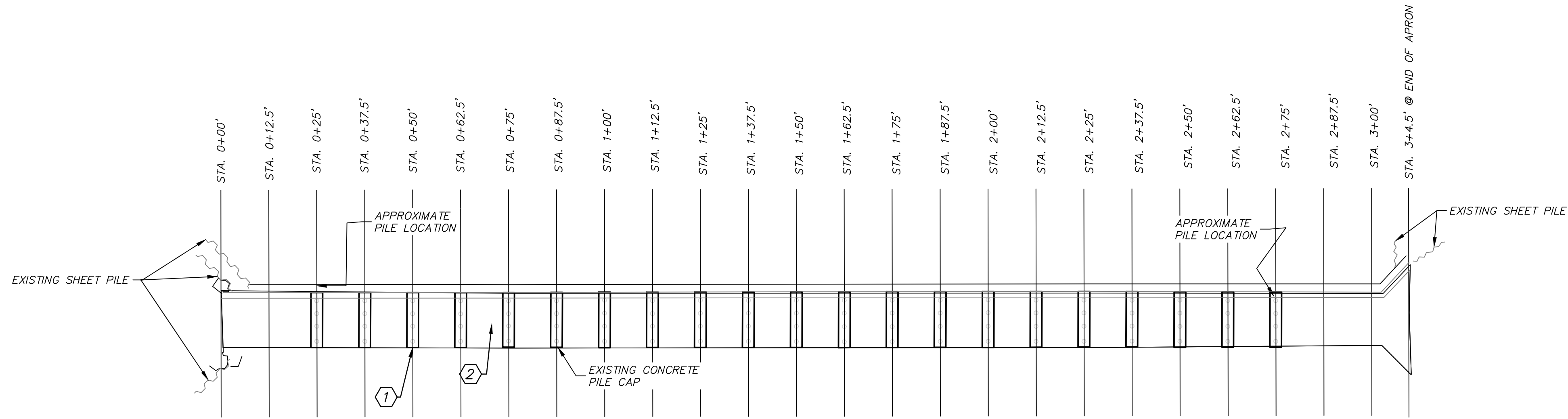
AERIAL FLUME REPAIRS

STRUCTURAL NOTES

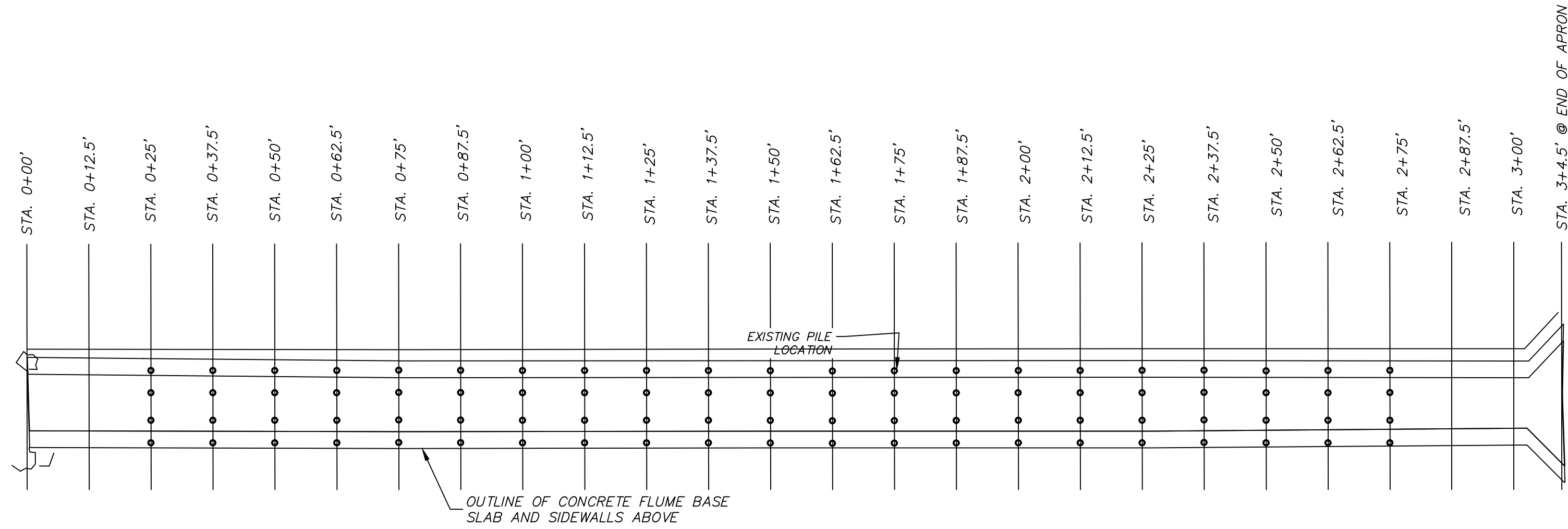
DRAWN BY:	TJC
CHECKED BY:	JAB
APPROVED BY:	JRE
DATE:	05-14-2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	

**S1.1**

G:\VA-Active JOB FILES\2018-0640 - RAW WATER CANAL IMPROVEMENTS\AC-DRAWINGS\STRUCTURAL\004 SET\2018-0640 FLUME STR PLANS (0002)2020-05-18.DWG 3/19/2020 10:02 AM



**2** PILE CAP & FLUME BOTTOM SLAB PLAN  
S1.2 PLAN VIEW SCALE: 1" = 20'



**1** EXISTING PILE PLAN  
S1.2 PLAN VIEW SCALE: 1" = 20'

**REPAIR NOTES:**

**BID ALTERNATE:**

① PARGE EXISTING PILE CAPS PER "EXISTING CONCRETE PILE CAPS" REPAIR NOTES SHEET S1.1.

**BID ALTERNATE**

② COAT ALL EXTERIOR SURFACES OF BOTTOM SLAB PER "EXISTING FLUME CONCRETE BASE SLAB" REPAIR NOTES SHEET S1.1.

**RAW WATER CANAL IMPROVEMENTS**  
**AERIAL FLUME REPAIRS**  
**FLUME PILE AND BOTTOM SLAB RETROFIT PLAN**

DRAWN BY:	TJC
CHECKED BY:	JAB
APPROVED BY:	JRE
DATE:	05-14-2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	

**S1.2**



**BID SET**

**CRANSTON**  
ENGINEERING

ENGINEERS - PLANNERS - SURVEYORS

14 Westbury Park Way, Suite 202  
Bluffton, South Carolina 29910  
Telephone 843-815-3191  
CranstonEngineering.com

REV.	DATE	DESCRIPTION
0	05-14-2020	BID SET

REPAIR NOTES:

BASE BID

- ③ REMOVE AND REPAIR EXISTING VERTICAL EXPANSION JOINTS PER "EXPANSION JOINT REPLACEMENT" REPAIR NOTES SHEET S1.1 AND DETAIL 3/S1.5.

(BID ALTERNATE)

- ④ REMOVE EXISTING WOODEN WALKWAY AND INSTALL NEW PRE-ENGINEERED ALUMINUM PEDESTRIAN ACCESS WALKWAY PER "PEDESTRIAN ACCESS BRIDGES" REPAIR NOTES ON SHEET S1.1.

BASE BID

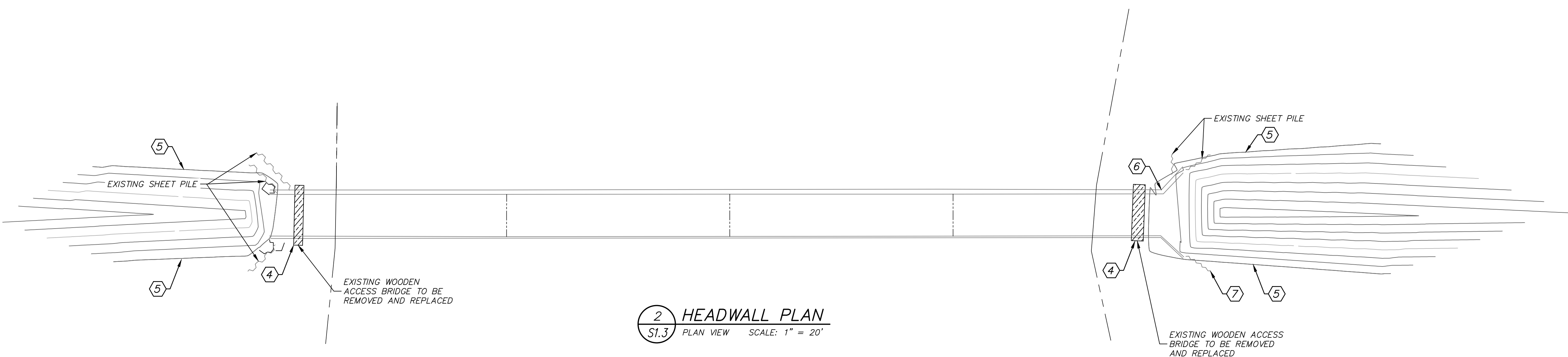
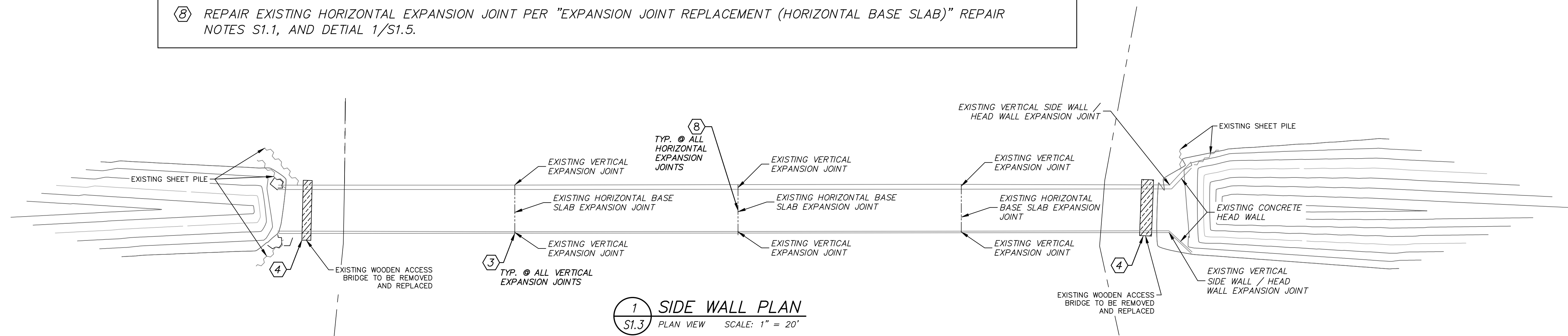
- ⑤ SLOPE STABILIZATION AND EROSION PROTECTION PER CIVIL DRAWINGS.

BASE BID

- ⑥ REPAIR EXISTING VERTICAL EXPANSION JOINT AND BACKFILL EXISTING WASHOUT AREA BEHIND FLUME WALL WITH FLOWABLE FILL IN ACCORDANCE WITH SCDOT SC-M-210. CONTRACTOR TO PROVIDE MIX DESIGN TO ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

- ⑦ INSTALL 10 LINEAR FEET OF NEW SHEET PILE HEADWALL, TO MATCH EXISTING SHEET PILE TYPE CURRENTLY INSTALLED AT THE PROJECT SITE. INSTALL TO A DEPTH OF 27'-0" FEET BELOW EXISTING GRADE OR TO REFUSAL.

- ⑧ REPAIR EXISTING HORIZONTAL EXPANSION JOINT PER "EXPANSION JOINT REPLACEMENT (HORIZONTAL BASE SLAB)" REPAIR NOTES S1.1, AND DETAIL 1/S1.5.



**BID SET**

REV.	DATE	DESCRIPTION
0	05-14-2020	BID SET

RAW WATER CANAL IMPROVEMENTS
AERIAL FLUME REPAIRS
FLUME SIDE WALL & HEAD WALL RETROFIT PLAN

DRAWN BY:	TJC
CHECKED BY:	JAB
APPROVED BY:	JRE
DATE:	05-14-2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	

**S1.3**

G:\VA\ACTIVE JOB FILES\2018\0640 - RAW WATER CANAL IMPROVEMENTS\AC-DRAWINGS\STRUCTURAL\JOB SET\2018-0640 FLUME STR PLANS (06062020-05-18).DWG 5/19/2020 10:07 AM

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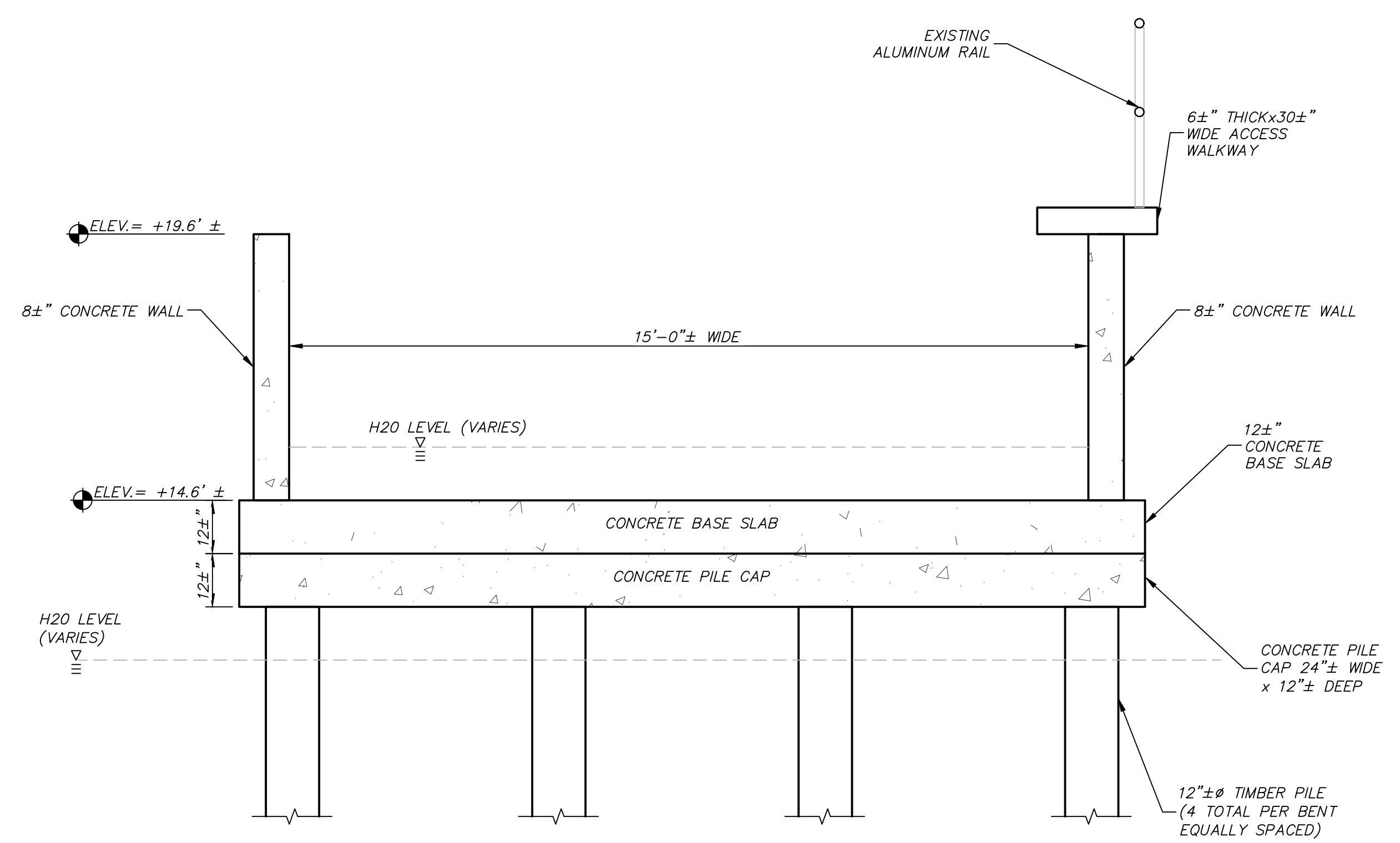


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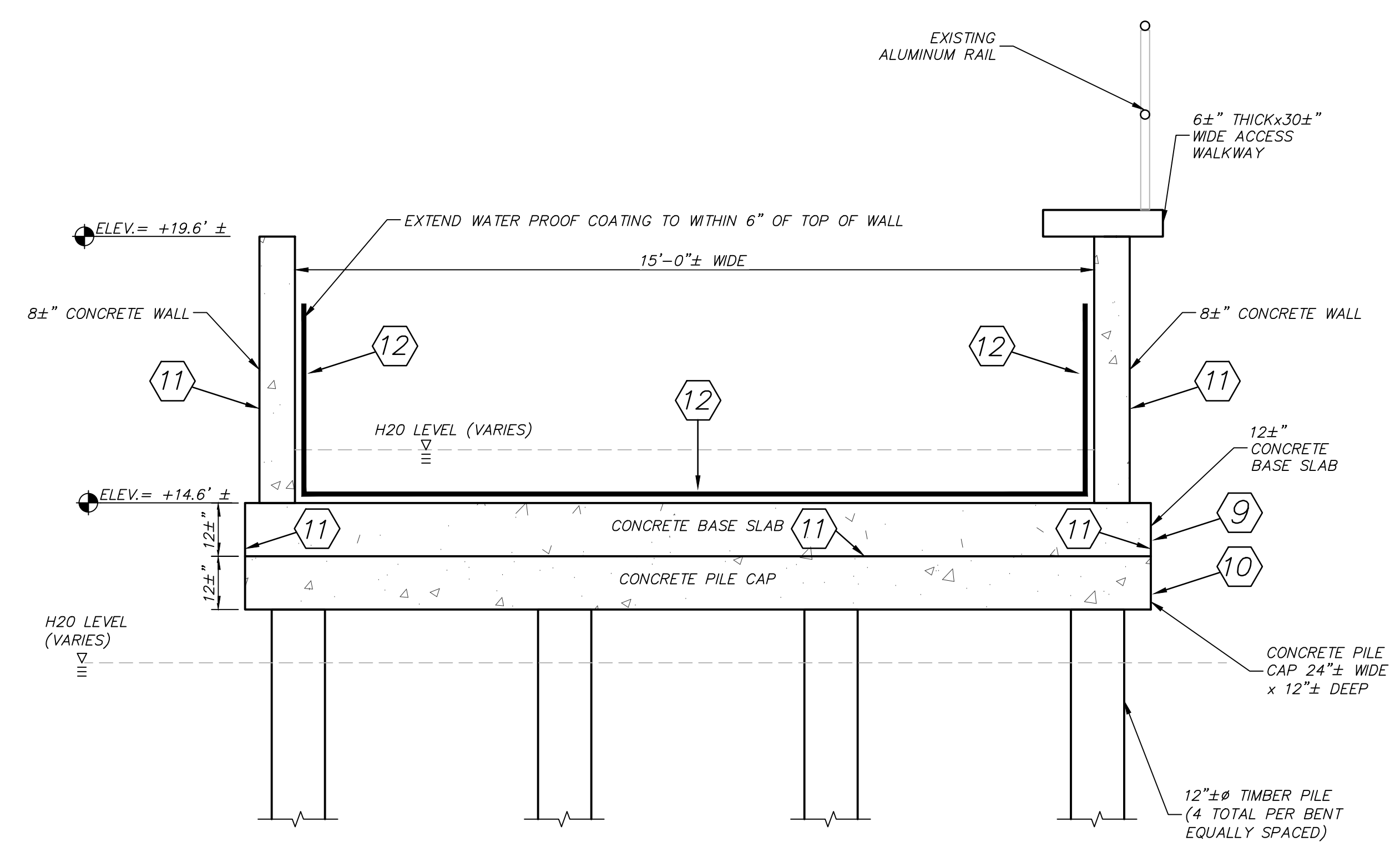
REV.	DATE	DESCRIPTION
0	05-14-2020	BID SET

RAW WATER CANAL IMPROVEMENTS
AERIAL FLUME REPAIRS
STRUCTURAL DETAILS

DRAWN BY:	TJC
CHECKED BY:	JAB
APPROVED BY:	JRE
DATE:	05-14-2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	S1.4



**1** "EXISTING FLUME CROSS-SECTION"  
S1.4 SCALE: 1/2" = 1'-0"



**2** "PROPOSED FLUME CROSS-SECTION"  
S1.4 SCALE: 1/2" = 1'-0"

**REPAIR NOTES:**

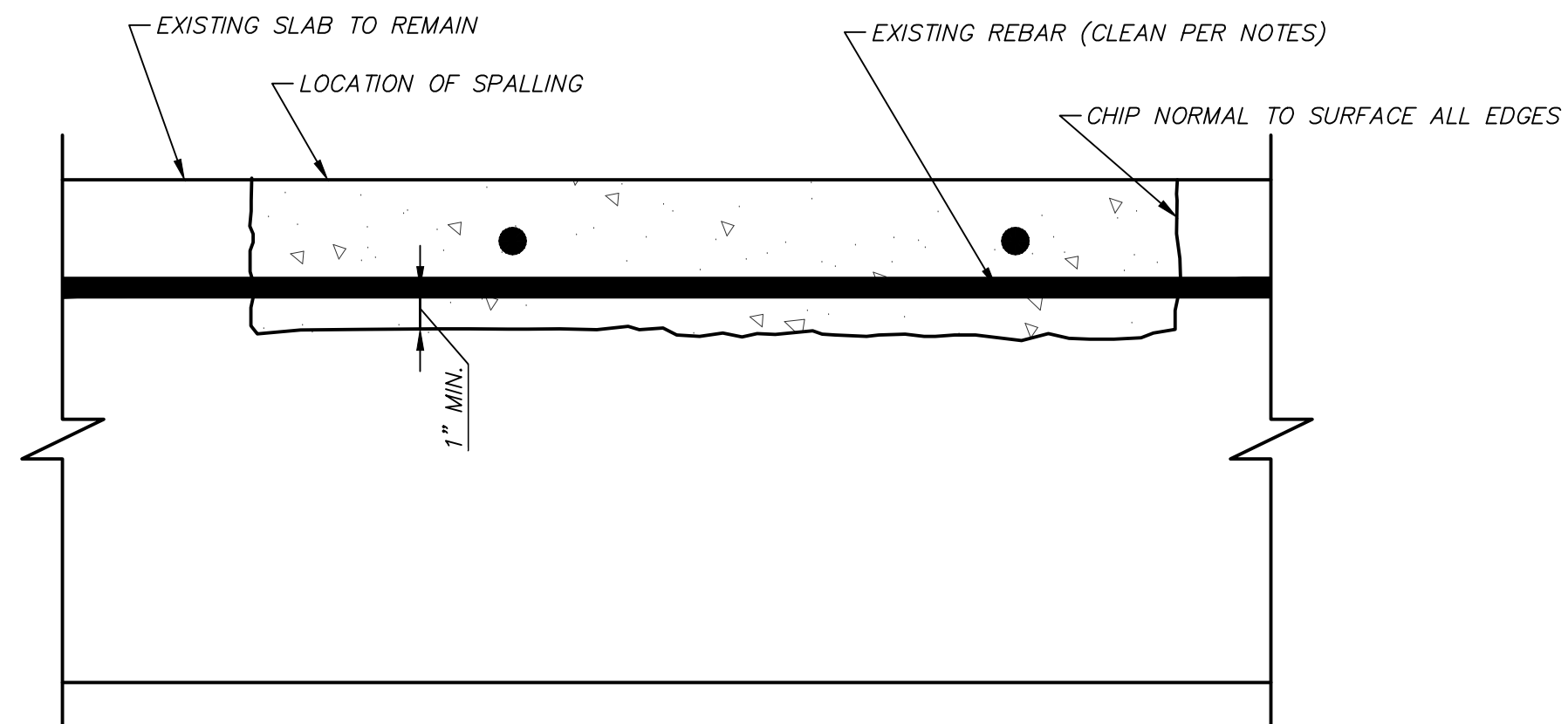
**BASE BID**  
9 REPAIR EXISTING CONCRETE SPALL AREAS IN FLUME BASE SLAB PER NOTES SHEET S1.1.

**(BID ALTERNATE)**  
10 COAT ALL EXTERIOR SURFACES OF PILE CAPS PER NOTES SHEET S1.1.

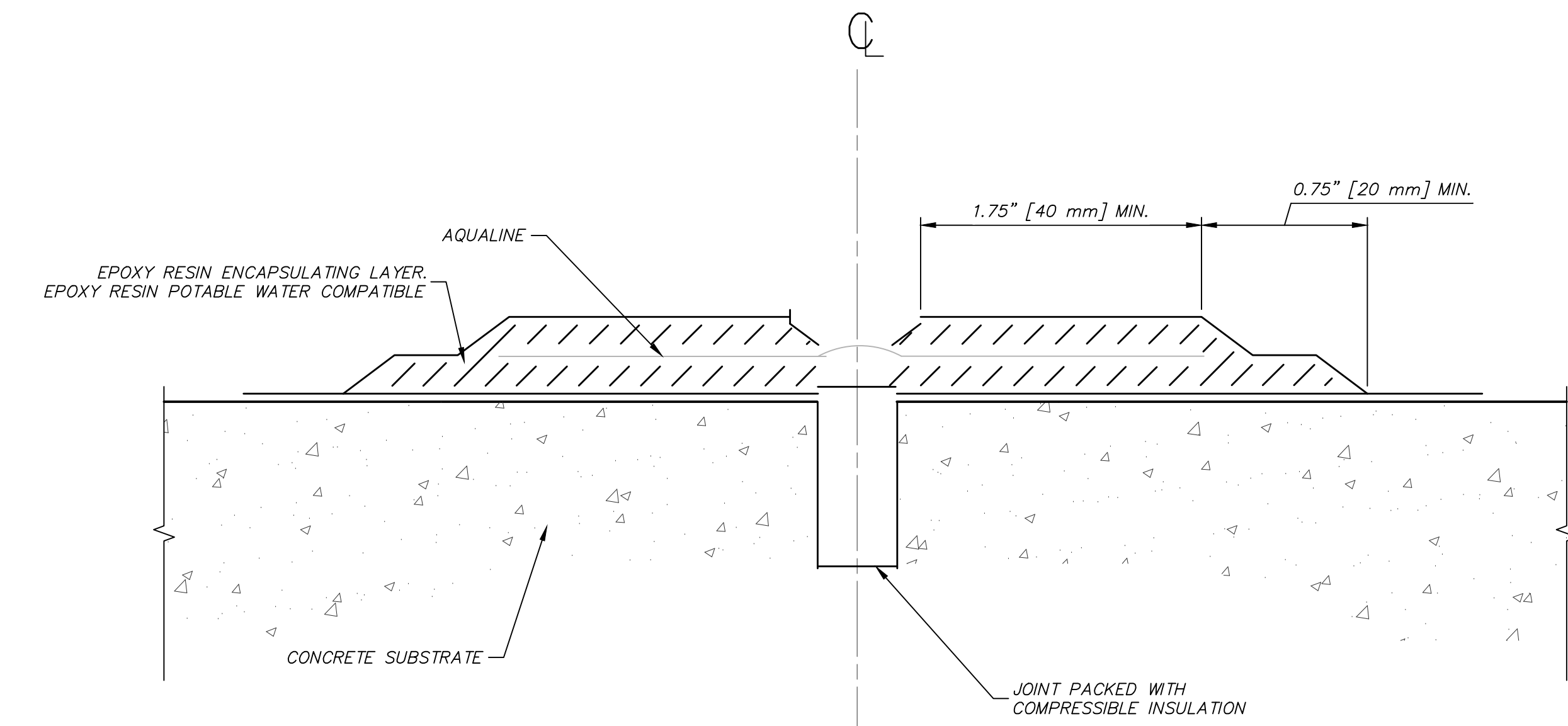
**(BID ALTERNATE)**  
11 COAT ALL EXTERIOR SURFACES OF FLUME BASE SLAB AND FLUME SIDE WALLS NOT COATED WITH WATER-PROOF LINING PER NOTES SHEET S1.1.

**BASE BID**  
12 SIDE WALLS AND FLUME BASE SLAB AT INTERIOR SURFACES OF THE FLUME SHALL BE WATER-PROOFED WITH NEW WATER-PROOF LINING SYSTEM PER NOTES SHEET S1.1. INSTALL 2" RADIUS FOR SMOOTH WALL TO BASE SLAB TRANSITION USING SHERWIN WILLIAMS STEEL SEAL FT-910 (OR APPROVED EQUAL).

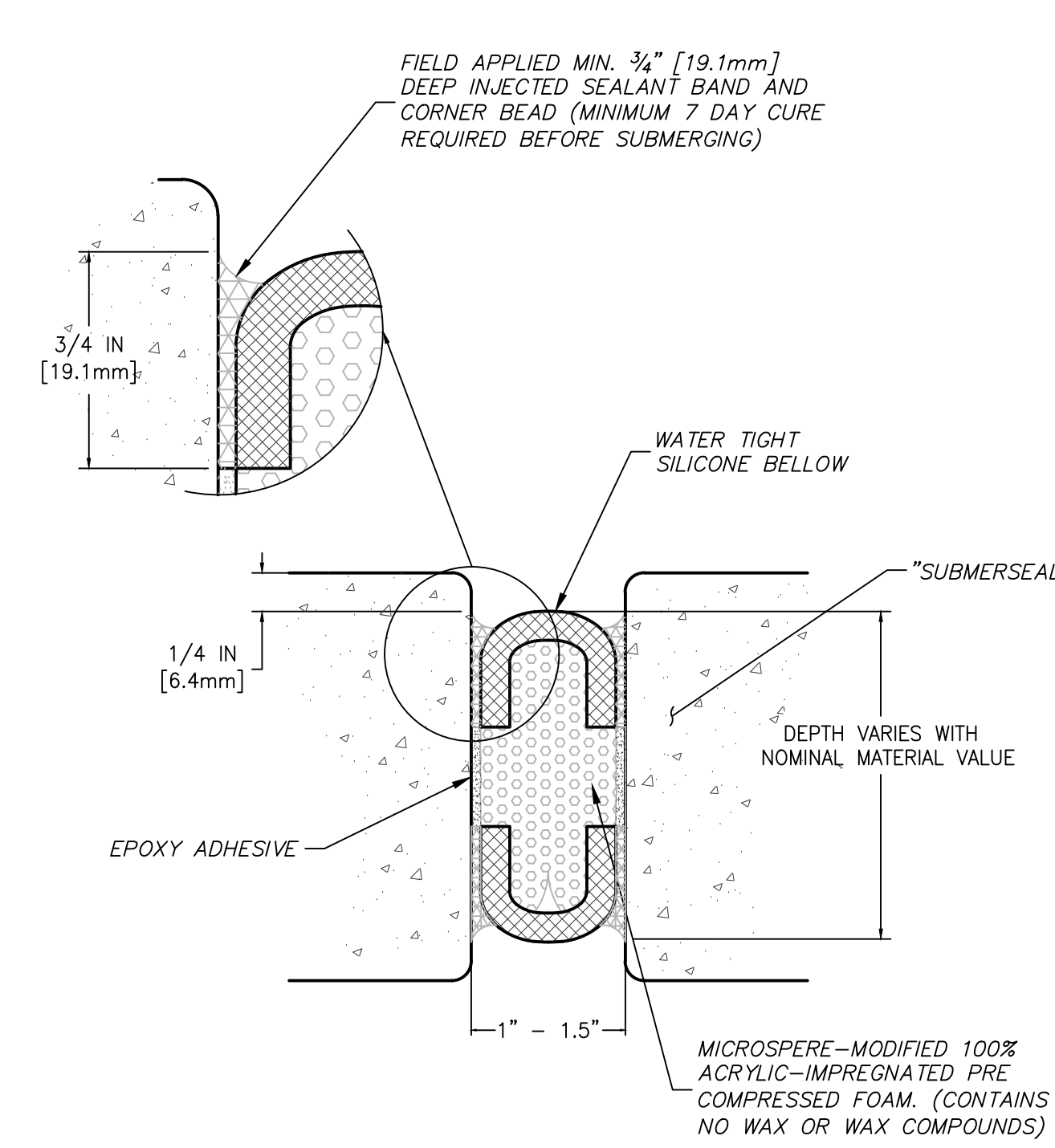
- REPAIR PROCEDURE:**
1. REMOVE ALL LOOSE CONCRETE TO SOUND SURFACE.
  2. SANDBLAST CONCRETE AND REBAR, REMOVE DUST AND DEBRIS.
  3. ADD EPOXY-COATED REBAR TO ALL EXISTING REBAR WITH 20% OR MORE LOSS OF SECTIONAL AREA.
  4. COAT EXISTING REBAR WITH SHERWIN WILLIAMS MACROPOXY 5500 LT.
  5. APPLY CONCRETE BONDING AGENT PRIOR TO PATCH.
  6. PATCH EXISTING CONCRETE SPALL AREAS WITH A.W. COOK UNIVERSAL POLYMER CONCENTRATE (OR APPROVED EQUAL) WITH MAXIMUM REPAIR DEPTH, 2" MAX. (OVERHEAD), 3" MAX. (VERTICAL), PER MANUFACTURER'S SPECIFICATIONS. FOR REPAIR DEPTH GREATER THAN THE MAXIMUM DEPTHS SPECIFIED, USE PORTLAND CEMENT CONCRETE IN ACCORDANCE WITH ASTM C150, TYPE II, 5,000 PSI WITH AN ABSORPTION RATE NOT EXCEEDING 6%.
  7. FOR UNREINFORCED CONCRETE, ADD TIE WIRE ANCHORS (AT LEAST 2 PER PATCH) AND STAINLESS STEEL TIE WIRE.



**2 CONCRETE REPAIR DETAIL**  
S1.5 SCALE: 3" = 1'-0"



**1 SITURA "AQUALINE" EXPANSION JOINT DETAIL**  
S1.5 NOT TO SCALE



**3 EMSEAL "SUBMERSEAL" EXPANSION JOIST DETAIL**  
S1.5 NOT TO SCALE



**BID SET**

REV.	DATE	DESCRIPTION
0	05-14-2020	BID SET

<b>RAW WATER CANAL IMPROVEMENTS</b>
<b>AERIAL FLUME REPAIRS</b>
<b>STRUCTURAL DETAILS</b>

DRAWN BY:	TJC
CHECKED BY:	JAB
APPROVED BY:	JRE
DATE:	05-14-2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	

**S1.5**

G:\GVA-ACTIVE JOB FILES\2018\2018-0640 - RAW WATER CANAL IMPROVEMENTS\AC-DRAWINGS\STRUCTURAL\00% SET\2018-0640 FLUME STR PLANS (00002020-05-18).DWG 5/19/2020 10:02 AM

# DIVISION 3 GRATE REHABILITATION AND CANAL OUTLET REHABILITATION

PREPARED FOR  
**BEAUFORT-JASPER WATER & SEWER AUTHORITY**

6 SNAKE ROAD  
OKATIE, SC 29909

**PROJECT DATA:**

1. OWNER/DEVELOPER:  
BEAUFORT-JASPER WATER & SEWER AUTHORITY  
6 SNAKE ROAD  
OKATIE, SC 29909  
PHONE: 843-987-8075
- 24 HOUR CONTACT:  
NAME: MR. BRIAN CHEMSAK  
PHONE: (843)-987-8062



**BID SET**



LOCATION MAP  
N.T.S.



LOCATION MAP  
N.T.S.



VICINITY MAP  
N.T.S.

Sheet Number	Sheet Title
C11.0	SUBSET TITLE SHEET
C12.0	EXISTING CONDITIONS
C13.0	DEMOLITION & SWPP PLAN
C13.1	SEDIMENT & EROSION CONTROL DETAILS
C13.2	TRAFFIC CONTROL PLAN
C14.0	SITE PLAN - PHASE 1
C14.1	SITE PLAN - PHASE 2
C15.0	CIVIL DETAILS
C15.1	CIVIL DETAILS
C16.0	EXISTING CONDITIONS
S2.1	STRUCTURAL NOTES
S2.2	GRATE STRUCTURE RETROFIT PLAN
S2.3	STRUCTURAL DETAILS
S2.4	STRUCTURAL DETAILS
S3.1	STRUCTURAL NOTES
S3.2	CANAL OUTLET STRUCTURES RETROFIT PLAN
S3.3	STRUCTURAL DETAILS
S3.4	STRUCTURAL DETAILS

REV.	DATE	DESCRIPTION
0	05-14-2020	BID SET

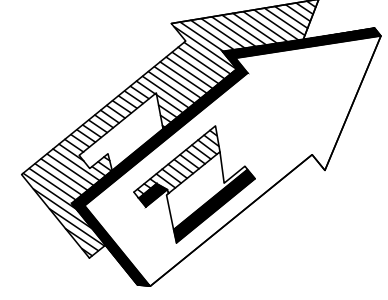
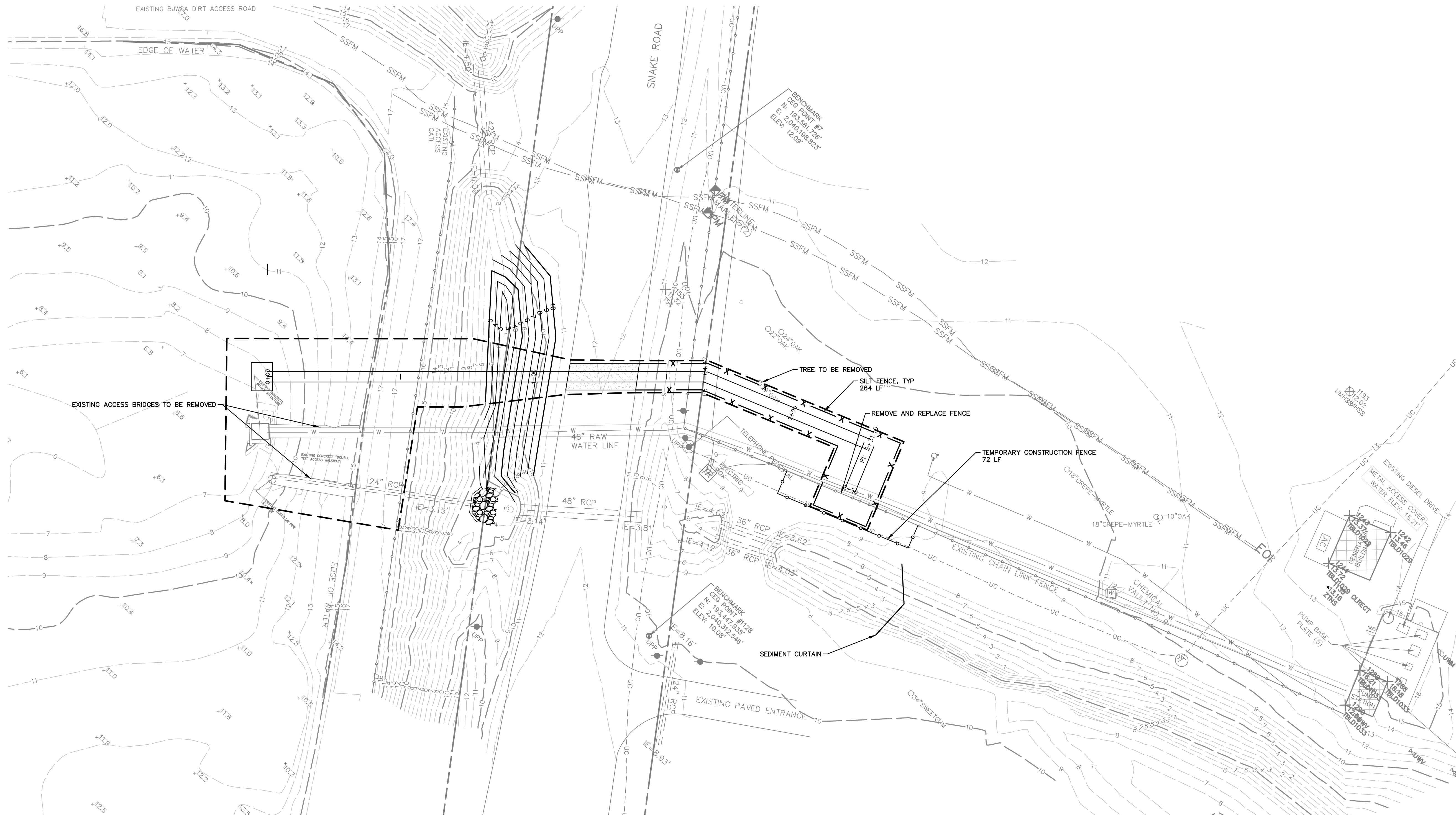
**RAW WATER CANAL IMPROVEMENTS  
GRATE REHABILITATION AND  
CANAL OUTLET REHABILITATION  
SUBSET TITLE SHEET**

DRAWN BY: TJC  
 CHECKED BY: JAB  
 APPROVED BY: JRE  
 DATE: 05-14-2020  
 SCALE: AS SHOWN  
 JOB No. 2018-0640  
 DRAWING No.

**C11.0**







PLAN  
HORIZONTAL SCALE 1"=20'

SCALE IN FEET

0 10 20 30 40

- GENERAL NOTES**
- CONTRACTOR TO FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
  - ALL WORK WITHIN SCDOT RIGHT OF WAY TO ADHERE TO SCDOT SPECIFICATIONS AND DETAILS.

C:\GAA-Active JOB FILES\2018\2018-0640 - RAW WATER CANAL IMPROVEMENTS\CADRAWINGS\CIVIL\2018-0640-DV-CHELSEA.DWG 5/18/2020 4:07 PM



**BID SET**

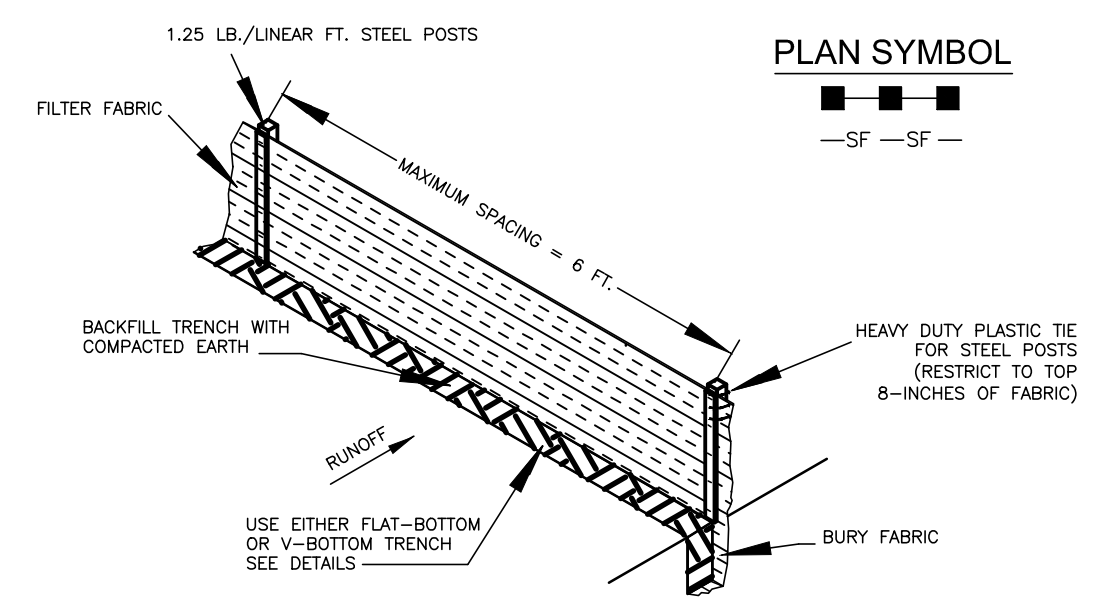
REV #	DATE	DESCRIPTION

RAW WATER CANAL IMPROVEMENTS
CANAL OUTLET REHABILITATION
DEMOLITION & SWPP PLAN

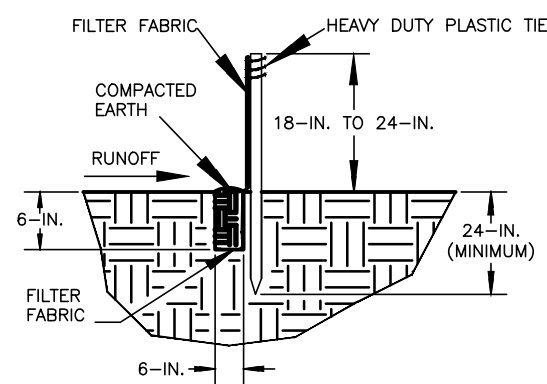
DRAWN BY:	RJE
CHECKED BY:	---
APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	1" = 20'
JOB No.	2018-0640
DRAWING No.	C13.0



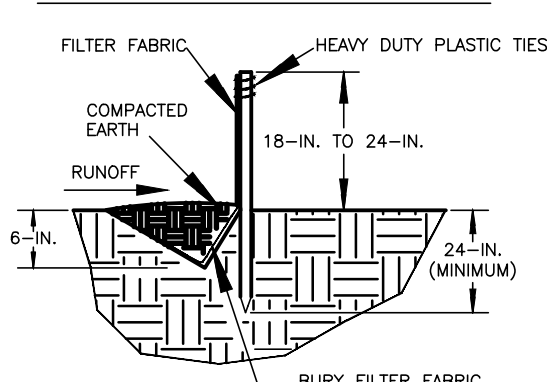
**SILT FENCE INSTALLATION**



**FLAT-BOTTOM TRENCH DETAIL**



**V-SHAPED TRENCH DETAIL**



- SILT FENCE - GENERAL NOTES**
1. Do not place silt fence across channels or in other areas subject to concentrated flows. Silt fence should not be used as a velocity control BMP. Concentrated flows are any flows greater than 0.5 cfs.
2. Maximum sheet or overlap flow path length to the silt fence shall be 100-feet.
3. Maximum slope steepness (normal [perpendicular] to the fence line) shall be 2:1.
4. Silt fence joints, when necessary, shall be completed by one of the following options:
- Wrap each fabric together at a support post with both ends fastened to the post, with a 1-foot minimum overlap.
- Overlap silt fence by installing 3-feet passed the support post to which the new silt fence roll is attached. Attach old roll to new roll with heavy-duty plastic ties; or,
- Overlap entire width of each silt fence roll from one support post to the next support post.
5. Attach filter fabric to the steel posts using heavy-duty plastic ties that are evenly spaced within the top 8-inches of the fabric.
6. Install the silt fence perpendicular to the direction of the stormwater flow and place the silt fence the proper distance from the toe of steep slopes to provide sediment storage and access for maintenance and cleanout.
7. Install Silt Fence Checks (Tie-Backs) every 50-100 feet, dependent on slope, along silt fence that is installed with slope and where concentrated flows are expected or are documented along the proposed/installed silt fence.

South Carolina Department of Health and Environmental Control
SILT FENCE
STANDARD DRAWING NO. SC-03 Page 1 of 2
FEBRUARY 2014
NOT TO SCALE

**SILT FENCE - POST REQUIREMENTS**

- 1. Silt Fence posts must be 48-inch long steel posts that meet, at a minimum, the following physical characteristics:
- Composed of a high strength steel with a minimum yield strength of 50,000 psi.
- Include a standard T section with a nominal face width of 1.38-inches and a nominal T length of 1.48-inches.
- Weigh 1.25 pounds per foot (± 8%).
2. Posts shall be equipped with projections to aid in fastening of filter fabric.
3. Steel posts may need to have a metal soil stabilization plate welded near the bottom when installed along steep slopes or installed in loose soils. The plate should have a minimum cross section of 17-square inches and be composed of 15 gauge steel, at a minimum. The metal soil stabilization plate should be completely buried.
4. Install posts to a minimum of 24-inches. A minimum height of 1- to 2-inches above the fabric shall be maintained, and a maximum height of 3 feet shall be maintained above the ground.
5. Post spacing shall be at a maximum of 6-feet on center.

**SILT FENCE - FABRIC REQUIREMENTS**

- 1. Silt fence must be composed of woven geotextile filter fabric that consists of the following requirements:
- Composed of fibers consisting of long chain synthetic polymers of at least 85% by weight of polyolefins, polyesters, or polyamides that are formed into a network such that the filaments or yarns retain dimensional stability relative to each other.
- Free of any treatment or coating which might adversely alter its physical properties after installation.
- Free of any defects or flaws that significantly affect its physical and/or filtering properties; and,
- Have a minimum width of 36-inches.
2. Use only fabric appearing on SC DOT's Qualified Products Listing (QPL), Approval Sheet #34, meeting the requirements of the most current edition of the SC DOT Standard Specifications for Highway Construction.
3. 12-inches of the fabric should be placed within excavated trench and laid in when the trench is backfilled.
4. Filter Fabric shall be purchased in continuous rolls and cut to the length of the barrier to avoid joints.
5. Filter Fabric shall be installed at a minimum of 24-inches above the ground.

**SILT FENCE - INSPECTION & MAINTENANCE**

- 1. The key to functional silt fence is weekly inspections, routine maintenance, and regular sediment removal.
2. Regular inspections of silt fence shall be conducted once every calendar week and, as recommended, within 24-hours after each rainfall event that produces 1/2-inch or more of precipitation.
3. Attention to sediment accumulations along the silt fence is extremely important. Accumulated sediment should be continually monitored and removed when necessary.
4. Remove accumulated sediment when it reaches 1/3 the height of the silt fence.
5. Removed sediment shall be placed in stockpile storage areas or spread thinly across disturbed area. Stabilize the removed sediment after it is relocated.
6. Check for areas where stormwater runoff has eroded a channel beneath the silt fence, or where the fence has sagged or collapsed due to runoff overtopping the silt fence. Install checks/tie-backs and/or reinstall silt fence, as necessary.
7. Check for tears within the silt fence, areas where silt fence has begun to decompose, and for any other circumstances that may render the silt fence ineffective. Removed damaged silt fence and reinstall new silt fence immediately.
8. Silt fence should be removed within 30 days after final stabilization is achieved and once it is removed, the resulting disturbed area shall be permanently stabilized.

South Carolina Department of Health and Environmental Control
SILT FENCE
STANDARD DRAWING NO. SC-03 PAGE 2 OF 2
FEBRUARY 2014
GENERAL NOTES

- STANDARD NOTES:**
1. PROVIDE SILT FENCE AND/OR OTHER CONTROL DEVICES, AS MAY BE REQUIRED, TO CONTROL SOIL EROSION DURING UTILITY CONSTRUCTION. ALL DISTURBED AREAS SHALL BE CLEANED, GRADED AND STABILIZED WITH GRASSING IMMEDIATELY AFTER THE UTILITY INSTALLATION. FILL, COVER & TEMPORARY SEEDING AT THE END OF THE DAY ARE RECOMMENDED. IF WATER IS ENCOUNTERED WHILE TRENCHING, THE WATER SHOULD BE FILTERED TO REMOVE ANY SEDIMENTS BEFORE BEING PUMPED BACK INTO ANY WATERS OF THE STATE.
2. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE WORK HAS CEASED, EXCEPT AS NOTED.
A. WHERE STABILIZATION BY THE 14TH DAY IS PRECLUDED BY SNOW COVER OR FROZEN GROUND CONDITIONS, STABILIZATION MEASURES MUST BE INITIATED AS SOON AS PRACTICABLE.
B. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, & EARTH-DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 14 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE.
3. THE CONTRACTOR MUST TAKE NECESSARY ACTION TO MINIMIZE THE TRACKING OF MUD ONTO THE PAVED ROADWAY FROM THE CONSTRUCTION AREA & THE GENERATION OF DUST. THE CONTRACTOR SHALL DAILY REMOVE MUD/SOIL FROM PAVEMENT, AS MAY BE REQUIRED.
4. ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED.
OFFSITE SEDIMENTATION: ALL TEMPORARY CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.
5. RESIDENTIAL SUBDIVISIONS REQUIRE EROSION CONTROL FEATURES FOR INFRASTRUCTURE AS WELL AS FOR INDIVIDUAL LOT CONSTRUCTION. INDIVIDUAL PROPERTY OWNERS SHALL FOLLOW THESE PLANS OR OBTAIN APPROVAL FOR AN INDIVIDUAL PLAN IN ACCORDANCE WITH S.C. REG. 72-300 & SCRI00000.
6. LITTER, CONSTRUCTION DEBRIS, OILS, FUELS & BUILDING PRODUCTS WITH THE SIGNIFICANT POTENTIAL IMPACT (SUCH AS STOCK-PILES OF FRESHLY TREATED LUMBER) & CONSTRUCTION CHEMICALS THAT COULD BE EXPOSED TO STORM WATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE IN STORM WATER DISCHARGES.
7. ALL SEDIMENT & EROSION CONTROL DEVICES SHALL BE INSPECTED ONCE EVERY CALENDAR WEEK. IF PERIODIC INSPECTION OR OTHER INFORMATION INDICATES THAT A BMP HAS BEEN INAPPROPRIATELY OR INCORRECTLY INSTALLED, THE PERMITEE MUST ADDRESS THE NECESSARY REPLACEMENT OR MODIFICATION REQUIRED TO CORRECT THE BMP WITHIN 48 HOURS OF IDENTIFICATION.
8. INITIATE STABILIZATION MEASURES ON ANY EXPOSED STEEP SLOPE (3H:1V OR GREATER) WHERE LAND DISTURBING ACTIVITIES HAVE CEASED, AND WILL NOT RESUME FOR A PERIOD OF 7 CALENDAR DAYS.
9. MINIMIZE SOIL COMPACTION AND, UNLESS INFEASIBLE, PRESERVE TOPSOIL.
10. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM EQUIPMENT & VEHICLE WASHING, WHEEL WASH WATER, & OTHER WASH WATER. WASH WATERS MUST BE TREATED IN A SEDIMENT BASIN OR ALTERNATIVE CONTROL THAT PROVIDES EQUIVALENT OR BETTER TREATMENT PRIOR TO DISCHARGE.
11. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM DEWATERING OF TRENCHES & EXCAVATED AREAS. THESE DISCHARGES ARE TO BE ROUTED THROUGH APPROPRIATE BMP'S (SEDIMENT BASIN, FILTER BAG, ETC.)
WASTEWATER FROM WASHOUT OF CONCRETE, UNLESS MANAGED BY AN APPROPRIATE CONTROL
WASTEWATER FROM WASHOUT & CLEANOUT OF STUCCO, PAINT, FROM RELEASE OILS, CURING
FUELS, OILS, OR OTHER POLLUTANTS USED IN VEHICLE & EQUIPMENT OPERATION & MAINTENANCE
SOAPS OR SOLVENTS USED IN VEHICLE & EQUIPMENT WASHING
13. AFTER CONSTRUCTION ACTIVITIES BEGIN, INSPECTIONS MUST BE CONDUCTED AT A MINIMUM OF AT LEAST ONCE EVERY CALENDAR WEEK & MUST BE CONDUCTED UNTIL FINAL STABILIZATION IS REACHED
14. IF EXISTING BMP'S NEED TO BE MODIFIED OR IF ADDITIONAL BMP'S ARE NECESSARY TO COMPLY WITH THE REQUIREMENTS OF THIS PERMIT AND/OR SC'S WATER QUALITY STANDARDS, IMPLEMENTATION MUST BE COMPLETED BEFORE NEXT STORM EVENT WHENEVER PRACTICABLE. IF IMPLEMENTATION BEFORE NEXT STORM IS IMPRACTICABLE, THE SITUATION MUST BE DOCUMENTED IN THE SWPPP & ALTERNATIVE BMP'S MUST BE IMPLEMENTED AS SOON AS REASONABLY POSSIBLE.
15. TEMPORARY DIVERSION BERMS AND/OR DITCHES WILL BE PROVIDED AS NEEDED DURING CONSTRUCTION TO PROTECT WORK AREAS FROM UPSLOPE RUNOFF AND/OR TO DIVERT SEDIMENT-LADEN WATER
16. ALL WATERS OF THE STATE (WOS), INCLUDING WETLANDS, ARE TO BE FLAGGED OR OTHERWISE CLEARLY MARKED IN THE FIELD. A DOUBLE ROW OF SILT FENCE IS TO BE INSTALLED IN ALL AREAS WHERE A 50-FOOT BUFFER CANT BE MAINTAINED BETWEEN THE DISTURBED AREA AND ALL WOS. A 10-FOOT BUFFER SHOULD BE MAINTAINED BETWEEN THE LAST ROW OF SILT FENCE AND ALL WOS.
17. IF CABLE, ELECTRIC, AND NATURAL GAS UTILITIES ARE INSTALLED, THE INSTALLATION OF THESE IS TO BE WITHIN THE PERMITTED LIMITS OF DISTURBANCE AND INSTALLATION OUTSIDE OF THESE AREAS WILL
18. INLET PROTECTION SHALL BE PROVIDED AT ALL EXISTING INLETS THAT RECEIVE FLOWS FROM THE DISTURBED
19. CONSTRUCTION ENTRANCES SHALL BE PROVIDED AT ALL LOCATIONS WHERE CONSTRUCTION TRAFFIC ACCESSES

**GRASSING REQUIREMENTS**

- 1. SEEDING SCHEDULE: TEMPORARY SEEDING: APRIL 15 - AUGUST 31, BROWNPOT MILLET @ 40 LBS./ACRE, SEPTEMBER 1 - DECEMBER 15, RYE GRAIN @ 56 LBS./ACRE
PERMANENT SEEDING: APRIL 1 - OCTOBER 15, A MIXTURE OF KENTUCKY 31 FESCUE @ 20 LBS./ACRE AND CREEPING RED FESCUE @ 20 LBS./ACRE, SEPTEMBER 1 TO OCTOBER 15, ADD A NURSE CROP OF ABRUZZI RYE @ 75 LBS./ACRE, OCTOBER 15 TO MARCH 30 SEED ABRUZZI RYE AT 100 LBS./ACRE. DOLOMITIC LIME WILL BE INCORPORATED AT THE RATE OF 3000 POUNDS/ACRE.
2. FERTILIZER WILL BE A COMMERCIAL GRADE 10-10-10 INCORPORATED INTO THE SOIL AT A RATE OF 1500 POUNDS/ACRE.
3. FROM JUNE THROUGH AUGUST AND NOT LESS THAN 30 DAYS AFTER SEEDING, APPLY AMMONIUM NITRATE (NOT LESS THAN 20% NITRATE) AT A RATE EQUAL TO 60 POUNDS OF AVAILABLE NITROGEN/ACRE.
4. ALL SEEDING AREAS WILL BE MULCHED WITH HAY OR STRAW AT A RATE OF 1500 POUNDS/ACRE. SEEDING AND MULCHING MAY BE ACCOMPLISHED IN A SINGLE HYDROSEEDING OPERATION. SEEDING AREAS WILL BE MULCHED WITH HAY, STRAW OR WOOD CELLULOSE AT A RATE OF 1500 LBS./ACRE.
TEMPORARY GRASSING:
1. MARCH 1-AUGUST 14 SHALL BE PEARL MILLET 50 LBS./ACRE COVERED WITH HEAVY MULCH.
AUGUST 15-FEBRUARY 28 SHALL BE RYE GRASS 40 LBS./ACRE AND RYE GRAIN SIMULTANEOUSLY.

**MONTHS OF CONSTRUCTION ACTIVITIES**

Grid showing months (1-4) for construction activities including silt fence installation, erosion control, and sediment control.

- 1. THE TIME AND PERIODS ABOVE ARE NOT EXACT OR READILY DETERMINABLE BUT IN ALL CASES SOIL EROSION AND SEDIMENT CONTROL STRUCTURES WILL BE INCORPORATED INTO THE CONSTRUCTION IN THE SEQUENCE AS SHOWN ABOVE AND/OR AS DIRECTED BY TOWN OF HILTON HEAD ISLAND OR SCDEIC.
2. GRASSING WILL BE ACCEPTED WHEN A 95% COVER BY PERMANENT GRASSES IS OBTAINED AND WEEDS ARE NOT DOMINANT.
3. GRASSING OF CONSTRUCTION AREAS WILL COMMENCE AT COMPLETION OF EACH PHASE OF CONSTRUCTION OR IN THE SEQUENCE AS SHOWN ABOVE. IN ANY CASE, GRASSING OF ANY CONSTRUCTION AREA WILL BEGIN AT THE EARLIEST POSSIBLE DATE.

I HAVE PLACED MY SIGNATURE AND SEAL ON THE DESIGN DOCUMENTS SUBMITTED SIGNIFYING THAT I ACCEPT RESPONSIBILITY FOR THE DESIGN OF THE SYSTEM. I CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THE DESIGN IS CONSISTENT WITH THE REQUIREMENTS OF TITLE 48, CHAPTER 14 OF THE CODE OF LAWS OF SC, 1976 AS AMENDED, PURSUANT TO REGULATION 72-300 ET SEQ. (IF APPLICABLE), AND IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF SCRI00000.

DISTURBED AREA = 1.60 AC

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**BID SET**

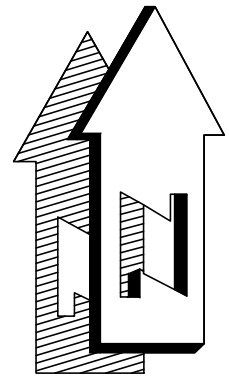
Table with columns: REV #, DATE, DESCRIPTION. Contains revision history for the bid set.

RAW WATER CANAL IMPROVEMENTS
CANAL OUTLET REHABILITATION
SEDIMENT & EROSION CONTROL DETAILS
DRAWN BY: RJE
CHECKED BY:
APPROVED BY: MER
DATE: 5/14/2020
SCALE: AS SHOWN
JOB No. 2018-0640
DRAWING No. C13.1





PLAN  
HORIZONTAL SCALE 1"=50'



NOTES

1. ALL LANES SHOULD BE A MINIMUM OF 10 FEET IN WIDTH AS MEASURED TO THE NEAR FACE OF THE CHANNELIZING DEVICES.
2. ON ROADWAYS WITH POSTED REGULATORY SPEED LIMITS OF 35 MPH OR LESS, INSTALL TRAFFIC CONTROL DEVICES AT INTERVALS OF 25 FT AND PLACE SIGNS AT INTERVALS OF 200 FT. ON ROADWAYS WITH POSTED SPEED LIMITS 40 MPH OR GREATER, INSTALL DEVICES AT INTERVALS OF 50 FT AND PLACE SIGNS AT 350 FT.
3. NO LESS THAN FIVE (5) TRAFFIC CONTROL DEVICES IN TAPER EQUALLY SPACED @ 10' TO 25' INTERVALS AS NECESSARY.
4. FLAGGERS REQUIRED AT ALL TIMES WHEN LIMITING TWO WAY TRAFFIC TO ONE LANE DURING CONSTRUCTION.
5. WHEN ACTIVE FLAGGER CONTROL IS NOT PRESENT, COVER OR TURN SIGN W20-7. THE SIGN MAY ALSO BE REPLACED WITH A W20-1 SIGN ("ROAD WORK AHEAD") WHEN FLAGGER IS NOT PRESENT.



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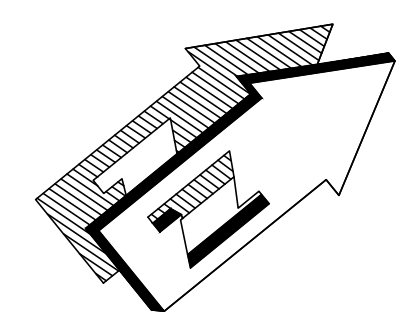
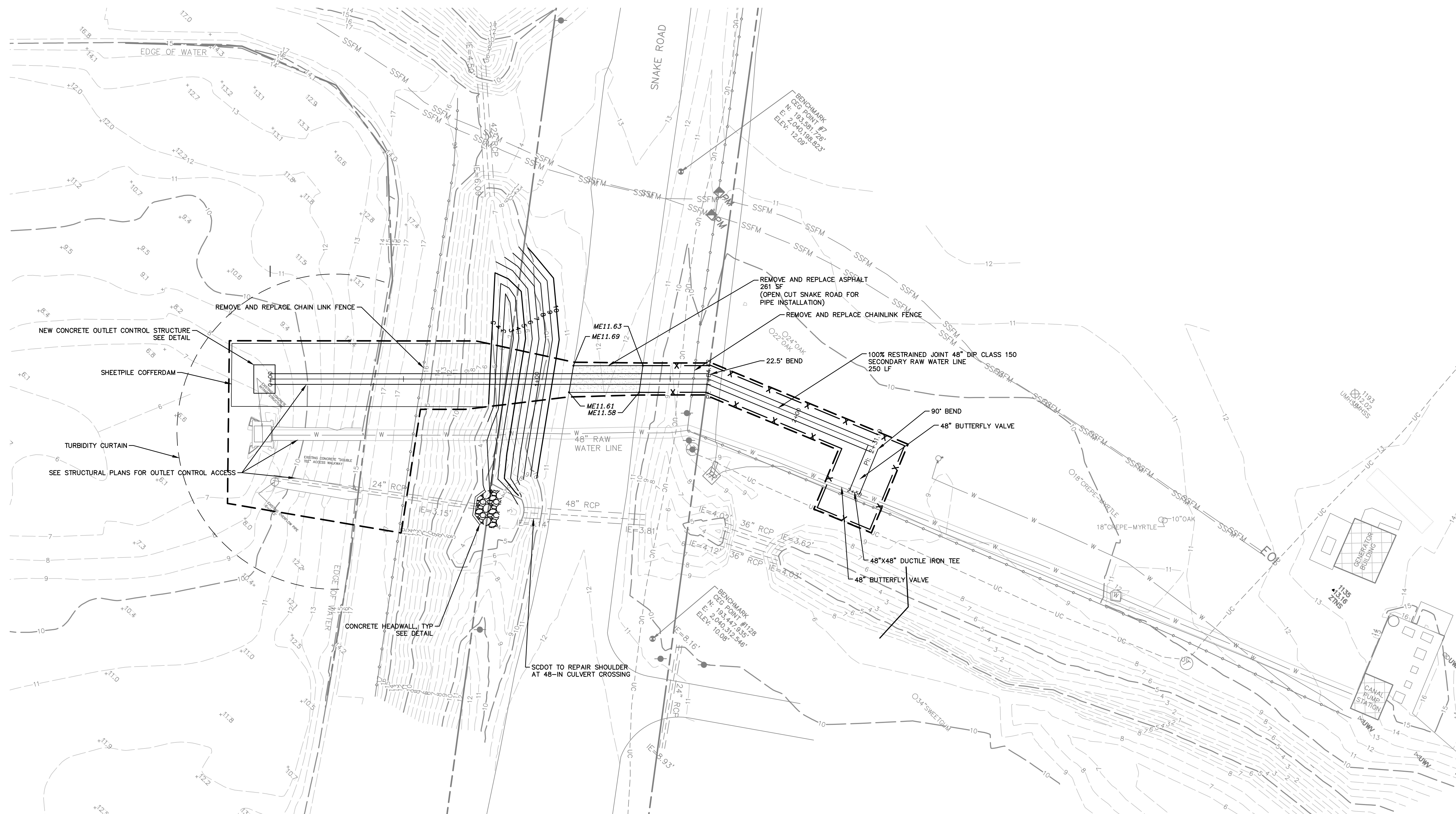
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REV #	DATE	DESCRIPTION

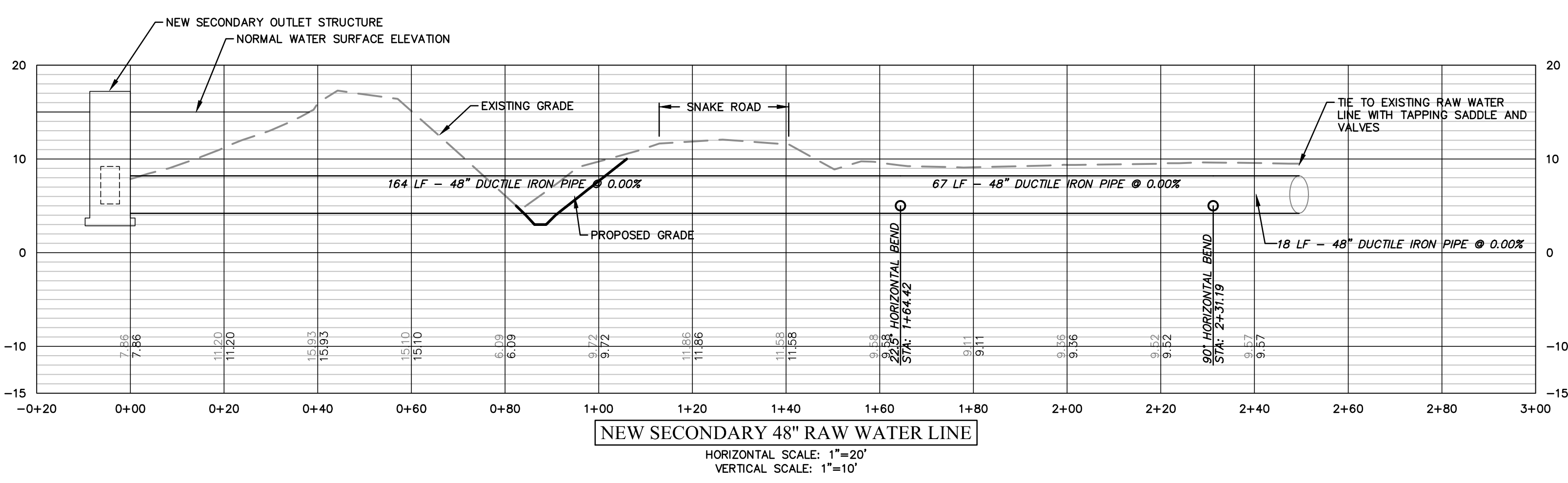
RAW WATER CANAL IMPROVEMENTS	
CANAL OUTLET REHABILITATION	
TRAFFIC CONTROL PLAN	

DRAWN BY:	RJE
CHECKED BY:	---
APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	C13.2





**PLAN**  
 HORIZONTAL SCALE 1"=20'  
 SCALE IN FEET



**GENERAL NOTES**

- CONTRACTOR TO PROVIDE COFFERDAM PLAN(S) TO BJWSA/ENGINEER 14 DAYS PRIOR TO START DATE. COFFERDAM PLAN(S) TO BE APPROVED BY BJWSA/ENGINEER BEFORE CONSTRUCTION BEGINS. COFFERDAM PLAN(S) TO BE SIGNED AND SEALED BY STRUCTURAL ENGINEER REGISTERED IN THE STATE OF SOUTH CAROLINA IF STRUCTURAL DESIGN OF COFFERDAM IS NECESSITATED.
- CONTRACTOR TO PROVIDE COFFERDAM LENGTHS AND REFUSAL DEPTHS PRIOR TO EXCAVATION.
- CONTRACTOR TO PROVIDE BYPASS PLAN(S) TO BJWSA/ENGINEERING 14 DAYS PRIOR TO START DATE. BYPASS PLAN(S) TO BE APPROVED BY BJWSA/ENGINEER BEFORE CONSTRUCTION BEGINS.
- CONTRACTOR TO PROVIDE TRAFFIC CONTROL PLAN TO BJWSA/ENGINEER 14 DAYS PRIOR TO START DATE. TRAFFIC CONTROL PLAN TO BE APPROVED BY BJWSA/ENGINEER AND SODOT BEFORE CONSTRUCTION BEGINS. TRAFFIC CONTROL PLAN TO FOLLOW ALL DESIGN GUIDELINES SET FORTH BY SODOT DESIGN GUIDE.
- CONTRACTOR TO FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
- ALL WORK WITHIN SODOT RIGHT OF WAY TO ADHERE TO SODOT SPECIFICATIONS AND DETAILS.
- CONTRACTOR TO PROVIDE TIE-IN PLAN 14 DAYS PRIOR TO CONSTRUCTION.
- IF WORK CANNOT BE COMPLETED WITHIN 12 HOURS, BYPASS PLAN MUST BE PROVIDED. SEE BYPASS SCHEDULE BELOW.

**BYPASS PERFORMANCE SPECIFICATION**

- MINIMUM CAPACITY SCHEDULE
  - 1.1. BYPASS TO PROVIDE THE MINIMUM FLOW RATE AS OUTLINED BELOW. MINIMUM VARIES BASED ON TIME OF YEAR.
    - 1.1.1. NOVEMBER – APRIL: 12 MGD (10,000 GPM)
    - 1.1.2. MAY – OCTOBER: 22 MGD (18,500 GPM)
- BACKUP BYPASS TO REMAIN ONSITE DURING ALL HOURS OF BYPASS OPERATION.

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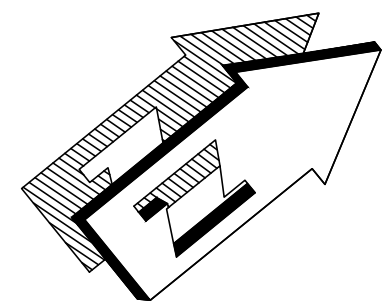
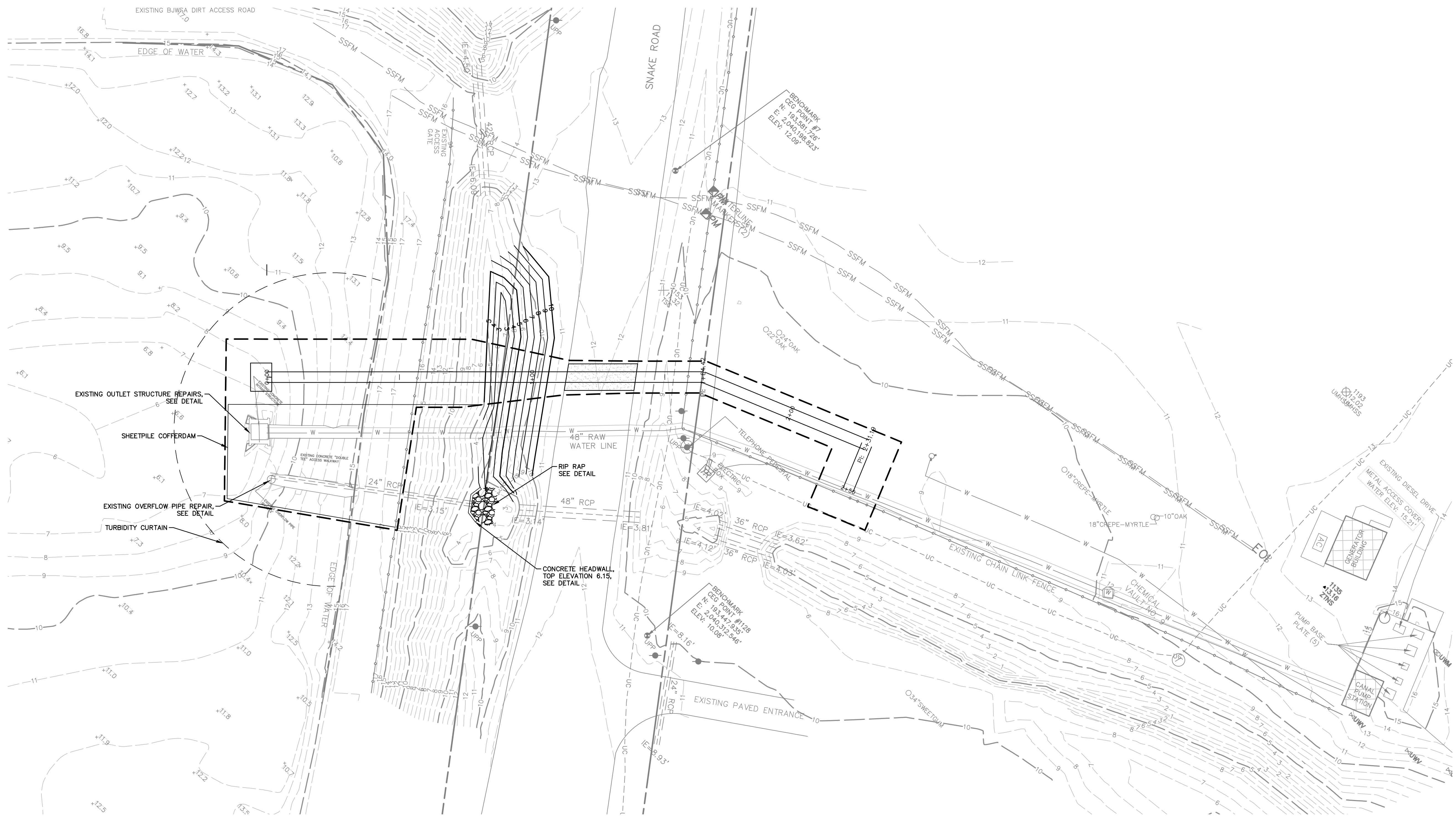
**BID SET**

REV #	DATE	DESCRIPTION

**RAW WATER CANAL IMPROVEMENTS  
 CANAL OUTLET REHABILITATION  
 SITE PLAN - PHASE 1**

DRAWN BY: RJE  
 CHECKED BY: ---  
 APPROVED BY: MER  
 DATE: 5/14/2020  
 SCALE: 1" = 20'  
 JOB No. 2018-0640  
 DRAWING No.





**GENERAL NOTES**

1. CONTRACTOR TO PROVIDE COFFERDAM PLAN(S) TO BJWSA/ENGINEER 14 DAYS PRIOR TO START DATE. COFFERDAM PLAN(S) TO BE APPROVED BY BJWSA/ENGINEER BEFORE CONSTRUCTION BEGINS. COFFERDAM PLAN(S) TO BE SIGNED AND SEALED BY STRUCTURAL ENGINEER REGISTERED IN THE STATE OF SOUTH CAROLINA IF STRUCTURAL DESIGN OF COFFERDAM IS NECESSITATED.
11. CONTRACTOR TO PROVIDE COFFERDAM LENGTHS AND REFUSAL DEPTHS PRIOR TO EXCAVATION.
2. CONTRACTOR TO PROVIDE BYPASS PLAN(S) TO BJWSA/ENGINEERING 14 DAYS PRIOR TO START DATE. BYPASS PLAN(S) TO BE APPROVED BY BJWSA/ENGINEER BEFORE CONSTRUCTION BEGINS.
3. CONTRACTOR TO PROVIDE TRAFFIC CONTROL PLAN TO BJWSA/ENGINEER 14 DAYS PRIOR TO START DATE. TRAFFIC CONTROL PLAN TO BE APPROVED BY BJWSA/ENGINEER AND SCDOT BEFORE CONSTRUCTION BEGINS. TRAFFIC CONTROL PLAN TO FOLLOW ALL DESIGN GUIDELINES SET FORTH BY SCDOT DESIGN GUIDE.
4. CONTRACTOR TO FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
5. ALL WORK WITHIN SCDOT RIGHT OF WAY TO ADHERE TO SCDOT SPECIFICATIONS AND DETAILS.
6. CONTRACTOR TO PROVIDE TIE-IN PLAN 14 DAYS PRIOR TO CONSTRUCTION.
- 6.1. IF WORK CANNOT BE COMPLETED WITHIN 12 HOURS, BYPASS PLAN MUST BE PROVIDED. SEE BYPASS SCHEDULE BELOW.
7. PHASE 2 WORK SHALL NOT COMMENCE UNTIL PHASE 1 WORK IS SUBSTANTIALLY COMPLETE AND THE SECONDARY RAW WATER FEED LINE IS OPERATIONAL.
8. CONTRACTOR TO CONFIRM CONDITION OF EXISTING STRUCTURE WITH ENGINEER PRIOR TO PERFORMING ANY WORK.

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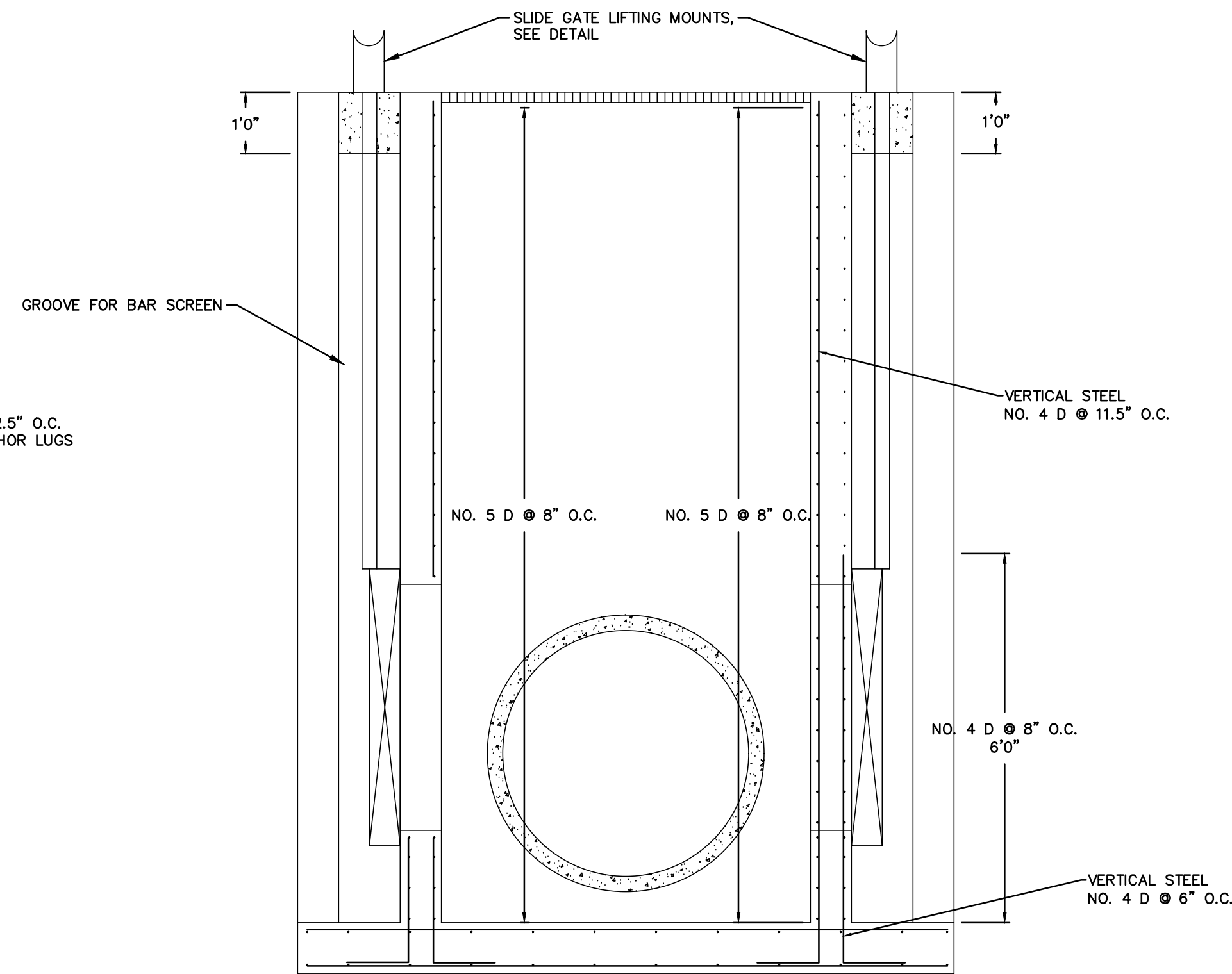
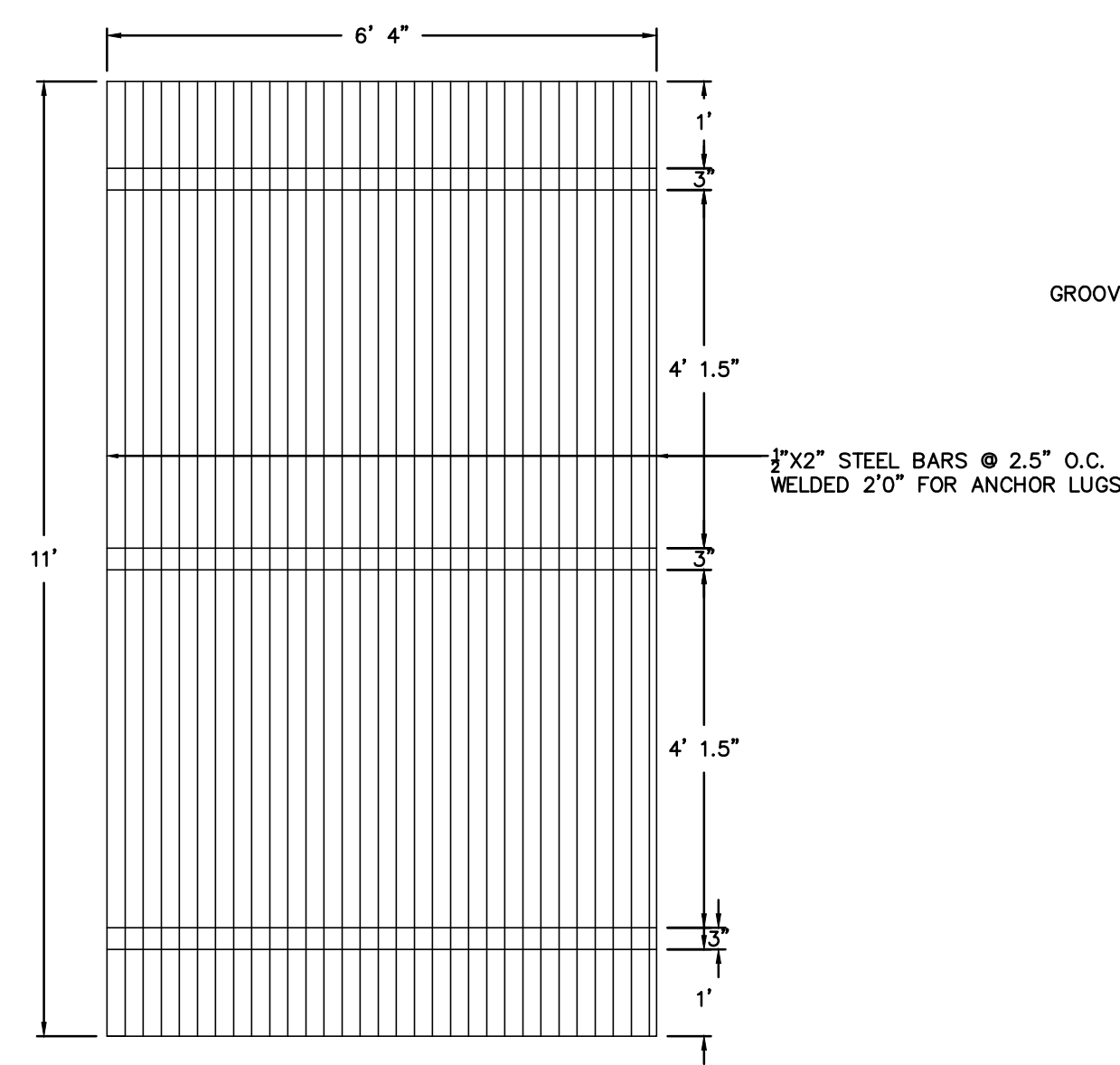
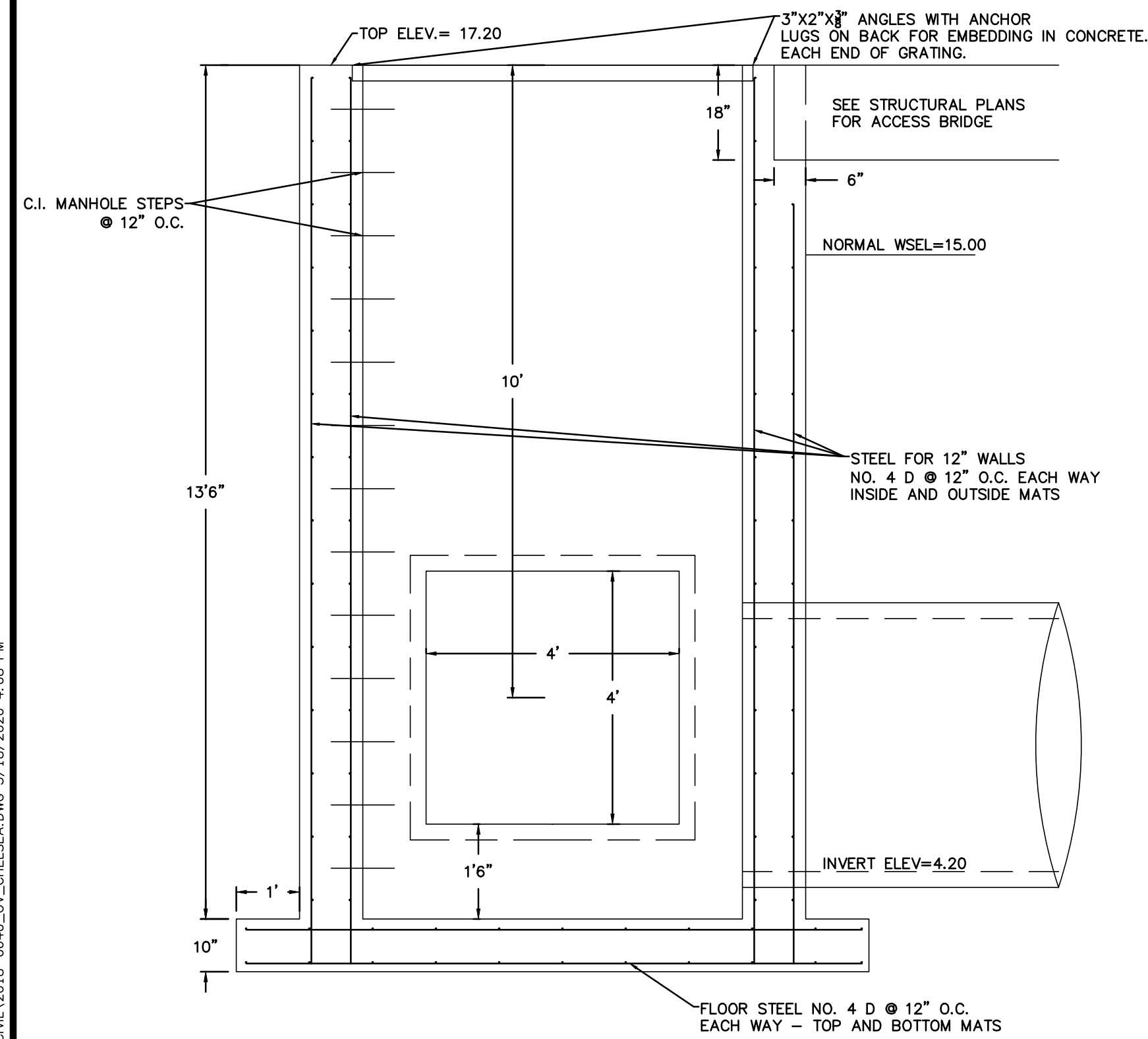
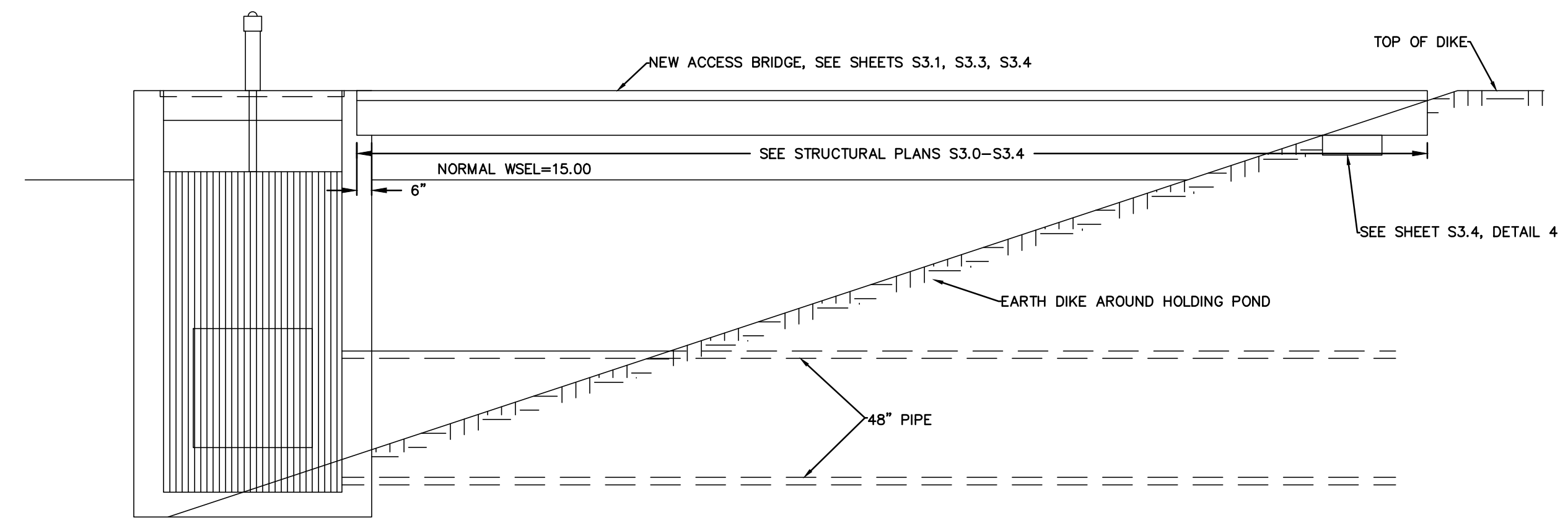
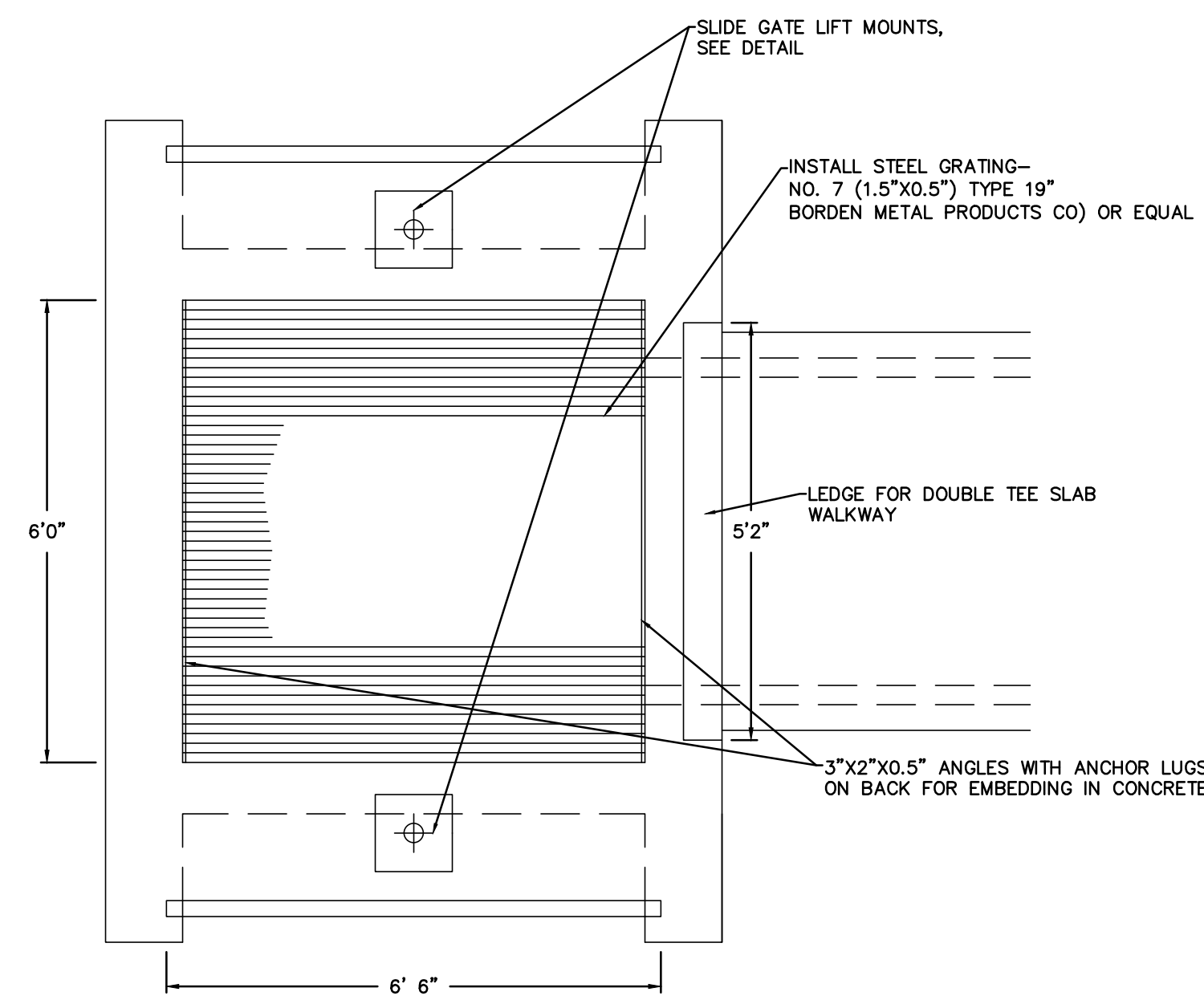
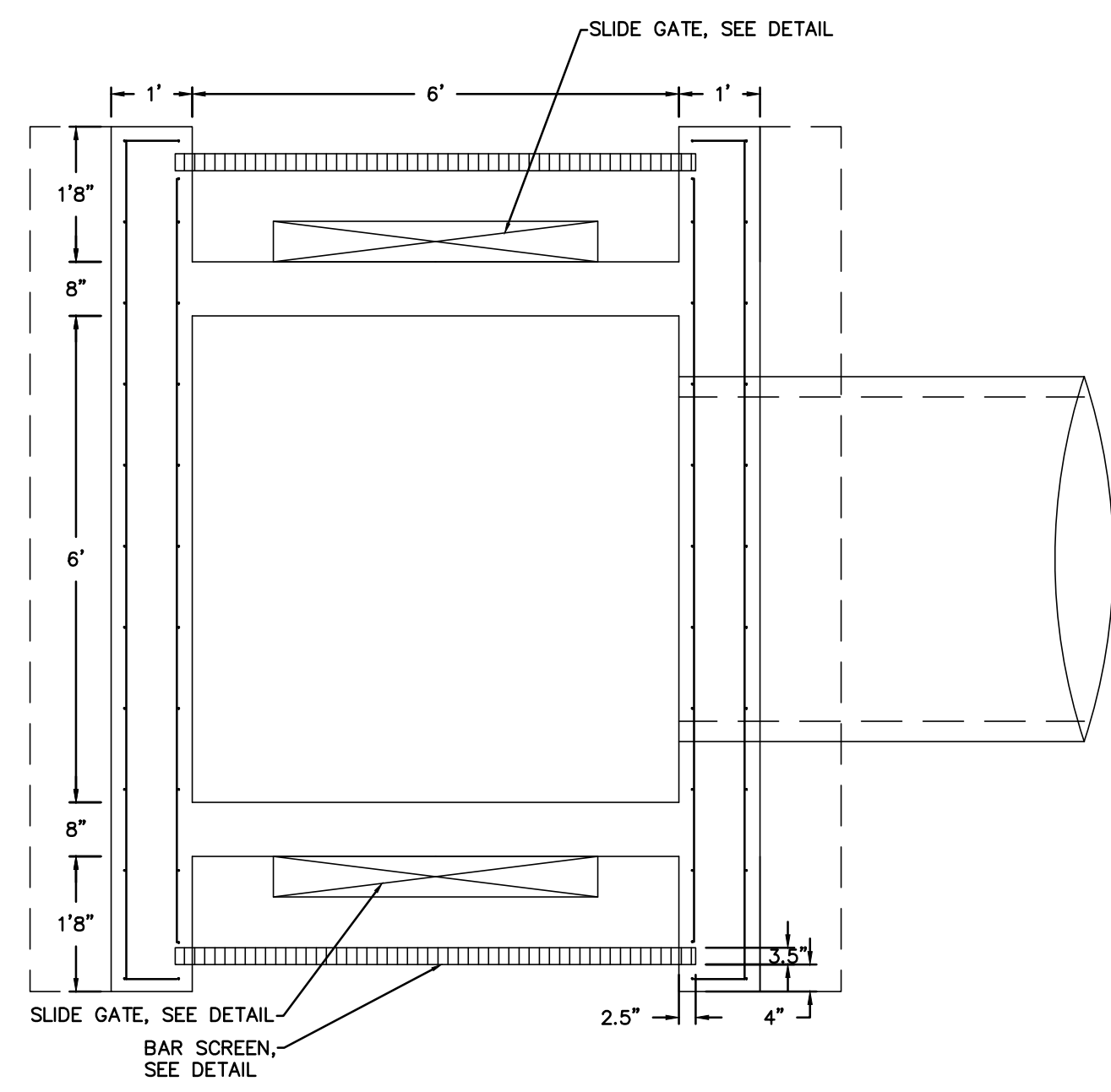
REV #	DATE	DESCRIPTION

RAW WATER CANAL IMPROVEMENTS  
CANAL OUTLET REHABILITATION  
SITE PLAN - PHASE 2

DRAWN BY:	RJE
CHECKED BY:	---
APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	1" = 20'
JOB No.	2018-0640
DRAWING No.	C14.1







**BID SET**

REV #	DATE	DESCRIPTION

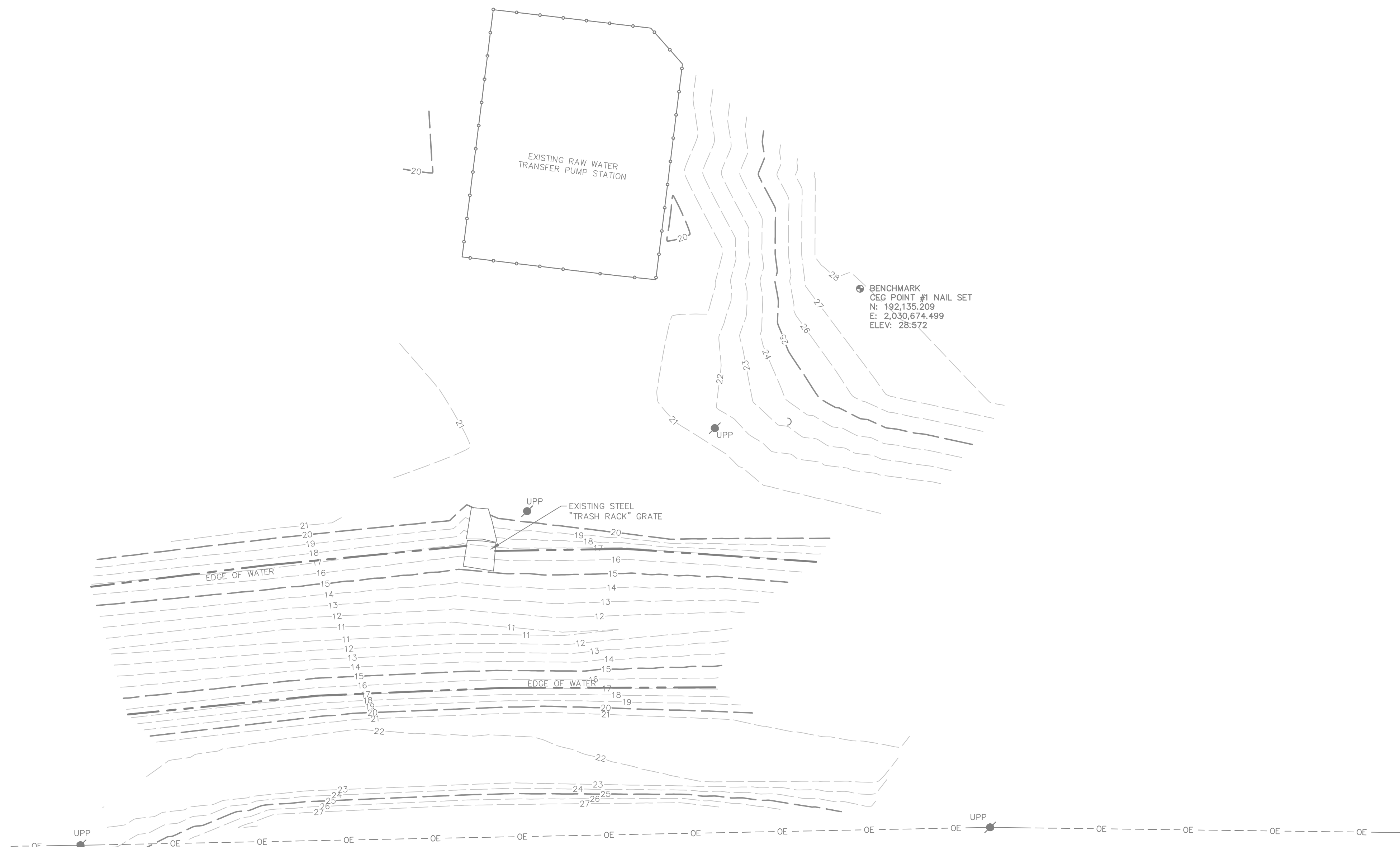
RAW WATER CANAL IMPROVEMENTS  
CANAL OUTLET REHABILITATION  
CIVIL DETAILS

DRAWN BY:	RJE
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APPROVED BY:	MER
DATE:	5/14/2020
SCALE:	
JOB No.	2018-0640
DRAWING No.	



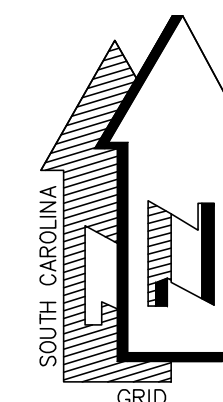
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**LEGEND:**  
UPP - POWER POLE  
UWV - WATER VALVE  
UFH - FIRE HYDRANT  
ICV - IRRIGATION CONTROL VALVE

PROPERTY KNOWN AS GRATE AREA  
**JASPER COUNTY, SOUTH CAROLINA**  
SCALE: 1" = 20'  
AUGUST 13, 2019



**CRANSTON**  
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# BID SET

REV #	DATE	DESCRIPTION

<b>RAW WATER CANAL IMPROVEMENTS</b>
<b>GRATE REHABILITATION</b>
<b>EXISTING CONDITIONS</b>

DRAWN BY: \_\_\_\_\_ RJE

CHECKED BY: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_ MER

DATE: 5/14/2020

SCALE:

JOB No. 2018-0640

DRAWING No. **C16.0**





# STRUCTURAL NOTES

## GENERAL REQUIREMENTS

- WHERE A SECTION OR DETAIL IS SHOWN FOR ONE CONDITION, IT SHALL APPLY TO ALL SIMILAR CONDITIONS.
- THE DESIGN ADEQUACY AND SAFETY OF ERECTION BRACING, SHORING, TEMPORARY SUPPORTS, ETC. SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- DO NOT SCALE DRAWINGS. FOLLOW DIMENSIONS SHOWN ON PLANS.
- CONTRACTOR SHALL COORDINATE AND VERIFY ALL DIMENSIONS AND ELEVATIONS SHOWN HEREIN WITH FIELD CONDITIONS PRIOR TO CONSTRUCTION OR MATERIAL PURCHASE AND SHALL NOTIFY ENGINEER IN WRITING OF DISCREPANCIES.
- DIMENSIONS INDICATED RELATIVE TO EXISTING STRUCTURE ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION OR MATERIALS PURCHASE. CONTRACTOR SHALL NOTIFY ENGINEER IN WRITING OF DISCREPANCIES.
- SPECIFIED ANCHOR SYSTEMS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. SPECIAL ATTENTION SHALL BE GIVEN TO THE DRILLING, CLEANING, AND PREPARATION OF HOLES. WHERE ADHESIVE ANCHORS ARE SHOWN, SPECIAL ATTENTION SHALL BE GIVEN TO THE REQUIRED MIXING, APPLICATION, AND CURING TIME OF ADHESIVE TYPE SPECIFIED.

## SUBGRADE PREPARATION

- CONTRACTOR SHALL STRIP AND REMOVE ALL VEGETATION, TOPSOIL, ROOTS, AND ORGANIC SOILS FROM THE CONSTRUCTION AREA FOR A DISTANCE OF AT LEAST 5' BEYOND THE EXTENT OF THE STRUCTURE LIMITS. THE DEPTH OF STRIPPING SHALL BE THAT REQUIRED TO REMOVE SIGNIFICANT ROOT ZONES, SMALL TREE STUMPS, AND OTHER UNACCEPTABLE MATERIALS, BUT IN NO CASE SHALL IT BE LESS THAN 12".
- AFTER TOPSOILS, ETC. WITHIN AND TO A POINT 5' OUTSIDE THE WALL CONSTRUCTION AREA HAVE BEEN REMOVED FROM THE SITE, THE UPPER 24" OF EXPOSED SOILS SHALL BE COMPACTED TO A MINIMUM DENSITY OF 95% STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698).
- COMPACTION TESTING SHALL BE PERFORMED UNDER THE OBSERVATION OF AN APPROVED TESTING LABORATORY SUPERVISED BY A GEOTECHNICAL ENGINEER. UNDERCUT, BACKFILL, AND COMPACT AREAS WHICH PUMP, DEFLECT, OR RUT EXCESSIVELY OR WHICH DO NOT STABILIZE AFTER SUCCESSIVE PASSES OF COMPACTION EQUIPMENT.
- AFTER COMPLETION OF DENSIFICATION OF EXISTING SOILS, PLACE STRUCTURAL FILL FOR BUILDING AND PAVEMENT AREAS IN THIN (8" TO 10") LIFTS COMPACT TO A MINIMUM DENSITY OF 95% STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698). MATERIAL USED AS STRUCTURAL FILL SHALL BE NON-PLASTIC GRANULAR MATERIAL CONTAINING LESS THAN 15% FINES PASSING THROUGH THE NO. 200 SIEVE AND FREE OF ORGANICS, BOULDERS, OR OTHER DELETERIOUS MATERIALS.

## FOUNDATIONS

- ALL FOUNDATION FILL SUBGRADE SOILS SHALL BE COMPACTED AS FOLLOWS: (REF. ASTM D1557)
  - 95% MODIFIED PROCTOR FOR GREATER THAN 18" BELOW FINAL FILL.
  - 98% MODIFIED PROCTOR FOR THE UPPER 18" BENEATH BUILDINGS AND PAVEMENTS.
- SOILS TESTING LABORATORY SHALL CONDUCT COMPACTION TESTS IN ACCORDANCE WITH ASTM D698. RATE OF COMPACTION SHALL BE AS FOLLOWS:
  - ONE TEST FOR EACH SPREAD FOOTING;
  - ONE TEST FOR EACH 50 LINEAR FEET OF CONTINUOUS FOOTING;
  - ONE TEST FOR EACH 1000 S.F. OF SLAB.
- FOUNDATIONS HAVE BEEN DESIGNED FOR 1,500 PSF MINIMUM ALLOWABLE SOIL BEARING PRESSURE.
- REMOVE ALL WATER SOFTENED SOILS FROM FOOTING EXCAVATIONS PRIOR TO PLACING CONCRETE. FILL REMAINING VOIDS WITH ADDITIONAL CONCRETE.
- SUPPORT ALL BOTTOM REINFORCEMENT IN FOUNDATION WITH STANDEES OR WHOLE CONCRETE BRICKS AT 48" O.C. MAX. REQUIRED CONCRETE COVER SHALL BE MAINTAINED AT ALL TIMES.
- ALL FOOTING, PIER, AND OTHER FOUNDATION REINFORCING SHALL BE TIED IN PLACE PRIOR TO POURING CONCRETE.
- WHERE FINISHED GRADES DIFFER ON OPPOSITE SIDES OF FOUNDATION WALLS, PROVIDE TEMPORARY BRACING. PREVENT LATERAL MOVEMENT UNTIL ALL ADJACENT FILLING, COMPACTION, FLOOR SLABS, AND FRAMING AT NEXT LEVEL OVER HAS BEEN COMPLETED.
- UNLESS INDICATED ON FOUNDATION PLAN, VERTICAL STEPS IN FOOTINGS TO BE MAXIMUM 2'-0" VERTICAL SPACED NO LESS THAN 4'-0" O.C. HORIZONTALLY TO MAINTAIN MINIMUM 12" COVER BELOW FINISHED EARTH GRADE.
- CONSTRUCTION JOINTS IN CONTINUOUS FOOTINGS TO BE FORMED VERTICALLY IN ACCORDANCE WITH FOUNDATION DETAILS IN PLANS.

## REINFORCING STEEL

- ALL REINFORCING STEEL SHALL BE ASTM A615, GRADE 60, UNLESS NOTED OTHERWISE.
- ALL WELDED WIRE FABRIC SHALL BE ASTM A185, 70 KSI MINIMUM YIELD STRENGTH.
- ADDITIONAL REINFORCING AND THAT QUANTITY OF REINFORCING OCCURRING AT OPENINGS SHALL BE PLACED EQUALLY EACH SIDE OF OPENINGS AS DETAILED.
- HOOKS IN REINFORCING ARE IN ADDITION TO LENGTH SHOWN.
- REINFORCING IS TO BE SUPPORTED IN FORMS AND SPACED WITH WIRE BAR SUPPORTS ACCORDING TO CRSI "PLACING REINFORCING BARS" UNLESS NOTED OTHERWISE.
- MINIMUM REINFORCING STEEL CLEAR COVERS ARE AS FOLLOWS:
  - CONCRETE CAST DIRECTLY AGAINST EARTH.....3"
  - INTERIOR SLABS.....1"
  - INTERIOR BEAMS AND COLUMNS.....1 1/2"
  - EXTERIOR BEAMS AND COLUMNS.....2"
  - EXTERIOR SLABS.....1 1/2"
- UNLESS NOTED OTHERWISE, ALL BAR REINFORCING LAP SPLICES SHALL HAVE A MINIMUM LAP LENGTH OF 48 BAR DIAMETERS.

## CAST-IN-PLACE REINFORCED CONCRETE

- THE FOLLOWING ACI STANDARDS (LATEST EDITION) APPLY:
  - ACI 318 - CODE
  - ACI 315 - DETAILING
  - ACI 301 - SPECIFICATIONS
  - ACI 304 - PLACING
  - ACI 347 - FORMWORK
  - ACI 211.1 - MIX PROPORTIONING
  - ACI 305 - HOT WEATHER CONCRETING
  - ACI 306 - COLD WEATHER CONCRETING
- ALL CONCRETE SHALL BE NORMAL WEIGHT CONCRETE (145 PCF) WITH MIXES MEETING THE FOLLOWING CRITERIA: (UNLESS OTHERWISE NOTED IN BWSA TECHNICAL SPECIFICATIONS)

STRUCTURAL ELEMENT	28 DAY COMPRESSIVE STRENGTH
FOOTINGS, GRADE BEAMS & FOUNDATION WALLS	3,000 PSI
SLAB ON GRADE	3,000 PSI
ELEVATED SLABS & BEAMS	4,000 PSI
COLUMNS	4,000 PSI

- SLUMP SHALL NOT EXCEED 5". SLUMP TESTS SHALL BE PERFORMED ON EACH TRUCK LOAD AND CONFORM TO ASTM C143.

- PRE-CAST CONCRETE: REINFORCED PORTLAND CEMENT CONCRETE SECTIONS COMPLYING WITH ASTM C150, TYPE II, 5,000 PSI WITH AN ADSORPTION RATE NOT EXCEEDING 6%. CONCRETE SHALL BE MANUFACTURED WITH GRANITE STONE, IN ACCORDANCE WITH BEAUFORT JASPER WATER AND SEWER AUTHORITY TECHNICAL SPECIFICATIONS.

## BOX CULVERT SECTION

- CONTRACTOR TO VERIFY EXISTING CONDITIONS AND DIMENSIONS AT EXISTING BOX CULVERT. ALL BOX CULVERT SECTIONS SHALL BE PRE-CAST AND DESIGNED IN ACCORDANCE SCDOT SECTION 700 AND ALL APPLICABLE SCDOT DETAILS, WITH AASHTO HS-20 DESIGN LOADING, AND ANY ADDITIONAL SPECIFIC LOADING REQUIREMENTS AS SPECIFIED BY BWSA. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR ALL NEW BOX CULVERT SECTIONS TO CRANSTON ENGINEERING GROUP FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

## STRUCTURAL STEEL GRATE AND SUPPORT FRAME

- GRATE AND FRAME MUST BE HOT-DIPPED GALVANIZED. ALL BOLTS FOR CONNECTION OF GRATE TO FRAME AND FRAME TO CONCRETE SHALL BE ASTM A316 STAINLESS STEEL. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR NEW STRUCTURAL STEEL GRATE AND SUPPORT FRAME TO CRANSTON ENGINEERING GROUP FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

## STRUCTURAL STEEL

- APPLICABLE STRUCTURAL STEEL CODES:
  - AISC SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, 14TH EDITION
  - AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES
- MATERIALS:
 

"W" SHAPES	ASTM A992, GRADE 50
STEEL TUBING	ASTM A500, GRADE B, F <sub>y</sub> = 46 KSI
ALL OTHER	ASTM A36
ANCHOR BOLTS	ASTM A307
HIGH STRENGTH BOLTS	ASTM A325
WELDING ELECTRODES	E70 SERIES
- STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED ACCORDING TO THE LATEST EDITION OF AISC "SPECIFICATION, DESIGN, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" AND RELATED PUBLICATIONS SPECIFIED THEREIN.
- ALL SHEAR AND TENSION TYPE BOLTED CONNECTIONS SHALL BE MADE WITH 3/4" DIAMETER ASTM A325N HIGH STRENGTH BOLTS. DESIGN TORQUE TO BE DEVELOPED USING LOAD INDICATOR WASHERS AS MANUFACTURED BY BETHLEHEM STEEL CORPORATION OR APPROVED EQUIVALENT. INSTALL AS PER MANUFACTURER'S PUBLISHED INSTRUCTIONS. ALL OTHER BOLTED CONNECTIONS MAY BE MADE WITH ASTM A307 BOLTS AND WASHERS.
- STEEL FRAMING ERECTION INCLUDING ALL BOLTED AND WELDED CONNECTIONS, BRACING, AND ANCHORAGES SHALL BE COMPLETED AND PLUMB PRIOR TO PLACEMENT OF DECK.
- NON-SHRINK, NON-METALLIC GROUT WITH A 28 DAY COMPRESSIVE STRENGTH OF 5000 PSI SHALL BE USED UNDER BASE PLATES.
- ENGINEER SHALL BE CONTACTED FOR APPROVAL OF ANY FIELD MODIFICATIONS OF ANCHOR BOLTS OR RODS AND COLUMN BASE PLATES.
- TEMPORARY BRACING OF STEEL STRUCTURAL ELEMENTS IS THE RESPONSIBILITY OF THE CONTRACTOR. STRUCTURAL STABILITY SHALL BE MAINTAINED AT ALL TIMES DURING THE ERECTION PROCESS.
- FRAMING CONNECTIONS NOT DETAILED, OR CONNECTIONS THAT ARE MODIFIED FROM THOSE DETAILED SHALL BE DESIGNED BY SUPPLIER FOR THE END REACTION SHOWN ON THE PLAN. IF NO REACTION IS PROVIDED, CONNECTIONS SHALL BE DESIGNED FOR 1/2 THE BEAM MAXIMUM UNIFORM LOAD PER AISC MANUAL FOR STEEL CONSTRUCTION.
- SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED. USE 3/16" FILLET WELD MINIMUM.
- FIELD CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED AS DETAILED. NO FIELD WELDING OF HOT-DIPPED GALVANIZED MEMBERS IS ALLOWED. USE 3/16" FILLET WELD MINIMUM.
- SUBMIT FOR REVIEW SHOP DRAWINGS OF STEEL DETAILS PRIOR TO FABRICATING STRUCTURAL STEEL.
- ALL BRICK SHELF ANGLES SHALL BE HOT-DIPPED GALVANIZED.
- ALL EXTERIOR ELEMENTS AND THOSE ELEMENTS NOTED TO BE GALVANIZED SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123 AFTER SANDBLAST CLEANING PER SSPC-SP10. USE ASTM A325 BOLTS HOT DIPPED GALVANIZED WITH GALVANIZED HARDENED WASHERS AND GALVANIZED HEAVY HEX NUTS FOR BOLTING OF GALVANIZED ITEMS.
- STEEL COLUMNS, BASE PLATES, AND ALL STEEL BELOW GRADE SHALL HAVE A MINIMUM 3" CONCRETE COVER PROTECTION.
- ALL SHOP AND FIELD WELDS SHALL BE PERFORMED BY A CERTIFIED WELDER IN ACCORDANCE WITH AWS D1.1.



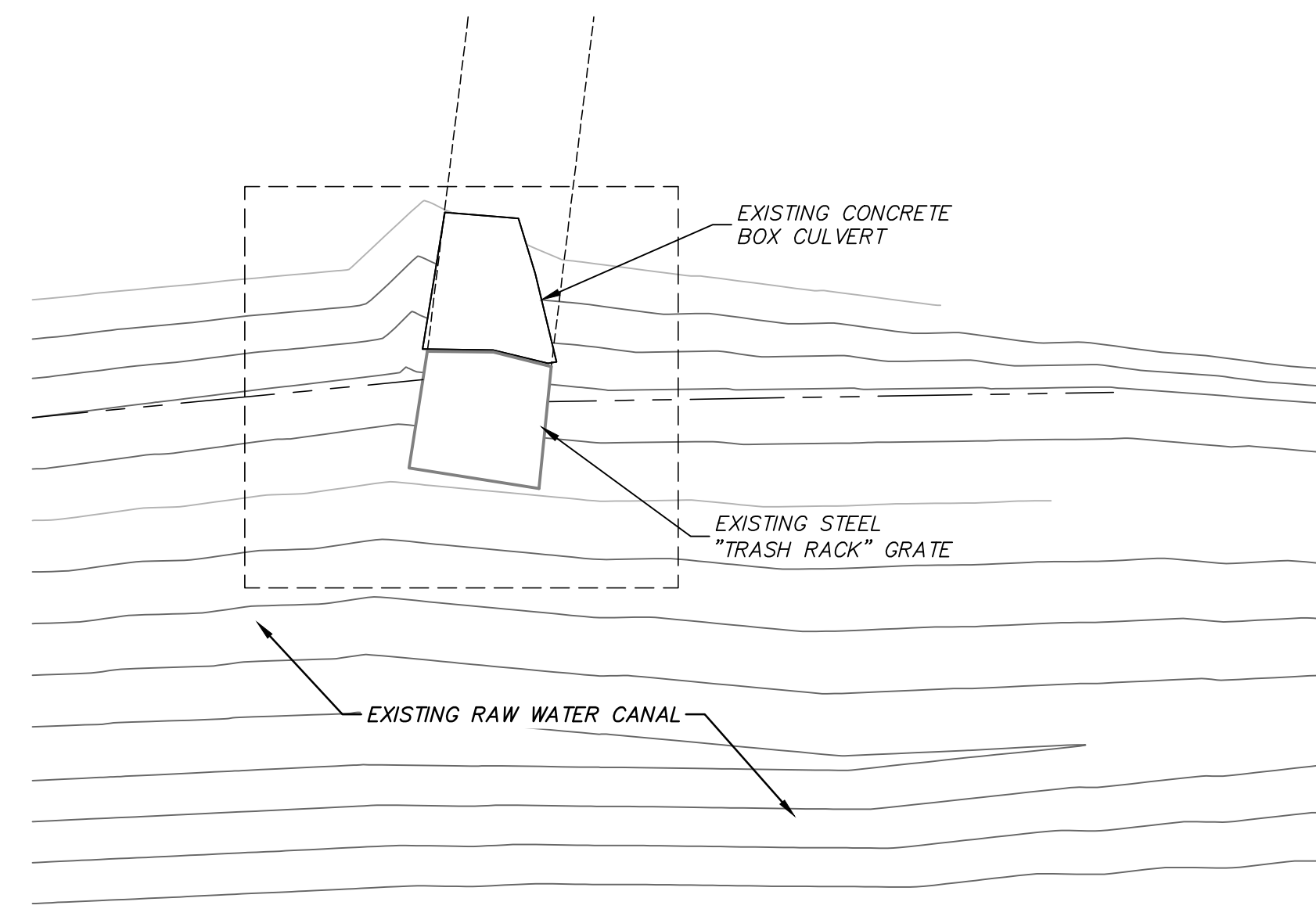
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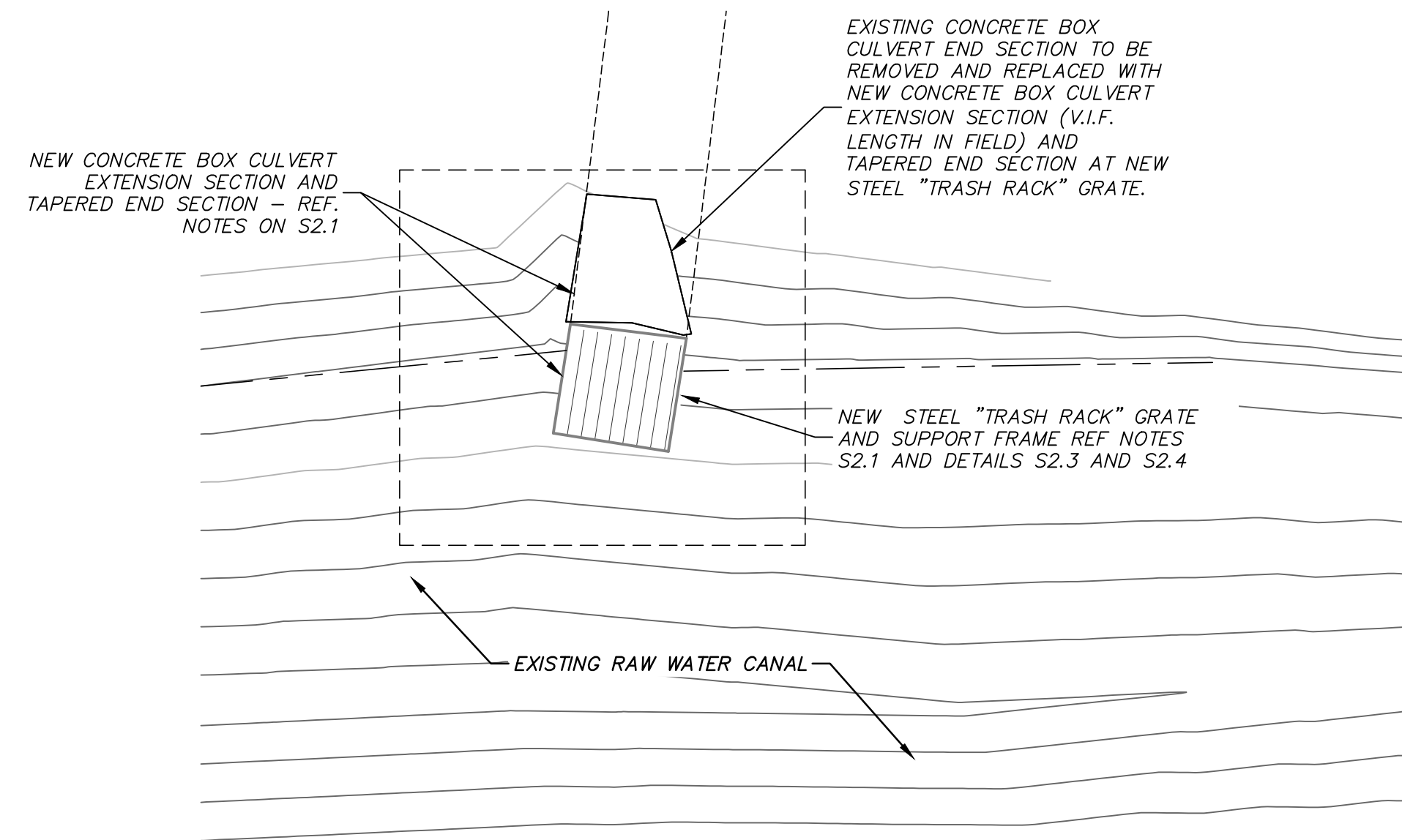
**RAW WATER CANAL IMPROVEMENTS**  
**GRATE REHABILITATION AND CANAL OUTLET REHABILITATION**  
**STRUCTURAL NOTES**

DRAWN BY:	TJC
CHECKED BY:	JAB
APPROVED BY:	JRE
DATE:	05-14-2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	

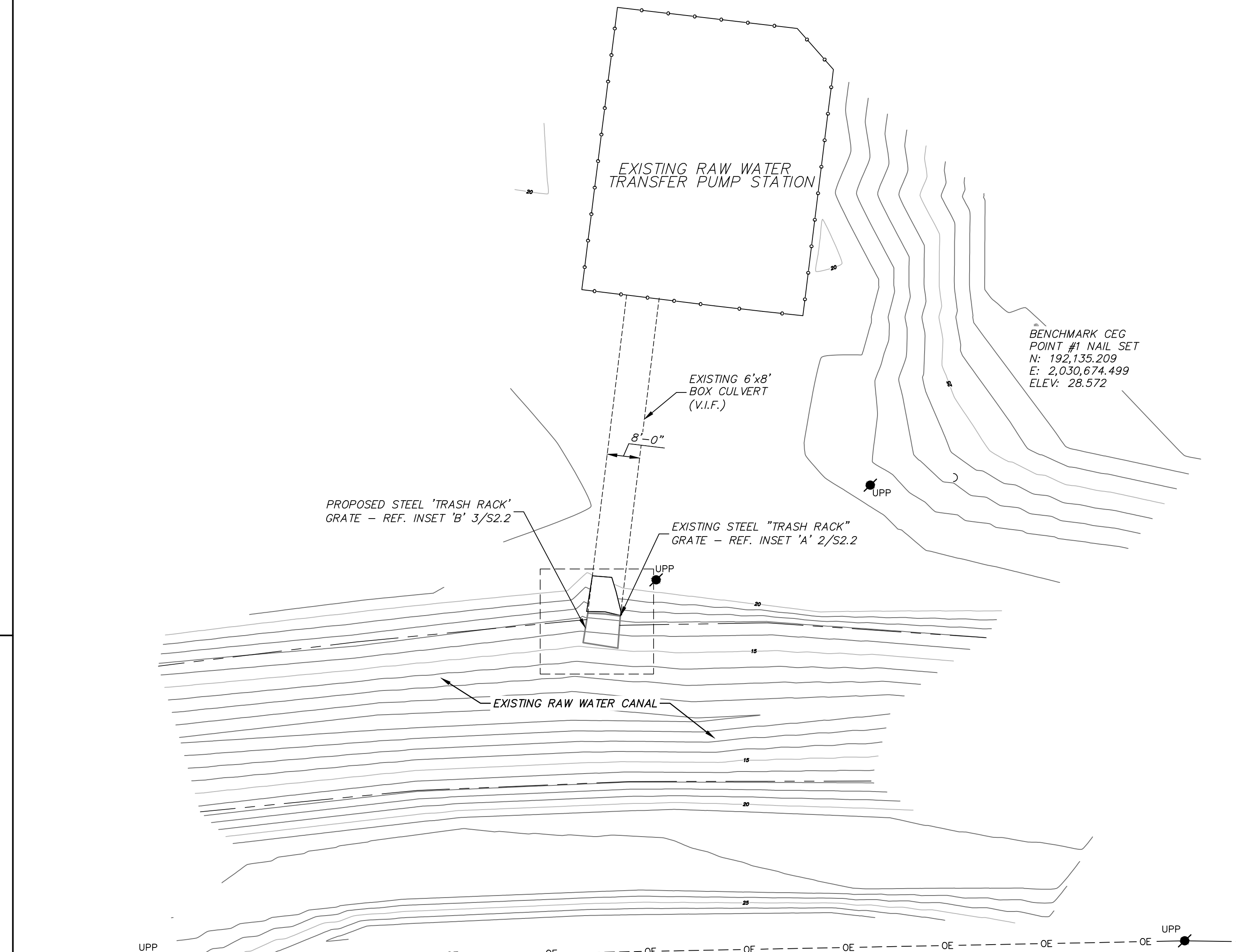
**S2.1**



2 INSET 'A' - EXISTING GRATE  
S2.2 PLAN VIEW SCALE: 1" = 10'



3 INSET 'B' - PROPOSED GRATE  
S2.2 PLAN VIEW SCALE: 1" = 10'



1 GRATE - STRUCTURAL RETROFIT PLAN  
S2.2 SCALE: 1" = 20'

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**BID SET**

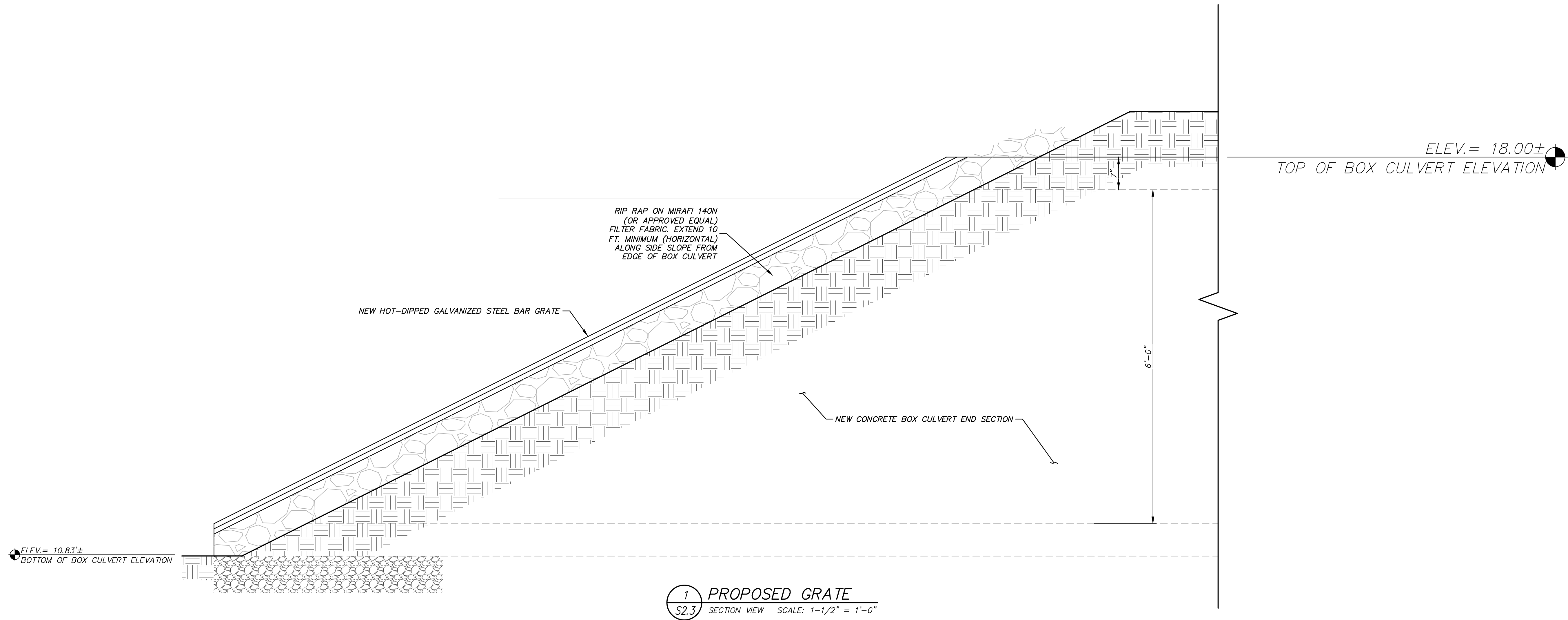
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RAW WATER CANAL IMPROVEMENTS	
GRATE REHABILITATION AND CANAL OUTLET REHABILITATION	
GRATE STRUCTURE RETROFIT PLAN	

DRAWN BY:	TJC
CHECKED BY:	JAB
APPROVED BY:	JRE
DATE:	05-14-2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	

**S2.2**

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1 PROPOSED GRATE  
S2.3 SECTION VIEW SCALE: 1-1/2" = 1'-0"



**BID SET**

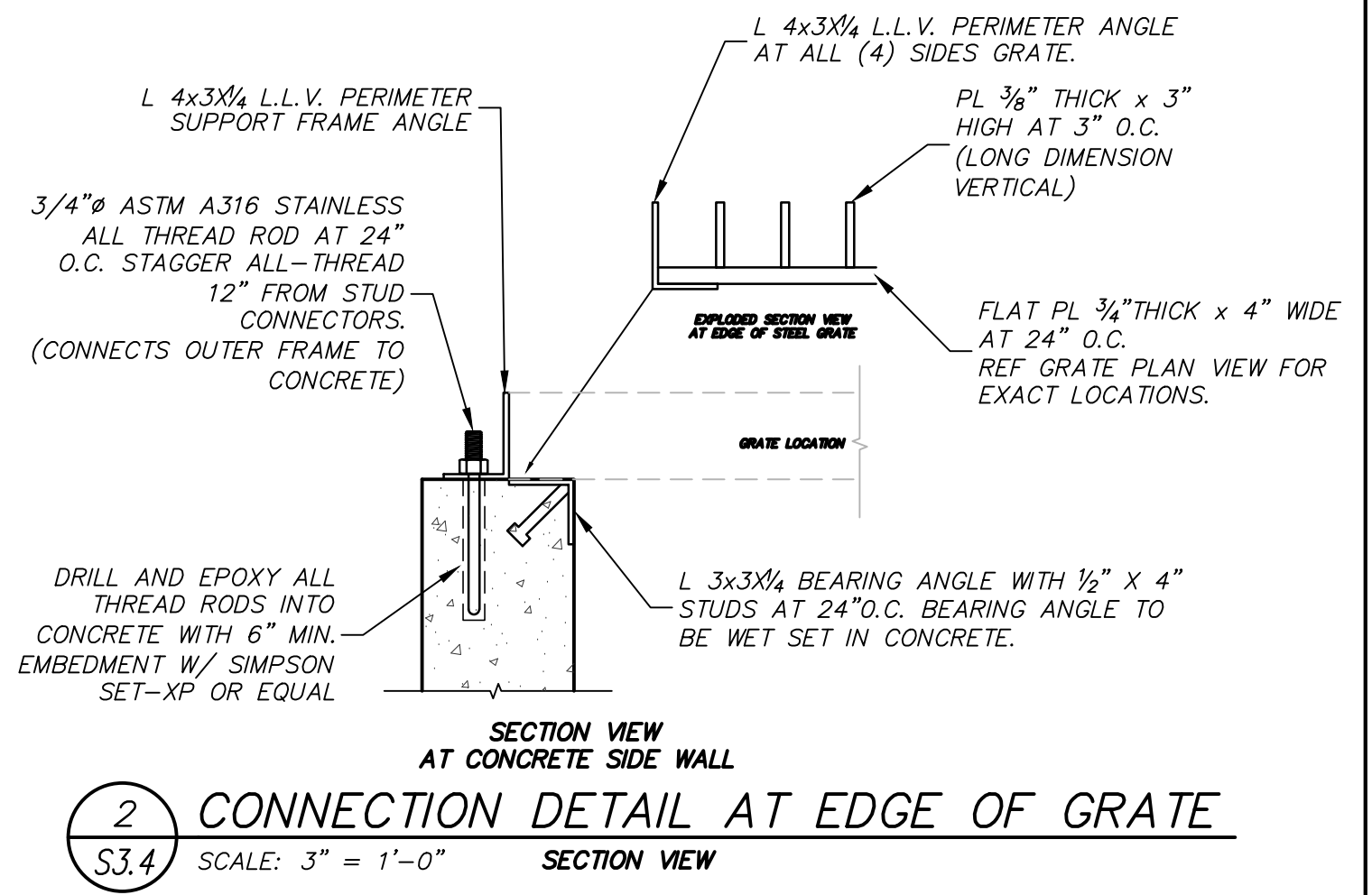
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RAW WATER CANAL IMPROVEMENTS
GRATE REHABILITATION AND CANAL OUTLET REHABILITATION
STRUCTURAL DETAILS

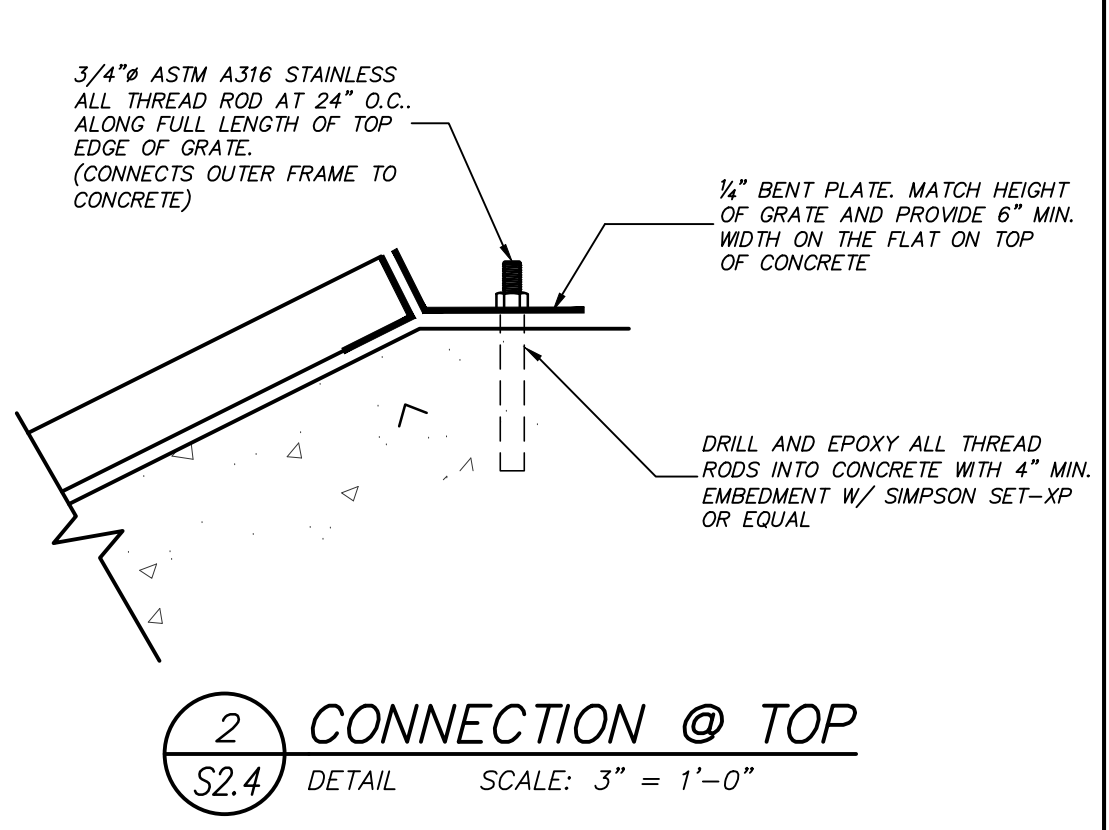
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CHECKED BY:	JAB
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JOB No.	2018-0640
DRAWING No.	

**S2.3**

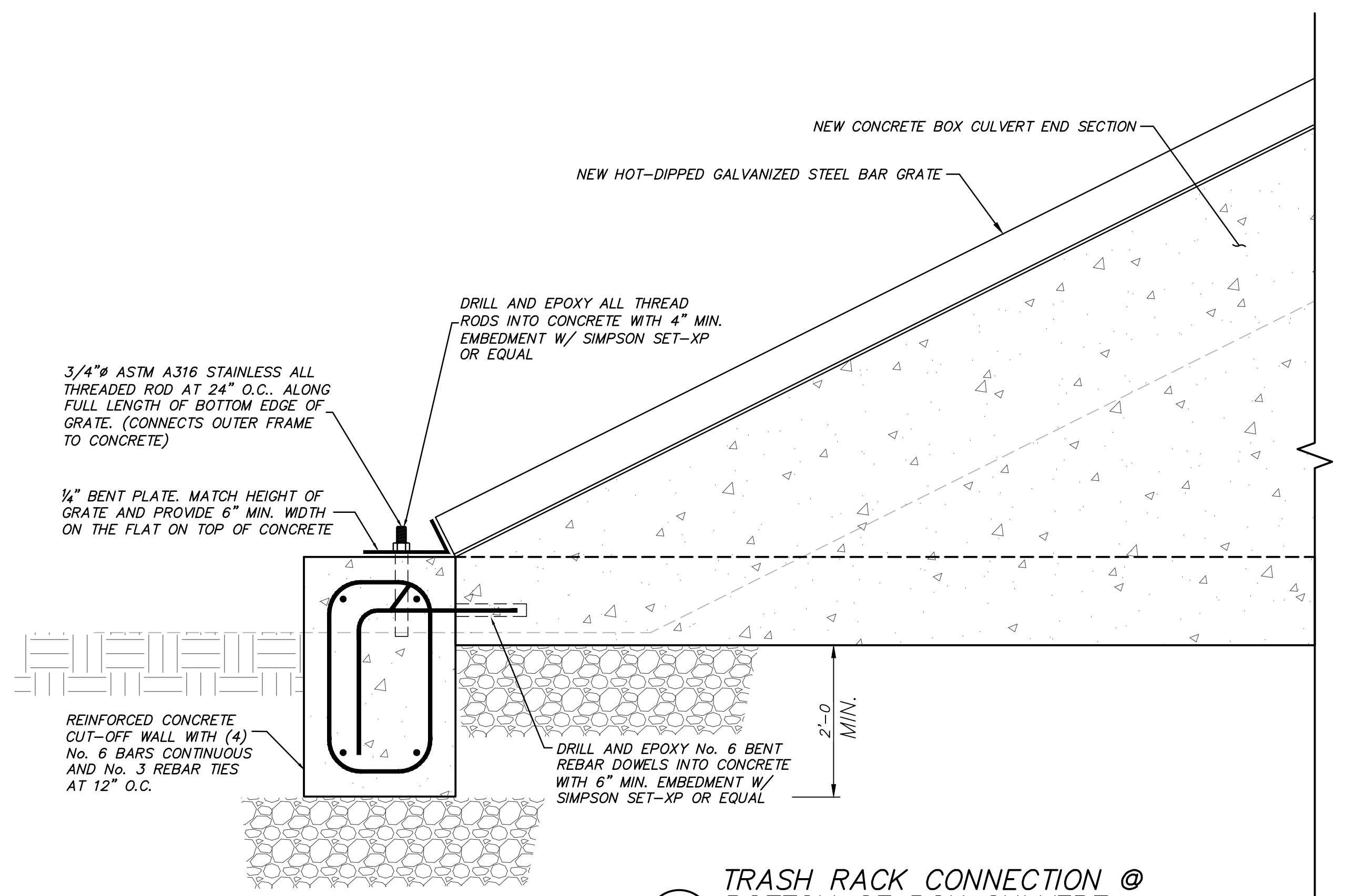
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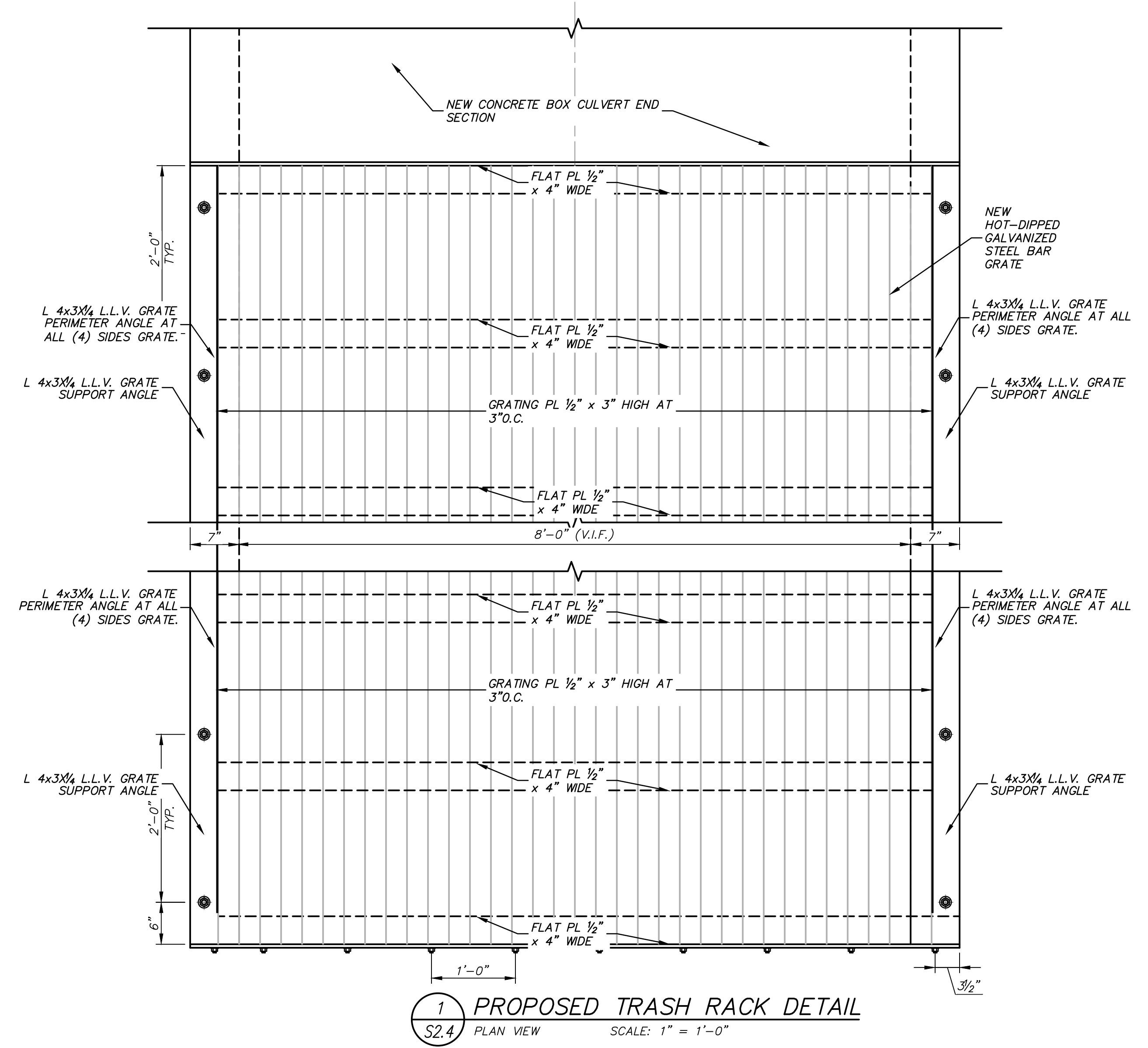
**2 CONNECTION DETAIL AT EDGE OF GRATE**  
SCALE: 3" = 1'-0"



**2 CONNECTION @ TOP**  
SCALE: 3" = 1'-0"



**4 TRASH RACK CONNECTION @ BOTTOM OF BOX CULVERT**  
SCALE: 1-1/2" = 1'-0"



**1 PROPOSED TRASH RACK DETAIL**  
SCALE: 1" = 1'-0"



**BID SET**

REV.	DATE	DESCRIPTION
0	05-14-2020	BID SET

**RAW WATER CANAL IMPROVEMENTS**  
**GRATE REHABILITATION AND CANAL OUTLET REHABILITATION**  
**STRUCTURAL DETAILS**

DRAWN BY:	TJC
CHECKED BY:	JAB
APPROVED BY:	JRE
DATE:	05-14-2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	S2.4

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## STRUCTURAL NOTES

### GENERAL REQUIREMENTS

1. WHERE A SECTION OR DETAIL IS SHOWN FOR ONE CONDITION, IT SHALL APPLY TO ALL SIMILAR CONDITIONS.
2. THE DESIGN ADEQUACY AND SAFETY OF ERECTION BRACING, SHORING, TEMPORARY SUPPORTS, ETC. SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
3. DO NOT SCALE DRAWINGS. FOLLOW DIMENSIONS SHOWN ON PLANS.
4. CONTRACTOR SHALL COORDINATE AND VERIFY ALL DIMENSIONS AND ELEVATIONS SHOWN HEREIN WITH FIELD CONDITIONS PRIOR TO CONSTRUCTION OR MATERIAL PURCHASE AND SHALL ENGINEER IN WRITING OF DISCREPANCIES.
5. DIMENSIONS INDICATED RELATIVE TO EXISTING STRUCTURE ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION OR MATERIALS PURCHASE. CONTRACTOR SHALL NOTIFY ENGINEER IN WRITING OF DISCREPANCIES.
6. SPECIFIED ANCHOR SYSTEMS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. SPECIAL ATTENTION SHALL BE GIVEN TO THE DRILLING, CLEANING, AND PREPARATION OF HOLES. WHERE ADHESIVE ANCHORS ARE SHOWN, SPECIAL ATTENTION SHALL BE GIVEN TO THE REQUIRED MIXING, APPLICATION, AND CURING TIME OF ADHESIVE TYPE SPECIFIED.

### REINFORCING STEEL

1. ALL REINFORCING STEEL SHALL BE ASTM A615, GRADE 60, UNLESS NOTED OTHERWISE.
2. ALL WELDED WIRE FABRIC SHALL BE ASTM A185, 70 KSI MINIMUM YIELD STRENGTH.
3. ADDITIONAL REINFORCING AND THAT QUANTITY OF REINFORCING OCCURRING AT OPENINGS SHALL BE PLACED EQUALLY EACH SIDE OF OPENINGS AS DETAILED.
4. HOOKS IN REINFORCING ARE IN ADDITION TO LENGTH SHOWN.
5. REINFORCING IS TO BE SUPPORTED IN FORMS AND SPACED WITH WIRE BAR SUPPORTS ACCORDING TO CRSI "PLACING REINFORCING BARS" UNLESS NOTED OTHERWISE.
6. MINIMUM REINFORCING STEEL CLEAR COVERS ARE AS FOLLOWS:
  - A. CONCRETE CAST DIRECTLY AGAINST EARTH.....3"
  - B. INTERIOR SLABS.....1"
  - C. INTERIOR BEAMS AND COLUMNS.....1 1/2"
  - D. EXTERIOR BEAMS AND COLUMNS.....2"
  - E. EXTERIOR SLABS.....1 1/2"
7. UNLESS NOTED OTHERWISE, ALL BAR REINFORCING LAP SPLICES SHALL HAVE A MINIMUM LAP LENGTH OF 48 BAR DIAMETERS.

### SUBGRADE PREPARATION

1. CONTRACTOR SHALL STRIP AND REMOVE ALL VEGETATION, TOPSOIL, ROOTS, AND ORGANIC SOILS FROM THE CONSTRUCTION AREA FOR A DISTANCE OF AT LEAST 5' BEYOND THE EXTENT OF THE STRUCTURE LIMITS. THE DEPTH OF STRIPPING SHALL BE THAT REQUIRED TO REMOVE SIGNIFICANT ROOT ZONES, SMALL TREE STUMPS, AND OTHER UNACCEPTABLE MATERIALS, BUT IN NO CASE SHALL IT BE LESS THAN 12".
2. AFTER TOPSOILS, ETC. WITHIN AND TO A POINT 5' OUTSIDE THE WALL CONSTRUCTION AREA HAVE BEEN REMOVED FROM THE SITE, THE UPPER 24" OF EXPOSED SOILS SHALL BE COMPACTED TO A MINIMUM DENSITY OF 95% STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698).
3. COMPACTION TESTING SHALL BE PERFORMED UNDER THE OBSERVATION OF AN APPROVED TESTING LABORATORY SUPERVISED BY A GEOTECHNICAL ENGINEER. UNDERCUT, BACKFILL, AND COMPACT AREAS WHICH PUMP, DEFLECT, OR RUT EXCESSIVELY OR WHICH DO NOT STABILIZE AFTER SUCCESSIVE PASSES OF COMPACTION EQUIPMENT.
4. AFTER COMPLETION OF DENSIFICATION OF EXISTING SOILS, PLACE STRUCTURAL FILL FOR BUILDING AND PAVEMENT AREAS IN THIN (8" TO 10") LIFTS COMPACT TO A MINIMUM DENSITY OF 95% STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-689). MATERIAL USED AS STRUCTURAL FILL SHALL BE NON-PLASTIC GRANULAR MATERIAL CONTAINING LESS THAN 15% FINES PASSING THROUGH THE NO. 200 SIEVE AND FREE OF ORGANICS, BOULDERS, OR OTHER DELETERIOUS MATERIALS.

### FOUNDATIONS

1. ALL FOUNDATION FILL SUBGRADE SOILS SHALL BE COMPACTED AS FOLLOWS: (REF. ASTM D1557)
  - A. 95% MODIFIED PROCTOR FOR GREATER THAN 18" BELOW FINAL FILL.
  - B. 98% MODIFIED PROCTOR FOR THE UPPER 18" BENEATH BUILDINGS AND PAVEMENTS.
2. SOILS TESTING LABORATORY SHALL CONDUCT COMPACTION TESTS IN ACCORDANCE WITH ASTM D698. RATE OF COMPACTION SHALL BE AS FOLLOWS:
  - A. ONE TEST FOR EACH SPREAD FOOTING;
  - B. ONE TEST FOR EACH 50 LINEAR FEET OF CONTINUOUS FOOTING;
  - C. ONE TEST FOR EACH 1000 S.F. OF SLAB.
3. FOUNDATIONS HAVE BEEN DESIGNED FOR 1,500 PSF MINIMUM ALLOWABLE SOIL BEARING PRESSURE.
4. REMOVE ALL WATER SOFTENED SOILS FROM FOOTING EXCAVATIONS PRIOR TO PLACING CONCRETE. FILL REMAINING VOIDS WITH ADDITIONAL CONCRETE.
5. SUPPORT ALL BOTTOM REINFORCEMENT IN FOUNDATION WITH STANDEES OR WHOLE CONCRETE BRICKS AT 48" O.C. MAX. REQUIRED CONCRETE COVER SHALL BE MAINTAINED AT ALL TIMES.
6. ALL FOOTING, PIER, AND OTHER FOUNDATION REINFORCING SHALL BE TIED IN PLACE PRIOR TO POURING CONCRETE.
7. WHERE FINISHED GRADES DIFFER ON OPPOSITE SIDES OF FOUNDATION WALLS, PROVIDE TEMPORARY BRACING. PREVENT LATERAL MOVEMENT UNTIL ALL ADJACENT FILLING, COMPACTION, FLOOR SLABS, AND FRAMING AT NEXT LEVEL OVER HAS BEEN COMPLETED.
8. UNLESS INDICATED ON FOUNDATION PLAN, VERTICAL STEPS IN FOOTINGS TO BE MAXIMUM 2'-0" VERTICAL SPACED NO LESS THAN 4'-0" O.C. HORIZONTALLY TO MAINTAIN MINIMUM 12" COVER BELOW FINISHED EARTH GRADE.
9. CONSTRUCTION JOINTS IN CONTINUOUS FOOTINGS TO BE FORMED VERTICALLY IN ACCORDANCE WITH FOUNDATION DETAILS IN PLANS.

### CAST-IN-PLACE REINFORCED CONCRETE

1. THE FOLLOWING ACI STANDARDS (LATEST EDITION) APPLY:
  - A. ACI 318 - CODE
  - B. ACI 315 - DETAILING
  - C. ACI 301 - SPECIFICATIONS
  - D. ACI 304 - PLACING
  - E. ACI 347 - FORMWORK
  - F. ACI 211.1 - MIX PROPORTIONING
  - G. ACI 305 - HOT WEATHER CONCRETING
  - H. ACI 306 - COLD WEATHER CONCRETING
2. ALL CONCRETE SHALL BE NORMAL WEIGHT CONCRETE (145 PCF) WITH MIXES MEETING THE FOLLOWING CRITERIA (UNLESS OTHERWISE NOTED IN BJSWA TECHNICAL SPECIFICATIONS):

STRUCTURAL ELEMENT	28 DAY COMPRESSIVE STRENGTH
FOOTINGS, GRADE BEAMS & FOUNDATION WALLS	3,000 PSI
SLAB ON GRADE	3,000 PSI
ELEVATED SLABS & BEAMS	4,000 PSI
COLUMNS	4,000 PSI

3. SLUMP SHALL NOT EXCEED 5". SLUMP TESTS SHALL BE PERFORMED ON EACH TRUCK LOAD AND CONFORM TO ASTM C143.

### PEDESTRIAN ACCESS BRIDGES

1. ALL PEDESTRIAN ACCESS BRIDGES TO BE FABRICATED BY "GATOR BRIDGE" (OR APPROVED EQUAL), 2880 MELLONVILLE AVE, SANFORD, FL 32773, PH (407)-323-0190.  
 GATOR BRIDGE  
 DESIGN ENGINEER: CMI LIMITED CO.  
 REESE PATTEN  
 EMAIL: RPATTEN@CMILC.COM  
 PHONE: (770)-850-4096

CONTRACTOR SHALL COORDINATE WITH BEAUFORT-JASPER WATER & SEWER AUTHORITY (BJSWA) FOR SPECIFIC DIMENSIONAL AND CONSTRUCTION REQUIREMENTS AND OBTAIN APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR SHALL FURNISH SHOP DRAWINGS AND STAMPED CALCULATIONS WITH THE SEAL OF REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE OF SOUTH CAROLINA PRIOR TO FABRICATION TO CRANSTON ENGINEERING FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

**CRANSTON**  
ENGINEERING

ENGINEERS - PLANNERS - SURVEYORS

14 Westbury Park Way, Suite 202  
Bluffton, South Carolina 29910  
Telephone 843-815-3191  
CranstonEngineering.com



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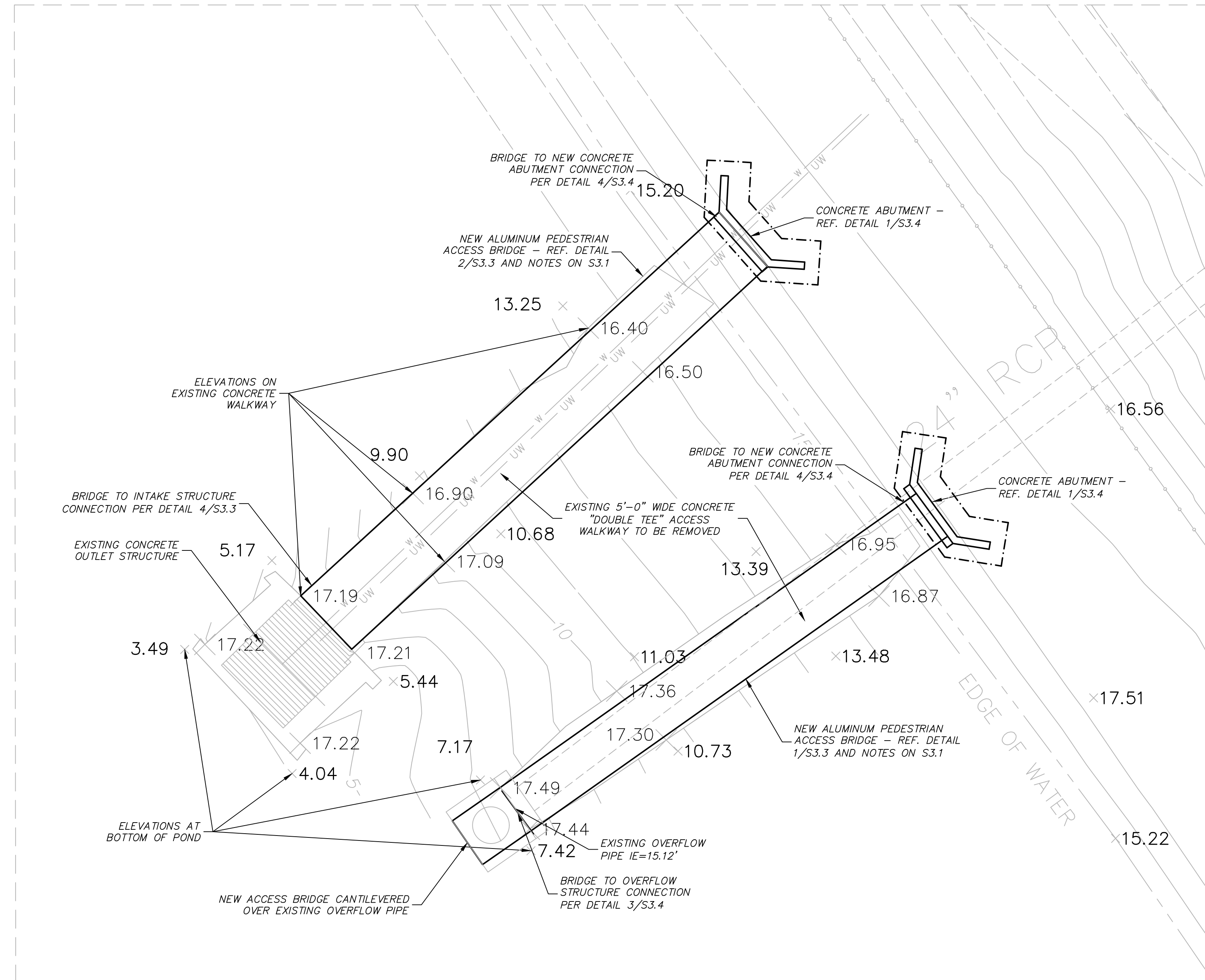
RAW WATER CANAL IMPROVEMENTS

GRATE REHABILITATION AND CANAL OUTLET REHABILITATION

STRUCTURAL NOTES

DRAWN BY:	TJC
CHECKED BY:	JAB
APPROVED BY:	JRE
DATE:	05-14-2020
SCALE:	AS SHOWN
JOB No.	2018-0640
DRAWING No.	S3.1

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1  
S3.2 CANAL OUTLET/ OVERFLOW STRUCTURES RETROFIT PLAN  
PLAN VIEW SCALE: 1" = 20'



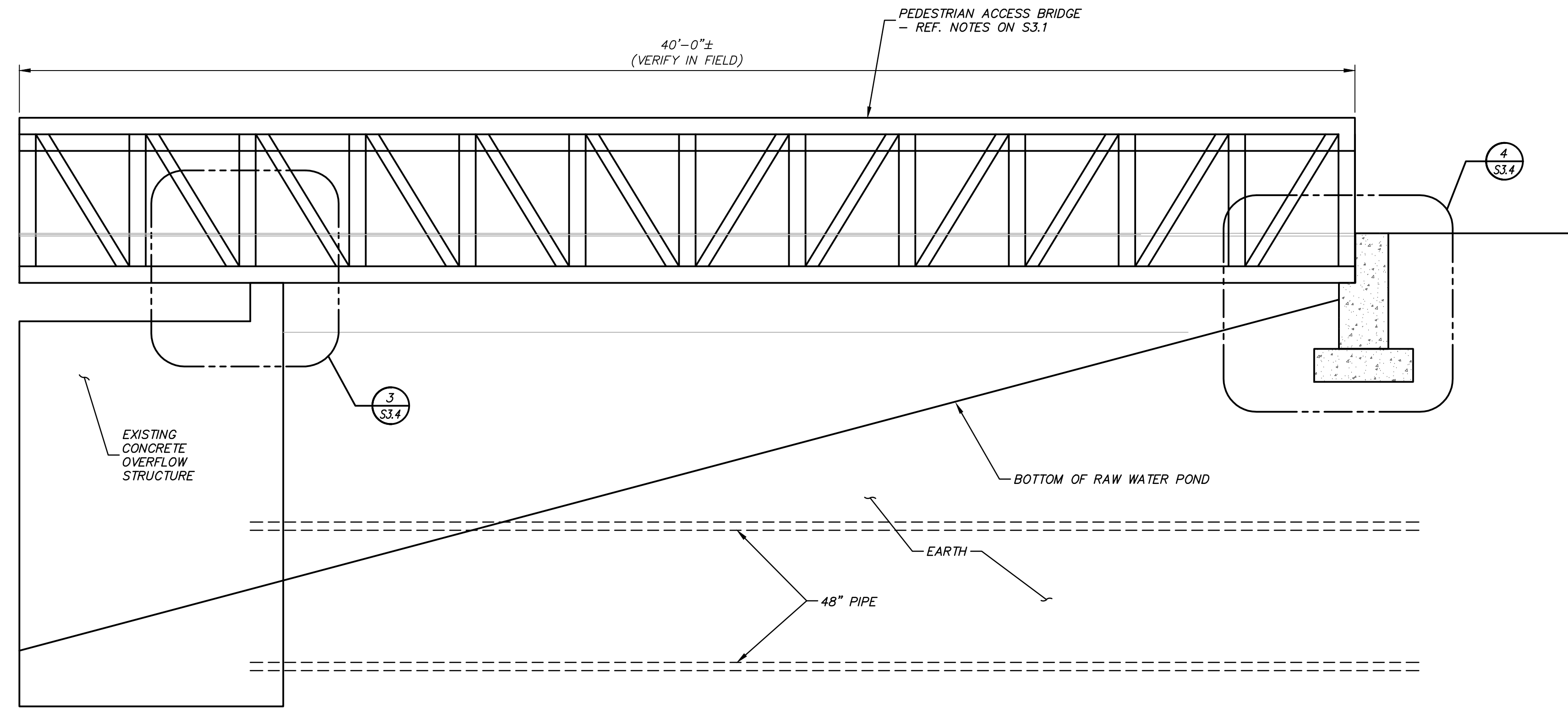
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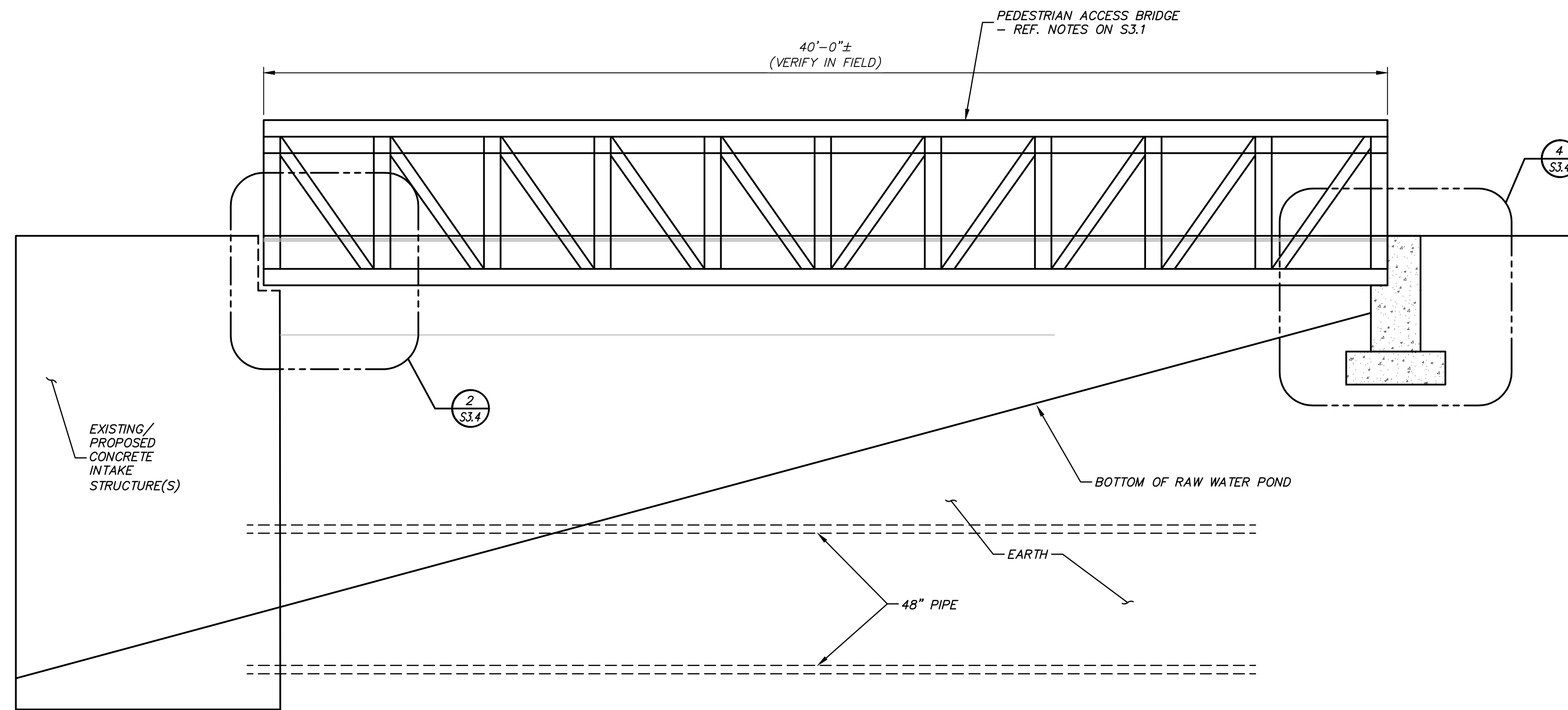
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GRATE REHABILITATION AND CANAL OUTLET REHABILITATION
CANAL OUTLET STRUCTURES RETROFIT PLAN

DRAWN BY:	TJC
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APPROVED BY:	JRE
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JOB No.	2018-0640
DRAWING No.	S3.2

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**1** PEDESTRIAN ALUMINUM ACCESS BRIDGE TO CANAL OVERFLOW STRUCTURE  
 S3.3 SECTION VIEW SCALE: 1/4" = 1'-0"



**2** PEDESTRIAN ALUMINUM ACCESS BRIDGE TO CANAL OUTLET STRUCTURE(S)  
 S3.3 SECTION VIEW SCALE: 1/4" = 1'-0"



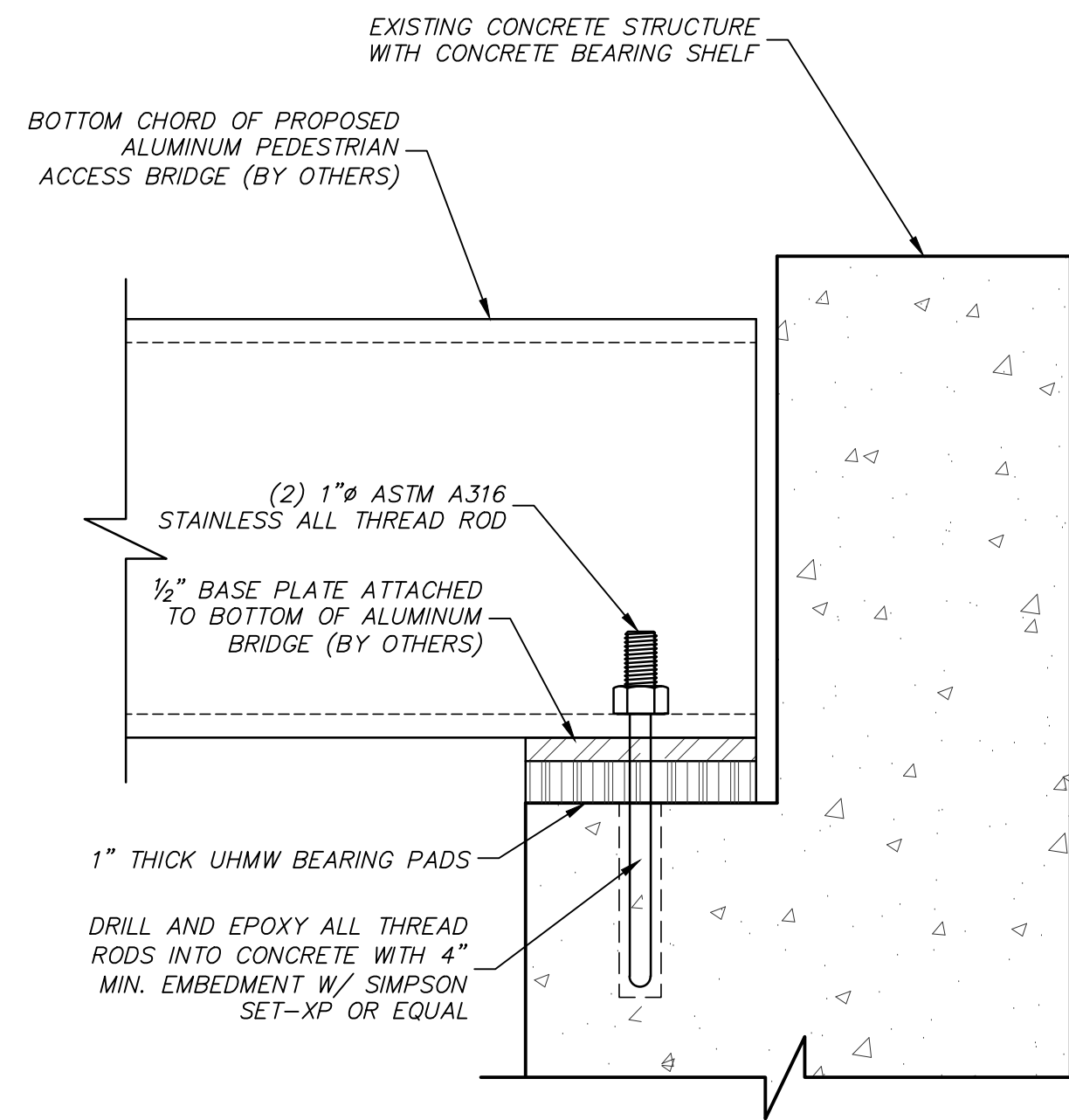
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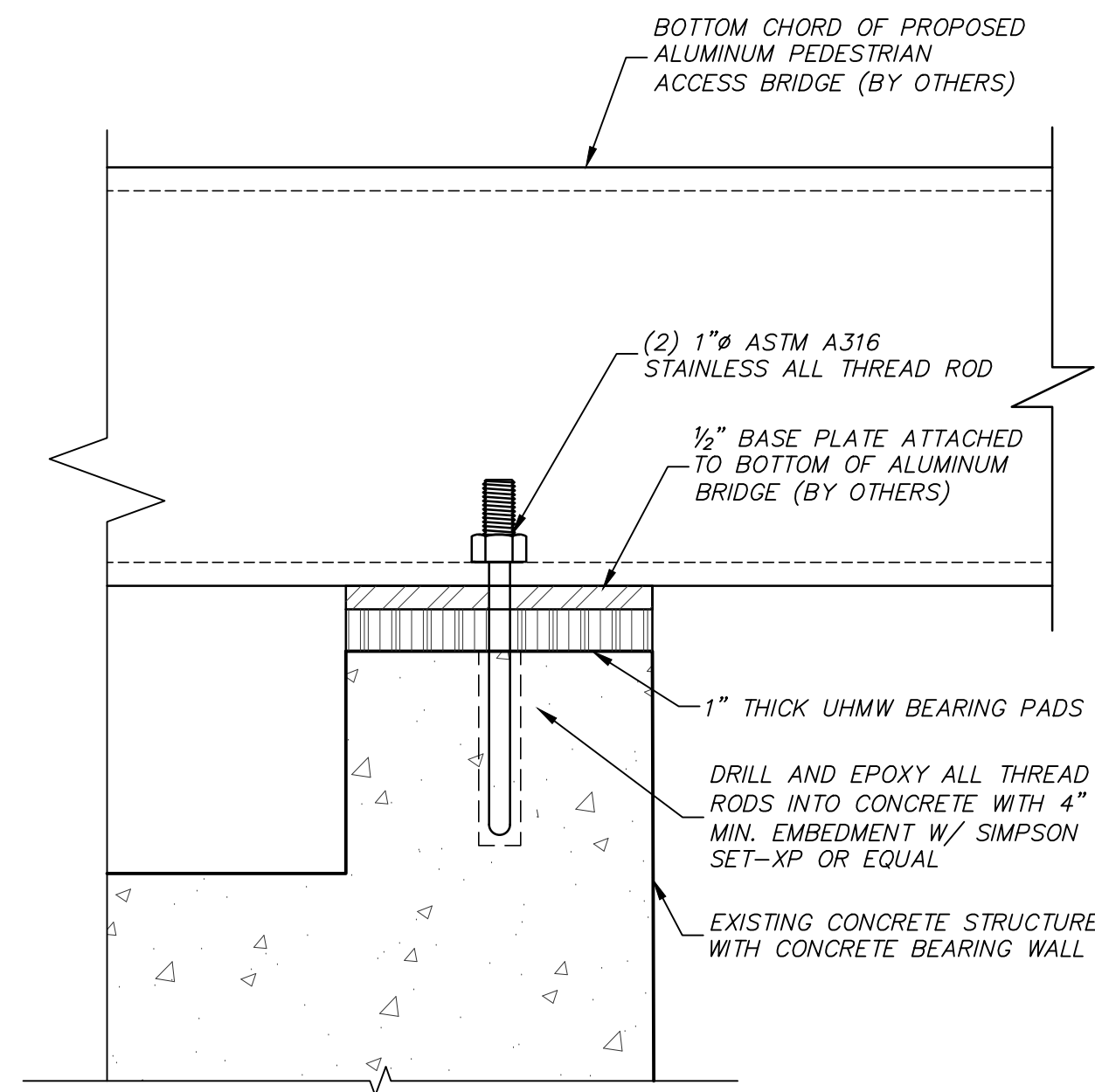
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**GRATE REHABILITATION AND CANAL OUTLET REHABILITATION**  
**STRUCTURAL DETAILS**

DRAWN BY: TJC  
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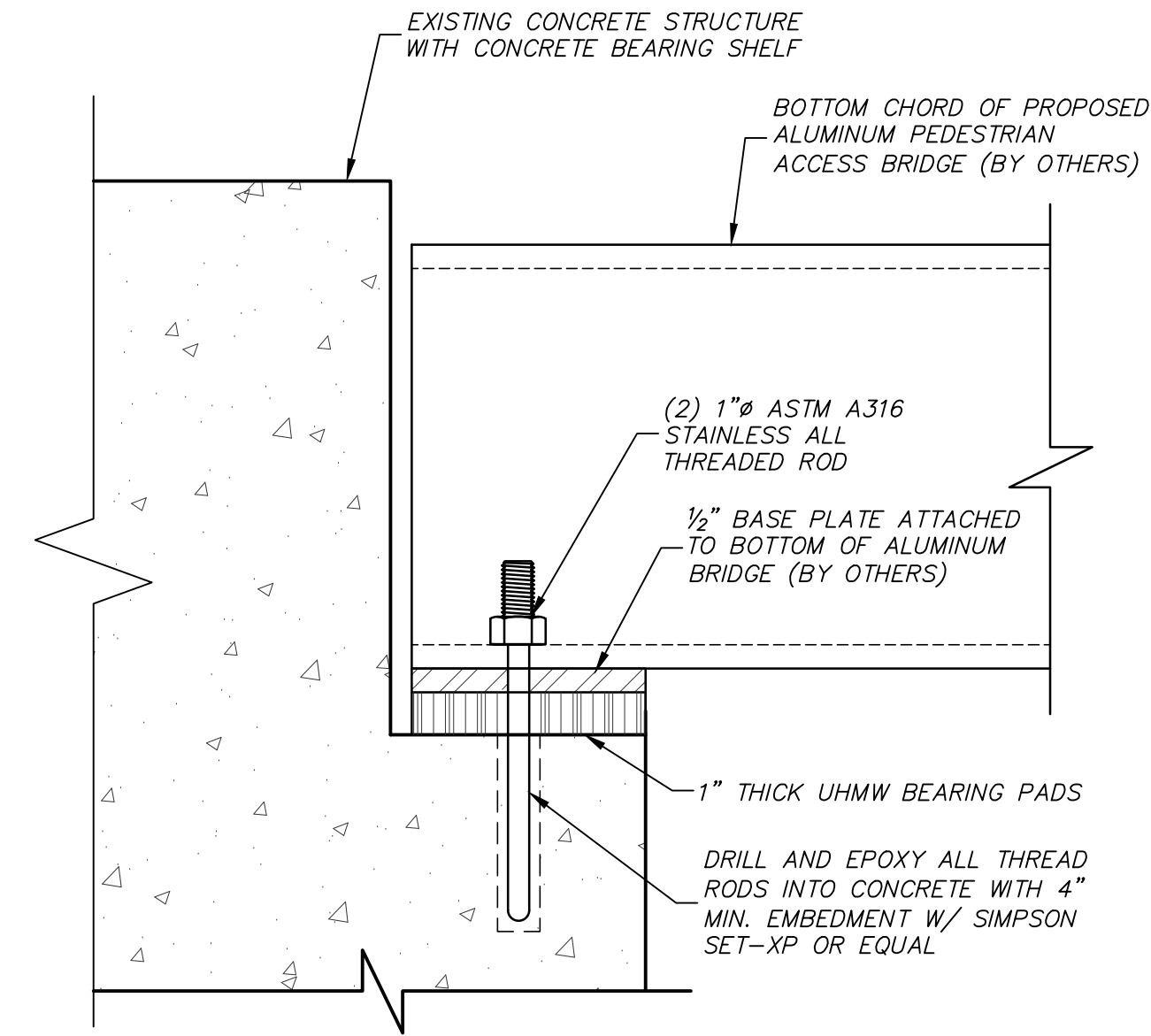
**S3.3**



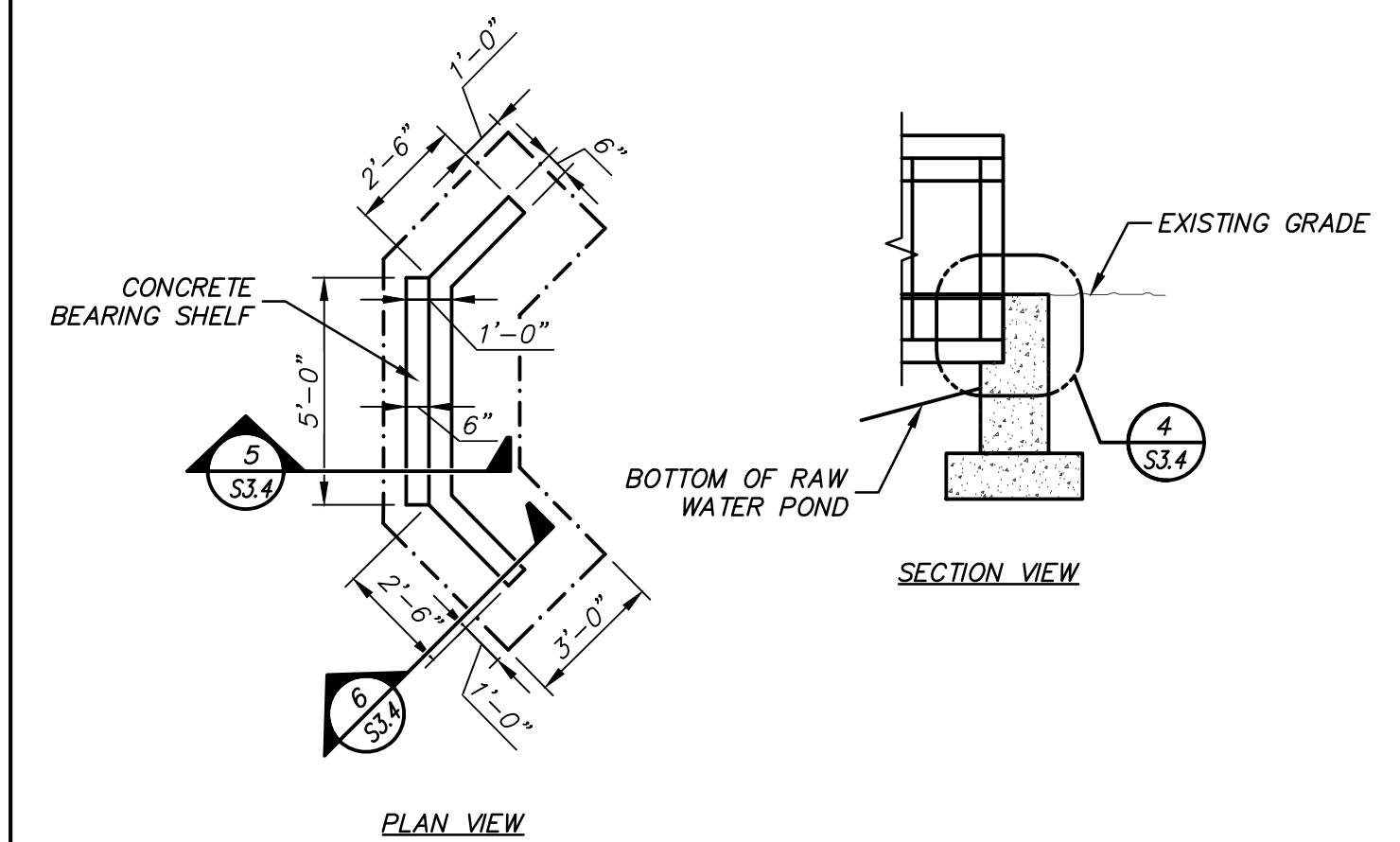
**4 BRIDGE TO NEW CONCRETE ABUTMENT**  
 S3.4 SCALE: 3" = 1'-0" PROPOSED STRUCTURE ELEVATION



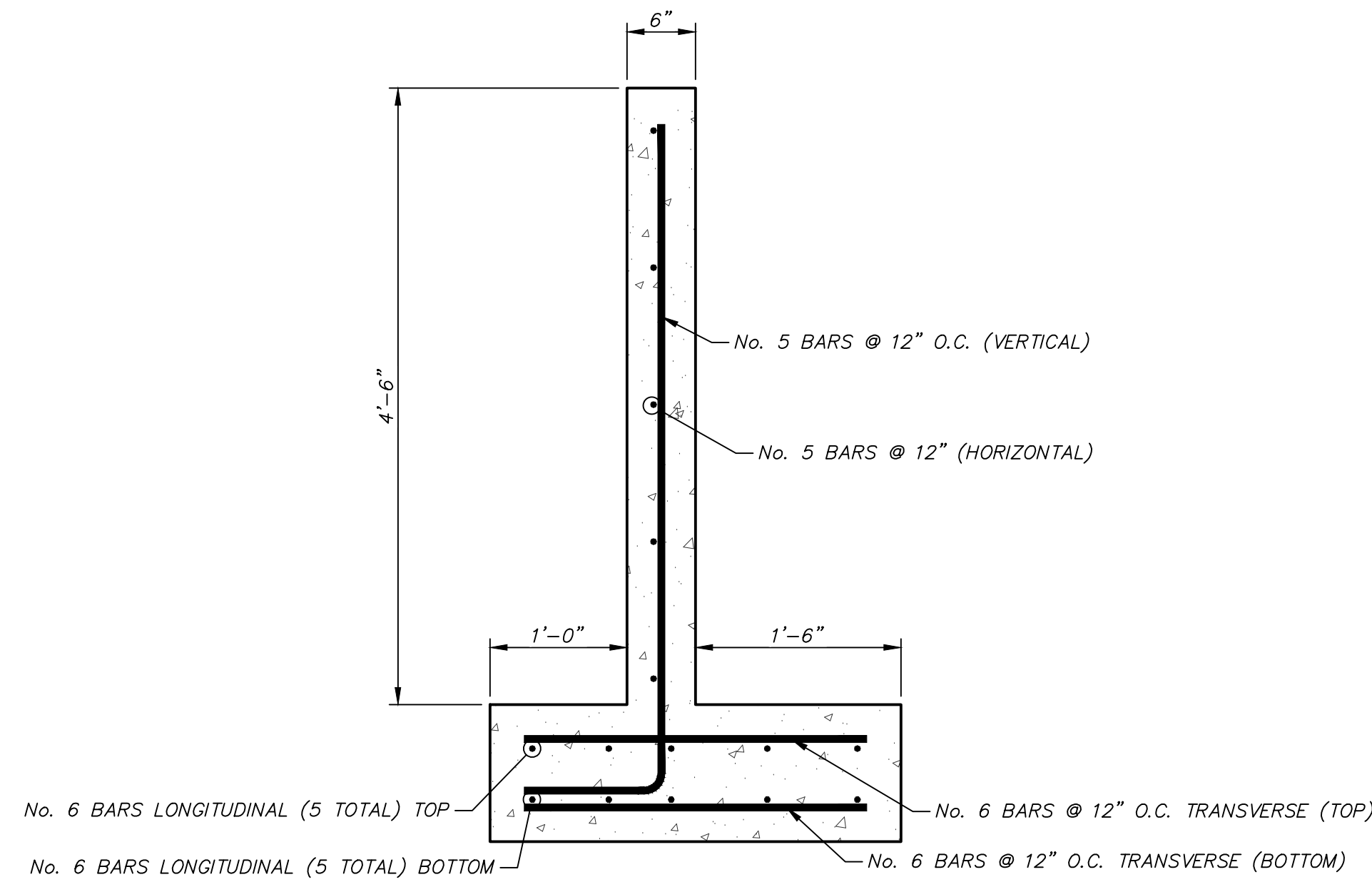
**3 BRIDGE TO OVERFLOW STRUCTURE**  
 S3.4 SCALE: 3" = 1'-0" PROPOSED STRUCTURE ELEVATION



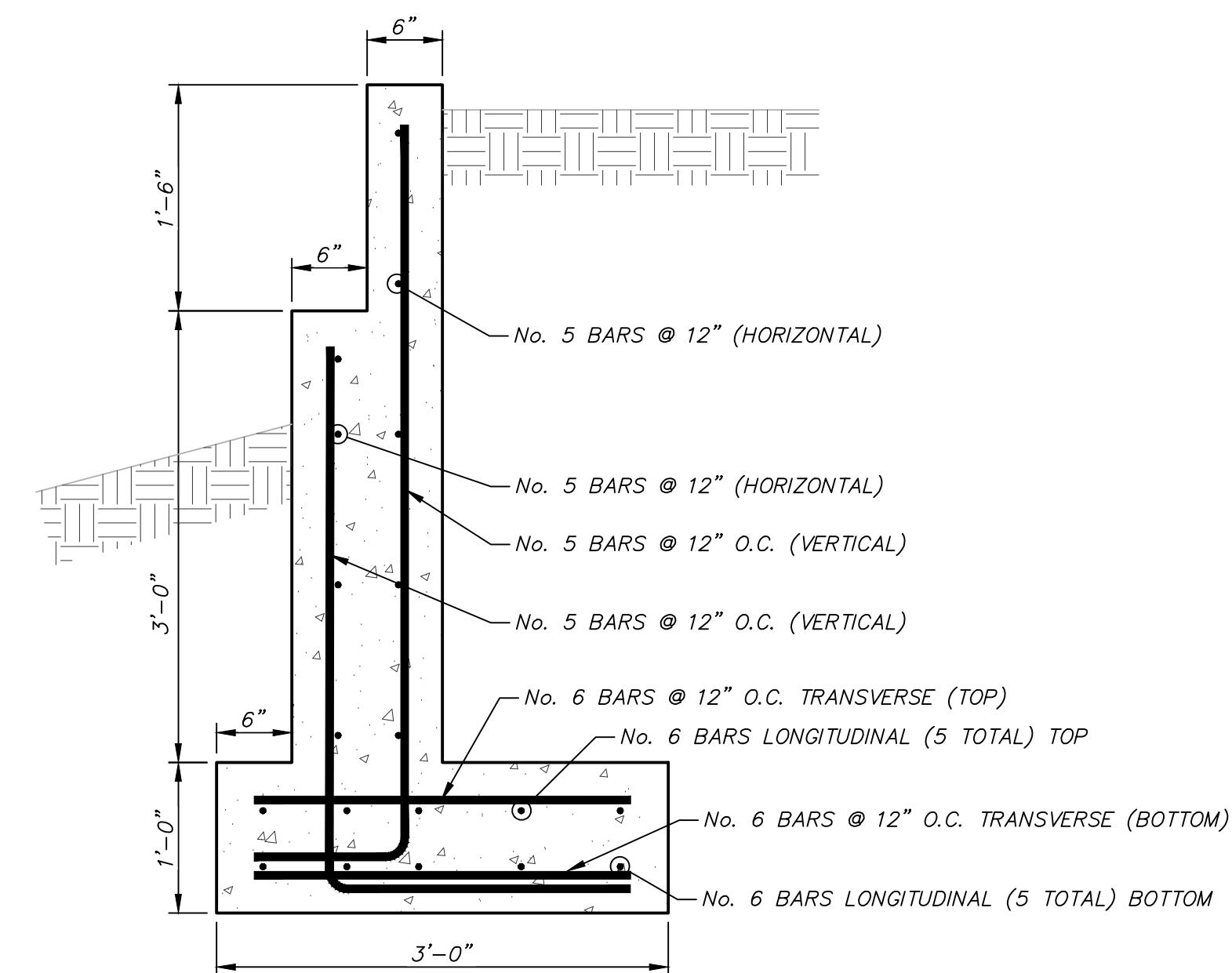
**2 BRIDGE TO OUTLET STRUCTURE(S)**  
 S3.4 SCALE: 3" = 1'-0" PROPOSED STRUCTURE ELEVATION



**1 PROPOSED CONCRETE ABUTMENT**  
 S3.4 SCALE: 1/4" = 1'-0"  
 REBAR AND FOOTINGS BASED ON GEOTECH. STRUCTURAL FILL AT FOOTINGS BELOW H20 TABLE NOTE.



**6 ABUTMENT CROSS-SECTION @ BEARING**  
 S3.4 SCALE: 1" = 1'-0"



**5 ABUTMENT CROSS-SECTION @ BEARING**  
 S3.4 SCALE: 1" = 1'-0"



**BID SET**

REV.	DATE	DESCRIPTION
0	05-14-2020	BID SET

<b>RAW WATER CANAL IMPROVEMENTS</b>	
<b>GRATE REHABILITATION AND CANAL OUTLET REHABILITATION</b>	
<b>STRUCTURAL DETAILS</b>	

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