

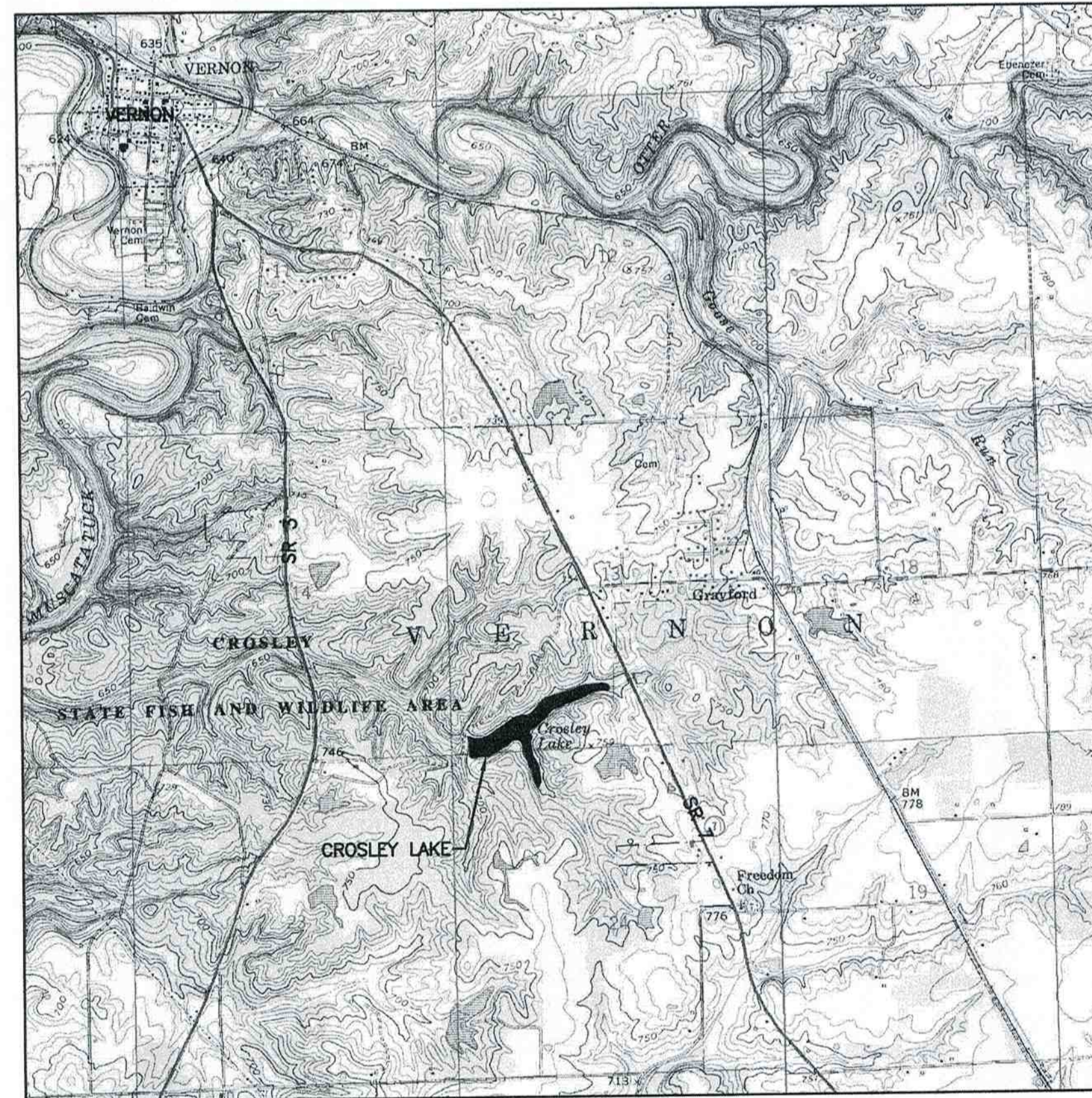
# INDIANA DEPARTMENT OF NATURAL RESOURCES CROSLEY FISH AND WILDLIFE AREA DAM IMPROVEMENTS PROJECT

PROJECT NO. ENG1802321631/E020098

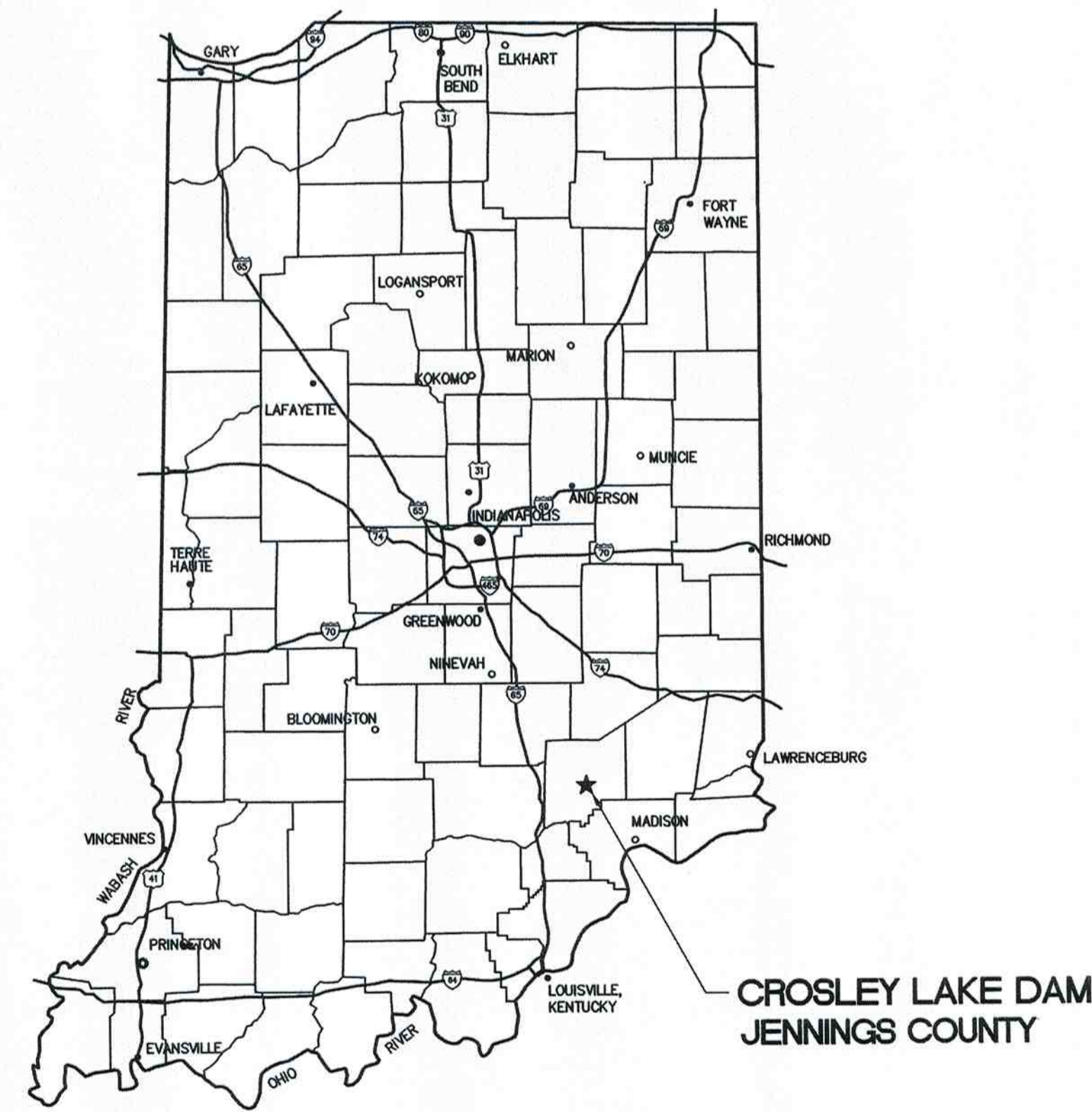
MAY 2018

PLANS FOR PROJECT RE-BID  
SEPTEMBER 27, 2018

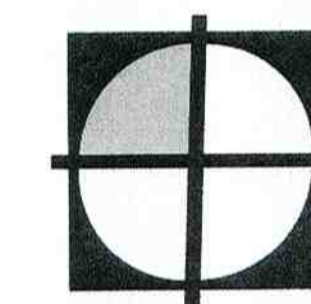
IDNR DIRECTOR - CAMERON F. CLARK  
GOVERNOR OF INDIANA - ERIC J. HOLCOMB



LOCATION MAP  
NO SCALE



GENERAL LOCATION MAP  
NO SCALE



**COMMONWEALTH**  
ENGINEERS, INC.

APPROVED BY: *Roger M. Kottowski* 5/9/18  
ROGER M. KOTTELOWSKI  
INDIANA P.E. NO. PE20374  
DATE:

CERTIFIED BY: *Drew O. Flamon* MAY 9, 2018  
DREW O. FLAMION  
INDIANA P.E. NO. PE11100003  
DATE:

CONTRACT NO. : D13038



**NOTIFICATION INFORMATION**

OWNER: STATE OF INDIANA VIA DEPARTMENT OF NATURAL RESOURCES DIVISION OF ENGINEERING 402 WEST WASHINGTON STREET, W299 INDIANAPOLIS, IN 46204 (317)232-4150	GEOTECHNICAL ENGINEER: EARTH EXPLORATION, INC 7770 W. NEW YORK ST. INDIANAPOLIS, IN 46214 P: (317)273-1690 F: (317)273-2250
PROPERTY MANAGER: IDNR CROSLLEY FISH AND WILDLIFE 2010 S. STATE HIGHWAY 3 NORTH VERNON, IN 47265 (812)346-5596 CHAD SPRINGER, IDNR CROSLLEY MGR.	STRUCTURAL ENGINEER: CE SOLUTIONS, INC. 10 SHOSHONE DRIVE CARMEL, IN 46032 P: (317)818-1912 F: (317)818-1911
ENGINEER: COMMONWEALTH ENGINEERS, INC. 7256 COMPANY DRIVE INDIANAPOLIS, IN 46237 (317)888-1177	

**PLAN LEGEND**

**EXISTING FEATURES**

	EXISTING UTILITY POLE		EXISTING STORM INLET/DROP BOX
	EXISTING GUY ANCHOR		EXISTING STORM PIPE/CULVERT
	EXISTING SIGN		EXISTING OVERHEAD ELECTRICAL LINE
	EXISTING BOLLARD		EXISTING BURIED ELECTRICAL LINE
	SOIL BORING LOCATION WITH ROCK CORING		EXISTING WATER LINE
	ROCK BORING LOCATION		WATER VALVE
	CONTROL POINT LOCATION		FIRE HYDRANT
	PROPERTY CORNER/MARKER FOUND		EXISTING WATER METER
	EXISTING TREE		EXISTING FENCE
	EXISTING TREE LINE		EXISTING DITCH
	EXISTING RIPRAP		EXISTING CONTOUR
			EXISTING APPROX. PROPERTY LINE
			EXISTING APPROX. SECTION LINE
			EXISTING LAKE EDGE OF WATER

**PLAN SHEET INDEX**

DRAWING No.	DRAWING DESCRIPTION
01	TITLE SHEET
02	DRAWING INDEX SHEET, LEGENDS, SYMBOLS, AND PROJECT NOTES
03	SITE SURVEY
04	SITE PLAN
05	EXISTING PRINCIPAL SPILLWAY CHANNEL IMPROVEMENTS
06	PRINCIPAL SPILLWAY ARTICULATED CONCRETE BLOCK OVERFLOW LINE 'P' PLAN, PROFILE AND DETAILS
07	PRINCIPAL SPILLWAY WALL LINE 'W' PLAN AND PROFILE
08	ACCESS DRIVE & TYPICAL PRINCIPAL SPILLWAY WALL DETAILS
09	EMERGENCY SPILLWAY LINE 'E' PLAN AND PROFILE
10	LAKE DRAWDOWN PLAN AND PROFILE
11	LAKE DRAWDOWN DETAILS
12	STORM WATER POLLUTION PREVENTION PLAN
13	STORM WATER POLLUTION PREVENTION DETAILS
14	MISCELLANEOUS DETAILS
15	MISCELLANEOUS DETAILS
16	HYDROLOGIC AND HYDRAULICS DATA
17	DAM CENTERLINE PROFILE - LINE 'A'
18	DAM TYPICAL CROSS SECTIONS - LINE 'A'
19	DAM TYPICAL CROSS SECTIONS - LINE 'A'
20	DAM TYPICAL CROSS SECTIONS - LINE 'A'
S1-1	GENERAL STRUCTURAL NOTES
S1-2	TYPICAL STRUCTURAL DETAILS - CONCRETE
S2-1	OVERALL FOUNDATION PLAN AND RETAINING WALL PROFILE
S2-2	ACCESS DRIVE - ENLARGED FOUNDATION PLAN, SECTIONS, AND DETAILS
S2-3	RETAINING WALL SECTIONS AND DETAILS
S2-4	ISOMETRIC VIEWS

**GENERAL NOTES:**

- THE PURPOSE OF THIS PROJECT IS TO BRING CROSLLEY LAKE DAM (STATE ID 40-7) TO STATE COMPLIANCE FOR THE SIGNIFICANT HAZARD RATING.
- ONLY VISIBLE ABOVE GROUND UTILITY INFRASTRUCTURE OR ACTUAL FIELD MARKINGS DESIGNATING EXISTANCE OF A BURIED UTILITY OR UTILITY PROVIDING AS-BUILT/BEST AVAILABLE MAPPING ARE INCLUDED ON THE PLANS, WITHIN THE SPECIFIC PROJECT LIMITS. BURIED UTILITIES WERE LOCATED AT THE SITE THROUGH INDIANA 811 LOCATING SERVICE (1-800-382-5549). LOCATION OF SUCH UTILITIES, SHOWN WITHIN THESE PLANS, ARE SUBJECT TO THE ACCURACY STANDARDS AS ESTABLISHED BY INDIANA CODE 8-1-26. NO ATTEMPT HAS BEEN MADE AS PART OF THE SURVEY TO OBTAIN OR SHOW DATA CONCERNING SIZE, DEPTH, CONDITION OR CAPACITY OF SAID BURIED UTILITIES, UNLESS SPECIFICALLY NOTED OR SHOWN ON THE PLANS. THE ENGINEER, OWNER OR ASSOCIATED CONSULTANTS/PERSONNEL DO NOT CERTIFY AS TO THE ACCURACY OR COMPLETENESS OF THE BURIED UTILITIES SHOWN HERE-IN.
- OTHER BURIED UTILITIES MAY BE IN PROJECT AREA, MARK ALL UTILITIES BEFORE CONSTRUCTION. PRIOR TO ANY EXCAVATION TAKING PLACE ON SITE, CONTACT INDIANA UNDERGROUND 811 AND THE APPROPRIATE UTILITY COMPANY FOR LOCATION OF ALL LINES.
- PORTIONS OF THE EXISTING FEATURES SHOWN WERE DRAWN USING 2013 DIGITAL ORTHO-PHOTOGRAPHY DATA. ALL BEARINGS SHOWN ON THE PLANS ARE ASSUMED.
- VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION AND REPORT ANY DISCREPANCIES TO THE OWNER.
- INFORMATION ON THIS DRAWING IS INTENDED ONLY FOR THE IDENTIFIED PROJECT SHOWN ON THIS DRAWING.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL REQUIREMENTS OF GOVERNMENT AGENCIES AND PERMITS.
- INFORMATION ON THIS DRAWING IS INTENDED ONLY FOR THE IDENTIFIED PROJECT SHOWN ON THIS DRAWING.
- EROSION CONTROL SILT FENCES OR INLET PROTECTION DEVICES SHALL BE PLACED BELOW ALL AREAS DISTURBED DURING CONSTRUCTION AND THAT DRAINS TO WATERWAYS, PRIOR TO COMMENCING WITH WORK ACTIVITIES.
- THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION AND/OR ORDERING MATERIAL AND REPORT ANY DISCREPANCIES TO THE ENGINEER IN WRITING.
- DURING EXCAVATION OPERATIONS, SEGREGATE OUT ALL TOPSOIL AND STOCKPILE FOR SUBSEQUENT USE IN AREAS TO BE SEEDED OR SODDED. EXTRA CARE SHALL BE TAKEN TO AVOID MIXING STOCKPILED MATERIAL WITH OBJECTIONABLE MATERIAL.
- THE CONTRACTOR SHALL TAKE ALL RESPONSIBILITY FOR ANY INJURY OR DAMAGE RESULTING TO PERSONS OR PROPERTY BECAUSE OF SUCH WORK.
- REFER TO THE GEOTECHNICAL REPORT FOR INFORMATION RELATING TO THE EXISTING SUBSURFACE SOIL CONDITIONS. SHEET 3 CONTAINS THE SOIL/ROCK BORING LOCATIONS. REFER TO THE SPECIFICATIONS FOR THE GEOTECHNICAL REPORT AND SOIL/ROCK BORING LOCATIONS, LOGS, FINDINGS AND RECOMMENDATIONS.
- THE REMOVAL OF EXISTING EMBANKMENT SHALL BE BASED ON THE RECOMMENDATIONS NOTED IN THE GEOTECHNICAL REPORT, THESE PLANS AND AS OBSERVED DURING CONSTRUCTION IN THE PRESENCE OF THE GEOTECHNICAL ENGINEER. THE EXISTING SIDE SLOPES OF THE DAM SHALL BE PROTECTED FROM POSSIBLE EROSION TO DOWNSTREAM AREAS.
- CONTRACTOR SHALL PROVIDE A PLAN OF OPERATION, WHICH SHALL INCLUDE: SAFETY MEASURES TO PROTECT THE PUBLIC FROM CONTRACTOR'S WORK, CONSTRUCTION MEANS AND METHODS FOR EACH SECTION OF WORK, CONSTRUCTION PHASING AND PROVISIONS TO MAINTAIN DRAINAGE DURING CONSTRUCTION (INCLUDING HANDLING HIGH INTENSITY STORM EVENTS SUCH AS THE 100-YEAR). ENGINEER AND OWNER MUST APPROVE PLAN OF OPERATION PRIOR TO CONSTRUCTION. EXISTING SPILLWAY SHALL REMAIN IN OPERATION AS LONG AS POSSIBLE DURING CONSTRUCTION, UNTIL SUCH TIME, CONSTRUCTION AND STARTUP OF THE NEW SPILLWAY STRUCTURE IS COMPLETE.
- CONTRACTOR SHALL BE ALLOWED TO DRAWDOWN AND MAINTAIN THE LAKE AT ELEVATION 684.00. REFER TO CONTRACT DETAILED SPECIFICATIONS FOR DETAILS AND ADDITIONAL REQUIREMENTS.
- IT IS THE INTENT THAT ALL RIPRAP, AND TURF REINFORCEMENT MATERIALS SHALL BE KEYED IN THE SIDE SLOPES ACCORDING TO THE PLANS AND IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ALL SUCH MATERIALS SHALL BLEND IN SMOOTHLY TO ADJACENT LAND AREAS. ADD ADDITIONAL TOPSOIL WITHIN THE EDGES OF RIP-RAP AREAS WHERE A TRANSITION TO SEEDED AREAS BEGIN IN ORDER TO ACCOUNT FOR SETTLEMENT OF SOIL.

**PROPOSED FEATURES**

	RIPRAP
	STONE PAVEMENT (PLAN) OR STONE/GRAVEL (DETAILS AND PROFILES)
	ARTICULATED CONCRETE BLOCK
	CONCRETE
	CONTOURS
	CONSTRUCTION LIMITS
	DITCH FLOW LINE
	PIPE
	MANHOLE
	CLEANOUT
	SILT FENCE
	CHAIN LINK FENCE
	FIBER WATTLE

**PROJECT ALTERNATES FOR RE-BID:**

THE PROJECT CONSIST OF FIVE ALTERNATES DISCUSSED IN DETAIL HERE.

**ALTERNATE 1: ADD LAKE DRAWDOWN FACILITY**

**LOCATION:** THROUGH DAM EMBANKMENT - LINE 'D', CROSSING AT DAM CENTERLINE LINE 'A' APPROXIMATE STATION 12+61 (JUST NORTH OF EMERGENCY SPILLWAY)  
**SHEET REFERENCES:** GENERAL LOCATION SHEET 04, WORK ON SHEETS 10 AND 11  
**SPECIFICATION REFERENCE:** DETAIL SPECIFICATION SECTION 06 EXCAVATION AND EMBANKMENT, SECTION 08 RIPRAP, SECTION 12 LAKE DRAWDOWN PRECAST STRUCTURES, PIPE AND APPURTENANCES  
**WORK DETAIL:** INSTALL STR. 101 LAKE DRAWDOWN INTAKE & CONCRETE ANCHOR, REVETMENT RIPRAP LEVELING PAD, NEW STR. 102 60" DIAMETER MH WITH FILLER PIPE AND VALVE, NEW STR. 103 48" DIA. MH WITH VALVE, AND 8" PIPE WITH COLLARS AND INLET SCREEN. NOTE: NEW STR. 104 OUTLET HEADWALL SHALL REMAIN PART OF THE BASE BID, WHICH SHALL INCLUDE A FOUR (4) FOOT 8" DUCTILE IRON PIPE STUBBED AND CAPPED BEHIND WALL FOR FUTURE CONNECTION. DUCTILE IRON PIPE SHALL MEET LAKE DRAWDOWN PIPE MATERIAL SPECIFICATIONS.

**ALTERNATE 2: ADD EMERGENCY SPILLWAY UTILIZING HYDROTURF CS SYSTEM**

**LOCATION:** DOWNSTREAM DAM EMBANKMENT ON THE SOUTH END OF DAM; CENTERLINE OF EMERGENCY SPILLWAY AT DAM CENTERLINE LINE 'A' APPROXIMATE STATION 13+18.  
**SHEET REFERENCES:** GENERAL LOCATION SHEET 04, WORK ON SHEETS 09, 12, 15 AND 17. NOTE: ARTICULATED CONCRETE BLOCK MATS ARE SHOWN IN THE ACTUAL PLAN SET. WITHIN DETAILED SPECIFICATION SECTION 19, HYDROTURF CS SYSTEM PRODUCT INSTALLATION DETAILS AND REQUIREMENTS ARE PROVIDED. IN ADDITION, THE HYDROTURF CS SYSTEM EXTENDS BEYOND THE TOE OF THE DAM (WHICH DIFFERS FROM THE ARTICULATED CONCRETE BLOCK MAT INSTALLATION SHOWN ON SHEET 09). FOR THAT REASON, THE HYDROTURF CS SYSTEM, SUBSEQUENTLY SHIFTS THE CONCRETE ARMOR UNIT INSTALLATION DOWNSTREAM AND LESS RIPRAP WILL BE UTILIZED. THE END OF THE RIPRAP SHALL REMAIN AT LINE 'E' STATION 32+15 (AS SHOWN ON SHEET 09).  
**SPECIFICATION REFERENCE:** DETAIL SPECIFICATION SECTION 06 EXCAVATION AND EMBANKMENT, SECTION 08 RIPRAP, SECTION 10 CONCRETE ARMOR UNITS, SECTION 17 PERMANENT SEEDING AND SECTION 19 HYDROTURF CS SYSTEM  
**WORK DETAIL:** INSTALL EMERGENCY SPILLWAY WITH HYDROTURF CS HARD ARMOR PROTECTION, CONCRETE ARMOR UNITS ENERGY DISSIPATORS AND 42" THICKNESS OF CLASS II RIPRAP. NOTE: BASE BID SHALL INCLUDE PROVIDING A POSITIVE DRAINAGE FOR TWO STAGE FILTER DRAINS FROM NEW STR. 104 TO OUTLET CHANNEL AS SHOWN ON SHEET 09. BASE BID SHALL MAINTAIN NEW 12'-0" DAM CREST TO ELEV. 702.00.

**ALTERNATE 3: ADD ARTICULATED CONCRETE BLOCK MATS IN-LIEU OF HYDROTURF CS SYSTEM FOR EMERGENCY SPILLWAY**

**LOCATION:** DOWNSTREAM DAM EMBANKMENT ON THE SOUTH END OF DAM; CENTERLINE OF EMERGENCY SPILLWAY AT DAM CENTERLINE LINE 'A' APPROXIMATE STATION 13+18.  
**SHEET REFERENCES:** GENERAL LOCATION SHEET 04, WORK ON SHEETS 09, 12, 15 AND 17.  
**SPECIFICATION REFERENCE:** DETAIL SPECIFICATION SECTION 06 EXCAVATION AND EMBANKMENT, SECTION 08 RIPRAP, SECTION 09 ARTICULATED CONCRETE BLOCK MATS, SECTION 10 CONCRETE ARMOR UNITS AND SECTION 17 PERMANENT SEEDING  
**WORK DETAIL:** THIS ALTERNATE SUBSTITUTES ARTICULATED CONCRETE BLOCK MATS HARD ARMOR IN-LIEU OF THE HYDROTURF CS SYSTEM, AS GENERALLY SHOWN WITHIN THIS PLAN SET. THE TOTAL COST DIFFERENCE, MATERIAL AND INSTALLATION SHOULD BE INCLUDED WITHIN THIS ALTERNATE.

**ALTERNATE 4: ADD RIPRAP ON FILTER FABRIC**

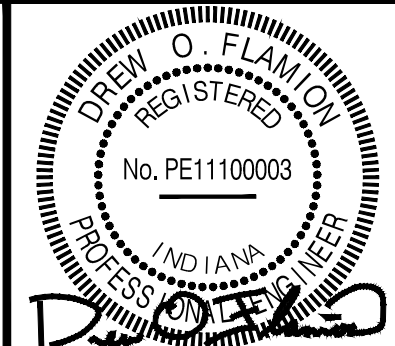
**LOCATION:** ADD UPSTREAM DAM EMBANKMENT, EAST OFFSETS GIVEN; DAM CENTERLINE LINE 'A', FROM APPROX. STATION 10+75, APPROX. 27 FEET LEFT; TO APPROX. STATION 11+00, APPROX. 23 FEET LEFT; TO APPROX. STATION 12+95 APPROX. 23 FEET LEFT; TO APPROX. STATION ENDING AT APPROX. 13+42 STATION 37 FEET LEFT.  
**SHEET REFERENCES:** GENERAL LOCATION SHEET 04, WORK ON SHEETS 12, 14, 18, 19 AND 20.  
**SPECIFICATION REFERENCE:** DETAIL SPECIFICATION SECTION 08 RIPRAP  
**WORK DETAIL:** INSTALLATION OF RIPRAP (APPROX. 330 SYS PLAN VIEW 2D SCALE), FROM TWO (2) FEET BELOW NORMAL POOL (ELEV. 693.65), CONTINUING DOWN THE DOWNSTREAM EMBANKMENT AS REQUIRED TO PROVIDE MIN. 2:1 SLOPE. NOTE: BASE BID SHALL BE FOR RIPRAP FROM ELEV. 700.50 TO ELEV. 693.65 (APPROX. 555 SYS PLAN VIEW 2D SCALE).

**ALTERNATE 5: ADD PRESSURE GROUTING**

**LOCATION:** AT PRINCIPAL SPILLWAY CREST AND DAM CREST; DAM CENTERLINE LINE 'A' APPROXIMATE STATION 10+00 TO APPROXIMATE STATION 11+40  
**SHEET REFERENCES:** GENERAL LOCATION SHEET 04, WORK ON SHEETS 05 AND 17.  
**SPECIFICATION REFERENCE:** DETAIL SPECIFICATION SECTION 13 PRESSURE GROUTING  
**WORK DETAIL:** INSTALLATION OF ALL PRESSURE GROUTING.



REVISIONS				
No.	DATE	DESCRIPTION	REVISED BY	DOF
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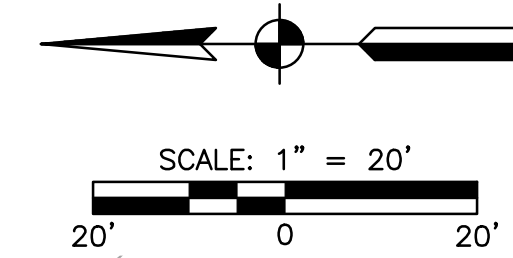


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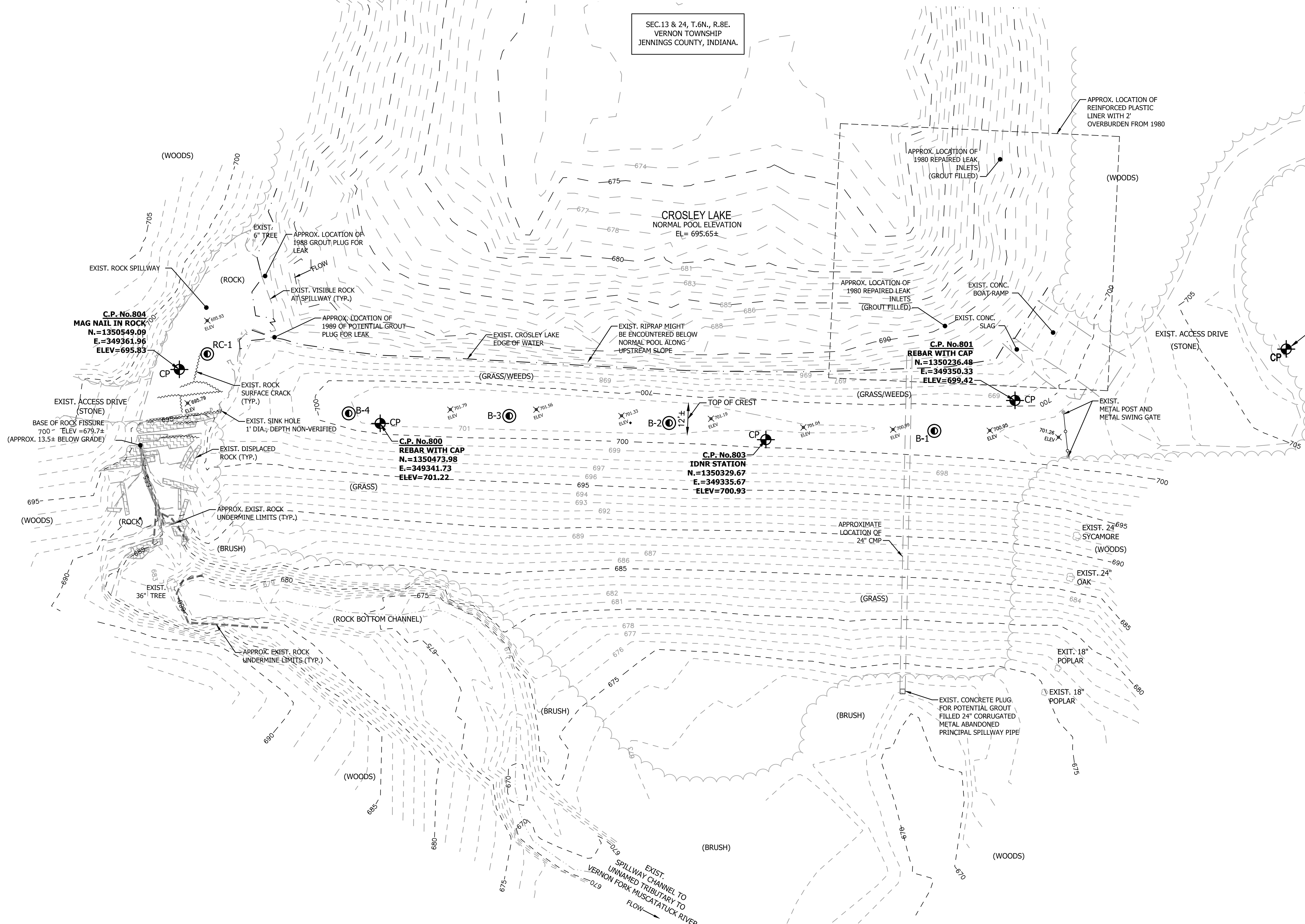
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CHECKED BY:	RMK
DATE:	MAY 2018
JOB NO.:	D13038
SCALE:	AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLLEY FISH & WILDLIFE AREA - CROSLLEY LAKE  
DAM IMPROVEMENTS PROJECT  
**PROJECT NO. ENG1802321631/E020098**  
  
DRAWING INDEX SHEET, LEGENDS,  
SYMBOLS AND PROJECT NOTES

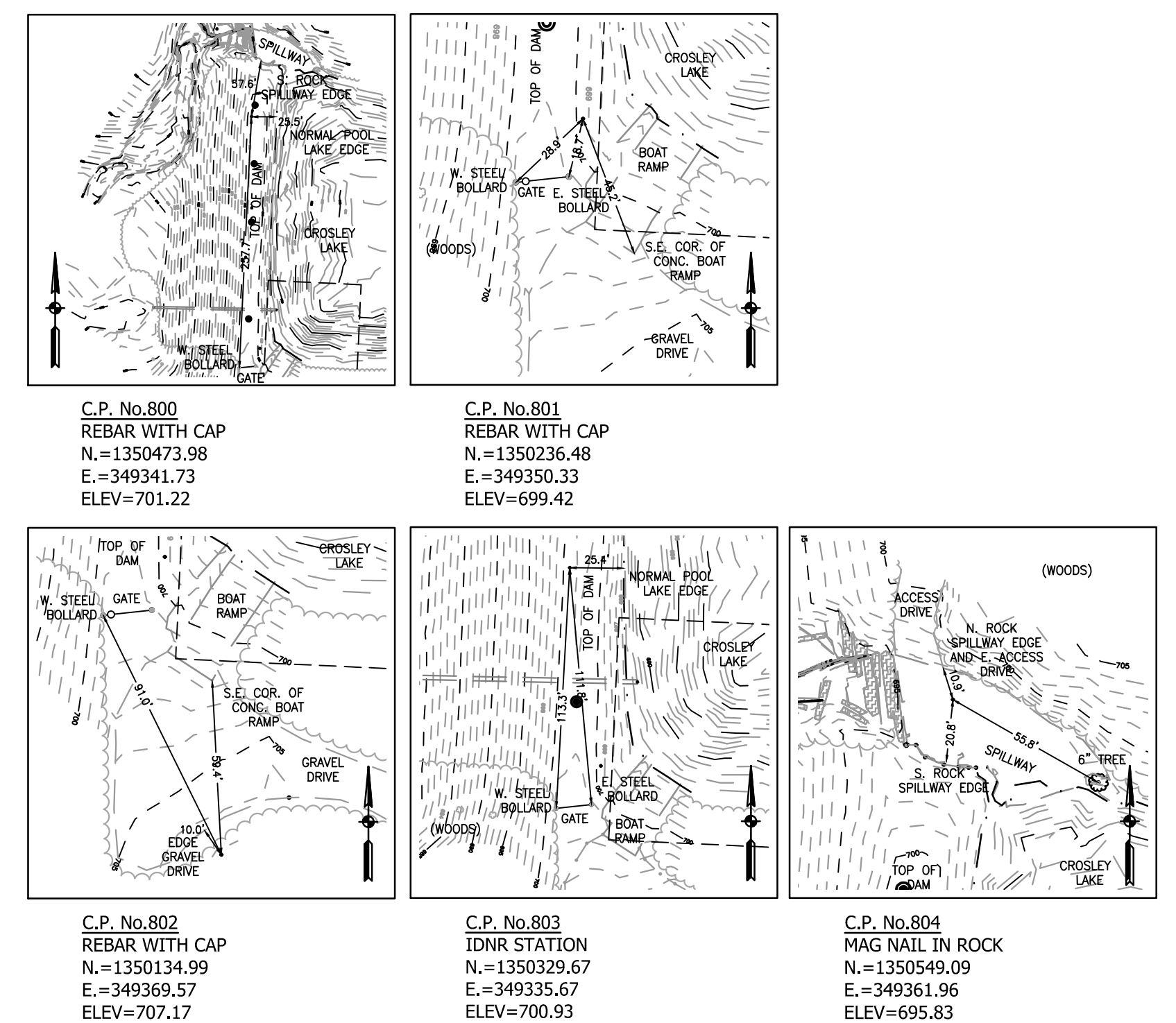
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**02**  
2 OF 26



SEC.13 & 24, T.6N., R.8E.  
VERNON TOWNSHIP  
JENNINGS COUNTY, INDIANA.



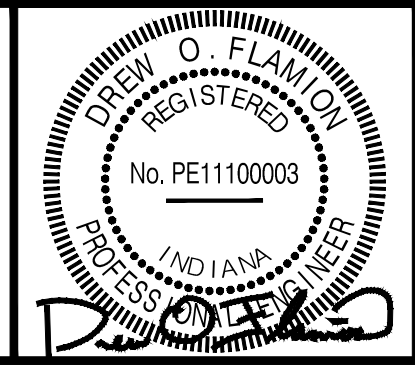
**CONTROL POINTS**



- SURVEY NOTES:**
- ELEVATIONS PROVIDED ARE BASED ON 1988 NAVD DATUM.
  - TO CONVERT TO 1929 NGVD DATUM FROM 1988 DATUM, ADD 0.42± FEET. NOTE CONVERSION IS APPROXIMATE ONLY, NOT INTENDED FOR SURVEY USE.
  - COORDINATES PROVIDED ARE BASED ON GPS INDIANA STATE PLANE EAST, FOR ZONE 1301.
  - CROSLY LAKE BATHYMETRIC SURVEY, CONTOUR & ELEVATION DATA, BELOW NORMAL POOL, COMPLETED ON MARCH 26, 2003 BY EARTH EXPLORATION INC.
  - MODIFICATION TO ORIGINAL BATHYMETRIC SURVEY WAS COMPLETED BY COMMONWEALTH ENGINEERS, INC., WHERE ACTUAL RECENT SURVEY SUPERSEDED SUCH DATA.



REVISIONS			
No.	DATE	DESCRIPTION	REVISED BY



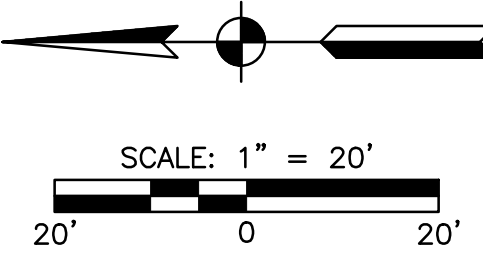
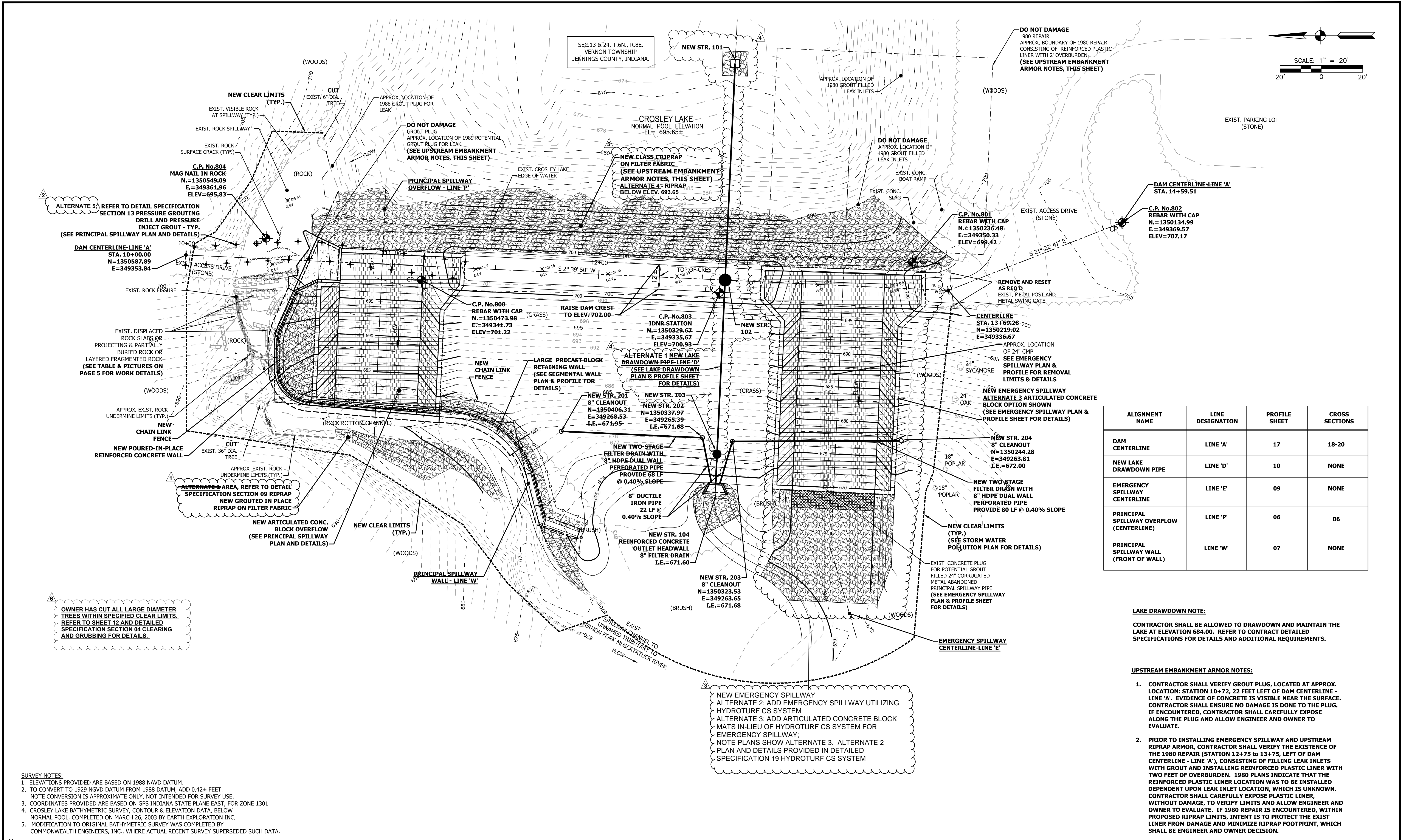
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DRAWN BY: ALR  
DESIGNED BY: DOF  
CHECKED BY: RMK  
DATE: MAY 2018  
JOB NO: D13038  
SCALE: AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT  
**PROJECT NO. ENG1802321631/E020098**

SITE SURVEY

DRAWING NO.  
**03**  
3 OF 26



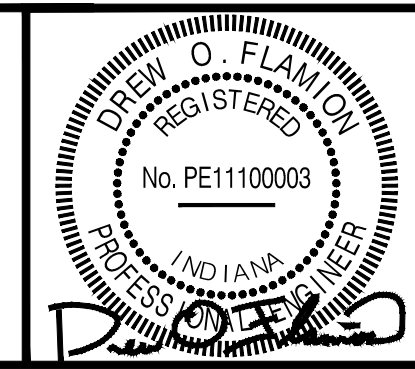
ALIGNMENT NAME	LINE DESIGNATION	PROFILE SHEET	CROSS SECTIONS
DAM CENTERLINE	LINE 'A'	17	18-20
NEW LAKE DRAWDOWN PIPE	LINE 'D'	10	NONE
EMERGENCY SPILLWAY CENTERLINE	LINE 'E'	09	NONE
PRINCIPAL SPILLWAY OVERFLOW (CENTERLINE)	LINE 'P'	06	06
PRINCIPAL SPILLWAY WALL (FRONT OF WALL)	LINE 'W'	07	NONE

**LAKE DRAWDOWN NOTE:**  
 CONTRACTOR SHALL BE ALLOWED TO DRAWDOWN AND MAINTAIN THE LAKE AT ELEVATION 684.00. REFER TO CONTRACT DETAILED SPECIFICATIONS FOR DETAILS AND ADDITIONAL REQUIREMENTS.

- UPSTREAM EMBANKMENT ARMOR NOTES:**
- CONTRACTOR SHALL VERIFY GROUT PLUG, LOCATED AT APPROX. LOCATION: STATION 10+72, 22 FEET LEFT OF DAM CENTERLINE - LINE 'A'. EVIDENCE OF CONCRETE IS VISIBLE NEAR THE SURFACE. CONTRACTOR SHALL ENSURE NO DAMAGE IS DONE TO THE PLUG. IF ENCOUNTERED, CONTRACTOR SHALL CAREFULLY EXPOSE ALONG THE PLUG AND ALLOW ENGINEER AND OWNER TO EVALUATE.
  - PRIOR TO INSTALLING EMERGENCY SPILLWAY AND UPSTREAM RIPRAP ARMOR, CONTRACTOR SHALL VERIFY THE EXISTENCE OF THE 1980 REPAIR (STATION 12+75 TO 13+75, LEFT OF DAM CENTERLINE - LINE 'A'), CONSISTING OF FILLING LEAK INLETS WITH GROUT AND INSTALLING REINFORCED PLASTIC LINER WITH TWO FEET OF OVERBURDEN. 1980 PLANS INDICATE THAT THE REINFORCED PLASTIC LINER LOCATION WAS TO BE INSTALLED DEPENDENT UPON LEAK INLET LOCATION, WHICH IS UNKNOWN. CONTRACTOR SHALL CAREFULLY EXPOSE PLASTIC LINER, WITHOUT DAMAGE, TO VERIFY LIMITS AND ALLOW ENGINEER AND OWNER TO EVALUATE. IF 1980 REPAIR IS ENCOUNTERED, WITHIN PROPOSED RIPRAP LIMITS, INTENT IS TO PROTECT THE EXIST LINER FROM DAMAGE AND MINIMIZE RIPRAP FOOTPRINT, WHICH SHALL BE ENGINEER AND OWNER DECISION.

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  - CROSLY LAKE BATHYMETRIC SURVEY, CONTOUR & ELEVATION DATA, BELOW NORMAL POOL, COMPLETED ON MARCH 26, 2003 BY EARTH EXPLORATION INC.
  - MODIFICATION TO ORIGINAL BATHYMETRIC SURVEY WAS COMPLETED BY COMMONWEALTH ENGINEERS, INC., WHERE ACTUAL RECENT SURVEY SUPERSEDED SUCH DATA.

REVISIONS				
No.	DATE	DESCRIPTION	REVISED BY	DOF
1	9/27/2018	PREVIOUS BID ALTERNATE 1 IS NOW IN BASE BID	DOF	
2	9/27/2018	PREVIOUS BID ALTERNATE 3 IS NOW ALTERNATE 5	DOF	
3	9/27/2018	EMERGENCY SPILLWAY IS NOW ALTERNATE 2 & 3	DOF	
4	9/27/2018	LAKE DRAWDOWN IS NOW ALTERNATE 1	DOF	
5	9/27/2018	ALTERNATE 4 - UPSTREAM RIPRAP BELOW EL. 693.65	DOF	
6	9/27/2018	OWNER HAS COMPLETED TREE CUTTING TASK	DOF	

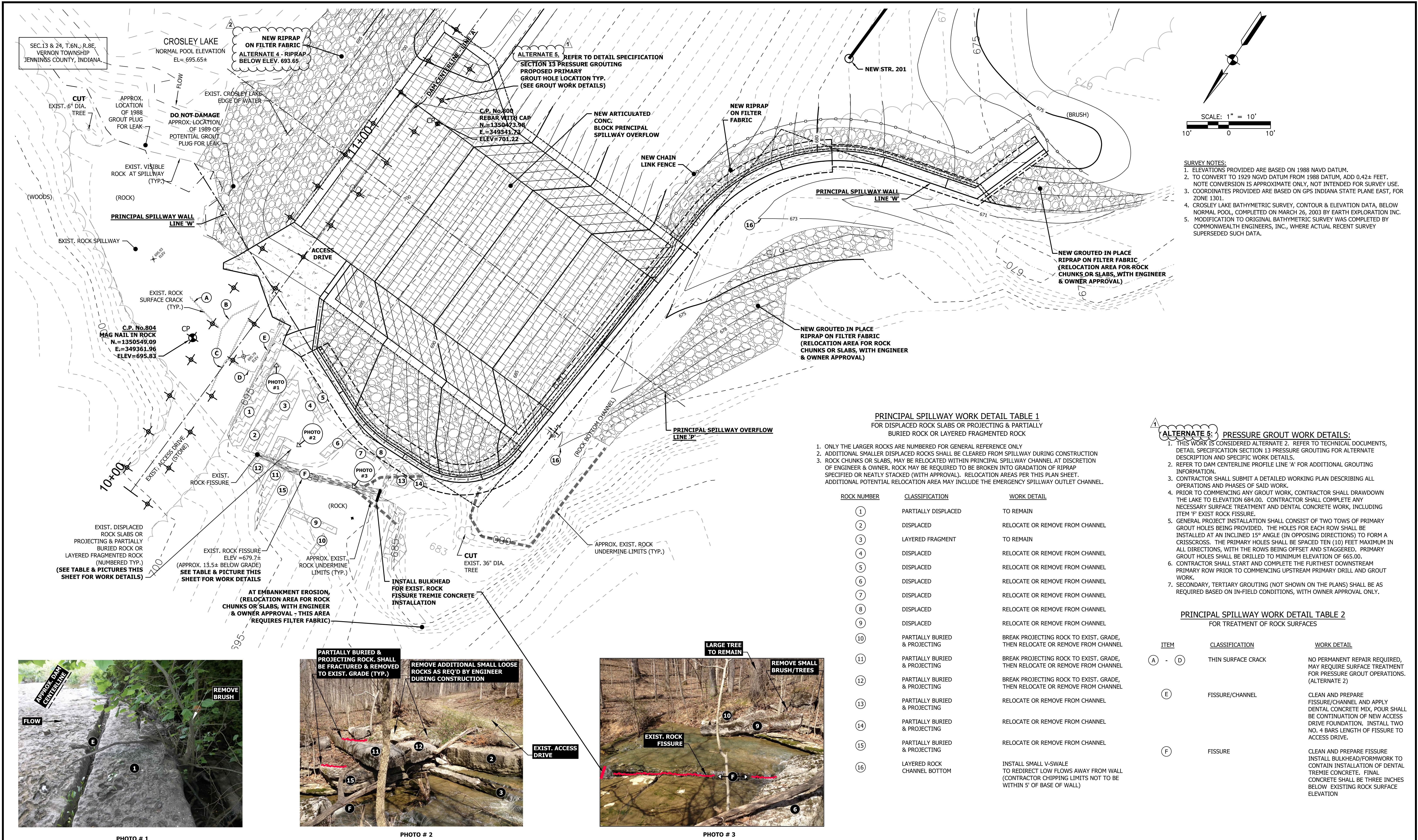


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DRAWN BY: ALR  
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 SCALE: AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
 CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
 DAM IMPROVEMENTS PROJECT  
**PROJECT NO. ENG1802321631/E020098**

DRAWING NO.  
**04**  
 SITE PLAN  
 4 OF 26



**SURVEY NOTES:**  
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 5. MODIFICATION TO ORIGINAL BATHYMETRIC SURVEY WAS COMPLETED BY COMMONWEALTH ENGINEERS, INC., WHERE ACTUAL RECENT SURVEY SUPERSEDED SUCH DATA.

**PRINCIPAL SPILLWAY WORK DETAIL TABLE 1**  
 FOR DISPLACED ROCK SLABS OR PROJECTING & PARTIALLY BURIED ROCK OR LAYERED FRAGMENTED ROCK

- ONLY THE LARGER ROCKS ARE NUMBERED FOR GENERAL REFERENCE ONLY
- ADDITIONAL SMALLER DISPLACED ROCKS SHALL BE CLEARED FROM SPILLWAY DURING CONSTRUCTION
- ROCK CHUNKS OR SLABS, MAY BE RELOCATED WITHIN PRINCIPAL SPILLWAY CHANNEL AT DISCRETION OF ENGINEER & OWNER. ROCK MAY BE REQUIRED TO BE BROKEN INTO GRADATION OF RIPRAP SPECIFIED OR NEATLY STACKED (WITH APPROVAL). RELOCATION AREAS PER THIS PLAN SHEET. ADDITIONAL POTENTIAL RELOCATION AREA MAY INCLUDE THE EMERGENCY SPILLWAY OUTLET CHANNEL.

ROCK NUMBER	CLASSIFICATION	WORK DETAIL
1	PARTIALLY DISPLACED	TO REMAIN
2	DISPLACED	RELOCATE OR REMOVE FROM CHANNEL
3	LAYERED FRAGMENT	TO REMAIN
4	DISPLACED	RELOCATE OR REMOVE FROM CHANNEL
5	DISPLACED	RELOCATE OR REMOVE FROM CHANNEL
6	DISPLACED	RELOCATE OR REMOVE FROM CHANNEL
7	DISPLACED	RELOCATE OR REMOVE FROM CHANNEL
8	DISPLACED	RELOCATE OR REMOVE FROM CHANNEL
9	DISPLACED	RELOCATE OR REMOVE FROM CHANNEL
10	PARTIALLY BURIED & PROJECTING	BREAK PROJECTING ROCK TO EXIST. GRADE, THEN RELOCATE OR REMOVE FROM CHANNEL
11	PARTIALLY BURIED & PROJECTING	BREAK PROJECTING ROCK TO EXIST. GRADE, THEN RELOCATE OR REMOVE FROM CHANNEL
12	PARTIALLY BURIED & PROJECTING	BREAK PROJECTING ROCK TO EXIST. GRADE, THEN RELOCATE OR REMOVE FROM CHANNEL
13	PARTIALLY BURIED & PROJECTING	RELOCATE OR REMOVE FROM CHANNEL
14	PARTIALLY BURIED & PROJECTING	RELOCATE OR REMOVE FROM CHANNEL
15	PARTIALLY BURIED & PROJECTING	RELOCATE OR REMOVE FROM CHANNEL
16	LAYERED ROCK CHANNEL BOTTOM	INSTALL SMALL V-SWALE TO REDIRECT LOW FLOWS AWAY FROM WALL (CONTRACTOR CHIPPING LIMITS NOT TO BE WITHIN 5' OF BASE OF WALL)

**ALTERNATE 5: PRESSURE GROUT WORK DETAILS:**

- THIS WORK IS CONSIDERED ALTERNATE 2. REFER TO TECHNICAL DOCUMENTS, DETAIL SPECIFICATION SECTION 13 PRESSURE GROUTING FOR ALTERNATE DESCRIPTION AND SPECIFIC WORK DETAILS.
- REFER TO DAM CENTERLINE PROFILE LINE 'A' FOR ADDITIONAL GROUTING INFORMATION.
- CONTRACTOR SHALL SUBMIT A DETAILED WORKING PLAN DESCRIBING ALL OPERATIONS AND PHASES OF SAID WORK.
- PRIOR TO COMMENCING ANY GROUT WORK, CONTRACTOR SHALL DRAWDOWN THE LAKE TO ELEVATION 684.00. CONTRACTOR SHALL COMPLETE ANY NECESSARY SURFACE TREATMENT AND DENTAL CONCRETE WORK, INCLUDING ITEM 'F' EXIST ROCK FISSURE.
- GENERAL PROJECT INSTALLATION SHALL CONSIST OF TWO TOWS OF PRIMARY GROUT HOLES BEING PROVIDED. THE HOLES FOR EACH ROW SHALL BE INSTALLED AT AN INCLINED 15° ANGLE (IN OPPOSING DIRECTIONS) TO FORM A CRISSCROSS. THE PRIMARY HOLES SHALL BE SPACED TEN (10) FEET MAXIMUM IN ALL DIRECTIONS, WITH THE ROWS BEING OFFSET AND STAGGERED. PRIMARY GROUT HOLES SHALL BE DRILLED TO MINIMUM ELEVATION OF 665.00.
- CONTRACTOR SHALL START AND COMPLETE THE FURTHEST DOWNSTREAM PRIMARY ROW PRIOR TO COMMENCING UPSTREAM PRIMARY DRILL AND GROUT WORK.
- SECONDARY, TERTIARY GROUTING (NOT SHOWN ON THE PLANS) SHALL BE AS REQUIRED BASED ON IN-FIELD CONDITIONS, WITH OWNER APPROVAL ONLY.

**PRINCIPAL SPILLWAY WORK DETAIL TABLE 2**  
 FOR TREATMENT OF ROCK SURFACES

ITEM	CLASSIFICATION	WORK DETAIL
A - D	THIN SURFACE CRACK	NO PERMANENT REPAIR REQUIRED, MAY REQUIRE SURFACE TREATMENT FOR PRESSURE GROUT OPERATIONS. (ALTERNATE 2)
E	FISSURE/CHANNEL	CLEAN AND PREPARE FISSURE/CHANNEL AND APPLY DENTAL CONCRETE MIX, POUR SHALL BE CONTINUATION OF NEW ACCESS DRIVE FOUNDATION. INSTALL TWO NO. 4 BARS LENGTH OF FISSURE TO ACCESS DRIVE.
F	FISSURE	CLEAN AND PREPARE FISSURE INSTALL BULKHEAD/FORMWORK TO CONTAIN INSTALLATION OF DENTAL TREMIE CONCRETE. FINAL CONCRETE SHALL BE THREE INCHES BELOW EXISTING ROCK SURFACE ELEVATION



PHOTO # 1

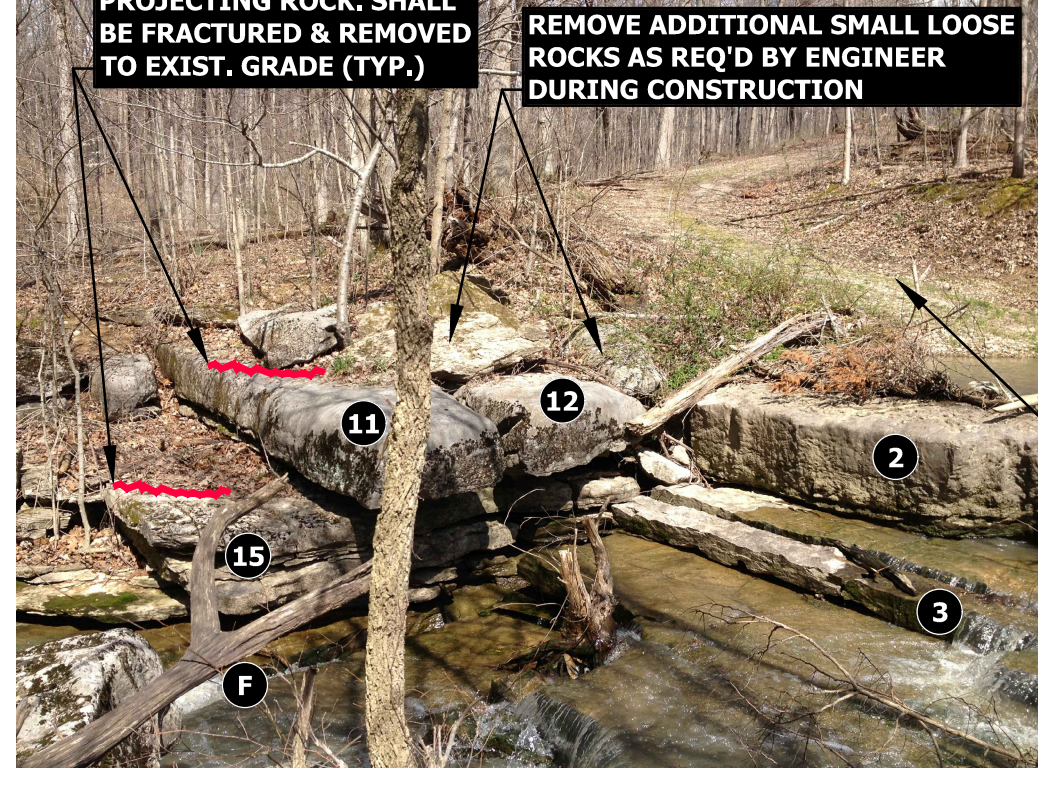


PHOTO # 2

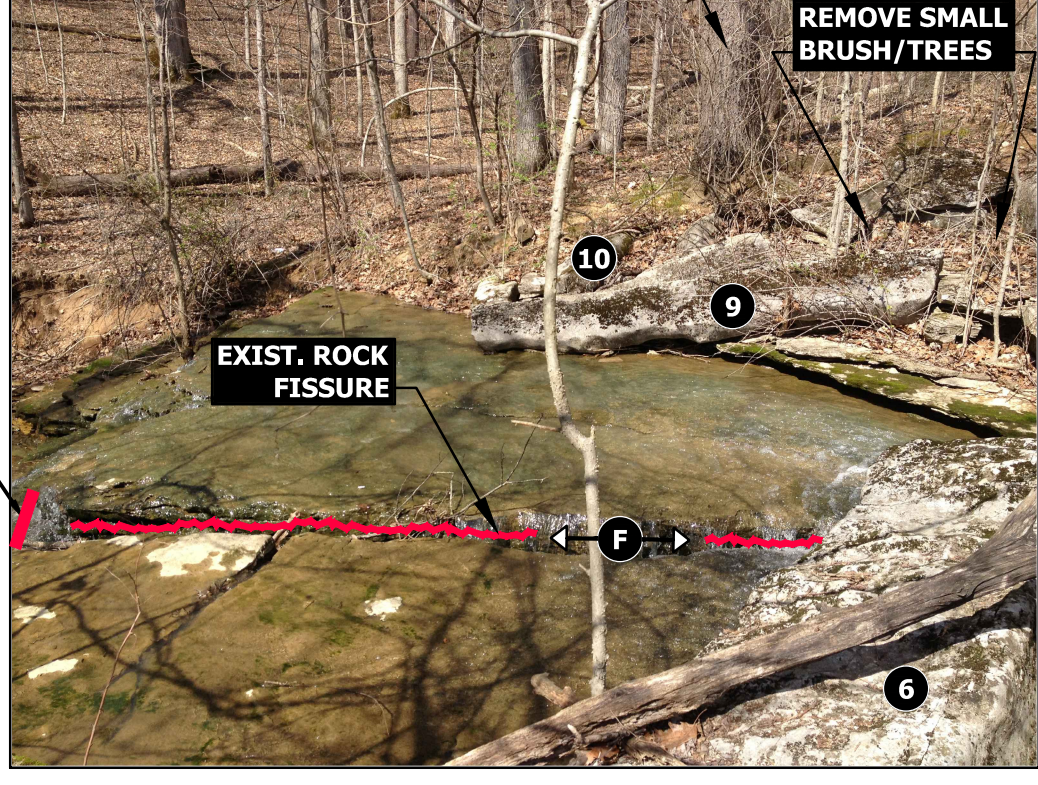
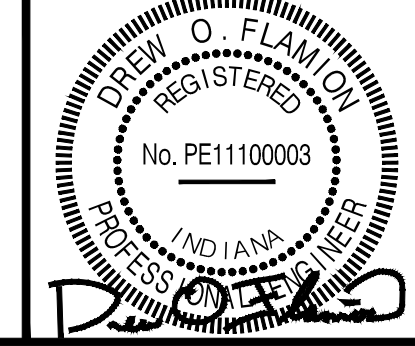


PHOTO # 3

REVISIONS			
No.	DATE	DESCRIPTION	REVISED BY
1	9/27/2018	PREVIOUS BID ALTERNATE 3 IS NOW ALTERNATE 5	DOF
2	9/27/2018	ALTERNATE 4 - UPSTREAM RIPRAP BELOW EL. 693.65	DOF



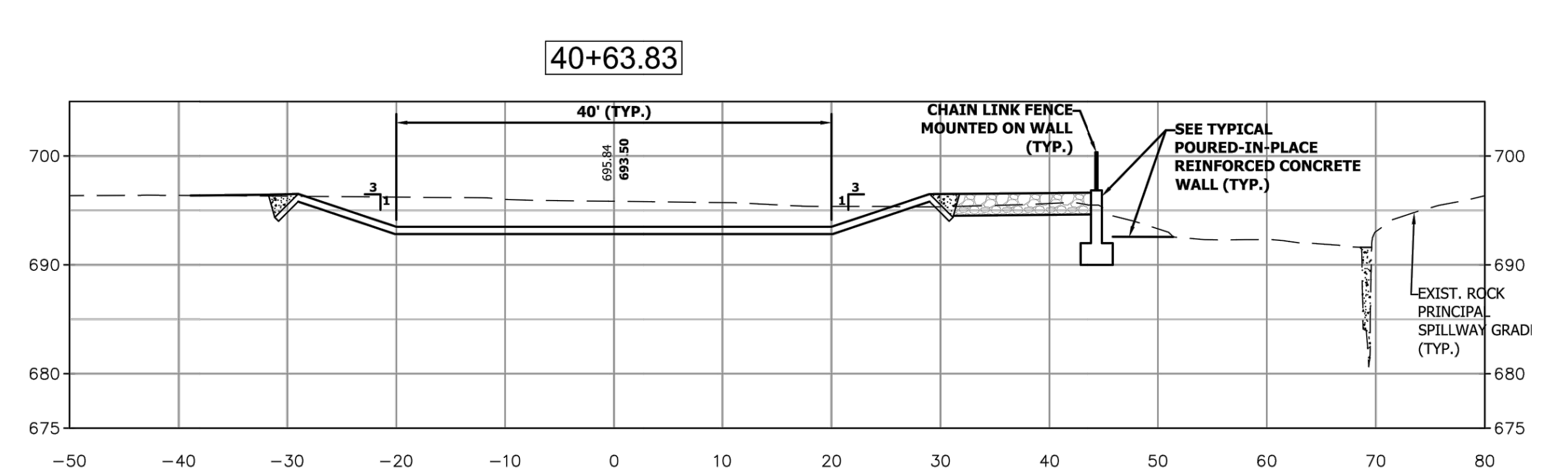
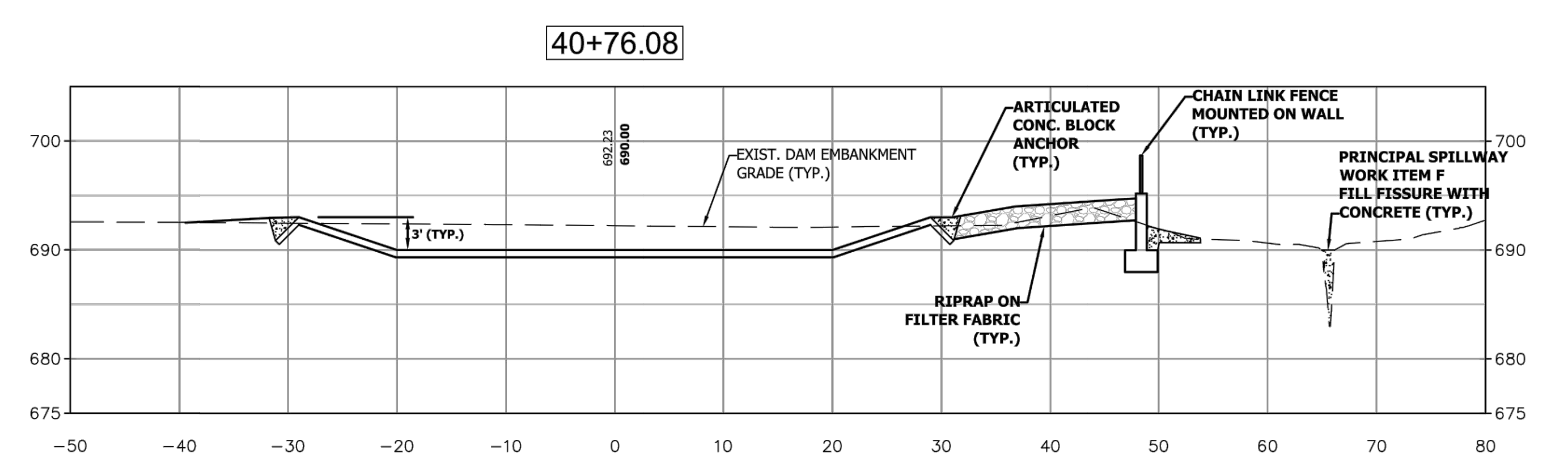
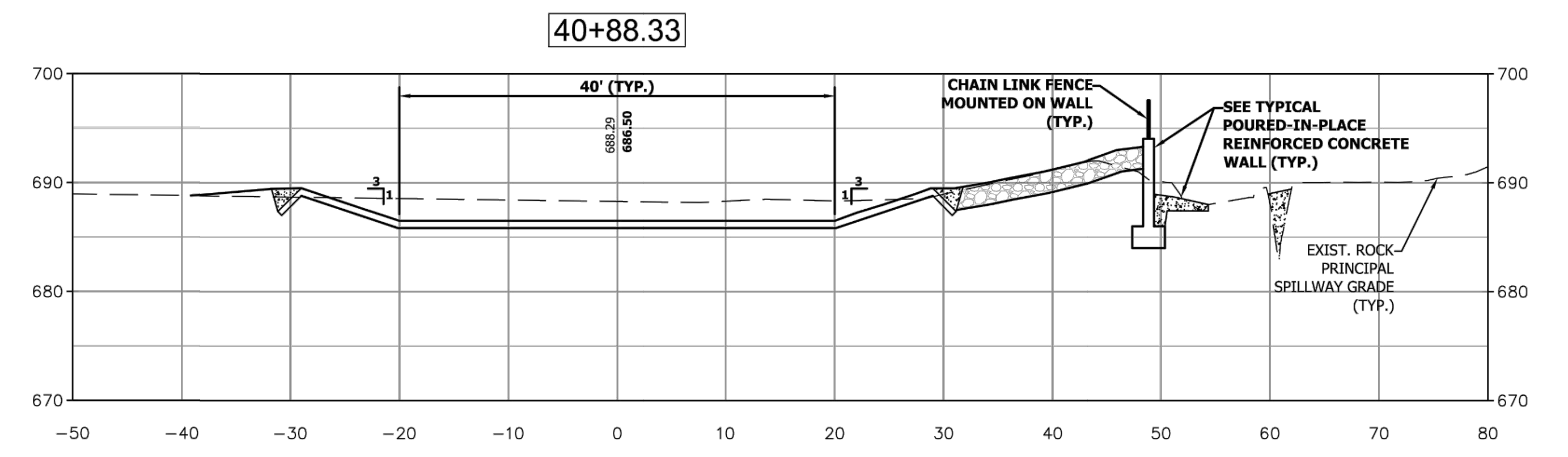
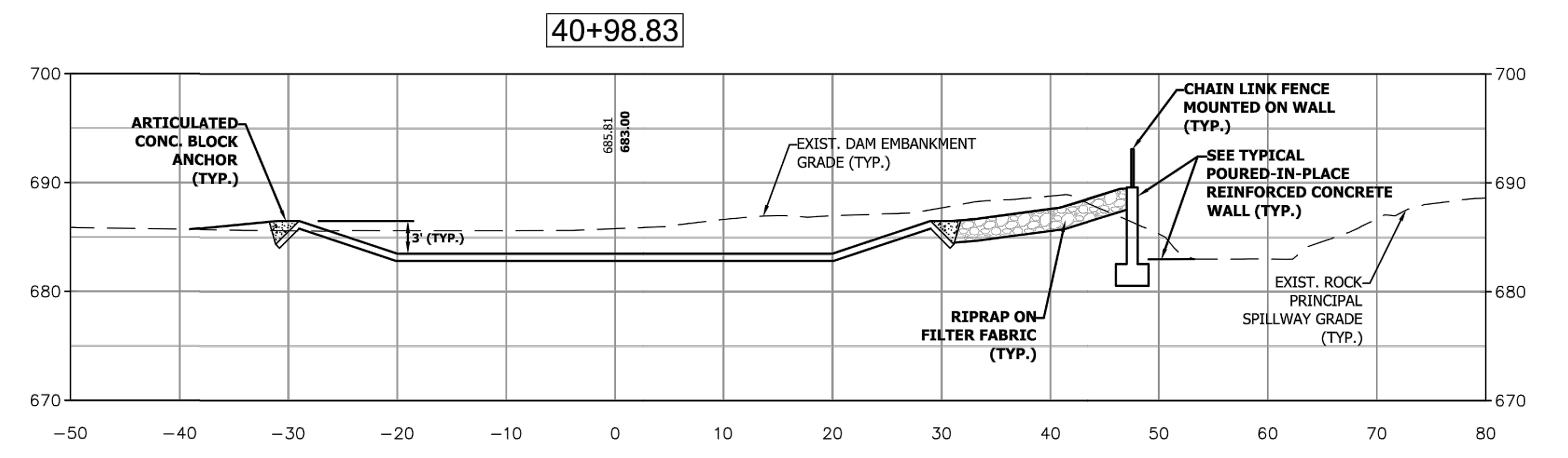
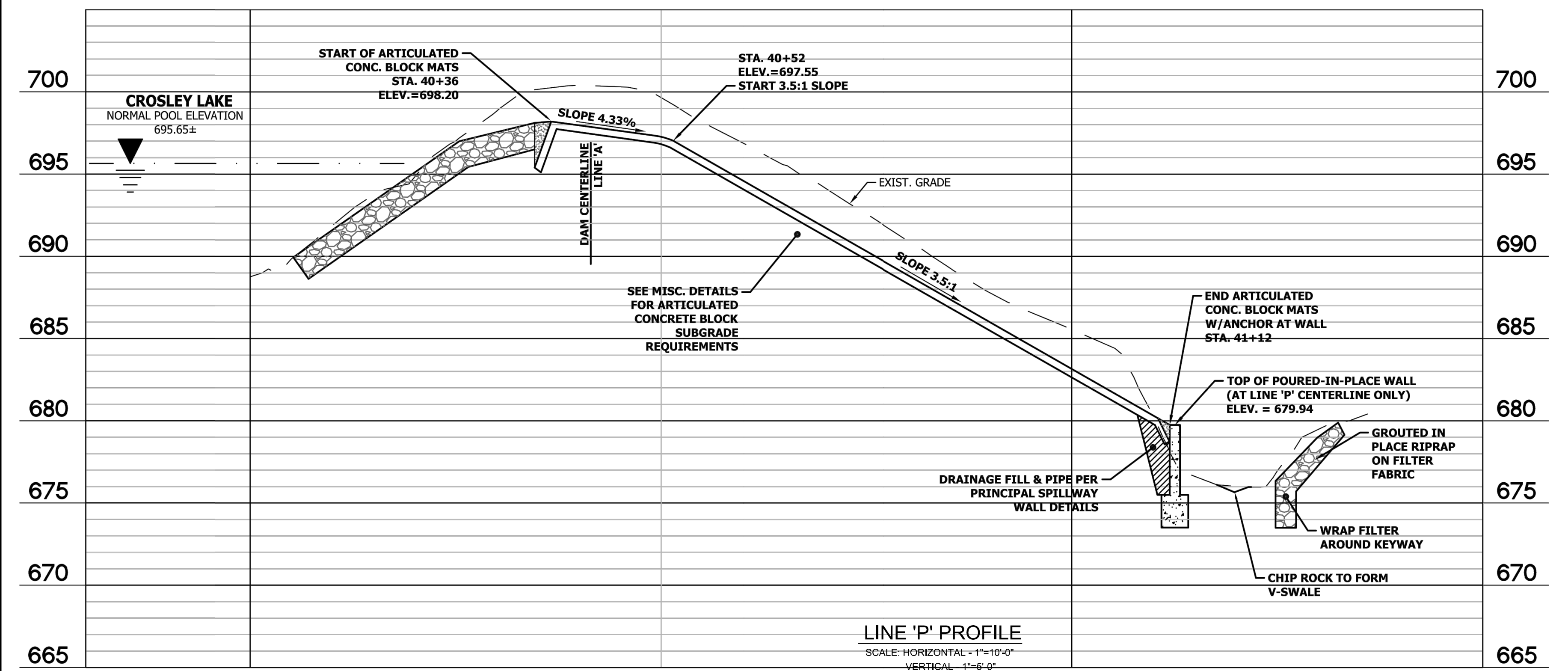
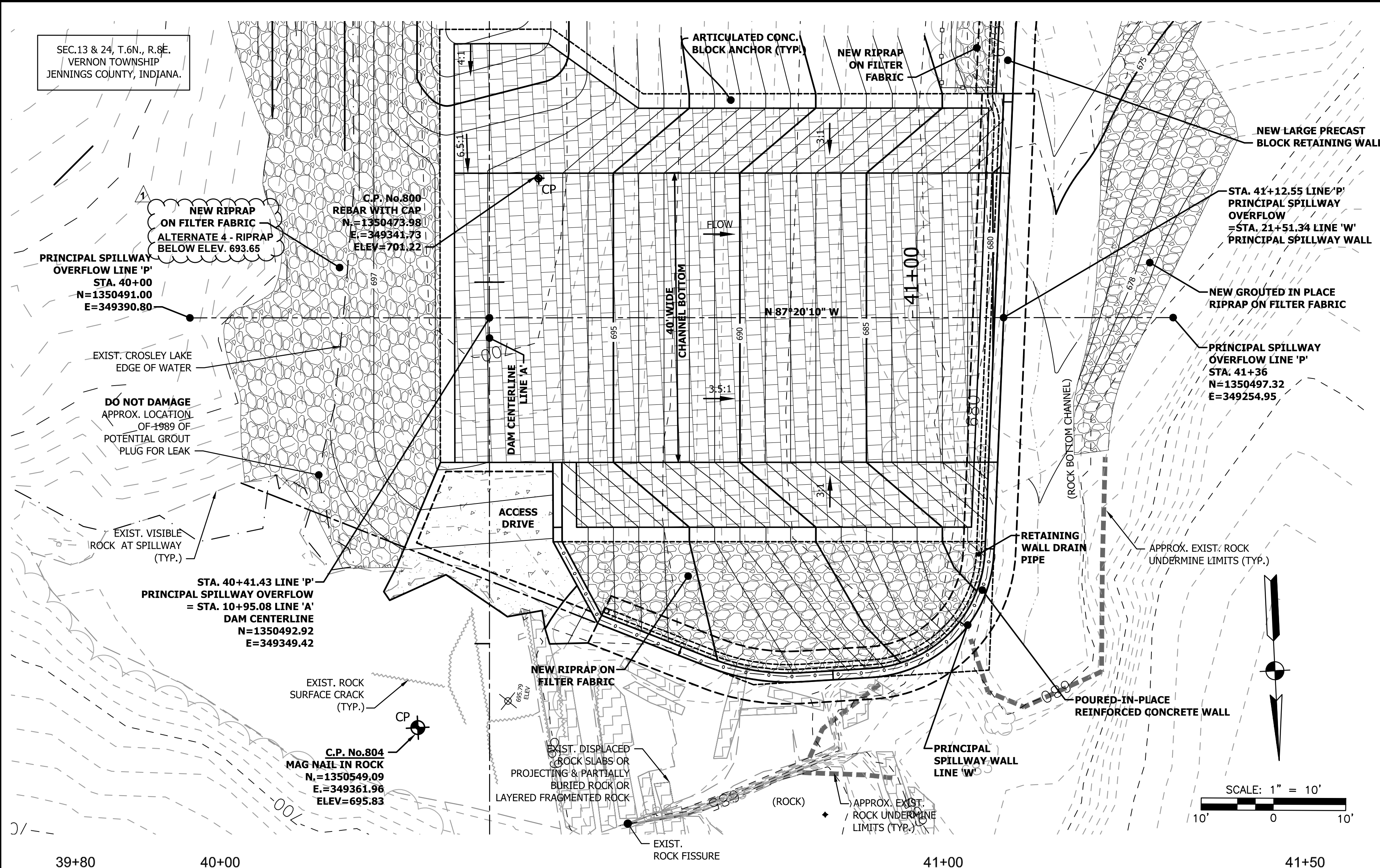
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 DESIGNED BY: DOF  
 CHECKED BY: RMK  
 DATE: MAY 2018  
 JOB NO: D13038  
 SCALE: AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
 CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
 DAM IMPROVEMENTS PROJECT  
**PROJECT NO. ENG1802321631/E020098**  
 EXISTING PRINCIPAL SPILLWAY  
 CHANNEL IMPROVEMENTS

DRAWING NO.  
**05**  
 5 OF 26

P:\Clients A-L\DNR\13038 Crosley Lake Dam\040A-CURRENT\DRAWINGS\00-050606-13038-PRINCIPALSPILLWAY Plan and Profile.dwg



ACB PRINCIPAL SPILLWAY OVERFLOW - LINE 'P'  
CROSS SECTIONS  
SCALE: HORIZONTAL - 1"=10'-0"  
VERTICAL - 1"=10'-0"  
NOTE: CROSS SECTIONS LOOKING DOWNSTREAM

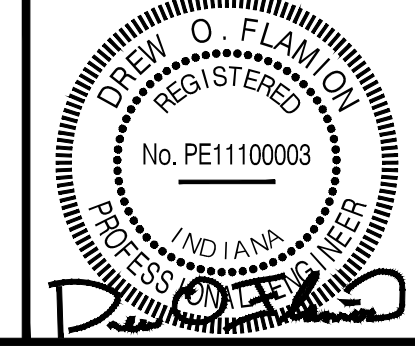
- SURVEY NOTES:**
- ELEVATIONS PROVIDED ARE BASED ON 1988 NAVD DATUM.
  - TO CONVERT TO 1929 NGVD DATUM FROM 1988 DATUM, ADD 0.42± FEET. NOTE CONVERSION IS APPROXIMATE ONLY, NOT INTENDED FOR SURVEY USE.
  - COORDINATES PROVIDED ARE BASED ON GPS INDIANA STATE PLANE EAST, FOR ZONE 1301.
  - CROSLY LAKE BATHYMETRIC SURVEY, CONTOUR & ELEVATION DATA, BELOW NORMAL POOL, COMPLETED ON MARCH 26, 2003 BY EARTH EXPLORATION INC.
  - MODIFICATION TO ORIGINAL BATHYMETRIC SURVEY WAS COMPLETED BY COMMONWEALTH ENGINEERS, INC., WHERE ACTUAL RECENT SURVEY SUPERSEDED SUCH DATA.

- GENERAL NOTES:**
- FOR ACTUAL WALL ELEVATIONS, REFER TO SHEET 7. CROSS SECTIONS SHOWN ON THIS SHEET FOR REFERENCE ONLY.

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No.	DATE	DESCRIPTION	REVISED BY
1	9/27/2018	ALTERNATE 4 - UPSTREAM RIPRAP BELOW EL. 693.65	DOF



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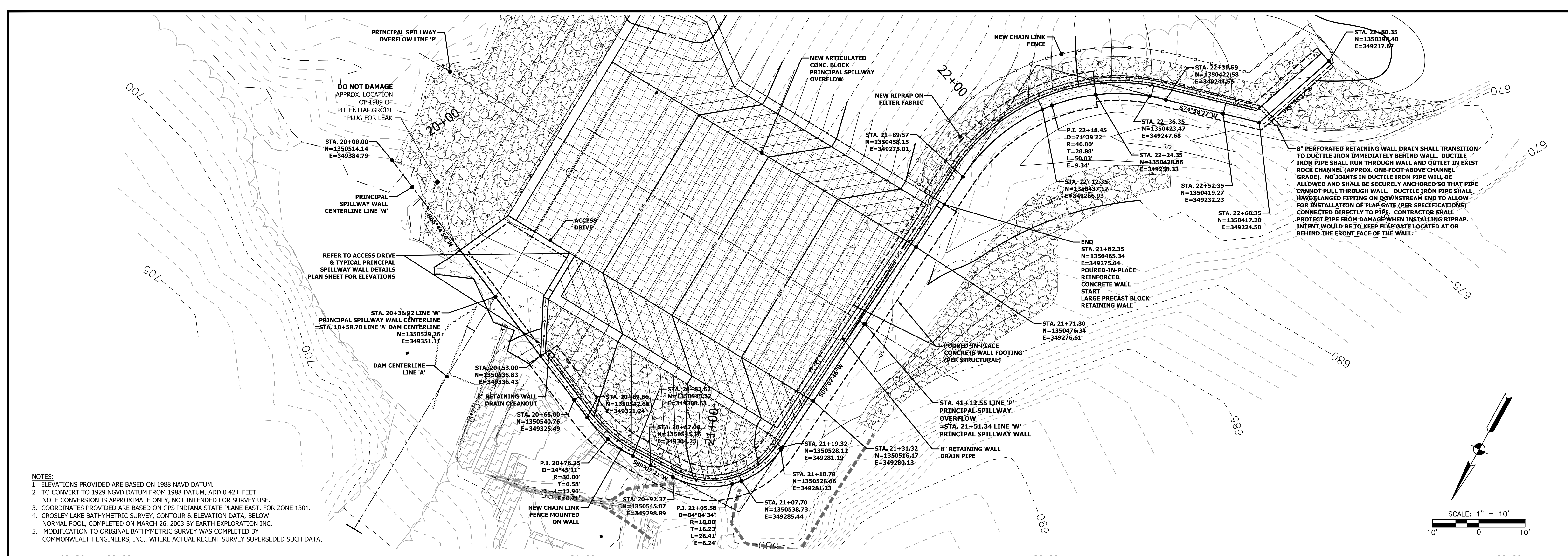
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DATE: MAY 2018  
JOB NO: D13038  
SCALE: AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT  
**PROJECT NO. ENG1802321631/E020098**

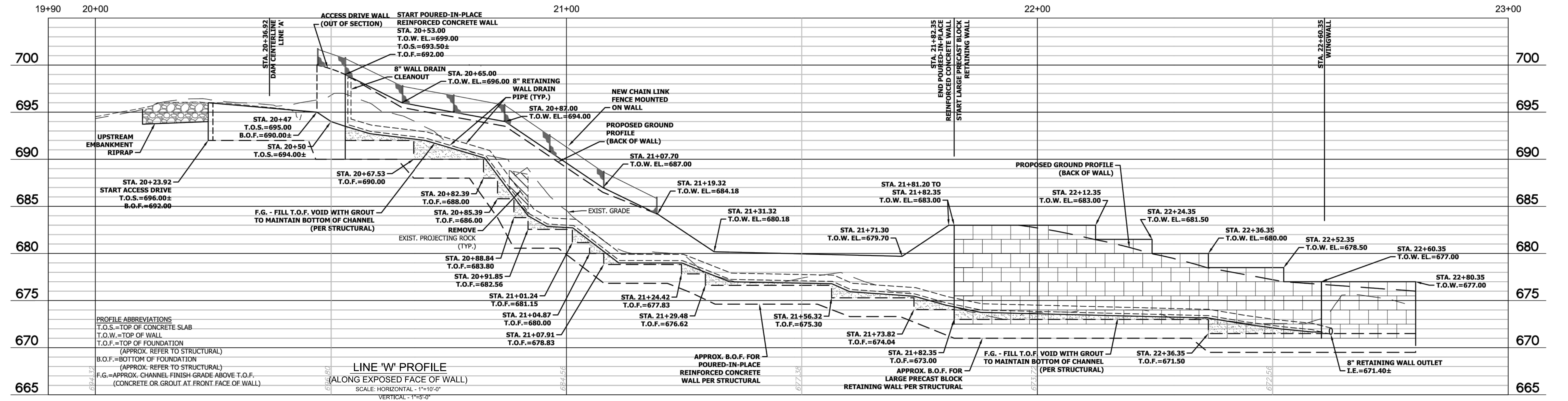
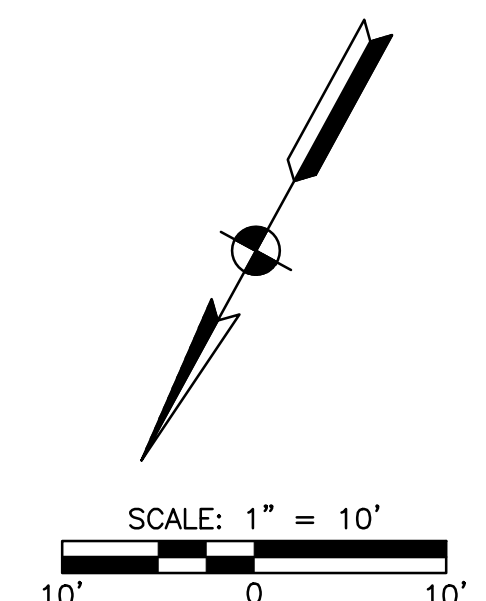
PRINCIPAL SPILLWAY ARTICULATED CONCRETE BLOCK OVERFLOW-LINE 'P'  
PLAN, PROFILE, CROSS SECTIONS & DETAILS

DRAWING NO.  
**06**  
6 OF 26

P:\Clients A-L\INDR\13038 Crosley Lake Dam\CAD\A-CURRENT\DRAWINGS\00-07and08-13038-SEGMENTAL RETAINING WALL Plan and Profile and Dets.dwg



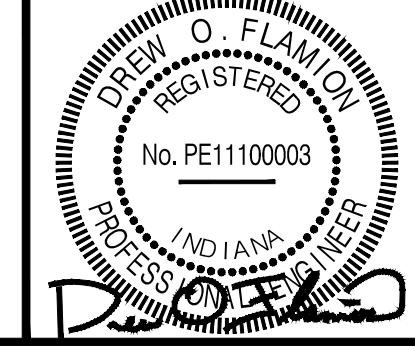
- NOTES:**
- ELEVATIONS PROVIDED ARE BASED ON 1988 NAVD DATUM.
  - TO CONVERT TO 1929 NGVD DATUM FROM 1988 DATUM, ADD 0.42± FEET. NOTE CONVERSION IS APPROXIMATE ONLY, NOT INTENDED FOR SURVEY USE.
  - COORDINATES PROVIDED ARE BASED ON GPS INDIANA STATE PLANE EAST, FOR ZONE 1301.
  - CROSLY LAKE BATHYMETRIC SURVEY, CONTOUR & ELEVATION DATA, BELOW NORMAL POOL, COMPLETED ON MARCH 26, 2003 BY EARTH EXPLORATION INC. MODIFICATION TO ORIGINAL BATHYMETRIC SURVEY WAS COMPLETED BY COMMONWEALTH ENGINEERS, INC., WHERE ACTUAL RECENT SURVEY SUPERSEDED SUCH DATA.



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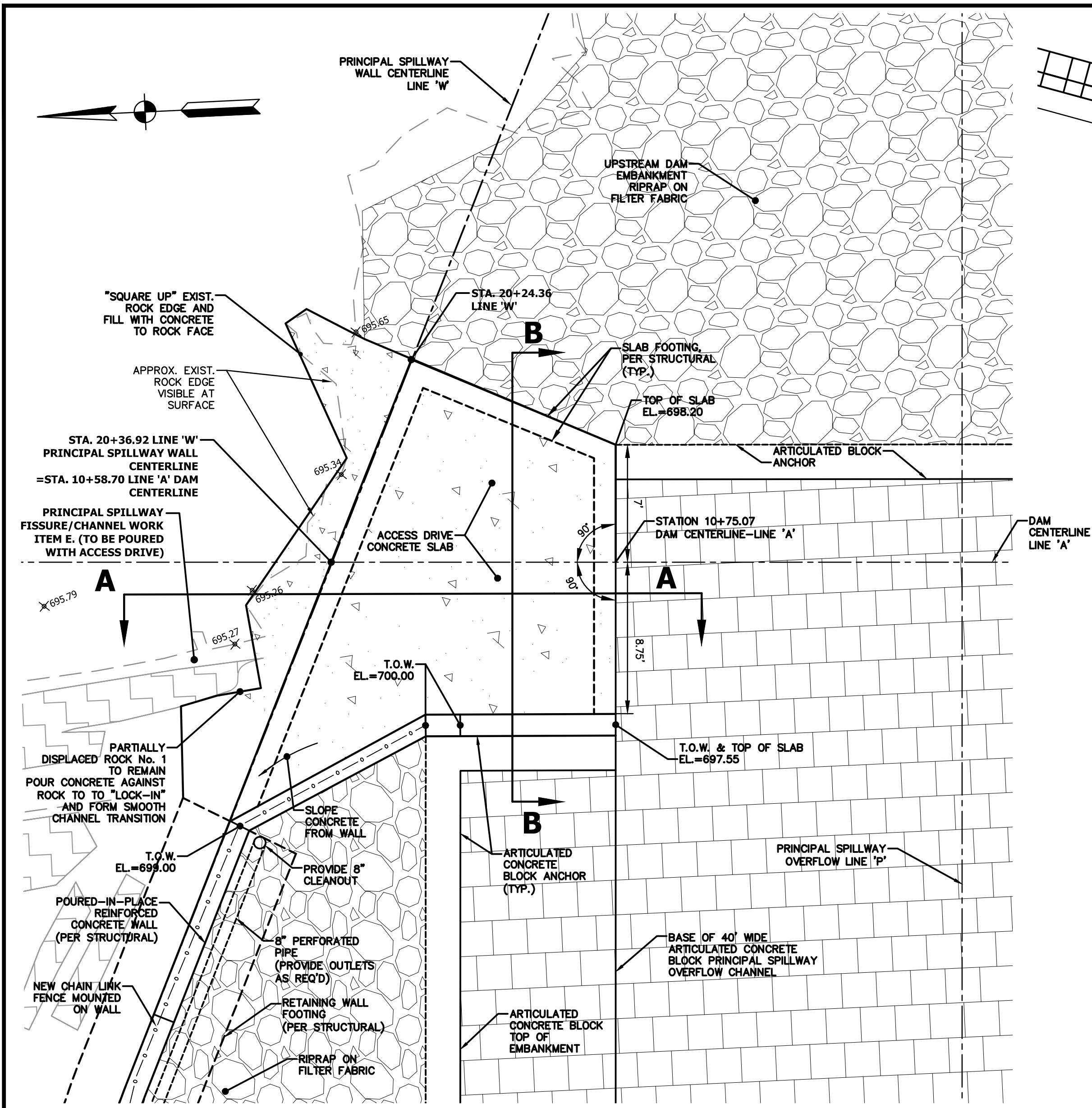
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JOB NO: D13038  
SCALE: AS NOTED

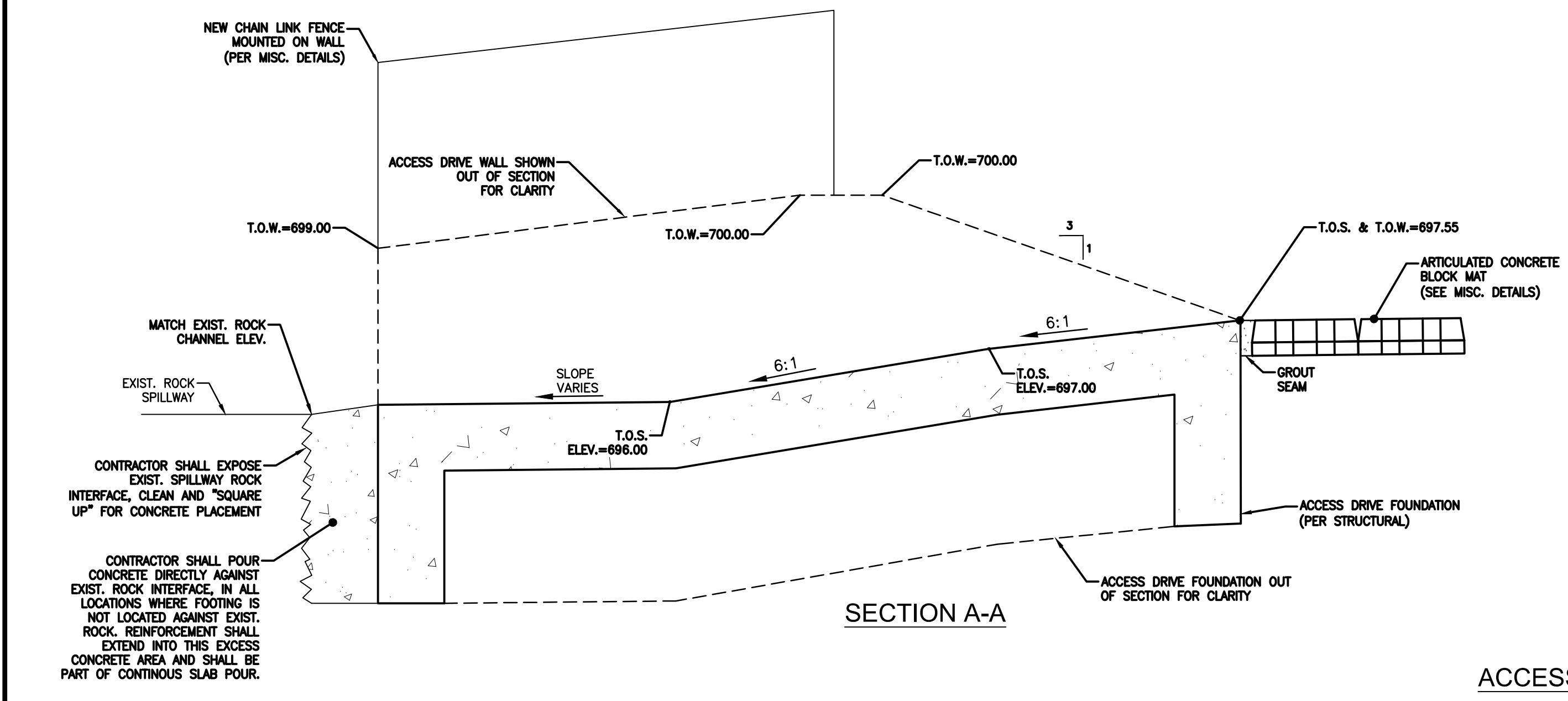
INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT  
**PROJECT NO. ENG1802321631/E020098**  
PRINCIPAL SPILLWAY WALL - LINE 'W'  
(ALONG EXPOSED FACE OF WALL)  
PLAN AND PROFILE

DRAWING NO.  
**07**  
7 OF 26

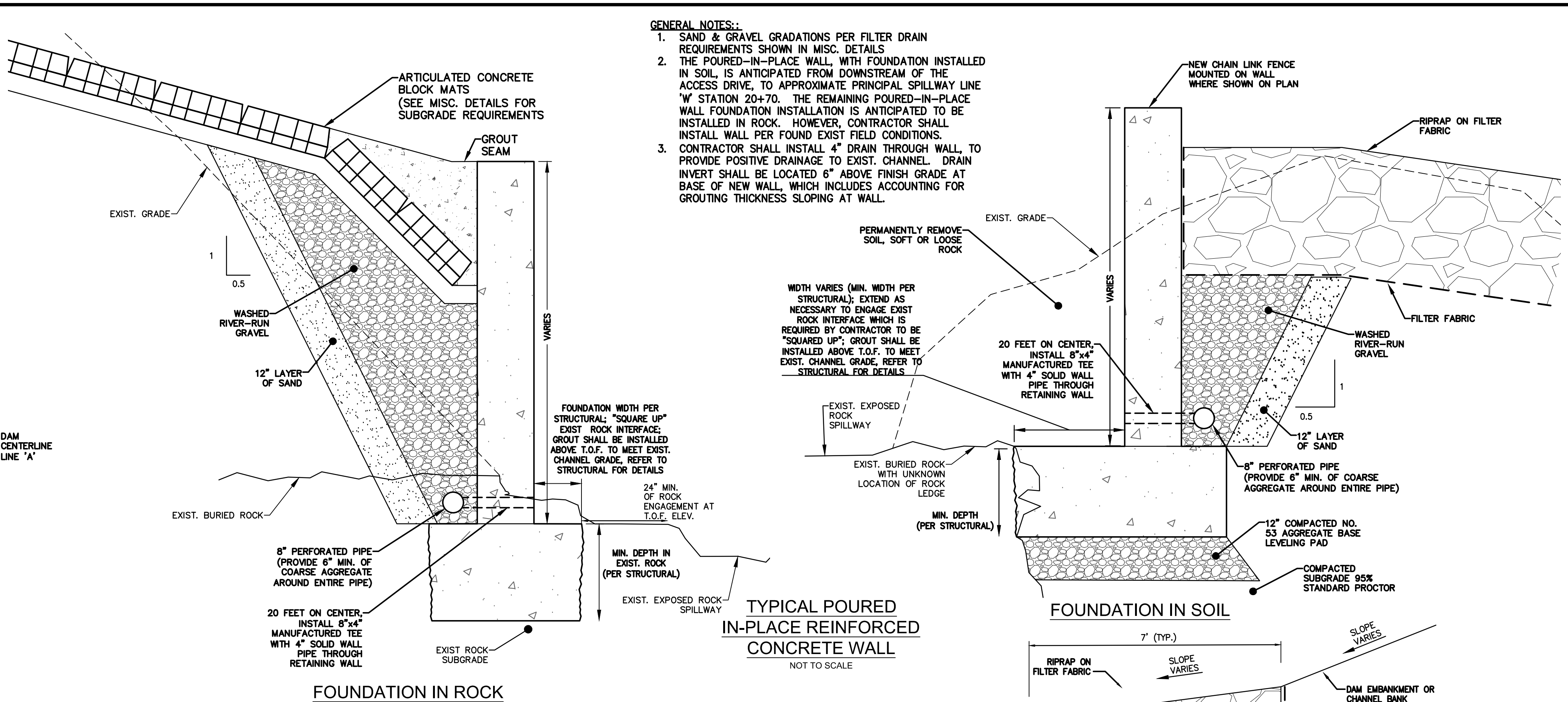
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ACCESS DRIVE DETAILS  
SCALE: 1"=5'



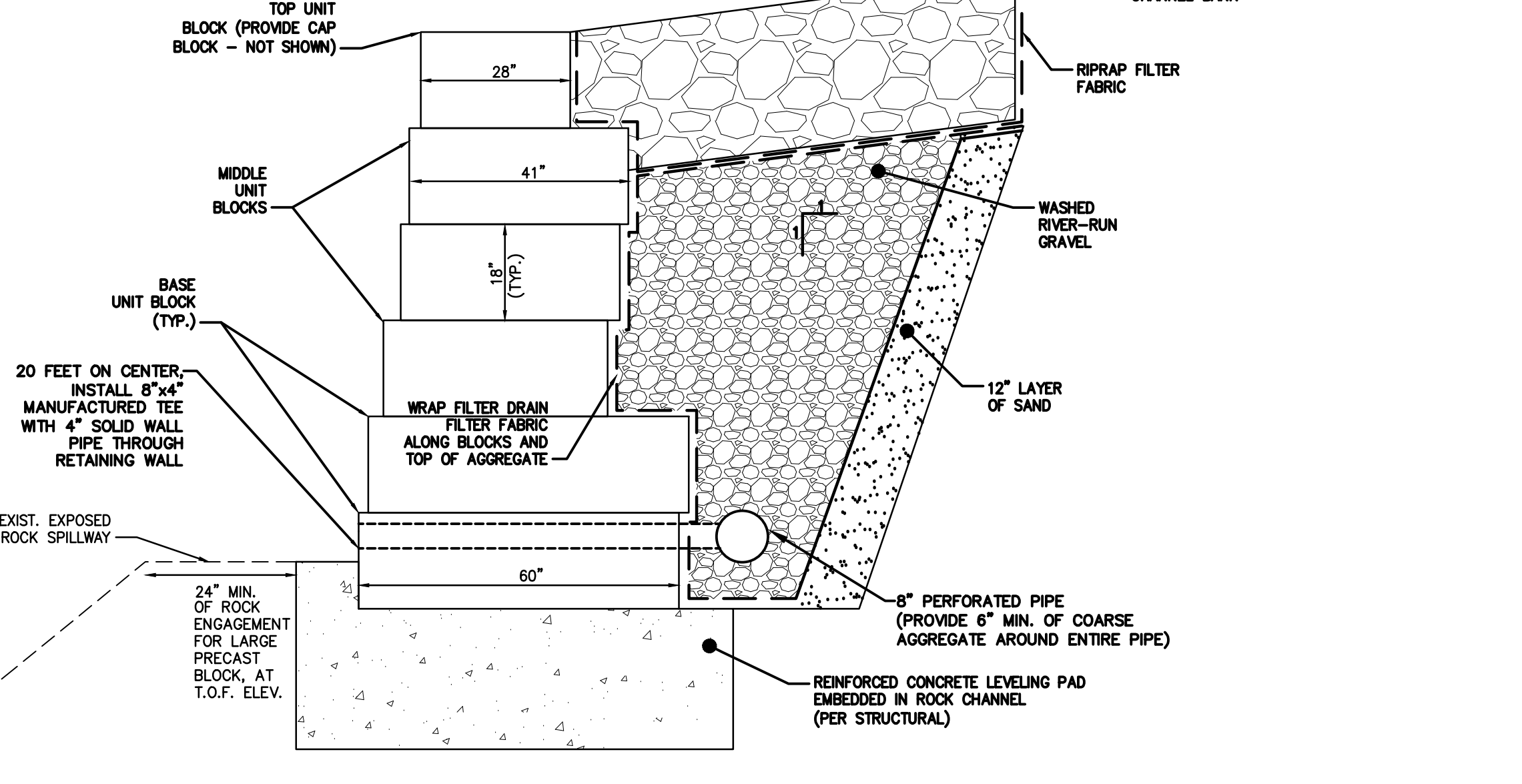
ACCESS DRIVE TYPICAL SECTIONS  
SCALE: 1"=2'



TYPICAL POURED IN-PLACE REINFORCED CONCRETE WALL  
NOT TO SCALE

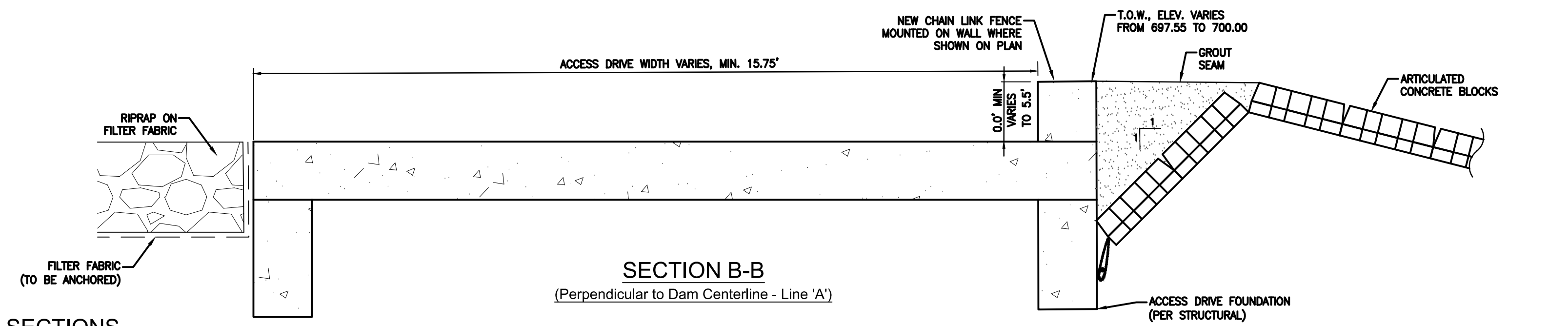
FOUNDATION IN SOIL

FOUNDATION IN ROCK



TYPICAL LARGE PRECAST BLOCK RETAINING WALL DETAIL  
SCALE: 1"=2'

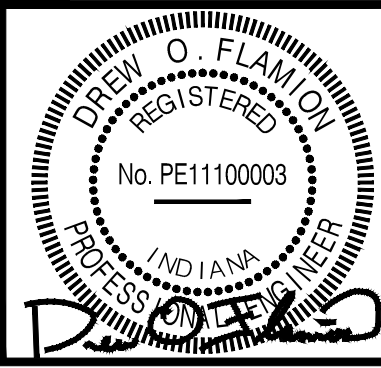
- NOTE:
- CONTRACTOR SHALL PROVIDE EXPOSED FINISH ON BOTH SIDES OF RETAINING WALL, TOP TWO BLOCKS.
  - LARGE PRECAST BLOCK MANUFACTURER SHALL PROVIDE ALL NECESSARY CALCULATIONS SUPPORTING BLOCK SIZES. SHOWN SIZES ARE APPROXIMATE ONLY.
  - SAND & GRAVEL GRADATIONS PER FILTER DRAIN REQUIREMENTS SHOWN IN MISC. DETAILS.
  - CONTRACTOR SHALL INSTALL 4" DRAIN THROUGH WALL TO PROVIDE POSITIVE DRAINAGE TO EXIST. CHANNEL. DRAIN INVERT SHALL BE LOCATED 6" ABOVE FINISH GRADE AT BASE OF NEW WALL, WHICH INCLUDES ACCOUNTING FOR GROUTING THICKNESS SLOPING AT WALL.



SECTION B-B  
(Perpendicular to Dam Centerline - Line 'A')

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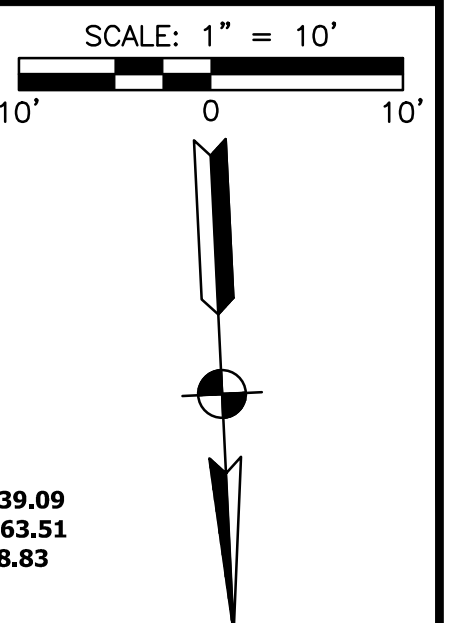
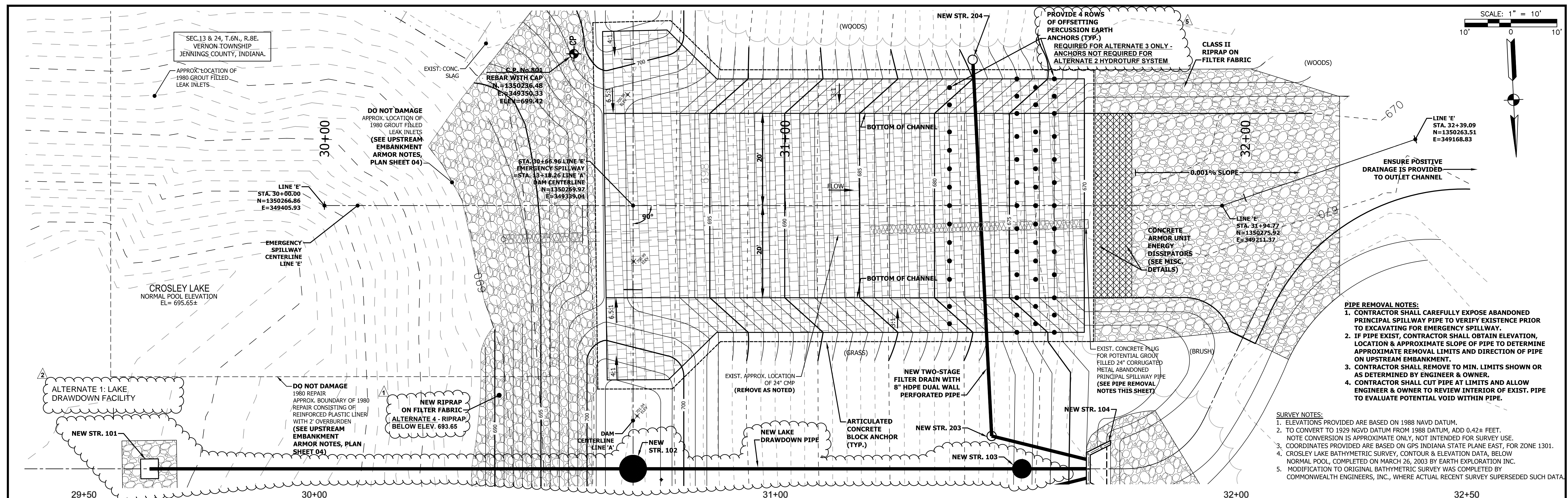
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SCALE: AS NOTED

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CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT  
**PROJECT NO. ENG1802321631/E020098**  
ACCESS DRIVE & TYPICAL  
PRINCIPAL SPILLWAY WALL DETAILS

DRAWING NO.  
**08**  
8 OF 26

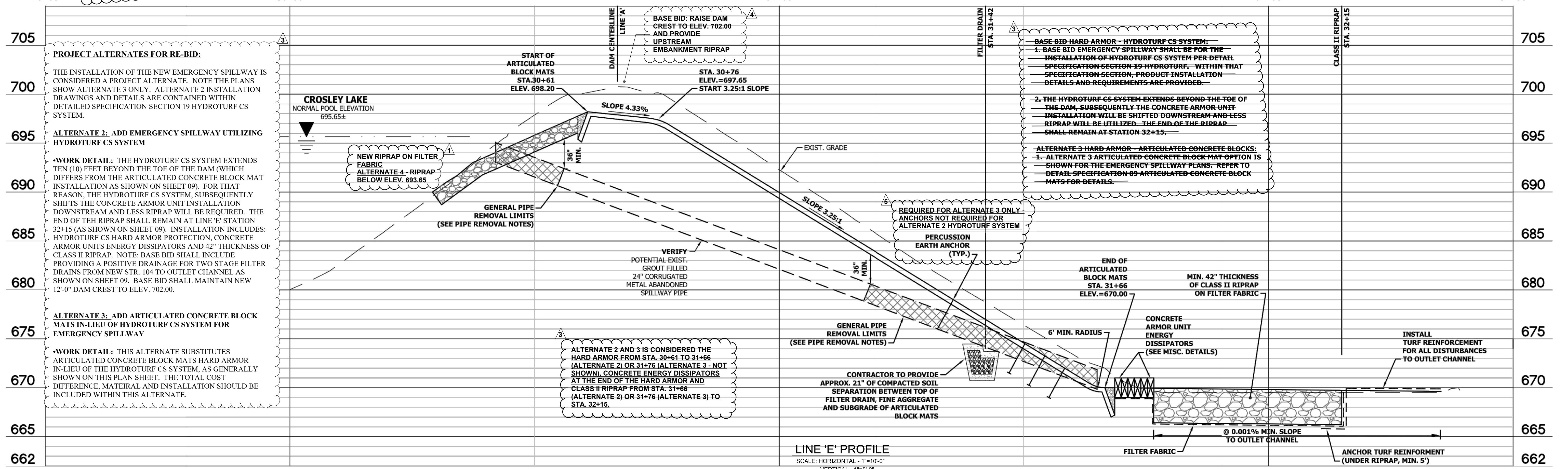


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- PIPE REMOVAL NOTES:**
1. CONTRACTOR SHALL CAREFULLY EXPOSE ABANDONED PRINCIPAL SPILLWAY PIPE TO VERIFY EXISTENCE PRIOR TO EXCAVATING FOR EMERGENCY SPILLWAY.
  2. IF PIPE EXIST, CONTRACTOR SHALL OBTAIN ELEVATION, LOCATION & APPROXIMATE SLOPE OF PIPE TO DETERMINE APPROXIMATE REMOVAL LIMITS AND DIRECTION OF PIPE ON UPSTREAM EMBANKMENT.
  3. CONTRACTOR SHALL REMOVE TO MIN. LIMITS SHOWN OR AS DETERMINED BY ENGINEER & OWNER.
  4. CONTRACTOR SHALL CUT PIPE AT LIMITS AND ALLOW ENGINEER & OWNER TO REVIEW INTERIOR OF EXIST. PIPE TO EVALUATE POTENTIAL VOID WITHIN PIPE.

- SURVEY NOTES:**
1. ELEVATIONS PROVIDED ARE BASED ON 1988 NAVD DATUM.
  2. TO CONVERT TO 1929 NGVD DATUM FROM 1988 DATUM, ADD 0.42± FEET.
  3. COORDINATES PROVIDED ARE BASED ON GPS INDIANA STATE PLANE EAST, FOR ZONE 1301.
  4. CROSLY LAKE BATHYMETRIC SURVEY, CONTOUR & ELEVATION DATA, BELOW NORMAL POOL, COMPLETED ON MARCH 26, 2003 BY EARTH EXPLORATION INC.
  5. MODIFICATION TO ORIGINAL BATHYMETRIC SURVEY WAS COMPLETED BY COMMONWEALTH ENGINEERS, INC., WHERE ACTUAL RECENT SURVEY SUPERSEDED SUCH DATA.



**PROJECT ALTERNATES FOR RE-BID:**

THE INSTALLATION OF THE NEW EMERGENCY SPILLWAY IS CONSIDERED A PROJECT ALTERNATE. NOTE THE PLANS SHOW ALTERNATE 3 ONLY. ALTERNATE 2 INSTALLATION DRAWINGS AND DETAILS ARE CONTAINED WITHIN DETAILED SPECIFICATION SECTION 19 HYDROTURF CS SYSTEM.

**ALTERNATE 2: ADD EMERGENCY SPILLWAY UTILIZING HYDROTURF CS SYSTEM**

**WORK DETAIL:** THE HYDROTURF CS SYSTEM EXTENDS TEN (10) FEET BEYOND THE TOE OF THE DAM (WHICH DIFFERS FROM THE ARTICULATED CONCRETE BLOCK MAT INSTALLATION AS SHOWN ON SHEET 09). FOR THAT REASON, THE HYDROTURF CS SYSTEM, SUBSEQUENTLY SHIFTS THE CONCRETE ARMOR UNIT INSTALLATION DOWNSTREAM AND LESS RIPRAP WILL BE REQUIRED. THE END OF THE RIPRAP SHALL REMAIN AT LINE 'E' STATION 32+15 (AS SHOWN ON SHEET 09). INSTALLATION INCLUDES: HYDROTURF CS HARD ARMOR PROTECTION, CONCRETE ARMOR UNITS ENERGY DISSIPATORS AND 42" THICKNESS OF CLASS II RIPRAP. NOTE: BASE BID SHALL INCLUDE PROVIDING A POSITIVE DRAINAGE FOR TWO STAGE FILTER DRAINS FROM NEW STR. 104 TO OUTLET CHANNEL AS SHOWN ON SHEET 09. BASE BID SHALL MAINTAIN NEW 12'-0" DAM CREST TO ELEV. 702.00.

**ALTERNATE 3: ADD ARTICULATED CONCRETE BLOCK MATS IN-LIEU OF HYDROTURF CS SYSTEM FOR EMERGENCY SPILLWAY**

**WORK DETAIL:** THIS ALTERNATE SUBSTITUTES ARTICULATED CONCRETE BLOCK MATS HARD ARMOR IN-LIEU OF THE HYDROTURF CS SYSTEM, AS GENERALLY SHOWN ON THIS PLAN SHEET. THE TOTAL COST DIFFERENCE, MATERIAL AND INSTALLATION SHOULD BE INCLUDED WITHIN THIS ALTERNATE.

**BASE BID HARD ARMOR - HYDROTURF CS SYSTEM:**

1. BASE BID EMERGENCY SPILLWAY SHALL BE FOR THE INSTALLATION OF HYDROTURF CS SYSTEM PER DETAIL SPECIFICATION SECTION 19 HYDROTURF WITHIN THAT SPECIFICATION SECTION, PRODUCT INSTALLATION DETAILS AND REQUIREMENTS ARE PROVIDED.
2. THE HYDROTURF CS SYSTEM EXTENDS BEYOND THE TOE OF THE DAM, SUBSEQUENTLY THE CONCRETE ARMOR UNIT INSTALLATION WILL BE SHIFTED DOWNSTREAM AND LESS RIPRAP WILL BE UTILIZED. THE END OF THE RIPRAP SHALL REMAIN AT STATION 32+15.

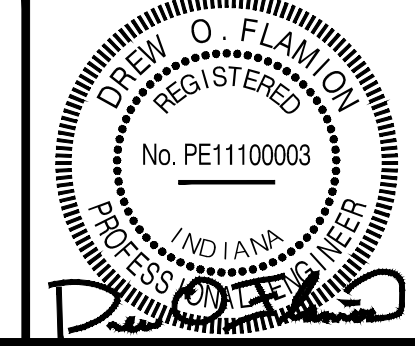
**ALTERNATE 3 HARD ARMOR - ARTICULATED CONCRETE BLOCK MATS:**

1. ALTERNATE 3 ARTICULATED CONCRETE BLOCK MAT OPTION IS SHOWN FOR THE EMERGENCY SPILLWAY PLANS. REFER TO DETAIL SPECIFICATION 09 ARTICULATED CONCRETE BLOCK MATS FOR DETAILS.

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No.	DATE	DESCRIPTION	REVISED BY
1	9/27/2018	ALTERNATE 4 - UPSTREAM RIPRAP BELOW EL. 693.65	DOF
2	9/27/2018	LAKE DRAWDOWN IS NOW ALTERNATE 1	DOF
3	9/27/2018	EMERGENCY SPILLWAY IS NOW ALTERNATE 2 & 3	DOF
4	9/27/2018	RAISE DAM AT EMERGENCY SPILLWAY IS BASE BID	DOF
5	9/27/2018	EARTH PERCUSSION ANCHORS FOR ALT. 3 ONLY	DOF



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JOB NO: D13038  
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INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT

**PROJECT NO. ENG1802321631/E020098**

EMERGENCY SPILLWAY - LINE 'E'  
PLAN AND PROFILE

DRAWING NO.  
**09**  
9 OF 26

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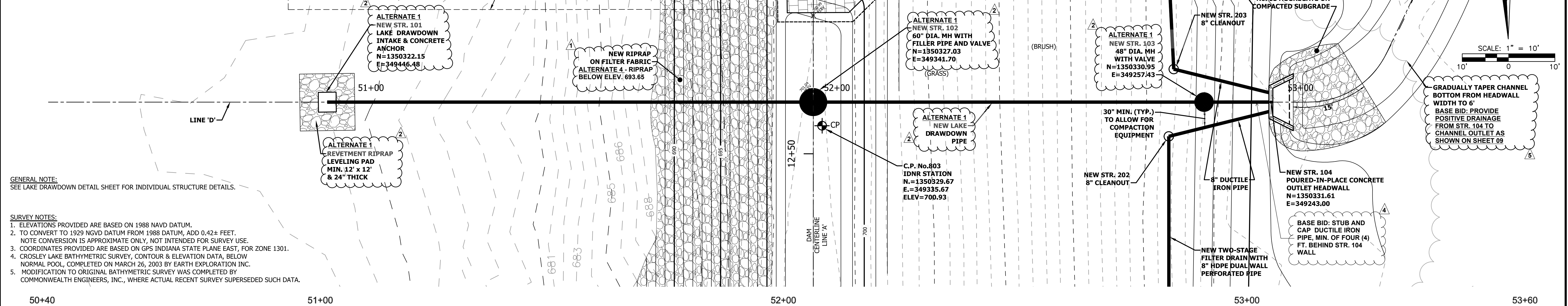
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VERNON TOWNSHIP  
JENNINGS COUNTY, INDIANA.

CROSLY LAKE  
NORMAL POOL ELEVATION  
695.65±

DO NOT DAMAGE  
1980 REPAIR  
APPROX. BOUNDARY  
OF 1980 REPAIR  
CONSISTING OF  
REINFORCED PLASTIC  
LINER WITH 2'  
OVERBURDEN  
(SEE UPSTREAM  
EMBANKMENT  
ARMOR NOTES,  
PLAN SHEET 04)

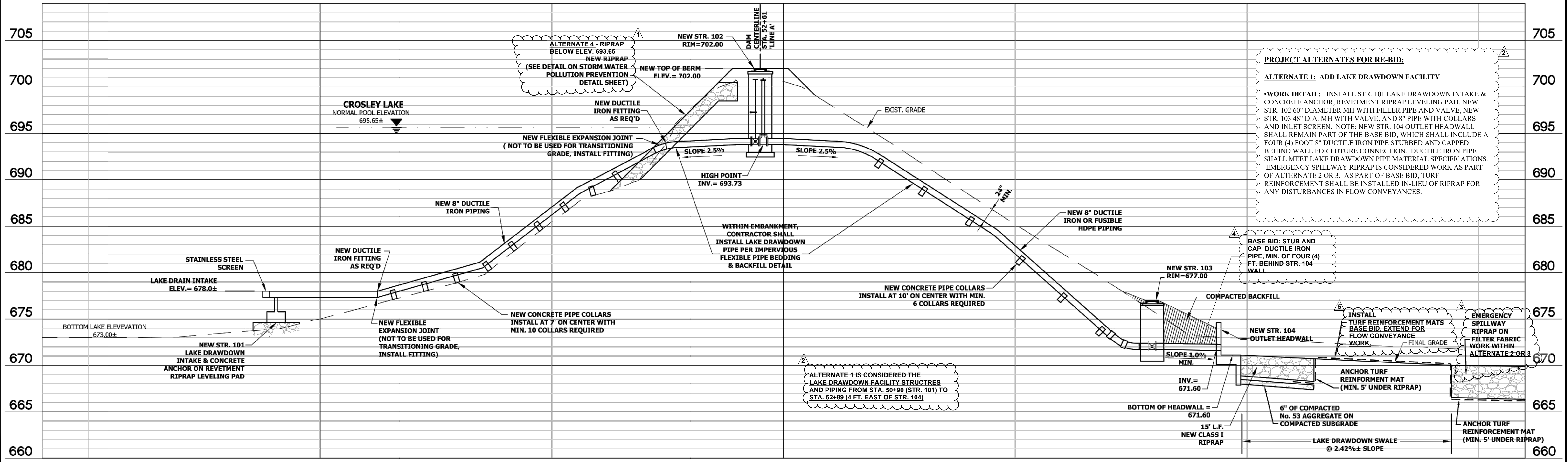
NEW EMERGENCY SPILLWAY IS NOW CONSIDERED PROJECT ALTERNATE.  
ALTERNATE 2: ADD EMERGENCY SPILLWAY UTILIZING HYDROTURF CS SYSTEM  
ALTERNATE 3: ADD ARTICULATED CONCRETE BLOCK MATS IN-LIEU OF HYDROTURF CS SYSTEM FOR EMERGENCY SPILLWAY  
NOTE: BASE BID SHALL INCLUDE PROVIDING A POSITIVE DRAINAGE FOR TWO STAGE FILTER DRAINS FROM NEW STR. 104 TO OUTLET CHANNEL AS SHOWN ON SHEET 09. CLASS II EMERGENCY SPILLWAY RIPRAP IS CONSIDERED A COST ASSOCIATED WITH EMERGENCY SPILLWAY ALTERNATES.

SCALE: 1" = 10'



GENERAL NOTE:  
SEE LAKE DRAWDOWN DETAIL SHEET FOR INDIVIDUAL STRUCTURE DETAILS.

SURVEY NOTES:  
1. ELEVATIONS PROVIDED ARE BASED ON 1988 NAVD DATUM.  
2. TO CONVERT TO 1929 NGVD DATUM FROM 1988 DATUM, ADD 0.42± FEET.  
NOTE CONVERSION IS APPROXIMATE ONLY, NOT INTENDED FOR SURVEY USE.  
3. COORDINATES PROVIDED ARE BASED ON GPS INDIANA STATE PLANE EAST, FOR ZONE 1301.  
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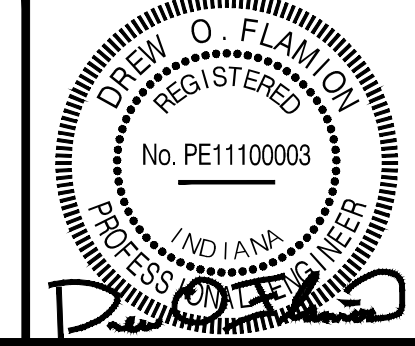
PROJECT ALTERNATES FOR RE-BID:  
ALTERNATE 1: ADD LAKE DRAWDOWN FACILITY  
•WORK DETAIL: INSTALL STR. 101 LAKE DRAWDOWN INTAKE & CONCRETE ANCHOR, REVETMENT RIPRAP LEVELING PAD, NEW STR. 102 60\"/>

ALTERNATE 1 IS CONSIDERED THE LAKE DRAWDOWN FACILITY STRUCTURES AND PIPING FROM STA. 50+90 (STR. 101) TO STA. 52+89 (4 FT. EAST OF STR. 104)

LINE 'D' PROFILE  
SCALE: HORIZONTAL - 1"=10'-0"  
VERTICAL - 1"=5'-0"

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No.	DATE	DESCRIPTION	REVISED BY
1	9/27/2018	ALTERNATE 4 - UPSTREAM RIPRAP BELOW EL. 693.65	DOF
2	9/27/2018	LAKE DRAWDOWN IS NOW ALTERNATE 1	DOF
3	9/27/2018	EMERGENCY SPILLWAY IS NOW ALTERNATE 2 & 3	DOF
4	9/27/2018	STR. 104 AND STUB AND CAP 8\"/>	



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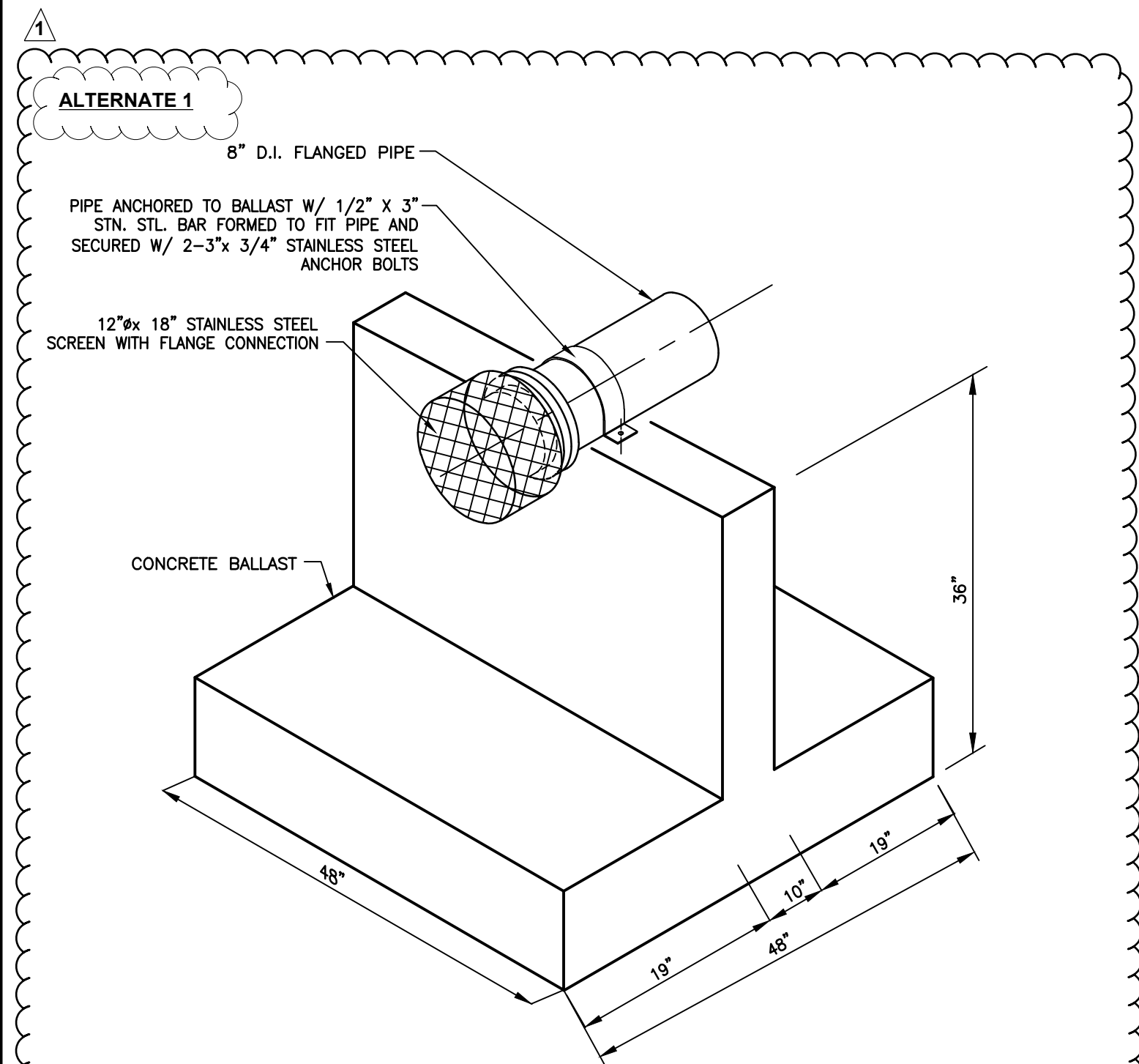
DRAWN BY:	ALR
DESIGNED BY:	DOF
CHECKED BY:	RMK
DATE:	MAY 2018
JOB NO.:	D13038
SCALE:	AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT

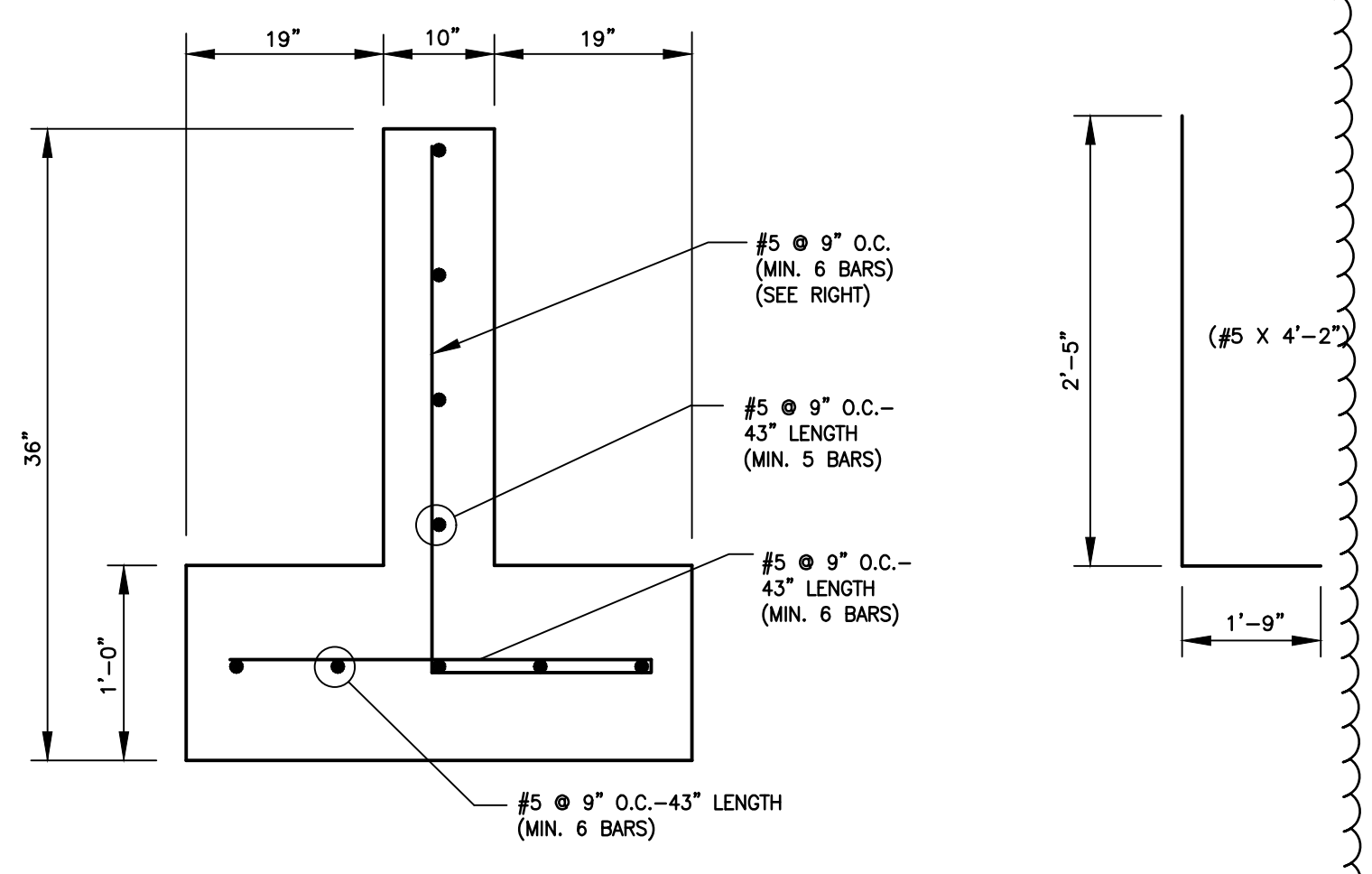
**PROJECT NO. ENG1802321631/E020098**

LAKE DRAWDOWN - LINE 'D'  
PLAN AND PROFILE

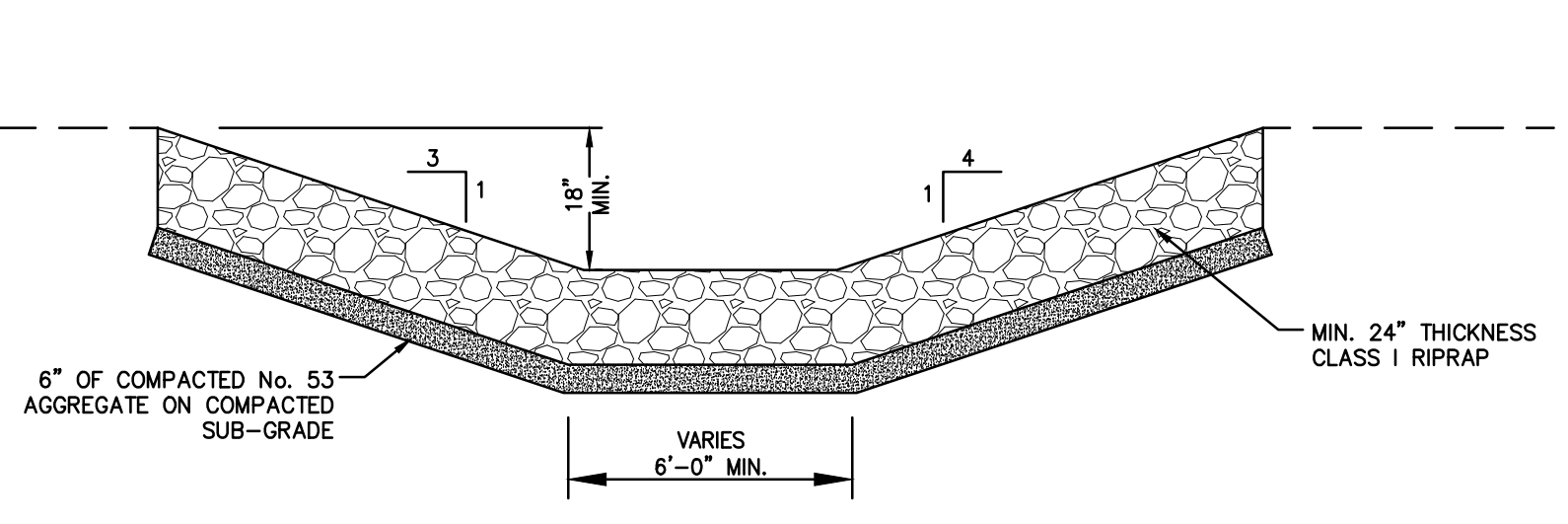
DRAWING NO.  
**10**  
10 OF 26



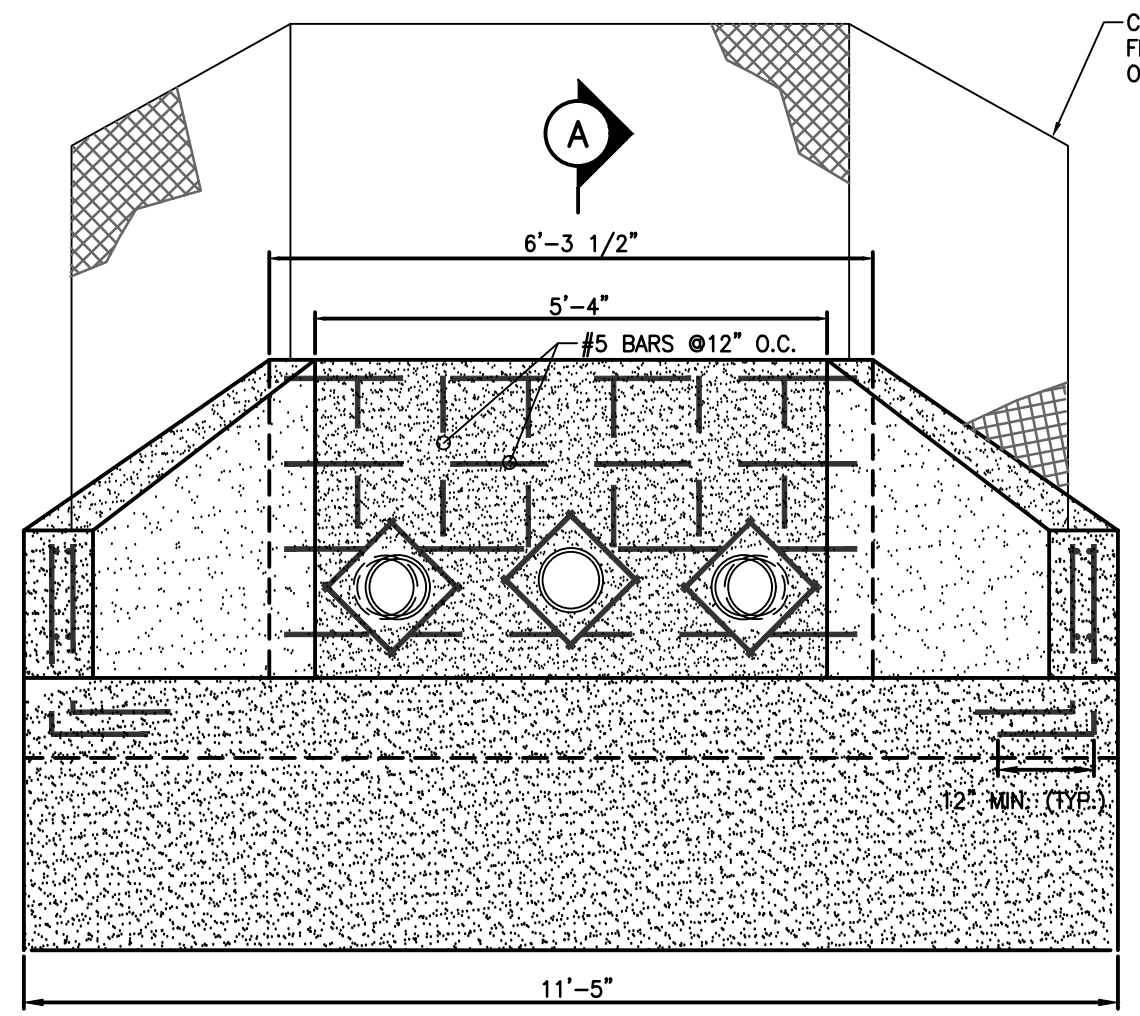
**NEW STR. 101  
LAKE DRAWDOWN &  
INTAKE CONCRETE ANCHOR DETAIL**  
NOT TO SCALE



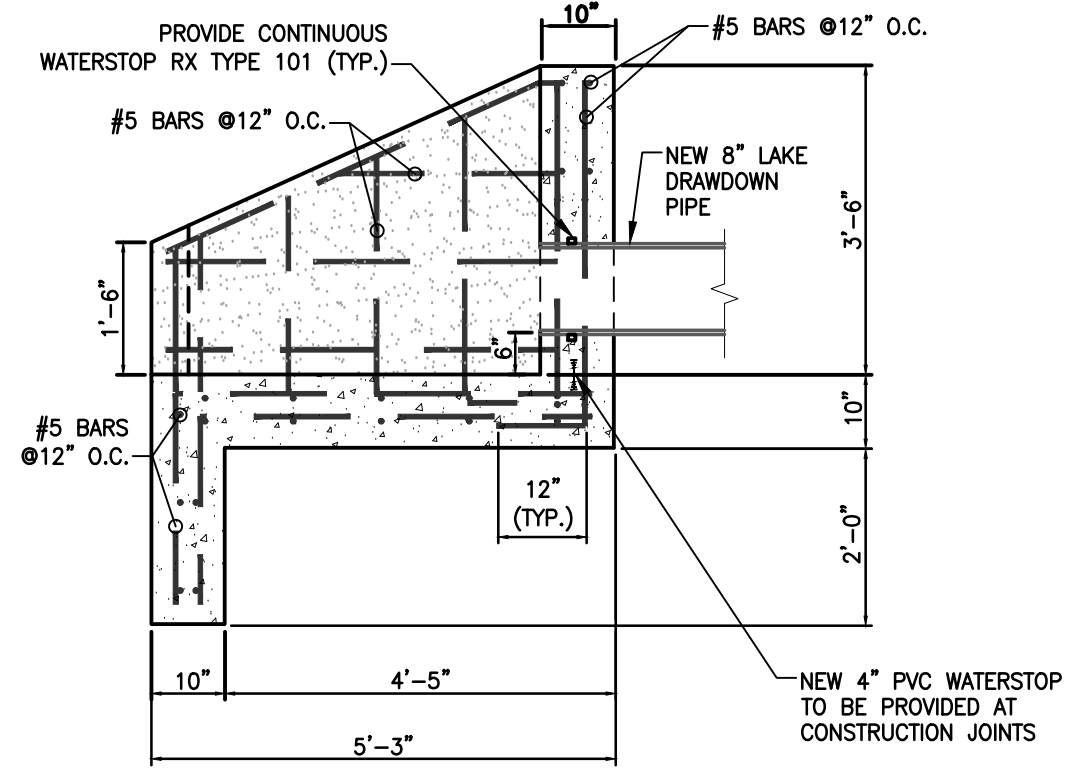
**NEW STR. 101  
LAKE DRAWDOWN & INTAKE  
CONCRETE ANCHOR-STEEL REINFORCING**  
NOT TO SCALE



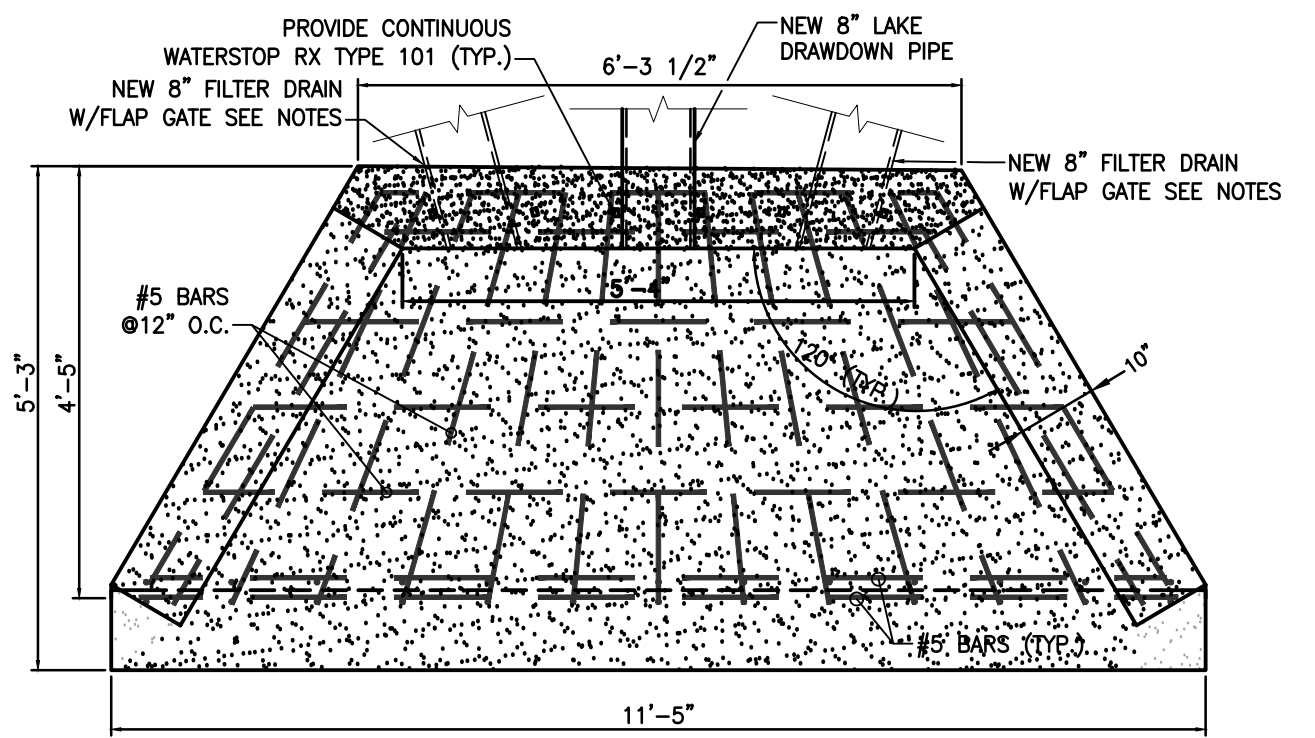
**LAKE DRAWDOWN  
OUTLET CHANNEL DETAIL**  
NOT TO SCALE  
(LOOKING DOWNSTREAM)



**FRONT ELEVATION**

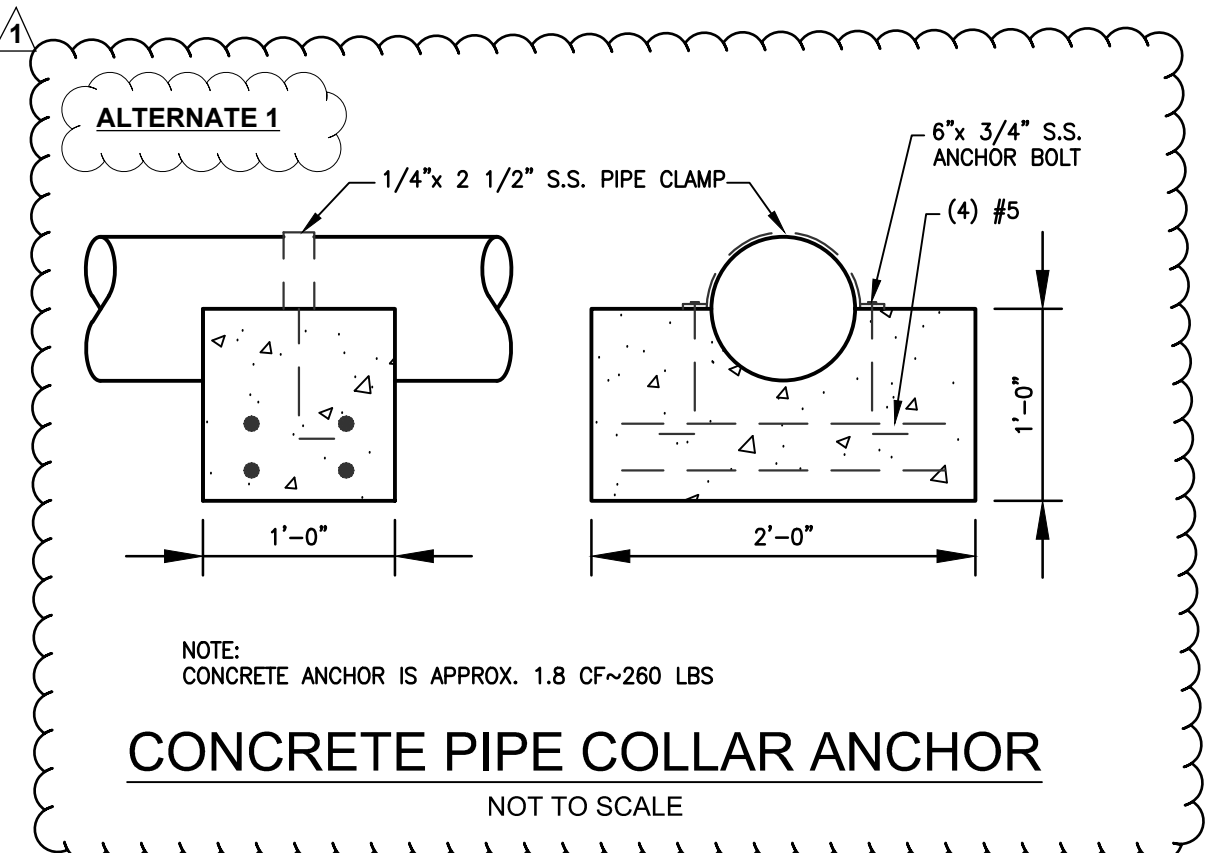


**SECTION A-A**



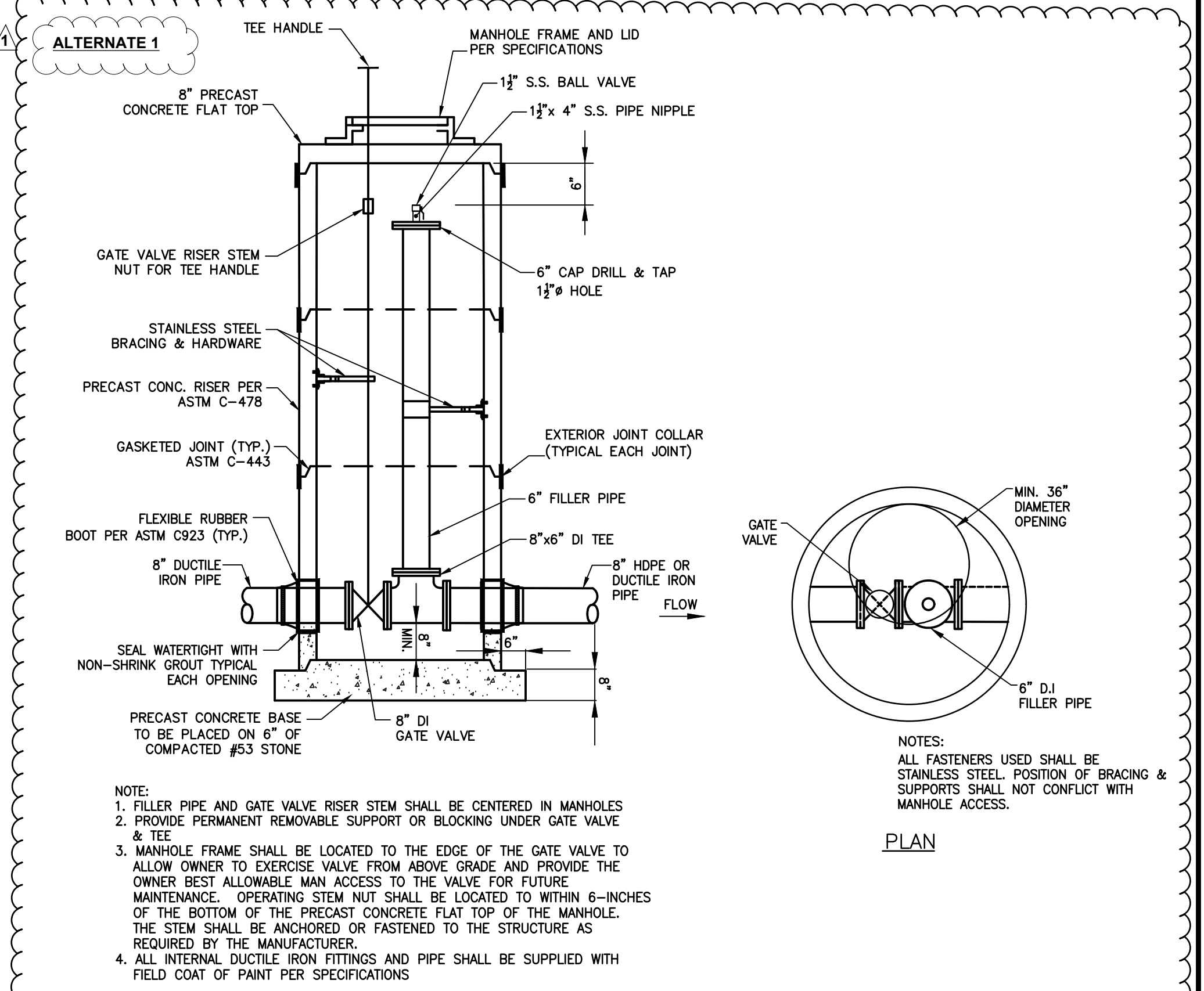
**PLAN**

**NEW STR. 104 POURED IN PLACE  
CONCRETE OUTLET HEADWALL DETAIL**

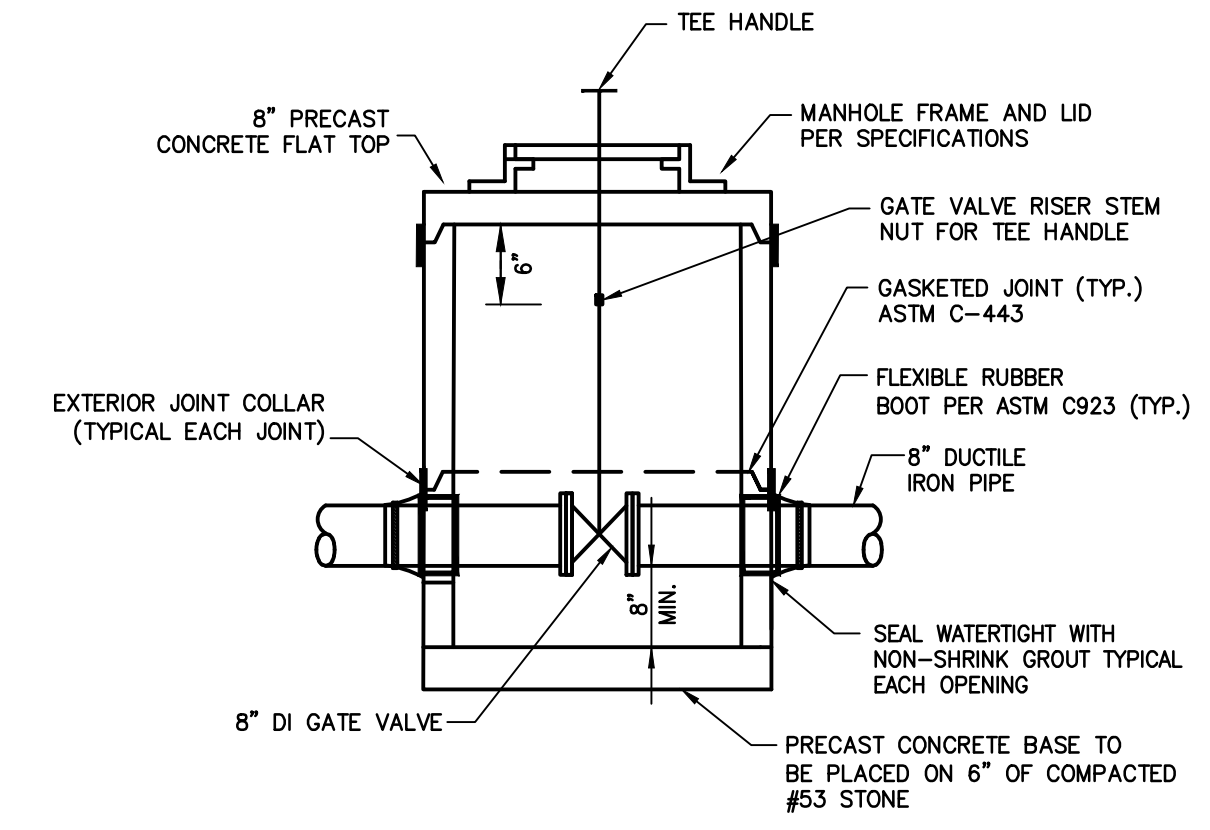


**CONCRETE PIPE COLLAR ANCHOR**  
NOT TO SCALE

- NOTES:**
1. CONCRETE TO BE CLASS 'D' MIN. 4500 PSI @ 28 DAYS.
  2. PROVIDE MIN. 2" CONCRETE COVER UNLESS OTHERWISE NOTED.
  3. 3/4" CHAMFER ON ALL EXPOSED EDGES.
  4. REAR FACES OF WINGS AND HEADWALLS TO BE WATERPROOFED, IN ACCORDANCE WITH SPECIFICATIONS.
  5. INSTALL CHAIN LINK FENCE ON TOP OF STRUCTURE. FENCE SHALL BE MOUNTED TO TOP OF STRUCTURE WALLS. CHAIN LINK FENCE NOT SHOWN ON ALL PLAN & SECTIONS FOR CLARITY.
  6. CONTRACTOR SHALL INSTALL TWO WALL MOUNTED FLAP GATES FOR THE TWO 8" FILTER EMBANKMENT DRAINS. FLAP GATE IS NOT REQUIRED FOR THE LAKE DRAWDOWN PIPE. REFER TO SPECIFICATIONS FOR GATE REQUIREMENTS. NOTE FLAP GATES ARE NOT SHOWN FOR CLARITY.
  7. BASE BID: STUB AND CAP 8" DUCTILE IRON LAKE DRAWDOWN PIPE, FOUR (4) FEET BEHIND OUTER CONCRETE WALL.



**60" DIAMETER  
STR. 102 MANHOLE DETAIL**  
NOT TO SCALE



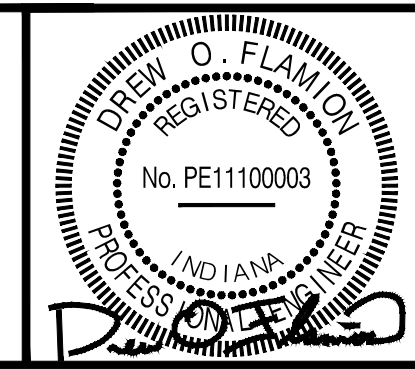
**48" DIAMETER  
STR. 103 MANHOLE DETAIL**  
NOT TO SCALE

- NOTES:**
1. PROVIDE PERMANENT REMOVABLE SUPPORT OR BLOCKING UNDER GATE VALVE.
  2. MANHOLE FRAME SHALL BE LOCATED TO THE EDGE OF THE GATE VALVE TO ALLOW OWNER TO EXERCISE VALVE FROM ABOVE GRADE AND PROVIDE THE OWNER BEST ALLOWABLE MAN ACCESS TO THE VALVE FOR FUTURE MAINTENANCE. OPERATING STEM NUT SHALL BE LOCATED TO WITHIN 6-INCHES OF THE BOTTOM OF THE PRECAST CONCRETE FLAT TOP OF THE MANHOLE. THE STEM SHALL BE ANCHORED OR FASTENED TO THE STRUCTURE AS REQUIRED BY THE MANUFACTURER.
  3. ALL INTERNAL DUCTILE IRON FITTINGS AND PIPE SHALL BE SUPPLIED WITH FIELD COAT OF PAINT PER SPECIFICATIONS.

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Know what's below.  
Call before you dig.  
OR 1-800-382-5544  
(ITS THE LAW)

REVISIONS			
No.	DATE	DESCRIPTION	REVISED BY
1	9/27/2018	LAKE DRAWDOWN IS NOW ALTERNATE 1	DOF
2	9/27/2018	STR. 104 AND STUB AND CAP 8" PIPE IS BASE BID	DOF



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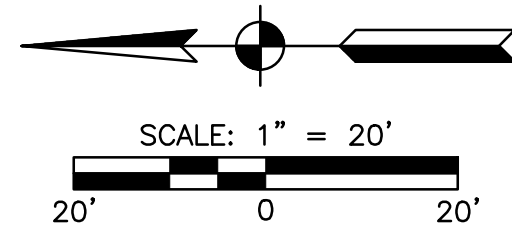
DRAWN BY:	ALR
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SCALE:	AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT

**PROJECT NO. ENG1802321631/E020098**

LAKE DRAWDOWN DETAILS

DRAWING NO.	11
	11 OF 26



NOTE: THE FOLLOWING IS A PARTIAL LIST OF THE MEASURES REQUIRED. SEE PLANS AND SPECIFICATIONS FOR ADDITIONAL MEASURES.

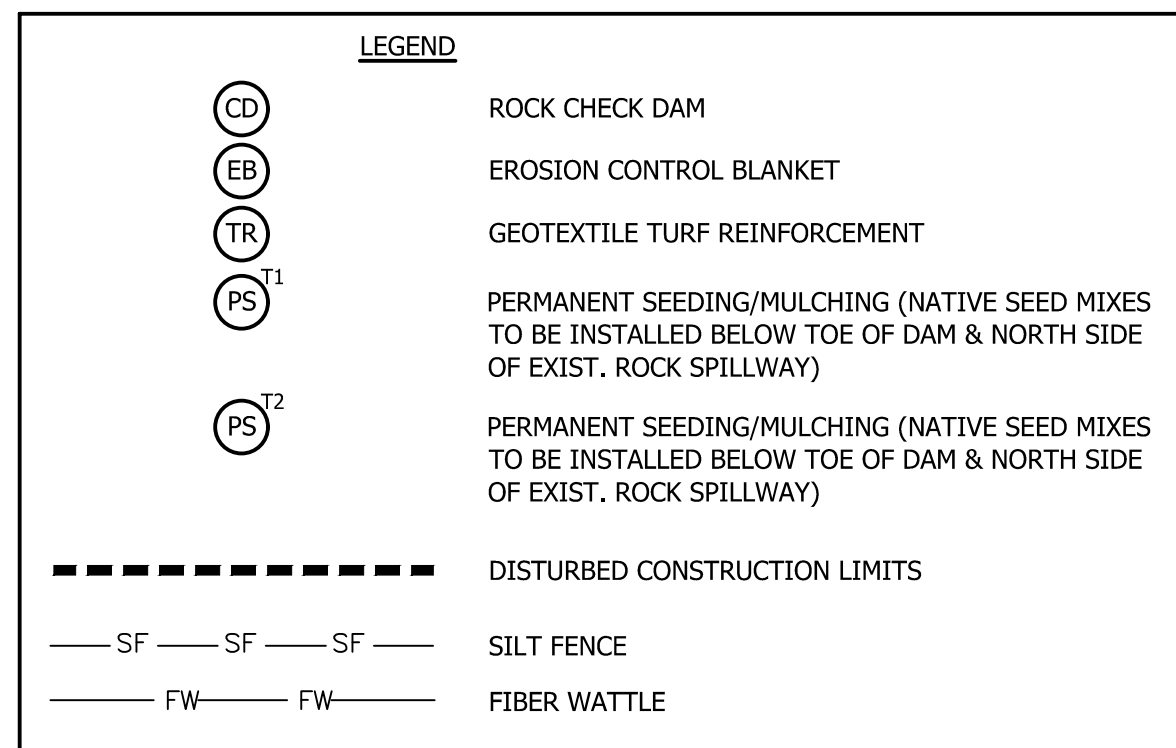
- CONTRACTOR TO COORDINATE LOCATION OF STAGING AREA WITH THE OWNER. CONTRACTOR SHALL ALSO PROVIDE A CONCRETE WASHOUT LOCATION AND VEHICLE FUELING/MAINTENANCE LOCATION WITH A SYSTEM USED TO CONTAIN THE POLLUTANTS ASSOCIATED WITH THESE ACTIVITIES.
- CONTRACTOR TO PROVIDE A STABLE CONSTRUCTION ENTRANCE WHERE CONSTRUCTION TRAFFIC WILL BE TRAVERSING BETWEEN SOIL SURFACES AND PAVED ROADWAYS (SEE S.W.P.P. DETAILS).
- TEMPORARY CULVERTS SHALL BE REQUIRED AT ALL AREAS WITH CONCENTRATED FLOWS. HEAVY CONSTRUCTION TRAFFIC SHALL HAVE LIMITED ACCESS ALONG THE CREST OF THE DAM.
- ALL EXPOSED FINISH GRADE DISTURBED AREAS, SHALL BE STABILIZED WITH PERMANENT SEEDING. TEMPORARY EROSION CONTROL BLANKETS SHALL BE USED IN CONCENTRATED FLOW AREAS SUCH AS DITCHES, SWALES, AND STREAM BANKS. AREAS THAT ARE NOT SUBJECT TO CONCENTRATED FLOWS, BUT HAVE SLOPES THAT ARE 4:1 OR STEEPER SHALL BE MULCH SEEDING. IF DISTURBED AREAS REMAIN INACTIVE FOR MORE THAN 15 DAYS, TEMPORARY SEED SHALL BE INSTALLED FOR TEMPORARY SURFACE STABILIZATION.
- SILT FENCE SHALL BE USED AS A SEDIMENT BARRIER WHERE STORM WATER RUNOFF FROM DISTURBED AREAS ARE EXPECTED TO SHEET DRAIN TO UNDISTURBED AREAS.
- TEMPORARY SEDIMENT TRAPS SHALL BE USED AT THE DOWNSTREAM END OF DISTURBED AREAS WITHIN DITCHES OR SWALES WHERE CONCENTRATED FLOW OCCURS AND IS EXPECTED TO DRAIN TO UNDISTURBED AREAS OR STORM SEWER END SECTIONS.
- INLET PROTECTION SHALL BE USED ON STORM STRUCTURES RECEIVING STORM WATER THROUGH OPEN CASTINGS. SILT FENCE INLET PROTECTION SHALL BE USED WHEN SURFACE AROUND INLET IS UNPAVED, AND SAND BAGS SHALL BE USED WHEN SURFACE AROUND INLET IS PAVED.
- SEE MISCELLANEOUS DETAIL SHEETS FOR ADDITIONAL STORM WATER POLLUTION PREVENTION MEASURE DETAILS.
- AFTER COMPLETION OF CONTRACT, OR AS REQUESTED BY OWNER, THE CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION CONTROL ITEMS AND ALL ACCUMULATED DEPOSITS. AS REQUIRED, CONTRACTOR SHALL PROVIDE MULCHED SEEDING OR SOO TO ESTABLISH ORIGINAL CONDITIONS PRIOR TO CONSTRUCTION.
- ADDITIONAL DISTURBED AREAS, NOT SHOWN WITHIN THIS PLAN, SHALL BE PROVIDED PERMANENT SEEDING PER THE DETAILED SPECIFICATION REQUIREMENTS. THIS MAY INCLUDE, BUT NOT LIMITED TO: ANY BORROW MATERIAL SITES, ACCESS AND STAGING AREAS, AND ANY TEMPORARY CONSTRUCTION ACCESS DRIVES.

**GENERAL POLLUTION PREVENTION NOTES:**

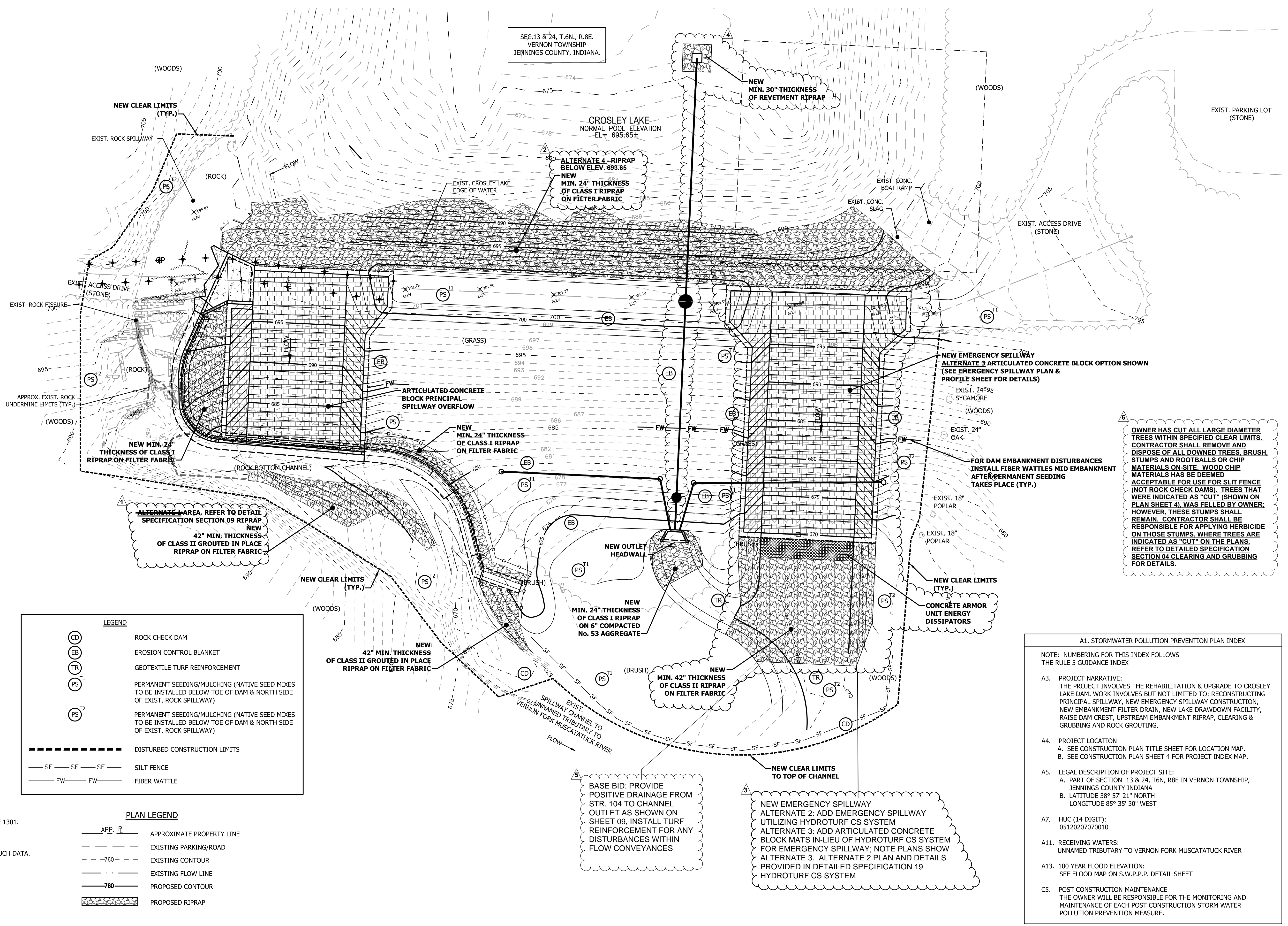
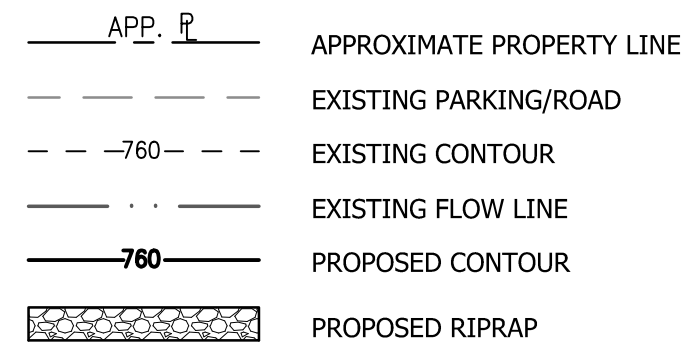
- OTHER BURIED UTILITIES MAY BE IN PROJECT AREA. THE LOCATION OF UNDERGROUND UTILITIES SHALL BE VERIFIED BY CALLING TOLL FREE 1-800-382-5544 AT LEAST 2 DAYS PRIOR TO ANY DIGGING IN THE AREA.
- EROSION CONTROL SILT FENCES SHALL BE PLACED BELOW ALL AREAS THAT ARE DISTURBED DURING CONSTRUCTION AND THAT DRAIN TO WATERWAYS.
- DURING EXCAVATION OPERATIONS, SEGREGATE OUT ALL TOPSOIL AND STOCKPILE FOR SUBSEQUENT USE IN AREAS TO BE SEEDING. EXTRA CARE SHALL BE TAKEN TO AVOID MIXING STOCKPILED MATERIAL WITH OBJECTIONABLE MATERIAL.
- ALL DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE SHOWN ON PLANS, SECTIONS AND DETAILS. DRAWINGS SHALL NOT BE SCALED FOR CONSTRUCTION PURPOSES.
- NOTES AND DETAILS ON THE DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.
- NEITHER THE OWNER NOR THE ENGINEER WILL ENFORCE SAFETY MEASURES OR REGULATIONS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, DESIGN, CONSTRUCT AND MAINTAIN ALL SAFETY DEVICES, INCLUDING SHORING AND BRACING AND SHALL BE SOLELY RESPONSIBLE FOR CONFORMING TO ALL LOCAL, STATE AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS AND REGULATIONS. SITE OBSERVATION VISITS BY THE ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE SAFETY ITEMS.

**SURVEY NOTES:**

- ELEVATIONS PROVIDED ARE BASED ON 1988 NAVD DATUM.
- TO CONVERT TO 1929 NGVD DATUM FROM 1988 DATUM, ADD 0.42+ FEET. NOTE CONVERSION IS APPROXIMATE ONLY, NOT INTENDED FOR SURVEY USE.
- COORDINATES PROVIDED ARE BASED ON GPS INDIANA STATE PLANE EAST, FOR ZONE 1301.
- CROSLLEY LAKE BATHYMETRIC SURVEY, CONTOUR & ELEVATION DATA, BELOW NORMAL POOL, COMPLETED ON MARCH 26, 2003 BY EARTH EXPLORATION INC.
- MODIFICATION TO ORIGINAL BATHYMETRIC SURVEY WAS COMPLETED BY COMMONWEALTH ENGINEERS, INC., WHERE ACTUAL RECENT SURVEY SUPERSEDED SUCH DATA.



**PLAN LEGEND**



OWNER HAS CUT ALL LARGE DIAMETER TREES WITHIN SPECIFIED CLEAR LIMITS. CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL DOWNED TREES, BRUSH, STUMPS AND ROOTBALLS OR CHIP MATERIALS ON-SITE. WOOD CHIP MATERIALS HAS BEEN DEEMED ACCEPTABLE FOR USE FOR SLIT FENCE (NOT ROCK CHECK DAMS). TREES THAT WERE INDICATED AS "CUT" (SHOWN ON PLAN SHEET 4), WAS FELLED BY OWNER; HOWEVER, THESE STUMPS SHALL REMAIN. CONTRACTOR SHALL BE RESPONSIBLE FOR APPLYING HERBICIDE ON THOSE STUMPS, WHERE TREES ARE INDICATED AS "CUT" ON THE PLANS. REFER TO DETAILED SPECIFICATION SECTION 04 CLEARING AND GRUBBING FOR DETAILS.

**A1. STORMWATER POLLUTION PREVENTION PLAN INDEX**

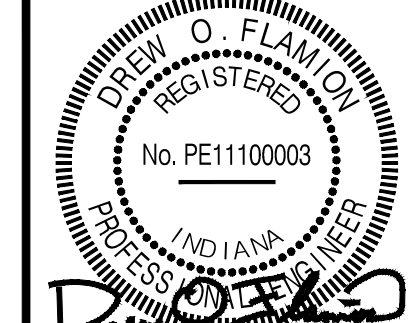
NOTE: NUMBERING FOR THIS INDEX FOLLOWS THE RULE 5 GUIDANCE INDEX

- PROJECT NARRATIVE: THE PROJECT INVOLVES THE REHABILITATION & UPGRADE TO CROSLLEY LAKE DAM. WORK INVOLVES BUT NOT LIMITED TO: RECONSTRUCTING PRINCIPAL SPILLWAY, NEW EMERGENCY SPILLWAY CONSTRUCTION, NEW EMBANKMENT FILTER DRAIN, NEW LAKE DRAWDOWN FACILITY, RAISE DAM CREST, UPSTREAM EMBANKMENT RIPRAP, CLEARING & GRUBBING AND ROCK GROUTING.
- PROJECT LOCATION  
A. SEE CONSTRUCTION PLAN TITLE SHEET FOR LOCATION MAP.  
B. SEE CONSTRUCTION PLAN SHEET 4 FOR PROJECT INDEX MAP.
- LEGAL DESCRIPTION OF PROJECT SITE:  
A. PART OF SECTION 13 & 24, T6N, R8E IN VERNON TOWNSHIP, JENNINGS COUNTY INDIANA  
B. LATITUDE 38° 57' 21" NORTH  
LONGITUDE 85° 35' 30" WEST
- HUC (14 DIGIT): 051202070010
- RECEIVING WATERS: UNNAMED TRIBUTARY TO VERNON FORK MUSCATATUCK RIVER
- 100 YEAR FLOOD ELEVATION: SEE FLOOD MAP ON S.W.P.P. DETAIL SHEET
- POST CONSTRUCTION MAINTENANCE: THE OWNER WILL BE RESPONSIBLE FOR THE MONITORING AND MAINTENANCE OF EACH POST CONSTRUCTION STORM WATER POLLUTION PREVENTION MEASURE.

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No.	DATE	DESCRIPTION	REVISED BY
1	9/27/2018	PREVIOUS BID ALTERNATE 1 IS NOW IN BASE BID	DOF
2	9/27/2018	ALTERNATE 4 - UPSTREAM RIPRAP BELOW EL. 693.65	DOF
3	9/27/2018	EMERGENCY SPILLWAY IS NOW ALTERNATE 2 & 3	DOF
4	9/27/2018	LAKE DRAWDOWN IS NOW ALTERNATE 1	DOF
5	9/27/2018	PROVIDE TURF REINFORCEMENT IS BASE BID	DOF
6	9/27/2018	OWNER HAS COMPLETED TREE CUTTING TASK	DOF



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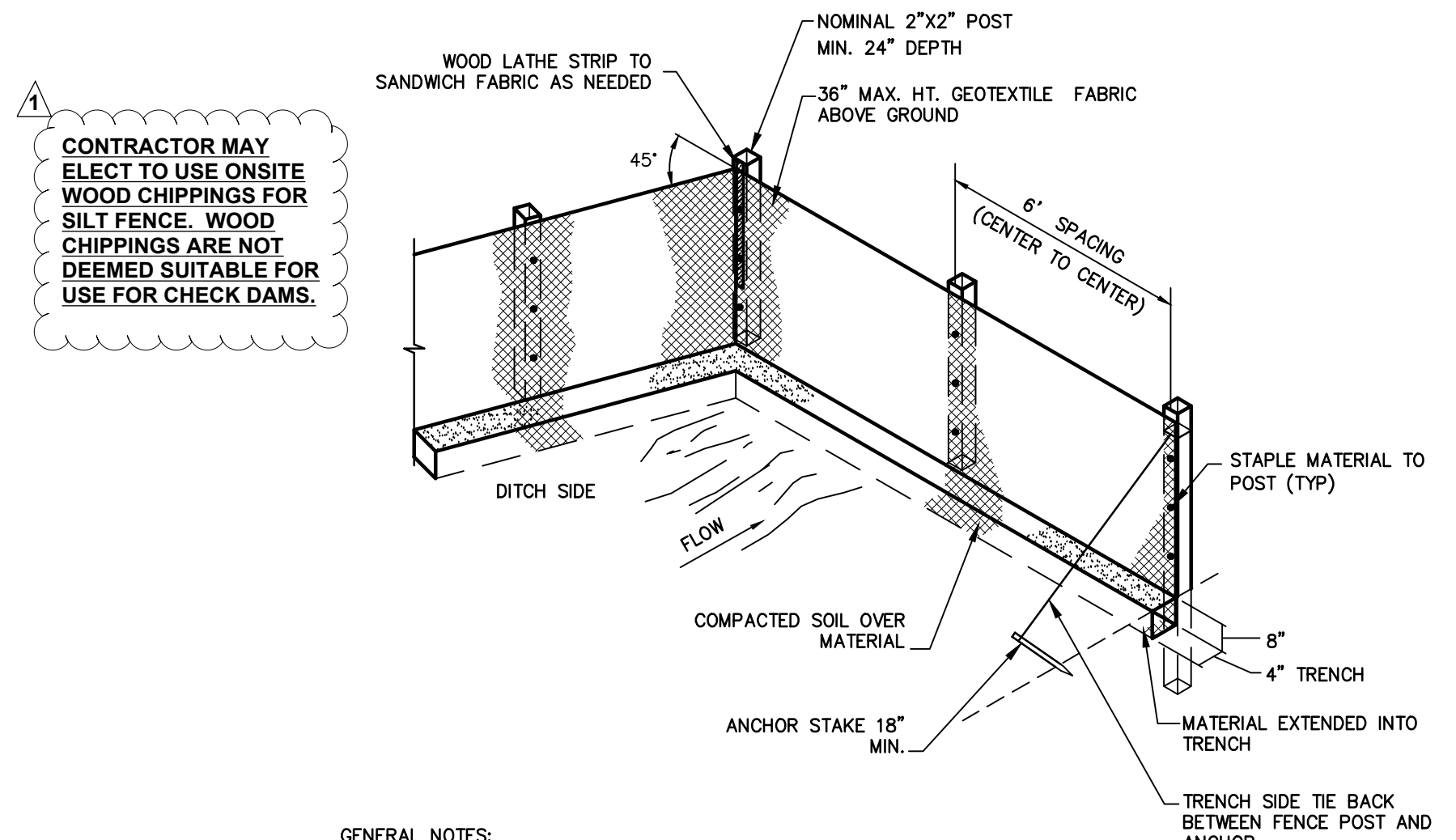
DRAWN BY: ALR  
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DATE: MAY 2018  
JOB NO: D13038  
SCALE: AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLLEY FISH & WILDLIFE AREA - CROSLLEY LAKE  
DAM IMPROVEMENTS PROJECT

**PROJECT NO. ENG1802321631/E020098**

STORM WATER POLLUTION PREVENTION PLAN

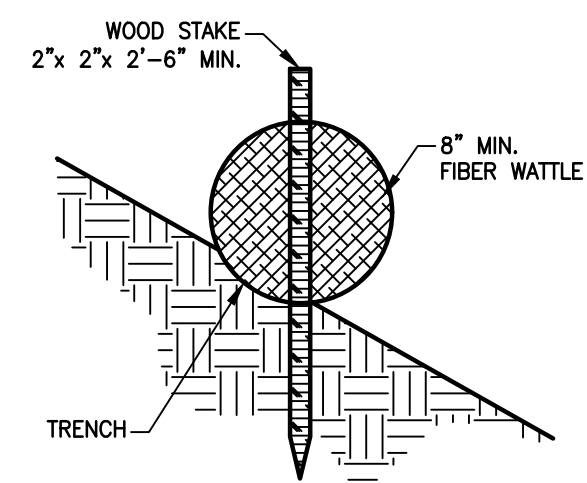
DRAWING NO.  
**12**  
12 OF 26



CONTRACTOR MAY ELECT TO USE ONSITE WOOD CHIPPINGS FOR SILT FENCE. WOOD CHIPPINGS ARE NOT DEEMED SUITABLE FOR USE FOR CHECK DAMS.

- GENERAL NOTES:**
- SILT FENCES SHOULD BE INSTALLED PRIOR TO MAJOR SOIL DISTURBANCE.
  - FENCES SHALL BE INSTALLED BETWEEN THE TRENCH AND ANY DRAINAGE DITCHES OR SWALES.
  - FENCES SHALL ALSO BE INSTALLED AROUND THE STOCKPILED SOILS.
  - THE GEOTEXTILE SHALL BE FREE FROM DEFECTS, TEARS, PUNCTURES, FLAWS, DETERIORATION OR DAMAGE INCURRED DURING MANUFACTURE, TRANSPORTATION, STORAGE, OR INSTALLATION.
  - TIE BACKS SHALL BE PLACED AS REQUIRED.

**SILT FENCE**  
NOT TO SCALE

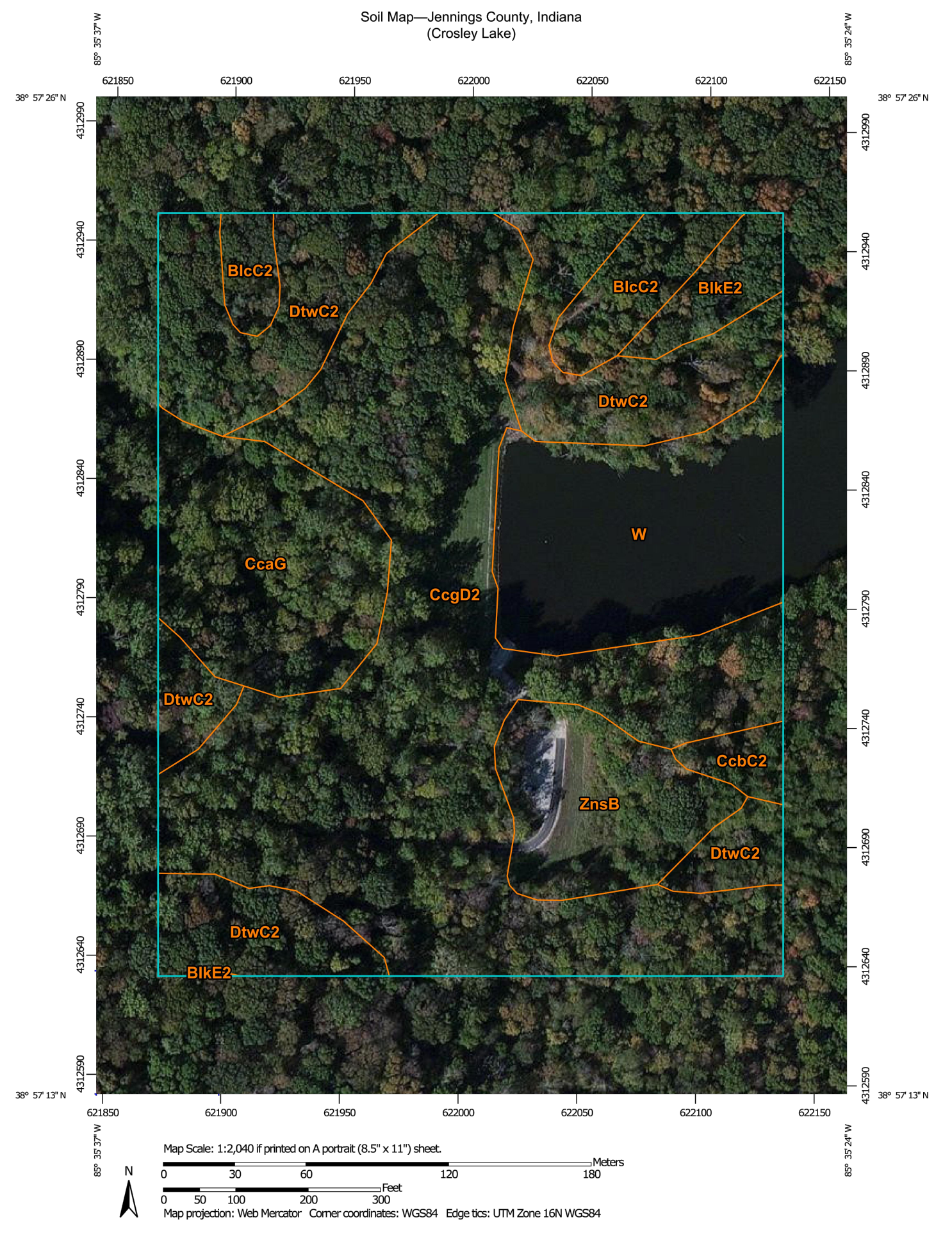


**ROLLED EROSION CONTROL PRODUCT (SILT FENCE ALTERNATIVE)**  
NOT TO SCALE

**Map Unit Legend**

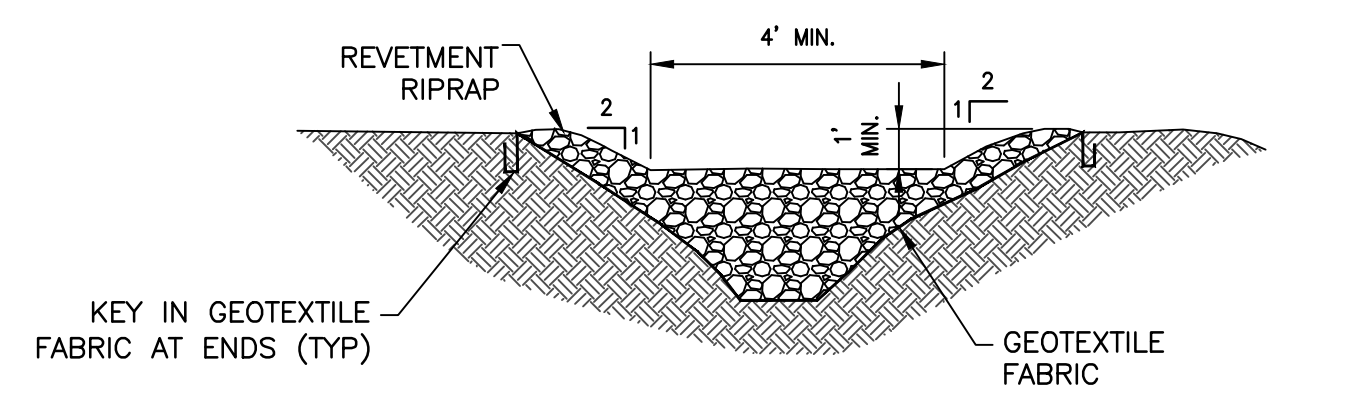
Jennings County, Indiana (IN079)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BlcC2	Blochier, soft black shale substratum-Jennings-Deputy silt loams, 6 to 12 percent slopes, eroded	0.9	4.3%
BlkE2	Bonnell-Blochier-Hickory silt loams, 12 to 25 percent slopes, eroded	0.5	2.3%
CcaG	Caneyville-Rock outcrop complex, 25 to 60 percent slopes	2.2	10.4%
CcbC2	Caneyville-Zenas silt loams, karst, rolling, eroded	0.2	1.2%
CcgD2	Caneyville and Grayford silt loams, 12 to 25 percent slopes, eroded	8.7	41.5%
DtwC2	Deputy silt loam, 6 to 15 percent slopes, eroded	4.3	20.8%
W	Water	2.6	12.6%
ZnsB	Zenas silt loam, karst, undulating	1.5	7.0%
<b>Totals for Area of Interest</b>		<b>20.9</b>	<b>100.0%</b>

**SOILS MAP LEGEND**

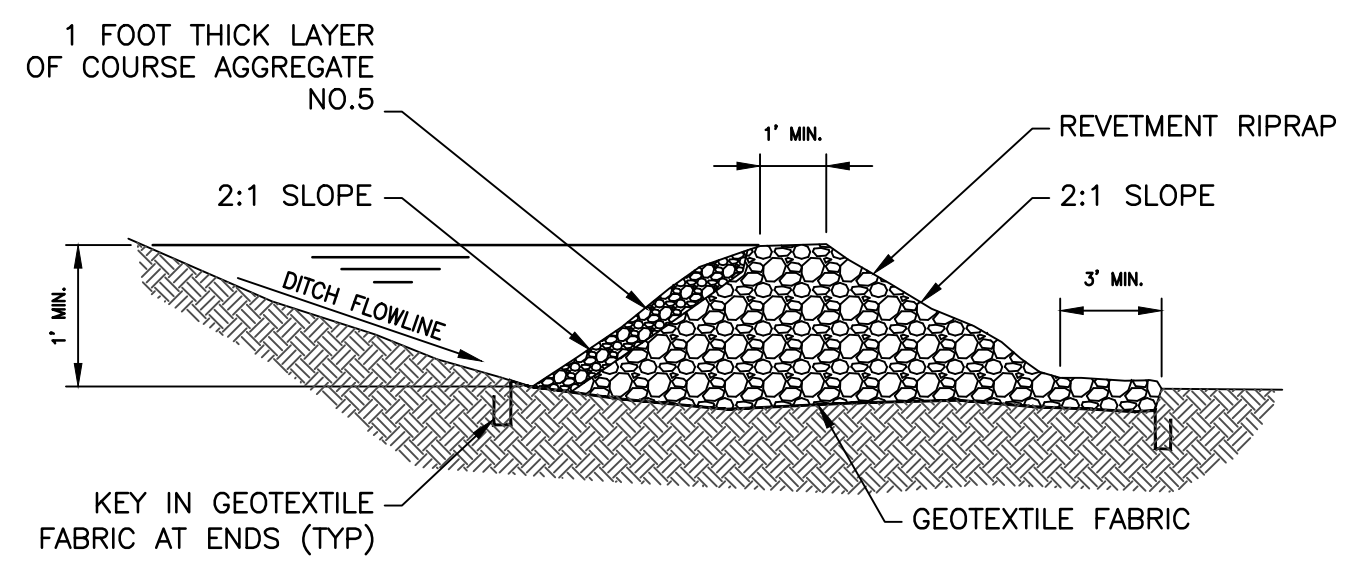


USDA Natural Resources Conservation Service Web Soil Survey National Cooperative Soil Survey 2/4/2016 Page 1 of 3

**SOILS MAP**



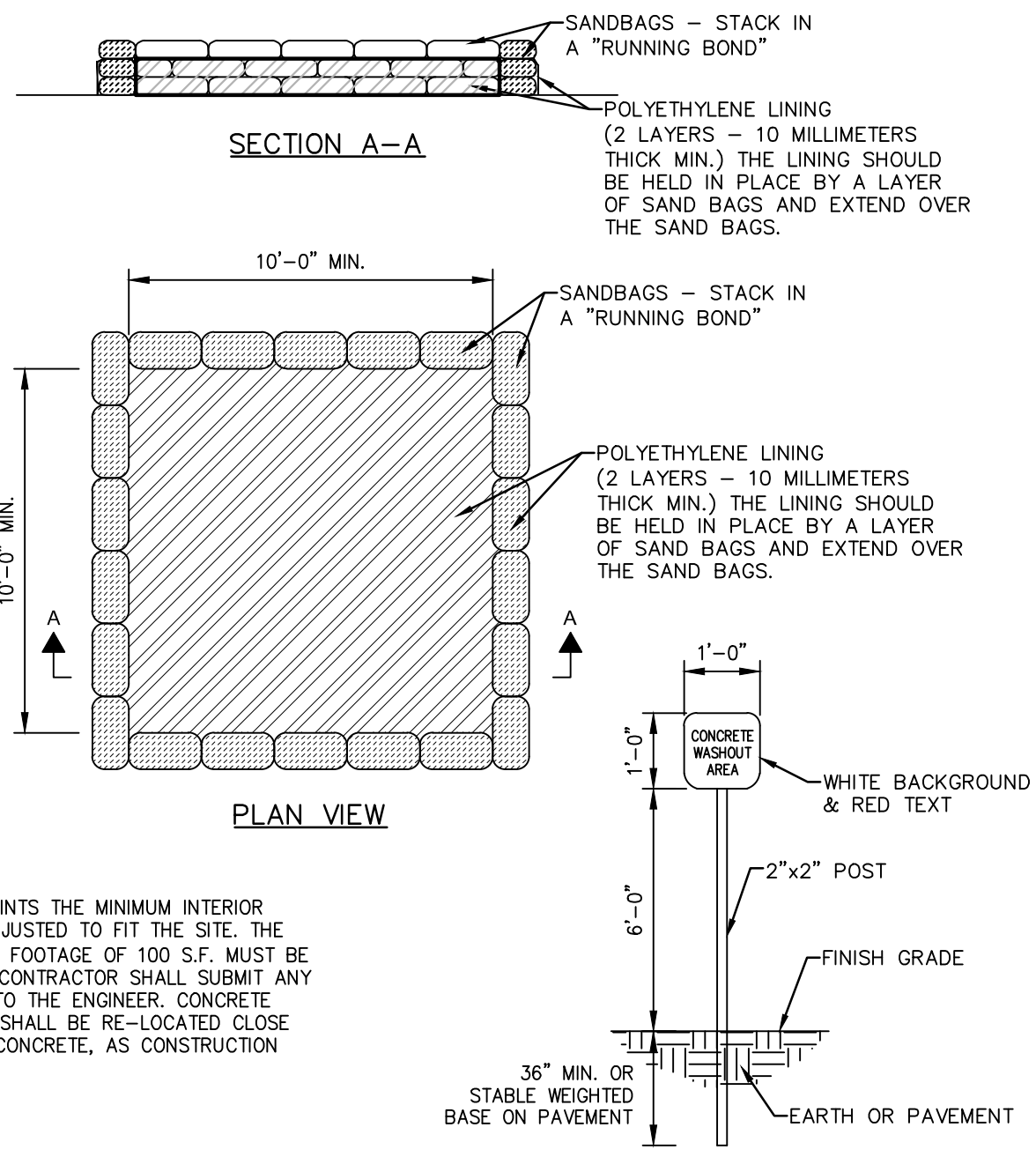
**SECTION PERPENDICULAR TO FLOWLINE**



**SECTION PARALLEL TO FLOWLINE**

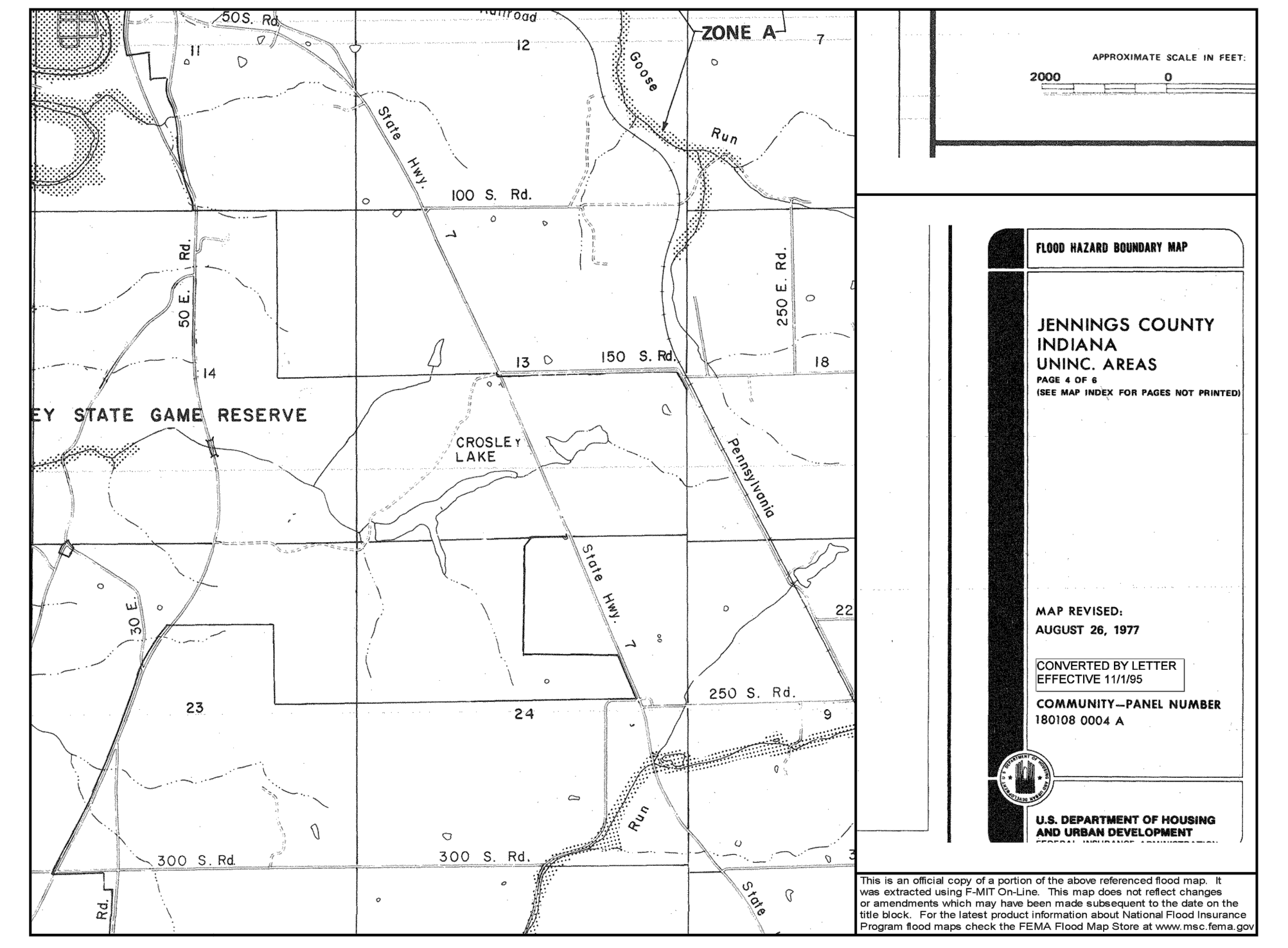
- GENERAL NOTES:**
- RIPRAP DITCH CHECK DAMS SHALL BE PLACED SUCH THAT THE TOP OF THE DOWNSTREAM CHECK DAM IS AT THE SAME ELEVATION AS THE TOE OF THE ADJACENT UPSTREAM CHECK DAM.
  - AFTER COMPLETION OF CONTRACT, OR AS REQUESTED BY OWNER, THE CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION CONTROL ITEMS, REMOVE ALL ACCUMULATED DEPOSITS AND, AS REQUIRED, SEED AND MULCH OR SOD AS REQUIRED TO ESTABLISH AREA TO CONDITION PRIOR TO CONSTRUCTION.

**ROCK CHECK DAM DETAIL**  
NOT TO SCALE



**CONCRETE WASHOUT DETAIL**  
NOT TO SCALE

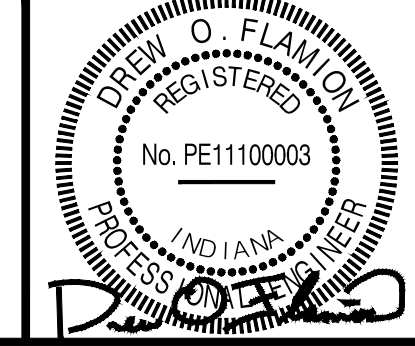
NOTE: DUE TO SITE CONSTRAINTS THE MINIMUM INTERIOR DIMENSION MAY BE ADJUSTED TO FIT THE SITE. THE STRUCTURE'S INTERIOR FOOTAGE OF 100 S.F. MUST BE MAINTAINED AND THE CONTRACTOR SHALL SUBMIT ANY DESIGN ALTERATIONS TO THE ENGINEER. CONCRETE WASHOUT STRUCTURE SHALL BE RE-LOCATED CLOSE TO AREAS RECEIVING CONCRETE, AS CONSTRUCTION PROGRESSES.



**FLOOD MAP**



REVISIONS			
No.	DATE	DESCRIPTION	REVISED BY
1	9/27/2018	WOOD CHIPS HAS BEEN DEEMED ACCEPTABLE ALTERNATIVE USE FOR SILT FENCE ONLY	DOF

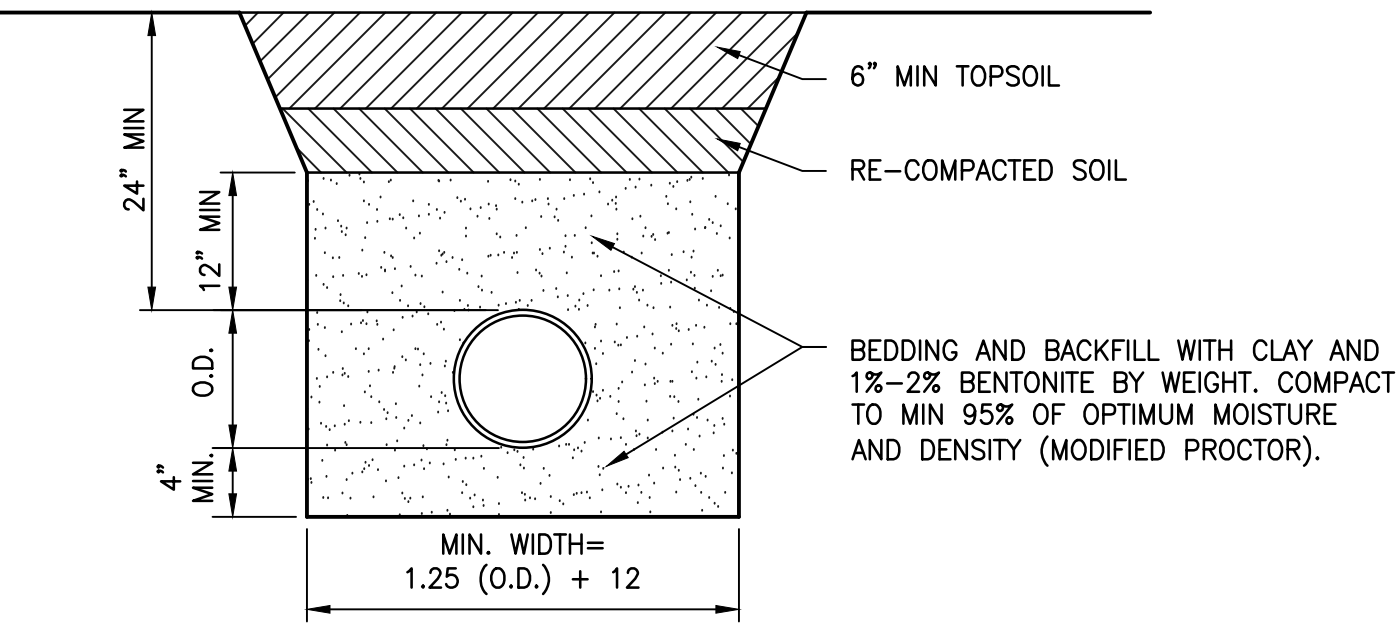


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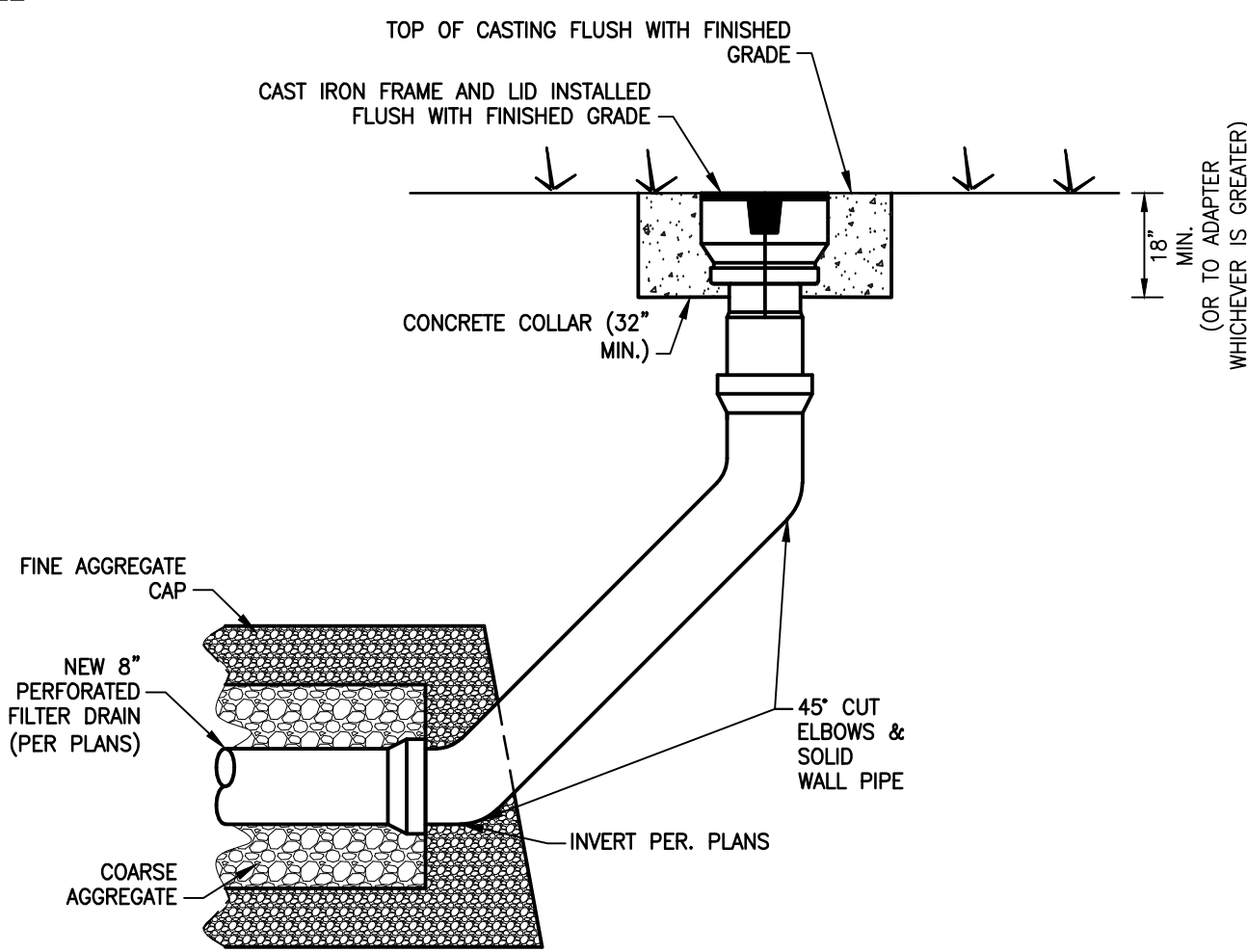
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SCALE: AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT  
**PROJECT NO. ENG1802321631/E020098**  
STORM WATER POLLUTION PREVENTION  
DETAILS

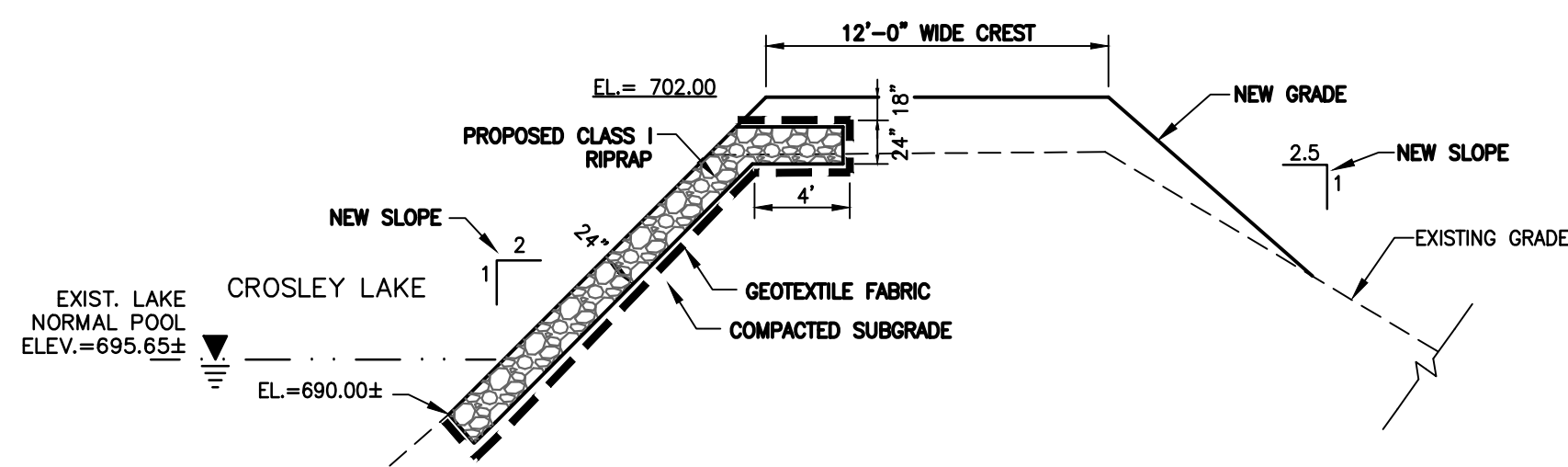
DRAWING NO.  
**13**  
13 OF 26



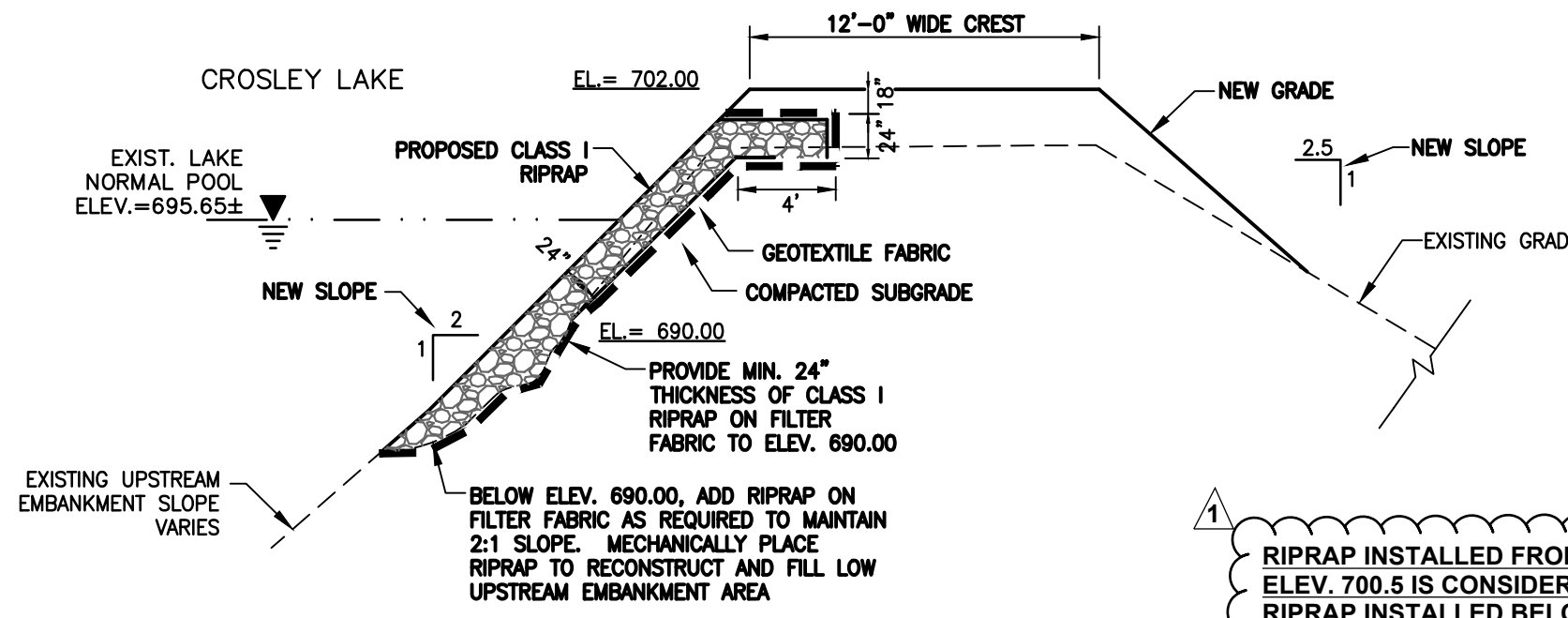
**IMPERVIOUS FLEXIBLE PIPE BEDDING AND BACKFILL DETAIL**  
NOT TO SCALE



**8" CLEANOUT DETAIL**  
NOT TO SCALE



**TYPICAL EMBANKMENT PROFILE**



**EMBANKMENT PROFILE WITH RIPRAP PLACEMENT BELOW ELEV. 690.00**  
NOT TO SCALE

**CREST RAISE & UPSTREAM EMBANKMENT RIPRAP DETAILS**  
NOT TO SCALE

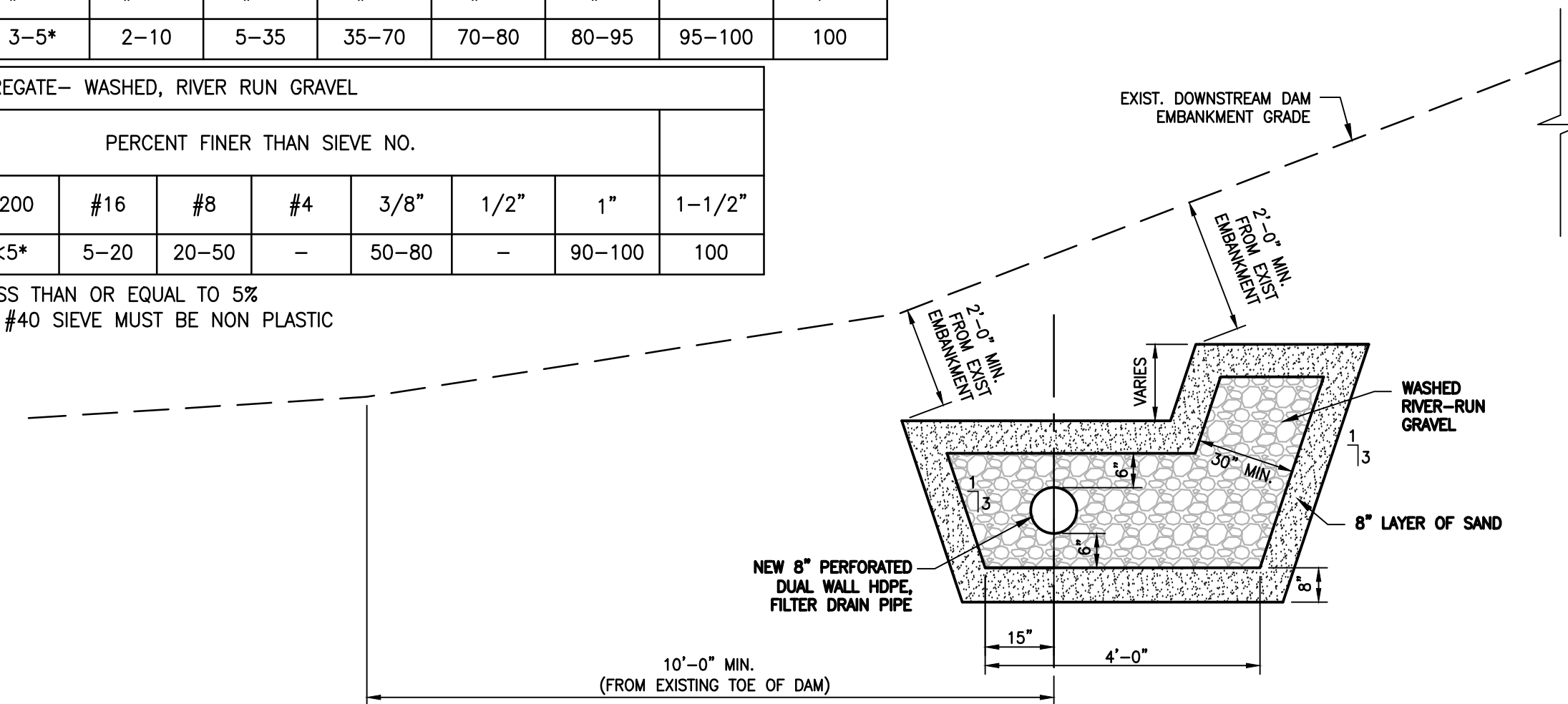
RIPRAP INSTALLED FROM ELEV. 693.65 TO ELEV. 700.5 IS CONSIDERED BASE BID. RIPRAP INSTALLED BELOW ELEV. 693.65, IS CONSIDERED WORK ASSOCIATED WITH ALTERNATE 4.

FINE AGGREGATE - SAND							
PERCENT FINER THAN SIEVE NO.							
	#200	#100	#50	#30	#16	#8	3/8"
FINE	3-5*	2-10	5-35	35-70	70-80	80-95	95-100

COARSE AGGREGATE- WASHED, RIVER RUN GRAVEL							
PERCENT FINER THAN SIEVE NO.							
	#200	#16	#8	#4	3/8"	1/2"	1"
COARSE	<5*	5-20	20-50	-	50-80	-	90-100

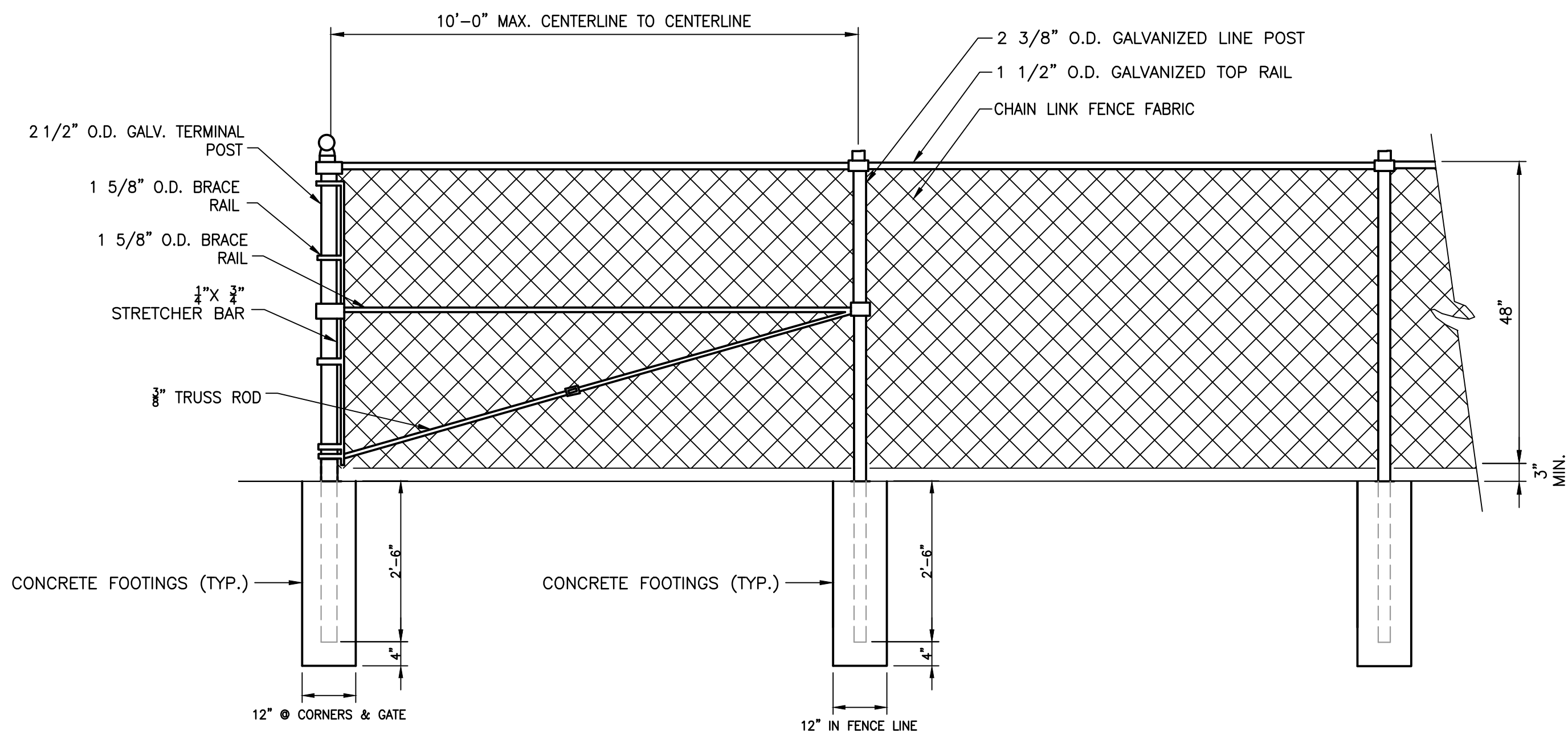
\*MUST BE LESS THAN OR EQUAL TO 5% FINES BELOW #40 SIEVE MUST BE NON PLASTIC



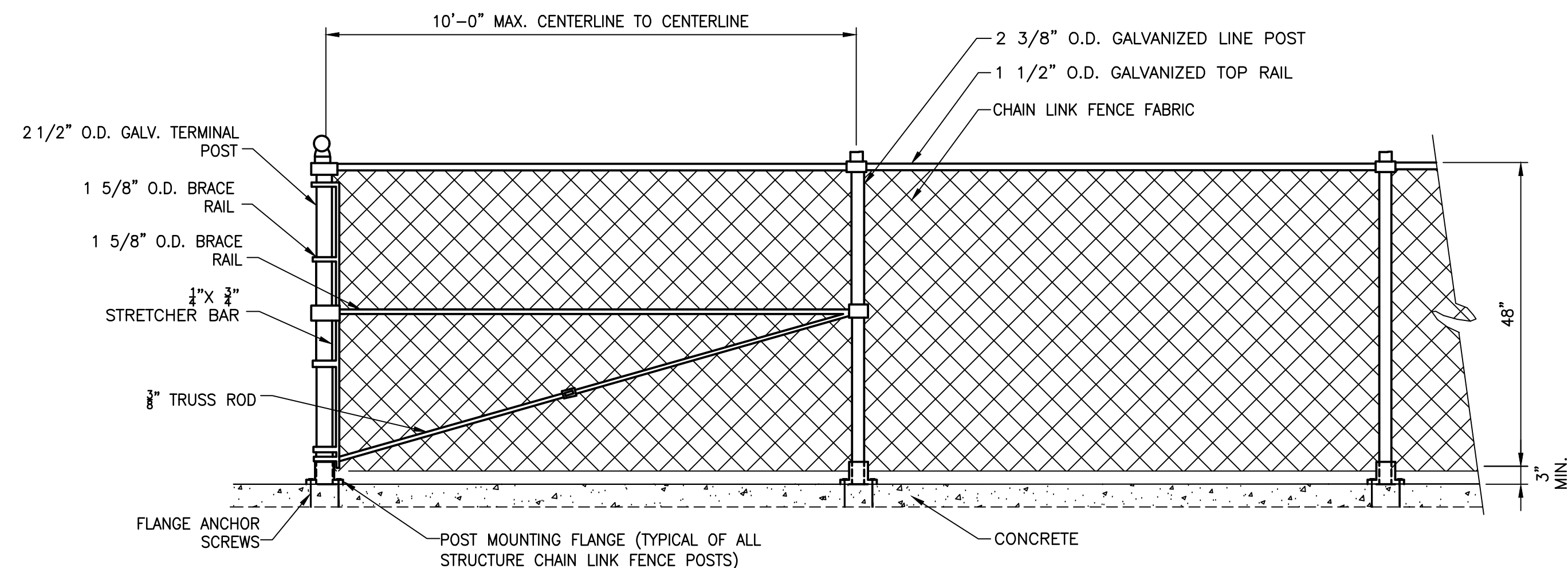
**FILTER DRAIN GENERAL NOTES:**

- DUCTILE IRON PIPE SHALL BE INSTALLED FROM OUTLET HEADWALL TO FIRST 8" CLEANOUT. REFER TO IMPERVIOUS FLEXIBLE PIPE BEDDING AND BACKFILL DETAIL FOR DUCTILE IRON PIPE INSTALLATION.
- MIN. FILTER DRAIN SLOPE = 0.40%
- COMPACTION AND TESTING REQUIREMENTS PER DETAILED SPECIFICATIONS.
- PROVIDE FINE AGGREGATE FOR CAP FOR COARSE AGGREGATE IN ALL LOCATIONS, INCLUDING TERMINAL CLEANOUTS. AT NO POINT SHALL EMBANKMENT SOIL BE IN DIRECT CONTACT WITH THE COARSE AGGREGATE.

**FILTER DRAIN DETAIL**  
NOT TO SCALE

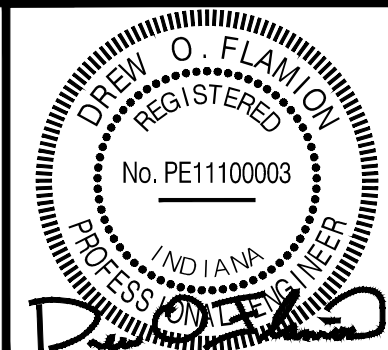


**STRUCTURE CHAIN LINK FENCE DETAIL-PLACED IN SOILS**  
NO SCALE



**STRUCTURE CHAIN LINK FENCE DETAIL-PLACED ON CONCRETE**  
NO SCALE

REVISIONS			
No.	DATE	DESCRIPTION	REVISED BY
1	9/27/2018	ALTERNATE 4 - UPSTREAM RIPRAP BELOW EL. 693.65	DOF



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DRAWN BY: ALR  
DESIGNED BY: DOF  
CHECKED BY: RMK  
DATE: MAY 2018  
JOB NO: D13038  
SCALE: AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT

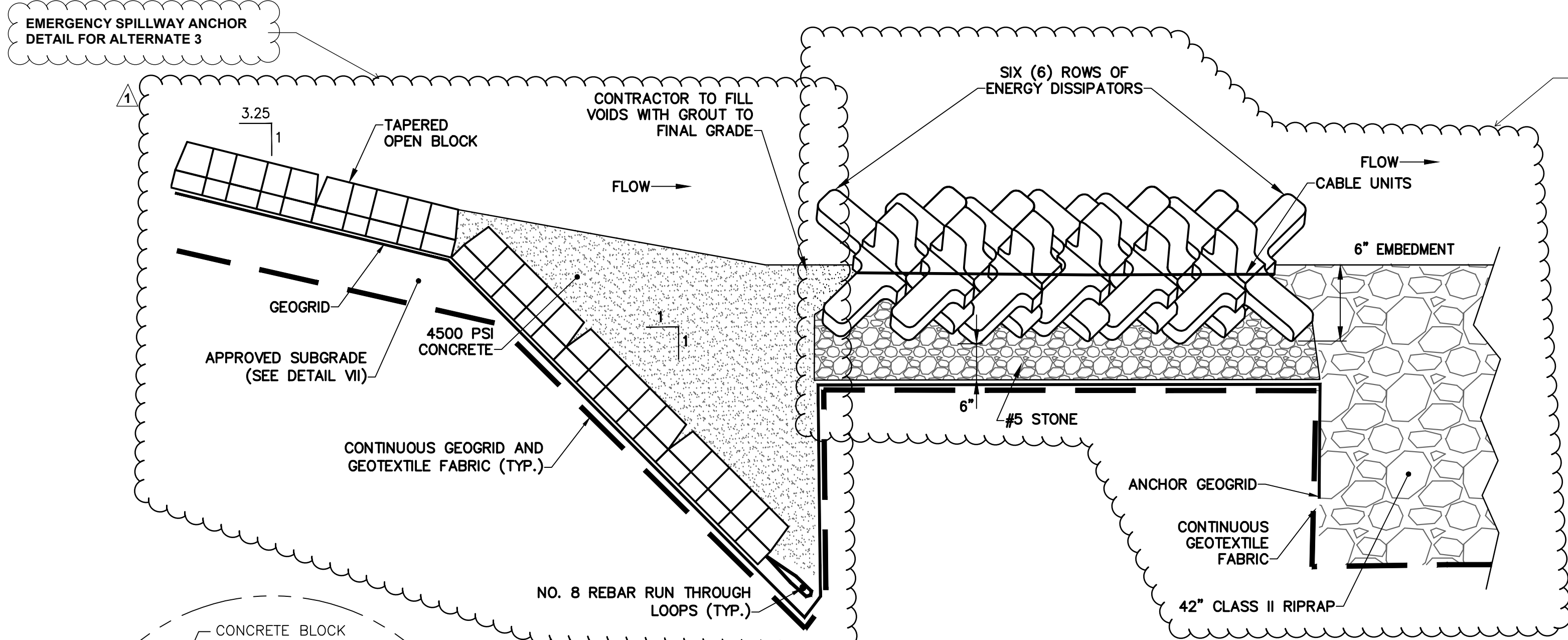
**PROJECT NO. ENG1802321631/E020098**

MISCELLANEOUS DETAILS

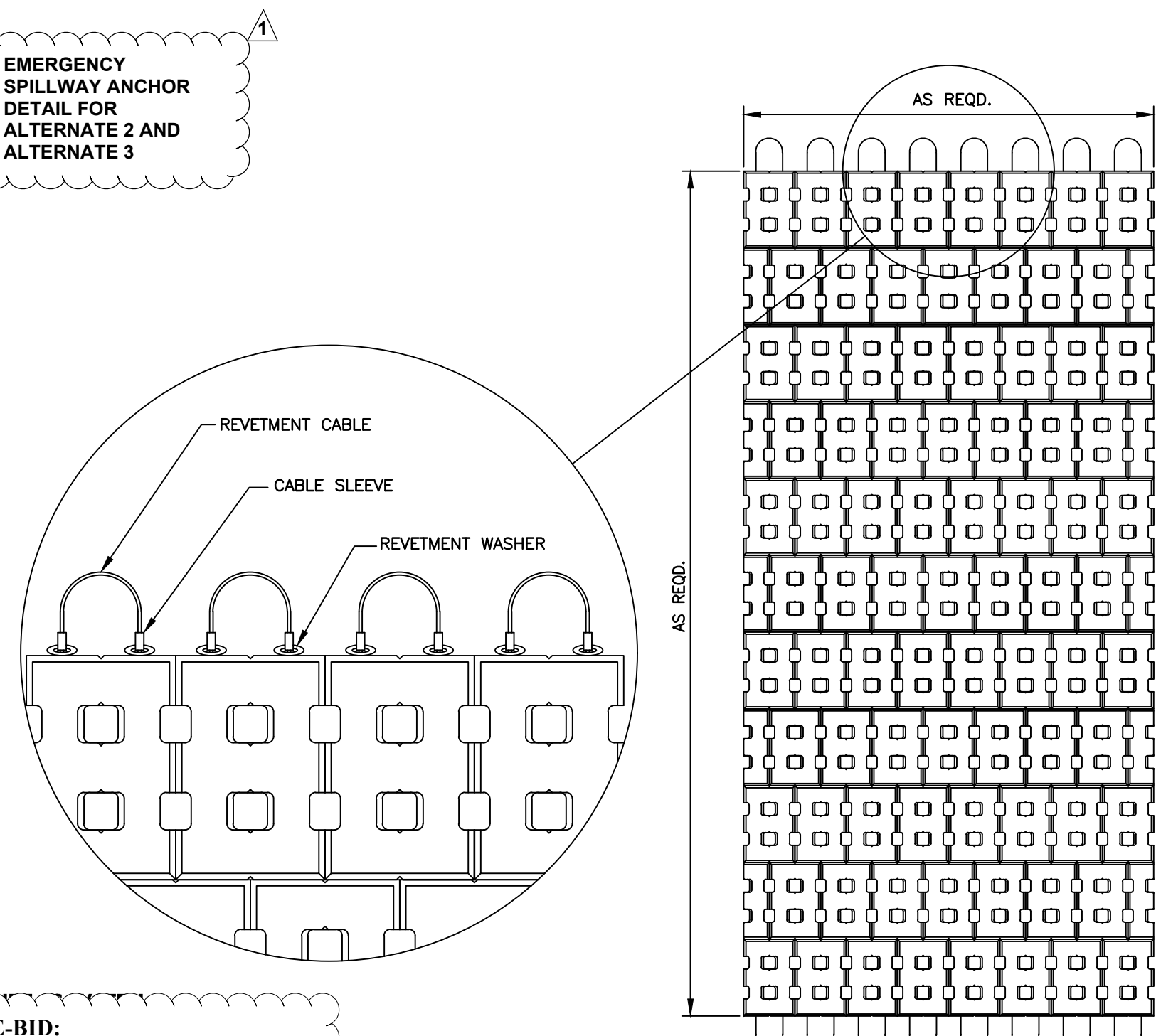
DRAWING NO.

**14**

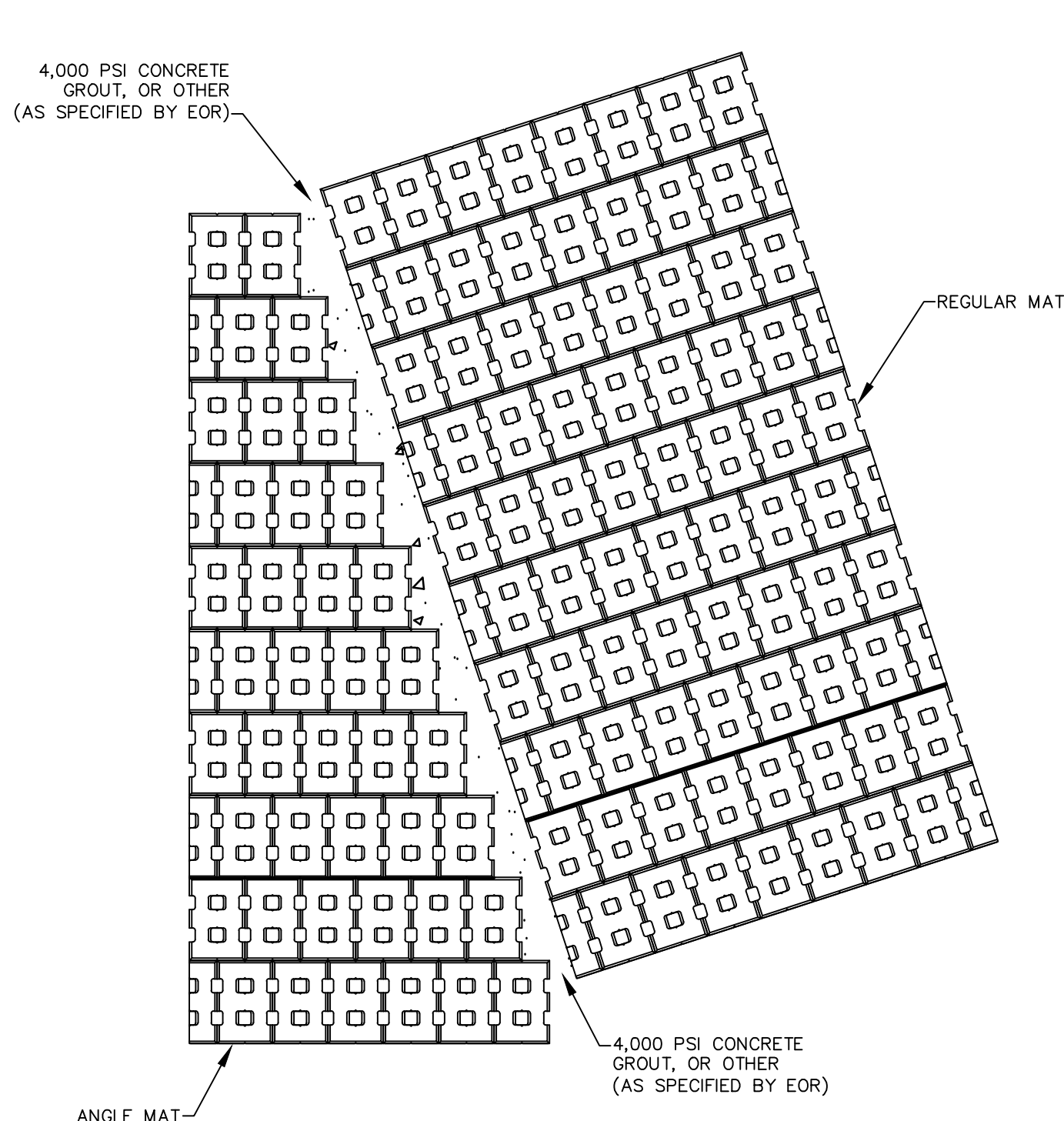
14 OF 26



**ACB EMERGENCY SPILLWAY  
DOWNSTREAM TERMINATION**  
NOT TO SCALE



**ACB TYPICAL MAT LAYOUT**  
NOT TO SCALE



**ACB TYPICAL ANGLE MAT**  
NOT TO SCALE

**PROJECT ALTERNATES FOR RE-BID:**

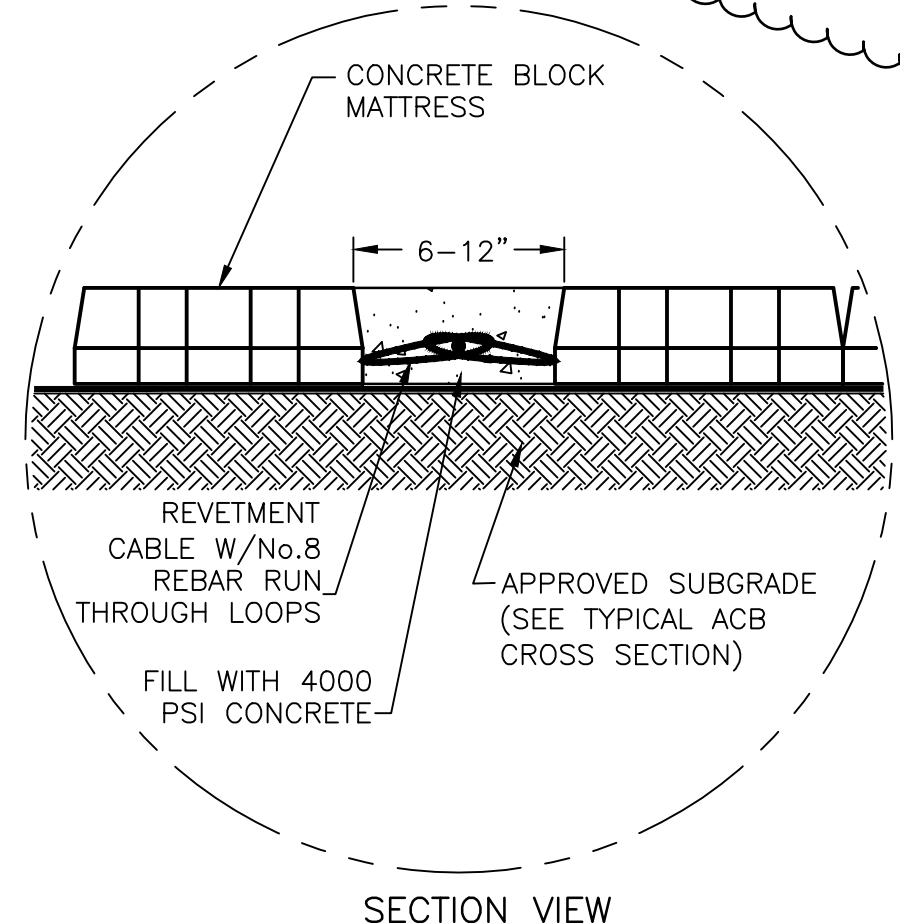
THE INSTALLATION OF THE NEW EMERGENCY SPILLWAY IS CONSIDERED A PROJECT ALTERNATE. NOTE THE PLANS SHOW ALTERNATE 3 ONLY. ALTERNATE 2 INSTALLATION DETAILS AND DETAILS ARE CONTAINED WITHIN DETAILED SPECIFICATION SECTION 19 HYDROTURF CS SYSTEM. THIS SHEET DOES SHOW DETAILS THAT PERTAIN TO BOTH THE EMERGENCY SPILLWAY (ALTERNATE) AS WELL AS THE BASE BID ARTICULATED CONCRETE BLOCK PRINCIPAL SPILLWAY OVERFLOW. ARTICULATED CONCRETE BLOCK DETAILS THAT PERTAIN TO ONLY ALTERNATE 3 WORK ARE NOTED AS SUCH.

**ALTERNATE 2: ADD EMERGENCY SPILLWAY UTILIZING HYDROTURF CS SYSTEM**

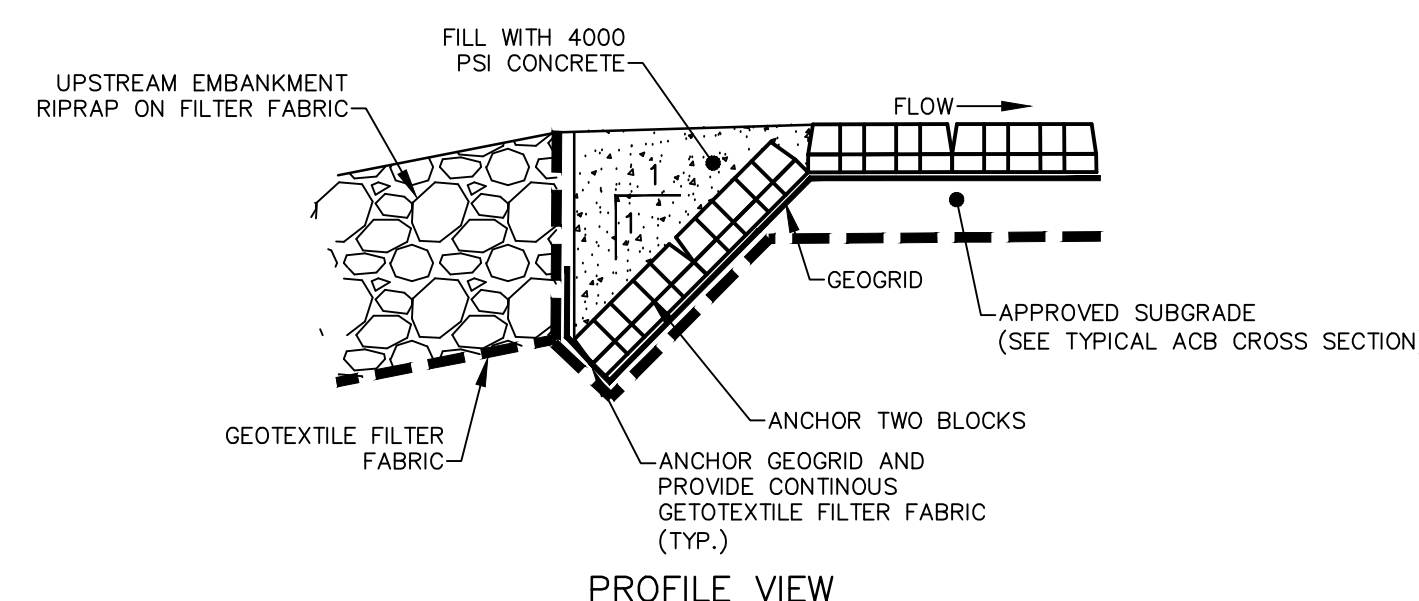
•WORK DETAIL: REFER TO SHEET 9.

**ALTERNATE 3: ADD ARTICULATED CONCRETE BLOCK MATS IN-LIEU OF HYDROTURF CS SYSTEM FOR EMERGENCY SPILLWAY**

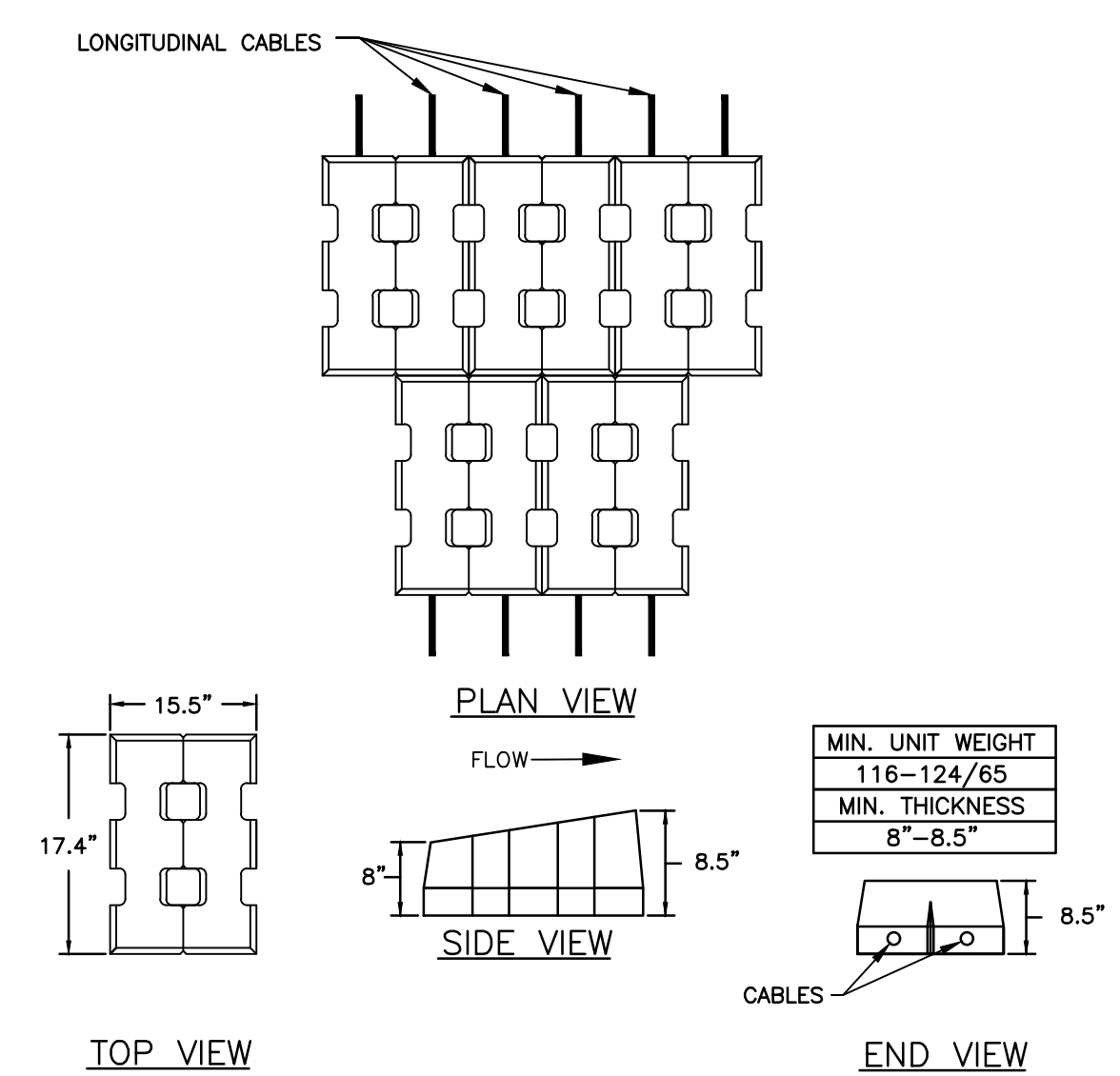
•WORK DETAIL: REFER TO SHEET 9.



**ACB TYPICAL GROUT SEAM**  
NOT TO SCALE



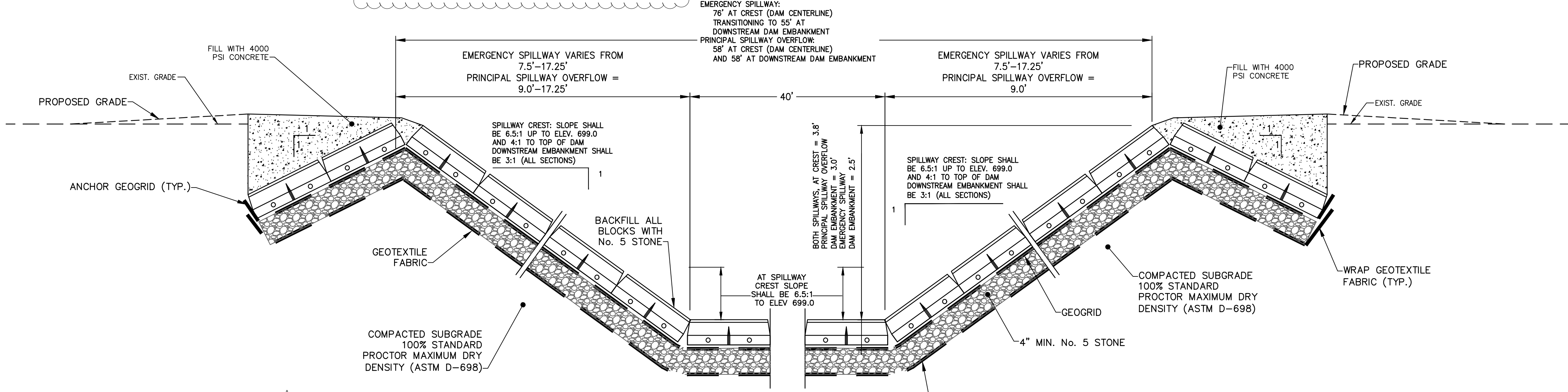
**ACB TYPICAL UPSTREAM TERMINATION**  
NOT TO SCALE



**TAPERED OPEN BLOCK UNIT DIMENSIONS**  
NOT TO SCALE

**GENERAL ARTICULATED CONCRETE BLOCK NOTE:**

MANUFACTURER'S REPRESENTATIVE SHALL BE ON-SITE & PROVIDE NECESSARY OVERSIGHT TO ENSURE CONTRACTOR INSTALLS PER MANUFACTURER'S RECOMMENDATION



**TYPICAL ACB CROSS SECTION DETAIL NOTES:**

EMERGENCY SPILLWAY RELATED SECTION MEASUREMENTS AND SHAPE FACTORS PERTAIN TO ALTERNATE 2 AND 3.

HARD ARMOR DETAILS (ARTICULATED CONCRETE BLOCK MAT, SUBGRADE PREPARATION AND ANCHORING, ETC.) PERTAIN TO BOTH PRINCIPAL SPILLWAY OVERFLOW (BASE BID) AND ALTERNATE 3 EMERGENCY SPILLWAY HARD ARMOR OPTION.

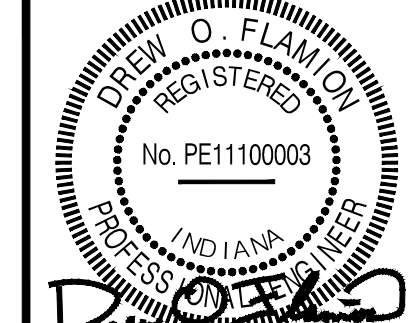
**TYPICAL ACB CROSS SECTION  
(LOOKING DOWNSTREAM)**  
NOT TO SCALE

**NOTE:**

SEE TYPICAL PRINCIPAL SPILLWAY WALL DETAILS FOR ACB INSTALLATION AGAINST POURED-IN-PLACE WALL



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1	9/27/2018	EMERGENCY SPILLWAY IS NOW ALTERNATE 2 & 3	DOF



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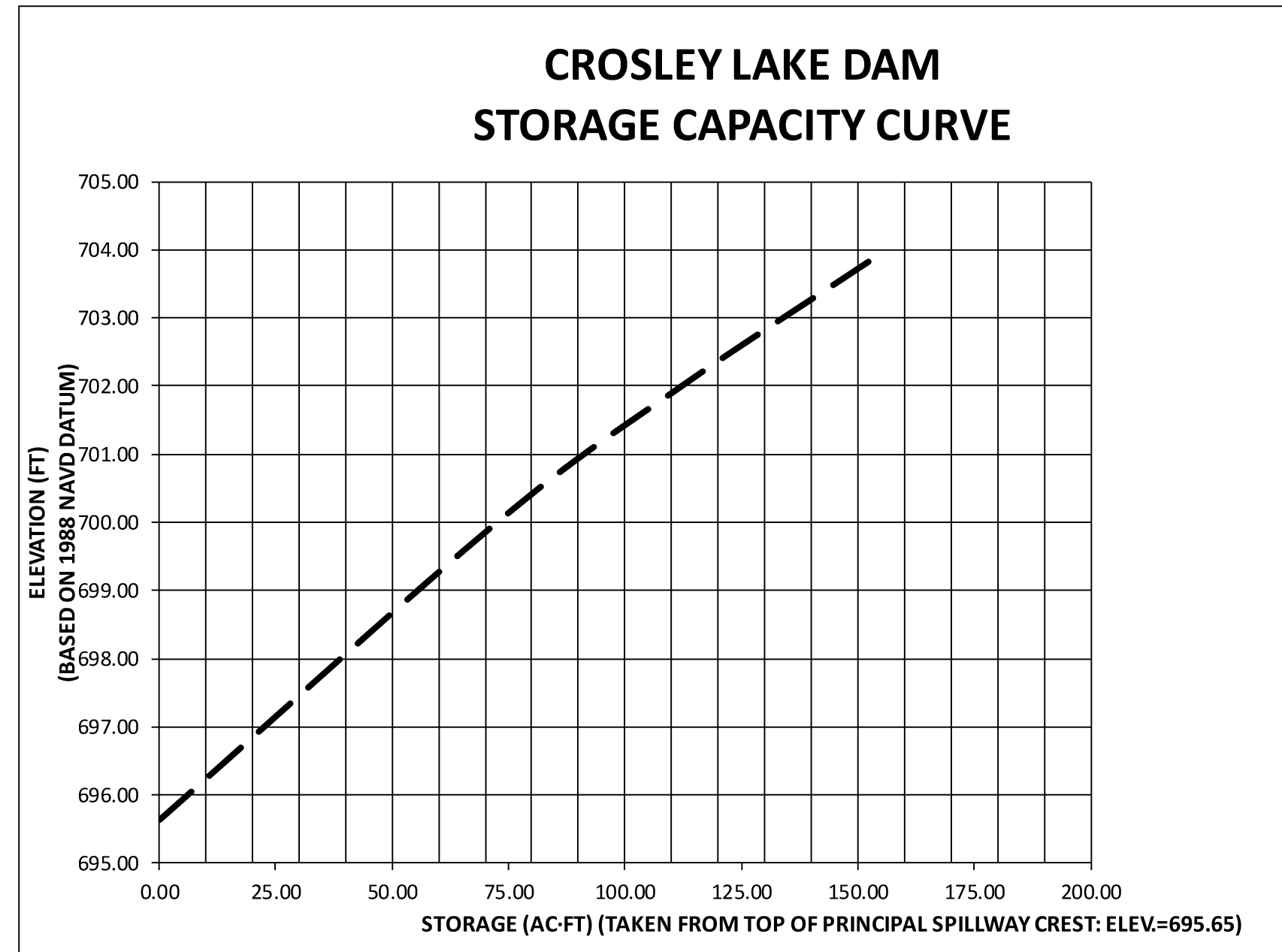
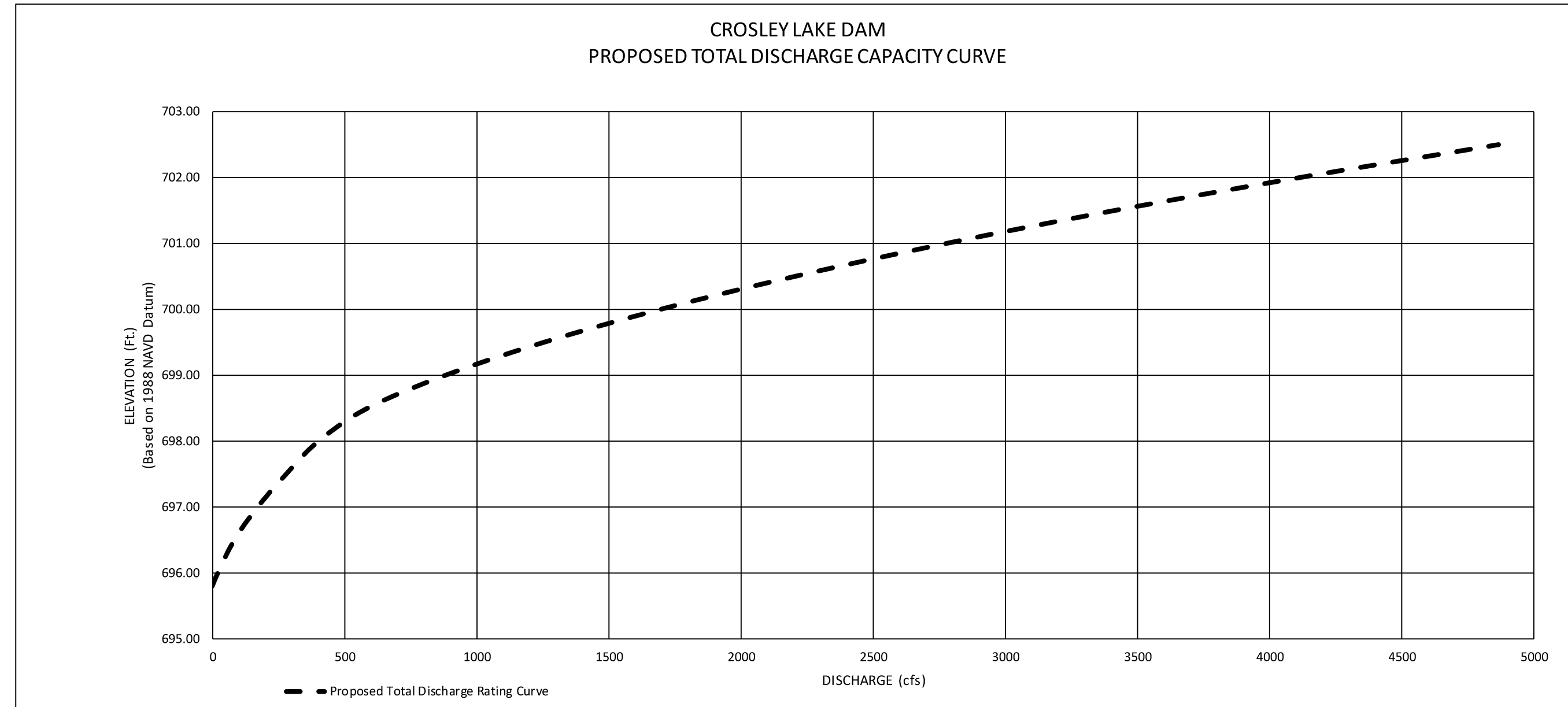
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DESIGNED BY: DOF  
CHECKED BY: RMK  
DATE: MAY 2018  
JOB NO: D13038  
SCALE: AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLLEY FISH & WILDLIFE AREA - CROSLLEY LAKE  
DAM IMPROVEMENTS PROJECT

**PROJECT NO. ENG1802321631/E020098**

MISCELLANEOUS DETAILS

DRAWING NO.  
**15**  
15 OF 26



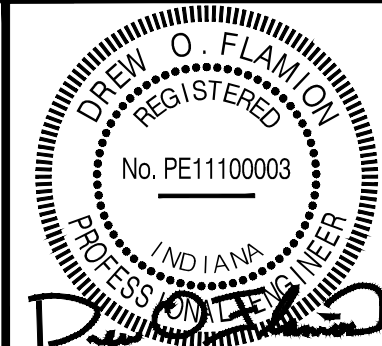
PHYSICAL DATA	
HAZARD CLASSIFICATION	SIGNIFICANT
DRAINAGE AREA (SQ MI)	APPROX. 1.01 SQ MI
TIME OF CONCENTRATION, TC (HRS)	0.82 HRS.
RUNOFF CURVE NUMBER	74
(AMC II CONDITIONS)	II
STRUCTURAL DATA	
PRINCIPAL ROCK SPILLWAY	
MATERIAL	ROCK/CONCRETE/RIPRAP
LENGTH	240 FT.
SIZE	VARIES - IRREGULAR CHANNEL
HEIGHT	WALL HEIGHT VARIES: 3 FT TO 8 FT
WIDTH	VARIES: 25 FT TO 35 FT
CREST ELEV./AREA	695.65 EX. ROCK CHANNEL
WEIR LENGTH	32 FT EX. ROCK CHANNEL
PRINCIPAL SPILLWAY OVERFLOW	
MATERIAL	ARTICULATED CONCRETE BLOCK
BASE WIDTH	40 FT
SIDE SLOPE	3:1
CREST ELEV./AREA/STOR	698.20
SHAPE	TRAPEZOID
N' VALUE	0.025 ACB
LENGTH/SLOPE OF SPILLWAY	80 FT/1.0% CREST TO 3.5:1 SLOPE
ARMORING	ARTICULATED CONCRETE BLOCK
EMERGENCY SPILLWAY	
MATERIAL	ARTICULATED CONCRETE BLOCK/CONCRETE UNITS/RIPRAP
BASE WIDTH	40 FT
SIDE SLOPE	3:1
CREST ELEV./AREA/STOR	698.20
SHAPE	TRAPEZOID
N' VALUE	0.025 ACB
LENGTH/SLOPE OF SPILLWAY	160 FT/1.0% CREST TO 3.25:1 SLOPE TO 0.001% AT TOE
ARMORING	ARTICULATED CONCRETE BLOCK/CONCRETE UNITS/RIPRAP
TOP OF DAM	
ELEV	702.00
AREA	NORMAL POOL (EL. 695.65±) = 14.6± AC MAX WATER SURFACE (EL. 702.00±) = 21.1± AC
STORAGE	92.95 AC/FT FROM NORMAL POOL (695.65) TO CREST OF DAM -MAX WATER SURFACE (702.00)
FREEBOARD	3.8 FT (100-YR FREQUENCY) 0.6 FT (50% PMP)
LENGTH OF DAM	340 FT
CHANNEL OUTLET ELEV	670.00

HYDROLOGIC/HYDRAULIC DATA	
DESCRIPTION (UNITS)	VALUE
<b>BASIN HYDROLOGY</b>	
RAINFALL (IN)	13.75 IN
DURATION (HRS)	6 HRS
%PMP OR - YR FREQUENCY	50% PMP
RUNOFF (IN)	25.29 IN
RUNOFF (ACRE-FT)	1,736 AC-FT.
PEAK INFLOW (CFS)	3,714 CFS
<b>PRINCIPAL/EMERGENCY SPILLWAY</b>	
MAX. DISCHARGE - 50% PMP (CFS)	
PRIMARY ROCK SPILLWAY	1,639 CFS
40' WIDE PRINCIPAL SPILLWAY OVERFLOW	754 CFS
40' WIDE EMERGENCY SPILLWAY	873 CFS
MAX. VELOCITY - AT OPENING (FPS)	
PRIMARY ROCK SPILLWAY	8 FPS
40' WIDE PRINCIPAL SPILLWAY OVERFLOW	6 FPS
40' WIDE EMERGENCY SPILLWAY	6 FPS
MAX. VELOCITY - EXIT CHANNEL (FPS)	
PRIMARY ROCK SPILLWAY	18 FPS
40' WIDE PRINCIPAL SPILLWAY OVERFLOW	25 FPS
40' WIDE EMERGENCY SPILLWAY	27 FPS
<b>BREACH ANALYSIS</b>	
SHAPE OF BREACH	N/A
WIDTH (FT)	N/A
SIDESLOPE	N/A
TIME TO FAILURE (HRS)	N/A
<b>IMMEDIATE DOWNSTREAM ELEV. (FT)</b>	
PRIMARY ROCK SPILLWAY	670.00
40' WIDE PRINCIPAL SPILLWAY OVERFLOW	675.00 - 678.00
40' WIDE EMERGENCY SPILLWAY	670.00

4 IF EMERGENCY SPILLWAY IS NOT CONSTRUCTED WITH ALTERNATE 2 OR 3, FACILITY WILL NOT SAFELY PASS 50% PMP EVENT.



REVISIONS			
No.	DATE	DESCRIPTION	REVISED BY
1	9/27/2018	FACILITY HYDRAULIC CAPACITY NOTE	DOF



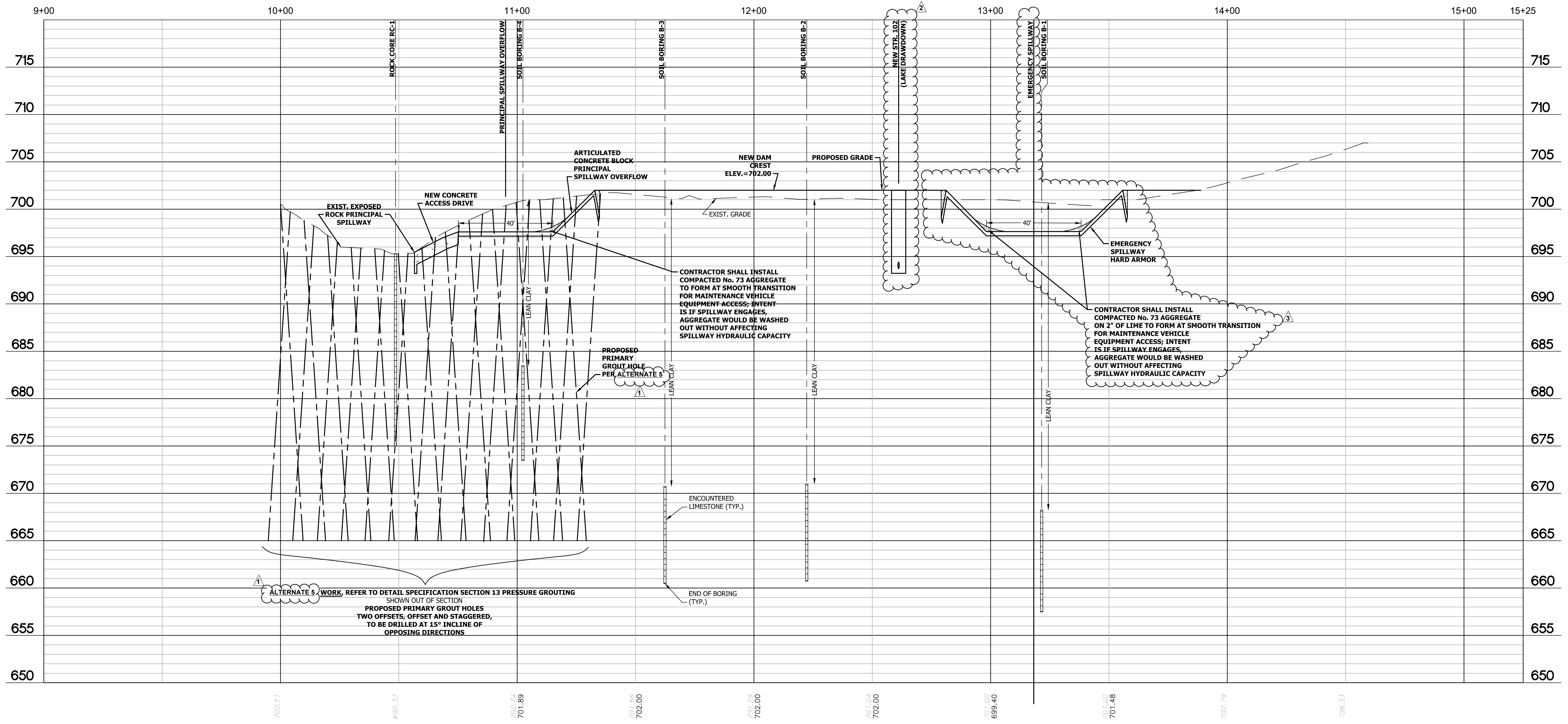
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DRAWN BY:	ALR
DESIGNED BY:	DOF
CHECKED BY:	RMK
DATE:	MAY 2018
JOB NO:	D13038
SCALE:	AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES CROSLEY FISH & WILDLIFE AREA - CROSLEY LAKE DAM IMPROVEMENTS PROJECT	
<b>PROJECT NO. ENG1802321631/E020098</b>	
HYDROLOGIC AND HYDRAULICS DATA	

DRAWING NO.	16
16 OF 26	





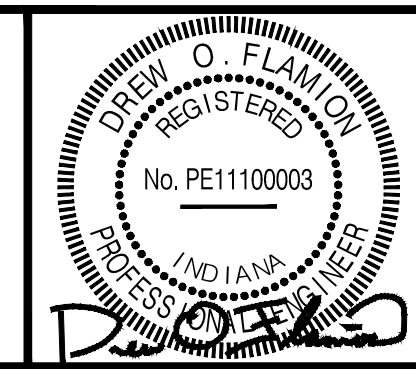
DAM CENTERLINE - PROFILE LINE 'A'  
 SCALE: HORIZONTAL - 1"=20'-0"  
 VERTICAL - 1"=5'-0"

- SURVEY NOTES:**
- ELEVATIONS PROVIDED ARE BASED ON 1988 NAVD DATUM.
  - TO CONVERT TO 1929 NGVD DATUM FROM 1988 DATUM, ADD 0.42± FEET. NOTE CONVERSION IS APPROXIMATE ONLY, NOT INTENDED FOR SURVEY USE.
  - COORDINATES PROVIDED ARE BASED ON GPS INDIANA STATE PLANE EAST, FOR ZONE 1301.
  - CROSLY LAKE BATHYMETRIC SURVEY, CONTOUR & ELEVATION DATA, BELOW NORMAL POOL, COMPLETED ON MARCH 26, 2003 BY EARTH EXPLORATION INC.
  - MODIFICATION TO ORIGINAL BATHYMETRIC SURVEY WAS COMPLETED BY COMMONWEALTH ENGINEERS, INC., WHERE ACTUAL RECENT SURVEY SUPERSEDED SUCH DATA.

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 OR 1-800-382-5544  
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REVISIONS			
No.	DATE	DESCRIPTION	REVISED BY
1	9/27/2018	PREVIOUS BID ALTERNATE 3 IS NOW ALTERNATE 5	DOF
2	9/27/2018	LAKE DRAWDOWN IS NOW ALTERNATE 1	DOF
3	9/27/2018	EMERGENCY SPILLWAY IS NOW ALTERNATE 2 & 3	DOF



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SCALE:	AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
 CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
 DAM IMPROVEMENTS PROJECT

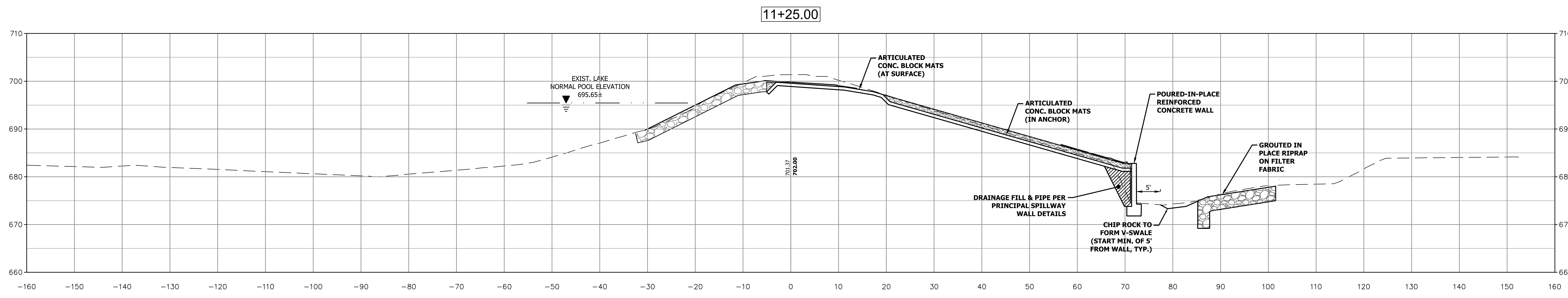
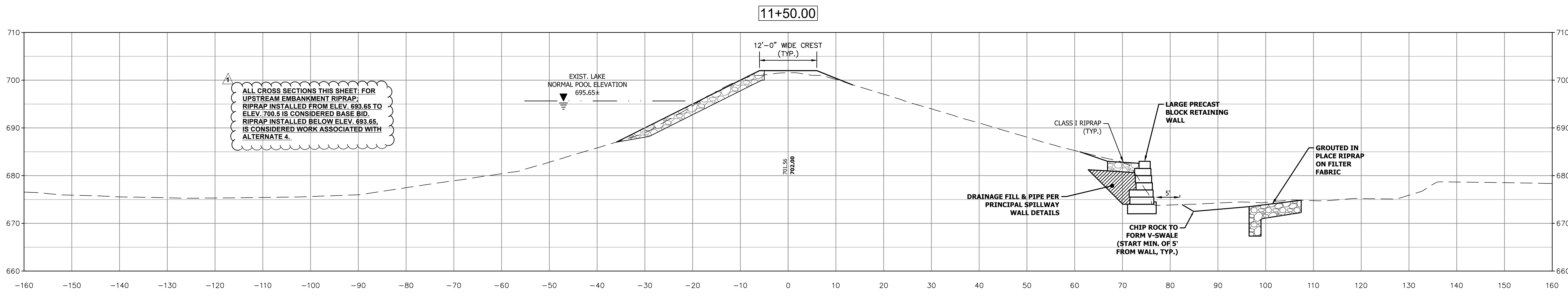
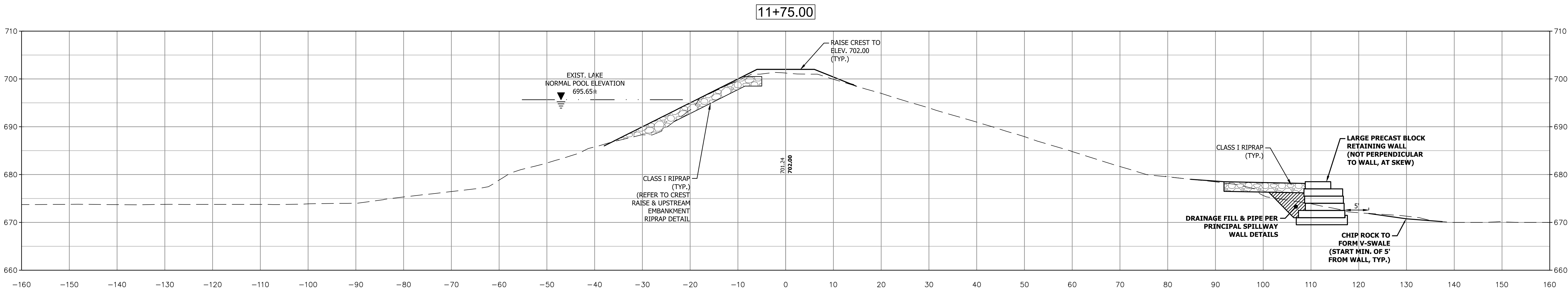
**PROJECT NO. ENG1802321631/E020098**

DAM CENTERLINE PROFILE - LINE 'A'

DRAWING NO.

**17**

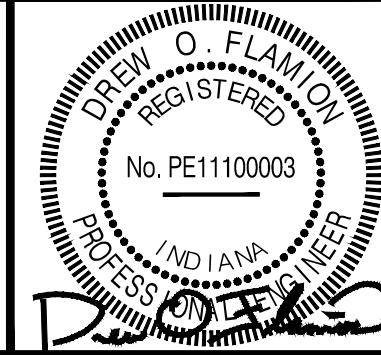
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No.	DATE	DESCRIPTION	REVISED BY
1	9/27/2018	ALTERNATE 4 - UPSTREAM RIPRAP BELOW EL. 693.65	DOF

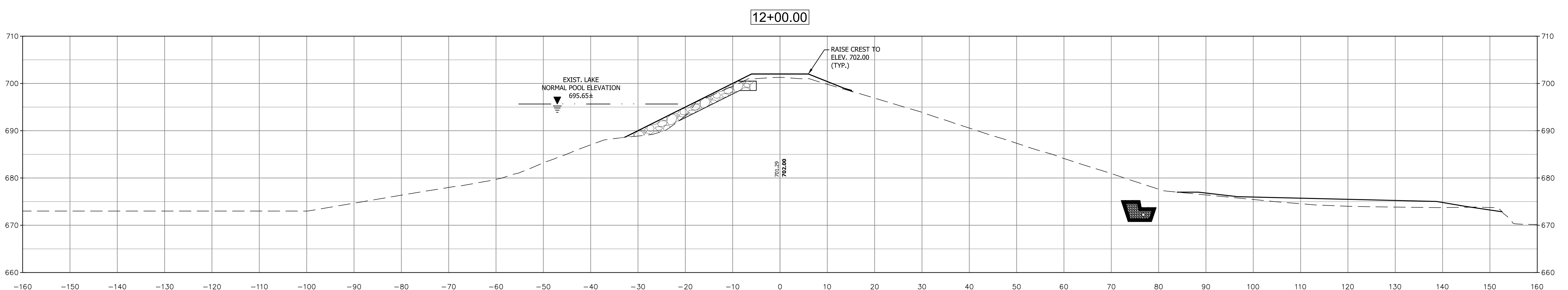
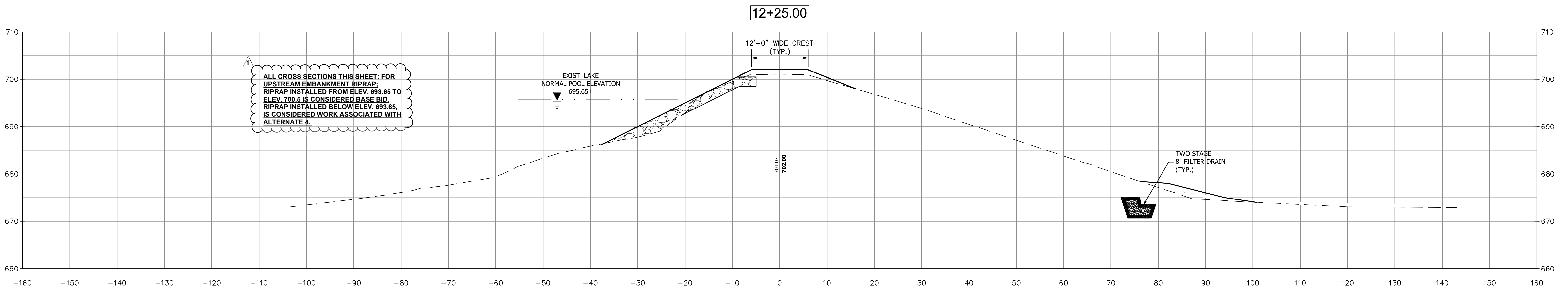
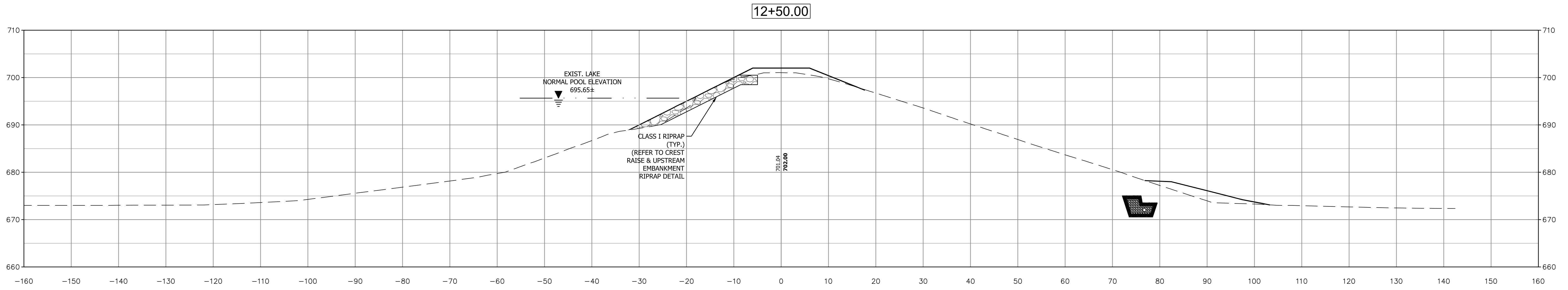


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DATE: MAY 2018  
JOB NO: D13038  
SCALE: AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT  
**PROJECT NO. ENG1802321631/E020098**  
DAM CROSS SECTIONS - LINE 'A'

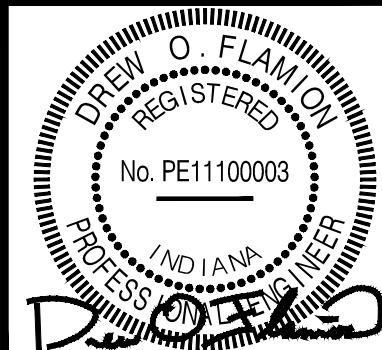
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**18**  
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No.	DATE	DESCRIPTION	REVISED BY
1	9/27/2018	ALTERNATE 4 - UPSTREAM RIPRAP BELOW EL. 693.65	DOF



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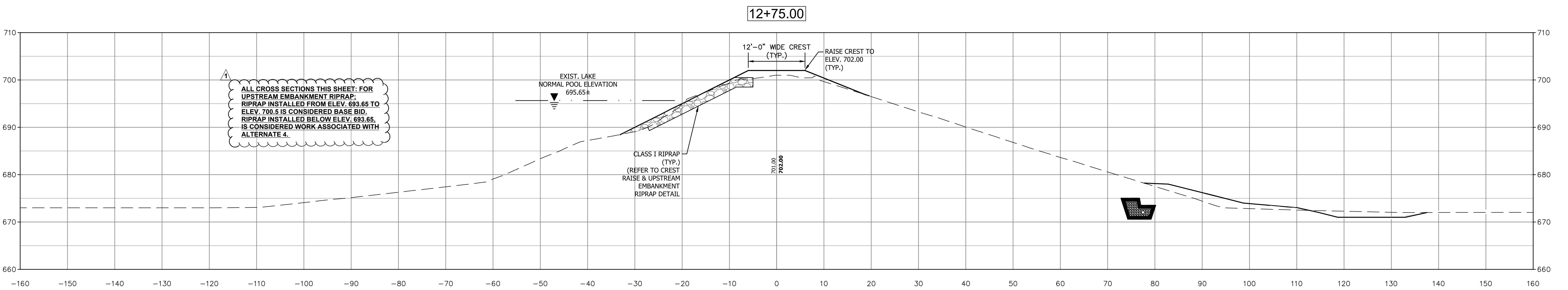
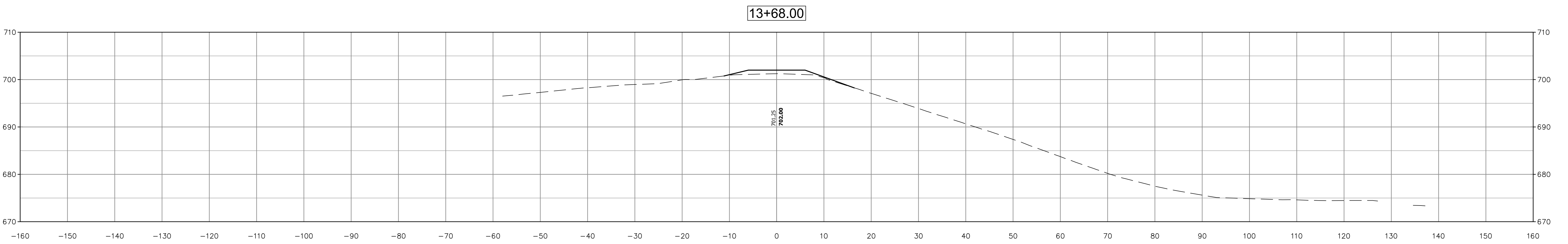
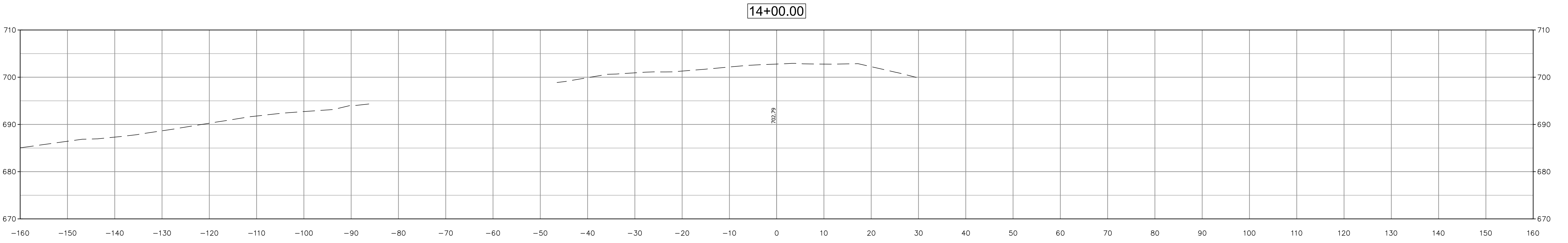
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DATE: MAY 2018  
JOB NO: D13038  
SCALE: AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT

**PROJECT NO. ENG1802321631/E020098**

DAM CROSS SECTIONS - LINE 'A'

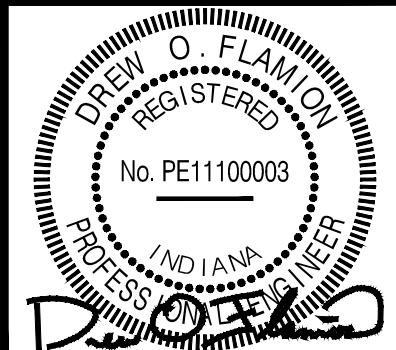
DRAWING NO.  
**19**  
19 OF 26



ALL CROSS SECTIONS THIS SHEET: FOR UPSTREAM EMBANKMENT RIPRAP: RIPRAP INSTALLED FROM ELEV. 693.65 TO ELEV. 700.5 IS CONSIDERED BASE BID. RIPRAP INSTALLED BELOW ELEV. 693.65, IS CONSIDERED WORK ASSOCIATED WITH ALTERNATE 4.

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1	9/27/2018	ALTERNATE 4 - UPSTREAM RIPRAP BELOW EL. 693.65	DOF



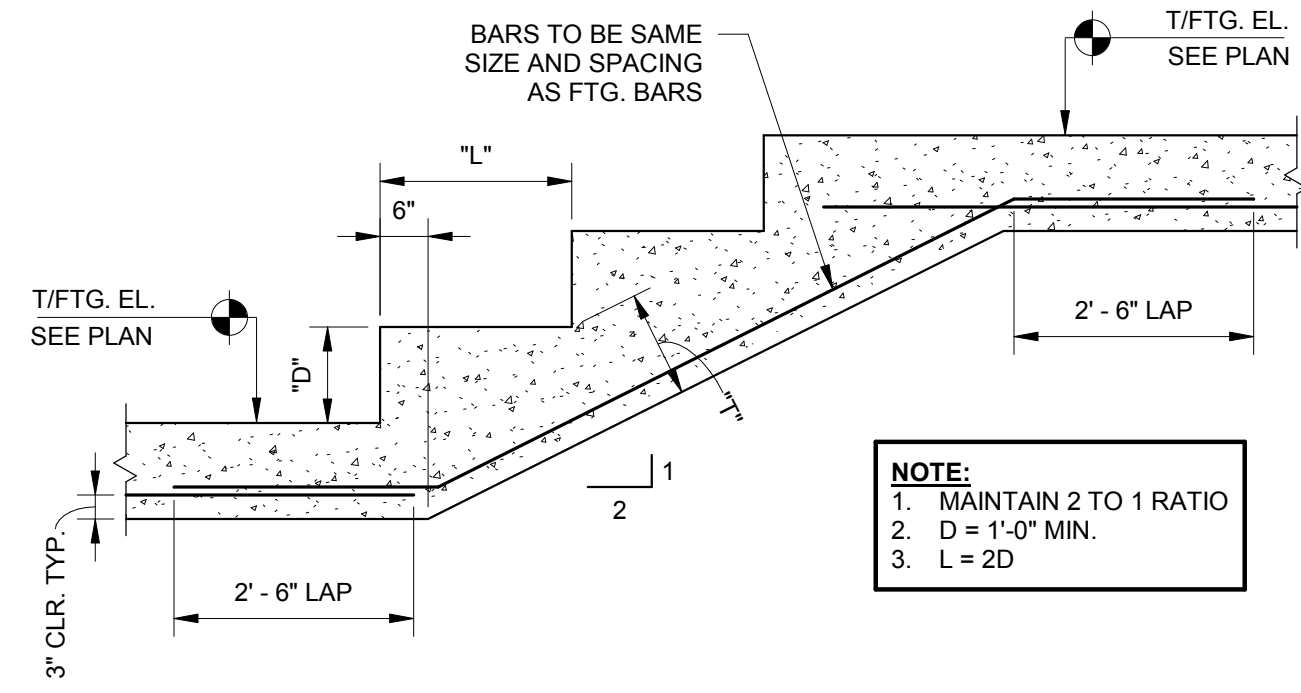
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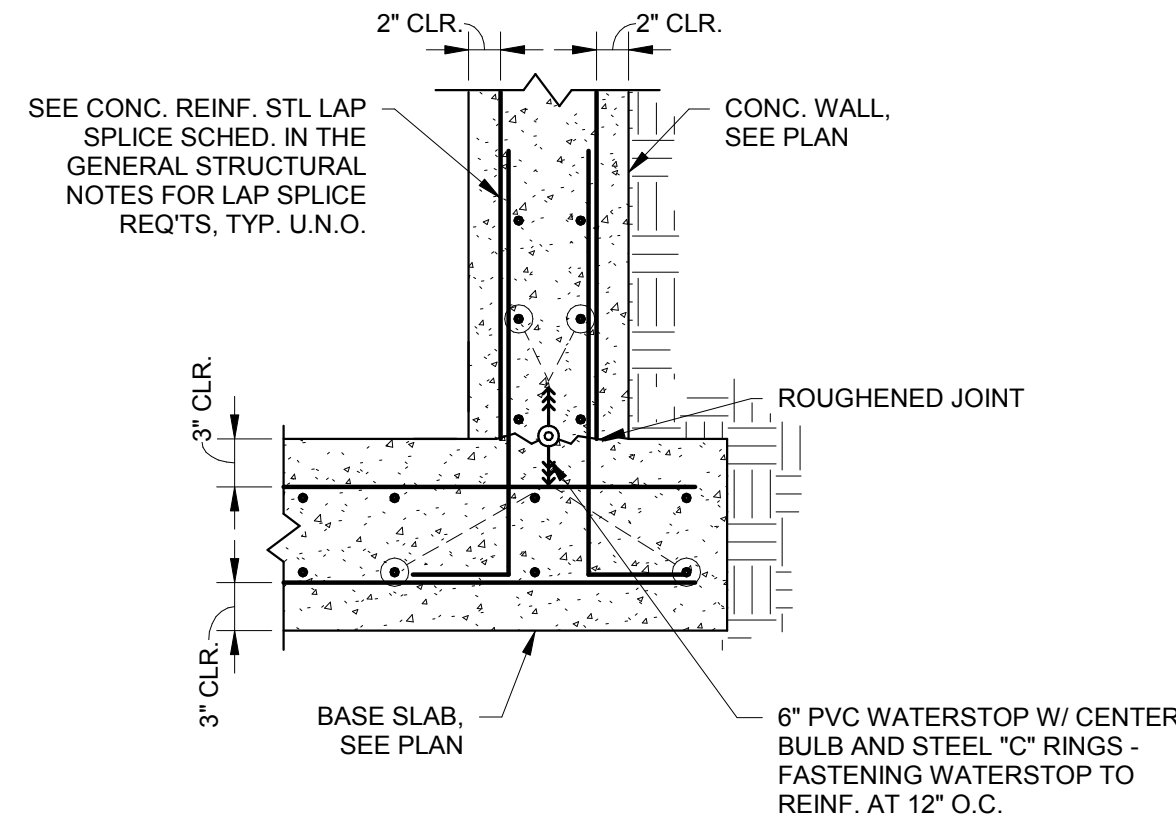
INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT  
**PROJECT NO. ENG1802321631/E020098**  
DAM CROSS SECTIONS - LINE 'A'

DRAWING NO.  
**20**  
20 OF 26

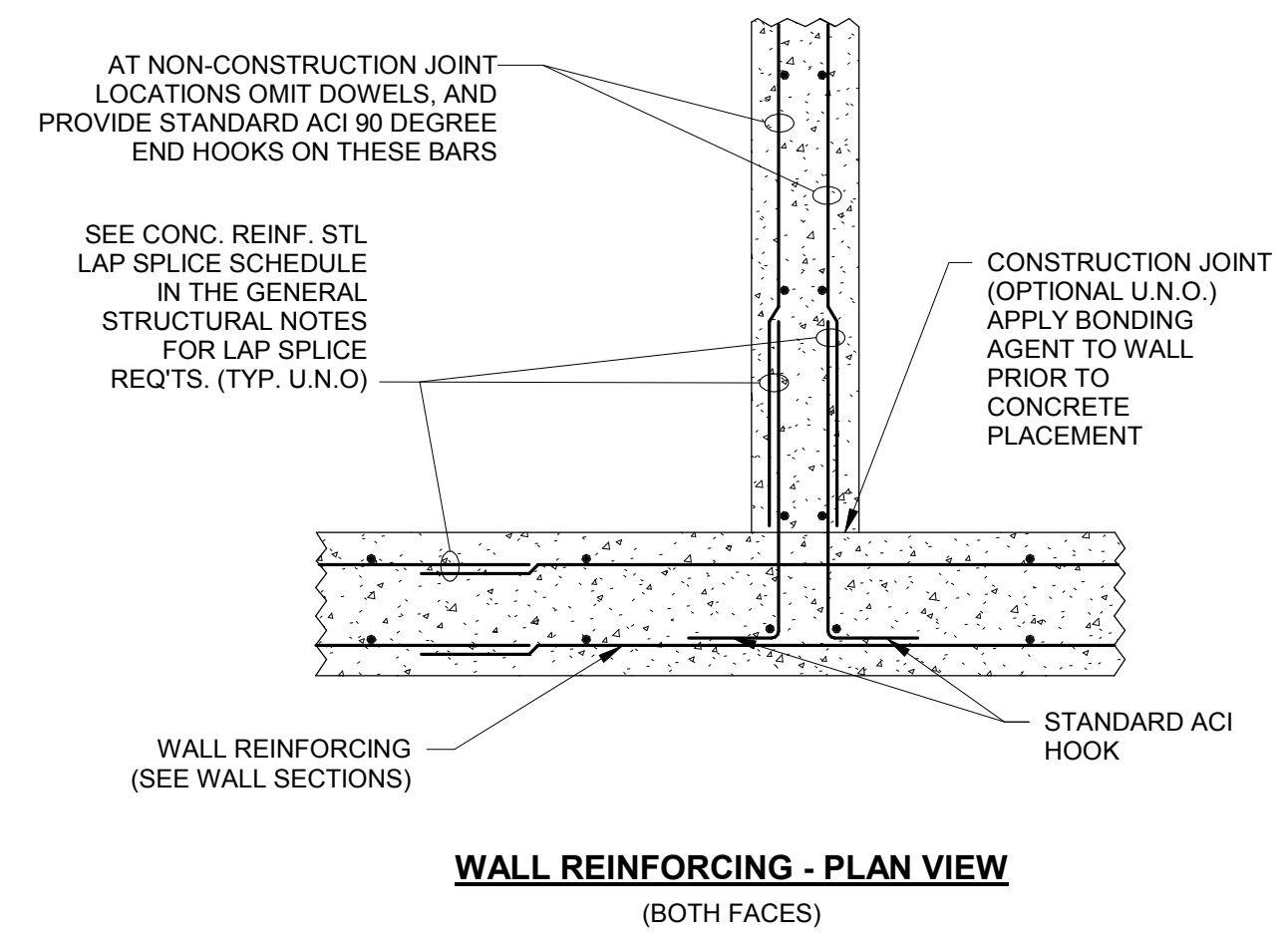




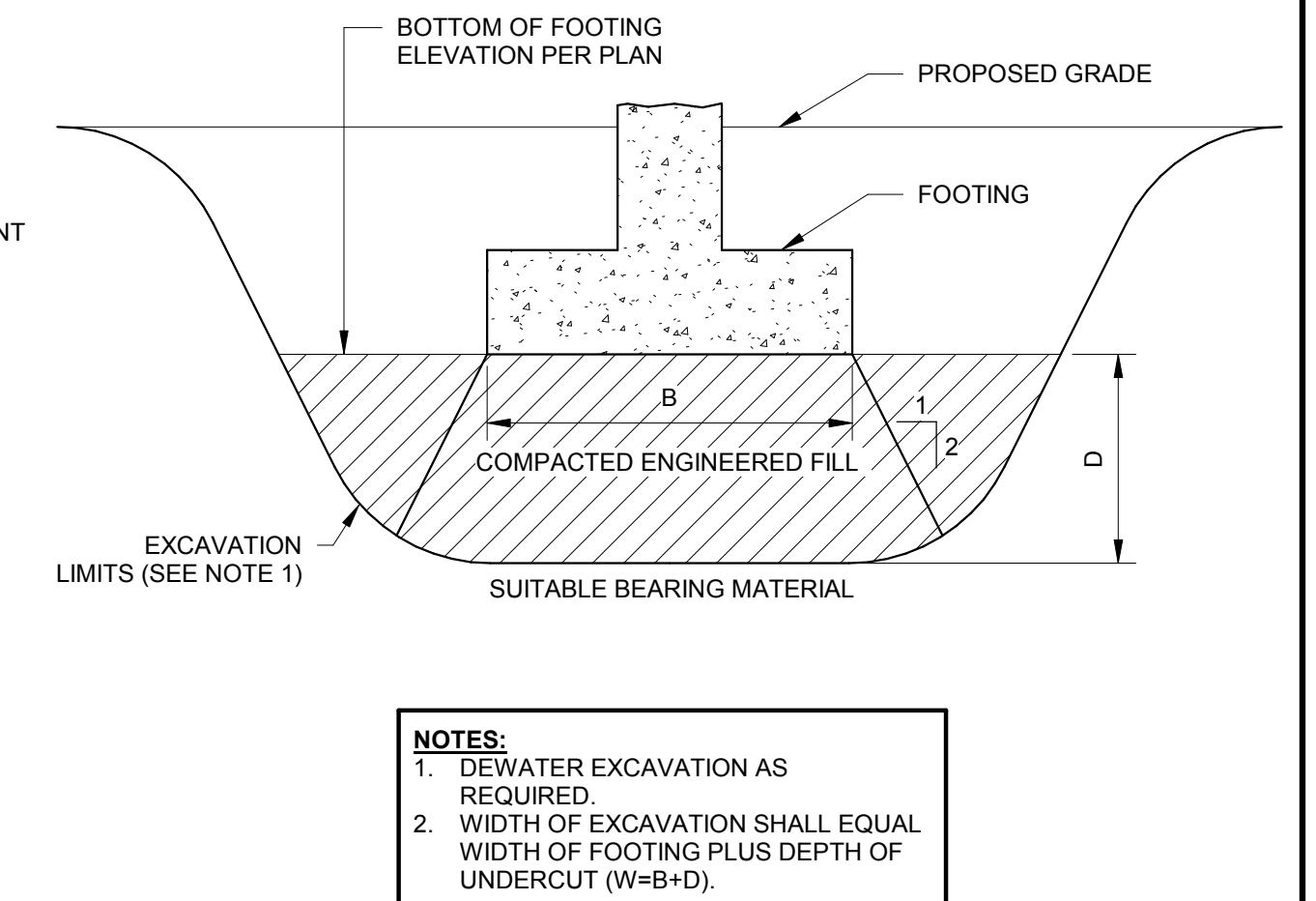
9 TYPICAL STEP FOOTING  
 S1-2 1/2" = 1'-0"



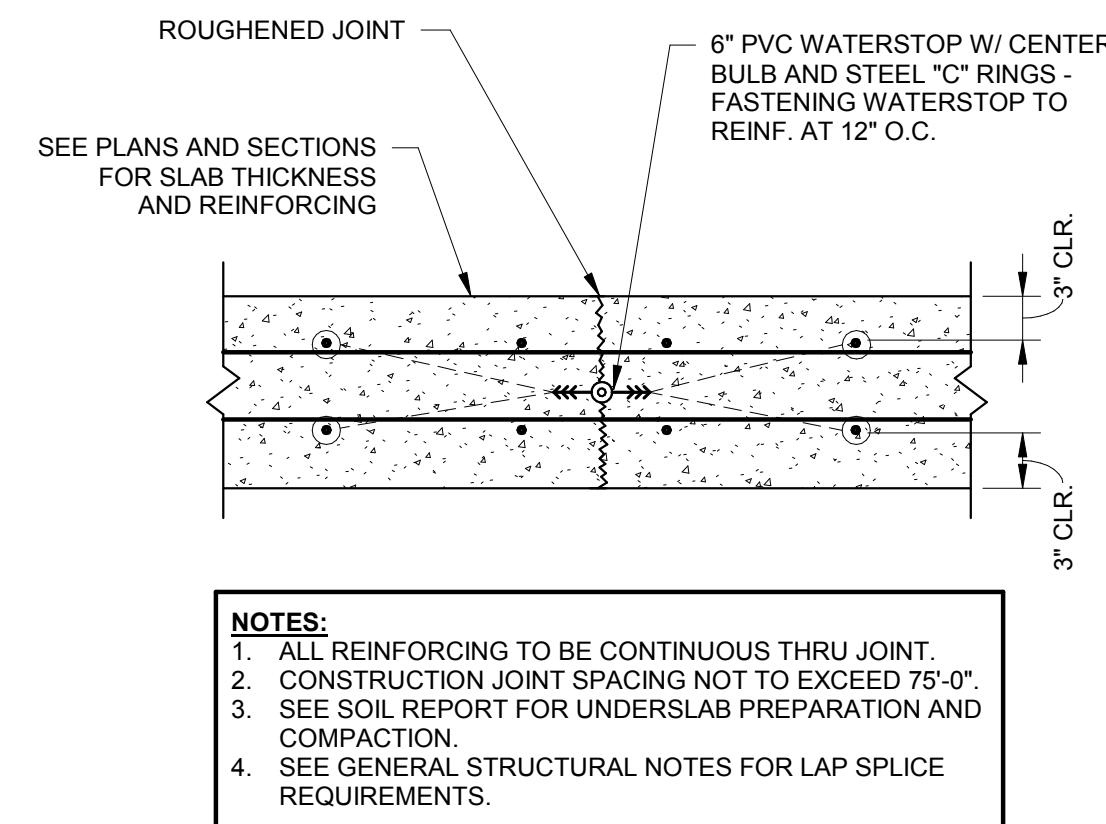
6 TYPICAL WALL TO BASE SLAB  
 S1-2 1" = 1'-0"



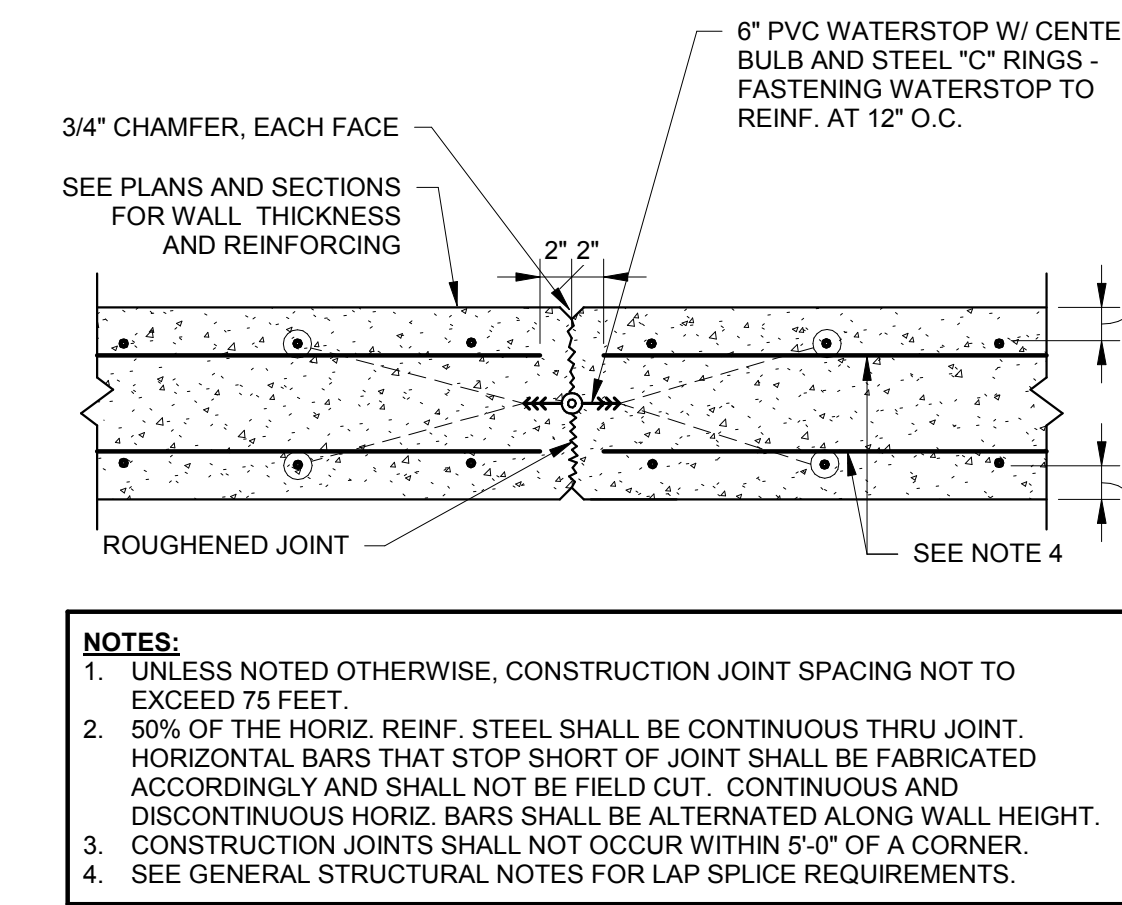
3 TYP. CONC. WALL INTERSECTION  
 S1-2 1/8" = 1'-0"



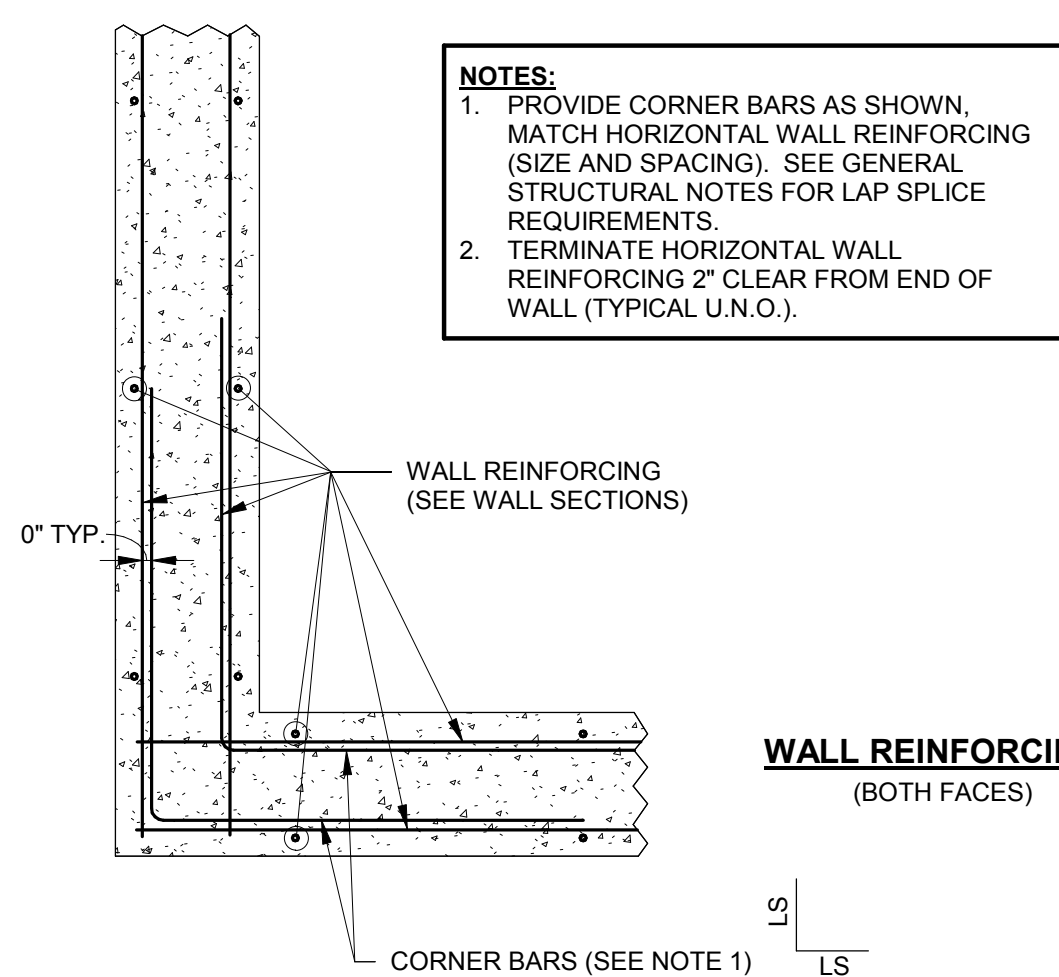
1 TYP. FOOTING IN UNDERCUT AREA  
 S1-2 1" = 1'-0"



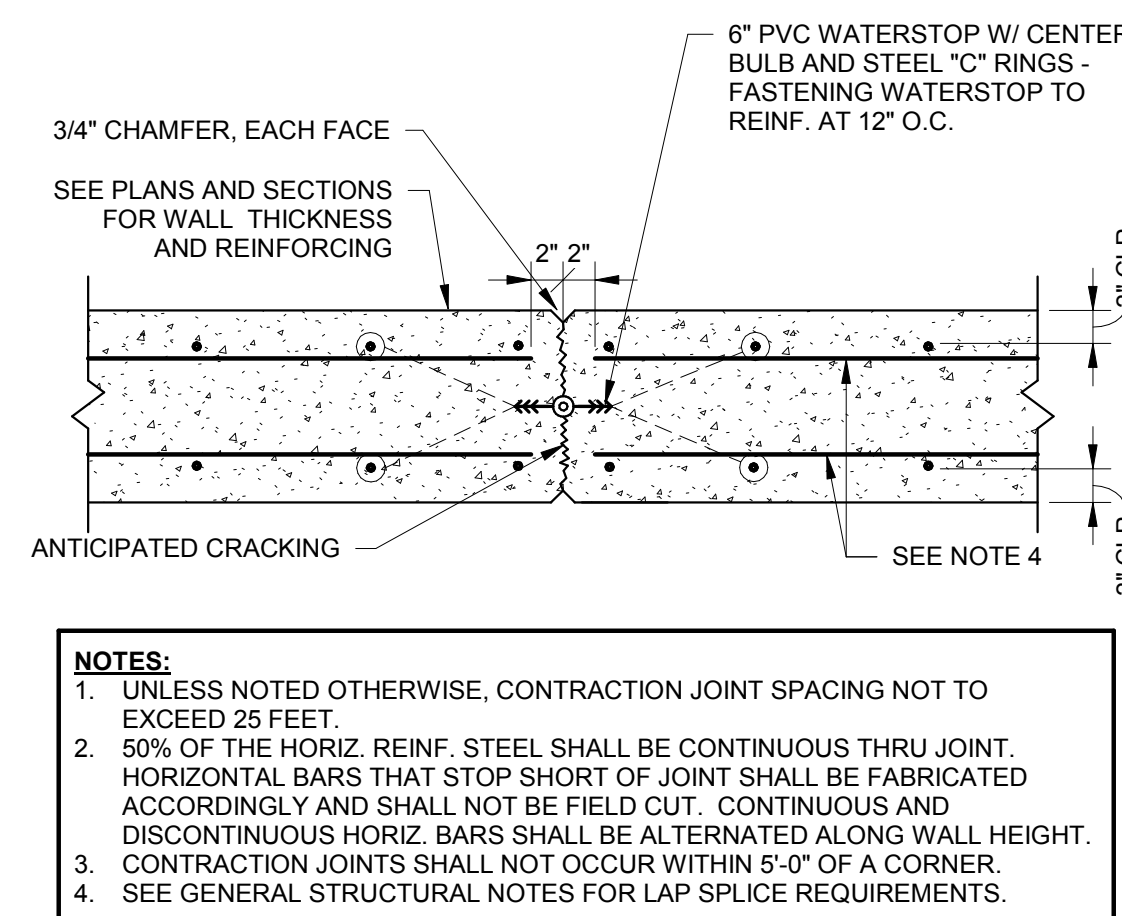
7 TYP. BASE SLAB CONSTRUCTION JT.  
 S1-2 1" = 1'-0"



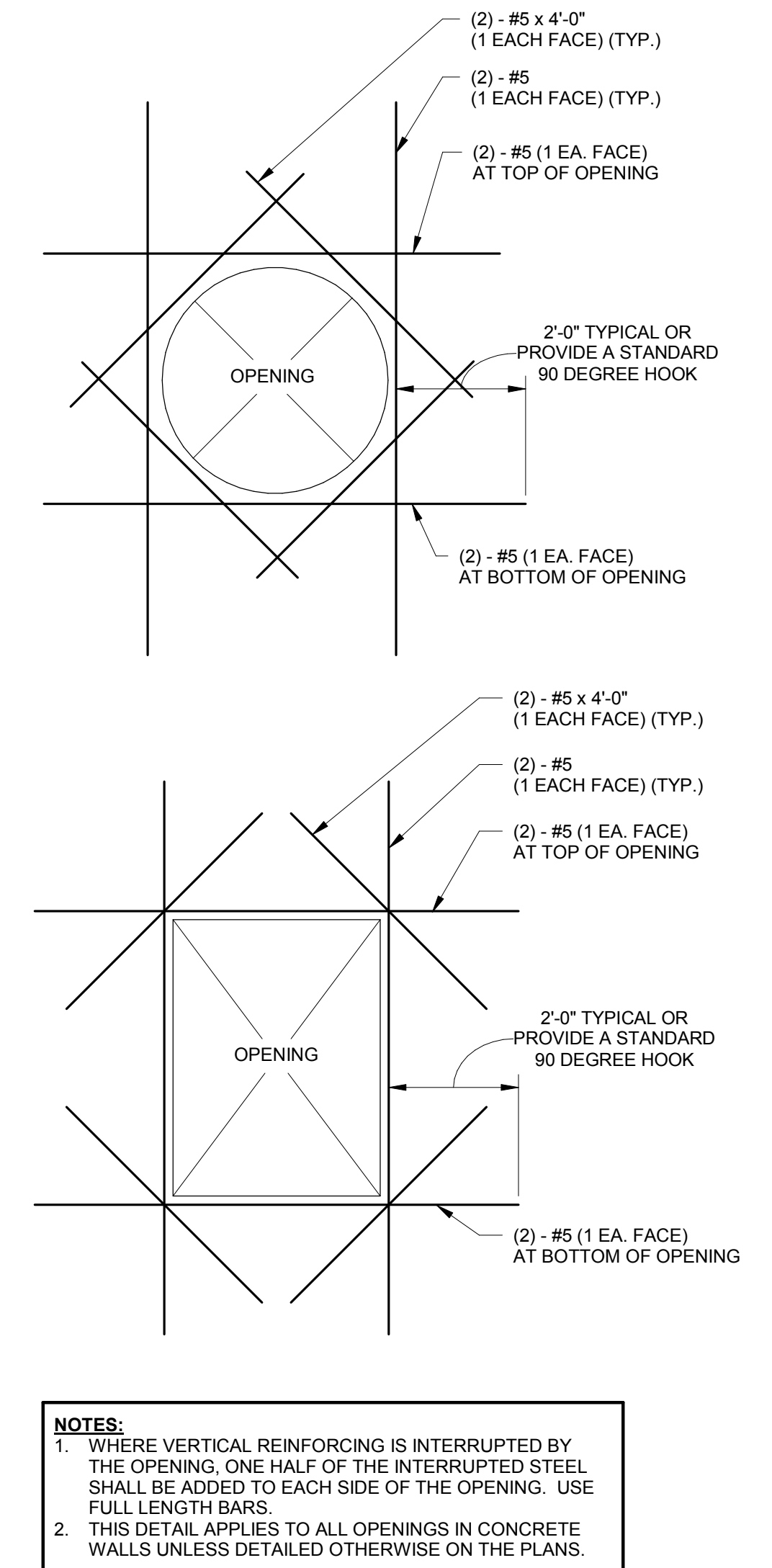
4 TYP. WALL CONSTRUCTION JOINT  
 S1-2 1" = 1'-0"



8 TYPICAL CONCRETE WALL CORNER REINFORCEMENT - PLAN VIEW  
 S1-2 1/8" = 1'-0"



5 TYP. WALL CONTRACTION JOINT  
 S1-2 1" = 1'-0"



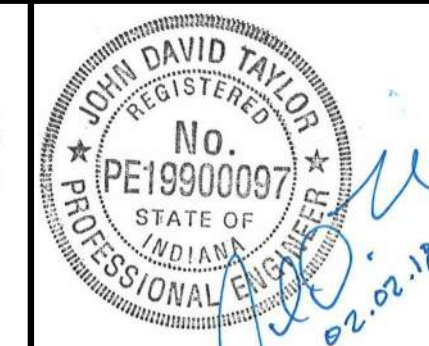
2 TYP. OPENING IN CONCRETE WALL  
 S1-2 1/8" = 1'-0"

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DRAWN BY: MAH  
 DESIGNED BY: JDT  
 CHECKED BY: JDT  
 DATE: 01/19/18  
 JOB NO: 16-107  
 SCALE: AS NOTED

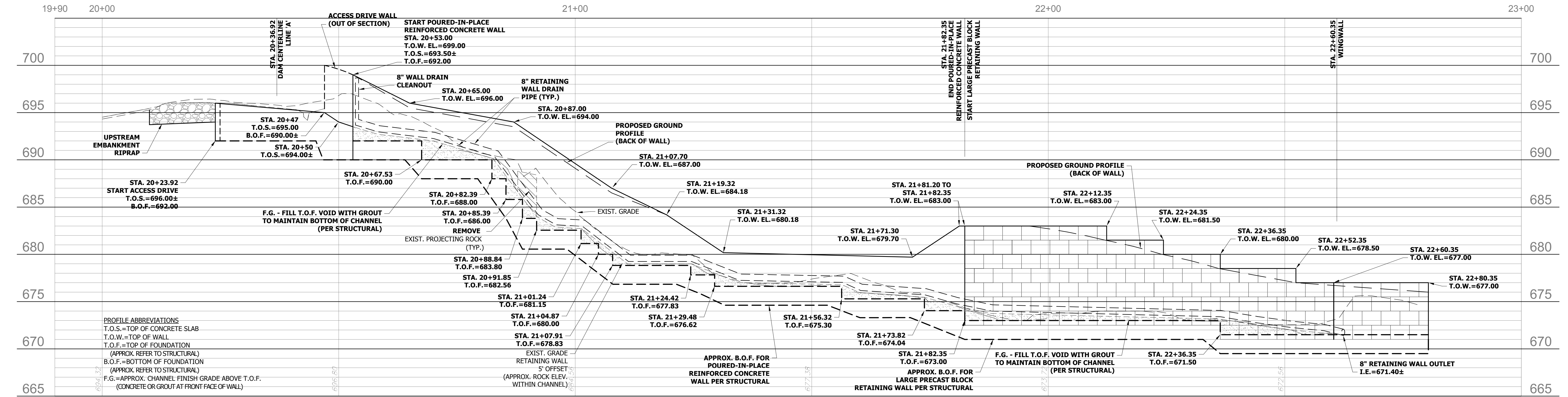
INDIANA DEPARTMENT OF NATURAL RESOURCES  
 CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
 DAM IMPROVEMENTS PROJECT  
**PROJECT NO. E02098**  
 TYPICAL STRUCTURAL DETAILS - CONCRETE

DRAWING NO.  
**S1-2**  
 22 OF 26



- FOUNDATION PLAN NOTES**
- INDICATES NOTE REFERENCED IN PLAN
  - 1. SEE THE S1-SERIES SHEETS FOR GENERAL STRUCTURAL NOTES AND TYPICAL STRUCTURAL DETAILS.
  - 2. GENERAL CONTRACTOR TO COORDINATE ALL OPENING, PIPE SLEEVES, EMBEDDED ITEMS, HANDRAILS, GRATING, ETC. WITH THE PROCESS DRAWINGS.
  - 3. ALL DIMENSIONS AND ELEVATIONS SHALL BE VERIFIED PRIOR TO FABRICATION, CONSTRUCTION OR ERECTION. THE GENERAL CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ANY DISCREPANCIES.
  - 4. SEE SITE PLAN FOR ALL FINAL GRADE ELEVATIONS.
  - 5. SEE GEOTECHNICAL REPORT FOR ALL BACKFILLING AND COMPACTION REQUIREMENTS BEHIND WALLS AND UNDER BASE SLABS.
  - 6. GENERAL CONTRACTOR SHALL SUBMIT A CONSTRUCTION JOINT (C.J.) AND CONSTRUCTION JOINT (C.T.) LOCATION PLAN TO THE STRUCTURAL ENGINEER FOR REVIEW PRIOR TO CONCRETE PLACEMENT.
  - 7. SEE DETAILS 4/S1-2 AND 5/S1-2 FOR WALL CONSTRUCTION JOINT AND WALL CONSTRUCTION JOINT REQUIREMENTS.
  - Ⓢ FOUNDATION OF RETAINING WALL ANTICIPATED IN SOIL.
  - Ⓣ FOUNDATION OF RETAINING WALL ANTICIPATED IN ROCK.

1 OVERALL FOUNDATION PLAN  
S2-1 1" = 10'-0"

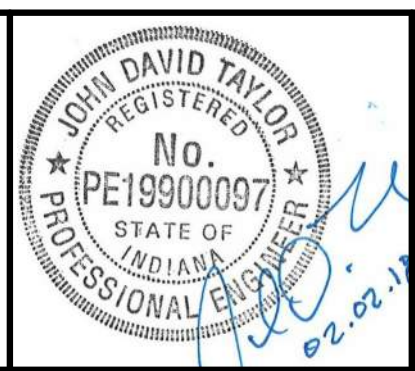


2 LINE 'W' PROFILE  
S2-1 1" = 10'-0" - HORIZONTAL  
1" = 5'-0" - VERTICAL



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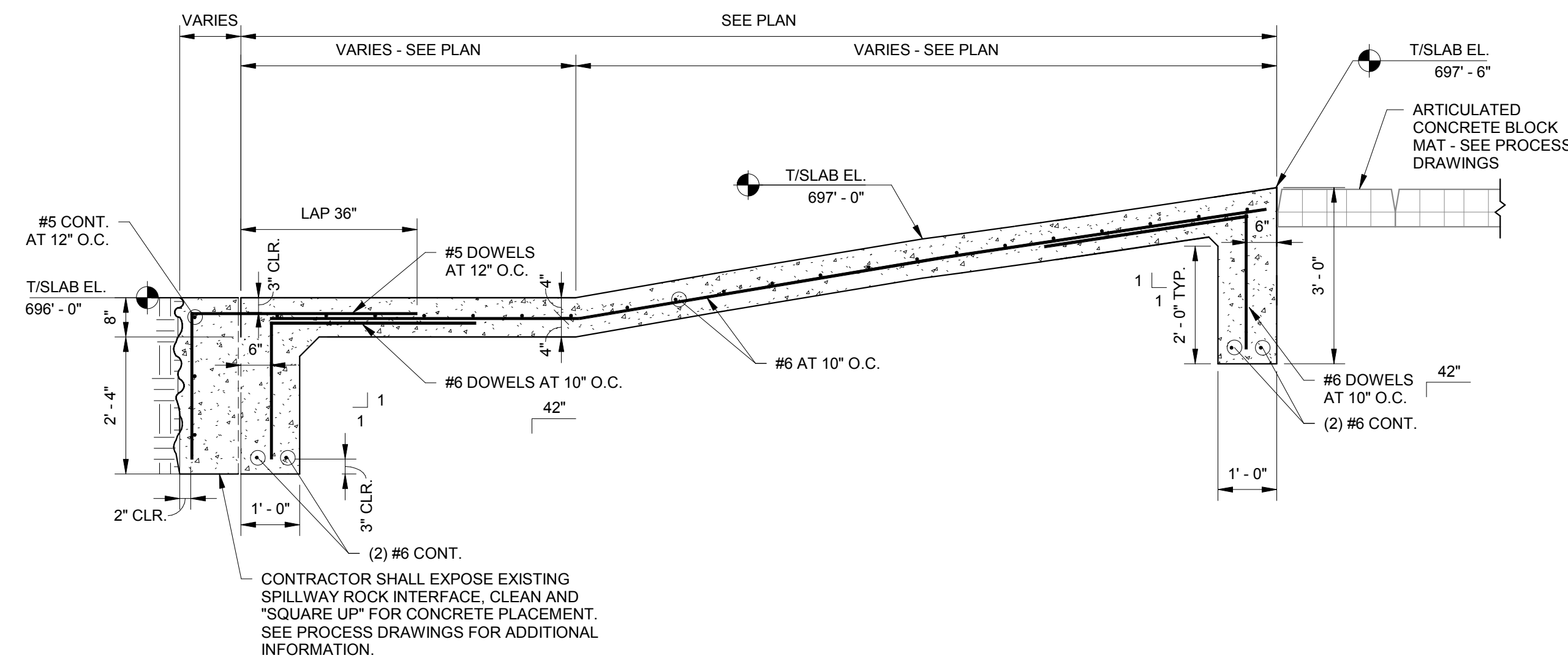
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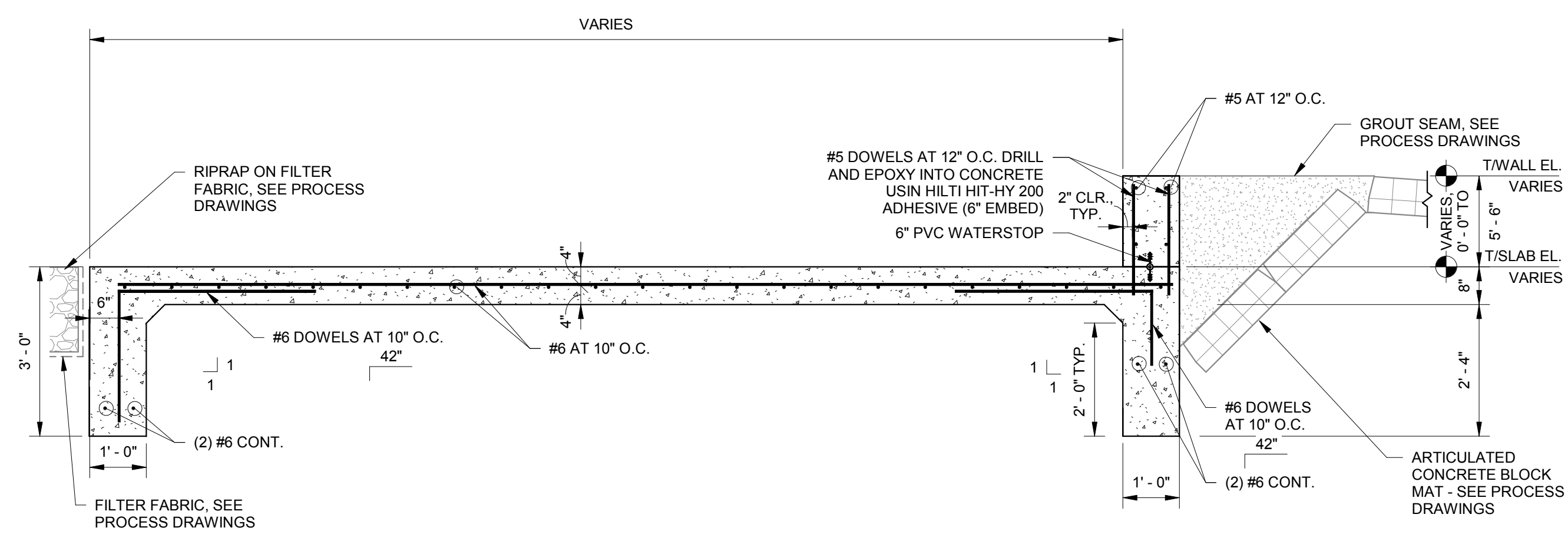
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JOB NO: 16-107  
SCALE: AS NOTED

INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT  
**PROJECT NO. E020098**  
OVERALL FOUNDATION PLAN  
AND RETAINING WALL PROFILE

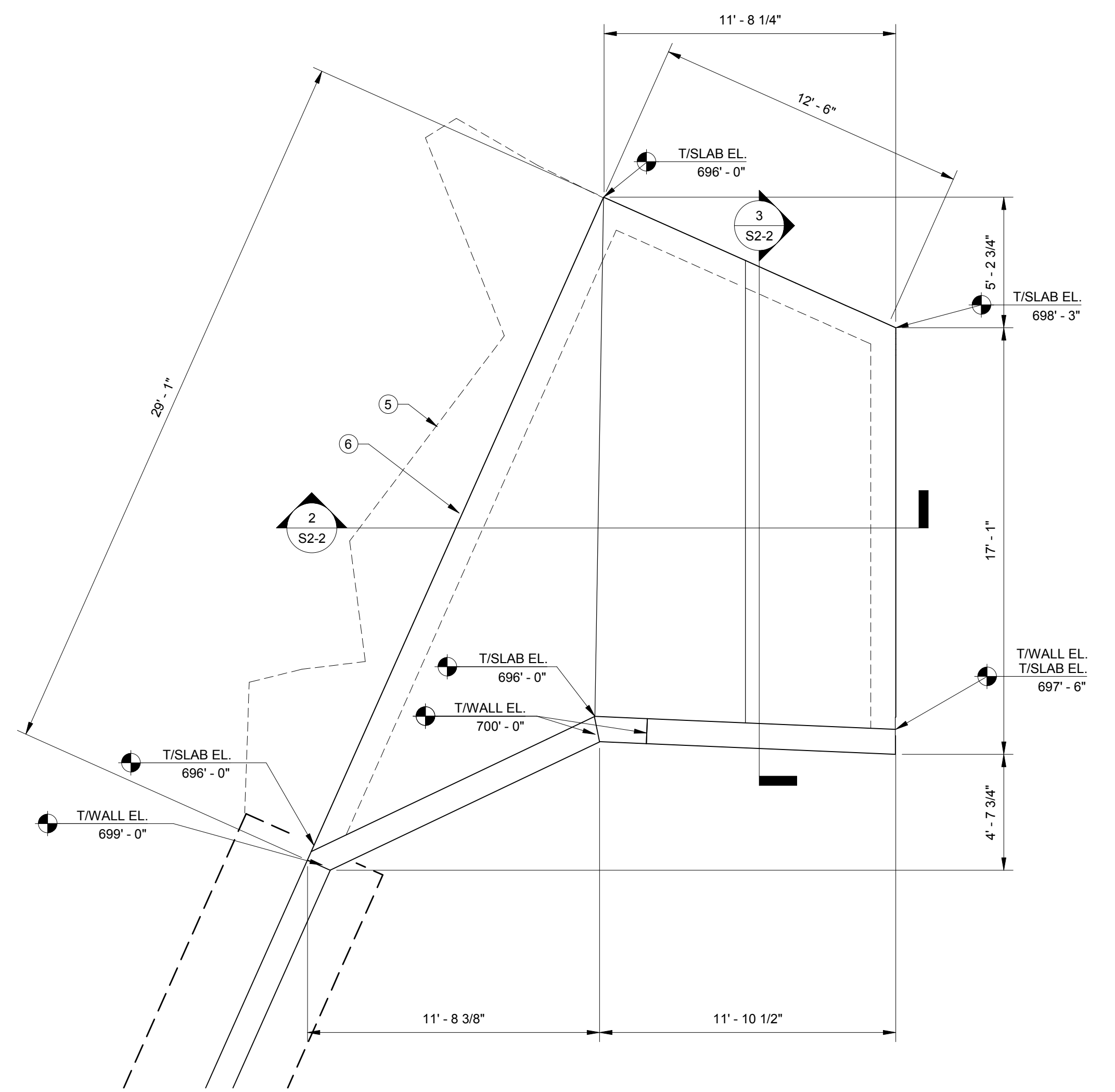
DRAWING NO.  
**S2-1**  
23 OF 26



2 SECTION  
S2-2 1/2" = 1'-0"



3 SECTION  
S2-2 1/2" = 1'-0"



1 ACCESS DRIVE - ENLARGED FOUNDATION PLAN  
S2-2 1/4" = 1'-0"

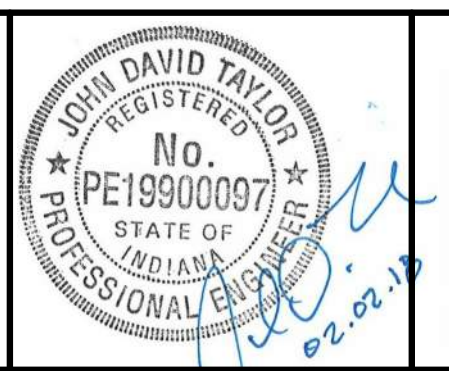
- FOUNDATION PLAN NOTES**
- INDICATES NOTE REFERENCED IN PLAN
  - 1. SEE THE S1-SERIES SHEETS FOR GENERAL STRUCTURAL NOTES AND TYPICAL STRUCTURAL DETAILS.
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  - 3. SEE SITE PLAN FOR ALL FINAL GRADE ELEVATIONS.
  - 4. SEE GEOTECHNICAL REPORT FOR ALL BACKFILLING AND COMPACTION REQUIREMENTS BEHIND WALLS AND UNDER BASE SLABS.
  - 5. APPROXIMATE EXISTING ROCK EDGE. SEE PROCESS DRAWINGS FOR ADDITIONAL INFORMATION.
  - 6. GENERAL CONTRACTOR - FIELD VERIFY TOP OF CONCRETE SLAB ELEVATIONS PRIOR TO CONCRETE PLACEMENT. TOP OF CONCRETE SLAB ELEVATION TO MATCH EXISTING TOP OF ROCK ELEVATIONS.

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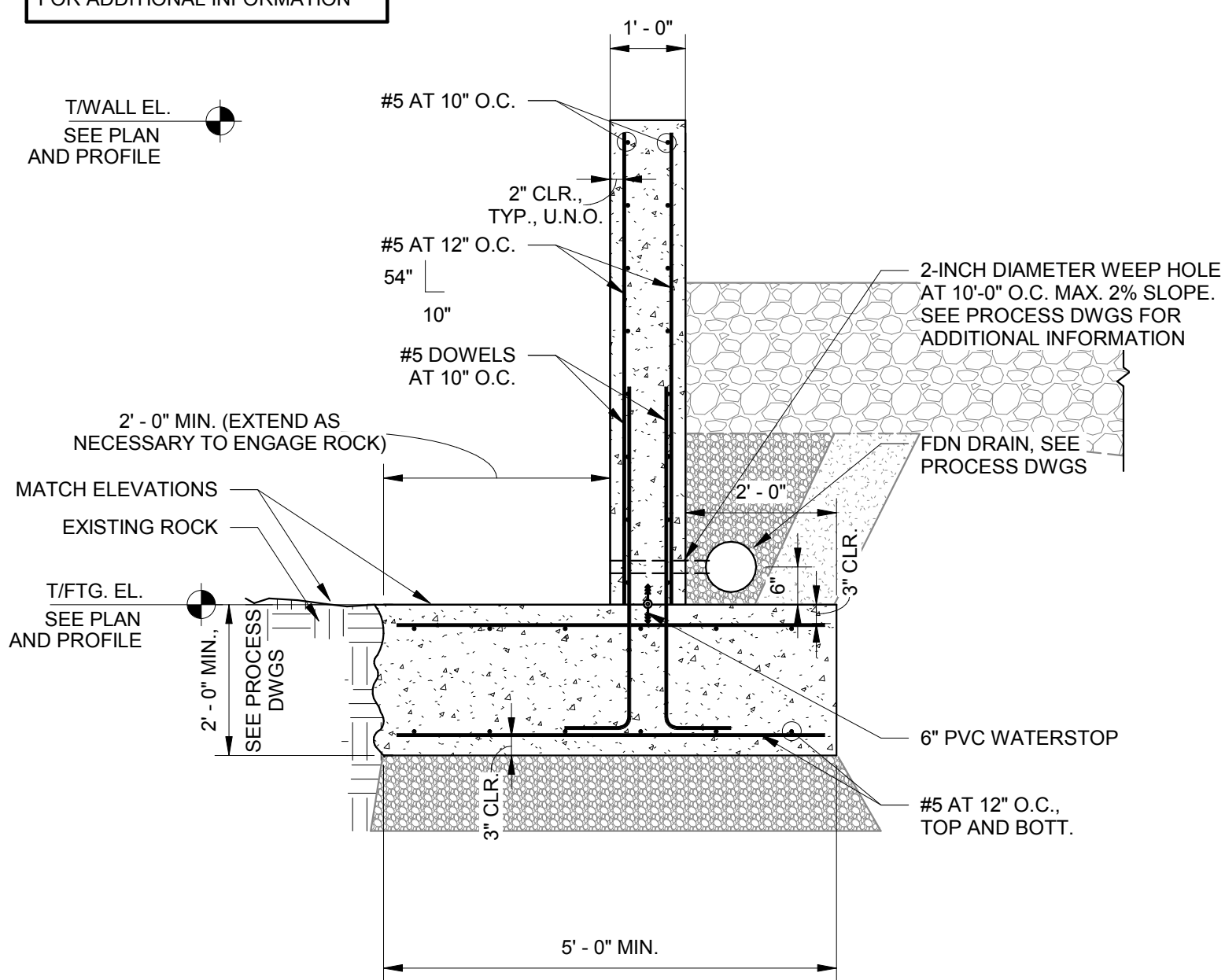
INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT  
**PROJECT NO. E020098**  
ACCESS DRIVE - ENLARGED FOUNDATION PLAN,  
SECTIONS, AND DETAILS

DRAWING NO.  
**S2-2**  
24 OF 26



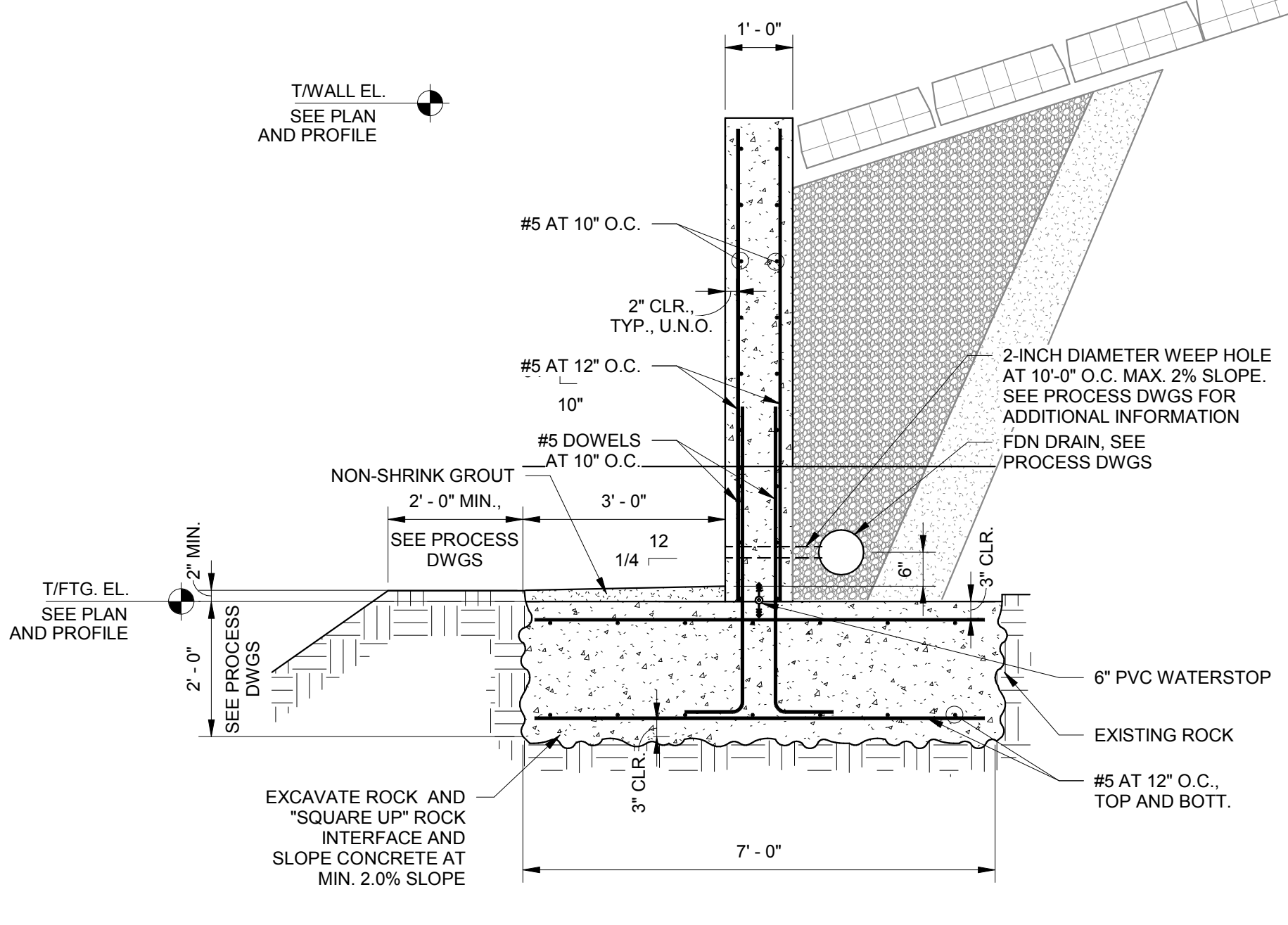
NOTE: SEE PROCESS DRAWINGS FOR ADDITIONAL INFORMATION

T/WALL EL. SEE PLAN AND PROFILE



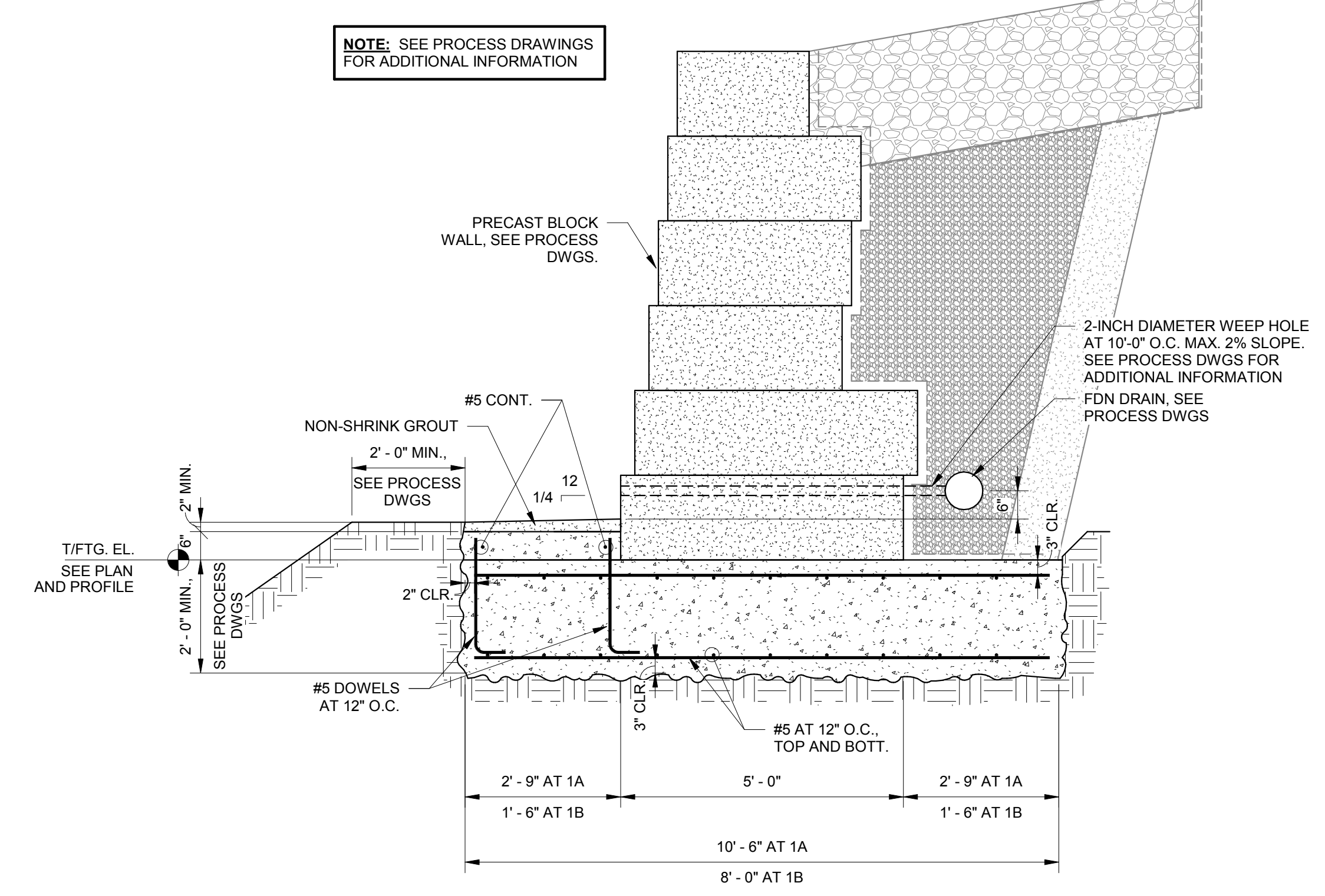
NOTE: SEE PROCESS DRAWINGS FOR ADDITIONAL INFORMATION

T/WALL EL. SEE PLAN AND PROFILE



NOTE: SEE PROCESS DRAWINGS FOR ADDITIONAL INFORMATION

PRECAST BLOCK WALL, SEE PROCESS DWGS.



3 FOUNDATION WALL IN SOIL  
S2-3 1/2" = 1'-0"

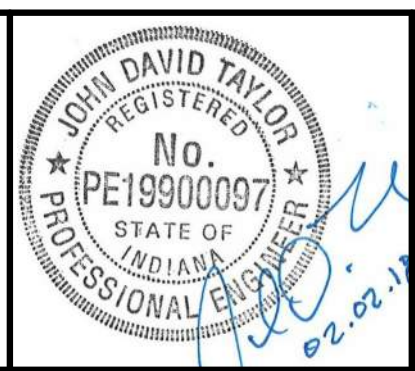
2 FOUNDATION WALL IN ROCK  
S2-3 1/2" = 1'-0"

1 PRECAST BLOCK RETAINING WALL  
S2-3 1/2" = 1'-0"



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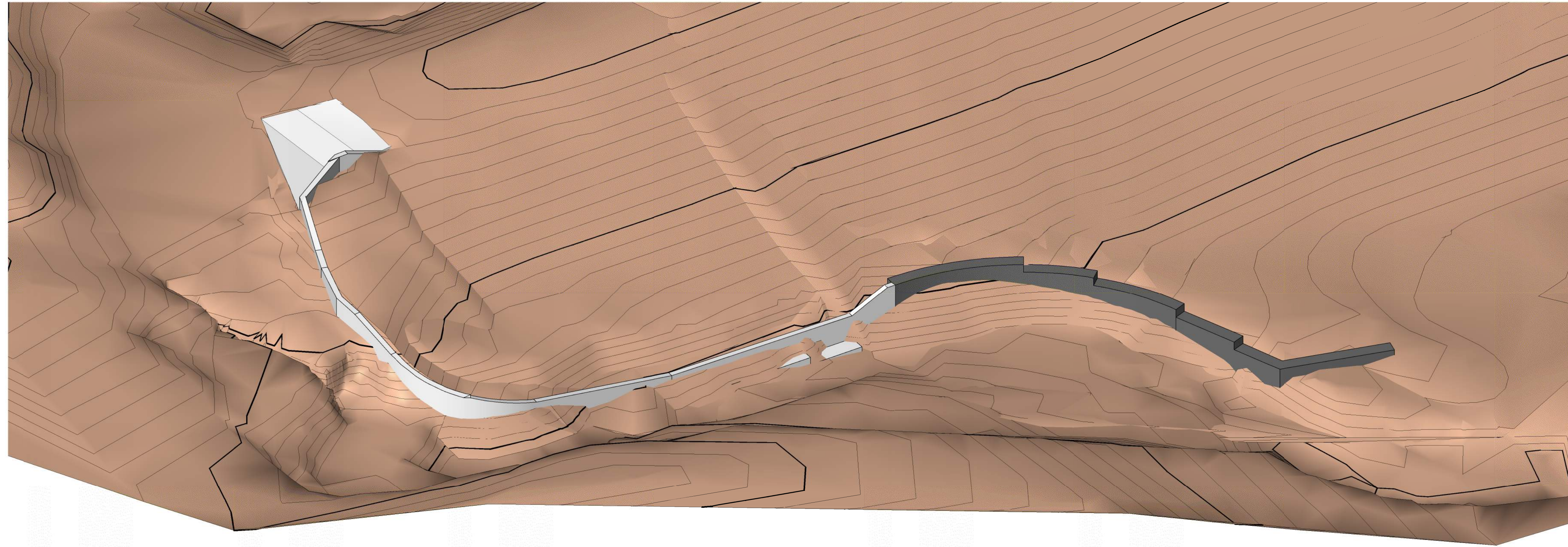
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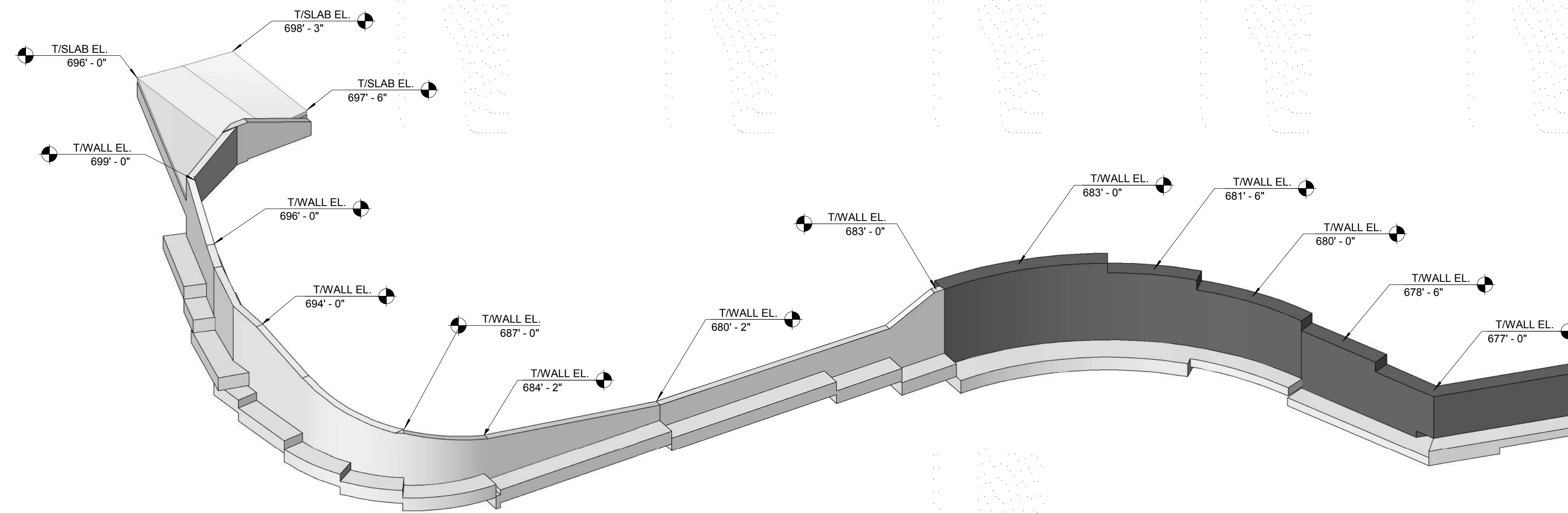
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INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT  
**PROJECT NO. E020098**  
RETAINING WALL  
SECTIONS AND DETAILS

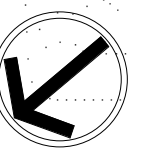
DRAWING NO.  
**S2-3**  
25 OF 26



1 ISOMETRIC  
S2-4



2 ISOMETRIC  
S2-4



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INDIANA DEPARTMENT OF NATURAL RESOURCES  
CROSLY FISH & WILDLIFE AREA - CROSLY LAKE  
DAM IMPROVEMENTS PROJECT  
**PROJECT NO. E020098**  
ISOMETRIC VIEWS

DRAWING NO.  
**S2-4**  
26 OF 26