HISTORY OF CONSTRUCTION FOR EXISTING CCR SURFACE IMPOUNDMENT
REVISION 1
PLANT YATES ASH POND 2
391-3-4-.10(4) and 40 C.F.R. PART 257.73

(i) Site Name and Ownership Information:

Site Name: Eugene A. Yates Power Plant

Site Location: Newnan, Georgia
Site Address: 708 Dyer Road
Newnan, GA 30263

Owner: Georgia Power Company
Address: 241 Ralph McGill Boulevard
Atlanta, GA 30308

CCR Impoundment Name: Plant Yates Ash Pond 2 (AP-2)
NID ID: GA04184 (038-063-04138 Georgia State ID)

The Federal CCR Rule, and, for Existing Surface Impoundments where applicable, the Georgia CCR Rule (391-3-4-.10) require the owner or operator of a CCR surface impoundment to compile a history of construction of the CCR unit. *See* 40 C.F.R. § 257.73(c); Ga. Comp. R. & Regs. r. 391.3-4-.10(4)(b)[1]. In addition, if there is a change in the history of construction, the Rules require an update to the relevant information. *See* 40 C.F.R. § 257.73(c)(2); Ga. Comp. R. & Regs. r. 391.3-4-.10(4)(b) [1]. To the extent feasible, the following information is provided:

(ii) Location:

33.459091, -84.907674
See Location Map in the Appendix

(iii) Purpose of CCR Impoundment:

The Eugene A. Yates Power Plant (Plant Yates) was once a seven-unit, coal-fired, power generation facility. Plant Yates Units 1-5 have been dismantled and Units 6 and 7 have been converted to natural gas. AP-2 was designed to receive and store coal combustion residuals produced during the coal-fired electric power generating process at Plant Yates. Plant Yates ceased burning coal in 2015 and thus ceased sluicing ash to AP-2 at that time. The Notification of Intent to Initiate Closure was placed in the facility's Operating Record on 04/17/2019. AP-2 is currently undergoing closure-by-removal.

[1] In a typographical error, 391.3-4.10(4)(b) references the "structural integrity criteria in 40 CFR 247.73," when the reference to such criteria should be 40 CFR 257.73.

(iv) Watershed Description:

Plant Yates and AP-2 are located within the Acorn Creek-Chattahoochee River HUC-12 watershed which has a total area of 28,284 acres. The Acorn Creek-Chattahoochee River watershed is part of the larger Middle Chattahoochee-Lake Harding HUC-8 watershed which has an area of 1,950,182 acres. The inflow to Ash Pond 2 consists of the rainfall that falls within the limits of the surface impoundment and runoff from several hundred acres of adjoining watershed.

(v) Description of physical and engineering properties of CCR unit foundation/abutments:

AP-2 is located in the Piedmont Physiographic Provence of Georgia. The Piedmont is characterized by igneous and metamorphic rocks. According to the Geologic Map of Georgia, 1976, Plant Yates is located in an Undifferentiated Granite formation of the Piedmont. The residual soils in the Piedmont are a result of weathering of the underlying bedrock. Piedmont residual soils and alluvial soils (due to its proximity to the Chattahoochee River) are present within the footprint of AP-2. The alluvial soils consist of firm to very stiff silts and clays which were underlain by partially weathered rock and residual soils. The foundation materials below the new AP-2 cross-valley embankment have been classified as generally consisting of partially weathered to relatively unweathered rock based on subsurface investigations performed to support design.

(vi) Summary of Site Preparation and Construction Activities:

AP-2, originally commissioned in 1966 and also known at one time as the "new ash pond" and the "common pond," was designed by Georgia Power Company's Chief Engineer. The original construction, supervised by a professional engineer, had a top of dam elevation of 721 ft and a corresponding surface area of 50 acres.

AP-2 is currently undergoing closure by removal activities. To support those closure activities, a temporary cofferdam was constructed that bisected the impoundment into two distinct areas commonly referred to as AP-2 West and AP-2 East. A new permanent cross-valley embankment has been constructed, basically bisecting the original footprint of AP-2. AP-2 West, the area located between the new permanent cross-valley embankment and the original surface impoundment embankment, has been dewatered and all ash removed. AP-2 East has been substantially dewatered and ash removal is underway, as is removal of the temporary cofferdam. The original embankment no longer impounds water and is being lowered as a part of closure.

After completion of the closure by removal activities, the new impoundment will serve as a service water pond for Plant Yates.

(vii) Engineering Diagram:

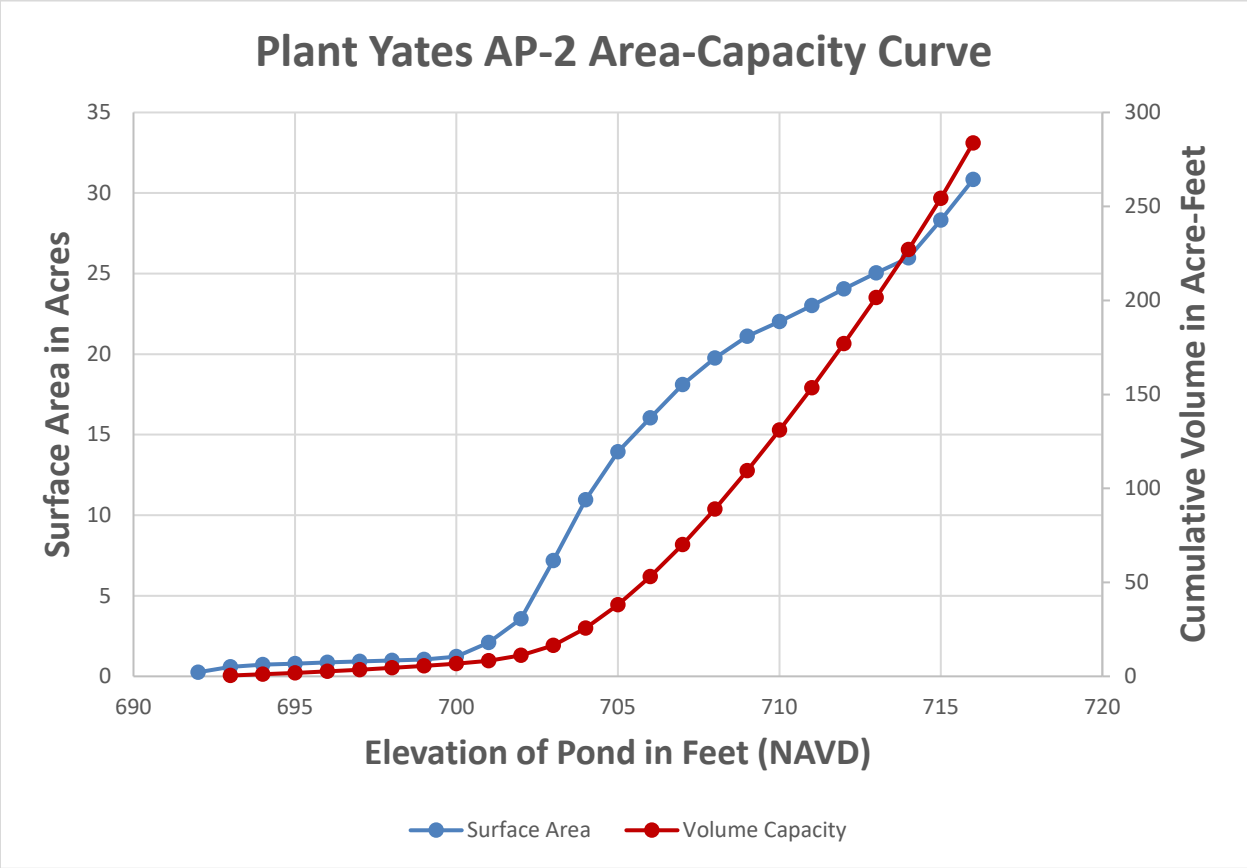
The following drawings reflecting the construction of the new AP-2 cross-valley embankment can be found in the Appendix:

- Sheets 1-22, Drawings for Plant Yates Service Water Pond Dam, prepared by Schnabel Engineering, Schnabel Project No. 17C17013.00

(viii) Description of Instrumentation:

There are eight piezometers located within the new cross-valley embankment of AP-2 that are used to measure water levels within the embankment.

(ix) Area-capacity curves:



(x) Spillway/Diversion design features and capacity calculations:

Primary discharge from AP-2 occurs on the north end of the embankment where water flows into a neutralization sump controlled with a stoplog structure. Operating level through this spillway is established at approximately EL 716 ft. There is no active discharge pipe passing through or under the embankment. However, there is a siphon spillway located at approximately Station 7+25 that can be used to lower future water levels in the event it is necessary to do so. This siphon is not expected to be operational until such time closure by removal construction activities are complete and the new service water pond is allowed to fill and becomes operational. Additionally, there is an auxiliary labyrinth chute spillway constructed of cast-in-place concrete over the crest of the dam. Both the auxiliary spillway entrance and downstream outlet channel are riprap lined.

Flood routing calculations indicate that the auxiliary spillway has a capacity of about 3,650 cubic feet per second (cfs) during the design storm.

(xi) Provisions for surveillance, maintenance and repair:

Inspections of dikes are critical components and are conducted on a regular basis – at least annually by professional dam safety engineers and at least weekly by trained plant personnel. In addition, inspections are performed after periods of heavy rainfall and storms. The inspections provide assurance that structures are sound and that action is taken, as needed, based on the findings. Weekly safety inspections include numerous items including pond levels, weather conditions and rainfall since the prior inspection, conditions of slopes and drains, erosion, animal damage, ant hills, alignment of retaining structures and more. During annual inspections, dam safety engineers assess instrument readings, inspect any maintenance or remediation performed since the previous inspection, check the status of work recommended at prior inspections, ensure that the posting of emergency notification information is up to date and evaluate any items noted during plant personnel inspections.

Construction specifications:

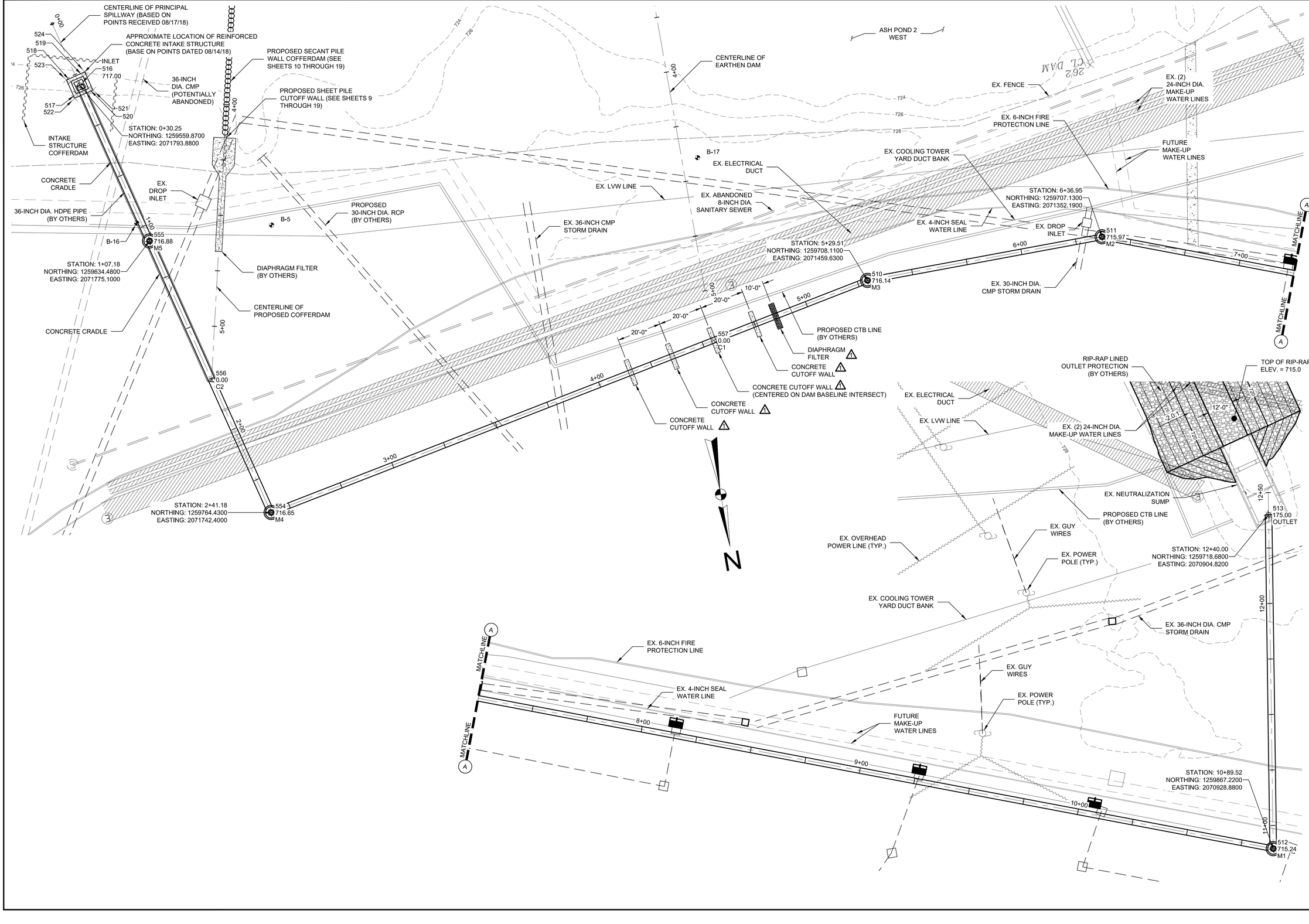
The following specifications relevant to the construction of the AP-2 can be found in the Appendix:

- Construction Specifications for Plant Yates Service Water Pond, as prepared by Schnabel Engineering, dated August 16, 2019
- Construction Specifications for Plant Yates Service Water Pond Dam Spillway, Bypass Channel and Bypass Spillway, as prepared by Schnabel Engineering, dated October 27, 2020

(xii) Known record of structural instability:

There is no known record of major structural instability or repairs to the current AP-2 impoundment.

Appendix



REV	DESCRIPTION	DATE
1	ADDED ANTI-SEEP COLLARS AND DIAPHRAGM FILTER	8/23/18

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: RPB

RANDALL POBASS
DATE:
GEORGIA PROFESSIONAL ENGINEER NO. 10685

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 / Phone: 770-781-8008 / Fax: 770-781-8003 / schnabel-eng.com

PLANT YATES ASH POND 2
NEWNAN, GEORGIA

PRINCIPAL SPILLWAY REALIGNMENT

PREPARED FOR:
SOUTHERN COMPANY
2 RIVERWESS CENTER PKWY, BIN B7Z
BIRMINGHAM, AL

PROJECT: 17C17013.00

DATE: 08/22/2018

SHEET
1 OF 1

PLANT YATES
SERVICE WATER POND DAM

PREPARED FOR

SOUTHERN COMPANY
BIRMINGHAM, ALABAMA

AUGUST 16, 2019

LOCATION MAP

THIS PROJECT CONSISTS OF MULTIPLE PHASES
AS GENERALLY DESCRIBED BELOW:

PHASE I
PHASE II

THE PLANS PRESENTED HEREIN ARE SOLELY
RELATED TO PHASE I AND GRADING FOR PHASE II.

SHEET INDEX

REV.	DESCRIPTION	DATE

DESIGNED BY: JTD/JC
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
GEORGIA PROFESSIONAL ENGINEER NO. 034136
DATE: 08/16/2019

GEORGIA REGISTERED No. PE034136 PROFESSIONAL ENGINEER JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

COVER SHEET

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET
1 OF 14

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\YATES PHASE_3_DAM_EMBANKMENT.DWG

GENERAL NOTES:

1. SCHNABEL ENGINEERING, LLC IS SOLELY RESPONSIBLE FOR THE PREPARATION OF THE PLANS FOR THE SUBJECT DAM AND SPILLWAY. ADHERENCE TO THESE PLANS, AS WELL AS ADHERENCE TO GOVERNMENT AND COUNTY REGULATIONS, ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. THE DAILY ON-SITE PRESENCE OF SCHNABEL ENGINEERING, LLC REPRESENTATIVES WILL BE REQUIRED TO CONFIRM THAT SITE CONDITIONS ARE AS ANTICIPATED AND TO CONFIRM THAT CONTRACTOR'S MEANS AND METHODS DO NOT COMPROMISE DESIGN INTENT.
3. CONTRACTOR TO VERIFY ALL CONDITIONS, ELEVATIONS AND DIMENSIONS BEFORE BEGINNING CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER FOR JUSTIFICATION AND/OR CORRECTION BEFORE PROCEEDING WITH THE WORK. CONTRACTOR TO ASSUME RESPONSIBILITY FOR DISCREPANCIES WHICH ARE NOT REPORTED. ALL DIMENSIONS SHOULD BE READ OR CALCULATED.
4. CONTRACTOR TO HAVE ALL UTILITIES FIELD LOCATED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY.
5. THE CONTRACTOR SHALL CONDUCT ALL WORK IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND ALL LOCAL, STATE AND FEDERAL RULES AND REGULATIONS. PROPER SAFETY PROCEDURES ARE OF SPECIAL CONCERN ON THE PROJECT CONSIDERING THAT WORKERS MAY BE WORKING IN TRENCH EXCAVATIONS.
6. ALL MATERIALS AND WORK PERFORMED SHALL COMPLY WITH THE TECHNICAL SPECIFICATIONS OF THE PROJECT.

WATER CONTROL NOTES:

1. CONTRACTOR SHALL BUILD, MAINTAIN AND OPERATE ANY TEMPORARY DIKES, COFFERDAMS, CHANNELS, FLUMES, SUMPS AND OTHER TEMPORARY DIVERSION AND PROTECTIVE WORKS NEEDED TO DIVERT SURFACE WATER FROM THE CONSTRUCTION WORK WHILE CONSTRUCTION IS IN PROGRESS. DIVERSION OR RETENTION OF SURFACE WATERS WILL BE CONTINUED UNTIL SUCH TIME AS DETERMINED BY THE ENGINEER.
2. FOUNDATIONS FOR CONCRETE, AND OTHER PARTS OF THE CONSTRUCTION SITE, SHALL BE DEWATERED AND KEPT FREE OF STANDING WATER OR EXCESSIVELY MUDDY OR SOFT CONDITIONS AS NEEDED FOR PROPER EXECUTION OF THE CONSTRUCTION WORK.
3. DEWATERING METHODS FOR FOUNDATION CONSTRUCTION OR SUBGRADE PREPARATION THAT CAUSE A LOSS OF FINES FROM FOUNDATION OR SUBGRADE AREAS WILL NOT BE PERMITTED.
4. CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGES INCURRED AS A RESULT OF THE LACK OF ADEQUATE SURFACE OR SUBSURFACE WATER CONTROL.
5. CONTRACTOR IS TO PROVIDE THE ENGINEER WITH A WATER CONTROL PLAN FOR REVIEW AND CONCURRENCE PRIOR TO THE START OF CONSTRUCTION.

SOIL COMPACTION NOTES:

1. ALL AREAS TO RECEIVE STRUCTURAL FILL TO BE CLEARED AND STRIPPED FREE OF TOPSOIL, ROOTS, STUMPS, ORGANICS AND ALL OTHER DELETERIOUS MATERIAL.
2. SUBGRADE AREAS WHICH ARE WET, SOFT, OR DEEMED OTHERWISE UNSUITABLE BY THE GEOTECHNICAL ENGINEER, SHALL BE UNDERCUT AND REPLACED WITH FILL MATERIALS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER AND COMPACTED IN ACCORDANCE WITH NOTE (4) OF THIS SECTION. SUBGRADE SHALL BE CAPABLE OF SUPPORTING 3,000 PSF WITH LESS THAN 1/2 INCH OF TOTAL SETTLEMENT.
3. AREAS TO RECEIVE STRUCTURAL FILL SHALL BE BENCHED INTO EXISTING SLOPES, DENSIFIED, AND SHALL BE AT SUCH MOISTURE CONTENT THAT THE FILL SOILS CAN BE COMPACTED AGAINST THE SLOPE TO EFFECT A GOOD BOND BETWEEN THE FILL SOILS AND THE EXISTING SOILS.
4. STRUCTURAL FILL TO BE PLACED IN MAXIMUM 8-INCH LOOSE LIFTS AND COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY AND BETWEEN OPTIMUM AND 4% ABOVE OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE STANDARD PROCTOR TEST (ASTM D-698).
5. ALL FILL SOILS TO BE PLACED UNDER THE OBSERVATION OF THE ENGINEER OR HIS REPRESENTATIVE.
6. UTILIZE SHEEPSFOOT ROLLER TO COMPACT SOILS IN MASS GRADING/FILLING ACTIVITIES. MECHANICAL HAND TAMPERS WILL BE USED TO COMPACT SOIL AROUND, ABOVE OR ADJACENT TO STRUCTURES AND/OR CONDUITS WHERE THE USE OF LARGE SHEEPSFOOT ROLLERS MAY DAMAGE STRUCTURES. MECHANICAL HAND TAMPERS WILL BE USED WITHIN 3 FEET OF ALL STRUCTURES.

NOTES ON DRAIN CONSTRUCTION:

1. DRAIN CONSTRUCTION WILL CONSIST OF INSTALLING THE FINE AND COARSE DRAIN FILL AND THE COLLECTOR/OUTLET PIPES FOR THE PROPOSED EMBANKMENT DRAINAGE SYSTEM.
2. COARSE DRAIN FILL TO BE TOUGH, HARD, DURABLE PARTICLES AND SHALL BE REASONABLY FREE OF FLAT OR ELONGATED PIECES AND SHALL CONTAIN NO ORGANIC MATTER OR SOFT FRIABLE PARTICLES. CONTRACTOR TO FURNISH ENGINEER WITH THE GRADATION OF COARSE DRAIN FILL FROM SUPPLIER PRIOR TO USE. COARSE DRAIN FILL DERIVED FROM LIMESTONE OR OTHER MATERIALS HAVING EITHER CEMENTITIOUS OR SOLUTIONING PROPERTIES WILL NOT BE ACCEPTED. ENGINEER SHALL REVIEW AND APPROVE SOURCE OF COARSE DRAIN FILL.
3. UTILIZE ASTM C-33 SAND FOR FINE DRAINAGE FILL. CONTRACTOR TO FURNISH ENGINEER WITH THE GRADATION OF ASTM C-33 SAND FROM SUPPLIER PRIOR TO USE. SAND FOR FINE DRAINAGE FILL SHALL BE NATURAL / RIVER RUN MATERIAL. SAND CREATED FROM ROCK CRUSHING OPERATIONS WILL NOT BE PERMITTED. SAND DERIVED FROM LIMESTONE OR OTHER MATERIALS HAVING EITHER CEMENTITIOUS OR SOLUTIONING PROPERTIES WILL NOT BE ACCEPTED. ENGINEER SHALL REVIEW AND APPROVE SOURCE OF SAND.
4. COARSE DRAIN FILL SHALL BE SURROUNDED BY A MINIMUM OF 9-INCHES OF FINE DRAIN FILL.
5. PERFORATED PIPE SHALL BE SURROUNDED BY A MINIMUM OF 6-INCHES OF COARSE DRAIN FILL.
6. MAINTAIN A MIN. OF 24-INCHES OF FINE DRAIN FILL BETWEEN STRUCTURES AND COARSE DRAIN FILL, UNLESS DETAILED OTHERWISE ON THE PLANS.
7. SOME MODIFICATIONS OF DRAIN LAYOUT AND INVERTS MAY BE REQUIRED IN THE FIELD TO ACCOMMODATE EXISTING SITE TOPOGRAPHY.
8. PIPING SHALL BE PERFORATED AND NON-PERFORATED RIGID POLYVINYL CHLORIDE (PVC) PIPE OR DUCTILE IRON PIPE AS INDICATED ON THE DRAWINGS. ALL PVC PIPE WILL BE AWWA C900, PRESSURE CLASS 150. ALL BENDS AND FITTINGS SHALL BE COMPATIBLE WITH THE PIPE UTILIZED AND SHOULD BE INSTALLED ACCORDING TO APPLICABLE MANUFACTURER'S RECOMMENDATIONS.
9. INSTALLATION OF SUBSURFACE DRAINS WILL BE ACCOMPLISHED IN SUCH A MANNER THAT WORKER SAFETY IS NOT COMPROMISED IN ANY WAY. CONTRACTOR TO TAKE NECESSARY PRECAUTIONS TO PREVENT COLLAPSE OF TRENCH OR SLOPE INSTABILITY DURING INSTALLATION OF DRAINAGE SYSTEM.

GENERAL NOTES FOR CONCRETE STRUCTURES:

1. EXCEPT AS OTHERWISE NOTED OR SPECIFIED, THESE GENERAL NOTES SHALL APPLY TO THE CONCRETE STRUCTURES.
2. ALL CONCRETE SHALL CONFORM TO THE MOST RECENT EDITION OF "CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES, ACI-350."
3. STRUCTURAL CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 4500 PSI AT 28 DAYS AND REINFORCEMENT WITH A MINIMUM YIELD STRENGTH OF 60,000 PSI.
4. BACKFILL CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS AND REINFORCEMENT WITH A MINIMUM YIELD STRENGTH OF 60,000 PSI.
5. CONCRETE TESTING WILL BE IN COMPLIANCE WITH THE FOLLOWING ASTM STANDARDS: C31, C39, C138, C143, C172, C173, AND C231.
6. FOR REINFORCING STEEL
   a. FOR DEVELOPMENT AND LAP SPLICE LENGTH, REFER TO ACI 318 AND ACI 350.
   b. REINFORCEMENT SHALL HAVE A MINIMUM LENGTH OF 20'-0" BETWEEN SPLICES UNLESS OTHERWISE SHOWN.
   c. SPLICES SHALL NOT CROSS CONSTRUCTION OR CONTRACTION JOINTS.
   d. SPLICE DIMENSIONS SHOWN ARE MINIMUM VALUES. CONTRACTOR MAY ELECT TO UTILIZE LONGER SPLICE LENGTHS TO ACCOUNT FOR POTENTIAL CONSTRUCTION VARIANCES AT NO ADDITIONAL COST TO THE OWNER.
6. FOR DOWEL BARS:
   a. DOWEL BARS SHALL MEET THE REQUIREMENTS OF ASTM A36 AND ARE TO BE GALVANIZED IN ACCORDANCE WITH ASTM A123.
   b. PLAIN DOWEL BARS SHALL BE 2 FEET LONG AND 3/4" DIAMETER SMOOTH STEEL.
   c. ONE-HALF OF EACH DOWEL BAR SHALL BE COATED WITH HEAVY GREASE TO PREVENT BOND WITH CONCRETE.
   d. DOWELS SHALL BE KEPT IN STRAIGHT ALIGNMENT, AS SHOWN IN THE PLANS, DURING AND SUBSEQUENT TO CONCRETE PLACEMENT.
   e. DOWELS SHALL BE SPACED 12 INCHES APART ALONG ALL CONTRACTION JOINTS UNLESS OTHERWISE NOTED.
7. CHAMFER ALL EXPOSED CORNERS 3/4" UNLESS OTHERWISE SHOWN OR DESIGNATED.
8. CUT OR BEND STEEL REINFORCING BARS AS NECESSARY TO INSTALL DRAIN PIPE OUTLETS.
9. JOINTS
   a. ADDITIONAL CONSTRUCTION JOINTS OR RELOCATION OF CONSTRUCTION JOINTS MAY BE USED IF APPROVED BY ENGINEER.
   b. CONSTRUCTION JOINTS SHALL BE AS SHOWN ON THE PLANS. UNDER NO CIRCUMSTANCES MAY A SECTION OF WALL BE POURED HIGHER THAN TEN FEET DURING ANY ONE PLACEMENT (UNLESS OTHERWISE SHOWN).
10. EMBEDDED MATERIALS
    a. BEFORE PLACING CONCRETE, CARE SHALL BE TAKEN THAT ALL EMBEDDED ITEMS ARE IN POSITION AND SECURELY FASTENED IN PLACE.
    b. ALL WATERSTOPS SHALL BE SUPPORTED AND PROTECTED FROM DAMAGE AND EXPOSURE.
11. CLEAR COVER TO REINFORCEMENT DISTANCE SHALL BE 2" FROM FORMED FACES/EDGES AND 3" FROM UNFORMED FACES/EDGES CAST AGAINST EARTH OR ROCK (UNLESS OTHERWISE SHOWN).

811 Know what's **below.** **Call** before you dig.

GEORGIA 811
CALL BEFORE YOU DIG
DIAL 811 OR CALL 1-800-282-7411
UTILITIES PROTECTION CENTER
IT'S THE LAW

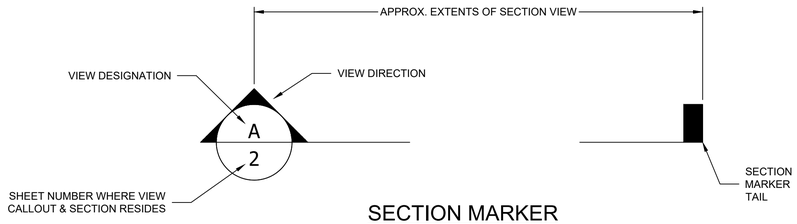
NOTE: CONTRACTOR MUST COORDINATE WORK WITH UTILITY PROVIDERS TO MAINTAIN UTILITY SERVICE AND A SAFE WORK SITE.

TOPOGRAPHIC INFORMATION PROVIDED BY:

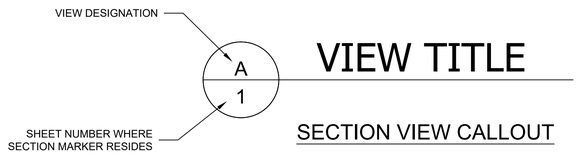
SOUTHERN COMPANY
BIRMINGHAM, AL

SURVEY DATED: 05/26/2017

COORDINATES ARE BASED OFF THE GEORGIA WEST STATE PLANE COORDINATE SYSTEM AND ELEVATIONS ON NAVD 88.



SECTION MARKER



SECTION VIEW CALLOUT

FLOW

FLOW ARROW

INDICATES DIRECTION OF FLOW

ABBREVIATIONS

B.F.	BOTH FACES	NTS, N.T.S.	NOT TO SCALE
B.I.G.	BREAK-IN-GRADE	N.P.	NORMAL POOL
BP, B.P.	BEGINNING POINT	O.P.	OUTSIDE DIAMETER
CJ,C.J.	CONSTRUCTION JOINT	O.F.	OUTSIDE FACE (BACKFILL SIDE)
C/L, CL, ℄	CENTER LINE	O/S	OFFSET FROM CENTERLINE
CMP, C.M.P.	CORRUGATED METAL PIPE	P-1	PIEZOMETERS (TYP.)
D.F.	DOWNSTREAM FACE	P.C.	POINT OF CURVATURE
DI, D.I.	DROP INLET	PI, P.I.	POINT OF INTERSECTION
DIA.	DIAMETER	PROP	PROPOSED
DIP, D.I.P.	DUCTILE IRON PIPE	PVC	POLYVINYL CHLORIDE PIPE
D/S	DOWNSTREAM	R	RADIUS
E.F.	EACH FACE	RCP, R.C.P.	REINFORCED CONCRETE PIPE
ELEV., EL.	ELEVATION	REF.	REFERENCE
E/P	EDGE OF PAVEMENT	STA.	STATION
EP, E.P.	END POINT	SS, S.S.	SANITARY SEWER
EXIST.	EXISTING	SSMH, S.S.M.H.	SANITARY SEWER MANHOLE
FT	FEET	TCJ, T.C.J.	TRANSVERSE CONTRACTION JOINT
HW, H.W.	HEADWALL	TP	TEST PIT
I.D.	INSIDE DIAMETER	TYP.	TYPICAL DETAIL
IE, I.E.	INVERT ELEVATION	U.F.	UPSTREAM FACE
I.F.	INSIDE FACE (FLOW SIDE)	U/S	UPSTREAM
INV.	INVERT	VC	VERTICAL CURVE
LF, L.F.	LINEAR FOOT	W.E.	WATER ELEVATION
M.S.L.	MEAN SEA LEVEL	W/O	WITHOUT

REV	DESCRIPTION	DATE

DESIGNED BY: JTD/JC
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
GEORGIA PROFESSIONAL ENGINEER NO. 034186
DATE: 08/16/2019

GEORGIA REGISTERED No. PE034186 PROFESSIONAL JONATHAN THOMAS DEAN

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PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

GENERAL NOTES

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET
2 OF 14

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\YATES PHASE_3_DAM_EMBANKMENT.DWG

COORDINATES ARE BASED OFF THE GEORGIA WEST NAD 83 STATE PLANE COORDINATE SYSTEM AND ELEVATIONS ON NAVD 88.

NOTE: TOPOGRAPHY DEPICTED BELOW EL. 722 BASED UPON 1969 TOPOGRAPHIC DATA. TOPOGRAPHY DEPICTED ABOVE EL. 722 BASED UPON TOPOGRAPHIC DATA PROVIDED BY SOUTHERN COMPANY AND DATED 5/26/2017.

N

EXISTING OVERHEAD POWER LINES

BENCHMARK
MONUMENT P25
N:1259506.61
E:2070627.72
EL. = 729.32

B-109

EXISTING POWER POLES (TYP.)

EXISTING GUY ANCHORS (TYP.)

B-108

APPROX. LOCATION OF EXISTING 8-INCH DIAMETER SANITARY SEWER. (ABANDONED)

B-504

B-505

B-503

B-506

B-110

B-107

6+00

7+00

8+00

9+00

10+00

10+50

5+00

4+00

3+00

2+00

1+00

0+00

DAM BASELINE

B-502A

EXISTING GUY ANCHORS (TYP.)

EXISTING POWER POLES (TYP.)

EXISTING NEUTRALIZATION SUMP INLET

B-106

EXISTING NEUTRALIZATION SUMP

APPROX. LOCATION OF EXISTING (2) 24-INCH DIA. MAKE-UP WATER LINES

EXISTING GUY ANCHORS/WIRES TO BE REMOVED/RELOCATED BY OTHERS

B-111

APPROX. LOCATION OF EXISTING COOLING TOWER YARD DUCT BANK

APPROX. LOCATION OF EXISTING SERVICE WATER POND OUTLET CONDUIT

EXISTING OVERHEAD POWER LINES

APPROX. LOCATION OF EXISTING LVW LINE

APPROX. LOCATION OF PROPOSED CTB LINE (BY OTHERS)

EXISTING FENCE

APPROX. LOCATION OF EXISTING ELECTRICAL DUCT

APPROX. LOCATION OF EXISTING ELECTRICAL MANHOLE (TYP.).

EXISTING OVERHEAD POWER LINE

LEGEND

- TEST BORING
- EXISTING GUY WIRE ANCHOR
- EXISTING TRANSMISSION BASE / POWER POLE
- EXISTING LIGHT POLE

SCALE: 1"=40'
0 40' 80'

DATE	DESCRIPTION	REV.

DESIGNED BY: JTD/JG
DRAWN BY: GNB
CHECKED BY: JGM

JONATHAN THOMAS DEAN, P.E.
GEORGIA PROFESSIONAL ENGINEER NO. 034136
DATE: 08/16/2019

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

EXISTING SITE PLAN

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET
3 OF 14

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CADD\DRAWINGS\05-FINAL_DESIGN\YATES PHASE_3_DAM_EMBANKMENT.DWG

COORDINATES ARE BASED OFF THE GEORGIA WEST STATE PLANE COORDINATE SYSTEM AND ELEVATIONS ON NAVD 88.

LEGEND

- TEST BORING
- EXISTING GUY WIRE ANCHOR
- EXISTING TRANSMISSION BASE / POWER POLE
- EXISTING LIGHT POLE

GENERAL NOTES:

1. DISTURBED AREAS SHALL RECEIVE PERMANENT VEGETATION IN ACCORDANCE WITH VEGETATIVE PLAN SHOWN THIS SHEET.
2. NO GRADING OR EXCAVATION IS PERMITTED WITHIN 30 FEET OF ANY TRANSMISSION TOWER, POWER LINE, OR GUY WIRE.
3. DURING EXCAVATION AND GRADING ALONG/WITHIN THE NORTH SHORELINE, CONTRACTOR SHALL USE CAUTION. THERE ARE POTENTIAL BURIED ACTIVE AND IN-ACTIVE UTILITIES OF WHICH THE LOCATIONS ARE UNCERTAIN. APPROXIMATE LIMITS OF KNOWN UNDERGROUND UTILITIES ARE SHOWN HEREIN. CONTRACTOR SHALL VERIFY ALL UTILITIES WITHIN PROPOSED WORK LIMITS PRIOR TO CONSTRUCTION.
4. SOUTHERN COMPANY/GEORGIA POWER SHALL PROVIDE AS-BUILT ASH REMOVAL / EXCAVATION LIMITS TO SCHNABEL FOR REVIEW PRIOR TO START OF CONSTRUCTION OF NEW EARTHEN DAM.

TEMPORARY COFFERDAM NOTES:

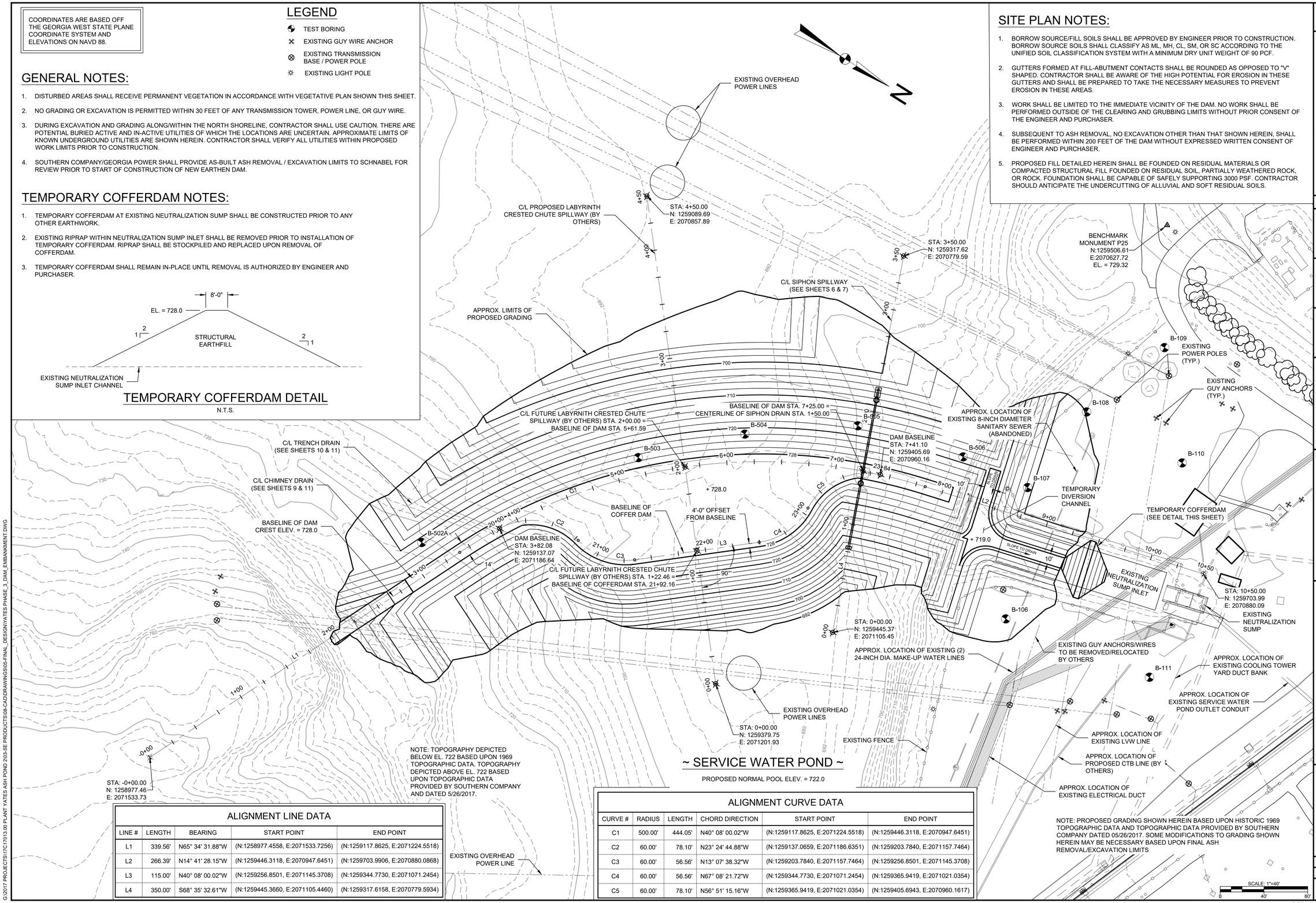
1. TEMPORARY COFFERDAM AT EXISTING NEUTRALIZATION SUMP SHALL BE CONSTRUCTED PRIOR TO ANY OTHER EARTHWORK.
2. EXISTING RIPRAP WITHIN NEUTRALIZATION SUMP INLET SHALL BE REMOVED PRIOR TO INSTALLATION OF TEMPORARY COFFERDAM. RIPRAP SHALL BE STOCKPILED AND REPLACED UPON REMOVAL OF COFFERDAM.
3. TEMPORARY COFFERDAM SHALL REMAIN IN-PLACE UNTIL REMOVAL IS AUTHORIZED BY ENGINEER AND PURCHASER.

TEMPORARY COFFERDAM DETAIL

N.T.S.

SITE PLAN NOTES:

1. BORROW SOURCE/FILL SOILS SHALL BE APPROVED BY ENGINEER PRIOR TO CONSTRUCTION. BORROW SOURCE SOILS SHALL CLASSIFY AS ML, MH, CL, SM, OR SC ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM WITH A MINIMUM DRY UNIT WEIGHT OF 90 PCF.
2. GUTTERS FORMED AT FILL-ABUTMENT CONTACTS SHALL BE ROUNDED AS OPPOSED TO "V" SHAPED. CONTRACTOR SHALL BE AWARE OF THE HIGH POTENTIAL FOR EROSION IN THESE GUTTERS AND SHALL BE PREPARED TO TAKE THE NECESSARY MEASURES TO PREVENT EROSION IN THESE AREAS.
3. WORK SHALL BE LIMITED TO THE IMMEDIATE VICINITY OF THE DAM. NO WORK SHALL BE PERFORMED OUTSIDE OF THE CLEARING AND GRUBBING LIMITS WITHOUT PRIOR CONSENT OF THE ENGINEER AND PURCHASER.
4. SUBSEQUENT TO ASH REMOVAL, NO EXCAVATION OTHER THAN THAT SHOWN HEREIN, SHALL BE PERFORMED WITHIN 200 FEET OF THE DAM WITHOUT EXPRESSED WRITTEN CONSENT OF ENGINEER AND PURCHASER.
5. PROPOSED FILL DETAILED HEREIN SHALL BE FOUNDED ON RESIDUAL MATERIALS OR COMPACTED STRUCTURAL FILL FOUNDED ON RESIDUAL SOIL, PARTIALLY WEATHERED ROCK, OR ROCK. FOUNDATION SHALL BE CAPABLE OF SAFELY SUPPORTING 3000 PSF. CONTRACTOR SHOULD ANTICIPATE THE UNDERCUTTING OF ALLUVIAL AND SOFT RESIDUAL SOILS.



ALIGNMENT LINE DATA

LINE #	LENGTH	BEARING	START POINT	END POINT
L1	339.56'	N65° 34' 31.88"W	(N:1258977.4558, E:2071533.7256)	(N:1259117.8625, E:2071224.5518)
L2	266.39'	N14° 41' 28.15"W	(N:1259446.3118, E:2070947.6451)	(N:1259703.9906, E:2070880.0868)
L3	115.00'	N40° 08' 00.02"W	(N:1259256.8501, E:2071145.3708)	(N:1259344.7730, E:2071071.2454)
L4	350.00'	S68° 35' 32.61"W	(N:1259445.3660, E:2071105.4460)	(N:1259317.6158, E:2070779.5934)

ALIGNMENT CURVE DATA

CURVE #	RADIUS	LENGTH	CHORD DIRECTION	START POINT	END POINT
C1	500.00'	444.05'	N40° 08' 00.02"W	(N:1259117.8625, E:2071224.5518)	(N:1259446.3118, E:2070947.6451)
C2	60.00'	78.10'	N23° 24' 44.88"W	(N:1259137.0659, E:2071186.6351)	(N:1259203.7840, E:2071157.7464)
C3	60.00'	56.56'	N13° 07' 38.32"W	(N:1259203.7840, E:2071157.7464)	(N:1259256.8501, E:2071145.3708)
C4	60.00'	56.56'	N67° 08' 21.72"W	(N:1259344.7730, E:2071071.2454)	(N:1259365.9419, E:2071021.0354)
C5	60.00'	78.10'	N56° 51' 15.16"W	(N:1259365.9419, E:2071021.0354)	(N:1259405.6943, E:2070960.1617)

REV	DESCRIPTION	DATE

DESIGNED BY: JTD/JC
DRAWN BY: QHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 08/16/2019
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL ENGINEER JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

PROPOSED SITE PLAN - PHASE 1

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET 4 OF 12

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NOTES:

1. DAM CENTERLINE PROFILE DEPICTS BORING DATA AND ENGINEERS INTERPRETATION OF SAID DATA. CONTRACTOR SHALL NOT RELY ON ENGINEER INTERPRETATION OF DATA WHICH WAS SOLELY DEVELOPED FOR DESIGN PURPOSES. CONTRACTOR SHALL REVIEW DATA AND DEVELOP INDEPENDENT INTERPRETATION OF AVAILABLE DATA.
2. APPROXIMATE LIMITS OF FOUNDATION EXCAVATION SHOWN HEREIN IS BASED ON DATA ASSOCIATED WITH TEST BORINGS PERFORMED DURING THE SUBSURFACE INVESTIGATION (DATED FEBRUARY THROUGH MARCH, 2019) AND SHOULD BE CONSIDERED APPROXIMATE. CHANGES TO THE PROFILE AS SHOWN SHOULD BE ANTICIPATED DURING CONSTRUCTION.
3. THE DAM SHALL BE FOUNDED ON COMPETENT ROCK OR RESIDUAL MATERIALS, AS DETERMINED IN THE FIELD BY THE ENGINEER.
4. APPROXIMATE DEPTH OF CORE TRENCH:

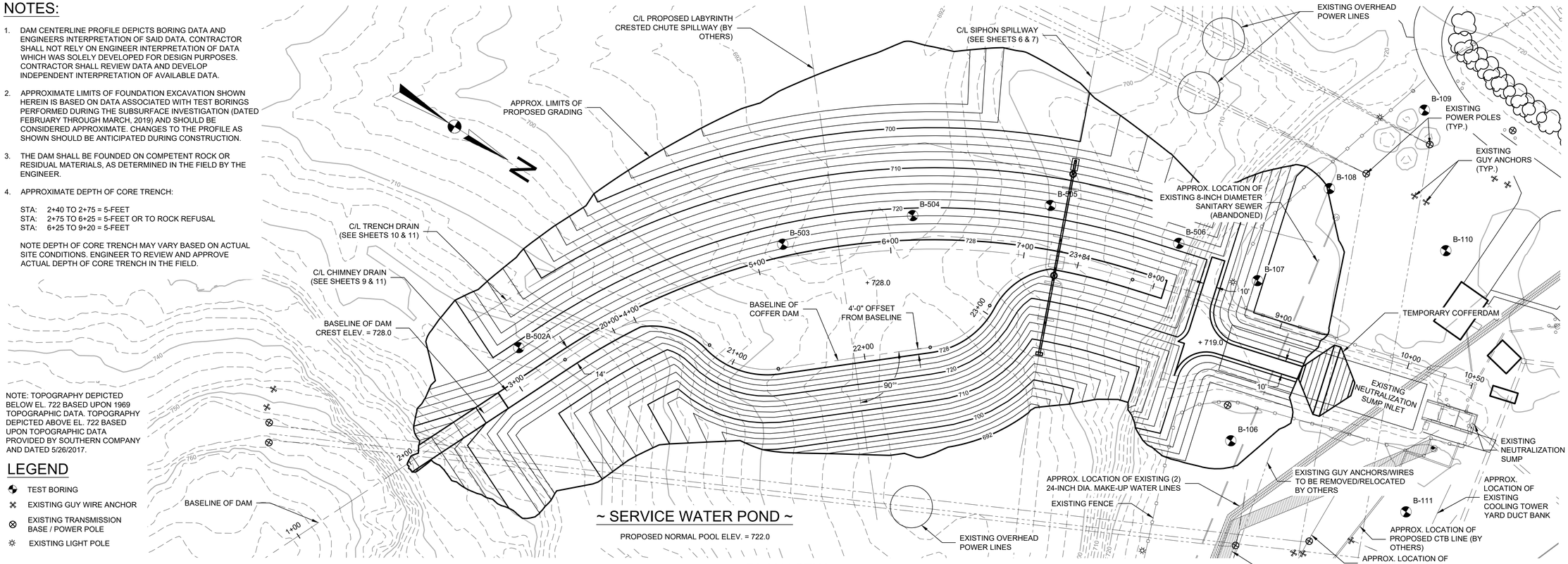
   STA: 2+40 TO 2+75 = 5-FEET
   STA: 2+75 TO 6+25 = 5-FEET OR TO ROCK REFUSAL
   STA: 6+25 TO 9+20 = 5-FEET

   NOTE DEPTH OF CORE TRENCH MAY VARY BASED ON ACTUAL SITE CONDITIONS. ENGINEER TO REVIEW AND APPROVE ACTUAL DEPTH OF CORE TRENCH IN THE FIELD.

NOTE: TOPOGRAPHY DEPICTED BELOW EL. 722 BASED UPON 1969 TOPOGRAPHIC DATA. TOPOGRAPHY DEPICTED ABOVE EL. 722 BASED UPON TOPOGRAPHIC DATA PROVIDED BY SOUTHERN COMPANY AND DATED 5/26/2017.

LEGEND

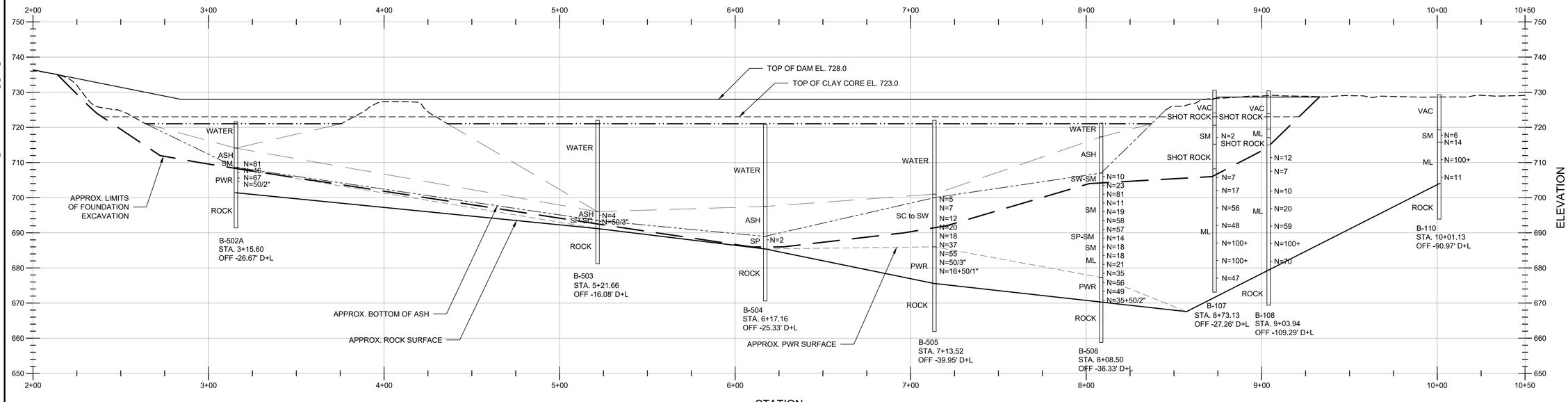
- TEST BORING
- EXISTING GUY WIRE ANCHOR
- EXISTING TRANSMISSION BASE / POWER POLE
- EXISTING LIGHT POLE



PLAN VIEW

SCALE: 1"=40'

0 40' 80'



STATION

DAM CENTERLINE PROFILE VIEW

SCALE: 1"=30'

0 30' 60'

ELEVATION

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\YATES PHASE_3_DAM_EMBANKMENT.DWG

DATE	DESCRIPTION	REV

DESIGNED BY: JTD/JC
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 08/16/2019
GEORGIA PROFESSIONAL ENGINEER NO. 034186

GEORGIA REGISTERED No. PE034186 PROFESSIONAL ENGINEER JONATHAN THOMAS DEAN

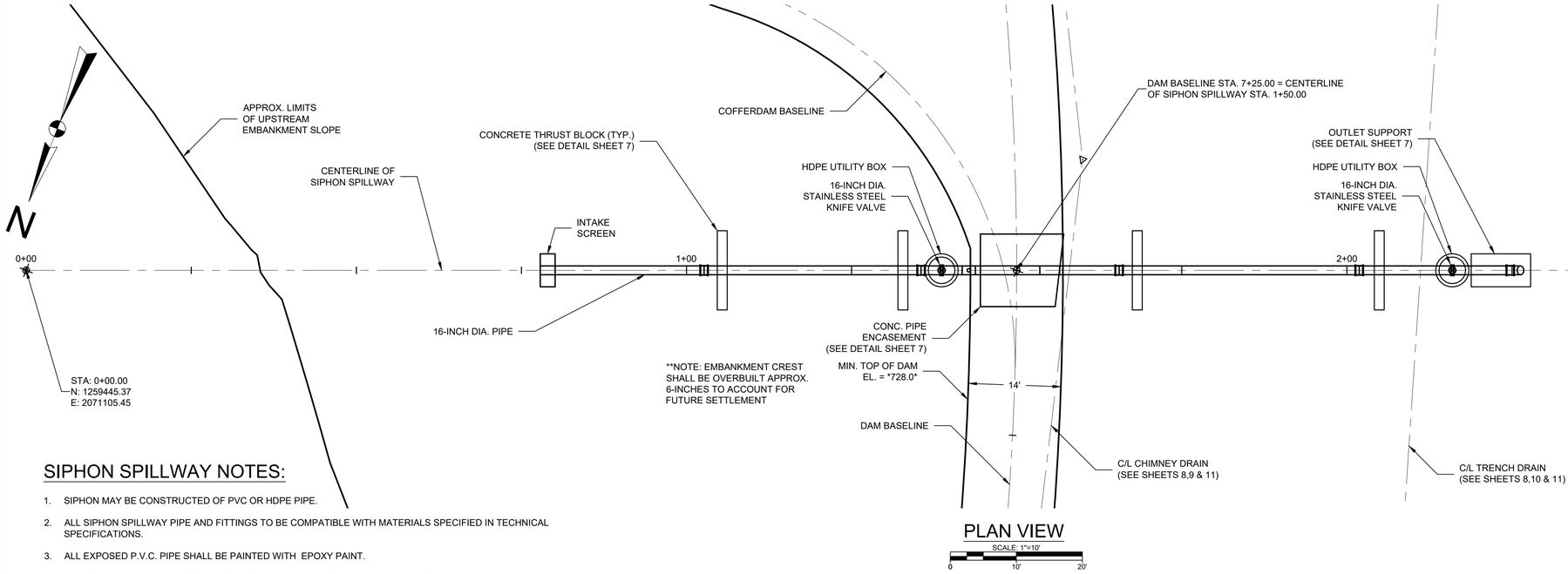
Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 / Phone: 770-781-8008 / Fax: 770-781-8003 / schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

DAM CENTERLINE PLAN & PROFILE - PHASE I

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET 5 OF 14



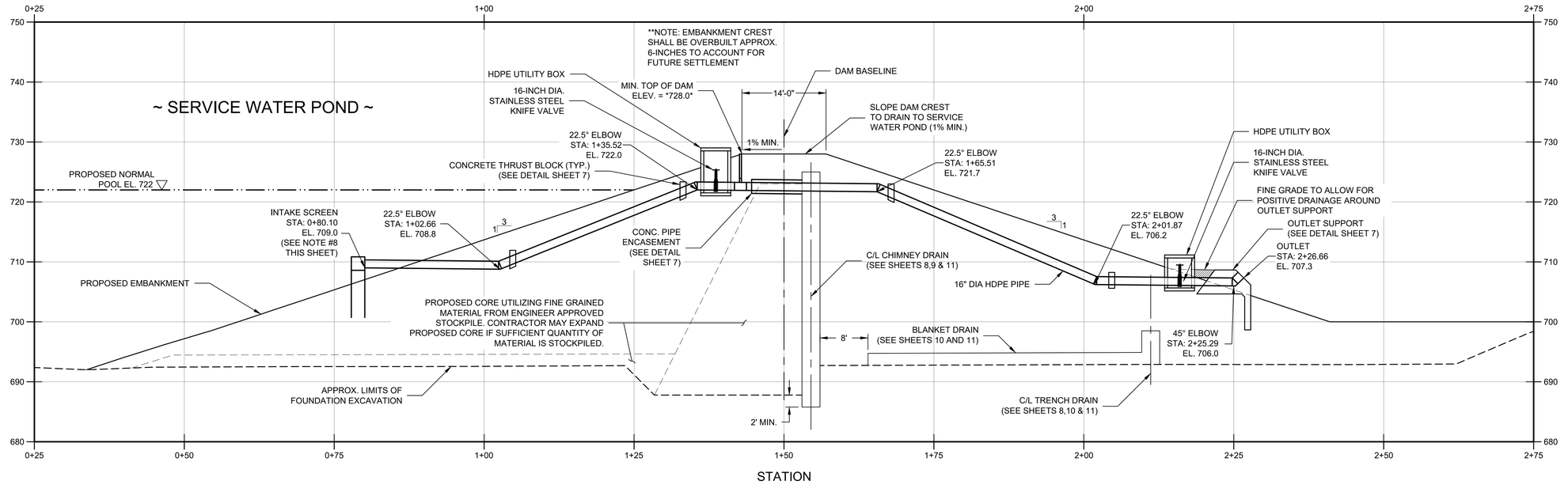
PLAN VIEW

SCALE: 1"=10'

0 10' 20'

SIPHON SPILLWAY NOTES:

1. SIPHON MAY BE CONSTRUCTED OF PVC OR HDPE PIPE.
2. ALL SIPHON SPILLWAY PIPE AND FITTINGS TO BE COMPATIBLE WITH MATERIALS SPECIFIED IN TECHNICAL SPECIFICATIONS.
3. ALL EXPOSED P.V.C. PIPE SHALL BE PAINTED WITH EPOXY PAINT.
4. PIPE CAPS SHALL BE PROVIDED TO OWNER FOR MANUAL PRIMING OF SIPHON PIPES.
5. IF USED, ALL 16" DIA. HDPE PIPE SHALL BE DR-17.
6. IF USED, ALL PVC PIPE SHALL BE AWWA C-905, DR-18.
7. CONTRACTOR SHALL SUBMIT PROPOSED KNIFE VALVE FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
8. 27" x 26" ALUMINUM INTAKE SCREEN WITH SPLITTER VORTEX PLATES (WELDED IN INTAKE SCREEN TO INTERSECT INSIDE SCREEN AND EXTEND 12" OF THREE SIDES) & 2 - 4 FT SUPPORT LEGS (TO BOLT TO BACK OF INTAKE SCREEN) AS MANUFACTURED BY SOUTHEASTERN PIPE & DRAIN SYSTEMS OR APPROVED EQUAL. CONTRACTOR SHALL SUBMIT PROPOSED INTAKE SCREEN FOR REVIEW AND APPROVAL.



16-INCH DIA. SIPHON SPILLWAY PROFILE VIEW

SCALE: 1"=10'

0 10' 20'

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\YATES PHASE_3_SIPHON DETAILS.DWG

DESIGNED BY: JTD/JJC
DRAWN BY: QHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 08/16/2019
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

DATE | DESCRIPTION | REV

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

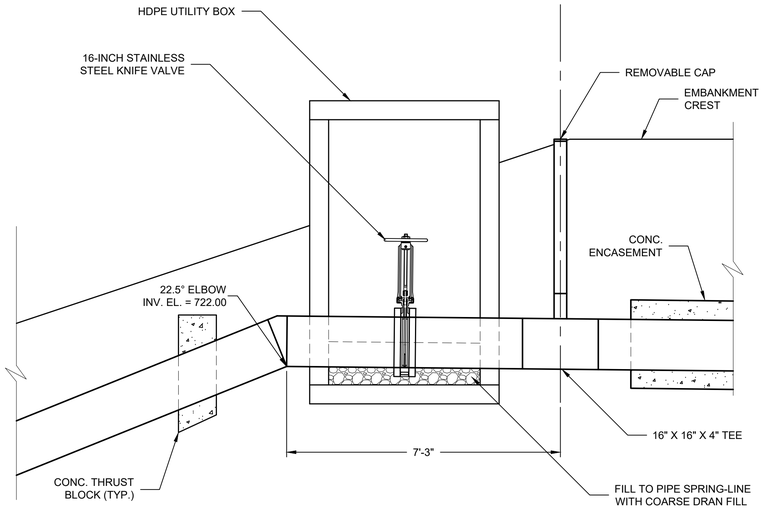
SIPHON SPILLWAY PLAN & PROFILE

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET 6 OF 14

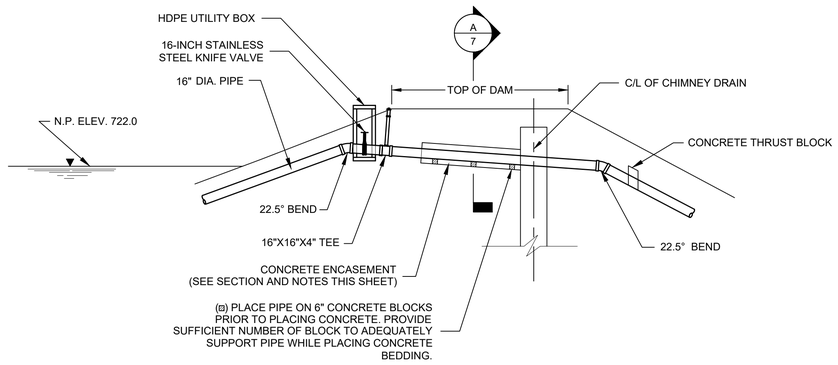
NOTES FOR INSTALLATION OF CONCRETE ENCASEMENT:

- CONTRACTOR SHALL TAKE NECESSARY STEPS TO ENSURE THAT CONCRETE FILLS ALL VOIDS BETWEEN SIPHON PIPING AND TRENCH BOTTOM AND THAT CONCRETE IS CONTINUOUS BENEATH PIPE.
- START CONCRETE 6" DOWNSTREAM OF TEE AND EXTEND TO CHIMNEY DRAIN. SEE DETAIL THIS SHEET.
- CONTRACTOR SHALL SECURE SIPHON PRIOR TO PLACING CONCRETE CRADLE TO ENSURE PIPE DOES NOT FLOAT.



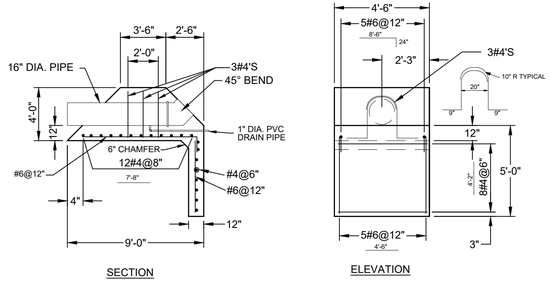
DETAIL AT FILL PIPE

N.T.S.



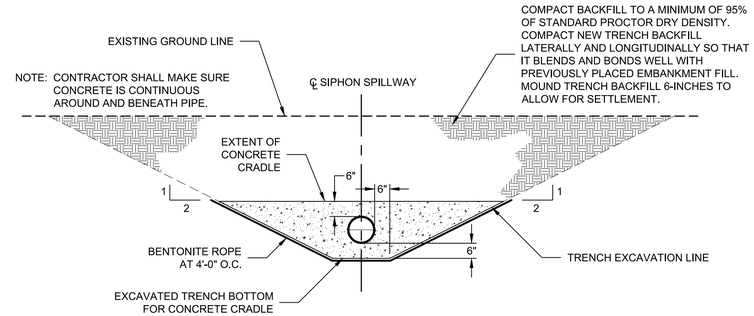
CONCRETE BEDDING DETAIL FOR 16" DIA. SIPHON SPILLWAY PIPE

N.T.S.



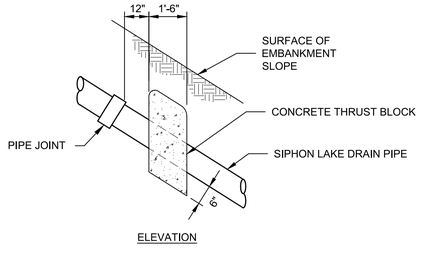
OUTLET SUPPORT DETAIL

N.T.S.



SECTION 'A' - CONCRETE ENCASEMENT

N.T.S.



CONCRETE THRUST BLOCK DETAIL

N.T.S.

REV	DESCRIPTION	DATE

DESIGNED BY: JTD/JJC
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 08/16/2019
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL ENGINEER JONATHAN THOMAS DEAN

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PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

SIPHON SPILLWAY DETAILS

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET 7 OF 14

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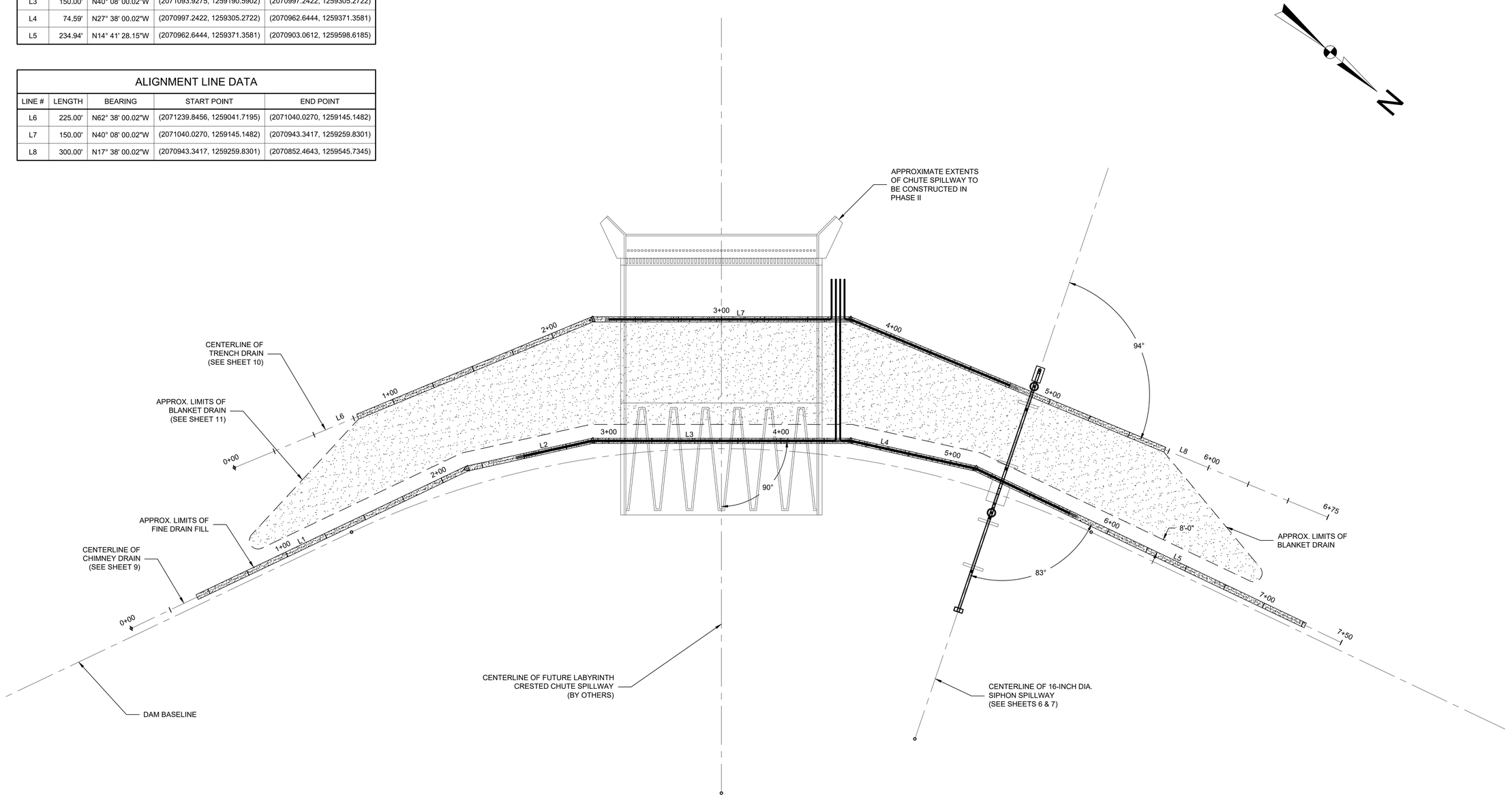
ALIGNMENT LINE DATA				
LINE #	LENGTH	BEARING	START POINT	END POINT
L1	215.87'	N65° 34' 31.88"W	(2071349.7635, 1259056.0572)	(2071153.2129, 1259145.3178)
L2	74.59'	N52° 38' 00.02"W	(2071153.2129, 1259145.3178)	(2071093.9275, 1259190.5902)
L3	150.00'	N40° 08' 00.02"W	(2071093.9275, 1259190.5902)	(2070997.2422, 1259305.2722)
L4	74.59'	N27° 38' 00.02"W	(2070997.2422, 1259305.2722)	(2070962.6444, 1259371.3581)
L5	234.94'	N14° 41' 28.15"W	(2070962.6444, 1259371.3581)	(2070903.0612, 1259598.6185)

ALIGNMENT LINE DATA				
LINE #	LENGTH	BEARING	START POINT	END POINT
L6	225.00'	N62° 38' 00.02"W	(2071239.8456, 1259041.7195)	(2071040.0270, 1259145.1482)
L7	150.00'	N40° 08' 00.02"W	(2071040.0270, 1259145.1482)	(2070943.3417, 1259259.8301)
L8	300.00'	N17° 38' 00.02"W	(2070943.3417, 1259259.8301)	(2070852.4643, 1259545.7345)



NOTE: EXTENTS OF DRAINS MAY VARY FROM THAT SHOWN HEREIN BASED ON ACTUAL FIELD CONDITIONS.

SCALE: 1"=30'
0 30' 60'

REV	DESCRIPTION	DATE

DESIGNED BY: JTD/JC
DRAWN BY: QHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
GEORGIA PROFESSIONAL ENGINEER NO. 034136
DATE: 08/16/2019

GEORGIA REGISTERED JONATHAN THOMAS DEAN No. PE034136 PROFESSIONAL ENGINEER

Schnabel ENGINEERING
6445 Shiloh Road, Suite A | Alpharetta, GA 30005 | Phone: 770-781-8008 | Fax: 770-781-8003
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PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

DRAIN LAYOUT PLAN

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET 8 OF 14

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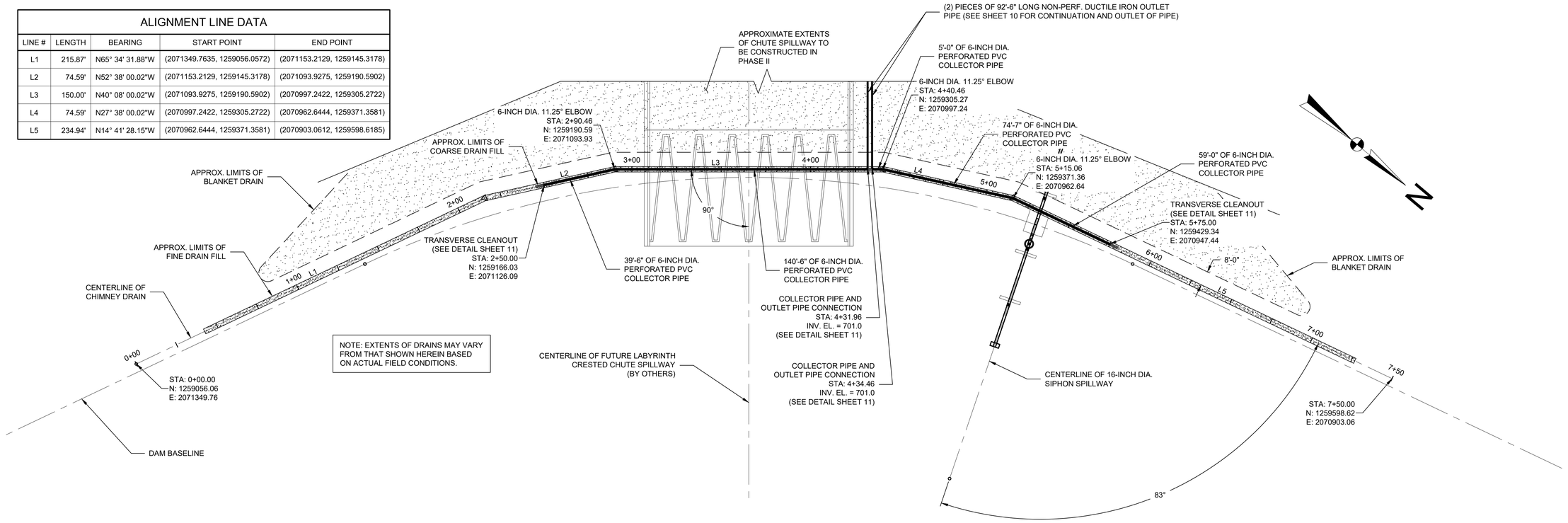
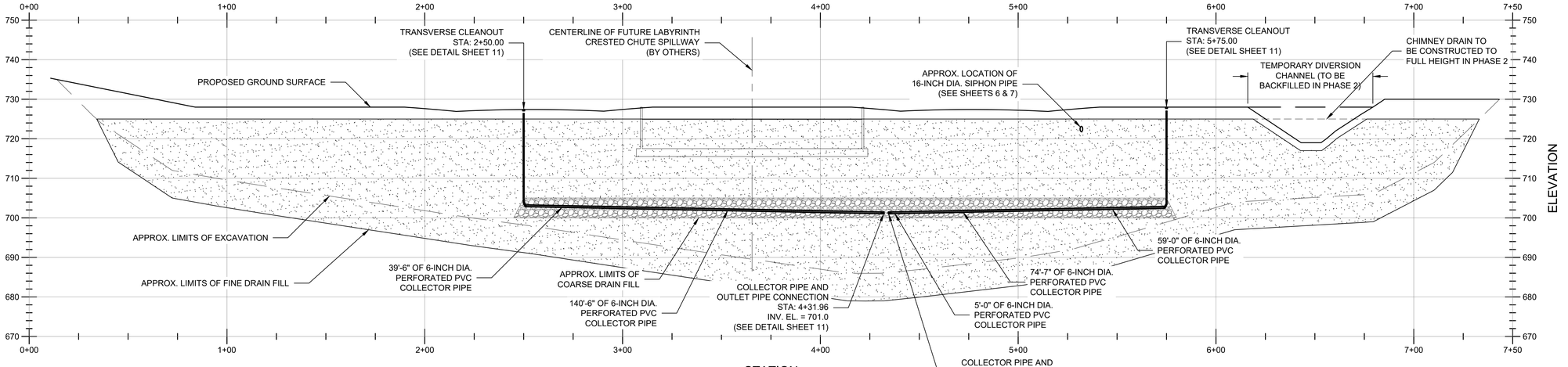
ALIGNMENT LINE DATA				
LINE #	LENGTH	BEARING	START POINT	END POINT
L1	215.87'	N65° 34' 31.88"W	(2071349.7635, 1259056.0572)	(2071153.2129, 1259145.3178)
L2	74.59'	N52° 38' 00.02"W	(2071153.2129, 1259145.3178)	(2071093.9275, 1259190.5902)
L3	150.00'	N40° 08' 00.02"W	(2071093.9275, 1259190.5902)	(2070997.2422, 1259305.2722)
L4	74.59'	N27° 38' 00.02"W	(2070997.2422, 1259305.2722)	(2070962.6444, 1259371.3581)
L5	234.94'	N14° 41' 28.15"W	(2070962.6444, 1259371.3581)	(2070903.0612, 1259598.6185)



CHIMNEY DRAIN PLAN VIEW

SCALE: 1"=30'



CHIMNEY DRAIN PROFILE VIEW

HORIZONTAL SCALE

VERTICAL SCALE

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\YATES PHASE_3_DRAINAGE DETAILS.DWG

REV	DESCRIPTION	DATE

DESIGNED BY: JTD/JC
DRAWN BY: QHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 08/16/2019
GEORGIA PROFESSIONAL ENGINEER NO. 034186

GEORGIA REGISTERED No. PE034186 PROFESSIONAL ENGINEER JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

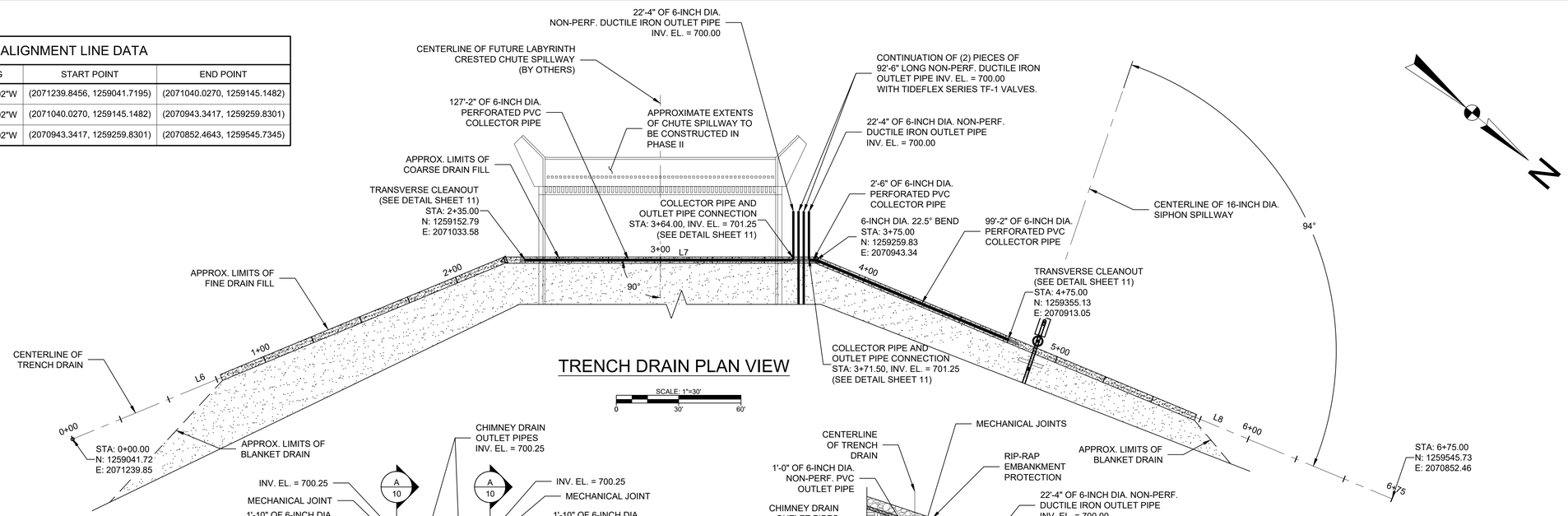
PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

CHIMNEY DRAIN PLAN & PROFILE

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET 9 OF 14

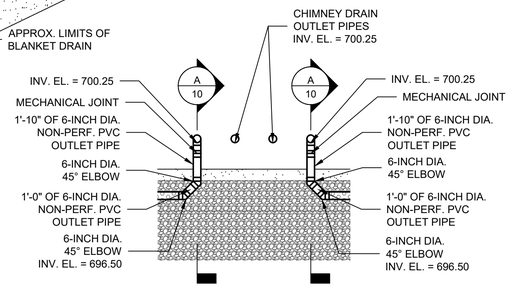
ALIGNMENT LINE DATA				
LINE #	LENGTH	BEARING	START POINT	END POINT
L6	225.00'	N62° 38' 00.02"W	(2071239.8456, 1259041.7195)	(2071040.0270, 1259145.1482)
L7	150.00'	N40° 08' 00.02"W	(2071040.0270, 1259145.1482)	(2070943.3417, 1259259.8301)
L8	300.00'	N17° 38' 00.02"W	(2070943.3417, 1259259.8301)	(2070852.4643, 1259545.7345)



TRENCH DRAIN PLAN VIEW

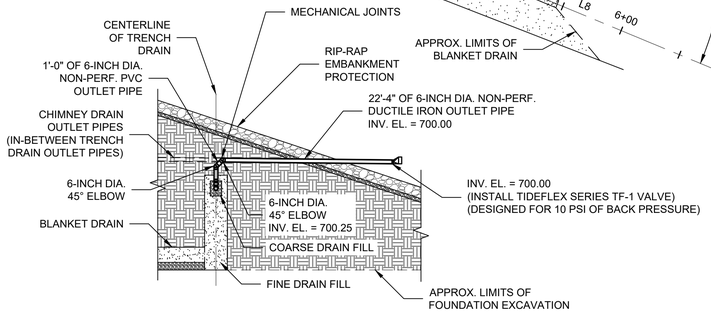
SCALE: 1"=30'
0 30' 60'

NOTE: EXTENTS OF DRAINS MAY VARY FROM THAT SHOWN HEREIN BASED ON ACTUAL FIELD CONDITIONS.



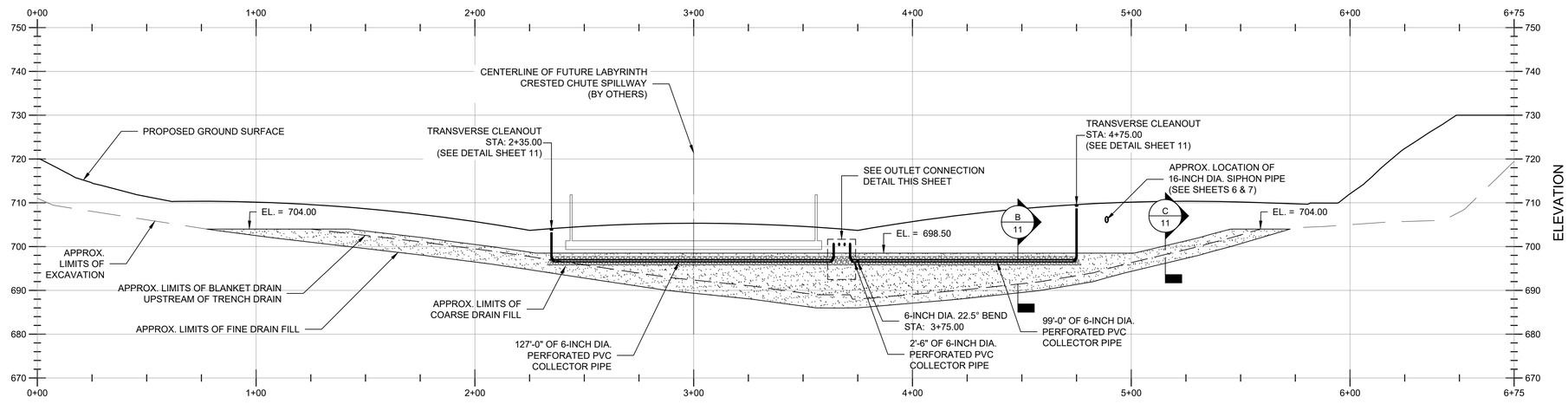
TRENCH DRAIN OUTLET CONNECTION DETAIL

SCALE: 1"=5'
0 5' 10'



A/10 OUTLET SECTION

SCALE: 1"=10'
0 10' 20'



TRENCH DRAIN PROFILE VIEW

HORIZONTAL SCALE
0 30' 60'
VERTICAL SCALE
0 15' 30'

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\YATES PHASE_3_DRAINAGE DETAILS.DWG

DESIGNED BY: JTD/JC	DRAWN BY: GHB	CHECKED BY: JSM	REV	DESCRIPTION	DATE

JONATHAN THOMAS DEAN, P.E.
DATE: 08/16/2019
GEORGIA PROFESSIONAL ENGINEER NO. 034136

REGISTERED GEORGIA No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

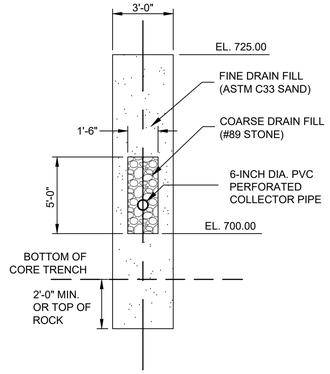
Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 / Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

TRENCH DRAIN PLAN & PROFILE

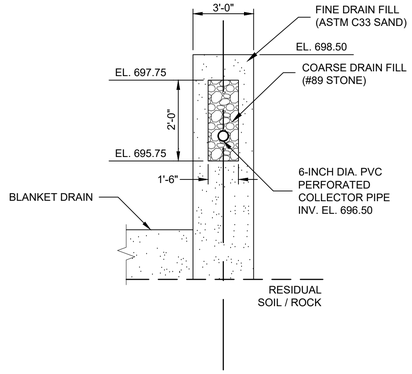
PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET 10 OF 14



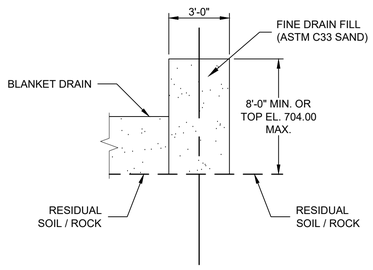
TYPICAL CHIMNEY DRAIN SECTION

N.T.S.



B/10 TRENCH DRAIN SECTION

N.T.S.



C/10 TRENCH DRAIN SECTION

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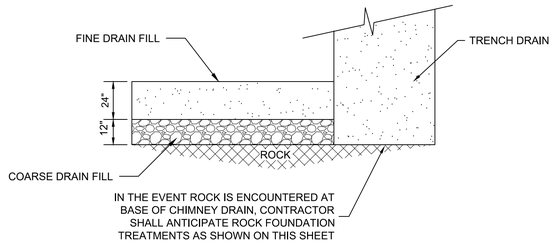
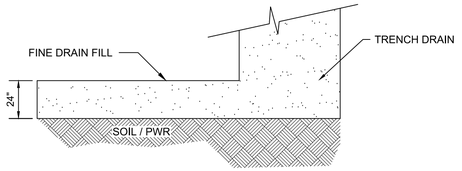
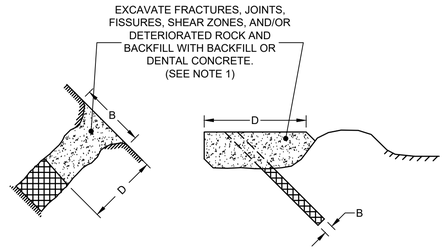
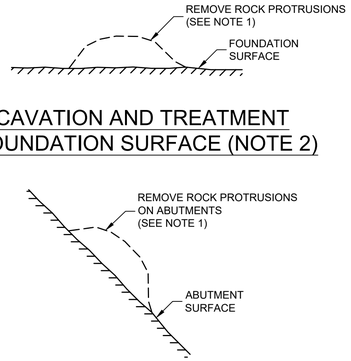




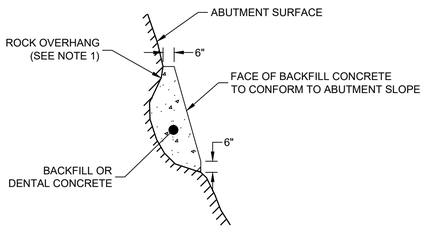


TREATMENT DETAIL FOR SHEARED OR DETERIORATED ROCK ZONES



EXCAVATION AND TREATMENT OF FOUNDATION SURFACE (NOTE 2)

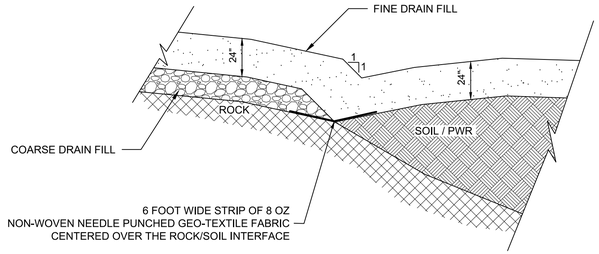
TREATMENT OF ROCK PROTRUSIONS ON ABUTMENT (NOTE 2)



TREATMENT OF OVERHANGS ON ABUTMENT

ROCK FOUNDATION TREATMENT DETAILS

N.T.S.

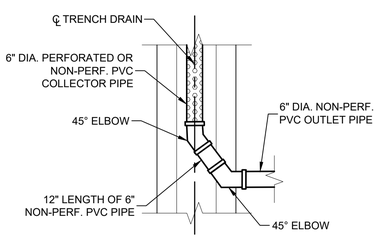


BLANKET DRAIN DETAILS

N.T.S.

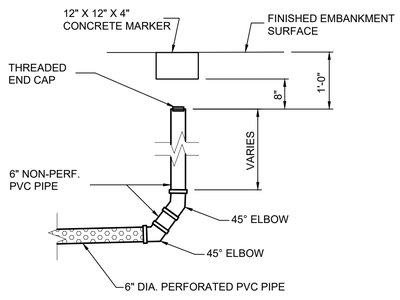
NOTES:

1. FOUNDATION TREATMENT REQUIREMENTS ARE SUBJECT TO INTERPRETATION, AS REQUIRED BY PURCHASER'S REPRESENTATIVE.
2. TREATMENT SHALL BE CONSIDERED AS FOUNDATION TREATMENT AND SHALL BE EXCLUDED FROM ROCK EXCAVATION.
3. REFER TO TECHNICAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR FOUNDATION TREATMENTS.



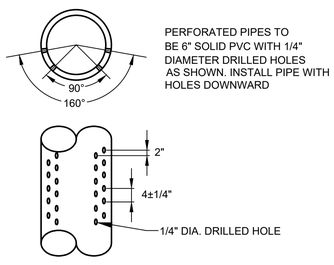
COLLECTOR PIPE & OUTLET PIPE CONNECTION DETAIL

N.T.S.



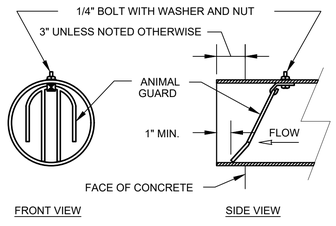
6" TRANSVERSE CLEANOUT DETAIL

N.T.S.



6" PERFORATED PIPE DETAIL

N.T.S.



ANIMAL GUARD DETAIL

N.T.S.
APPROVED MODEL
MANUFACTURED BY
"AGRI-DRAIN" OR EQUAL.
(AGRI-DRAIN TELEPHONE
NUMBER: 1-800-232-4742)

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\YATES PHASE_3_DRAINAGE DETAILS.DWG

DATE | DESCRIPTION | REV

CHECKED BY: JSM
DRAWN BY: GHB
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JONATHAN THOMAS DEAN, P.E.
DATE: 08/16/2019
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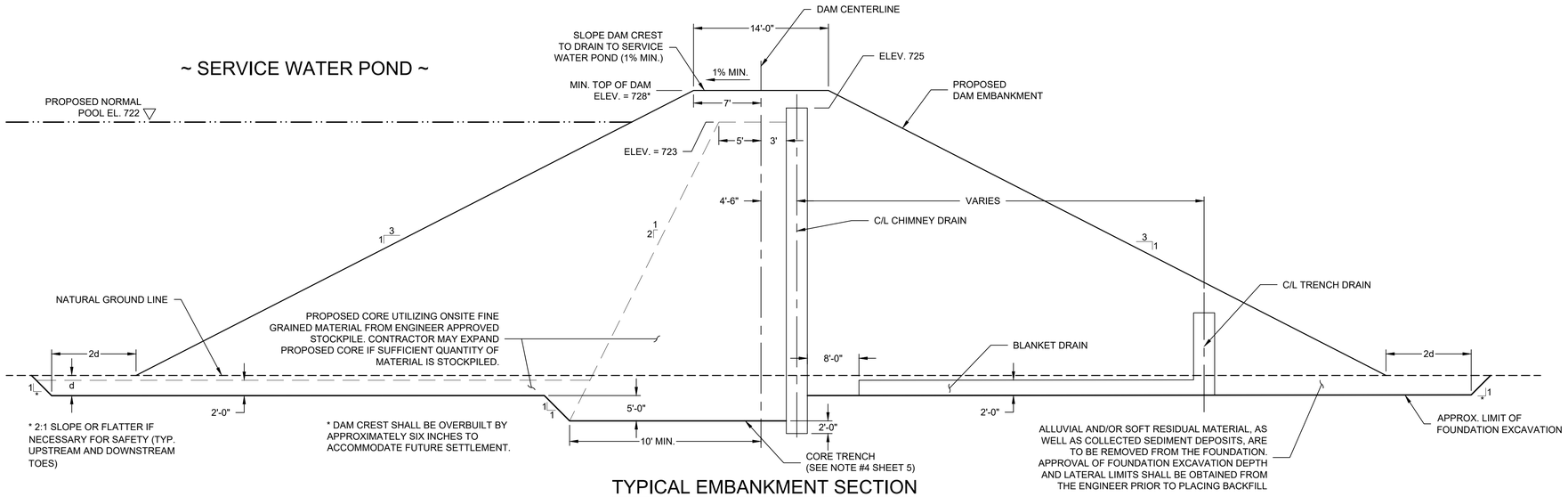
PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

DRAIN DETAILS

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET
11 OF 14

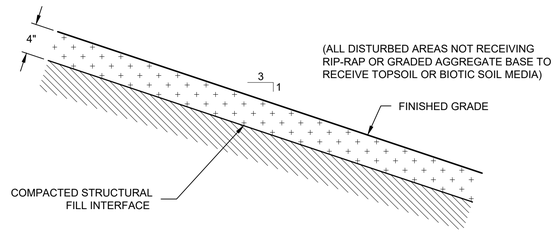


TYPICAL EMBANKMENT SECTION

N.T.S.

FILL MATERIALS	COMPACTION REQUIREMENTS						
DESCRIPTION	UNIFIED CLASS	PERCENT OF MAXIMUM DENSITY	MOISTURE LIMITS PERCENT OPTIMUM FROM	MOISTURE LIMITS PERCENT OPTIMUM TO	MAXIMUM LAYER THICKNESS INCHES UNCOMPACTED	MAX. ROCK SIZE IN INCHES	CONTROL TEST A.S.T.M. DESIGN
SANDY SILT	ML/MH	95 (MIN)	OPT.	+4	8"	4"	ASTM D-698
SILTY SAND	SM	95 (MIN)	OPT.	+4	8"	4"	ASTM D-698
CLAYEY SAND	SC	95 (MIN)	OPT.	+4	8"	4"	ASTM D-698
LEAN CLAY	CL	95 (MIN)	OPT.	+4	8"	4"	ASTM D-698

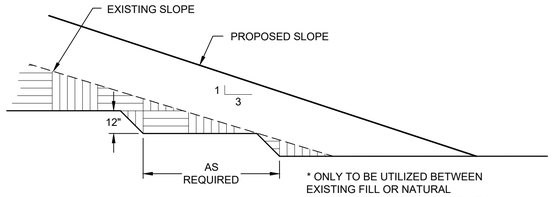
NOTE: FINES CONTENT SHALL NOT BE LESS THAN 30 PERCENT. DRY DENSITY OF COMPACTED SOIL SHALL NOT BE LESS THAN 90 PSF.



TOPSOIL DETAIL

N.T.S.

* IF TOPSOIL IS UTILIZED



BENCH DETAIL

N.T.S.

VEGETATIVE PLAN:

ALL BARE AREAS RESULTING FROM CONSTRUCTION OPERATIONS WILL BE ESTABLISHED TO PERENNIAL VEGETATION AS SOON AS POSSIBLE AFTER FINAL GRADING IS COMPLETE.

A. INITIAL TREATMENT

SEEDBED PREPARATION - PREPARE SEEDBED TO A DEPTH OF AT LEAST 4 INCHES ON ALL AREAS WHERE A GOOD SEEDBED IS NOT PRESENT. REMOVE ROCKS, ROOTS, OR OTHER OBJECTS THAT WILL INTERFERE WITH VEGETATION ESTABLISHMENT OR MAINTENANCE OPERATIONS.

FERTILIZER - APPLY AGRICULTURAL LIME AT THE RATE OF 4,000 POUNDS PER ACRE, AND 1,500 POUNDS 6-12-12 ANALYSIS FERTILIZER (OR EQUIVALENT) PER ACRE, UNLESS SOIL SAMPLES INDICATE DIFFERENTLY. SPREAD LIME AND FERTILIZER UNIFORMLY OVER ALL AREAS IMMEDIATELY BEFORE FINAL LAND PREPARATION AND MIX THOROUGHLY WITH THE SOIL. APPLY TOP DRESSING OF 75 POUNDS PER ACRE OF AMMONIUM NITRATE (OR EQUIVALENT) WHEN PLANTS ARE 2 TO 4 INCHES TALL.

SEEDING - ALL GRASS WILL BE SEEDED OR SODDED WITH THE FOLLOWING. ALL SEEDING RATES BELOW REPRESENT PURE, LIVE, UNCOATED SEED:

DS3 - PERMANENT GRASSING	LBS./AC.	SEEDING DATES
BERMUDA, COMMON (UNHULLED)	195.0	OCT. 1 TO FEB. 28
BERMUDA, COMMON (HULLED)	65.0	MAR. 1 TO JUN. 30
FESCUE, TALL	50.0	AUG. 15 TO OCT. 31
DS2 - TEMPORARY GRASSING		
RYE	168.0	AUG. 15 TO DEC. 31
RYEGRASS, ANNUAL*	40.0	AUG. 1 TO APR. 15
BROWNTOP MILLET	40.0	APR. 1 TO JUL. 15

(1) PERMANENT GRASSING SHALL BE SEEDED ONLY DURING THE DATES INDICATED. TEMPORARY GRASSING IS TO BE SEEDED DURING OTHER DATES OF THE YEAR. CONTRACTOR SHOULD ANTICIPATE SEEDING TEMPORARY GRASS AT THE COMPLETION OF LAND DISTURBING ACTIVITIES AND RETURNING LATER (POTENTIALLY AFTER DEMOBILIZATION HAS OCCURRED) TO SEED PERMANENT GRASS. IF TEMPORARY GRASS IS SEEDED FIRST, THE TEMPORARY GRASS SHALL BE STRIPPED, THE SEED BED SHALL BE PREPARED, AND THE GROUND SHALL BE FERTILIZED PRIOR TO SEEDING PERMANENT GRASS.

SOIL ANALYSES SHALL BE PERFORMED TO EVALUATE PERCENTAGE OF NITROGEN, PHOSPHORUS, POTASH, SOLUBLE SALT CONTENT, ORGANIC MATTER CONTENT, AND pH VALUE. SOIL TESTS AT 6-INCH AND 12-INCH DEPTHS SHALL BE PERFORMED ON THE COMPLETED EMBANKMENT AND AUXILIARY SPILLWAY. SIX LOCATIONS SHALL BE TESTED ON BOTH THE EMBANKMENT AND AUXILIARY SPILLWAY. AREAS INDICATING POOR SOIL NUTRIENTS AND/OR pH SHALL BE AMENDED APPROPRIATELY TO THE FULL 12-INCH DEPTH.

*NOTE: RYEGRASS SHALL NOT BE USED IN ANY SEEDING MIXTURES CONTAINING PERENNIAL SPECIES DUE TO ITS ABILITY TO OUT-COMPETE DESIRED SPECIES CHOSEN FOR PERMANENT PERENNIAL COVER.

THE ENGINEER MAY ADJUST THE SEEDING DATES THIRTY (30) DAYS, EARLIER OR LATER, TO BETTER MEET SITE NEEDS AND COMPENSATE FOR VARIATIONS IN LOCAL CLIMATIC CONDITIONS.

ALL SEED WILL BE DISTRIBUTED UNIFORMLY OVER THE AREA.

FIRM SEEDED OR SODDED AREAS WITH CULTIPACKER OR ROLLER IMMEDIATELY FOLLOWING PLANTING.

MULCHING - ALL SEEDED AREAS STEEPER THAN 2 PERCENT WILL BE MULCHED IMMEDIATELY AFTER SEEDING BY SPREADING UNIFORMLY DRY STRAW OR HAY, FREE OF COMPETING WEEDS, AT THE RATE OF ABOUT 2 ½ TONS PER ACRE AND TO COVER APPROXIMATELY 75 PERCENT OF THE GROUND SURFACE. WHEN FEASIBLE, ANCHOR MULCH WITH A PACKER OR DISC HARROW WITH BLADES SET STRAIGHT OR WITH EMULSIFIED ASPHALT (GRADE AE5 OR SS1) AT A RATE OF 100 GALLONS EMULSION MIXED WITH 100 GALLONS WATER FOR EACH TON OF MULCH.

B. MANAGEMENT

APPLY ANNUAL APPLICATION OF 400 POUNDS OF 10-10-10 ANALYSIS FERTILIZER PER ACRE AND TOPDRESS WITH 30 POUNDS OF AMMONIUM NITRATE PER ACRE. APPLY AGRICULTURAL LIMESTONE AT THE RATE OF 1 TON PER ACRE EVERY 4 TO 6 YEARS.

C. IN LIEU OF TOPSOIL, CONTRACTOR MAY UTILIZE BIOTIC SOIL MEDIA SUCH AS PROGANICS OR APPROVED EQUAL. MANUFACTURER'S RECOMMENDATIONS REGARDING APPLICATION RATE, SURFACE PREPARATION, ETC. SHALL BE ADHERED TO.

DESIGNED BY: JTD/JC
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 08/16/2019
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL ENGINEER JONATHAN THOMAS DEAN

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schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

TYPICAL EMBANKMENT DETAILS - PHASE I

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET 12 OF 14

DATE | DESCRIPTION | REV

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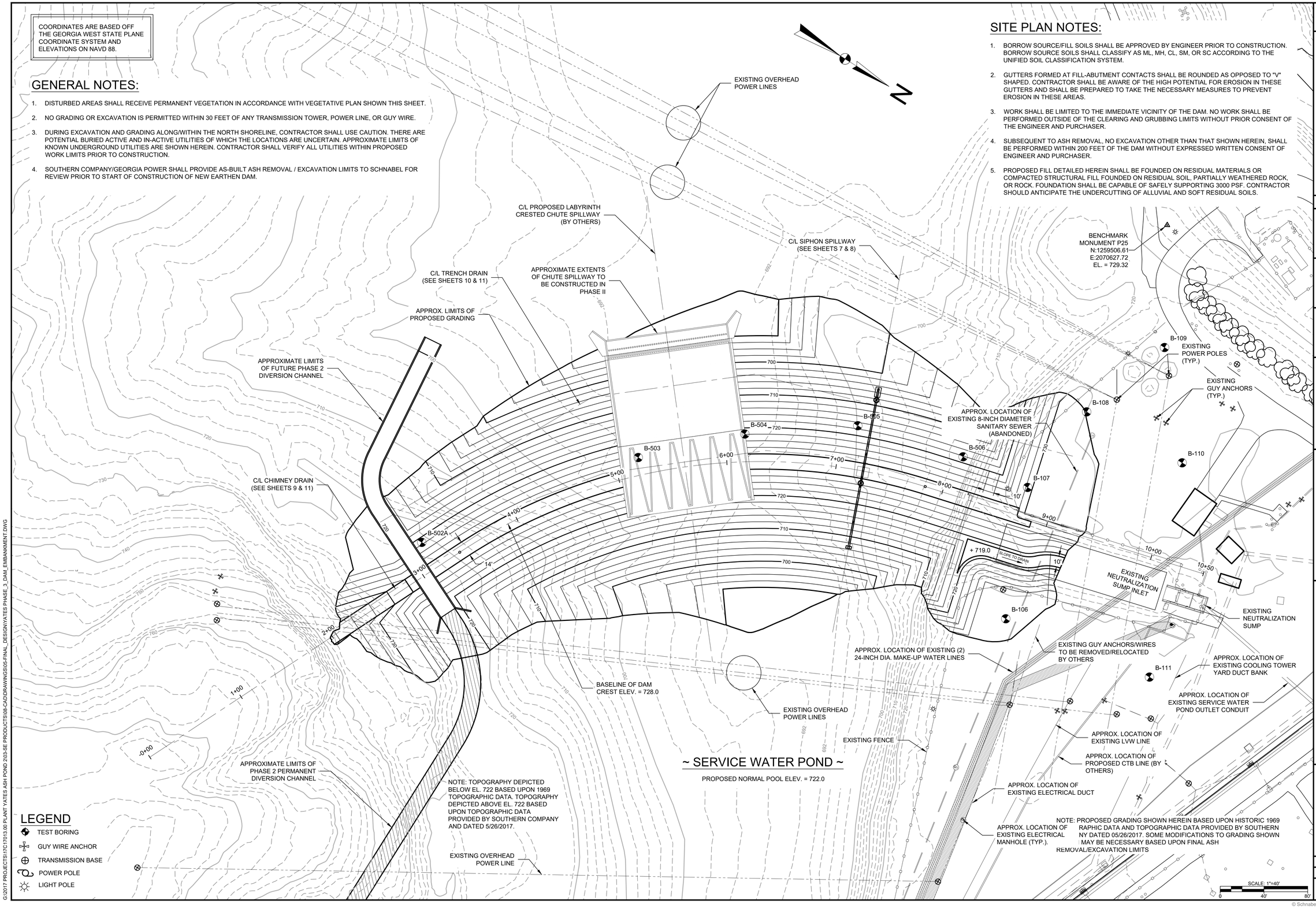
COORDINATES ARE BASED OFF THE GEORGIA WEST STATE PLANE COORDINATE SYSTEM AND ELEVATIONS ON NAVD 88.

GENERAL NOTES:

1. DISTURBED AREAS SHALL RECEIVE PERMANENT VEGETATION IN ACCORDANCE WITH VEGETATIVE PLAN SHOWN THIS SHEET.
2. NO GRADING OR EXCAVATION IS PERMITTED WITHIN 30 FEET OF ANY TRANSMISSION TOWER, POWER LINE, OR GUY WIRE.
3. DURING EXCAVATION AND GRADING ALONG/WITHIN THE NORTH SHORELINE, CONTRACTOR SHALL USE CAUTION. THERE ARE POTENTIAL BURIED ACTIVE AND IN-ACTIVE UTILITIES OF WHICH THE LOCATIONS ARE UNCERTAIN. APPROXIMATE LIMITS OF KNOWN UNDERGROUND UTILITIES ARE SHOWN HEREIN. CONTRACTOR SHALL VERIFY ALL UTILITIES WITHIN PROPOSED WORK LIMITS PRIOR TO CONSTRUCTION.
4. SOUTHERN COMPANY/GEORGIA POWER SHALL PROVIDE AS-BUILT ASH REMOVAL / EXCAVATION LIMITS TO SCHNABEL FOR REVIEW PRIOR TO START OF CONSTRUCTION OF NEW EARTHEN DAM.

SITE PLAN NOTES:

1. BORROW SOURCE/FILL SOILS SHALL BE APPROVED BY ENGINEER PRIOR TO CONSTRUCTION. BORROW SOURCE SOILS SHALL CLASSIFY AS ML, MH, CL, SM, OR SC ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM.
2. GUTTERS FORMED AT FILL-ABUTMENT CONTACTS SHALL BE ROUNDED AS OPPOSED TO "V" SHAPED. CONTRACTOR SHALL BE AWARE OF THE HIGH POTENTIAL FOR EROSION IN THESE GUTTERS AND SHALL BE PREPARED TO TAKE THE NECESSARY MEASURES TO PREVENT EROSION IN THESE AREAS.
3. WORK SHALL BE LIMITED TO THE IMMEDIATE VICINITY OF THE DAM. NO WORK SHALL BE PERFORMED OUTSIDE OF THE CLEARING AND GRUBBING LIMITS WITHOUT PRIOR CONSENT OF THE ENGINEER AND PURCHASER.
4. SUBSEQUENT TO ASH REMOVAL, NO EXCAVATION OTHER THAN THAT SHOWN HEREIN, SHALL BE PERFORMED WITHIN 200 FEET OF THE DAM WITHOUT EXPRESSED WRITTEN CONSENT OF ENGINEER AND PURCHASER.
5. PROPOSED FILL DETAILED HEREIN SHALL BE FOUNDED ON RESIDUAL MATERIALS OR COMPACTED STRUCTURAL FILL FOUNDED ON RESIDUAL SOIL, PARTIALLY WEATHERED ROCK, OR ROCK. FOUNDATION SHALL BE CAPABLE OF SAFELY SUPPORTING 3000 PSF. CONTRACTOR SHOULD ANTICIPATE THE UNDERCUTTING OF ALLUVIAL AND SOFT RESIDUAL SOILS.



LEGEND

- TEST BORING
- GUY WIRE ANCHOR
- TRANSMISSION BASE
- POWER POLE
- LIGHT POLE

REV	DESCRIPTION	DATE

DESIGNED BY: JTD/JC
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
GEORGIA REGISTERED PROFESSIONAL ENGINEER NO. 034136
DATE: 08/16/2019

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Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 / Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

PROPOSED SITE PLAN - PHASE II

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET 13 OF 14

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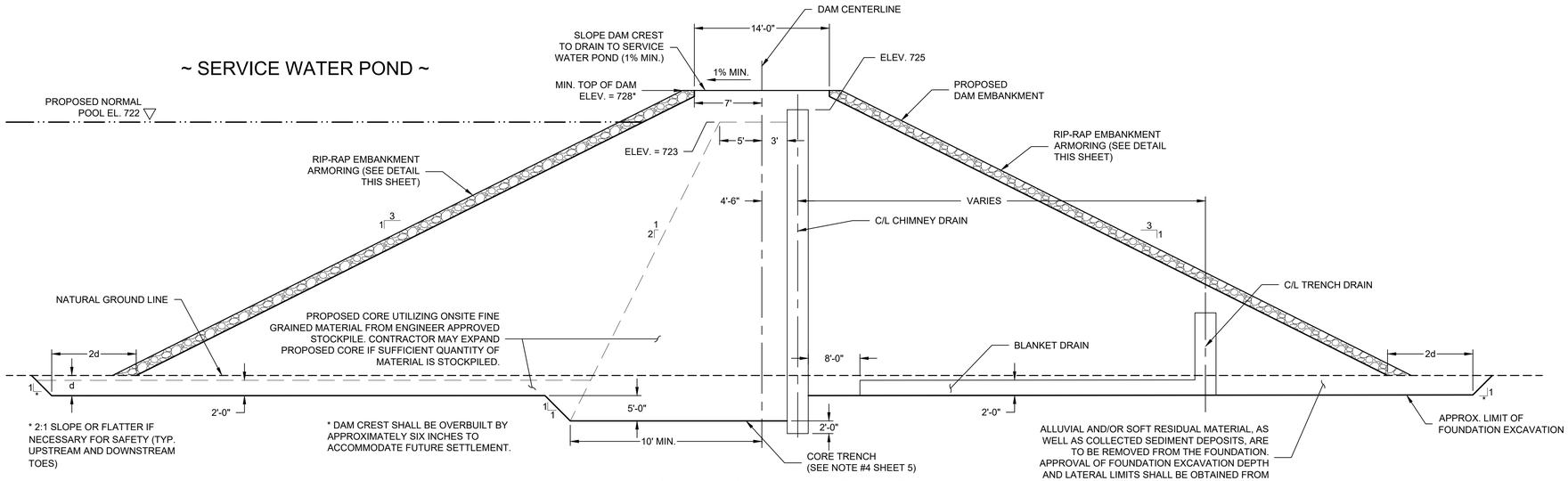

TYPICAL EMBANKMENT SECTION

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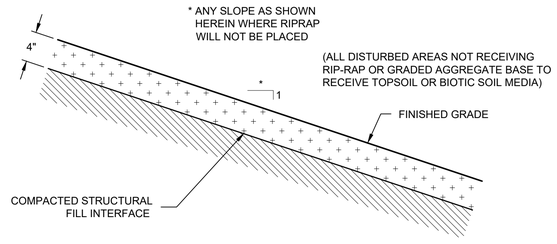
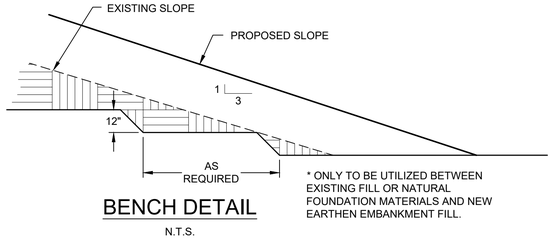


TOPSOIL DETAIL

N.T.S.
* IF TOPSOIL IS UTILIZED



BENCH DETAIL

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BROWNTOP MILLET	40.0	APR. 1 TO JUL. 15

(1) PERMANENT GRASSING SHALL BE SEEDED ONLY DURING THE DATES INDICATED. TEMPORARY GRASSING IS TO BE SEEDED DURING OTHER DATES OF THE YEAR. CONTRACTOR SHOULD ANTICIPATE SEEDING TEMPORARY GRASS AT THE COMPLETION OF LAND DISTURBING ACTIVITIES AND RETURNING LATER (POTENTIALLY AFTER DEMOBILIZATION HAS OCCURRED) TO SEED PERMANENT GRASS. IF TEMPORARY GRASS IS SEEDED FIRST, THE TEMPORARY GRASS SHALL BE STRIPPED, THE SEED BED SHALL BE PREPARED, AND THE GROUND SHALL BE FERTILIZED PRIOR TO SEEDING PERMANENT GRASS.

SOIL ANALYSES SHALL BE PERFORMED TO EVALUATE PERCENTAGE OF NITROGEN, PHOSPHORUS, POTASH, SOLUBLE SALT CONTENT, ORGANIC MATTER CONTENT, AND pH VALUE. SOIL TESTS AT 6-INCH AND 12-INCH DEPTHS SHALL BE PERFORMED ON THE COMPLETED EMBANKMENT AND AUXILIARY SPILLWAY. SIX LOCATIONS SHALL BE TESTED ON BOTH THE EMBANKMENT AND AUXILIARY SPILLWAY. AREAS INDICATING POOR SOIL NUTRIENTS AND/OR pH SHALL BE AMENDED APPROPRIATELY TO THE FULL 12-INCH DEPTH.

*NOTE: RYEGRASS SHALL NOT BE USED IN ANY SEEDING MIXTURES CONTAINING PERENNIAL SPECIES DUE TO ITS ABILITY TO OUT-COMPETE DESIRED SPECIES CHOSEN FOR PERMANENT PERENNIAL COVER.

THE ENGINEER MAY ADJUST THE SEEDING DATES THIRTY (30) DAYS, EARLIER OR LATER, TO BETTER MEET SITE NEEDS AND COMPENSATE FOR VARIATIONS IN LOCAL CLIMATIC CONDITIONS.

ALL SEED WILL BE DISTRIBUTED UNIFORMLY OVER THE AREA.

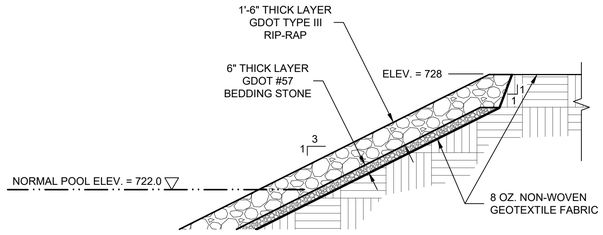
FIRM SEEDED OR SODDED AREAS WITH CULTIPACKER OR ROLLER IMMEDIATELY FOLLOWING PLANTING.

MULCHING - ALL SEEDED AREAS STEEPER THAN 2 PERCENT WILL BE MULCHED IMMEDIATELY AFTER SEEDING BY SPREADING UNIFORMLY DRY STRAW OR HAY, FREE OF COMPETING WEEDS, AT THE RATE OF ABOUT 2 ½ TONS PER ACRE AND TO COVER APPROXIMATELY 75 PERCENT OF THE GROUND SURFACE. WHEN FEASIBLE, ANCHOR MULCH WITH A PACKER OR DISC HARROW WITH BLADES SET STRAIGHT OR WITH EMULSIFIED ASPHALT (GRADE AE5 OR SS1) AT A RATE OF 100 GALLONS EMULSION MIXED WITH 100 GALLONS WATER FOR EACH TON OF MULCH.

B. MANAGEMENT

APPLY ANNUAL APPLICATION OF 400 POUNDS OF 10-10-10 ANALYSIS FERTILIZER PER ACRE AND TOPDRESS WITH 30 POUNDS OF AMMONIUM NITRATE PER ACRE. APPLY AGRICULTURAL LIMESTONE AT THE RATE OF 1 TON PER ACRE EVERY 4 TO 6 YEARS.

C. IN LIEU OF TOPSOIL, CONTRACTOR MAY UTILIZE BIOTIC SOIL MEDIA SUCH AS PROGANICS OR APPROVED EQUAL. MANUFACTURER'S RECOMMENDATIONS REGARDING APPLICATION RATE, SURFACE PREPARATION, ETC. SHALL BE ADHERED TO.



RIP-RAP EMBANKMENT ARMORING DETAIL

N.T.S.

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\YATES PHASE_3_DAM_EMBANKMENT.DWG

REV	DESCRIPTION	DATE

DESIGNED BY: JTD/JC
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
GEORGIA PROFESSIONAL ENGINEER NO. 034136
DATE: 08/16/2019

GEORGIA REGISTERED No. PE034136 PROFESSIONAL ENGINEER JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM
COWETA COUNTY, GEORGIA

TYPICAL EMBANKMENT DETAILS - PHASE II

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: AUGUST 16, 2019
SHEET 14 OF 14

PLANT YATES
SERVICE WATER POND DAM

PREPARED FOR

SOUTHERN COMPANY

BIRMINGHAM, ALABAMA

OCTOBER 27, 2020

THIS PROJECT CONSISTS OF MULTIPLE PHASES
AS GENERALLY DESCRIBED BELOW:

PHASE I
PHASE II

THE PLANS PRESENTED HEREIN ARE SOLELY
RELATED TO PHASE II. PLEASE REFERENCE PLANS
DATED AUGUST 16, 2019 FOR PHASE I DETAILS.

LOCATION MAP

SHEET INDEX

REV.	DESCRIPTION	DATE
1	REVISED LABYRINTH SPILLWAY & REMOVED BYPASS	02/28/21

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

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PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

COVER SHEET

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
1 OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CADD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_CIVIL_FINAL.DWG

GENERAL NOTES:

1. SCHNABEL ENGINEERING, LLC IS SOLELY RESPONSIBLE FOR THE PREPARATION OF THE PLANS FOR THE SUBJECT DAM AND SPILLWAYS. ADHERENCE TO THESE PLANS, AS WELL AS ADHERENCE TO GOVERNMENT AND COUNTY REGULATIONS, ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. THE DAILY ON-SITE PRESENCE OF SCHNABEL ENGINEERING, LLC REPRESENTATIVES WILL BE REQUIRED TO CONFIRM THAT SITE CONDITIONS ARE AS ANTICIPATED AND TO CONFIRM THAT CONTRACTOR'S MEANS AND METHODS DO NOT COMPROMISE DESIGN INTENT.
3. CONTRACTOR TO VERIFY ALL CONDITIONS, ELEVATIONS AND DIMENSIONS BEFORE BEGINNING CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER FOR JUSTIFICATION AND/OR CORRECTION BEFORE PROCEEDING WITH THE WORK. CONTRACTOR TO ASSUME RESPONSIBILITY FOR DISCREPANCIES WHICH ARE NOT REPORTED. ALL DIMENSIONS SHOULD BE READ OR CALCULATED.
4. CONTRACTOR TO HAVE ALL UTILITIES FIELD LOCATED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY.
5. THE CONTRACTOR SHALL CONDUCT ALL WORK IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND ALL LOCAL, STATE AND FEDERAL RULES AND REGULATIONS. PROPER SAFETY PROCEDURES ARE OF SPECIAL CONCERN ON THE PROJECT CONSIDERING THAT WORKERS MAY BE WORKING IN TRENCH EXCAVATIONS.
6. ALL MATERIALS AND WORK PERFORMED SHALL COMPLY WITH THE TECHNICAL SPECIFICATIONS OF THE PROJECT.

WATER CONTROL NOTES:

1. CONTRACTOR SHALL BUILD, MAINTAIN AND OPERATE TEMPORARY DIKES, COFFERDAMS, CHANNELS, FLUMES, SUMPS AND OTHER TEMPORARY DIVERSION AND PROTECTIVE WORKS NEEDED TO DIVERT SURFACE WATER FROM THE CONSTRUCTION WORK WHILE CONSTRUCTION IS IN PROGRESS. DIVERSION OR RETENTION OF SURFACE WATERS WILL BE CONTINUED UNTIL SUCH TIME AS DETERMINED BY THE ENGINEER.
2. FOUNDATIONS FOR CONCRETE, AND OTHER PARTS OF THE CONSTRUCTION SITE, SHALL BE DEWATERED AND KEPT FREE OF STANDING WATER OR MUDDY OR SOFT CONDITIONS AS NEEDED FOR PROPER EXECUTION OF THE CONSTRUCTION WORK.
3. DEWATERING METHODS FOR FOUNDATION CONSTRUCTION OR SUBGRADE PREPARATION THAT CAUSE A LOSS OF FINES WILL NOT BE PERMITTED.
4. CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGES INCURRED AS A RESULT OF THE LACK OF ADEQUATE SURFACE OR SUBSURFACE WATER CONTROL.
5. CONTRACTOR IS TO PROVIDE THE ENGINEER WITH A WATER CONTROL PLAN FOR REVIEW AND CONCURRENCE PRIOR TO THE START OF CONSTRUCTION.

SOIL COMPACTION NOTES:

1. ALL AREAS TO RECEIVE STRUCTURAL FILL TO BE CLEARED AND STRIPPED FREE OF TOPSOIL, ROOTS, STUMPS, ORGANICS AND ALL OTHER DELETERIOUS MATERIAL.
2. SUBGRADE AREAS WHICH ARE WET, SOFT, OR DEEMED OTHERWISE UNSUITABLE BY THE ENGINEER, SHALL BE UNDERCUT AND REPLACED WITH FILL MATERIALS AS RECOMMENDED BY THE ENGINEER AND COMPACTED IN ACCORDANCE WITH NOTE (4) OF THIS SECTION. SUBGRADE SHALL BE CAPABLE OF SUPPORTING 3,000 PSF WITH LESS THAN 1/2 INCH OF TOTAL SETTLEMENT.
3. AREAS TO RECEIVE STRUCTURAL FILL SHALL BE BENCHED INTO EXISTING SLOPES, DENSIFIED, AND SHALL BE AT SUCH MOISTURE CONTENT THAT THE FILL SOILS CAN BE COMPACTED AGAINST THE SLOPE TO EFFECT A GOOD BOND BETWEEN THE FILL SOILS AND THE EXISTING SOILS.
4. STRUCTURAL FILL TO BE PLACED IN MAXIMUM 8-INCH LOOSE LIFTS AND COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY AND BETWEEN OPTIMUM AND 4% ABOVE OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE STANDARD PROCTOR TEST (ASTM D-698).
5. ALL FILL SOILS TO BE PLACED UNDER THE OBSERVATION OF THE ENGINEER OR HIS REPRESENTATIVE.
6. UTILIZE SHEEPSFOOT ROLLER TO COMPACT SOILS IN MASS GRADING/FILLING ACTIVITIES. MECHANICAL HAND TAMPERS WILL BE USED TO COMPACT SOIL AROUND, ABOVE OR ADJACENT TO STRUCTURES AND/OR CONDUITS WHERE THE USE OF LARGE SHEEPSFOOT ROLLERS MAY DAMAGE STRUCTURES. MECHANICAL HAND TAMPERS WILL BE USED WITHIN 3 FEET OF ALL STRUCTURES. PRIOR TO PLACING FILL ON SURFACES COMPACTED BY PLATE TAMPERS, JUMPING JACKS, OR BY OTHER MEANS THAT CREATE A SMOOTH SURFACE, THE FILL SURFACE SHALL BE SCARIFIED TO PROMOTE BOND WITH THE SUCCEEDING LIFT.

NOTES ON DRAIN CONSTRUCTION:

1. DRAIN CONSTRUCTION WILL CONSIST OF INSTALLING THE FINE AND COARSE DRAIN FILL AND THE COLLECTOR/OUTLET PIPES FOR THE PROPOSED EMBANKMENT DRAINAGE SYSTEM.
2. COARSE DRAIN FILL TO BE TOUGH, HARD, DURABLE PARTICLES AND SHALL BE FREE OF FLAT OR ELONGATED PIECES AS DETERMINED BY THE ENGINEER AND SHALL CONTAIN NO ORGANIC MATTER OR SOFT FRIABLE PARTICLES. CONTRACTOR TO FURNISH ENGINEER WITH THE GRADATION OF COARSE DRAIN FILL FROM SUPPLIER AND 5-GALLON SAMPLE PRIOR TO USE. COARSE DRAIN FILL DERIVED FROM LIMESTONE OR OTHER MATERIALS HAVING EITHER CEMENTITIOUS OR SOLUTIONING PROPERTIES WILL NOT BE ACCEPTED. ENGINEER SHALL REVIEW AND APPROVE SOURCE OF COARSE DRAIN FILL.
3. UTILIZE ASTM C-33 SAND FOR FINE DRAINAGE FILL. CONTRACTOR TO FURNISH ENGINEER WITH THE GRADATION OF ASTM C-33 SAND FROM SUPPLIER AND 5-GALLON SAMPLE PRIOR TO USE. SAND FOR FINE DRAINAGE FILL SHALL BE NATURAL / RIVER RUN MATERIAL. SAND CREATED FROM ROCK CRUSHING OPERATIONS WILL NOT BE PERMITTED. SAND DERIVED FROM LIMESTONE OR OTHER MATERIALS HAVING EITHER CEMENTITIOUS OR SOLUTIONING PROPERTIES WILL NOT BE ACCEPTED. ENGINEER SHALL REVIEW AND APPROVE SOURCE OF SAND.
4. COARSE DRAIN FILL SHALL BE SURROUNDED BY A MINIMUM OF 9-INCHES OF FINE DRAIN FILL.
5. PERFORATED PIPE SHALL BE SURROUNDED BY A MINIMUM OF 6-INCHES OF COARSE DRAIN FILL.
6. MAINTAIN A MIN. OF 24-INCHES OF FINE DRAIN FILL BETWEEN STRUCTURES AND COARSE DRAIN FILL, UNLESS DETAILED OTHERWISE ON THE PLANS.
7. SOME MODIFICATIONS OF DRAIN LAYOUT AND INVERTS MAY BE REQUIRED IN THE FIELD TO ACCOMMODATE EXISTING SITE TOPOGRAPHY.
8. PIPING SHALL BE PERFORATED AND NON-PERFORATED RIGID POLYVINYL CHLORIDE (PVC) PIPE OR DUCTILE IRON PIPE AS INDICATED ON THE DRAWINGS. ALL PVC PIPE WILL BE AWWA C900, PRESSURE CLASS 150. ALL BENDS AND FITTINGS SHALL BE COMPATIBLE WITH THE PIPE UTILIZED AND SHOULD BE INSTALLED ACCORDING TO APPLICABLE MANUFACTURER'S RECOMMENDATIONS.
9. INSTALLATION OF SUBSURFACE DRAINS WILL BE ACCOMPLISHED IN SUCH A MANNER THAT WORKER SAFETY IS NOT COMPROMISED IN ANY WAY. CONTRACTOR TO TAKE NECESSARY PRECAUTIONS TO PREVENT COLLAPSE OF TRENCH OR SLOPE INSTABILITY DURING INSTALLATION OF DRAINAGE SYSTEM.

GENERAL NOTES FOR CONCRETE STRUCTURES:

1. EXCEPT AS OTHERWISE NOTED OR SPECIFIED, THESE GENERAL NOTES SHALL APPLY TO THE CONCRETE STRUCTURES.
2. ALL CONCRETE SHALL CONFORM TO THE MOST RECENT EDITION OF "CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES, ACI-350."
3. STRUCTURAL CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 4500 PSI AT 28 DAYS AND REINFORCEMENT WITH A MINIMUM YIELD STRENGTH OF 60,000 PSI.
4. BACKFILL CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS AND REINFORCEMENT WITH A MINIMUM YIELD STRENGTH OF 60,000 PSI.
5. CONCRETE TESTING WILL BE IN COMPLIANCE WITH THE FOLLOWING ASTM STANDARDS: C31, C39, C138, C143, C172, C173, AND C231.
6. FOR REINFORCING STEEL
   a. FOR DEVELOPMENT AND LAP SPLICE LENGTH, REFER TO ACI 318 AND ACI 350.
   b. REINFORCEMENT SHALL HAVE A MINIMUM LENGTH OF 20'-0" BETWEEN SPLICES UNLESS OTHERWISE SHOWN.
   c. SPLICES SHALL NOT CROSS CONSTRUCTION OR CONTRACTION JOINTS.
   d. SPLICE DIMENSIONS SHOWN ARE MINIMUM VALUES. CONTRACTOR MAY ELECT TO UTILIZE LONGER SPLICE LENGTHS TO ACCOUNT FOR POTENTIAL CONSTRUCTION VARIANCES AT NO ADDITIONAL COST TO THE OWNER.
6. FOR DOWEL BARS:
   a. DOWEL BARS SHALL MEET THE REQUIREMENTS OF ASTM A36 AND ARE TO BE GALVANIZED IN ACCORDANCE WITH ASTM A123.
   b. PLAIN DOWEL BARS SHALL BE 2 FEET LONG AND 3/4" DIAMETER SMOOTH STEEL.
   c. ONE-HALF OF EACH DOWEL BAR SHALL BE COATED WITH HEAVY GREASE TO PREVENT BOND WITH CONCRETE.
   d. DOWELS SHALL BE KEPT IN STRAIGHT ALIGNMENT, AS SHOWN IN THE PLANS, DURING AND SUBSEQUENT TO CONCRETE PLACEMENT.
   e. DOWELS SHALL BE SPACED 12 INCHES APART ALONG ALL CONTRACTION JOINTS UNLESS OTHERWISE NOTED.
7. CHAMFER ALL EXPOSED CORNERS 3/4" UNLESS OTHERWISE SHOWN OR DESIGNATED.
8. CUT OR BEND STEEL REINFORCING BARS AS NECESSARY TO INSTALL DRAIN PIPE OUTLETS.
9. JOINTS
   a. ADDITIONAL CONSTRUCTION JOINTS OR RELOCATION OF CONSTRUCTION JOINTS MAY BE USED IF APPROVED BY ENGINEER.
   b. CONSTRUCTION JOINTS SHALL BE AS SHOWN ON THE PLANS. UNDER NO CIRCUMSTANCES MAY A SECTION OF WALL BE POURED HIGHER THAN TEN FEET DURING ANY ONE PLACEMENT (UNLESS OTHERWISE SHOWN).
10. EMBEDDED MATERIALS
    a. BEFORE PLACING CONCRETE, CARE SHALL BE TAKEN THAT ALL EMBEDDED ITEMS ARE IN POSITION AND SECURELY FASTENED IN PLACE.
    b. ALL WATERSTOPS SHALL BE SUPPORTED AND PROTECTED FROM DAMAGE AND EXPOSURE.
11. CLEAR COVER TO REINFORCEMENT DISTANCE SHALL BE 2" FROM FORMED FACES/EDGES AND 3" FROM UNFORMED FACES/EDGES CAST AGAINST EARTH OR ROCK (UNLESS OTHERWISE SHOWN).

811 Know what's **below.** **Call** before you dig.

GEORGIA 811
CALL BEFORE YOU DIG
DIAL 811 OR CALL 1-800-282-7411
UTILITIES PROTECTION CENTER
IT'S THE LAW

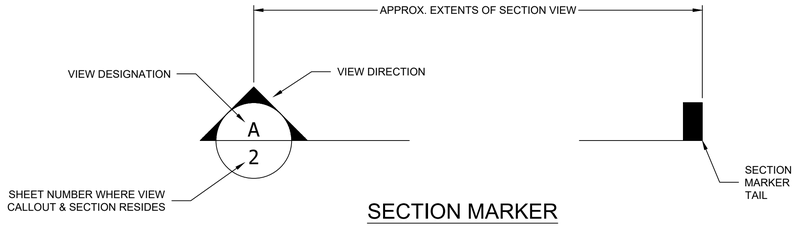
NOTE: CONTRACTOR MUST COORDINATE WORK WITH UTILITY PROVIDERS TO MAINTAIN UTILITY SERVICE AND A SAFE WORK SITE.

TOPOGRAPHIC INFORMATION PROVIDED BY:

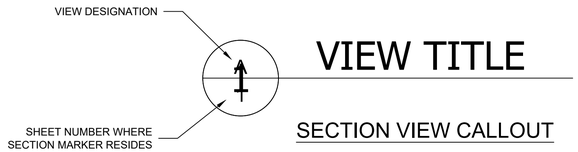
SOUTHERN COMPANY
BIRMINGHAM, AL

SURVEY DATED: 03/16/2018

COORDINATES ARE BASED OFF THE GEORGIA WEST STATE PLANE COORDINATE SYSTEM AND ELEVATIONS ON NAVD 88.



SECTION MARKER



VIEW TITLE

SECTION VIEW CALLOUT

FLOW

FLOW ARROW

INDICATES DIRECTION OF FLOW

ABBREVIATIONS

B.F.	BOTH FACES	NTS, N.T.S.	NOT TO SCALE
B.I.G.	BREAK-IN-GRADE	N.P.	NORMAL POOL
BP, B.P.	BEGINNING POINT	O.P.	OUTSIDE DIAMETER
CJ,C.J.	CONSTRUCTION JOINT	O.F.	OUTSIDE FACE (BACKFILL SIDE)
C/L, CL, ℄	CENTER LINE	O/S	OFFSET FROM CENTERLINE
CMP, C.M.P.	CORRUGATED METAL PIPE	P-1	PIEZOMETERS (TYP.)
D.F.	DOWNSTREAM FACE	P.C.	POINT OF CURVATURE
DI, D.I.	DROP INLET	PI, P.I.	POINT OF INTERSECTION
DIA.	DIAMETER	PROP	PROPOSED
DIP, D.I.P.	DUCTILE IRON PIPE	PVC	POLYVINYL CHLORIDE PIPE
D/S	DOWNSTREAM	R	RADIUS
E.F.	EACH FACE	RCP, R.C.P.	REINFORCED CONCRETE PIPE
ELEV., EL.	ELEVATION	REF.	REFERENCE
E/P	EDGE OF PAVEMENT	STA.	STATION
EP, E.P.	END POINT	SS, S.S.	SANITARY SEWER
EXIST.	EXISTING	SSMH, S.S.M.H.	SANITARY SEWER MANHOLE
FT	FEET	TCJ, T.C.J.	TRANSVERSE CONTRACTION JOINT
HW, H.W.	HEADWALL	TP	TEST PIT
I.D.	INSIDE DIAMETER	TYP.	TYPICAL DETAIL
IE, I.E.	INVERT ELEVATION	U.F.	UPSTREAM FACE
I.F.	INSIDE FACE (FLOW SIDE)	U/S	UPSTREAM
INV.	INVERT	VC	VERTICAL CURVE
LF, L.F.	LINEAR FOOT	W.E.	WATER ELEVATION
M.S.L.	MEAN SEA LEVEL	W/O	WITHOUT

REV	DESCRIPTION	DATE

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
GEORGIA PROFESSIONAL ENGINEER NO. 034136
DATE: 10/27/2020

GEORGIA REGISTERED No. PE034136 PROFESSIONAL ENGINEER JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
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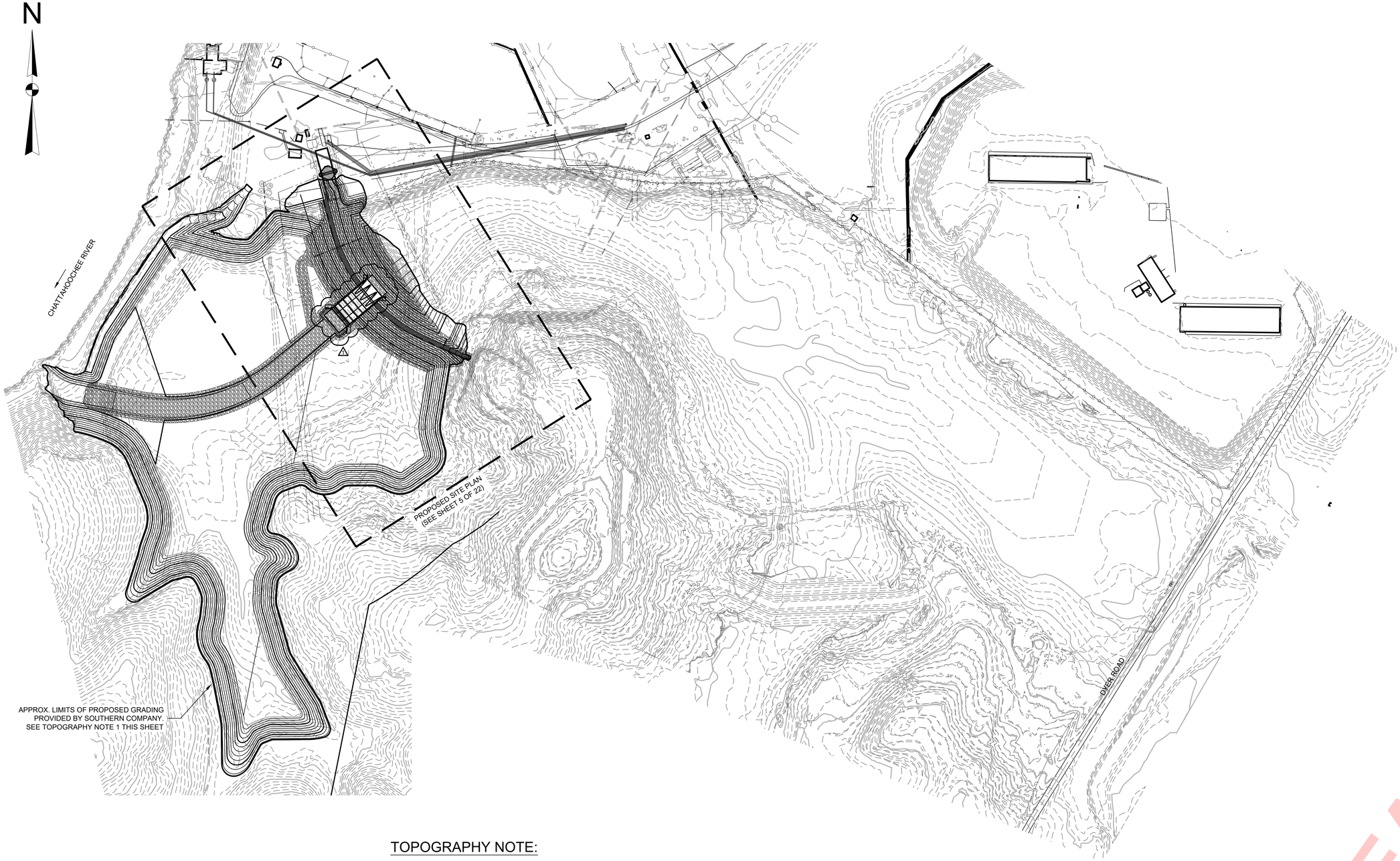
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

GENERAL NOTES

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
2 OF 22



TOPOGRAPHY NOTE:

1. TOPOGRAPHY DEPICTED BELOW EL. 722.0 IN THE POND BED UPSTREAM OF THE DAM EMBANKMENT BASED UPON 1969 TOPOGRAPHIC DATA. TOPOGRAPHY DEPICTED ABOVE EL. 722.0 BASED UPON TOPOGRAPHIC DATA PROVIDED BY SOUTHERN COMPANY AND DATED 3/16/2018. SOME MODIFICATIONS TO GRADING SHOWN HEREIN MAY BE NECESSARY BASED UPON FINAL ASH REMOVAL/EXCAVATION LIMITS. PURCHASER SHALL PROVIDE AS BUILT SURVEY OF PHASE I WORK AND ASH REMOVAL TO ENGINEER FOR REVIEW PRIOR TO CONSTRUCTION.

DATE	DESCRIPTION	REV
02/26/21	REVISED LABYRINTH SPILLWAY & REMOVED BYPASS	1

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

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PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

PROPOSED PHASE II PROJECT SITE MAP

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET 3 OF 22

SCALE: 1"=150'
0 150' 300'

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_CIVIL_FINAL.DWG

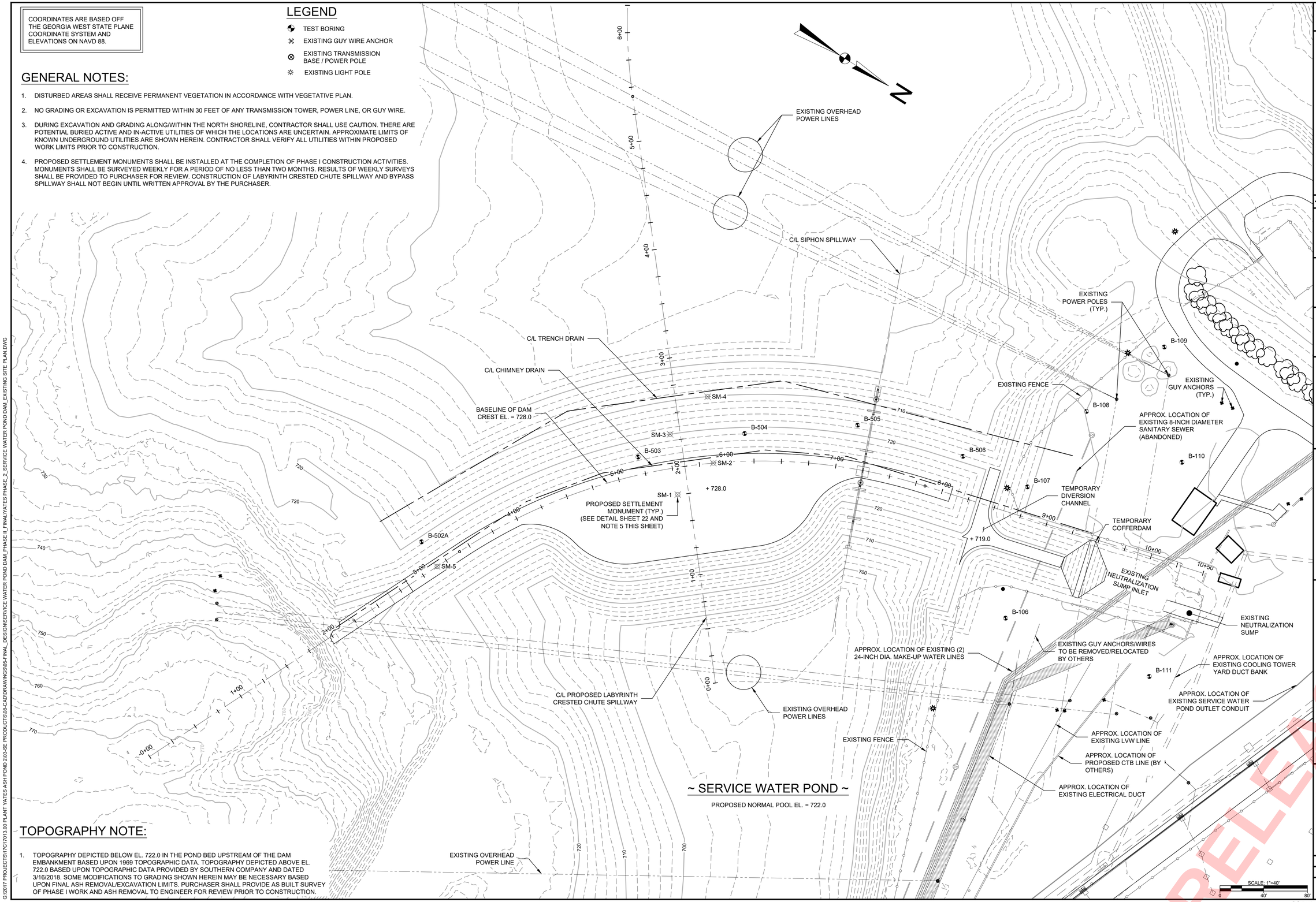
COORDINATES ARE BASED OFF THE GEORGIA WEST STATE PLANE COORDINATE SYSTEM AND ELEVATIONS ON NAVD 88.

LEGEND

- TEST BORING
- EXISTING GUY WIRE ANCHOR
- EXISTING TRANSMISSION BASE / POWER POLE
- EXISTING LIGHT POLE

GENERAL NOTES:

1. DISTURBED AREAS SHALL RECEIVE PERMANENT VEGETATION IN ACCORDANCE WITH VEGETATIVE PLAN.
2. NO GRADING OR EXCAVATION IS PERMITTED WITHIN 30 FEET OF ANY TRANSMISSION TOWER, POWER LINE, OR GUY WIRE.
3. DURING EXCAVATION AND GRADING ALONG/WITHIN THE NORTH SHORELINE, CONTRACTOR SHALL USE CAUTION. THERE ARE POTENTIAL BURIED ACTIVE AND IN-ACTIVE UTILITIES OF WHICH THE LOCATIONS ARE UNCERTAIN. APPROXIMATE LIMITS OF KNOWN UNDERGROUND UTILITIES ARE SHOWN HEREIN. CONTRACTOR SHALL VERIFY ALL UTILITIES WITHIN PROPOSED WORK LIMITS PRIOR TO CONSTRUCTION.
4. PROPOSED SETTLEMENT MONUMENTS SHALL BE INSTALLED AT THE COMPLETION OF PHASE I CONSTRUCTION ACTIVITIES. MONUMENTS SHALL BE SURVEYED WEEKLY FOR A PERIOD OF NO LESS THAN TWO MONTHS. RESULTS OF WEEKLY SURVEYS SHALL BE PROVIDED TO PURCHASER FOR REVIEW. CONSTRUCTION OF LABYRINTH CRESTED CHUTE SPILLWAY AND BYPASS SPILLWAY SHALL NOT BEGIN UNTIL WRITTEN APPROVAL BY THE PURCHASER.



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REV.	DESCRIPTION	DATE
1	REMOVED BYPASS	02/26/21

DESIGNED BY: JTD
DRAWN BY: GMB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136
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PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

EXISTING SITE PLAN

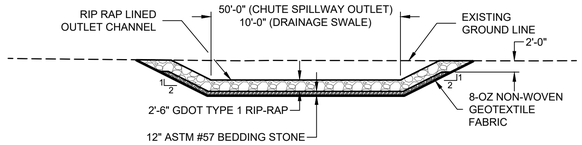
PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET 4 OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\09-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER P

GENERAL NOTES:

1. DISTURBED AREAS SHALL RECEIVE PERMANENT VEGETATION IN ACCORDANCE WITH VEGETATIVE PLAN.
2. NO GRADING OR EXCAVATION IS PERMITTED WITHIN 30 FEET OF ANY TRANSMISSION TOWER, POWER LINE, OR GUY WIRE.
3. DURING EXCAVATION AND GRADING ALONG/WITHIN THE NORTH SHORELINE, CONTRACTOR SHALL USE CAUTION. THERE ARE POTENTIAL BURIED ACTIVE AND IN-ACTIVE UTILITIES OF WHICH THE LOCATIONS ARE UNCERTAIN. APPROXIMATE LIMITS OF KNOWN UNDERGROUND UTILITIES ARE SHOWN HEREIN. CONTRACTOR SHALL VERIFY ALL UTILITIES WITHIN PROPOSED WORK LIMITS PRIOR TO CONSTRUCTION.



A TYPICAL OUTLET CHANNEL SECTION

N.T.S.

COORDINATES ARE BASED OFF THE GEORGIA WEST STATE PLANE COORDINATE SYSTEM AND ELEVATIONS ON NAVD 88.

SITE PLAN NOTES:

1. BORROW SOURCE/FILL SOILS SHALL BE APPROVED BY ENGINEER PRIOR TO CONSTRUCTION. BORROW SOURCE SOILS SHALL CLASSIFY AS ML, MH, CL, SM, OR SC ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM.
2. GUTTERS FORMED AT FILL-ABUTMENT CONTACTS SHALL BE ROUNDED AS OPPOSED TO "V" SHAPED. CONTRACTOR SHALL BE AWARE OF THE HIGH POTENTIAL FOR EROSION IN THESE GUTTERS AND SHALL BE PREPARED TO TAKE THE NECESSARY MEASURES TO PREVENT EROSION IN THESE AREAS.
3. WORK SHALL BE LIMITED TO THE IMMEDIATE VICINITY OF THE DAM. NO WORK SHALL BE PERFORMED OUTSIDE OF THE CLEARING AND GRUBBING LIMITS WITHOUT PRIOR CONSENT OF THE ENGINEER AND PURCHASER.
4. SUBSEQUENT TO ASH REMOVAL, NO EXCAVATION OTHER THAN THAT SHOWN HEREIN, SHALL BE PERFORMED WITHIN 200 FEET OF THE DAM WITHOUT EXPRESSED WRITTEN CONSENT OF ENGINEER AND PURCHASER.
5. PROPOSED FILL DETAILED HEREIN SHALL BE FOUNDED ON RESIDUAL MATERIALS OR COMPACTED STRUCTURAL FILL FOUNDED ON RESIDUAL SOIL, PARTIALLY WEATHERED ROCK, OR ROCK. FOUNDATION SHALL BE CAPABLE OF SAFELY SUPPORTING 3000 PSF. CONTRACTOR SHOULD ANTICIPATE THE UNDERCUTTING OF ALLUVIAL AND SOFT RESIDUAL SOILS.

TOPOGRAPHY NOTE:

1. TOPOGRAPHY DEPICTED BELOW EL. 722.0 IN THE POND BED UPSTREAM OF THE DAM EMBANKMENT BASED UPON 1969 TOPOGRAPHIC DATA. TOPOGRAPHY DEPICTED ABOVE EL. 722.0 BASED UPON TOPOGRAPHIC DATA PROVIDED BY SOUTHERN COMPANY AND DATED 3/16/2018. SOME MODIFICATIONS TO GRADING SHOWN HEREIN MAY BE NECESSARY BASED UPON FINAL ASH REMOVAL/EXCAVATION LIMITS. PURCHASER SHALL PROVIDE AS BUILT SURVEY OF PHASE I WORK AND ASH REMOVAL TO ENGINEER FOR REVIEW PRIOR TO CONSTRUCTION.

~ SERVICE WATER POND ~

PROPOSED NORMAL POOL EL. = 722.0

REV	DESCRIPTION	DATE
1	REVISED LABYRINTH SPILLWAY & REMOVED BYPASS	02/28/21

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL ENGINEER JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

PROPOSED SITE PLAN

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

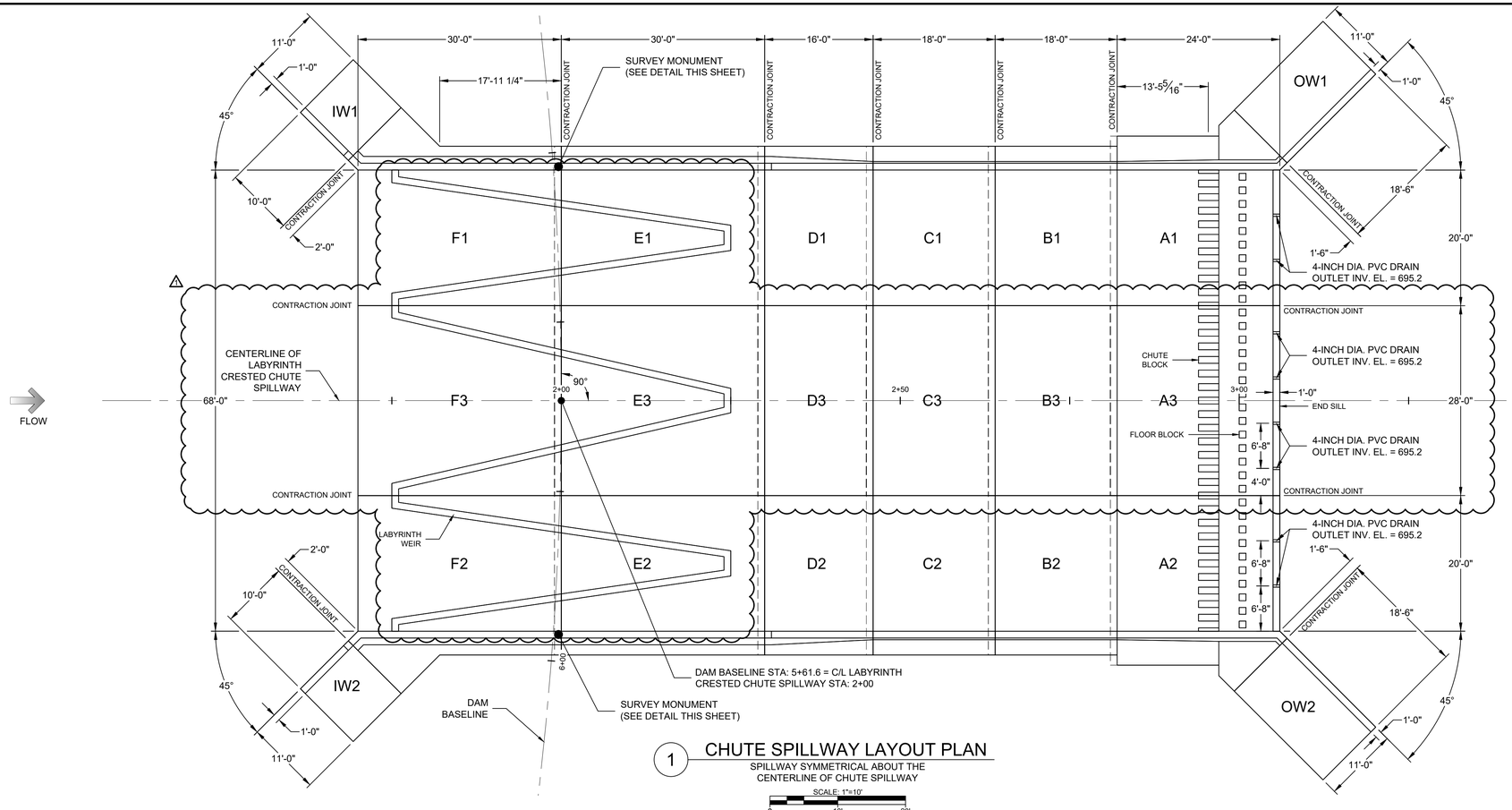
PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET 5 OF 22

SCALE: 1"=40'
0 40' 80'

RELEASED

ACCEPTED

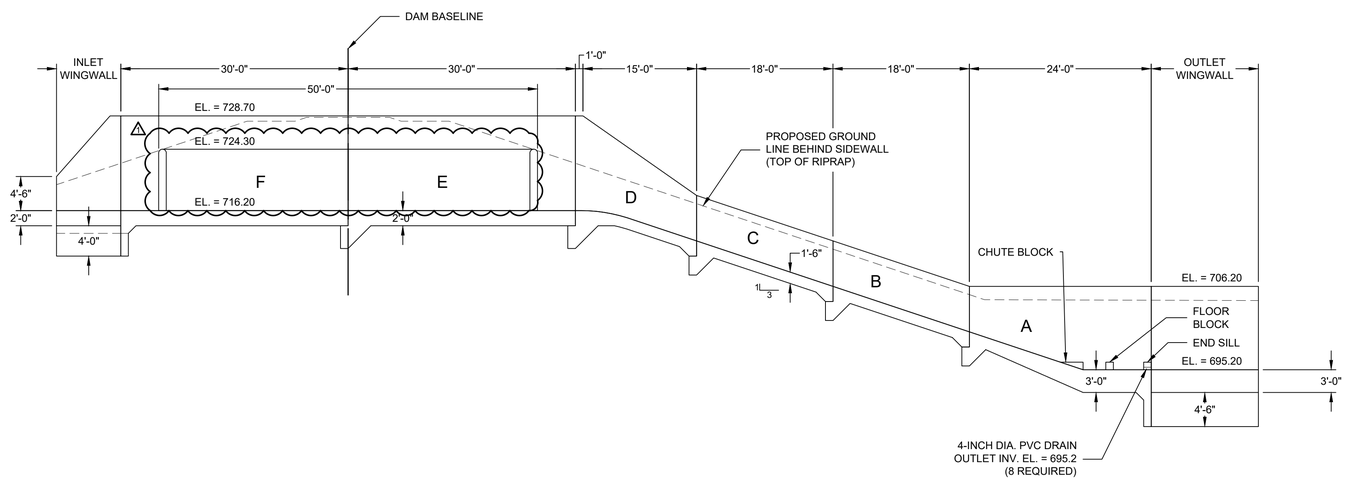
G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_FINAL.DWG



1 CHUTE SPILLWAY LAYOUT PLAN

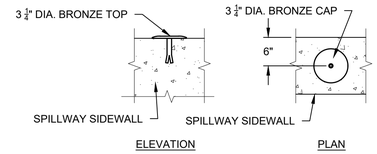
SPILLWAY SYMMETRICAL ABOUT THE
CENTERLINE OF CHUTE SPILLWAY

SCALE: 1"=10'



2 CHUTE SPILLWAY LAYOUT PROFILE

SCALE: 1"=10'



NOTE: CAST MONUMENT INTO CONCRETE AT
CETNERLINE OF DAM AS SHOWN ABOVE.

SURVEY MONUMENT DETAIL

N.T.S.

REV	DESCRIPTION	DATE
1	REVISED LABYRINTH SPILLWAY	02/26/21

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

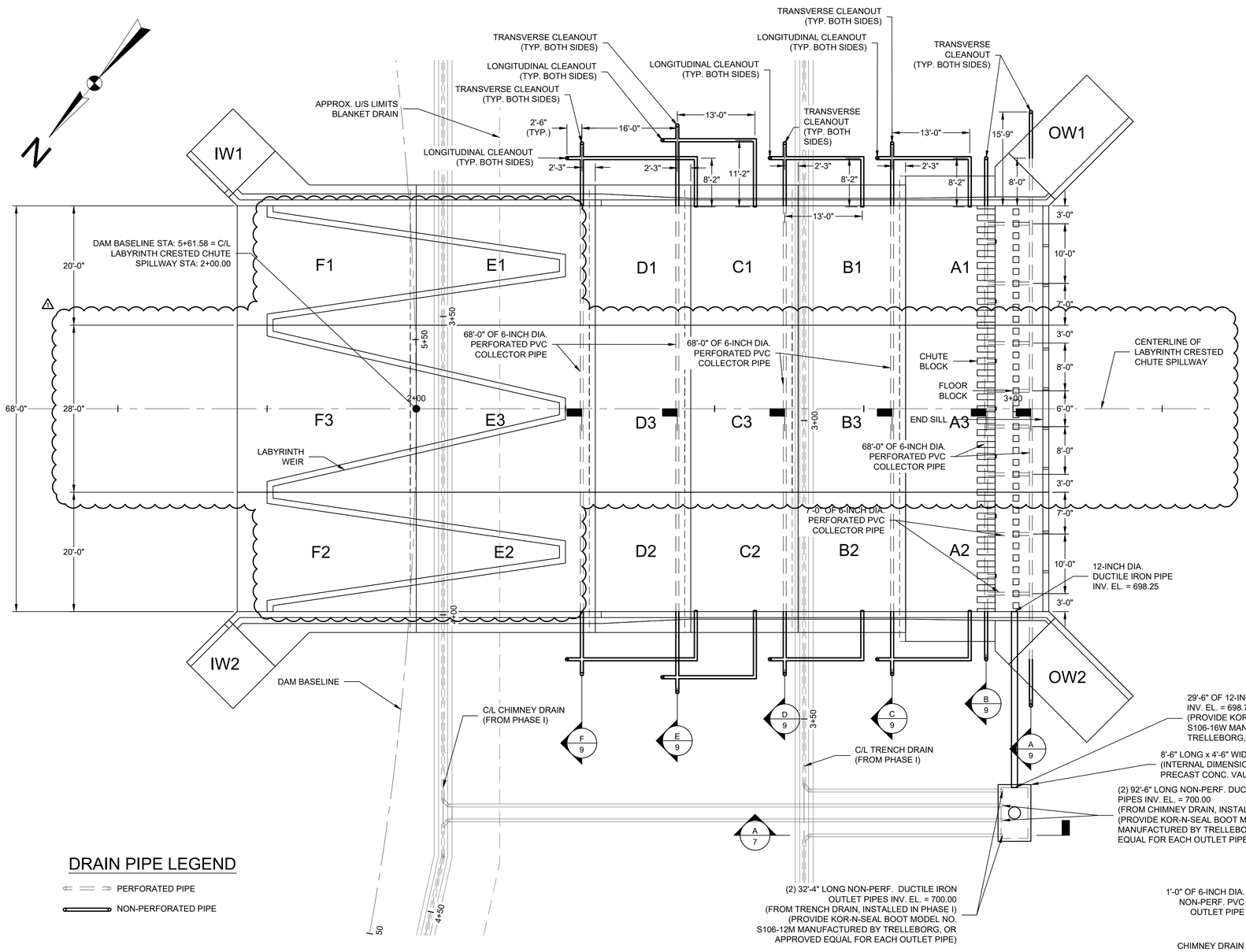
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY LAYOUT PLAN AND PROFILE

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
6 OF 22

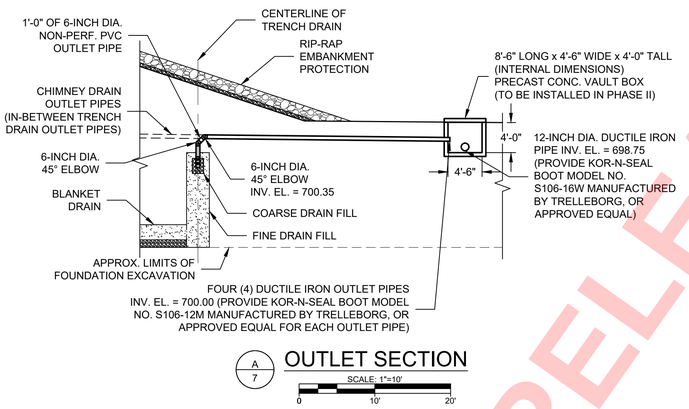
G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CADD\RAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER



1 CHUTE SPILLWAY DRAINAGE PLAN ⚠

SPILLWAY SYMMETRICAL ABOUT THE CENTERLINE OF CHUTE SPILLWAY

SCALE: 1"=10'



A/7 OUTLET SECTION

SCALE: 1"=10'

REV	DESCRIPTION	DATE
1	REVISED LABYRINTH SPILLWAY	02/26/21

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 / Phone: 770-781-8008 / Fax: 770-781-8003 / schnabel-eng.com

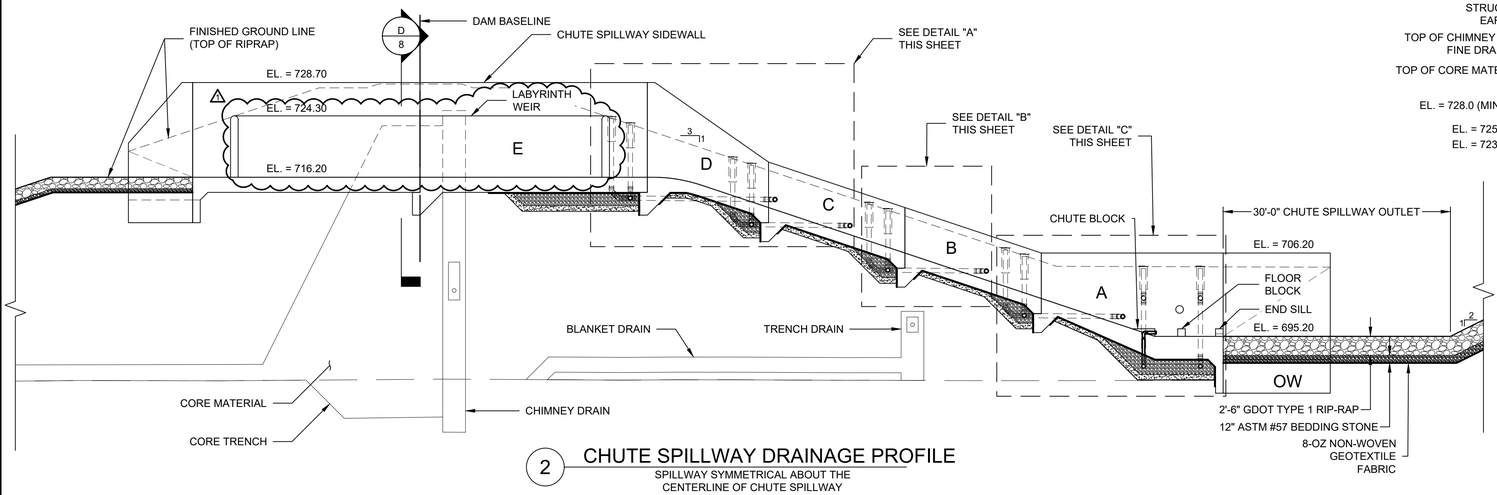
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY DRAINAGE PLAN

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET 7 OF 22

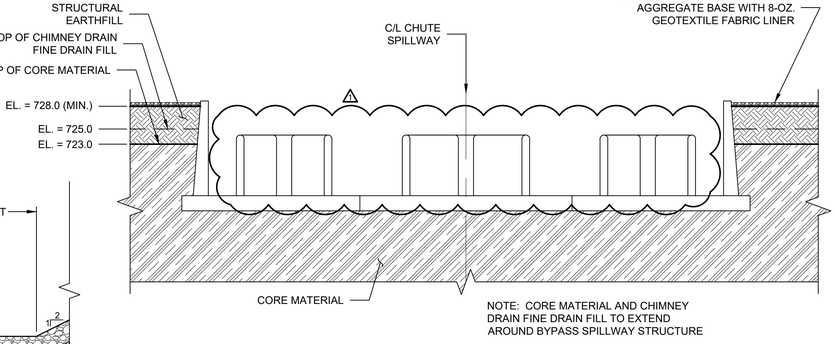
G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATE



2 CHUTE SPILLWAY DRAINAGE PROFILE

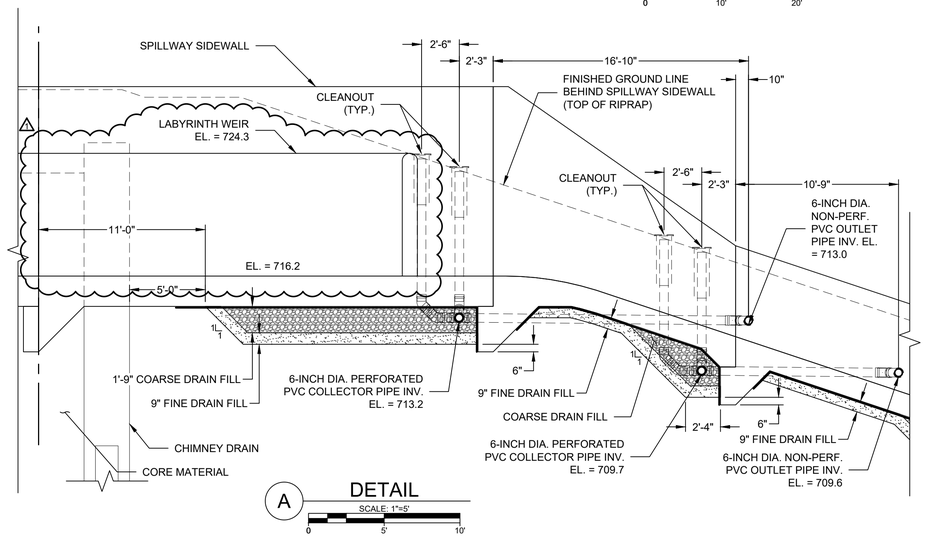
SPILLWAY SYMMETRICAL ABOUT THE CENTERLINE OF CHUTE SPILLWAY

SCALE: 1"=10'



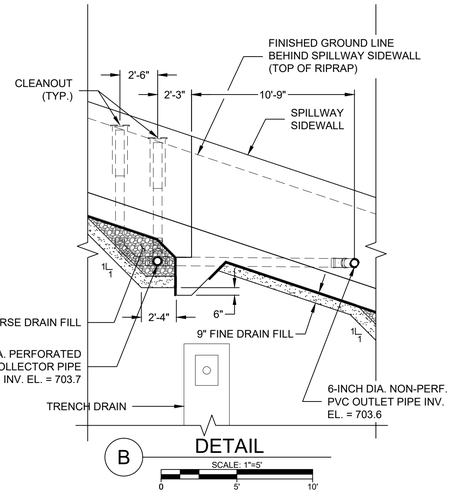
D CORE/CHIMNEY DRAIN SECTION

SCALE: 1"=10'



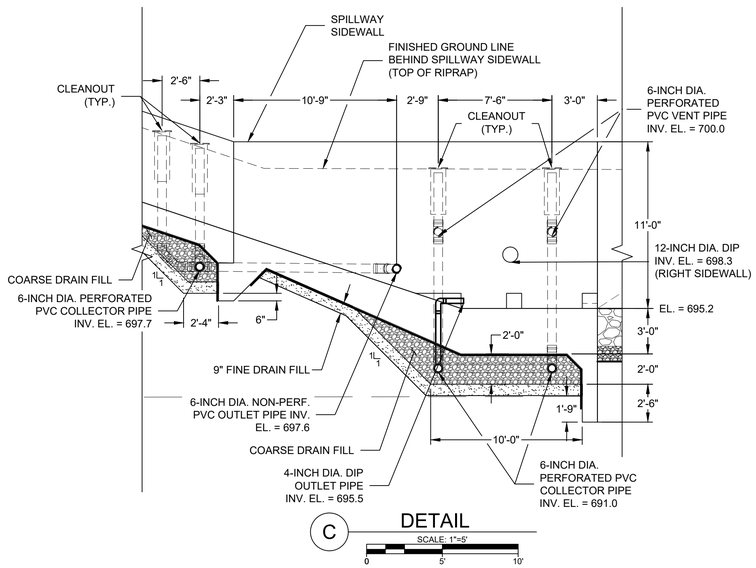
A DETAIL

SCALE: 1"=5'



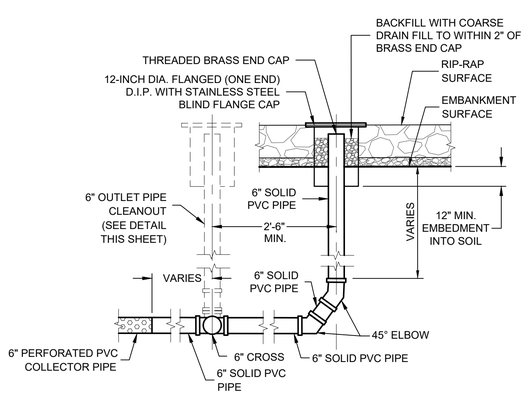
B DETAIL

SCALE: 1"=5'



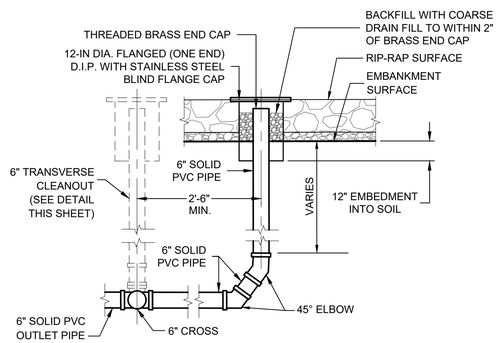
C DETAIL

SCALE: 1"=5'



6" TRANSVERSE CLEANOUT DETAIL

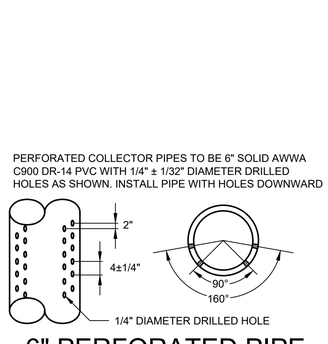
N.T.S.



6" LONGITUDINAL PIPE CLEANOUT DETAIL

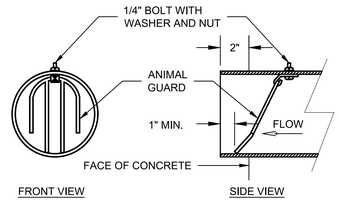
N.T.S.

NOTE: DUCTILE IRON PIPE TO BE MCWANE DUCTILE FLANGE PIPE (FLG X FLG) 12" DIA. WITH FLANGE ON ONE END ONLY AND A MATCHING BLIND FLANGE, OR APPROVED EQUAL. LENGTH TO BE DETERMINED IN FIELD ONCE FINISHED RIP-RAP AND BEDDING THICKNESS IS DETERMINED.



6" PERFORATED PIPE

N.T.S.



ANIMAL GUARD DETAIL

N.T.S.

APPROVED MODEL MANUFACTURED BY "AGRI-DRAIN" OR EQUAL. (AGRI-DRAIN TELEPHONE NUMBER: 1-800-232-4742)

DESCRIPTION	DATE
REVISED LABYRINTH SPILLWAY	02/2021

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
GEORGIA PROFESSIONAL ENGINEER NO. 034136
DATE: 10/27/2020

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

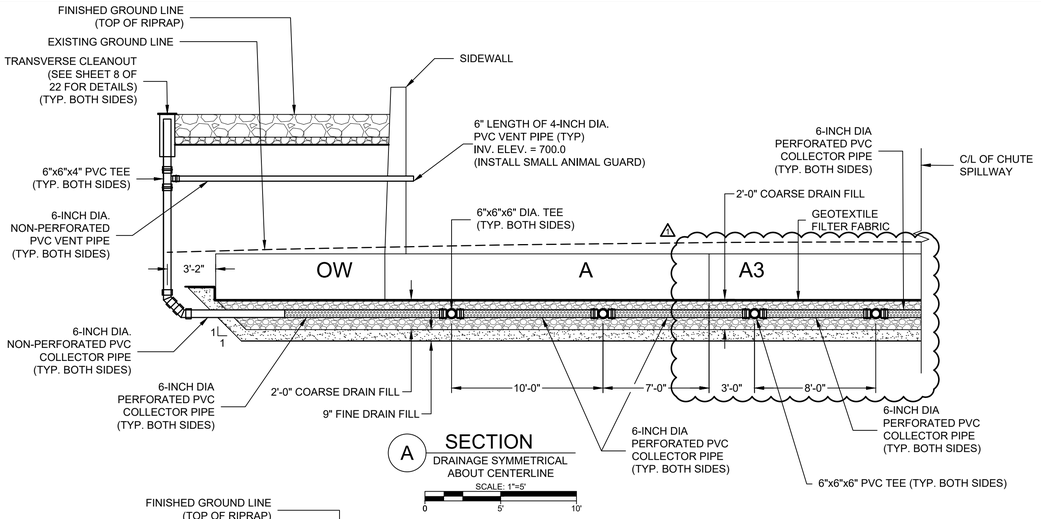
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

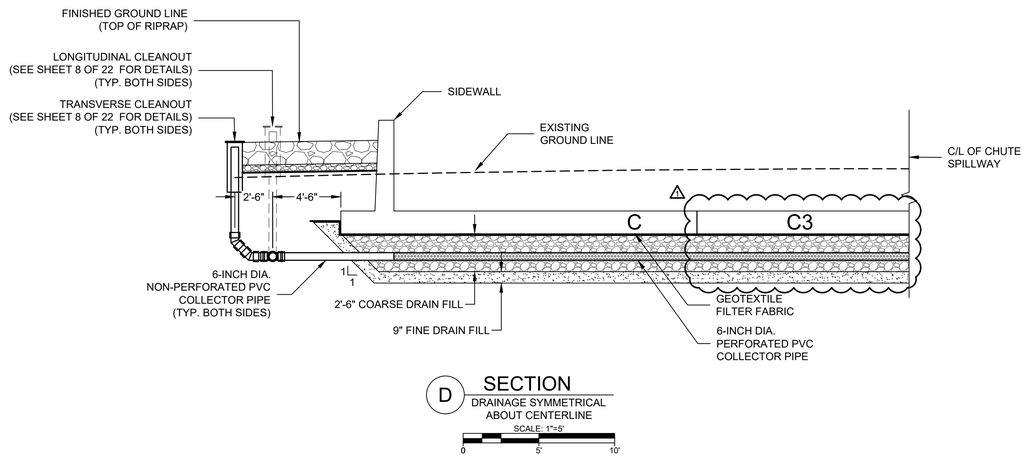
CHUTE SPILLWAY DRAINAGE PROFILE

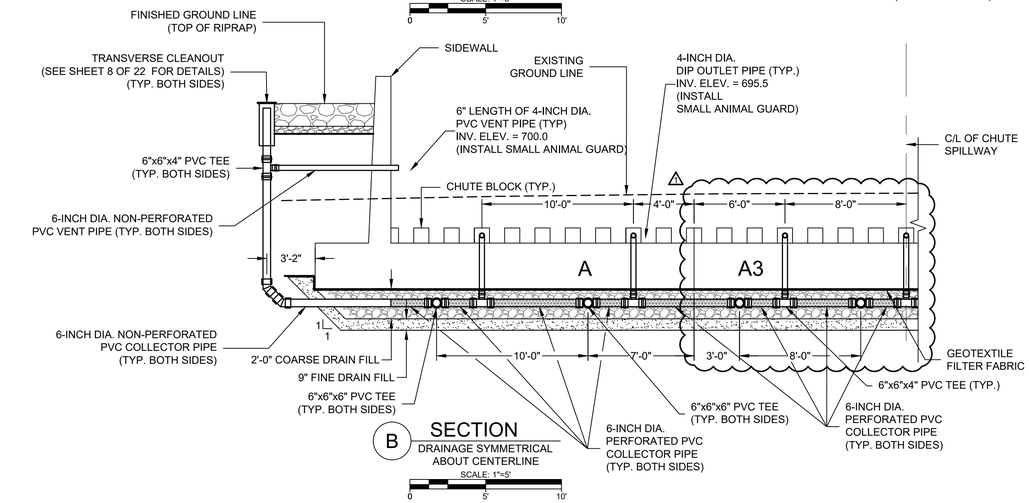
PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

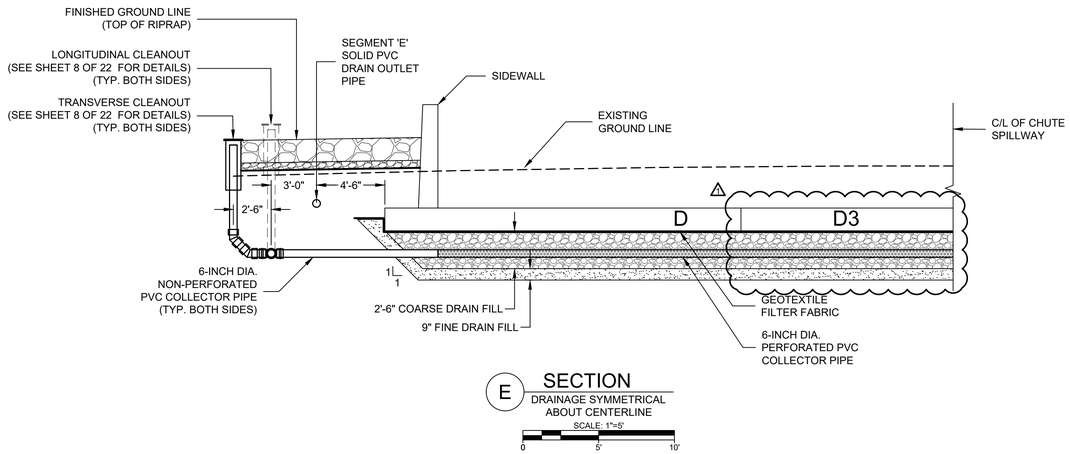
PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET 8 OF 22

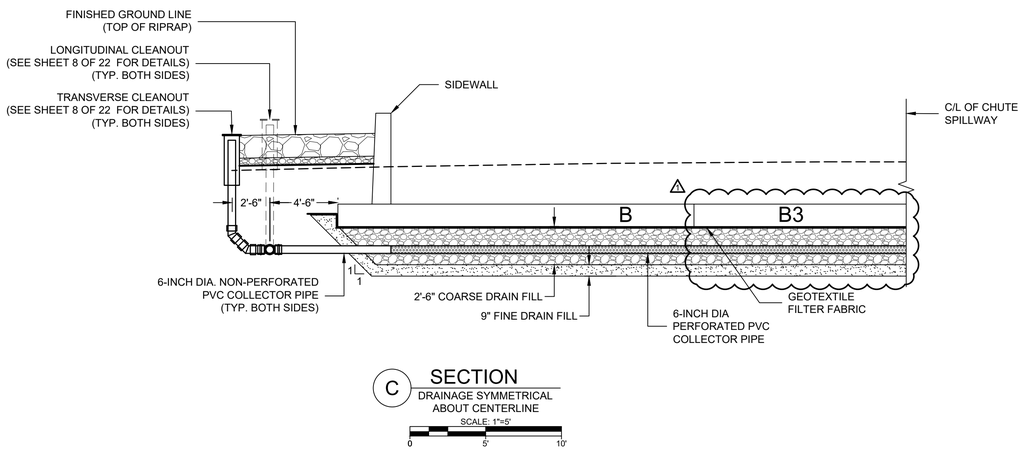
G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_CHUTE_FINAL.DWG

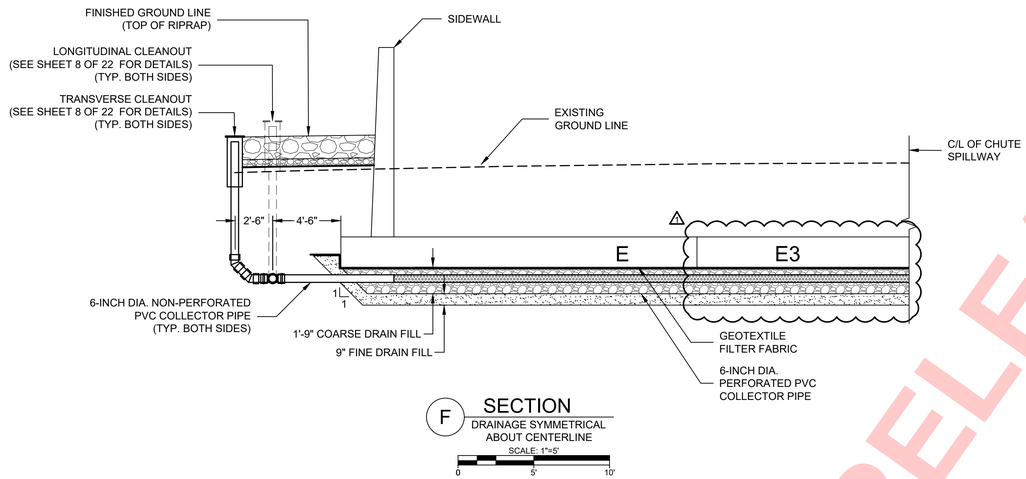












DATE	DESCRIPTION	REV
02/26/21	REVISED LABYRINTH SPILLWAY	1

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

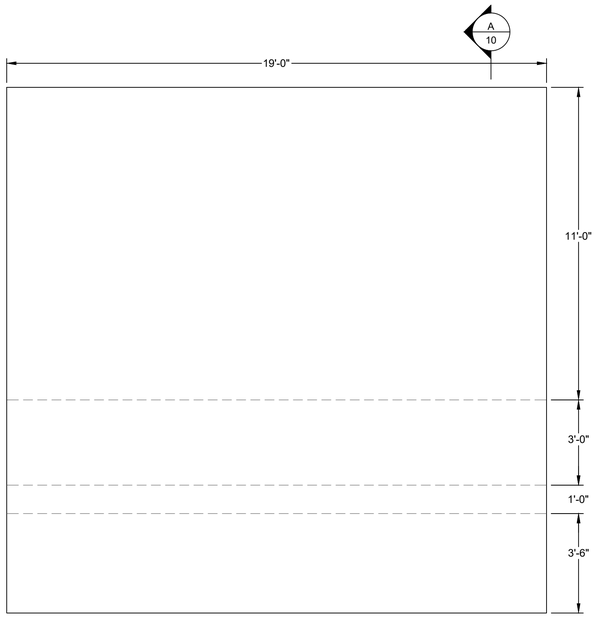
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY
DRAINAGE DETAILS

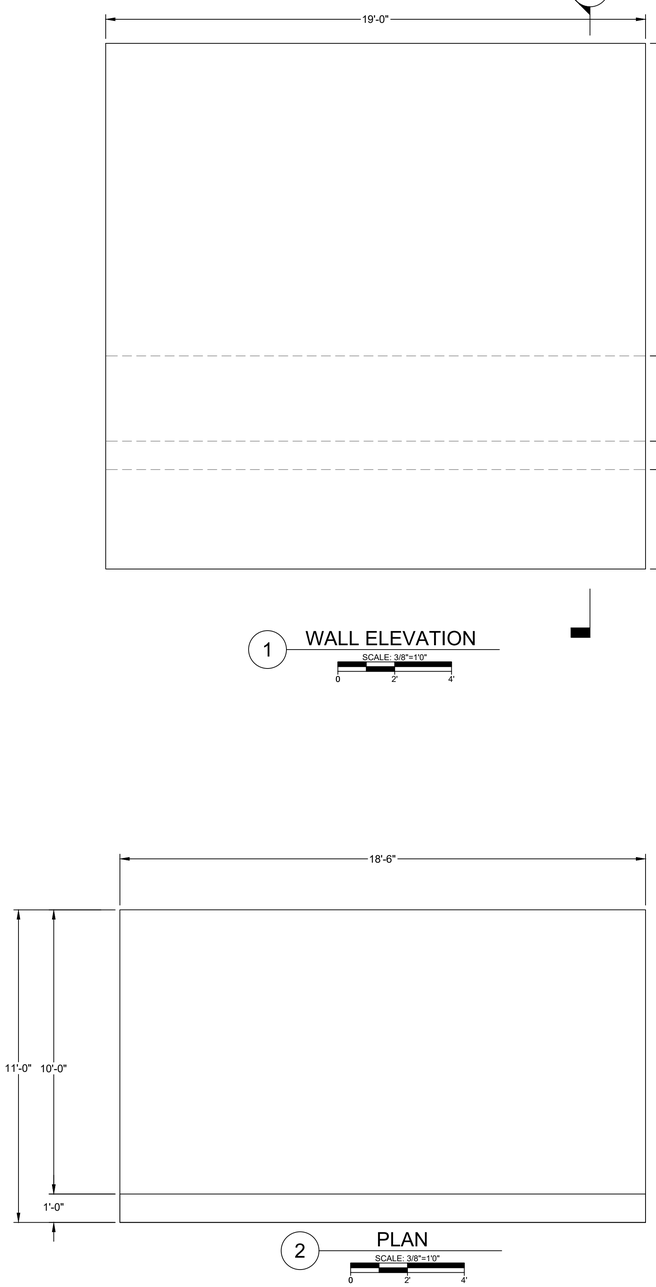
PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
9 OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_CHUTE_FINAL.DWG



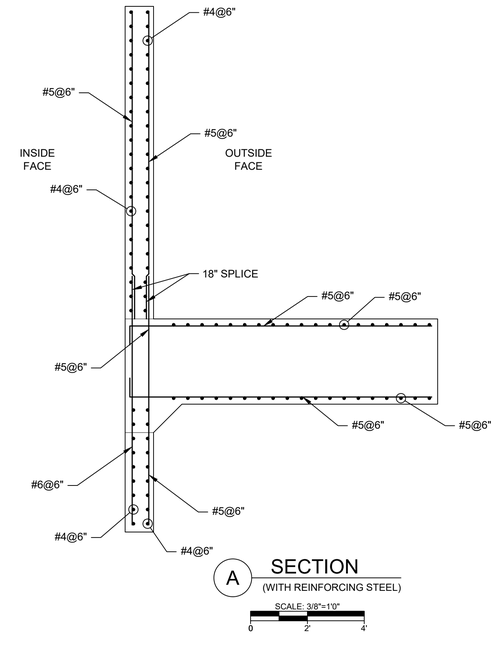
1 WALL ELEVATION
SCALE: 3/8"=1'0"
0 2' 4'



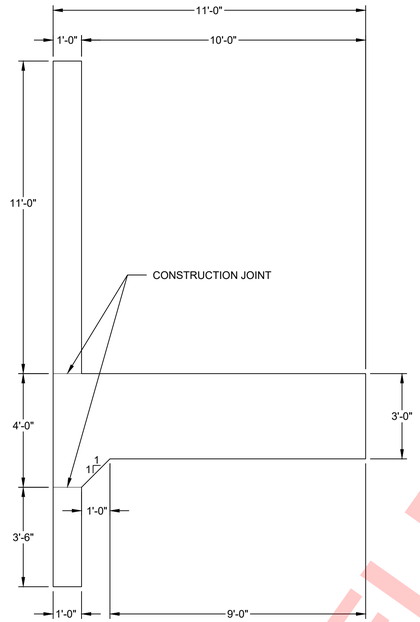
2 PLAN
SCALE: 3/8"=1'0"
0 2' 4'

NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.
2. OW2 SIMILAR, OPPOSITE HAND



A SECTION
(WITH REINFORCING STEEL)
SCALE: 3/8"=1'0"
0 2' 4'



A SECTION
(DIMENSIONAL LAYOUT)
SCALE: 3/8"=1'0"
0 2' 4'

REV	DESCRIPTION	DATE

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN ENGINEER

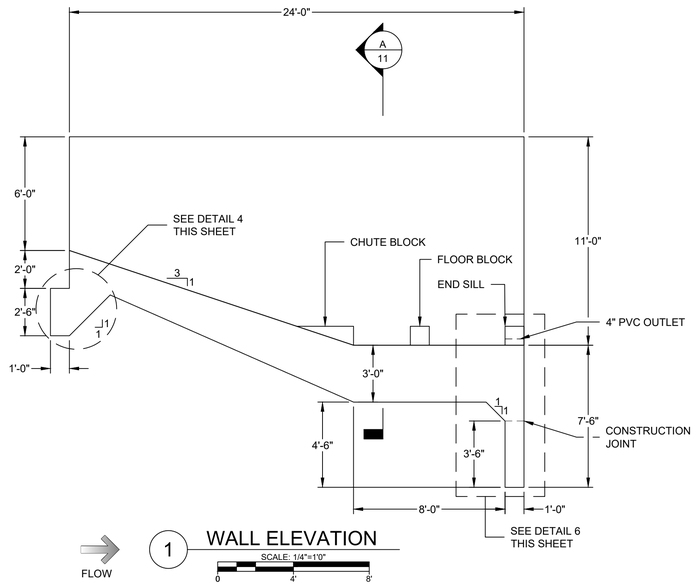
Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 / Phone: 770-781-8008 / Fax: 770-781-8003 / schnabel-eng.com

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY DETAILS SEGMENT OW1

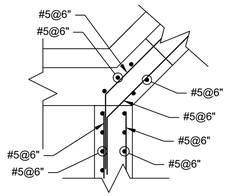
PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
10 OF 22



1 WALL ELEVATION

SCALE: 1/4"=1'0"

0 4' 8'

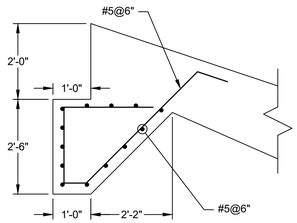


3 SIDE WALL CORNER DETAIL

(WITH REINFORCING STEEL)

SCALE: 1/2"=1'0"

0 2' 4'

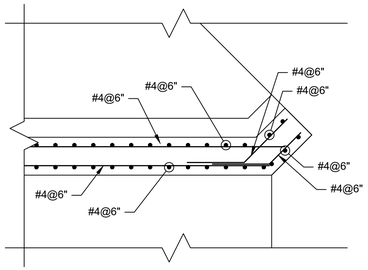


4 UPSTREAM CUTOFF WALL DETAIL

(WITH REINFORCING STEEL)

SCALE: 1/2"=1'0"

0 2' 4'

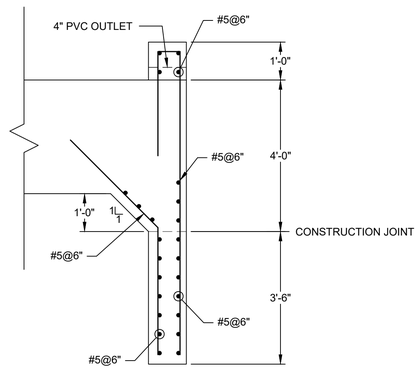


5 SIDEWALL CORNER DETAIL

(WITH REINFORCING STEEL)

SCALE: 1/2"=1'0"

0 2' 4'



6 CUTOFF WALL DETAIL

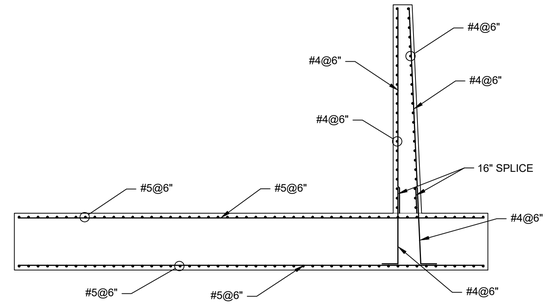
(WITH REINFORCING STEEL)

SCALE: 1/2"=1'0"

0 2' 4'

NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.
2. A2 SIMILAR, OPPOSITE HAND

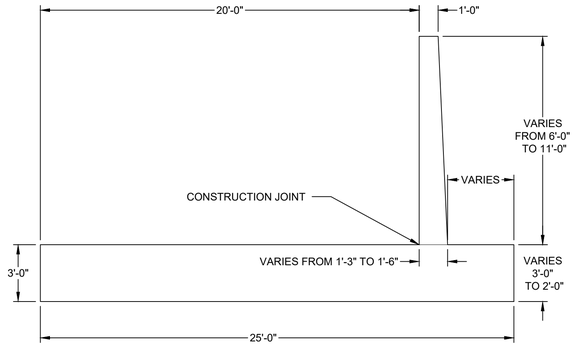


A SECTION

(WITH REINFORCING STEEL)

SCALE: 1/4"=1'0"

0 4' 8'

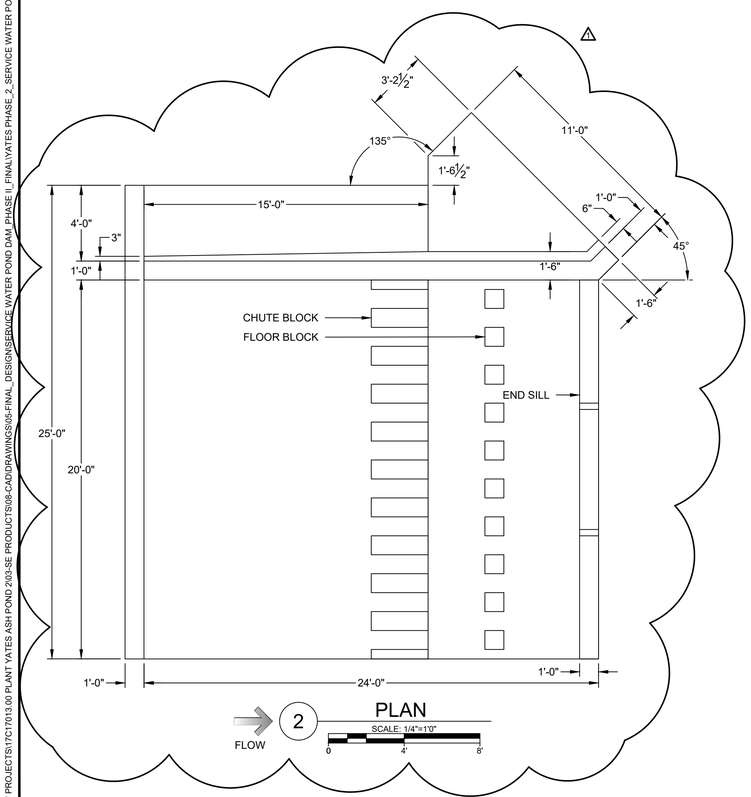


A SECTION

(DIMENSIONAL LAYOUT)

SCALE: 1/4"=1'0"

0 4' 8'



2 PLAN

SCALE: 1/4"=1'0"

0 4' 8'

DATE	DESCRIPTION	REV
02/28/21	REVISED LABYRINTH SPILLWAY	1

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED JONATHAN THOMAS DEAN No. PE034136 PROFESSIONAL

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

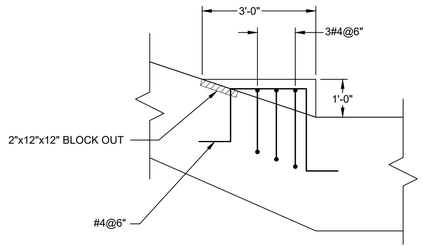
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY DETAILS SEGMENT A1 (1 OF 2)

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
11 OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_STRUCTURAL_CHUTE_FINAL.DWG

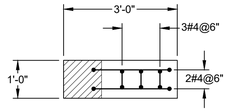


FLOW

1 CHUTE BLOCK DETAIL - SECTION

(WITH STRUCTURAL STEEL)
NOTE: (31) FULL CHUTE BLOCKS AND (6) HALF CHUTE BLOCKS REQUIRED (TOTAL)

SCALE: 1/2"=1'0"
0 2' 4'

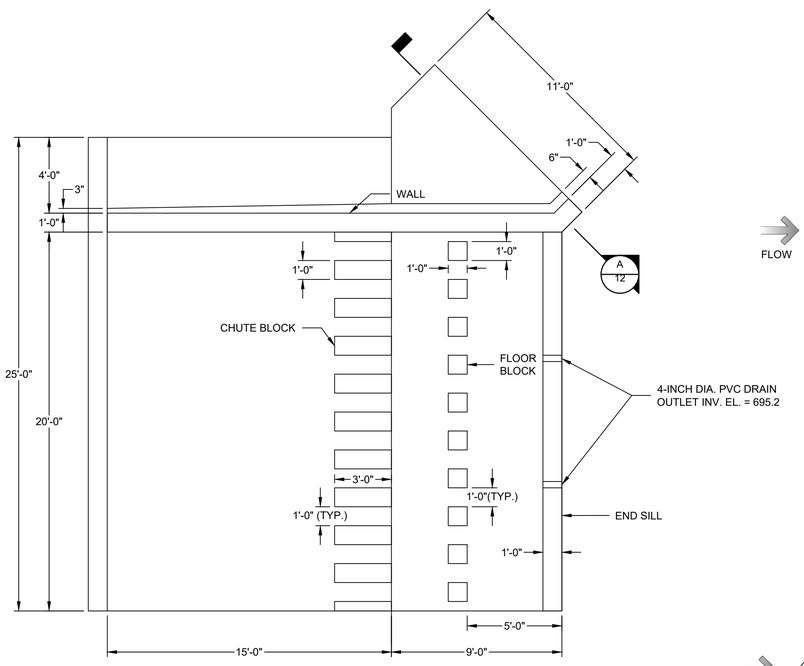


FLOW

2 CHUTE BLOCK DETAIL - PLAN

(WITH STRUCTURAL STEEL)
NOTE: (31) FULL CHUTE BLOCKS AND (6) HALF CHUTE BLOCKS REQUIRED (TOTAL)

SCALE: 1/2"=1'0"
0 2' 4'

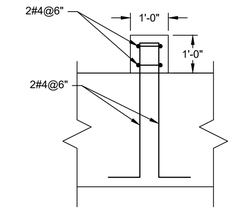


FLOW

3 BLOCK LAYOUT

FLOOR AND CHUTE BLOCK LAYOUT SYMMETRICAL ABOUT CENTERLINE

SCALE: 1/4"=1'0"
0 4' 8'

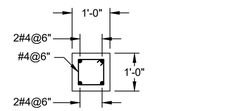


FLOW

4 FLOOR BLOCK DETAIL - SECTION

(WITH REINFORCING STEEL)
NOTE: (34) FULL FLOOR BLOCKS REQUIRED (TOTAL)

SCALE: 1/2"=1'0"
0 2' 4'

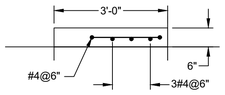


FLOW

5 FLOOR BLOCK DETAIL - PLAN

(WITH REINFORCING STEEL)
NOTE: (34) FLOOR BLOCKS REQUIRED (FULL)

SCALE: 1/2"=1'0"
0 2' 4'

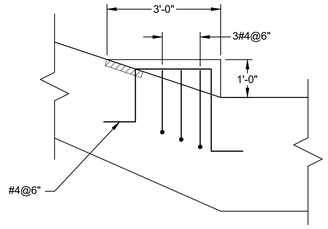


FLOW

6 HALF CHUTE BLOCK DETAIL - PLAN

(WITH REINFORCING STEEL)
NOTE: (6) HALF CHUTE BLOCKS REQUIRED

SCALE: 1/2"=1'0"
0 2' 4'



FLOW

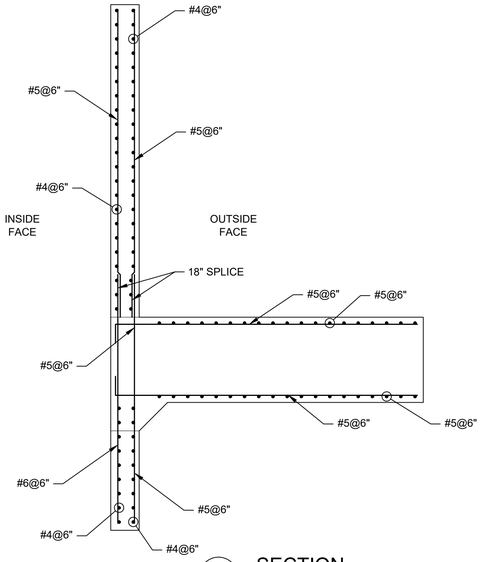
7 HALF CHUTE BLOCK DETAIL - SECTION

(WITH REINFORCING STEEL)
NOTE: (31) FULL CHUTE BLOCKS AND 6) HALF CHUTE BLOCKS REQUIRED

SCALE: 1/2"=1'0"
0 2' 4'

NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.
2. A2 SIMILAR, OPPOSITE HAND

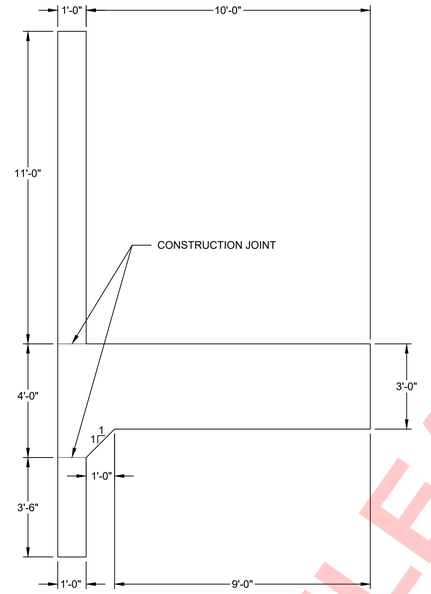


A

SECTION

(WITH REINFORCING STEEL)

SCALE: 3/8"=1'0"
0 2' 4'



A

SECTION

(DIMENSIONAL LAYOUT)

SCALE: 3/8"=1'0"
0 2' 4'

REV	DESCRIPTION	DATE

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
GEORGIA PROFESSIONAL ENGINEER NO. 034136
DATE: 10/27/2020

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

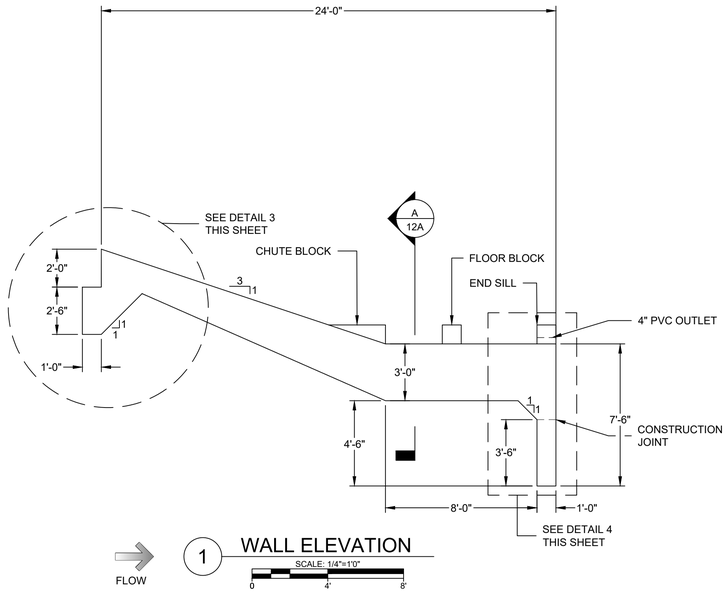
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY DETAILS SEGMENT A1 (2 OF 2)

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET 12 OF 22

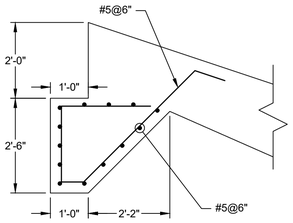
G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2/03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_STRUCTURAL_CHUTE_FINAL.DWG



1 WALL ELEVATION

SCALE: 1/4"=1'0"

0 4' 8'



3 UPSTREAM CUTOFF WALL DETAIL

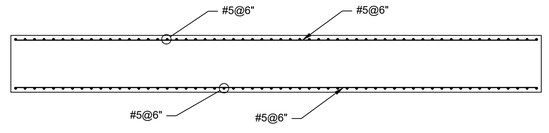
(WITH REINFORCING STEEL)

SCALE: 1/2"=1'0"

0 2' 4'

NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.

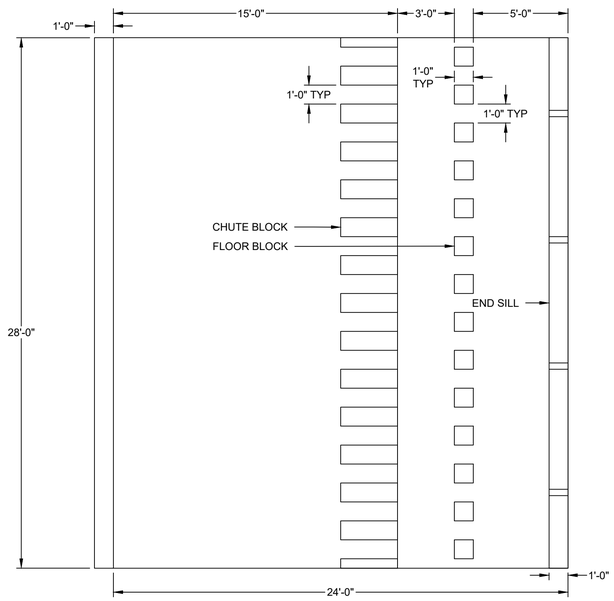


A SECTION

(WITH REINFORCING STEEL)

SCALE: 1/4"=1'0"

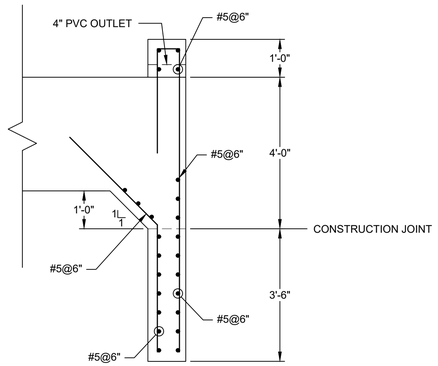
0 4' 8'



2 PLAN

SCALE: 1/4"=1'0"

0 4' 8'

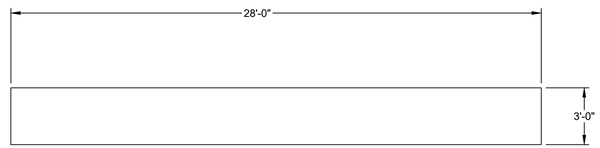


4 CUTOFF WALL DETAIL

(WITH REINFORCING STEEL)

SCALE: 1/2"=1'0"

0 2' 4'



A SECTION

(DIMENSIONAL LAYOUT)

SCALE: 1/4"=1'0"

0 4' 8'

REV	DESCRIPTION	DATE
1	REVISED LABYRINTH SPILLWAY	02/26/21

CHECKED BY: JSM
DRAWN BY: GHB
DESIGNED BY: JTD

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

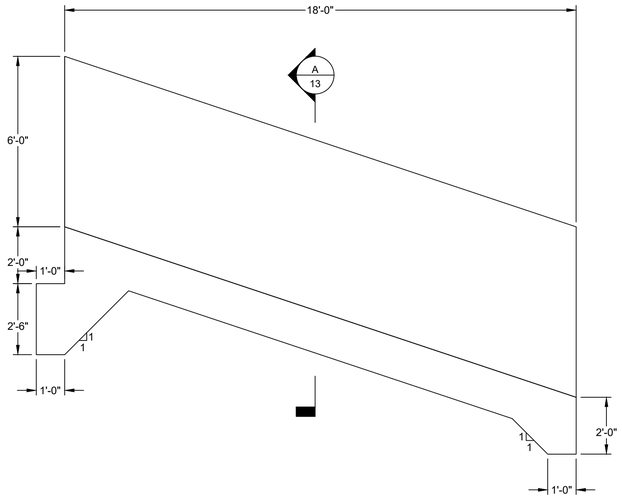
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY
DETAILS SEGMENT A3

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
12A OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATE

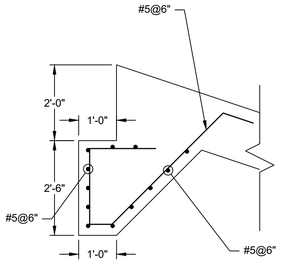


FLOW

1 WALL ELEVATION

SCALE: 3/8"=1'0"

0 2' 4'



FLOW

3 UPSTREAM CUTOFF WALL DETAIL

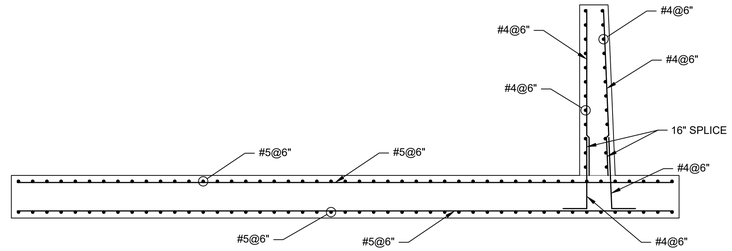
(WITH STRUCTURAL STEEL)

SCALE: 1/2"=1'0"

0 2' 4'

NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.
2. B2 AND C2 SIMILAR, OPPOSITE HAND.

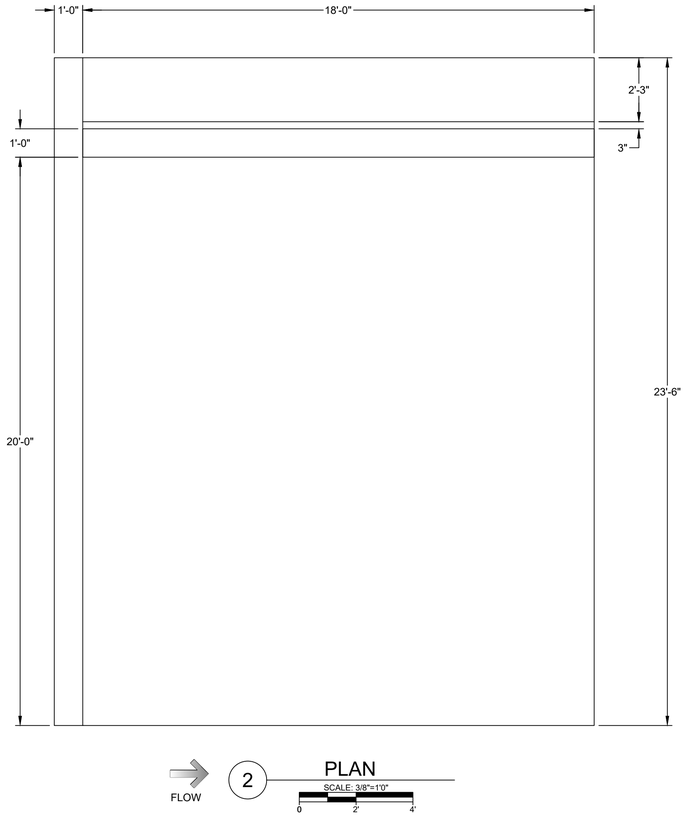


A SECTION

(WITH STRUCTURAL STEEL)

SCALE: 3/8"=1'0"

0 2' 4'

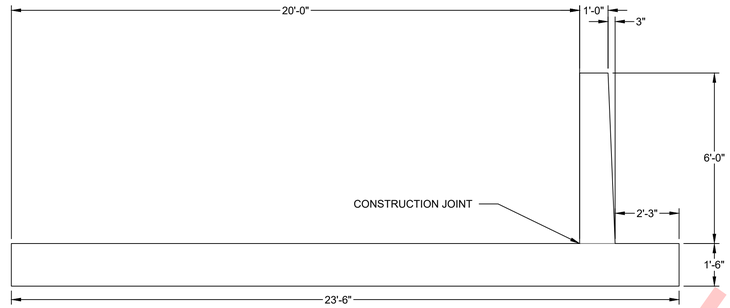


FLOW

2 PLAN

SCALE: 3/8"=1'0"

0 2' 4'



A SECTION

(DIMENSIONAL LAYOUT)

SCALE: 3/8"=1'0"

0 2' 4'

REV	DESCRIPTION	DATE

DESIGNED BY: JTD

DRAWN BY: GHB

CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.

DATE: 10/27/2020

GEORGIA PROFESSIONAL ENGINEER NO. 034136

REGISTERED GEORGIA JONATHAN THOMAS DEAN No. PE034136 PROFESSIONAL ENGINEER

Schnabel ENGINEERING

6445 Shiloh Road, Suite A / Alpharetta, GA 30005 / Phone: 770-781-8008 / Fax: 770-781-8003 / schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

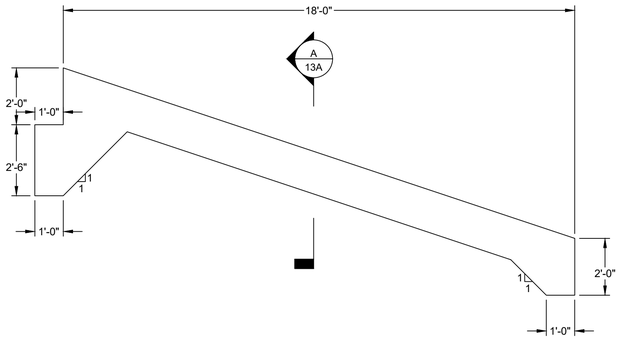
CHUTE SPILLWAY DETAILS
SEGMENTS B1 AND C1

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00

DATE: OCTOBER 27, 2020

SHEET
13 OF 22

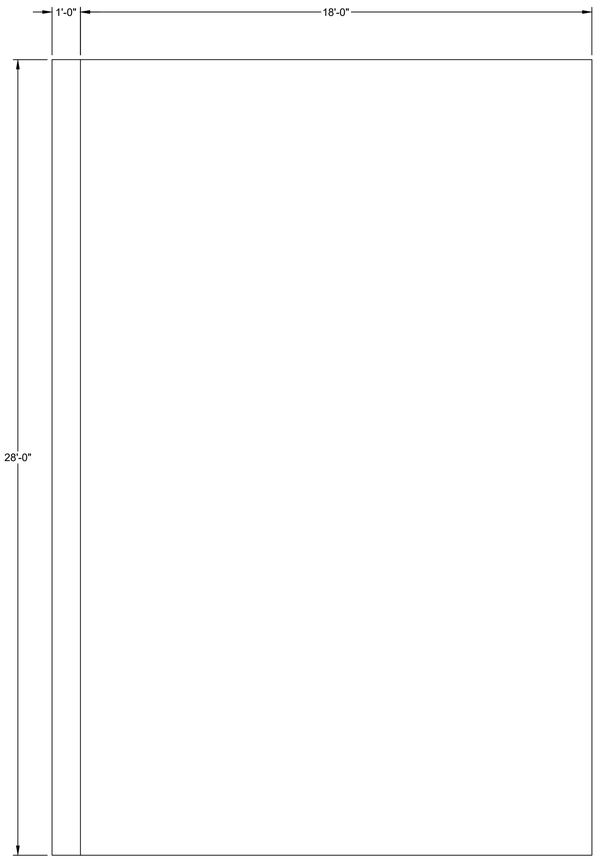


FLOW

1 WALL ELEVATION

SCALE: 3/8"=1'0"

0 2' 4'

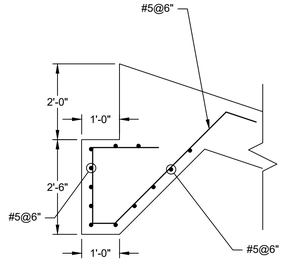


FLOW

2 PLAN

SCALE: 3/8"=1'0"

0 2' 4'



FLOW

3 UPSTREAM CUTOFF WALL DETAIL

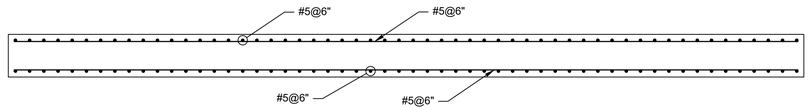
(WITH STRUCTURAL STEEL)

SCALE: 1/2"=1'0"

0 2' 4'

NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.

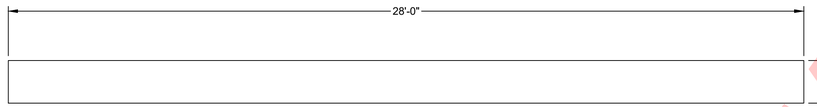


A SECTION

(WITH STRUCTURAL STEEL)

SCALE: 3/8"=1'0"

0 2' 4'



A SECTION

(DIMENSIONAL LAYOUT)

SCALE: 3/8"=1'0"

0 2' 4'

REV	DESCRIPTION	DATE
1	REVISED LABYRINTH SPILLWAY	02/26/21

DESIGNED BY: JTD

DRAWN BY: QHB

CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.

DATE: 10/27/2020

GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL ENGINEER JONATHAN THOMAS DEAN

Schnabel ENGINEERING

6445 Shiloh Road, Suite A / Alpharetta, GA 30005 / Phone: 770-781-8008 / Fax: 770-781-8003 / schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY DETAILS SEGMENTS B3 AND C3

PREPARED FOR:

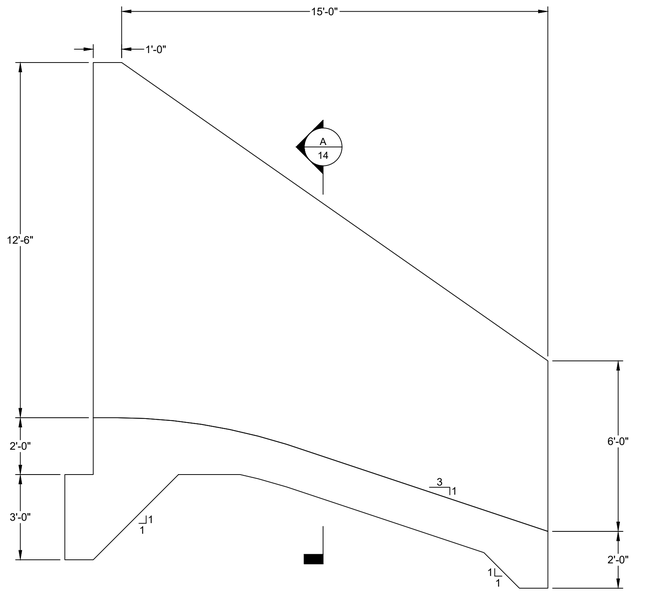
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00

DATE: OCTOBER 27, 2020

SHEET
13A OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_STRUCTURAL_CHUTE_FINAL.DWG

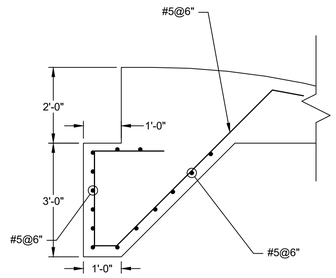


FLOW

1 WALL ELEVATION

SCALE: 3/8"=1'0"

0 2' 4'



FLOW

4 UPSTREAM CUTOFF WALL DETAIL

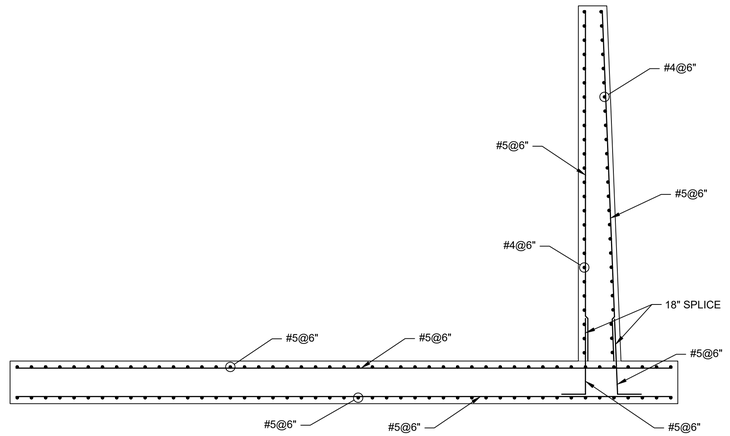
(WITH STRUCTURAL STEEL)

SCALE: 1/2"=1'0"

0 2' 4'

NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.
2. D2 SIMILAR, OPPOSITE HAND.

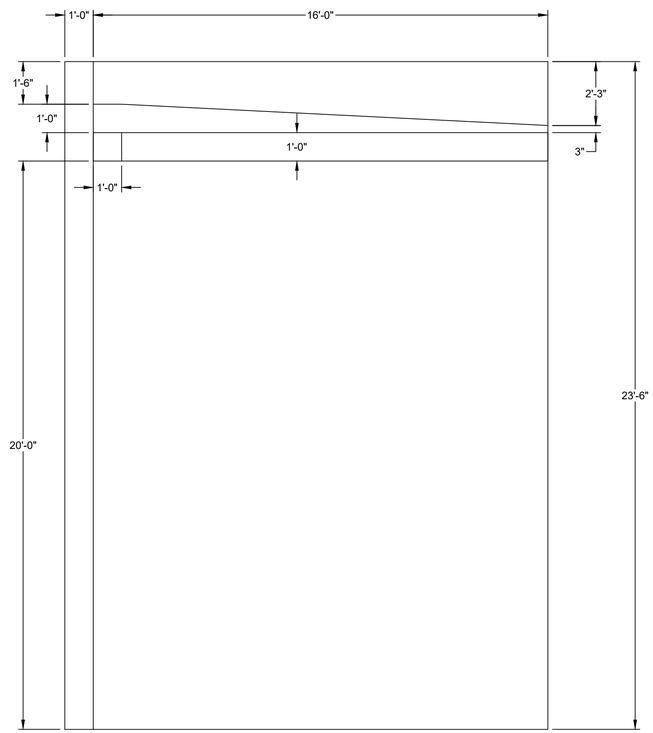


A SECTION

(WITH STRUCTURAL STEEL)

SCALE: 3/8"=1'0"

0 2' 4'



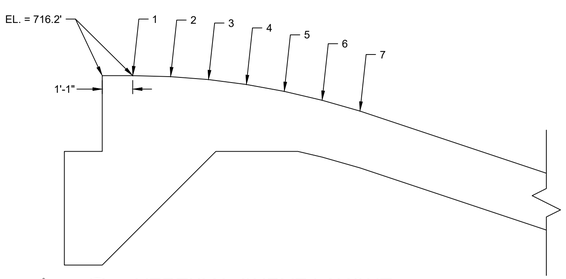
FLOW

2 PLAN

SCALE: 3/8"=1'0"

0 2' 4'

VERTICAL CURVE COORDINATES		
POINT	X (FEET)	Y (FEET)
1	0	0
2	1	-0.03
3	2	-0.10
4	3	-0.23
5	4	-0.42
6	5	-0.65
7	6	-0.93



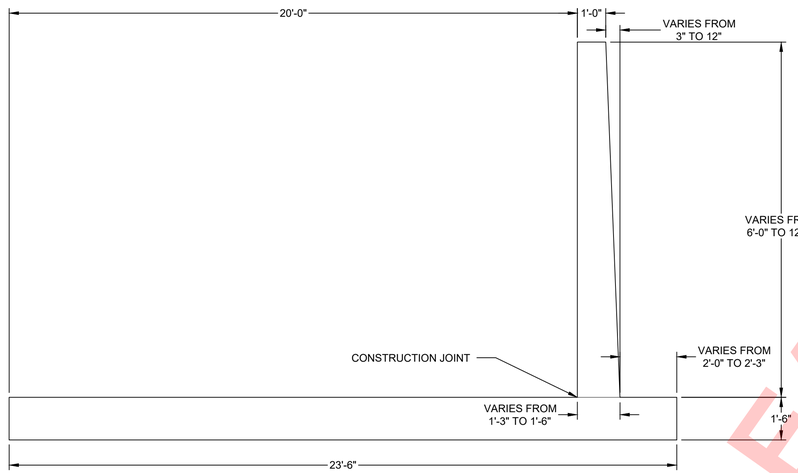
FLOW

3 VERTICAL CURVE LAYOUT

(DIMENSIONAL LAYOUT)

SCALE: 1/2"=1'0"

0 2' 4'



A SECTION

(DIMENSIONAL LAYOUT)

SCALE: 3/8"=1'0"

0 2' 4'

REV	DESCRIPTION	DATE

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

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PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY DETAILS SEGMENT D1

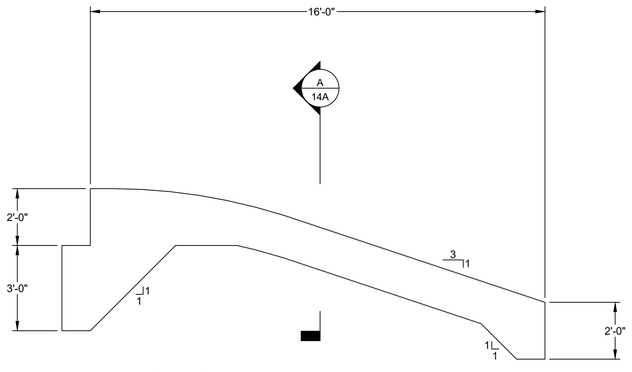
PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
14 OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_STRUCTURAL_CHUTE_FINAL.DWG

NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.

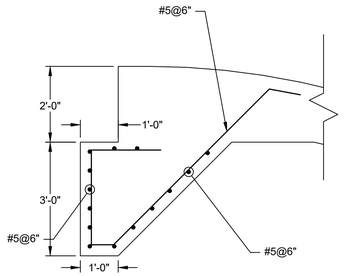


FLOW

1 WALL ELEVATION

SCALE: 3/8"=1'0"

0 2' 4'



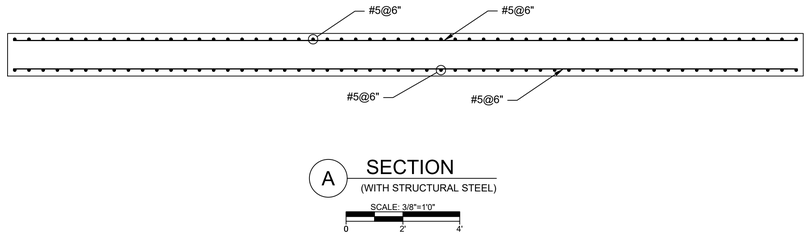
FLOW

4 UPSTREAM CUTOFF WALL DETAIL

(WITH STRUCTURAL STEEL)

SCALE: 1/2"=1'0"

0 2' 4'

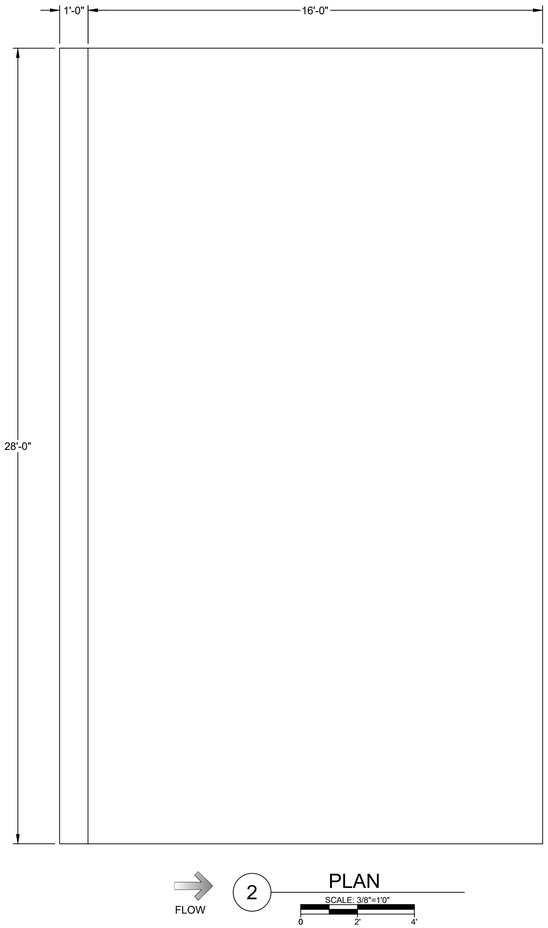


A SECTION

(WITH STRUCTURAL STEEL)

SCALE: 3/8"=1'0"

0 2' 4'



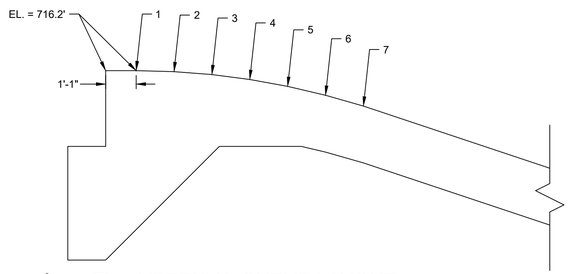
FLOW

2 PLAN

SCALE: 3/8"=1'0"

0 2' 4'

VERTICAL CURVE COORDINATES		
POINT	X (FEET)	Y (FEET)
1	0	0
2	1	-0.03
3	2	-0.10
4	3	-0.23
5	4	-0.42
6	5	-0.65
7	6	-0.93



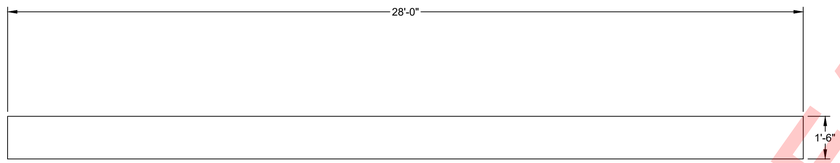
FLOW

3 VERTICAL CURVE LAYOUT

(DIMENSIONAL LAYOUT)

SCALE: 1/2"=1'0"

0 2' 4'



A SECTION

(DIMENSIONAL LAYOUT)

SCALE: 3/8"=1'0"

0 2' 4'

REV	DESCRIPTION	DATE
1	REVISED LABYRINTH SPILLWAY	02/26/21

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

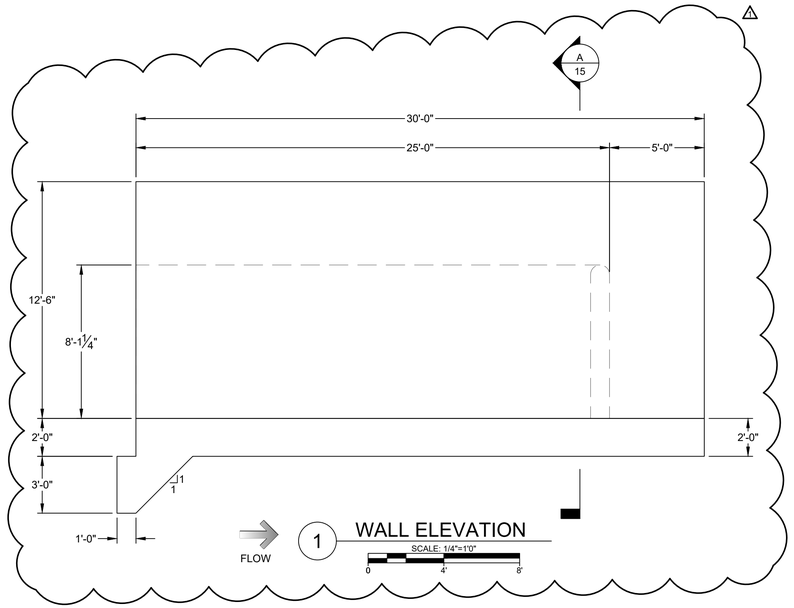
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY DETAILS SEGMENT D3

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

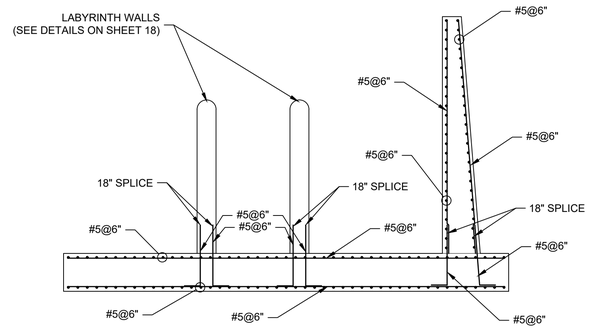
PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET 14A OF 22

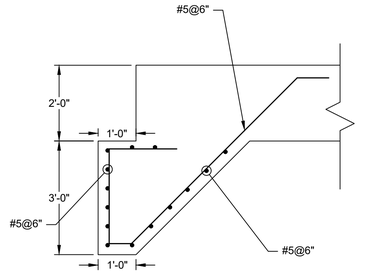
G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATE

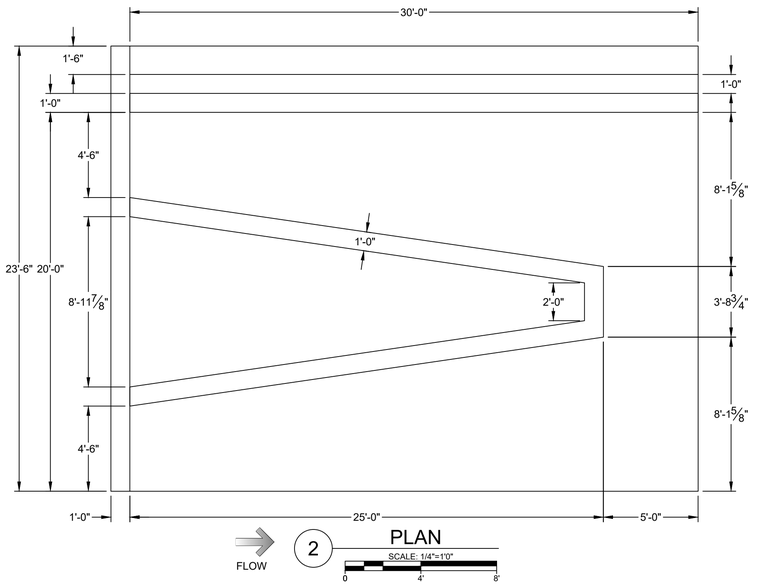


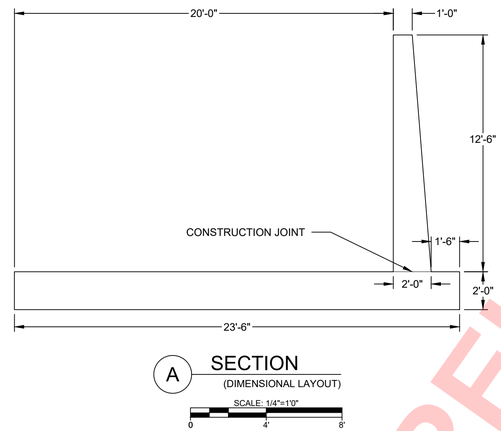
NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.
2. E2 SIMILAR, OPPOSITE HAND.









DATE	DESCRIPTION	REV
02/26/21	REVISED LABYRINTH SPILLWAY	1

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

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schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY DETAILS SEGMENT E1

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

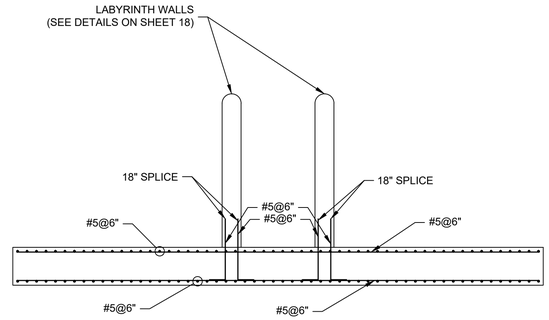
PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
15 OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_STRUCTURAL_CHUTE_FINAL.DWG

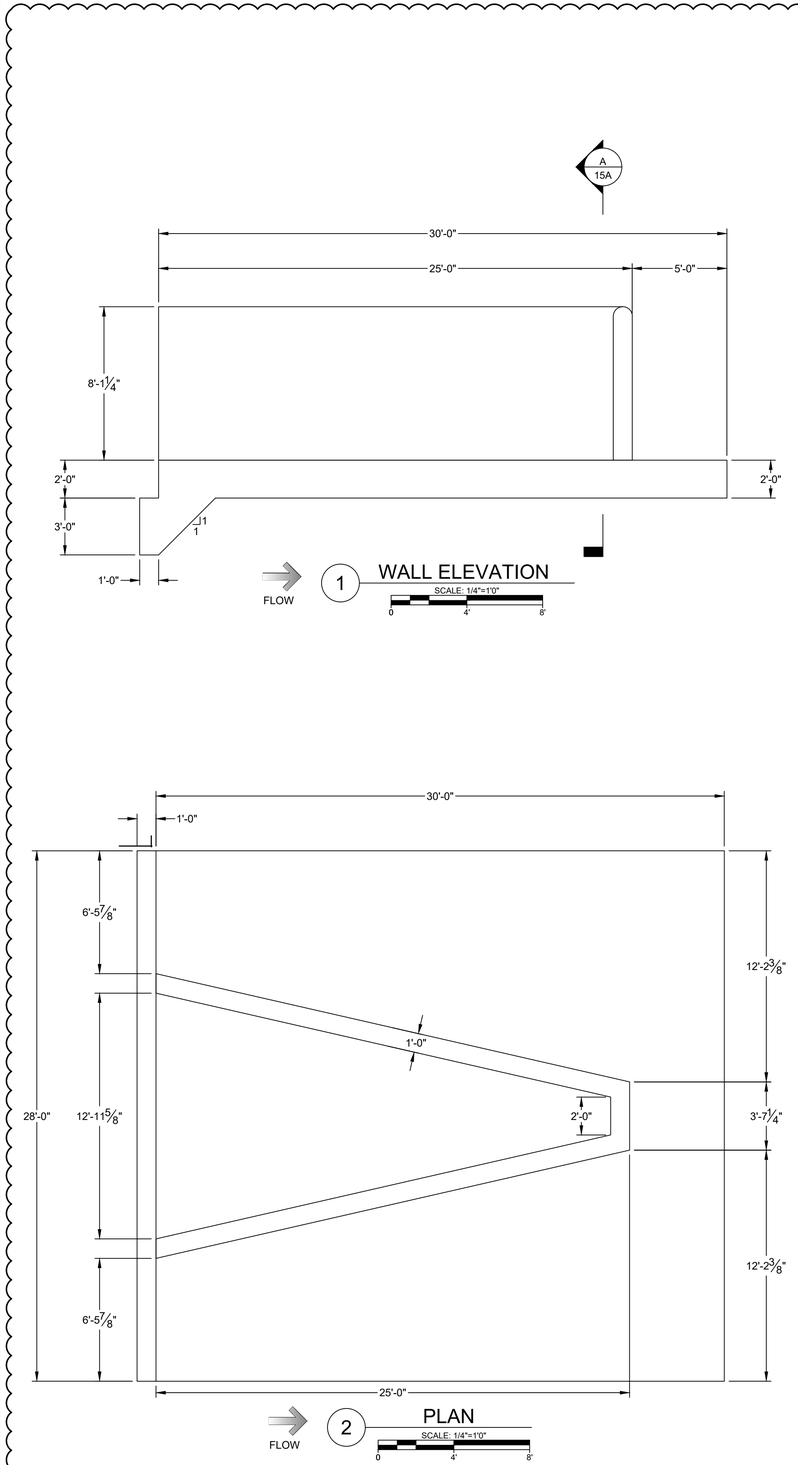
NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.

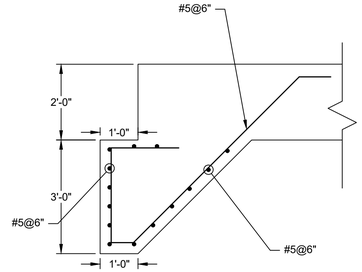
1 WALL ELEVATION
SCALE: 1/4"=1'0"
0 4' 8'



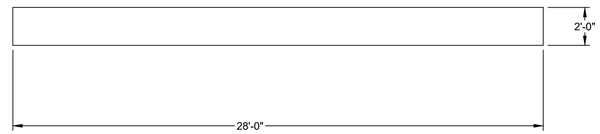
A SECTION
(WITH STRUCTURAL STEEL)
SCALE: 1/4"=1'0"
0 4' 8'



2 PLAN
SCALE: 1/4"=1'0"
0 4' 8'



FLOW
3 UPSTREAM CUTOFF WALL DETAIL
(WITH STRUCTURAL STEEL)
SCALE: 1/2"=1'0"
0 2' 4'



A SECTION
(DIMENSIONAL LAYOUT)
SCALE: 1/4"=1'0"
0 4' 8'

DATE	DESCRIPTION	REV
02/28/21	REVISED LABYRINTH SPILLWAY	2

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

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schnabel-eng.com

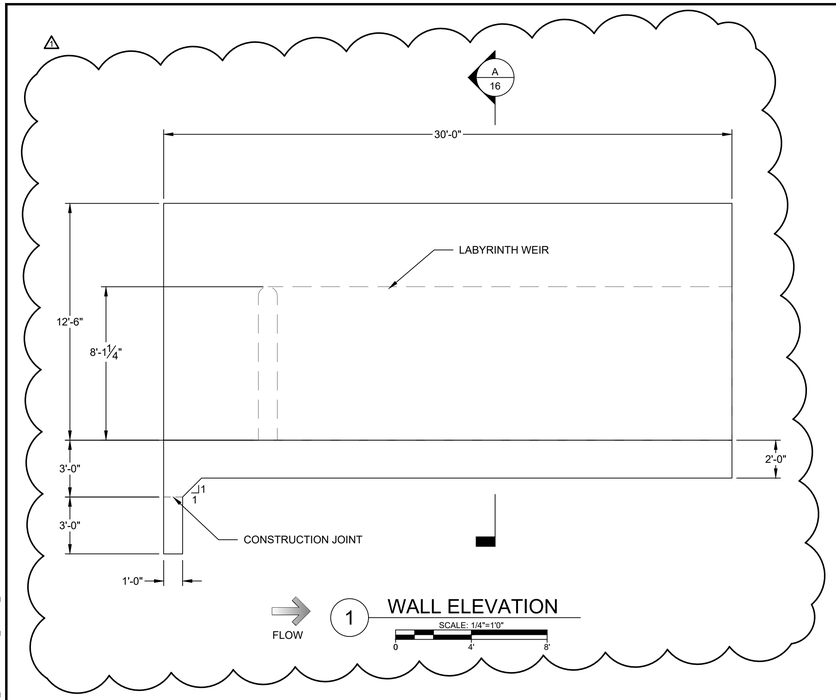
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY DETAILS
SEGMENT E3

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
15A OF 22

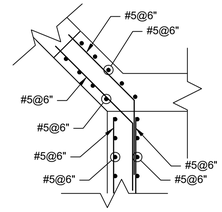
G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_STRUCTURAL_CHUTE_FINAL.DWG



1 WALL ELEVATION

SCALE: 1/4"=1'0"

0 4' 8'



3 CUTOFF WALL CORNER DETAIL

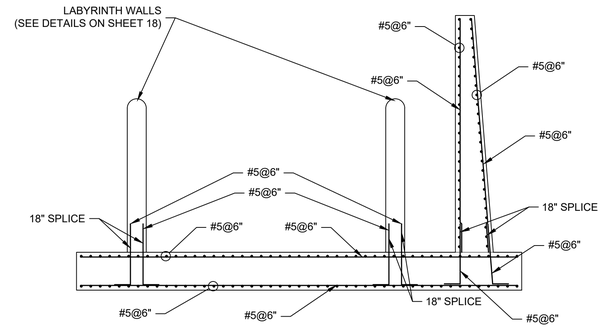
(WITH REINFORCNG STEEL)

SCALE: 1/2"=1'0"

0 2' 4'

NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.
2. SEGMENT F2 SIMILAR, OPPOSITE HAND.

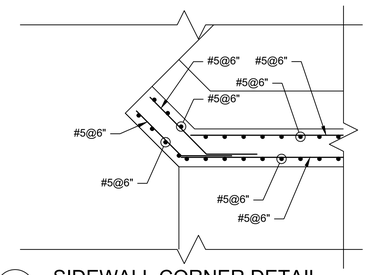


A SECTION

(WITH REINFORCNG STEEL)

SCALE: 1/4"=1'0"

0 4' 8'

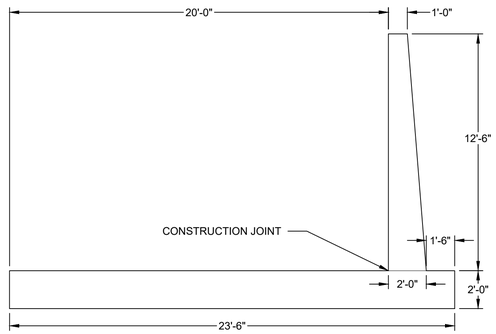


4 SIDEWALL CORNER DETAIL

(WITH REINFORCNG STEEL)

SCALE: 1/2"=1'0"

0 2' 4'

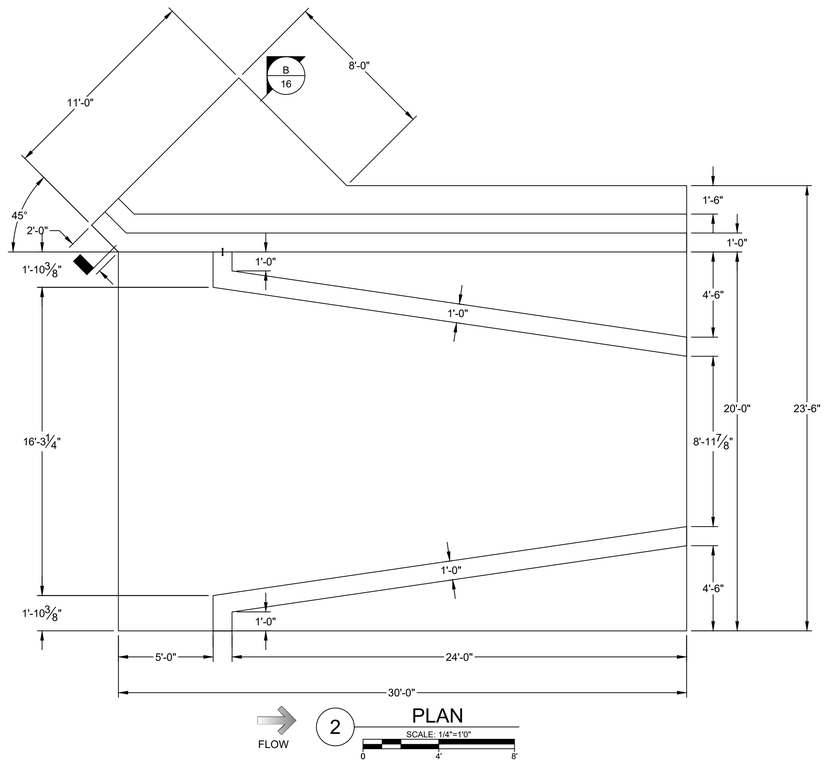


A SECTION

(DIMENSIONAL LAYOUT)

SCALE: 1/4"=1'0"

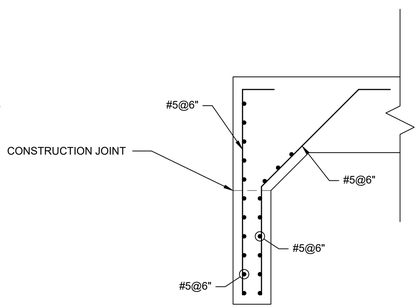
0 4' 8'



2 PLAN

SCALE: 1/4"=1'0"

0 4' 8'

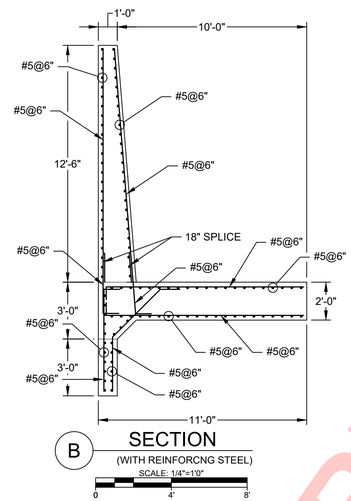


5 CUTOFF WALL DETAIL

(WITH REINFORCNG STEEL)

SCALE: 1/2"=1'0"

0 2' 4'



B SECTION

(WITH REINFORCNG STEEL)

SCALE: 1/4"=1'0"

0 4' 8'

DATE	DESCRIPTION	REV
02/28/21	REVISED LABYRINTH SPILLWAY	1

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

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Phone: 770-781-8008 / Fax: 770-781-8003 /
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PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY DETAILS
SEGMENT F1

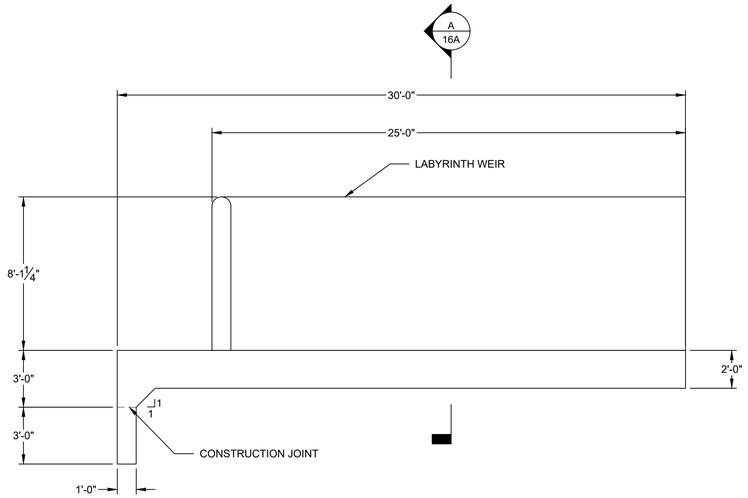
PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
16 OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_STRUCTURAL_CHUTE_FINAL.DWG

NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.

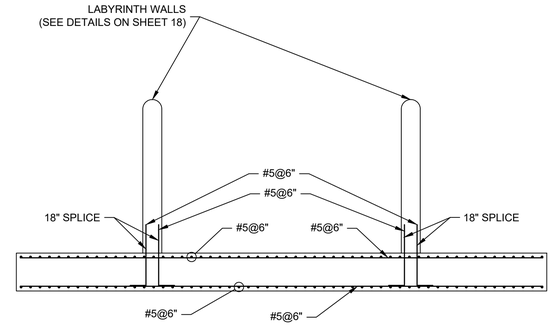


FLOW

1 WALL ELEVATION

SCALE: 1/4"=1'0"

0 4' 8'

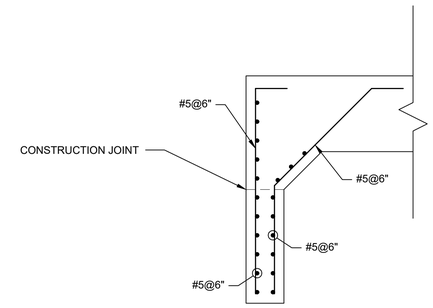


A SECTION

(WITH REINFORCNG STEEL)

SCALE: 1/4"=1'0"

0 4' 8'

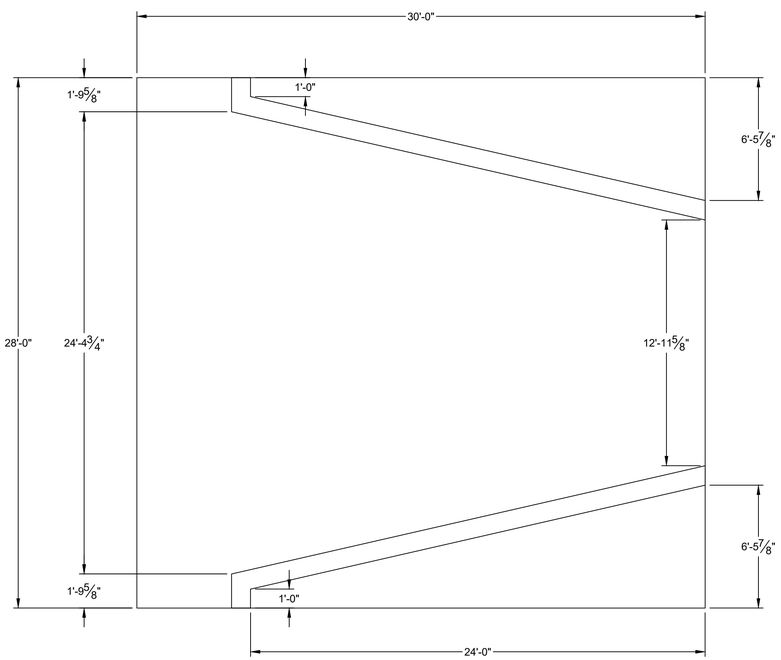


3 CUTOFF WALL DETAIL

(WITH REINFORCNG STEEL)

SCALE: 1/2"=1'0"

0 2' 4'

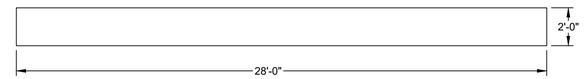


FLOW

2 PLAN

SCALE: 1/4"=1'0"

0 4' 8'



A SECTION

(DIMENSIONAL LAYOUT)

SCALE: 1/4"=1'0"

0 4' 8'

REV	DESCRIPTION	DATE
1	REVISED LABYRINTH SPILLWAY	02/26/21

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

REGISTERED PROFESSIONAL ENGINEER
GEORGIA
No. PE034136
JONATHAN THOMAS DEAN

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PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY DETAILS
SEGMENT F3

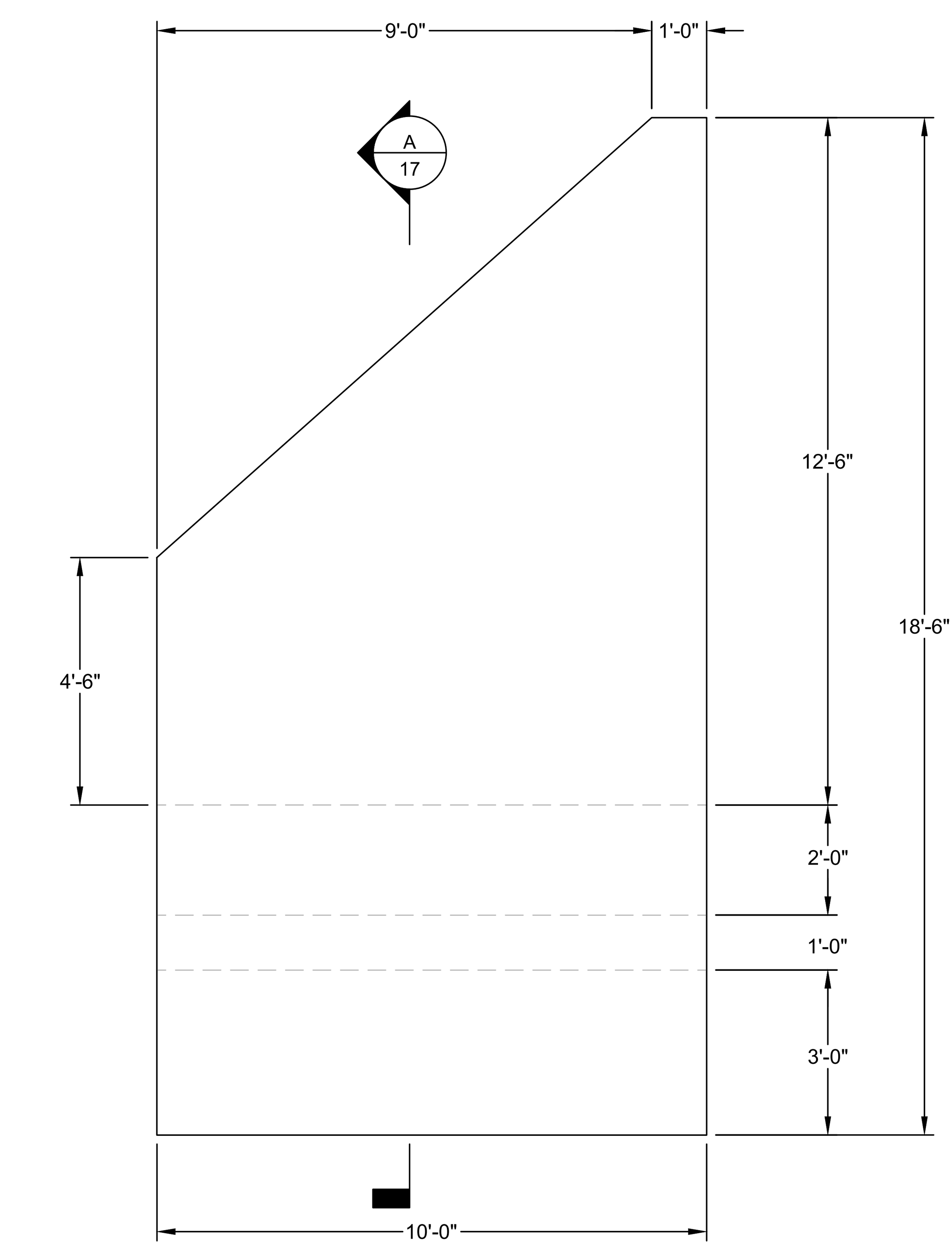
PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
16A OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_STRUCTURAL_CHUTE_FINAL.DWG

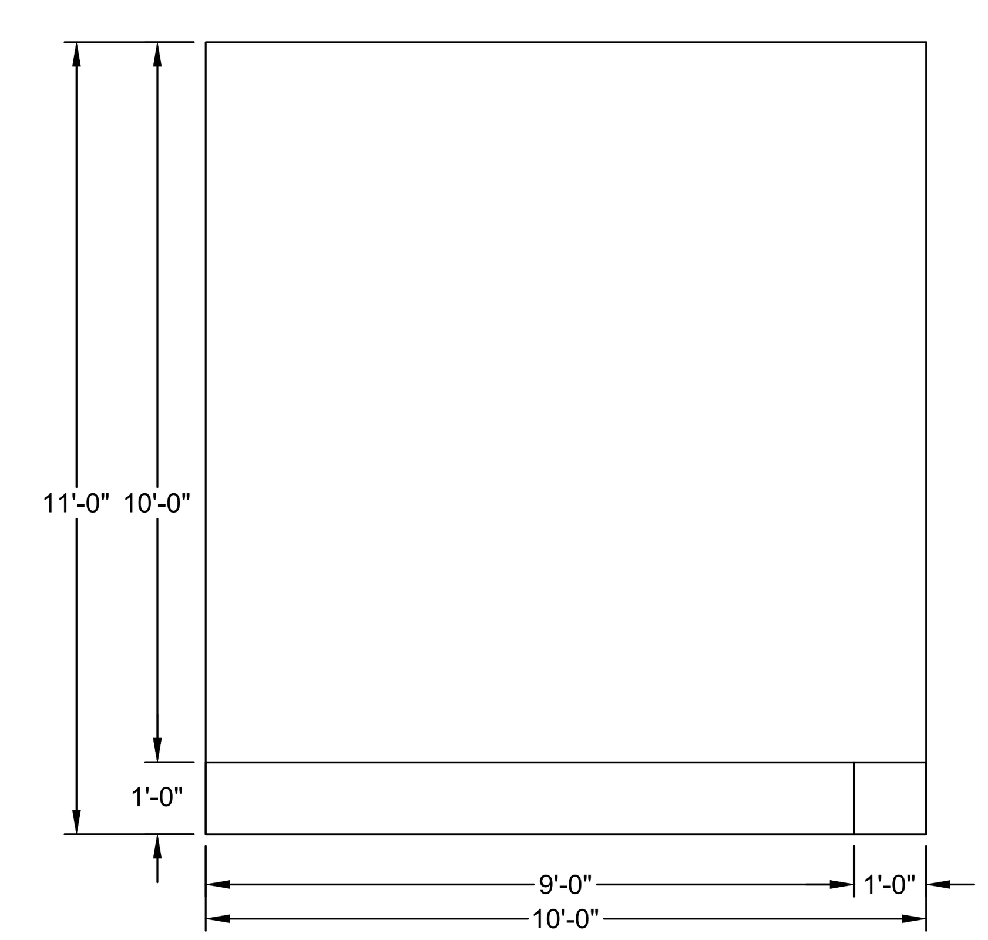
NOTES:

1. SEE SHEET 20 FOR LOCATION AND TYPES OF WATERSTOP, LOCATION OF SMOOTH DOWELS, AND JOINT DETAILS.
2. SEGMENT "IW1" AS SHOWN. SEGMENT "IW2" OPPOSITE HAND



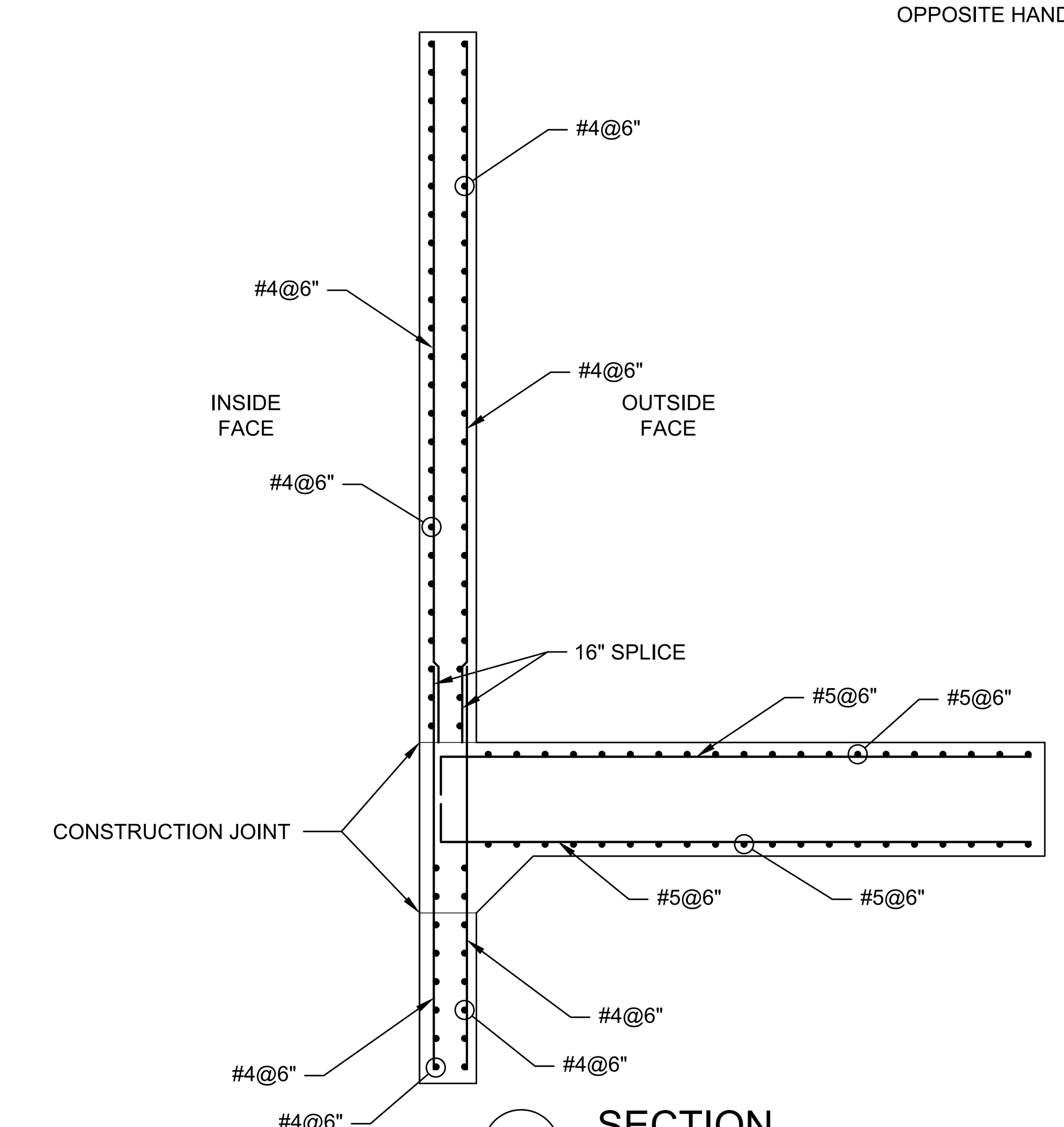
1 WALL ELEVATION

SCALE: 3/8"=1'0"



2 PLAN

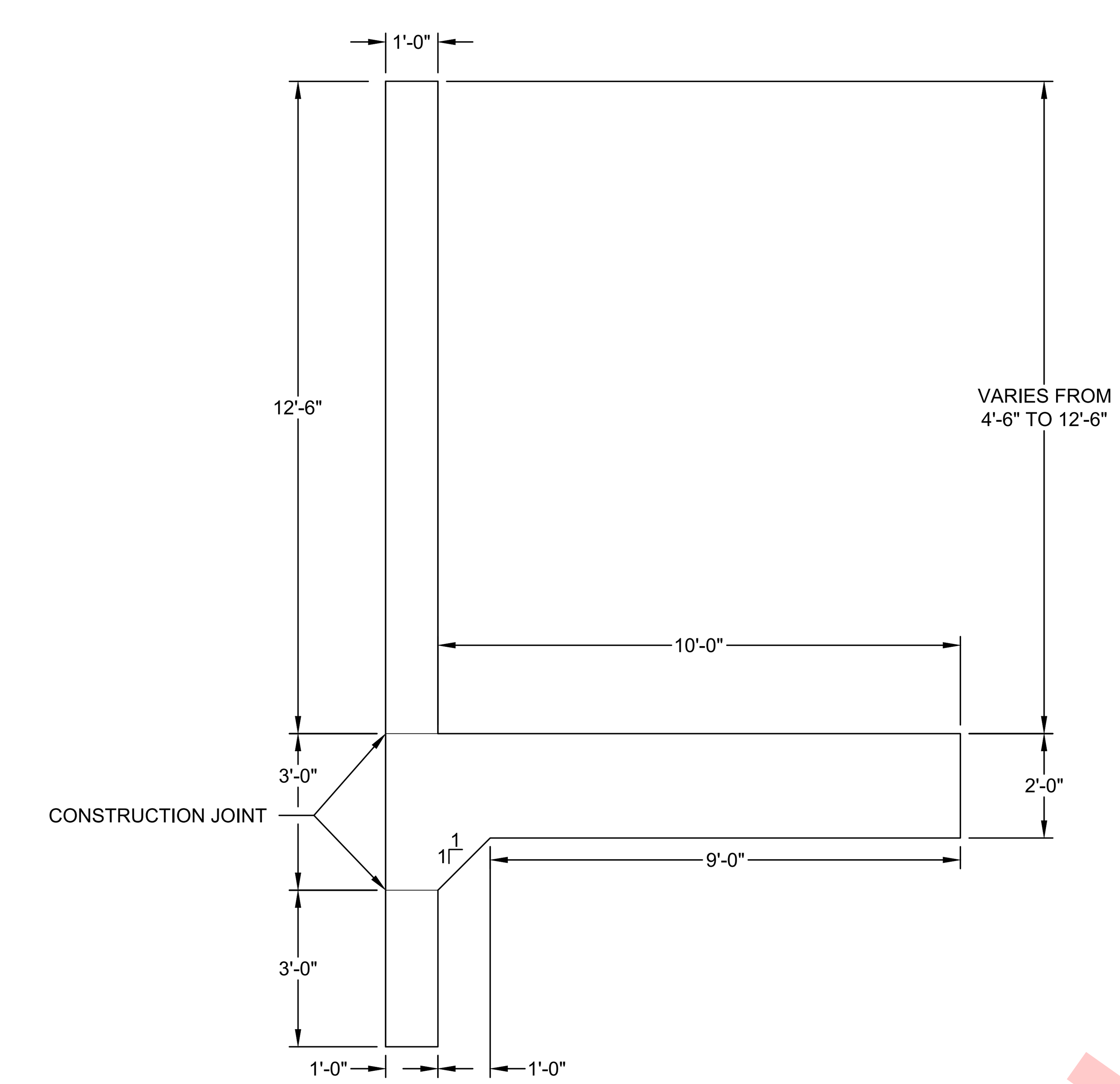
SCALE: 3/8"=1'0"



A SECTION

(WITH REINFORCING STEEL)

SCALE: 3/8"=1'0"



A SECTION

(DIMENSIONAL LAYOUT)

SCALE: 3/8"=1'0"

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_STRUCTURAL_CHUTE_FINAL.DWG

REV | DESCRIPTION | DATE

DESIGNED BY: JTD | DRAWN BY: GHB | CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.

GEORGIA PROFESSIONAL ENGINEER NO. 034136 DATE: 10/27/2020

Schnabel ENGINEERING

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PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY DETAILS SEGMENT IW1

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

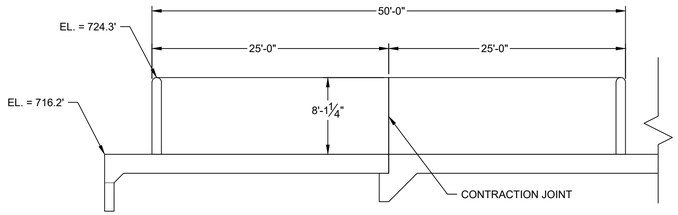
PROJECT: 17C17013.00

DATE: OCTOBER 27, 2020

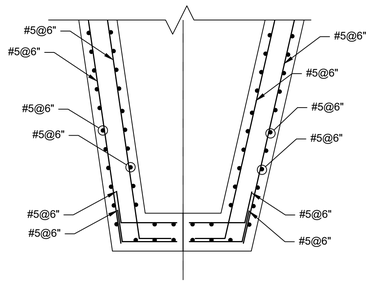
SHEET 17 OF 22

RELEASED

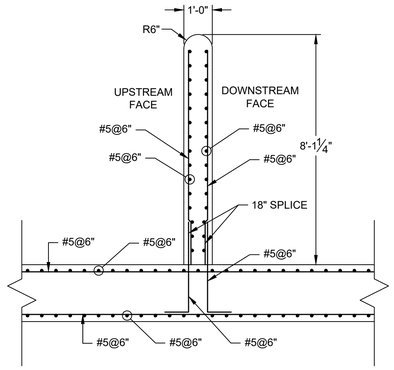
ACCEPTED



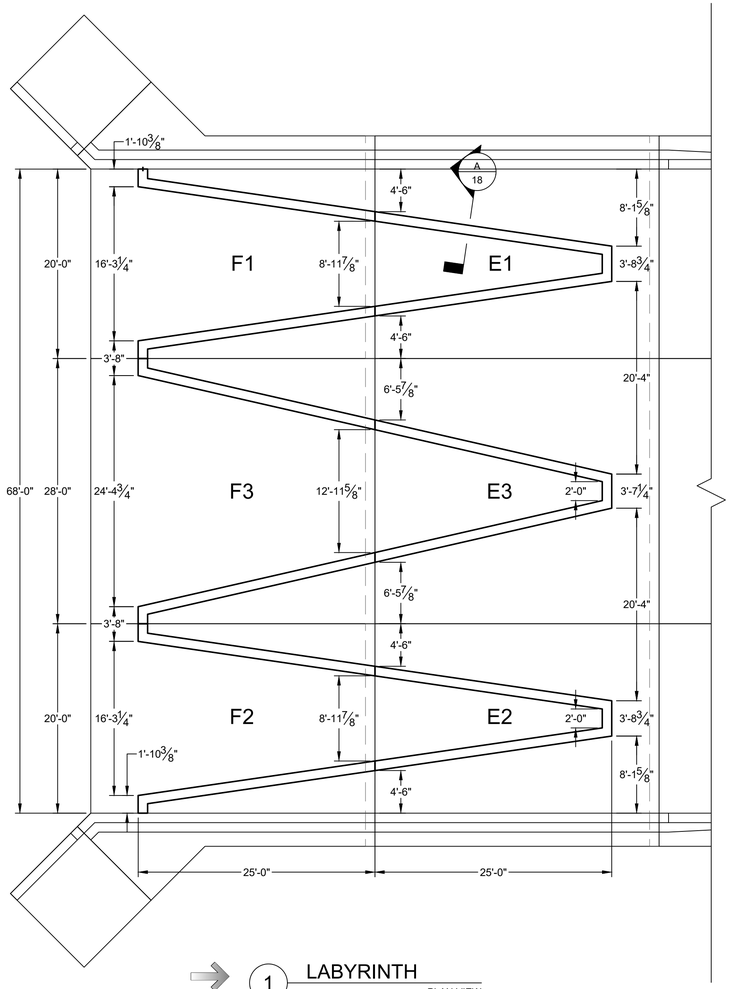
FLOW 2 LABYRINTH
PROFILE VIEW
SCALE: 1/8"=1'0"
0 8' 16'



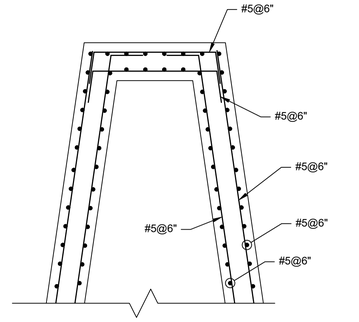
FLOW 3 F1-F3 & F2-F3 UPSTREAM APEX DETAIL
PLAN VIEW
SCALE: 1/2"=1'0"
0 2' 4'



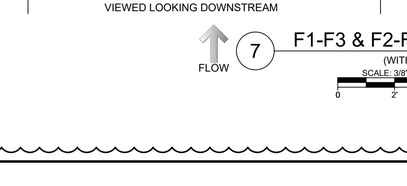
FLOW A TYPICAL LABYRINTH WALL SECTION
(WITH REINFORCING STEEL)
SCALE: 3/8"=1'0"
0 2' 4'

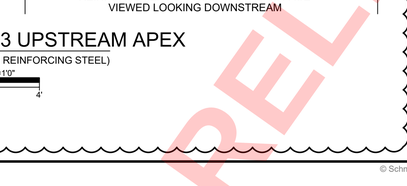


FLOW 1 LABYRINTH
PLAN VIEW
SCALE: 1/8"=1'0"
0 8' 16'

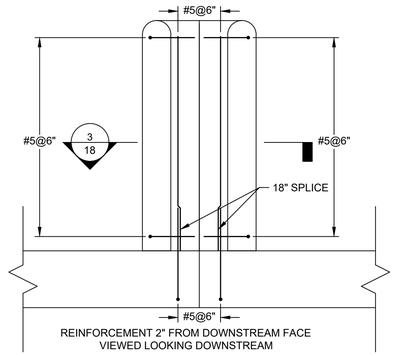


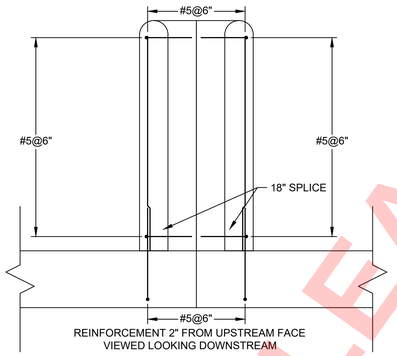
FLOW 4 E1 & E2 DOWNSTREAM APEX DETAIL
PLAN VIEW
SCALE: 1/2"=1'0"
0 2' 4'



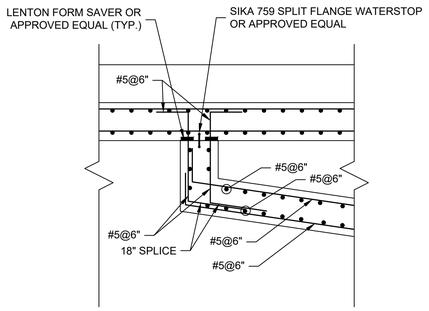


FLOW 6 E1 & E2 DOWNSTREAM APEX
(WITH REINFORCING STEEL)
SCALE: 3/8"=1'0"
0 2' 4'





FLOW 7 F1-F3 & F2-F3 UPSTREAM APEX
(WITH REINFORCING STEEL)
SCALE: 3/8"=1'0"
0 2' 4'



FLOW 5 F1 & F2 SIDEWALL JUNCTION
PLAN VIEW
SCALE: 1/2"=1'0"
0 2' 4'

NOTE: F2 SIDEWALL JUNCTION IS SIMILAR (OPPOSITE HAND)

DATE	DESCRIPTION	REV
02/26/21	REVISED LABYRINTH SPILLWAY	1

CHECKED BY: JSM
DRAWN BY: GHB
DESIGNED BY: JTD

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

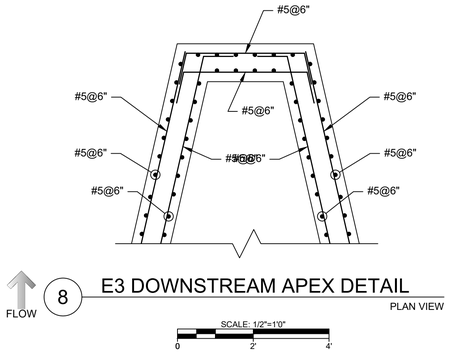
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

LABYRINTH STRUCTURAL DETAILS

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET 18 OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2/03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_STRUCTURAL_CHUTE_FINAL.DWG

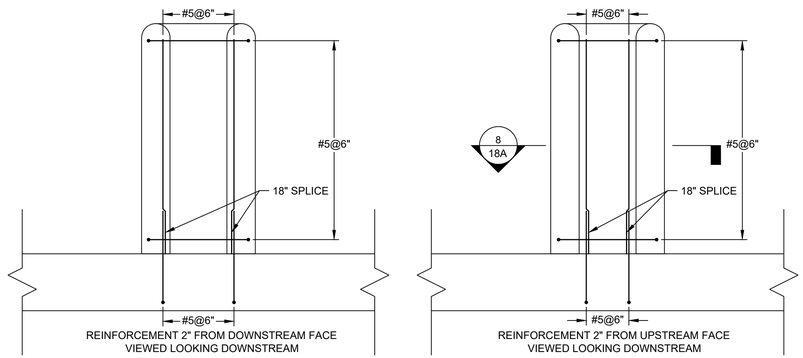


FLOW 8 E3 DOWNSTREAM APEX DETAIL

PLAN VIEW

SCALE: 1/2"=1'0"

0 2' 4'



FLOW 9 E3 DOWNSTREAM APEX

(WITH REINFORCING STEEL)

REV	DESCRIPTION	DATE
1	REVISED LABYRINTH SPILLWAY	02/26/21

DESIGNED BY: JTD
DRAWN BY: QHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

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schnabel-eng.com

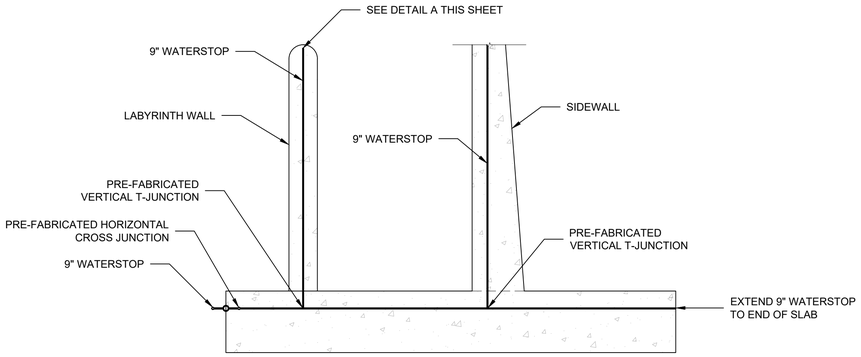
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

LABYRINTH STRUCTURAL DETAILS (CONT.)

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

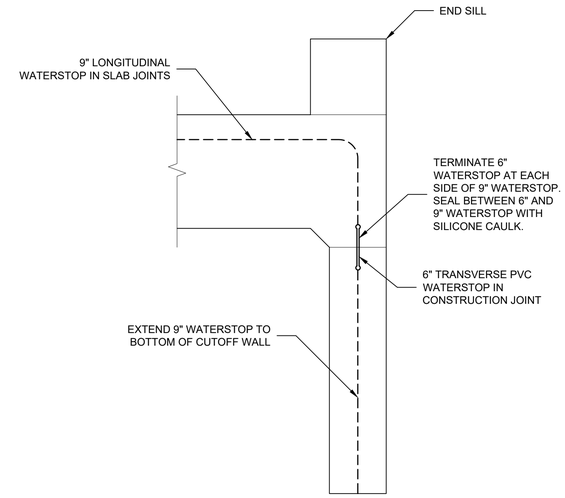
PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
18A OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_STRUCTURAL_CHUTE_FINAL.DWG



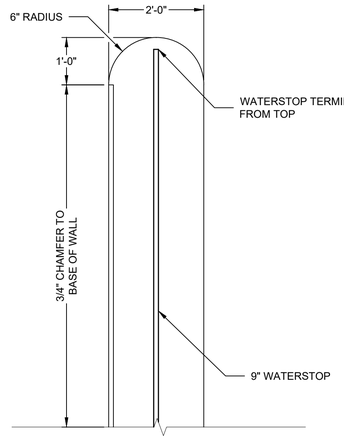
LONGITUDINAL SLAB WATERSTOP DETAIL

N.T.S.



DOWNSTREAM CUTOFF WALL WATERSTOP DETAIL

N.T.S.



A DETAIL "A"

NOT TO SCALE

NOTES:

1. CHAMFER ALL EXPOSED CORNERS 3/4" UNLESS OTHERWISE SHOWN.
2. CHAMFER ALL CONTRACTION JOINTS ON UPSTREAM SIDE OF LABYRINTH WALLS, INSIDE FACE OF SIDEWALLS UPSTREAM OF LABYRINTH/SIDEWALL JUNCTION AND SLABS UPSTREAM OF LABYRINTH WALLS 1 1/2" UNLESS OTHERWISE SHOWN.
3. NO CHAMFERS REQUIRED ON CONSTRUCTION JOINTS.
4. JOINT SEALANT REQUIRED ON UPSTREAM FACE OF ALL CONTRACTION JOINTS WITH 1 1/2" CHAMFER.
5. 9" BULB WATERSTOPS REQUIRED ON ALL CONTRACTION JOINTS IN THE SLABS, SIDEWALLS AND LABYRINTH WALLS.
6. 6" DUMBBELL WATERSTOP REQUIRED ON ALL CONSTRUCTION JOINTS.
7. CONTRACTION JOINTS HAVE NO REINFORCING THROUGH THE JOINT AND THE CONCRETE SURFACES ARE UNBONDED.
8. 3/4" DOWEL BARS LOCATED IN CONTRACTION JOINTS SHALL BE GREASED IN ONE SECTION OF CONCRETE.
9. DETAILS ON THIS SHEET ARE NOT TO SCALE.

DATE	DESCRIPTION	REV

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

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schnabel-eng.com

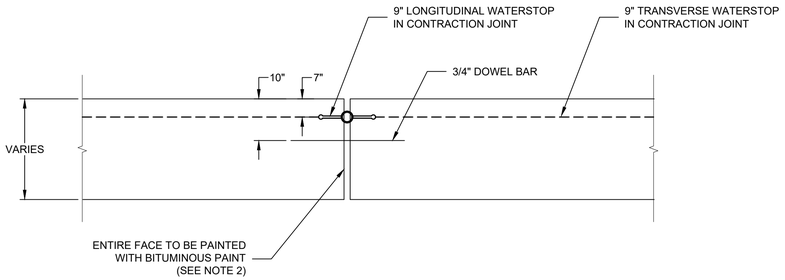
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

LABYRINTH WATERSTOP DETAILS

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
19 OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATE

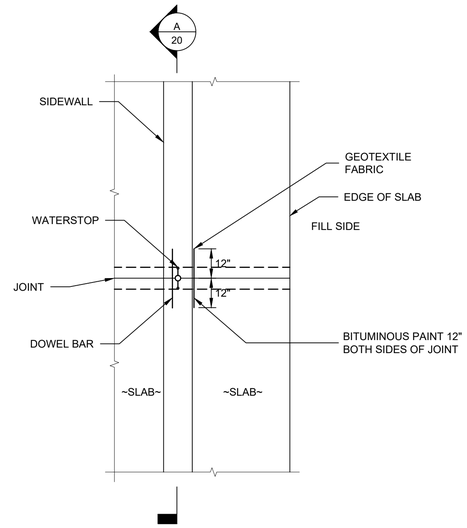


LONGITUDINAL SLAB CONTRACTION JOINT

N.T.S.

NOTES:

1. ASPHALT TREATED FELT: #30W ASPHALT SATURATED ORGANIC FELT. ASTM 30 D226 TYPE 2
2. BITUMINOUS PAINT: COLD APPLIED ASPHALT COATING COMPLYING WITH MIL-C-161730 TYPE 1. KARANAK 118 BLACK ASPHALTUM OR APPROVED EQUAL. COAT SURFACE WITH 2 COATS MIN 16 MILL DFT
3. JOINT SEALANT: SIKAFLEX-1A ELASTOMERIZ SEALANT OR APPROVED EQUAL.

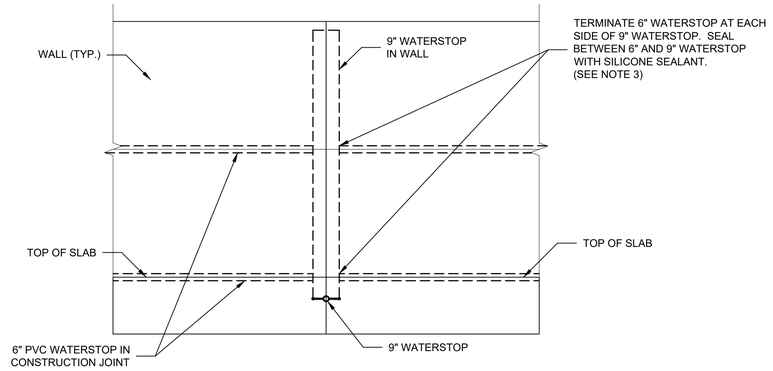


TRANSVERSE WALL CONTRACTION JOINT DETAIL

N.T.S.

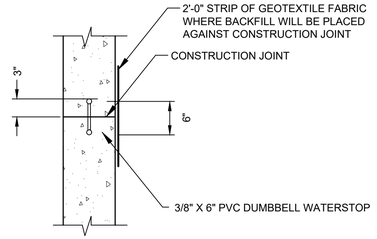
SIDEWALL JOINT NOTES:

1. GEOTEXTILE FABRIC AND BITUMINOUS PAINT USED TO ADHERE FABRIC TO SIDEWALL SHALL EXTEND FROM THE BOTTOM OF THE FOOTING TO THE LEVEL OF THE FINISHED GRADE. ANY FABRIC OR BITUMINOUS PAINT EXPOSED TO VIEW AFTER BACKFILLING OF THE WALLS IS COMPLETED SHALL BE COMPLETELY REMOVED TO THE SATISFACTION OF THE ENGINEER.
2. VERTICAL WATERSTOP IN SIDEWALLS TO EXTEND TO 3" FROM TOP OF SIDEWALL.



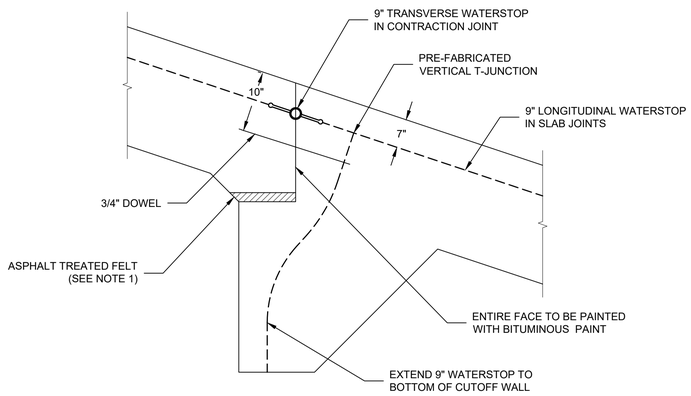
A WALL CONTRACTION JOINT DETAIL

NOT TO SCALE



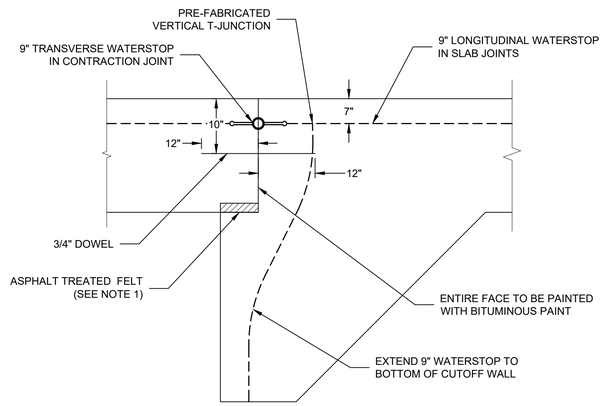
WALL CONSTRUCTION JOINT WATERSTOP

N.T.S.



TRANSVERSE SLOPING SLAB CONTRACTION JOINT DETAIL

N.T.S.



TRANSVERSE NON-SLOPING SLAB CONTRACTION JOINT DETAIL

N.T.S.

DATE	DESCRIPTION	REV

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 /
Phone: 770-781-8008 / Fax: 770-781-9003 /
schnabel-eng.com

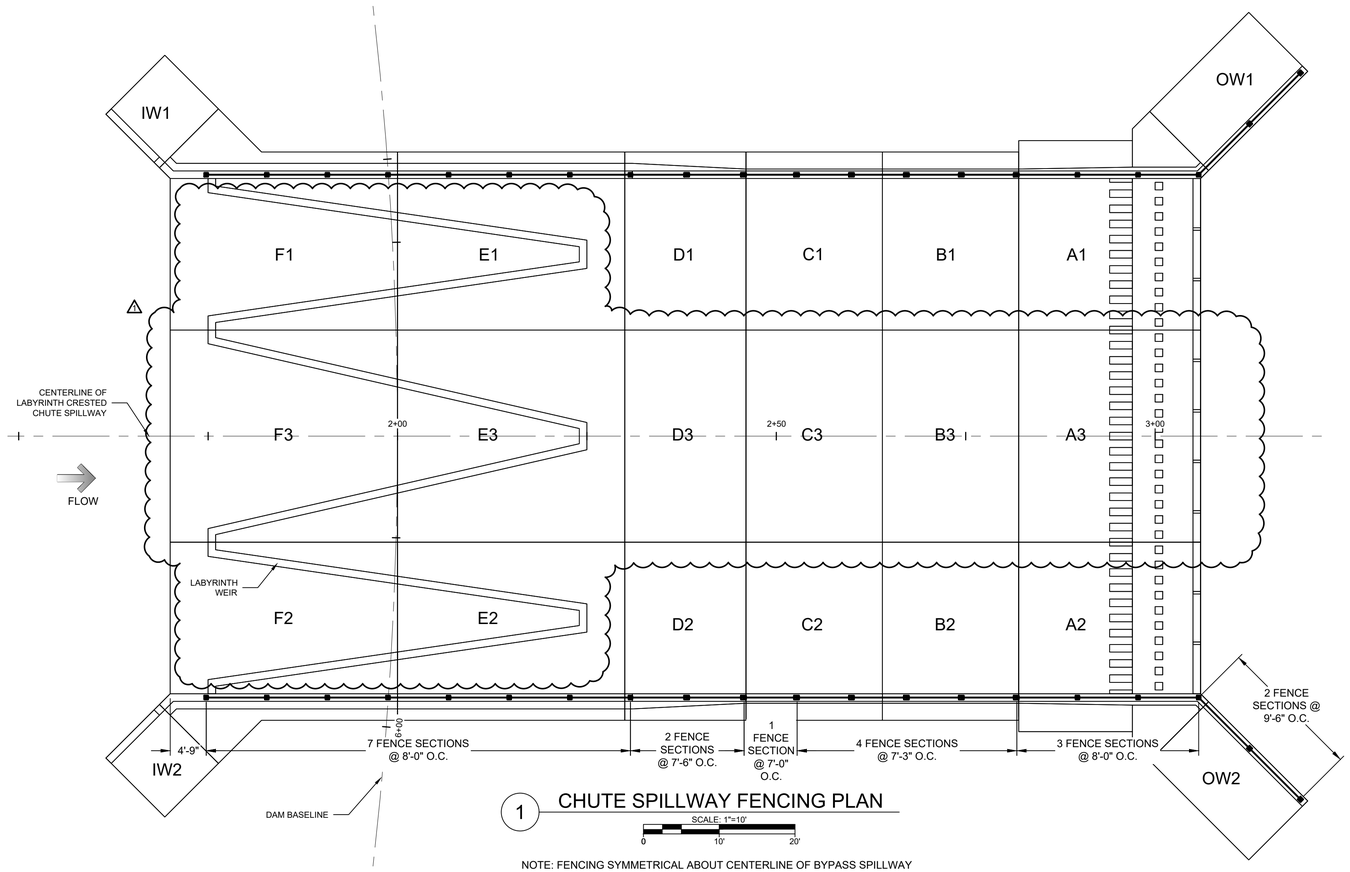
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

JOINT DETAILS

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET
20 OF 22

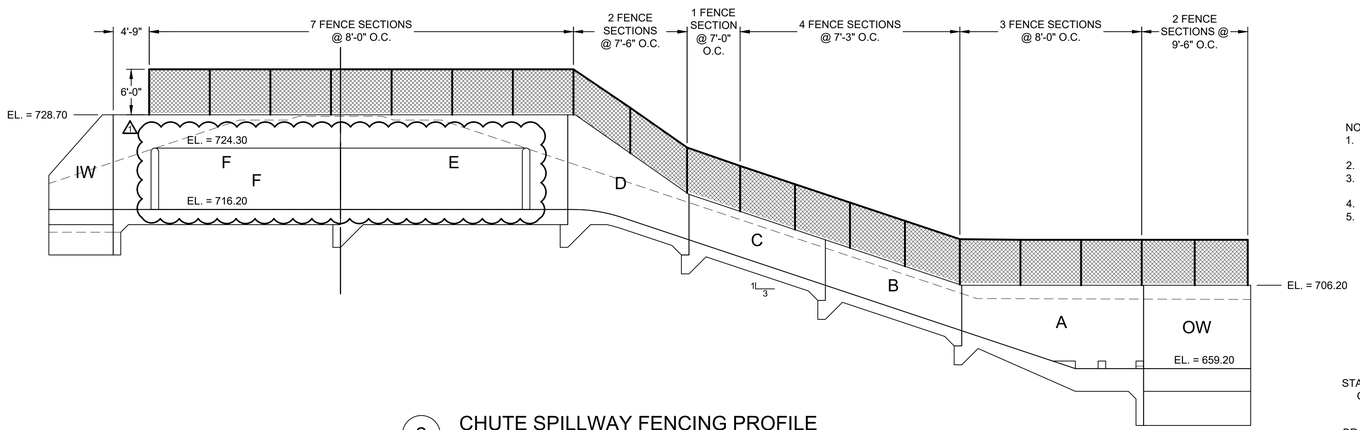
G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_STRUCTURAL_CHUTE_FINAL.DWG



1 CHUTE SPILLWAY FENCING PLAN

SCALE: 1"=10'

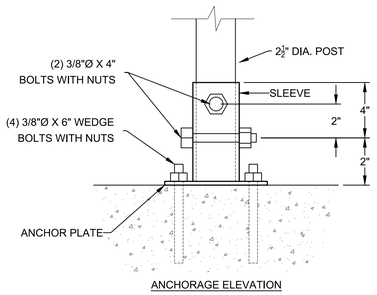
NOTE: FENCING SYMMETRICAL ABOUT CENTERLINE OF BYPASS SPILLWAY



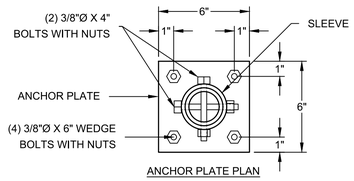
2 CHUTE SPILLWAY FENCING PROFILE

(TYP. EACH SIDE OF SPILLWAY)

SCALE: 1"=10'



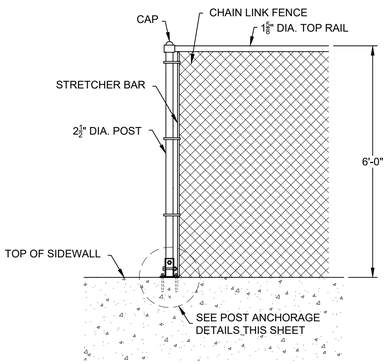
ANCHORAGE ELEVATION



ANCHOR PLATE PLAN

CHUTE SPILLWAY FENCING POST ANCHORAGE DETAIL FLAT ANCHOR PLATE

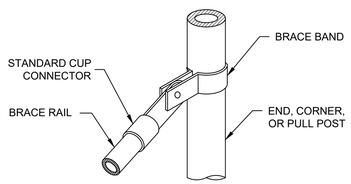
N.T.S.



NOTES:
1. ALL FENCING AND HARDWARE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
2. POST SHALL BE SECURED USING ANCHORAGE PLATES.
3. STRETCHER BARS TO BE USED WITH CORNER OR END POST AT ALL HORIZONTAL OR VERTICAL BENDS.
4. CHAIN LINK FENCE FABRIC TO BE PLACED ON OUTSIDE OF POST.
5. REFER TO FENCING SPECIFICATION CS-91.

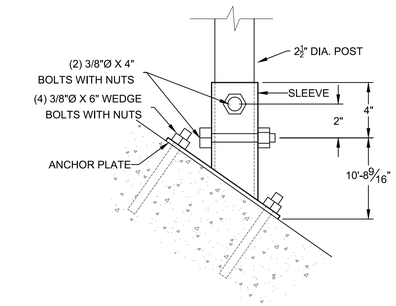
CHUTE SPILLWAY FENCING END POST DETAIL

N.T.S.

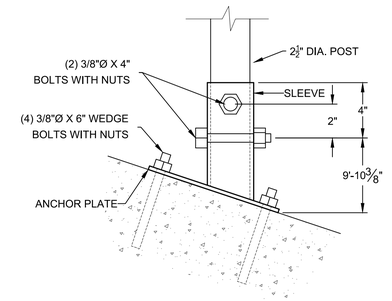


DETAIL OF BRACE CONNECTION

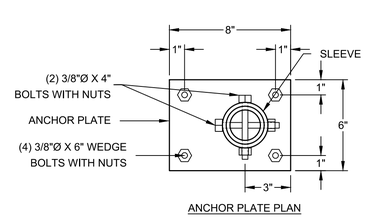
N.T.S.



ANCHORAGE ELEVATION
(1.4:1 SLOPE / 35° SLOPE)



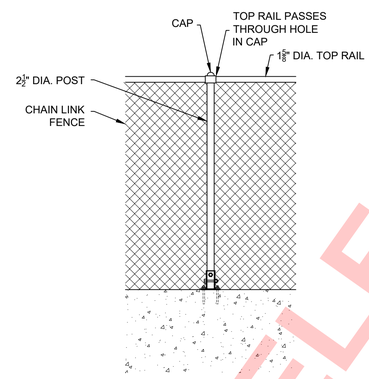
ANCHORAGE ELEVATION
(3:1 SLOPE / 18.4° SLOPE)



ANCHOR PLATE PLAN

CHUTE SPILLWAY FENCING POST ANCHORAGE DETAIL SLOPED ANCHOR PLATE

N.T.S.



CHUTE SPILLWAY FENCING INTERIOR POST DETAIL

N.T.S.

DATE	DESCRIPTION	REV
02/26/21	REVISED LABYRINTH SPILLWAY	1

DESIGNED BY: JTD
DRAWN BY: GHB
CHECKED BY: JSM

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL JONATHAN THOMAS DEAN

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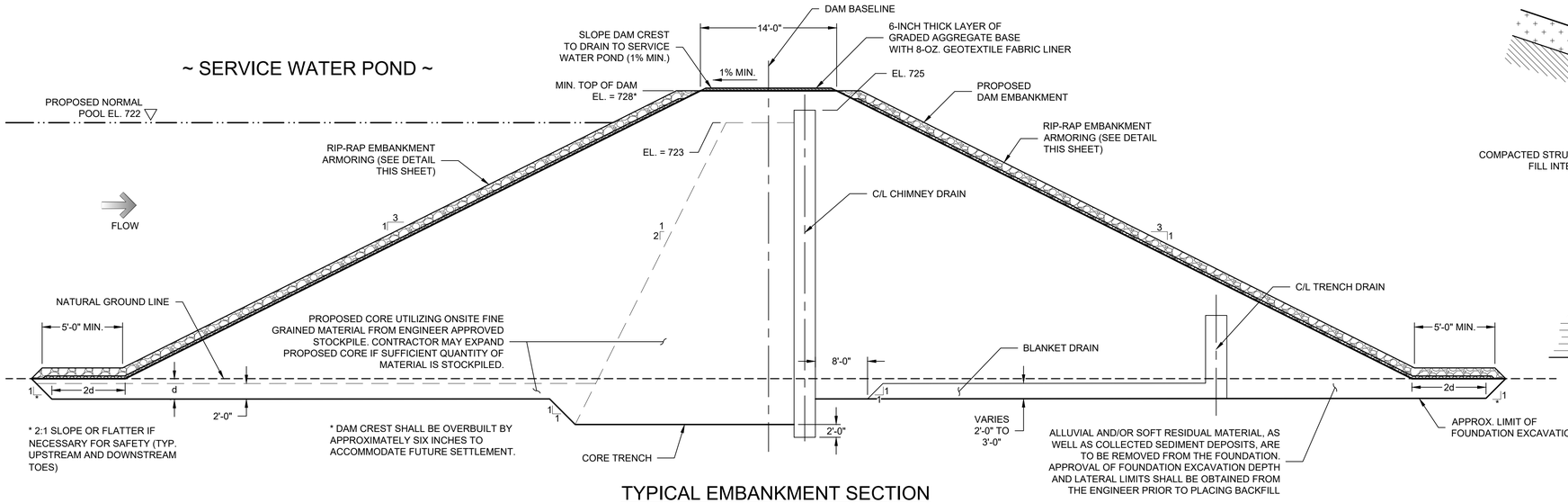
PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

CHUTE SPILLWAY FENCING DETAILS

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

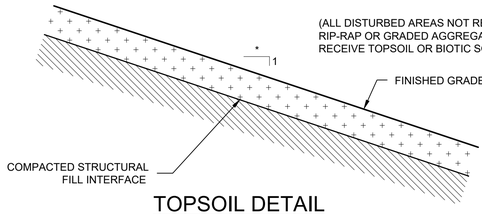
PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET 21 OF 22

G:\2017 PROJECTS\17C17013.00 PLANT YATES ASH POND 2\03-SE PRODUCTS\08-CAD\DRAWINGS\05-FINAL_DESIGN\SERVICE WATER POND DAM_PHASE II_FINAL\YATES PHASE_2_SERVICE WATER POND DAM_CHUTE_FINAL.DWG



TYPICAL EMBANKMENT SECTION

N.T.S.

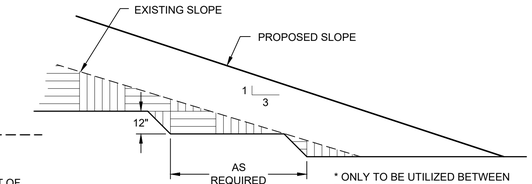


TOPSOIL DETAIL

N.T.S.

* IF TOPSOIL IS UTILIZED

* ANY SLOPE AS SHOWN HEREIN WHERE RIPRAP WILL NOT BE PLACED



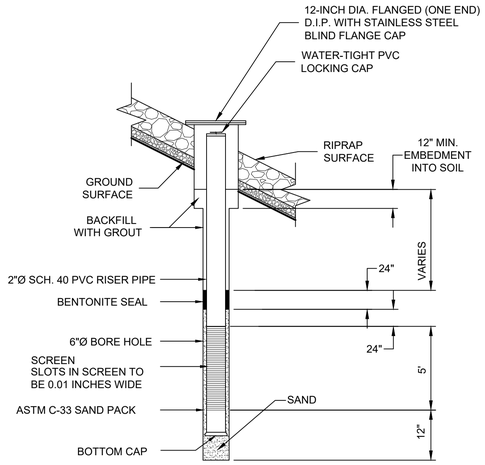
BENCH DETAIL

N.T.S.

* ONLY TO BE UTILIZED BETWEEN EXISTING FILL OR NATURAL FOUNDATION MATERIALS AND NEW EARTHEN EMBANKMENT FILL.

FILL MATERIALS	COMPACTION REQUIREMENTS						
DESCRIPTION	UNIFIED CLASS	PERCENT OF MAXIMUM DENSITY	MOISTURE LIMITS PERCENT OPTIMUM FROM	MOISTURE LIMITS PERCENT OPTIMUM TO	MAXIMUM LAYER THICKNESS INCHES UNCOMPACTED	MAX. ROCK SIZE IN INCHES	CONTROL TEST A.S.T.M. DESIGN
SANDY SILT	ML/MH	95 (MIN)	OPT.	+4	8"	4"	ASTM D-698
SILTY SAND	SM	95 (MIN)	OPT.	+4	8"	4"	ASTM D-698
CLAYEY SAND	SC	95 (MIN)	OPT.	+4	8"	4"	ASTM D-698
LEAN CLAY	CL	95 (MIN)	OPT.	+4	8"	4"	ASTM D-698

NOTE: FINES CONTENT SHALL NOT BE LESS THAN 30 PERCENT. DRY DENSITY OF COMPACTED SOIL SHALL NOT BE LESS THAN 90 PSF.



PIEZOMETER

N.T.S.

PIEZOMETER ID.	STATION	OFFSET	TOP EL. *	BOTTOM EL.
P-1	8+75	7' RIGHT	728.0	710.0
P-2	6+50	7' RIGHT	728.0	680.0
P-3	6+50	49' LEFT	714.0	680.0
P-4	6+50	79' LEFT	704.0	680.0
P-5	4+75	7' RIGHT	728.0	680.0
P-6	4+75	49' LEFT	714.0	680.0
P-7	4+75	79' LEFT	704.0	680.0
P-8	2+90	7' RIGHT	728.0	710.0

PIEZOMETER DATA TABLE

* NOTE: TOP ELEVATION REPRESENTS APPROXIMATE FILL SURFACE, NOT INCLUDING BEDDING STONE AND RIPRAP. PIEZOMETERS SHALL EXTEND THROUGH FINAL RIPRAP AS SHOWN ON DETAIL THIS SHEET. CONTRACTOR SHALL PROTECT PIEZOMETERS DURING PLACEMENT OF BEDDING STONE AND RIPRAP. ANY PIEZOMETERS DAMAGED DURING PLACEMENT OF BEDDING STONE AND/OR RIPRAP SHALL BE REPAIRED/REPLACED BY THE CONTRACTOR AND NO ADDITIONAL COST TO THE PURCHASER.

VEGETATIVE PLAN:

ALL BARE AREAS RESULTING FROM CONSTRUCTION OPERATIONS WILL BE ESTABLISHED TO PERENNIAL VEGETATION AS SOON AS POSSIBLE AFTER FINAL GRADING IS COMPLETE.

A. INITIAL TREATMENT

SEEDBED PREPARATION - PREPARE SEEDBED TO A DEPTH OF AT LEAST 4 INCHES ON ALL AREAS WHERE A GOOD SEEDBED IS NOT PRESENT. REMOVE ROCKS, ROOTS, OR OTHER OBJECTS THAT WILL INTERFERE WITH VEGETATION ESTABLISHMENT OR MAINTENANCE OPERATIONS.

FERTILIZER - APPLY AGRICULTURAL LIME AT THE RATE OF 4,000 POUNDS PER ACRE, AND 1,500 POUNDS 6-12-12 ANALYSIS FERTILIZER (OR EQUIVALENT) PER ACRE, UNLESS SOIL SAMPLES INDICATE DIFFERENTLY. SPREAD LIME AND FERTILIZER UNIFORMLY OVER ALL AREAS IMMEDIATELY BEFORE FINAL LAND PREPARATION AND MIX THOROUGHLY WITH THE SOIL. APPLY TOP DRESSING OF 75 POUNDS PER ACRE OF AMMONIUM NITRATE (OR EQUIVALENT) WHEN PLANTS ARE 2 TO 4 INCHES TALL.

SEEDING - ALL GRASS WILL BE SEEDED OR SODDED WITH THE FOLLOWING. ALL SEEDING RATES BELOW REPRESENT PURE, LIVE, UNCOATED SEED:

DS3 - PERMANENT GRASSING	LBS./AC.	SEEDING DATES
BERMUDA, COMMON (UNHULLED)	195.0	OCT. 1 TO FEB. 28
BERMUDA, COMMON (HULLED)	65.0	MAR. 1 TO JUN. 30
FESCUE, TALL	50.0	AUG. 15 TO OCT. 31
DS2 - TEMPORARY GRASSING		
RYE	168.0	AUG. 15 TO DEC. 31
RYEGRASS, ANNUAL*	40.0	AUG. 1 TO APR. 15
BROWNTOP MILLET	40.0	APR. 1 TO JUL. 15

(1) PERMANENT GRASSING SHALL BE SEEDED ONLY DURING THE DATES INDICATED. TEMPORARY GRASSING IS TO BE SEEDED DURING OTHER DATES OF THE YEAR. CONTRACTOR SHOULD ANTICIPATE SEEDING TEMPORARY GRASS AT THE COMPLETION OF LAND DISTURBING ACTIVITIES AND RETURNING LATER (POTENTIALLY AFTER DEMOBILIZATION HAS OCCURRED) TO SEED PERMANENT GRASS. IF TEMPORARY GRASS IS SEEDED FIRST, THE TEMPORARY GRASS SHALL BE STRIPPED, THE SEED BED SHALL BE PREPARED, AND THE GROUND SHALL BE FERTILIZED PRIOR TO SEEDING PERMANENT GRASS.

SOIL ANALYSES SHALL BE PERFORMED TO EVALUATE PERCENTAGE OF NITROGEN, PHOSPHORUS, POTASH, SOLUBLE SALT CONTENT, ORGANIC MATTER CONTENT, AND pH VALUE. SOIL TESTS AT 6-INCH AND 12-INCH DEPTHS SHALL BE PERFORMED ON THE COMPLETED EMBANKMENT AND AUXILIARY SPILLWAY. SIX LOCATIONS SHALL BE TESTED ON BOTH THE EMBANKMENT AND AUXILIARY SPILLWAY. AREAS INDICATING POOR SOIL NUTRIENTS AND/OR pH SHALL BE AMENDED APPROPRIATELY TO THE FULL 12-INCH DEPTH.

*NOTE: RYEGRASS SHALL NOT BE USED IN ANY SEEDING MIXTURES CONTAINING PERENNIAL SPECIES DUE TO ITS ABILITY TO OUT-COMPETE DESIRED SPECIES CHOSEN FOR PERMANENT PERENNIAL COVER.

THE ENGINEER MAY ADJUST THE SEEDING DATES THIRTY (30) DAYS, EARLIER OR LATER, TO BETTER MEET SITE NEEDS AND COMPENSATE FOR VARIATIONS IN LOCAL CLIMATIC CONDITIONS.

ALL SEED WILL BE DISTRIBUTED UNIFORMLY OVER THE AREA.

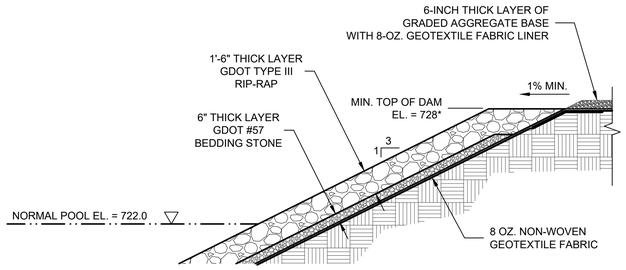
FIRM SEEDED OR SODDED AREAS WITH CULTIPACKER OR ROLLER IMMEDIATELY FOLLOWING PLANTING.

MULCHING - ALL SEEDED AREAS STEEPER THAN 2 PERCENT WILL BE MULCHED IMMEDIATELY AFTER SEEDING BY SPREADING UNIFORMLY DRY STRAW OR HAY, FREE OF COMPETING WEEDS, AT THE RATE OF ABOUT 2 ½ TONS PER ACRE AND TO COVER APPROXIMATELY 75 PERCENT OF THE GROUND SURFACE. WHEN FEASIBLE, ANCHOR MULCH WITH A PACKER OR DISC HARROW WITH BLADES SET STRAIGHT OR WITH EMULSIFIED ASPHALT (GRADE AE5 OR SS1) AT A RATE OF 100 GALLONS EMULSION MIXED WITH 100 GALLONS WATER FOR EACH TON OF MULCH.

B. MANAGEMENT

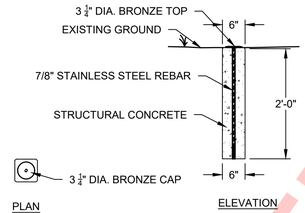
APPLY ANNUAL APPLICATION OF 400 POUNDS OF 10-10-10 ANALYSIS FERTILIZER PER ACRE AND TOPDRESS WITH 30 POUNDS OF AMMONIUM NITRATE PER ACRE. APPLY AGRICULTURAL LIMESTONE AT THE RATE OF 1 TON PER ACRE EVERY 4 TO 6 YEARS.

C. IN LIEU OF TOPSOIL, CONTRACTOR MAY UTILIZE BIOTIC SOIL MEDIA SUCH AS PROGANICS OR APPROVED EQUAL. MANUFACTURER'S RECOMMENDATIONS REGARDING APPLICATION RATE, SURFACE PREPARATION, ETC. SHALL BE ADHERED TO.



RIP-RAP EMBANKMENT ARMORING DETAIL

N.T.S.



SETTLEMENT MONUMENT DETAIL

N.T.S.

DATE	DESCRIPTION	REV
02/26/21	REMOVED BYPASS	1

CHECKED BY: JSM
DRAWN BY: GHB
DESIGNED BY: JTD

JONATHAN THOMAS DEAN, P.E.
DATE: 10/27/2020
GEORGIA PROFESSIONAL ENGINEER NO. 034136

GEORGIA REGISTERED No. PE034136 PROFESSIONAL ENGINEER JONATHAN THOMAS DEAN

Schnabel ENGINEERING
6445 Shiloh Road, Suite A / Alpharetta, GA 30005 / Phone: 770-781-8008 / Fax: 770-781-8003 /
schnabel-eng.com

PLANT YATES
SERVICE WATER POND DAM - PHASE II
COWETA COUNTY, GEORGIA

TYPICAL EMBANKMENT DETAILS

PREPARED FOR:
SOUTHERN COMPANY
3535 COLONNADE PKWY
BIRMINGHAM, AL

PROJECT: 17C17013.00
DATE: OCTOBER 27, 2020
SHEET 22 OF 22

CONSTRUCTION SPECIFICATIONS

FOR

Plant Yates
Phase 3: Service Water Pond Dam

Schnabel Reference No. 17C17013.00
August 16, 2019

Prepared for: Southern Company

Schnabel ENGINEERING

CONSTRUCTION SPECIFICATIONS

For

Plant Yates
Phase 3: Service Water Pond Dam
Coweta County, Georgia

August 16, 2019
Schnabel Reference No. 17C17013.00

Owner

Southern Company

Engineer

Schnabel Engineering, LLC
6445 Shiloh Road
Suite A
Alpharetta, Georgia 30005

TABLE OF CONTENTS
TECHNICAL SPECIFICATIONS

SECTION 01051

LAYOUT OF WORK AND QUANTITY SURVEYS

PART 1 GENERAL

1.1 SCOPE

A. This specification section covers the procedures and accuracy requirements for survey services for layout of work and field measurement of work quantities to be determined by surveys.

1.2 REQUIREMENTS INCLUDE

A. The Contractor shall perform all layout surveys required for the control and completion of the work and all necessary surveys to compute quantities of work performed.

B. The Purchaser has established primary control to be used by the Contractor for establishing lines and grades required for the work. Primary control consists of one benchmark in the vicinity of the work. Before beginning work, the Contractor shall check and verify control point established by the Purchaser and shall advise the Purchaser in writing that the point is acceptable or, if it is not acceptable, the reasons therefore. Purchaser will provide Contractor electronic files following submittal of a release form to the Purchaser.

C. The Contractor shall preserve and maintain primary control point until otherwise authorized. Primary control points damaged or destroyed by the Contractor prior to authorization may be reestablished by the Purchaser, and the expense of reestablishment will be deducted from amounts due, or to become due, the Contractor.

D. The Contractor shall provide experienced construction surveyors, and survey work shall be under the supervision and direction of a Land Surveyor who is registered in the State of Georgia and has a minimum of 2 years responsible charge of construction similar in nature to that required by this contract. The Contractor shall maintain sufficient qualified personnel to perform required surveying work. All survey work performed by the Contractor shall be subject to field and office review by the Purchaser.

1.3 SUBMITTALS

A. Submittals shall be in accordance with this paragraph.

B. At least 15 days prior to beginning surveying work, the Contractor shall submit, for review, a complete plan for the surveying required to lay out the work, including methods and timetables for establishing lines and grades.

C. At least 15 days prior to beginning surveying work, the Contractor shall submit, for review, a resume of qualifying experience for the registered Land Surveyor who will be responsible for the supervision and direction of Contractor’s survey work. At least 15 days prior to changing such responsible individual, a qualifying experience resume for the new individual shall be submitted for approval.

D. At least 10 days prior to beginning surveying work, the Contractor shall submit, for review and resolution as required, results of the Contractor’s check on the accuracy of Purchaser-established primary control.

E. Within 2 days of completing and producing notes for a survey or portion of survey, the Contractor shall submit to the Purchaser, for review and filing, a copy of such notes. Within 2 days of completing a field survey book, the Contractor shall submit to the Purchaser, for review and filing, a copy of the original field survey book.

F. Accompanying progress reimbursement requests, the Contractor shall submit, for review, a copy of applicable quantity survey notes and computations and an itemized statement for work performed or placed during the progress period measured on the basis of surveying.

G. If requested by the Purchaser, the Contractor shall submit, for review and filing, a copy of the workday's survey notes at the conclusion of that workday.

H. All surveys submitted to the Purchaser shall be provided in both hard copy and electronic format. The electronic format surveys are to be in such a format that is compatible with AutoCAD 2010 or newer. Contour data shall be provided in polyline format with elevations assigned to each contour and point files shall be included in PNEZD, comma delimited format. All files shall be referenced to the Georgia NAVD 88 coordinate system.

1.4 LAYOUT OF WORK

A. From Purchaser-established primary control point, the Contractor shall establish all lines and grades necessary to control the work, and shall be responsible for all measurements that may be required for execution of the work to the tolerances prescribed in these Specifications or on the Drawings.

B. The Contractor shall establish, place, and replace as required, such additional stakes, markers, and other controls as may be necessary for control, intermediate checks, and guidance of construction operations.

C. Prior to the initiation of any earthwork operations, the Contractor shall provide to the Purchaser a field-run topographic survey with 2-foot contour intervals within the limits of disturbance at the site.

1.5 QUANTITY SURVEYS

A. The Contractor shall perform all original ground surveys as required to depict existing conditions prior to construction and determine final quantities of work for reimbursement. These ground surveys shall be performed after the areas are cleared and grubbed. The Contractor shall perform such surveys and computations as are necessary to determine quantities of work performed or placed during each progress reimbursement period, and shall perform all surveys necessary for the Purchaser to determine final quantities of work in place.

B. The Contractor shall notify the Purchaser at least 24 hours before performing a survey and, unless specifically waived in writing, surveys shall be performed in the presence of an authorized representative of the Purchaser.

1.6 CONTRACTOR SURVEYS

A. Surveys required:

1. Alignment staking. – Each 50 feet on tangent; each 25 feet on curves.

2. Slope staking. – Each 50 feet on tangent; each 25 feet on curves; restake every 10 feet in elevation.

3. Periodic benchmarks every 20 vertical feet shall be established outside footprint of dam along the baseline.

4. Structures – Stake out structures; check prior to and during construction.

5. Cross section – Original, final, and intermediate as required, for structure sites and other locations as necessary for quantity surveys.

6. “Record” – As required for structures and other features of the work.

1.7 RECORDS

A. Survey data shall be recorded in accordance with recognized professional surveying standards. Original field notes, computations, and other surveying data shall be recorded in standard survey field books. Notes or data not in accordance with standard formats will be rejected. Illegible notes or data, or erasures on any page of a field book will be considered sufficient cause for rejection of part, or all, of the field book. Therefore, rejection of part, or all, of field book may necessitate resurveying. Corrections by ruling or lining out errors will be satisfactory.

1.8 DEGREE OF ACCURACY

A. Degree of accuracy shall be of an order high enough to satisfy tolerances specified for the work and the following:

1. Structure and pipe points shall be set within 0.05 foot, except where installation or operation considerations require tighter tolerances.

2. Cross section points shall be located within 0.1 foot, horizontally and vertically.

3. Vertical elevation surveys shall set within 0.1 foot.

1.9 RELATED SECTIONS

A. NOT USED

PART 2 PRODUCTS

2.1 EQUIPMENT AND MATERIALS

A. The Contractor shall furnish all equipment and materials including instruments, stakes, spikes, steel pins, flagging, templates, platforms, tools, and other accessories as may be required in laying out any part of the work from the primary control points established by the Purchaser and in performing quantity surveys. Instruments shall be accurate and shall be subject to inspection, and any defective instruments, as determined by the Purchaser, shall be promptly replaced, repaired, or adjusted as required.

PART 3 EXECUTION

A. Not Used.

PART 4 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

• END OF SECTION •

SECTION 01100

CONSTRUCTION SEQUENCE

PART 1 GENERAL

1.1 SCOPE

A. Contractor may propose an alternate construction sequence that may better suit his means and methods. Any modifications to the sequence listed below shall be submitted to the Purchaser for approval. The Contractor shall submit his proposed construction sequence within 14 days after Notice to Proceed.

1.2 RELATED SECTIONS

A. Section 02111: Clearing and Grubbing

B. Section 02100: Control of Water

C. Section 02201: Earthfill

D. Section 02222: Excavation

E. Section 02654: Siphon Spillways

1.3 SEQUENCE OR WORK

A. General: The sequence of work is as follows:

1. Mobilization to site and install necessary erosion and sediment control measures.
2. Clear, grub, and strip the area designated.
3. Install/construct control of water measures.
4. Excavate unsuitable soils within the proposed dam foundation.
5. Construct embankment dam.
6. Construct siphon spillway.
7. Maintain erosion control and control of water measures throughout construction.
8. Establish permanent vegetation, remove erosion control and control of water measures.
9. Demobilize from site.

1.4 WATER CONTROL

A. Contractor is responsible for controlling surface runoff and groundwater controls necessary for the completion of the work.

PART 2 EXECUTION

A. Not Used.

PART 3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

• END OF SECTION •

SECTION 02100

CONTROL OF WATER

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of the Control of Surface Water and Groundwater as needed to perform the required construction in accordance with the Specifications. It shall include:

1. Building and maintaining groundwater dewatering systems, all necessary temporary impounding works, cofferdams, check dams, channels, ditches, diversions and flumes.
2. Furnishing, installing and operating all necessary pumps, piping and other facilities and equipment.
3. Preparation and submission of a Control of Water Plan.
4. Removing all such temporary works and equipment after they have served their purposes.

1.2 RELATED SECTIONS

A. Section 02201, Earthfill.

1.3 MEASUREMENT AND REIMBURSEMENT

A. NOT USED

1.4 REFERENCES

A. The Contractor shall review available data regarding surface water and groundwater flow and geotechnical conditions at the site before submitting a Control of Water Plan to the Purchaser. Data includes, but is not limited to, analyses and studies performed as part of this project.

B. The Contractor is warned that surface water, groundwater, runoff and other site conditions may be highly variable and difficult to accurately predict. Analyses and evaluations undertaken in connection with the design of improvements were performed to support the project design. These analyses and evaluations may or may not provide satisfactory information to the Contractor for developing a Control of Water Plan. The Contractor's is solely responsible for evaluating the applicability of the available information and to obtain or develop additional information as a basis for development of the Contractor's Control of Water Plan.

1.5 SUBMITTALS

A. Control of Water Plan: The Contractor shall furnish to the Purchaser in writing, his complete plan for controlling surface and groundwater, to include maintenance of his proposed diversion and protective works, for review and comment, before beginning the work. The Plan shall include proposed sequencing of control of water measures throughout each phase of construction including the removal of cofferdams. Review of this plan by the Purchaser will not relieve the Contractor of his responsibility for completing the work as specified.

PART 2 PRODUCTS

A. Not Used.

PART 3 EXECUTION

3.1 DIVERTING CONCENTRATED FLOW AND OTHER SURFACE WATER

A. The control and diversion of surface water is the sole responsibility of the Contractor.

B. The steepest temporary excavation slope shall be 2H:1V. If a steeper excavation slope is proposed, the Contractor shall submit proposed temporary dewatering measures and supporting slope stability calculations as part of the Control of Water Plan.

C. The Contractor shall build, maintain, and operate cofferdams, channels, flumes, sumps, and other diversion and protective works within the project's defined limits of disturbance needed to divert concentrated flow and other surface water into basins and traps while construction is in progress. The Contractor must satisfy himself that his cofferdam and diversion system is sufficient to reasonably protect his work and the safety of the dam.

D. The Contractor shall furnish, install and operate all necessary pumps, well points, piping and other facilities and equipment needed to divert concentrated flow and other surface water through the construction site while construction is in progress. All discharges from water control equipment shall be directed into basins and traps.

E. After the diversion works have served their purpose, the Contractor shall remove, level, or grade such works to present a sightly appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works. The removal of the diversion facilities shall be subject to the approval of the Purchaser

3.2 DEWATERING THE CONSTRUCTION SITE

A. The foundation of the structures to be constructed under this Contract shall be dewatered and kept free of standing or running water or muddy conditions as needed for proper execution of the construction work. Dewatering shall be performed to maintain the groundwater a minimum of 3 feet below the working subgrade. Temporary gravel filled trenches will be permitted to assist in dewater activities. Dewatering may be performed to maintain the groundwater at a greater depth below the working subgrade at the Contractor's discretion. Dewatering methods that cause a loss of fines from foundation areas will not be permitted.

B. The Contractor shall build, maintain, operate cofferdams, channels, flumes, sumps; wellpoints, and other diversion and protective works needed to divert or remove water from foundation areas while construction is in progress.

C. Water pumped or drained from excavations, drains or water courses encountered in the work, shall be disposed of in accordance with an approved Water Control Plan, without injury to adjacent property, the work under construction, or to pavements, roads, and water courses.

D. No water shall be discharged to sanitary sewers. Sanitary sewage shall be pumped to sanitary sewers or shall be disposed of by a method approved by the Purchaser.

E. After the construction-dewatering site works have served their purpose, the Contractor shall remove, level, or grade such works to present a slightly appearance and to prevent any obstruction to the flow of water or any other interference with the operation of or access to the permanent works. The termination of the dewatering of the construction site works shall be subject to the approval of the Purchaser.

• END OF SECTION •

SECTION 02111

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Areas to be cleared and grubbed are the areas adjacent to the dam to the limits shown on the Drawings or as directed by the Purchaser.

1.2 RELATED SECTIONS

A. Section 02222, Excavation

1.3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

PART 2 PRODUCTS

A. Not Used.

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

A. Clearing shall consist of the removal and disposal of all trees, logs, brush, snags, bushes, vines, shrubs, decayed stumps, leaves, roots, grasses, weeds, fences, posts, rubbish, and other perishable and objectionable materials. Grubbing shall include the removal and disposal of all stumps, roots, and root clusters which shall be grubbed out to a depth of at least one (1) foot below the ground surface at embankment sites and other designated areas. In addition, all stumps, logs, and roots greater than 2 inches shall be removed regardless of depth below subgrade.

B. The limits of areas to be cleared and grubbed shall be marked by the Contractor using stakes, flags, tree markings or other methods. Trees to be left in place and uninjured will be designated by special markings positioned on the trunks at about 6 feet above the ground surface.

3.2 PROTECTION OF EXISTING VEGETATION

A. Trees and other woody vegetation designated to remain undisturbed shall be protected from damage throughout the entire construction period. Any damage resulting from the contractor’s operations or neglect shall be repaired by the Contractor.

B. Earthfill, stockpiling of materials, vehicular parking, and excessive foot or vehicular traffic shall not be allowed within the dripline of vegetation designated to remain in place. Vegetation damaged by any of these or similar actions shall be replaced with viable vegetation of the same species.

C. Any cuts, skins, scrapes, or bruises to the bark of the vegetation shall be carefully trimmed and local nursery accepted procedures used to seal damaged bark.

D. Any limbs or branches 0.5-inch or large in diameter that are broken, severed, or otherwise seriously damaged during construction shall be cut off at the base of the damaged limb or branch flush with the adjacent limb or tree trunk.

3.3 DISPOSAL

A. The Contractor shall be responsible for compliance with all Federal, State and local laws and regulations relative to disposal by removal, and for obtaining all necessary permits and fees for removal or disposal.

B. Timber suitable for harvesting shall be the property of the Contractor and removed from the site. Other materials cleared and grubbed shall be mulched or disposed off-site in accordance with all state and local regulations and laws. Costs of off-site disposal, including, permits and fees, shall be incidental to this item of work.

C. Precautions shall be taken to prevent debris from clearing and grubbing operations from entering any watercourse, including high flows.

D. Material and other material which cannot be disposed of by mulching shall be hauled off-site to an approved sold waste facility.

• END OF SECTION •

SECTION 02201

EARTHFILL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of the placement of earthfill as shown on the Drawings and specified herein.

1.2 RELATED SECTIONS

A. Section 02100, Control of Water.

B. Section 02111, Clearing and Grubbing

C. Section 02222, Excavation.

D. Section 02936, Permanent Turf Establishment

1.3 TOLERANCES

A. Earthfill shall be place to the lines, grades, and elevations as shown on the Drawing. Tolerances shall be as follows:

Elevations: minus 0.0 feet to plus 0.2 feet.
Grades: No steeper than shown on Drawings and no more than 1 percent flatter.

1.4 TESTING

A. Density tests of fill will be performed by the Contractor's Approved Third Party Independent Testing Agency. Tests shall be performed in accordance with ASTM D 2937 or ASTM D6938.

B. Moisture contents of earthfill at the time of compaction shall be measured in accordance with ASTM D2937

C. During the course of the work the Purchaser will request such tests as are required to identify materials, measure compaction characteristics, measure moisture content, and measure density of fill in place. These tests performed by the Contractor will be used to verify that the fills conform to the requirements of the Specifications. Such tests are not intended to provide the Contractor with the information required by him for the proper execution of the work and their performance shall not relieve the Contractor of the necessity to perform tests for that purpose.

D. The Contractor will perform the following tests at the frequencies listed below:

Density: Twice per lift, or every 500 cubic yards, whichever is most frequent.
Moisture content: Every time a density test is performed.

PART 2 PRODUCTS

2.1 MATERIALS

A. Earthfill materials shall be obtained from required on-site excavations or approved off-site sources. The selection, blending, routing and disposition of materials in the various fills shall be subject to review by the Purchaser.

B. Fill materials shall contain no sod, brush, roots or other perishable materials. Fill shall not contain more than one percent by weight of organics.

C. Structural earthfill shall be classified as SM, SC, CL, CH, MH, or ML according to the Unified Soil Classification System (ASTM D2487). Fill soils shall not have a liquid limit greater than 60 or a plasticity index greater than 40. The maximum particle size shall not exceed four inches.

D. Following excavation of the core trench, as detailed on the drawings, all loose soils or rock fragments shall be removed prior to placement of fill materials. Bottom and sides of the trench shall be firm and meet the dewatering requirements of the project.

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION

A. Foundations for earthfill shall be stripped to remove vegetation and other unsuitable materials or shall be excavated as specified.

B. Earth foundation surfaces shall be graded to remove surface irregularities, proofrolled (see Part 3.1.G), and shall be scarified parallel to the axis of the fill to a minimum depth of two inches. The surface materials of the foundation shall be compacted and bonded with the first layer of earthfill as specified for subsequent layers of earthfill.

C. Earth abutment surfaces shall be free of loose, uncompacted earth in excess of two inches in depth normal to the slope and shall be at such a moisture content that the earthfill can be compacted against them to effect a good bond between the fill and the abutments.

D. Rock foundation and abutment surfaces shall be cleared of all loose materials by hand or other effective means and shall be free of standing water when fill is placed upon them.

E. Foundation and abutment surfaces shall not be steeper than one horizontal to one vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earthfill conforming to the Specifications for Earthfill to be placed upon the foundation.

F. In areas within the floodplain all foundation and embankment surfaces shall be closely examined immediately prior to the placement of all earthfills and backfills. All materials that exhibit drying cracks, slaking, or other evidences of being unstable or unsuitable, shall be removed or reworked by scarification, wetting, and compaction to the affected depths prior to the placement of fill.

G. Proofrolling involves passing a fully-loaded loaded dumptruck over a subgrade or lift of structural earth fill to observe its reaction. Excessive deflection of the subsurface resulting from the proofroll indicates soft and/or very wet soils. Minor deflections may be considered acceptable as determined by the Engineer.

3.2 PLACEMENT

A. Fill shall not be placed until the required excavation and foundation preparation has been completed and the foundation has been inspected by the Purchaser. Fill shall not be placed upon a frozen surface, nor shall snow, ice or frozen material be incorporated in the fill.

B. Fill shall be placed in horizontal layers. The thickness of each layer of structural earthfill before compaction shall be 8 inches, or 4 inches where hand operated compaction equipment is used. Hand compacted fill, including fill compacted by manually directed power tampers, and shall be placed in layers whose thickness before compaction does not exceed the maximum thickness specified for layers of fill compacted by manually directed power tampers.

C. Fill adjacent to structures shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly. The height of the fill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure.

D. Gutters formed where earth surfaces intersect shall be shaped to form rounded rather than "V" type gutters.

3.3 CONTROL OF MOISTURE CONTENT

A. During placement and compaction of fill, the moisture content of materials being placed and that of the preceding layer shall be maintained between the range specified. The application of water to the fill materials shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the materials after placement of the fill, if necessary. Uniform moisture distribution shall be obtained by disking, blading or other approved methods prior to compaction of the layer. Material that is too wet when deposited on the fill shall either be removed or dried to the specified moisture content prior to compaction.

B. A heavy duty construction disk shall be on site while earth fill is being placed to provide the necessary disking for moisture control. The harrow shall be capable of disking material deeper than the thickness of uncompacted layers.

3.4 COMPACTION

A. Structural earthfill shall be placed with a moisture content between optimum and four percent above optimum and compacted to a minimum of 95 percent of maximum dry density as determined by the Standard Proctor Compaction Test ASTM D698.

B. Compaction of all earthfill not adjacent to structures shall be done with a sheepsfoot roller. In the event adequate compaction cannot be obtained utilizing a sheepsfoot roller due to the content of coarse aggregate within the proposed fill material, smooth drum vibratory rollers may be utilized after review and approval by the Engineer. Utilization of smooth drum vibratory rollers or other similar compaction methods will require scarification of the lift surface per Engineer's recommendation prior to placement of subsequent lift.

C. Fill adjacent to structures shall be compacted to a density equivalent to that of the surrounding fill by means of hand tamping, or manually directed power tampers or plate vibrators. Fill to be compacted by hand tamping, or manually directed power tampers or plate vibrators shall be spread in horizontal layers approximately four (4) inches in thickness before compaction. Heavy equipment shall not be operated within three feet of any structure. Vibrating rollers shall not be operated within five feet of any structure. Compaction by means of drop weights operating from a crane or hoist will not be permitted.

D. The passage of heavy equipment will not be allowed over any conduit until the backfill has been placed above the top surface of the conduit to a height equal to three feet.

E. Compaction of fill adjacent to structures shall not be started: (1) until the specified design strength has been attained for reinforced-concrete structures; and (2) until 48 hours have elapsed after concrete placement for other structures.

3.5 REMOVAL AND PLACEMENT OF DEFECTIVE FILL

A. Fill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the Specifications shall be reworked to meet the requirement or removed and replaced by acceptable fill at the Contractor's expense. The replacement fill and the foundation, abutment and fill surfaces upon which it is placed shall conform to all requirements of this Specification for foundation preparation, approval, placement, moisture control and compaction.

• END OF SECTION •

SECTION 02202

SELECT FILL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Select fill materials shall be used as either special backfill, filters, or drains, as shown on the Drawings or as directed by the Purchaser.

1.2 RELATED SECTIONS

A. Section 02222, Excavation.

B. Section 02275, Riprap.

1.3 MEASUREMENT AND PAYMENT

A. Not Used.

1.4 SUBMITTALS

A. The name and location of the source of material.

B. Samples and test reports of the material, including compaction curves (if applicable) for all materials to be used. Test reports for “Fine Drain Fill” and “Coarse Drain Fill” shall include, at a minimum, ten recent gradations performed by the manufacturer.

C. Submittals of Select Fill are due 10 days prior to delivery.

1.5 TESTING

A. During the course of the work the Purchaser will request such tests to be performed, as are required to identify materials, measure compaction characteristics, measure moisture contents, and measure density of fill in place. These tests performed by the Contractor will be used to verify that the fills conform to the requirements of the Specifications. Such tests are not intended to provide the Contractor with the information required by him for the proper execution of the work and their performance shall not relieve the Contractor of the necessity to perform tests for that purpose.

B. All testing, including field and laboratory services, shall be performed by the Contractor.

PART 2 PRODUCTS

2.1 MATERIALS

A. Select Fill material shall be obtained from off-site borrow areas. The selection, blending, routing and placement of material in the fill shall be subject to approval by the Purchaser.

B. Select Fill material shall contain no sod, brush, roots or other perishable materials.

C. Coarse Drain Fill shall meet all the requirements of the latest edition of Georgia Department of Transportation (GDOT) Specification for Aggregates and shall be in conformance with either of the following gradations:

1. GDOT Size No. 89 Stone

D. Fine Drain Fill shall meet all the requirements of the latest edition of GDOT Specification for aggregates and shall be in conformance with the following gradation:

1. ASTM C-33 Fine Aggregate

E. Fine Drain Fill shall be natural and not produced from crushing operations.

F. Select fill shall not be comprised of limestone material or other materials having solutioning or cementing properties.

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION

A. Foundations for Select Fill shall be stripped of vegetation and other unsuitable materials or shall be excavated as specified and approved by the Purchaser.

B. Foundation surfaces shall not be steeper than one horizontal to one vertical unless otherwise specified.

3.2 PLACEMENT

A. Select Fill shall not be placed until the required excavation and foundation preparations have been completed and the foundation surfaces have been inspected and approved by the Purchaser. Select Fill shall not be placed upon a frozen surface, nor shall snow, ice or frozen material be incorporated in the fill.

B. Select Fill shall be placed in horizontal layers. The thickness of each layer after compaction shall not exceed nine inches for all Select Fill. Materials placed by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness before being compacted.

C. Select Fill adjacent to structures shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly.

D. The distribution of materials shall be essentially uniform, and the fill shall be free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material.

E. Select Fill shall be placed with sufficient care to prevent damage to filter fabric. Filter fabric that is damaged shall be repaired to the satisfaction of the Purchaser.

F. The materials shall be placed in a manner to avoid segregation of particle sizes and to ensure the continuity and integrity of all zones. No foreign materials shall be allowed to become intermixed with or otherwise contaminate the Select Fill materials. Exposed areas of Select Fill materials placed against existing foundation materials shall be protected from contamination caused by erosion of the existing material.

G. Traffic shall not be allowed to cross over Select Fill material at random. Equipment crossovers shall be maintained, and the number and location of such crossovers shall be established and approved prior to the beginning of material placement. Each crossover shall

be cleaned of all contaminating materials and shall be inspected by the Purchaser before additional Select Fill material is placed.

H. Any Select Fill which may become contaminated with foreign materials shall be removed and replaced, at the Contractor's expense.

I. The upper surface of drain fill constructed concurrently with adjacent zones of earthfill shall be maintained at a minimum elevation of 1 foot above the upper surface of adjacent earthfill.

J. Drain fill over and/or around pipe or drain pipe shall be placed in such as manner as to avoid any displacement in line or grade of the pipe.

K. Placement of drain fill adjacent to concrete structures shall not be commenced until the following item intervals have elapsed following placement of the concrete:

Structure type	**Time interval (days)**
Vertical or near-vertical wall with earth loading on one side only (retaining walls and counterforts)	14
Walls backfilled on both sides simultaneously	7
Conduits and galleries, coast-in-place (with inside forms in place) (inside forms removed)	 7 14
Conduits, precast, cradled	2
Conduits, precast, bedded	1
Cantilever outlet bents backfilled on both sides simultaneously	3

3.3 COMPACTION

A. Fine Drain Fill shall be compacted to between 60 and 80 percent of relative density as determined by ASTM D-4253 and D-4254.

B. No compaction will be required for Coarse Drain Fill.

• END OF SECTION •

SECTION 02209

GEOTEXTILE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of furnishing and placing Geotextile at the locations and to the limits shown on the Drawings or as directed by the Purchaser.

1.2 RELATED SECTIONS

A. Section 02275, Riprap

1.3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

1.4 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

A. Materials delivered to the site shall be inspected for damage, unloaded and stored with a minimum of handling. Materials shall not be stored directly on the ground. During shipment and storage, Geotextile shall be wrapped in burlap or similar heavy-duty protective covering. The storage area shall be such that the fabric is protected from mud, soil, dust, and debris. Geotextile materials that are not to be installed immediately shall not be stored in direct sunlight.

B. Materials shall be handled in such a manner as to ensure delivery to the site in sound, undamaged condition.

1.5 SUBMITTALS

A. The name and test reports of the material.

PART 2 PRODUCTS

2.1 MATERIALS

A. The Geotextile shall be a nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester, formed into a stable network by needle punching. All fabrics shall be inert to commonly encountered chemicals and hydrocarbons, mildew and rot resistant, insect and rodent resistant, resistant to ultraviolet light and heat exposure, and conform to the physical strength requirements listed in Table 1.

B. The Geotextile shall provide an Equivalent Opening Size (EOS) no finer than the U.S. Standard Sieve No. 100 and no coarser than the U.S. Standard Sieve No. 50.

Table 1 - Physical Strength Requirements

Physical Properties	Test Procedure	Average Roll Minimum Value (Weakest Principal Direction)
Grab Tensile Strength	ASTM D4632	205 lbs.
Elongation at Failure	ASTM D4632	50%
Trapezoid Tear Strength	ASTM D4533	80 lbs.
Puncture Strength	ASTM D6241	500 lbs.

C. The seams of the fabric shall be sewn with thread of a material meeting the chemical requirements given above for synthetic yarn or shall be bonded by cementing or by heat. Seams shall be tested in accordance with method ASTM D4884, using 1-inch square jaws and 12 inches per minute constant rate of traverse. The strengths shall be not less than 90% of the required tensile strength (Table 1) of the unaged fabric in any principal direction. Unaged fabric is defined as fabric in the condition received from the manufacturer or distributor.

D. All brands of synthetic Geotextile and all seams to be used shall be accepted on the following basis. The Contractor shall furnish the Purchaser, in duplicate, a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the fabric. The mill certificate or affidavit shall attest that the fabric meets the chemical, physical and manufacturing requirements stated in this Specification.

E. Securing Pins: The pins shall be 3/16-inch by 18-inch long steel bars, pointed at one end and fabricated with a head to retain a steel washer having a minimum outside diameter of 1.5 inches. U-shape staples, 11 gage by 12-inches long and 1 to 1.5 inches wide, are also acceptable.

PART 3 EXECUTION

3.1 INSTALLATION

A. Geotextile shall be free from defects, rips, holes, deterioration or damage. The prepared foundation shall be relatively smooth, free from obstructions, depressions, debris, low density pockets and protruding rock. Beginning at the toe of the slope, the fabric shall be placed with the long dimension parallel to the slope and shall be laid smooth and free of tension, stress, folds, wrinkles or creases. The strips shall be placed to provide a minimum width of 12 inches of overlap for each joint, unless a larger overlap is recommended by the manufacturer.

B. Securing pins with washers shall be inserted through both strips of overlapped fabric at no greater than five foot intervals.

C. Additional pins, regardless of location, shall be installed, as necessary, to prevent any slippage of the Geotextile. The fabric shall be placed so that the upper strip of fabric will overlap the next lower strip. Each securing pin shall be pushed through the fabric until the washer bears against the fabric and secures it firmly to the foundation.

D. The fabric shall be protected at all times during construction from any damage or contamination by surface run-off. The work shall be scheduled so that the covering of the fabric with a layer of specified material is completed within 30 days after the fabric is placed. Fabric damaged

during installation or placement of backfill, or through failure to prevent contamination by surface run-off or backfill within the specified time limit herein, shall be removed and replaced at the Contractor's expense.

E. No material shall be dropped on to an uncovered, exposed, or bare geotextile from a height greater than two (2) feet.

• END OF SECTION •

SECTION 02222

EXCAVATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall include the excavation of earth, sediment, and rock materials at the locations and to the lines and grades shown on the Drawings, and the stockpiling and/or disposal of all materials as specified herein.

B. Common Excavation shall include all materials not classified as Rock Excavation.

C. Rock Excavation shall include all material to be excavated which requires: systematic barring and wedging for removal; boulders or loose rock of one cubic yard or more in volume; and material which cannot be loosened or broken down by equipment having a bucket breakout force of at least 50,000 lbs.

1.2 RELATED SECTIONS

A. Section 02201, Earthfill

B. Section 02111, Clearing and Grubbing

1.3 SUBMITTALS

A. The Contractor shall provide the following topographic maps. These maps shall have a contour interval no greater than two (2) feet. Contractor shall notify the Purchaser of any scheduled surveys that will be used for quantity calculations. Maps shall be produced by a land surveyor registered in the State of Georgia. No pay item excavation shall take place until the required survey is provided to the Purchaser and the survey is approved.

1. Surveyed topographic map and sections showing original ground surface for, auxiliary spillway, inlet/outlet structure, and any of the areas that are shown to be excavated.

2. Surveyed topographic map and sections showing completed unclassified (i.e., to top of rock) excavation for areas of rock excavation

3. Surveyed topographic map and section showing rock excavation completed to the limit of rock excavation.

B. At least 21 calendar days prior to starting the first excavation of any area of the work, submit an Excavation Plan for all classifications of excavation. The Excavation Plan shall describe an orderly sequence for performing the required excavation. The Plan shall describe the proposed work sequence and schedule and include:

1. Plans for creating stockpiles for future backfill material

2. Plans and diagrams for handling excavation, fill, and disposal of spoil materials.

3. Descriptions of proposed excavating and hauling equipment to be used including make, model, and quantity of equipment units.

4. Description of any excavation for the Contractor's convenience. Excavation for the Contractor's convenience shall be defined in advance and approved by the Purchaser before excavation is undertaken by the Contractor.

5. Excavation support systems for excavations that are deeper than five feet.

1.4 PROTECTION AND SAFETY

A. Comply with all safety requirements of OSHA, state, and federal regulations. Where there is a conflict between the requirements of this section and the requirements of the publication Construction Safety Standards, the more stringent requirements shall govern.

B. All percussion-type drilling shall be performed with drilling apparatus equipped with water or chemical dust-control systems or other equipment means of controlling the dust. Pressure tanks used in the suppression equipment shall conform to ASME Boiler and Pressure Vessel Code, Section VII, for Unfired Pressure Vessels. Equipment and solutions used shall be suitable for operation in freezing weather. Dust-control devices are not required on jackhammers, provided the operators wear approved-type dust respirators when dust concentrations exceed safe hygienic limits.

C. Holes, shafts, and trenches shall be protected by safety fencing at the end of the work day.

PART 2 - EXECUTION

2.1 COMMON EXCAVATION

A. The tolerance for Common Excavation shall be plus or minus three-tenths (0.3) of a foot from the lines and grades shown on the Drawings or as directed by the Purchaser. Excavation beyond the approved lines and grades shall be backfilled as directed by the Purchaser with approved suitable material and compacted. This work shall be at the Contractor's expense and no reimbursement will be made for over excavation or backfill of over excavated areas.

B. Where excavation lines are marked as pay lines, the Contractor may cut a flatter slope, subject to approval by the Purchaser at no additional reimbursement for Excavation or Earthfill, if he believes that a flatter slope is more appropriate for his operations.

C. Common Excavation, which meets the requirements of Section 02201, Earthfill shall be stockpiled for such purposes. Material excavated from the site which is not suitable for use as Earthfill may be used by the Contractor for his own purposes, with the excess stockpiled in the area shown on the Drawings or in other areas approved by the Purchaser.

2.2 ROCK EXCAVATION

A. The tolerance for Rock Excavation shall be plus or minus three-tenths (0.3) of a foot from the lines and grades shown on the Drawings or as directed by the Purchaser. Blasting shall not be allowed. Excavation in rock outside the pay lines shall be backfilled with appropriate materials including concrete, depending on location, at the direction of the Purchaser. This work shall be at the Contractor's expense and no reimbursement will be made for over excavation or backfill concrete.

B. Rock Excavation materials shall be disposed of in spoil areas shown on the Drawings or in other areas approved by the Purchaser.

C. The equipment that meets the rated breakout force shall be equipped with rock teeth with less wear less than 25%. The equipment shall be positioned to excavate the material at a minimum of three different positions as approved by the Purchaser. The Contractor is expected to be aggressive in excavating this material before the Purchaser will classify the material as rock.

2.3 BORROW AREAS

A. All material required for the specified earthfills shall be obtained from onsite borrow areas identified and approved by the Purchaser. Suitable materials from these excavations shall be used as onsite earthfill and separated into its own stockpile. The excavated material shall be protected for re-use in a manner that will minimize contamination and moisture absorption, as approved by the Purchaser. Priority pollutants testing shall be performed on any off-site borrow materials at a frequency of one test every 5,000 cubic yards. The Contractor shall provide the Purchaser notice at least three weeks before hauling begins so that Purchaser can schedule a time for collecting soil samples for chemical analyses. No off-site borrow material may be brought onto the site until the Purchaser has reviewed the analytical results and approved the borrow source. Testing costs will be the responsibility of the Purchaser.

2.4 SHORING AND BRACING

A. Excavated surfaces too steep to be safe and stable, if unsupported, shall be supported as necessary to safeguard the work and workmen, to prevent sliding or settling of the adjacent ground, and to avoid damaging existing improvements. The width of the excavation shall be increased, if necessary, to provide space for sheeting, bracing, shoring and other supporting installations. The Contractor shall furnish, place and subsequently remove such supporting installations.

2.5 SPOIL AREAS

A. Spoil Areas shall be in locations approved by the Purchaser.

B. The final surface of the spoil areas shall have a uniform, smooth appearance, free from abrupt depressions. The surface shall be graded to drain, and covered with a minimum of two feet of earthfill. Spoil area shall be and seeded and mulched.

• END OF SECTION •

SECTION 02275

RIPRAP

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of furnishing and placing rock Riprap and bedding stone at the locations and to the dimensions shown on the Drawings.

1.2 RELATED SECTIONS

A. Section 02201, Earthfill.

B. Section 02209, Geotextile

C. Section 02222, Excavation.

1.3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

1.4 REFERENCES

A. The bulk specific gravity and absorption shall be determined by ASTM C-127. The test for soundness shall be performed according to the procedure for ledge rock in Federal Specification SS-R-406C, Method 203.01. The test for abrasion shall be in accordance with ASTM C-535, except as directed herein.

1.5 ALLOWABLE TOLERANCES

A. Except as provided below, the rock shall have the following properties:

1. Bulk specific gravity (saturated surface-dry basis) not less than 2.25.
2. Absorption not greater than 2 percent.
3. Soundness; weight loss in five cycles not greater than 10 percent when sodium sulfate is used and 15 percent when magnesium sulfate is used.
4. Abrasion; weight loss after 500 revolutions not greater than 50 percent (using Los Angeles Machine Grading B).

1.6 SUBMITTALS

A. Submit test data showing material meets requirements of this Specification.

PART 2 PRODUCTS

2.1 MATERIAL

A. Riprap and Bedding Stone shall be obtained from off-site quarries that meet the specified quality and grading requirements. Individual rock fragments shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering.

B. Riprap shall be comprised of angular fragments obtained by blasting. Riprap shall meet the following requirements.

1. Riprap shall meet all the requirements of the latest version of GDOT specifications and shall be graded in accordance with GDOT Type III Riprap and GDOT Type I Riprap.

C. Rock that fails to meet the requirements stated in Allowable Tolerances, may be accepted only if similar rock from the same source has been demonstrated to be sound after five years or more of service under conditions of weather, wetting and drying and erosive forces similar to those anticipated for the rock to be installed under this Specification.

D. Bedding Stone shall meet all the requirements of the latest version of GDOT specifications for coarse aggregate and shall be graded in accordance with GDOT No. 4 and GDOT No.57.

PART 3 EXECUTION

3.1 PLACEMENT

A. The subgrade surface on which the rock riprap, filter, bedding, or geotextile is to be placed shall be cut or filled and graded to the lines and grades shown on the Drawings. When fill to subgrade lines is required, it shall consist of approved material and shall conform to the requirements of the specified class of earthfill. Rock riprap, filter, bedding, or geotextile shall not be placed until the foundation preparation is completed and the subgrade surface has been inspected and approved by the Purchaser.

B. Riprap shall be placed and graded in a manner to ensure that the large rock fragments are uniformly distributed and that the smaller fragments fill the spaces between the large fragments in such a manner as will result in a compact, uniform layer. Hand placing will be required only to the extent necessary to produce the results specified above.

C. The Purchaser shall have entry to any quarries furnishing the rock under this Contract. The rock delivered to the project site shall be subject to testing by the Purchaser for conformance to these Specifications.

D. Riprap shall be placed in such a manner so as to not damage existing structures, foundations, or other items of Work or adjacent structures. The Contractor shall be responsible for all damages resulting from uncontrolled or otherwise improper placement of Riprap.

• END OF SECTION •

SECTION 02652

POLYVINYL CHLORIDE PIPE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of furnishing, fabricating, and installing solid wall and perforated PVC pipe, fittings and ductile iron extensions as shown on the Drawings.

1.2 RELATED SECTIONS

A. Section 02202, Select Fill

1.3 MEASUREMENT AND PAYMENT

A. Not Used

PART 2 PRODUCTS

2.1 MATERIALS

A. Pipe shall be pressure rated PVC pipe conforming to the requirements of A.W.W.A. Standard C900, Pressure Class 165, for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inches through 12 inches, for Water. The pipe shall be furnished with cast iron equivalent outside diameters.

B. Fittings shall be compatible with the type of pipe furnished and be of the all bell, rubber ring connecting type with gasket retainer grooves in the inner surfaces of the bells.

C. Couplings for plain end pipe shall be elastometric gasket couplings where the joint is in earth, sand, or gravel. Solvent cement couplings may be used at joints embedded in concrete.

D. Welded or fused pipe, fittings, couplings, and elbows will not be permitted.

E. Perforations, where specified, shall be circular holes, arranged in rows parallel to the axis of the pipe. Perforations shall be approximately 4 inches (102 mm) center-to-center along the rows. Rows shall be arranged in two equal groups in either side of the vertical center line of the pipe, and the total number of rows shall be as shown on the plans. The orientation of the rows shall be as shown on the plans. The spacing of rows between these limits shall be uniform. Holes may appear at the ends of short and random lengths.

F. No PVC drain pipe shall be exposed upon completion of the work. Only ductile iron drain pipes shall be exposed.

2.2 ANIMAL GUARDS

A. Animal guards shall be as manufactured by Agri-Drain, or equivalent and as approved by the Purchaser.

PART 3 EXECUTION

3.1 HANDLING AND STORAGE

A. The pipe shall be handled with care to prevent damage and shall not be thrown, dropped, or dragged. Special care shall be taken to avoid impact damage when the pipe must be handled at temperatures of 40°F or less. Pipe shall be stored on a relatively flat surface so that the barrels are evenly supported. Unless the pipe is specially formulated for exposure to ultraviolet radiation, it shall be covered with an opaque material when in outside storage.

3.2 LAYING AND BEDDING

A. Earth, Sand, or Gravel Bedding. The pipe shall be firmly and uniformly bedded in a shaped bedding groove that closely conforms to the bottom of the pipe for a width of at least 60 percent of the pipe width (10 percent of the overall pipe height). Bell holes of ample width and depth shall be excavated at each joint location so that the pipe is uniformly supported along its entire length. Blocking or wedges shall be used to bring the pipe to grade.

B. The pipe shall be loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding. Backfill shall be carefully placed and compacted to form a continuous uniform support around the pipe. Pipe shall be backfilled to a minimum cover of one foot on the same day installed.

C. Pipe Embedded in Concrete. Pipe embedded in concrete shall be securely tied to prevent movement of the pipe during concrete placement. Pipe may be tied to reinforcing steel provided a clear distance of 1 ½ inches is maintained between the pipe and the steel. Pipe, or portions thereof, to be embedded in concrete in the finished work shall be installed prior to placement of the concrete.

D. Pipe shall be laid to the line and grade shown on the Drawings. Perforated pipe shall be laid with the perforations down and oriented symmetrically about the vertical centerline. Perforations shall be clear of any obstructions when the pipe is laid.

E. Just before placement, each pipe section shall be inspected to ensure that all foreign material is removed from inside the pipe. The pipe ends and the couplings shall be free of foreign material when assembled. At the completion of a work shift, all open ends of the pipeline shall be temporarily closed off using a suitable cover or plug.

3.3 JOINTS

A. Pipe joints shall be sound and conform to the details shown on the Drawings. Elastometric gasket joints at bell and spigot joints or at couplings shall be thoroughly cleaned and lubricated prior to assembly in accordance with the manufacturer’s recommendations.

3.4 ANIMAL GUARDS

A. Animal guards shall be installed at all drain outlets

B. Installation shall be in accordance with the details shown on the Drawings.

• END OF SECTION •

SECTION 02654

SIPHON SPILLWAYS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of furnishing, fabricating, and installing pipe and fittings to construct the siphon spillways as shown on the Drawings.

1.2 RELATED SECTIONS

A. 02201, Earthfill

B. 02202, Select Fill

C. 02222, Excavation

D. 03200, Steel Reinforcement

E. 03300, Cast-In-Place Concrete

1.3 MEASUREMENT AND PAYMENT

A. Not Used

PART 2 PRODUCTS

2.0 MATERIALS

A. Pipe shall be new AWWA C-905 PVC pipe or new high molecular weight, high density polyethylene pipe equal to Driscopipe 1000 as manufactured by Phillips Driscopipe, Inc., Dallas Texas, or approved equal.

B. PVC Fittings shall be compatible with the type of pipe furnished and be of the all bell, rubber ring connecting type with gasket retainer grooves in the inner surfaces of the bells.

C. HDPE pipe shall have a nominal DIPS (Ductile Iron Pipe Size) OD unless otherwise specified. The SDR (Standard Dimension Ratio) of the pipe shall be SDR 17. The interior walls of the pipe shall be smooth.

2.1 INTAKE SCREEN

A. Intake screen for siphon pipe shall be installed at the location shown on the drawings.

B. Intake screen shall be aluminum or stainless steel bar type as supplied by “Southeastern Pipe and Drain Systems” or equivalent.

PART 3 EXECUTION

3.0 HANDLING AND STORAGE

A. The pipe shall be handled with care to prevent damage and shall not be thrown, dropped, nor dragged. Special care shall be taken to avoid impact damage when the pipe must be handled at temperatures of 40°F or less. Pipe shall be stored on a relatively flat surface so that the barrels are evenly supported. Unless the pipe is specially formulated for exposure to ultraviolet radiation, it shall be covered with an opaque material when in outside storage.

3.1 LAYING AND BEDDING

A. The pipe shall be firmly and uniformly bedded in a shaped bedding groove that closely conforms to the bottom of the pipe for a width of at least 60 percent of the pipe width (10 percent of the overall height). Bell holes of ample width and depth shall be excavated at each joint location so that the pipe is uniformly supported along its entire length. Blocking or wedges **shall not** be used to bring the pipe to grade.

B. The pipe shall be loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding. Backfill shall be carefully placed and compacted to form a continuous uniform support around the pipe. Pipe shall be backfilled to a minimum cover of one foot on the same day installed.

C. Pipe Embedded in Concrete. Pipe embedded in concrete shall be securely tied to prevent movement of the pipe during concrete placement. Pipe may be tied to reinforcing steel provided a clear distance of 1.5 inches is maintained between the pipe and the steel. Pipe, or portions thereof, to be embedded in concrete in the finished work shall be installed prior to placement of the concrete.

D. Pipe shall be laid to the line and grade shown on the drawings.

3.2 JOINTS

A. Pipe joints shall be sound and conform to the manufacturer's requirements. Elastomeric joints at bell and spigot joints or at couplings shall be thoroughly cleaned and lubricated prior to assembly in accordance with the manufacturer's recommendations.

3.3 PRESSURE TESTING

A. Testing for Siphon Spillway Pipe: When a length of pipe approved by the Purchaser is ready for testing, the following procedures shall be used.

   a. Preparation: Provide a test pump, an accurate meter, and all other accessories required to make the test. Provide and remove all temporary bulkheads, plugs, and flanges required to perform the pressure test.

   b. Test Pressure and Leakage: Test the pipeline at +/- 15 psi. Sustain the pressure for 1 hour. The pressure shall not drop by more than 2 psi during this period.

   c. If leaks are detected, locate, repair and retest. If results are not totally satisfactory, the Engineer may require testing for a longer period of time.

• END OF SECTION •

SECTION 02935

TOPSOIL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Requirements for preparing, depositing and spreading Topsoil or Engineered Soil Media (ESM) at locations determined by the Purchaser.

B. Topsoil or ESM will be placed over the surfaces of disturbed areas not receiving riprap and areas identified by the Purchaser to receive permanent turf.

1.2 RELATED SECTIONS

A. Section 02201, Earthfill

B. Section 02222, Excavation

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 TOPSOIL

A. Material for Topsoiling shall be brought in from offsite. Topsoil shall consist of natural, friable loam, possessing characteristics of the best soils in the vicinity which produce heavy growth of crops, grass, and other vegetation. It shall be reasonably free from subsoil, clay lumps, grass clumps, stones, roots or similar objects larger than two inches in diameter, brush, objectionable woods or litter, or any other material or substance which may be harmful to plant growth or hindrance to grading, planting or maintenance of operations. Priority pollutants testing shall be performed on any off-site borrow materials, at a frequency of one test every 5,000 cubic yards. The Contractor shall provide the Purchaser notice at least three weeks before hauling begins so that the Purchaser can schedule a time for collecting soil samples for chemical analyses. No off-site material may be brought onto the site until the Purchaser has reviewed the analytical results and approved the material source. Testing costs will be the responsibility of the Purchaser.

B. Two samples shall be obtained from within the topsoil and analyzed for soil fertility prior to bringing onto the site. The soil fertility analysis shall recommend nutrient needs for the topsoil by testing for the following minimum parameters:

1. Percent Organic Matter
2. Soil pH
3. Nitrate Concentration
4. Phosphorus Concentration
5. Calcium Concentration
6. Iron Concentration
7. Cation Exchange Capacity
8. Bulk Density
9. Percent sand, silt, and clay

The results of the soil fertility tests shall be provided to the Purchaser and the Landscaping Professional one week prior to the start of Permanent Turf establishment. A meeting

between Purchaser, Contractor, and Landscaping Professional shall be conducted to discuss any suggested modifications to the permanent grassing specifications prior to permanent grass installation.

2.1.2 ENGINEERED SOIL MEDIA

A. ESM shall be a hydraulically-applied Biotic Soil Media such as ProGanics BSM as manufactured by Profile Products, LLC or Purchaser approved equal.

B. Contractor shall submit manufacturer's product data and installation instructions, including required substrate preparation, list of materials and proposed application rate.

C. Contractor shall submit a letter of certification from the Manufacturer indicating that the product meets or exceeds all technical and packaging requirements and is made in the U.S.A.

D. ESM shall be delivered in UV and weather-resistant factory labeled packages. ESM shall be stored and handled in strict compliance with Manufacturer's instructions and recommendations. ESM shall be protected from damage, weather, excessive temperatures and construction operations.

E. ESM shall conform to the following typical property values when uniformly applied at a rate of 3,500 pounds per acre under laboratory conditions.

Property	**Test Method**	**Tested Value**
Physical		
Organic Material	ASTM D586	≥ 94%
Mass Per Unit Area	ASTM D6566[1]	≥ 11.6 oz/yd^2
Ground Cover	ASTM D6567[1]	≥ 99%
Water Holding Capacity	ASTM D7367	≥ 900%
pH	ASTM D1293	6.0 ± 1.0
Carbon : Nitrogen (C:N) Ratio	ASTM E1508 & EPA Method 1687	50:1 ± 10
Material Color	Observed	Brown
Performance		
Cover Factor[2]	Large Scale Testing[4]	≤ 0.01
% Effectiveness[3]	Large Scale Testing[4]	≥ 99%
Vegetation Establishment	ASTM D7322[1]	≥ 850%
Environmental		
Ecotoxicity	EPA 2021.0	48-hr LC_{50} > 100%
Biodegradability	ASTM D5338	Yes
EPA Metal Limits	EPA 503 Metal Limits	Pass
Pathogen Reduction	40 CFR 503 Class A Compost	Pass

1. When applied at a rate of 3,500 lb/ac
2. Cover Factor is calculated as soil loss ratio of treated surface versus untreated control surface.
3. % Effectiveness = One minus Cover Factor minus 100%.
4. Large scale testing conducted at Utah Water Research Laboratory (UWRL). ProGanics was applied at 3,500 lb/ac and covered with ProMatrix EFM, a Bonded Fiber Matrix, at 3,500 lb/ac and tested under uniform conditions. For specific testing information, please contact a Profile technical service representative.

PART 3 EXECUTION

3.1 PROCEDURE

3.1.1 TOPSOIL

A. In the areas to be Topsoiled, the Contractor shall complete all grading necessary to bring the surface to the lines indicated on the Drawings and parallel to the proposed finished grade. These areas are to be free from rock or other foreign material of two inches or greater in any dimension. Immediately prior to placing of Topsoil, the areas shall be loosened by discing or by scarifying to a depth of at least two inches to permit proper bonding of the Topsoil to the ground on which it is placed.

B. Topsoil shall not be placed until the area to be covered has been shaped, trimmed, finished and all other construction work in the area has been completed. Topsoil shall not be placed when the ground is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to the proposed planting or to proper grading. Topsoil shall be placed and spread to a depth sufficient such that after natural settlement and rolling with a light roller, the completed work shall conform to the lines, grades and elevations indicated on the Drawings. Unless specified otherwise, the depth of Topsoil after settlement shall be 6 inches minimum. After spreading the Topsoil, all large stiff clods, hard lumps, large rocks, stumps, litter, or other foreign matter shall be raked up and removed from the Topsoil area and disposed of by the Contractor. The area shall then be rolled with a light roller weighing not less than 100 pounds and not over 210 pounds per foot of width with an approved cultipacker.

C. If soil or weather conditions are unsuitable, the Contractor shall cease Topsoil operations and shall resume operations when conditions permit.

3.1.1 ENGINEERED SOIL MEDIA

A. In the areas of ESM application, the Contractor shall complete all grading necessary to bring the surface to the lines indicated on the Drawings and parallel to the proposed finished grade. These areas are to be free from rock or other foreign material of two inches or greater in any dimension.

B. ESM shall not be placed until the area has been shaped, trimmed, finished and all other construction work in the area has been completed. ESM shall not be placed when the ground is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to the proposed planting or to proper grading.

C. Strictly comply with equipment Manufacturer’s installation instructions and recommendations. Use approved hydroseeding machines. To achieve optimum soil surface coverage, apply ESM from opposing directions to soil surface. Erosion control products, slope interruption devices or water diversion techniques should be used in conjunction with this product. No chemical additives with the exception of fertilizer, soil neutralizers and biostimulant materials should be added to this product.

D. To ensure proper application rates, measure and stake area. For best results, allow ESM to dry slightly prior to application/installation of erosion control products; more rapid drying will occur when temperatures exceed 60°F. Drying times may be accelerated in high temperature, low humidity conditions with product applied to dry soils. Use caution to insure overspray of hydraulic erosion control product does not cause movement of the ESM. When installing rolled erosion control product over ESM, take caution to limit disturbance of the treated surface and avoid excessive foot traffic.

E. Mixing: A mechanically agitated hydroseeding machine is strongly recommended:

1. Fill mechanically agitated hydroseeder with water to at least 1/3 of displacement. Turn pump on and thoroughly purge pump and pre-wet lines. Turn pump off.

2. Turn agitator on and load low density materials first (i.e. seed).

3. Continue slowly filling tank with water while loading ESM and soil amendments.

4. Consult application and loading charts to determine number of bags to be added for desired area and application rate. Mix at a rate of 100 lb of BSM per 100 gallons (45.4 kg/379 liters) in machines equipped with gear or positive displacement pumps and 75 lb of ESM per 100 gallons (34.0 kg/379 liters) in machines with centrifugal pumps. Contact Equipment manufacturer to confirm optimum mixing rates.

5. All ESM should be completely loaded before water level reaches 75% of the top of tank.

6. Add fertilizer and other heavier materials and continue mixing.

7. Top off with water and mix until all material is fully broken apart and hydrated (minimum of 10 minutes — increase mixing time when applying in cold conditions). This is very important to allow the ESM to fully hydrate.

8. Shut off recirculation valve to reduce potential for air entrainment within the slurry.

9. Slow down agitator to very low speed and start applying with optimum nozzle.

10. Spray in opposing directions for maximum soil coverage.

11. Return to water source as quickly as possible to purge pump and lines, then repeat mixing and application process.

F. Application Rates: These application rates are for standard conditions. Designers may need to increase application rates on rough or rocky surfaces.

% Organic Matter	Rate (lb/acre)
< 0.75	5,000
≥ 0.75 & < 1.5	4,500
≥ 1.5 & < 2.0	4,000
≥ 2.0 & < 5.0	3,500

G. After application, thoroughly flush the tank, pumps and hoses to remove all material. Wash all material from the exterior of the machine and remove any slurry spills. Once dry, material will be more difficult to remove.

H. Clean spills promptly. Advise Purchaser of methods for protection of treated areas. Do not allow treated areas to be trafficked or subjected to grazing.

I. All inspections and maintenance recommendations shall be conducted by qualified professionals consistent with the Purchasers expectations.

J. Initial inspections shall insure installations are in accordance with the project documents. Subsequent inspections at pre-determined time intervals and corrective maintenance activities directed after each significant or other potentially damaging weather or site event.

3.2 STOCK PILE AREAS

A. Stock Pile Areas shall be in locations approved by the Purchaser.

B. After all Topsoil operations are completed, any excess material remaining in the Stock Pile shall be placed in the spoils area. The excess topsoil placed in these areas shall be spread to a relatively uniform thickness across the entire finished surface of the area.

• END OF SECTION •

SECTION 02936

PERMANENT TURF ESTABLISHMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of tillage of Topsoil, and the furnishing and placing of limestone, fertilizer, seed, mulching materials and erosion control blanket for the establishment of permanent turf and maintaining and tending the permanent turf until acceptance. Areas to be prepared and seeded for permanent turfing are as follows:

1. All cut, fill and disturbed areas as well as the staging, and spoils areas.
2. Areas not requiring Permanent Turf Establishment include disturbed areas that will be covered by the proposed temporary and permanent pool elevations as shown on the Drawings and any rock surfaces.

1.2 RELATED SECTIONS

A. Section 02201, Earthfill.

B. Section 02222, Excavation.

C. Section 02935, Topsoil.

1.3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

1.4 DELIVERY, STORAGE, AND HANDLING OF MATERIAL

A. Each kind of seed shall be furnished and delivered, unless otherwise approved, in separate, sealed containers, or bags acceptably sewn tight or sealed.

B. Seed which has become wet, moldy or otherwise damaged in transit or storage will not be acceptable. Seed, after delivery to the Contractor, shall be stored in such a manner as to protect it from damage or deterioration from any sources. Provisional acceptance of seed must be obtained before the seed is sown. Final acceptance may be subject to the results of sampling and testing.

C. All limestone shall be furnished in paper bags weighing less than 100 pounds with the name of the material, net weight of contents and the manufacturer's name and guaranteed analysis appearing on each container. Bulk deliveries shall be accompanied by a certificate covering the names, weight and analysis as specified herewith for packaged material.

D. Fertilizer shall be furnished in paper bags weighing less than 100 pounds each with the name of the material, net weight of contents and the manufacturer's name and guaranteed analysis appearing on each container.

PART 2 PRODUCTS

2.1 MATERIALS

A. All limestone shall be pulverized; 100 percent shall pass the Number 10 sieve; minimum 90 percent shall pass the Number 20 sieve; and minimum 60 percent shall pass the Number 100

sieve. Agricultural pulverized limestone shall meet one of the following minimum chemical requirements:

1. Type HM-High Magnesium (Dolomite), 21 Percent MgO, 20 percent CaO, 43 percent $MgCO_3$ and 51 percent $CaCO_3$.
2. Type MO-mixed Oxides (Magnesium) 50 percent MgO + CaO.

B. The type of fertilizer and approximate application rate required shall be determined by a qualified soil analyst retained by the Contractor based on soil samples provided by the Contractor.

C. Seed shall be labeled in accordance with the state laws and the U.S. Department of Agriculture rules and regulations under the Federal Seed Act in effect on the date of invitations for bids. Bag tag figures are evidence of purity and germination. No seed will be accepted with a test date of more than 9 months before the delivery date to the site.

Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be accepted. The percent of noxious week seed allowable shall be as defined in the current State laws relating to agricultural seeds. Each type of seed shall be delivered in separate sealed containers and fully tagged unless exception is granted by Purchaser. Material other than pure live seed shall comprise only nonviable seed, chaff, hulls, live seed of crop plants other than those specified, harmless inert matter and weed seeds except that weed seed other than seeds of noxious weeds will be permitted up to one percent of the gross weight of each kind of seed. Legume seeds shall be accompanied by adequate amounts of their proper inoculants unless accompanied by certification of preinoculation.

D. The weight of pure live seed in each lot of seed is computed by the labeled purity percent times the labeled germination percent times weight. (Example: 34 pounds of pure live seed of particular grass is required. Stock available has 85.0 percent purity and 80.0 percent germination, which meets the minimum requirements in this example and equals 68 percent pure live seed. Thirty four divided by 68 percent equals 50 pounds gross as being required to furnish the 34 pounds of pure live seed.) Other materials shall comprise the remaining 32 percent, between 68 percent of pure live seed and 100 percent in the example. The inoculants for treating seeds of legumes shall be standard culture of nitrogen fixing bacteria not more than one year old. Each inoculant shall be the specific culture required by each legume. It shall be supplied only from manufacturers licensed to sell legume inoculants in the State of Georgia. Each kind of seed shall be furnished and delivered, unless otherwise approved, in separate, sealed containers, or bags acceptably sewn tight or sealed. All seeds and seed labels shall be in accordance with State and Federal Laws, Rules and Regulations as each is in effect on the date of Invitation of Bids. The Contractor shall furnish the vendor with the specifications for the material.

E. Mulching material shall consist of hay or straw. Mulching material shall be free from mature seed bearing stalks or roots of prohibited or noxious weeds.

F. Erosion Control Blankets shall have uniform thickness and distribution of biodegradable fibers throughout, with top and bottom covered with a degradable plastic netting having a maximum mesh opening of 2 x 2 inches. Top netting shall be UV stabilized for longer life. Netting shall be entwined with the matting fibers in a manner which shall provide sufficient reinforcement against damage during handling and placement. Mat shall consist of straw and coconut fibers, with a minimum of 30% coconut fiber, and shall be Bon Terra CS2 Erosion Control Blanket as manufactured by Bon Terra America, Gennesse, Idaho (800-882-9489) or equal.

PART 3 EXECUTION

3.1 PROCEDURE

A. Seeding shall be done at such times of the year when soil conditions are suitable for tillage and when moisture and temperatures are suitable for plant growth. Climatic conditions shall be suitable for the application of materials and proper operation of tillage and seeding equipment. All work required for seeding for permanent vegetation will be accomplished under appropriate conditions. All soil areas with slopes of three horizontal to one vertical or flatter shall be thoroughly tilled to a depth of four inches or as approved by the Purchaser by disking, harrowing, scarifying or other approved methods. When slopes are steeper than three horizontal to one vertical, tillage shall be limited to horizontal scarification to eliminate erosion irregularities and break up any surface crust immediately before seeding. All tillage shall be carried out as nearly on the contour as practicable to reduce the erosion hazard. All surface stones and debris over three inches in any dimension shall be removed and disposed of as approved by the Purchaser.

B. Seeding dates are indicated on seed mixture table shown on the Drawings.

C. Limestone shall be applied at the rate specified by the qualified soil analyst referred to in Part 2.1.A above.

D. A commercial fertilizer shall be applied at the rate specified by the qualified soil analyst referred to in Part 2.1.A above.

E. Lime and fertilizer shall not be mixed together dry or in a hydroseeder for simultaneous application.

F. When lime and fertilizer have been spread dry, they may be incorporated into the soil in one operation.

G. Lime and fertilizer shall be applied hydraulically, with a low box-type spreader, or hand broadcast. Dry lime and fertilizer shall be well mixed with the soil. Fertilizer placed by the use of a drill shall constitute acceptable mixing. When a hydroseeder is used to apply lime or fertilizer, the soil mixing does not apply.

H. Seed mixture shall be as shown on the Drawings.

I. Before any seed is sown, the seed bed shall be tilled as previously described, smoothed and brought to grade. Prior to the sowing of seed, the soil shall be raked to a depth of ¾ inches. All raking shall be done in a direction parallel to the contour lines on the slope and not uphill or downhill. All sticks, stones, weeds, roots or other objectionable material appearing on the surface shall be removed. The finished surface of the soil shall be maintained in a true and even condition during the sowing of the seed.

J. The seed shall be uniformly sown on the designated areas using an approved hydraulic seeder, power-drawn drill, power-operated seeder, hand-operated seeder, or by hand, within five days of applying fertilizer and lime to the soil.

K. Mulching material shall be used on surfaces with slopes of 3 horizontal to 1 vertical or flatter and shall be applied after the sowing and rolling have been completed. Mulch applied to seeded areas shall achieve a minimum of 75% soil cover. Straw mulch shall be uniformly applied over the entire surface at a minimum rate of two and one-half tons per acre and spread to a depth of two inches loose measure. All mulching material shall be in a moist condition at the time of placement or shall be sprinkled immediately after placing. While moist, the straw shall be anchored in the soil by a V-type wheel land packer or disc harrow or

anchored with netting or an effective tackifier to secure the straw firmly in the ground to form a soil binding mulch and prevent loss or bunching by wind. On slopes where machinery cannot be used, mulching material shall be retained in place by a shallow covering of earth, by twine and stakes or other suitable means which will not be detrimental to subsequent maintenance. Approved asphalt emulsion may be used as a “tie-down”, provided it is applied uniformly over and through the mulch at a rate of not less than 75 gallons per acre. It shall be non-toxic to plants and seeds.

L. For slopes steeper than 3 horizontal to 1 vertical not on the dam embankment, erosion control mats shall be installed. Erosion control mats shall be used on the dam embankment slopes.

M. The Contractor shall be responsible for the establishment of a uniform, dense and sturdy growth of Permanent Turf. Areas of sparse growth shall be reseeded at no additional cost to the Purchaser.

N. The Contractor shall be responsible for the maintenance and protection of the Permanent Turf until final completion of the project. Maintenance shall include irrigation, fertilization, adding additional seed, adding mulch, repairing erosion, and mowing of the Permanent Turf. Mowing shall be performed when the grass height exceeds 8 inches.

O. Watering Schedule: The Contractor shall water newly installed permanent vegetative cover at a frequency that promotes germination and a dense growth of healthy grass cover.

• END OF SECTION •

SECTION 03 30 01

CAST-IN-PLACE CONCRETE FOR MINOR STRUCTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section addresses products and placements for cast-in-place concrete to be used for construction of the siphon spillway.

1.2 RELATED SECTIONS

A. Section 31 23 16 - Excavation

B. Section 31 23 23 - Fill Placement

1.3 REFERENCES

A. American Concrete Institute:

1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials
2. ACI 301 - Specifications for Structural Concrete
3. ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete
4. ACI 305 - Hot Weather Concreting
5. ACI 306.1 - Standard Specification for Cold Weather Concreting
6. ACI 308.1 - Standard Specification for Curing Concrete
7. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures

B. ASTM International:

1. ASTM C33 - Standard Specification for Concrete Aggregates.
2. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
3. ASTM C150 - Standard Specification for Portland Cement.
4. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
5. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
6. ASTM C441 - Standard Test Method for Effectiveness of Pozzolans or Ground Blast-Furnace Slag in Preventing Excessive Expansion of Concrete Due to the Alkali-Silica Reaction
7. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
8. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
9. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.

10. ASTM C920 - Standard Specification for Elastomeric Joint Sealants
11. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
12. ASTM C1218 - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
13. ASTM C1260 - Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
14. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

C. US Army Corps of Engineers (COE)

1. COE CRD-C 513 – Corps of Engineers Specifications for Rubber Waterstops
2. COE CRD-C 572 – Corps of Engineers Specifications for PVC Waterstops

1.4 SUBMITTALS

A. Prior to placement of concrete, the Contractor shall furnish the Purchaser, for approval, a statement of the materials and mix proportions he intends to use. The statement shall include evidence satisfactory to the Purchaser that the materials and proportions will produce concrete conforming to this specification. The materials and proportions so stated shall constitute the "job mix." After a job mix has been approved, neither the source, character or grading of the aggregates nor the type or brand of cement or admixture shall be changed without prior notice to the Purchaser. If such changes are necessary, no concrete, containing such new or altered materials shall be placed until the Purchaser has approved a revised job mix.

B. Delivery Tickets: Ready-mixed concrete producer shall furnish duplicate delivery tickets. Contractor shall retain one ticket and submit other ticket to Purchaser at time of concrete delivery. Delivery tickets shall indicate delivery date, type of concrete, class, cement content, admixtures, and amount of water.

1.5 QUALITY REQUIREMENTS

A. Perform Work in accordance with ACI 301 and ACI 350 and all requirements of this Section and related sections of this specification.

B. Conform to ACI 305 when concreting during hot weather.

C. Conform to ACI 306.1 when concreting during cold weather.

1.6 MEASUREMENT AND PAYMENT

A. Not Used

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement shall conform to ASTM C150, Type I/II, low alkali (LA) Portland type. Cement used throughout the work shall be uniform in color.

B. Coarse and Fine Aggregate shall meet ASTM C33. The maximum size aggregate shall be 1 inch for reinforced concrete.

C. Water shall be clean, potable and free from oil, salt, acid, alkali, organic matter, or other deleterious substances.

2.2 ADMIXTURES

A. Air Entrainment: Conform to ASTM C260 and be compatible with water reducing and any other admixture. If air-entraining cement is used, any additional air-entraining admixture shall be of the same type as that in the cement.

B. Water Reducing Admixtures: Conform to ASTM C494, Type A. Use water reducing admixture to increase workability of mix.

C. Set Retarders: ASTM C494, Type B, shall not be used in concrete, unless otherwise authorized in writing by Purchaser.

D. Water Reducing Admixtures and Set Retarders: ASTM C494, Type D shall not be used in concrete, unless otherwise authorized in writing by Purchaser.

E. High Range Water Reducing Admixtures: Conform to ASTM C494, Type F. Use HRWRA to increase workability of mix.

F. High Range Water Reducing Admixtures and Retarders: ASTM C494, Type G shall not be used in concrete, unless otherwise authorized in writing by Purchaser.

G. Accelerating Admixtures: ASTM C494, Type C or E shall not be used in concrete, unless otherwise authorized in writing by Purchaser.

2.3 FORMWORK

A. Forms shall be of wood, plywood, steel, or other approved material and shall be mortar tight. The forms and associated false work shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and contours.

B. Form surfaces shall be smooth and free from holes, dents, sags or other irregularities. Forms shall be coated with a non-staining form release agent before set into place.

C. Metal ties or anchorages within the forms shall be equipped with cones, she-bolts, or other devices that permit their removal to a depth of at least one inch without injury to the concrete. Ties designed to break off below the surface of the concrete shall not be used without cones.

2.4 CONCRETE REINFORCEMENT

A. Quality

1. Steel reinforcing bars shall conform to ASTM A 615, Grade 60. All bending shall be in accordance with standard practice and shall be performed by machine methods as approved. The reinforcement as delivered to the Site shall be free from loose, flaky rust, mill scale, and from oil, grease, mud, mortar, or other coating which might inhibit its bond with concrete or grout.

B. Identification

1. Each bundle of steel shall be tagged at the mill with an identifying mill tag, showing the name of the mill and the melt or heat number. The mill shall certify that all reinforcing steel or welded wire fabric represented by that melt or heat number complies with the specification requirements. Reinforcing bars to be shipped to the jobsite are to have attached plastic or metal tags. Place on each tag the mark number of the rebar corresponding to the mark number indicated on the shop drawings. Mark numbers on tags to be so placed that the numbers cannot be removed by weather or other means.

C. Storage

1. The materials should be stored off of the ground and protected from weathering if stored for any prolonged time to prevent rusting.

2.5 CONCRETE ACCESSORIES

A. Curing and Sealing Compound: Liquid membrane-forming compound for curing concrete, ASTM C309, clear type.

B. Bond Breaker: Asphalt impregnated felts, 15 pounds, polyethylene tape, coated paper, metal foil, or other approved material.

PART 3 EXECUTION

3.1 PLACING STEEL REINFORCEMENT

A. The placing of reinforcing steel shall conform to the applicable provisions of CRSI "Recommended Practice for Placing Reinforcing Bars" except as specified herein. Reinforcement bars shall be detailed to conform to the current standards. Reinforcing steel shall not be placed as concrete operations proceed or without definite means of holding it in its correct position. Once reinforcement is secured within forms, reinforcement shall be maintained clean until completely embedded in the concrete. All bending shall be in accordance with standard approved practice. Unless otherwise indicated, provide minimum concrete protective covering for reinforcement as follows:

1. Concrete placed against earth - 3 inches
2. Formed surfaces exposed to or located above any liquid - 2 inches
3. Formed surfaces exposed to weather or in contact with earth:
    a. Number 6 or larger bars - 2 inches
    b. Smaller than Number 6 bars - 1-1/2 inches

B. Extend reinforcement to within 2 inches of concrete perimeter edges. If perimeter edge is earth formed, extend reinforcement to within 3 inches of the edge. Do not bend reinforcement after embedding in hardened concrete unless approved by the Purchaser. Do not bend reinforcing bars by means of heat.

3.2 SPLICING

A. Except as otherwise specified herein, all splices, lengths of laps, locations, placement, and embedment of reinforcement shall conform to the applicable requirements of ACI 318. Staggering of splices may be required. In general, vertical bar splices shall not be spaced closer than 15 ft and horizontal splices not closer than 30 ft. Lapped ends of bars

shall be placed in contact and securely wired or shall be separated sufficiently to permit the embedment of the entire surface of each bar in concrete.

B. Lapped or mechanical splices may be used. Reinforcement bars shall be tied securely at alternate intersections, except around the perimeter of a mat, in which case, every intersection shall be tied. Ties shall be made of No. 16 iron wire.

3.3 SUPPORTS

A. All reinforcement shall be secured in place by use of metal or concrete supports, spacers, or ties. Such supports shall be of sufficient strength to maintain the reinforcement in place throughout the concreting operation. The supports shall be used in such a manner that they will not be exposed or contribute in any way to the discoloration or deterioration of the concrete.

B. The use of broken stone, metal pipe or wooden blocks will not be permitted.

C. Provide supporting concrete blocks or use of other approved methods on the ground. Provide plastic coated metal chairs, runners, bolsters, spacers, hangers, and rebar supports as required on form work. Plastic coating shall meet the requirements stated in the Concrete Reinforcing Steel Institute "Manual of Standard Practice". Only the rebar support tips in contact with the forms need to be plastic coated.

3.4 MIXERS AND MIXING

A. Concrete shall be uniform and thoroughly mixed when delivered to the site. Variations in slump of more than 1 inch within a batch will be considered evidence of inadequate mixing and shall be corrected by increasing mixing time or other means.

B. For stationary mixers, the mixing time after all cement and aggregates are in the mixer drum shall be not less than 1-1/2 minutes. When concrete is mixed in a truck mixer, the number of revolutions of the drum or blades at mixing speed shall be not less than 70 nor more than 100.

C. Unless otherwise specified, volumetric batching and continuous mixing at the construction site will be permitted. The batching and mixing equipment shall conform to the requirements of ASTM Specification C 685 and shall be demonstrated prior to placement of concrete, by tests with the job mix, to produce concrete meeting the specified proportioning and uniformity requirements. Concrete made by this method shall be produced, inspected, and certified in conformance with Sections 6, 7, 8, 13, and 14 of ASTM Specification C 685.

D. No mixing water in excess of the amount called for by the job mix shall be added to the concrete during mixing or hauling or after arrival at the delivery point.

3.5 CONVEYING

A. Concrete shall be delivered to the site and discharged into the forms within 1-1/2 hours after the introduction of cement to the aggregates. In hot weather or under conditions contributing to quick stiffening of the concrete, the time between the introduction of the cement to the aggregates and discharge shall not exceed 45 minutes.

B. The Purchaser may allow a longer time, provided the set time of the concrete is increased a corresponding amount by the addition of an approved set-retarding admixture. In any case, concrete shall be conveyed from the mixer to the forms as

rapidly as predictable by methods that will prevent segregation of the aggregates or loss of mortar.

3.6 PLACING

A. Concrete shall not be placed until the subgrade, forms and steel reinforcement have been inspected and approved. No concrete shall be placed except in the presence of the Purchaser. The Contractor shall give reasonable notice to the Purchaser each time he intends to place concrete. Such notice shall be far enough in advance to give the Purchaser adequate time to inspect the subgrade, forms, steel reinforcement and other preparations for compliance with the specifications.

B. The concrete shall be deposited as closely as possible to its final position in the forms and shall be worked into the corners and angles of the forms and all around the reinforcement and embedded items in a manner to prevent segregation of aggregates or excessive laitance. Formed concrete shall be placed in horizontal layers not more than 20 inches thick. Concrete shall not be dropped more than five feet vertically unless suitable equipment is used to prevent segregation. Hoppers and chutes, pipes or "elephant trunks" shall be used as necessary to prevent segregation and the splashing of mortar on the forms and reinforcing steel above the layer being placed.

C. Immediately after the concrete is placed in the forms, it shall be consolidated by spading, hand tamping, or vibration as necessary to insure smooth surfaces and dense concrete. Each layer shall be consolidated to insure monolithic bond with the preceding layer. If the surface of a layer of concrete in place sets to the degree that it will not flow and merge with the succeeding layer when spaded or vibrated, the Contractor shall discontinue placing concrete and shall make a construction joint according to the procedure specified in Subpart 3.8, Construction Joints.

D. If placing is discontinued when an incomplete horizontal layer is in place, the unfinished end of the layer shall be formed by a vertical bulkhead.

3.7 CONSTRUCTION JOINT

A. Construction Joints shall be made at the locations shown on the drawings. If construction joints are needed which are not shown on the drawings, they shall be placed in locations approved by the Purchaser.

B. Where a featheredge would be produced at a construction joint, as in the top surface of a sloping wall, an insert form shall be used so that the resulting edge thickness on either side of the joint is not less than 6 inches.

C. In walls, as each lift is completed, the top surfaces shall be immediately and carefully protected from any condition that might adversely affect the hardening of the concrete.

D. Steel tying and form construction adjacent to concrete in place shall not be started until the concrete has cured at least 12 hours. Before new concrete is deposited on or against concrete that has hardened, the forms shall be retightened. New concrete shall not be placed until the hardened concrete has cured at least 12 hours.

3.8 REMOVAL OF FORMS

A. Forms shall not be removed without the approval of the Purchaser.

B. Forms shall be removed in such a way as to prevent damage to the concrete. Supports shall be removed in a manner that will permit the concrete to take the stresses due to its own weight uniformly and gradually.

3.9 FINISHING FORMED SURFACES

A. Immediately after the removal of forms:

1. All fins and irregular projections shall be removed from exposed surfaces.

2. The holes produced on all surfaces by the removal of the form ties, cone-bolts, and she-bolts shall be cleaned, wetted and filled with a dry-pack mortar consisting of one part Portland cement, three parts sand that will pass a No. 16 sieve, and just sufficient water to produce a consistency such that the filling is at the point of becoming rubbery when the material is solidly packed.

3.10 FINISHING UNFORMED SURFACES

A. All exposed surfaces of the concrete shall be accurately screeded to grade and then float finished, unless specified otherwise.

B. Excessive floating or troweling of surfaces while the concrete is soft will not be permitted.

C. The addition of dry cement or water to the surface of the screeded concrete to expedite finishing will not be allowed.

D. Joints and edges on unformed surfaces that will be exposed to view shall be chamfered or finished with molding tools.

3.11 CURING

A. Concrete shall be prevented from drying for a curing period of at least 7 days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period, or until curing compound is applied as specified below. Moisture shall be maintained by sprinkling, flooding, or fog spraying or by covering with continuously moistened canvas, cloth mats, straw, sand or other approved material.

B. Wood forms left in place during the curing period shall be kept continuously wet. Formed surfaces shall be thoroughly wetted immediately after forms are removed and shall be kept wet until patching and repairs are completed. Water or covering shall be applied in such a way that the concrete surface is not eroded or otherwise damaged.

C. Concrete, except at construction joints, may be coated with approved curing compound in lieu of continued application of moisture, except as otherwise specified. The compound shall be sprayed on the moist concrete surfaces as soon as free water has disappeared, but shall not be applied to any surface until patching, repairs and finishing of that surface are completed. The compound shall be applied at a uniform rate of not less than one gallon per 150 square feet of surface and shall form a continuous adherent membrane over the entire surface. Curing compound shall be thoroughly mixed before applying and continuously agitated during application. Curing compound shall not be applied to surfaces requiring bond to subsequently placed concrete, such as construction joints, shear plates, reinforcing steel and other embedded items. If the membrane is damaged during the curing period, the damaged area shall be resprayed at the rate of application specified above. Surfaces covered by the membrane shall not be trafficked unless protected from wear.

3.12 REMOVAL AND REPLACEMENT OR REPAIR

A. When concrete is honeycombed, damaged or otherwise defective, the Contractor shall remove and replace the structure or structural member containing the defective concrete or, where feasible, correct or repair the defective parts. The Purchaser will determine the required extent of removal, replacement, or repair.

B. Prior to starting repair work the Contractor shall obtain the Purchaser's approval of his plan for affecting the repair. The Contractor shall perform all repair work in the presence of the Purchaser.

3.13 CONCRETING IN COLD WEATHER

A. Concrete shall not be mixed nor placed when the daily minimum atmospheric temperature is less than 40 degrees Fahrenheit unless facilities are provided to prevent the concrete from freezing.

B. The use of accelerators or antifreeze compounds will not be allowed.

3.14 CONCRETING IN HOT WEATHER

A. The Contractor shall apply effective means to maintain the temperature of the concrete below 90 degrees Fahrenheit during mixing, conveying and placing.

END OF SECTION

SECTION 15105

HIGH DENSITY POLYETHLYLENE (HDPE) PIPE AND FITTINGS

PART 1 GENERAL

1.1 SCOPE

A. The work shall consist of furnishing and installing HDPE pipe and necessary fittings for siphon spillway as shown on the Drawings.

1.2 RELATED SECTIONS

A. Section 02201, Earthfill

B. Section 02222, Excavation

C. Section 02654, Siphon Spillways

1.3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

PART 2 PRODUCTS

2.1 MATERIALS

A. Pipe and Fittings: The pipe supplied under this specification shall be high performance, high molecular weight, high density polyethylene pipe equal to Driscopipe 1000 as manufactured by Phillips Driscopipe, Inc., Dallas, Texas. Pipe supplied under this specification shall have a nominal DIPS (Ductile Iron Pipe Size) OD unless otherwise specified. The SDR (Standard Dimension Ratio) of the pipe supplied shall be as specified in the Drawings. The interior walls of the pipe shall be smooth.

PART 3 EXECUTION

3.1 HANDLING AND STORAGE

A. Handling of Pipe: Pipe shall be stored on clean, level ground to prevent undue scratching or gouging of the pipe. If the pipe must be stacked for storage, such stacking should be done in accordance with the pipe manufacturer's recommendations. The handling of the pipe should be done in such a manner that it is not damaged by dragging over sharp objects or cut by chokers or lifting equipment. Unless the pipe is specially formulated for exposure to ultraviolet radiation, it shall be covered with an opaque material when in outside storage.

3.2 LAYING AND BEDDING

A. Handling of Pipe: Pipe shall be laid to the line and grade shown on the Drawings. Pipe shall be installed in accordance with ASTM D-2321 procedures and guidelines.

1. The pipe shall be firmly and uniformly bedded in a shaped bedding groove that closely conforms to the bottom of the pipe for a width of at least 60 percent of the pipe width (10 percent of the overall height). Blocking or wedges shall not be used to bring the pipe to grade.

2. The pipe shall be loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding. The earth backfill shall be carefully placed and compacted to form a continuous uniform support around the pipe. Pipe shall be backfilled to a minimum cover of one foot on the same day installed. The backfill shall be conformed to the embankment soil specification and meet the same compaction requirements.

3. Repair of Damaged Sections: Segments of pipe having cuts of gouges in excess of 10 percent of the wall thickness of the pipe should be cut out and removed. The undamaged portions of the pipe shall be rejoined using the butt fusion joining method.

4. Pipe Joining: Sections of polyethylene pipe should be joined into continuous lengths on the job site above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements, alignment, and fusion pressures.

5. Handling of Fused Pipe: Fused segments of pipe shall be handled so as to avoid damage to the pipe. When lifting fused sections of pipe, chains or cable type chokers shall be prohibited. Nylon slings are required. Spreader bars shall be used when lifting long fused sections. Care shall be exercised to avoid cutting or gouging the pipe.

END OF SECTION

SECTION 15800

INSTRUMENTATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Furnishing and installing devices for measuring pore water pressures within the embankment dam and foundation.

B. Furnishing and installing permanent benchmarks as shown on the Drawings.

1.2 RELATED SECTIONS

A. Section 02100, Control of Water

B. Section 02201, Earthfill

C. Section 02222, Excavation

1.3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

1.4 REFERENCES

A. ASTM C-33 – Aggregate

B. American Colloid Company – Bentonite

C. Slope Indicator Company – Water Level Indicator, Bentonite Pellets

1.5 QUALITY ASSURANCE

A. The Purchaser will test the completed piezometers upon notification from the Contractor that the system is ready for test. If inspection or tests show defects, such defective work or material shall be replaced and inspection and tests repeated.

PART 2 PRODUCTS

2.1 GENERAL

A. The use of the manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired only.

B. Furnish Miscellaneous Items.

2.2 MATERIALS

A. Piezometers. The piezometers shall be the standpipe as shown on the Drawings.

B. Water Level Indicator. The water level indicator shall be similar to the Model 51690012 Water Level Indicator as manufactured by Durham Geo-Enterprises, Stone Mountain, Georgia, for approved equal.

C. Bentonite Pellets. Bentonite pellets shall be similar to Baroid Bentonite Pellets as manufactured by Baroid Industrial Drilling Products, Houston, Texas, or approved equal.

D. Granular Bentonite. Granular bentonite shall be high swelling bentonite similar to grade No. 55, Volclay, manufactured by American Colloid Company, Skokie, Illinois, or an approved equal.

E. Sand. Sand shall conform to the requirements of ASTM Specification C-144, Aggregate for Masonry Mortar or ASTM Specification C-33, fine aggregate.

F. Cement-Bentonite Grout. Grout to be used in the decommissioning of existing piezometers shall be a Portland cement-bentonite grout with a grout mix as follows: one sack of Class A Portland Cement (94-lb sack), two pounds of dry sodium bentonite powder, and 6.5 to 7.5 gallons of potable water.

PART 3 EXECUTION

3.1 INSTALLATION

A. The installation of the piezometers shall be as shown on the Drawings. The exact locations for their installation will be selected by the Purchaser.

B. Acceptance of the piezometers installations as being complete will not relieve the Contractor of the responsibility of protecting the installation from damage due to his construction operations. Any damage as a result of the Contractor's operations shall be repaired by the Contractor at the Contractor's expense.

• END OF SECTION •

CONSTRUCTION SPECIFICATIONS

FOR

Plant Yates
Service Water Pond Dam Spillway, Bypass Channel and Bypass Spillway

Schnabel Reference No. 17C17013.00
October 27, 2020

Prepared for: Southern Company

Schnabel ENGINEERING

CONSTRUCTION SPECIFICATIONS

For

Plant Yates
Service Water Pond Dam Spillway, Bypass Channel and Bypass Spillway
Coweta County, Georgia

October 27, 2020
Schnabel Reference No. 17C17013.00

Owner

Southern Company

Engineer

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6445 Shiloh Road
Suite A
Alpharetta, Georgia 30005

TABLE OF CONTENTS
TECHNICAL SPECIFICATIONS

SECTION 01051

LAYOUT OF WORK AND QUANTITY SURVEYS

PART 1 GENERAL

1.1 SCOPE

A. This specification section covers the procedures and accuracy requirements for survey services for layout of work and field measurement of work quantities to be determined by surveys.

1.2 REQUIREMENTS INCLUDE

A. The Contractor shall perform all layout surveys required for the control and completion of the work and all necessary surveys to compute quantities of work performed.

B. The Purchaser has established primary control to be used by the Contractor for establishing lines and grades required for the work. Primary control consists of one benchmark in the vicinity of the work. Before beginning work, the Contractor shall check and verify control point established by the Purchaser and shall advise the Purchaser in writing that the point is acceptable or, if it is not acceptable, the reasons therefore. Purchaser will provide Contractor electronic files following submittal of a release form to the Purchaser.

C. The Contractor shall preserve and maintain primary control point until otherwise authorized. Primary control points damaged or destroyed by the Contractor prior to authorization may be reestablished by the Purchaser, and the expense of reestablishment will be deducted from amounts due, or to become due, the Contractor.

D. The Contractor shall provide experienced construction surveyors, and survey work shall be under the supervision and direction of a Land Surveyor who is registered in the State of Georgia and has a minimum of 2 years responsible charge of construction similar in nature to that required by this contract. The Contractor shall maintain sufficient qualified personnel to perform required surveying work. All survey work performed by the Contractor shall be subject to field and office review by the Purchaser.

1.3 SUBMITTALS

A. Submittals shall be in accordance with this paragraph.

B. At least 15 days prior to beginning surveying work, the Contractor shall submit, for review, a complete plan for the surveying required to lay out the work, including methods and timetables for establishing lines and grades.

C. At least 15 days prior to beginning surveying work, the Contractor shall submit, for review, a resume of qualifying experience for the registered Land Surveyor who will be responsible for the supervision and direction of Contractor's survey work. At least 15 days prior to changing such responsible individual, a qualifying experience resume for the new individual shall be submitted for approval.

D. At least 10 days prior to beginning surveying work, the Contractor shall submit, for review and resolution as required, results of the Contractor's check on the accuracy of Purchaser-established primary control.

E. Within 2 days of completing and producing notes for a survey or portion of survey, the Contractor shall submit to the Purchaser, for review and filing, a copy of such notes. Within 2 days of completing a field survey book, the Contractor shall submit to the Purchaser, for review and filing, a copy of the original field survey book.

F. Accompanying progress reimbursement requests, the Contractor shall submit, for review, a copy of applicable quantity survey notes and computations and an itemized statement for work performed or placed during the progress period measured on the basis of surveying.

G. If requested by the Purchaser, the Contractor shall submit, for review and filing, a copy of the workday's survey notes at the conclusion of that workday.

H. All surveys submitted to the Purchaser shall be provided in both hard copy and electronic format. The electronic format surveys are to be in such a format that is compatible with AutoCAD 2010 or newer. Contour data shall be provided in polyline format with elevations assigned to each contour and point files shall be included in PNEZD, comma delimited format. All files shall be referenced to the Georgia NAVD 88 coordinate system.

1.4 LAYOUT OF WORK

A. From Purchaser-established primary control point, the Contractor shall establish all lines and grades necessary to control the work, and shall be responsible for all measurements that may be required for execution of the work to the tolerances prescribed in these Specifications or on the Drawings.

B. The Contractor shall establish, place, and replace as required, such additional stakes, markers, and other controls as may be necessary for control, intermediate checks, and guidance of construction operations.

C. Prior to the initiation of any earthwork operations, the Contractor shall provide to the Purchaser a field-run topographic survey with 2-foot contour intervals within the limits of disturbance at the site.

1.5 QUANTITY SURVEYS

A. The Contractor shall perform all original ground surveys as required to depict existing conditions prior to construction and determine final quantities of work for reimbursement. These ground surveys shall be performed after the areas are cleared and grubbed. The Contractor shall perform such surveys and computations as are necessary to determine quantities of work performed or placed during each progress reimbursement period, and shall perform all surveys necessary for the Purchaser to determine final quantities of work in place.

B. The Contractor shall notify the Purchaser at least 24 hours before performing a survey and, unless specifically waived in writing, surveys shall be performed in the presence of an authorized representative of the Purchaser.

1.6 CONTRACTOR SURVEYS

A. Surveys required:

1. Alignment staking. – Each 50 feet on tangent; each 25 feet on curves.

2. Slope staking. – Each 50 feet on tangent; each 25 feet on curves; restake every 10 feet in elevation.

3. Periodic benchmarks every 20 vertical feet shall be established outside footprint of dam along the baseline.

4. Structures – Stake out structures; check prior to and during construction.

5. Cross section – Original, final, and intermediate as required, for structure sites and other locations as necessary for quantity surveys.

6. “Record” – As required for structures and other features of the work.

1.7 RECORDS

A. Survey data shall be recorded in accordance with recognized professional surveying standards. Original field notes, computations, and other surveying data shall be recorded in standard survey field books. Notes or data not in accordance with standard formats will be rejected. Illegible notes or data, or erasures on any page of a field book will be considered sufficient cause for rejection of part, or all, of the field book. Therefore, rejection of part, or all, of field book may necessitate resurveying. Corrections by ruling or lining out errors will be satisfactory.

1.8 DEGREE OF ACCURACY

A. Degree of accuracy shall be of an order high enough to satisfy tolerances specified for the work and the following:

1. Structure and pipe points shall be set within 0.05 foot, except where installation or operation considerations require tighter tolerances.

2. Cross section points shall be located within 0.1 foot, horizontally and vertically.

3. Vertical elevation surveys shall set within 0.1 foot.

1.9 RELATED SECTIONS

A. NOT USED

PART 2 PRODUCTS

2.1 EQUIPMENT AND MATERIALS

A. The Contractor shall furnish all equipment and materials including instruments, stakes, spikes, steel pins, flagging, templates, platforms, tools, and other accessories as may be required in laying out any part of the work from the primary control points established by the Purchaser and in performing quantity surveys. Instruments shall be accurate and shall be subject to inspection, and any defective instruments, as determined by the Purchaser, shall be promptly replaced, repaired, or adjusted as required.

PART 3 EXECUTION

A. Not Used.

PART 4 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

• END OF SECTION •

SECTION 01100

CONSTRUCTION SEQUENCE

PART 1 GENERAL

1.1 SCOPE

A. Contractor may propose an alternate construction sequence that may better suit his means and methods. Any modifications to the sequence listed below shall be submitted to the Purchaser for approval. The Contractor shall submit his proposed construction sequence within 14 days after Notice to Proceed.

1.2 RELATED SECTIONS

A. Section 02111: Clearing and Grubbing

B. Section 02100: Control of Water

C. Section 02201: Earthfill

D. Section 02202: Select Fill

E. Section 02209: Geotextile

F. Section 02222: Excavation

G. Section 02275: Riprap

H. Section 03300: Cast-in-Place Concrete

I. Section 15800: Instrumentation

1.3 SEQUENCE OR WORK

A. General: The sequence of work is as follows:

1. Mobilization to site and install necessary erosion and sediment control measures.
2. Install temporary settlement instrumentation.
3. Clear, grub, and strip the areas designated.
4. Install/construct control of water measures.
5. Excavate for the proposed diversion channels.
6. Construction of reinforced concrete diversion channel outlet.
7. Excavate embankment dam soils for the proposed labyrinth spillway construction.
8. Construction of reinforced concrete labyrinth spillway.
9. Install permanent instrumentation.

10. Place riprap for embankment, slope and channel protection.

11. Maintain erosion control and control of water measures throughout construction.

12. Establish permanent vegetation, remove erosion control and control of water measures.

13. Demobilize from site.

1.4 WATER CONTROL

A. Contractor is responsible for controlling surface runoff and groundwater controls necessary for the completion of the work.

PART 2 EXECUTION

A. Not Used.

PART 3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

• END OF SECTION •

SECTION 02100

CONTROL OF WATER

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of the Control of Surface Water and Groundwater as needed to perform the required construction in accordance with the Specifications. It shall include:

1. Building and maintaining groundwater dewatering systems, all necessary temporary impounding works, cofferdams, check dams, channels, ditches, diversions and flumes.
2. Furnishing, installing and operating all necessary pumps, piping and other facilities and equipment.
3. Preparation and submission of a Control of Water Plan.
4. Removing all such temporary works and equipment after they have served their purposes.

1.2 RELATED SECTIONS

A. Section 02201, Earthfill.

1.3 MEASUREMENT AND REIMBURSEMENT

A. NOT USED

1.4 REFERENCES

A. The Contractor shall review available data regarding surface water and groundwater flow and geotechnical conditions at the site before submitting a Control of Water Plan to the Purchaser. Data includes, but is not limited to, analyses and studies performed as part of this project.

B. The Contractor is warned that surface water, groundwater, runoff and other site conditions may be highly variable and difficult to accurately predict. Analyses and evaluations undertaken in connection with the design of improvements were performed to support the project design. These analyses and evaluations may or may not provide satisfactory information to the Contractor for developing a Control of Water Plan. The Contractor's is solely responsible for evaluating the applicability of the available information and to obtain or develop additional information as a basis for development of the Contractor's Control of Water Plan.

1.5 SUBMITTALS

A. Control of Water Plan: The Contractor shall furnish to the Purchaser in writing, his complete plan for controlling surface and groundwater, to include maintenance of his proposed diversion and protective works, for review and comment, before beginning the work. The Plan shall include proposed sequencing of control of water measures throughout each phase of construction including the removal of cofferdams. Review of this plan by the Purchaser will not relieve the Contractor of his responsibility for completing the work as specified.

PART 2 PRODUCTS

A. Not Used.

PART 3 EXECUTION

3.1 DIVERTING CONCENTRATED FLOW AND OTHER SURFACE WATER

A. The control and diversion of surface water is the sole responsibility of the Contractor.

B. The steepest temporary excavation slope shall be 2H:1V. If a steeper excavation slope is proposed, the Contractor shall submit proposed temporary dewatering measures and supporting slope stability calculations as part of the Control of Water Plan.

C. The Contractor shall build, maintain, and operate cofferdams, channels, flumes, sumps, and other diversion and protective works within the project's defined limits of disturbance needed to divert concentrated flow and other surface water into basins and traps while construction is in progress. The Contractor must satisfy himself that his cofferdam and diversion system is sufficient to reasonably protect his work and the safety of the dam.

D. The Contractor shall furnish, install and operate all necessary pumps, well points, piping and other facilities and equipment needed to divert concentrated flow and other surface water through the construction site while construction is in progress. All discharges from water control equipment shall be directed into basins and traps.

E. After the diversion works have served their purpose, the Contractor shall remove, level, or grade such works to present a sightly appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works. The removal of the diversion facilities shall be subject to the approval of the Purchaser

3.2 DEWATERING THE CONSTRUCTION SITE

A. The foundation of the structures to be constructed under this Contract shall be dewatered and kept free of standing or running water or muddy conditions as needed for proper execution of the construction work. Dewatering shall be performed to maintain the groundwater a minimum of 3 feet below the working subgrade. Temporary gravel filled trenches will be permitted to assist in dewater activities. Dewatering may be performed to maintain the groundwater at a greater depth below the working subgrade at the Contractor's discretion. Dewatering methods that cause a loss of fines from foundation areas will not be permitted.

B. The Contractor shall build, maintain, operate cofferdams, channels, flumes, sumps; wellpoints, and other diversion and protective works needed to divert or remove water from foundation areas while construction is in progress.

C. Water pumped or drained from excavations, drains or water courses encountered in the work, shall be disposed of in accordance with an approved Water Control Plan, without injury to adjacent property, the work under construction, or to pavements, roads, and water courses.

D. No water shall be discharged to sanitary sewers. Sanitary sewage shall be pumped to sanitary sewers or shall be disposed of by a method approved by the Purchaser.

E. After the construction-dewatering site works have served their purpose, the Contractor shall remove, level, or grade such works to present a slightly appearance and to prevent any obstruction to the flow of water or any other interference with the operation of or access to the permanent works. The termination of the dewatering of the construction site works shall be subject to the approval of the Purchaser.

• END OF SECTION •

SECTION 02111

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Areas to be cleared and grubbed are the areas adjacent to the dam to the limits shown on the Drawings or as directed by the Purchaser.

1.2 RELATED SECTIONS

A. Section 02222, Excavation

1.3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

PART 2 PRODUCTS

A. Not Used.

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

A. Clearing shall consist of the removal and disposal of all trees, logs, brush, snags, bushes, vines, shrubs, decayed stumps, leaves, roots, grasses, weeds, fences, posts, rubbish, and other perishable and objectionable materials. Grubbing shall include the removal and disposal of all stumps, roots, and root clusters which shall be grubbed out to a depth of at least one (1) foot below the ground surface at embankment sites and other designated areas. In addition, all stumps, logs, and roots greater than 2 inches shall be removed regardless of depth below subgrade.

B. The limits of areas to be cleared and grubbed shall be marked by the Contractor using stakes, flags, tree markings or other methods. Trees to be left in place and uninjured will be designated by special markings positioned on the trunks at about 6 feet above the ground surface.

3.2 PROTECTION OF EXISTING VEGETATION

A. Trees and other woody vegetation designated to remain undisturbed shall be protected from damage throughout the entire construction period. Any damage resulting from the contractor's operations or neglect shall be repaired by the Contractor.

B. Earthfill, stockpiling of materials, vehicular parking, and excessive foot or vehicular traffic shall not be allowed within the dripline of vegetation designated to remain in place. Vegetation damaged by any of these or similar actions shall be replaced with viable vegetation of the same species.

C. Any cuts, skins, scrapes, or bruises to the bark of the vegetation shall be carefully trimmed and local nursery accepted procedures used to seal damaged bark.

D. Any limbs or branches 0.5-inch or large in diameter that are broken, severed, or otherwise seriously damaged during construction shall be cut off at the base of the damaged limb or branch flush with the adjacent limb or tree trunk.

3.3 DISPOSAL

A. The Contractor shall be responsible for compliance with all Federal, State and local laws and regulations relative to disposal by removal, and for obtaining all necessary permits and fees for removal or disposal.

B. Timber suitable for harvesting shall be the property of the Contractor and removed from the site. Other materials cleared and grubbed shall be mulched or disposed off-site in accordance with all state and local regulations and laws. Costs of off-site disposal, including, permits and fees, shall be incidental to this item of work.

C. Precautions shall be taken to prevent debris from clearing and grubbing operations from entering any watercourse, including high flows.

D. Material and other material which cannot be disposed of by mulching shall be hauled off-site to an approved sold waste facility.

• END OF SECTION •

SECTION 02201

EARTHFILL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of the placement of earthfill as shown on the Drawings and specified herein.

1.2 RELATED SECTIONS

A. Section 02100, Control of Water.

B. Section 02111, Clearing and Grubbing

C. Section 02222, Excavation.

D. Section 02936, Permanent Turf Establishment

1.3 TOLERANCES

A. Earthfill shall be place to the lines, grades, and elevations as shown on the Drawing. Tolerances shall be as follows:

Elevations: minus 0.0 feet to plus 0.2 feet.
Grades: No steeper than shown on Drawings and no more than 1 percent flatter.

1.4 TESTING

A. Density tests of fill will be performed by the Contractor's Approved Third Party Independent Testing Agency. Tests shall be performed in accordance with ASTM D 2937 or ASTM D6938.

B. Moisture contents of earthfill at the time of compaction shall be measured in accordance with ASTM D2937

C. During the course of the work the Purchaser will request such tests as are required to identify materials, measure compaction characteristics, measure moisture content, and measure density of fill in place. These tests performed by the Contractor will be used to verify that the fills conform to the requirements of the Specifications. Such tests are not intended to provide the Contractor with the information required by him for the proper execution of the work and their performance shall not relieve the Contractor of the necessity to perform tests for that purpose.

D. The Contractor will perform the following tests at the frequencies listed below:

Density: Twice per lift, or every 500 cubic yards, whichever is most frequent.
Moisture content: Every time a density test is performed.

PART 2 PRODUCTS

2.1 MATERIALS

A. Earthfill materials shall be obtained from required on-site excavations or approved off-site sources. The selection, blending, routing and disposition of materials in the various fills shall be subject to review by the Purchaser.

B. Fill materials shall contain no sod, brush, roots or other perishable materials. Fill shall not contain more than one percent by weight of organics.

C. Structural earthfill shall be classified as SM, SC, CL, CH, MH, or ML according to the Unified Soil Classification System (ASTM D2487). Fill soils shall not have a liquid limit greater than 60 or a plasticity index greater than 40. The maximum particle size shall not exceed four inches.

D. Following excavation of the core trench, as detailed on the drawings, all loose soils or rock fragments shall be removed prior to placement of fill materials. Bottom and sides of the trench shall be firm and meet the dewatering requirements of the project.

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION

A. Foundations for earthfill shall be stripped to remove vegetation and other unsuitable materials or shall be excavated as specified.

B. Earth foundation surfaces shall be graded to remove surface irregularities, proofrolled (see Part 3.1.G), and shall be scarified parallel to the axis of the fill to a minimum depth of two inches. The surface materials of the foundation shall be compacted and bonded with the first layer of earthfill as specified for subsequent layers of earthfill.

C. Earth abutment surfaces shall be free of loose, uncompacted earth in excess of two inches in depth normal to the slope and shall be at such a moisture content that the earthfill can be compacted against them to effect a good bond between the fill and the abutments.

D. Rock foundation and abutment surfaces shall be cleared of all loose materials by hand or other effective means and shall be free of standing water when fill is placed upon them.

E. Foundation and abutment surfaces shall not be steeper than one horizontal to one vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earthfill conforming to the Specifications for Earthfill to be placed upon the foundation.

F. In areas within the floodplain all foundation and embankment surfaces shall be closely examined immediately prior to the placement of all earthfills and backfills. All materials that exhibit drying cracks, slaking, or other evidences of being unstable or unsuitable, shall be removed or reworked by scarification, wetting, and compaction to the affected depths prior to the placement of fill.

G. Proofrolling involves passing a fully-loaded loaded dumptruck over a subgrade or lift of structural earth fill to observe its reaction. Excessive deflection of the subsurface resulting from the proofroll indicates soft and/or very wet soils. Minor deflections may be considered acceptable as determined by the Engineer.

3.2 PLACEMENT

A. Fill shall not be placed until the required excavation and foundation preparation has been completed and the foundation has been inspected by the Purchaser. Fill shall not be placed upon a frozen surface, nor shall snow, ice or frozen material be incorporated in the fill.

B. Fill shall be placed in horizontal layers. The thickness of each layer of structural earthfill before compaction shall be 8 inches, or 4 inches where hand operated compaction equipment is used. Hand compacted fill, including fill compacted by manually directed power tampers, and shall be placed in layers whose thickness before compaction does not exceed the maximum thickness specified for layers of fill compacted by manually directed power tampers.

C. Fill adjacent to structures shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly. The height of the fill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure.

D. Gutters formed where earth surfaces intersect shall be shaped to form rounded rather than "V" type gutters.

3.3 CONTROL OF MOISTURE CONTENT

A. During placement and compaction of fill, the moisture content of materials being placed and that of the preceding layer shall be maintained between the range specified. The application of water to the fill materials shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the materials after placement of the fill, if necessary. Uniform moisture distribution shall be obtained by disking, blading or other approved methods prior to compaction of the layer. Material that is too wet when deposited on the fill shall either be removed or dried to the specified moisture content prior to compaction.

B. A heavy duty construction disk shall be on site while earth fill is being placed to provide the necessary disking for moisture control. The harrow shall be capable of disking material deeper than the thickness of uncompacted layers.

3.4 COMPACTION

A. Structural earthfill shall be placed with a moisture content between optimum and four percent above optimum and compacted to a minimum of 95 percent of maximum dry density as determined by the Standard Proctor Compaction Test ASTM D698.

B. Compaction of all earthfill not adjacent to structures shall be done with a sheepsfoot roller. In the event adequate compaction cannot be obtained utilizing a sheepsfoot roller due to the content of coarse aggregate within the proposed fill material, smooth drum vibratory rollers may be utilized after review and approval by the Engineer. Utilization of smooth drum vibratory rollers or other similar compaction methods will require scarification of the lift surface per Engineer's recommendation prior to placement of subsequent lift.

C. Fill adjacent to structures shall be compacted to a density equivalent to that of the surrounding fill by means of hand tamping, or manually directed power tampers or plate vibrators. Fill to be compacted by hand tamping, or manually directed power tampers or plate vibrators shall be spread in horizontal layers approximately four (4) inches in thickness before compaction. Heavy equipment shall not be operated within three feet of any structure. Vibrating rollers shall not be operated within five feet of any structure. Compaction by means of drop weights operating from a crane or hoist will not be permitted.

D. The passage of heavy equipment will not be allowed over any conduit until the backfill has been placed above the top surface of the conduit to a height equal to three feet.

E. Compaction of fill adjacent to structures shall not be started: (1) until the specified design strength has been attained for reinforced-concrete structures; and (2) until 48 hours have elapsed after concrete placement for other structures.

3.5 REMOVAL AND PLACEMENT OF DEFECTIVE FILL

A. Fill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the Specifications shall be reworked to meet the requirement or removed and replaced by acceptable fill at the Contractor's expense. The replacement fill and the foundation, abutment and fill surfaces upon which it is placed shall conform to all requirements of this Specification for foundation preparation, approval, placement, moisture control and compaction.

• END OF SECTION •

SECTION 02202

SELECT FILL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Select fill materials shall be used as either special backfill, filters, or drains, as shown on the Drawings or as directed by the Purchaser.

1.2 RELATED SECTIONS

A. Section 02222, Excavation.

B. Section 02275, Riprap.

1.3 MEASUREMENT AND PAYMENT

A. Not Used.

1.4 SUBMITTALS

A. The name and location of the source of material.

B. Samples and test reports of the material, including compaction curves (if applicable) for all materials to be used. Test reports for “Fine Drain Fill” and “Coarse Drain Fill” shall include, at a minimum, ten recent gradations performed by the manufacturer.

C. Submittals of Select Fill are due 10 days prior to delivery.

1.5 TESTING

A. During the course of the work the Purchaser will request such tests to be performed, as are required to identify materials, measure compaction characteristics, measure moisture contents, and measure density of fill in place. These tests performed by the Contractor will be used to verify that the fills conform to the requirements of the Specifications. Such tests are not intended to provide the Contractor with the information required by him for the proper execution of the work and their performance shall not relieve the Contractor of the necessity to perform tests for that purpose.

B. All testing, including field and laboratory services, shall be performed by the Contractor.

PART 2 PRODUCTS

2.1 MATERIALS

A. Select Fill material shall be obtained from off-site borrow areas. The selection, blending, routing and placement of material in the fill shall be subject to approval by the Purchaser.

B. Select Fill material shall contain no sod, brush, roots or other perishable materials.

C. Coarse Drain Fill shall meet all the requirements of the latest edition of Georgia Department of Transportation (GDOT) Specification for Aggregates and shall be in conformance with either of the following gradations:

1. GDOT Size No. 89 Stone

D. Fine Drain Fill shall meet all the requirements of the latest edition of GDOT Specification for aggregates and shall be in conformance with the following gradation:

1. ASTM C-33 Fine Aggregate

E. Fine Drain Fill shall be natural and not produced from crushing operations.

F. Select fill shall not be comprised of limestone material or other materials having solutioning or cementing properties.

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION

A. Foundations for Select Fill shall be stripped of vegetation and other unsuitable materials or shall be excavated as specified and approved by the Purchaser.

B. Foundation surfaces shall not be steeper than one horizontal to one vertical unless otherwise specified.

3.2 PLACEMENT

A. Select Fill shall not be placed until the required excavation and foundation preparations have been completed and the foundation surfaces have been inspected and approved by the Purchaser. Select Fill shall not be placed upon a frozen surface, nor shall snow, ice or frozen material be incorporated in the fill.

B. Select Fill shall be placed in horizontal layers. The thickness of each layer after compaction shall not exceed nine inches for all Select Fill. Materials placed by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness before being compacted.

C. Select Fill adjacent to structures shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly.

D. The distribution of materials shall be essentially uniform, and the fill shall be free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material.

E. Select Fill shall be placed with sufficient care to prevent damage to filter fabric. Filter fabric that is damaged shall be repaired to the satisfaction of the Purchaser.

F. The materials shall be placed in a manner to avoid segregation of particle sizes and to ensure the continuity and integrity of all zones. No foreign materials shall be allowed to become intermixed with or otherwise contaminate the Select Fill materials. Exposed areas of Select Fill materials placed against existing foundation materials shall be protected from contamination caused by erosion of the existing material.

G. Traffic shall not be allowed to cross over Select Fill material at random. Equipment crossovers shall be maintained, and the number and location of such crossovers shall be established and approved prior to the beginning of material placement. Each crossover shall

be cleaned of all contaminating materials and shall be inspected by the Purchaser before additional Select Fill material is placed.

H. Any Select Fill which may become contaminated with foreign materials shall be removed and replaced, at the Contractor's expense.

I. The upper surface of drain fill constructed concurrently with adjacent zones of earthfill shall be maintained at a minimum elevation of 1 foot above the upper surface of adjacent earthfill.

J. Drain fill over and/or around pipe or drain pipe shall be placed in such as manner as to avoid any displacement in line or grade of the pipe.

K. Placement of drain fill adjacent to concrete structures shall not be commenced until the following item intervals have elapsed following placement of the concrete:

Structure type	**Time interval (days)**
Vertical or near-vertical wall with earth loading on one side only (retaining walls and counterforts)	14
Walls backfilled on both sides simultaneously	7
Conduits and galleries, coast-in-place (with inside forms in place) (inside forms removed)	 7 14
Conduits, precast, cradled	2
Conduits, precast, bedded	1
Cantilever outlet bents backfilled on both sides simultaneously	3

3.3 COMPACTION

A. Fine Drain Fill shall be compacted to between 60 and 80 percent of relative density as determined by ASTM D-4253 and D-4254.

B. No compaction will be required for Coarse Drain Fill.

• END OF SECTION •

SECTION 02209

GEOTEXTILE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of furnishing and placing Geotextile at the locations and to the limits shown on the Drawings or as directed by the Purchaser.

1.2 RELATED SECTIONS

A. Section 02275, Riprap

1.3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

1.4 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

A. Materials delivered to the site shall be inspected for damage, unloaded and stored with a minimum of handling. Materials shall not be stored directly on the ground. During shipment and storage, Geotextile shall be wrapped in burlap or similar heavy-duty protective covering. The storage area shall be such that the fabric is protected from mud, soil, dust, and debris. Geotextile materials that are not to be installed immediately shall not be stored in direct sunlight.

B. Materials shall be handled in such a manner as to ensure delivery to the site in sound, undamaged condition.

1.5 SUBMITTALS

A. The name and test reports of the material.

PART 2 PRODUCTS

2.1 MATERIALS

A. The Geotextile shall be a nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester, formed into a stable network by needle punching. All fabrics shall be inert to commonly encountered chemicals and hydrocarbons, mildew and rot resistant, insect and rodent resistant, resistant to ultraviolet light and heat exposure, and conform to the physical strength requirements listed in Table 1.

B. The Geotextile shall provide an Equivalent Opening Size (EOS) no finer than the U.S. Standard Sieve No. 100 and no coarser than the U.S. Standard Sieve No. 50.

Table 1 - Physical Strength Requirements

Physical Properties	Test Procedure	Average Roll Minimum Value (Weakest Principal Direction)
Grab Tensile Strength	ASTM D4632	205 lbs.
Elongation at Failure	ASTM D4632	50%
Trapezoid Tear Strength	ASTM D4533	80 lbs.
Puncture Strength	ASTM D6241	500 lbs.

C. The seams of the fabric shall be sewn with thread of a material meeting the chemical requirements given above for synthetic yarn or shall be bonded by cementing or by heat. Seams shall be tested in accordance with method ASTM D4884, using 1-inch square jaws and 12 inches per minute constant rate of traverse. The strengths shall be not less than 90% of the required tensile strength (Table 1) of the unaged fabric in any principal direction. Unaged fabric is defined as fabric in the condition received from the manufacturer or distributor.

D. All brands of synthetic Geotextile and all seams to be used shall be accepted on the following basis. The Contractor shall furnish the Purchaser, in duplicate, a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the fabric. The mill certificate or affidavit shall attest that the fabric meets the chemical, physical and manufacturing requirements stated in this Specification.

E. Securing Pins: The pins shall be 3/16-inch by 18-inch long steel bars, pointed at one end and fabricated with a head to retain a steel washer having a minimum outside diameter of 1.5 inches. U-shape staples, 11 gage by 12-inches long and 1 to 1.5 inches wide, are also acceptable.

PART 3 EXECUTION

3.1 INSTALLATION

A. Geotextile shall be free from defects, rips, holes, deterioration or damage. The prepared foundation shall be relatively smooth, free from obstructions, depressions, debris, low density pockets and protruding rock. Beginning at the toe of the slope, the fabric shall be placed with the long dimension parallel to the slope and shall be laid smooth and free of tension, stress, folds, wrinkles or creases. The strips shall be placed to provide a minimum width of 12 inches of overlap for each joint, unless a larger overlap is recommended by the manufacturer.

B. Securing pins with washers shall be inserted through both strips of overlapped fabric at no greater than five foot intervals.

C. Additional pins, regardless of location, shall be installed, as necessary, to prevent any slippage of the Geotextile. The fabric shall be placed so that the upper strip of fabric will overlap the next lower strip. Each securing pin shall be pushed through the fabric until the washer bears against the fabric and secures it firmly to the foundation.

D. The fabric shall be protected at all times during construction from any damage or contamination by surface run-off. The work shall be scheduled so that the covering of the fabric with a layer of specified material is completed within 30 days after the fabric is placed. Fabric damaged

during installation or placement of backfill, or through failure to prevent contamination by surface run-off or backfill within the specified time limit herein, shall be removed and replaced at the Contractor's expense.

E. No material shall be dropped on to an uncovered, exposed, or bare geotextile from a height greater than two (2) feet.

• END OF SECTION •

SECTION 02222

EXCAVATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall include the excavation of earth, sediment, and rock materials at the locations and to the lines and grades shown on the Drawings, and the stockpiling and/or disposal of all materials as specified herein.

B. Common Excavation shall include all materials not classified as Rock Excavation.

C. Rock Excavation shall include all material to be excavated which requires: systematic barring and wedging for removal; boulders or loose rock of one cubic yard or more in volume; and material which cannot be loosened or broken down by equipment having a bucket breakout force of at least 50,000 lbs.

1.2 RELATED SECTIONS

A. Section 02201, Earthfill

B. Section 02111, Clearing and Grubbing

1.3 SUBMITTALS

A. The Contractor shall provide the following topographic maps. These maps shall have a contour interval no greater than two (2) feet. Contractor shall notify the Purchaser of any scheduled surveys that will be used for quantity calculations. Maps shall be produced by a land surveyor registered in the State of Georgia. No pay item excavation shall take place until the required survey is provided to the Purchaser and the survey is approved.

1. Surveyed topographic map and sections showing original ground surface for, spillways, bypass channel sections, and any of the areas that are shown to be excavated.

2. Surveyed topographic map and sections showing completed unclassified (i.e., to top of rock) excavation for areas of rock excavation

3. Surveyed topographic map and section showing rock excavation completed to the limit of rock excavation.

B. At least 21 calendar days prior to starting the first excavation of any area of the work, submit an Excavation Plan for all classifications of excavation. The Excavation Plan shall describe an orderly sequence for performing the required excavation. The Plan shall describe the proposed work sequence and schedule and include:

1. Plans for creating stockpiles for future backfill material

2. Plans and diagrams for handling excavation, fill, and disposal of spoil materials.

3. Descriptions of proposed excavating and hauling equipment to be used including make, model, and quantity of equipment units.

4. Description of any excavation for the Contractor's convenience. Excavation for the Contractor's convenience shall be defined in advance and approved by the Purchaser before excavation is undertaken by the Contractor.

5. Excavation support systems for excavations that are deeper than five feet.

1.4 PROTECTION AND SAFETY

A. Comply with all safety requirements of OSHA, state, and federal regulations. Where there is a conflict between the requirements of this section and the requirements of the publication Construction Safety Standards, the more stringent requirements shall govern.

B. All percussion-type drilling shall be performed with drilling apparatus equipped with water or chemical dust-control systems or other equipment means of controlling the dust. Pressure tanks used in the suppression equipment shall conform to ASME Boiler and Pressure Vessel Code, Section VII, for Unfired Pressure Vessels. Equipment and solutions used shall be suitable for operation in freezing weather. Dust-control devices are not required on jackhammers, provided the operators wear approved-type dust respirators when dust concentrations exceed safe hygienic limits.

C. Holes, shafts, and trenches shall be protected by safety fencing at the end of the work day.

PART 2 - EXECUTION

2.1 COMMON EXCAVATION

A. The tolerance for Common Excavation shall be plus or minus three-tenths (0.3) of a foot from the lines and grades shown on the Drawings or as directed by the Purchaser. Excavation beyond the approved lines and grades shall be backfilled as directed by the Purchaser with approved suitable material and compacted. This work shall be at the Contractor's expense and no reimbursement will be made for over excavation or backfill of over excavated areas.

B. Where excavation lines are marked as pay lines, the Contractor may cut a flatter slope, subject to approval by the Purchaser at no additional reimbursement for Excavation or Earthfill, if he believes that a flatter slope is more appropriate for his operations.

C. Common Excavation, which meets the requirements of Section 02201, Earthfill shall be stockpiled for such purposes. Material excavated from the site which is not suitable for use as Earthfill may be used by the Contractor for his own purposes, with the excess stockpiled in the area shown on the Drawings or in other areas approved by the Purchaser.

2.2 ROCK EXCAVATION

A. The tolerance for Rock Excavation shall be plus or minus three-tenths (0.3) of a foot from the lines and grades shown on the Drawings or as directed by the Purchaser. Blasting shall not be allowed. Excavation in rock outside the pay lines shall be backfilled with appropriate materials including concrete, depending on location, at the direction of the Purchaser. This work shall be at the Contractor's expense and no reimbursement will be made for over excavation or backfill concrete.

B. Rock Excavation materials shall be disposed of in spoil areas shown on the Drawings or in other areas approved by the Purchaser.

C. The equipment that meets the rated breakout force shall be equipped with rock teeth with less wear less than 25%. The equipment shall be positioned to excavate the material at a minimum of three different positions as approved by the Purchaser. The Contractor is expected to be aggressive in excavating this material before the Purchaser will classify the material as rock.

2.3 BORROW AREAS

A. All material required for the specified earthfills shall be obtained from onsite borrow areas identified and approved by the Purchaser. Suitable materials from these excavations shall be used as onsite earthfill and separated into its own stockpile. The excavated material shall be protected for re-use in a manner that will minimize contamination and moisture absorption, as approved by the Purchaser. Priority pollutants testing shall be performed on any off-site borrow materials at a frequency of one test every 5,000 cubic yards. The Contractor shall provide the Purchaser notice at least three weeks before hauling begins so that Purchaser can schedule a time for collecting soil samples for chemical analyses. No off-site borrow material may be brought onto the site until the Purchaser has reviewed the analytical results and approved the borrow source. Testing costs will be the responsibility of the Purchaser.

2.4 SHORING AND BRACING

A. Excavated surfaces too steep to be safe and stable, if unsupported, shall be supported as necessary to safeguard the work and workmen, to prevent sliding or settling of the adjacent ground, and to avoid damaging existing improvements. The width of the excavation shall be increased, if necessary, to provide space for sheeting, bracing, shoring and other supporting installations. The Contractor shall furnish, place and subsequently remove such supporting installations.

2.5 SPOIL AREAS

A. Spoil Areas shall be in locations approved by the Purchaser.

B. The final surface of the spoil areas shall have a uniform, smooth appearance, free from abrupt depressions. The surface shall be graded to drain, and covered with a minimum of two feet of earthfill. Spoil area shall be and seeded and mulched.

• END OF SECTION •

SECTION 02275

RIPRAP

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of furnishing and placing rock Riprap and bedding stone at the locations and to the dimensions shown on the Drawings.

1.2 RELATED SECTIONS

A. Section 02201, Earthfill.

B. Section 02209, Geotextile

C. Section 02222, Excavation.

1.3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

1.4 REFERENCES

A. The bulk specific gravity and absorption shall be determined by ASTM C-127. The test for soundness shall be performed according to the procedure for ledge rock in Federal Specification SS-R-406C, Method 203.01. The test for abrasion shall be in accordance with ASTM C-535, except as directed herein.

1.5 ALLOWABLE TOLERANCES

A. Except as provided below, the rock shall have the following properties:

1. Bulk specific gravity (saturated surface-dry basis) not less than 2.25.
2. Absorption not greater than 2 percent.
3. Soundness; weight loss in five cycles not greater than 10 percent when sodium sulfate is used and 15 percent when magnesium sulfate is used.
4. Abrasion; weight loss after 500 revolutions not greater than 50 percent (using Los Angeles Machine Grading B).

1.6 SUBMITTALS

A. Submit test data showing material meets requirements of this Specification.

PART 2 PRODUCTS

2.1 MATERIAL

A. Riprap and Bedding Stone shall be obtained from off-site quarries that meet the specified quality and grading requirements. Individual rock fragments shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering.

B. Riprap shall be comprised of angular fragments obtained by blasting. Riprap shall meet the following requirements.

1. Riprap shall meet all the requirements of the latest version of GDOT specifications and shall be graded in accordance with GDOT Type III Riprap and GDOT Type I Riprap.

C. Rock that fails to meet the requirements stated in Allowable Tolerances, may be accepted only if similar rock from the same source has been demonstrated to be sound after five years or more of service under conditions of weather, wetting and drying and erosive forces similar to those anticipated for the rock to be installed under this Specification.

D. Bedding Stone shall meet all the requirements of the latest version of GDOT specifications for coarse aggregate and shall be graded in accordance with GDOT No. 4 and GDOT No.57.

PART 3 EXECUTION

3.1 PLACEMENT

A. The subgrade surface on which the rock riprap, filter, bedding, or geotextile is to be placed shall be cut or filled and graded to the lines and grades shown on the Drawings. When fill to subgrade lines is required, it shall consist of approved material and shall conform to the requirements of the specified class of earthfill. Rock riprap, filter, bedding, or geotextile shall not be placed until the foundation preparation is completed and the subgrade surface has been inspected and approved by the Purchaser.

B. Riprap shall be placed and graded in a manner to ensure that the large rock fragments are uniformly distributed and that the smaller fragments fill the spaces between the large fragments in such a manner as will result in a compact, uniform layer. Hand placing will be required only to the extent necessary to produce the results specified above.

C. The Purchaser shall have entry to any quarries furnishing the rock under this Contract. The rock delivered to the project site shall be subject to testing by the Purchaser for conformance to these Specifications.

D. Riprap shall be placed in such a manner so as to not damage existing structures, foundations, or other items of Work or adjacent structures. The Contractor shall be responsible for all damages resulting from uncontrolled or otherwise improper placement of Riprap.

• END OF SECTION •

SECTION 02652

POLYVINYL CHLORIDE PIPE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of furnishing, fabricating, and installing solid wall and perforated PVC pipe, fittings and ductile iron extensions as shown on the Drawings.

1.2 RELATED SECTIONS

A. Section 02202, Select Fill

1.3 MEASUREMENT AND PAYMENT

A. Not Used

PART 2 PRODUCTS

2.1 MATERIALS

A. Pipe shall be pressure rated PVC pipe conforming to the requirements of A.W.W.A. Standard C900, Pressure Class 165, for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inches through 12 inches, for Water. The pipe shall be furnished with cast iron equivalent outside diameters.

B. Fittings shall be compatible with the type of pipe furnished and be of the all bell, rubber ring connecting type with gasket retainer grooves in the inner surfaces of the bells.

C. Couplings for plain end pipe shall be elastometric gasket couplings where the joint is in earth, sand, or gravel. Solvent cement couplings may be used at joints embedded in concrete.

D. Welded or fused pipe, fittings, couplings, and elbows will not be permitted.

E. Perforations, where specified, shall be circular holes, arranged in rows parallel to the axis of the pipe. Perforations shall be approximately 4 inches (102 mm) center-to-center along the rows. Rows shall be arranged in two equal groups in either side of the vertical center line of the pipe, and the total number of rows shall be as shown on the plans. The orientation of the rows shall be as shown on the plans. The spacing of rows between these limits shall be uniform. Holes may appear at the ends of short and random lengths.

F. No PVC drain pipe shall be exposed upon completion of the work, unless specifically shown on the Drawings. Only ductile iron drain pipes shall be exposed.

2.2 ANIMAL GUARDS

A. Animal guards shall be as manufactured by Agri-Drain, or equivalent and as approved by the Purchaser.

PART 3 EXECUTION

3.1 HANDLING AND STORAGE

A. The pipe shall be handled with care to prevent damage and shall not be thrown, dropped, or dragged. Special care shall be taken to avoid impact damage when the pipe must be handled at temperatures of 40°F or less. Pipe shall be stored on a relatively flat surface so that the barrels are evenly supported. Unless the pipe is specially formulated for exposure to ultraviolet radiation, it shall be covered with an opaque material when in outside storage.

3.2 LAYING AND BEDDING

A. Earth, Sand, or Gravel Bedding. The pipe shall be firmly and uniformly bedded in a shaped bedding groove that closely conforms to the bottom of the pipe for a width of at least 60 percent of the pipe width (10 percent of the overall pipe height). Bell holes of ample width and depth shall be excavated at each joint location so that the pipe is uniformly supported along its entire length. Blocking or wedges shall be used to bring the pipe to grade.

B. The pipe shall be loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding. Backfill shall be carefully placed and compacted to form a continuous uniform support around the pipe. Pipe shall be backfilled to a minimum cover of one foot on the same day installed.

C. Pipe Embedded in Concrete. Pipe embedded in concrete shall be securely tied to prevent movement of the pipe during concrete placement. Pipe may be tied to reinforcing steel provided a clear distance of 1 ½ inches is maintained between the pipe and the steel. Pipe, or portions thereof, to be embedded in concrete in the finished work shall be installed prior to placement of the concrete.

D. Pipe shall be laid to the line and grade shown on the Drawings. Perforated pipe shall be laid with the perforations down and oriented symmetrically about the vertical centerline. Perforations shall be clear of any obstructions when the pipe is laid.

E. Just before placement, each pipe section shall be inspected to ensure that all foreign material is removed from inside the pipe. The pipe ends and the couplings shall be free of foreign material when assembled. At the completion of a work shift, all open ends of the pipeline shall be temporarily closed off using a suitable cover or plug.

3.3 JOINTS

A. Pipe joints shall be sound and conform to the details shown on the Drawings. Elastometric gasket joints at bell and spigot joints or at couplings shall be thoroughly cleaned and lubricated prior to assembly in accordance with the manufacturer's recommendations.

3.4 ANIMAL GUARDS

A. Animal guards shall be installed at all drain outlets

B. Installation shall be in accordance with the details shown on the Drawings.

• END OF SECTION •

SECTION 02830

CHAIN LINK FENCE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of furnishing and installing chain link fencing complete with all posts, braces, gates, signage and all other appurtenances.

1.2 RELATED SECTIONS

A. Section 03300, Cast-in-Place Concrete.

1.3 MEASUREMENT FOR PAYMENT

A. Not used

1.4 SUBMITTALS

A. Contractor to provide shop drawings to include construction details, material descriptions, dimensions of individual components.

PART 2 PRODUCTS

2.1 MATERIALS

A. Chain-link fence fabric, fence posts, top rails, braces, gates and accessories shall conform to the requirements of Federal Specification RR-F-191. Types, classes, and materials shall be as follows except as otherwise specified.

1. The fence fabric shall be supplied with a Class 2b PVC coating 0.4 ounce per square foot. The posts, top rails and accessories shall also be PVC coated with minimum 10 mils thickness over zinc coating to match color of chain link fabric.
2. The color of the coating shall be green, as described by ASTM F934
3. The fabric core wire shall be 9-gauge with a pattern of 2-inch diamond mesh.

PART 3 EXECUTION

3.1 INSTALLATION

A. Fence Posts: Unless otherwise specified, line posts shall be placed at intervals of 9 feet measured from center to center of adjacent posts. In determining the post spacing, measurement will be made parallel with the ground surface or concrete wall. Post will be set in the manner shown on the Drawings. Support sleeves for each post shall be installed as shown on the Drawings. All corner posts, end posts, gate posts, and pull posts shall be embedded, braced and trussed as shown on the Drawings.

B. Wire Fabric: Fencing shall be installed on the side of the posts designated on the Drawings. The fabric shall be stretched taut and securely fastened, by means of the tie clips, to the posts at intervals not exceeding 15 inches and to the top rails or tension wires at intervals not exceeding 2 feet. Care shall be taken to equalize the tension on each side of each post. Fasten ties to wrap a full 360 degrees around post and rails and a minimum of one complete diamond of fabric. Twist ends of tie wire three full twists, and cut off protruding ends to

preclude untwisting by hand. Tie fabric to line posts at 12 inches on center and to brace and top rails at 24 inches on center.

C. Tension Wire: Install according to ASTM F567 and ASTM F1916, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with tie wires at maximum spacing of 24 inches on center. Install tension wire within 6 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.

D. Any damage to the coating shall be repaired in accordance with the manufacturer's recommendations, or the damaged fencing material shall be replaced. The Contractor shall provide the engineer a copy of the manufacturer's recommended repair procedure and materials before correcting damaged coatings.

• END OF SECTION •

SECTION 02935

TOPSOIL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Requirements for preparing, depositing and spreading Topsoil or Engineered Soil Media (ESM) at locations determined by the Purchaser.

B. Topsoil or ESM will be placed over the surfaces of disturbed areas not receiving riprap and areas identified by the Purchaser to receive permanent turf.

1.2 RELATED SECTIONS

A. Section 02201, Earthfill

B. Section 02222, Excavation

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 TOPSOIL

A. Material for Topsoiling shall be brought in from offsite. Topsoil shall consist of natural, friable loam, possessing characteristics of the best soils in the vicinity which produce heavy growth of crops, grass, and other vegetation. It shall be reasonably free from subsoil, clay lumps, grass clumps, stones, roots or similar objects larger than two inches in diameter, brush, objectionable woods or litter, or any other material or substance which may be harmful to plant growth or hindrance to grading, planting or maintenance of operations. Priority pollutants testing shall be performed on any off-site borrow materials, at a frequency of one test every 5,000 cubic yards. The Contractor shall provide the Purchaser notice at least three weeks before hauling begins so that the Purchaser can schedule a time for collecting soil samples for chemical analyses. No off-site material may be brought onto the site until the Purchaser has reviewed the analytical results and approved the material source. Testing costs will be the responsibility of the Purchaser.

B. Two samples shall be obtained from within the topsoil and analyzed for soil fertility prior to bringing onto the site. The soil fertility analysis shall recommend nutrient needs for the topsoil by testing for the following minimum parameters:

1. Percent Organic Matter
2. Soil pH
3. Nitrate Concentration
4. Phosphorus Concentration
5. Calcium Concentration
6. Iron Concentration
7. Cation Exchange Capacity
8. Bulk Density
9. Percent sand, silt, and clay

The results of the soil fertility tests shall be provided to the Purchaser and the Landscaping Professional one week prior to the start of Permanent Turf establishment. A meeting

between Purchaser, Contractor, and Landscaping Professional shall be conducted to discuss any suggested modifications to the permanent grassing specifications prior to permanent grass installation.

2.1.2 ENGINEERED SOIL MEDIA

A. ESM shall be a hydraulically-applied Biotic Soil Media such as ProGanics BSM as manufactured by Profile Products, LLC or Purchaser approved equal.

B. Contractor shall submit manufacturer's product data and installation instructions, including required substrate preparation, list of materials and proposed application rate.

C. Contractor shall submit a letter of certification from the Manufacturer indicating that the product meets or exceeds all technical and packaging requirements and is made in the U.S.A.

D. ESM shall be delivered in UV and weather-resistant factory labeled packages. ESM shall be stored and handled in strict compliance with Manufacturer's instructions and recommendations. ESM shall be protected from damage, weather, excessive temperatures and construction operations.

E. ESM shall conform to the following typical property values when uniformly applied at a rate of 3,500 pounds per acre under laboratory conditions.

Property	Test Method	Tested Value
Physical		
Organic Material	ASTM D586	≥ 94%
Mass Per Unit Area	ASTM D6566[1]	≥ 11.6 oz/yd^2
Ground Cover	ASTM D6567[1]	≥ 99%
Water Holding Capacity	ASTM D7367	≥ 900%
pH	ASTM D1293	6.0 ± 1.0
Carbon : Nitrogen (C:N) Ratio	ASTM E1508 & EPA Method 1687	50:1 ± 10
Material Color	Observed	Brown
Performance		
Cover Factor[2]	Large Scale Testing[4]	≤ 0.01
% Effectiveness[3]	Large Scale Testing[4]	≥ 99%
Vegetation Establishment	ASTM D7322[1]	≥ 850%
Environmental		
Ecotoxicity	EPA 2021.0	48-hr LC_{50} > 100%
Biodegradability	ASTM D5338	Yes
EPA Metal Limits	EPA 503 Metal Limits	Pass
Pathogen Reduction	40 CFR 503 Class A Compost	Pass

1. When applied at a rate of 3,500 lb/ac
2. Cover Factor is calculated as soil loss ratio of treated surface versus untreated control surface.
3. % Effectiveness = One minus Cover Factor minus 100%.
4. Large scale testing conducted at Utah Water Research Laboratory (UWRL). ProGanics was applied at 3,500 lb/ac and covered with ProMatrix EFM, a Bonded Fiber Matrix, at 3,500 lb/ac and tested under uniform conditions. For specific testing information, please contact a Profile technical service representative.

PART 3 EXECUTION

3.1 PROCEDURE

3.1.1 TOPSOIL

A. In the areas to be Topsoiled, the Contractor shall complete all grading necessary to bring the surface to the lines indicated on the Drawings and parallel to the proposed finished grade. These areas are to be free from rock or other foreign material of two inches or greater in any dimension. Immediately prior to placing of Topsoil, the areas shall be loosened by discing or by scarifying to a depth of at least two inches to permit proper bonding of the Topsoil to the ground on which it is placed.

B. Topsoil shall not be placed until the area to be covered has been shaped, trimmed, finished and all other construction work in the area has been completed. Topsoil shall not be placed when the ground is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to the proposed planting or to proper grading. Topsoil shall be placed and spread to a depth sufficient such that after natural settlement and rolling with a light roller, the completed work shall conform to the lines, grades and elevations indicated on the Drawings. Unless specified otherwise, the depth of Topsoil after settlement shall be 6 inches minimum. After spreading the Topsoil, all large stiff clods, hard lumps, large rocks, stumps, litter, or other foreign matter shall be raked up and removed from the Topsoil area and disposed of by the Contractor. The area shall then be rolled with a light roller weighing not less than 100 pounds and not over 210 pounds per foot of width with an approved cultipacker.

C. If soil or weather conditions are unsuitable, the Contractor shall cease Topsoil operations and shall resume operations when conditions permit.

3.1.1 ENGINEERED SOIL MEDIA

A. In the areas of ESM application, the Contractor shall complete all grading necessary to bring the surface to the lines indicated on the Drawings and parallel to the proposed finished grade. These areas are to be free from rock or other foreign material of two inches or greater in any dimension.

B. ESM shall not be placed until the area has been shaped, trimmed, finished and all other construction work in the area has been completed. ESM shall not be placed when the ground is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to the proposed planting or to proper grading.

C. Strictly comply with equipment Manufacturer's installation instructions and recommendations. Use approved hydroseeding machines. To achieve optimum soil surface coverage, apply ESM from opposing directions to soil surface. Erosion control products, slope interruption devices or water diversion techniques should be used in conjunction with this product. No chemical additives with the exception of fertilizer, soil neutralizers and biostimulant materials should be added to this product.

D. To ensure proper application rates, measure and stake area. For best results, allow ESM to dry slightly prior to application/installation of erosion control products; more rapid drying will occur when temperatures exceed 60°F. Drying times may be accelerated in high temperature, low humidity conditions with product applied to dry soils. Use caution to insure overspray of hydraulic erosion control product does not cause movement of the ESM. When installing rolled erosion control product over ESM, take caution to limit disturbance of the treated surface and avoid excessive foot traffic.

E. Mixing: A mechanically agitated hydroseeding machine is strongly recommended:

1. Fill mechanically agitated hydroseeder with water to at least 1/3 of displacement. Turn pump on and thoroughly purge pump and pre-wet lines. Turn pump off.

2. Turn agitator on and load low density materials first (i.e. seed).

3. Continue slowly filling tank with water while loading ESM and soil amendments.

4. Consult application and loading charts to determine number of bags to be added for desired area and application rate. Mix at a rate of 100 lb of BSM per 100 gallons (45.4 kg/379 liters) in machines equipped with gear or positive displacement pumps and 75 lb of ESM per 100 gallons (34.0 kg/379 liters) in machines with centrifugal pumps. Contact Equipment manufacturer to confirm optimum mixing rates.

5. All ESM should be completely loaded before water level reaches 75% of the top of tank.

6. Add fertilizer and other heavier materials and continue mixing.

7. Top off with water and mix until all material is fully broken apart and hydrated (minimum of 10 minutes — increase mixing time when applying in cold conditions). This is very important to allow the ESM to fully hydrate.

8. Shut off recirculation valve to reduce potential for air entrainment within the slurry.

9. Slow down agitator to very low speed and start applying with optimum nozzle.

10. Spray in opposing directions for maximum soil coverage.

11. Return to water source as quickly as possible to purge pump and lines, then repeat mixing and application process.

F. Application Rates: These application rates are for standard conditions. Designers may need to increase application rates on rough or rocky surfaces.

% Organic Matter	Rate (lb/acre)
< 0.75	5,000
≥ 0.75 & < 1.5	4,500
≥ 1.5 & < 2.0	4,000
≥ 2.0 & < 5.0	3,500

G. After application, thoroughly flush the tank, pumps and hoses to remove all material. Wash all material from the exterior of the machine and remove any slurry spills. Once dry, material will be more difficult to remove.

H. Clean spills promptly. Advise Purchaser of methods for protection of treated areas. Do not allow treated areas to be trafficked or subjected to grazing.

I. All inspections and maintenance recommendations shall be conducted by qualified professionals consistent with the Purchasers expectations.

J. Initial inspections shall insure installations are in accordance with the project documents. Subsequent inspections at pre-determined time intervals and corrective maintenance activities directed after each significant or other potentially damaging weather or site event.

3.2 STOCK PILE AREAS

A. Stock Pile Areas shall be in locations approved by the Purchaser.

B. After all Topsoil operations are completed, any excess material remaining in the Stock Pile shall be placed in the spoils area. The excess topsoil placed in these areas shall be spread to a relatively uniform thickness across the entire finished surface of the area.

• END OF SECTION •

SECTION 02936

PERMANENT TURF ESTABLISHMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of tillage of Topsoil, and the furnishing and placing of limestone, fertilizer, seed, mulching materials and erosion control blanket for the establishment of permanent turf and maintaining and tending the permanent turf until acceptance. Areas to be prepared and seeded for permanent turfing are as follows:

1. All cut, fill and disturbed areas as well as the staging, and spoils areas.
2. Areas not requiring Permanent Turf Establishment include disturbed areas that will be covered by the proposed temporary and permanent pool elevations as shown on the Drawings and any rock surfaces.

1.2 RELATED SECTIONS

A. Section 02201, Earthfill.

B. Section 02222, Excavation.

C. Section 02935, Topsoil.

1.3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

1.4 DELIVERY, STORAGE, AND HANDLING OF MATERIAL

A. Each kind of seed shall be furnished and delivered, unless otherwise approved, in separate, sealed containers, or bags acceptably sewn tight or sealed.

B. Seed which has become wet, moldy or otherwise damaged in transit or storage will not be acceptable. Seed, after delivery to the Contractor, shall be stored in such a manner as to protect it from damage or deterioration from any sources. Provisional acceptance of seed must be obtained before the seed is sown. Final acceptance may be subject to the results of sampling and testing.

C. All limestone shall be furnished in paper bags weighing less than 100 pounds with the name of the material, net weight of contents and the manufacturer's name and guaranteed analysis appearing on each container. Bulk deliveries shall be accompanied by a certificate covering the names, weight and analysis as specified herewith for packaged material.

D. Fertilizer shall be furnished in paper bags weighing less than 100 pounds each with the name of the material, net weight of contents and the manufacturer's name and guaranteed analysis appearing on each container.

PART 2 PRODUCTS

2.1 MATERIALS

A. All limestone shall be pulverized; 100 percent shall pass the Number 10 sieve; minimum 90 percent shall pass the Number 20 sieve; and minimum 60 percent shall pass the Number 100

sieve. Agricultural pulverized limestone shall meet one of the following minimum chemical requirements:

1. Type HM-High Magnesium (Dolomite), 21 Percent MgO, 20 percent CaO, 43 percent $MgCO_3$ and 51 percent $CaCO_3$.
2. Type MO-mixed Oxides (Magnesium) 50 percent MgO + CaO.

B. The type of fertilizer and approximate application rate required shall be determined by a qualified soil analyst retained by the Contractor based on soil samples provided by the Contractor.

C. Seed shall be labeled in accordance with the state laws and the U.S. Department of Agriculture rules and regulations under the Federal Seed Act in effect on the date of invitations for bids. Bag tag figures are evidence of purity and germination. No seed will be accepted with a test date of more than 9 months before the delivery date to the site.

Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be accepted. The percent of noxious week seed allowable shall be as defined in the current State laws relating to agricultural seeds. Each type of seed shall be delivered in separate sealed containers and fully tagged unless exception is granted by Purchaser. Material other than pure live seed shall comprise only nonviable seed, chaff, hulls, live seed of crop plants other than those specified, harmless inert matter and weed seeds except that weed seed other than seeds of noxious weeds will be permitted up to one percent of the gross weight of each kind of seed. Legume seeds shall be accompanied by adequate amounts of their proper inoculants unless accompanied by certification of preinoculation.

D. The weight of pure live seed in each lot of seed is computed by the labeled purity percent times the labeled germination percent times weight. (Example: 34 pounds of pure live seed of particular grass is required. Stock available has 85.0 percent purity and 80.0 percent germination, which meets the minimum requirements in this example and equals 68 percent pure live seed. Thirty four divided by 68 percent equals 50 pounds gross as being required to furnish the 34 pounds of pure live seed.) Other materials shall comprise the remaining 32 percent, between 68 percent of pure live seed and 100 percent in the example. The inoculants for treating seeds of legumes shall be standard culture of nitrogen fixing bacteria not more than one year old. Each inoculant shall be the specific culture required by each legume. It shall be supplied only from manufacturers licensed to sell legume inoculants in the State of Georgia. Each kind of seed shall be furnished and delivered, unless otherwise approved, in separate, sealed containers, or bags acceptably sewn tight or sealed. All seeds and seed labels shall be in accordance with State and Federal Laws, Rules and Regulations as each is in effect on the date of Invitation of Bids. The Contractor shall furnish the vendor with the specifications for the material.

E. Mulching material shall consist of hay or straw. Mulching material shall be free from mature seed bearing stalks or roots of prohibited or noxious weeds.

F. Erosion Control Blankets shall have uniform thickness and distribution of biodegradable fibers throughout, with top and bottom covered with a degradable plastic netting having a maximum mesh opening of 2 x 2 inches. Top netting shall be UV stabilized for longer life. Netting shall be entwined with the matting fibers in a manner which shall provide sufficient reinforcement against damage during handling and placement. Mat shall consist of straw and coconut fibers, with a minimum of 30% coconut fiber, and shall be Bon Terra CS2 Erosion Control Blanket as manufactured by Bon Terra America, Gennesse, Idaho (800-882-9489) or equal.

PART 3 EXECUTION

3.1 PROCEDURE

A. Seeding shall be done at such times of the year when soil conditions are suitable for tillage and when moisture and temperatures are suitable for plant growth. Climatic conditions shall be suitable for the application of materials and proper operation of tillage and seeding equipment. All work required for seeding for permanent vegetation will be accomplished under appropriate conditions. All soil areas with slopes of three horizontal to one vertical or flatter shall be thoroughly tilled to a depth of four inches or as approved by the Purchaser by disking, harrowing, scarifying or other approved methods. When slopes are steeper than three horizontal to one vertical, tillage shall be limited to horizontal scarification to eliminate erosion irregularities and break up any surface crust immediately before seeding. All tillage shall be carried out as nearly on the contour as practicable to reduce the erosion hazard. All surface stones and debris over three inches in any dimension shall be removed and disposed of as approved by the Purchaser.

B. Seeding dates are indicated on seed mixture table shown on the Drawings.

C. Limestone shall be applied at the rate specified by the qualified soil analyst referred to in Part 2.1.A above.

D. A commercial fertilizer shall be applied at the rate specified by the qualified soil analyst referred to in Part 2.1.A above.

E. Lime and fertilizer shall not be mixed together dry or in a hydroseeder for simultaneous application.

F. When lime and fertilizer have been spread dry, they may be incorporated into the soil in one operation.

G. Lime and fertilizer shall be applied hydraulically, with a low box-type spreader, or hand broadcast. Dry lime and fertilizer shall be well mixed with the soil. Fertilizer placed by the use of a drill shall constitute acceptable mixing. When a hydroseeder is used to apply lime or fertilizer, the soil mixing does not apply.

H. Seed mixture shall be as shown on the Drawings.

I. Before any seed is sown, the seed bed shall be tilled as previously described, smoothed and brought to grade. Prior to the sowing of seed, the soil shall be raked to a depth of ¾ inches. All raking shall be done in a direction parallel to the contour lines on the slope and not uphill or downhill. All sticks, stones, weeds, roots or other objectionable material appearing on the surface shall be removed. The finished surface of the soil shall be maintained in a true and even condition during the sowing of the seed.

J. The seed shall be uniformly sown on the designated areas using an approved hydraulic seeder, power-drawn drill, power-operated seeder, hand-operated seeder, or by hand, within five days of applying fertilizer and lime to the soil.

K. Mulching material shall be used on surfaces with slopes of 3 horizontal to 1 vertical or flatter and shall be applied after the sowing and rolling have been completed. Mulch applied to seeded areas shall achieve a minimum of 75% soil cover. Straw mulch shall be uniformly applied over the entire surface at a minimum rate of two and one-half tons per acre and spread to a depth of two inches loose measure. All mulching material shall be in a moist condition at the time of placement or shall be sprinkled immediately after placing. While moist, the straw shall be anchored in the soil by a V-type wheel land packer or disc harrow or

anchored with netting or an effective tackifier to secure the straw firmly in the ground to form a soil binding mulch and prevent loss or bunching by wind. On slopes where machinery cannot be used, mulching material shall be retained in place by a shallow covering of earth, by twine and stakes or other suitable means which will not be detrimental to subsequent maintenance. Approved asphalt emulsion may be used as a “tie-down”, provided it is applied uniformly over and through the mulch at a rate of not less than 75 gallons per acre. It shall be non-toxic to plants and seeds.

L. For slopes steeper than 3 horizontal to 1 vertical not on the dam embankment, erosion control mats shall be installed. Erosion control mats shall be used on the dam embankment slopes.

M. The Contractor shall be responsible for the establishment of a uniform, dense and sturdy growth of Permanent Turf. Areas of sparse growth shall be reseeded at no additional cost to the Purchaser.

N. The Contractor shall be responsible for the maintenance and protection of the Permanent Turf until final completion of the project. Maintenance shall include irrigation, fertilization, adding additional seed, adding mulch, repairing erosion, and mowing of the Permanent Turf. Mowing shall be performed when the grass height exceeds 8 inches.

O. Watering Schedule: The Contractor shall water newly installed permanent vegetative cover at a frequency that promotes germination and a dense growth of healthy grass cover.

• END OF SECTION •

SECTION 03100

CONCRETE FORMWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.2 RELATED SECTIONS

A. Section 03200, Concrete Reinforcement.

B. Section 03300, Cast-in-Place Concrete.

1.3 MEASUREMENT AND PAYMENT

A. Not used.

1.4 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 318 - Building Code Requirements for Reinforced Concrete.

C. ACI 347 - Recommended Practice For Concrete Formwork.

D. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures

E. PS 1 - Construction and Industrial Plywood.

1.5 DESIGN REQUIREMENTS

A. Design and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

B. The design and construction of concrete formwork is the sole responsibility of the Contractor.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 347.

B. Design formwork under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State of Georgia.

PART 2 PRODUCTS

2.1 FORM MATERIALS

A. Forms shall be of wood, plywood, steel or other approved material and shall be mortar tight. The forms and associated falsework shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and contours. Form surfaces shall be smooth and free from holes, dents, sags or other irregularities. Forms shall be coated with a non-staining form oil before being set into place. Care shall be taken to avoid splashing oil on reinforcing steel or existing concrete.

2.2 FORMWORK ACCESSORIES

A. Form Ties: Metal ties or anchorages within the forms shall be equipped with cones, she-bolts or other devices that permit their removal to a depth of at least one inch without injury to the concrete. Ties designated to break off below the surface of the concrete shall not be used without cones. All internal form support steel shall be positioned to provide minimum clearances as shown on the drawings.

B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture.

C. Corners: Chamfered, rigid plastic or wood strip, ¾ x ¾ inch size; maximum possible lengths.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings. All subgrades shall be approved by the Purchaser prior to placing concrete.

B. Before erection of formwork against rock subgrades, rock surfaces shall be cleaned by air-water cutting, wet sandblasting or wire brush scrubbing, as necessary, and all exposed rock surfaces shall be kept in a wetted condition from the time of exposure continuously through the time of placement of concrete. The method used for continuous wetting shall employ clean water free of injurious amounts of deleterious materials and shall be subject to approval of the Purchaser.

C. Before erection of formwork against soil subgrades, soil surfaces shall be compacted and free of any soft or loose material. Soil shall be damp prior to placing concrete.

3.2 ERECTION – FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members which are not indicated on Drawings.

F. All edges that will be exposed to view when the structure is completed shall be chamfered, unless finished with molding tools.

G. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.

H. Coordinate this section with other sections of work which require attachment of components to formwork.

3.3 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes which are effected by agent.

3.4 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in or passing through concrete work. Items to be embedded in the concrete shall be positioned accurately and anchored firmly. Weepholes in walls or slabs shall be formed with nonferrous materials.

B. Coordinate with work of other sections in forming and placing openings, slots, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

C. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.

D. Install waterstops in accordance with manufacturer's instructions continuous without displacing reinforcement.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.5 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

C. Prior to placement of concrete, the forms and subgrade shall be free of chips, sawdust, debris, water, ice, snow, extraneous oil, mortar, or other harmful substances or coatings. Any oil on the reinforcing steel or other surfaces required to be bonded to the concrete shall be removed.

D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.6 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 347, as outlined below.

1. Surfaces subject to high-velocity flow (inside face of spillway sidewalls, downstream face of labyrinth walls, inside face of stilling basin sidewalls, chute blocks, floor blocks, end sills) require a Class A formed surface with regard to abrupt irregularities.
2. Surfaces subject to high-velocity flow require a Class B surface with regard to gradual irregularities.
3. Irregularities on surfaces not subject to high-velocity flow shall meet the following requirements.

a.	Backfilled surfaces	Class C
b.	All other surfaces	Class B

3.7 FORM REMOVAL

A. Forms shall be removed only when the Purchaser is present and shall not be removed without his approval. Forms shall be removed in such a way as to prevent damage to the concrete. Supports shall be removed in a manner that will permit the concrete to take the stresses due to its own weight uniformly and gradually. Forms shall not be removed sooner than the following minimum times after the concrete is placed. These periods represent cumulative number of days and fractions of days, not necessarily consecutive, during which the temperature of the air adjacent to the concrete is above 50 degrees F.

Element	Time
Deck slabs - supporting (inside) forms and shoring	7 days
Sides of beams, small structures	24 hours
Columns, walls, spillway risers	
Concrete placement greater than 20 feet in height	3 days
Concrete placement 20 feet in height or less	24 hours
Cradles	24 hours
Slabs on Grade	24 hours

B. Where forms are removed prior to 7 days age, the age of stripped concrete shall be at least 7 days before any load is applied other than the weight of the column or wall itself and the forms and scaffolds for succeeding lifts.

C. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

D. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

• END OF SECTION •

SECTION 03200

STEEL REINFORCEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel bars and steel welded wire reinforcement and accessories for cast-in-place concrete.
B. Galvanized dowels.

1.2 RELATED SECTIONS

A. Section 03100, Concrete Formwork.

B. Section 03300, Cast-in-Place Concrete.

1.3 MEASUREMENT FOR PAYMENT

A. Steel Reinforcement: Bar and steel welded wire reinforcement placed according to the Drawings and Specifications shall be subsidiary to Cast-In-Place Concrete. No separate payment will be made for steel reinforcement.

1.4 REFERENCES

A. ACI 301 – Structural Concrete for Buildings.

B. ACI 318 – Building Code Requirements for Reinforced Concrete.

C. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures

D. ACI SP-66 – American Concrete Institute – Detailing Manual.

E. ASTM A36 – Carbon Structural Steel.

F. ASTM A82 – Cold Drawn Steel Wire for Concrete Reinforcement.

G. ASTM A123 – Zinc (Hot-Dip Galvanizing) Coating on Iron and Steel Products.

H. ASTM A185 – Welded Steel Wire Reinforcement for Concrete.

I. ASTM A615 – Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

J. ASTM A767 – Zinc-Coated (Galvanized) Bars for Concrete Reinforcement.

K. ASTM A775 – Epoxy-Coated Reinforcing Steel Bars.

L. ASTM D3963 – Epoxy-Coated Reinforcing Steel.

M. CRSI – Concrete Reinforcing Steel Institute – Manual of Practice.

N. CRSI 63 – Recommended Practice For Placing Reinforcing Bars.

O. CRSI 65 – Recommended Practice For Placing Bar Supports, Specifications and Nomenclature.

1.5 SUBMITTALS FOR REVIEW

A. Section 01300 – Submittals: Procedures for submittals.

B. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel, bending and cutting schedules, and supporting and spacing devices.

1.6 SUBMITTALS FOR INFORMATION

A. Section 01300 – Submittals: Procedures for submittals.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Submit certified copies of mill test report of reinforcement materials analysis.

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with CRSI 63, 65 and Manual of Practice. Maintain one copy of each document on site.

B. Provide Purchaser with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection.

C. Welders' Certificates: Submit Manufacturer's Certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.8 DELIVERY AND STORAGE

A. All reinforcing bars shall be delivered to the job site cut to exact length, bent, securely bundled and tagged with metal tags corresponding to the bar schedules and diagrams.

B. All bars and steel welded wire reinforcement shall be stored off the ground a minimum height of six inches and protected from mud, mechanical injury, surface deterioration, and moisture.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed billet steel bars, unfinished.

B. Steel Welded Wire Reinforcement: ASTM A185 Plain Type; in flat sheets unfinished.

C. Dowels: ASTM A615, grade 60. Dowels shall be galvanized.

2.2 ACCESSORIES

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions. Include load bearing pad on bottom to prevent vapor barrier puncture, where applicable.

2.3 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice.

B. Locate reinforcing splices not indicated on Drawings, at point of minimum stress.

PART 3 EXECUTION

3.1 PLACEMENT

A. Before reinforcement is placed, the surfaces of the bars and steel welded wire reinforcement and any metal supports shall be cleaned to remove any loose, flaky rust, mill scale, oil, grease, mud or other coatings or foreign substances. After placement, the reinforcement shall be maintained in a clean condition until it is completely embedded in the concrete.

B. All placement of steel reinforcing and supports shall conform to the Recommended Practice for Placing Reinforcing Bars, CRSI 59; and the Recommended Practice for Placing Bar Supports, CRSI 63. Reinforcement shall be accurately placed and secured in position in a manner that will prevent its displacement during the placement of concrete. Do not deviate from required position. Accommodate placement of formed openings. Tack welding of bars will not be permitted.

C. Reinforcement shall not be placed until the prepared site has been inspected by the Purchaser. After placement of the reinforcement, concrete shall not be placed until the reinforcement has been inspected by the Purchaser. Concrete protection for reinforcement shall be as shown on the Drawings. If concreting is delayed for a considerable number of days after reinforcing is placed in position, it shall be protected by covering with canvas or other satisfactory covering, or if directed by the Purchaser, shall be painted with a coat of neat cement grout. Any bars or fabric having loose scaly rust shall be cleaned before concrete is placed.

D. Maintain concrete cover around reinforcing as follows:

Item	Coverage
Walls (exposed to weather, water, or backfill)	2 inches
Footings and Concrete Formed Against Earth	3 inches

E. Metal chairs, metal hangers, metal spacers and concrete chairs may be used to support the reinforcement. Metal hangers, spacers and ties shall be placed in such a manner that they will not be exposed in the finished concrete surface. The legs of metal chairs that may be exposed at the lower face of slabs or beams shall be galvanized. Precast concrete chairs shall be manufactured of the same class of concrete as that specified for the structure and shall have tie wires securely anchored in the chair or a V-shaped groove at least 3/4 inch in depth molded into the upper surface to receive the steel bar at the point of support. Precast concrete chairs shall be moist at the time concrete is placed.

3.2 FIELD QUALITY CONTROL

A. Inspect for acceptability and compliance with Contract Documents.

• END OF SECTION •

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cast-in-place structural and backfill concrete shown on the Drawings.

B. Waterstop.

C. Control, expansion and contraction joint devices associated with concrete work.

1.2 RELATED SECTIONS

A. Section 01300, Submittals.

B. Section 02100, Control of Water.

C. Section 03100, Concrete Formwork.

D. Section 03200, Concrete Reinforcement.

1.3 MEASUREMENT AND PAYMENT

A. Not used.

1.4 REFERENCES

ASTM C-31	–	Making and Curing Concrete Test Specimens in the Field
ASTM C-33	–	Concrete Aggregates
ASTM C-39	–	Compressive Strength of Cylindrical Concrete Specimens
ASTM C-94	–	Ready-Mixed Concrete
ASTM C-138	–	Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
ASTM C-143	–	Slump of Portland Cement Concrete
ASTM C-150	–	Portland Cement
ASTM C-172	–	Sampling Freshly Mixed Concrete
ASTM C-231	–	Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C-260	–	Air-Entraining Admixtures for Concrete
ASTM C-289	–	Potential Reactivity of Aggregates (Chemical Method)
ASTM C-309	–	Liquid Membrane-Forming Compounds of Curing Concrete
ASTM C-494	–	Chemical Admixtures for Concrete
ASTM C-994	–	Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
ACI	–	ACI Manual of Concrete Practice
ACI 117	–	Specifications for Tolerances for Concrete Construction and Materials
ACI 211.1	–	Selecting Proportions for Normal, Heavyweight, and Mass Concrete
ACI 301	–	Specifications for Structural Concrete for Buildings
ACI 304	–	Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete
ACI 305R	–	Hot Weather Concreting
ACI 306R	–	Cold Weather Concreting
ACI 308	–	Standard Practice for Curing Concrete
ACI 318	–	Building Code Requirements for Reinforced Concrete

Concrete Manual, Bureau of Reclamation, U.S. Department of the Interior

ACI 350 – Code Requirements for Environmental Engineering Concrete Structures

1.5 SUBMITTALS FOR REVIEW

A. Section 01300 – Submittals: Procedures for submittals.

B. Mix Designs: For each specified type of concrete or mortar, the Contractor shall be responsible for the design of the mix. At least thirty (30) days prior to any placement of specific type of concrete or mortar, the Contractor shall furnish the Purchaser with a statement of the materials and mix proportions (including admixtures) he intends to use for the specified class of concrete. The statement shall include evidence satisfactory to the Purchaser that the materials and proportions selected will produce concrete of the quality, consistency and strength specified. The statement shall include results of mix designs and laboratory tests including:

1. Mix Designation and Identification
2. Mix Proportions Based on SSD Aggregates and 1 c.y.
3. Moisture Content of the Aggregates as used in trials and corrections for the aggregate weights used
4. Specific Gravity and Absorption of the aggregates
5. Admixture Source and Dosage
6. Yield and Wet Unit Weight
7. Strength Results and Unit Weights of Cylinders
8. Strength Requirements – Both the design strength and the required average strength with the applicable ASTM C-94 over design factor
9. Cement Source
10. Aggregate Source and Gradation
11. Mix Temperature
12. Slump – Design and Actual
13. Air Content – Design and Actual
14. For mixes with a high-range, water reducer present, the slump and air content at 15 to 20 minute time increments

When ready-mixed concrete is furnished, the Contractor shall advise the Purchaser of the name of the concrete supplier proposed and the location of the plant or plants at which the concrete will be batched. The Contractor shall also furnish the Purchaser a statement-of-delivery ticket showing the time of loading, the revolution counter reading at the time of loading and the quantities of materials used for each load of concrete. The delivery ticket shall also indicate the volume of water withheld and the volume of water than can be added to each delivered load and still meet mix design requirements.

C. Product Data: Provide specification compliance data on admixtures (if specified), waterstop, joint sealants, and joint devices.

D. Samples: Submit two, 4 inch long samples of each type of waterstop and control joint devices.

1.6 SUBMITTALS FOR INFORMATION

A. Section 01300 – Submittals: Procedures for submittals.

B. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent Work for joint devices, waterstop, joint sealants.

1.7 SUBMITTALS AT PROJECT CLOSEOUT

A. Accurately record actual locations of embedded utilities and components which are concealed from view.

1.8 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301, and maintain one copy of document on site.

B. Acquire cement from same source for all work, and acquire aggregate from same source for all work.

C. Conform to ACI 305R when concreting during hot weather.

D. Conform to ACI 306R when concreting during cold weather.

E. Field Quality Control – see Subsection 3.13.

1.9 STORAGE, HANDLING AND DELIVERY

A. Cement shall be stored in such a manner as to be protected from weather, dampness or other destructive agents. Cement that is partially hydrated or otherwise damaged will be rejected.

B. Aggregates shall be stored or stockpiled in such a manner that separation of coarse and fine particles of each size will be avoided and that various sizes will not become intermixed before proportioning. Methods of handling and transporting aggregates shall be such as to avoid contamination, excessive breakage, segregation or degradation.

C. All curing compound shall be delivered to the site of the work in the original container bearing the name of the manufacturer and the brand name. The compound shall be stored in a manner to prevent damage to the containers and to protect water-emulsion types from freezing.

D. Admixtures shall be prevented from freezing.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I or II, low-alkali - Normal Portland type. Cement used throughout the work shall be uniform in color.

B. Fine Aggregate: ASTM C33.

C. Coarse Aggregate: ASTM C33, Size No. 57 Stone.

D. Water: Clean and not detrimental to concrete free from injurious amounts of oil, salt, acid, alkali, organic matter, or other deleterious substances.

2.2 ADMIXTURES

A. Air Entrainment: ASTM C260. If air-entraining cement is used, any additional air-entraining admixture shall be of the same type as that in the cement.

B. Chemical: ASTM C494. The type selected shall be determined by the Contractor for his placing conditions and mix design.

C. Water Reducer and Set Retarders: ASTM C494.

D. Anti-Washout: ASTM C494 Type S. Euclid EVCON AWA or similar.

2.3 CONCRETE MIXES

A. Mix Designs: The Contractor shall be responsible for initial mix designs and related testing to the mix designs, which shall conform to the following requirements:

1. All materials used in the work shall be subject to inspection and tests at the batch plant and at the job site.
2. All testing shall be performed in accordance with applicable test references of the American Society for Testing and Materials (ASTM). Laboratories and personnel used by the Contractor for testing and mix designs shall conform with ASTM E 329 and the guidance of the ASTM "Manual of Aggregate and Concrete Testing".
3. Trial batches and compression tests shall be made of a proposed job mix to determine whether the concrete mix is adequate. If so determined, the materials and proportions stated shall constitute the job mix. After the job mix has been designated, neither the source, character or grading of the aggregates nor the type or brand of cement or admixture shall be changed without prior notice to and approval of the Purchaser.
4. Water-cement ratios of all mixes shall be determined from a water-cement ratio curve plotted from tests run at constant slump of the cement and aggregates used on the job. Mixes shall be run using both the design slump and the maximum slump permitted. In the case of air-entrained concrete, mixes shall be run using both the maximum slump and air content and the design air content and slump. The strength of the mixes at design slump and air content shall meet the specified design strength plus the applicable over design factor as stipulated in ASTM C-94.
5. All concrete mixes shall be designed using the minimum water possible subject to workability requirements.

B. The Contractor shall provide production concrete conforming to ASTM C-94, including the applicable overdesign factor of Table 4 for limiting the probability of tests falling below the specified strength (f'_c) to one out of every ten tests. The mixes shall conform to the general guidance listed below for each specific use.

C. Strength requirements are for 28 days of age unless otherwise noted. The Contractor may provide stronger mixes within the guidelines given below that allow higher early strengths if necessary for form removal and to assist his schedule. The Contractor shall be responsible for evaluating his construction loads and controlling his operations so that he does not overload or damage the structure.

D. The requirements for cast-in-place concrete are as follows:

1. Structural Concrete

Specified Design Strength @ 28 days:	4500 psi
Slump (before addition of High-Range Water Reducer):	3 to 5 inches
Slump (after addition of High-Range Reducer):	max. 8 inches
Air Content:	6 percent ± 1.5
High-Range Water Reducer:	Optional

Water Reducer	Required
Maximum Water/Cement Ratio:	0.42
Minimum Cementitious Content (per CY)	535 lbs.

E. When conditions are such that the temperature of the concrete at the time of placement is consistently above 75 degrees F, the Purchaser may direct the Contractor to use a water reducing, set-retarding admixture. The cement content shall be the same as that required in the mix without the admixture.

F. The use of calcium chloride or other accelerators or anti-freeze compounds will not be allowed.

2.4 TOLERANCES

A. The fineness modulus of the fine aggregate shall be not less than 2.3 or more than 3.1, nor vary by more than 0.20 from the value assumed in selecting proportions of the concrete. If this value is exceeded, the fine aggregate is rejected unless suitable adjustments are made in proportions of the fine and coarse aggregate.

B. Unless otherwise specified, the air content (by volume) of the concrete at the time of placement and at the final placement location shall be from 4.5 to 7.5 percent. If the concrete is pumped, the testing will be performed at the discharge end of the discharge line. The consistency of the concrete shall be such as to allow it to be worked into place without segregation or excessive latency.

C. The quantities of cement and aggregates in each batch of concrete, as indicated by the scales, shall be within the following percentages of the required batch weights:

Cement – plus or minus one percent
Aggregates – plus or minus two percent

2.5 WATERSTOP

A. Waterstop shall be Sika Greenstreak PVC or an approved equal. Waterstop shall conform to the dimensions and details shown on the Drawings.

2.6 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler: ASTM D 994; Preformed expansion joint filler for concrete (Bituminous Type), and shall be one (1) inch thick.

2.7 ACCESSORIES

A. Curing compound shall conform to the requirements of ASTM C-309, Type II.

PART 3 EXECUTION

3.1 MIXERS AND MIXING

A. Concrete may be furnished by batch mixing at the site of the work or by ready-mix methods. Batch plants shall conform to the requirements of the applicable State Highway Department or Department of Transportation specifications for automatic proportioning equipment and as specified herein, and shall be previously approved by the State's Highway Department or Department of Transportation.

B. Mixers shall be capable of thoroughly mixing the concrete ingredients into a uniform mass within the specified mixing time and of discharging the mix without segregation. Each mixer or agitator shall bear a manufacturer's rating plate indicating the rated capacity and recommended speeds of rotation, and shall be operated in accordance with these recommendations.

C. Concrete shall be uniform and thoroughly mixed when delivered to the work. Variations in slump of more than one inch within a batch will be considered evidence of inadequate mixing and shall be corrected by changing batching procedures, increasing mixing time, changing mixers, or other means. Mixing time shall be within the limits specified below unless the Contractor demonstrates by mixer performance tests that adequate uniformity is obtained by different times of mixing. For this purpose, the testing program and uniformity requirements shall be as set forth in ASTM Designation C-94.

D. **No mixing water in excess of the amount called for by the job mix shall be added to the concrete during mixing or hauling or after arrival at the delivery point.**

E. For concrete mixed at the site of the work with stationary construction mixers, the time of mixing after all cement and aggregates are in the mixer drum shall be not less than l2 minutes. The batch shall be so charged into the mixer that some water will enter in advance of the cement and aggregates and all mixing water shall be introduced into the drum before 3 minutes of the mixing time has elapsed. Controls shall be provided to ensure that the batch cannot be discharged until the required mixing time has elapsed.

F. When concrete is mixed in a truck mixer loaded to its maximum capacity, the number of revolutions of the drum or blades at mixing speed shall be not less than 70 nor more than 100. If the batch is at least 2 cubic yard less than maximum capacity, the number of revolutions at mixing speed may be reduced to not less than 50. Mixing in excess of 100 revolutions shall be at the speed designated by the manufacturer of the equipment as agitating speed. The mixing operation shall begin within 30 minutes after the cement has been added to the aggregates and the water shall be added during mixing. When mixing is begun during or immediately after charging, a portion of the mixing water shall be added ahead of, or with, the other ingredients.

G. When concrete is partially mixed at a central plant and the mixing is completed in a truck mixer, the mixing time in the central plant mixer shall be the minimum required to intermingle the ingredients and shall be not less than 30 seconds. The mixing shall be completed in a truck mixer and the number of revolutions of the drum or blades at mixing speed shall be not less than 50 nor more than 100. Mixing in excess of 100 revolutions shall be at the speed designated by the manufacturer of the equipment as agitating speed. The total number of revolutions shall not exceed 300 before discharge of the concrete, unless otherwise specified.

H. For central-mixed concrete, mixing in the stationary mixer shall meet the same requirements as batch mixing at the site. When an agitator, or truck mixer used as an agitator, transports concrete that has been completely mixed in a stationary mixer, mixing during transportation shall be at the speed designated by the manufacturer of the equipment as agitating speed.

I. The use of nonagitating equipment to transport concrete to the site of the work will not be permitted.

3.2 EXAMINATION

A. Verify site conditions.

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.3 CONVEYING AND DEPOSITING

A. Place concrete in accordance with ACI 301.

B. Concrete shall be delivered to the site and discharged into the forms within 90 minutes after the introduction of the cement to the aggregates. In hot weather or under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85 degrees F or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed 45 minutes. The Purchaser may allow a longer time, provided the setting time of the concrete is increased a corresponding amount by the addition of an approved set-retarding admixture. **In no case will concrete be accepted for use in the work if the mix temperature before placing exceeds 90 degrees F.** In any case, concrete shall be conveyed from the mixer to the forms as rapidly as practicable, by methods that will prevent segregation of the aggregates or loss of mortar. Concrete shall not be dropped more than 5 feet vertically unless suitable equipment is used to prevent segregation.

C. Concrete shall not be placed until the subgrade, forms and steel reinforcement have been inspected and approved. The Contractor shall have all equipment and materials required for curing available at the site ready for use before placement of concrete begins. **No concrete shall be placed except in the presence of the Purchaser.** The Contractor shall give **at least** forty-eight (48) hours' notice to the Purchaser each time he intends to place concrete. Such notice shall be far enough in advance to give the Purchaser adequate time to inspect the subgrade, forms, steel reinforcement and other preparations for compliance with the specifications before concrete is delivered for placing.

D. The concrete shall be deposited as closely as possible to its final position in the forms and shall be worked into the corners and angles of the forms and around all reinforcement and embedded items in a manner to prevent segregation of aggregates or excessive laitance.

E. The depositing of concrete shall be regulated so that the concrete may be consolidated with a minimum of lateral movement. Internal stays and braces, serving temporarily to hold the forms in correct shape and alignment prior to placement of concrete at their locations, shall be removed when the concrete has been placed to an elevation such as to render their service unnecessary.

F. Slab concrete shall be placed to design thickness in one continuous layer. Formed concrete shall be placed in horizontal layers not more than 20 inches thick. Hoppers and chutes, pipes or "elephant trunks" shall be used as necessary to prevent splashing of mortar on the forms and reinforcing steel above the layer being placed.

G. Successive layers shall be placed at a fast enough rate to prevent the formation of "cold joints". If the surface of a layer of concrete in place sets to the degree that it will not flow and merge with the succeeding layer when vibrated, the Contractor shall discontinue placing concrete and shall make a construction joint according to the procedure specified in Subsection 3.5 of this specification. If placing is discontinued when an incomplete layer is in place, the unfinished end of the layer shall be formed by a vertical bulkhead.

H. Prior to placing concrete on select fill material, the select fill material shall be covered with a continuous membrane of nonwoven geotextile fabric.

3.4 CONSOLIDATION

A. Concrete shall be consolidated with internal type mechanical vibrators capable of transmitting vibration to the concrete at frequencies not less than 6000 impulses per minute. A sufficient number of vibrators shall be employed so that, at the required rate of placement, vibration is maintained throughout the entire volume of each layer of concrete and complete compaction is secured. The location, manner and duration of the application of the vibrators shall be such as to secure maximum consolidation of the concrete without causing segregation of the mortar and coarse aggregate, and without causing water or cement paste to flush to the surface.

B. The Contractor shall provide a sufficient number of vibrators to properly consolidate the concrete immediately after it is placed in the work. Vibration shall be applied in the freshly deposited concrete by slowly inserting and removing the vibrator at points uniformly spaced and not farther apart than twice the radius over which the vibration is visibly effective. The vibrator shall extend into the previously placed layer of fresh concrete, at all points, to ensure effective bond between layers.

C. Vibration shall not be applied directly to the reinforcement steel or the forms nor to concrete that has hardened to the degree that it does not become plastic when vibrated. The use of vibrators to transport concrete in the forms or conveying equipment will not be permitted. Vibration shall be supplemented by spading and hand tamping as necessary to ensure smooth and dense concrete along form surfaces, in corners, and around embedded items and waterstops.

3.5 JOINTS

A. Construction joints shall be made at the locations shown on the Drawings or at locations approved by the Purchaser. Where a feather edge would be produced at a construction joint, as in the top surface of a sloping wall, an insert form shall be used so that the resulting edge thickness on either side of the joint is not less than six inches.

B. Expansion and contraction joints shall be made only at locations shown on the Drawings. Exposed concrete edges at expansion and contraction joints shall be carefully tooled or chamfered, and the joints shall be free of mortar and concrete. Joint filler shall be left exposed for its full length with clean and true edges.

C. Expansion joints shall be placed as shown on the Drawings or as directed by the Purchaser. Joint surfaces shall be cleaned of all unsatisfactory concrete, form release agents, grease, oil, stains or debris prior to placement of joint filler.

D. Control joints (when specified) shall be constructed by the insertion of control joint formers in such a manner that the corners of the concrete will not be chipped or broken. The edges of the concrete at the joints shall be finished with an edging tool prior to removal of the top strip.

E. Preformed expansion joint filler shall be held firmly in the correct position against the form as the concrete is placed.

F. In walls and columns as each lift is completed, the top surfaces shall be immediately and carefully protected from any condition that might adversely affect the hardening of the concrete.

G. Steel tying and form construction adjacent to concrete in place shall not be started until the concrete has cured at least 12 hours. Before new concrete is deposited on or against concrete that has hardened, the forms shall be retightened. New concrete shall not be placed until the hardened concrete has cured at least 12 hours.

H. Surfaces of construction joints shall be cleaned of all unsatisfactory concrete, laitance, coatings, stains, or debris by washing and scrubbing with a wire brush or wire broom or by other means approved by the Purchaser. Vertical joints shall be thoroughly moistened immediately prior to placing concrete. Surfaces shall be kept moist for at least one hour prior to placement of new concrete. The new concrete shall be placed directly on the cleaned and washed surface.

I. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories. Install joint devices in accordance with manufacturer's instructions.

J. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, and waterstop are not disturbed during concrete placement.

K. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

L. Place concrete continuously between predetermined expansion, control, and construction joints.

3.6 WATERSTOPS

A. Install all waterstops in accordance with manufacturer’s recommendations. Lapping of waterstops, use of adhesives, or solvents shall not be allowed.

B. Field butt splices shall be heat fused welded using a Teflon coated thermostatically controlled waterstop welding iron at approximately 380 degrees F.

3.7 REMOVAL OF FORMS

A. Forms shall be removed in accordance with the requirements of Section 03100 - Concrete Formwork.

3.8 FINISHING FORMED SURFACES

A. All concrete surfaces shall be true and even, and shall be free from open or rough spaces, depressions, projections, or other defects in the specified surface finish or alignment. Depressions are measured as the distance from the concrete surface to the edge of a ten-foot long straight edge. Over tolerance depressions or projections will not be allowed to accumulate. Finishing of formed surfaces shall be as specified below and shall be performed immediately upon removal of forms.

B. Form removal shall be performed sequentially such that completion of finishing operations can be accomplished within **four hours** of form removal.

C. Backfilled Surfaces: Repair defective concrete, fill form tie holes and surface depressions deeper than 1 inch, and remove or smooth fins and abrupt projections which exceed 3/4 inch.

D. Exposed Surfaces: Repair defective concrete, fill all form tie holes, remove projections larger than 1/4 inch, and patch voids larger than ¾ inch wide or 1/2 inch deep.

E. All form bolts and ties shall be removed to a depth at least one inch below the surface of the concrete. The cavities produced by form ties and all other holes of similar size and depth shall be thoroughly cleaned and, after the interior surfaces have been kept continuously wet for at least three hours, shall be carefully packed with a dry patching mortar (pre-shrunk) mixed not richer than one part cement to three parts sand.

1. Holes left by form bolts or straps which pass through the wall shall be filled solid with mortar.

2. Patching mortar shall be thoroughly compacted into place to form a dense, well-bonded unit, and the in-place mortar shall be sound and free from shrinkage cracks. All patched areas shall be cured as specified in Subsection 3.10 of this Specification.

F. All concrete surfaces, except those surfaces which are required to be covered with earth, rock or concrete waterproofing compound shall be rubbed with a medium coarse carborundum stone using water for lubrication and cleaning. The rubbing shall be started as soon as possible after the forms are removed, patching is finished, and the patching mortar has set thoroughly. Rubbing shall be continued until all form marks, projections and irregularities have been removed and a uniform surface has been obtained. After rubbing is completed, the surface shall be washed to remove loose powder and shall be left free from unsound patches, paste, powder, and objectionable marks.

3.9 FINISHING UNFORMED SURFACES

A. All exposed surfaces of the concrete shall be accurately screeded to grade and then wood float finished immediately after the floated surface has hardened sufficiently to prevent an excess of fine material from being drawn to the surface. Excessive floating or troweling while the concrete is soft will not be permitted. The addition of dry cement or water to the surface of the screeded concrete to expedite finishing will not be allowed. Joints and edges on unformed surfaces that will be exposed to view shall be chamfered or finished with molding tools.

B. The top surfaces of all labyrinth walls (not including the radius) shall receive a heavy broom finish. The irregularities in the finish shall have an amplitude of approximately ¼ inch.

3.10 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Concrete shall be prevented from drying for a curing period of at least seven days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period. Moisture shall be maintained by sprinkling, flooding or fog spraying, or by covering with continuously moistened canvas, cloth mats, straw, sand or other approved material. Wood forms left in place during the curing period shall be kept wet. The use of curing compounds on Structural Concrete will not be permitted.

C. Formed surfaces shall be thoroughly wetted **immediately** after forms are removed and shall be kept wet until patching and repairs are completed. Water or covering shall be applied in such a way that the concrete surface is not eroded or otherwise damaged. Water for curing shall be clean and free from any substance that will cause discoloration of the concrete. Special care shall be given to cold weather curing so as to maintain the required concrete temperature.

D. Curing compound shall not be applied to surfaces requiring bond with subsequently placed concrete, such as construction joints, waterstops, reinforcing steel, and other embedded items.

3.11 CONCRETING IN COLD WEATHER

A. When the atmospheric temperature is less than 40 degrees F at the time concrete is delivered to the work site, during placement, or at any time during the curing period, perform Work in accordance with ACI 306R – Cold Weather Concreting.

B. The temperature of the concrete at time of placing shall not be less than 50 degrees F nor more than 90 degrees F. The temperature of neither aggregates nor mixing water shall be more than 100 degrees F just prior to mixing with the cement. No frozen materials nor materials containing ice shall be used.

C. Methods of insulating, housing and heating concrete shall be utilized to protect the work, in accordance with ACI 306R – Cold Weather Concreting. The temperature of the concrete and air adjacent to the concrete shall be maintained at not less than 50 degrees F nor more than 90 degrees F for the duration of the curing period.

D. When dry heat is used to protect concrete, means of maintaining an ambient humidity of at least 40 percent shall be provided unless the concrete has been coated with curing compound or is covered tightly with an approved impervious material. Concrete damaged by freezing shall be removed and replaced at the Contractor's expense.

3.12 CONCRETING IN HOT WEATHER

A. When climatic or other conditions are such that the temperature of the concrete may reasonably be expected to exceed 90 degrees F at the time of delivery at the work site, during placement, or during the first 24 hours after placement, perform Work in accordance with ACI 305R – Hot Weather Concreting.

B. The Contractor shall maintain the temperature of the concrete below 90 degrees F during mixing, conveying, and placing.

C. The concrete shall be placed in the work immediately after mixing. Truck mixing shall be delayed until only time enough remains to accomplish it before the concrete is placed.

D. Exposed concrete surfaces which tend to dry or set too rapidly shall be continuously moistened by means of fog sprays or otherwise protected from drying during the time between placement and finishing, and after finishing.

E. Finishing of slabs and other exposed surfaces shall be started as soon as the condition of the concrete allows and shall be completed without delay.

F. Concrete surfaces exposed to the air shall be covered as soon as the concrete has hardened sufficiently and shall be kept continuously wet for at least the first 24 hours of the curing period, and for the entire curing period unless curing compound is applied as specified below.

G. Formed surfaces shall be kept completely and continuously wet for the duration of curing period (prior to, during and after form removal) or until curing compound is applied as specified below.

H. If moist curing is discontinued before the end of the curing, period, curing compound shall be applied immediately, according to manufacturer’s recommendations. This does not apply to Structural Concrete.

3.13 FIELD QUALITY CONTROL

A. Provide free access to Work and cooperate with appointed firm.

B. Submit proposed mix design of each class of concrete to testing firm for review prior to commencement of Work.

C. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.

D. Sampling will be performed in accordance with ASTM C 172, except as noted herein. Tests of a portion of a batch may be made on samples representative of that portion for any of the following purposes:

1. Determining the uniformity of the batch.

2. Checking compliance with requirements for slump, air content, and temperature when the batch is discharged over an extended period of time.

3. When a pump or conveyor is used to transport the concrete, the concrete shall be sampled from the end of the pump hose or conveyor after the concrete has been transported.

F During the progress of the work, a set of seven (7) 4" x 8" cylinders shall be made for each 50 yards of concrete placed or fraction thereof with at least one set made for each day's placement of concrete. For each set of cylinders, one (1) shall be tested at seven days, two (2) will be tested at 14 days, three (3) will be tested at 28 days and one (1) will be held.

G Each cylinder will be properly labeled with an identifying mark. Report forms will indicate the mix proportions, air content, water content, slump, batching time, placing time and an adequate description of the location in the structure where the concrete was placed. The making and curing of test cylinders will be in accordance with ASTM C-31. Cylinders will be tested in accordance with ASTM C-39. The test result shall be the average of the strength of the three 28-day specimens, except that if one specimen in the test shows manifest evidence of improper sampling, molding, or testing it shall be discarded and the strengths of the remaining 2 specimens shall be averaged. Should more than one specimen representing a test show such defects, the entire test shall be discarded.

H One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.

I Slump and air content tests will be made of each batch and/or as frequently as directed as each truck arrives at the placement location. Slump tests will be made in accordance with requirements of ASTM C-143. Air content tests will be made in accordance with ASTM C-138 or ASTM C-231.

J Tests for determining the temperature of the freshly mixed concrete will be in accordance with ASTM C-1064.

K The Contractor shall plan his operations to allow adequate time for all required testing and inspection. The Contractor shall provide facilities necessary to obtain and handle representative samples of materials to be tested and furnish all necessary cooperation and assistance as requested by the Purchaser.

L The Purchaser may reject concrete batches for high slump, uncontrolled air entrainment, temperature outside the specified range, poorly mixed concrete or delays. Rejected concrete shall not be used at any location on the project.

M The Purchaser shall have free entry to the plant and equipment furnishing concrete under the contract. Proper facilities shall be provided for the Purchaser to inspect materials, equipment and processes and to obtain samples of the concrete. All tests and inspections will be conducted so as not to interfere unnecessarily with the manufacture and delivery of the concrete.

3.14 TOLERANCES AND ACCEPTANCE

A. Acceptance of the concrete work will be a cumulative acceptance process based upon progressively meeting the requirements of the Contract Documents for: (1) fresh concrete; (2) concrete strength and durability; (3) structure dimensions; and, (4) appearance.

B. Fresh Concrete: Fresh concrete conforming to the mix and quality requirements of Subsection 2.3, and handled and placed in accordance with this specification, will be considered satisfactory.

C. Concrete Strength: The average of any three consecutive strength tests shall be equal to or greater than the specified strength. In addition, no individual strength test (average of three cylinders) shall be more than 500 psi below the specified strength. When the number of tests made of any class of concrete total six or less, the average of all the tests shall be equal to or greater than shown in the following table:

No. Of Tests	**Required Ave. Strength, f'_c**
1	0.89
2	0.97
3	1.02
4	1.05
5	1.07
6	1.08

D Variations from Specified Lines, Grades, and Dimensions: The dimensions of formed members, unless otherwise specified, will be satisfactory if they conform to the requirements of ACI 117, Section 10, as modified by the following:

1. Cross sectional thickness at any point shall be between -0.25 inches and +0.5 inches.
2. Slope of all surfaces with respect to the specified plane shall not exceed the following amounts when measured with a 10 foot straightedge.
3. Vertical deviation shall be no more than 0.2 percent
4. Horizontal deviation shall be no more than 0.2 %.

E Structure Appearance: The appearance of the concrete will be satisfactory if it meets the requirements of Subsection 3.8.

3.15 REMOVAL OR REPAIR

A Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements. When concrete is honeycombed, damaged or otherwise defective, the Contractor shall remove and replace the structure or structural member containing the defective concrete, or correct or repair the defective parts. The Purchaser will determine the required extent of removal, replacement or repair.

B Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Purchaser for each individual area.

C Prior to starting repair work, the Contractor shall obtain the Purchaser's approval of his plan for making the repair. Such approval shall not be considered a waiver of the Purchaser's right to require complete removal of defective work if the completed repair does not produce concrete of the required quality and appearance.

D Repair work shall be performed only when the Purchaser is present.

E Repair of formed surfaces shall be started within 24 hours after removal of the forms. Except as otherwise approved by the Purchaser, the appropriate methods described in Chapter VII of the Concrete Manual, (Bureau of Reclamation, U.S. Department of Interior) shall be used. If approved in writing by the Purchaser, proprietary compounds for adhesion or as patching ingredients may be used. Such compounds shall be used in accordance with the manufacturer's recommendations.

F Curing shall be applied to repaired areas immediately after the repairs are completed.

G All removal and repair shall be performed at the Contractor's expense.

• END OF SECTION •

SECTION 03600

TREATMENT OF ROCK SURFACES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of preparing designated rock surfaces, including the specified dental excavation, and furnishing and placing of the specified treatment material as directed by the Purchaser.

1.2 RELATED SECTIONS

A. Section 02222, Excavation.

B. Section 02100, Control of Water.

1.3 MEASUREMENT AND PAYMENT

A. Not Used.

PART 2 PRODUCTS

2.1 MATERIALS

A. The cement grout shall be an admixture of cement, flyash, sand, and water having a minimum compressive strength of 2500 psi at 28 days. At the time of grout placement, the slump shall be in the range of 4 to 6 inches.

B. Cement shall be ASTM C150, Type I or II, low-alkali – Normal Portland type. Cement used throughout the work shall be uniform in color.

C. Unless otherwise specified pozzolans conforming to ASTM C618 Class F specification in amounts not to exceed 20 percent, based upon absolute volume, may be substituted for an equal amount of Portland cement in the grout mixture.

D. Aggregates shall conform to ASTM C33.

E. Water shall be free and clean of injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

PART 3 EXECUTION

3.1 PREPARATION AND CLEANING

A. Rock surfaces (i.e., cracks, fissures, holes, and solution channels exposed during excavation) to receive surface treatment shall be cleaned of all soil, soft or loose rock. The exact extent of dental excavation shall be determined in the field by the Purchaser.

B. The surfaces to receive dental concrete shall be cleaned by air-water cutting, water jetting, wire brush scrubbing, or other methods necessary to obtain an acceptable surface. The cleaned surfaces should be in such condition to make readily visible all features and irregularities associated with the foundation.

C. Contractor to utilize a vacuum truck which is capable of handling water, loose soil and rock up to three inches in diameter to assist in cleaning rock foundations.

D. Rock surfaces shall be free of standing or running water during the placement of the surface treatment material.

E. Notify Purchaser at least 24 hours in advance of any area being prepared for inspection. Final cleanup of rock surfaces shall be subject to approval by the Purchaser.

3.2 PLACEMENT

A. Surface treatment materials shall be delivered to the site and placed within 1-1/2 hours after the introduction of water to the cement.

B. When climatic or other conditions are such that the temperature of the concrete may reasonably be expected to exceed 90 degrees F at the time of delivery at the worksite, during placement or during the first 24 hours after placement, the time between the introduction of water to the cement and time of concrete placement shall not exceed 45 minutes unless the treatment materials contain an approved set retarding admixture.

C. Treatment materials shall not be dropped more than five feet vertically.

D. Treatment materials shall not be placed until the rock surfaces have been inspected and approved by the Purchaser.

E. Formwork may be required in some areas while placing dental concrete.

F. No finishing is required for dental concrete. The surface of the dental concrete shall be treated as a cold joint.

G. All cracks, fissures, solution channels, and holes to receive surface treatment shall be kept wet for at least two hours immediately prior to treatment.

H. Wet all surfaces to receive dental concrete immediately prior to placement. Remove all standing water prior to placement.

I. Concrete may be filled against any specified remaining rock surfaces that exceed the slope limitation of 1H to 1V and shall be shaped such that the finished surface of the concrete does not exceed a 1H to 1V slope.

J. The dental concrete shall not have feathered or sharp edges. All edges shall be rounded.

K. Materials placed shall be consolidated by vibration, spading, or tamping as necessary to assure complete filling of the opening.

L. Soil may be backfilled over the dental concrete after three days.

3.3 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury.

B. Dental concrete placed in accordance with the plans and specifications shall be kept continuously moist for seven days after it is placed unless curing compound is applied.

C. Exposed surfaces shall be kept continually moist for the entire period. Moisture shall be maintained by sprinkling, flooding or fog spraying, or by covering with continuously moistened canvas, cloth mats, straw, sand or other approved material. Wood forms left in place during the curing period shall be kept wet.

D. Formed surfaces shall be thoroughly wetted immediately after forms are removed and kept wet for duration of curing period. Water or covering shall be applied in such a way that the concrete surface is not eroded or otherwise damaged. Water for curing shall be clean and free from any deleterious substances. Special care shall be given to cold weather curing so as to maintain the required concrete temperature.

• END OF SECTION •

SECTION 15800

INSTRUMENTATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Furnishing and installing devices for measuring pore water pressures within the embankment dam and foundation.

B. Furnishing and installing permanent benchmarks as shown on the Drawings.

1.2 RELATED SECTIONS

A. Section 02100, Control of Water

B. Section 02201, Earthfill

C. Section 02222, Excavation

1.3 MEASUREMENT AND REIMBURSEMENT

A. Not Used.

1.4 REFERENCES

A. ASTM C-33 – Aggregate

B. American Colloid Company – Bentonite

C. Slope Indicator Company – Water Level Indicator, Bentonite Pellets

1.5 QUALITY ASSURANCE

A. The Purchaser will test the completed piezometers upon notification from the Contractor that the system is ready for test. If inspection or tests show defects, such defective work or material shall be replaced and inspection and tests repeated.

PART 2 PRODUCTS

2.1 GENERAL

A. The use of the manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired only.

B. Furnish Miscellaneous Items.

2.2 MATERIALS

A. Piezometers. The piezometers shall be the standpipe as shown on the Drawings.

B. Water Level Indicator. The water level indicator shall be similar to the Model 51690012 Water Level Indicator as manufactured by Durham Geo-Enterprises, Stone Mountain, Georgia, for approved equal.

C. Bentonite Pellets. Bentonite pellets shall be similar to Baroid Bentonite Pellets as manufactured by Baroid Industrial Drilling Products, Houston, Texas, or approved equal.

D. Granular Bentonite. Granular bentonite shall be high swelling bentonite similar to grade No. 55, Volclay, manufactured by American Colloid Company, Skokie, Illinois, or an approved equal.

E. Sand. Sand shall conform to the requirements of ASTM Specification C-144, Aggregate for Masonry Mortar or ASTM Specification C-33, fine aggregate.

F. Cement-Bentonite Grout. Grout to be used in the decommissioning of existing piezometers shall be a Portland cement-bentonite grout with a grout mix as follows: one sack of Class A Portland Cement (94-lb sack), two pounds of dry sodium bentonite powder, and 6.5 to 7.5 gallons of potable water.

PART 3 EXECUTION

3.1 INSTALLATION

A. The installation of the piezometers shall be as shown on the Drawings. The exact locations for their installation will be selected by the Purchaser.

B. Acceptance of the piezometers installations as being complete will not relieve the Contractor of the responsibility of protecting the installation from damage due to his construction operations. Any damage as a result of the Contractor's operations shall be repaired by the Contractor at the Contractor's expense.

• END OF SECTION •