

**JOINT**  
**PUBLIC NOTICE**

**CHARLESTON DISTRICT, CORPS OF ENGINEERS**  
**1835 Assembly Street, Room 865B-1**  
**Columbia, South Carolina 29201**

and

**THE S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL**  
**Water Quality Certification and Wetlands Section**  
**2600 Bull Street**  
**Columbia, South Carolina 29201**

REGULATORY DIVISION

Refer to: P/N SAC-2019-00062

DATE October 29, 2019

Pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), Sections 401 and 404 of the Clean Water Act (33 U.S.C. 1341), and the S.C. Construction in Navigable Waters Permit Program (R. 19-450, et. seq., 1976 S.C. Code of Laws, as amended), an application has been submitted to the Department of the Army and the South Carolina Department of Health and Environmental Control by

**Mr. Tim Huffman**  
**Duke Energy Carolinas, LLC.**  
**526 S. Church Street. Mail Code EC10C**  
**Charlotte, North Carolina 28202**

for a permit to modify the existing water control structures known as the Great Falls Diversion Dam Long Bypassed Reach (LBR), and the Great Falls-Dearborn Headworks Spillway Short Bypassed Reach (SBR), to comply with minimum flow releases and recreational commitments as stipulated in the Comprehensive Relicensing Agreement (CRA) for the Catawba-Wateree Hydro Project No. 2232-522 (dated December 22, 2006 which is included in the new operating license issued by the FERC on November 25, 2015.

**CATAWBA RIVER AND GREAT FALLS RESERVOIR**

located at the Great Falls Diversion Dam LBR, and the Great Falls-Dearborn Headworks Spillway SBR, Lancaster AND Chester Counties, South Carolina (Latitude: 34.5963°, Longitude: - 80.8896°), **Great Falls**.

In order to give all interested parties an opportunity to express their views

**NOTICE**

is hereby given that written statements regarding the proposed work will be received by the **Corps** until

**30 Days from the Date of this Notice,**

and **SCDHEC** will receive written statements regarding the proposed work until

**30 Days from the Date of this Notice**

from those interested in the activity and whose interests may be affected by the proposed work.

The purpose of the Project is to comply with commitments for minimum flow and recreational flow releases made by Duke Energy in the Comprehensive Relicensing Agreement (CRA), which is included in the new operating license issued by the FERC on November 25, 2015. Per the CRA, the Duke (Licensee) must provide recreational flow releases in accordance with FERC-approved Recreation Management Plans of at least 2,940 cubic feet/second (cfs) into the Great Falls Long Bypassed Reach and at least 2,860 cfs into the Great Falls Short Bypassed Reach based on the Great Falls Dearborn Development Recreational Flow Schedule. The proposed work would consist of modifying existing water control structures known as the Great Falls Diversion Dam LBR, and the Great Falls-Dearborn Headworks Spillway SBR, to provide the minimum flow releases and recreational commitments in the CRA for the Catawba-Wateree Hydro Project No. 2232-522 (dated December 22, 2006). In detail, the overall project contains three main components, which will impact waters of the U.S. are the subject of this notice. Combined, the proposed permanent impacts to waters of the U.S. total approximately 1.88 acres of riverbed of the Catawba River that is currently "bypassed" due to existing water control structures. The entire project is within the FERC Catawba-Wateree Hydro Project No. 2232-522 and was included in the Final Environmental Impacts Statement for Hydropower License, FERC/FEIS-0228F, dated July 2009.

The following is a summary of the three major components subject to this notice:

Component 1: Long Bypassed Reach Weirs and Diversion Structures at the Great Falls Diversion Dam: The existing Great Falls Diversion Dam would be modified by installing two weirs in the existing structure adjacent to the dam's southwest abutment (right abutment as looking downstream). The left weir (referenced as looking downstream) would be used to pass mandated minimum flows (450 cfs and 850 cfs depending on season) into the Main Flow Channel, and would be constructed on the Great Falls Diversion Dam, and would extend slightly outside of the original footprint into the riverbed of the bypassed Catawba River in that area. The left weir would also be utilized in conjunction with the right weir to pass the mandated 2,860-2,940 cfs recreational flow. Recreational flows would be released according to applicable Recreation Management Plans, and would typically be released on specified Saturdays and/or Sundays. The right weir would provide safe passage to boaters only under the recreational flow release into the smaller Boater Bypass Flow Channel, and would be constructed on the existing Great Falls Diversion Dam, and extending slightly outside of the original footprint into the bypassed Catawba River riverbed. Water from the Main Flow Channel and the Boater Bypass Flow Channel would discharge into the LBR. Construction of the left and right weirs would require partial excavation of the existing concrete Great Falls Diversion Dam at the proposed locations. The Main Flow Channel and the Boater Bypass Flow Channel would be constructed of concrete and natural rock fill overlying the bedrock riverbed immediately downstream of the dam. Localized, limited excavation of topographically high bedrock along the riverbed would be required within both proposed channels. Approximately 375 cubic yards of concrete and bedrock excavation within an approximate 0.05-acre footprint would be required at the two weirs and channels. It is anticipated that approximately 13,900 cubic yards of concrete and natural rock boulder fill placement would be required to construct the two proposed weirs and channels. Proposed work for the Main Flow Channel Outlet, LBR Weirs, and Diversion Structures would include fill within 1.54 acres of the bypassed Catawba River riverbed, downstream of the existing dam. The footprint of that portion of the proposed work at would extend approximately 240 linear feet from the existing dam at the widest point of the proposed project footprint.

Component 2: Roller Compacted Concrete Haul Road at the Great Falls Diversion Dam: A roller compacted concrete (RCC) haul road would provide construction access to the work area immediately below the downstream toe of the existing Great Falls Diversion Dam. The proposed 14-foot-wide, approximately 1,500-foot-long haul road would be installed on bedrock between the east abutment and the work area. The haul road turnaround/laydown area would extend approximately 60 feet from the toe of the dam into the LBR. The haul road including the turnaround/laydown area would result in approximately 0.34 acre of permanent fill impacts to the bypassed streambed, and would require approximately 6,290 cubic yards of concrete. The applicant has stated that the RCC haul road would be relatively maintenance free during construction and is expected to withstand water flow several feet deep without degradation. The RCC haul road could be incorporated into the concrete mass of the flow structures as construction of those flow structures proceeds from west to east along the toe of the dam. The RCC haul road would remain in place after completion of construction as a permanent feature of the Project.

Component 3: Short Bypassed Reach Obermeyer Gates at the Great Falls-Dearborn Headworks: To accomplish the mandated recreational flow releases at the SBR, a section of new Obermeyer-type hinge gates would replace approximately 140 feet of the existing damaged wooden flash boards at the Great Falls-Dearborn Spillway SBR. The proposed Obermeyer gate system would be 7 feet high to facilitate the required recreational flow releases. Additionally, the remainder of the wood flashing would be replaced using Obermeyer gates of similar height to the above to ensure the proper passage of flood flows. No direct fill impacts to the reservoir or SBR are proposed for this portion of the proposed project.

The applicant has proposed no mitigation for impacts to wetlands and/or waters of the United States due to the overall benefits to water quality and additional physical habitat for fish and wildlife by restoring flow to riverbed channel. The project purpose according to the applicant is to comply with minimum flow releases and recreational commitments as stipulated in the Comprehensive Relicensing Agreement (CRA) for the Catawba-Wateree Hydro Project No. 2232-522 (dated December 22, 2006).

**NOTE: This public notice and associated plans are available on the Corps' website at:**  
<http://www.sac.usace.army.mil/Missions/Regulatory/PublicNotices> .

The District Engineer has concluded that the discharges associated with this project, both direct and indirect, should be reviewed by the South Carolina Department of Health and Environmental Control in accordance with provisions of Section 401 of the Clean Water Act. As such, this notice constitutes a request, on behalf of the applicant, for certification that this project will comply with applicable effluent limitations and water quality standards. The work shown on this application must also be certified as consistent with applicable provisions of the Coastal Zone Management Program (15 CFR 930).

This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. Implementation of the proposed project would impact 1.88 acres of freshwater habitat well inland of estuarine substrates and emergent wetlands utilized by various life stages of species comprising the shrimp, and snapper-grouper management complexes. The District Engineer's initial determination is that the proposed action would not have a substantial individual or cumulative adverse impact on EFH or fisheries managed by the South Atlantic Fishery Management Council and the National Marine Fisheries Service (NMFS). The District Engineer's final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the NMFS.

Pursuant to the Section 7 of the Endangered Species Act of 1973 (as amended), the Corps has reviewed the project area, examined all information provided by the applicant, and the District Engineer has determined that the project is not likely to adversely affect the Carolina heelsplitter (*Lasmigona decorate*) a Federally endangered species that may be present in the vicinity of the project. Furthermore, the District Engineer has determined that the project will have no effect on other Federally endangered, threatened, or proposed species and will not result in the destruction or adverse modification of designated or proposed critical habitat. This public notice serves as a request for written concurrence from the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service on this determination.

In accordance with Section 106 of the NHPA, the District Engineer has consulted South Carolina ArchSite (GIS), for the presence or absence of historic properties (as defined in 36 C.F.R. 800.16)(I)(1)), and has initially determined that historic properties, are present; moreover, these historic properties may be affected by the undertaking. This public notice serves to notify the State Historic Preservation Office that the Corps plans to initiate Section 106 consultation on these historic properties. Individuals or groups who would like to be consulting parties for the purposes of the NHPA should make such a request to the Corps in writing within 30 days of this public notice. To ensure that other historic properties that the District Engineer is not aware of are not overlooked, this public notice also serves as a request to the State Historic Preservation Office and other interested parties to provide any information they may have with regard to historic properties.

The District Engineer's final eligibility and effect determination will be based upon coordination with the SHPO and/or THPO, as appropriate and required and with full consideration given to the proposed undertaking's potential direct and indirect effects on historic properties within the Corps-identified permit area.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for a public hearing shall state, with particularity, the reasons for holding a public hearing.

The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the activity on the public interest. The benefit which reasonably may be expected to accrue from the project must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the project will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, flood plain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production and, in general, the needs and welfare of the people. A permit will be granted unless the District Engineer determines that it would be contrary to the public interest. In cases of conflicting property rights, the Corps cannot undertake to adjudicate rival claims.

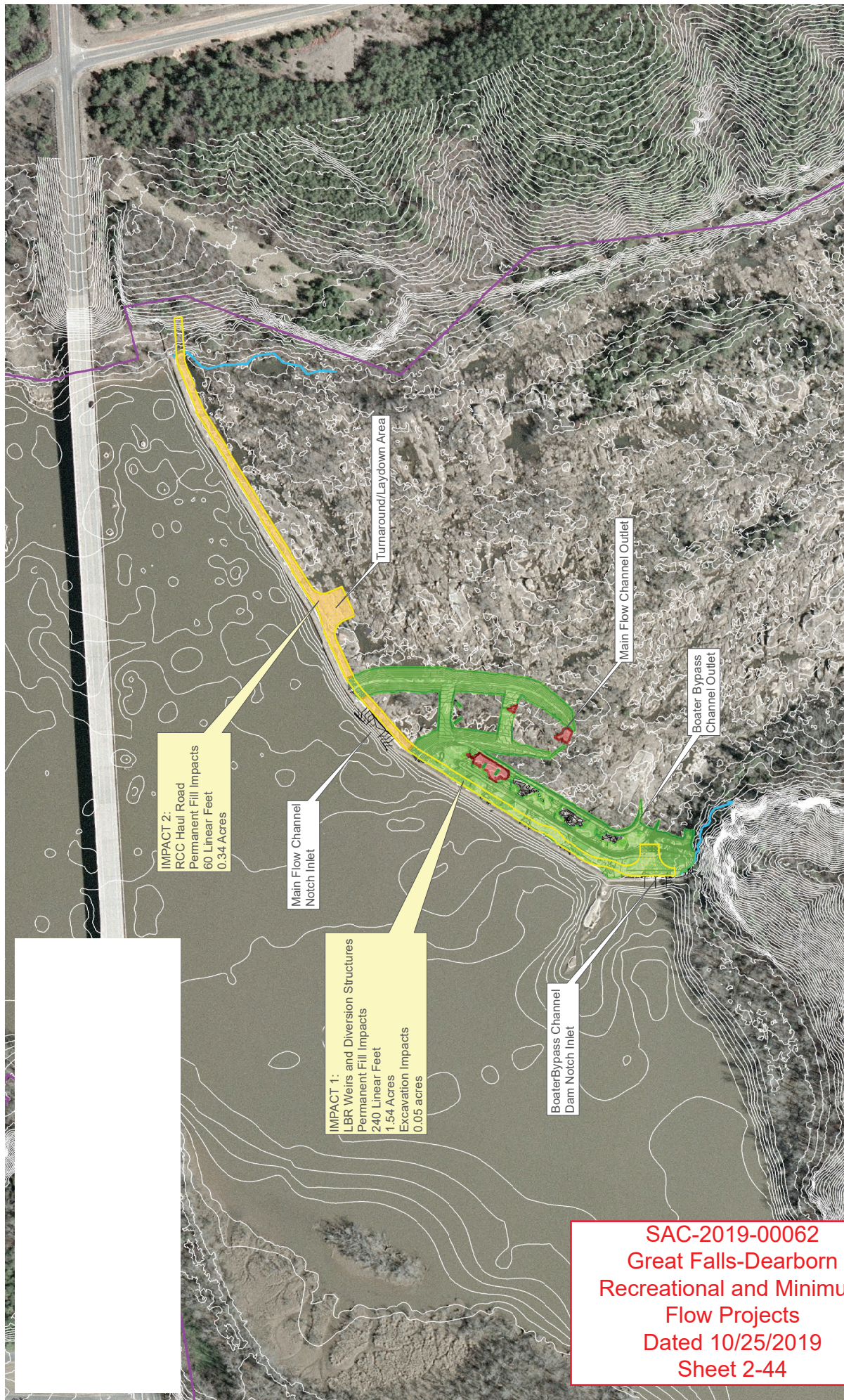
The Corps is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this project. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the

preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the activity. **Please submit comments in writing, identifying the project of interest by public notice number, to the following address:**

**U.S. Army Corps of Engineers  
ATTN: REGULATORY DIVISION  
1835 Assembly Street, Room 865B-1  
Columbia, South Carolina 29201**

If there are any questions concerning this public notice, please contact Jonathan Swartz, Project Manager, at (803) 253-3906, or by email at [Jonathan.M.Swartz@usace.army.mil](mailto:Jonathan.M.Swartz@usace.army.mil).





**IMPACT 2:**  
 RCC Haul Road  
 Permanent Fill Impacts  
 60 Linear Feet  
 0.34 Acres

Main Flow Channel  
 Notch Inlet

**IMPACT 1:**  
 LBR Weirs and Diversion Structures  
 Permanent Fill Impacts  
 240 Linear Feet  
 1.54 Acres  
 Excavation Impacts  
 0.05 acres

Boater Bypass Channel  
 Dam Notch Inlet

Main Flow Channel Outlet

Boater Bypass  
 Channel Outlet

Turnaround/Laydown Area

**SAC-2019-00062**  
**Great Falls-Dearborn**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 2-44**

**GREAT FALLS-DEARBORN RECREATIONAL AND MINIMUM FLOW PROJECTS**  
**LONG BYPASSED REACH IMPACTS**

**FIGURE 3**

SAC-2019-00062 - INDIVIDUAL PERMIT

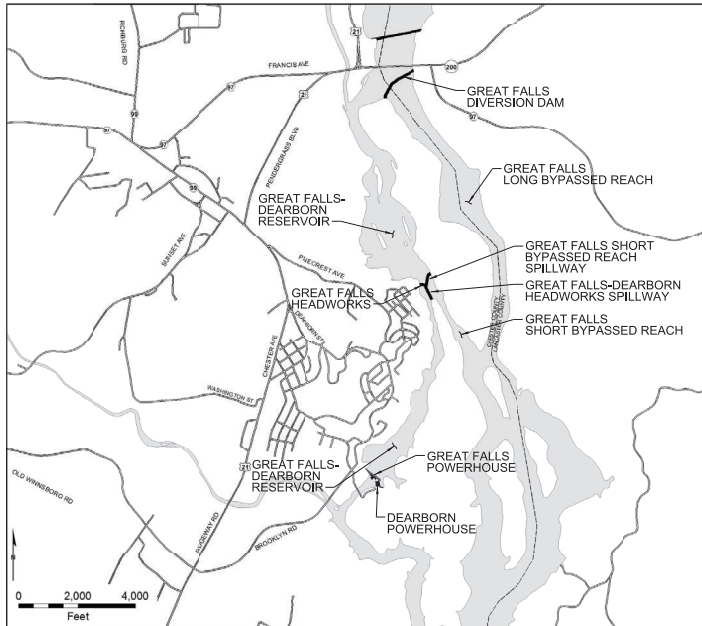
FILE: \\S:\GIS\PROJECTS\2019\201906\GREAT FALLS-DEARBORN\201906\IMPACTS\IMPACTS\_1\IMPACTS\_1\_102519.DWG DATE: 10/25/19



# ISSUED FOR 70% S<sub>2</sub>O REVIEW



HDR Engineering, Inc. of the Carolinas



Contract Drawings For

## DUKE ENERGY CAROLINAS, LLC

### Great Falls Hydro Station (FERC No. 2232)

#### Great Falls Long Bypassed Reach And Great Falls Diversion Dam Minimum Flow and Recreation Release Structures

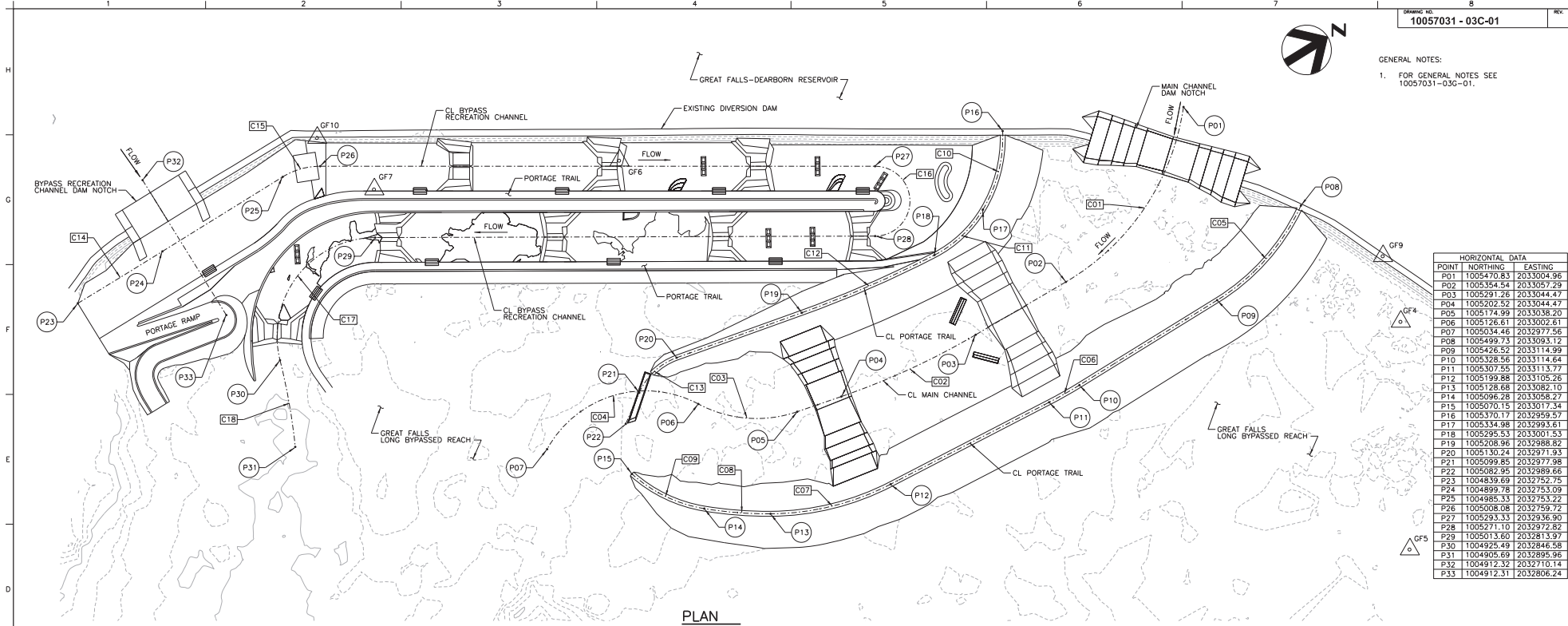
HDR Project No.  
10057031

Chester County, South Carolina  
September, 2019

SAC-2019-00062  
Great Falls-Dearbourn  
Recreational and Minimum  
Flow Projects  
Dated 10/25/2019  
Sheet 3-44



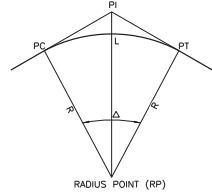
GENERAL NOTES:  
1. FOR GENERAL NOTES SEE 10057031-03C-01.



PLAN  
SCALE: 1"=30'

HORIZONTAL DATA		
POINT	NORTHING	EASTING
P01	1005470.83	2033004.96
P02	1005354.54	2033057.29
P03	1005291.26	2033044.47
P04	1005202.52	2033044.47
P05	1005174.99	2033038.20
P06	1005126.61	2033002.61
P07	1005034.46	2032977.56
P08	1004987.75	2033093.12
P09	1005426.52	2033114.99
P10	1005328.56	2033114.64
P11	1005307.55	2033113.77
P12	1005199.88	2033105.26
P13	1005128.68	2033082.10
P14	1005096.28	2033058.27
P15	1005070.15	2033017.34
P16	1005370.17	2032959.57
P17	1005334.98	2032993.61
P18	1005295.53	2033001.53
P19	1005208.96	2032988.82
P20	1005130.24	2032971.93
P21	1005099.85	2032977.98
P22	1005082.95	2032989.66
P23	1004839.69	2032752.75
P24	1004899.78	2032753.09
P25	1004985.33	2032753.22
P26	1005008.08	2032759.72
P27	1005293.33	2032936.90
P28	1005271.10	2032972.82
P29	1005013.60	2032813.97
P30	1004925.69	2032846.58
P31	1004905.69	2032895.96
P32	1004912.32	2032710.14
P33	1004912.31	2032806.24

CONTROL POINT LOCATION TABLE					
INITIAL COORDINATE VALUES (DATE SURVEYED: 7/2017)					
CONTROL POINT NUMBER	MON TYPE	NAD83 (2011)		NGVD29 DATUM ELEVATION (FT.)	REMARKS
		SOUTH CAROLINA STATE PLANE N (FT.)	E (FT.)		
AA3974		1005950.58	2032295.84	378.68	NGS POINT
GF4		1005513.79	2033184.63	346.24	
GF5		1005445.79	2033304.52	346.41	
GF6		1005163.51	2032852.32	346.67	
GF7		1005028.27	2032788.86	342.57	
GF9		1005525.58	2033145.26	355.59	
GF10		1005015.39	2032744.14	355.75	



CURVE DATA						
CURVE	ORIGIN POINT OF		RADIUS (RP)	PC	PT	RADIUS
	NORTHING	EASTING				
C01	1005358.37	2032910.43	P01	P02	146.91	
C02	1005303.06	2032603.62	P03	P04	452.17	
C03	1005191.75	2032964.73	P05	P06	75.35	
C04	1005067.84	2033036.79	P06	P07	67.99	
C05	1005426.99	2032983.05	P08	P09	131.94	
C06	1005329.56	2032985.31	P10	P11	279.33	
C07	1005212.52	2032945.36	P12	P13	160.40	
C08	1005253.23	2032878.23	P13	P14	239.15	
C09	1005153.29	2032993.06	P14	P15	86.62	
C10	1005301.40	2032928.53	P16	P17	84.90	
C11	1005296.05	2032918.16	P17	P18	73.23	
C12	1005349.10	2032335.59	P18	P19	668.09	
C13	1005122.05	2033010.11	P20	P21	39.05	
C14	1004910.19	2025614.63	P23	P24	7138.47	
C15	1004985.25	2032796.45	P25	P26	43.23	
C16	-	-	P27	P28	21.12	
C17	1004982.30	2032864.72	P28	P29	59.63	
C18	1004575.63	2032734.94	P29	P30	367.24	

LEGEND  
△ EXISTING CONTROL MONUMENT (CONTROL POINT)



SAC-2019-00062  
Great Falls-Dearborn  
Recreational and Minimum  
Flow Projects  
Dated 10/25/2019  
Sheet 4-44



PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING

DRAWN BY: PT DUNNE	CIVIL	DUKE ENERGY CAROLINAS, LLC
DESIGNED BY: DL ARNOLD	MECHANICAL	GREAT FALLS-DEARBORN HYDRO STATIONS
CHECKED BY:	ELECTRICAL	GREAT FALLS LONG BYPASSED REACH AND GREAT FALLS DIVERSION DAM
APPROVED BY:	DATE:	MIN FLOW & RECREATION RELEASE STR SITE PLAN
70% S20 REVIEW	PTD DLA --- -- -- --	SCALE: AS NOTED
DRN GSHZ CHKD APPR CIVL ELEC MECH	PROJECT NUMBER: 10057031	DATE: 10/25/2019
REVISION		DRWING/SHEET NO. 10057031 - 03C-01

PROJECT NOTES:

- P1. THESE DRAWINGS ARE FOR THE CONSTRUCTION OF THE LONG BYPASSED REACH MINIMUM AND RECREATION FLOW STRUCTURES. WORK THESE DRAWINGS WITH THE GREAT FALLS-DEARBORN DIVERSION BYPASS WATERWAY DESIGN DRAWINGS BY S20 ISSUED OCTOBER 2018.
- P2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.
- P3. DIMENSIONS, ELEVATIONS, AND DETAILS OF EXISTING STRUCTURES ARE BASED ON HISTORICAL DRAWINGS, FIELD MEASUREMENTS, AND AERIAL LIDAR SURVEY PERFORMED BY MASER CONSULTING P.A. IN JULY 2017. THE CONTRACTOR SHALL FIELD VERIFY DIMENSIONS AND DETAIL INFORMATION FOR EXISTING STRUCTURES SHOWN ON THE DRAWINGS PRIOR TO DETAILING, FABRICATION, AND CONSTRUCTION. ANY DEVIATIONS FROM WHAT IS NOTED ON THE DRAWINGS SHALL BE REPORTED IN WRITING TO THE ENGINEER.
- P4. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH HDR SPECIFICATION SPEC-01-10057031-02. IN THE CASE OF CONFLICTS BETWEEN THE SPECIFICATIONS AND THE DRAWINGS, THE OWNER SHALL BE NOTIFIED IN WRITING TO RESOLVE THE DISCREPANCY PRIOR TO PROCEEDING WITH DETAILING, FABRICATION, OR CONSTRUCTION.
- P5. SHOP DRAWINGS SHALL BE PREPARED BASED ON INFORMATION FIELD VERIFIED BY THE CONTRACTOR AND DRAWINGS RELEASED FOR CONSTRUCTION BY THE ENGINEER. SHOP DRAWINGS PREPARED USING UNVERIFIED INFORMATION AND/OR DRAWINGS NOT RELEASED FOR CONSTRUCTION MAY BE RETURNED WITHOUT REVIEW.
- P6. STRUCTURAL FILL SHALL BE PROOF-ROLLED IMMEDIATELY PRIOR TO CONSTRUCTION OF THE BASE SLAB TO SIX INCHES OF CRUSHER RUN SHALL BE PLACED ON PREPARED SUBGRADE.
- P7. CONTRACTOR SHALL CONDUCT THEIR OPERATIONS IN SUCH A MANNER AS NOT TO INTERFERE WITH ACCESS TO OR OPERATIONS OF OTHER PROJECT FACILITIES.

SURVEY NOTES:

- SN1. REFERENCED HORIZONTAL PLANE COORDINATES ARE REFERENCED TO NAD83, 2011, SOUTH CAROLINA STATE PLANE, INTERNATIONAL FEET.
- SN2. ELEVATIONS SHOWN ARE REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29) SUBTRACT 8.8 FEET FROM ELEVATIONS FOR ORIGINAL PLANT DATUM.
- SN3. ELEVATIONS ON REFERENCE DRAWINGS ARE REFERENCED TO ORIGINAL PLANT DATUM. ADD 8.8 FEET TO REFERENCE DRAWING ELEVATIONS TO OBTAIN NGVD29 ELEVATIONS.
- SN4. SURVEY INFORMATION WAS OBTAINED BY AN AERIAL LIDAR SURVEY PERFORMED BY MASER CONSULTING P.A. ON JULY 10 AND 11, 2017.
- SN5. PROJECT CONTROL POINT LOCATIONS, COORDINATES, AND ELEVATIONS ARE SHOWN ON DRAWING 030-01.
- SN6. CARE SHALL BE TAKEN NOT TO DISTURB SURVEY MONITORING PINS WHILE WORKING OR ACCESSING THE WORK AREA. CONTRACTOR SHALL REPLACE ANY MONITORING PINS DAMAGED BY THE WORK AT CONTRACTOR'S EXPENSE. LOCATION OF NEW PINS SHALL BE DETERMINED BY OWNER.

DESIGN NOTES:

- D1. REINFORCED CONCRETE DESIGN WAS PERFORMED IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, ACI 318-14.
- D2. STRUCTURES ARE DESIGNED FOR A MAXIMUM HEADWATER ELEVATION OF 360.8 FEET.

PROJECT SIGNAGE NOTES:

- PS1. PERMANENT PROJECT SIGNAGE LOCATIONS SHALL BE DETERMINED BY OWNER.

DEMOLITION NOTES:

- D1. THE CONTRACTOR SHALL DISPOSE OF ALL REMOVED AND DEMOLISHED MATERIALS IN ACCORDANCE WITH THE PROJECT PERMITS AND ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS.
- D2. THE CONTRACTOR SHALL PREVENT DEMOLISHED MATERIALS FROM ENTERING THE WATERWAY IN ACCORDANCE WITH THE APPROVED PROJECT POLLUTION CONTROL PLAN, WHICH SHALL BE SUBMITTED BY THE CONTRACTOR TO THE OWNER FOR APPROVAL PRIOR TO THE START OF DEMOLITION ACTIVITIES.
- D3. DEMOLITION OF MAIN AND BYPASS CHANNEL NOTCHES IN EXISTING DIVERSION DAM SHALL BE AFTER COMPLETION OF ALL MAIN AND BYPASS CHANNEL STRUCTURES.

ROCK EXCAVATION NOTES:

- RE1. ROCK EXCAVATION PLAN SHALL BE SUBMITTED TO THE OWNER FOR APPROVAL PRIOR TO START OF CONSTRUCTION.
- RE2. BLASTING OF BEDROCK IS NOT PERMITTED.
- RE3. CONTRACTOR SHALL TAKE CARE TO NOT DAMAGE EXISTING CONCRETE DURING ROCK EXCAVATION NEAR THE TOE OF THE EXISTING DIVERSION DAM.
- RE4. LOCALIZED AREAS OF ROCK EXCAVATION NOT SHOWN ON THE DRAWINGS MAY BE REQUIRED AS DETERMINED BY S20 DURING CONSTRUCTION.

ROLLER COMPACTED CONCRETE (RCC) NOTES:

- RCC1. THE ROLLER COMPACTED CONCRETE (RCC) HAUL ROAD SHALL BE DESIGNED FOR HEAVY CONSTRUCTION TRAFFIC. CONTRACTOR SHALL SUBMIT HAUL ROAD DESIGN BASIS CRITERIA INCLUDING CALCULATIONS AND DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO PLACEMENT.
- RCC2. RCC SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 5000 PSI WITH STRENGTH VERIFIED BY TESTING OF CYLINDERS REPRESENTATIVE OF IN PLACE RCC.
- RCC3. RCC MIX PROPORTIONS SHALL BE DEVELOPED IN ACCORDANCE WITH STANDARD INDUSTRY PRACTICE AND SHALL BE SUBMITTED TO THE OWNER FOR APPROVAL PRIOR TO PLACEMENT.
- RCC4. RCC SUBGRADE PREPARATION, BATCHING, TRANSPORTING, PLACEMENT, COMPACTION AND CURING SHALL BE IN ACCORDANCE WITH STANDARD INDUSTRY PRACTICE AND THE GUIDELINES PRESENTED IN THE GUIDE FOR ROLLER-COMPACTED CONCRETE PAVEMENTS BY PORTLAND CEMENT ASSOCIATION, AUGUST 2010.

CONCRETE NOTES:

- C1. CONCRETE MIX PROPORTIONS SHALL BE DEVELOPED IN ACCORDANCE WITH ACI 301 AND SHALL BE SUBMITTED TO THE OWNER AND APPROVED PRIOR TO ANY PLACEMENT.
- C2. THE CONTRACTOR SHALL ENGAGE AN INDEPENDENT TESTING LAB TO TAKE SAMPLES AND TEST IN ACCORDANCE WITH ACI REQUIREMENTS.
- C3. PLACE AND CURE CONCRETE IN ACCORDANCE WITH ACI 301. COLLECT TWELVE CONCRETE CYLINDERS FOR COMPRESSIVE STRENGTH TESTING FOR EACH DAYS PLACEMENT. TEST THREE OF THE CONCRETE SPECIMENS AT SEVEN, FOURTEEN AND TWENTY-EIGHT DAYS AND HOLD THREE SPECIMENS IN RESERVE.
- C4. ALL CONCRETE WORK, INCLUDING BATCHING, MIXING, TRANSPORTING, PLACING, FINISHING, CURING, AND REPAIR SHALL CONFORM TO ACI 301 REQUIREMENTS.
- C5. THE NOMINAL MAX AGGREGATE SIZE SHALL BE 3/4 INCH, UNLESS SPECIFIED OTHERWISE OR APPROVED BY THE ENGINEER.
- C6. CEMENT SHALL BE TYPE II CONFORMING TO ASTM C150 UNLESS OTHERWISE APPROVED BY THE ENGINEER.
- C7. CONCRETE MINIMUM 28 DAY COMPRESSIVE STRENGTH SHALL BE 5000 PSI WITH STRENGTH VERIFIED BY TESTING OF CYLINDERS REPRESENTATIVE OF IN PLACE CONCRETE.
- C8. ALL EXPOSED EDGES SHALL BE CHAMFERED 3/4" UNLESS NOTED OTHERWISE.
- C9. SUBMIT A CONCRETE PLACEMENT PLAN MEETING REQUIREMENTS OF THE PROJECT SPECIFICATIONS.
- C10. JOINT MATERIALS SHALL BE IN ACCORDANCE WITH PROJECT SPECIFICATIONS.
- C11. WATERSTOPS SHALL BE GREENSTREAK WATERSTOPS AS MANUFACTURED BY SIKA CORPORATION, OR AN ENGINEER APPROVED EQUAL.  
WATERSTOP-PVC WATERSTOP NO. 701  
RETROFIT WATERSTOP-PVC WATERSTOP, NO. 581  
HYDROPHILIC STRIP WATERSTOP: HYDROTITE CJ-1020-2K  
WATERSTOPS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- C12. LOW STRENGTH CONCRETE MAY BE PLACED AS CONCRETE FILL AS NOTED ON DRAWINGS. LOW STRENGTH CONCRETE 28 DAY COMPRESSIVE STRENGTH SHALL BE 2500 PSI. MATERIAL MIX PROPORTIONS SHALL BE DEVELOPED BY TRIAL BATCH METHOD. SUBMIT WRITTEN REPORTS TO OWNER FOR APPROVAL PRIOR TO STARTING WORK. ALTERNATIVELY, THE CONCRETE MIX SPECIFIED FOR ADJACENT STRUCTURES MAY BE PLACED IN LIEU OF THE LOW STRENGTH CONCRETE.
- C13. TOP-CAST TOP SURFACE RETARDER BY GCP APPLIED TECHNOLOGIES SHALL BE APPLIED TO ALL CONCRETE SURFACES IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

REINFORCING NOTES:

- R1. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, UNLESS NOTED OTHERWISE.
- R2. REINFORCING STEEL CLEAR COVER REQUIREMENTS:  
A. 4" WATER PASSAGE SURFACES.  
B. 3" CAST AGAINST EARTH AND PERMANENTLY EXPOSED EARTH.  
C. 2" UNLESS NOTED OTHERWISE.
- R3. ALL REINFORCING FABRICATION SHALL CONFORM TO THE CRSI "MANUAL OF STANDARD PRACTICE" LATEST EDITION.
- R4. BAR SPLICE LAPS SHALL BE AS FOLLOWS:

fc'	BAR TYPE	BAR SIZE						
		#4	#5	#6	#7	#8	#9	
5000 PSI	TOP	24	28	34	50	56	66	
	OTHER	18	22	26	38	44	52	

- A. ALL TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12 INCHES OF CONCRETE CAST BELOW THE BARS.
  - B. LENGTHS ARE IN INCHES.
  - C. MINIMUM BAR SPACING SHALL BE TWICE THE BAR DIAMETER.
  - R5. CONTRACTOR HAS OPTION OF USING MECHANICAL SPLICE (COUPLING) TO FACILITATE CONSTRUCTION.
  - R6. MECHANICAL SPLICES AND DOWEL BAR SHALL CONFORM TO ACI 318-14 AND BE CAPABLE OF DEVELOPING 125% OF THE YIELD STRENGTH (Fy) OF THE REINFORCING IN TENSION AND COMPRESSION.
  - R7. MECHANICAL SPLICE MANUFACTURER DOCUMENTATION SHALL BE SUBMITTED FOR APPROVAL.
  - R8. POST-INSTALLED REINFORCING DOWELS INTO CONCRETE SHALL BE INSTALLED USING HILTI HIT-RE200-V3. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- ROUTING NOTES:
- G1. GROUT SHALL BE A PREMIXED, NON-METALLIC, NON-SHRINK CEMENTITIOUS GROUT, WITH A MINIMUM SEVEN DAY COMPRESSIVE STRENGTH OF 5000 PSI.
  - G2. GROUT SHALL COMPLY WITH THE APPLICABLE PROVISIONS OF ASTM C1107 STANDARD SPECIFICATION FOR PACKAGES DRY, HYDRAULIC-CEMENT GROUT (NON-SHRINK).
  - G3. MIX GROUT WITH CLEAN POTABLE WATER FOR A CONSISTENCY SUITABLE FOR APPLICATION AND 30 MINUTE WORKING TIME.
  - G4. PLACE AND CURE GROUT IN ACCORDANCE WITH ACI 301 AND/OR MANUFACTURER'S RECOMMENDATIONS. MAKE STANDARD CUBES FOR COMPRESSIVE TEST IN ACCORDANCE WITH PROJECT SPECIFICATIONS.
  - G5. PRIOR TO PLACING GROUT THE SURFACE OF THE ADJACENT CONCRETE SHALL BE ROUGHENED, FREE OF ALL OIL, GREASE AND DIRT.
  - G6. ALL ADJACENT CONCRETE SURFACES SHALL BE MAINTAINED SATURATED SURFACE DRY FOR A MINIMUM OF 4 HOURS PRIOR TO PLACEMENT OF GROUT.
  - G7. KEEP ALL EXPOSED SHOULDERS OF THE GROUT MOIST FOR THREE DAYS FOLLOWING PLACEMENT.

ROCK ANCHOR NOTES:

- RA1. ROCK ANCHORS SHALL BE GRADE 75 ALL-THREAD REBAR (DOWELS) BY WILLIAMS FORM ENGINEERING CORPORATION OR OWNER APPROVED EQUAL.
  - RA2. DOWELS SHALL BE EPOXY COATED IN ACCORDANCE WITH ASTM A775 OR ASTM A934. DAMAGED EPOXY COATING SHALL BE REPAIRED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
  - RA3. CENTRALIZERS SHALL BE CAPABLE OF WITHSTANDING ALL LOADINGS IMPOSED DURING INSTALLATION OF THE ANCHOR WITHOUT DEFORMING. THEY SHALL BE CONSTRUCTED TO PROVIDE THE LEAST RESTRICTION TO THE UPWARD FLOW OF GROUT AND PROVIDE A MINIMUM GROUT THICKNESS OF 1/2 INCH AROUND ANCHOR.
  - RA4. ROCK ANCHOR HOLES SHALL BE CORE DRILLED.
- RAPID BLOC NOTES:
- RB1. RAPID BLOCS SHALL CONSIST OF 5 STANDARD BLOCS, 5 ROUNDED LIDS AND 20 WEDGES (R40DRBLOCS.COM). ADDITIONAL EXTRA RAPID BLOC QUANTITIES TO BE DETERMINED BY THE OWNER.
  - RB2. RAPID BLOCS SHALL BE PROCURED BY CONTACTING  
S20 DESIGN  
318 MCCONNELL DRIVE  
LYONS, CO 80540  
ATTN: KURT SMITHGALL

STEEL NOTES:

- S1. HANDRAIL SHALL BE FABRICATED IN ACCORDANCE WITH THE MOST RECENT VERSION OF DUKE ENERGY SPECIFICATION FHG-ENG-NA-STND-CS-0017, STANDARD FOR HANDRAILS, STAIRS, LADDERS AND GRATING UNLESS NOTED OTHERWISE.

DEFINITIONS:

OWNER'S REPRESENTATIVE:  
DUKE ENERGY'S PROJECT MANAGER, CONSTRUCTION MANAGER, OR ANY OTHER AUTHORIZED EMPLOYEE OF DUKE ENERGY CORPORATION.

ENGINEER:  
HDR ENGINEERING INC.'S PROJECT MANAGER, PROJECT ENGINEER, OR ANY OTHER AUTHORIZED EMPLOYEE OF HDR ENGINEERING, INC.

S20:  
S20 DESIGN AND ENGINEERING INC.

Drawing No. 10057031 - 03G-01

SAC-2019-00062  
 Great Falls-Dearbourn  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 5-44



**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

DRAWN BY: P1 OUNNE DESIGNED BY: TL OLEARY CHECKED BY: APPROVED BY:	CIVIL MECHANICAL ELECTRICAL DATE:	DUKE ENERGY CAROLINAS, LLC GREAT FALLS-DEARBORN HYDRO STATIONS GREAT FALLS LONG BYPASSED REACH AND GREAT FALLS DIVERSION DAM MIN FLOW & RECREATION RELEASE STR GENERAL NOTES	SCALE: NONE DRAWING/SHEET NO. 10057031 - 03G-01
PE SEAL NO. DATE 09/25/2019	ISSUED FOR 70% S20 REVIEW. REVISION PTD TLO DRN [DSN] [CHKD] [APPR] [CIVL] [ELEC] [MECH]	PROJECT NUMBER: 10057031	REV



DRAWING INDEX:

GENERAL DRAWINGS:

- 10057031-03G-01 MINIMUM FLOW & RECREATION RELEASE STRUCTURES COVER SHEET
- 10057031-03G-02 MINIMUM FLOW & RECREATION RELEASE STRUCTURES GENERAL NOTES
- 10057031-03G-03 MINIMUM FLOW & RECREATION RELEASE STRUCTURES ABBREVIATIONS
- 10057031-03G-04 MINIMUM FLOW & RECREATION RELEASE STRUCTURES DRAWING INDEX

CIVIL DRAWINGS:

- 10057031-03C-01 MINIMUM FLOW & RECREATION RELEASE STRUCTURES SITE PLAN

STRUCTURAL DRAWINGS:

- 10057031-03X-01 MINIMUM FLOW & RECREATION RELEASE STRUCTURES DEMOLITION PLAN
- 10057031-03X-02 MINIMUM FLOW & RECREATION RELEASE STRUCTURES DEMOLITION PLAN AND SECTIONS
- 10057031-03X-03 MINIMUM FLOW & RECREATION RELEASE STRUCTURES DEMOLITION PLAN AND SECTIONS
- 10057031-03S-01 MINIMUM FLOW & RECREATION RELEASE STRUCTURES MAIN RECREATION CHANNEL STRUCTURE 1 PLAN AND SECTIONS
- 10057031-03S-02 MINIMUM FLOW & RECREATION RELEASE STRUCTURES MAIN RECREATION CHANNEL STRUCTURE 1 PLAN AND SECTIONS
- 10057031-03S-03 MINIMUM FLOW & RECREATION RELEASE STRUCTURES MAIN RECREATION CHANNEL STRUCTURE 2 PLAN AND SECTIONS
- 10057031-03S-04 MINIMUM FLOW & RECREATION RELEASE STRUCTURES MAIN RECREATION CHANNEL STRUCTURE 3 PLAN AND SECTIONS
- 10057031-03S-05 MINIMUM FLOW & RECREATION RELEASE STRUCTURES MAIN RECREATION CHANNEL SECTIONS AND DETAILS
- 10057031-03S-06 MINIMUM FLOW & RECREATION RELEASE STRUCTURES MAIN RECREATION CHANNEL SECTIONS AND DETAILS
- 10057031-03S-10 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL PLAN
- 10057031-03S-11 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL PLAN
- 10057031-03S-12 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL PLAN
- 10057031-03S-13 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL NOTCH PLAN AND SECTIONS
- 10057031-03S-14 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL STRUCTURE 1 PLAN AND SECTIONS
- 10057031-03S-15 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL STRUCTURE 2 PLAN AND SECTIONS
- 10057031-03S-16 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL STRUCTURE 3 PLAN AND SECTIONS
- 10057031-03S-17 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL STRUCTURE 4 PLAN AND SECTIONS
- 10057031-03S-18 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL STRUCTURE 5 PLAN AND SECTIONS
- 10057031-03S-19 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL STRUCTURE 6 PLAN AND SECTIONS
- 10057031-03S-20 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL STRUCTURE 7 PLAN AND SECTIONS
- 10057031-03S-21 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL STRUCTURE 8 PLAN AND SECTIONS
- 10057031-03S-22 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL STRUCTURE 9 PLAN AND SECTIONS
- 10057031-03S-23 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL SECTIONS AND DETAILS
- 10057031-03S-24 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL PARTIAL PLAN, SECTIONS AND DETAILS
- 10057031-03S-25 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL SECTIONS AND DETAILS
- 10057031-03S-26 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL SECTIONS AND DETAILS
- 10057031-03S-30 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL PLANS, SECTIONS AND DETAILS
- 10057031-03S-31 MINIMUM FLOW & RECREATION RELEASE STRUCTURES BYPASS RECREATION CHANNEL PLANS, SECTIONS AND DETAILS
- 10057031-03S-32 MINIMUM FLOW & RECREATION RELEASE STRUCTURES MAIN AND BYPASS RECREATION PLANS, SECTIONS AND DETAILS
- 10057031-03S-33 MINIMUM FLOW & RECREATION RELEASE STRUCTURES MAIN AND BYPASS RECREATION CHANNEL TYPICAL DETAILS
- 10057031-03S-34 MINIMUM FLOW & RECREATION RELEASE STRUCTURES MAIN AND BYPASS RECREATION CHANNEL TYPICAL DETAILS

REFERENCE DRAWINGS:

- 10030164-05S-01 TITLE SHEET
- 10030164-05S-02 SITE OVERVIEW
- 10030164-05S-03 CUT-FILL
- 10030164-05S-04 RECREATIONAL ACCESS PLAN
- 10030164-05S-05 MAIN CHANNEL PLAN SHEET
- 10030164-05S-06 MAIN CHANNEL PROFILE SHEET
- 10030164-05S-07 MAIN STATION CUT - (1)
- 10030164-05S-08 MAIN STATION CUT - (2)
- 10030164-05S-09 MAIN STATION CUT - (3)
- 10030164-05S-10 MAIN STATION CUT - (4)
- 10030164-05S-11 MAIN STATION CUT - (5)
- 10030164-05S-12 MAIN STATION CUT - (6)
- 10030164-05S-13 MAIN STATION CUT - (7)
- 10030164-05S-14 MAIN STATION CUT - (8)
- 10030164-05S-15 MAIN STRUCTURE POINTS - (1)
- 10030164-05S-16 MAIN STRUCTURE POINTS - (2)
- 10030164-05S-17 MAIN STRUCTURE POINTS - (3)
- 10030164-05S-18 MAIN CHANNEL DETAILS - (1)
- 10030164-05S-19 MAIN CHANNEL DETAILS - (2)
- 10030164-05S-20 MAIN CHANNEL ELEMENTS OVERVIEW
- 10030164-05S-21 BYPASS CHANNEL SHEET OVERVIEW
- 10030164-05S-22 BYPASS NOTCH PLAN & PROFILE
- 10030164-05S-23 BYPASS STATION CUTS
- 10030164-05S-24 BYPASS PLAN AND PROFILE SHEET - (1)
- 10030164-05S-25 BYPASS PLAN AND PROFILE SHEET - (2)
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- 10030164-05S-53 BYPASS CHANNEL ELEMENTS - (1)
- 10030164-05S-54 BYPASS CHANNEL ELEMENTS - (2)
- 10030164-05S-55 GENERAL DETAILS (1)
- 10030164-05S-56 GENERAL DETAILS (2)
- 10030164-05S-57 GENERAL DETAILS (3)

**SAC-2019-00062**  
**Great Falls-Dearbom**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 7-44**



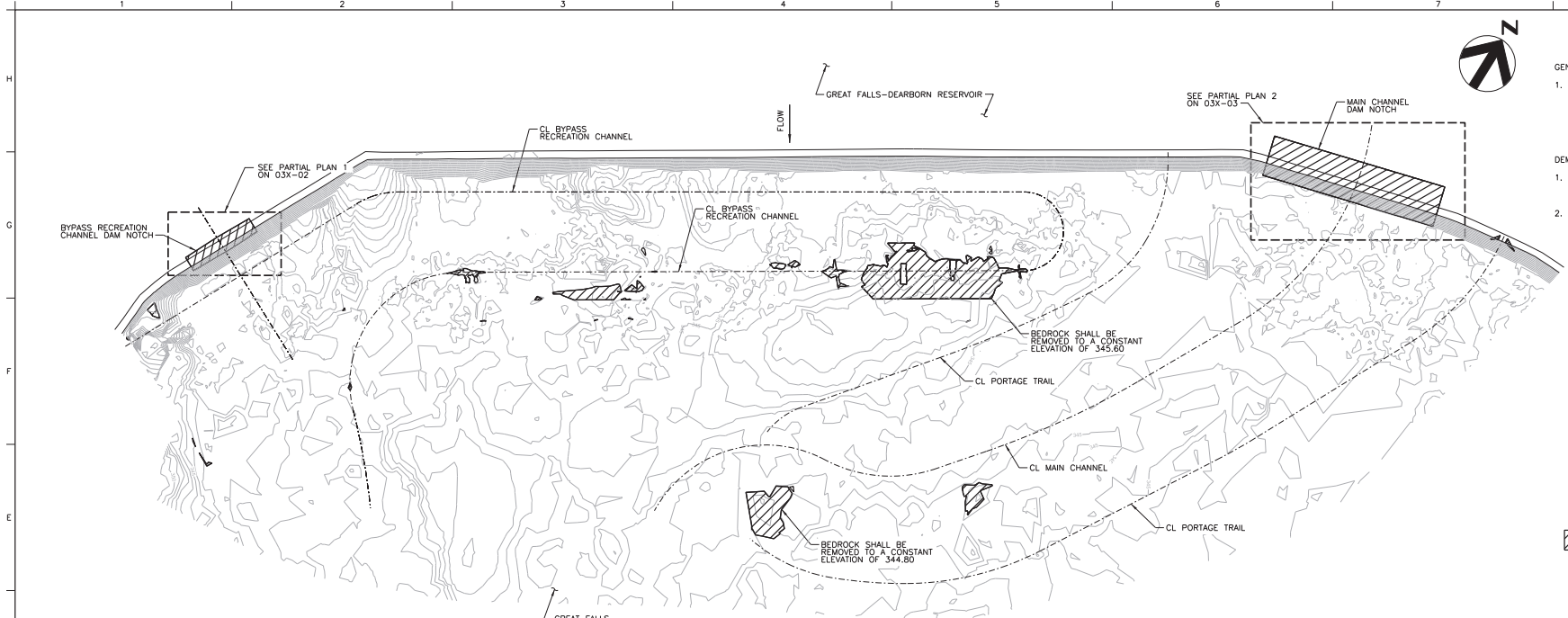
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**NOT FOR**  
**CONSTRUCTION**  
**OR**  
**RECORDING**

DRAWN BY:	CIVIL	DUKE ENERGY CAROLINAS, LLC
DESIGNED BY:	MECHANICAL	GREAT FALLS-DEARBORN HYDRO STATIONS
CHECKED BY:	ELECTRICAL	GREAT FALLS LONG BYPASSED REACH AND GREAT FALLS DIVERSION DAM
APPROVED BY:	DATE:	MIN FLOW & RECREATION RELEASE STR DRAWING INDEX
PROJECT NUMBER:	10057031	

NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	TLO	DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH	SCALE:	NONE	DRAWING/SHEET NO.	10057031 - 03G-03	REV.	-
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- GENERAL NOTES:
- FOR GENERAL NOTES SEE 10057031-03G-01.
- DEMOLITION NOTES:
- CONTRACTOR SHALL SUBMIT A DEMOLITION PLAN TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO BEGINNING WORK.
  - CONTRACTOR IS REQUIRED TO MEET THE OWNER'S ENVIRONMENTAL REQUIREMENTS.



PLAN  
SCALE: 1"=30'

SAC-2019-000062  
 Great Falls-Dearborn  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 8-44



**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH

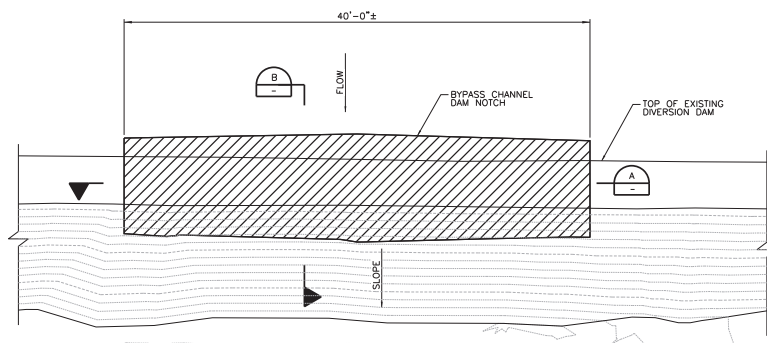
DRAWN BY: CIVIL  
 P1 DUNNE  
 DESIGNED BY: MECHANICAL  
 DL ARNOLD  
 CHECKED BY: ELECTRICAL  
 APPROVED BY: DATE:

DUKE ENERGY CAROLINAS, LLC  
**GREAT FALLS-DEARBORN HYDRO STATIONS**  
 GREAT FALLS LONG BYPASSED REACH AND  
 GREAT FALLS DIVERSION DAM  
 MIN FLOW & RECREATION RELEASE STR  
 DEMOLITION  
 PLAN

SCALE: AS NOTED  
 DRAWING/SHEET NO. 10057031 - 03X-01

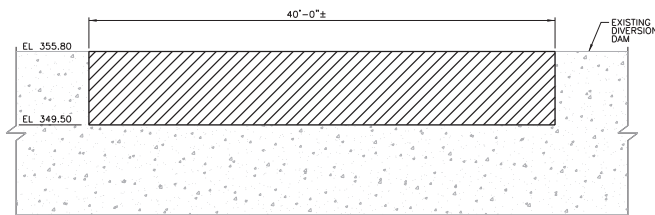


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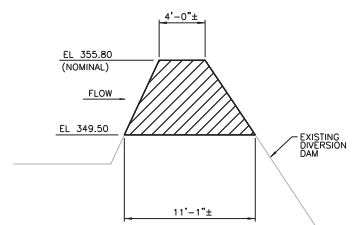


PARTIAL PLAN  
SCALE: 3/16"=1'-0" 1 03X-01

LEGEND:  
 DEMOLITION



SECTION  
SCALE: 3/16"=1'-0" A



SECTION  
SCALE: 3/16"=1'-0" B

SAC-2019-00062  
 Great Falls-Dearbom  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 9-44

4 3 2 1 0 4FT  
SCALE: 3/16"=1'-0"



HDR Engineering, Inc. of the Carolinas

**PRELIMINARY  
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CONSTRUCTION  
OR  
RECORDING**

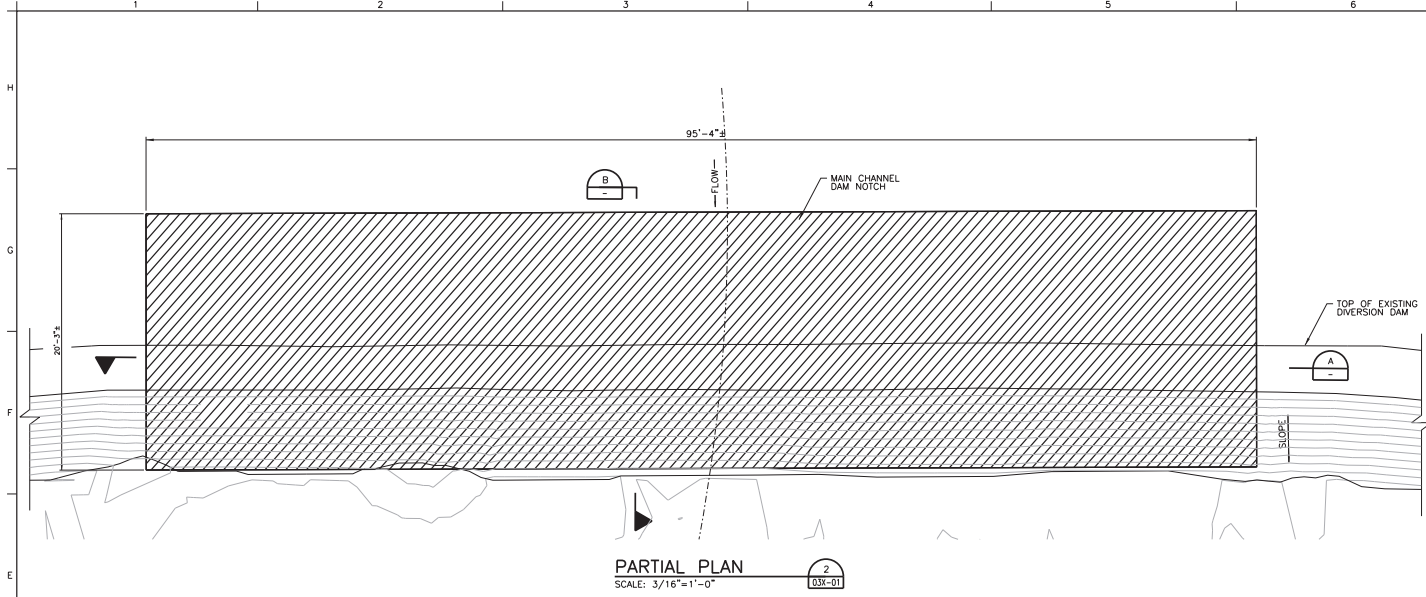
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH

DRAWN BY:	CIVIL
DESIGNED BY:	MECHANICAL
CHECKED BY:	ELECTRICAL
APPROVED BY:	DATE:

DUKE ENERGY CAROLINAS, LLC	REV
GREAT FALLS-DEARBORN HYDRO STATIONS	
GREAT FALLS LONG BYPASSED REACH AND	
GREAT FALLS DIVERSION DAM	
MIN FLOW & RECREATION RELEASE STR	
DEMOLITION	
ENLARGED PLAN AND SECTIONS	
SCALE: AS NOTED	
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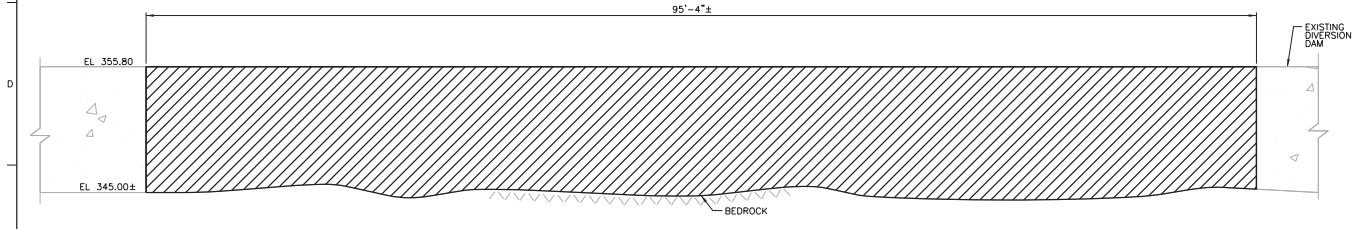


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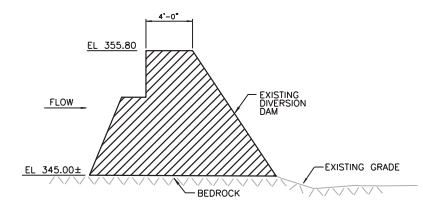


PARTIAL PLAN  
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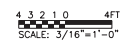
LEGEND:  
 DEMOLITION



SECTION  
SCALE: 3/16"=1'-0"



SECTION  
SCALE: 3/16"=1'-0"



SAC-2019-00062  
 Great Falls-Dearborm  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 10-44



**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

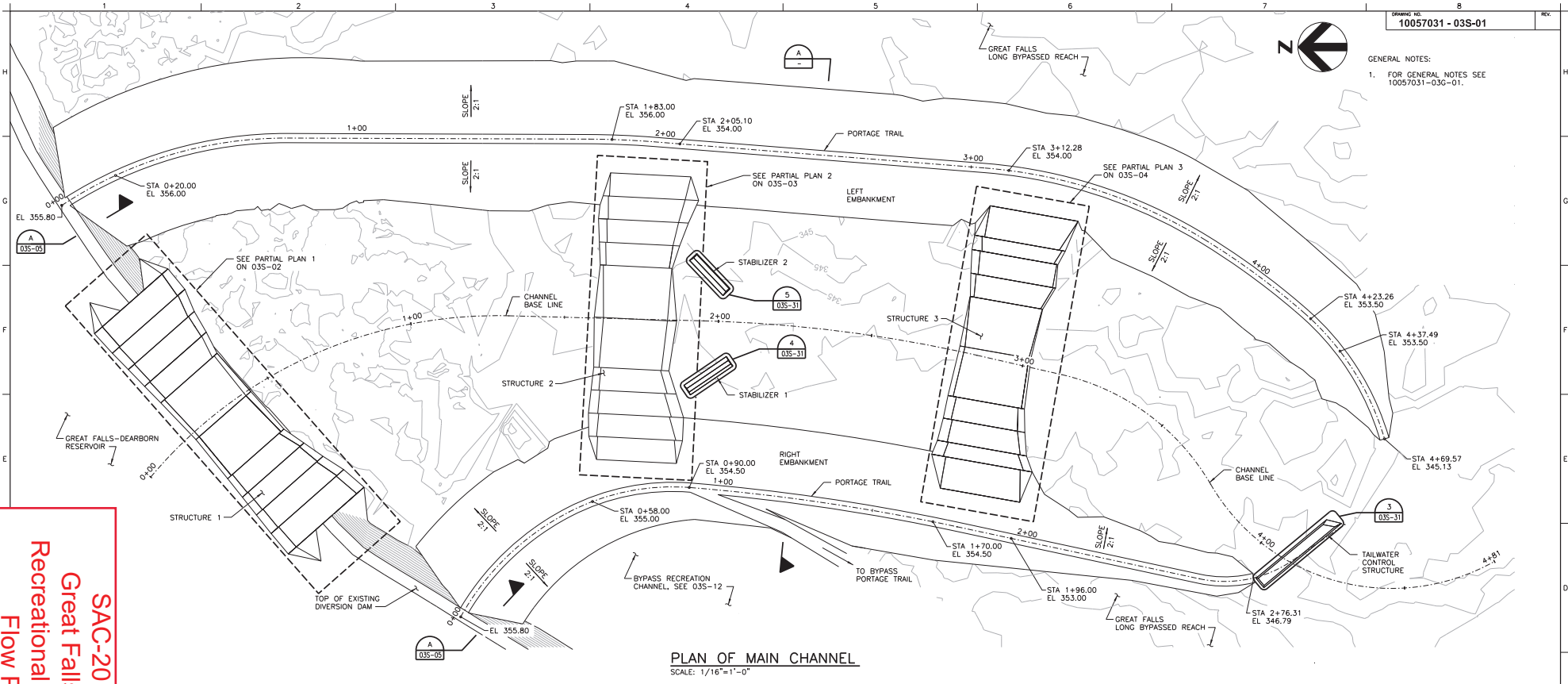
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	ELA	DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH

DRAWN BY: P1 DUNNE  
DESIGNED BY: DL ARNOLD  
CHECKED BY: \_\_\_\_\_  
APPROVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

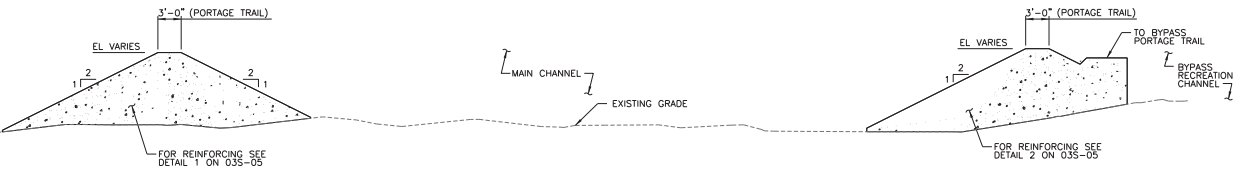
DUKE ENERGY CAROLINAS, LLC  
**GREAT FALLS-DEARBORN HYDRO STATIONS**  
 GREAT FALLS LONG BYPASSED REACH AND  
 GREAT FALLS DIVERSION DAM  
 MIN FLOW & RECREATION RELEASE STR  
 DEMOLITION  
 PLAN AND SECTIONS  
 SCALE: AS NOTED DRAWING/SHEET NO. 10057031 - 03X-03

10057031 - 03S-01

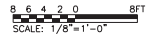
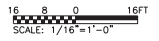
GENERAL NOTES:  
1. FOR GENERAL NOTES SEE 10057031-03G-01.



PLAN OF MAIN CHANNEL  
SCALE: 1/16"=1'-0"



SECTION  
SCALE: 1/8"=1'-0"



**SAC-2019-00062**  
**Great Falls-Dearbourn**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 11-44**

**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	ELA	DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER: 10057031

DRAWN BY: CIVIL  
 P1 DUNNE  
 DESIGNED BY: MECHANICAL  
 DL ARNOLD  
 CHECKED BY: ELECTRICAL  
 APPROVED BY: DATE:

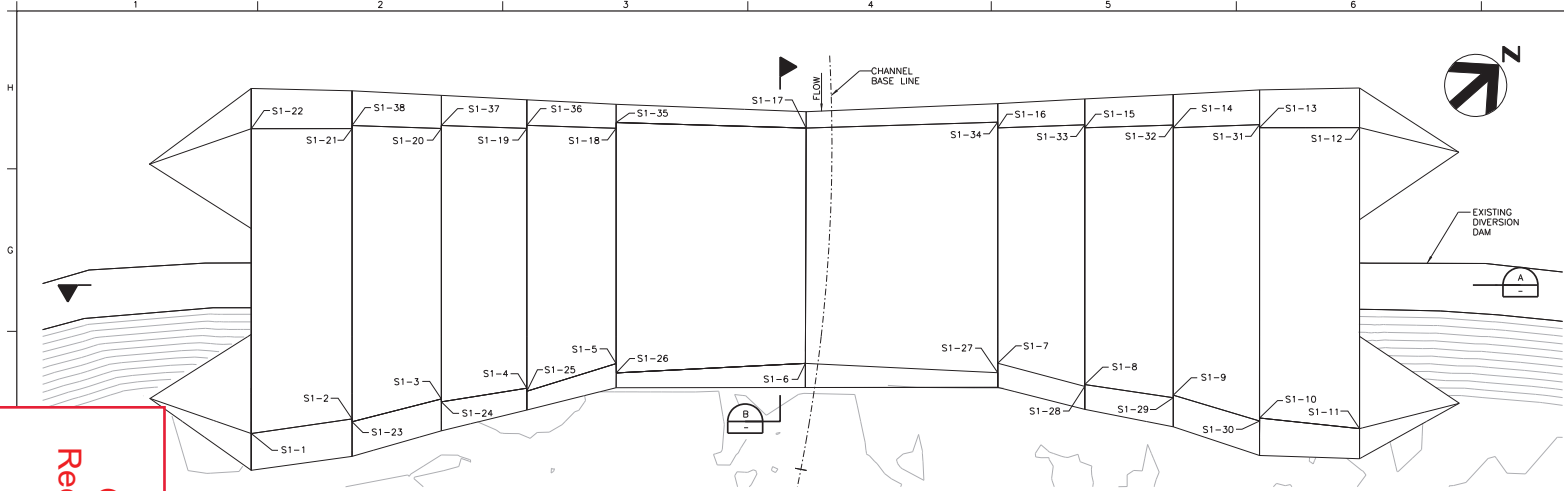
DUKE ENERGY CAROLINAS, LLC  
**GREAT FALLS-DEARBORN HYDRO STATIONS**  
**GREAT FALLS LONG BYPASSED REACH AND**  
**GREAT FALLS DIVERSION DAM**  
**MIN FLOW & RECREATION RELEASE STR**  
**MAIN RECREATION CHANNEL**  
**PLAN AND SECTION**

SCALE: AS NOTED  
 DRAWING/SHEET NO. 10057031 - 03S-01



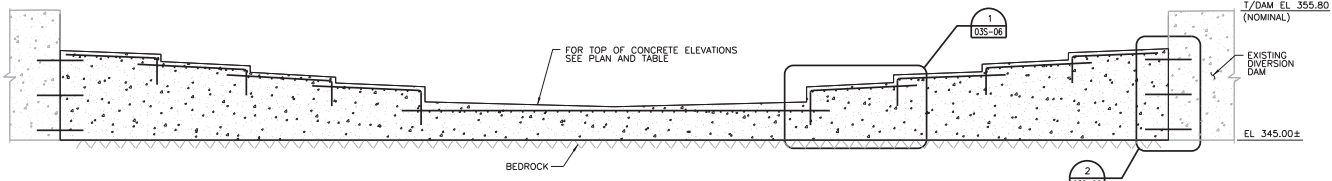
Drawing No. 10057031 - 03S-02

GENERAL NOTES:  
1. FOR GENERAL NOTES SEE 10057031-03G-01.

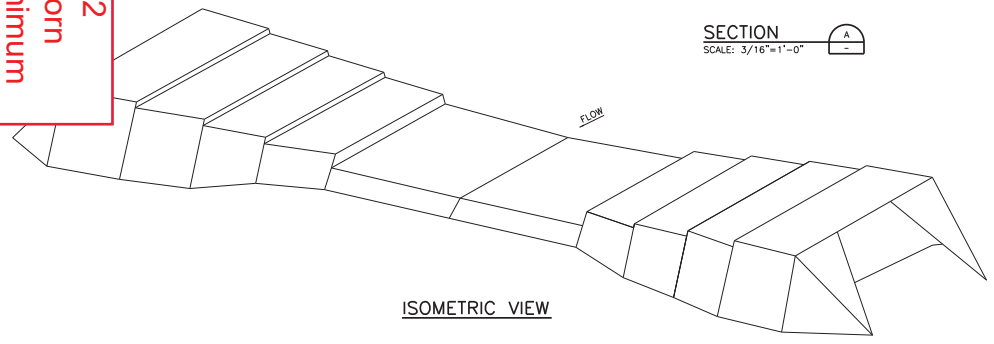


PARTIAL PLAN OF MAIN CHANNEL STRUCTURE 1  
SCALE: 3/16"=1'-0" 03S-01

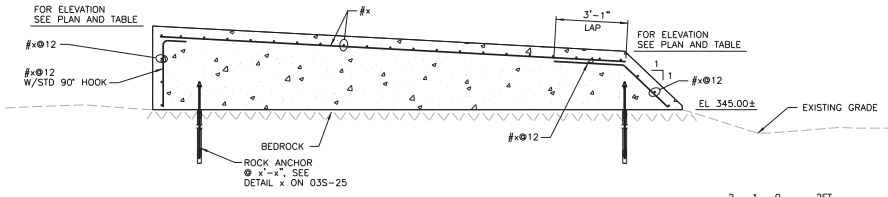
MAIN CHANNEL STRUCTURE 1			
POINT	NORTHING	EASTING	ELEVATION
S1-1	1005403.92	2032999.57	352.19
S1-2	1005410.58	2033005.25	352.06
S1-3	1005416.94	2033009.88	351.14
S1-4	1005422.49	2033014.78	350.29
S1-5	1005429.14	2033019.15	349.31
S1-6	1005439.90	2033031.36	347.54
S1-7	1005450.83	2033043.77	349.31
S1-8	1005454.40	2033050.59	349.96
S1-9	1005458.74	2033056.81	350.95
S1-10	1005462.17	2033063.78	351.87
S1-11	1005467.16	2033070.83	352.13
S1-12	1005486.56	2033053.74	353.57
S1-13	1005480.87	2033047.29	353.18
S1-14	1005475.97	2033041.73	352.19
S1-15	1005470.94	2033036.02	351.28
S1-16	1005465.99	2033030.40	350.29
S1-17	1005455.10	2033018.05	348.59
S1-18	1005444.30	2033005.79	350.23
S1-19	1005439.22	2033000.03	351.21
S1-20	1005434.36	2032994.52	352.19
S1-21	1005429.29	2032988.76	353.18
S1-22	1005423.56	2032982.26	353.70
S1-23	1005410.40	2033005.41	351.44
S1-24	1005416.75	2033010.04	350.47
S1-25	1005422.29	2033014.96	349.60
S1-26	1005428.55	2033019.69	347.94
S1-27	1005450.22	2033044.30	347.93
S1-28	1005454.28	2033050.70	349.53
S1-29	1005458.58	2033057.05	350.38
S1-30	1005461.98	2033063.94	351.24
S1-31	1005481.07	2033047.12	352.53
S1-32	1005476.15	2033041.57	351.61
S1-33	1005471.14	2033035.84	350.63
S1-34	1005466.36	2033030.08	349.07
S1-35	1005444.67	2033005.46	349.00
S1-36	1005439.42	2032999.86	350.56
S1-37	1005434.56	2032994.35	351.55
S1-38	1005429.48	2032988.59	352.53



SECTION A-A  
SCALE: 3/16"=1'-0" 03S-06



ISOMETRIC VIEW



SECTION B-B  
SCALE: 3/8"=1'-0" 03S-08

2 1 0 2FT  
SCALE: 3/8"=1'-0"  
4 3 2 1 0 4FT  
SCALE: 3/16"=1'-0"

SAC-2019-00062  
 Great Falls-Dearborn  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 12-44



PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING

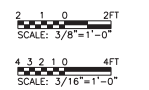
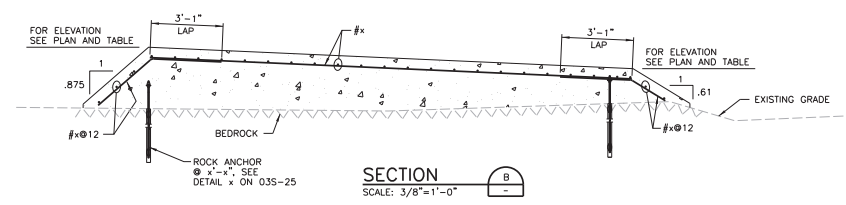
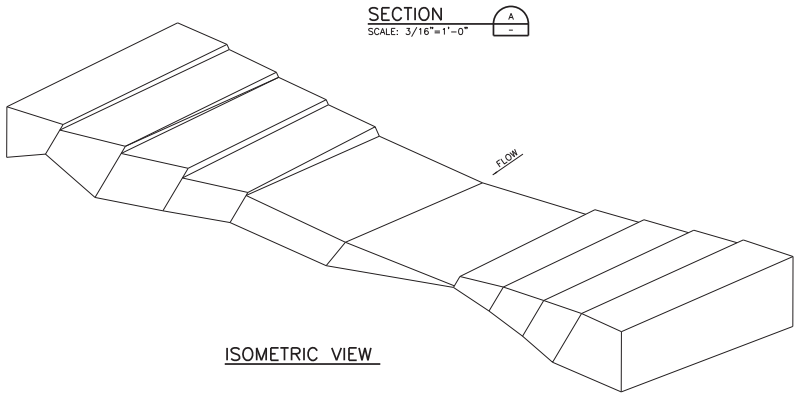
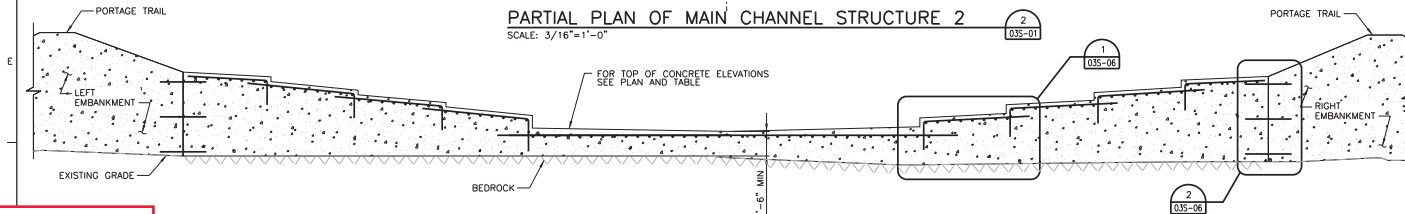
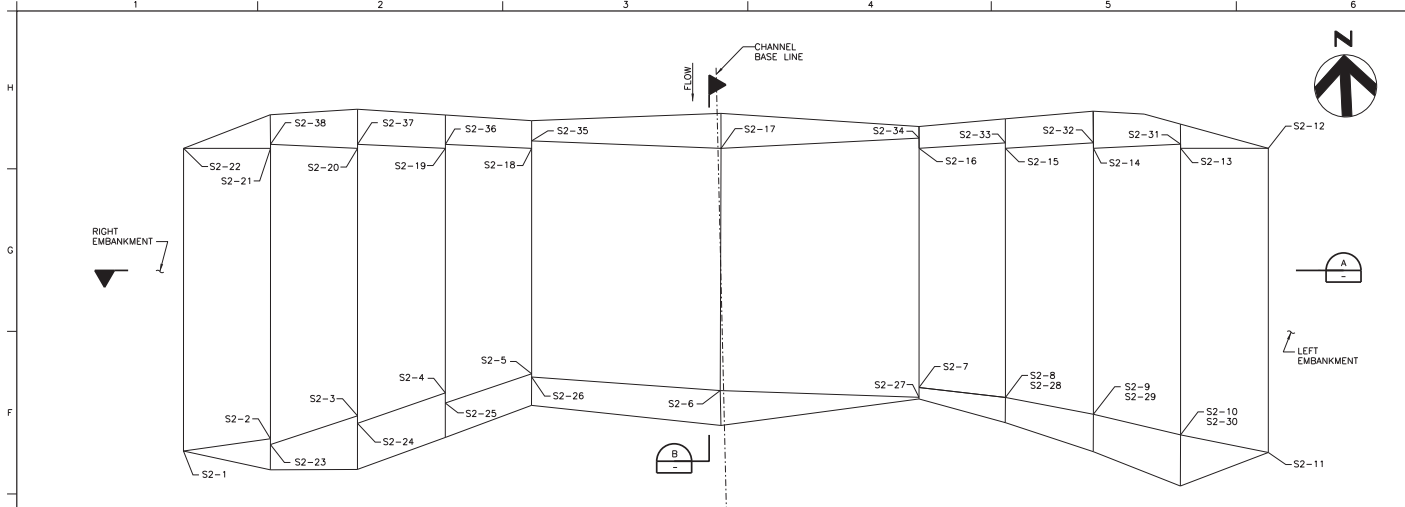
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSGN	CHKD	APPR	CIVIL	ELEC	MECH	PROJECT NUMBER: 10057031	SCALE: AS NOTED	DRAWING/SHEET NO. 10057031 - 03S-02	REV

DRAWN BY: CIVIL  
 P1 DUNNE  
 DESIGNED BY: MECHANICAL  
 DL ARNOLD  
 CHECKED BY: ELECTRICAL  
 APPROVED BY: DATE:

DUKE ENERGY CAROLINAS, LLC  
 GREAT FALLS-DEARBORN HYDRO STATIONS  
 GREAT FALLS LONG BYPASSED REACH AND  
 GREAT FALLS DIVERSION DAM  
 MIN FLOW & RECREATION RELEASE STR  
 MAIN RECREATION CHANNEL STRUCTURE 1  
 PLAN AND SECTIONS

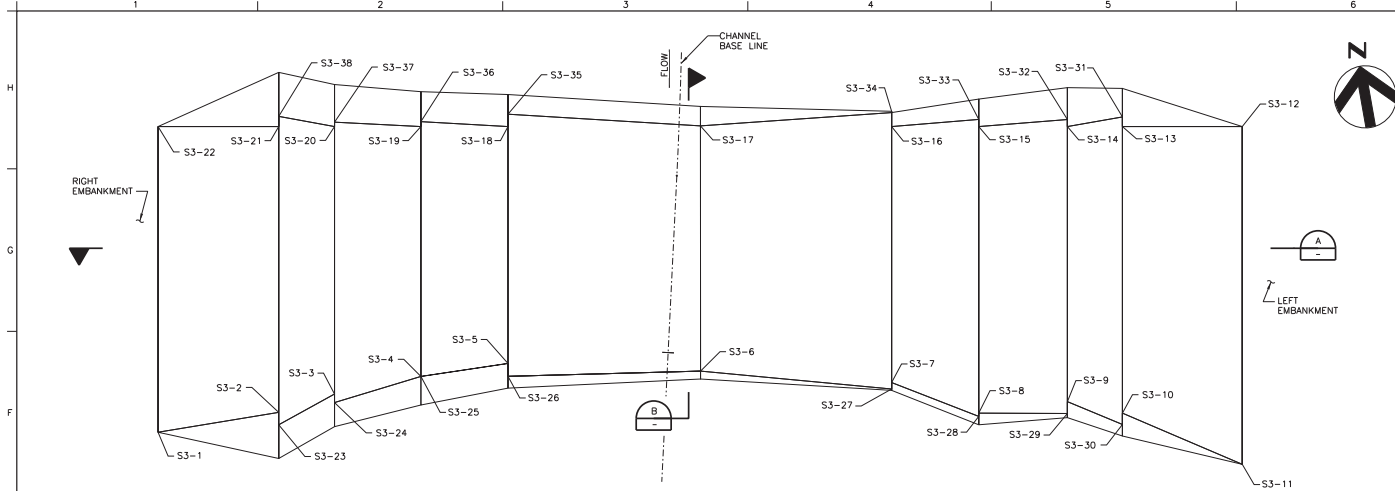
GENERAL NOTES:  
1. FOR GENERAL NOTES SEE 10057031-03C-01.

MAIN CHANNEL STRUCTURE 2			
POINT	NORTHING	EASTING	ELEVATION
S2-1	1005300.12	2033009.37	349.86
S2-2	1005300.80	2033016.88	349.67
S2-3	1005302.39	2033024.45	348.75
S2-4	1005303.98	2033032.08	347.83
S2-5	1005305.25	2033039.57	346.71
S2-6	1005303.01	2033055.68	346.08
S2-7	1005302.42	2033072.74	346.98
S2-8	1005301.21	2033080.10	348.16
S2-9	1005299.38	2033087.56	349.21
S2-10	1005297.24	2033094.95	350.39
S2-11	1005295.36	2033102.40	350.91
S2-12	1005321.45	2033103.69	352.10
S2-13	1005321.82	2033096.17	351.83
S2-14	1005322.19	2033088.70	350.78
S2-15	1005322.57	2033081.16	349.80
S2-16	1005322.93	2033073.76	348.81
S2-17	1005323.78	2033056.78	346.98
S2-18	1005324.58	2033040.53	348.75
S2-19	1005324.95	2033033.12	349.73
S2-20	1005325.33	2033025.59	350.72
S2-21	1005325.70	2033018.12	351.77
S2-22	1005326.07	2033010.66	352.10
S2-23	1005300.30	2033016.85	349.14
S2-24	1005301.76	2033024.41	348.05
S2-25	1005303.12	2033032.03	346.86
S2-26	1005304.99	2033039.54	346.31
S2-27	1005301.60	2033072.68	345.87
S2-28	1005301.23	2033080.09	347.86
S2-29	1005299.41	2033087.56	348.88
S2-30	1005297.28	2033094.95	350.03
S2-31	1005322.22	2033096.18	350.76
S2-32	1005322.69	2033088.71	349.75
S2-33	1005323.06	2033081.16	348.80
S2-34	1005323.83	2033073.78	347.22
S2-35	1005325.23	2033040.54	347.35
S2-36	1005325.31	2033033.13	348.95
S2-37	1005325.68	2033025.60	349.86
S2-38	1005326.05	2033018.13	351.04



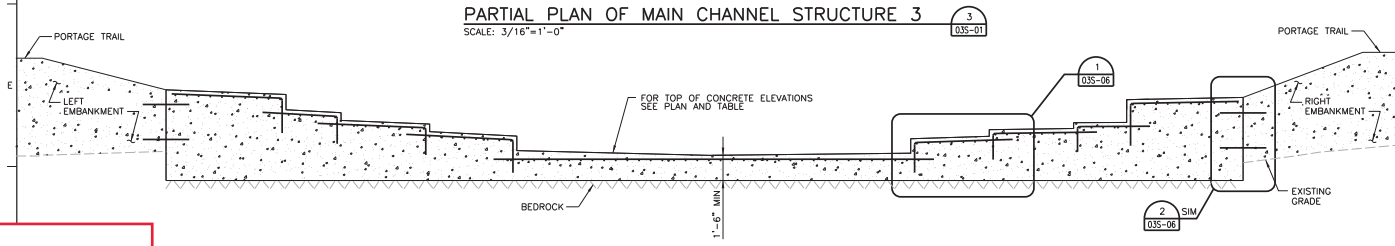
**SAC-2019-00062**  
**Great Falls-Dearborn**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 13-44**

<p>HDR Engineering, Inc. of the Carolinas</p>		<p><b>PRELIMINARY</b> <b>NOT FOR</b> <b>CONSTRUCTION</b> <b>OR</b> <b>RECORDING</b></p>	PE SEAL	NO.	DATE	ISSUED FOR 70% S20 REVIEW.	REVISION	PTD	EIA	---	---	---	---	---	---	DRAWN BY: PT DUNNE	CIVIL	DUKE ENERGY CAROLINAS, LLC <b>GREAT FALLS-DEARBORN HYDRO STATIONS</b> GREAT FALLS LONG BYPASSED REACH AND GREAT FALLS DIVERSION DAM MIN FLOW & RECREATION RELEASE STR MAIN RECREATION CHANNEL STRUCTURE 2 PLAN AND SECTIONS	SCALE: AS NOTED	DRAWING/SHEET NO. 10057031 - 03S-03	REV
			09/25/2019	DRN	GSH	CHD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER: 10057031	APPROVED BY:	DATE:								

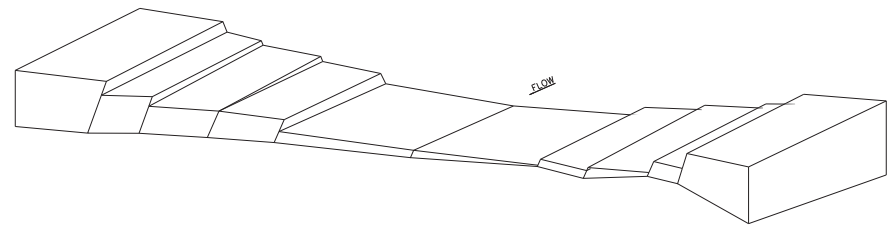


MAIN CHANNEL STRUCTURE 3			
POINT	NORTHING	EASTING	ELEVATION
S3-1	1005188.59	2032996.78	349.34
S3-2	1005188.46	2033007.28	348.95
S3-3	1005189.18	2033012.27	347.50
S3-4	1005189.37	2033019.83	346.45
S3-5	1005189.17	2033027.39	346.12
S3-6	1005185.64	2033043.56	344.68
S3-7	1005181.81	2033059.54	345.67
S3-8	1005177.93	2033066.45	346.06
S3-9	1005177.57	2033074.12	347.37
S3-10	1005175.78	2033078.60	348.95
S3-11	1005169.66	2033087.96	349.41
S3-12	1005198.21	2033093.02	351.31
S3-13	1005200.01	2033082.88	350.91
S3-14	1005200.83	2033078.23	349.34
S3-15	1005202.16	2033070.74	348.36
S3-16	1005203.46	2033063.37	347.31
S3-17	1005206.38	2033047.22	345.67
S3-18	1005209.20	2033030.94	347.44
S3-19	1005210.50	2033023.57	348.49
S3-20	1005211.79	2033016.27	349.41
S3-21	1005212.63	2033011.55	350.98
S3-22	1005214.43	2033001.35	351.31
S3-23	1005187.41	2033007.09	347.62
S3-24	1005188.46	2033012.14	346.58
S3-25	1005189.37	2033019.37	346.45
S3-26	1005188.08	2033027.20	345.02
S3-27	1005181.27	2033059.44	345.12
S3-28	1005177.65	2033066.40	345.78
S3-29	1005176.57	2033073.94	346.35
S3-30	1005174.82	2033078.43	347.49
S3-31	1005200.82	2033083.03	349.67
S3-32	1005201.42	2033078.34	348.74
S3-33	1005202.76	2033070.84	347.75
S3-34	1005204.64	2033063.58	346.11
S3-35	1005210.25	2033031.12	346.11
S3-36	1005210.92	2033023.64	347.86
S3-37	1005212.16	2033016.33	348.85
S3-38	1005213.49	2033011.70	349.67

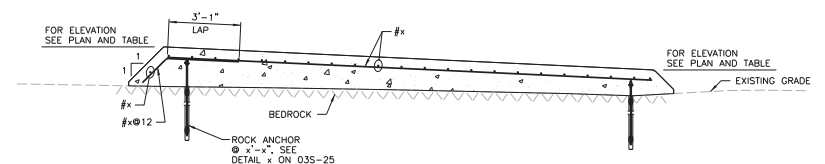
GENERAL NOTES:  
1. FOR GENERAL NOTES SEE 10057031-03G-01.



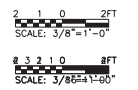
SECTION A-A  
SCALE: 3/16"=1'-0"



ISOMETRIC VIEW



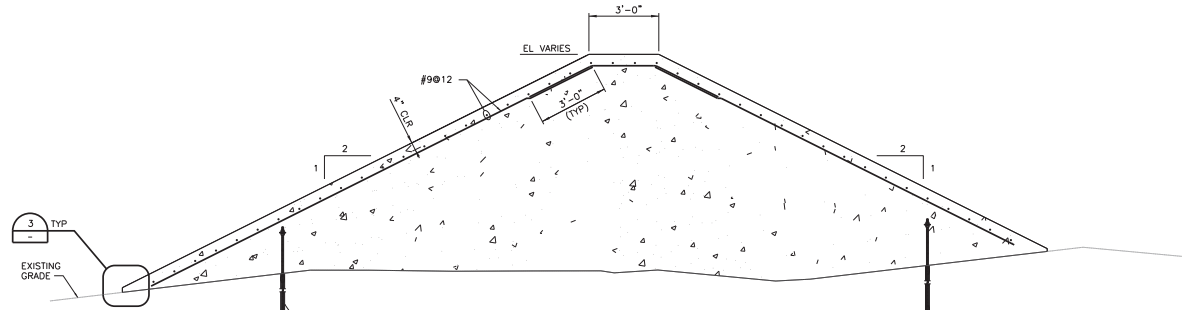
SECTION B-B  
SCALE: 3/8"=1'-0"



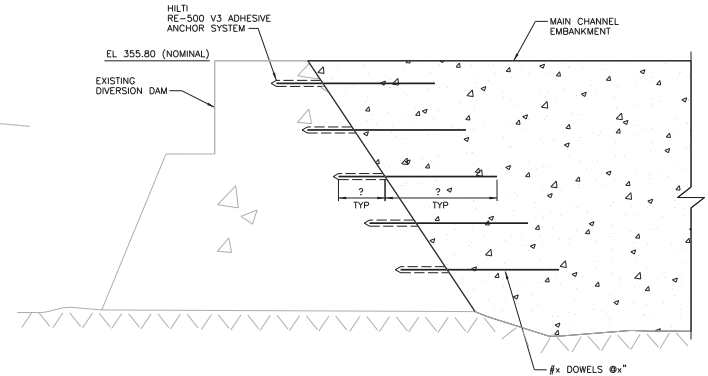
**SAC-2019-00062**  
**Great Falls-Dearbom**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 14-44**

<p>HDR Engineering, Inc. of the Carolinas</p>		<p><b>PRELIMINARY</b> <b>NOT FOR</b> <b>CONSTRUCTION</b> <b>OR</b> <b>RECORDING</b></p>	NO. _____ DATE _____	ISSUED FOR 70% S20 REVIEW.	REVISION _____	PTD _____ DLA _____	DRN _____ OSZH _____ CHKD _____ APPR _____	CIVIL _____ ELEC _____ MECH _____	PROJECT NUMBER: 10057031	DRAWN BY: P1 DUNNE DESIGNED BY: DL ARNOLD CHECKED BY: _____ APPROVED BY: _____ DATE: _____	CIVIL _____ MECHANICAL _____ ELECTRICAL _____	DUKE ENERGY CAROLINAS, LLC GREAT FALLS-DEARBORN HYDRO STATIONS GREAT FALLS LONG BYPASSED REACH AND GREAT FALLS DIVERSION DAM MIN FLOW & RECREATION RELEASE STR MAIN RECREATION CHANNEL STRUCTURE 3 PLAN AND SECTIONS	SCALE: AS NOTED DRAWING/SHEET NO.: 10057031 - 03S-04	REV _____
			PE SEAL _____											

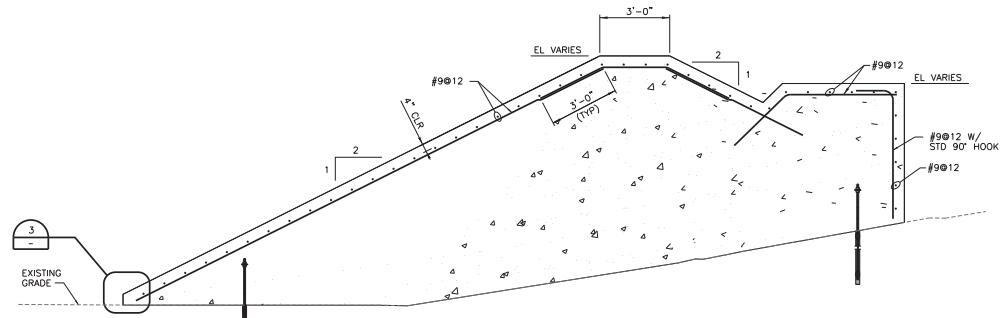
GENERAL NOTES:  
 1. FOR GENERAL NOTES SEE 10057031-03G-01.



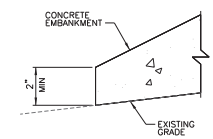
DETAIL 1  
 SCALE: 3/8"=1'-0"  
 03S-01



SECTION A  
 SCALE: 3/8"=1'-0"  
 03S-01



DETAIL 2  
 SCALE: 3/8"=1'-0"  
 03S-01



DETAIL 3  
 SCALE: 3"=1'-0"  
 03S-01

SAC-2019-00062  
 Great Falls-Dearbom  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 15-44

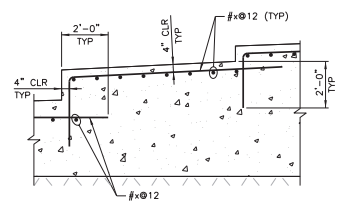


**PRELIMINARY  
 NOT FOR  
 CONSTRUCTION  
 OR  
 RECORDING**

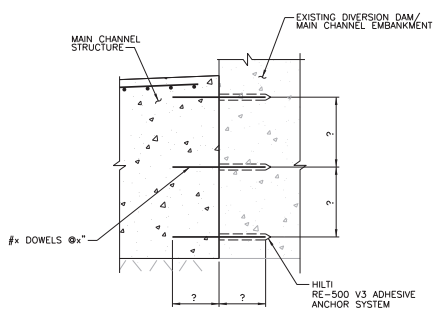
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSCH	CHKD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER: 10057031

DRAWN BY: P1 DUNNE	CIVIL	DUKE ENERGY CAROLINAS, LLC GREAT FALLS-DEARBORN HYDRO STATIONS GREAT FALLS LONG BYPASSED REACH AND GREAT FALLS DIVERSION DAM MIN FLOW & RECREATION RELEASE STR MAIN RECREATION CHANNEL SECTIONS AND DETAILS
DESIGNED BY: DL ARNOLD	MECHANICAL	
CHECKED BY:	ELECTRICAL	
APPROVED BY:	DATE:	
SCALE: AS NOTED	DRAWING/SHEET NO. 10057031 - 03S-05	REV

GENERAL NOTES:  
 1. FOR GENERAL NOTES SEE 10057031-03G-01.



DETAIL 1  
 SCALE: 3/8"=1'-0"  
 03S-02  
 03S-03  
 03S-04



DETAIL 2  
 SCALE: 3/8"=1'-0"  
 03S-02  
 03S-03  
 03S-04

SAC-2019-00062  
 Great Falls-Dearbourn  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 16-44



**PRELIMINARY  
 NOT FOR  
 CONSTRUCTION  
 OR  
 RECORDING**

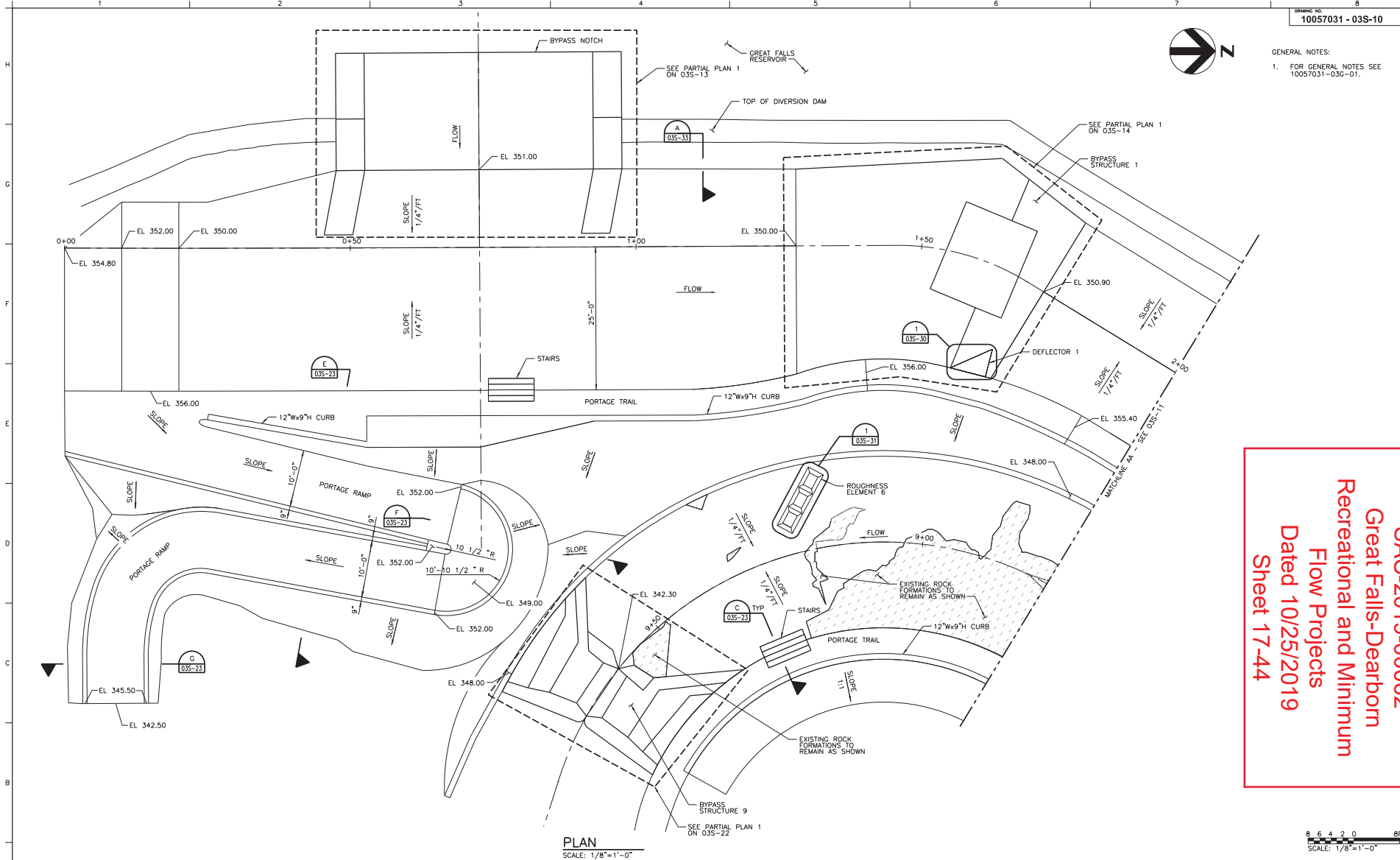
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	GSZH	CHKD	APPR	CIVL	ELEC	MECH

DRAWN BY: CIVIL  
 P1 DUNNE  
 DESIGNED BY: MECHANICAL  
 DL ARNOLD  
 CHECKED BY: ELECTRICAL  
 APPROVED BY: DATE:

DUKE ENERGY CAROLINAS, LLC  
**GREAT FALLS-DEARBORN HYDRO STATIONS**  
 GREAT FALLS LONG BYPASSED REACH AND  
 GREAT FALLS DIVERSION DAM  
 MIN FLOW & RECREATION RELEASE STR  
 MAIN RECREATION CHANNEL  
 SECTIONS AND DETAILS

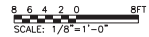
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 DRAWING/SHEET NO. 10057031 - 03S-06

GENERAL NOTES:  
 1. FOR GENERAL NOTES SEE 10057031-03G-01.



PLAN  
 SCALE: 1/8"=1'-0"

**SAC-2019-00062**  
**Great Falls-Dearbom**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 17-44**



HDR Engineering, Inc. of the Carolinas  
 SOUTH CAROLINA  
 PROFESSIONAL ENGINEER  
 NO. 03318  
 STATE OF SOUTH CAROLINA

**PRELIMINARY  
 NOT FOR  
 CONSTRUCTION  
 OR  
 RECORDING**

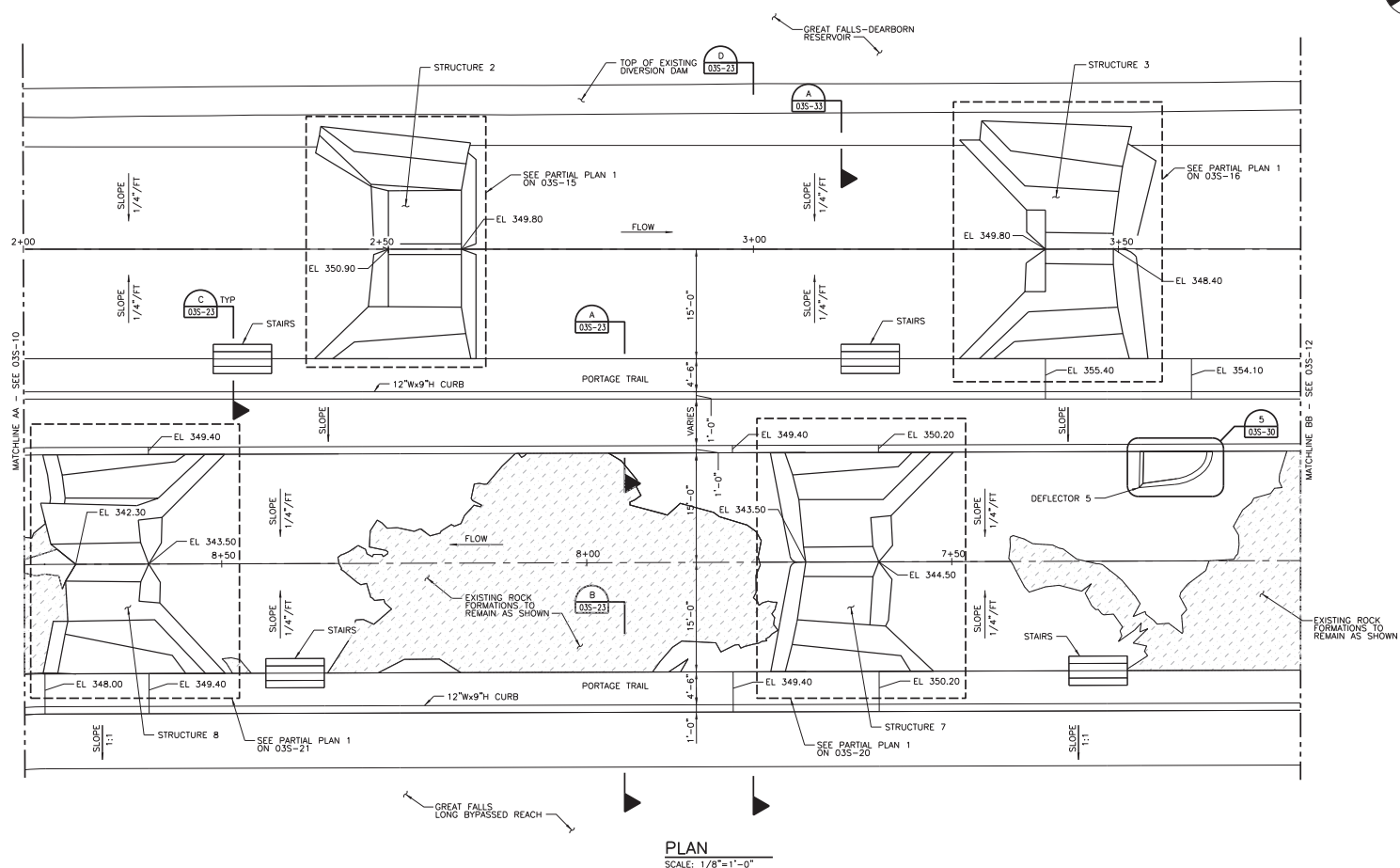
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DESIGNED BY: DL ARNOLD	MECHANICAL
CHECKED BY:	ELECTRICAL
APPROVED BY:	DATE:

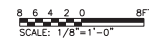
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GENERAL NOTES:  
1. FOR GENERAL NOTES SEE 10057031-03G-01.



SAC-2019-00062  
Great Falls-Dearbourn  
Recreational and Minimum  
Flow Projects  
Dated 10/25/2019  
Sheet 18-44



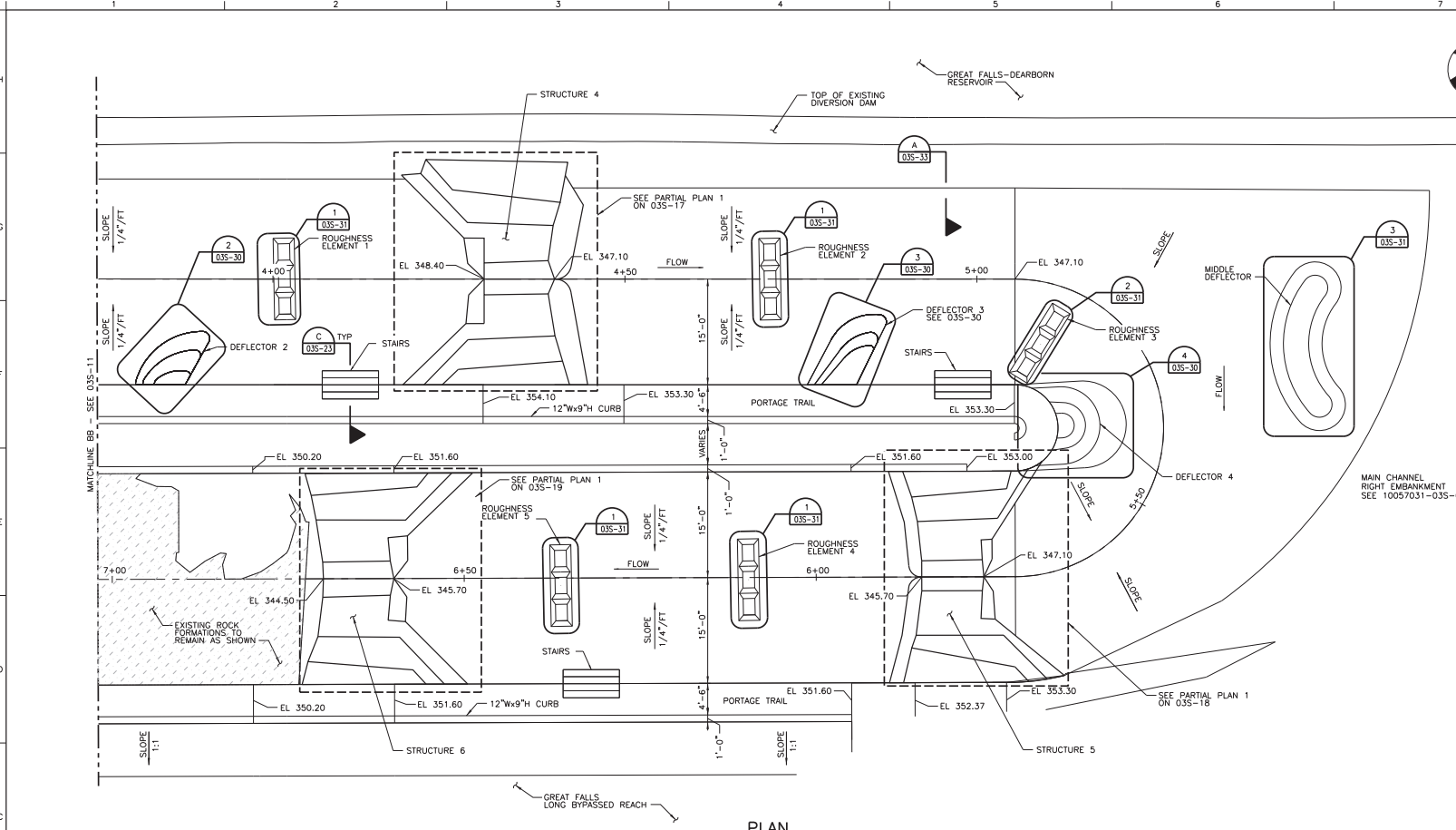
**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER: 10057031
DRAWN BY: P1 DUNNE DESIGNED BY: DL ARNOLD CHECKED BY: _____ APPROVED BY: _____ DATE: _____												
SCALE: AS NOTED DRAWING/SHEET NO. 10057031 - 03S-11												

DUKE ENERGY CAROLINAS, LLC  
**GREAT FALLS-DEARBORN HYDRO STATIONS**  
 GREAT FALLS LONG BYPASSED REACH AND  
 GREAT FALLS DIVERSION DAM  
 MIN FLOW & RECREATION RELEASE STR  
 BYPASS RECREATION CHANNEL  
 PLAN

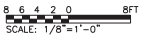


- GENERAL NOTES:
- FOR ADDITIONAL GENERAL NOTES SEE 10057031-03G-01.
  - FOR TYPICAL JOINT DETAILS SEE 10057031-03S-32.



PLAN  
SCALE: 1/8"=1'-0"

SAC-2019-00062  
 Great Falls-Dearbourn  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 19-44



**PRELIMINARY  
 NOT FOR  
 CONSTRUCTION  
 OR  
 RECORDING**

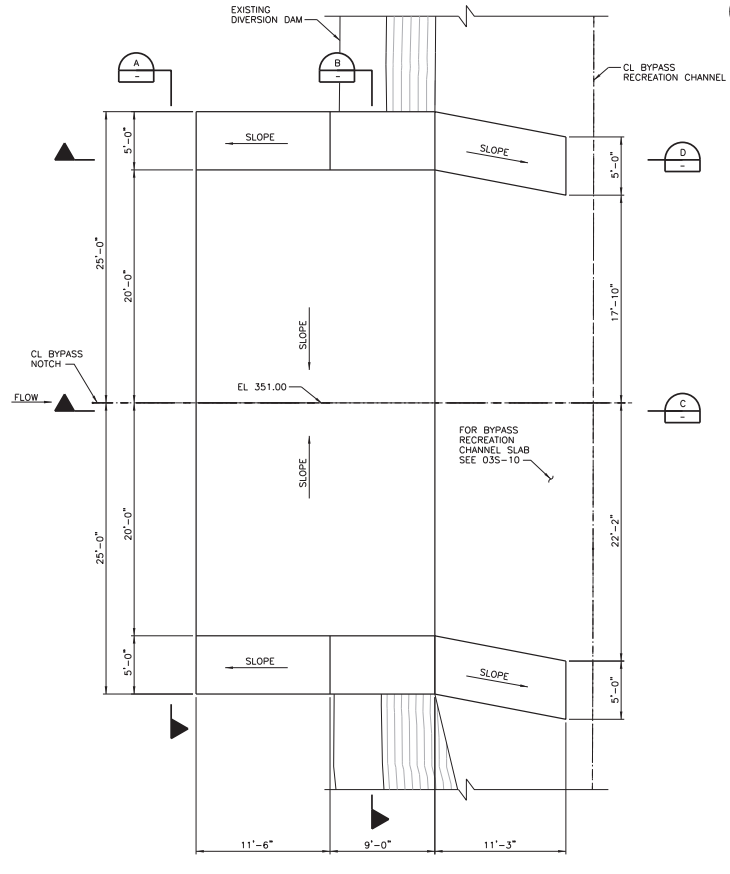
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	---	---	---	---	---	---	---
DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER:	10057031			

DRAWN BY: P1 DUNNE  
 DESIGNED BY: DL ARNOLD  
 CHECKED BY: \_\_\_\_\_  
 APPROVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

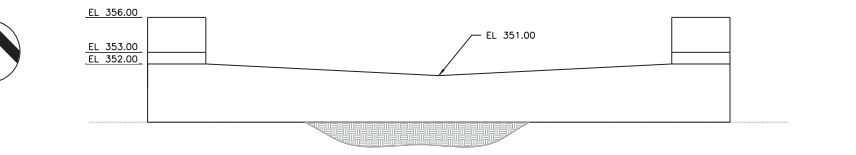
DUKE ENERGY CAROLINAS, LLC  
**GREAT FALLS-DEARBORN HYDRO STATIONS**  
 GREAT FALLS LONG BYPASSED REACH AND  
 GREAT FALLS DIVERSION DAM  
 MIN FLOW & RECREATION RELEASE STR  
 BYPASS RECREATION CHANNEL  
 PLAN



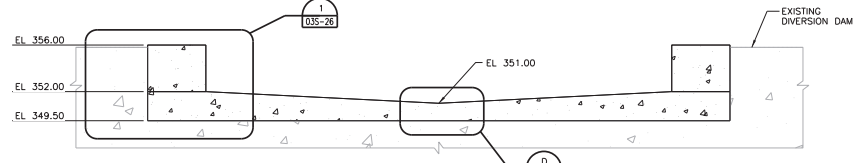
- GENERAL NOTES:
1. FOR ADDITIONAL GENERAL NOTES SEE 10057031-03G-01.
  2. FOR TYPICAL JOINT DETAILS SEE 10057031-03S-32.



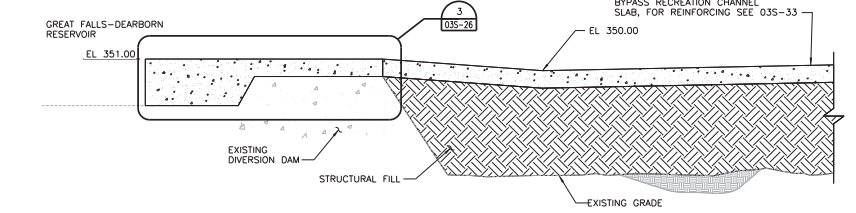
PARTIAL PLAN OF BYPASS NOTCH  
SCALE: 3/16"=1'-0"  
03S-10



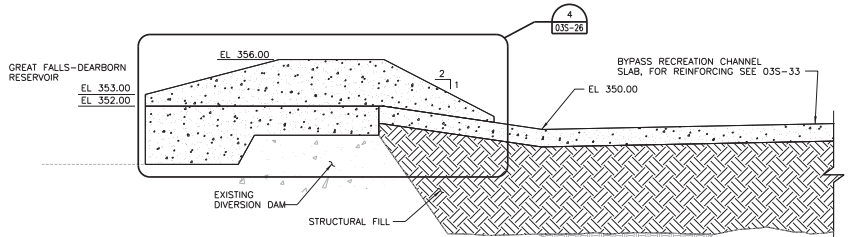
SECTION A-A  
SCALE: 3/16"=1'-0"  
03S-26



SECTION B-B  
SCALE: 3/16"=1'-0"  
03S-26

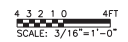


SECTION C-C  
SCALE: 3/16"=1'-0"  
03S-26



SECTION D-D  
SCALE: 3/16"=1'-0"  
03S-26

**SAC-2019-00062**  
**Great Falls-Dearborm**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 20-44**



**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

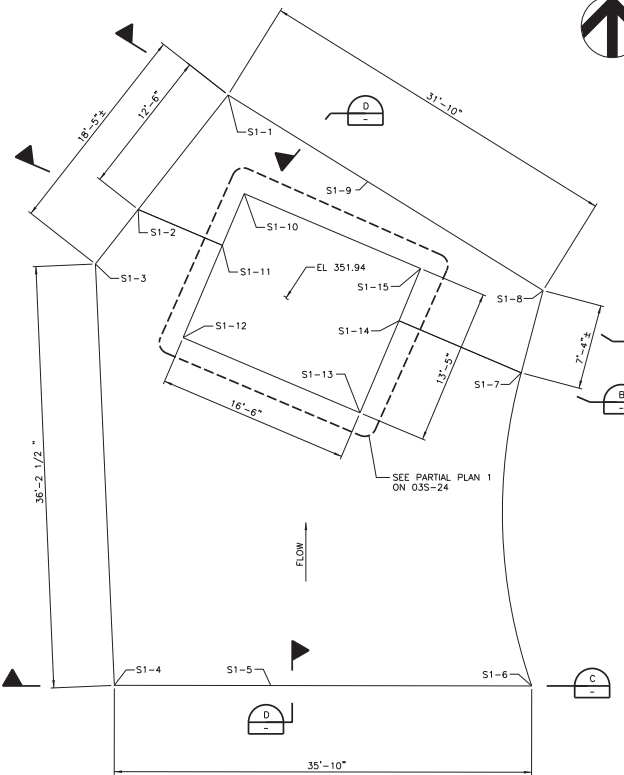
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSNH	CHKD	APPR	CIVL	ELEC	MECH

DRAWN BY:	CIVIL
DESIGNED BY:	MECHANICAL
CHECKED BY:	ELECTRICAL
APPROVED BY:	DATE:

DUKE ENERGY CAROLINAS, LLC  
**GREAT FALLS-DEARBORN HYDRO STATIONS**  
 GREAT FALLS LONG BYPASSED REACH AND  
 GREAT FALLS DIVERSION DAM  
 MIN FLOW & RECREATION RELEASE STR  
 BYPASS RECREATION CHANNEL NOTCH  
 PLAN AND SECTIONS

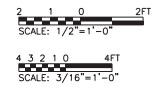
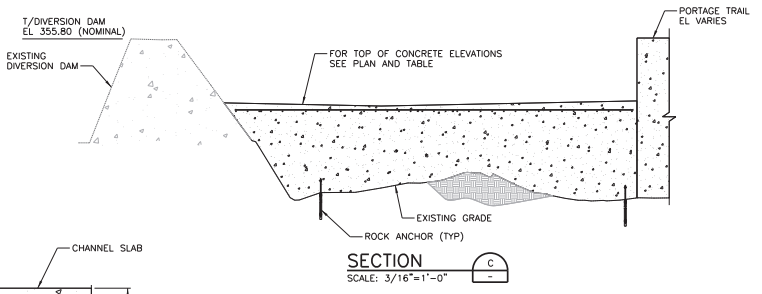
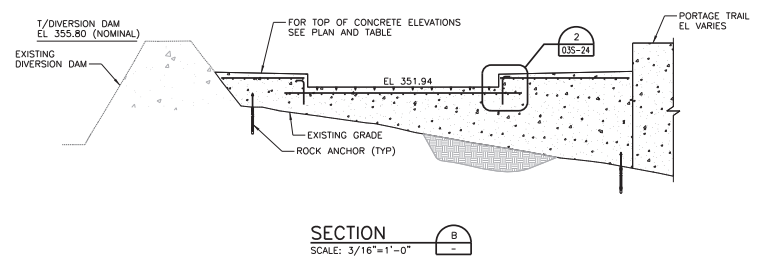
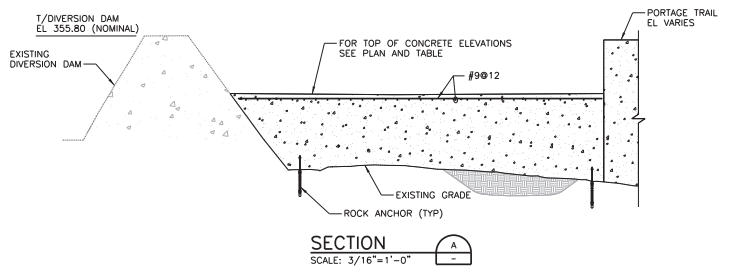
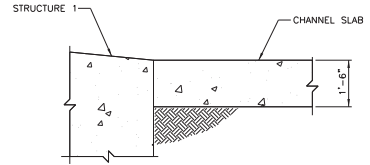
- GENERAL NOTES:
- FOR ADDITIONAL GENERAL NOTES SEE 10057031-03G-01
  - FOR TYPICAL JOINT DETAILS SEE 10057031-03S-32

SAC-2019-00062  
 Great Falls-Dearborn  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 21-44



**PARTIAL PLAN OF BYPASS STRUCTURE 1**  
SCALE: 3/16"=1'-0"

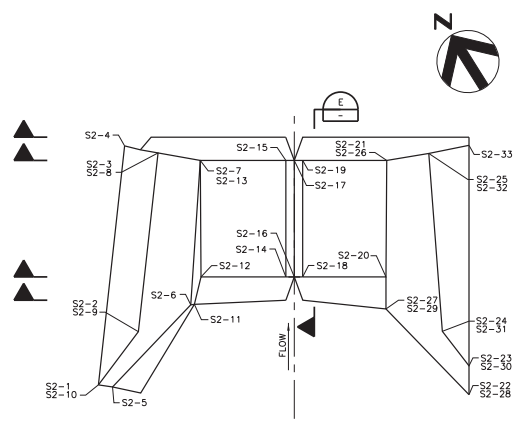
BYPASS STRUCTURE 1			
POINT	NORTHING	EASTING	ELEVATION
S1-1	1005018.40	2032749.53	351.00
S1-2	1005008.57	2032741.81	353.22
S1-3	1005003.89	2032738.14	352.95
S1-4	1004967.71	2032739.76	350.27
S1-5	1004967.69	2033753.19	350.00
S1-6	1004967.66	2032775.60	350.45
S1-7	1004994.54	2032774.70	351.00
S1-8	1005001.61	2032776.57	351.00
S1-9	1005010.96	2032761.52	350.90
S1-10	1005009.93	2032750.92	352.27
S1-11	1005005.49	2032749.03	353.06
S1-12	1004997.56	2032745.66	352.46
S1-13	1004991.11	2032760.85	352.10
S1-14	1004999.01	2032764.21	353.05
S1-15	1005003.49	2032766.06	351.94



**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

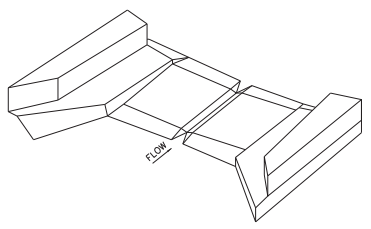
DRAWN BY: PT DUNNE DESIGNED BY: DL ARNOLD CHECKED BY: APPROVED BY: DATE:	CIVIL MECHANICAL ELECTRICAL	DUKE ENERGY CAROLINAS, LLC GREAT FALLS-DEARBORN HYDRO STATIONS GREAT FALLS LONG BYPASSED REACH AND GREAT FALLS DIVERSION DAM MIN FLOW & RECREATION RELEASE STR BYPASS RECREATION CHANNEL STRUCTURE 1 - PLAN AND SECTIONS
09/25/2019 NO. DATE	ISSUED FOR 70% S20 REVIEW. REVISION	PTD EIA DRN (OSH) (CHKD) (APPR) CIVIL ELEC MECH PROJECT NUMBER: 10057031
PE SEAL	SCALE: AS NOTED	DRAWING/SHEET NO. 10057031 - 03S-14

- GENERAL NOTES:
- FOR ADDITIONAL GENERAL NOTES SEE 10057031-03G-01.
  - FOR TYPICAL JOINT DETAILS SEE 10057031-03S-32.

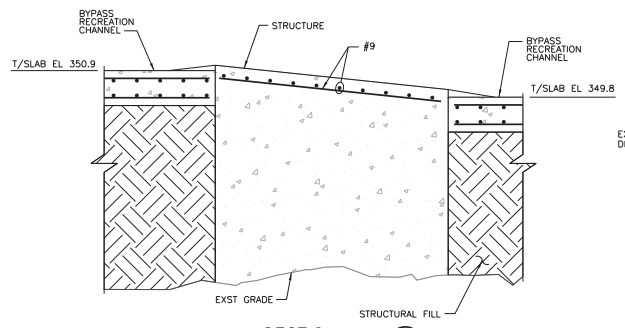


PARTIAL PLAN OF BYPASS STRUCTURE 2  
SCALE: 3/16"=1'-0"

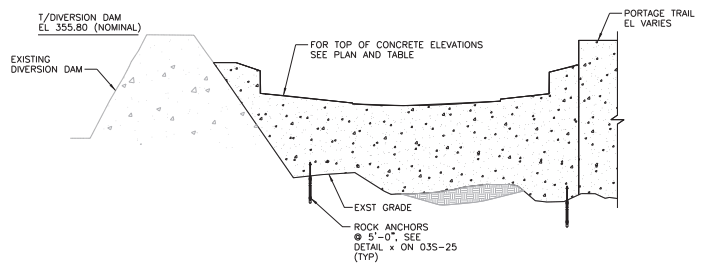
POINT	NORTHING	EASTING	ELEVATION
S2-1	1005077.37	2032782.97	356.10
S2-2	1005079.44	2032788.29	355.85
S2-3	1005091.59	2032797.83	354.02
S2-4	1005093.62	2032795.71	354.34
S2-5	1005076.58	2032783.91	352.90
S2-6	1005079.03	2032793.33	352.64
S2-7	1005089.13	2032800.57	351.06
S2-8	1005091.59	2032797.83	351.20
S2-9	1005079.44	2032788.29	352.90
S2-10	1005077.37	2032782.97	352.90
S2-11	1005078.90	2032793.62	351.19
S2-12	1005080.60	2032795.34	351.50
S2-13	1005089.13	2032800.57	350.50
S2-14	1005076.75	2032801.53	351.15
S2-15	1005085.25	2032806.81	350.05
S2-16	1005076.37	2032802.15	350.90
S2-17	1005084.87	2032807.42	349.80
S2-18	1005075.99	2032802.76	351.15
S2-19	1005084.49	2032808.03	350.10
S2-20	1005072.22	2032808.83	351.55
S2-21	1005080.68	2032814.17	350.94
S2-22	1005059.83	2032809.56	353.23
S2-23	1005061.93	2032810.85	353.23
S2-24	1005065.70	2032810.48	353.23
S2-25	1005079.28	2032817.55	351.20
S2-26	1005080.68	2032814.17	351.00
S2-27	1005069.88	2032807.38	352.44
S2-28	1005059.83	2032809.56	351.34
S2-29	1005069.88	2032807.38	351.21
S2-30	1005061.93	2032810.86	355.95
S2-31	1005065.70	2032810.48	355.70
S2-32	1005079.28	2032817.55	354.02
S2-33	1005078.05	2032820.87	354.08



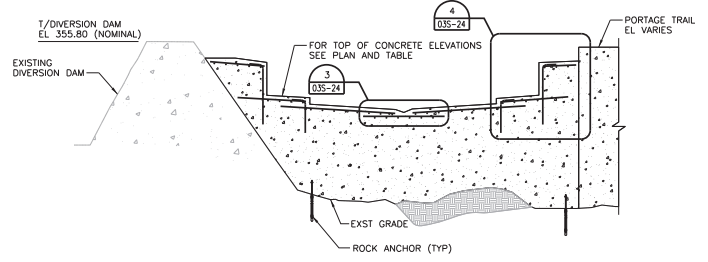
ISOMETRIC VIEW



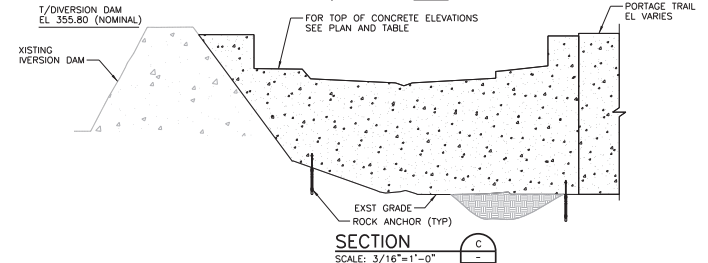
SECTION  
SCALE: 3/8"=1'-0"



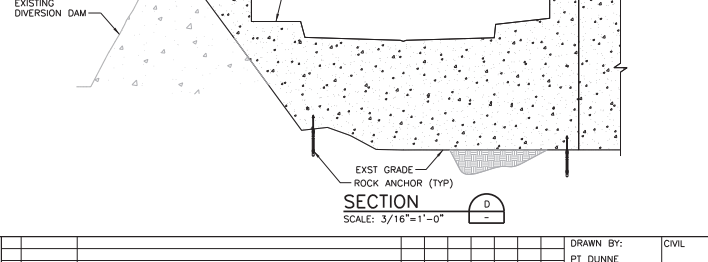
SECTION  
SCALE: 3/16"=1'-0"



SECTION  
SCALE: 3/16"=1'-0"

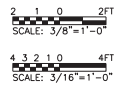


SECTION  
SCALE: 3/16"=1'-0"



SECTION  
SCALE: 3/16"=1'-0"

SAC-2019-00062  
 Great Falls-Dearborn  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 22-44



PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING

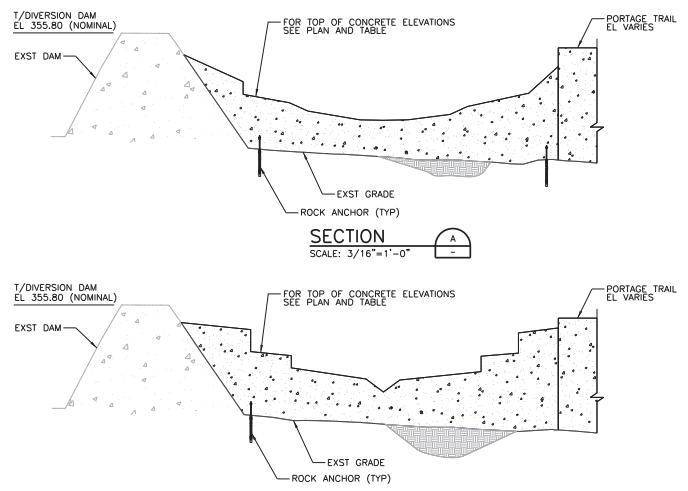
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER: 10057031

DRAWN BY: CIVIL  
 P1 DUNNE  
 DESIGNED BY: MECHANICAL  
 DL ARNOLD  
 CHECKED BY: ELECTRICAL  
 APPROVED BY: DATE:

DUKE ENERGY CAROLINAS, LLC  
 GREAT FALLS-DEARBORN HYDRO STATIONS  
 GREAT FALLS LONG BYPASSED REACH AND  
 GREAT FALLS DIVERSION DAM  
 MIN FLOW & RECREATION RELEASE STR  
 BYPASS RECREATION CHANNEL  
 STRUCTURE 2 - PLAN AND SECTIONS

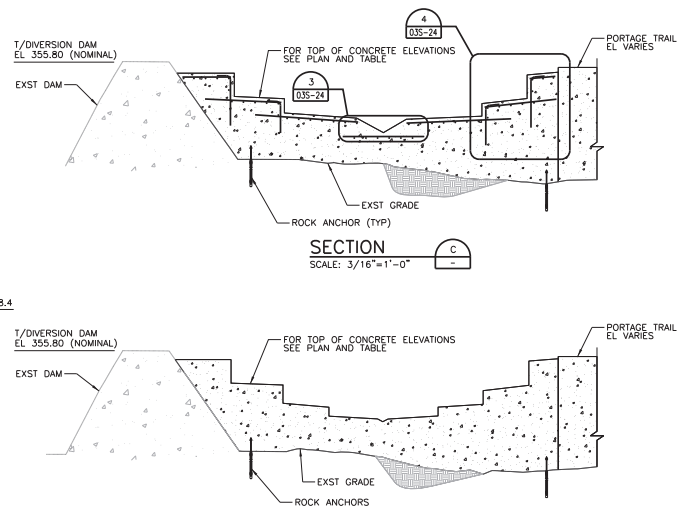
SCALE: AS NOTED  
 DRAWING/SHEET NO. 10057031 - 03S-15

- GENERAL NOTES:
- FOR ADDITIONAL GENERAL NOTES SEE 10057031-03G-01
  - FOR TYPICAL JOINT DETAILS SEE 10057031-03S-32



SECTION A  
SCALE: 3/16"=1'-0"

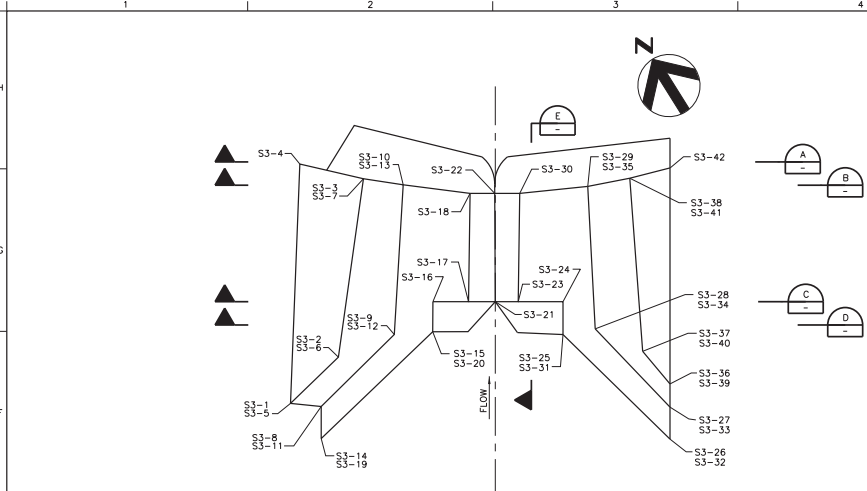
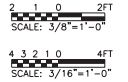
SECTION B  
SCALE: 3/16"=1'-0"



SECTION C  
SCALE: 3/16"=1'-0"

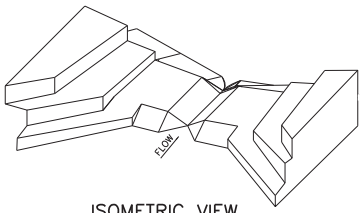
SECTION D  
SCALE: 3/16"=1'-0"

SAC-2019-00062  
 Great Falls-Dearborn  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 23-44

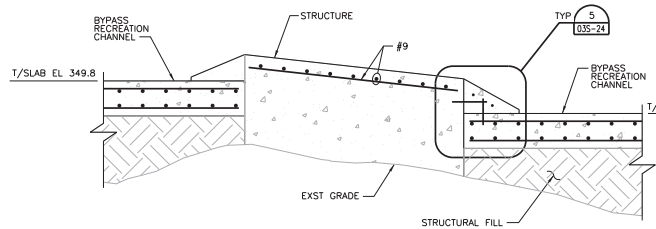


PARTIAL PLAN OF BYPASS STRUCTURE 3  
SCALE: 3/16"=1'-0"

POINT	NORTHING	EASTING	ELEVATION
S3-1	1005154.68	2032830.09	355.70
S3-2	1005155.89	2032835.68	355.45
S3-3	1005167.77	2032845.58	353.70
S3-4	1005171.72	2032841.61	354.15
S3-5	1005154.68	2032830.09	353.41
S3-6	1005155.89	2032835.68	353.41
S3-7	1005167.77	2032845.58	351.80
S3-8	1005153.07	2032832.19	353.41
S3-9	1005155.01	2032840.78	353.05
S3-10	1005165.52	2032848.21	351.52
S3-11	1005163.07	2032832.19	351.44
S3-12	1005155.01	2032840.78	351.30
S3-13	1005165.52	2032848.21	350.46
S3-14	1005150.73	2032830.73	351.44
S3-15	1005153.47	2032843.71	351.05
S3-16	1005155.65	2032845.08	351.27
S3-17	1005154.04	2032847.68	351.05
S3-18	1005161.87	2032852.70	350.05
S3-19	1005150.73	2032830.60	349.90
S3-20	1005153.47	2032843.71	350.00
S3-21	1005152.83	2032849.63	349.80
S3-22	1005161.42	2032854.91	348.40
S3-23	1005151.79	2032851.30	350.95
S3-24	1005149.76	2032854.57	351.11
S3-25	1005147.36	2032853.08	351.10
S3-26	1005134.86	2032856.15	351.31
S3-27	1005137.19	2032857.60	353.80
S3-28	1005146.32	2032855.69	352.50
S3-29	1005157.05	2032861.60	351.45
S3-30	1005159.62	2032856.32	349.92
S3-31	1005147.36	2032853.08	349.94
S3-32	1005134.86	2032856.15	349.90
S3-33	1005137.19	2032857.60	351.31
S3-34	1005146.32	2032855.69	351.31
S3-35	1005157.05	2032861.60	350.10
S3-36	1005138.88	2032858.65	350.75
S3-37	1005142.53	2032858.13	350.30
S3-38	1005155.74	2032865.03	353.40
S3-39	1005138.88	2032858.65	353.30
S3-40	1005142.53	2032858.13	353.15
S3-41	1005155.74	2032865.03	351.67
S3-42	1005154.66	2032868.45	353.73



ISOMETRIC VIEW



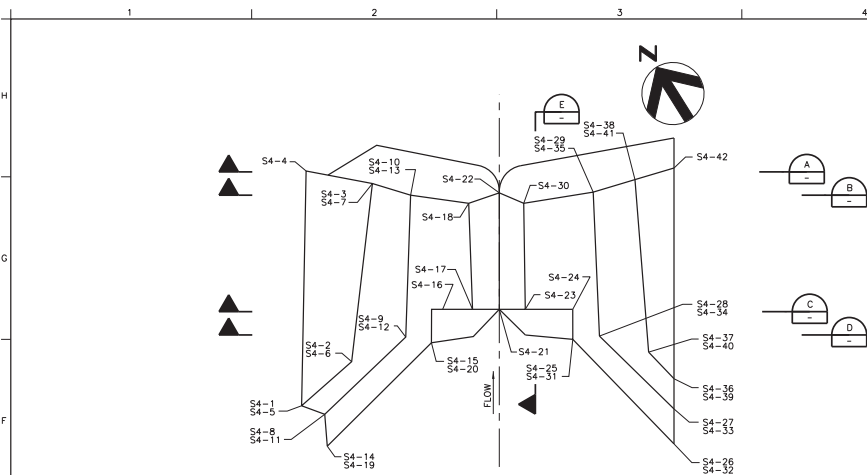
SECTION E  
SCALE: 3/8"=1'-0"



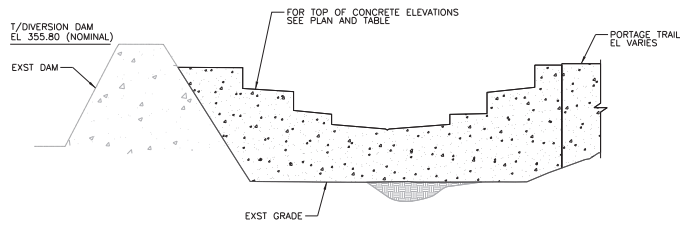
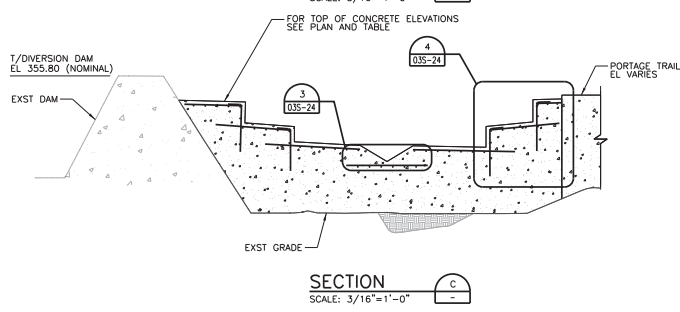
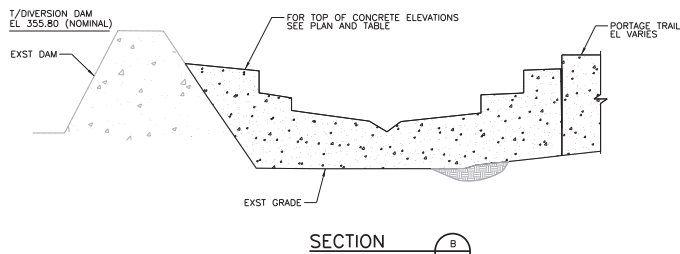
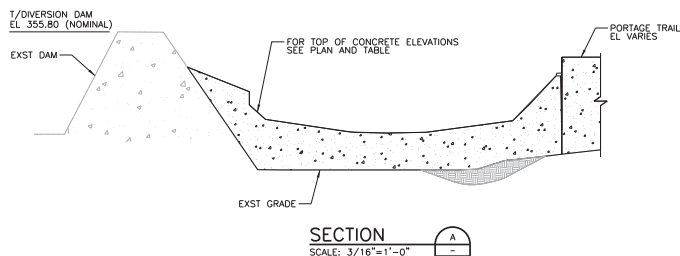
PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING

DRAWN BY: P1 DUNNE DESIGNED BY: DL ARNOLD CHECKED BY: APPROVED BY: DATE:	CIVIL MECHANICAL ELECTRICAL	DUKE ENERGY CAROLINAS, LLC GREAT FALLS-DEARBORN HYDRO STATIONS GREAT FALLS LONG BYPASSED REACH AND GREAT FALLS DIVERSION DAM MIN FLOW & RECREATION RELEASE STR BYPASS RECREATION CHANNEL STRUCTURE 3 - PLAN AND SECTIONS
09/25/2019 NO. DATE	ISSUED FOR 70% S20 REVIEW. REVISION	PROJECT NUMBER: 10057031

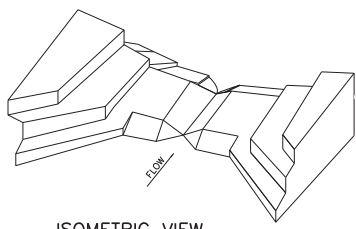
- GENERAL NOTES:
- 1. FOR ADDITIONAL GENERAL NOTES SEE 10057031-03G-01.
  - 2. FOR TYPICAL JOINT DETAILS SEE 10057031-03S-32.



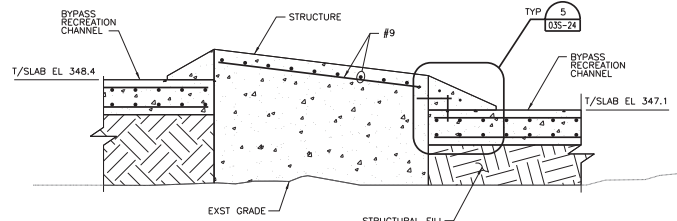
**PARTIAL PLAN OF BYPASS STRUCTURE 4**  
SCALE: 3/16"=1'-0"



POINT	NORTHING	EASTING	ELEVATION
S4-1	1005231.20	2032878.33	354.25
S4-2	1005232.15	2032883.98	354.05
S4-3	1005244.20	2032893.56	352.24
S4-4	1005248.12	2032889.29	352.75
S4-5	1005231.20	2032878.33	352.30
S4-6	1005232.15	2032883.98	352.30
S4-7	1005244.20	2032893.56	350.30
S4-8	1005229.53	2032879.63	352.30
S4-9	1005231.49	2032889.04	351.75
S4-10	1005241.53	2032895.82	349.95
S4-11	1005229.53	2032879.63	350.07
S4-12	1005231.49	2032889.04	350.07
S4-13	1005241.62	2032895.82	348.89
S4-14	1005227.09	2032878.37	350.07
S4-15	1005229.92	2032890.65	349.75
S4-16	1005232.35	2032892.18	349.75
S4-17	1005230.49	2032895.17	349.78
S4-18	1005238.39	2032899.69	348.70
S4-19	1005227.09	2032878.37	348.50
S4-20	1005229.92	2032899.65	348.50
S4-21	1005229.28	2032897.12	348.40
S4-22	1005237.77	2032902.39	347.10
S4-23	1005228.10	2032899.01	349.75
S4-24	1005225.95	2032902.48	349.88
S4-25	1005223.76	2032901.12	349.75
S4-26	1005211.54	2032903.77	350.01
S4-27	1005214.09	2032905.35	352.40
S4-28	1005222.79	2032903.21	351.67
S4-29	1005233.57	2032909.28	350.27
S4-30	1005235.90	2032903.70	348.63
S4-31	1005223.76	2032901.12	348.85
S4-32	1005211.54	2032903.77	348.50
S4-33	1005214.09	2032905.35	350.35
S4-34	1005222.79	2032903.21	349.85
S4-35	1005233.57	2032909.28	348.70
S4-36	1005216.29	2032906.72	354.36
S4-37	1005219.39	2032906.07	354.05
S4-38	1005232.59	2032912.89	352.24
S4-39	1005216.29	2032906.72	352.50
S4-40	1005219.39	2032906.07	352.30
S4-41	1005232.59	2032912.89	350.27
S4-42	1005231.67	2032916.27	352.24

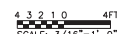
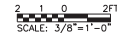


**ISOMETRIC VIEW**



**SECTION E-E**  
SCALE: 3/8"=1'-0"

**SAC-2019-00062**  
**Great Falls-DeARBorn**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 24-44**



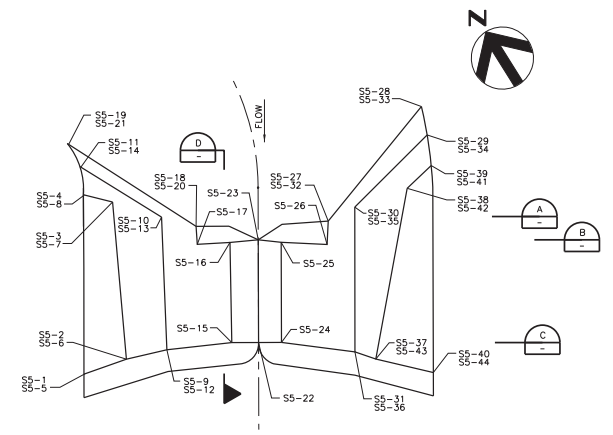
HDR Engineering, Inc. of the Carolinas

**PRELIMINARY**  
**NOT FOR**  
**CONSTRUCTION**  
**OR**  
**RECORDING**

NO.	DATE	ISSUED FOR 70% S20 REVIEW.	REVISION	PTD	ELA	---	---	---	---	---	---	---	---	---	---	PROJECT NUMBER: 10057031

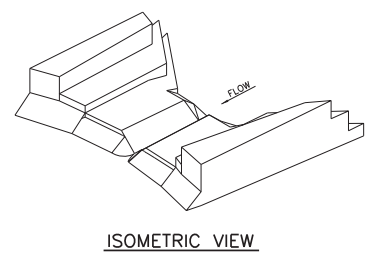
DRAWN BY: PT OUNNE	CIVIL	DUKE ENERGY CAROLINAS, LLC
DESIGNED BY: DL ARNOLD	MECHANICAL	GREAT FALLS-DEARBORN HYDRO STATIONS
CHECKED BY:	ELECTRICAL	GREAT FALLS LONG BYPASSED REACH AND
APPROVED BY:	DATE:	GREAT FALLS DIVERSION DAM
		MIN FLOW & RECREATION RELEASE STR
		STRUCTURE 4 - PLAN AND SECTIONS
SCALE: AS NOTED	DRAWING/SHEET NO. 10057031-03S-17	REV

- GENERAL NOTES:**
- FOR ADDITIONAL GENERAL NOTES SEE 10057031-03G-01.
  - FOR TYPICAL JOINT DETAILS SEE 10057031-03S-32.

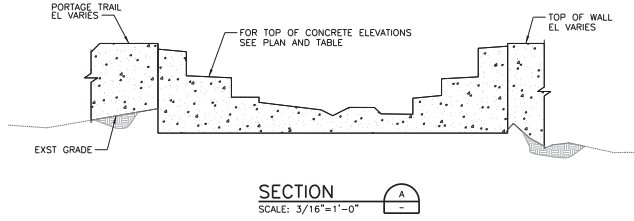


**PARTIAL PLAN OF BYPASS STRUCTURE 5**  
SCALE: 3/16"=1'-0"

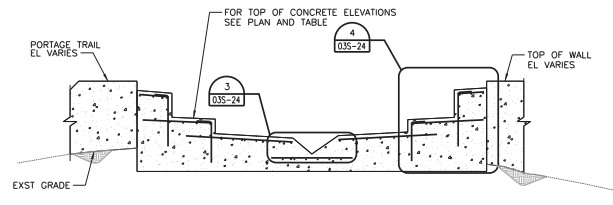
POINT	NORTHING	EASTING	ELEVATION
S5-1	1005265.36	2032951.76	350.98
S5-2	1005264.55	2032955.46	350.98
S5-3	1005276.63	2032961.56	352.98
S5-4	1005278.43	2032959.82	353.15
S5-5	1005265.36	2032951.76	348.10
S5-6	1005264.55	2032955.45	348.95
S5-7	1005276.63	2032961.56	350.45
S5-8	1005278.43	2032959.82	350.70
S5-9	1005263.40	2032958.82	348.60
S5-10	1005273.32	2032964.45	350.16
S5-11	1005280.62	2032960.83	351.38
S5-12	1005263.40	2032958.82	347.75
S5-13	1005273.32	2032964.45	348.70
S5-14	1005280.62	2032960.83	348.88
S5-15	1005260.98	2032963.89	347.60
S5-16	1005268.37	2032968.29	348.62
S5-17	1005269.71	2032965.82	348.75
S5-18	1005266.55	2032966.55	348.50
S5-19	1005283.12	2032960.97	348.88
S5-20	1005271.08	2032966.55	347.90
S5-21	1005283.12	2032960.97	347.20
S5-22	1005259.78	2032965.84	345.70
S5-23	1005267.28	2032970.47	346.93
S5-24	1005258.74	2032967.52	347.14
S5-25	1005266.06	2032972.03	348.55
S5-26	1005263.82	2032975.28	348.64
S5-27	1005265.48	2032976.42	348.45
S5-28	1005269.61	2032988.41	347.20
S5-29	1005267.28	2032987.54	348.71
S5-30	1005265.29	2032979.00	348.69
S5-31	1005254.73	2032972.45	347.50
S5-32	1005265.48	2032976.42	347.91
S5-33	1005269.61	2032988.41	348.69
S5-34	1005267.28	2032987.54	351.07
S5-35	1005265.29	2032979.00	350.30
S5-36	1005254.73	2032972.45	348.65
S5-37	1005253.26	2032973.64	348.65
S5-38	1005264.29	2032983.67	350.70
S5-39	1005264.87	2032986.45	351.05
S5-40	1005249.67	2032977.23	347.65
S5-41	1005264.97	2032986.45	353.21
S5-42	1005264.29	2032983.67	352.75
S5-43	1005253.26	2032973.64	350.75
S5-44	1005249.67	2032977.23	350.90



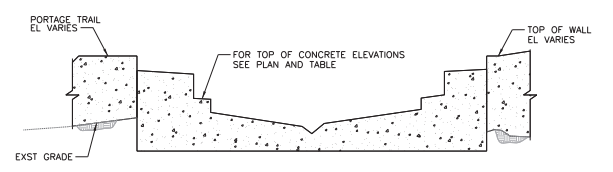
**ISOMETRIC VIEW**



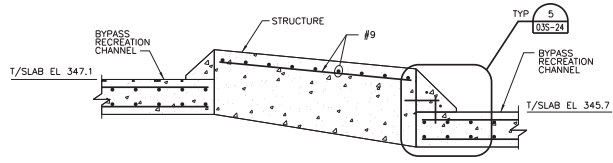
**SECTION A**  
SCALE: 3/16"=1'-0"



**SECTION B**  
SCALE: 3/16"=1'-0"

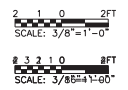


**SECTION C**  
SCALE: 3/16"=1'-0"



**SECTION D**  
SCALE: 3/8"=1'-0"

**SAC-2019-00062**  
**Great Falls-Dearborn**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 25-44**

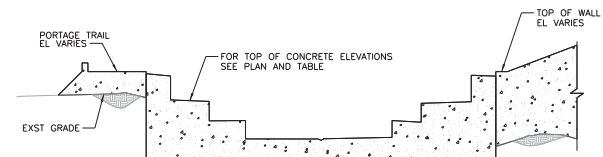


**PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING**

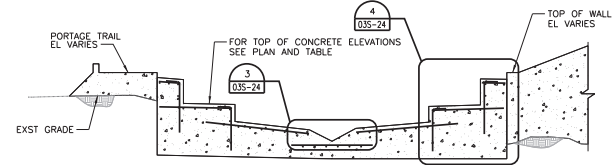
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	---	---	---	
		REVISION	DRN	OSZH	CHKD	APPR	CIVL	
							ELEC	MECH
							PROJECT NUMBER: 10057031	

DRAWN BY:	CIVIL	DUKE ENERGY CAROLINAS, LLC
DESIGNED BY:	MECHANICAL	GREAT FALLS-DEARBORN HYDRO STATIONS
CHECKED BY:	ELECTRICAL	GREAT FALLS LONG BYPASSED REACH AND GREAT FALLS DIVERSION DAM
APPROVED BY:	DATE:	MIN FLOW & RECREATION RELEASE STR
		STRUCTURE 5 - PLAN AND SECTIONS
SCALE: AS NOTED		DRAWING/SHEET NO. 10057031 - 03S-18

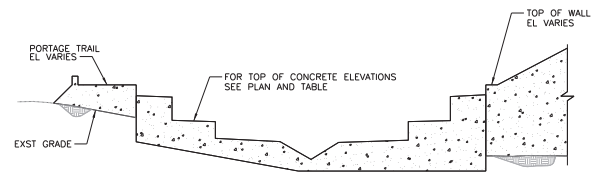
- GENERAL NOTES:
- FOR ADDITIONAL GENERAL NOTES SEE 10057031-03G-01.
  - FOR TYPICAL JOINT DETAILS SEE 10057031-03S-32.



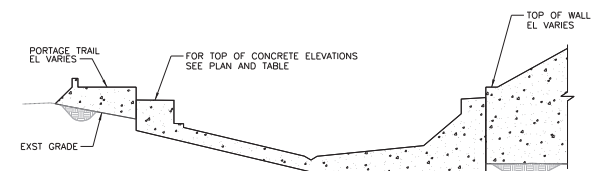
SECTION A  
SCALE: 3/16"=1'-0"



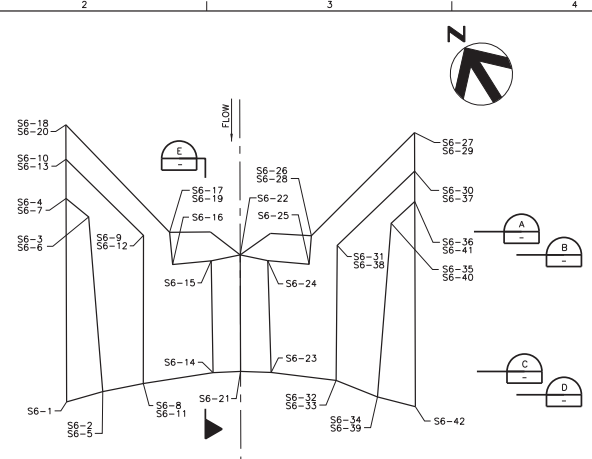
SECTION B  
SCALE: 3/16"=1'-0"



SECTION C  
SCALE: 3/16"=1'-0"

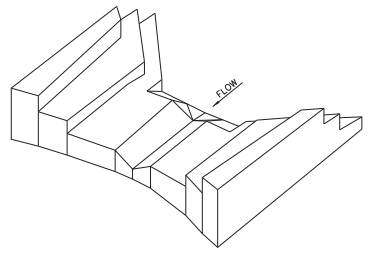


SECTION D  
SCALE: 3/16"=1'-0"

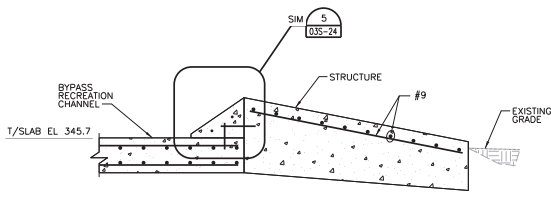


PARTIAL PLAN OF BYPASS STRUCTURE 6  
SCALE: 3/16"=1'-0"

POINT	NORTHING	EASTING	ELEVATION
S6-1	1005193.08	2032907.17	349.80
S6-2	1005192.20	2032910.25	349.70
S6-3	1005205.58	2032917.13	351.44
S6-4	1005207.97	2032916.13	351.30
S6-5	1005192.20	2032910.25	347.65
S6-6	1005205.58	2032917.13	349.15
S6-7	1005207.97	2032916.31	349.45
S6-8	1005190.96	2032913.56	347.65
S6-9	1005201.75	2032920.29	348.85
S6-10	1005210.74	2032918.10	349.50
S6-11	1005190.96	2032913.56	346.00
S6-12	1005201.75	2032920.29	347.25
S6-13	1005210.74	2032918.10	347.75
S6-14	1005188.59	2032919.15	345.95
S6-15	1005196.83	2032924.08	347.05
S6-16	1005198.31	2032921.10	347.41
S6-17	1005200.79	2032922.33	347.40
S6-18	1005213.35	2032919.63	347.41
S6-19	1005200.79	2032922.33	345.85
S6-20	1005213.44	2032919.69	345.80
S6-21	1005187.44	2032921.21	344.50
S6-22	1005195.95	2032926.46	345.70
S6-23	1005185.97	2032923.39	346.02
S6-24	1005194.28	2032928.21	346.90
S6-25	1005192.15	2032931.06	347.20
S6-26	1005194.12	2032932.52	347.40
S6-27	1005196.95	2032944.64	347.37
S6-28	1005194.12	2032932.52	346.40
S6-29	1005196.95	2032944.64	345.80
S6-30	1005194.09	2032942.68	347.37
S6-31	1005192.25	2032933.97	347.37
S6-32	1005182.45	2032927.77	346.20
S6-33	1005182.45	2032927.77	347.65
S6-34	1005179.37	2032930.04	347.60
S6-35	1005191.42	2032938.91	349.25
S6-36	1005191.88	2032941.31	349.44
S6-37	1005194.09	2032942.68	349.44
S6-38	1005192.25	2032933.97	348.95
S6-39	1005179.37	2032930.04	349.60
S6-40	1005191.42	2032938.91	351.30
S6-41	1005191.88	2032941.31	351.45
S6-42	1005177.30	2032932.03	349.60

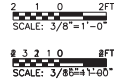


ISOMETRIC VIEW



SECTION E  
SCALE: 3/8"=1'-0"

SAC-2019-00062  
 Great Falls-Dearbom  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 26-44



PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING

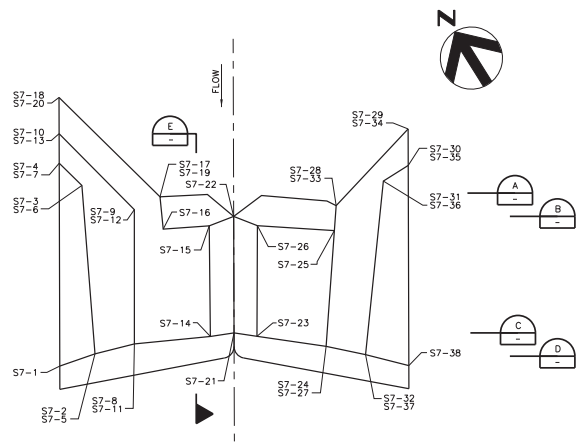
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	REVISION

DRAWN BY:	CIVIL	PTD	DLA					
DESIGNED BY:	MECHANICAL	DRN	OSGN	CHKD	APPR	CIVIL	ELEC	MECH
CHECKED BY:	ELECTRICAL							
APPROVED BY:	DATE:							
PROJECT NUMBER: 10057031								

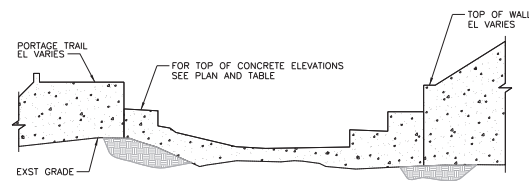
DUKE ENERGY CAROLINAS, LLC  
**GREAT FALLS-DEARBORN HYDRO STATIONS**  
 GREAT FALLS LONG BYPASSED REACH AND  
 GREAT FALLS DIVERSION DAM  
 MIN FLOW & RECREATION RELEASE STR  
 BYPASS RECREATION CHANNEL  
 STRUCTURE 6 - PLAN AND SECTIONS

SCALE: AS NOTED  
 DRAWING/SHEET NO. 10057031 - 03S-19

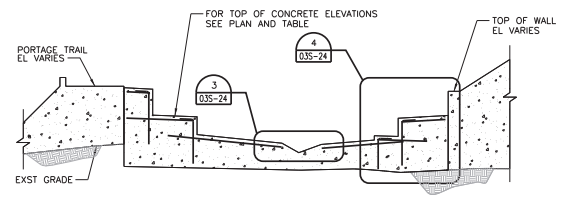
- GENERAL NOTES:
- FOR ADDITIONAL GENERAL NOTES SEE 10057031-03G-01.
  - FOR TYPICAL JOINT DETAILS SEE 10057031-03S-32.



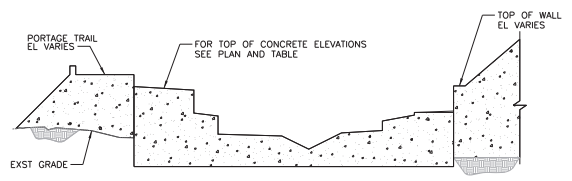
PARTIAL PLAN OF BYPASS STRUCTURE 7  
SCALE: 3/16"=1'-0"



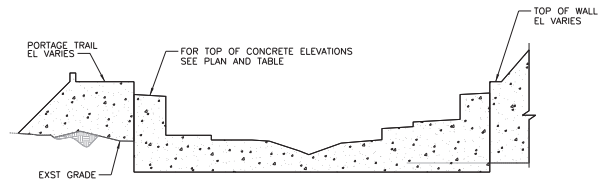
SECTION A  
SCALE: 3/16"=1'-0"



SECTION B  
SCALE: 3/16"=1'-0"

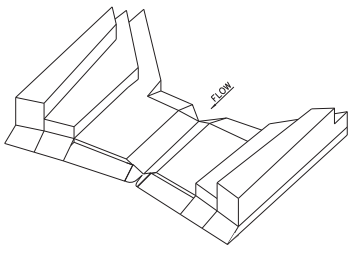


SECTION C  
SCALE: 3/16"=1'-0"

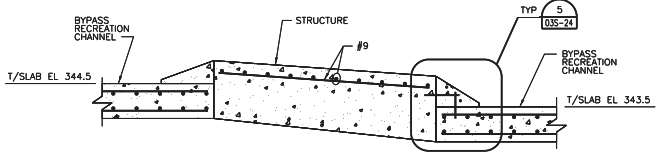


SECTION D  
SCALE: 3/16"=1'-0"

BYPASS STRUCTURE 7			
POINT	NORTHING	EASTING	ELEVATION
S7-1	1005107.80	2032854.50	348.80
S7-2	1005107.10	2032857.62	348.75
S7-3	1005119.98	2032864.29	350.00
S7-4	1005122.71	2032863.62	350.20
S7-5	1005107.10	2032857.62	346.60
S7-6	1005119.98	2032864.29	347.95
S7-7	1005122.71	2032863.62	348.25
S7-8	1005106.04	2032860.94	346.60
S7-9	1005115.84	2032867.02	347.50
S7-10	1005124.75	2032864.98	348.25
S7-11	1005106.04	2032860.94	345.00
S7-12	1005115.84	2032867.02	345.90
S7-13	1005124.75	2032864.98	346.35
S7-14	1005103.14	2032866.82	344.85
S7-15	1005111.26	2032871.75	345.50
S7-16	1005113.11	2032868.24	345.77
S7-17	1005115.61	2032869.47	346.10
S7-18	1005127.35	2032866.63	346.50
S7-19	1005115.61	2032869.47	344.65
S7-20	1005127.35	2032866.63	344.80
S7-21	1005102.33	2032868.71	343.50
S7-22	1005110.84	2032873.96	344.50
S7-23	1005101.04	2032870.22	344.85
S7-24	1005097.18	2032874.81	345.00
S7-25	1005105.25	2032880.66	345.98
S7-26	1005109.09	2032875.27	345.65
S7-27	1005097.18	2032874.81	346.67
S7-28	1005106.99	2032881.92	347.65
S7-29	1005109.17	2032890.10	348.15
S7-30	1005106.65	2032888.94	348.35
S7-31	1005106.64	2032886.48	348.00
S7-32	1005094.77	2032877.31	346.60
S7-33	1005106.99	2032881.92	346.07
S7-34	1005109.17	2032890.10	346.07
S7-35	1005106.65	2032888.94	350.50
S7-36	1005106.64	2032886.48	350.25
S7-37	1005094.79	2032877.31	348.75
S7-38	1005092.18	2032879.83	348.80

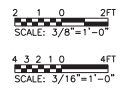


ISOMETRIC VIEW



SECTION E  
SCALE: 3/8"=1'-0"

SAC-2019-00062  
 Great Falls-Dearbom  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 27-44



PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING

NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSGN	CHKD	APPR	CIVIL	ELEC	MECH	PROJECT NUMBER: 10057031

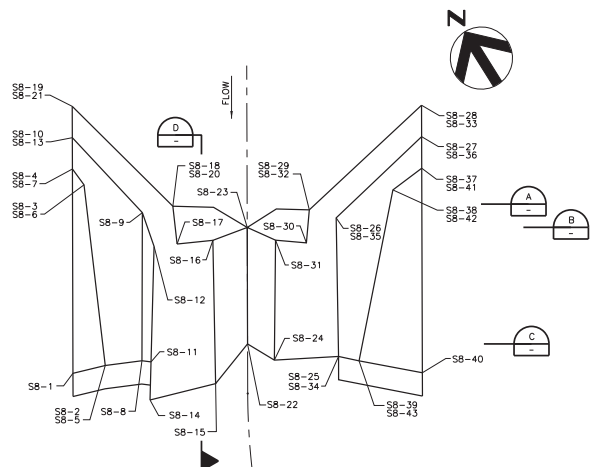
DRAWN BY: CIVIL  
P1 DUNNE  
DESIGNED BY: MECHANICAL  
DL ARNOLD  
CHECKED BY: ELECTRICAL  
APPROVED BY: DATE:

DUKE ENERGY CAROLINAS, LLC  
GREAT FALLS-DEARBORN HYDRO STATIONS  
GREAT FALLS LONG BYPASSED REACH AND  
GREAT FALLS DIVERSION DAM  
MIN FLOW & RECREATION RELEASE STR  
BYPASS RECREATION CHANNEL  
STRUCTURE 7 - PLAN AND SECTIONS

SCALE: AS NOTED  
DRAWING/SHEET NO. 10057031 - 03S-20

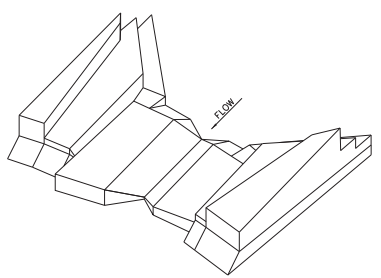


GENERAL NOTES:  
 1. FOR ADDITIONAL GENERAL NOTES SEE 10057031-03G-01.  
 2. FOR TYPICAL JOINT DETAILS SEE 10057031-03S-32.

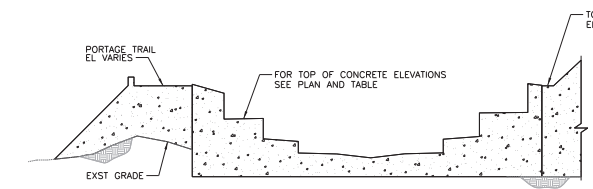


PARTIAL PLAN OF BYPASS STRUCTURE 8  
 SCALE: 3/16"=1'-0"

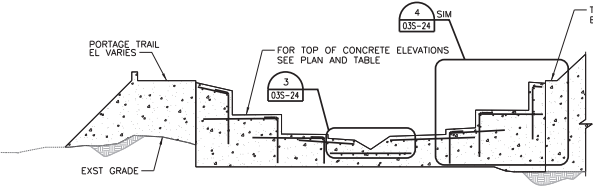
POINT	NORTHING	EASTING	ELEVATION
SB-1	1005023.02	2032802.04	347.50
SB-2	1005022.09	2032804.84	347.45
SB-3	1005036.23	2032811.48	349.85
SB-4	1005037.84	2032811.36	349.85
SB-5	1005022.09	2032804.84	345.30
SB-6	1005036.23	2032811.48	347.35
SB-7	1005037.84	2032811.36	347.30
SB-8	1005020.78	2032807.73	345.25
SB-9	1005031.57	2032814.47	347.06
SB-10	1005040.14	2032812.77	347.22
SB-11	1005020.29	2032808.35	344.71
SB-12	1005031.57	2032814.47	345.00
SB-13	1005040.14	2032812.77	345.40
SB-14	1005017.55	2032806.55	344.39
SB-15	1005015.78	2032812.07	344.25
SB-16	1005026.35	2032818.36	345.50
SB-17	1005027.70	2032815.59	345.62
SB-18	1005030.65	2032816.99	344.80
SB-19	1005042.43	2032814.19	345.70
SB-20	1005030.65	2032816.99	343.55
SB-21	1005042.43	2032814.19	343.60
SB-22	1005017.22	2032816.20	342.30
SB-23	1005025.73	2032821.45	343.50
SB-24	1005014.83	2032817.42	343.20
SB-25	1005012.19	2032822.29	343.80
SB-26	1005022.40	2032828.37	344.80
SB-27	1005024.44	2032838.22	345.02
SB-28	1005026.74	2032839.63	345.04
SB-29	1005024.21	2032826.78	344.60
SB-30	1005021.93	2032825.07	344.88
SB-31	1005023.52	2032822.94	344.91
SB-32	1005024.21	2032826.78	343.50
SB-33	1005026.74	2032839.63	343.58
SB-34	1005012.19	2032822.27	345.00
SB-35	1005022.40	2032828.37	346.60
SB-36	1005024.44	2032838.22	346.60
SB-37	1005022.23	2032836.80	346.60
SB-38	1005021.87	2032833.78	346.60
SB-39	1005010.94	2032823.56	345.20
SB-40	1005007.27	2032827.80	347.40
SB-41	1005022.14	2032836.80	349.95
SB-42	1005021.87	2032833.78	348.90
SB-43	1005010.94	2032823.56	347.20



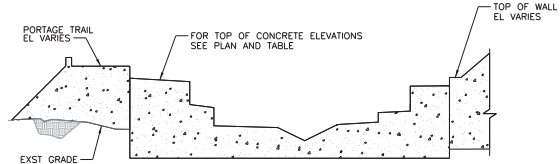
ISOMETRIC VIEW



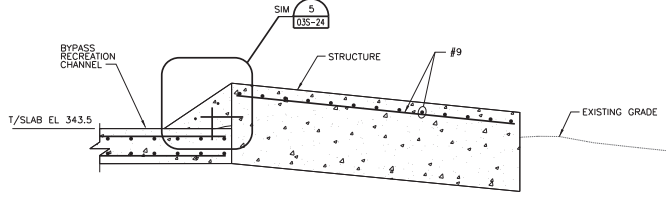
SECTION A  
 SCALE: 3/16"=1'-0"



SECTION B  
 SCALE: 3/16"=1'-0"



SECTION C  
 SCALE: 3/16"=1'-0"



SECTION D  
 SCALE: 3/8"=1'-0"

SAC-2019-00062  
 Great Falls-Dearborm  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 28-44

2 1 0 2FT  
 SCALE: 3/8"=1'-0"

4 3 2 1 0 4FT  
 SCALE: 3/16"=1'-0"

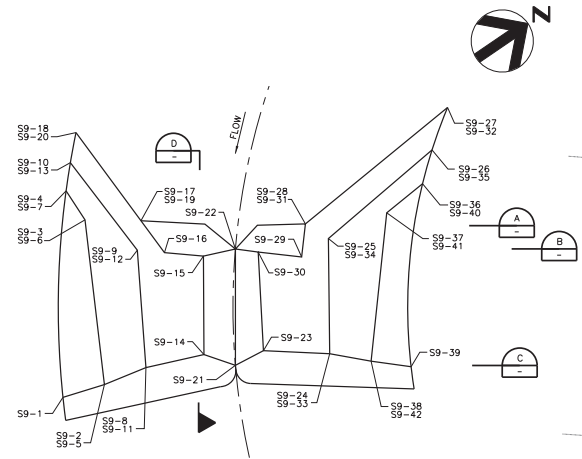


PRELIMINARY  
 NOT FOR  
 CONSTRUCTION  
 OR  
 RECORDING

NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DRN	OSGN	CHKD	APPR	CIVIL	ELEC	MECH	PROJECT NUMBER: 10057031													

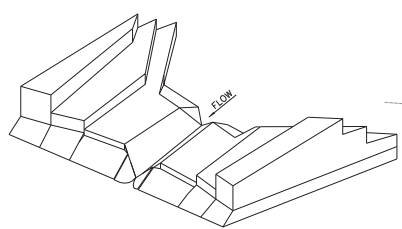
DRAWN BY:	CIVIL	DUKE ENERGY CAROLINAS, LLC
DESIGNED BY:	MECHANICAL	GREAT FALLS-DEARBORN HYDRO STATIONS
CHECKED BY:	ELECTRICAL	GREAT FALLS LONG BYPASSED REACH AND
APPROVED BY:	DATE:	GREAT FALLS DIVERSION DAM
		MIN FLOW & RECREATION RELEASE STR
		STRUCTURE 8 - PLAN AND SECTIONS
SCALE:	DRAWING/SHEET NO.	10057031 - 03S-21

- GENERAL NOTES:
- FOR ADDITIONAL GENERAL NOTES SEE 10057031-03G-01.
  - FOR TYPICAL JOINT DETAILS SEE 10057031-03S-32.

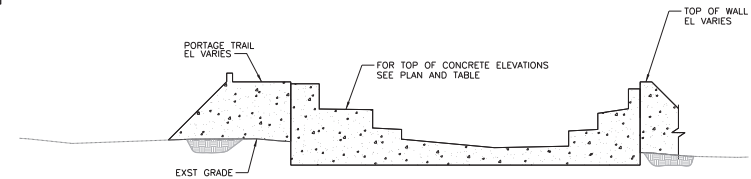


PARTIAL PLAN OF BYPASS STRUCTURE 9  
SCALE: 3/16"=1'-0"

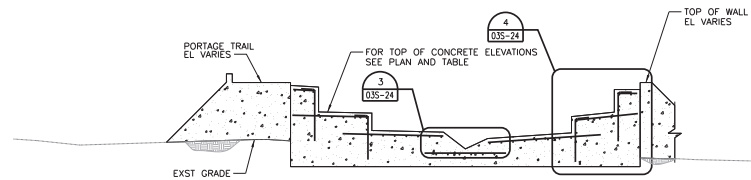
BYPASS STRUCTURE 9			
POINT	NORTHING	EASTING	ELEVATION
S9-1	1004916.79	2032829.10	346.50
S9-2	1004920.28	2032830.19	346.55
S9-3	1004926.91	2032817.59	347.40
S9-4	1004926.97	2032814.77	347.40
S9-5	1004920.28	2032830.19	344.20
S9-6	1004926.91	2032817.59	345.60
S9-7	1004926.97	2032814.77	345.60
S9-8	1004924.04	2032831.01	344.20
S9-9	1004929.14	2032822.28	345.00
S9-10	1004928.65	2032812.91	345.65
S9-11	1004924.04	2032831.01	343.05
S9-12	1004929.14	2032822.28	343.60
S9-13	1004928.66	2032812.71	344.25
S9-14	1004928.78	2032832.91	343.02
S9-15	1004933.53	2032825.91	343.56
S9-16	1004930.94	2032823.77	343.58
S9-17	1004930.83	2032820.37	343.75
S9-18	1004930.51	2032811.07	344.20
S9-19	1004930.83	2032820.37	342.46
S9-20	1004930.51	2032811.07	342.40
S9-21	1004930.44	2032835.20	340.30
S9-22	1004936.14	2032826.96	342.30
S9-23	1004933.18	2032835.52	342.89
S9-24	1004937.72	2032838.95	343.25
S9-25	1004943.23	2032830.74	344.01
S9-26	1004954.58	2032829.54	344.01
S9-27	1004957.48	2032827.30	344.01
S9-28	1004942.31	2032828.59	344.00
S9-29	1004940.44	2032830.75	343.84
S9-30	1004937.60	2032828.28	343.81
S9-31	1004942.31	2032828.59	342.30
S9-32	1004957.48	2032827.30	342.40
S9-33	1004937.72	2032838.95	344.20
S9-34	1004943.23	2032830.74	345.60
S9-35	1004954.58	2032829.54	346.20
S9-36	1004952.32	2032831.46	346.20
S9-37	1004948.61	2032831.76	346.00
S9-38	1004940.29	2032841.50	344.40
S9-39	1004942.52	2032843.35	346.55
S9-40	1004952.32	2032831.46	348.25
S9-41	1004948.61	2032831.76	348.20
S9-42	1004940.29	2032841.50	346.40



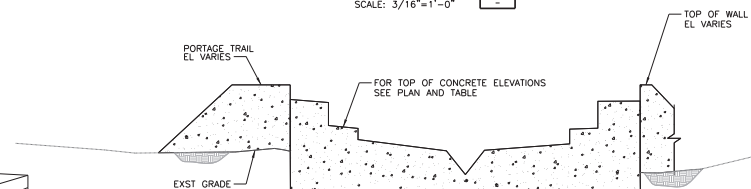
ISOMETRIC VIEW



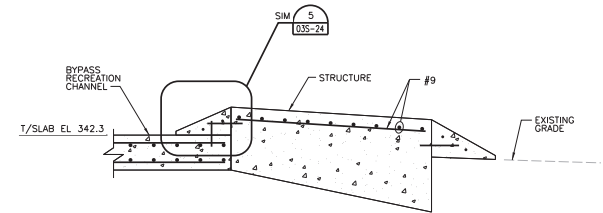
SECTION A  
SCALE: 3/16"=1'-0"



SECTION B  
SCALE: 3/16"=1'-0"

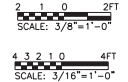


SECTION C  
SCALE: 3/16"=1'-0"



SECTION D  
SCALE: 3/8"=1'-0"

**SAC-2019-00062**  
**Great Falls-Dearbourn**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 29-44**



**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER: 10057031

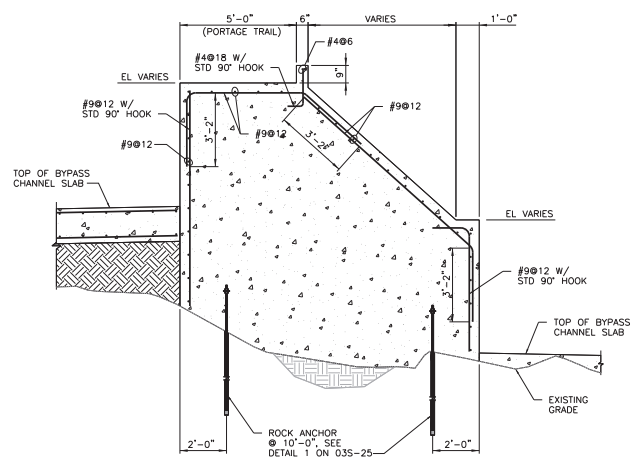
DRAWN BY: P1 DUNNE  
 DESIGNED BY: DL ARNOLD  
 CHECKED BY: \_\_\_\_\_  
 APPROVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

CIVIL  
 MECHANICAL  
 ELECTRICAL

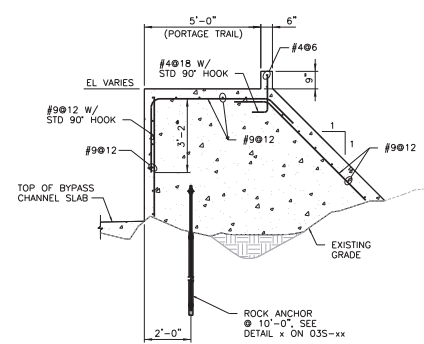
DUKE ENERGY CAROLINAS, LLC  
**GREAT FALLS-DEARBORN HYDRO STATIONS**  
 GREAT FALLS LONG BYPASSED REACH AND  
 GREAT FALLS DIVERSION DAM  
 MIN FLOW & RECREATION RELEASE STR  
 BYPASS RECREATION CHANNEL  
 STRUCTURE 9 - PLAN AND SECTIONS

SCALE: AS NOTED  
 DRAWING/SHEET NO. 10057031 - 03S-22

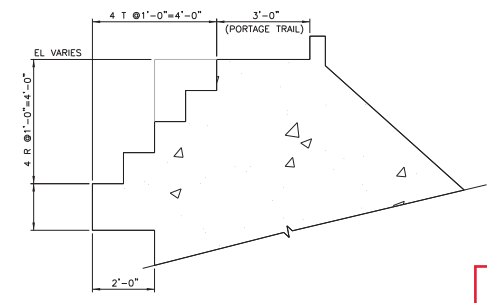
- GENERAL NOTES:
- FOR ADDITIONAL GENERAL NOTES SEE 10057031-03S-01.
  - FOR TYPICAL JOINT DETAILS SEE 10057031-03S-32.



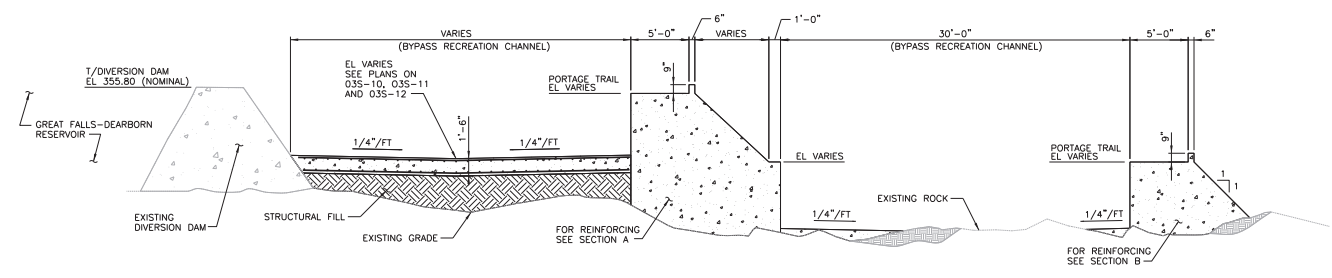
SECTION A  
SCALE: 3/8"=1'-0" 03S-11



SECTION B  
SCALE: 3/8"=1'-0" 03S-11



SECTION C  
SCALE: 1/2"=1'-0" 03S-10, 03S-11, 03S-12



SECTION D  
SCALE: 3/16"=1'-0" 03S-11

**SAC-2019-00062**  
**Great Falls-Dearborn**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 30-44**

2 1 0 2FT  
SCALE: 3/8"=1'-0"

4 3 2 1 0 4FT  
SCALE: 3/16"=1'-0"



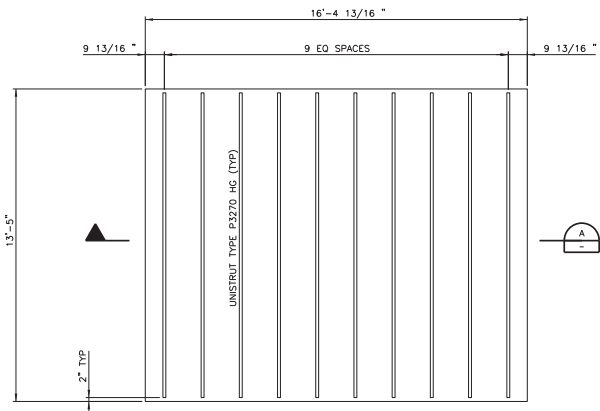
**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	ELA	DRN	OSGN	CHKD	APPR	CIVIL	ELEC	MECH

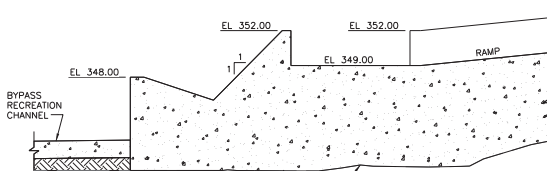
DRAWN BY:	CIVIL
DESIGNED BY:	MECHANICAL
CHECKED BY:	ELECTRICAL
APPROVED BY:	DATE:

DUKE ENERGY CAROLINAS, LLC  
**GREAT FALLS-DEARBORN HYDRO STATIONS**  
**GREAT FALLS LONG BYPASSED REACH AND**  
**GREAT FALLS DIVERSION DAM**  
**MIN FLOW & RECREATION RELEASE STR**  
**BYPASS RECREATION CHANNEL**  
**SECTIONS AND DETAILS**

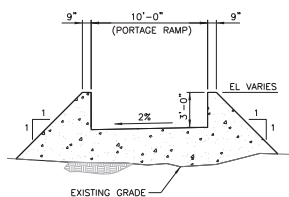
GENERAL NOTES:  
1. FOR GENERAL NOTES SEE 10057031-03C-01.



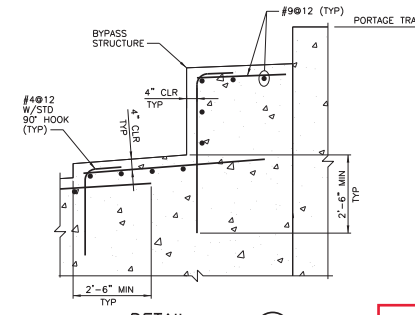
**PARTIAL PLAN**  
SCALE: 3/8"=1'-0"  
03S-14



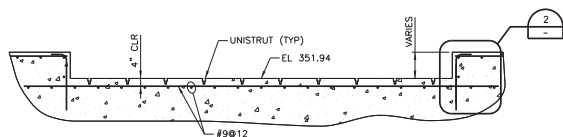
**SECTION**  
SCALE: 3/16"=1'-0"  
03S-15



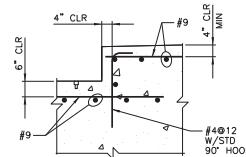
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SCALE: 3/16"=1'-0"  
03S-16



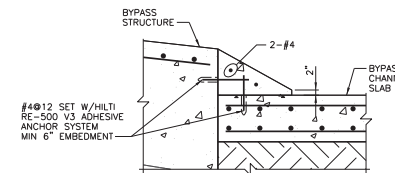
**DETAIL**  
SCALE: 1/2"=1'-0"  
03S-15  
03S-16



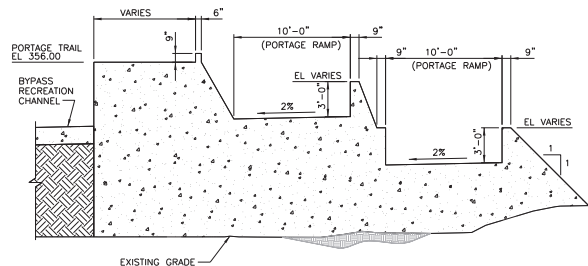
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SCALE: 3/8"=1'-0"  
03S-17



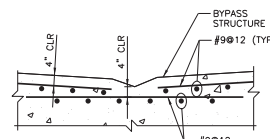
**DETAIL**  
SCALE: 1/2"=1'-0"  
03S-24



**DETAIL**  
SCALE: 1/2"=1'-0"  
03S-15  
03S-16

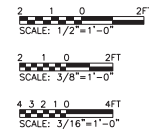


**SECTION**  
SCALE: 3/16"=1'-0"  
03S-18



**DETAIL**  
SCALE: 1/2"=1'-0"  
03S-15  
03S-16

SAC-2019-00062  
Great Falls-Dearbom  
Recreational and Minimum  
Flow Projects  
Dated 10/25/2019  
Sheet 31-44



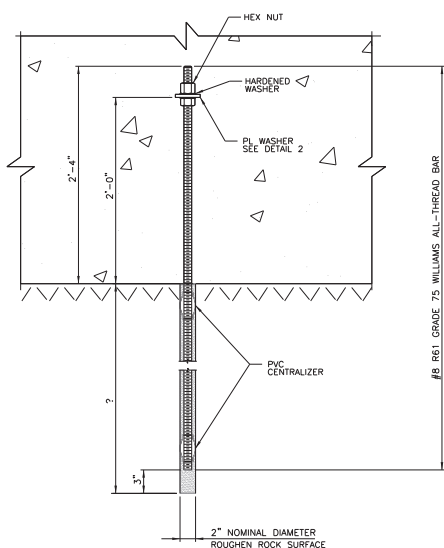
**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

DRAWN BY: P1 DUNNE DESIGNED BY: DL ARNOLD CHECKED BY: APPROVED BY: DATE:	CIVIL MECHANICAL ELECTRICAL	DUKE ENERGY CAROLINAS, LLC <b>GREAT FALLS-DEARBORN HYDRO STATIONS</b> GREAT FALLS LONG BYPASSED REACH AND GREAT FALLS DIVERSION DAM MIN FLOW & RECREATION RELEASE STR BYPASS RECREATION CHANNEL PARTIAL PLAN, SECTIONS AND DETAILS
09/25/2019 ISSUED FOR 70% S20 REVIEW. NO. DATE REVISION	PTD ELA DRN OSZH CHKD APPRI CIVIL ELEC MECH	SCALE: AS NOTED DRAWING/SHEET NO. 10057031 - 03S-24

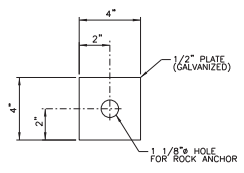
GENERAL NOTES:  
 1. FOR GENERAL NOTES SEE 10057031-03C-01.

ROCK ANCHOR NOTES:  
 1. ROCK ANCHORS SHALL BE #8 R61 GRADE 75 WILLIAMS ALL-THREAD BAR OR OWNER APPROVED EQUAL.  
 2. ANCHORS SHALL BE EPOXY COATED IN ACCORDANCE WITH ASTM A 775 OR ASTM A 934. DAMAGED COATING SHALL BE REPAIRED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.  
 3. THE CENTRALIZERS SHALL BE CAPABLE OF WITHSTANDING ALL LOADINGS IMPOSED DURING INSTALLATION OF THE ANCHOR WITHOUT DEFORMING. THEY SHALL BE CONSTRUCTED TO PROVIDE THE LEAST RESTRICTION TO THE UPWARD FLOW OF GROUT POSSIBLE AND PROVIDE A MINIMUM GROUT THICKNESS OF 1/2 INCH AROUND THE ANCHOR.

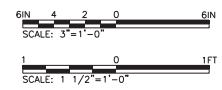
SAC-2019-00062  
 Great Falls-Dearbourn  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 32-44



**ROCK ANCHOR DETAIL**  
 SCALE: 1 1/2"=1'-0"



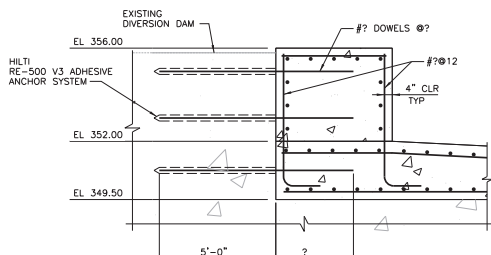
**PLATE WASHER DETAIL**  
 SCALE: 3"=1'-0"



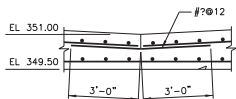
**PRELIMINARY  
 NOT FOR  
 CONSTRUCTION  
 OR  
 RECORDING**

NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	RMS	DRN	OSCH	CHKD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER: 10057031	SCALE: AS NOTED	DRAWING/SHEET NO. 10057031 - 03S-25	REV
DRAWN BY: P1 DUNNE												CIVIL	DUKE ENERGY CAROLINAS, LLC		
DESIGNED BY: RM SEGRIST												MECHANICAL	GREAT FALLS-DEARBORN HYDRO STATIONS		
CHECKED BY:												ELECTRICAL	GREAT FALLS LONG BYPASSED REACH AND		
APPROVED BY:													GREAT FALLS DIVERSION DAM		
DATE:													MIN FLOW & RECREATION RELEASE STR		
													BYPASS RECREATION CHANNEL		
													SECTIONS AND DETAILS		

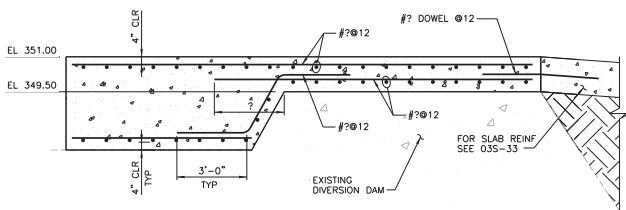
GENERAL NOTES:  
 1. FOR GENERAL NOTES SEE 10057031-03C-01.



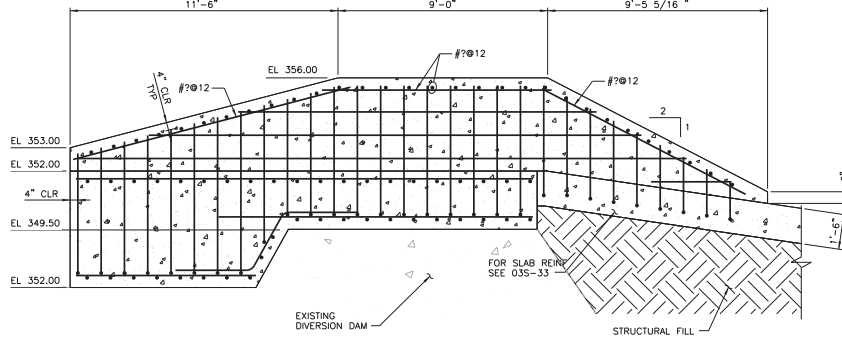
DETAIL 1  
 SCALE: 3/8"=1'-0" 03S-13



DETAIL 2  
 SCALE: 3/8"=1'-0" 03S-13



DETAIL 3  
 SCALE: 3/8"=1'-0" 03S-13



DETAIL 4  
 SCALE: 3/8"=1'-0" 03S-13

SAC-2019-00062  
 Great Falls-Dearborn  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 33-44

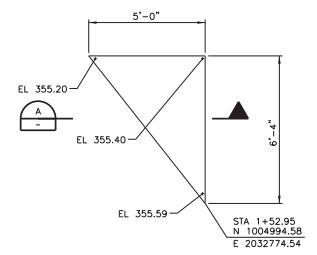


**PRELIMINARY  
 NOT FOR  
 CONSTRUCTION  
 OR  
 RECORDING**

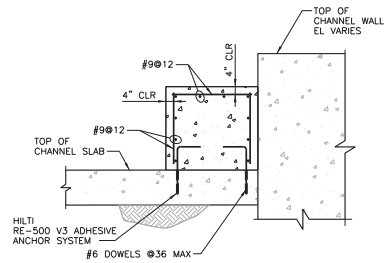
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER: 10057031

DRAWN BY: CIVIL  
 P1 DUNNE  
 DESIGNED BY: MECHANICAL  
 DL ARNOLD  
 CHECKED BY: ELECTRICAL  
 APPROVED BY: DATE:  
 SCALE: AS NOTED  
 DRAWING/SHEET NO. 10057031 - 03S-26

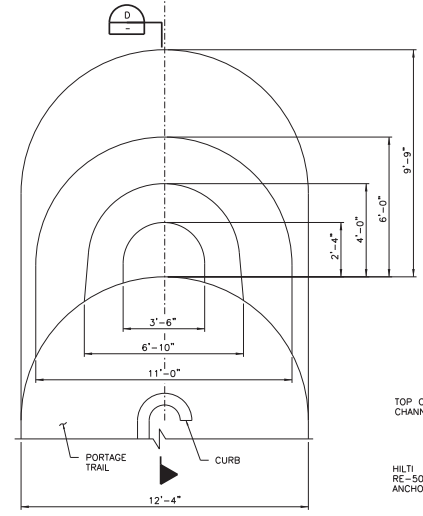
GENERAL NOTES:  
 1. FOR GENERAL NOTES SEE 10057031-03G-01.



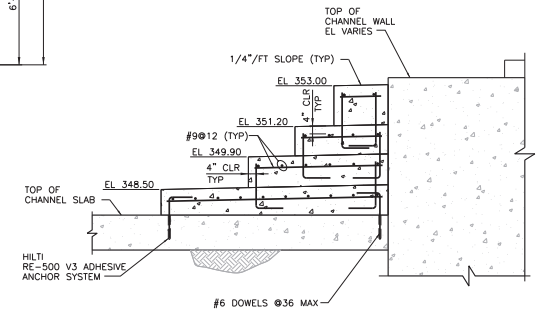
**DEFLECTOR 1 DETAIL**  
 SCALE: 3/8"=1'-0"



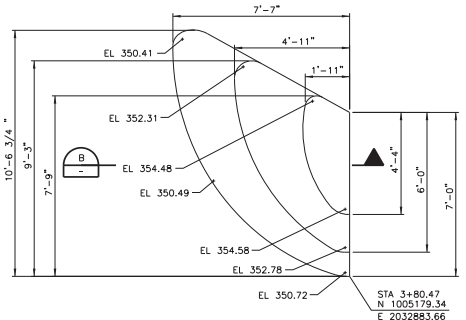
**SECTION**  
 SCALE: 3/8"=1'-0"



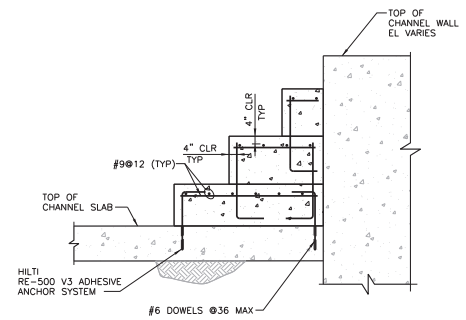
**DEFLECTOR 4 DETAIL**  
 SCALE: 3/8"=1'-0"



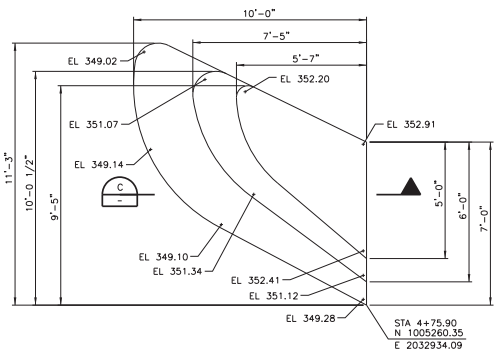
**SECTION**  
 SCALE: 3/8"=1'-0"



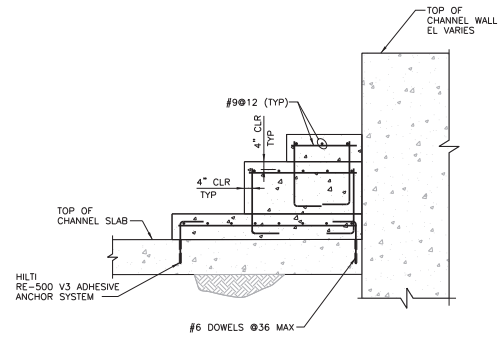
**DEFLECTOR 2 DETAIL**  
 SCALE: 3/8"=1'-0"



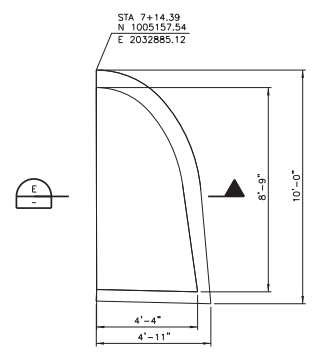
**SECTION**  
 SCALE: 3/8"=1'-0"



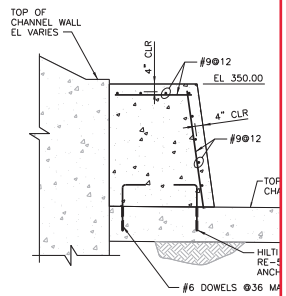
**DEFLECTOR 3 DETAIL**  
 SCALE: 3/8"=1'-0"



**SECTION**  
 SCALE: 3/8"=1'-0"



**DEFLECTOR 5 DETAIL**  
 SCALE: 3/8"=1'-0"



**SECTION**  
 SCALE: 3/8"=1'-0"

**SAC-2019-00062**  
**Great Falls-Dearbom**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 34-44**

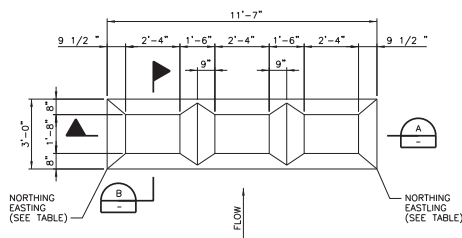


**PRELIMINARY  
 NOT FOR  
 CONSTRUCTION  
 OR  
 RECORDING**

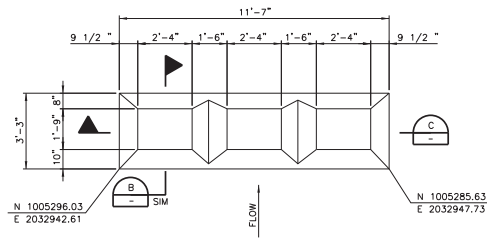
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER: 10057031	SCALE: AS NOTED	DRAWING/SHEET NO. 10057031 - 03S-30	REV

DRAWN BY: P1 DUNNE  
 DESIGNED BY: DL ARNOLD  
 CHECKED BY: \_\_\_\_\_  
 APPROVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 CIVIL  
 MECHANICAL  
 ELECTRICAL  
 DUKE ENERGY CAROLINAS, LLC  
**GREAT FALLS-DEARBORN HYDRO STATIONS**  
 GREAT FALLS LONG BYPASSED REACH AND  
 GREAT FALLS DIVERSION DAM  
 MIN FLOW & RECREATION RELEASE STR  
 BYPASS RECREATION CHANNEL  
 PLANS, SECTIONS AND DETAILS

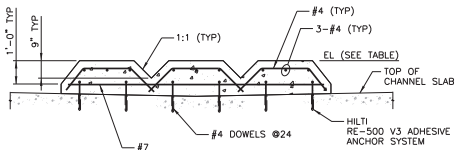
GENERAL NOTES:  
 1. FOR GENERAL NOTES SEE 10057031-03G-01.



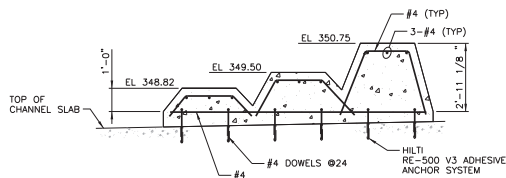
ROUGHNESS ELEMENTS 1,2,4,5 AND 6 DETAIL  
 SCALE: 3/8"=1'-0" 03S-10 03S-12



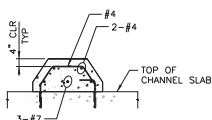
ROUGHNESS ELEMENT 3 DETAIL  
 SCALE: 3/8"=1'-0" 03S-12



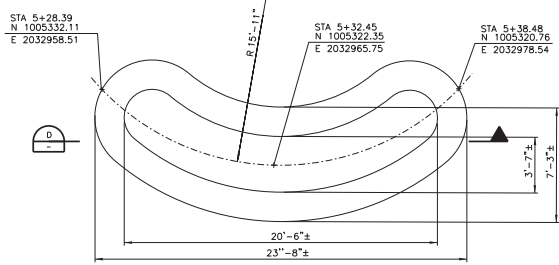
SECTION A-A  
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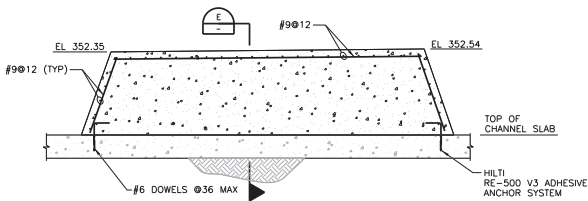
SECTION C-C  
 SCALE: 3/8"=1'-0"



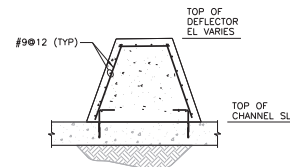
SECTION B-B  
 SCALE: 3/8"=1'-0"



MIDDLE DEFLECTOR DETAIL  
 SCALE: 1/4"=1'-0" 03S-12

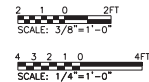


SECTION D-D  
 SCALE: 1/4"=1'-0"



SECTION E-E  
 SCALE: 1/4"=1'-0"

SAC-2019-00062  
 Great Falls-Dearbom  
 Recreational and Minimum  
 Flow Projects  
 Dated 10/25/2019  
 Sheet 35-44

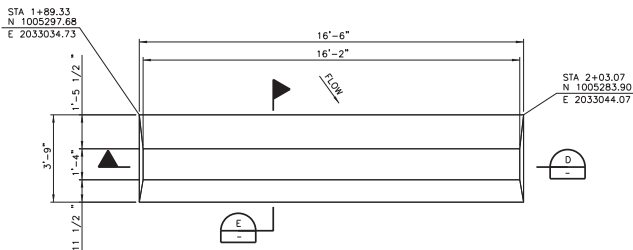


PRELIMINARY  
 NOT FOR  
 CONSTRUCTION  
 OR  
 RECORDING

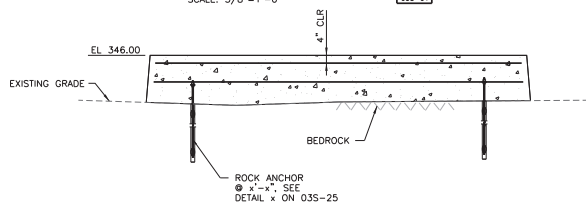
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER: 10057031

DRAWN BY: PT DUNNE	CIVIL
DESIGNED BY: DL ARNOLD	MECHANICAL
CHECKED BY:	ELECTRICAL
APPROVED BY:	DATE:
SCALE: AS NOTED	DRAWING/SHEET NO. 10057031 - 03S-31

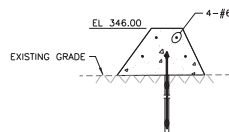




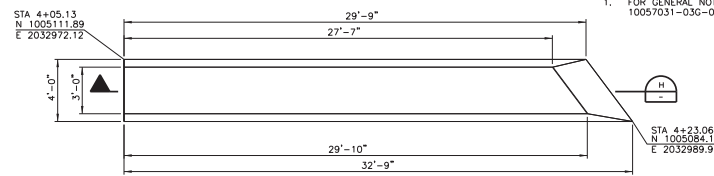
**STABILIZER 1 DETAIL**  
SCALE: 3/8"=1'-0"



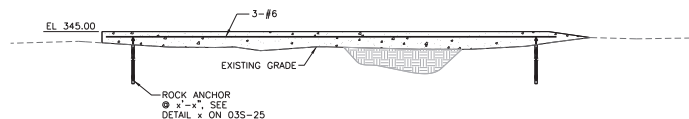
**SECTION**  
SCALE: 3/8"=1'-0"



**SECTION**  
SCALE: 3/8"=1'-0"

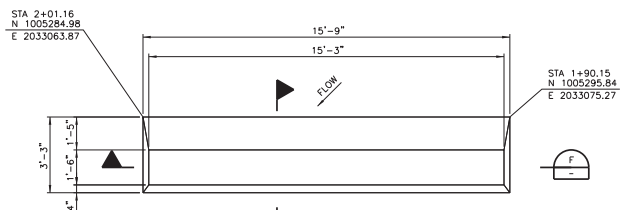


**TAILWATER CONTROL STRUCTURE DETAIL**  
SCALE: 1/4"=1'-0"

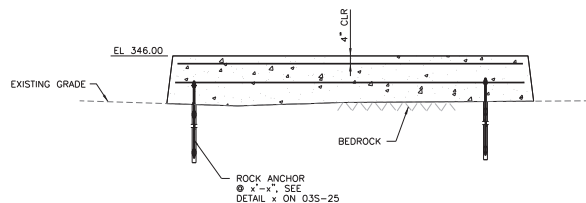


**SECTION**  
SCALE: 1/4"=1'-0"

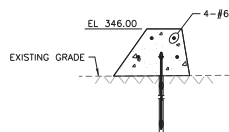
GENERAL NOTES:  
1. FOR GENERAL NOTES SEE  
10057031-03G-01.



**STABILIZER 2 DETAIL**  
SCALE: 3/8"=1'-0"



**SECTION**  
SCALE: 3/8"=1'-0"



**SECTION**  
SCALE: 3/8"=1'-0"

**SAC-2019-00062**  
**Great Falls-Dearbom**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 36-44**

2 1 0 2FT  
SCALE: 3/8"=1'-0"

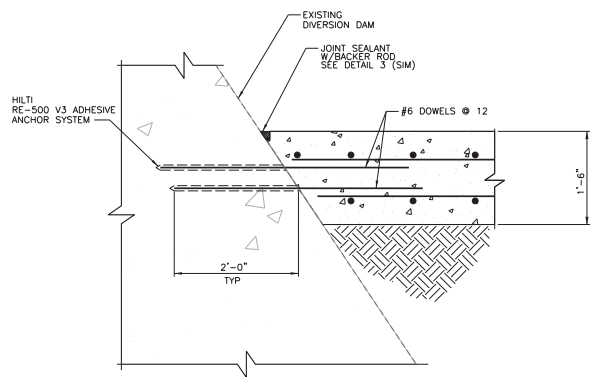
4 3 2 1 0 4FT  
SCALE: 1/4"=1'-0"



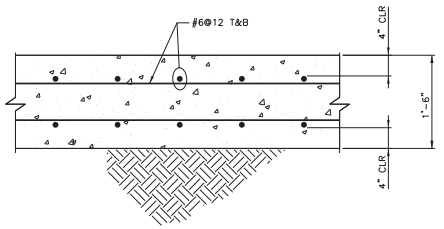
**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

DRAWN BY: PT DUNNE		CIVIL	DUKE ENERGY CAROLINAS, LLC <b>GREAT FALLS-DEARBORN HYDRO STATIONS</b> <b>GREAT FALLS LONG BYPASSED REACH AND</b> <b>GREAT FALLS DIVERSION DAM</b> <b>MIN FLOW &amp; RECREATION RELEASE</b> <b>PLAN, BYPASS RECREATION CHANNELS</b> <b>PLANS, SECTIONS AND DETAILS</b>
DESIGNED BY: DL ARNOLD		MECHANICAL	
CHECKED BY:		ELECTRICAL	
APPROVED BY:		DATE:	
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PROJECT NUMBER: 10057031
PE SEAL		PTD	ELA
		DRN	OSCH
		CHKD	APPR
		CIVL	ELEC
		MECH	
		AS NOTED	SCALE: AS NOTED
		DRWING/SHEET NO.	10057031 - 03S-32

GENERAL NOTES:  
1. FOR GENERAL NOTES SEE 10057031-03G-01.

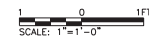


**TYPICAL SLAB TO EXISTING DAM SECTION**  
SCALE: 1"=1'-0"  
A  
03S-10  
03S-11  
03S-12



**TYPICAL SLAB REINFORCING DETAIL**  
SCALE: 1"=1'-0"

SAC-2019-00062  
Great Falls-Dearbourn  
Recreational and Minimum  
Flow Projects  
Dated 10/25/2019  
Sheet 37-44

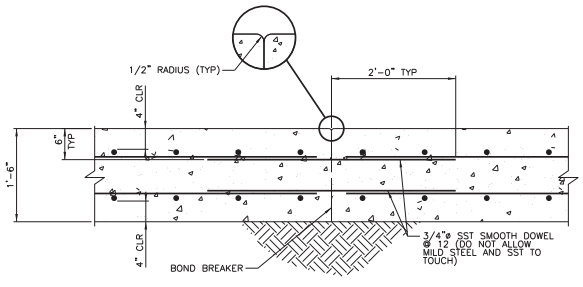


**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

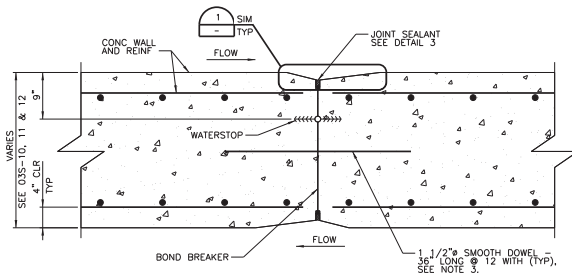
NO.	DATE	ISSUED FOR 70% S20 REVIEW.	PTD	DLA	DRN	OSGN	CHKD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER: 10057031	SCALE: AS NOTED	DRAWING/SHEET NO. 10057031 - 03S-33	REV

DRAWN BY: PT DUNNE	CIVIL	DUKE ENERGY CAROLINAS, LLC
DESIGNED BY: DL ARNOLD	MECHANICAL	GREAT FALLS-DEARBORN HYDRO STATIONS
CHECKED BY:	ELECTRICAL	GREAT FALLS LONG BYPASSED REACH AND GREAT FALLS DIVERSION DAM
APPROVED BY:	DATE:	MIN FLOW & RECREATION RELEASE STR BYPASS RECREATION CHANNEL
		TYPICAL DETAILS

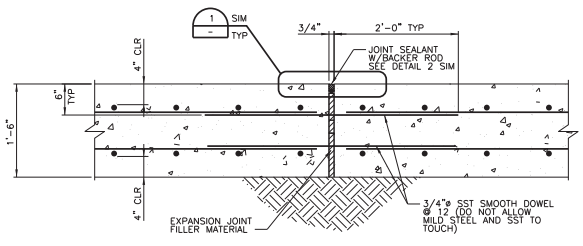
- GENERAL NOTES:
- FOR ADDITIONAL GENERAL NOTES SEE 10057031-03G-01.
  - COATED SIDE OF DOWEL BARS SHALL BE PRE-DIPPED IN A TECTYL 506 BOND BREAKER SOLUTION OR EQUAL.
  - WALL SMOOTH DOWEL BARS SHALL BE PLAIN STEEL BARS AND CONFORM TO ASTM A615, GR60 STEEL.



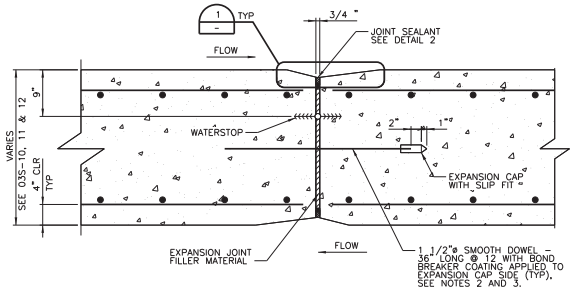
TYPICAL SLAB CONTRACTION JOINT DETAIL  
SCALE: 1"=1'-0"



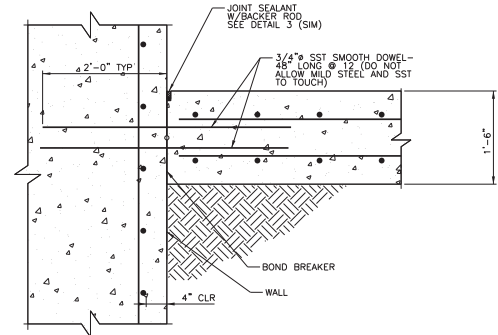
TYPICAL WALL CONTRACTION JOINT DETAIL  
SCALE: 1"=1'-0"



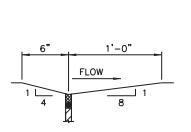
TYPICAL SLAB EXPANSION JOINT DETAIL  
SCALE: 1"=1'-0"



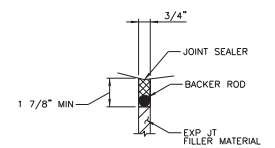
TYPICAL WALL EXPANSION JOINT DETAIL  
SCALE: 1"=1'-0"



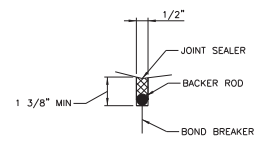
TYPICAL WALL TO SLAB JOINT DETAIL  
SCALE: 1"=1'-0"



DETAIL 1  
SCALE: 1 1/2"=1'-0"

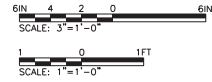


DETAIL 2  
SCALE: 3"=1'-0"



DETAIL 3  
SCALE: 3"=1'-0"

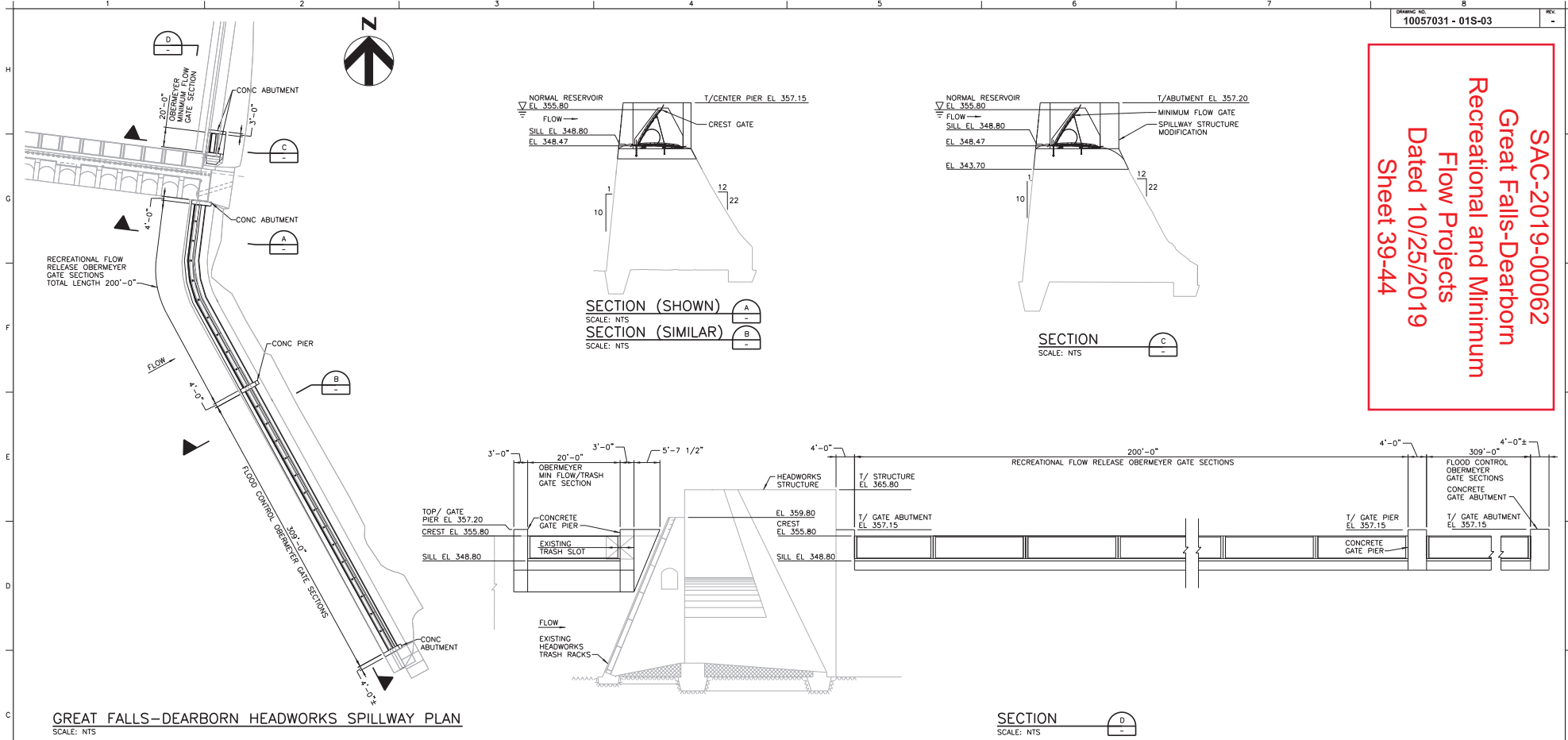
SAC-2019-00062  
Great Falls-Dearborn  
Recreational and Minimum  
Flow Projects  
Dated 10/25/2019  
Sheet 38-44



PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING

DRAWN BY: P1 DUNNE		CIVIL	DUKE ENERGY CAROLINAS, LLC GREAT FALLS-DEARBORN HYDRO STATIONS GREAT FALLS LONG BYPASSED REACH AND GREAT FALLS DIVERSION DAM MIN FLOW & RECREATION RELEASE STR BYPASS RECREATION CHANNEL TYPICAL DETAILS																		
DESIGNED BY: DL ARNOLD		MECHANICAL																			
CHECKED BY:		ELECTRICAL																			
APPROVED BY:		DATE:																			
PE SEAL	NO.	DATE	ISSUED FOR 70% S20 REVIEW.	REVISION	PTD	DLA	---	---	---	---	---	---	---	---	---	---	---	PROJECT NUMBER: 10057031	SCALE: AS NOTED	DRAWING/SHEET NO. 10057031 - 03S-34	REV

**SAC-2019-00062**  
**Great Falls-Dearbom**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 39-44**





**GREAT FALLS-DEARBORN HEADWORKS SPILLWAY PLAN**  
SCALE: NTS

**SECTION (SHOWN)**  
SCALE: NTS  
**SECTION (SIMILAR)**  
SCALE: NTS

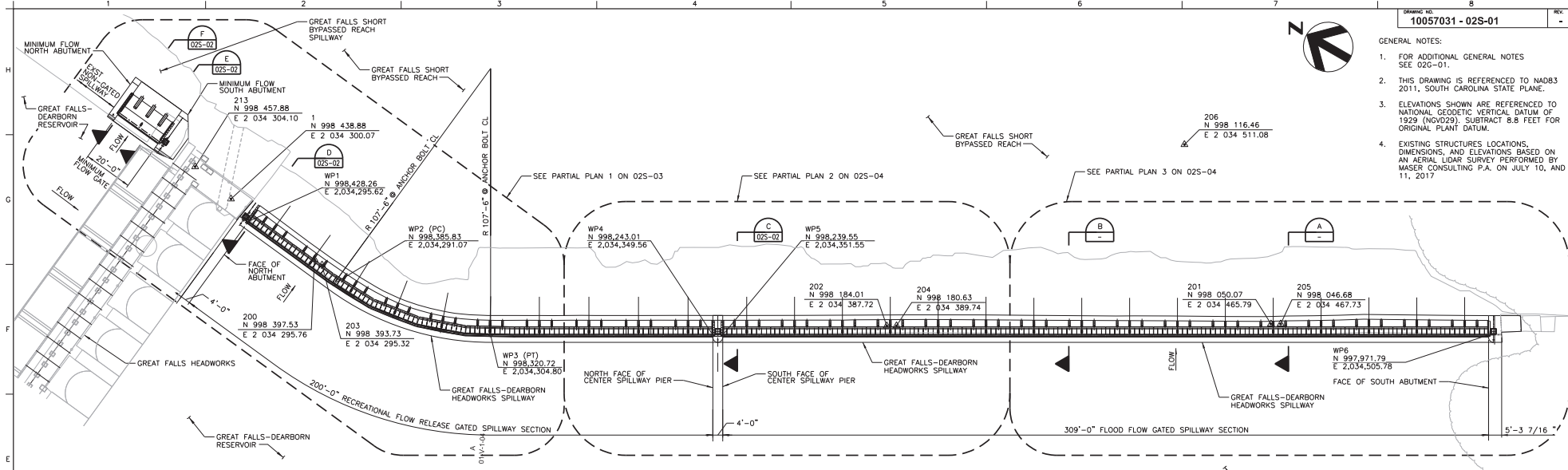
**SECTION**  
SCALE: NTS

**SECTION**  
SCALE: NTS

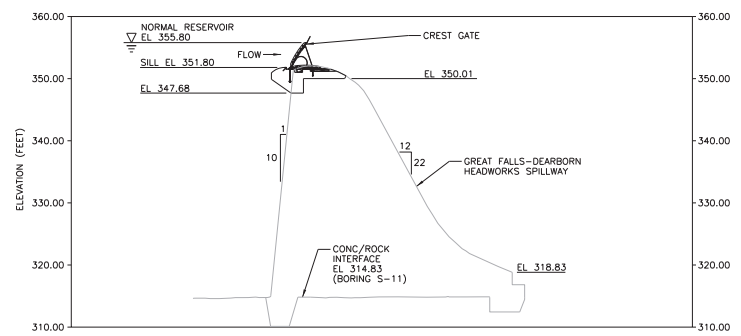
 HDR Engineering, Inc. of the Carolinas		<b>PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING</b>	PE SEAL	NO.	DATE	REVISION	DRAWN BY: S.J. PAWLOWSKI	CIVIL	DUKE ENERGY CAROLINAS, LLC <b>GREAT FALLS-DEARBORN HYDRO STATIONS</b>  PHASE 1 CONCEPTUAL SHORT BYPASSED REACH HEADWORKS SPILLWAY MODIFICATIONS OBERMEYER GATES PLAN AND SECTIONS					
				09/25/2019	UPDATED	CEW WAM	DESIGNED BY: T.L. O'LEARY	MECHANICAL		CHECKED BY:	ELECTRICAL	APPROVED BY:	DATE:	
				04/08/2019	UPDATED	CEW WAM	APPROVED BY:		DATE:					
				09/07/2018	UPDATED	CEW WAM	PROJECT NUMBER: 10057031		SCALE: AS NOTED					
				05/08/2018	ISSUED FOR CLIENT REVIEW	SJP TLO	PROJECT NUMBER: 10057031		DRAWING/SHEET NO. 10057031 - 01S-03					
				NO.	DATE	REVISION	DRN	(DSCH)	(CHKD)	(APPR)	(CIVL)	(ELEC)	(MECH)	REV.

Drawing No. **10057031 - 02S-01**

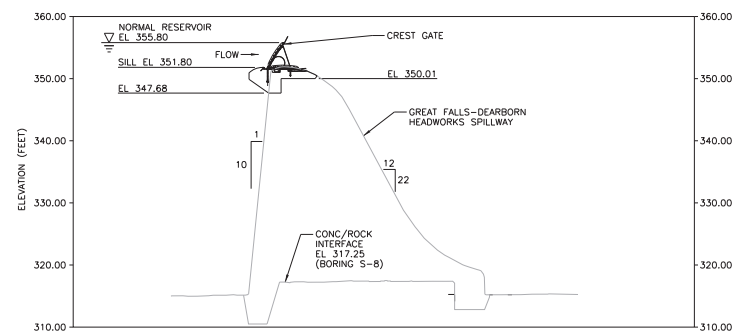
- GENERAL NOTES:
- FOR ADDITIONAL GENERAL NOTES SEE 02G-01.
  - THIS DRAWING IS REFERENCED TO NAD83 2011, SOUTH CAROLINA STATE PLANE.
  - ELEVATIONS SHOWN ARE REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29). SUBTRACT 8.8 FEET FOR ORIGINAL PLANT DATUM.
  - EXISTING STRUCTURES LOCATIONS, DIMENSIONS, AND ELEVATIONS BASED ON AN AERIAL LIDAR SURVEY PERFORMED BY MASER CONSULTING P.A. ON JULY 10, AND 11, 2017



**PLAN**  
SCALE: 1"=20'-0"



**SECTION A-A**  
SCALE: 1"=10'-0"



**SECTION B-B**  
SCALE: 1"=10'-0"

SURVEY CONTROL POINTS		
NAD83 (2011) SOUTH CAROLINA STATE PLANE		
POINT	NORTHING	EASTING
113232	409847.41	2098164.41
		ELEVATION
		507.21
		378.68
		366.01
		365.96
		356.26
		356.28
		356.01
		356.20
		356.00
		356.22
		321.48
		320.17
		313.71
		310.20
		321.48
		316.78
		330.33
		317.96
		366.04
		365.02
		355.86
		355.81
		355.84
		355.84
		418.70

**SAC-2019-00062**  
**Great Falls-Dearborm**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 40-44**



**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

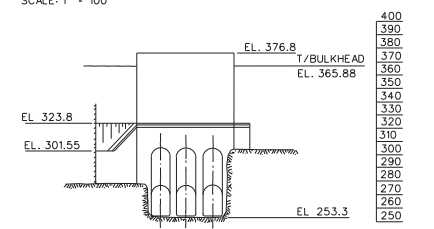
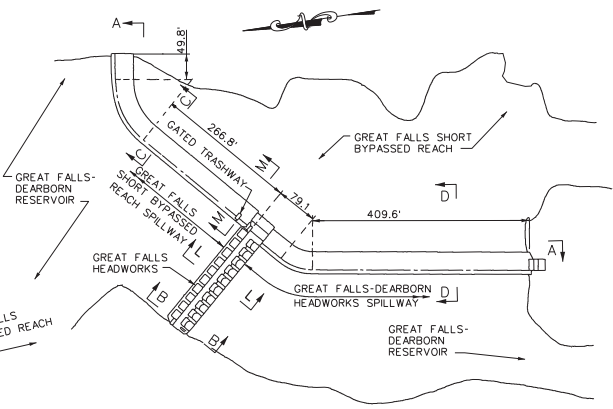
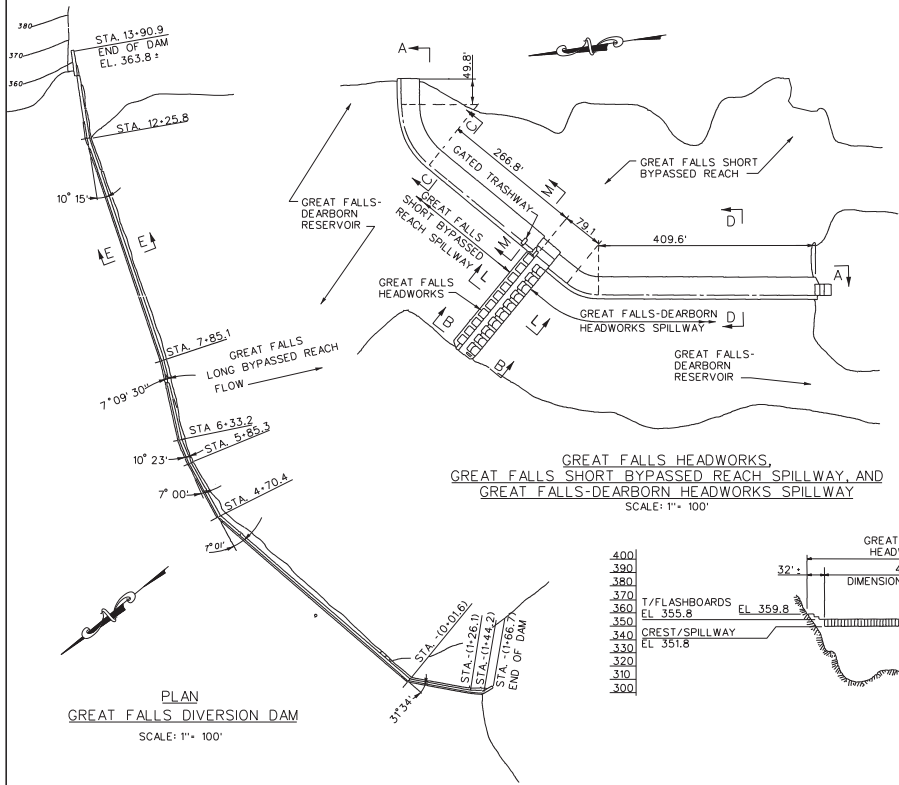
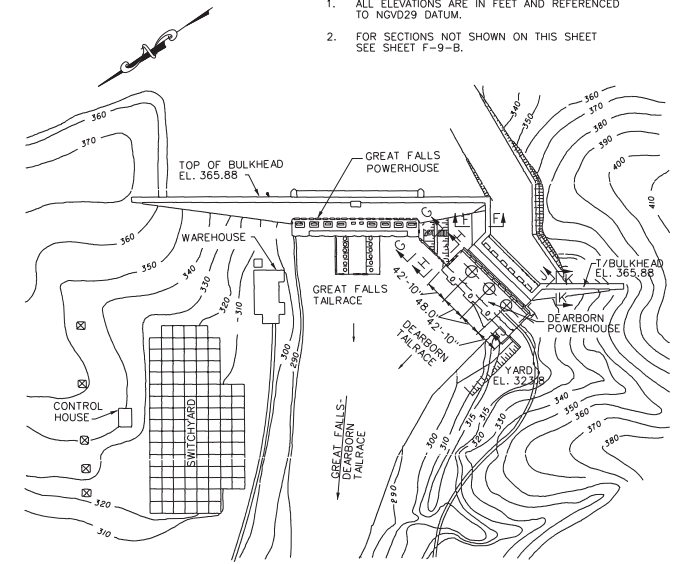
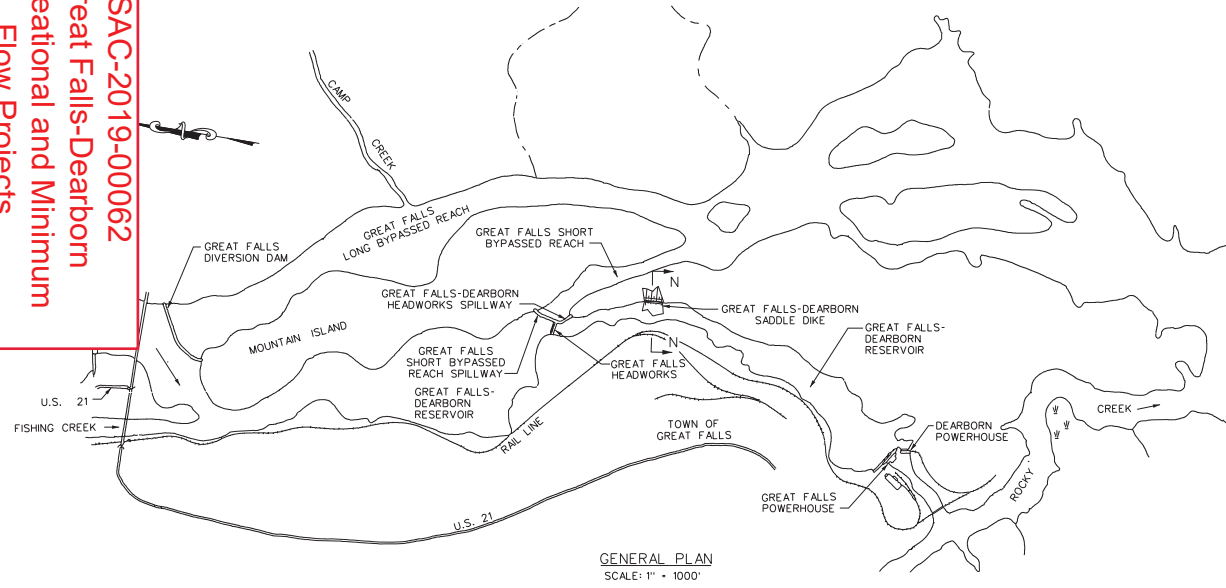
PE SEAL	NO.	DATE	REVISION	DKL	DRN	OSZH	CHKD	APPR	CIVL	ELEC	MECH	PROJECT NUMBER: 10057031	SCALE: AS NOTED	DRAWING/SHEET NO. 10057031 - 02S-01	REV. -

DRAWN BY: CIVL  
 DK LONG  
 DESIGNED BY: MECH  
 RB REED  
 CHECKED BY: ELECT  
 APPROVED BY: DATE:

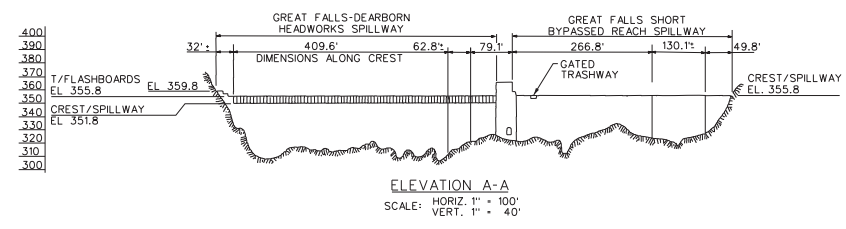
**GENERAL PLAN AND SECTIONS**

**SAC-2019-00062**  
**Great Falls-Dearborm**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 41-44**

- NOTES:
- ALL ELEVATIONS ARE IN FEET AND REFERENCED TO NGVD29 DATUM.
  - FOR SECTIONS NOT SHOWN ON THIS SHEET SEE SHEET F-9-B.



**GREAT FALLS HEADWORKS, GREAT FALLS SHORT BYPASSED REACH SPILLWAY, AND GREAT FALLS-DEARBORN HEADWORKS SPILLWAY**  
SCALE: 1" = 100'

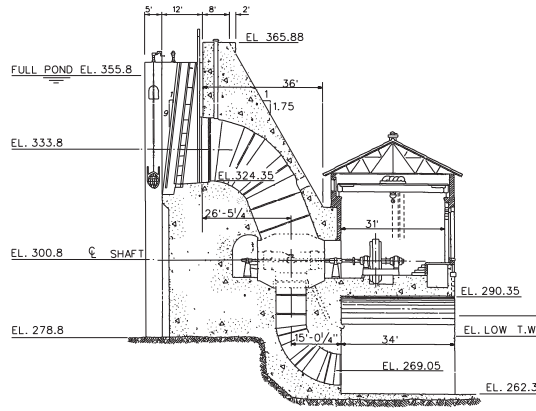


**CRITICAL ENERGY INFRASTRUCTURE INFORMATION (CEII) MATERIAL UNDER 18 CFR 388.113(c)**

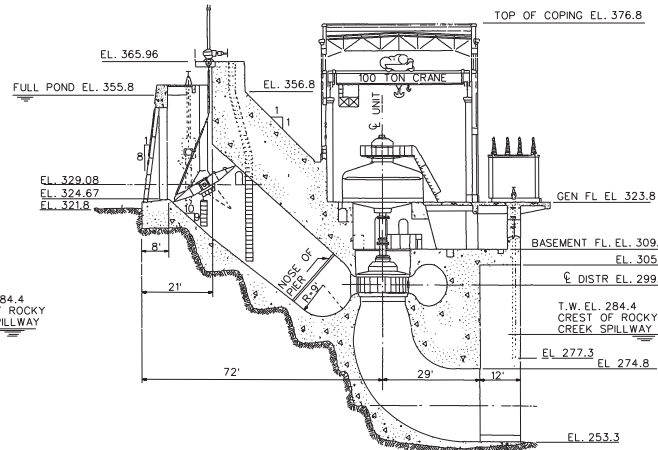
**EXHIBIT F SHEET F-9-A**  
**CATAWBA - WATEREE PROJECT FERC NO. 2232**  
**GREAT FALLS - DEARBORN DEVELOPMENT**  
**PLANS AND ELEVATIONS**

DUKE ENERGY CAROLINAS, LLC  
 MAY, 2017  
 SCALE: AS NOTED

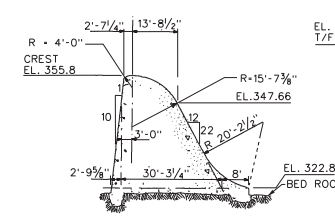
- NOTES:
- ALL ELEVATIONS ARE IN FEET AND REFERENCED TO NGVD29 DATUM.
  - FOR LOCATIONS OF SECTION CUTS SEE SHEET F-9-A.



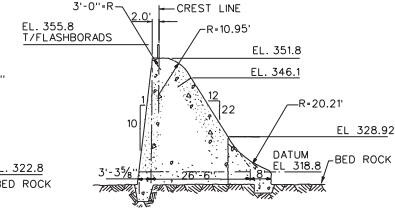
SECTION THRU GREAT FALLS POWERHOUSE  
SCALE: 1/8" = 1'-0"



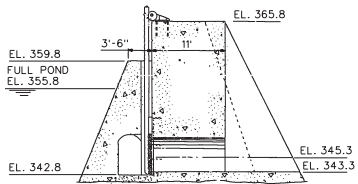
SECTION THRU DEARBORN POWERHOUSE  
SCALE: 1/8" = 1'-0"



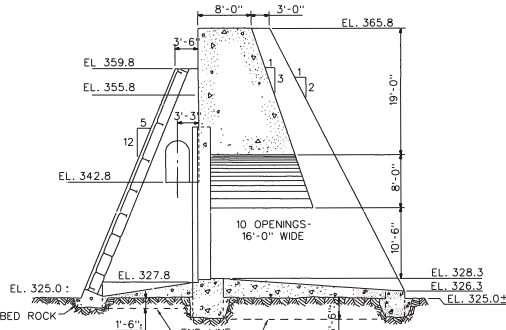
SECTION C-C  
SCALE: 1/8" = 1'-0"



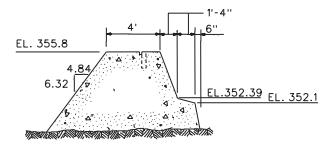
SECTION D-D  
SCALE: 1/8" = 1'-0"



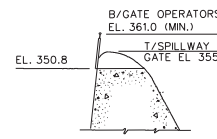
SECTION B-B  
SCALE: 1/8" = 1'-0"



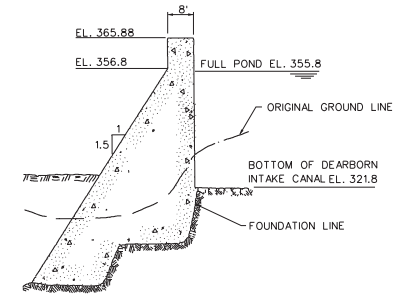
SECTION L-L  
SCALE: 1/8" = 1'-0"



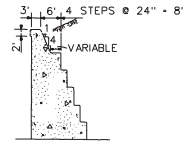
SECTION E-E  
SCALE: 1/4" = 1'-0"



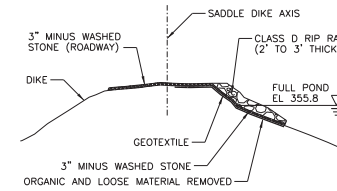
SECTION M-M  
SCALE: 1/8" = 1'-0"



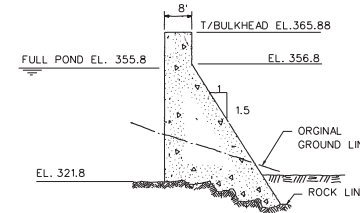
SECTION F-F  
SCALE: 1/8" = 1'-0"



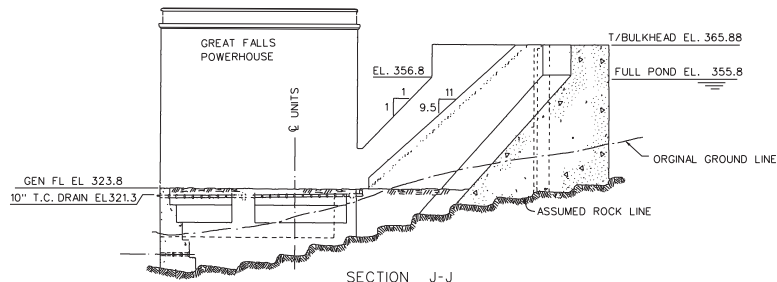
SECTION G-G  
SCALE: 1/8" = 1'-0"



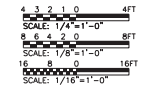
SECTION N-N  
SCALE: 1" = 20'



SECTION K-K  
SCALE: 1/8" = 1'-0"



SECTION J-J  
SCALE: 1/8" = 1'-0"



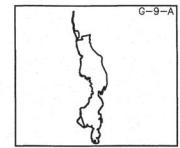
CRITICAL ENERGY  
INFRASTRUCTURE INFORMATION  
(CEII) MATERIAL UNDER 18 CFR 388.113(c)

EXHIBIT F SHEET F-9-B  
CATAWBA - WATEREE PROJECT FERC NO. 2232  
GREAT FALLS - DEARBORN DEVELOPMENT  
SECTIONS

DUKE ENERGY CAROLINAS, LLC

MAY, 2017 0 1" 2" SCALE: AS NOTED

SAC-2019-00062  
Great Falls-Dearborm  
Recreational and Minimum  
Flow Projects  
Dated 10/25/2019  
Sheet 42-44



LEGEND

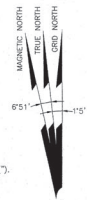
- PROJECT BOUNDARY
- PAVED ROAD
- COUNTY LINE
- STREAM
- UNPAVED ROAD
- RAILROAD
- FULL POND
- REFERENCE POINT

HORIZONTAL DATUM BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD83/2001 (NAD83 (U.S. FT)).  
 VERTICAL DATUM BASED ON NAVD83 (FT).

TO CONVERT FROM NAVD83 TO NAD83 ADD -0.76'.  
 THE PROJECT BOUNDARY IS DEFINED BY AN ELEVATION CONTOUR UNLESS NOTED OTHERWISE. THE ELEVATION FOR THE PROJECT BOUNDARY WAS PROVIDED BY DUKE ENERGY.

STEREOCOMPILED PROCESS IN ACCORDANCE WITH NATIONAL MAP ACCURACY STANDARDS BY KUCERA INTERNATIONAL. AERIAL PHOTOGRAPHY WAS FLOWN AT A SCALE APPROXIMATELY 1 INCH = 700 FEET.

ALL REFERENCED SURVEY DISTANCES ARE IN FEET (') AND ALL SURVEY ANGLES ARE IN DEGREES (°), MINUTES (') AND SECONDS (").



I, JOHN ANTALOVICH SR., A PROFESSIONAL LAND SURVEYOR/MAPPER WITH KUCERA INTERNATIONAL, INC. HAVE REVIEWED THE CATAWBA-WATEREE PROJECT MAPS. THE PLANIMETRIC AND CONTOUR SHOWN ON SAID MAPS WERE PRODUCED BY KUCERA INTERNATIONAL USING LOW AND PHOTOGRAMMETRIC METHODS. ALL WORK IS BASED ON NAD83/2001 NORTH CAROLINA STATE PLANE COORDINATE SYSTEM (US FEET). THE VERTICAL DATUM IS NAVD83.

THIS DOCUMENT ORIGINALLY ISSUED AND SEALED BY JOHN ANTALOVICH SR., L-24648 (SC) ON OCTOBER 29, 2004.  
 THIS MEDIA SHALL NOT BE CONSIDERED A CERTIFIED DOCUMENT.

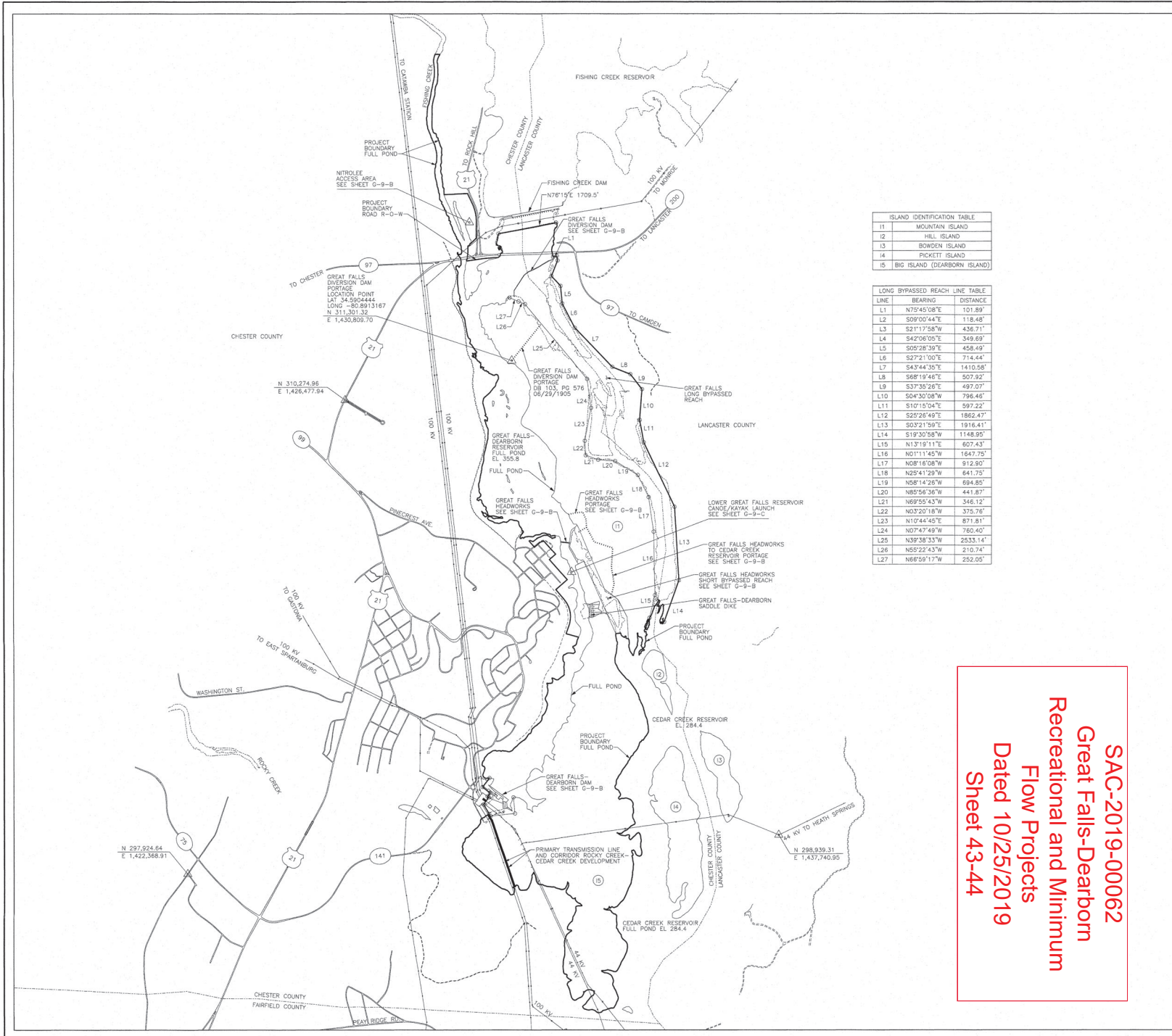
I, WALTER K. DIXON, A PROFESSIONAL LAND SURVEYOR FOR DUKE ENERGY, HAVE REVIEWED THIS PORTION OF THE CATAWBA-WATEREE PROJECT BOUNDARY SHOWN HEREIN. THE LICENSEE EITHER OWNS IN FEE SIMPLE OR POSSESSES FLOWAGE EASEMENTS OVER ALL LANDS SHOWN ON THIS MAP THAT ARE INSIDE THE PROJECT BOUNDARY. CONTOURS WERE PRODUCED BY KUCERA INTERNATIONAL AND ORIGINALLY ISSUED AND SEALED BY JOHN ANTALOVICH SR. ON OCTOBER 29, 2004. THE PLANIMETRIC AND CONTOUR SHOWN HEREIN ARE BASED ON NAD83/2001 NORTH CAROLINA STATE PLANE COORDINATE SYSTEM (US FEET) AND THE VERTICAL DATUM IS NAVD83 UNLESS NOTED OTHERWISE. THE PROJECT BOUNDARY LINES THAT ARE NOT CONTOUR LINES (E.G. AROUND ACCESS AREAS, DAMS, ETC.) WERE BASED ON DUKE ENERGY MAPS, RECORDED SURVEYS AND DEEDS OF RECORD.



*Walter K. Dixon*  
 SEAL WALTER K. DIXON DATE: 5/9/2019

EXHIBIT G SHEET G-9-A  
 CATAWBA-WATEREE PROJECT FERC NO. 2232  
 GREAT FALLS - DEARBORN DEVELOPMENT  
 SOUTH CAROLINA  
 MAP OF PROPERTIES  
 DUKE ENERGY CAROLINAS, LLC

MAY, 2018 0 1000' 2000' SCALE: 1" = 1000'



ISLAND IDENTIFICATION TABLE

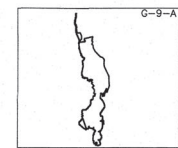
I1	MOUNTAIN ISLAND
I2	HILL ISLAND
I3	BOWDEN ISLAND
I4	PICKETT ISLAND
I5	BIG ISLAND (DEARBORN ISLAND)

LONG BYPASSED REACH LINE TABLE

LINE	BEARING	DISTANCE
L1	N75°45'08"E	101.89'
L2	S09°00'44"E	118.48'
L3	S21°17'58"W	436.71'
L4	S42°06'05"E	349.69'
L5	S05°26'39"E	458.49'
L6	S27°21'00"E	714.44'
L7	S43°44'35"E	1410.06'
L8	S68°19'46"E	507.92'
L9	S37°35'28"E	497.07'
L10	S04°30'08"W	796.46'
L11	S10°15'04"E	597.22'
L12	S25°26'49"E	1862.47'
L13	S03°21'59"E	1916.41'
L14	S19°30'58"W	1148.95'
L15	N13°19'11"E	607.43'
L16	N01°11'45"W	1647.75'
L17	N08°16'08"W	912.90'
L18	N25°41'29"W	641.75'
L19	N58°14'26"W	594.85'
L20	N85°56'36"W	441.87'
L21	N69°55'43"W	346.12'
L22	N03°20'18"W	375.76'
L23	N10°44'45"E	671.81'
L24	N07°47'49"W	760.40'
L25	N39°38'33"W	2533.14'
L26	N55°22'43"W	210.74'
L27	N66°59'17"W	252.05'

**SAC-2019-00062**  
**Great Falls-Dearborn**  
**Recreational and Minimum**  
**Flow Projects**  
**Dated 10/25/2019**  
**Sheet 43-44**





LEGEND

- PROJECT BOUNDARY
- PAVED ROAD
- COUNTY LINE
- STREAM
- UNPAVED ROAD
- RAILROAD
- FULL POND
- REFERENCE POINT

HORIZONTAL DATUM BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD83/2011 HARN (U.S. FT).  
VERTICAL DATUM BASED ON NAVD29 (FT).

TO CONVERT FROM NAVD29 TO NAD83/2011 HARN  $+0.76'$ . THE PROJECT BOUNDARY IS DEFINED BY AN ELEVATION CONTOUR UNLESS NOTED OTHERWISE. THE ELEVATION FOR THE PROJECT BOUNDARY WAS PROVIDED BY DUKE ENERGY.

STEREOCORRELATION PROCESS IN ACCORDANCE WITH NATIONAL MAP ACCURACY STANDARDS BY KUCERA INTERNATIONAL. AERIAL PHOTOGRAPHY WAS FLOWN AT A SCALE APPROXIMATELY 1 INCH = 700 FEET.

ALL REFERENCED SURVEY DISTANCES ARE IN FEET (') AND ALL SURVEY ANGLES ARE IN DEGREES (°), MINUTES (') AND SECONDS (").



I, JOHN ANTALOVICH SR., A PROFESSIONAL LAND SURVEYOR/MAPPER WITH KUCERA INTERNATIONAL, INC. HAVE REVIEWED THE CATAWBA-WATEREE PROJECT MAPS, THE PLANIMETRIC AND CONTOURS SHOWN ON SAID MAPS WERE PRODUCED BY KUCERA INTERNATIONAL USING LIDAR AND PHOTOGRAMMETRIC METHODS. ALL WORK IS BASED ON NAD83/2011 NORTH CAROLINA STATE PLANE COORDINATE SYSTEM (US FEET). THE VERTICAL DATUM IS NAVD29.

THIS DOCUMENT ORIGINALLY ISSUED AND SEALED BY JOHN ANTALOVICH SR., L-24046 (SD) ON OCTOBER 29, 2004. THIS MEDIA SHALL NOT BE CONSIDERED A CERTIFIED DOCUMENT.

I, WALTER K. DIXON, A PROFESSIONAL LAND SURVEYOR FOR DUKE ENERGY, HAVE REVIEWED THIS PORTION OF THE CATAWBA-WATEREE PROJECT BOUNDARY SHOWN HEREIN. THE LICENSEE EITHER OWNS IN FEE SIMPLE OR POSSESSES FLOWAGE EASEMENTS OVER ALL LANDS SHOWN ON THIS MAP THAT ARE INSIDE THE PROJECT BOUNDARY. CONTOURS WERE PRODUCED BY KUCERA INTERNATIONAL AND ORIGINALLY ISSUED AND SEALED BY JOHN ANTALOVICH SR. ON OCTOBER 29, 2004. THE PLANIMETRIC AND CONTOURS SHOWN HEREIN ARE BASED ON NAD83/2011 NORTH CAROLINA STATE PLANE COORDINATE SYSTEM (US FEET) AND THE VERTICAL DATUM IS NAVD29 UNLESS NOTED OTHERWISE. THE PROJECT BOUNDARY LINES THAT ARE NOT CONTOUR LINES (E.G. AROUND ACCESS AREAS, DAMS, ETC.) WERE BASED ON DUKE ENERGY MAPS, RECORDED SURVEYS AND DEEDS OF RECORD.



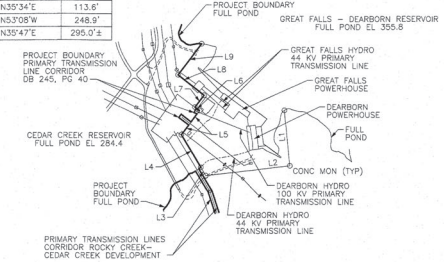
Walter K. Dixon

SEAL WALTER K. DIXON DATE 5/19/2018

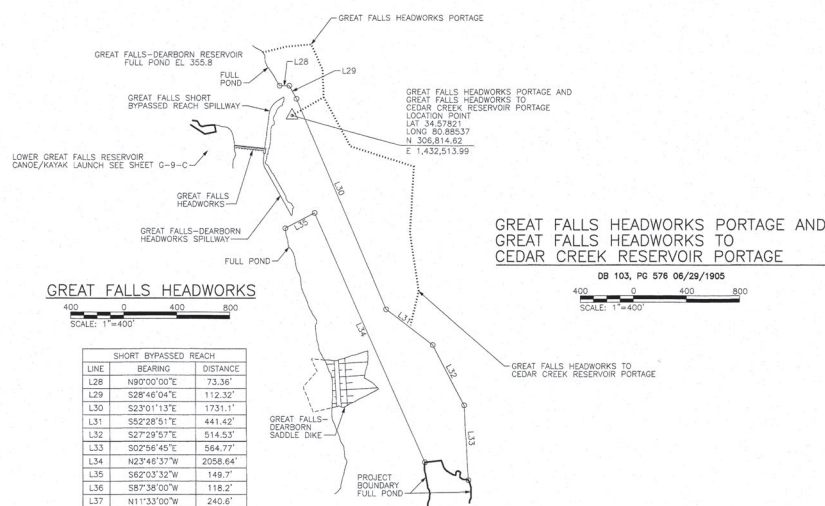
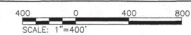
EXHIBIT G SHEET G-9-B  
CATAWBA-WATEREE PROJECT FERC NO. 2232  
GREAT FALLS - DEARBORN DEVELOPMENT  
SOUTH CAROLINA  
MAO PF PROPERTIES  
DUKE ENERGY CAROLINAS, LLC

MAY, 2018 SCALE: AS NOTED

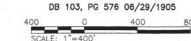
LINE	BEARING	DISTANCE
L1	S07°00'E	431.6'±
L2	S82°00'W	638.6'
L3	N32°16'W	72.7'
L4	N32°16'W	287.3'
L5	N35°42'E	229.1'
L6	N54°48'W	44.2'
L7	N35°34'E	113.6'
L8	N5°08'W	248.9'
L9	N35°47'E	295.0'±



GREAT FALLS AND DEARBORN POWERHOUSES



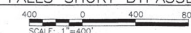
GREAT FALLS HEADWORKS PORTAGE AND GREAT FALLS RESERVOIRS PORTAGE



GREAT FALLS HEADWORKS

LINE	BEARING	DISTANCE
L28	N90°00'00"E	73.36'
L29	S28°45'04"E	112.32'
L30	S23°01'13"E	1731.1'
L31	S52°28'51"E	441.42'
L32	S27°29'57"E	514.53'
L33	S02°56'45"E	864.77'
L34	N23°43'37"W	2058.64'
L35	S62°03'32"W	149.7'
L36	S87°38'00"W	118.2'
L37	N11°33'00"W	240.6'

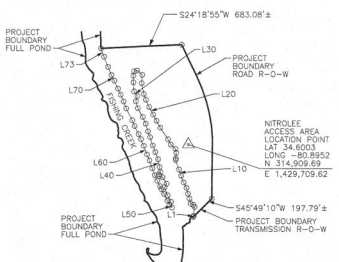
GREAT FALLS SHORT BYPASSED REACH



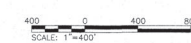
LINE	BEARING	DISTANCE
L1	N20°58'00"E	10.83'
L2	N61°58'20"E	67.29'
L3	N31°39'20"W	18.35'
L4	N83°19'10"W	21.60'
L5	N13°57'20"W	38.94'
L6	N17°26'40"W	37.62'
L7	N13°23'20"W	46.51'
L8	N27°17'50"W	46.85'
L9	N20°00'00"W	53.12'
L10	N19°59'00"W	50.10'
L11	N19°20'10"W	74.92'
L12	N4°18'20"E	12.95'
L13	N44°7'30"E	42.10'
L14	N62°28'20"W	30.51'
L15	N48°18'30"W	48.83'
L16	N27°11'30"E	45.72'
L17	N34°01'30"W	104.25'
L18	N28°38'00"W	59.54'
L19	N27°48'30"W	53.16'
L20	N27°50'00"W	64.90'
L21	N241°11'00"W	60.71'
L22	N19°57'40"W	45.69'
L23	N11°09'30"W	83.24'
L24	N4°20'20"E	63.24'
L25	N50°21'50"W	51.68'

LINE	BEARING	DISTANCE
L26	S72°49'50"W	23.25'
L27	S95°50'50"W	31.90'
L28	S75°51'0"E	50.56'
L29	S32°17'10"E	67.80'
L30	S35°18'40"E	43.33'
L31	S15°10'10"W	41.53'
L32	S19°20'00"E	54.38'
L33	S28°44'0"E	77.33'
L34	S22°42'10"E	55.76'
L35	S16°54'00"E	60.29'
L36	S19°13'20"E	48.31'
L37	S18°12'10"E	67.07'
L38	S21°16'10"E	52.89'
L39	S20°43'0"E	57.48'
L40	S11°31'20"E	60.70'
L41	S9°32'20"E	36.85'
L42	S34°13'30"W	23.66'
L43	S21°41'40"E	13.21'
L44	S70°38'20"E	25.89'
L45	S31°57'0"E	66.87'
L46	S11°31'20"E	31.41'
L47	S21°26'10"E	65.86'
L48	S27°07'10"E	64.83'
L49	S9°44'40"E	44.86'
L50	N40°57'10"W	29.34'

LINE	BEARING	DISTANCE
L51	N28°58'00"W	33.07'
L52	N28°18'20"W	57.89'
L53	N28°00'10"W	41.27'
L54	N24°49'20"W	24.92'
L55	N28°18'00"W	45.07'
L56	N23°33'30"W	47.00'
L57	N20°14'10"W	54.79'
L58	N19°32'10"W	82.48'
L59	N22°55'30"W	48.84'
L60	N20°09'50"W	70.09'
L61	N22°10'00"W	54.78'
L62	N25°37'20"W	42.41'
L63	N26°22'00"W	69.05'
L64	N21°02'00"W	47.39'
L65	N26°19'20"W	96.51'
L66	N20°55'50"W	57.10'
L67	N22°40'50"W	54.75'
L68	N23°55'30"W	51.33'
L69	N24°58'00"W	86.10'
L70	N27°06'10"W	47.52'
L71	N23°29'20"W	65.30'
L72	N21°27'00"W	82.96'
L73	N19°56'22"W	68.16'



NITROLEE ACCESS AREA 12.28± ACRES



SAC-2019-00062  
Great Falls-Dearborn  
Recreational and Minimum  
Flow Projects  
Dated 10/25/2019  
Sheet 44-44