




**Figure 1. General Location of Ash Basin Closure and Associated Projects**

Dan River Steam Station  
Rockingham County, NC

**Legend**

-  Ash Basin Closure and Associated Projects Work Area
-  Ash Basin
-  Site Boundary

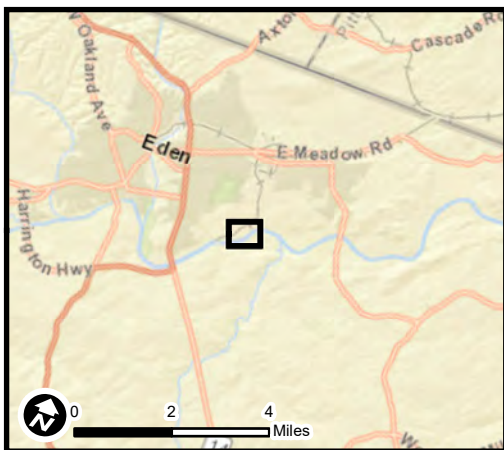


Job No. 7810150290.13  
 Drawn By: JAH  
 Reviewed By: ---  
 Date: 1/11/2019

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**Figure 2. Location of Proposed Work Areas and Project Components**

Dan River Steam Station  
Rockingham County, NC

**Legend**

- Interceptor Ditches
- Longitudinal Ditches
- Gabion Locations
- Wetlands
- Ash Basin
- Site Boundary



Job No. 7810150290.13  
 Drawn By: JAH  
 Reviewed By: ---  
 Date: 1/16/2019

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C:\Users\jason.hightower\Desktop\duke\_export\Dan\_River\Gabion\_Locations\2\_Aerial.mxd

*Wetland Master Plan – Addendum 1  
Dan River Plant Ash Basin Closure  
Rockingham County, North Carolina  
Project No. 7810150290*



## **APPENDIX A**

### **PLAN VIEW AND CROSS-SECTION PERMIT DRAWINGS**

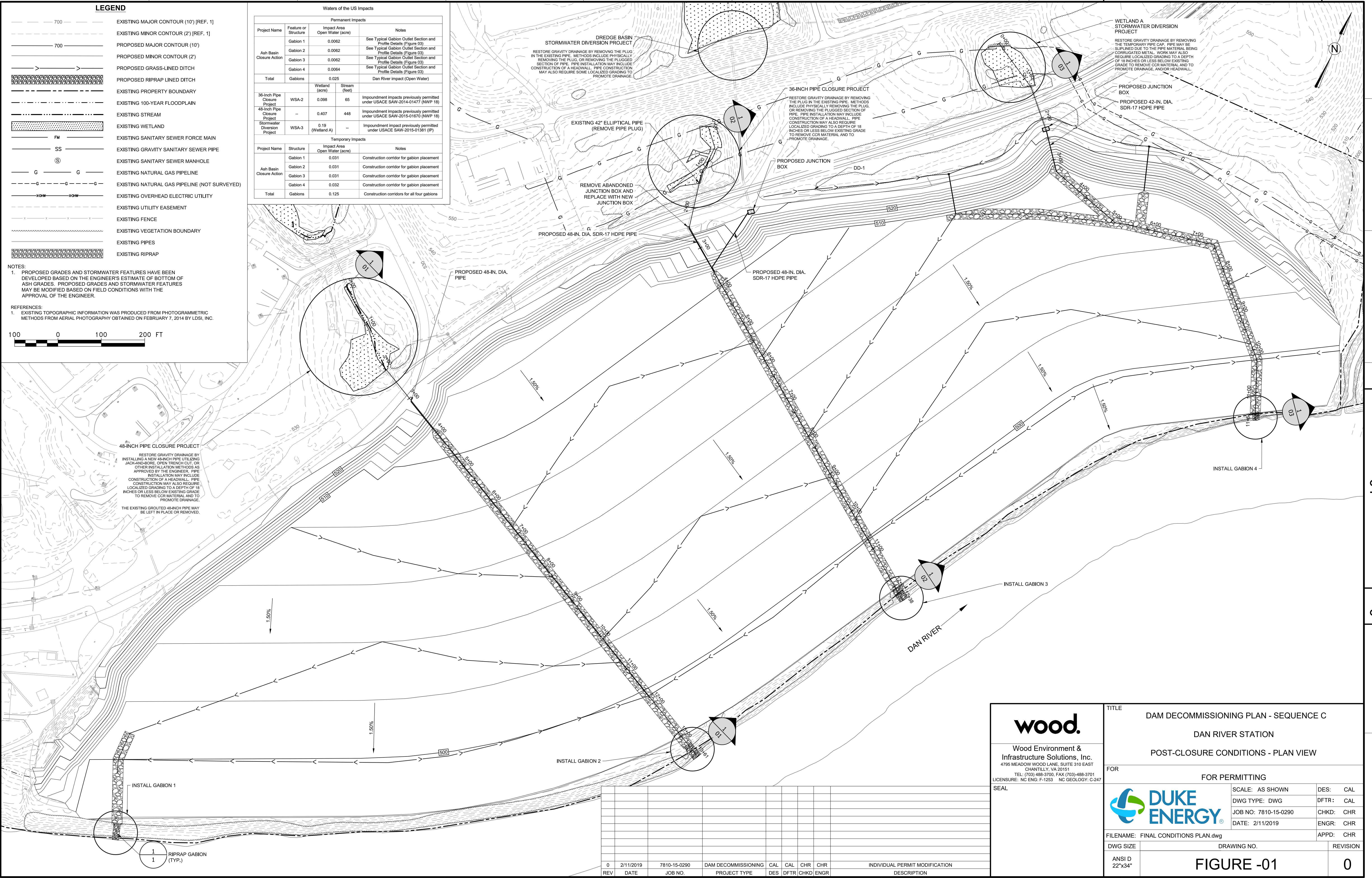
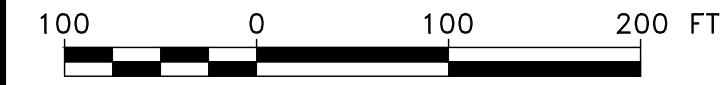
**LEGEND**

- 700 --- EXISTING MAJOR CONTOUR (10') [REF. 1]
- 700 --- EXISTING MINOR CONTOUR (2') [REF. 1]
- 700 --- PROPOSED MAJOR CONTOUR (10')
- 700 --- PROPOSED MINOR CONTOUR (2')
- --- PROPOSED GRASS-LINED DITCH
- --- PROPOSED RIPRAP LINED DITCH
- --- EXISTING PROPERTY BOUNDARY
- --- EXISTING 100-YEAR FLOODPLAIN
- --- EXISTING STREAM
- --- EXISTING WETLAND
- --- EXISTING SANITARY SEWER FORCE MAIN
- --- EXISTING GRAVITY SANITARY SEWER PIPE
- --- EXISTING SANITARY SEWER MANHOLE
- --- EXISTING NATURAL GAS PIPELINE
- --- EXISTING NATURAL GAS PIPELINE (NOT SURVEYED)
- --- EXISTING OVERHEAD ELECTRIC UTILITY
- --- EXISTING UTILITY EASEMENT
- --- EXISTING FENCE
- --- EXISTING VEGETATION BOUNDARY
- --- EXISTING PIPES
- --- EXISTING RIPRAP

Waters of the US Impacts				
Permanent Impacts				
Project Name	Feature or Structure	Impact Area (acres)	Notes	
Ash Basin Closure Action	Gabion 1	0.0062	See Typical Gabion Outlet Section and Profile Details (Figure 03)	
	Gabion 2	0.0062	See Typical Gabion Outlet Section and Profile Details (Figure 03)	
	Gabion 3	0.0062	See Typical Gabion Outlet Section and Profile Details (Figure 03)	
	Gabion 4	0.0064	See Typical Gabion Outlet Section and Profile Details (Figure 03)	
<b>Total</b>	<b>Gabions</b>	<b>0.025</b>	<b>Dan River Impact (Open Water)</b>	
Temporary Impacts				
Project Name	Structure	Impact Area (acres)	Notes	
36-Inch Pipe Closure Project	WSA-2	0.098	65 Impoundment impacts previously permitted under USACE SAW-2014-01477 (NWP 18)	
	48-Inch Pipe Closure Project	WSA-3	0.407	448 Impoundment impacts previously permitted under USACE SAW-2015-01670 (NWP 18)
		WSA-3	0.19	(Wetland A) Impoundment impact previously permitted under USACE SAW-2015-01381 (IP)
		Wetland (acres)	Stream (feet)	
Ash Basin Closure Action	Gabion 1	0.031	Construction corridor for gabion placement	
	Gabion 2	0.031	Construction corridor for gabion placement	
	Gabion 3	0.031	Construction corridor for gabion placement	
	Gabion 4	0.032	Construction corridor for gabion placement	
<b>Total</b>	<b>Gabions</b>	<b>0.125</b>	<b>Construction corridors for all four gabions</b>	

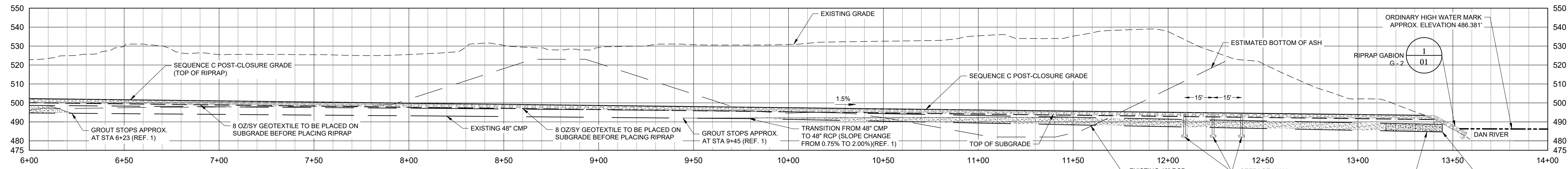
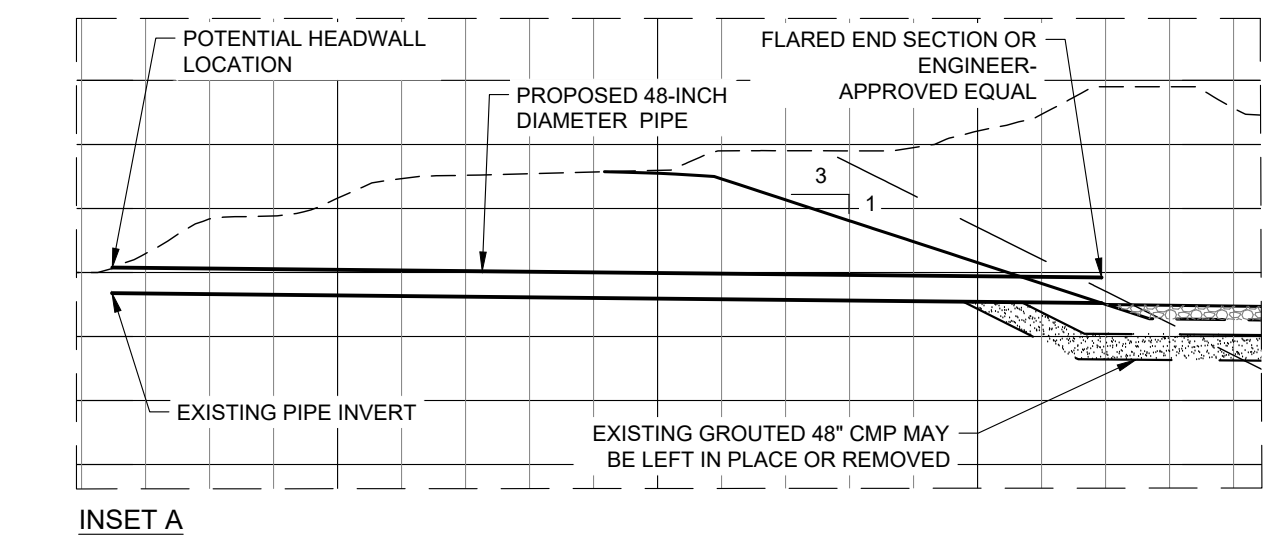
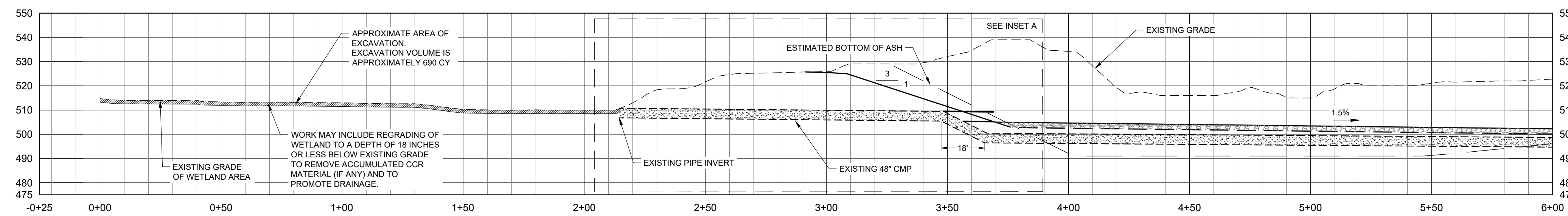
**NOTES:**  
 1. PROPOSED GRADES AND STORMWATER FEATURES HAVE BEEN DEVELOPED BASED ON THE ENGINEER'S ESTIMATE OF BOTTOM OF ASH GRADES. PROPOSED GRADES AND STORMWATER FEATURES MAY BE MODIFIED BASED ON FIELD CONDITIONS WITH THE APPROVAL OF THE ENGINEER.

**REFERENCES:**  
 1. EXISTING TOPOGRAPHIC INFORMATION WAS PRODUCED FROM PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY OBTAINED ON FEBRUARY 7, 2014 BY LDSI, INC.

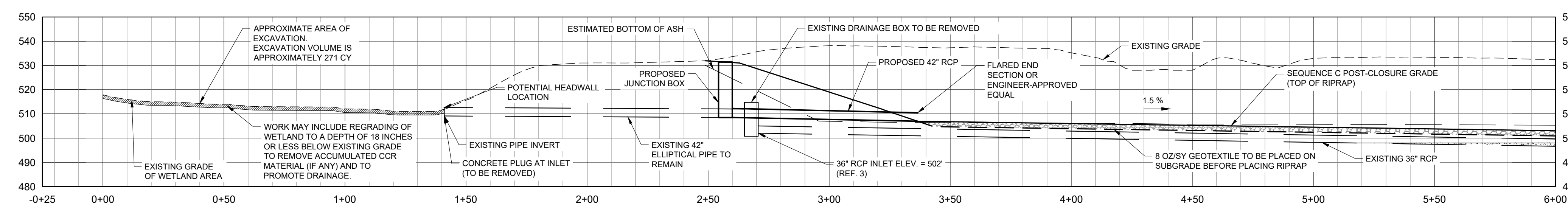


<p>Wood Environment &amp; Infrastructure Solutions, Inc.                  4795 MEADOW WOOD LANE, SUITE 310 EAST CHANTILLY, VA 20151                  TEL: (703) 488-3700, FAX: (703) 488-3701                  LICENSURE: NC ENG. F-1253 NC GEOLOGY: C-247                  SEAL</p>	TITLE <b>DAM DECOMMISSIONING PLAN - SEQUENCE C</b> <b>DAN RIVER STATION</b> <b>POST-CLOSURE CONDITIONS - PLAN VIEW</b>	
	FOR PERMITTING 	
SCALE: AS SHOWN DWG TYPE: DWG JOB NO: 7810-15-0290 DATE: 2/11/2019	DES: CAL DFTR: CAL CHKD: CHR ENGR: CHR APPD: CHR	FILENAME: FINAL CONDITIONS PLAN.dwg DWG SIZE: ANSI D 22"x34" DRAWING NO.: <b>FIGURE -01</b> REVISION: <b>0</b>

REV	DATE	JOB NO.	PROJECT TYPE	DES	DFTR	CHKD	ENGR	DESCRIPTION
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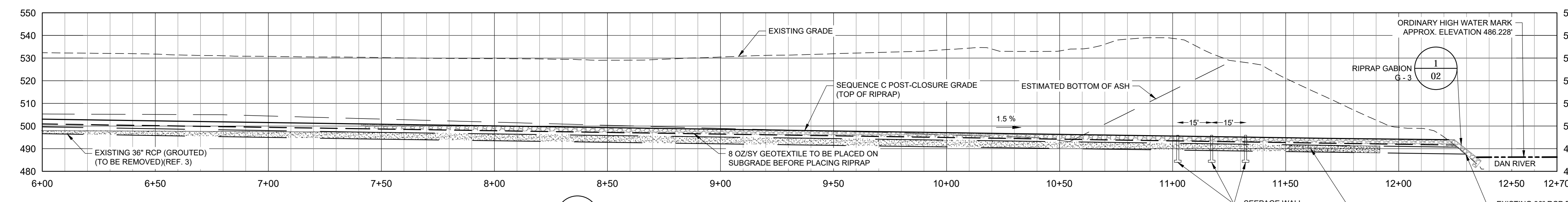
1  
01  
48 INCH DRAINAGE PIPE (GROUTED)  
(SEE NOTE 1)



- LEGEND**
- - - - - EXISTING GRADE
  - - - - - EXISTING BOTTOM OF ASH
  - - - - - SEQUENCE C POST-CLOSURE GRADE (TOP OF RIPRAP)
  - - - - - 8 OZ/SY GEOTEXTILE
  - - - - - TOP OF CHANNEL
  - - - - - EXISTING STORM PIPE
  - - - - - PROPOSED PIPE AND JUNCTION BOX
  - [Pattern] RIPRAP
  - [Pattern] CONCRETE PLUG
  - [Pattern] GROUT

**NOTES:**  
1: LOCATION OF GROUTED SECTIONS OF PIPES ARE APPROXIMATE

**REFERENCES:**  
REF. 1: DWG. "DAN RIVER POWER PLANT 48" DIA. PIPE S.W. PIPE SECTION AND PLAN VIEW" DATE: 04/17/2014  
REF. 2: DWG. NO. D-1039-MJ Rev. No. 3 APPROVED 11/7/1980  
REF. 3: DWG. "DAN RIVER POWER PLANT 42"/36" DIA. PIPE S.W. PIPE SECTION AND PLAN VIEW" DATE: 04/17/2014  
REF. 4: EXISTING TOPOGRAPHIC INFORMATION WAS PRODUCED FROM PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY OBTAINED ON FEBRUARY 7, 2014 BY LDSI, INC.

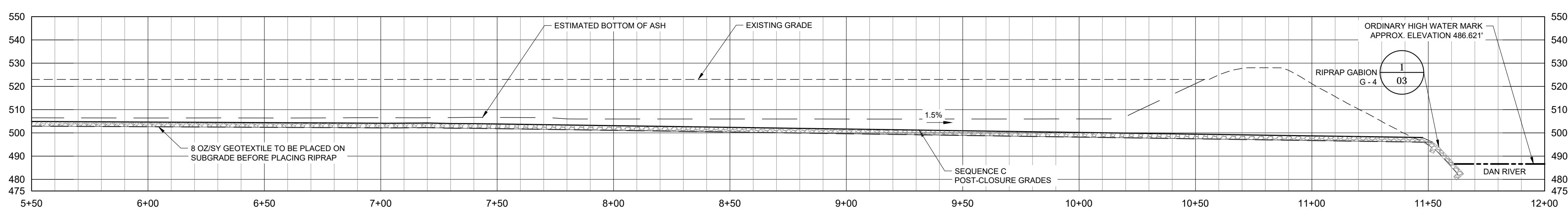
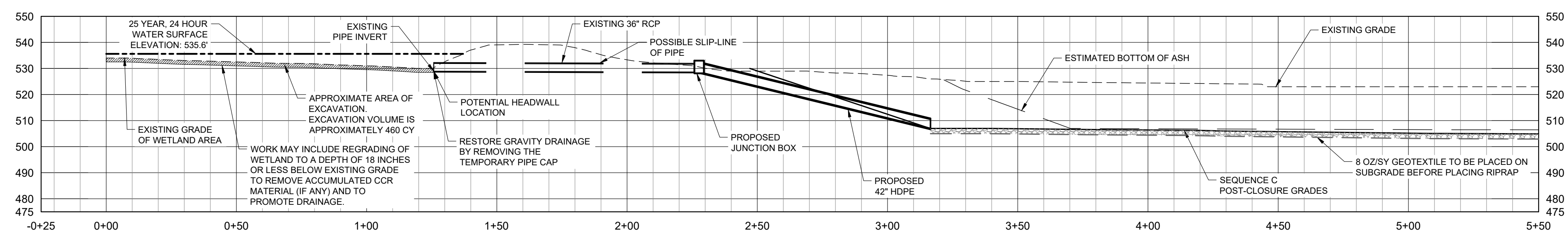


1  
02  
36 INCH DRAINAGE PIPE (GROUTED)  
(SEE NOTE 1)

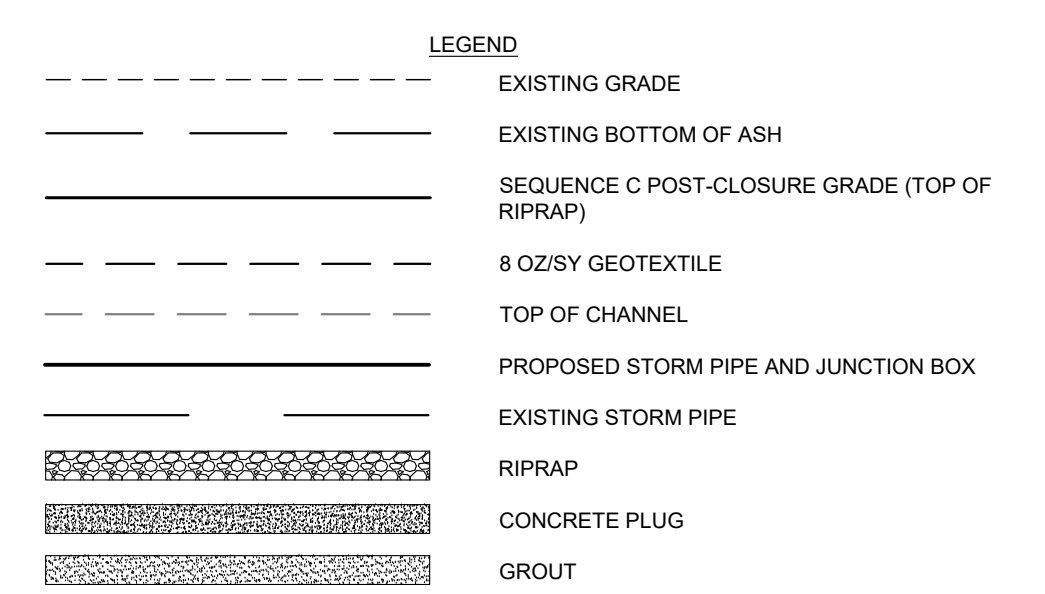


<p>Wood Environment &amp; Infrastructure Solutions, Inc. 4795 MEADOW WOOD LANE, SUITE 310 EAST CHANTILLY, VA 20151 TEL: (703) 488-3700, FAX (703) 488-3701 LICENSURE: NC ENG. F-1253 NC GEOLOGY: C-247</p>	<b>TITLE</b> DAM DECOMMISSIONING PLAN - SEQUENCE C DAN RIVER STATION PIPE PROFILES	
	<b>FOR</b> FOR PERMITTING	
<b>SCALE:</b> AS SHOWN <b>DWG TYPE:</b> DWG <b>JOB NO:</b> 7810-15-0290 <b>DATE:</b> 2/11/2019	<b>DES:</b> CAL <b>DFTR:</b> CAL <b>CHKD:</b> CHR <b>ENGR:</b> CHR	<b>APPD:</b> CHR
<b>FILENAME:</b> EXISTING ASH BASIN PIPE PROFILES.dwg <b>DWG SIZE:</b> ANSI D 22"x34"	<b>DRAWING NO.:</b>	<b>REVISION:</b>
<b>FIGURE -02</b>		<b>0</b>

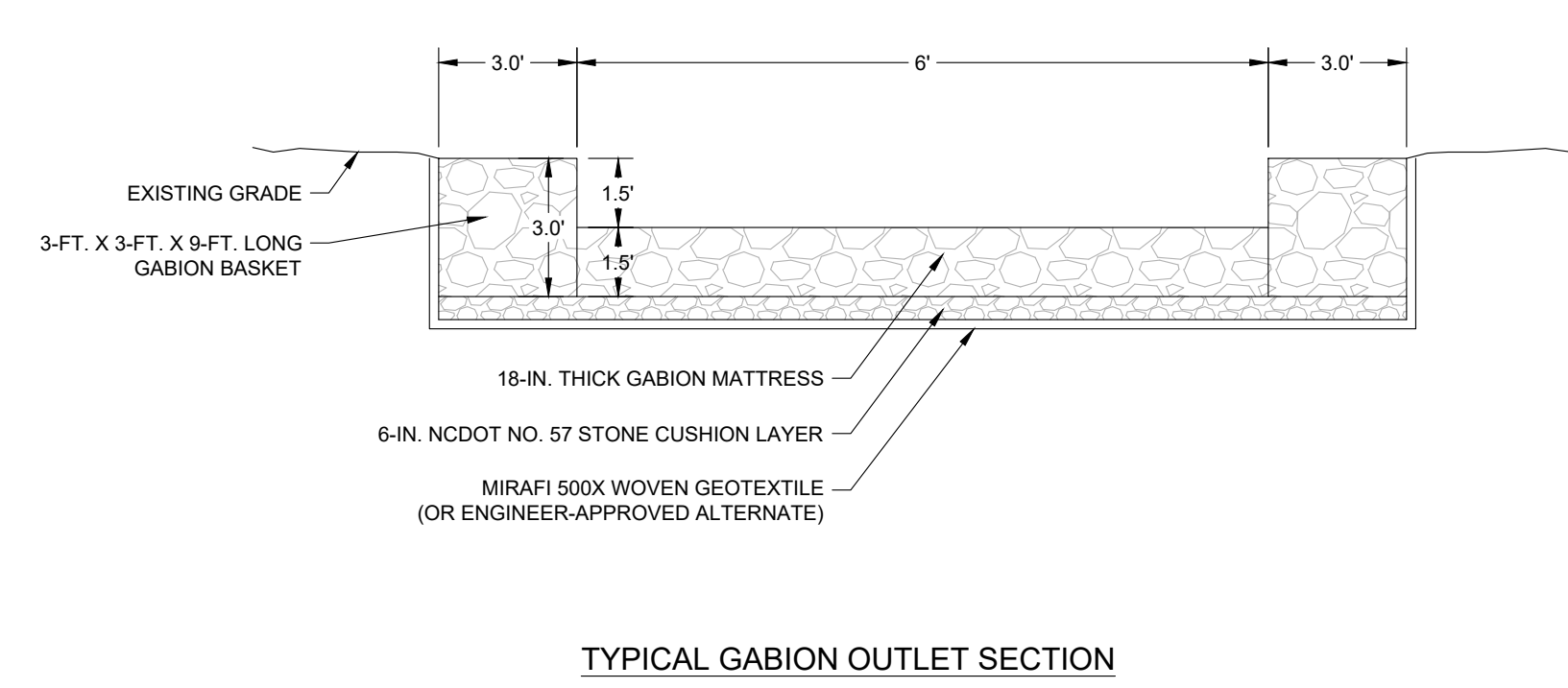
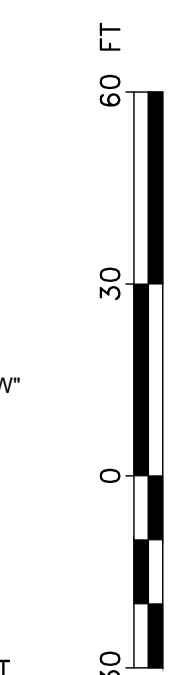
REV	DATE	JOB NO.	PROJECT TYPE	CAL	CAL	CHR	CHR	DESCRIPTION
0	2/11/2019	7810-15-0290	DAM DECOMMISSIONING	CAL	CAL	CHR	CHR	INDIVIDUAL PERMIT MODIFICATION



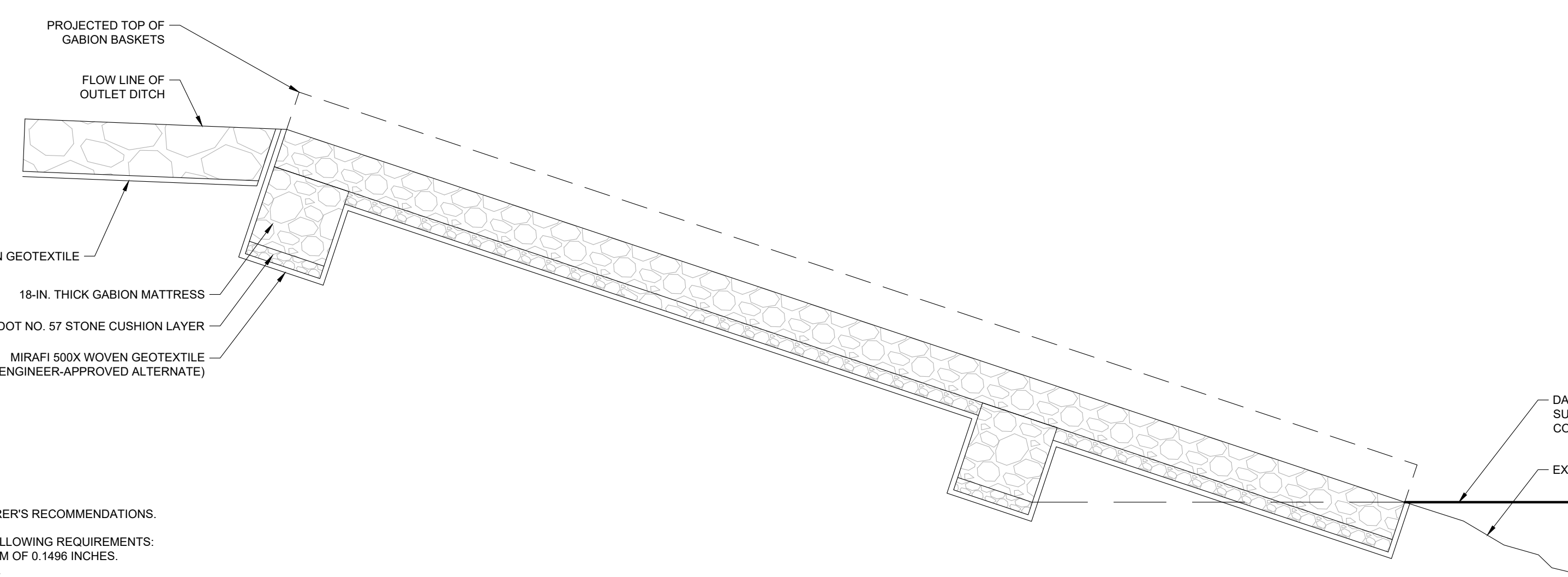
1  
03  
WETLAND A - 36 INCH TO 42 INCH DRAINAGE PIPE



REFERENCES:  
 REF. 1: DWG. "DAN RIVER POWER PLANT 48" DIA. PIPE S.W. PIPE SECTION AND PLAN VIEW" DATE: 04/17/2014  
 REF. 2: DWG. NO. D-1039-M-I Rev. No. 3 APPROVED 11/7/1980  
 REF. 3: DWG. "DAN RIVER POWER PLANT 42" DIA. PIPE S.W. PIPE SECTION AND PLAN VIEW" DATE: 04/17/2014  
 REF. 4: EXISTING TOPOGRAPHIC INFORMATION WAS PRODUCED FROM PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY OBTAINED ON FEBRUARY 7, 2014 BY LDSI, INC.



TYPICAL GABION OUTLET SECTION



TYPICAL GABION OUTLET PROFILE



1  
1  
RIPRAP GABION DETAIL  
1" = 4"

- NOTES:
- UNLESS DIRECTLY IN CONFLICT WITH REQUIREMENTS SET FORTH IN THE PROJECT NOTES AND DRAWINGS, GABIONS SHALL BE ASSEMBLED PER THE MANUFACTURER'S RECOMMENDATIONS.
  - GABIONS SHALL BE COMPRISED OF DOUBLE TWISTED HEXAGONAL ZINC COATED WIRE MESH WITH POLYVINYL CHLORIDE (PVC) COATING CONFORMING TO THE FOLLOWING REQUIREMENTS:
    - THE MESH WIRE SHALL HAVE A GROSS SECTIONAL CORE DIAMETER OF A MINIMUM OF 0.1063 INCHES WITH AN OUTER CROSS SECTIONAL DIAMETER OF A MINIMUM OF 0.1496 INCHES.
    - THE SELVEDGE WIRE SHALL HAVE A GROSS SECTIONAL INTERNAL DIAMETER OF 0.134 INCHES AND AN EXTERNAL CROSS SECTIONAL DIAMETER OF 0.174 INCHES.
    - PVC COATING SHALL HAVE A MINIMUM THICKNESS OF 0.015 INCHES. ABRASION RESISTANCE OF PVC COATING SHALL BE LESS THAN 12% WEIGHT LOSS IN ACCORDANCE WITH ASTM D1242 AND A PROJECTED DURABILITY LIFE OF 70 YEARS WHEN TESTED IN ACCORDANCE WITH UL 746B.
    - GABION MESH SHALL BE A MESH TYPE 8 X 10 WITH NOMINAL SIZE OF 3 1/4" BY 4 1/2".
  - THE CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE THE PVC COATING DURING ASSEMBLY, TRANSPORTATION, PLACEMENT, AND FILLING. THE OWNER RESERVES THE RIGHT TO REJECT GABIONS WHICH HAVE BEEN DAMAGED PRIOR TO FINAL ACCEPTANCE OF THE WORK.
  - GABIONS MAY BE ASSEMBLED USING PVC COATED LACING WIRE PER THE MANUFACTURER'S RECOMMENDATIONS, USING ALTERNATING SINGLE AND DOUBLE LOOPS THROUGH EVERY MESH OPENING WITH DOUBLE LOOPS SPACED AT NO MORE THAN 6 INCHES.
  - INDIVIDUAL GABION UNITS SHALL BE CONNECTED USING STAINLESS STEEL FASTENERS SPACED AT A MAXIMUM OF EVERY 4 INCHES. STAINLESS STEEL FASTENERS SHALL BE CLOSED USING A PNEUMATIC TOOL PER THE MANUFACTURER'S RECOMMENDATIONS. STAINLESS STEEL FASTENERS SHALL HAVE A CROSS SECTIONAL DIAMETER OF 0.120 INCHES. WHEN CLOSED, THE FASTENER SHOULD HAVE A NOMINAL OVERLAP OF 1 INCH. GABION UNITS SHALL BE SECURED ALONG ALL VERTICAL AND TOP EDGES. FOR STACKED UNITS, THE UPPER AND LOWER BASKETS SHALL BE CONNECTED WITH FASTENERS ALONG FRONT AND BACK EDGES.
  - GABIONS SHALL BE FILLED WITH SOUND RIP RAP WITH A MINIMUM SIZE OF 4 INCHES AND A MAXIMUM SIZE OF 8 INCHES. RIP RAP SHALL MEET THE REQUIREMENTS OF SECTION 1042 RIP RAP MATERIALS OF THE 2012 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES. ALTERNATE GRADATIONS MAY BE SUBMITTED FOR USE BUT SHALL NOT BE USED PRIOR TO APPROVAL BY THE ENGINEER.
  - GABIONS SHALL BE FILLED IN THREE EQUAL LAYERS TOTALING THE HEIGHT OF EACH GABION. SOME MANUAL PLACEMENT OF ROCKS TO REDUCE EXCESSIVE VOIDS WILL BE REQUIRED. GABIONS SHALL BE OVERFILLED BY APPROXIMATELY 1 TO 2 INCHES SUCH THAT LIDS MUST BE STRETCHED FOR CLOSURE. A LID CLOSURE TOOL SHALL BE USED PER THE MANUFACTURER'S RECOMMENDATIONS TO CLOSE LIDS.
  - WHEN PLACED LATERALLY, GABIONS SHALL BE LAID TRANSVERSELY TO THE DIRECTION OF THE WATER FLOW.
  - WHEN PLACED, GABIONS SHALL BE IN INTIMATE CONTACT WITH BEDDING AGGREGATE.
  - BEDDING MATERIAL FOR GABIONS SHALL BE COMPRISED OF AGGREGATE MEETING THE GRADATION REQUIREMENTS ON TABLE 1005-1 FOR NCDOT # 57 AGGREGATE AND SECTION 1014 OF THE 2012 NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
  - WOVEN GEOTEXTILE SHALL CONSIST OF POLYPROPYLENE YARNS AND BE RESISTANT TO BIOLOGICAL DEGRADATION AND NATURALLY OCCURRING CHEMICALS, ALKALI, AND ACIDS. WOVEN GEOTEXTILE SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS:
- | PHYSICAL PROPERTY (TEST METHOD)        | TEST VALUE             |
|--|------------------------|
| GRAB TENSILE STRENGTH (ASTM D4632)     | 200 LBS                |
| GRAB TENSILE ELONGATION (ASTM D4632)   | 10%                    |
| TRAPEZOIDAL TEAR STRENGTH (ASTM D4533) | 75 LBS                 |
| UV RESISTANCE (500 HOURS) (ASTM D4355) | 70% STRENGTH RETENTION |
| APPARENT OPENING SIZE (ASTM D4751)     | 0.43 MM                |
| CBR PUNCTURE STRENGTH (ASTM D6241)     | 700 LBS                |

REV	DATE	JOB NO.	PROJECT TYPE	DES	DFTR	CHKD	ENGR	DESCRIPTION
0	2/11/2019	7810-15-0290	DAM DECOMMISSIONING	CAL	CAL	CHR	CHR	INDIVIDUAL PERMIT MODIFICATION

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 CHANTILLY, VA 20151  
 TEL: (703) 488-3700, FAX: (703) 488-3701  
 LICENSURE: NC ENG. F-1253 NC GEOLOGY: C-247

TITLE: DAM DECOMMISSIONING PLAN - SEQUENCE C  
 DAN RIVER STATION  
 WSA-3 PIPE PROFILE AND GABION DETAIL

FOR: FOR PERMITTING

SCALE: AS SHOWN	DES: CAL
DWG TYPE: DWG	DFTR: CAL
JOB NO: 7810-15-0290	CHKD: CHR
DATE: 2/11/2019	ENGR: CHR
APPD: CHR	

FILENAME: WSA-3 PIPE PROFILE.dwg

DWG SIZE	DRAWING NO.	REVISION
ANSI D 22"x34"	FIGURE -03	0