



North Carolina Department of Transportation
Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS



(Version 3.00; Released August 2021)

WBS Element: 34165.1.11/34165.1. TIP/Proj No: I-2513AA/AB County(ies): Buncombe Page 1 of 5

General Project Information

WBS Element:		34165.1.11/34165.1.12		TIP Number:	I-2513AA/AB		Project Type:	Roadway Widening		Date:	12/12/2022
NCDOT Contact:		Kevin E Moore, PE				Contractor / Designer:		Matthew Harvey, PE			
	Address:	NCDOT PMU					Address:	Wetherill Engineering, Inc.			
		1000 Birch Ridge Drive						1223 Jones Franklin Road			
	Raleigh, NC 27610, USA				Raleigh, NC 27606						
	Phone:	919-707-6287					Phone:	919-851-8077			
	Email:	kemoore2@ncdot.gov					Email:	MHarvey@wetherilleng.com			
City/Town:		Asheville, NC				County(ies):		Buncombe			
River Basin(s):		French Broad				CAMA County?		No			
Wetlands within Project Limits?		Yes									

Project Description

Project Length (lin. miles or feet):	2.656 Miles	Surrounding Land Use:	Residential/Commercial
		Proposed Project	Existing Site
Project Built-Upon Area (ac.)	41.7	ac.	35.9
Typical Cross Section Description:	Variable - See Project Typical Sections		Variable - See Project Typical Sections
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	118,800	Year: 2040
	Existing:	95,100	Year: 2024

General Project Narrative:
(Description of Minimization of Water
Quality Impacts)

The project consists of roadway improvements on I-40 from east of SR 1224 (Monte Vista Road) to pavement joint west of SR 3412 (Sand Hill Road) and I-26 from Pond Road bridge to I-26/I-40/I-240 interchange. The project will also include initial improvements at I-40EB, to I-26EB Ramp and US 19/23 (Smokey Park Highway). The proposed stormwater runoff from the roadway widening has been conveyed to roadside ditches and storm drainage systems that drain to existing outfalls.

Potential areas for placing Stormwater Control Measures (SCM) were looked at within the project corridor. Below is a list of the locations and reason why or why not a device was proposed at the location:

Plan Sheet 4/5:
---Since this portion of the project is almost entirely a pavement overlay with no new built upon area, no SCMs were proposed here.

Plan Sheet 6:
---The gore area between -Y5LPB- and -Y- was looked for a potential SCM. This area was mentioned by the aesthetics committee and will likely be facilitated with plantings. Since this is not a new built upon area, a SCM will not be pursued.
---The area to the right of -Y5RPA- at Station 24+00 +/- was investigated for a SCM. A SCM was designed at the location to treat the water quality volume (WQV). It was found that the headwater from the crosspipe will back up the basin, even in smaller storm events. This will decrease the functionality of the basin and cause long term maintenance concerns. NCDOT maintenance personnel voiced concern with the basin interfering with their daily operations which would hinder their public safety operations. Since this facility serves one of the larger more vital locations in the area during icing/winter storm events, it was determined that a device could not be installed at this location without negatively impacting the community's safety.
---The area right of -Y5RPA- at Station 17+00 +/- at the outlet of the Ragsdale Creek culvert was investigated for an SCM and found to not be feasible. Railroads do not typically allow SCMs in their right of way and accessibility for long term maintenance would be difficult. For this reason, a SCM will not be pursued at this location.

Plan Sheet 7:
---The 5' base ditch left of -Y- 67+50 +/- along Montgomery Street was looked at, but disturbance to the Asheville School property will need to be limited since the property is a 4F property. For this reason a SCM will not be pursued.
---The outlet at drainage structure 0721 is a JS upstream and non-JS on the downstream side. The outfall is designed for larger storm events due to the large drainage area coming to this location. A SCM is not feasible at this location.
---There are no opportunities available right of -Y- on this plan sheet due to access issues. For this reason a SCM will not be pursued.

Plan Sheet 8:
---All outlets on this sheet are not easily accessible due to their existing locations in steep ravines. For this reason a SCM will not be pursued.

Plan Sheet 9:
---A SCM cannot be placed at the outlet of 0914 due to the steepness of the existing banks and the stream having a JS designation, as well as the site not being easily accessible.
---All outlets on this sheet are not easily accessible. The SCMs would have to be placed behind the proposed noise wall. For this reason an SCM will not be pursued.
---Energy Dissipator Basins were added at the outlets of Permit Sites 4 and 5. The basins will reduce the discharge velocity and minimize the stream degradation that is currently occurring under the existing conditions.

Plan Sheet 10:
---An SCM was looked at for the existing outlet at -Y_ WB- 30+50 +/-, but the basin would be in the floodplain of Ragsdale Creek and not easily accessible. For this reason an SCM will not be pursued.
---The drainage structure 1014 outlet is not easily accessible and adjacent to a residential property. For this reason an SCM will not be pursued.



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Additional General Project Information

General Project Narrative:
(Description of Minimization of Water
Quality Impacts)

Plan Sheet 11:

---The concrete ditches will be removed between -RPC- and -L1_EB- and be replaced with a step down infiltration SCM. This is one of the few options at this location due to the steep grade.

Plan Sheet 12:

---The 4' base outlet right of -RPC- 46+00 +/- is very steep and near an existing utility tower access. This site is not easily accessible. For this reason an SCM will not be pursued.

---Drainage outlet e1204 is within a floodplain. For this reason an SCM will not be pursued.

Plan Sheet 13:

---The outlet of drainage structure 1308 is a large drainage area. An SCM is not feasible here due to topography restrictions. For this reason an SCM will not be pursued.

Impact and Minimization Efforts: The project has been designed to minimize wetland and stream impacts along the corridor. Drainage has been designed so that outlets discharging into wetlands have non-erosive velocities to minimize disturbance to the wetlands. 2:1 fill slopes have been used throughout the project in order to minimize impacts in areas with wetlands and streams. Box culverts in the project area that convey jurisdictional streams have been buried a minimum of 1 foot and circular culverts have been buried 20% of their diameter so that they provide aquatic passage where applicable. Grassed shoulders and ditches with vegetated liner were used throughout the project where possible. Factors that prevented grass lined ditches from being used throughout the entire project include velocities in the ditch exceeding 4 fps and permissible shear stress in the ditch greater than 3.36 (shear stress = depth x slope x specific weight of water). The slope factor in the permissible shear stress equation was the main driver of ditches requiring rip rap or PSRM on the project, the steep ditch slopes are due to the natural topography in this area. The few instances where PSRM was used to line ditches was driven by the ditch slopes being so steep the shear stress in the ditch exceeded the limits for rip rap liner. Existing flow patterns and outfalls were maintained to the maximum extent practical to limit discharge increases to any particular area. While there was a 5.8 acre increase in impervious area for the entire project this increase was divided up among the 15 outfall locations. The existing outfalls consisted of buried pipe ends, undersized outfall channels/pipes, and little to no rip rap at pipe outlets. When the project is complete the outfalls will be upgraded to have rip rap outlet pads, energy dissipator basins, and improved outfall channels. These measures will help offset the lack of SCMs by reducing the discharge velocities which will mitigate watercourse erosion and damage to riparian ecology. The project is not expected to have a significant impact on water quality or quantity downstream of the project.



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WBS Element: 34165.1.11/34165.1 TIP/Proj No.: I-2513AA/AB County(ies): Buncombe Page 3 of 5

General Project Information

Waterbody Information

Surface Water Body (1):	Ragsdale Creek		NCDWR Stream Index No.:	6-76-11	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:		None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:	This portion of the project contributes stormwater about 3.5 river miles from occupied app elktoe habitat in the French Broad River		
NRTR Stream ID:	SV		Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	No	Dissipator Pads Provided in Buffer?	No
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					
Surface Water Body (2):	Trent Branch		NCDWR Stream Index No.:	6-76-10	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:		None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SW		Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					
Surface Water Body (3):	Hominy Creek		NCDWR Stream Index No.:	6-76d	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:		None		
Other Stream Classification:	None				
Impairments:	fecal coliform				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SX		Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					



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**Highway Stormwater Program
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WBS Element:

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County(ies): Buncombe

Page 4 of 5

Preformed Scour Holes and Energy Dissipators

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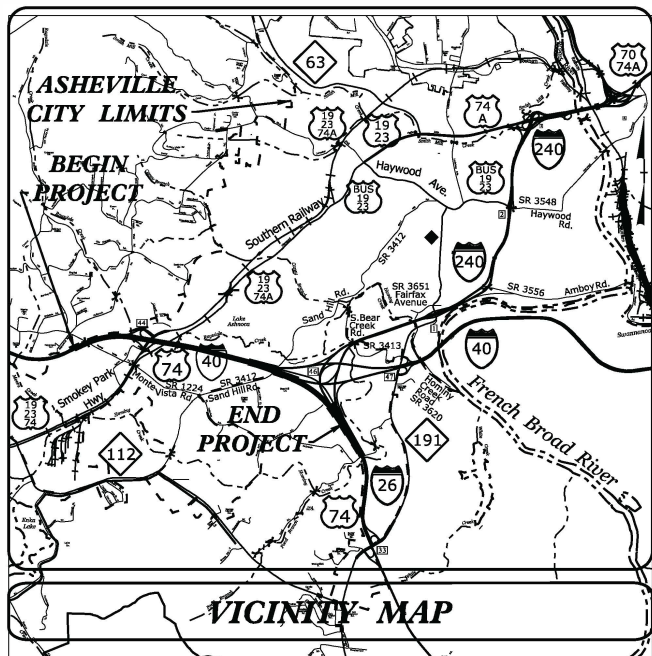
Additional Comments

* Refer to the NCDOT Best Management Practices Toolbox (2014), NCDOT Standards, the Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 14 (HEC-14), Third Edition, Hydraulic Design of Energy Dissipators for Culverts and Channels (July 2006), as applicable, for design guidance and criteria.

Page 5 of 5

TIP PROJECT: I-2513AA/AB

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols



RIGHT-OF-WAY PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BUNCOMBE COUNTY

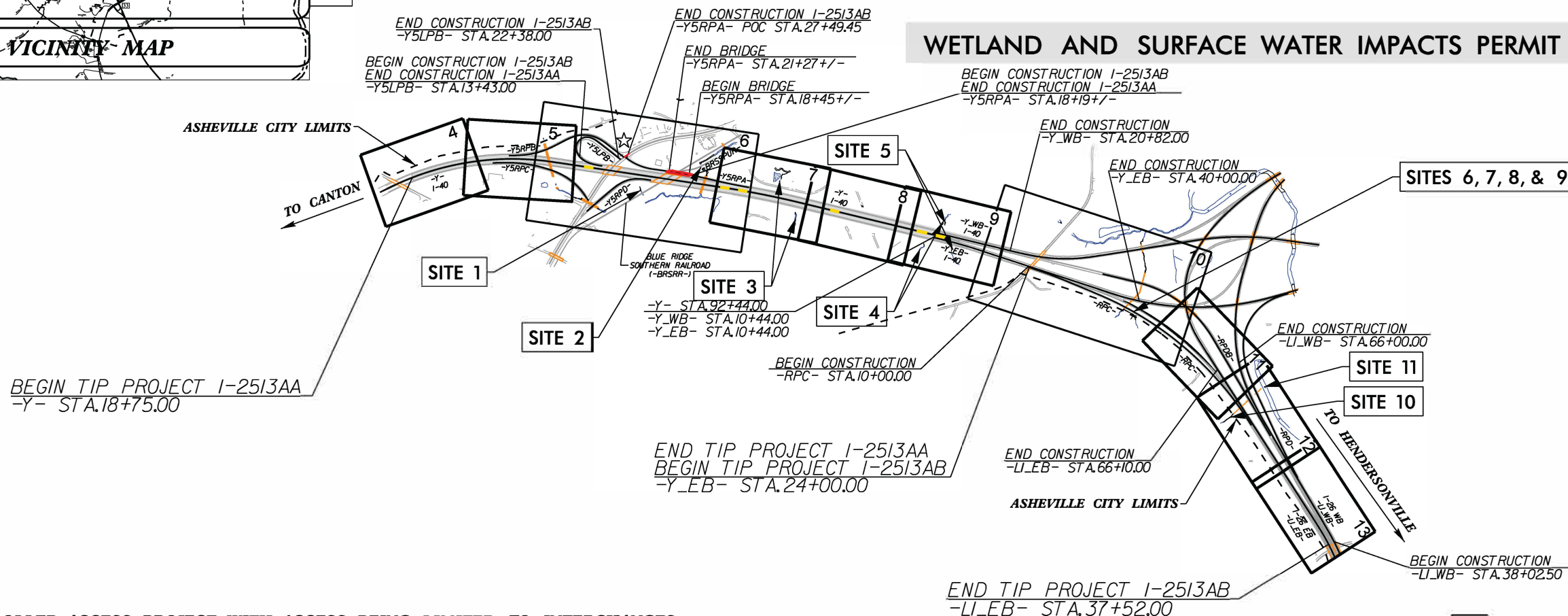
LOCATION: I-40 FROM EAST OF SR 1224 (MONTE VISTA RD) TO PAVEMENT
JOINT WEST OF SR 3412 (SAND HILL RD).
I-26 FROM POND ROAD BRIDGE TO I-26/I-40/I-240 INTERCHANGE.
INCLUDES INITIAL IMPROVEMENTS AT I-40EB TO I-26EB RAMP
AND US 1923 (SMOKEY PARK HIGHWAY)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES,
RETAINING WALLS, SOUND WALLS, AND ITS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2513AA/AB	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34165.1.1V34165.1.12	0026024 /0026025	P.E.	
34165.2.1434165.2.16	0026024 /0026025	R/W	
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34165.3.634165.3.7	0026024 /0026025	CONST.	

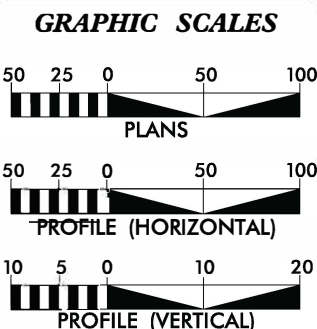
PERMIT DRAWING
SHEET 1 OF 26

WETLAND AND SURFACE WATER IMPACTS PERMIT



THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES
THIS PROJECT IS LOCATED WITHIN THE CITY LIMITS OF THE CITY OF ASHEVILLE
CLEARING ON THIS PROJECT WILL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III

CONTRACT:



DESIGN DATA	
ADT 2024 =	95,100
ADT 2040 =	118,800
K =	9 %
D =	55 %
T =	11 % *
V =	60 MPH
* TTST = 8% DUAL 3%	
FUNC CLASS = INTERSTATE	
STATEWIDE TIER	

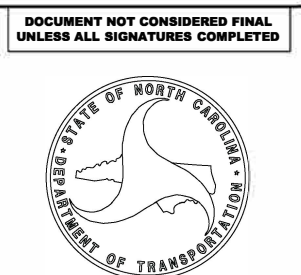
PROJECT LENGTH	
LENGTH ROADWAY TIP PROJECT I-2513AA/AB =	2.656 MI
TOTAL LENGTH TIP PROJECT I-2513AA/AB =	2.656 MI

 KCI ASSOCIATES OF N.C., P.A. 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609 Phone (919) 783-9214 NC Firm License No: C-0764	RIGHT OF WAY DATE: NOVEMBER 18, 2022
	LETTING DATE: NOVEMBER 21, 2023
CHARLES L. FLOWE, P.E. PROJECT ENGINEER	
BARRY C. SMITH, P.E. PROJECT DESIGN ENGINEER	
KEVIN E. MOORE, P.E. NCDOT CONTACT	

★ REVISED SIGNAL

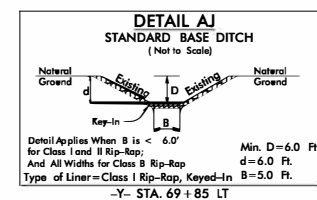
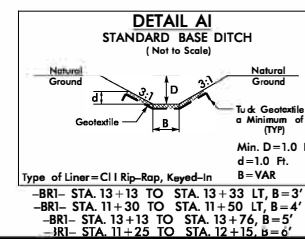
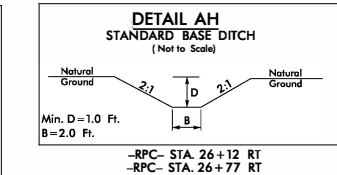
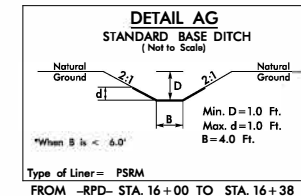
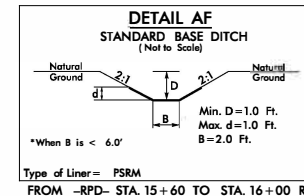
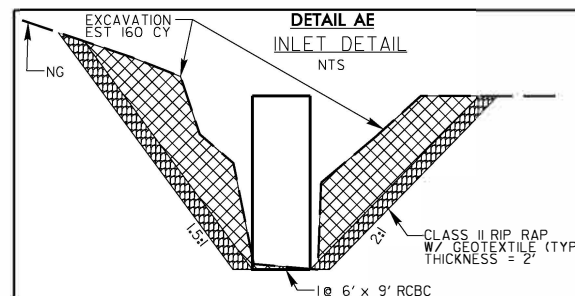
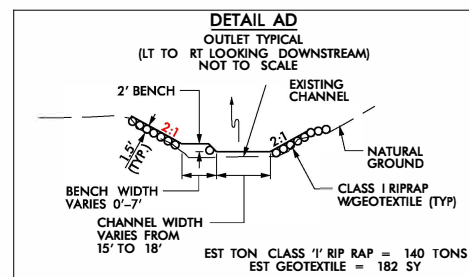
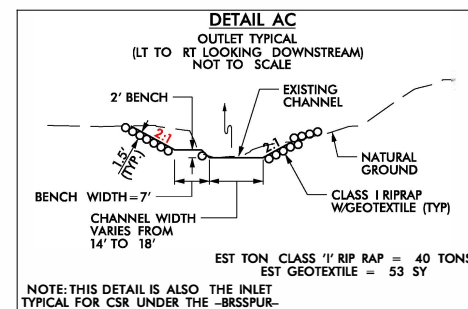
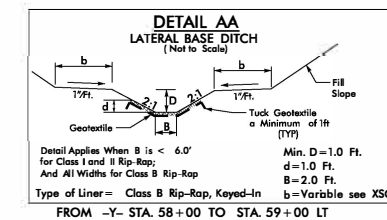
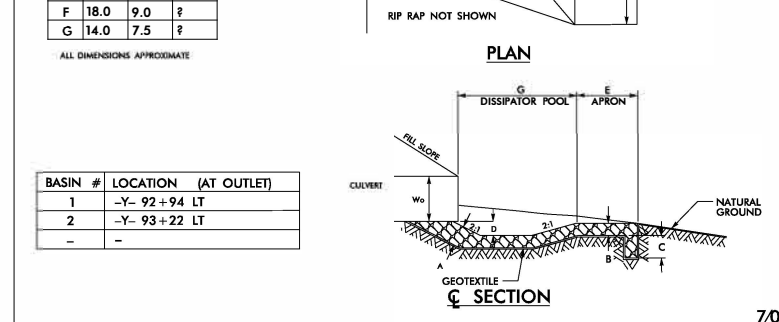
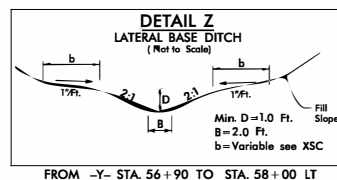
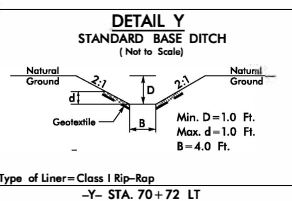
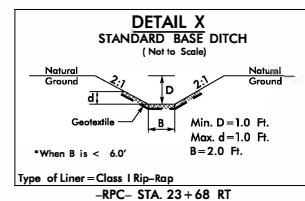
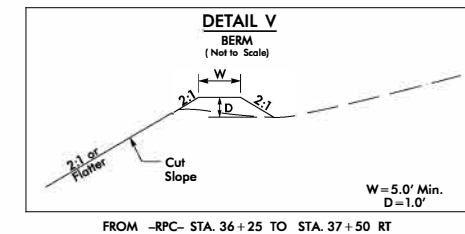
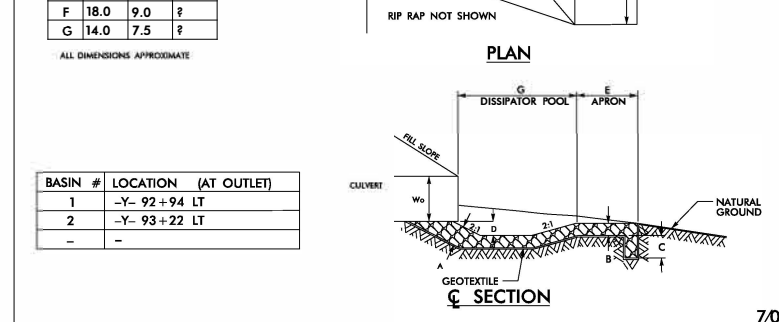
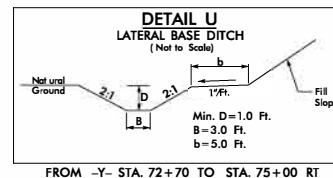
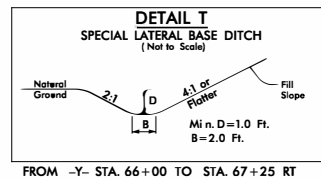
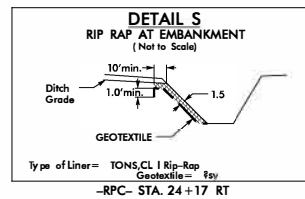
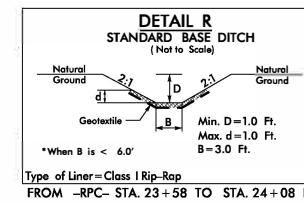
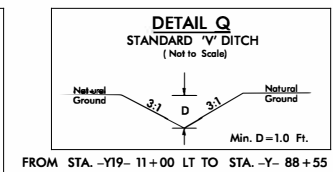
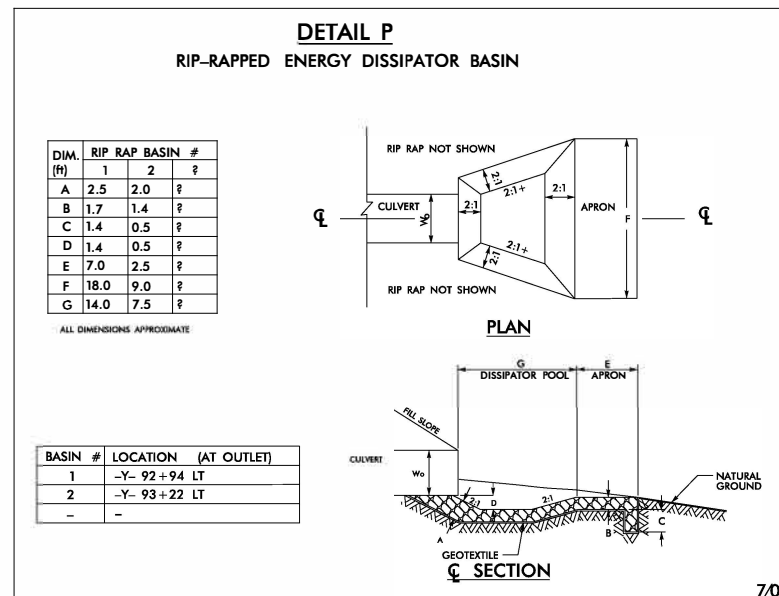
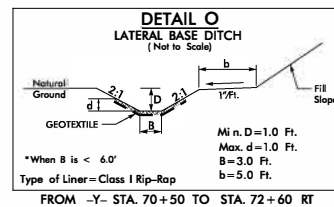
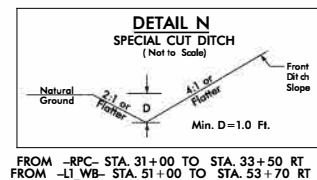
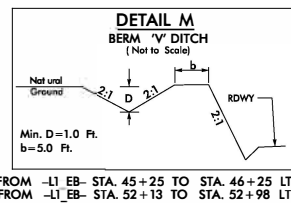
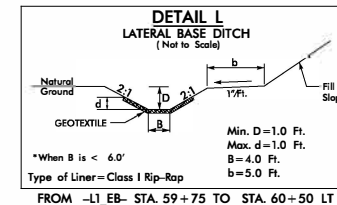
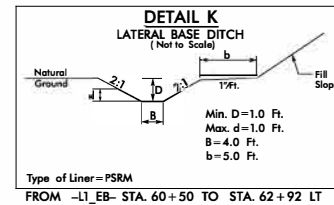
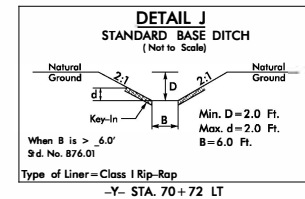
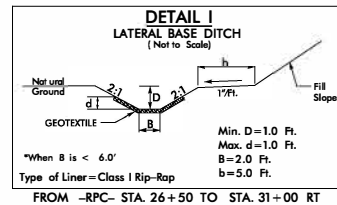
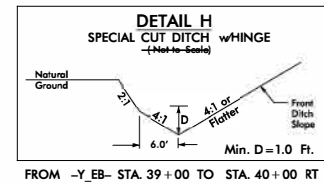
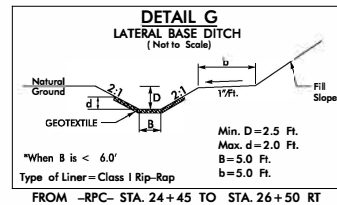
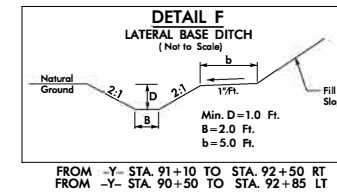
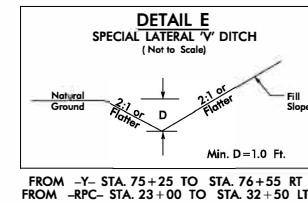
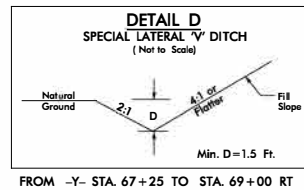
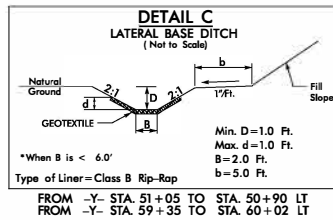
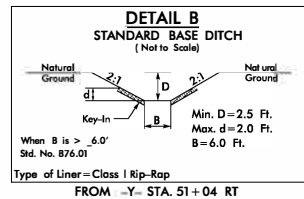
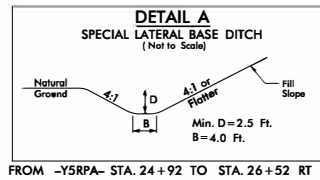
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ROADWAY DESIGN ENGINEER	
SIGNATURE: _____	P.E.

ETHERILL ENGINEERING
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107



PROJECT REFERENCE NO.		SHEET NO.	
I-2513AA/AB		2D-1	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED KCI KCI ASSOCIATES OF N.C., P.A. 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 783-9214 Fax (919) 783-9214 NC Firm License No. C-0764 WETHERILL ENGINEERING 1223 Jones Franklin Rd. Raleigh, N.C. 27606 License No. F-0377 Baz. 919 851 8077 Fax: 919 851 8107 TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION			

**PERMIT DRAWING
SHEET 2 OF 26**



FILTRATION BASIN DETAILS (BASIN 2A)

WETHERILL
ENGINEERING

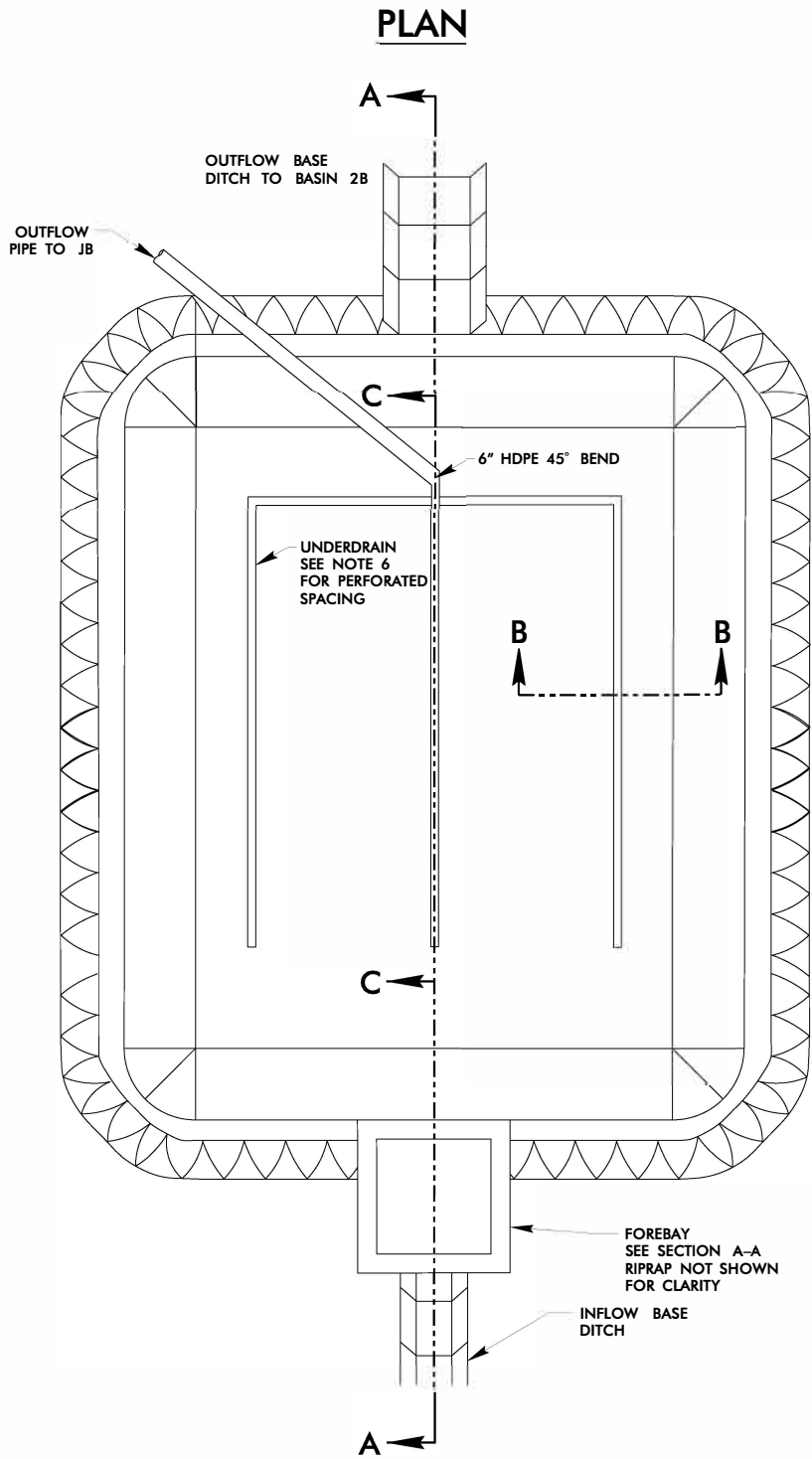
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CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

1223 Jones Franklin Road
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

PROJECT REFERENCE NO.
1-2513 AA/AB
SHEET NO.
2D-7
RW SHEET NO.
HYDRAULICS
ENGINEER

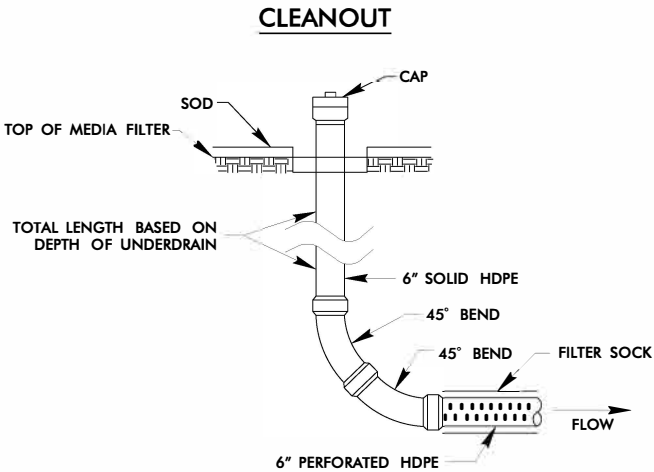
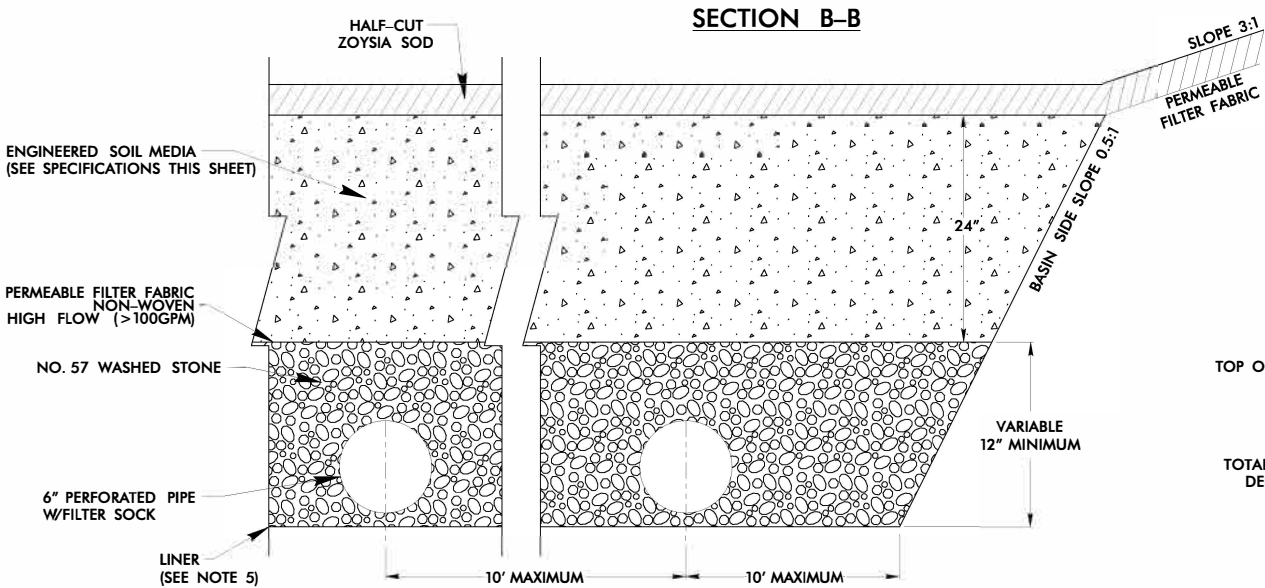
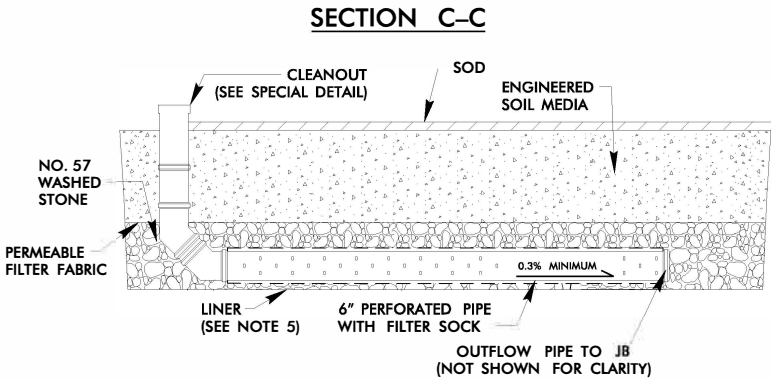
PERMIT DRAWING
SHEET 2A OF 26

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

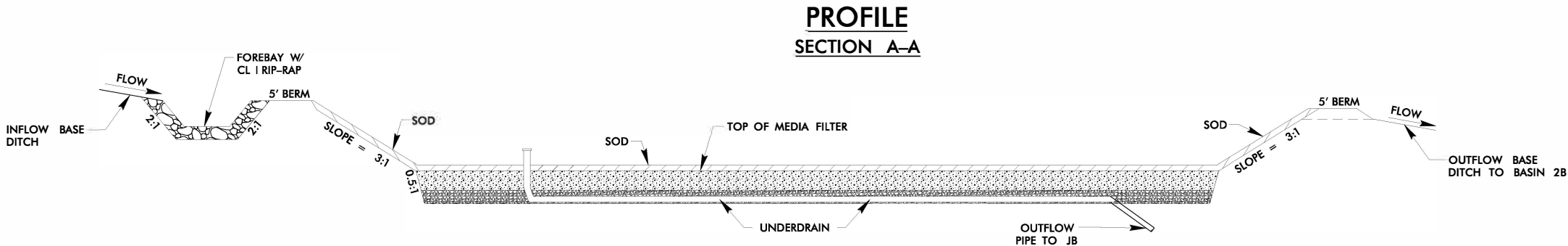


- NOTES
1. THE 6-INCH UNDERDRAIN IS THE PRIMARY DRAWDOWN DEVICE.
 4. UNDERDRAIN PIPES SHOULD BE PLACED A MAXIMUM OF 10 FEET FROM THE EDGE OF THE BASIN AND MUST HAVE A MAXIMUM OF 10 FEET BETWEEN THE PERFORATED UNDERDRAIN PIPES.
 5. UNDERDRAIN SHOULD BE BEDDED ON A THIN LAYER OF NO.57 WASHED STONE AND BACKFILLED TO A TOTAL MINIMUM STONE DEPTH OF 12 INCHES.
 6. UNDERDRAIN PERFORATED PIPE HOLES ARE 3/8 INCH IN DIAMETER AND LONGITUDINALLY SPACED 6 INCHES ON CENTER ALONG 4 ROWS.
 7. TOP OF MEDIA FILTER MUST BE LEVEL.

- SPECIFICATIONS
- ENGINEERED SOIL MEDIA SHALL CONSIST OF:
- (1) HOMOGENOUS SOIL MIX OF 85-88 PERCENT BY WEIGHT SAND (USDA SOIL TEXTURAL CLASSIFICATION), 8 TO 12 PERCENT FINES (SILT AND CLAY), AND 2 TO 5 PERCENT ORGANIC MATTER (ORGANIC MATTER SHALL BE LEAF OR BARK COMPOST, OR SIMILAR, AND SHALL NOT BE ANIMAL MANURE).
 - (2) P-INDEX BETWEEN 10 AND 30
 - (3) PH VALUE BETWEEN 5.5 - 7.5
 - (4) PERMEABILITY BETWEEN 1 AND 2 INCHES/HOUR MINIMUM
 - (5) BE UNIFORM AND FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR MATERIAL GREATER THAN 2 INCHES



- CLEANOUT NOTES:
1. ONLY UNDERDRAIN PIPE THAT IS LOCATED BENEATH ENGINEERED SOIL MEDIA SHOULD BE PERFORATED.
 2. PROVIDE THREADED SCREW CAP.



NOT TO SCALE

FILTRATION BASIN DETAILS (BASIN 2B)

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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

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PROJECT REFERENCE NO.
1-2513 AA/AB
SHEET NO.
2D-8
RW SHEET NO.
HYDRAULICS
ENGINEER

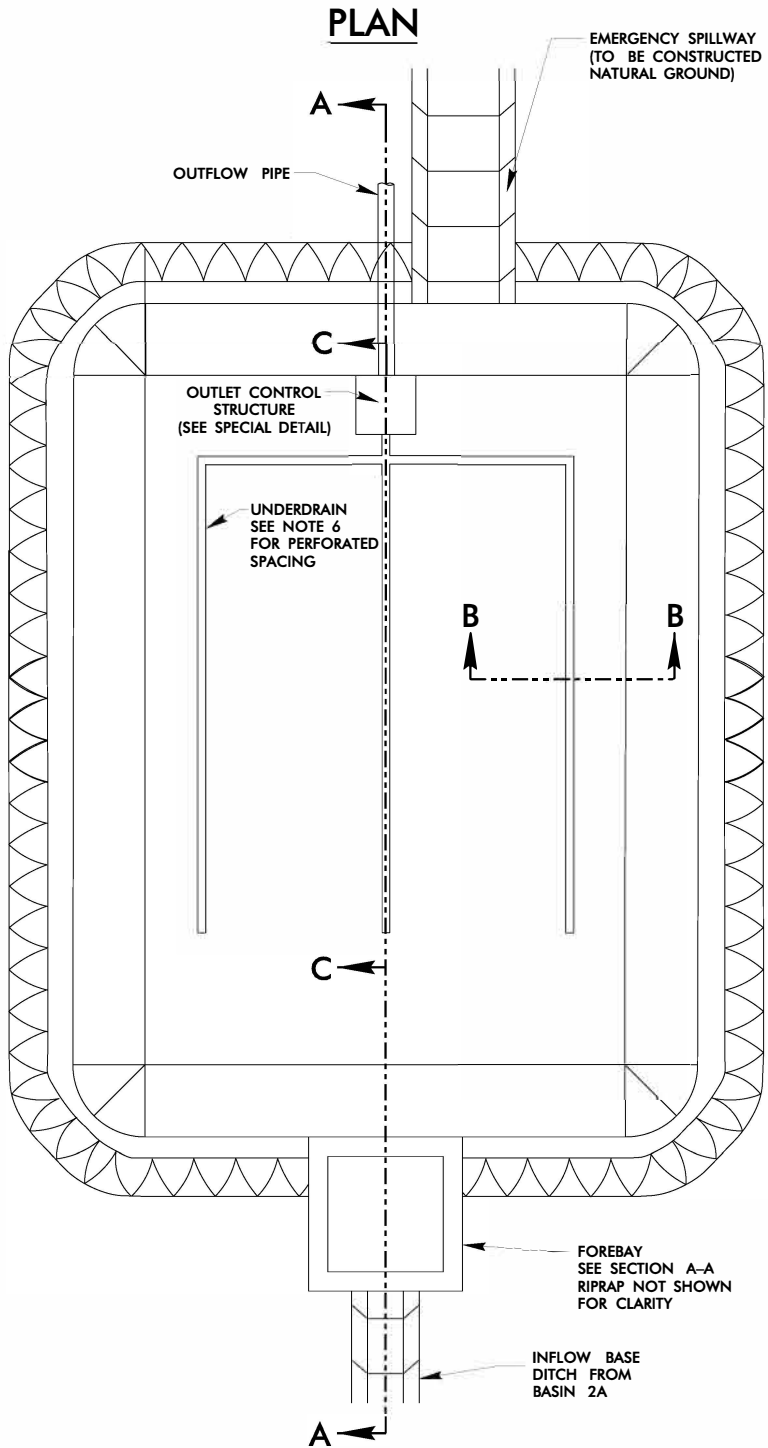
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PROJECT REFERENCE NO.
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2D-8
RW SHEET NO.
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ENGINEER

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PERMIT DRAWING
SHEET 2B OF 26

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NOTES

1. AN EMERGENCY SPILLWAY SHOULD BE INCORPORATED WHERE SITE PERMITS.
2. AN ACCESS BERM SHOULD BE PROVIDED FOR MAINTENANCE.
3. THE 6-INCH UNDERDRAIN IS THE PRIMARY DRAWDOWN DEVICE.
4. UNDERDRAIN PIPES SHOULD BE PLACED A MAXIMUM OF 10 FEET FROM THE EDGE OF THE BASIN AND MUST HAVE A MAXIMUM OF 10 FEET BETWEEN THE PERFORATED UNDERDRAIN PIPES.
5. UNDERDRAIN SHOULD BE BEDDED ON A THIN LAYER OF NO.57 WASHED STONE AND BACKFILLED TO A TOTAL MINIMUM STONE DEPTH OF 12 INCHES.
6. UNDERDRAIN PERFORATED PIPE HOLES ARE 3/8 INCH IN DIAMETER AND LONGITUDINALLY SPACED 6 INCHES ON CENTER ALONG 4 ROWS.
7. TOP OF MEDIA FILTER MUST BE LEVEL.

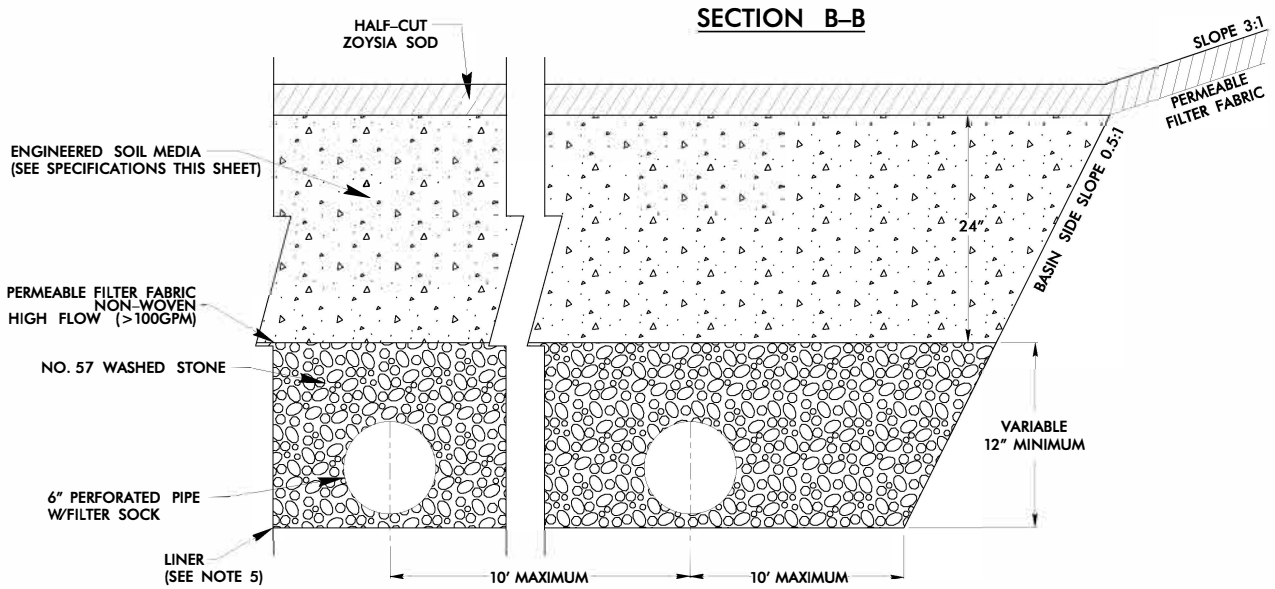
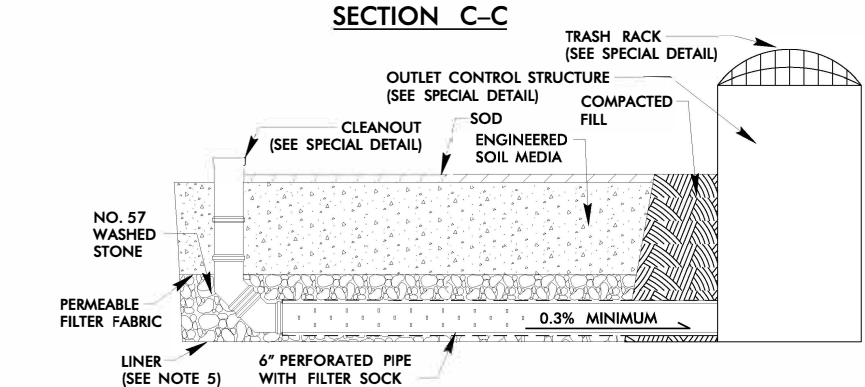
REFERENCED SPECIAL DETAILS

FOR "OUTLET CONTROL STRUCTURE DETAILS" SEE SHEET 2D-8
FOR "TRASH RACKS DETAIL" SEE SHEET 2D-9

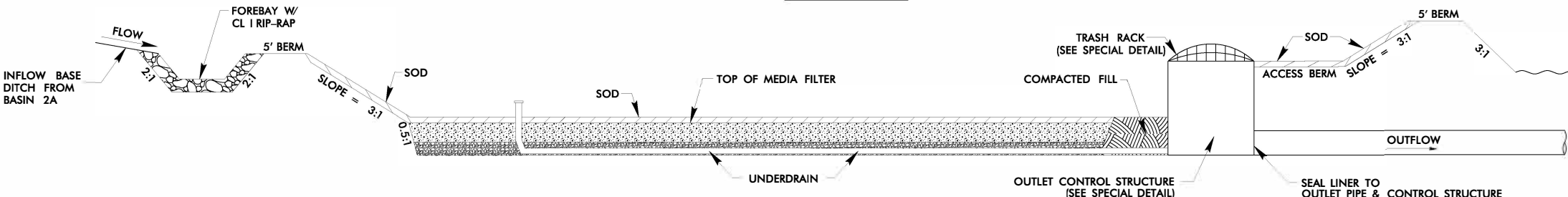
SPECIFICATIONS

ENGINEERED SOIL MEDIA SHALL CONSIST OF:

- (1) HOMOGENOUS SOIL MIX OF 85-88 PERCENT BY WEIGHT SAND (USDA SOIL TEXTURAL CLASSIFICATION), 8 TO 12 PERCENT FINES (SILT AND CLAY), AND 2 TO 5 PERCENT ORGANIC MATTER (ORGANIC MATTER SHALL BE LEAF OR BARK COMPOST, OR SIMILAR, AND SHALL NOT BE ANIMAL MANURE).
- (2) P-INDEX BETWEEN 10 AND 30
- (3) PH VALUE BETWEEN 5.5 - 7.5
- (4) PERMEABILITY BETWEEN 1 AND 2 INCHES/HOUR MINIMUM
- (5) BE UNIFORM AND FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR MATERIAL GREATER THAN 2 INCHES



PROFILE
SECTION A-A



NOT TO SCALE

3/12/2023
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USER: mbarber

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3/12/2023
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USER: mbarve

OUTLET CONTROL STRUCTURE DETAILS



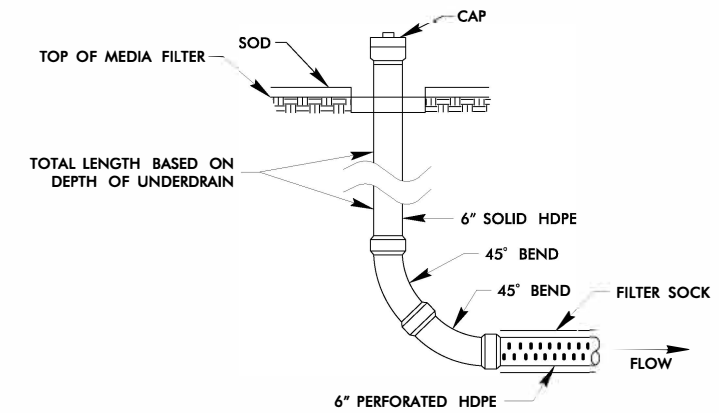
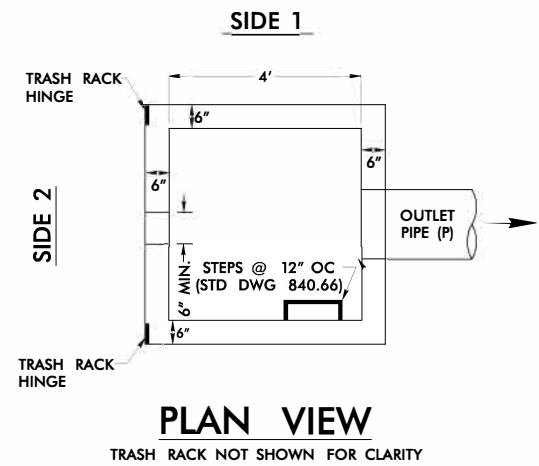
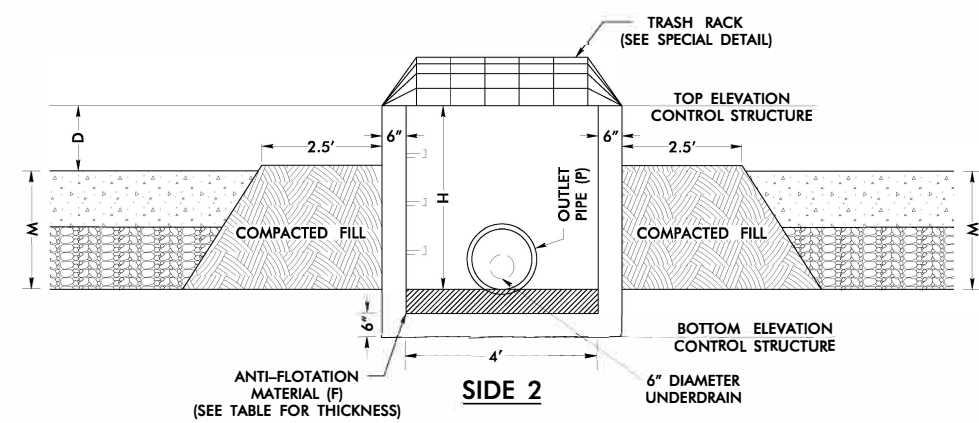
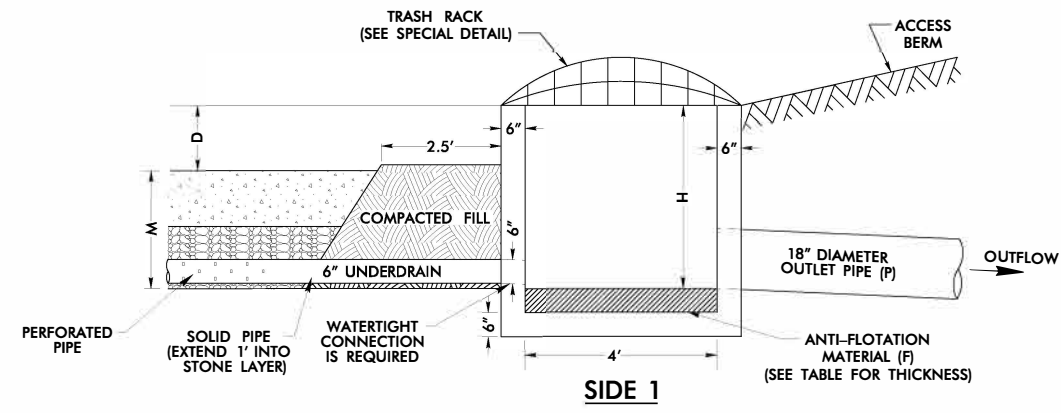
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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
ONIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO.	SHEET NO.
1-2513 AA/AB	2D-9
RW SHEET NO.	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

PERMIT DRAWING
SHEET 2C OF 26



- CLEANOUT NOTES:
1. ONLY UNDERDRAIN PIPE THAT IS LOCATED BENEATH ENGINEERED SOIL MEDIA SHOULD BE PERFORATED.
 2. PROVIDE THREADED SCREW CAP.

CLEANOUT

DIMENSIONS

D = PONDING DEPTH
M = MEDIA FILTER + AGGREGATE THICKNESS
F = ANTI-FLOTATION MATERIAL THICKNESS
SLAB THICKNESS IS 0.5'
MINIMUM H = D + M

NOTES

1. BEDDING MATERIAL SHALL NOT TO BE USED. DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.
2. ANTI-FLOTATION MATERIAL IS REQUIRED AND SHALL BE CONCRETE.

REFERENCED SPECIAL DETAILS

FOR "FILTRATION BASIN DETAILS (BASIN 2B)" SEE SHEET 2D-8
FOR "TRASH RACKS DETAIL" SEE SHEET 2D-10

MINIMUM DIMENSIONS FOR MEDIA FILTER BASIN DRAWDOWN STRUCTURES											
BASIN	STATION	STRUCTURE NUMBER	TOP ELEVATION MEDIA FILTER	TOP ELEVATION CONTROL STRUCTURE	BASIN DEPTH (D)	MEDIA FILTER + AGGREGATE DEPTH (M)	ANTI-FLOTATION MATERIAL (F) THICKNESS	BOTTOM ELEVATION CONTROL STRUCTURE	DIMENSIONS CONTROL STRUCTURE (W x L x H)	DIAMETER OUTLET PIPE (P) (SEE NOTE 5)	INVERT ELEVATION OUTLET PIPE (P)
2B	-L- 348 + 38 (RT)	1096	2032.00	2033.50	2.0'	3.0'	1.1'	2027.4	4' x 4' x 4.5'	18"	2029.25

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TRASH RACKS DETAIL



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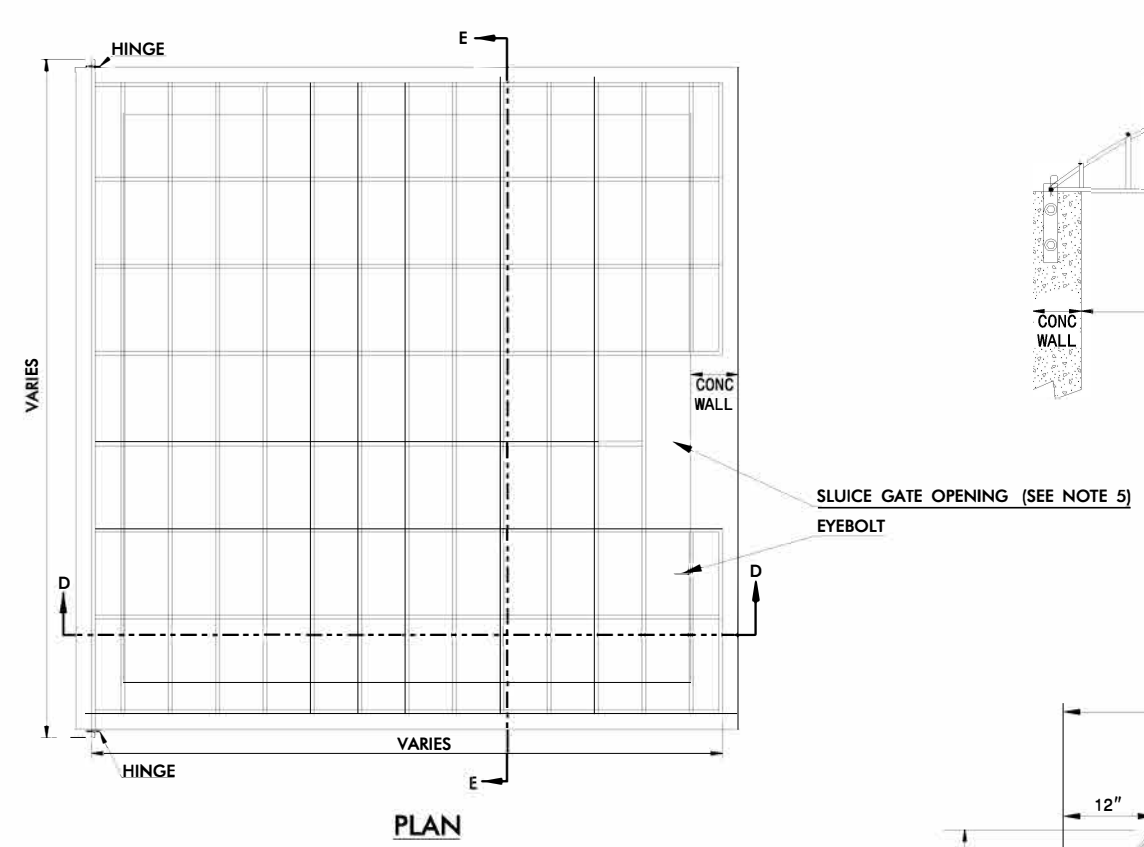
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO.	SHEET NO.
1-2513 AA/AB	2D-10
RW SHEET NO.	
HYDRAULICS ENGINEER	

PERMIT DRAWING
SHEET 2D OF 26

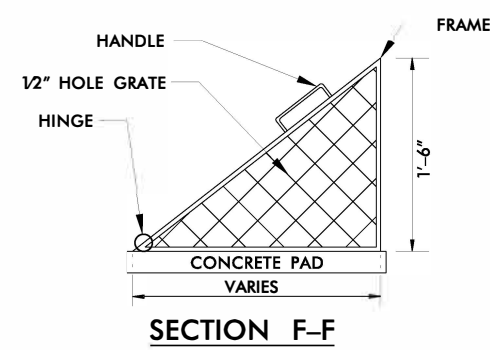
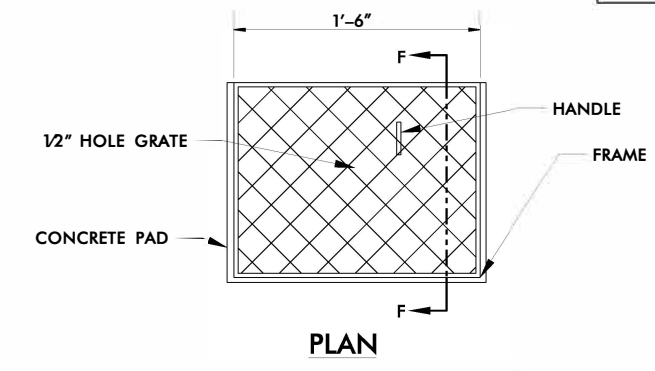
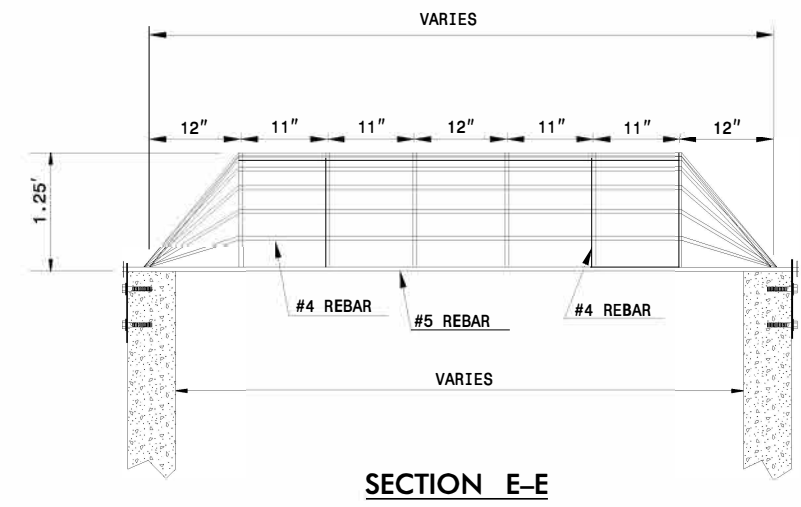
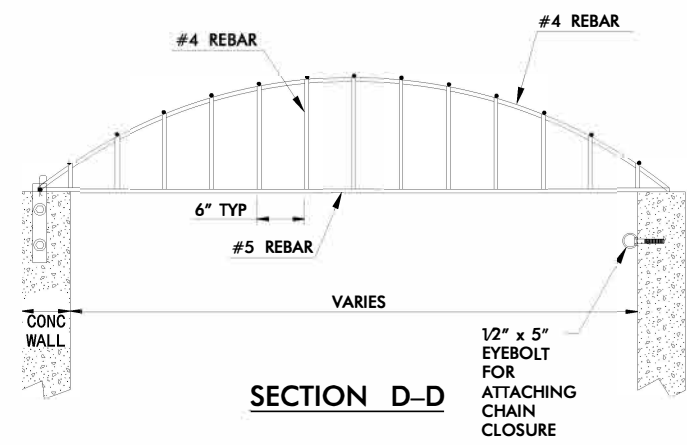
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NOT TO SCALE



- RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
 2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
 3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
 4. RACK AND HARDWARE SHALL BE REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.
 5. PROVIDE OPENING IN TRASH RACK TO ACCOMODATE SLUICE GATE ON THE OUTLET PIPE.

REBAR TRASH RACK



- ORIFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
 2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
 3. REMOVEABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
 4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM A-153.

REMOVEABLE ORIFICE TRASH RACK

MEDIA FILTRATION BASIN PLAN & PROFILE ALIGNMENT -BR1-



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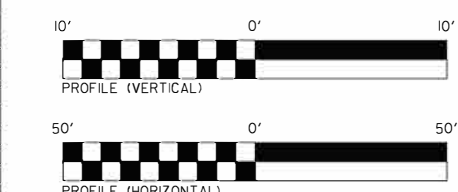
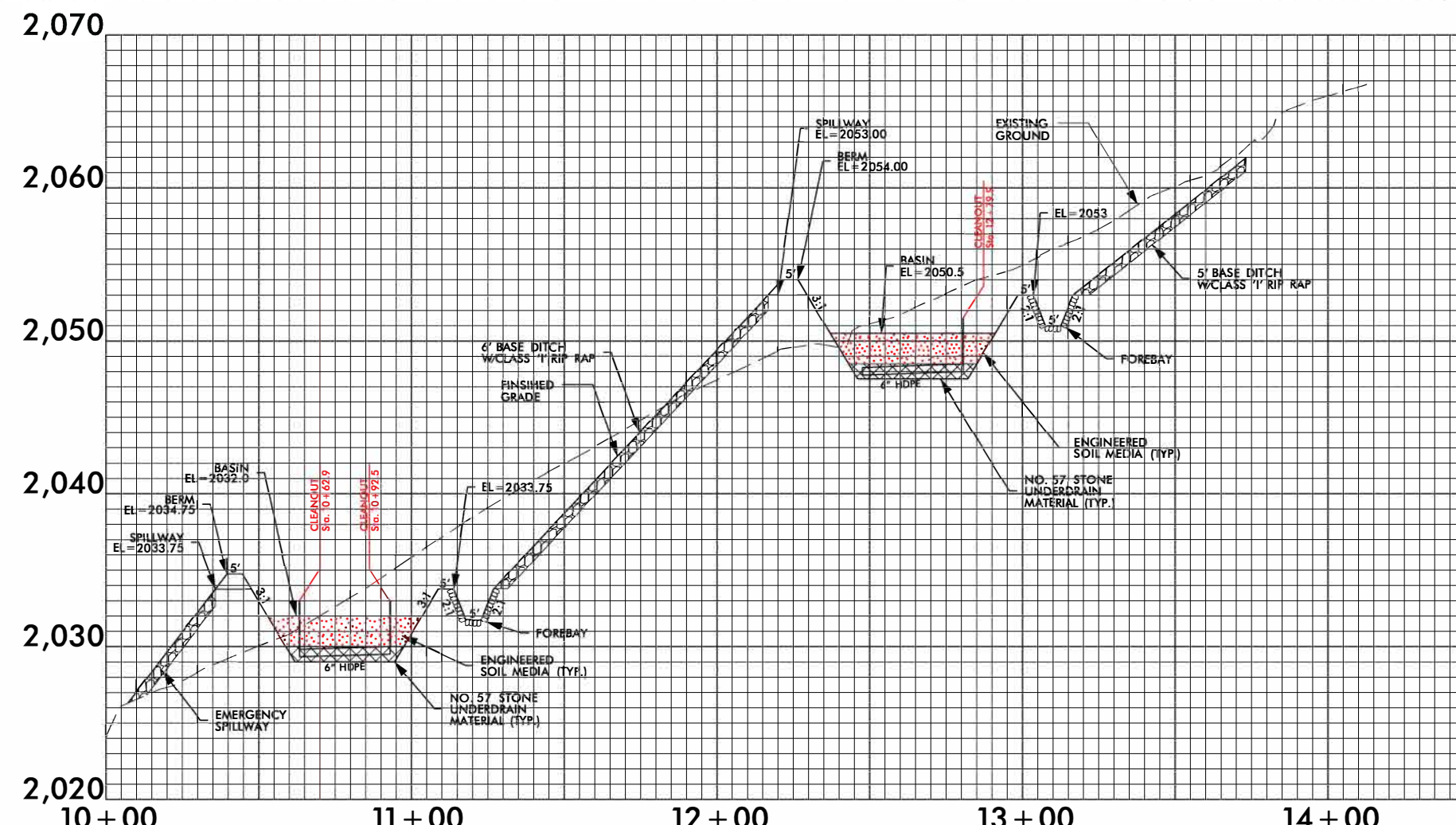
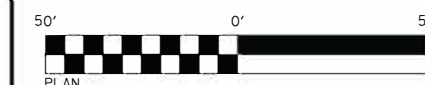
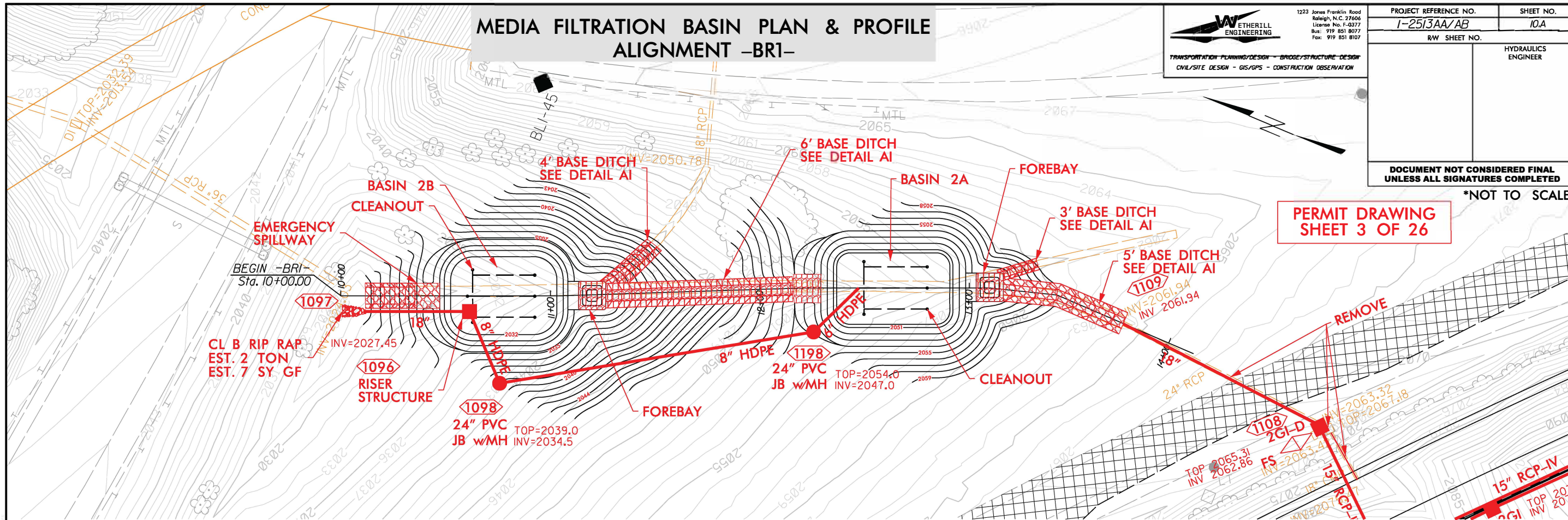
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO.	SHEET NO.
1-2513AA/AB	10.A
RW SHEET NO.	
HYDRAULICS ENGINEER	

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PERMIT DRAWING
SHEET 3 OF 26



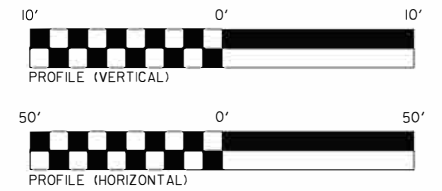
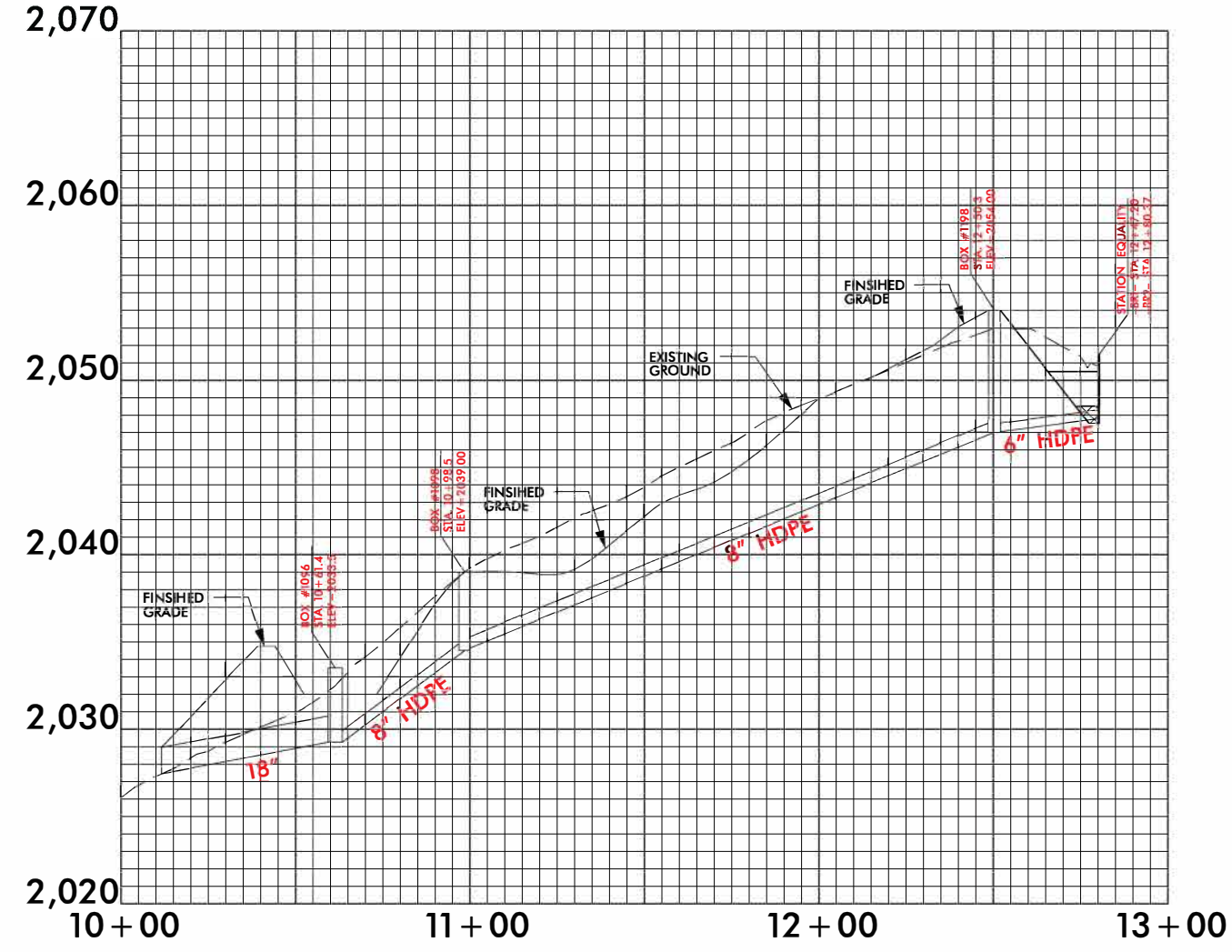
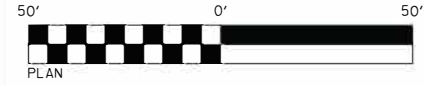
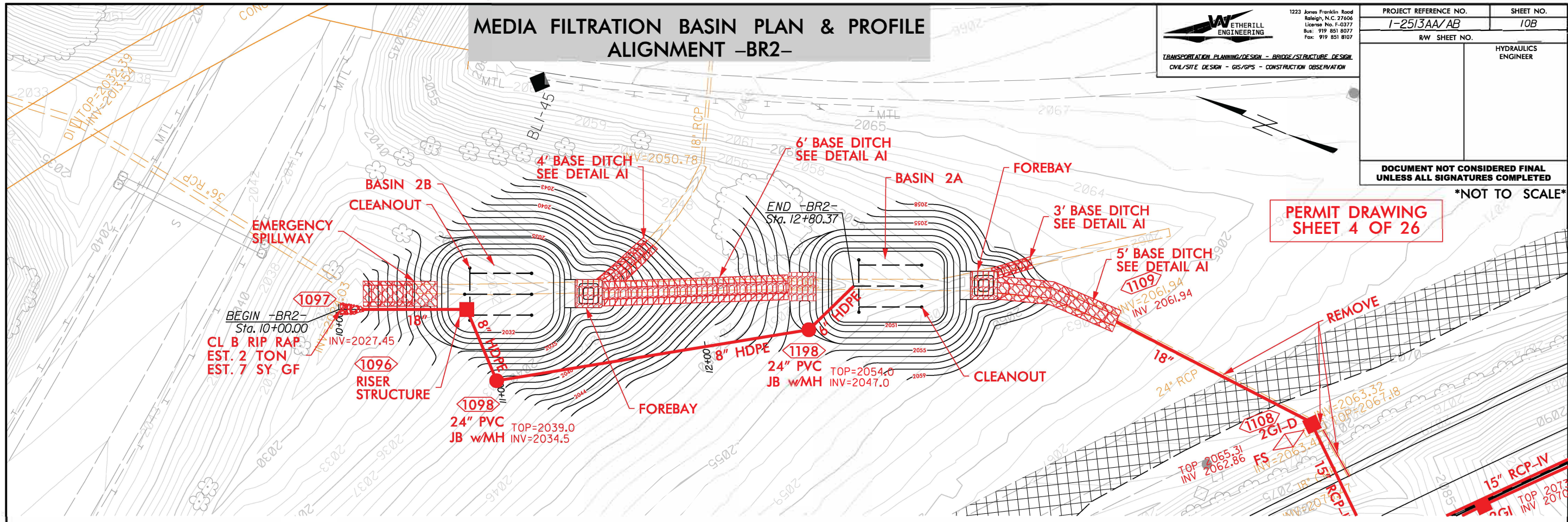
MEDIA FILTRATION BASIN PLAN & PROFILE ALIGNMENT -BR2-

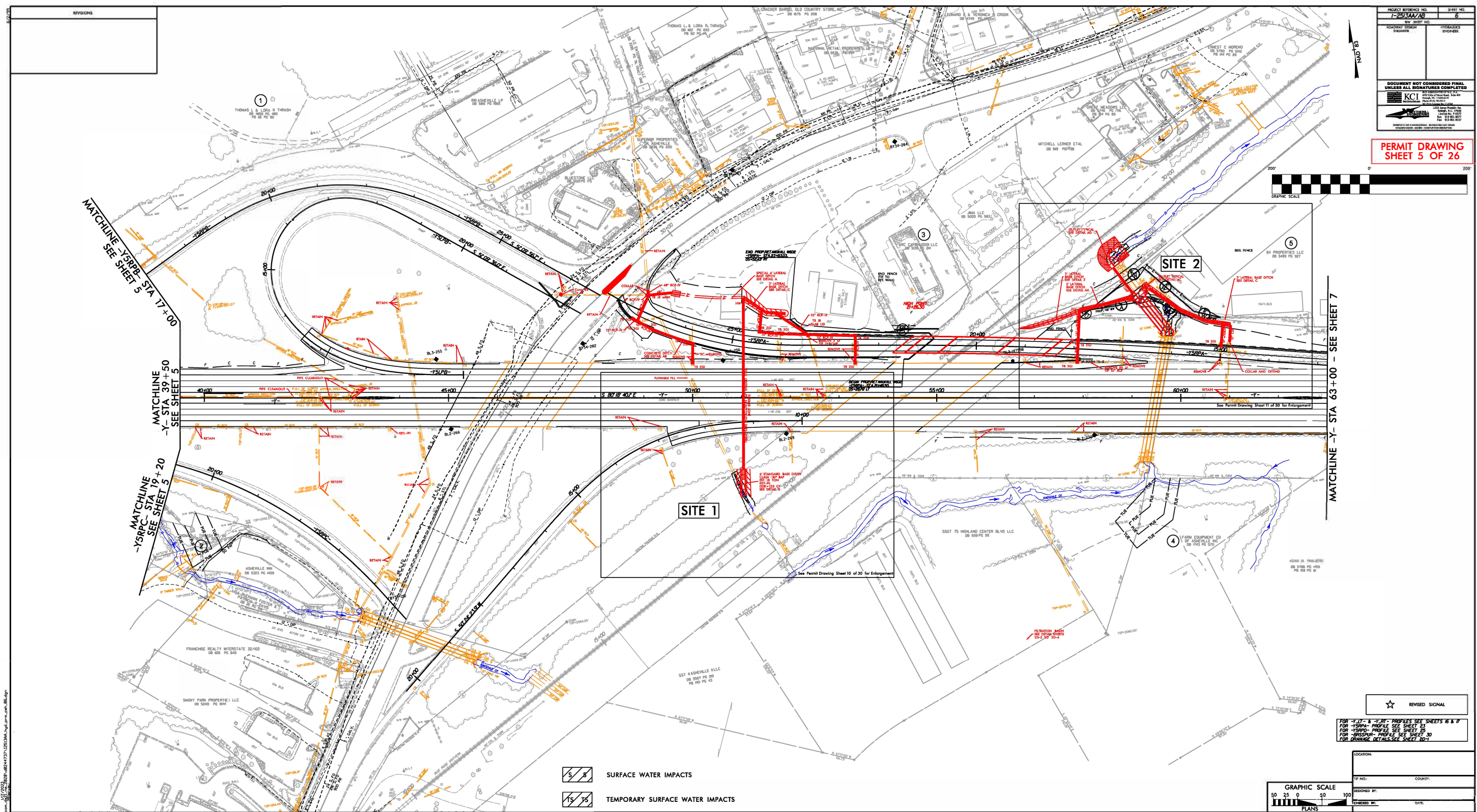
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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO.	SHEET NO.
1-2513AA/AB	10B
RW SHEET NO.	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

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PERMIT DRAWING
SHEET 4 OF 26

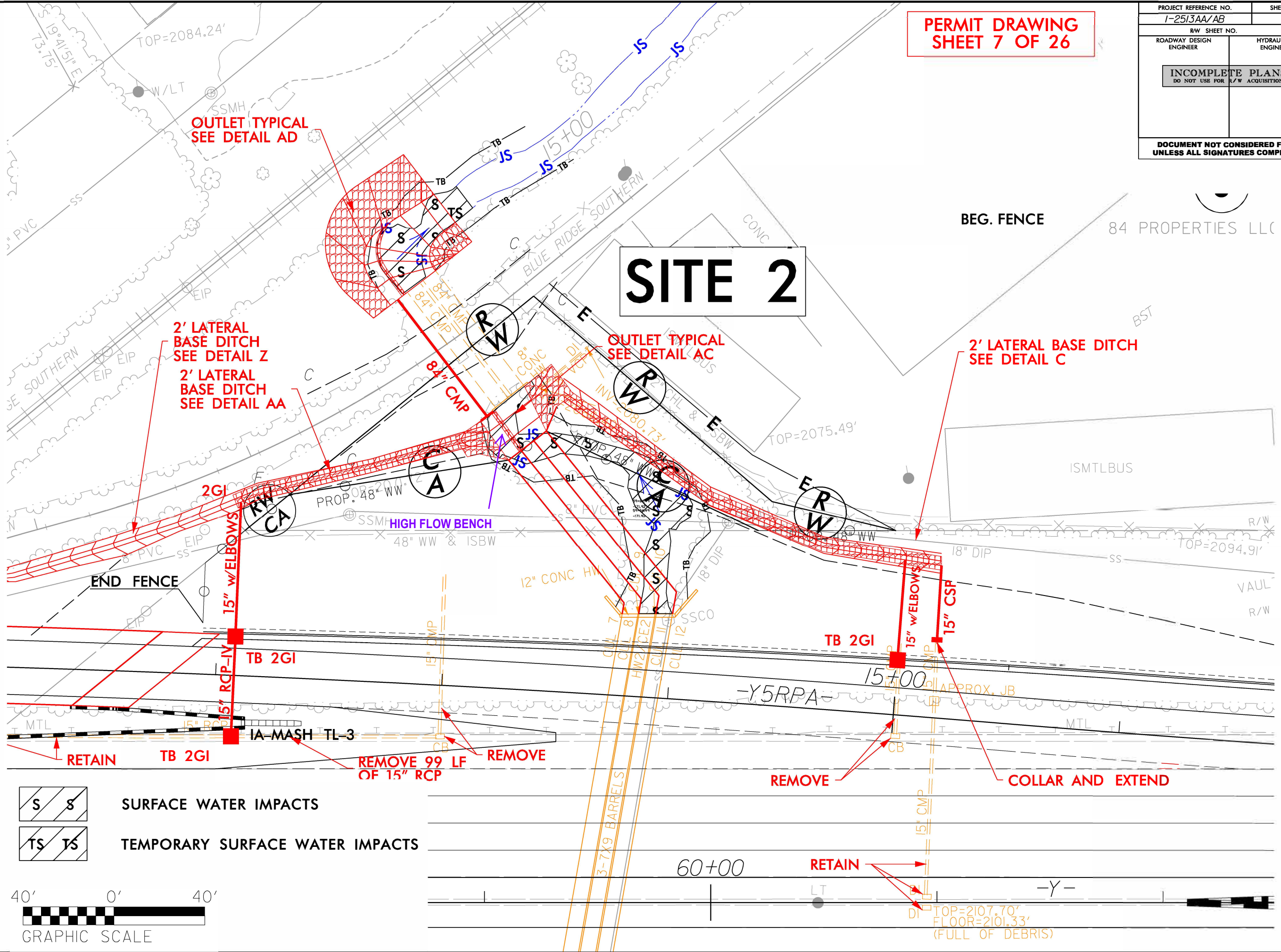




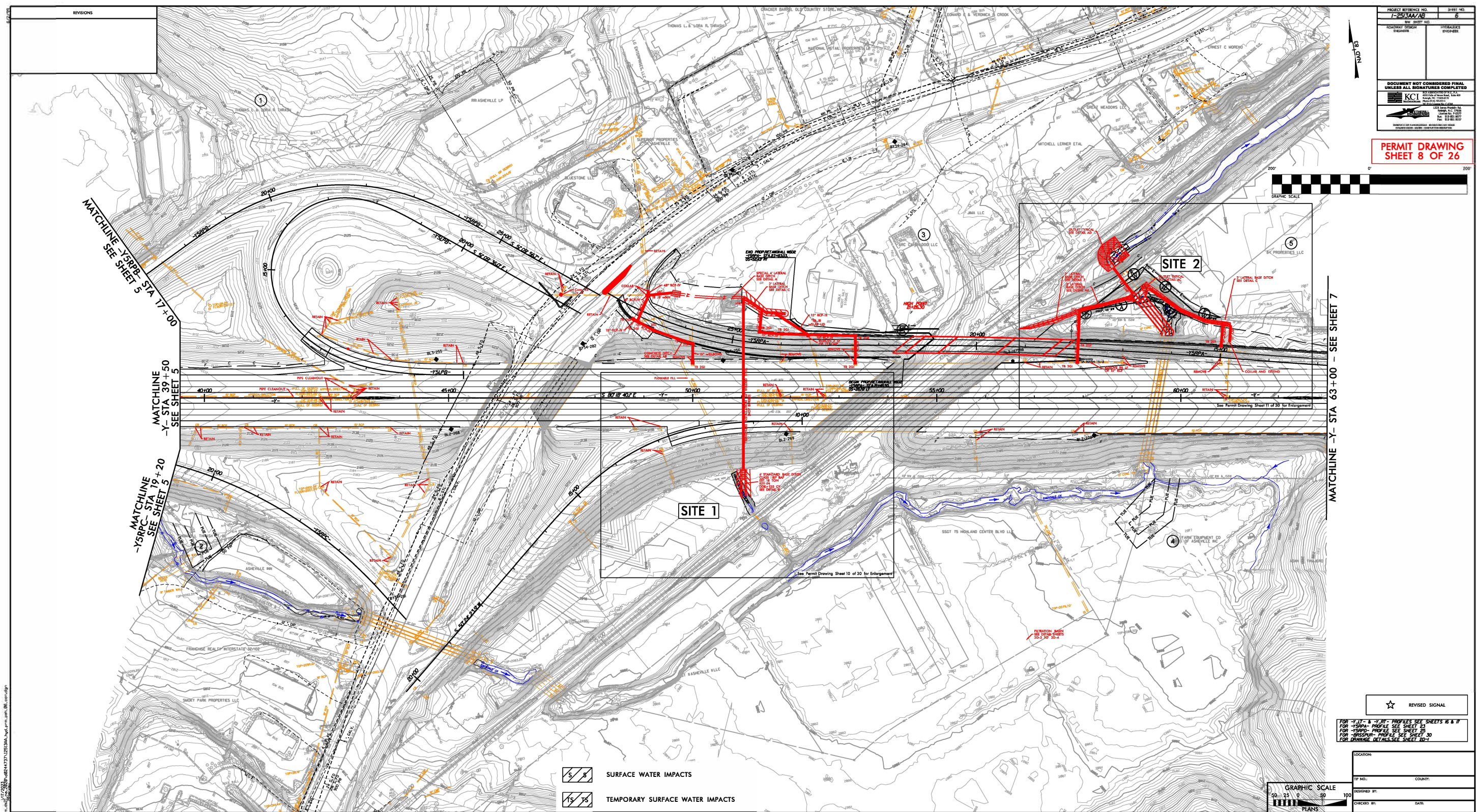
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1/17/2023
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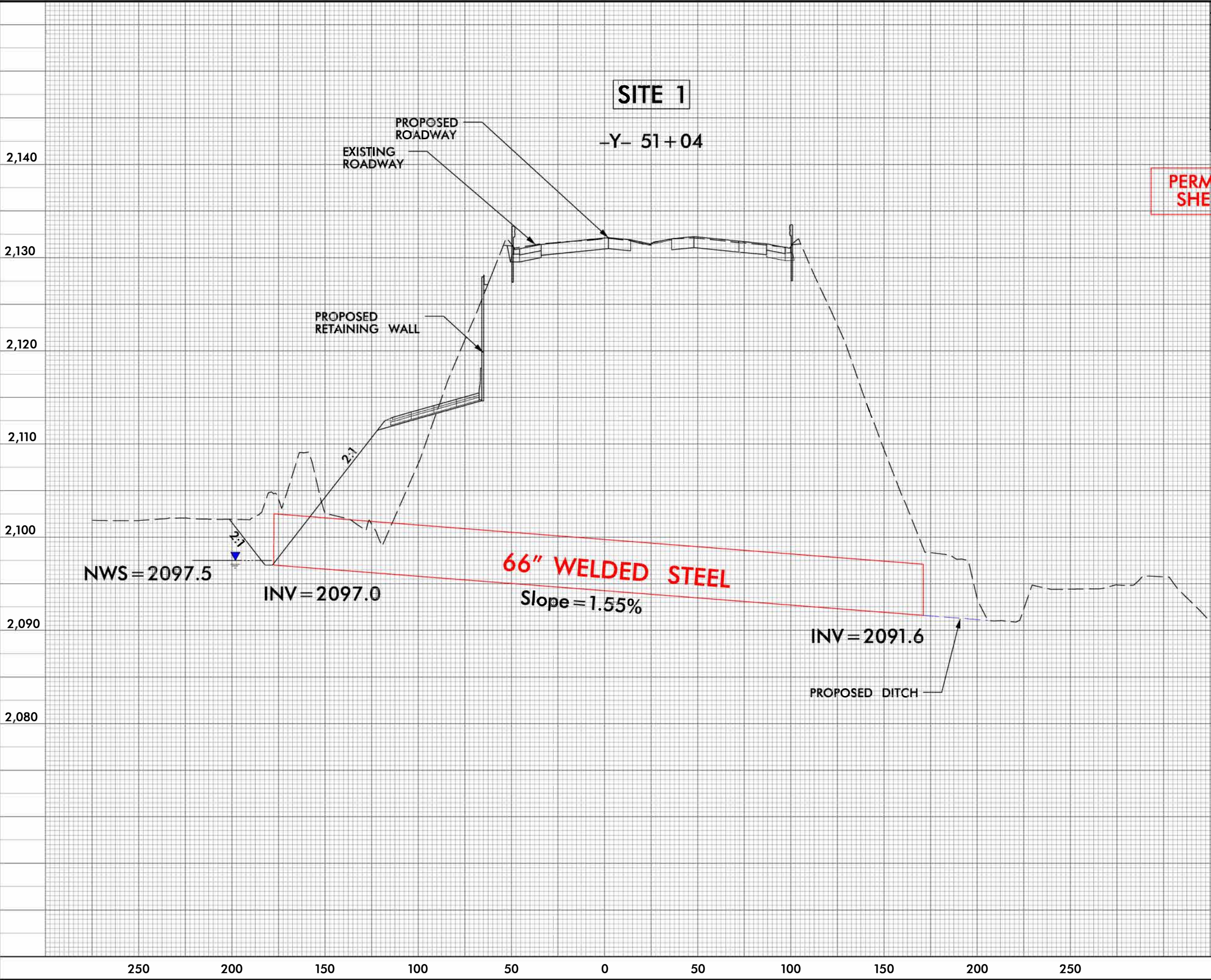
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1-2513AA/AB	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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1-2513AA/AB	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

SITE 2

PERMIT DRAWING
SHEET 10 OF 26

Q STA. 59+50 -Y-
SKEW: 99°55'
-YLT- ELEV = 2111.85'
-YRT- ELEV = 2111.97'
EXTEND EXISTING CULVERT
3 @ 7' X 9' RCBC

Q STA. 13+94 -BRSSPUR-
SKEW: 87°55'
ELEV = 2084.7'
SUPPLEMENT EXISTING
2 @ 84" CMP (WITH HEADWALL)
WITH AN ADDITIONAL
84" WELDED STEEL PIPE
W/HEADWALL AND SILLS

2,130

2,120

2,110

2,100

2,090

2,080

2,070

2,060

2,050

EXISTING
ROADWAY

PROPOSED
ROADWAY

PROPOSED
NOISE WALL

3:11:1 (2:1 NORMAL)

NWS ELEV = 2068.5'
WATER SURFACE
DATE OF SURVEY
EL. = 2067.7 (6/09/22)

SLOPE = 0.6%

PROPOSED
SLOPE = 0.6%

EXISTING SLOPE = 0.6%

EXISTING RCBC
INVERT = 2066.9'

EXISTING
STREAM BED

Q ELEV = 2063.9'

EXISTING RCBC
INVERT = 2065.2'

EXISTING RCBC
INVERT = 2066.0'

EXISTING 2@84" CMP
SUPPLEMENT WITH
ADDITIONAL 84" CMP

EXTEND EXISTING
3' X 7' X 9' RCBC
AT OUTLET

400

350

300

250

200

150

100

50

0

50

100

150

200

250

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100' 0' 100'

GRAPHIC SCALE

6



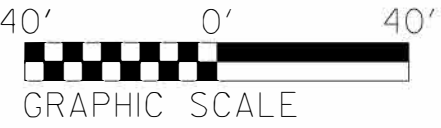
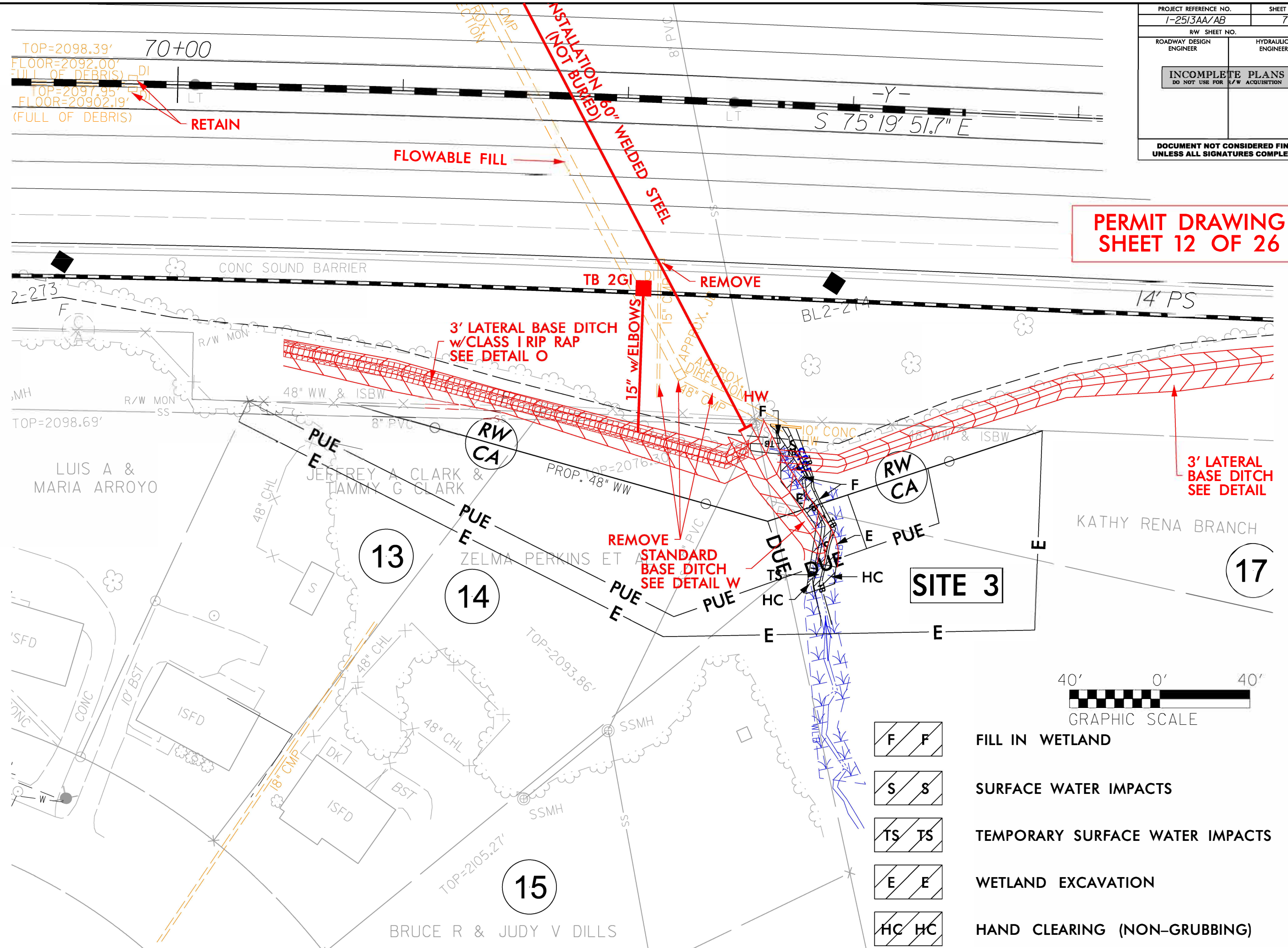
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FOR -Y_LT- & -Y_RT- PROFILES SEE SHEET 18
FOR -Y5RPA- PROFILE SEE SHEET 23
FOR DRAINAGE DETAILS, SEE SHEET 2D-1



MATCHLINE -Y- STA 75+00 - SEE SHEET 8

PERMIT DRAWING
SHEET 12 OF 26



- | | |
|--|---------------------------------|
| | FILL IN WETLAND |
| | SURFACE WATER IMPACTS |
| | TEMPORARY SURFACE WATER IMPACTS |
| | WETLAND EXCAVATION |
| | HAND CLEARING (NON-GRUBBING) |

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100' 0' 100'

GRAPHIC SCALE

NAD 83

MATCHLINE -Y- STA 75+00 - SEE SHEET 8

FOR -Y_LT- & -Y_RT- PROFILES SEE SHEET 18
FOR -Y5RPA- PROFILE SEE SHEET 23
FOR DRAINAGE DETAILS, SEE SHEET 2D-1

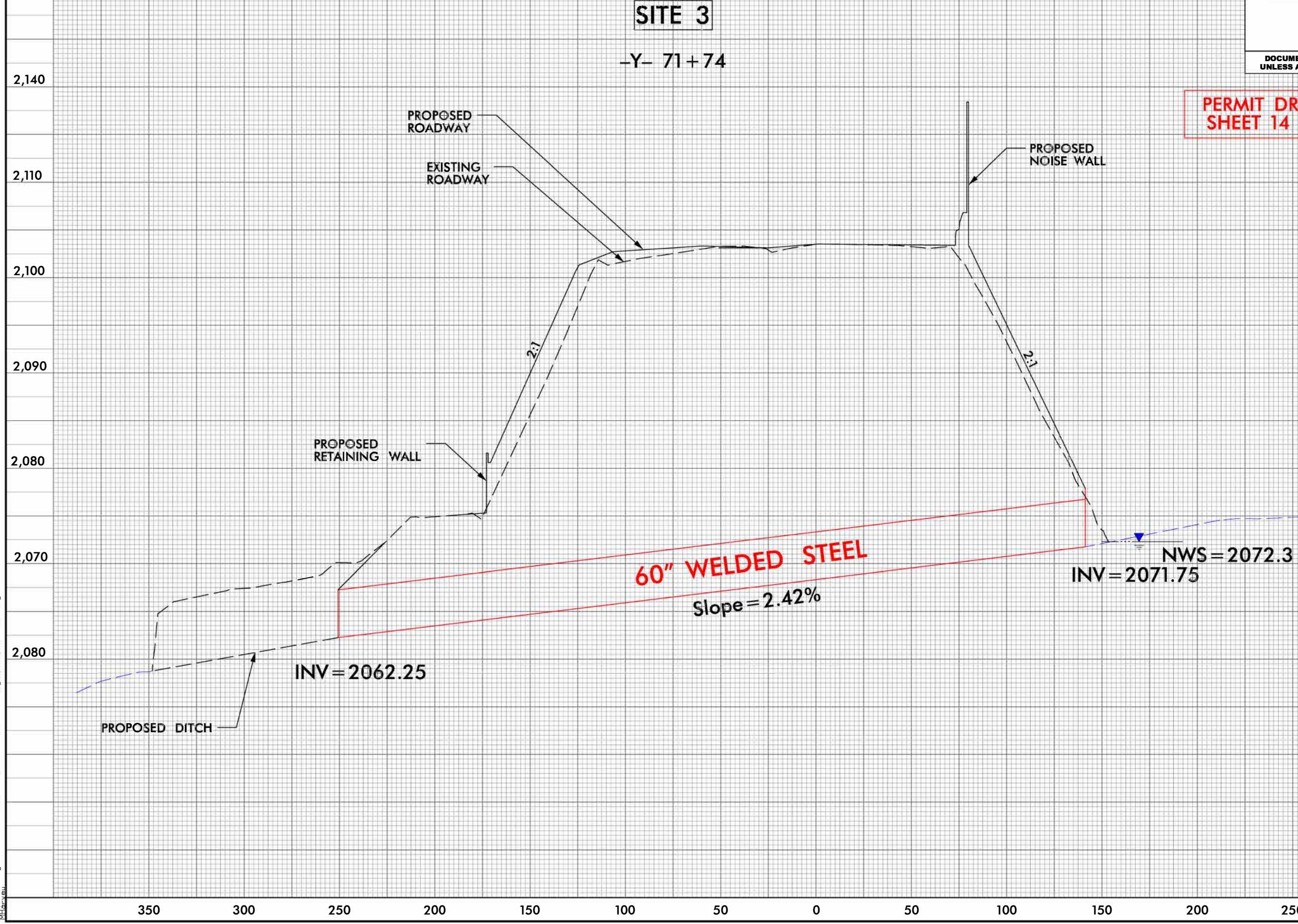
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PROJECT REFERENCE NO.	SHEET NO.
1-2513AA/AB	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/CW ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



**PERMIT DRAWING
SHEET 14 OF 26**

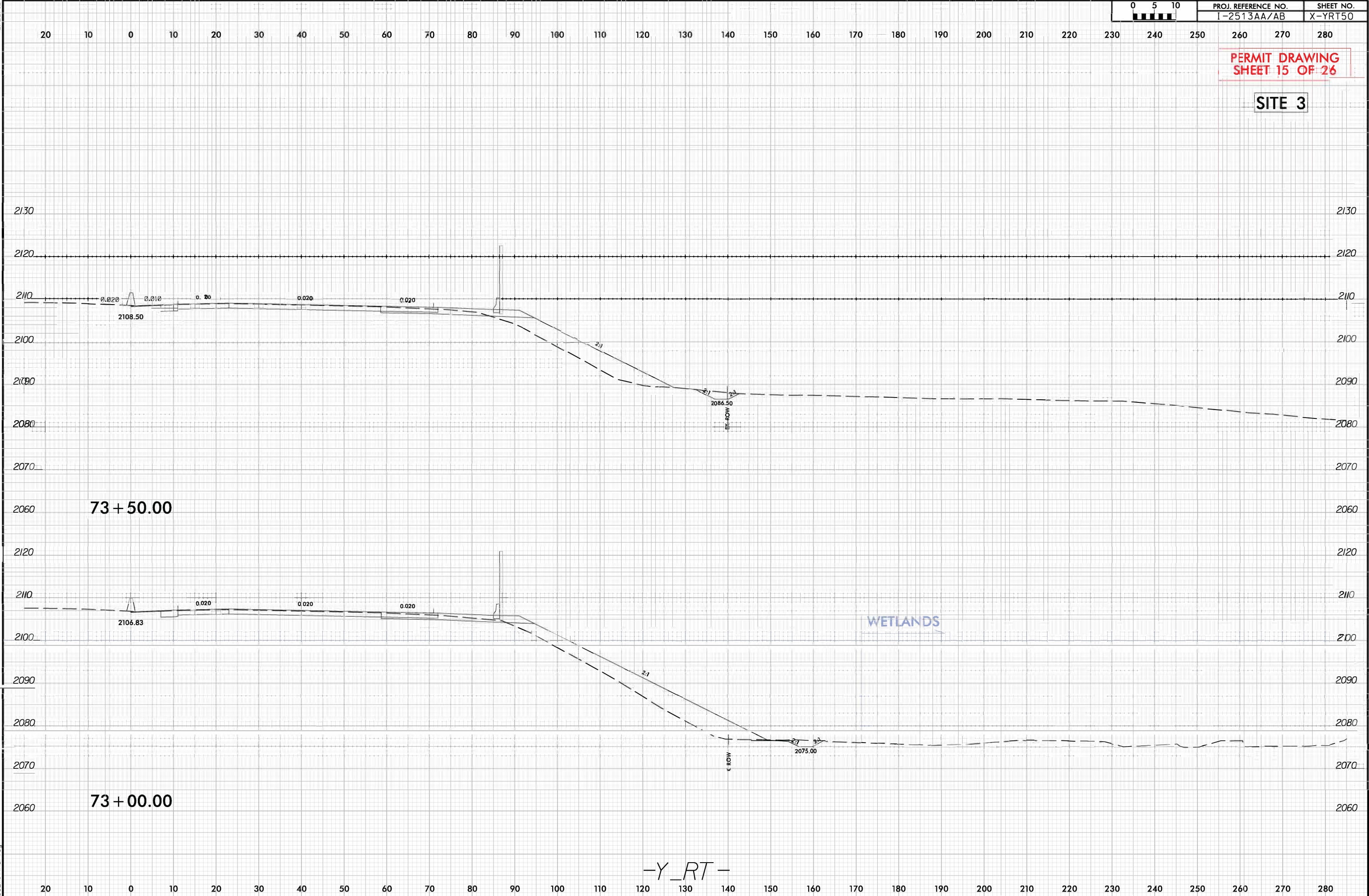
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PROJ. REFERENCE NO.	SHEET NO.
I-2513AA/AB	X-YRT50

PERMIT DRAWING
SHEET 15 OF 26

SITE 3



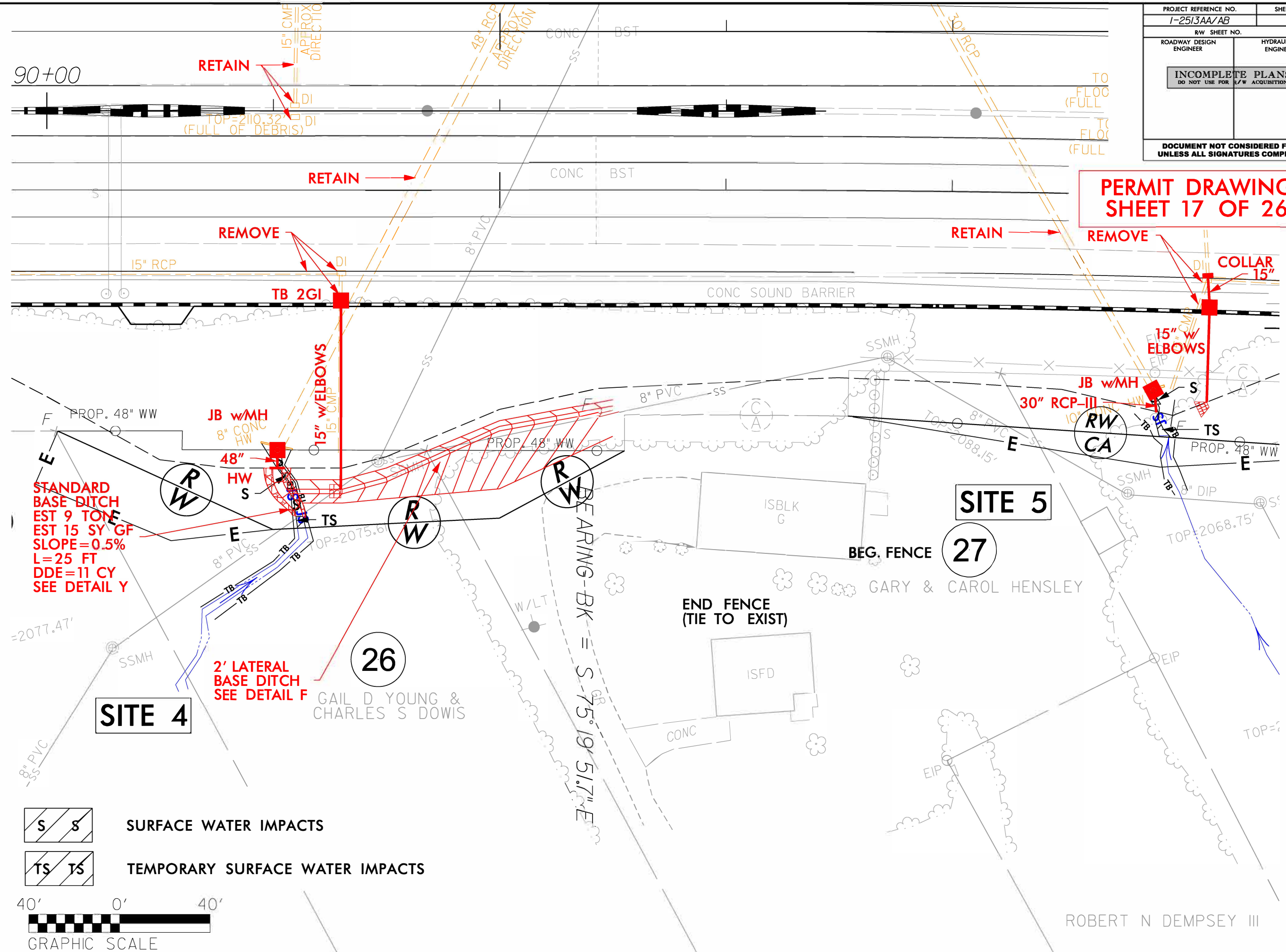
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SHEET 15 OF 26

-Y_RT-

FOR -Y_LT- & -Y_RT_ PROFILES SEE SHEET 20
FOR -Y_WB- PROFILE SEE SHEET 21
FOR -Y_EB- PROFILE SEE SHEET 21
FOR DRAINAGE DETAILS, SEE SHEET 2D-1

PROJECT REFERENCE NO.	SHEET NO.
1-2513AA/AB	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

**PERMIT DRAWING
SHEET 17 OF 26**



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TS TS

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

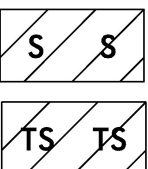
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GRAPHIC SCALE

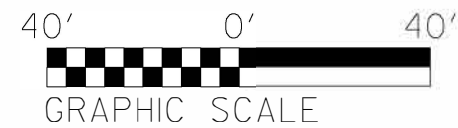
ROBERT N DEMPSEY III

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1/17/2023
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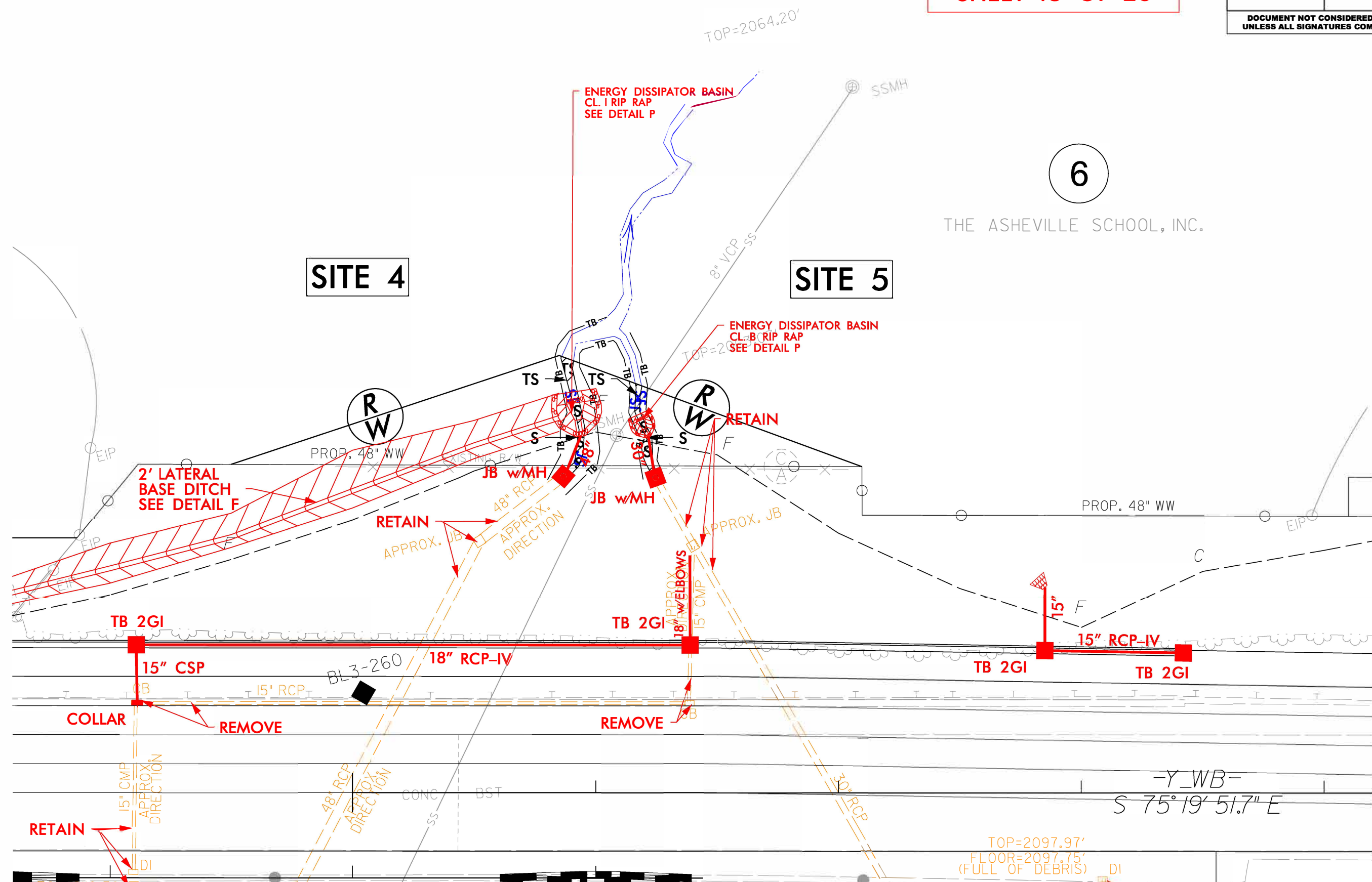


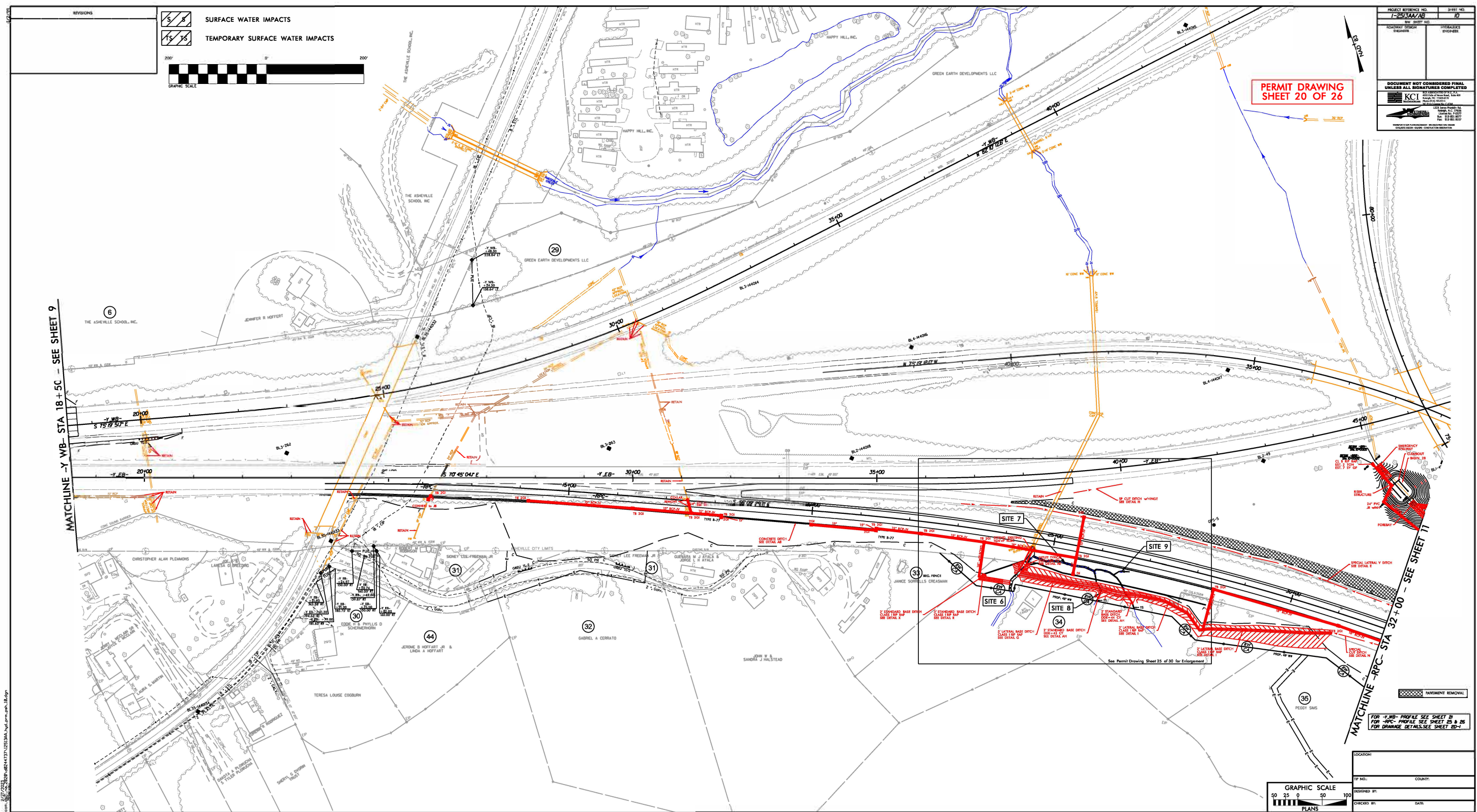
SURFACE WATER IMPACTS
TEMPORARY SURFACE WATER IMPACTS



**PERMIT DRAWING
SHEET 18 OF 26**

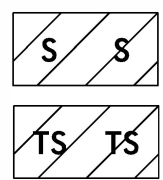
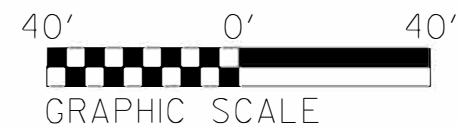
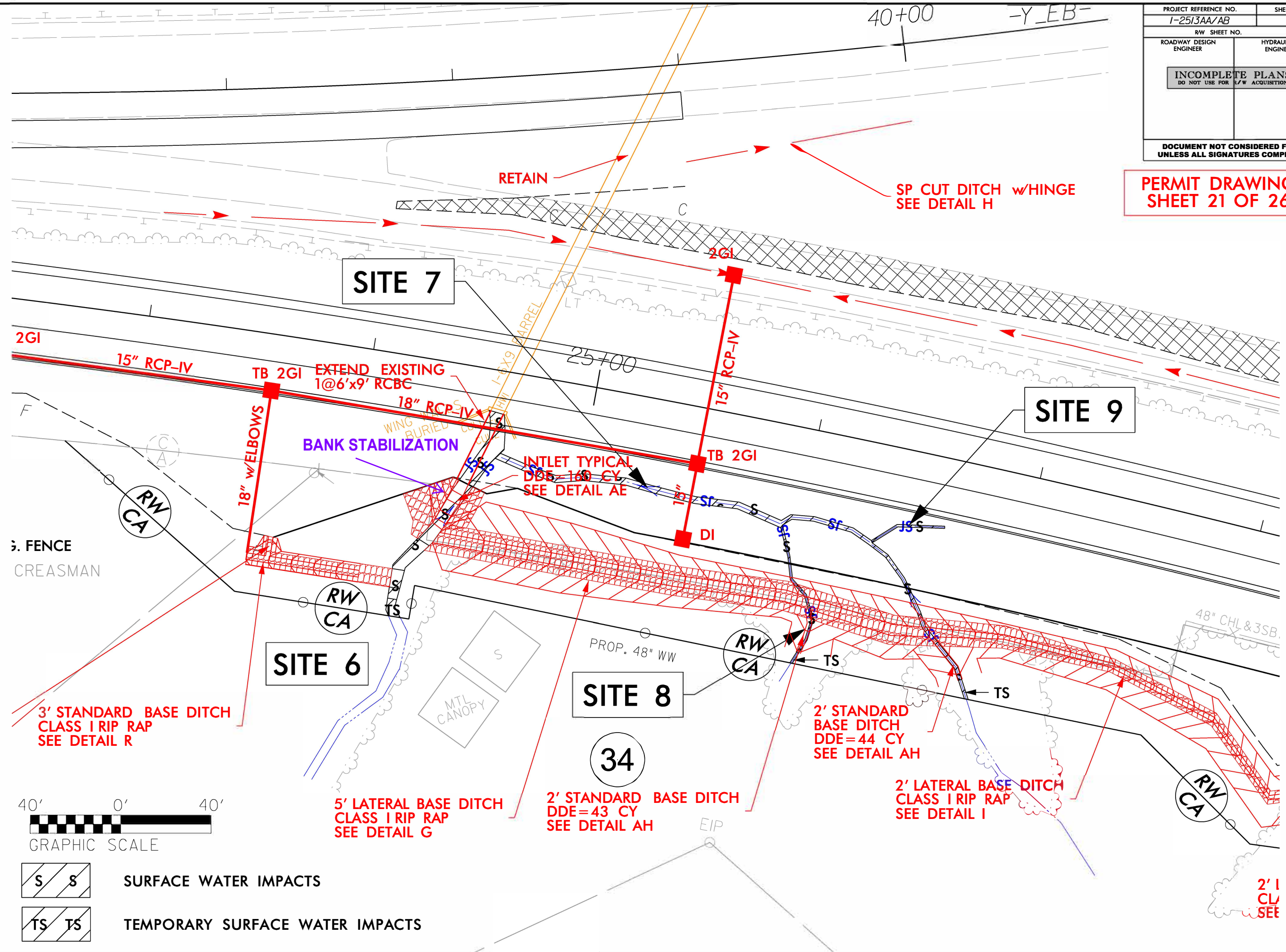
PROJECT REFERENCE NO. 1-2513AA/AB	SHEET NO. 9
RW SHEET NO. ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



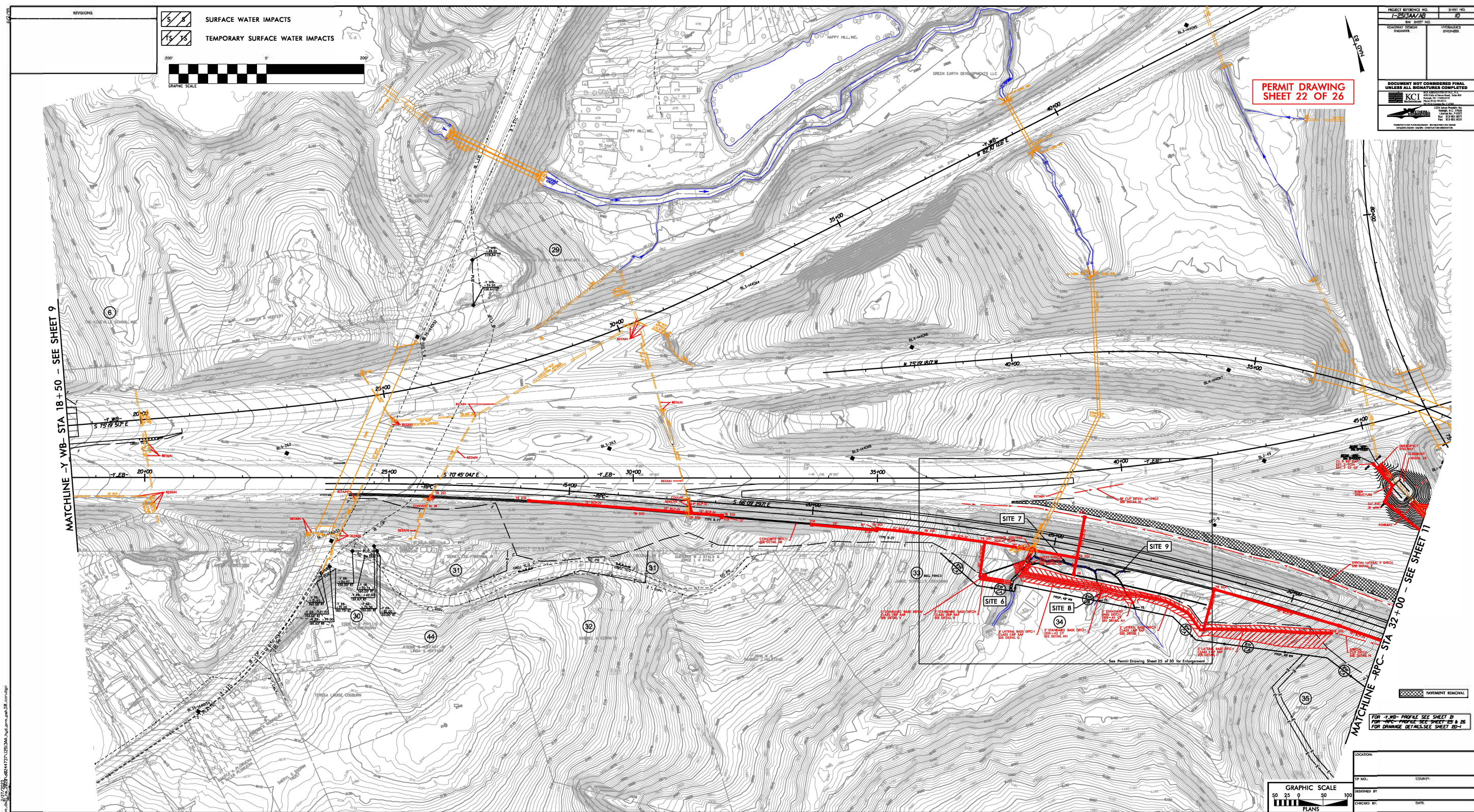


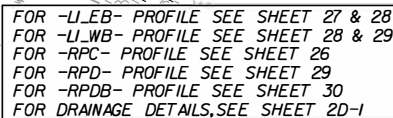
PROJECT REFERENCE NO. I-25/3AA/AB	SHEET NO. 6
RW SHEET NO. ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

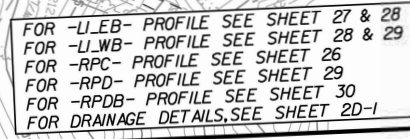
**PERMIT DRAWING
SHEET 21 OF 26**



8/17/99
REVISIONS
1/17/2023
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WETLAND AND SURFACE WATER IMPACTS SUMMARY												
			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-Y- 50+95 Rt	Existing 48" Pipe						< 0.01		11		
	-Y- 50+95 Rt	Base Ditch						< 0.01	< 0.01	39	15	
2	-Y- 59+50 Lt	3@7x9 RCBC Extention						0.04		147		
	-Y- 58+70 Lt	84"CMP *						0.02	< 0.01	44	10	
3	-Y- 69+85 Lt / -Y- 72+95 Rt	Channel Relocation	< 0.01		< 0.01		< 0.01	0.02	< 0.01	89	17	
4	-Y- 91+05 Rt	Channel Relocation						< 0.01	< 0.01	24	5	
	-Y- 91+05 Rt	48" Pipe						< 0.01		8		
	-Y- 92+92 Lt	48" Pipe						0.01		19		
	-Y- 92+92 Lt	Energy Dissipator						0.01	< 0.01	19	14	
5	-Y- 93+44 Rt	30' Pipe						< 0.01	< 0.01	10	11	
	-Y- 93+20 Lt	30' Pipe						< 0.01		17		
	-Y- 93+20 Lt	Energy Dissipator						< 0.01	< 0.01	10	12	
6	-RPC- 24+24 to 26+90 Rt	1@6'X9' RCBC Extension						< 0.01	< 0.01	58	8	
	-RPC- 24+24 to 26+90 Rt	Bank Stabilzation						< 0.01		40		
7	-RPC- 25+50 Rt	Base Ditch						0.01	< 0.01	246	9	
8	-RPC- 26+05 Rt	Base Ditch						< 0.01	< 0.01	60	5	
9	-RPC- 26+50 Rt	Base Ditch						< 0.01		34	9	
10	-RPC- 46+05 Rt	Base Ditch						< 0.01	< 0.01	19	24	
11	-RPD- 23+30 Rt	Outfall Protection						< 0.01	< 0.01	26	32	
TOTALS*:			< 0.01		< 0.01		< 0.01	0.14	0.02	920	171	0

*Rounded totals are sum of actual impacts

NOTES:

* HIGH FLOW BENCH

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

2/27/2023

Buncombe County

I-2513 AA/AB

34165.1.11/34165.1.12

SHEET26OF26