STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

September 18, 2018

US Army Corps of Engineers
Wilmington Regulatory Field Office
69 Darlington Avenue
Wilmington, North Carolina 28403

ATTN: Ms. Liz Hair, NCDOT Coordinator

Subject: **Request for Modification to Individual Section 404 and Section 401 Water Quality Certification** for Fayetteville Outer Loop from I-95 South of Fayetteville to NC 24-87, Cumberland, Hoke, and Robeson Counties. Federal Aid Project No. NHP-0620(031), State Project No. 34817.3.13, TIP Nos. X-0002 B & C, and U-2519 AA, AB, BA, BB, CA, CB, DA, & E.
Debit $570 from WBS 34817.3.13

Reference: Section 404 and 401 Individual Permit Application requested April 25, 2008
Section 404 Individual Permit issued October 23, 2008 (SAW-2008-01413)
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Dear Madam:

The purpose of this modification request is to provide final design and impact calculations for U-2519 AA & AB which were in preliminary design when the original permit was requested in 2008. As you are aware, several sections of X-0002 B & C and U-2519 are constructed or currently under construction. U-2519 AA & AB is an approximately 5.73 mile section of the Fayetteville Outer Loop that begins south of SR 1003 (Camden Road) and extends to Interstate 95.

There will be 4,719 linear feet of permanent stream impact and 1,049 linear feet of temporary stream impact associated with construction of the U-2519 AA & AB project. Permanent impacts to wetlands total 9.23 acres due to fill, excavation, and mechanized clearing on the project. Temporary wetland fill

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impacts of 0.41 acre are anticipated for a temporary road. In addition, a total of 0.96 acre of hand clearing will occur due to project construction.

Please see the enclosed 4B & 4C Merger Meeting minutes, borrow site vicinity maps, Stormwater Management Plan, permit drawings, half-size roadway plans (aka, 60% Right of Way plans), and a revised Privateer Wetland and Stream Mitigation Site Debit Ledger for sections U-2519 AA & AB.

Surveys for all federally-protected species listed for Cumberland and Robeson Counties were updated in August 2017. A Biological Conclusion of "No Effect" remains current for all species except the red-cockaded woodpecker (RCW). A Biological Opinion was issued on April 28, 2005; however, the 2017 report for sections U-2519 AA & AB has a Biological Conclusion of No Effect due to the extensive logging currently underway in areas of mature growth, and remaining pine stands within the project area being immature and not suitable habitat for RCW.

Table 1. U-2519 AA & AB Wetlands Impacts

Permit Site Number	FEIS Site ID	Riverine or Non-Riverine	Permanent Impacts (ac.) *	Temporary Impacts (ac.)	Mitigation Required**
1	Z 26	Non-Riverine	0.61	0	Yes
2	Z 23	Non-Riverine	0.09	0	Yes
3	Z 23	Non-Riverine	<0.01	0	Yes
5	Z 23	Riverine	0	0	No
6	Z 23	Riverine	2.48	0	Yes
8	Z 22	Riverine	2.07	0	Yes
15	Z 14	Riverine	< 0.01	0	Yes
16	Z 14	Non-Riverine	0.08	0	Yes
17	Z 14	Non-Riverine	0.17	0	Yes
18	Z 14	Non-Riverine	0.59	0	Yes
19	Z 14	Non-Riverine	1.86	0	Yes
20	Z 28	Non-Riverine	0.09	0	Yes
21	Z 26	Non-Riverine	0.27	0	Yes
22	Z 24	Riverine	0.14	0	Yes
23	Z 24	Riverine	0.28	0	Yes
24	Z 23	Riverine	0.33	0.41	Yes
25	Z 23	Non-Riverine	0	0	No
26	Z 23	Non-Riverine	0.03	0	Yes
29	Z 61	Riverine	0.02	0	Yes
30	(N/A)	Non-Riverine	0.09	0	Yes
Total:			9.23	0.41	

Notes: Rounded totals are sum of actual impacts
* Includes fill, excavation, and mechanized clearing. ** For permanent impacts.
Hand clearing: Site 3 – 0.02 ac., Site 5 – 0.01 ac., Site 8 - 0.11 ac., Site 15 – 0.06 ac., Site 22 - 0.11 ac., Site 24 – 0.19 ac., Site 25 – 0.01 ac., and Site 29 - 0.45 ac.

Table 2. U-2519 AA & AB Surface Water Impacts and Descriptions

Permit Site Number	Waterbody	Permanent		Temporary		Type of Stream	Mitigation Required**
		lf	ac.	lf	ac.		
3	UT to Horsepen Branch (Z 23a)	300	0.03	43	< 0.01	Intermittent	No
4	UT to Horsepen Branch (Z 23b)	78	< 0.01	35	< 0.01	Intermittent	No
5	Horsepen Branch (Z 23)	0	0	31	< 0.01	Perennial	Yes
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14*	Cold Camp Creek (Z 64)	125	0.03	0	0	Perennial	Yes
15	Rockfish Creek (Z 14)	35	< 0.01	30	0.01	Perennial	Yes
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24	Horsepen Branch (Z 23)	48	< 0.01	114	0.03	Perennial	Yes
24*	Horsepen Branch (Z 23)	79	0.03	0	0	Perennial	Yes
27	Horsepen Branch (Z 22)	90	0.02	87	0.02	Perennial	Yes
27*	Horsepen Branch (Z 22)	69	0.01	0	0	Perennial	Yes
28	Cold Camp Creek (Z 66)	416	0.07	0	0	Perennial	Yes
29	UT to Rockfish Creek (Z 61)	0	0	114	0.03	Perennial	Yes
30	UT to Rockfish Creek (SB)	90	< 0.01	0	0	Perennial	Yes
Total:		**4,719**	**0.70**	**1049**	**0.20**		

Notes: * Denotes bank stabilization; when necessary, mitigation required by the USACE exceeds the amount required by NCDWR

** For permanent impacts

The following permit sites had atypical conditions and are described in more detail:

Permit Site 6 – Impacts at this site are due to new roadway alignment. Permanent impacts are planned from roadway fill and mechanized clearing. An 8'x 6' RCBC will be installed and buried to appropriate depth. The RCBC installation will include wingwalls to reduce impacts and will include bank stabilization at the inlet and outlets. Toe protection has been reduced at this site and eliminated where drainage area to the wetland was relatively small and flow velocities were less than erosive. There will be two 36" RCP-IV equalizer pipes installed under the roadway to provide better connectivity between the parts of the wetland being separated by the roadway.

Permit Site 14 – Surface water impacts at this site are due to new roadway alignment and the need to pipe sections of the stream (Cold Camp Creek). The most downstream pipe, 72" RCP-IV, is buried 1'. The 60" RCP-IV could not be buried 1' due to how flat the channel is at this location. Therefore, the 60" RCP-IV was only buried 0.5' upstream and downstream in order to achieve positive drainage throughout this series of pipe. If the pipe had been buried any further, positive drainage would not be achieved. A special lateral base ditch will carry flow from the outlet of the 72" RCP-IV parallel to the roadway until it meets the existing stream.

Permit Site 18 – Impacts to wetlands at this site are due to new roadway alignment and include permanent fill, excavation, and mechanized clearing. Naturally, this wetland drains to the upstream inlet of the 8'x 6' RCBC. The toe protection and the box culvert can adequately convey any flow associated with this wetland.

Permit Site 19 - Impacts to wetlands at this site are due to new roadway alignment and include permanent fill, excavation, and mechanized clearing. Skaggs model was run to determine the effects of the lateral base ditch on the wetland. The lateral impact from the 2' base ditch was 91.8'. This was almost the entire width of the existing wetland. Due to the contours in the area, the ditch could not be shallowed to 1.5'. Therefore the design was retained as presented at the 4C meeting. The additional impact area is only shown in the notes section of the wetland impact summary and is not included in the impact totals.

Permit Site 22 - Impacts to wetlands at this site are due to widening of the existing road along I-95 at the project limits and include permanent fill and hand clearing. Toe protection is being added within the wetland along the existing toe of slope to where the widened section of roadway meets the existing roadway at which point the toe protection follows the new toe of slope. Drainage along the roadway will be directed to a rip rap dissipator basin which will be tied into the wetland and toe protection.

Permit Site 24 – Impacts at this site will be necessary in order to replace and extend the existing 6' x 5' RCBC, along US 301 over Horsepen Branch, with two 9' x 6' RCBCs. This will result in permanent impacts of 48 lf (< 0.01 acre) of surface water and 0.33 acre of wetland fill impact. Permanent bank stabilization impacts of 79 lf (0.03 acre) as well as hand clearing impacts of 0.19 acre are also anticipated. Temporary impacts of 114 lf (0.03 acre) of stream and 0.41 acre of wetland at this site are associated with the temporary road being constructed alongside the existing road, as an offsite detour was not practical. Temporary fill in the wetland will be removed entirely following the completion of construction and the ground will be restored to its original contours. The area will be revegetated following completion of construction with an approved vegetation mix.

The final design impacts for sections U-2519 AA & AB were less than previously estimated during preliminary design by 1.16 acres of riparian wetland, 0.51 acre of non-riparian wetland, and 259 linear feet of stream.

Compensatory Mitigation

Compensatory mitigation for the 9.23 acres of permanent wetland impacts will be debited from the Privateer Wetland and Stream Mitigation Site. This brings total project wetland impacts to 60.15 acres. The 2,849 linear feet of stream impacts requiring mitigation will also be debited from the Privateer Wetland and Stream Mitigation Site, bringing the total project stream impacts to 15,859 linear feet. A revised debit ledger for the Privateer Wetland and Stream Mitigation Site is attached to this modification request.

Utility Impacts

Utility relocations will be accomplished by means of directional bore in jurisdictional areas. There are no impacts anticipated due to utility relocations within this section of the project.

Borrow Site Locations

Two borrow locations have been identified for the project. The northern site is located on the Barnhill property adjacent to the project alignment south of SR 1116 (Lake Upchurch Dr.) and east of SR 1710 (Old Plank Rd.). The southern borrow site is located on the Riddle property along SR 1978 (Buckhorn Rd.). None of the borrow sources are anticipated to have impacts to jurisdictional resources. Using the "Skaggs Method for Determining Lateral Effects of a Borrow Pit on Adjacent Wetlands" (Skaggs, et al.), sites were evaluated to insure no impacts will occur to the jurisdictional resources adjacent to the borrow pit sites. Maps illustrating the borrow site locations are included.

Regulatory Approvals

The design-build let date for U-2519 AA was November 21, 2017 and the design-build let date for U-2519 AB was December 19, 2017. Final completion is anticipated in July 2022.

Section 404: We are hereby requesting the modifications described above and an expiration date of July 15, 2022 for the USACE Individual 404 Permit signed October 23, 2008 (SAW-2008-01413), for the above-described activities.

Section 401: We are hereby requesting a modification to the 401 Water Quality Certification from the NCDWR issued October 6, 2008 (DWQ No. 003278). In compliance with Section 143-215.3D(e) of the NCAC, please debit $570.00 from WBS 34817.3.13 for processing the Section 401 certification modification. A copy of this modification request and its distribution list will be posted on the NCDOT website at: https://connect.ncdot.gov/resources/Environmental.

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Tyler Stanton at 919-707-6156 or tstanton@ncdot.gov.

Sincerely,

Philip S. Harris III, P.E., C.P.M., Unit Head
Environmental Analysis Unit

cc:
NCDOT Permit Application Standard Distribution List

Privateer
WM 026-005

The Privateer Farms Restoration Site (Site) is located in Bladen and Cumberland Counties, North Carolina, approximately fourteen miles southeast of Fayetteville. Prior to restoration, land use on the Site over the past 20 years had been primarily row crop agriculture. Stream and riparian functions on the Site had been severely impacted as a result of agricultural conversion. Harrison Creek had historically meandered through the Site, but was channelized in the early 1980s to reduce flooding and provide a drainage outlet for the extensive network of ditches excavated across the Site. Subsequent to channelization, Harrison Creek existed as a large canal running straight through the Site.

Restoration activities for the Site involved moving the stream channel back to its historic location and elevation, and filling drainage ditches to raise the local water table and restore wetland and stream hydrology. The plan also included scarification of the fields and breaking of the local plow pan to increase surface water storage and provide a range of hydrologic conditions suitable for a variety of native wetland plant species. The restoration plan for the Site predicted the restoration of 405 acres of riverine wetlands, 25 acres of riverine wetland enhancement, and 33,985 linear feet (LF) of stream restoration. Following construction, the as-built data indicated that the total area of restored riverine wetlands was 402.5 acres (excluding 2.5 acres for road accesses), with 25 acres of enhanced riverine wetlands, and 34,005 LF of restored stream channel.

As of fall 2009, the Site has met all prescribed hydrologic and vegetative monitoring criteria and been recommended for closeout.

To offset unavoidable wetland and stream impacts associated with T.I.P. U-2519 AA/AB, the Privateer Mitigation Site will be debited 5.32 ac of Riparian wetland for 5.32 acre of Riparian wetland impact, 11.73 acres of Riparian Wetland for 3.91 acre of non-riparian wetland impact, and 4273.5 linear feet of stream for 2,849 linear of stream impacts. These debits and credits are reflected in the following ledger.

HUC	Mitigation Type	Starting Amount	Additional Notes
3030004	Stream Restoration	25676	**Out of service area ratios: 1.5:1 ratio for stream impacts 3:1 for wetland impacts
3030004	Riparian Wetland Restoration	185.58	**Out of service area ratios: 1.5:1 ratio for stream impacts 3:1 for wetland impacts

Privateer
WM 026-005

TYPE	DEBITAMOUNT	Status	SITE TIP	Action ID#	Notes
S_REST	-25676	Close Out	From EEP for U-2519/X-2		Credits transferred from EEP. **Out of service area ratios: 1.5:1 ratio for stream impacts 3:1 for wetland impacts
S_REST	-918	Close Out	U-2519CB, DA Mod	2008-01413	612 lf reduction @ 1.5:1
S_REST	-529.5	Close Out	U-2519CB, DA Mod	2008-01413	353 lf reduction @ 1.5:1
S_REST	214.5	Close Out	U-2519CB, DA Mod	2008-01413	143 lf addition @ 1.5:1
S_REST	615	Close Out	X-0002C Site 8 Mod	2008-01413	410 lf addition @ 1.5:1
S_REST	852	Close Out	U-2519CA Mod	2008-01413	568 lf addition @ 1.5:1
S_REST	1329	Close Out	U-2519, X-0002 Mod	2008-01413	886 lf addition @ 1.5:1. Unable to Confirm in permits. Taken from old ledger (Math works out)
S_REST	1518	Close Out	R-4903	2009-00655	1012 lf of impacts @ 1.5:1.
S_REST	8329	Close Out	EEP		Site transferred to EEP
S_REST	18519	Close Out	U-2519, X-0002	2008-01413	12,346 lf @ 1.5:1. Original Permit
S_REST	2142	Close Out	U-2519 BA BB		1428 lf @ 1.5:1
S_REST	4273.5	Close Out	U-2519 AA/AB		2849 lf @1.5:1

Privateer
WM 026-005

TYPE	DEBIT AMOUNT	Status	SITE TIP	Action ID#	Notes
RW_REST	-101.76	Close Out	From EEP for U-2519/X-2		Credits transferred from EEP. **Out of service area ratios: 1.5:1 ratio for stream impacts 3:1 for wetland impacts
RW_REST	-39.6	Close Out	From EEP for R-2303		Credits transferred from EEP. **Out of service area ratios: 1.5:1 ratio for stream impacts 3:1 for wetland impacts
RW_REST	-23.86	Close Out	From EEP for U-2519/X-2		Credits transferred from EEP. **Out of service area ratios: 1.5:1 ratio for stream impacts 3:1 for wetland impacts
RW_REST	-20.36	Close Out	From EEP for U-2519		Credits transferred from EEP. **Out of service area ratios: 1.5:1 ratio for stream impacts 3:1 for wetland impacts
RW_REST	-0.6	Close Out	U-2519CB, DA Mod	2008-01413	0.2 ac reduction @ 3:1.
RW_REST	-0.06	Close Out	U-2519CB, DA Mod	2008-01413	0.02 ac reduction @ 3:1.
RW_REST	0.15	Close Out	R-2303A	1992-03237	Permit Mod 0.5 ac impacts @ 3:1
RW_REST	1.14	Close Out	U-2519CB, DA Mod	2008-01413	0.38 ac addition @ 3:1.
RW_REST	1.29	Close Out	X-0002C Site 8	2008-01413	0.43 ac addition @ 3:1.
RW_REST	5.1	Close Out	U-2519E		Unable to Confirm. Unknown what the source of this debit is.
RW_REST	6.99	Close Out	U-2519CA Mod	2008-01413	2.33 ac addition @ 3:1.
RW_REST	7.38	Close Out	R-2303A	1992-03237	
RW_REST	145.29	Close Out	U-2519, X-0002	2008-01413	48.43 ac @ 3:1. Original Permit Estimate for all sections
RW_REST	216.92	Close Out	EEP		Site Transferred to EEP
RW_REST	1	Close Out	U-2519 BA/BB		1 ac Riparian Wetland impact @ 1:1 ratio
RW_REST	20.01	Close Out	U-2519 BA/BB		6.67 ac Non-Riparian wetland impact @ 3:1
RW_REST	5.32	Close Out	U-2519 AA/AB		5.32 ac Riparian Wetland Impact @1:1

Privateer
WM 026-005

TYPE	DEBIT AMOUNT	Status	SITE TIP	Action ID#	Notes
RW_REST	11.73	Close Out	U-2519 AA/AB		3.91 Non-Riparian Wetland Impact @ 3:1

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** For permanent impacts

The following permit sites had atypical conditions and are described in more detail:

Permit Site 6 – Impacts at this site are due to new roadway alignment. Permanent impacts are planned from roadway fill and mechanized clearing. An 8'x 6' RCBC will be installed and buried to appropriate depth. The RCBC installation will include wingwalls to reduce impacts and will include bank stabilization at the inlet and outlets. Toe protection has been reduced at this site and eliminated where drainage area to the wetland was relatively small and flow velocities were less than erosive. There will be two 36" RCP-IV equalizer pipes installed under the roadway to provide better connectivity between the parts of the wetland being separated by the roadway.

Permit Site 14 – Surface water impacts at this site are due to new roadway alignment and the need to pipe sections of the stream (Cold Camp Creek). The most downstream pipe, 72" RCP-IV, is buried 1'. The 60" RCP-IV could not be buried 1' due to how flat the channel is at this location. Therefore, the 60" RCP-IV was only buried 0.5' upstream and downstream in order to achieve positive drainage throughout this series of pipe. If the pipe had been buried any further, positive drainage would not be achieved. A special lateral base ditch will carry flow from the outlet of the 72" RCP-IV parallel to the roadway until it meets the existing stream.

Permit Site 18 – Impacts to wetlands at this site are due to new roadway alignment and include permanent fill, excavation, and mechanized clearing. Naturally, this wetland drains to the upstream inlet of the 8'x 6' RCBC. The toe protection and the box culvert can adequately convey any flow associated with this wetland.

Permit Site 19 - Impacts to wetlands at this site are due to new roadway alignment and include permanent fill, excavation, and mechanized clearing. Skaggs model was run to determine the effects of the lateral base ditch on the wetland. The lateral impact from the 2' base ditch was 91.8'. This was almost the entire width of the existing wetland. Due to the contours in the area, the ditch could not be shallowed to 1.5'. Therefore the design was retained as presented at the 4C meeting. The additional impact area is only shown in the notes section of the wetland impact summary and is not included in the impact totals.

Permit Site 22 - Impacts to wetlands at this site are due to widening of the existing road along I-95 at the project limits and include permanent fill and hand clearing. Toe protection is being added within the wetland along the existing toe of slope to where the widened section of roadway meets the existing roadway at which point the toe protection follows the new toe of slope. Drainage along the roadway will be directed to a rip rap dissipator basin which will be tied into the wetland and toe protection.

Permit Site 24 – Impacts at this site will be necessary in order to replace and extend the existing 6' x 5' RCBC, along US 301 over Horsepen Branch, with two 9' x 6' RCBCs. This will result in permanent impacts of 48 lf (< 0.01 acre) of surface water and 0.33 acre of wetland fill impact. Permanent bank stabilization impacts of 79 lf (0.03 acre) as well as hand clearing impacts of 0.19 acre are also anticipated. Temporary impacts of 114 lf (0.03 acre) of stream and 0.41 acre of wetland at this site are associated with the temporary road being constructed alongside the existing road, as an offsite detour was not practical. Temporary fill in the wetland will be removed entirely following the completion of construction and the ground will be restored to its original contours. The area will be revegetated following completion of construction with an approved vegetation mix.

The final design impacts for sections U-2519 AA & AB were less than previously estimated during preliminary design by 1.16 acres of riparian wetland, 0.51 acre of non-riparian wetland, and 259 linear feet of stream.

Compensatory Mitigation

Compensatory mitigation for the 9.23 acres of permanent wetland impacts will be debited from the Privateer Wetland and Stream Mitigation Site. This brings total project wetland impacts to 60.15 acres. The 2,849 linear feet of stream impacts requiring mitigation will also be debited from the Privateer Wetland and Stream Mitigation Site, bringing the total project stream impacts to 15,859 linear feet. A revised debit ledger for the Privateer Wetland and Stream Mitigation Site is attached to this modification request.

Utility Impacts

Utility relocations will be accomplished by means of directional bore in jurisdictional areas. There are no impacts anticipated due to utility relocations within this section of the project.

Borrow Site Locations

Two borrow locations have been identified for the project. The northern site is located on the Barnhill property adjacent to the project alignment south of SR 1116 (Lake Upchurch Dr.) and east of SR 1710 (Old Plank Rd.). The southern borrow site is located on the Riddle property along SR 1978 (Buckhorn Rd.). None of the borrow sources are anticipated to have impacts to jurisdictional resources. Using the "Skaggs Method for Determining Lateral Effects of a Borrow Pit on Adjacent Wetlands" (Skaggs, et al.), sites were evaluated to insure no impacts will occur to the jurisdictional resources adjacent to the borrow pit sites. Maps illustrating the borrow site locations are included.

Regulatory Approvals

The design-build let date for U-2519 AA was November 21, 2017 and the design-build let date for U-2519 AB was December 19, 2017. Final completion is anticipated in July 2022.

Section 404: We are hereby requesting the modifications described above and an expiration date of July 15, 2022 for the USACE Individual 404 Permit signed October 23, 2008 (SAW-2008-01413), for the above-described activities.

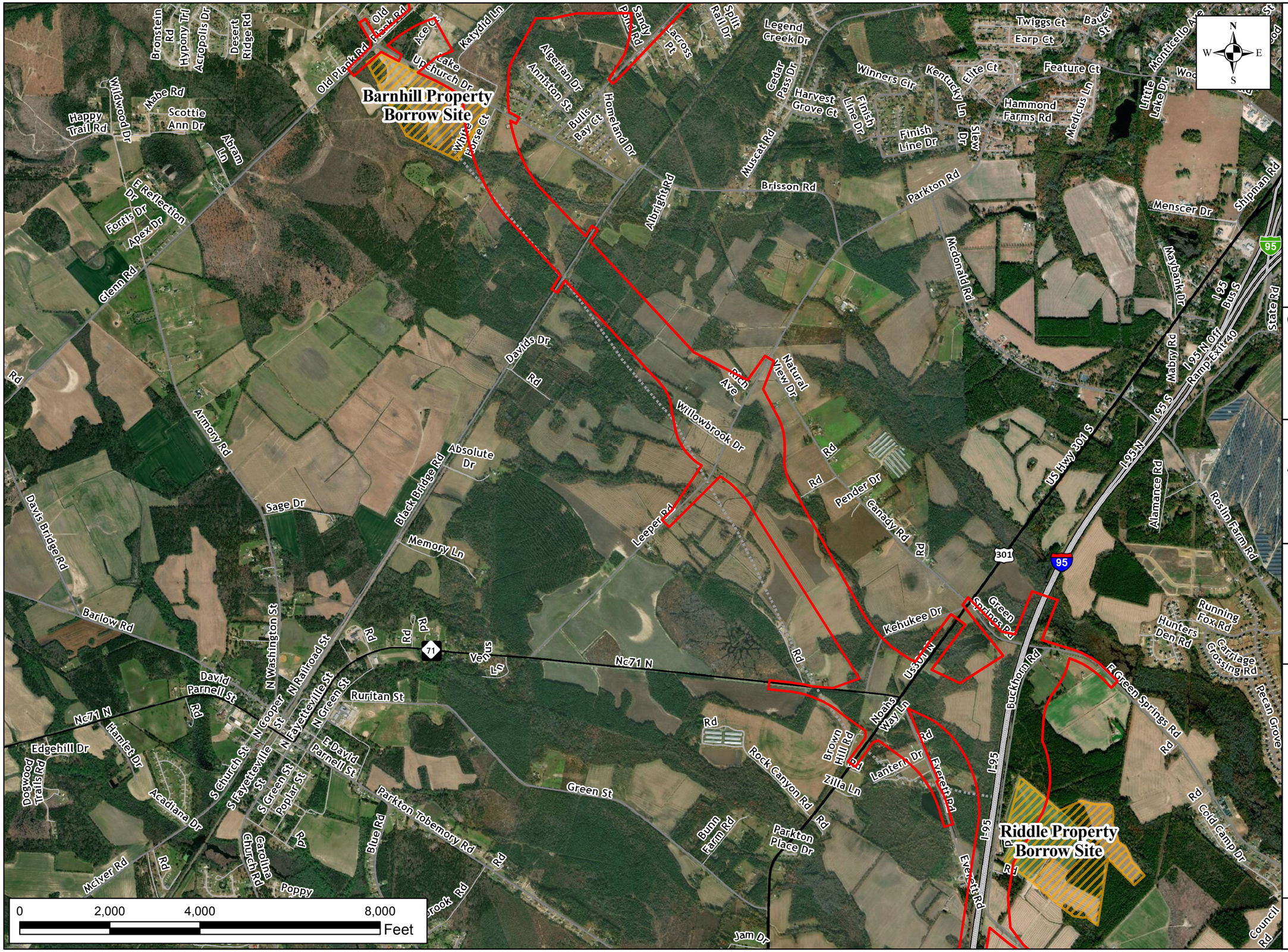
Section 401: We are hereby requesting a modification to the 401 Water Quality Certification from the NCDWR issued October 6, 2008 (DWQ No. 003278). In compliance with Section 143-215.3D(e) of the NCAC, please debit $570.00 from WBS 34817.3.13 for processing the Section 401 certification modification. A copy of this modification request and its distribution list will be posted on the NCDOT website at: https://connect.ncdot.gov/resources/Environmental.

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Tyler Stanton at 919-707-6156 or tstanton@ncdot.gov.

Sincerely,

Philip S. Harris III, P.E., C.P.M., Unit Head
Environmental Analysis Unit

cc:
NCDOT Permit Application Standard Distribution List



Balfour Beatty Infrastructure Inc.

A Joint Venture

BRANCH CIVIL

in association with

STV 100 Years

Client:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Project:

TIP Project U-2519AA & AB
Fayetteville Outer Loop

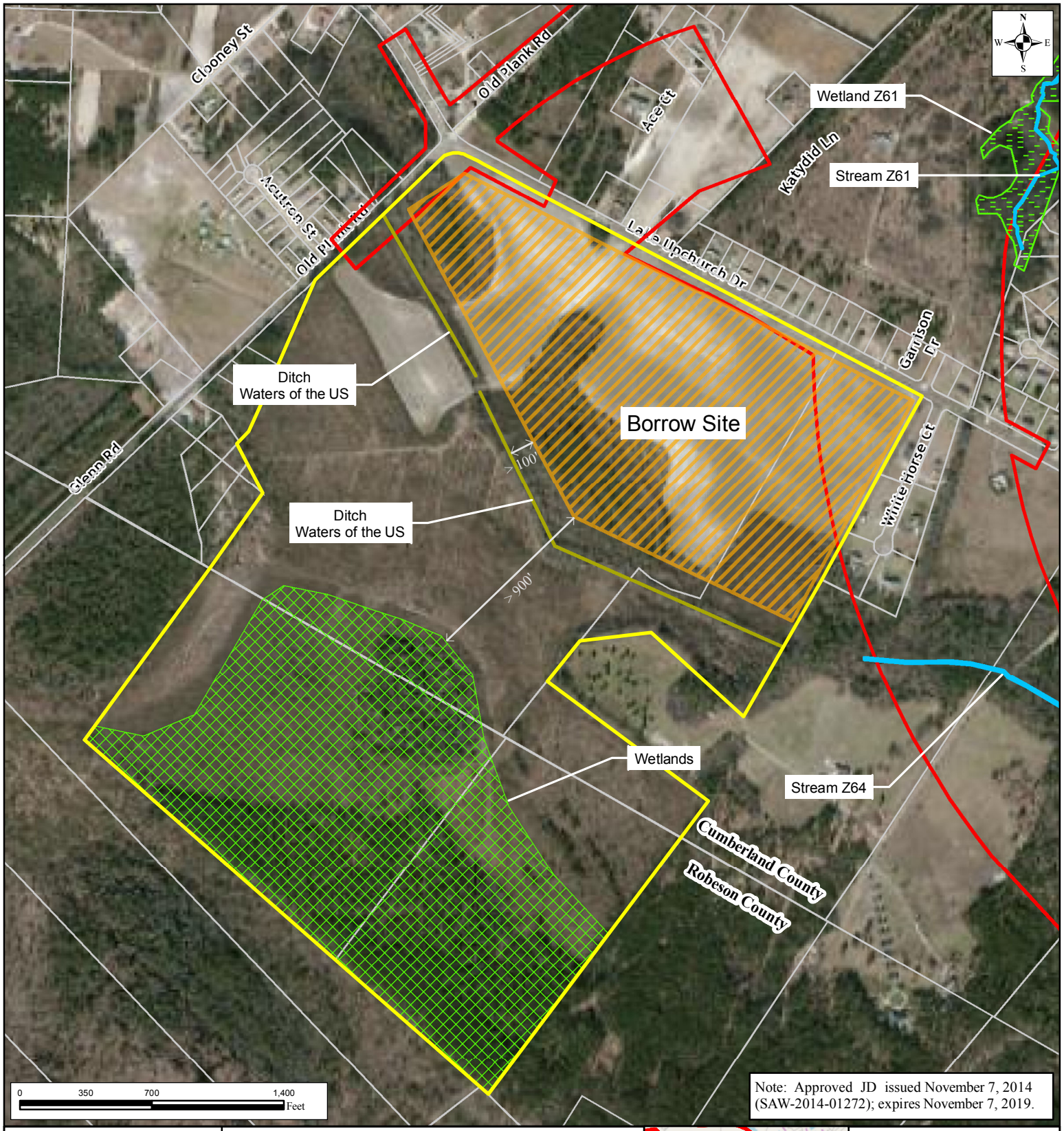
Title:

Potential Borrow Sites

Legend

- Potential Borrow Sites
- U-2519 Study Area

Overview



Note: Approved JD issued November 7, 2014 (SAW-2014-01272); expires November 7, 2019.

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Legend

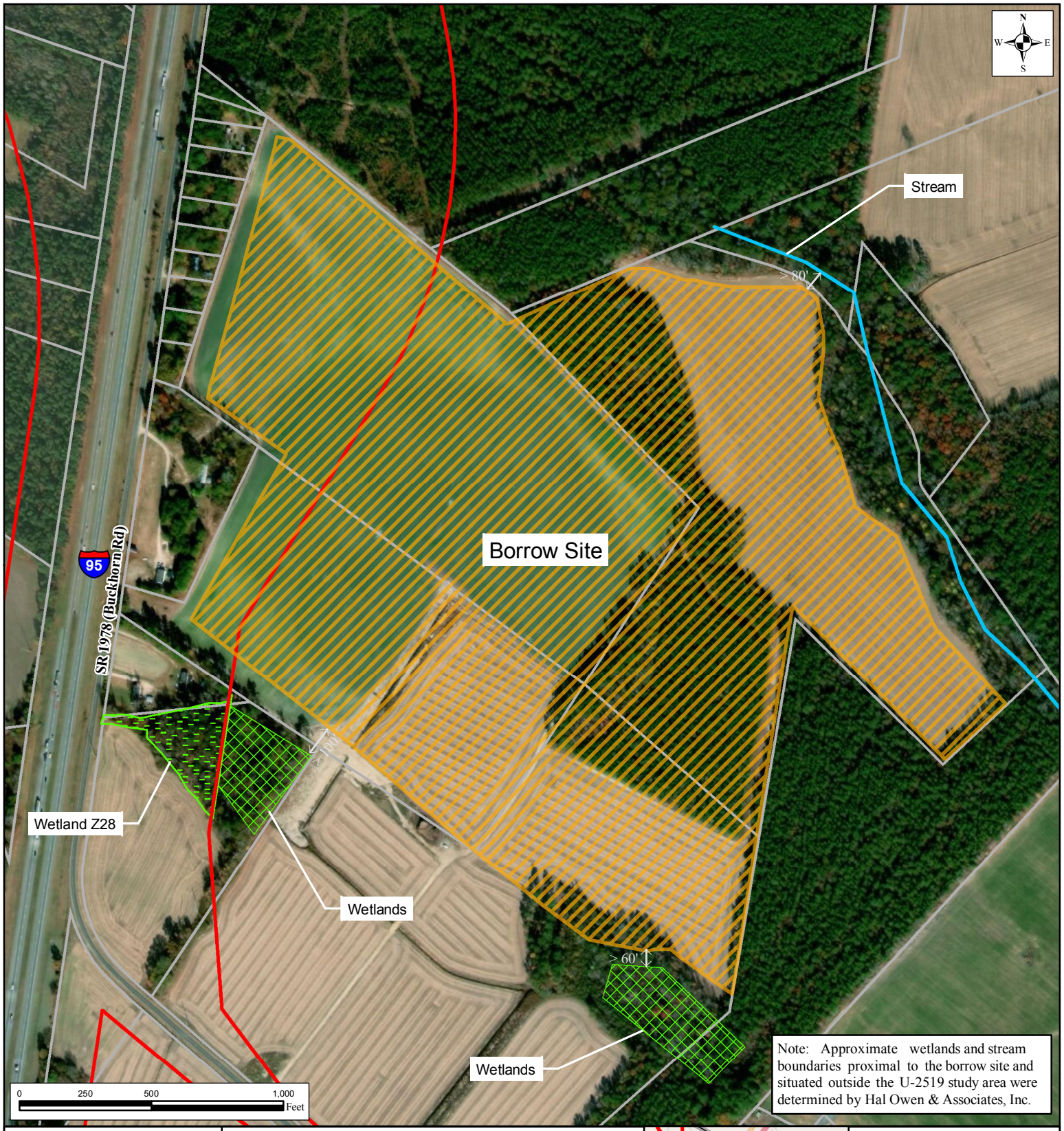
- U-2519 Study Area
- Study Area (SAW-2014-01272)
- Potential Borrow Site
- Waters of the US (Ditch)
- Wetlands (SAW-2014-01272)
- Wetlands (Verified for U-2519)
- Streams (Verified for U-2519)
- Parcels

Sources: Open Street Map

TIP Project U-2519AA & AB
Fayetteville Outer Loop

Monday, August 06, 2018

Barnhill Property Borrow Site Map



Note: Approximate wetlands and stream boundaries proximal to the borrow site and situated outside the U-2519 study area were determined by Hal Owen & Associates, Inc.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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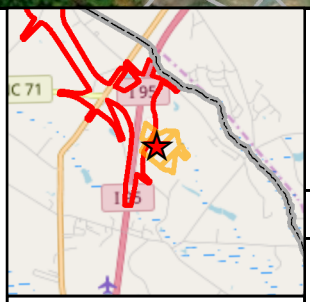
Legend

- U-2519 Study Area
- Potential Borrow Site
- Wetlands
- Streams
- Wetlands (Verified for U-2519)
- Parcels



Sources: Open Street Map

TIP Project U-2519AA & AB

Fayetteville Outer Loop

Monday, August 06, 2018

Riddle Property Borrow Site Map

U-2519 AA & AB, Division 6, Cumberland and Robeson Counties
Fayetteville Outer Loop from I-95 to South of SR 1003
4B Hydraulics Design Review
April 18, 2018
8:00 to 9:30 am
Structure Design Conference Room

Date: April 20, 2018

Subject: Meeting Minutes

Team Members:

Ron Lucas, FHWA (Absent)
Liz Hair, USACE (Absent)
Monte Matthews, USACE (Present)
Gary Jordan, USFWS (Absent)
Travis Wilson, NCWRC (On Conference Call)
Chris Militscher, USEPA (Absent)
Joanne Steenhuis, NCDENR (Absent – Comments Forwarded)

NCDOT Staff:

Paul Atkinson, NCDOT Hydraulics (Present)
Michael Penney, NCDOT – Design-Build (Present)
Jim Rerko, NCDOT - Division 6 (Present)
Randy Wise, NCDOT - Division 6 (Present)
Steve Kendall, NCDOT - Division 6 (Present)
Mark Staley, NCDOT - Roadside Environmental (Present)
Chris Rivenbark, NCDOT - Environmental Analysis (Present)
Brian Lipscome, NCDOT Hydraulics (Present)

Balford Beatty/Branch Civil JV:

Adam Freeman, STV Engineers (Present)
Eddie Vance, STV Engineers (Present)
Lewis Cuthrell, Branch Civil (Present)
Josh Dalton, Sungate (Present)
Eric Leonhart, Sungate (Present)
Michael Iagnocco, STV Engineers (Present)
Keith Nixon, Balfour Beatty (Present)

900 WEST TRADE STREET, SUITE 715
CHARLOTTE, NORTH CAROLINA 28202-1144
(704) 372-1885 FAX: (704) 372-3393

Adam Freeman started with overview of roadway design and described what all was revised through the design build process. Adam went through each interchange and highlighted our approach to impact avoidance and minimization.

- At the I-95 interchange Buckhorn Rd. was pulled in tighter to reduce the footprint of the interchange
- I-95 trumpet was shifted to minimize impacts to wetlands south of I-95
- US 301 Y-line was flipped to where the mainline goes over US 301 resulting in reduced impacts to wetlands and other jurisdictional features
- Parkton Rd. was shifted offline to avoid an on-site detour which minimized stream impacts
- Blackbridge Rd Interchange was shifted to minimize bridging requirements over the wetland system south of I-295
- The bridge over I-295 at Old Plank Rd. was eliminated in lieu of a service rd. which connects over to Blackbridge Rd.
- The mainline was shifted north at Rockfish Creek which minimized bridging requirements
- In general the profiles were lowered reducing the overall footprint of the project and associated impacts.

Josh Dalton kicked off the hydraulics and went sheet by sheet starting northwest side of CSXT Railroad (Sheet 14) to the end of project.

Sheet 14

- No impacts/comments.

Sheet 15

- Make transition from 6' base ditch to jurisdictional stream a smoother transition near (sta. 169+00 -L- RT). Ensure enough stabilization is provided to protect opposite bank from 6' base ditch outlet.

Sheets 16 - 19

- No comments.

Sheet 20

- Bridge over Rockfish Creek (sta. 248+52 -L- NB, sta. 248+75 -L- SB). Bridge will span riparian wetlands. Ditch outfalls to creek will be stabilized with riprap.

Sheet 21

- Check to see if wetland (sta. 256+00 -L- RT) continues or if it is as shown. Paul Atkinson noted that the line styles are different indicating that survey may have been done at a different time.
- If this isolated wetland (sta. 256+00 -L- RT) is a total take, delineate the area differently on the permit drawings.
    - Only shade area that is impacted.
    - The impacts may be mitigated at a different rate.
- If this location is not an isolated wetland (sta. 256+00 -L- RT), then shorten the ditch so not to drain.
- Do not bury the 7'x7' box culvert. Revise culvert to 7'x6' RCBC (sta. 261+74 -L-).
- Reduce outlet protection to only span from wing wall to wing wall (sta. 261+70 -L- LT).

Sheet 22

- No comments.

Sheet 23

- Concern about sandpit overflowing towards new subdivision, so outfall to the west keeping stormwater in right-of-way and tie back to culvert on sheet 21. Diversion ditch stretches from 269+00 -L- RT to 291+00 -L- RT. Ditch from wetlands to outlet of 42" RCP-III stretches from 261+97 -L- LT to 265+00 -L- LT.
- No concerns noted.

Sheets 23 - 24

- No impacts/comments.

Sheets 49 - 52

- No impacts/comments.

Sheet 53

- NCDOT commitment to bridge over wetlands (sta. 59+99 -Y10-). No comments.

Sheet 54

- No impacts/comments.

Sheet 55

- Black Ridge Rd -Y10- 2@36" RCP-IV (sta. 87+88 -Y10-) are not equalizer pipes; there is flow.
- Revise Standard Cut ditch to tie directly to 2@36" RCP-IV (sta. 87+88 -Y10 RT-).
- Do not bury 2@36" RCP-IV due to wetland at outfall (sta. 87+88 -Y10-).
- Additional question if JS continues to the upstream pond. Environmental Unit will check (sta. 87+88 -Y10- RT).

Sheets 56 - 58

- No impacts/comments.

Eddie Vance-STV continued and went sheet by sheet starting at I-95 (Sheet 4) to the CSXT railroad.

Sheet 4

- Wetland impact under Loop B. No comments.

Sheet 5

- Minor wetland impacts in southwest quadrant between Mainline and US 301. No comments.

Sheet 6

- Two JS crossings. One 54" buried 1' and a single 8'x6' box culvert buried 1'.
- The 8' culvert width matches closely to stream width.
- 30" RCP Equalizer Pipe at wetland. Not buried.
    - Question about how to riprap toe protection around pipe end.

Sheet 7

- No impacts/comments.

Sheet 8

- Fill in sandpit to right-of-way.

Sheet 9

- Double 8'x7' box culvert buried with flood bench.
- Add riprap at bend on inlet side of culvert.

- Calculate stream impacts of entire diversion

Sheet 10

- Discussed small watershed diversion from JS flowing from Quadrant A of interchange. Will look into further before the 4C Meeting to see if we can reduce the size of the diversion.
    - EAU to talk to Liz and Joanne regarding issue.

Sheets 11 & 12

- Channel change begins on sheet 11 and new 10'x7' box culvert on sheet 12 for Cold Camp Creek. Culvert will be buried 1' and the 10' culvert width matches closely to stream width.
- No riprap proposed in the stream bed since so flat and low velocities.
- Additional smaller jurisdictional tributaries impacted by roadway embankment.
- No comments.

Sheet 13

- No impacts/comments.

Sheets 26 & 27

- No impacts/comments.

Sheet 28

- Adding a supplemental 30" Trenchless Pipe on I-95 near -Y- Sta. 41+00 which outfalls into jurisdictional wetland. The design is matching existing invert elevation.
- No comments.

Sheet 29

- Double 8'x6' box culvert buried with flood bench replacing an existing 60" RCP on Green Springs Road -Y2-.
- Riprap outlet protection needed for velocity control.
- No comments.

Sheet 30

- No impacts/comments.

Sheet 31

- 42” RCP Equalizer Pipe at wetland. Not buried.

Sheets 32 & 33

- No impacts/comments.

Sheet 34

- Minor wetland impacts.
- No comments.

Sheet 35

- Double 9’x6’ box culvert buried replacing an existing 4’x8’ RCBC on US 301 -Y4-.
- Existing culvert is in backwater of downstream pond. Width of normal water at culvert is approximately 15’ to 18’ which matches proposed double box culvert width.
- Riprap outlet protection needed for velocity control.
- No comments.

Sheets 36 & 37

- No impacts/comments.

Sheet 38

- Check with Liz to determine if stream is a JS or not.
- Stream continues onto Sheet 44 which includes a proposed 36” pipe culvert. May have to upsize culvert one pipe size and bury.

Sheets 39 - 42

- No impacts/comments.

Sheet 43

- Minor wetland impacts.
- No comments.

Sheet 44

- Check with Liz to determine if stream is a JS or not.

- Will upsize 36” pipe culvert and bury if determined to be jurisdictional.

Sheets 45 & 46

- No impacts/comments.

Sheet 47

- Adding 8’x7’ box culvert buried on new Parkton Road -Y7- alignment. Existing 36” RCP culvert will be removed and replaced with open channel.
- DOT may try to get credit for removing existing pipe.

Sheet 48

- New double 10’x7’ box culvert with flood bench on Parkton Road -Y7- at Cold Camp Creek crossing.
- Question about Cold Camp Creek not showing as a JS downstream of Parkton Road. Designer assumes that entire reach in this vicinity is jurisdictional.

General Comments

- Follow Chapter 10 Hydraulic Guidelines for pre-post analysis.
- Place natural bed material inside culverts with sills. Follow Hydraulics’ guidance documents.
- If riprap in channel bottom, then key in to be flush with invert in order to not disrupt aquatic life movements.
- Use 4:1 slopes for basins for maintenance.

U-2519 AA & AB, Division 6, Cumberland and Robeson Counties
Fayetteville Outer Loop from I-95 to South of SR 1003
4C Permit Drawing Review
July 11, 2018
3:00 to 5:00 pm
Structure Design Conference Room

Date: July 12, 2018

Subject: Meeting Minutes

Team Members:

Liz Hair, USACE (Present)
Gary Jordan, USFWS (Absent)
Travis Wilson, NCWRC (Absent)
Chris Militscher, USEPA (Absent)
Joanne Steenhuis, NCDENR (Present)
Robert Patterson, DWR (On call)

NCDOT Staff:

Michael Penney, NCDOT – Design-Build (Present)
Jim Rerko, NCDOT - Division 6 (Present)
Mike Parker, NCDOT - Division 6 (Present)
Mark Staley, NCDOT - Roadside Environmental (On call)
Brian Lipscome, NCDOT - Hydraulics (Present)
Brook Anderson, NCDOT - Hydraulics (Present)
Tyler Stanton, NCDOT - EAU (On call)
Joe Bailey, NCDOT (KCI) (Present)

Balford Beatty/Branch Civil JV:

Adam Freeman, STV Engineers (Present)
Eddie Vance, STV Engineers (Present)
Lewis Cuthrell, Branch Civil (Present)
Josh Dalton, Sungate (Present)
Eric Leonhart, Sungate (Present)
Michael Iagnocco, STV Engineers (Present)
Keith Nixon, Balfour Beatty (Present)

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(704) 372-1885 FAX: (704) 372-3393

General Comments

- Revise non-jurisdictional stream names to just "Unnamed Tributary," not UT to a named branch.
- Tighten up slopes in wetlands to 3:1 as necessary.
- Clean-up drawing labels to better define Hand Clearing, Fill in Wetland, etc.
- Maximum depth of ditch adjacent to a wetland is generally 1.5'.
- At several locations the word "approximately" appears in the survey file. Define what "approximately" is referring to.
- Show bank stabilization as "permanent impact," but call-out on a separate line in the Summary Table and do not quantify as a "wetland or surface water impact."

Site 1

- No comments

Site 2

- Revise to 3:1 slopes along US-301

Site 3

- Clean up plans to better distinguish hand clearing and fill

Site 4

- No comments

Site 5

- No comments

Site 6

- Question whether or not toe protection is needed
    - Toe protection was eliminated where drainage area to wetland is relatively small and flow velocities along the toe will be less than erosive.
- Add another equalizer pipe
- Extend equalizer pipe to the slope stake line

Site 7

- Label pond as non-jursidictional

Site 8

- No comments

Sites 9, 10 & 11

- No comments

Site 12

- No comments

Site 13

- Missing JS impact
- Add a Site 13A for missing JS

Site 14

- Need to note the reason for buried pipe depth in the permit application
    - The buried depth was less than standard (0.5') to achieve fall

Site 15

- No comments

Site 16

- No comments

Site 17

- No comments

Site 18

- There are three fingers of wetlands, can they all flow through one culvert pipe
    - Based on the contours, the wetlands are naturally draining to the proposed culvert location

Site 19

- Maximum depth is 1.5' deep or run Skaggs Model

Site 20

- No comments

Site 21

- No comments

Site 22

- Need to distinguish the existing toe of slope in the plan view
- This area needs to be explained in the permit application

Site 23

- No comments

Site 24

- Need to add temporary impacts for detour
- Left side of roadway has odd shaped wetland boundary; make sure that wetland impacts are shown correctly

Site 25

- No comments

Site 26

- No comments

Site 27

- See General Comment about labeling bank stabilization

Site 28

- See General Comment about labeling bank stabilization

Site 29

- No comments

Site 30

- No comments

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 34817.3.4 **TIP No.:** U-2519 AA-AB **County(ies):** Cumberland Robeson

General Project Information

WBS Element:	34817.3.4	**TIP Number:**	U-2519 AA-AB	**Project Type:**	New Location	**Date:** 8/7/2018
NCDOT Contact:	Paul Atkinson, PE	**Contractor / Designer:**	Joshua G. Dalton, PE / Edward J. Vance, PE		
Address:	NCDOT Hydraulics Unit 1590 Mail Service Raleigh, NC 27699-1590	**Address:**	Sungate Design Group, P.A. & STV Engineers 905 Jones Franklin Road 900 W. Trade Street, Suite 715 Raleigh, NC 27606 Charlotte, NC 28202		
Phone:	919-707-6707	**Phone:**	919-859-2243 704-372-1885		
Email:	patkinson@ncdot.gov	**Email:**	jdalton@sungatedesign.com edward.vance@stvinc.com		
City/Town:	Hope Mills	**County(ies):**	Cumberland	Robeson	
River Basin(s):	Cape Fear	**CAMA County?**	No	No	
Wetlands within Project Limits?	Yes				

Project Description

Project Length (lin. miles or feet):	5.73	**Surrounding Land Use:**	Agricultural, Low Density Residential

	Proposed Project	**Existing Site**
Project Built-Upon Area (ac.)	135.4 ac.	37.5 ac.
Typical Cross Section Description:	Future I-295: Grassed ditch median with varying 6:1 to 8:1 side slopes. 4 paved lanes (total 48' wide). 14' shoulder on each side (17' with guardrail). 12' paved shoulder. Varying fill and cut slopes (see project XSC's for detailed information). Buckhorn Road-two 11' paved lanes; Greensprings Road-two 11' paved lanes; Everett Road-two 11' paved lanes w/ varying raised median; US 301-two 12' paved lanes w/ 4' paved shoulders & varying raised median; NC 71-two 12' paved lanes w/ 4' paved shoulders & varying raised median; Parkton Road-two 12' paved lanes w/ 4' paved shoulders & varying raised median; Black Bridge Road-two 12' paved lanes w/ 4' paved shoulders & varying raised median; Waldos Beach Road-two 12' paved lanes; Old Plank Road-two 11' paved lanes; Lake Upchurch Road-two 11' paved lanes; Various Ramps and Loops and Service Roads with 12' paved lanes. (see project XSC's for detailed information)	Buckhorn Road-two 9' paved lanes; Greensprings Road-two 11' paved lanes; Everett Road-two 9' paved lanes; US 301-two 11.5' paved lanes; NC 71-two 12' paved lanes; Parkton Road-two 10' paved lanes; Black Bridge Road-two 11'; Waldos Beach Road-two 9.5' paved lanes; Old Plank Road-two 10' paved lanes; Lake Upchurch Road-two 10' paved lanes.
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 33,100 Year: 2040	Existing: N/A Year: N/A
General Project Narrative: (Description of Minimization of Water Quality Impacts)	The North Carolina Department of Transportation (NCDOT) has proposed to construct Future I-295 between Parkton and Hope Mills, NC. There are ten proposed major structures involved with the construction Future I-295, eight of which are to be constructed at new stream crossing locations. The first proposed structure, over Rockfish Creek, is a multiple span, dual bridge. The proposed bridge is a 3 span (1@130', 2@140'), 63" Florida I-Beams with 4' end bent caps. The proposed bridge will have spill through abutments. This structure has been designed to have as little environmental and surface water impacts as possible. The second major structure, along UT to Rockfish Creek, is a 1@8'x6' RCBC. The third major structure, along UT to Rockfish Creek, is a three span (3@115'), 63" Florida I-Beams with 4' end bent caps. The proposed bridge will have spill through abutments. There are five additional structures that cross Horsepen Branch and/or unnamed tributary of Horsepen Branch: a new single 8'x7' RCBC buried 1' at relocated Parkton Road, a new single 8'x6' RCBC buried 1' at mainline, a new double 8'x7' RCBC buried 1' with flood bench at mainline, replacing a single 6'x5' RCBC with a double 9'x6' RCBC buried 1' at US 301, and replacing a single 60" CMP with double 8'x6' RCBC buried 1' at Green Spring Road. The last two culverts are new crossings over Cold Camp Creek: a double 10'x7' RCBC buried 1' at relocated Parkton Road and a single 10'x7' RCBC buried 1' at mainline. Five dry detention basins were used throughout the project limits to reduce pre/post impacts. Grassed swales were used for treatment when BMP design standards could be met. These grassed swales were used to reduce flow velocity, promote sedimentation, infilitration and runoff attenuation. Velocities at jurisdictional features and wetlands are non-erosive. Deck drains were used along -Y10- spanning both wetlands and an unnamed tributary of Rockfish Creek. The deck drains are not discharged within the stream or the wetlands. Deck drain dissipator pads have been provided directly beneath each set of deck drains to dissipate energy.	

Waterbody Information

Surface Water Body (1):	Long Branch	**NCDWR Stream Index No.:**	14-22-1-2-1		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Swamp Waters (Sw)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:			**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)					

North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element:	34817.3.4	TIP No.:	U-2519 AA-AB	County(ies):	Cumberland Robeson	Page	2	of	3

Additional Waterbody Information

Surface Water Body (2):	Horsepen Branch		**NCDWR Stream Index No.:**	14-22-1-1-1	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Swamp Waters (Sw)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:				**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):	Cold Camp Creek		**NCDWR Stream Index No.:**	14-22-1-1	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Swamp Waters (Sw)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:				**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 (4):	Buckhorn Swamp		**NCDWR Stream Index No.:**	14-22-1-1	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Swamp Waters (Sw)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:				**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 (5):	Rockfish Creek		**NCDWR Stream Index No.:**	18-31-(23)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	None		
Other Stream Classification:					
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:				**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	No	**Dissipator Pads Provided in Buffer?**	N/A
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)					

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 34817.3.4 **TIP No.:** U-2519 AA-AB **County(ies):** Cumberland Robeson

Other Best Management Practices

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	BMP Type	Drainage Area (ac)	New Built-Upon Area (ac)	Volume Treated (ac-ft)	Precipitation Depth Treated over NBUA (in)	BMP Associated w/ Buffer Rules?
18	26+26 -Y10RPC- LT N: 435745.3, E: 2001573.6	(2)UT to Rockfish Creek	Dry Detention Basin	17.1	7.2	0.71	1.25	No
18	12+69 -Y10B- LT N: 436081.0, E: 2002090.1	(2)UT to Rockfish Creek	Dry Detention Basin	9.9	2.2	0.21	1.21	No
24	297+50 -L- LT N: 441950.7, E: 1998011.4	(5)Rockfish Creek	Dry Detention Basin	17.2	5.7	0.56	1.24	No
24	303+63 -L- LT N: 441940.0. E: 1997374.8	(5)Rockfish Creek	Dry Detention Basin	3.5	1.5	0.15	1.26	No
57	24+26 -Y10B- LT N: 437184.7, E: 2001735.5	(2)UT to Rockfish Creek	Dry Detention Basin	4.6	1.6	0.09	0.71	No

Additional Comments

CONTRACT: C204043 TIP PROJECT: U-2519AA&AB

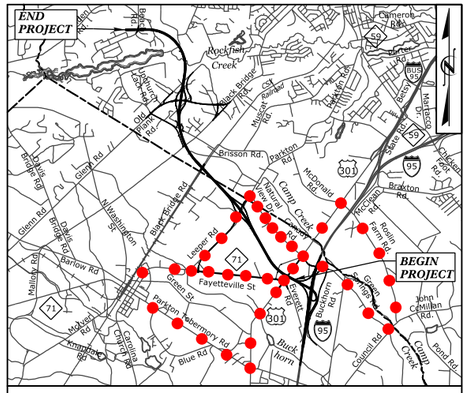
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PERMIT DRAWING
SHEET 1 OF 132

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2519AA&AB	1	132

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34817.3.4	NHP-1118(11)	P.E., ROW, UTILITIES & CONSTRUCTION

CUMBERLAND COUNTY /ROBESON COUNTY



VICINITY MAP N.T.S.

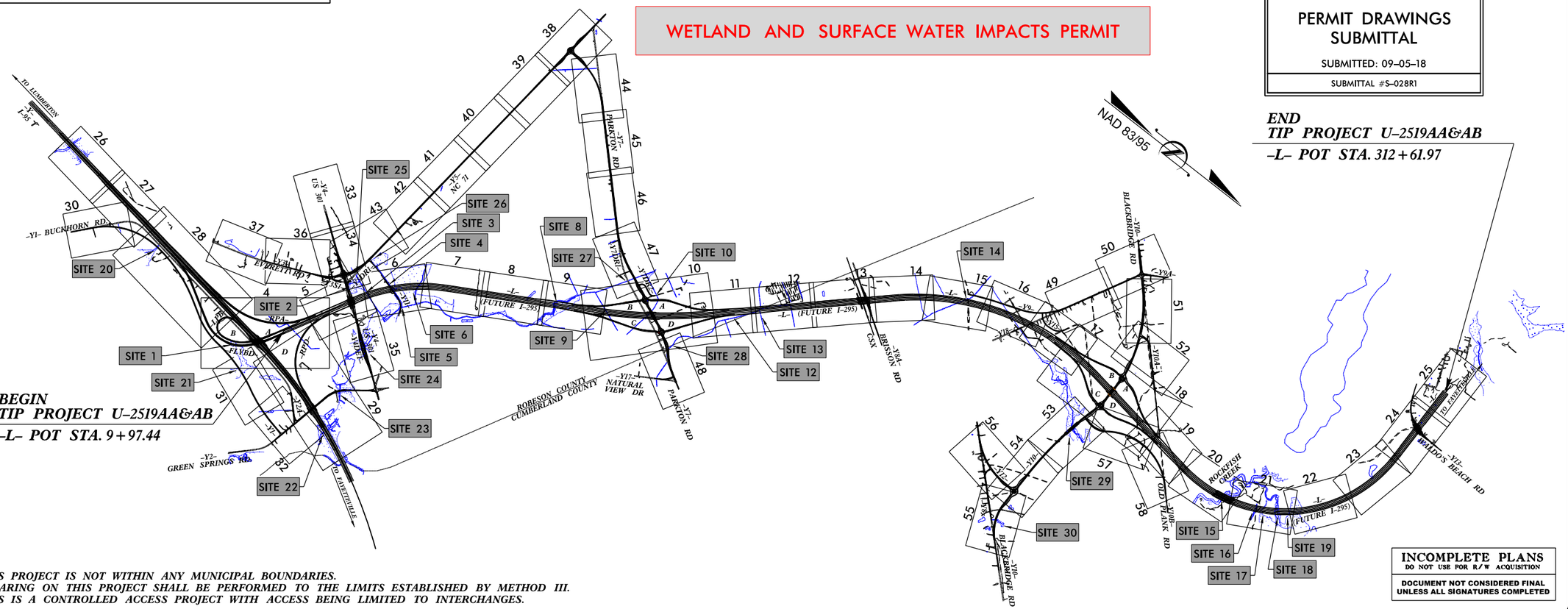
LOCATION: FUTURE I-295 – FAYETTEVILLE OUTER LOOP FROM I-95 IN ROBESON COUNTY TO SOUTH OF SR 1003 (CAMDEN ROAD) IN CUMBERLAND COUNTY

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING AND STRUCTURES

WETLAND AND SURFACE WATER IMPACTS PERMIT

PERMIT DRAWINGS SUBMITTAL
SUBMITTED: 09-05-18
SUBMITTAL #S-028R1

END TIP PROJECT U-2519AA&AB
-L- POT STA. 312+61.97



BEGIN TIP PROJECT U-2519AA&AB
-L- POT STA. 9+97.44

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100 PLANS

50 25 0 50 100 PROFILE (HORIZONTAL)

10 5 0 10 20 PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 25,000
ADT 2040 = 33,100
K = 8%
D = 55%
T = 12%*
V = 70 MPH
* (TTST=4%+DUAL 8%)
FUNC. CLASSIFICATION = INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2519AA & AB = 5.582 MILES
LENGTH STRUCTURE TIP PROJECT U-2519AA & AB = 0.150 MILES *
TOTAL LENGTH OF TIP PROJECT U-2519AA & AB = 5.732 MILES
* LENGTH BASED OFF NB BRIDGES

NCDOT CONTACT: K. ZAK HAMIDI, PE
PROJECT ENGINEER – DESIGN BUILD UNIT

PLANS PREPARED FOR THE NCDOT BY:
Balfour Beatty Infrastructure Inc. BRANCH CIVIL in association with STV 100 Years
A Joint Venture

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: NOVEMBER 21, 2017

LETTING DATE: NOVEMBER 21, 2017

JOSEPH A. FREEMAN, PE
DESIGN PROJECT MANAGER

ETHAN P. WRIGHT, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

9/5/2018
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pugkms

PERMIT DRAWING
SHEET 2 OF 132

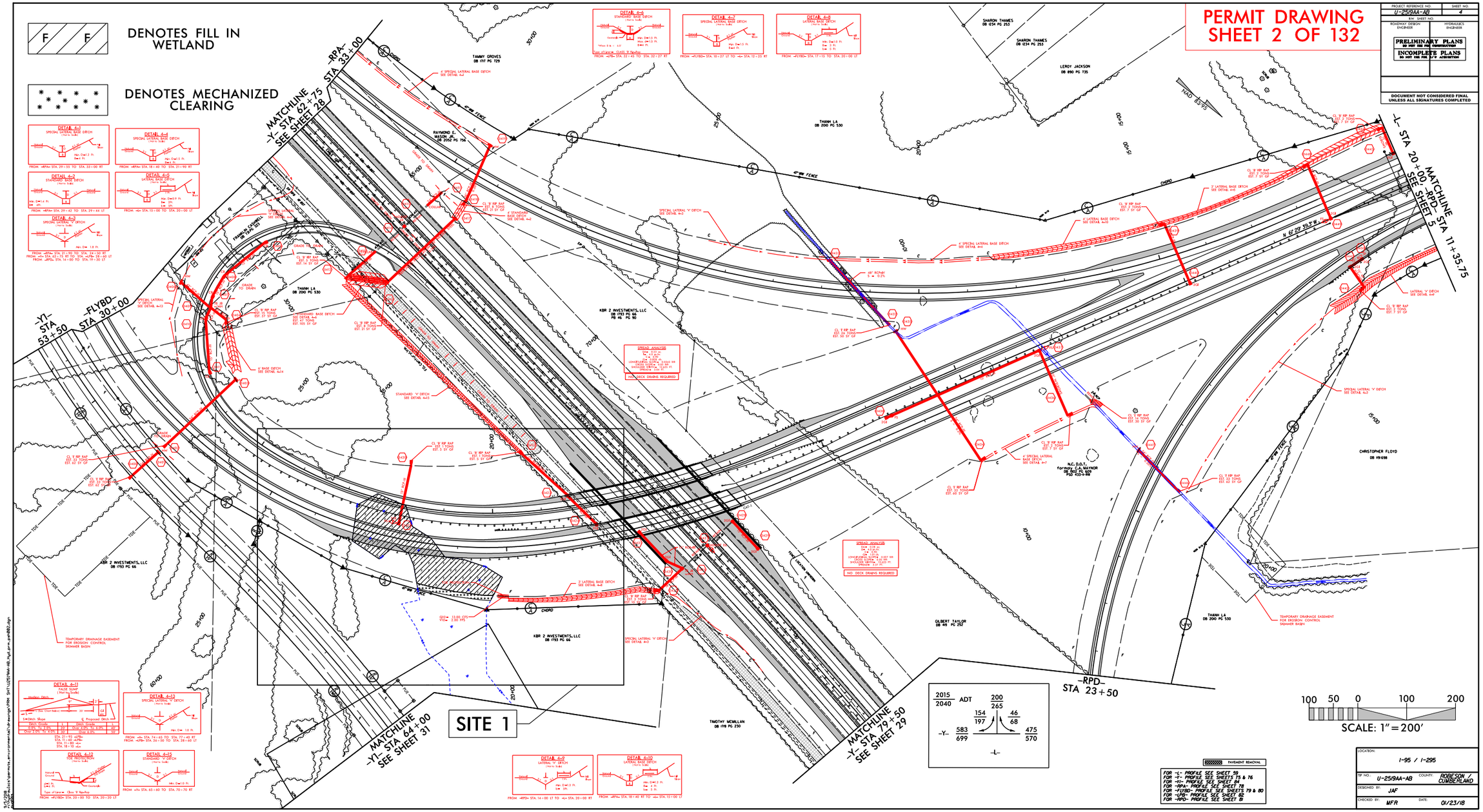
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F — DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING



PERMIT DRAWING
SHEET 3 OF 132

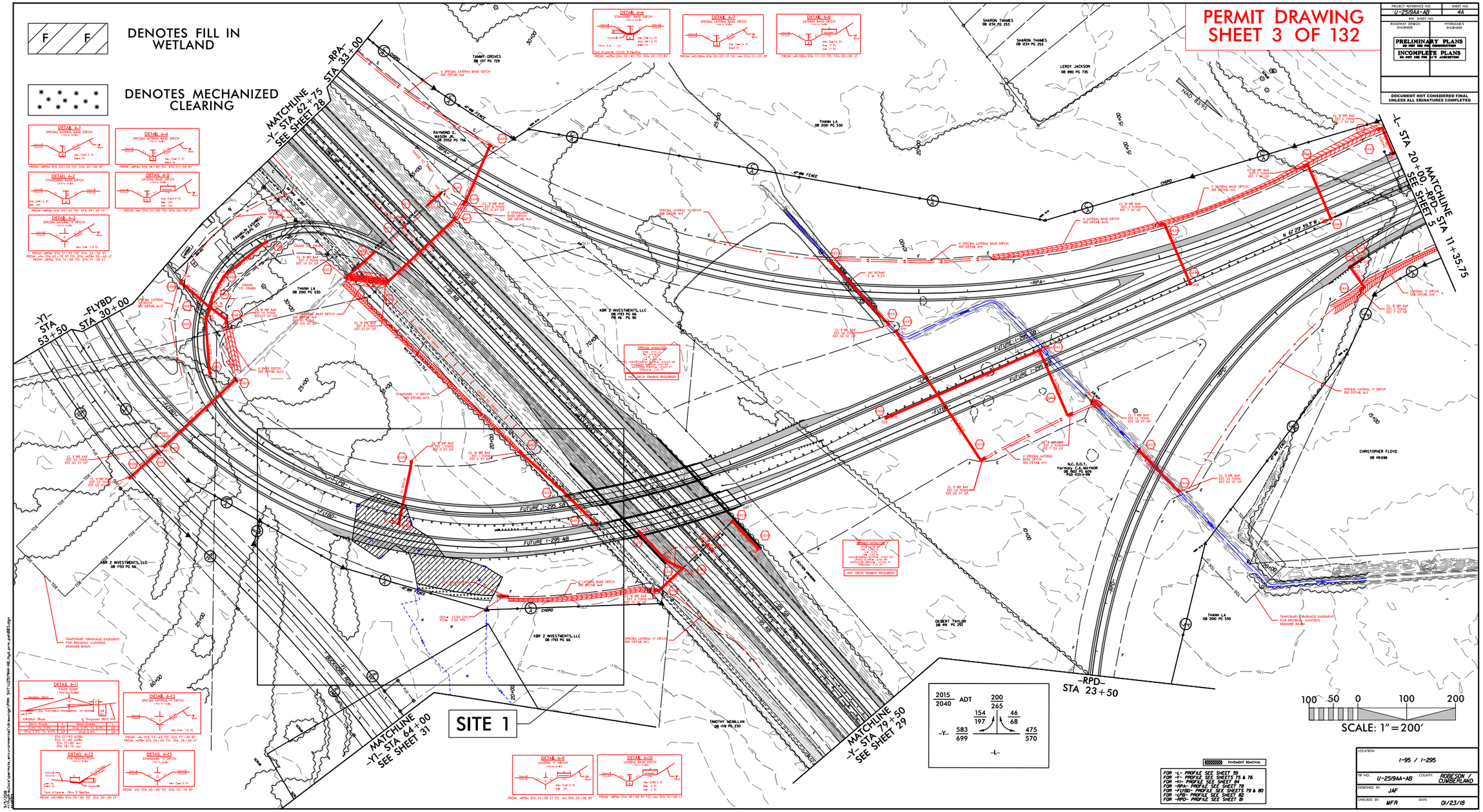
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	4A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F — DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING



PAVEMENT REMOVAL

FOR -L- PROFILE SEE SHEET 59
FOR -Y- PROFILE SEE SHEETS 75 & 76
FOR -Y1- PROFILE SEE SHEET 84
FOR -RPA- PROFILE SEE SHEET 78
FOR -FLYBD- PROFILE SEE SHEETS 79 & 80
FOR -LPD- PROFILE SEE SHEET 82
FOR -RPD- PROFILE SEE SHEET 81

LOCATION:	I-95 / I-295
TIP NO.: U-2519AA-AB	COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF	
CHECKED BY: MFR	DATE: 01/23/18

3/5/2018
C:\pwworking\mvc\mvcmacro\sf-mvcmpl.MVM SHT\U2519AA-AB_Hyd_Prm_Sht03A.dgn

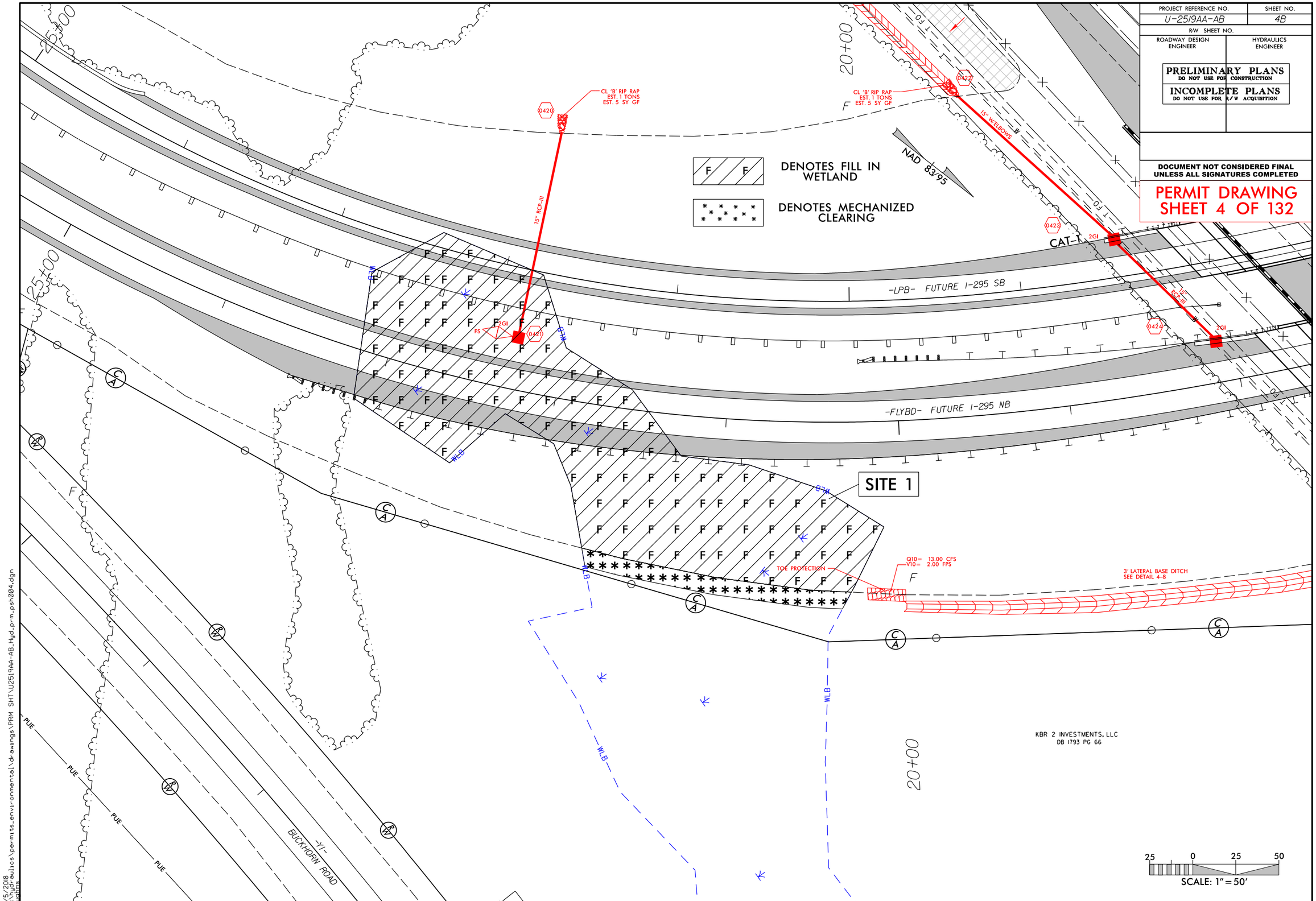
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	4B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 4 OF 132



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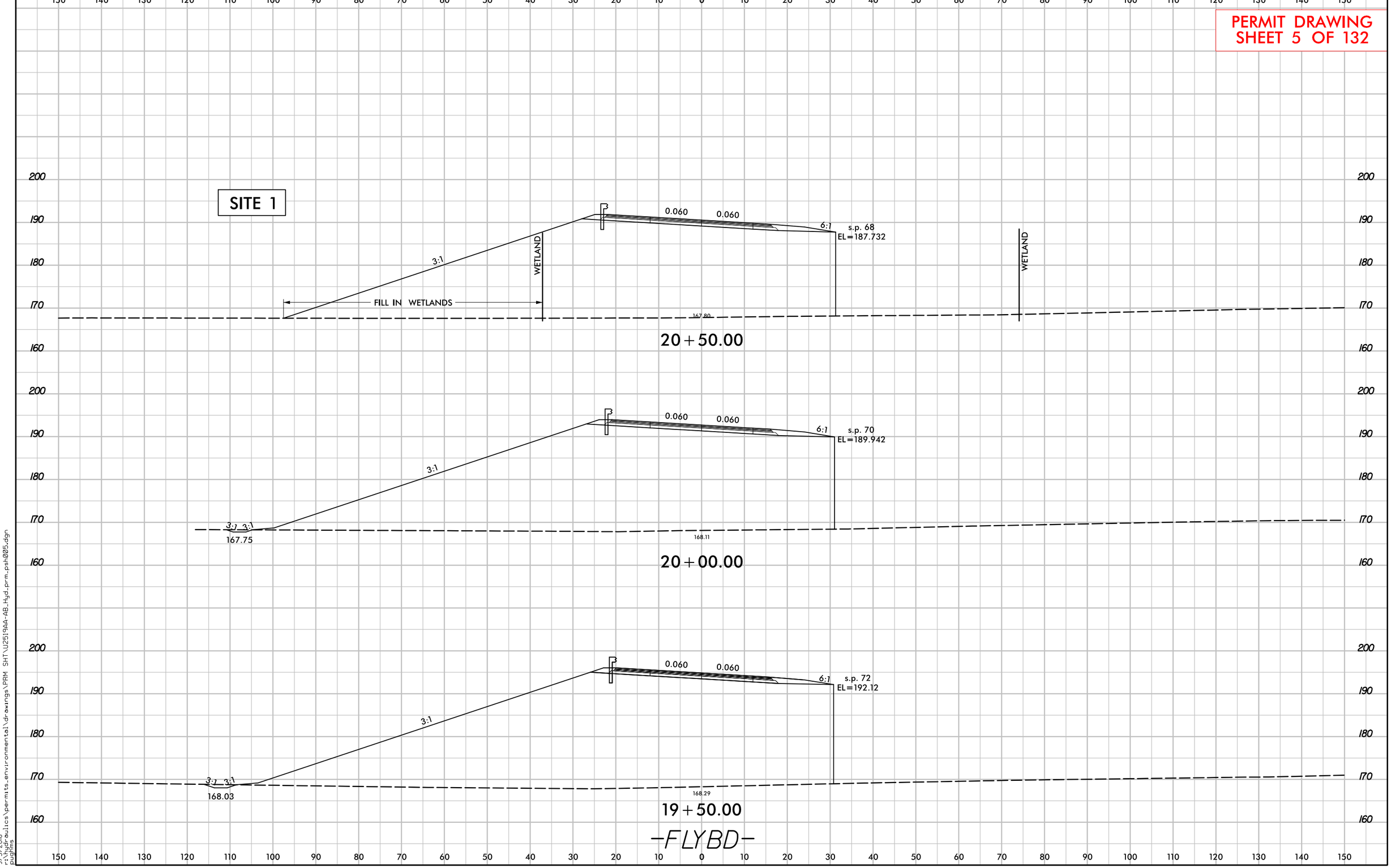
PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-267

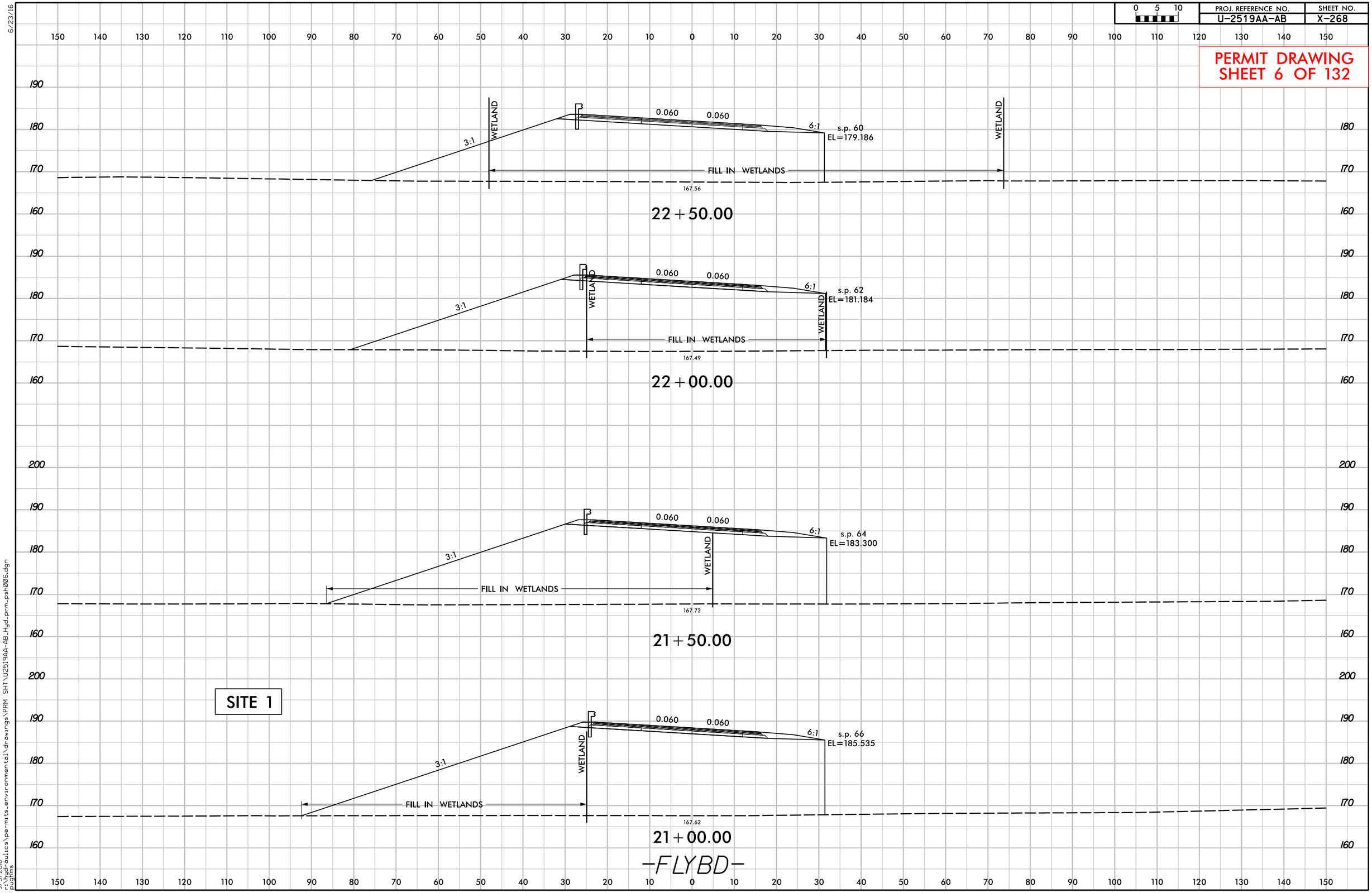
PERMIT DRAWING
SHEET 5 OF 132



6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-268

PERMIT DRAWING
SHEET 6 OF 132



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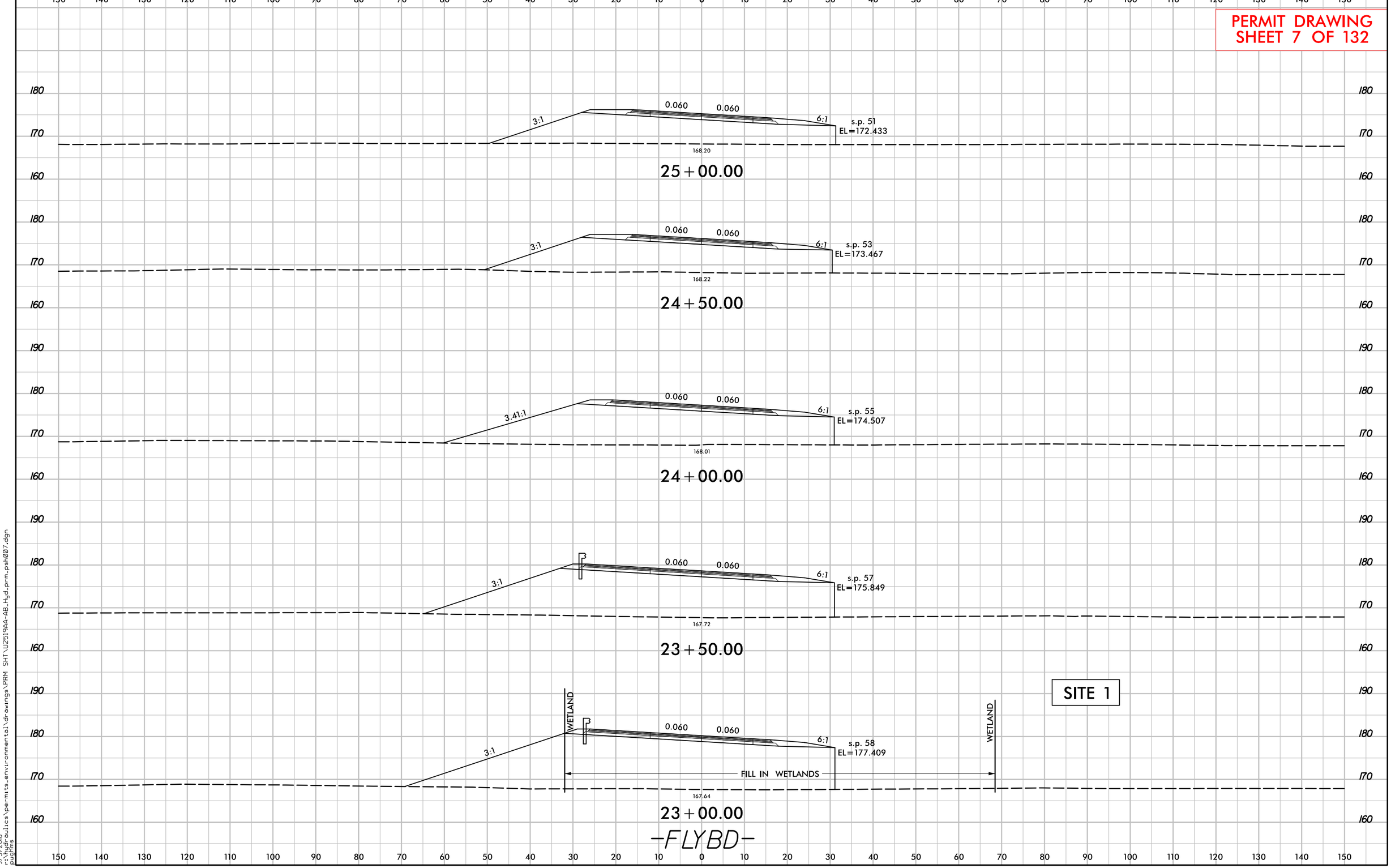
6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-269

0 5 10

PERMIT DRAWING
SHEET 7 OF 132



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PERMIT DRAWING
SHEET 8 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

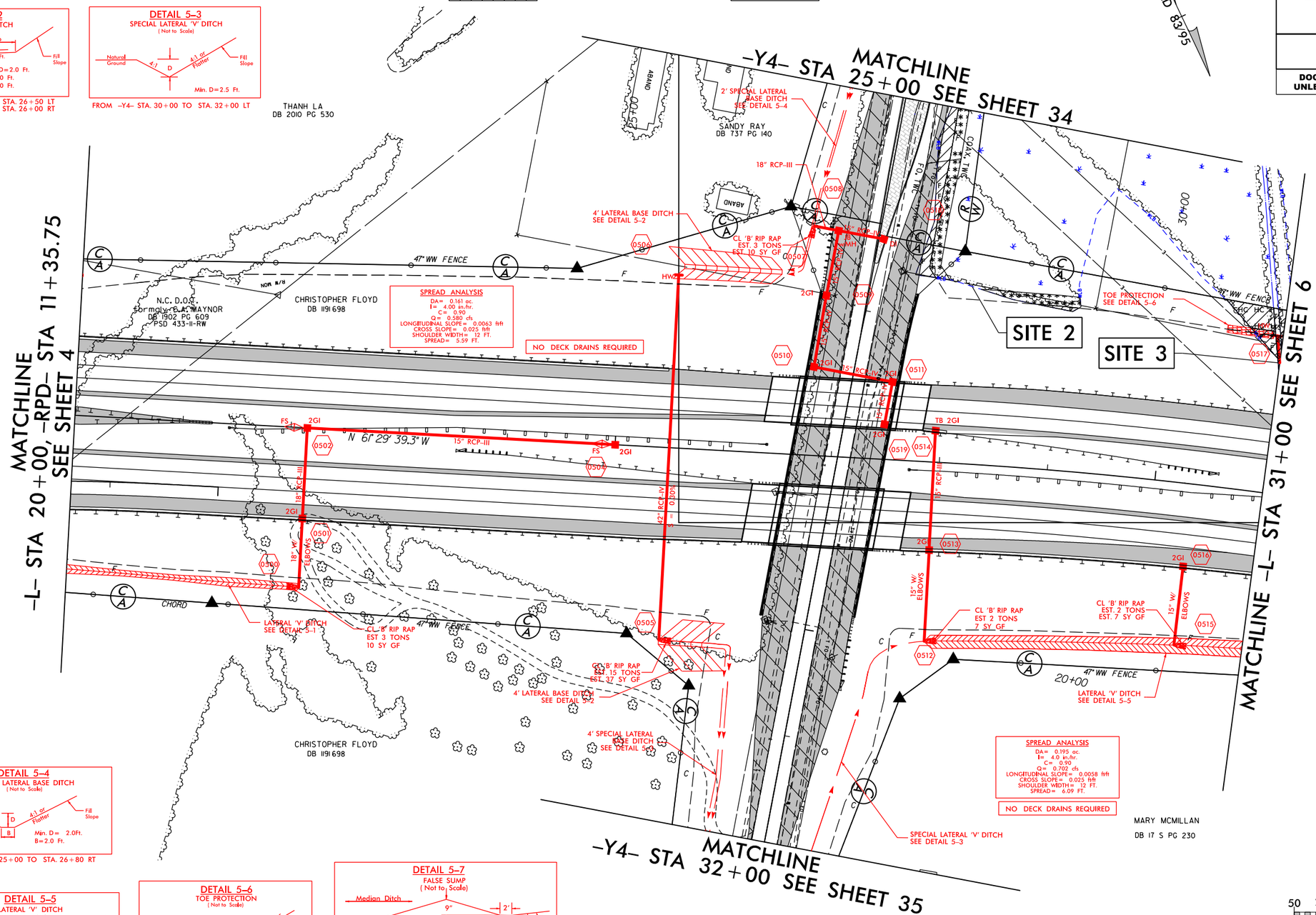
HC HC DENOTES HAND CLEARING

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

NAD 83/95



DETAIL 5-1
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 3:1, D, 3:1, b, 1'/Ft., Fill Slope
Min. D=1.1 Ft.
b= 5Ft.
FROM -L- STA. 20+00 TO STA. 22+15 RT

DETAIL 5-2
LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 3:1, D, B, 3:1, b, 1'/Ft., Fill Slope
Min. D=2.0 Ft.
B=4.0 Ft.
b=5.0 Ft.
FROM -L- STA. 25+50 TO STA. 26+50 LT
FROM -L- STA. 25+50 TO STA. 26+00 RT

DETAIL 5-3
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 4:1, D, 4:1 or Flatter, Fill Slope
Min. D=2.5 Ft.
FROM -Y4- STA. 30+00 TO STA. 32+00 LT

DETAIL 5-4
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 3:1, D, B, 3:1 or Flatter, Fill Slope
Min. D= 2.0Ft.
B=2.0 Ft.
FROM -Y4- STA. 25+00 TO STA. 26+80 RT

DETAIL 5-5
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 3:1, D, 3:1, b, 1'/Ft., Fill Slope
Min. D=1.4 Ft.
b= 5Ft.
FROM -L- STA. 27+66 TO STA. 31+00 RT

DETAIL 5-6
TOE PROTECTION
(Not to Scale)
Natural Ground, b, 3:1 or Flatter Fill Slope, d, Geotextile
d=1 Ft.
b=4 Ft.
Type of Liner= Class 'B' Rip-Rap
FROM -L- STA. 30+50 TO STA. 30+94 LT

DETAIL 5-7
FALSE SUMP
(Not to Scale)
Median Ditch, 9", 2', L (See Chart Below), 20', GI etc., S
S=Ditch Slope
℄ Proposed Ditch

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 22+00 -L-
STA. 24+90 -L-

50 25 0 50 100
SCALE: 1" =100'

FOR -L- PROFILE SEE SHEET 59
FOR -Y4- PROFILE SEE SHEETS 87 & 88
FOR -RPD- PROFILE SEE SHEET 81

9/5/2018
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PERMIT DRAWING
SHEET 9 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	5A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

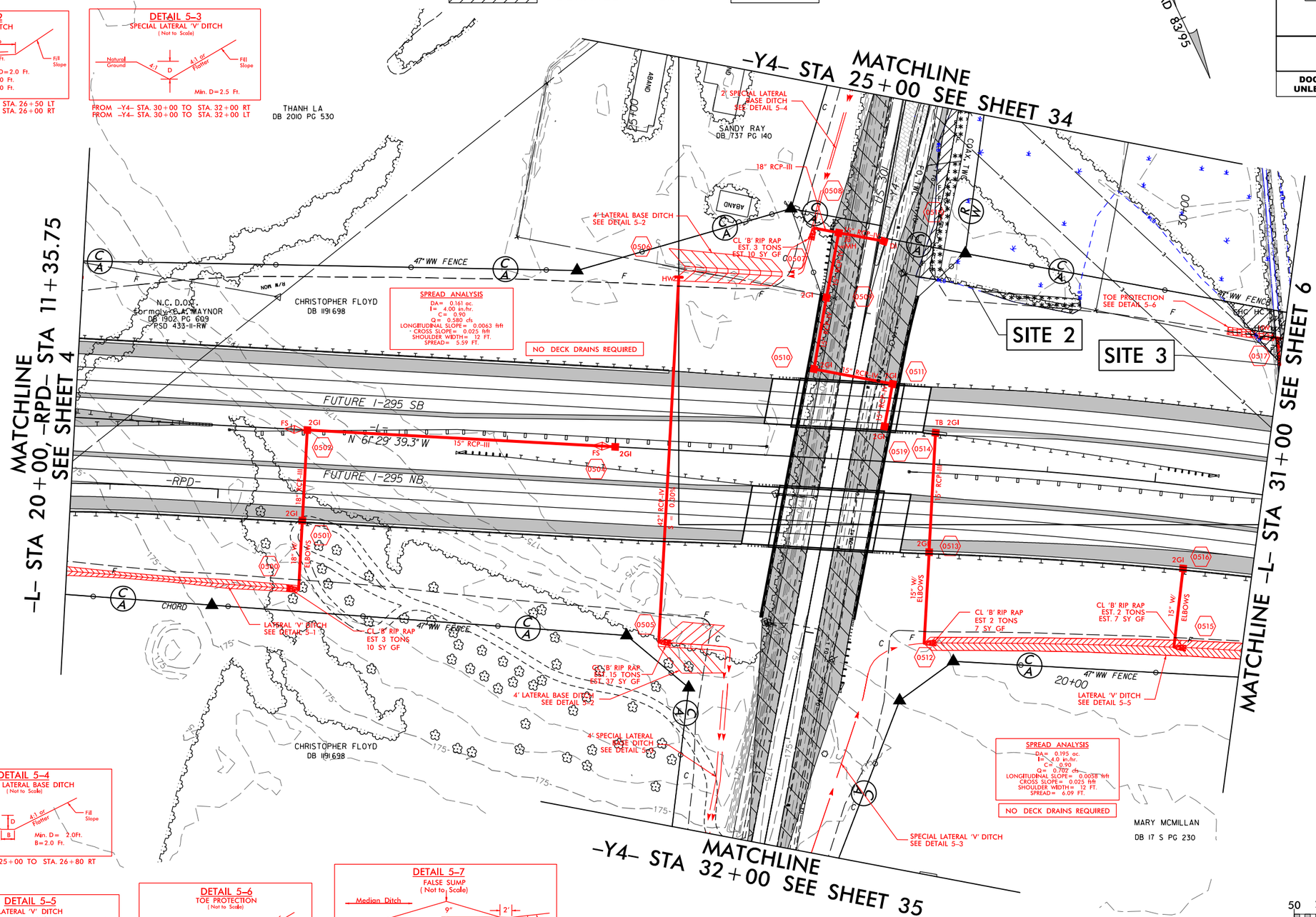
HC HC DENOTES HAND CLEARING

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

NAD 83/95



DETAIL 5-1
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 3:1, D, 3:1, b, 1'/Ft., Fill Slope
Min. D = 1.1 Ft.
b = 5Ft.
FROM -L- STA. 20+00 TO STA. 22+15 RT

DETAIL 5-2
LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 3:1, D, 3:1, b, 1'/Ft., B, Fill Slope
Min. D = 2.0 Ft.
B = 4.0 Ft.
b = 5.0 Ft.
FROM -L- STA. 25+50 TO STA. 26+50 LT
FROM -L- STA. 25+50 TO STA. 26+00 RT

DETAIL 5-3
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 4:1, D, 4:1 or Flatter, Fill Slope
Min. D = 2.5 Ft.
FROM -Y4- STA. 30+00 TO STA. 32+00 RT
FROM -Y4- STA. 30+00 TO STA. 32+00 LT

DETAIL 5-4
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 3:1, D, B, 4:1 or Flatter, Fill Slope
Min. D = 2.0Ft.
B = 2.0 Ft.
FROM -Y4- STA. 25+00 TO STA. 26+80 RT

DETAIL 5-5
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 3:1, D, 3:1, b, 1'/Ft., Fill Slope
Min. D = 1.4 Ft.
b = 5Ft.
FROM -L- STA. 27+66 TO STA. 31+00 RT

DETAIL 5-6
TOE PROTECTION
(Not to Scale)
Natural Ground, b, 3:1 or Flatter Fill Slope, d, Geotextile
d = 1 Ft.
b = 4 Ft.
Type of Liner = Class 'B' Rip-Rap
FROM -L- STA. 30+50 TO STA. 30+94 LT

DETAIL 5-7
FALSE SUMP
(Not to Scale)
Median Ditch, 9", 2', L (See Chart Below), 20', GI etc., S
S = Ditch Slope
℄ Proposed Ditch

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 22+00 -L-
STA. 24+90 -L-

FOR -L- PROFILE SEE SHEET 59
FOR -Y4- PROFILE SEE SHEETS 87 & 88
FOR -RPD- PROFILE SEE SHEET 81

9/5/2018
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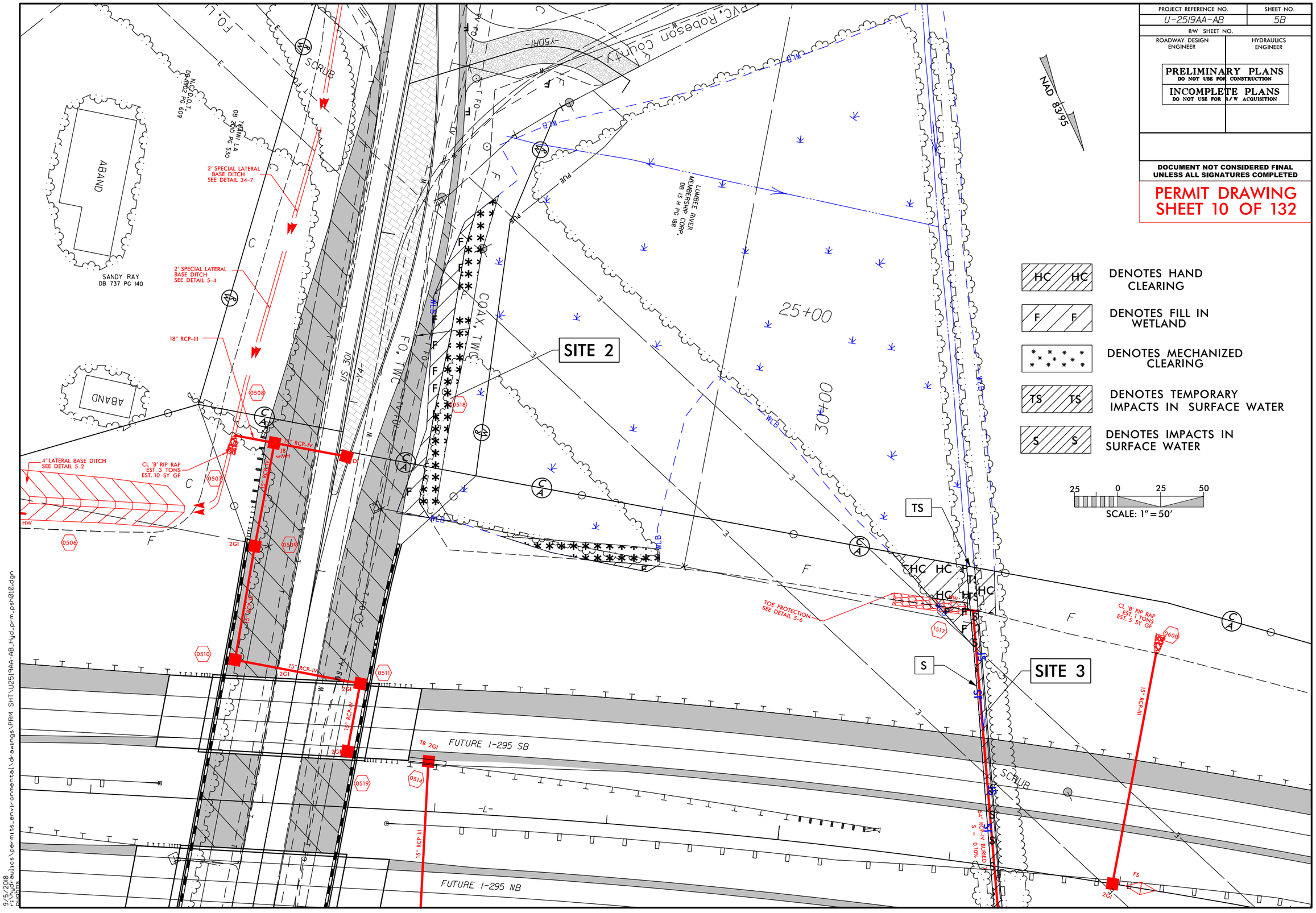
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	5B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 10 OF 132



HC HC	DENOTES HAND CLEARING
F F	DENOTES FILL IN WETLAND
* * * * * *	DENOTES MECHANIZED CLEARING
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S	DENOTES IMPACTS IN SURFACE WATER

9/5/2018
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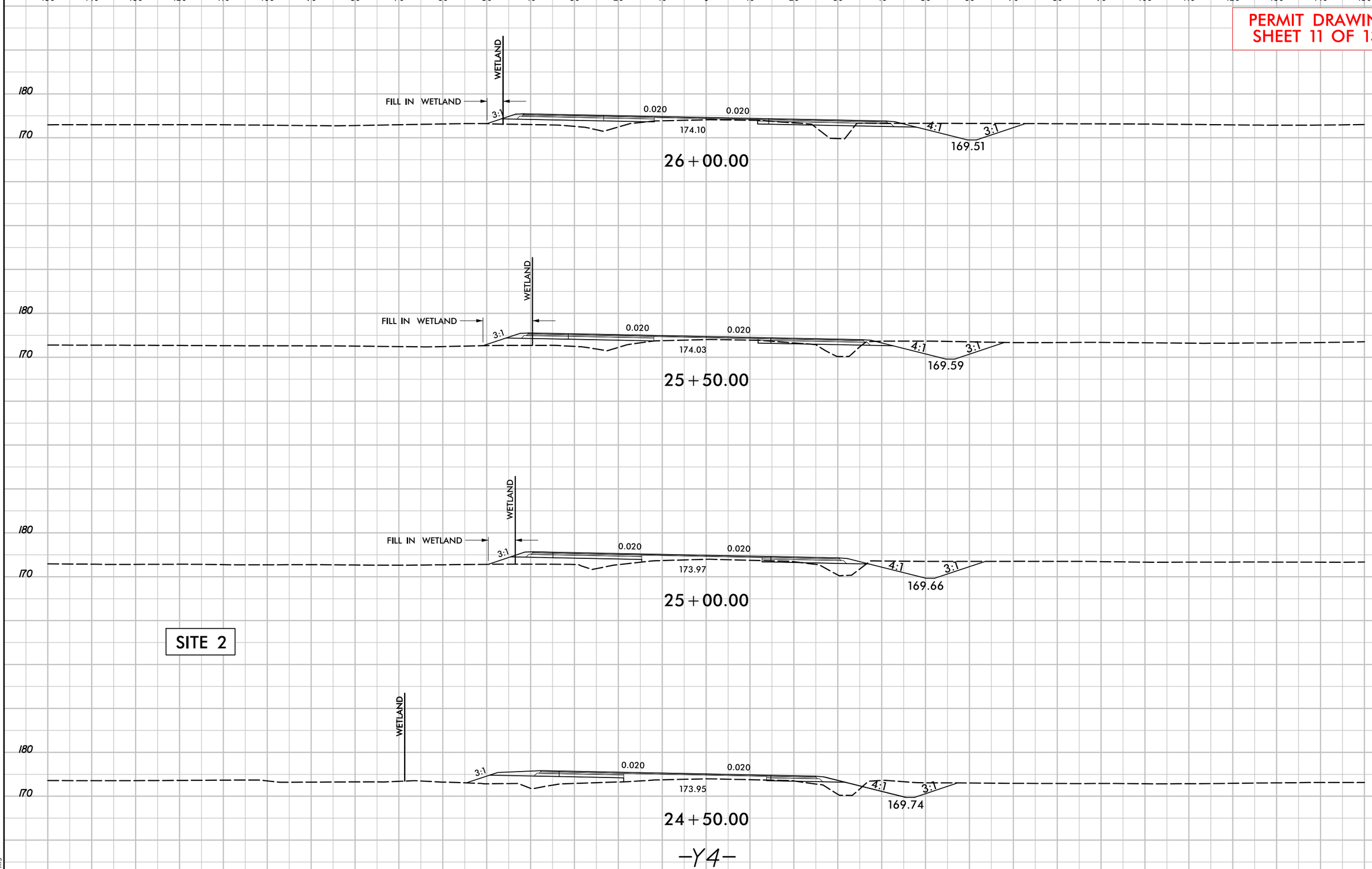
6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-408

PERMIT DRAWING
SHEET 11 OF 132



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pughins

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 12 OF 132

DETAIL 6-3
FALSE SUMP
(Not to Scale)

Median Ditch; 9"; 2'; L (See Chart Below); 20'; GI etc.; S; S=Ditch Slope; ℄ Proposed Ditch

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 32+10 -L-
STA. 35+60 -L-
STA. 37+60 -L-
STA. 43+40 -L-

E E — DENOTES EXCAVATION IN WETLAND

MYRA HAGEN DB 17 S PG 230

HC HC — DENOTES HAND CLEARING

F F — DENOTES FILL IN WETLAND

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 6-1
LATERAL 'V' DITCH
(Not to Scale)

Natural Ground; 3:1; D; 2:1; b; 1'Ft.; Fill Slope; Min. D=1.4 Ft. b= 5Ft.

FROM -L- STA. 31+00 TO STA. 31+60 RT
FROM -L- STA. 37+75 TO STA. 39+00 RT

DETAIL 6-2
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground; 3:1; D; 4:1 or Flatter; B; Fill Slope; Min. D=2.0 Ft. B=8 Ft.

FROM -L- STA. 44+75 TO STA. 45+00 LT

DETAIL 6-4
TOE PROTECTION
(Not to Scale)

Natural Ground; b; 3:1 or Flatter; Fill Slope; d; Geotextile; d=1 Ft. b=4 Ft.; Type of Liner= Class 'B' Rip-Rap

FROM -L- STA. 44+00 TO STA. 44+54 LT

DETAIL 6-5
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)

Natural Ground; Natural Bed Elevation; 1.25'; Geotextile; Channel Bed (Variable); Length= 18.0 Ft.; Type of Liner= CL 'I' Rip-Rap - Keyed-In

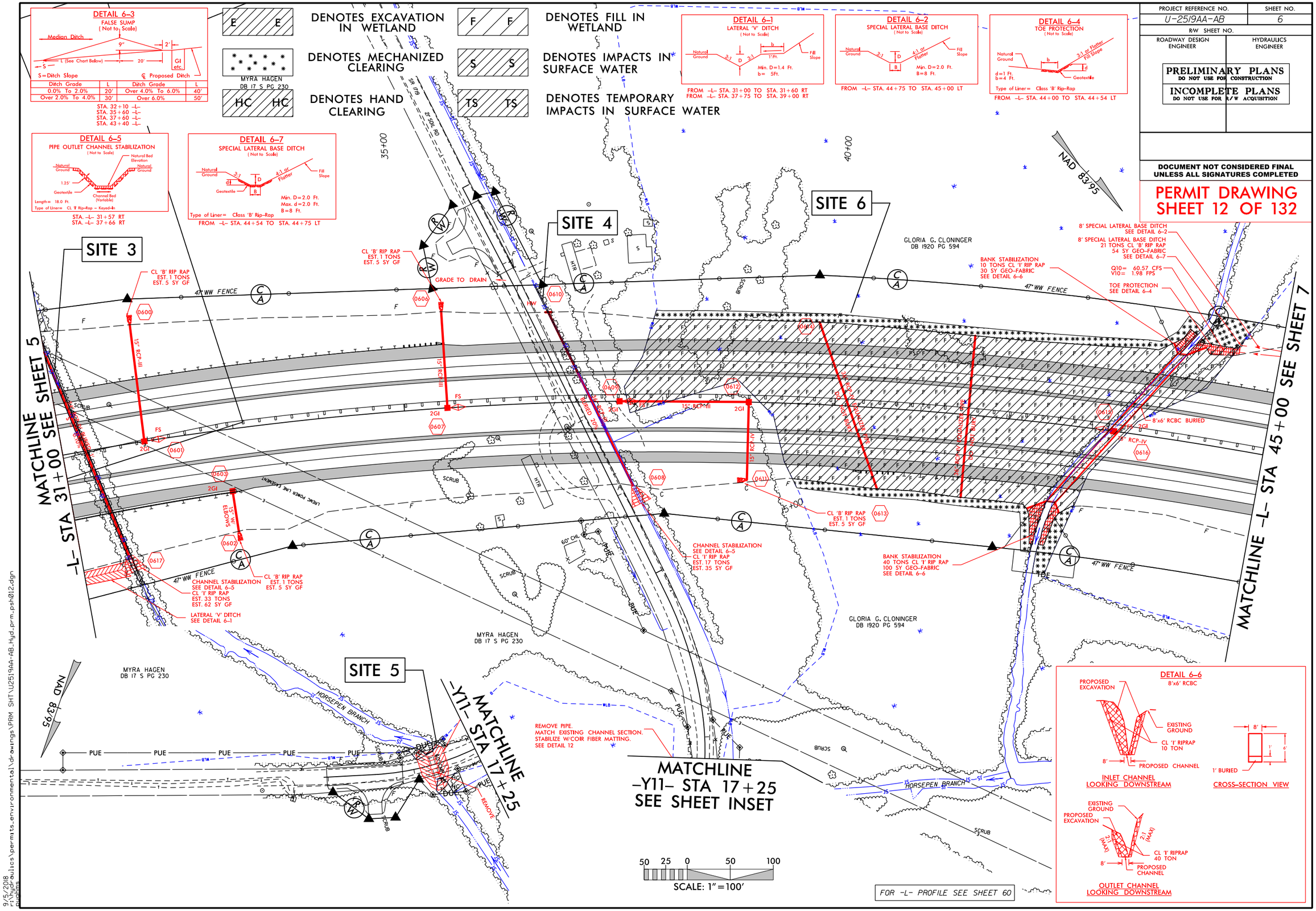
STA. -L- 31+57 RT
STA. -L- 37+66 RT

DETAIL 6-7
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground; 3:1; d; D; B; 4:1 or Flatter; Fill Slope; Geotextile; Min. D=2.0 Ft. Max. d=2.0 Ft. B=8 Ft.

Type of Liner= Class 'B' Rip-Rap

FROM -L- STA. 44+54 TO STA. 44+75 LT



DETAIL 6-6
8'x6' RCBC

9/5/2018
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ORIGINAL

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	6A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 13 OF 132

DETAIL 6-3
FALSE SUMP
(Not to Scale)

Median Ditch; 9"; 2'; L (See Chart Below); 20'; GI etc.; S; S=Ditch Slope; ℄ Proposed Ditch

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 32+10 -L-
STA. 35+60 -L-
STA. 37+60 -L-
STA. 43+40 -L-

E E — DENOTES EXCAVATION IN WETLAND

MYRA HAGEN DB 17 S PG 230 — DENOTES MECHANIZED CLEARING

HC HC — DENOTES HAND CLEARING

F F — DENOTES FILL IN WETLAND

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 6-1
LATERAL 'V' DITCH
(Not to Scale)

Natural Ground; 3:1; D; 2:1; b; 1'Ft.; Fill Slope; Min. D=1.4 Ft. b= 5Ft.

FROM -L- STA. 31+00 TO STA. 31+60 RT
FROM -L- STA. 37+75 TO STA. 39+00 RT

DETAIL 6-2
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground; 3:1; D; 4:1 or Flatter; B; Fill Slope; Min. D=2.0 Ft. B=8 Ft.

FROM -L- STA. 44+75 TO STA. 45+00 LT

DETAIL 6-4
TOE PROTECTION
(Not to Scale)

Natural Ground; b; 3:1 or Flatter; Fill Slope; d; Geotextile; d=1 Ft. b=4 Ft.; Type of Liner= Class 'B' Rip-Rap

FROM -L- STA. 44+00 TO STA. 44+54 LT

DETAIL 6-5
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)

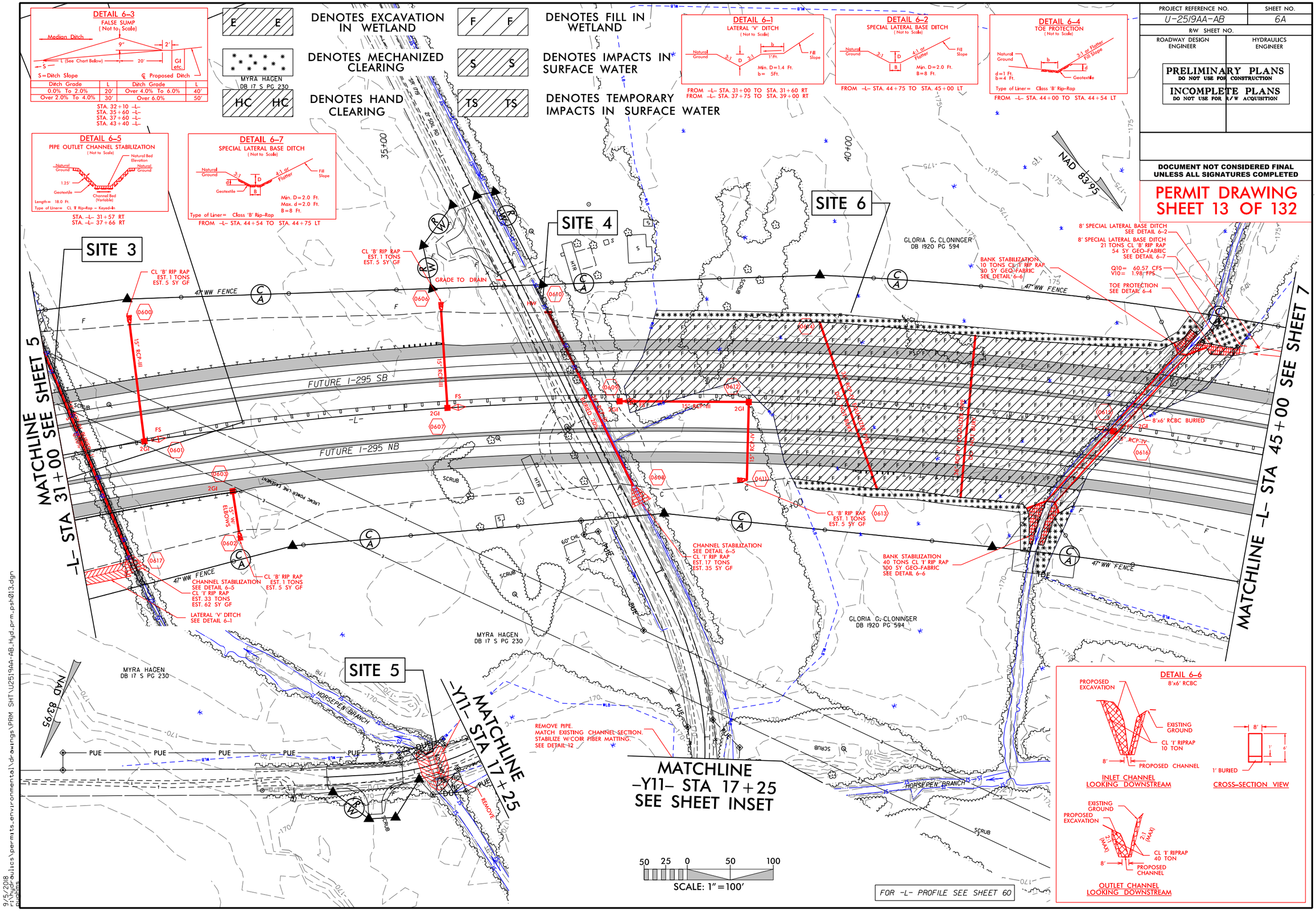
Natural Ground; Natural Bed Elevation; 1.25'; Geotextile; Channel Bed (Variable); Length= 18.0 Ft.; Type of Liner= CL 'I' Rip-Rap - Keyed-In

STA. -L- 31+57 RT
STA. -L- 37+66 RT

DETAIL 6-7
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground; 3:1; d; D; 4:1 or Flatter; B; Geotextile; Fill Slope; Min. D=2.0 Ft. Max. d=2.0 Ft. B=8 Ft.; Type of Liner= Class 'B' Rip-Rap

FROM -L- STA. 44+54 TO STA. 44+75 LT



DETAIL 6-6
8'x6' RCBC

9/5/2018
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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	6B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 14 OF 132

S/S DENOTES IMPACTS IN SURFACE WATER

TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

HC/HC DENOTES HAND CLEARING

F/F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

NAD 83/95

SITE 2

SITE 3

TS

S

TS

WLB

30+00

35+00

20+00

FUTURE I-295 SB

FUTURE I-295 NB

-L-

SCRUB

LREMC POWER LINE EASEMENT

TOE PROTECTION
SEE DETAIL 5-6

CL 'B' RIP RAP
EST. 1 TONS
EST. 5 SY GF

15" RCP-III

54" RCP-IV BURIED
S = 0.0%

FS

2GI

TB 2GI

15" RCP-III

15" W/ ELBOWS

CL 'B' RIP RAP
EST 2 TONS
7 SY GF

LATERAL 'V' DITCH
SEE DETAIL 5-5

CL 'B' RIP RAP
EST. 2 TONS
EST. 7 SY GF

CHANNEL STABILIZATION
SEE DETAIL 6-5
CL 'I' RIP RAP
EST. 33 TONS
EST. 62 SY GF

LATERAL 'V' DITCH
SEE DETAIL 6-1

0512 0513 0514 0515 0516 0517 0600 0601 0602 0603 0617

25 0 25 50
SCALE: 1" = 50'

9/5/2018
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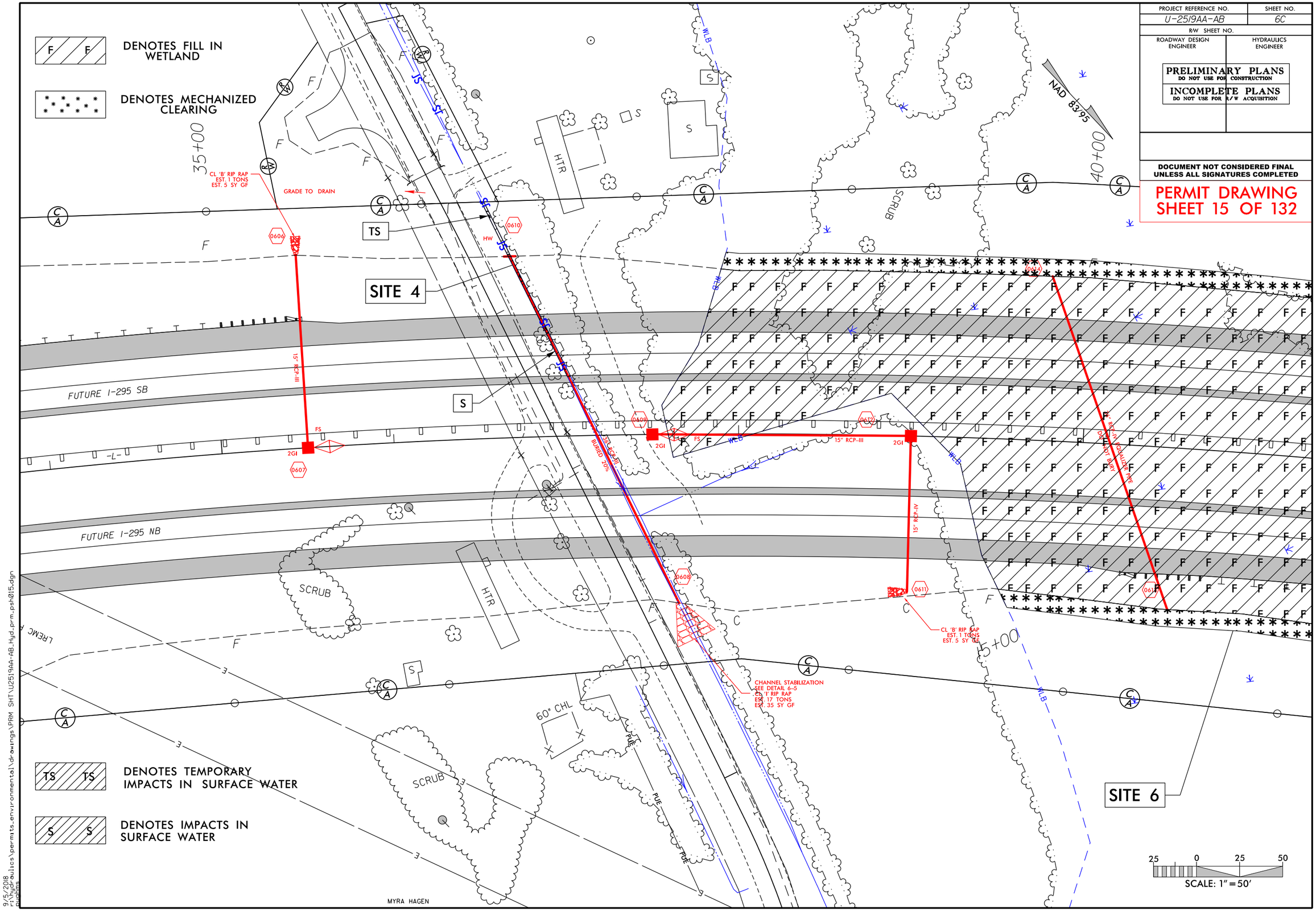
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	6C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 15 OF 132



MYRA HAGEN

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plotting

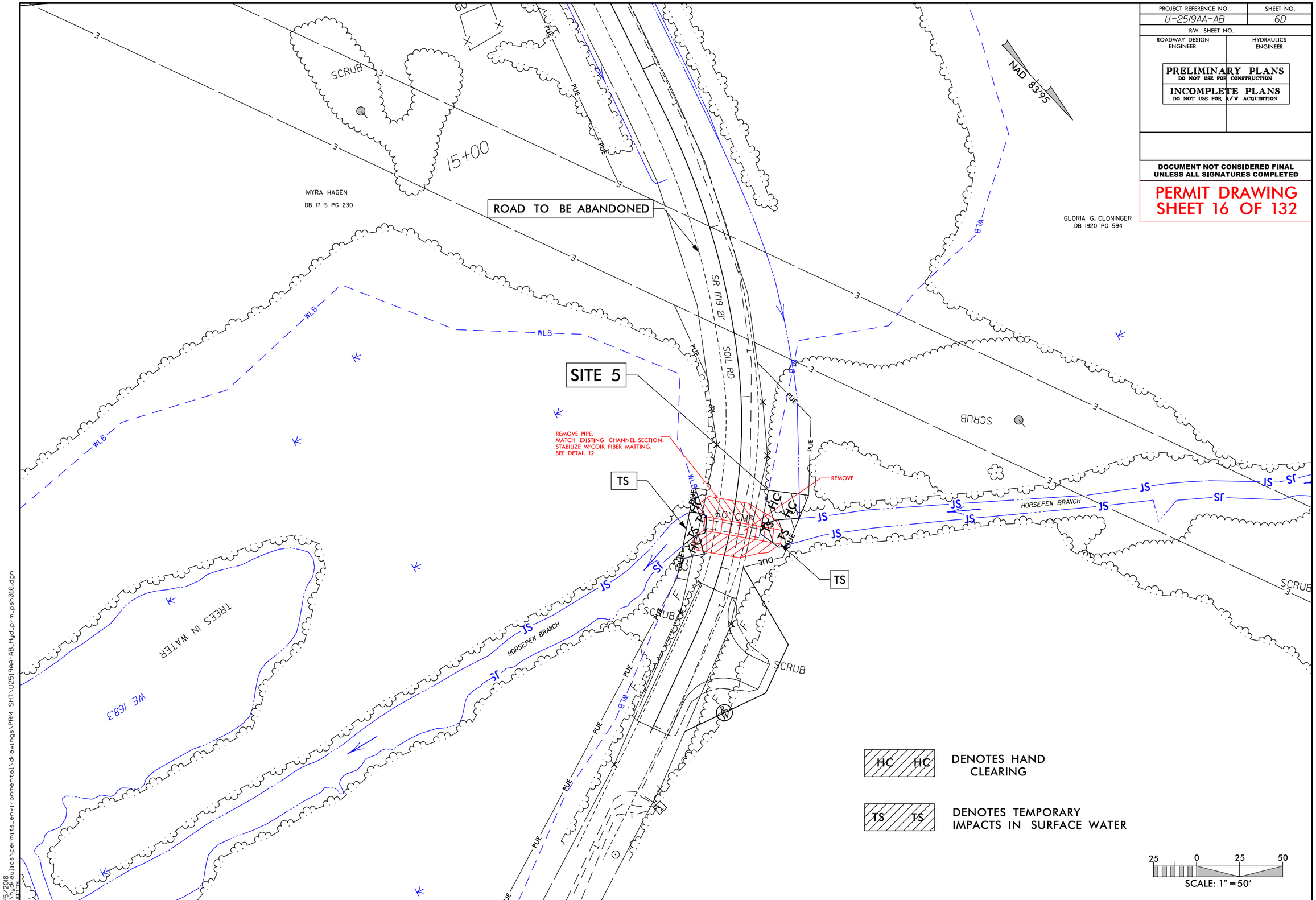
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	6D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 16 OF 132



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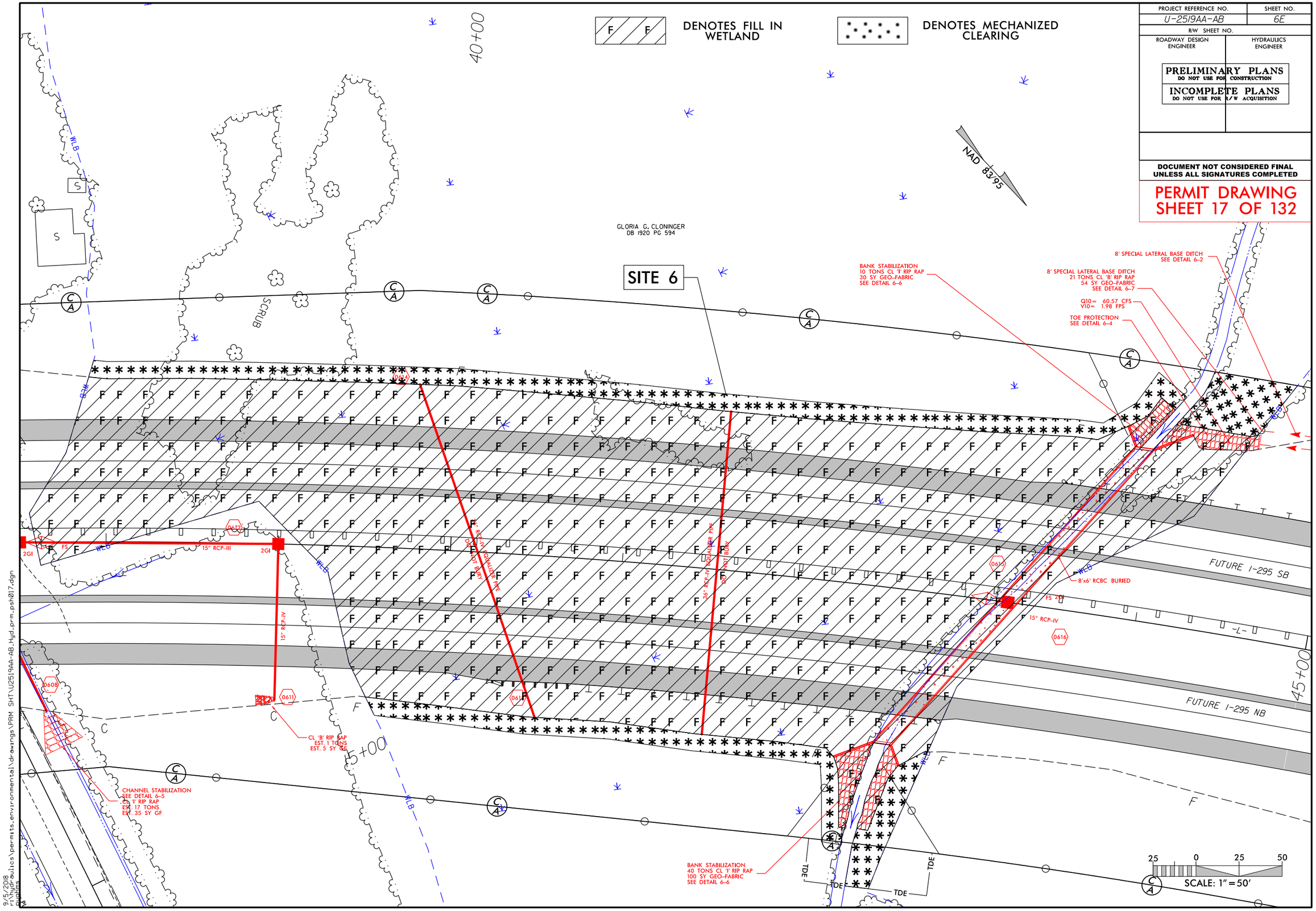
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	6E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 17 OF 132



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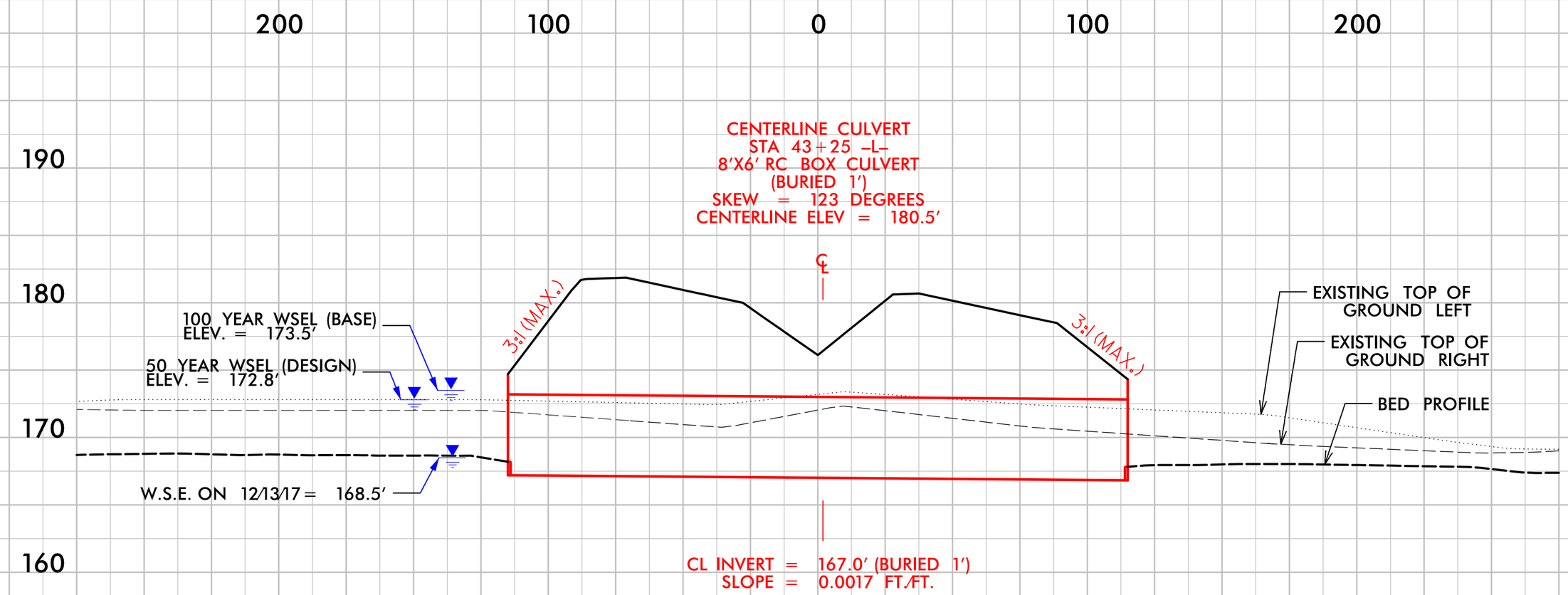
PERMIT DRAWING
SHEET 18 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	6F
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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PERMIT DRAWING
SHEET 19 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	60

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PIPE HYDRAULIC DATA
54" RCP-IV Sta. 31+27

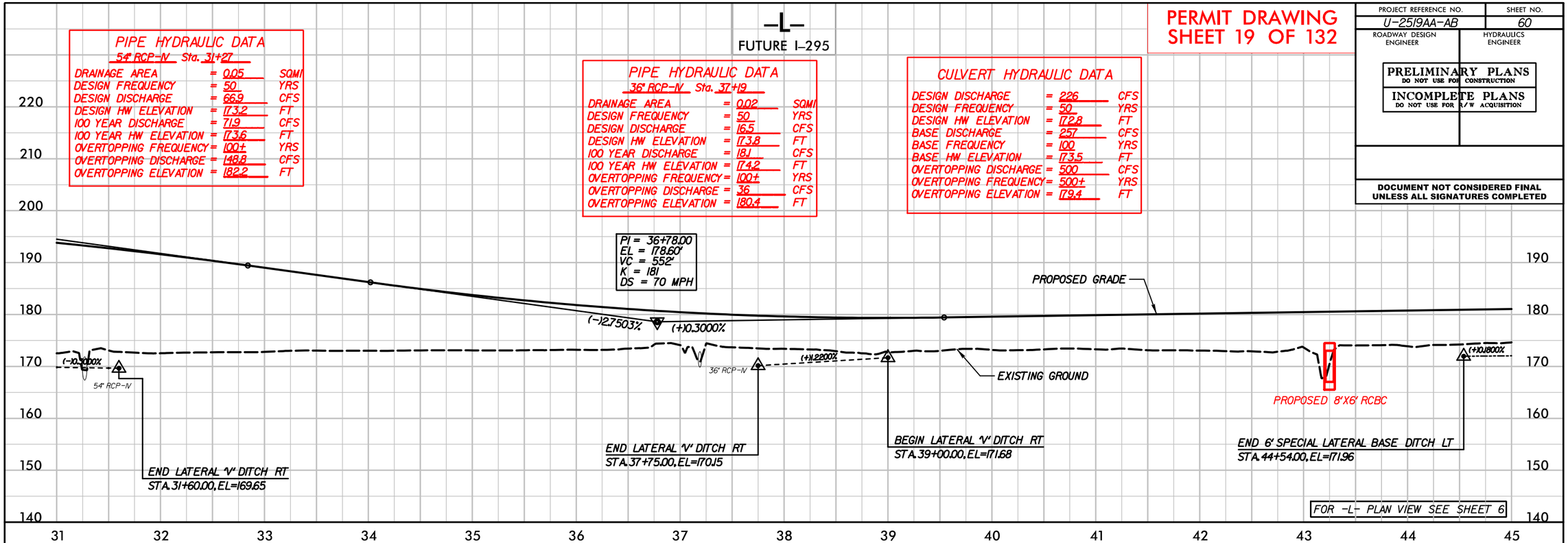
DRAINAGE AREA	= 0.05	SQMI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 66.9	CFS
DESIGN HW ELEVATION	= 173.2	FT
100 YEAR DISCHARGE	= 71.9	CFS
100 YEAR HW ELEVATION	= 173.6	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 148.8	CFS
OVERTOPPING ELEVATION	= 182.2	FT

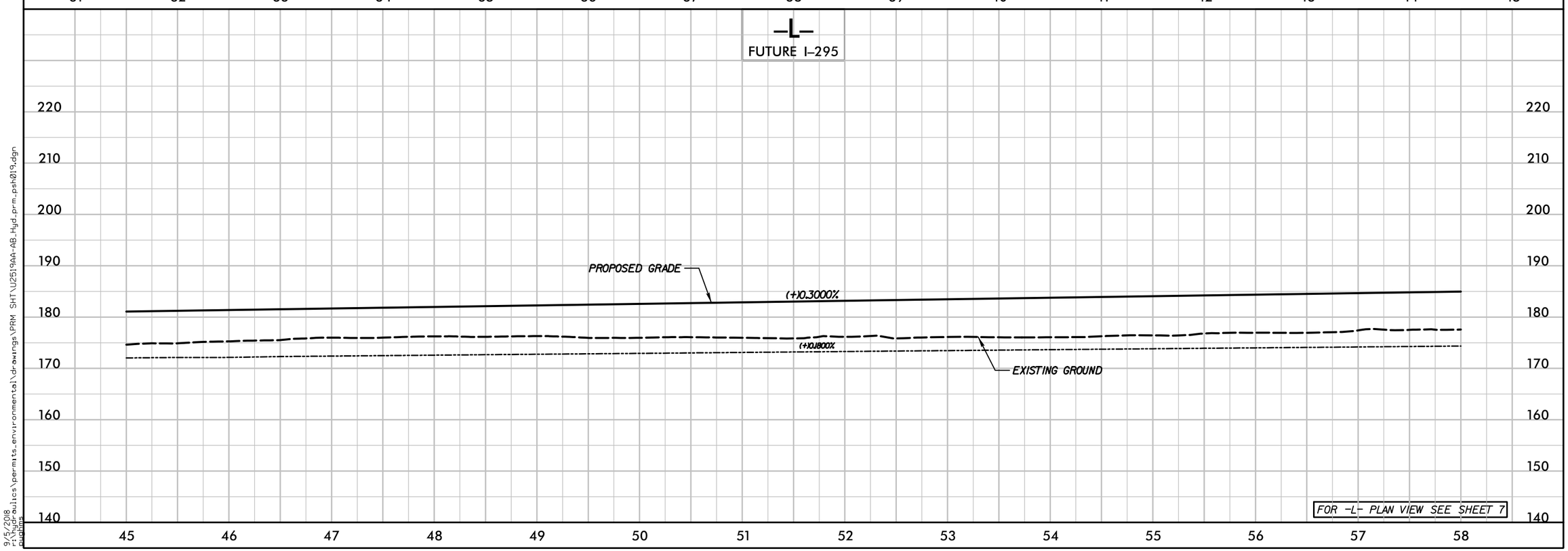
PIPE HYDRAULIC DATA
36" RCP-IV Sta. 37+19

DRAINAGE AREA	= 0.02	SQMI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 16.5	CFS
DESIGN HW ELEVATION	= 173.8	FT
100 YEAR DISCHARGE	= 18.1	CFS
100 YEAR HW ELEVATION	= 174.2	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 36	CFS
OVERTOPPING ELEVATION	= 180.4	FT

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 226	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 172.8	FT
BASE DISCHARGE	= 257	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 173.5	FT
OVERTOPPING DISCHARGE	= 500	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 179.4	FT





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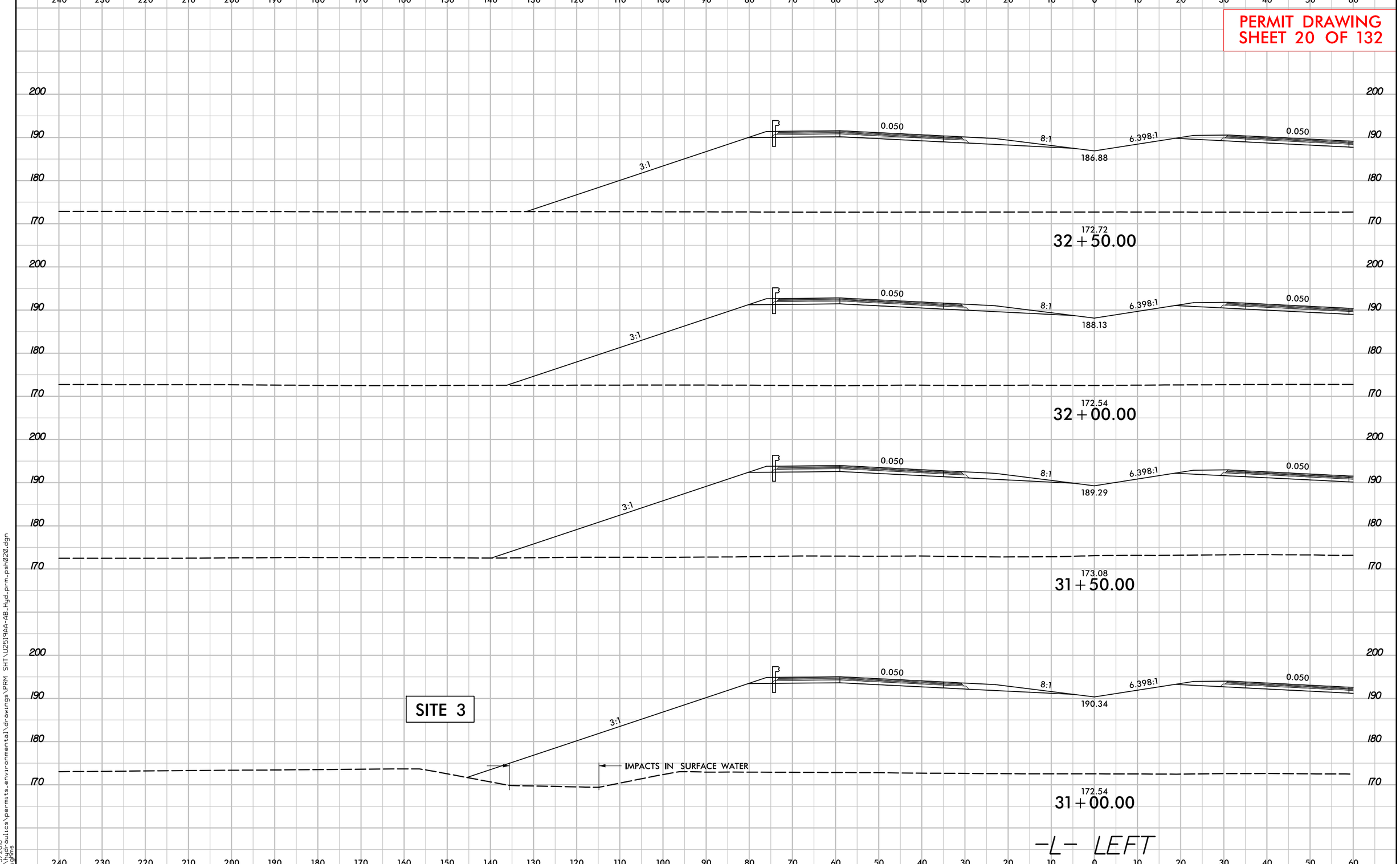
SHEET 20 OF 132



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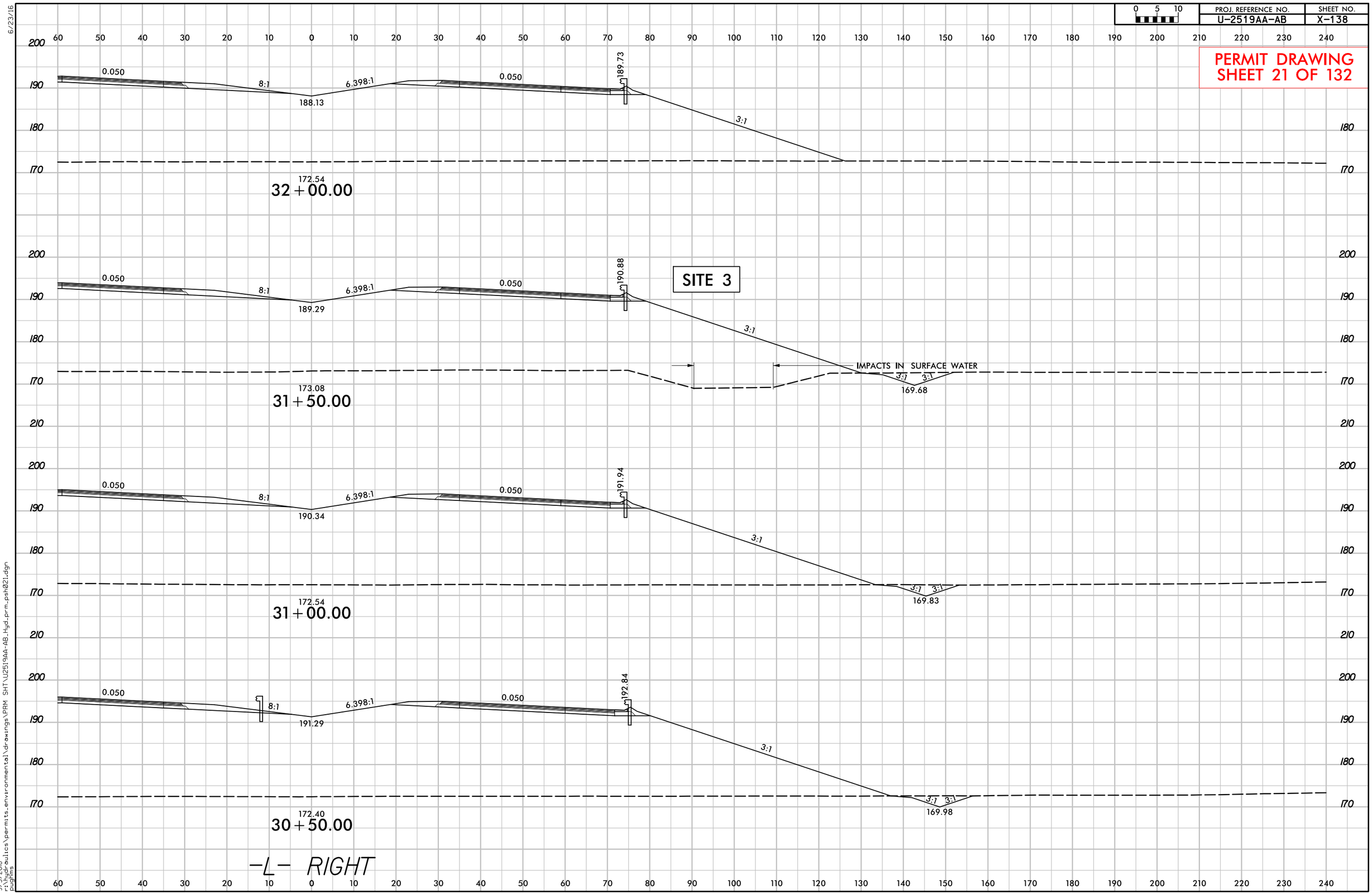
SHEET 21 OF 132



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U-2519AA-AB	X-141

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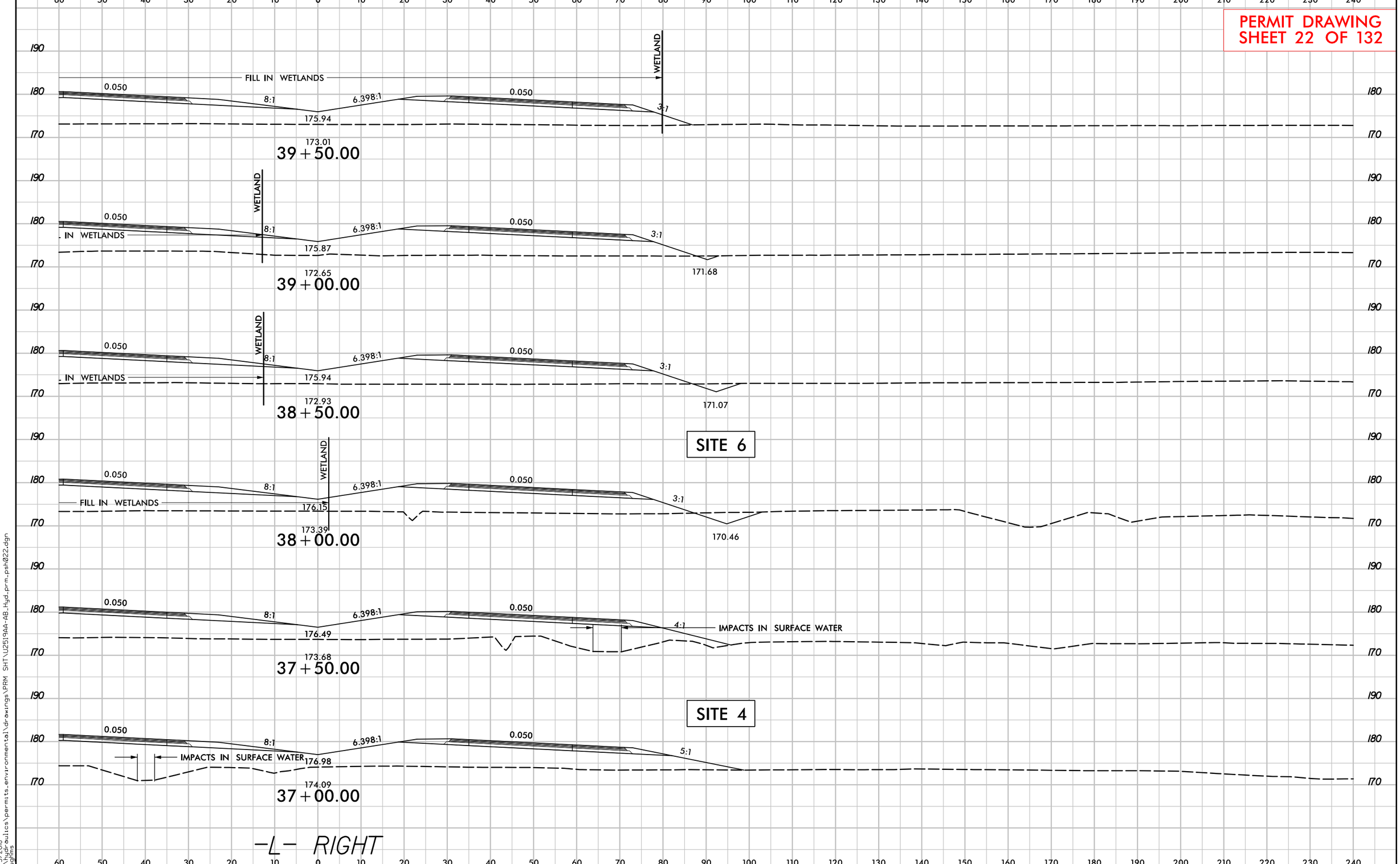
SHEET 22 OF 132



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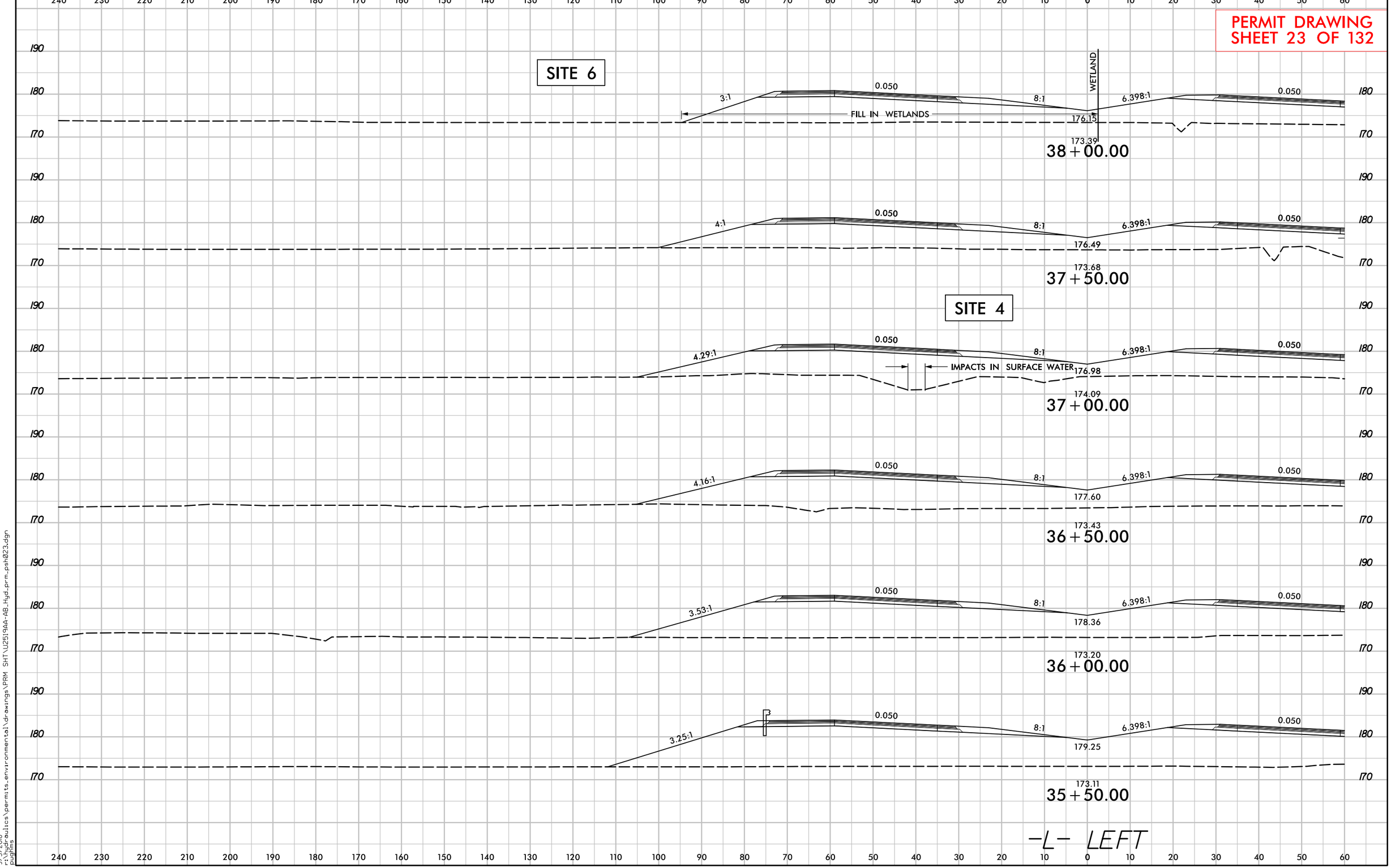
PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-14

PERMIT DRAWING
SHEET 23 OF 132



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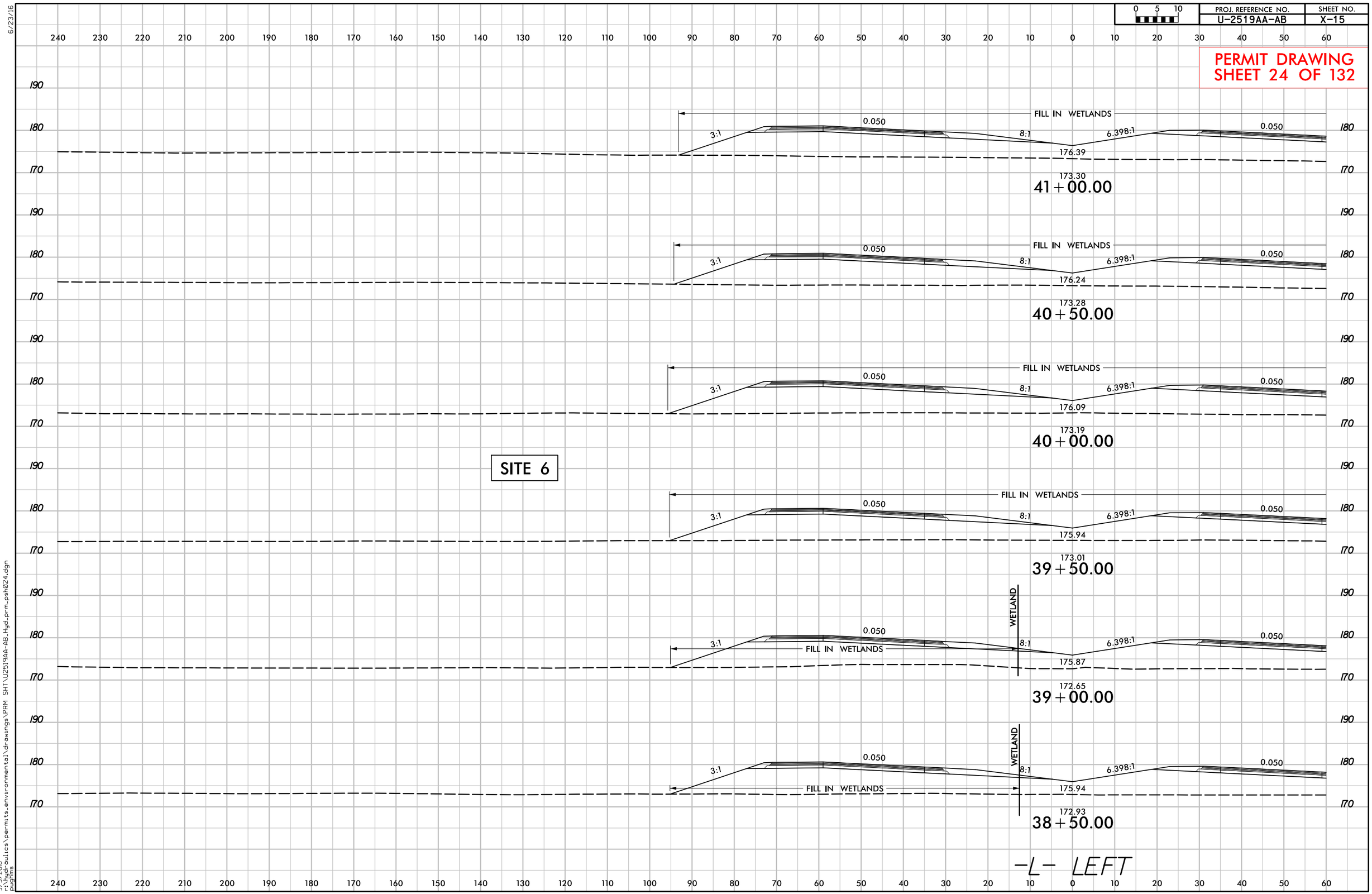
PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-15

PERMIT DRAWING
SHEET 24 OF 132



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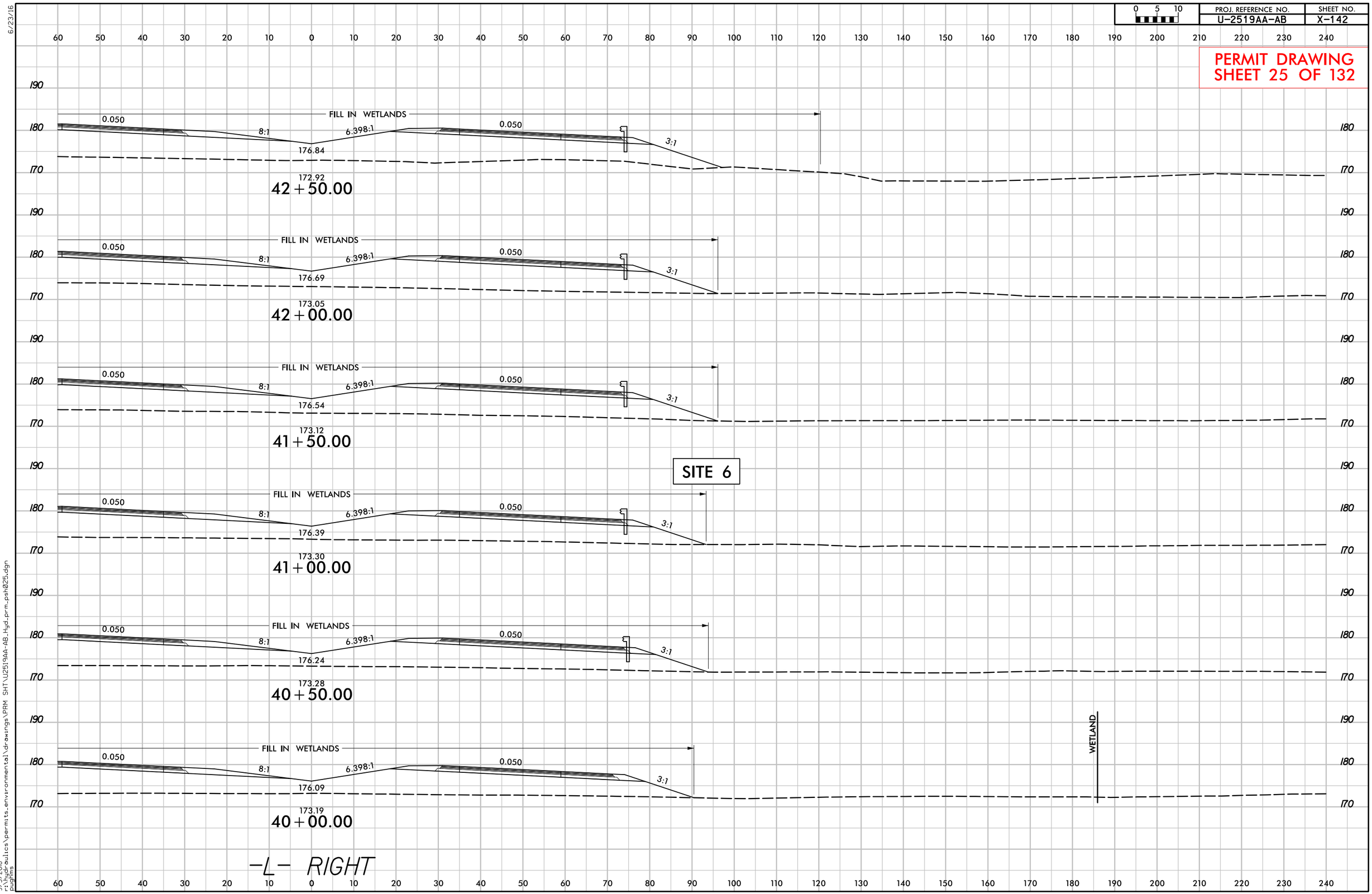
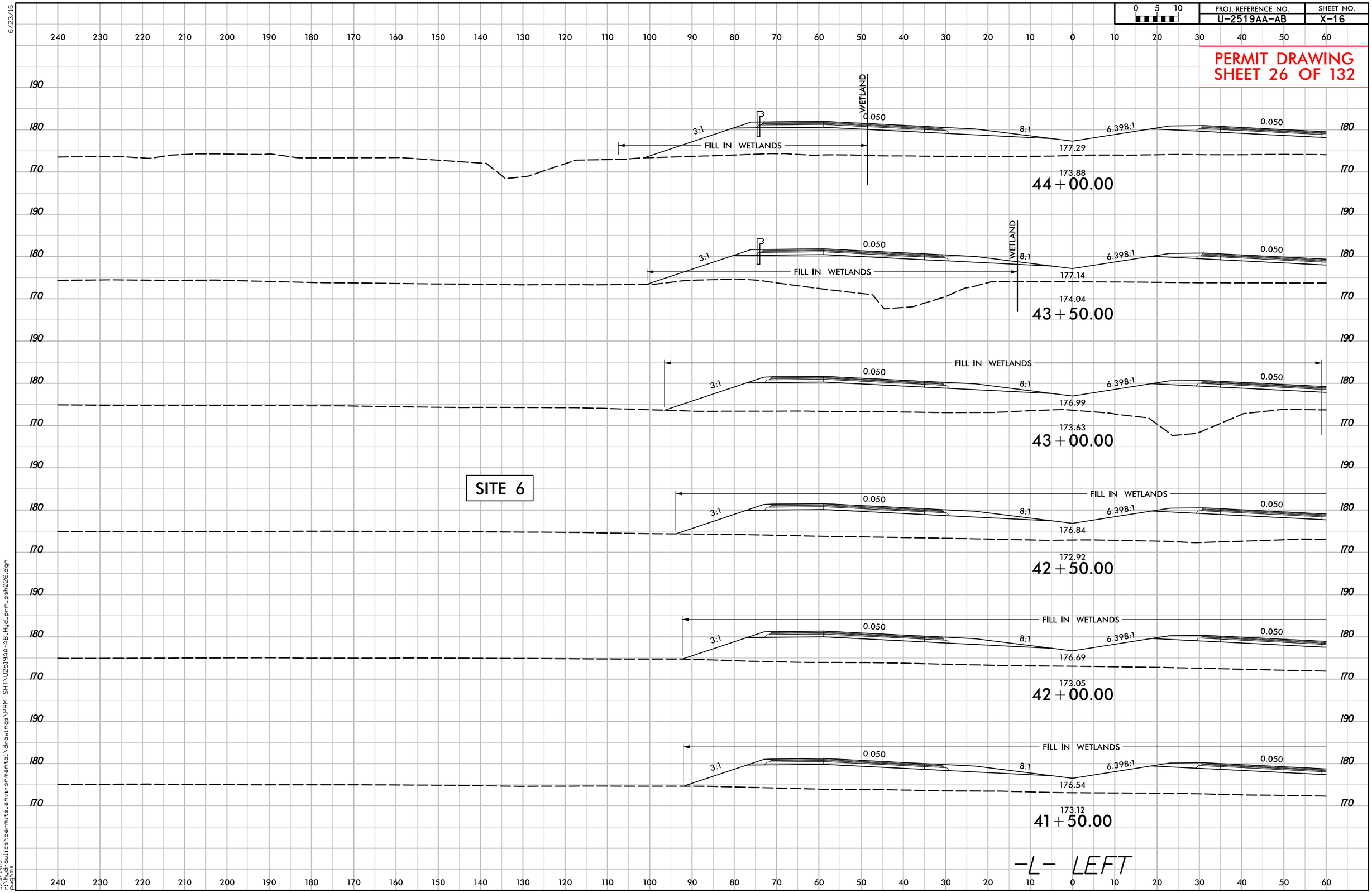
U-2519AA-AB	X-142

PERMIT DRAWING
SHEET 25 OF 132



PERMIT DRAWING
SHEET 26 OF 132



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PROJ. REFERENCE NO.	SHEET NO.
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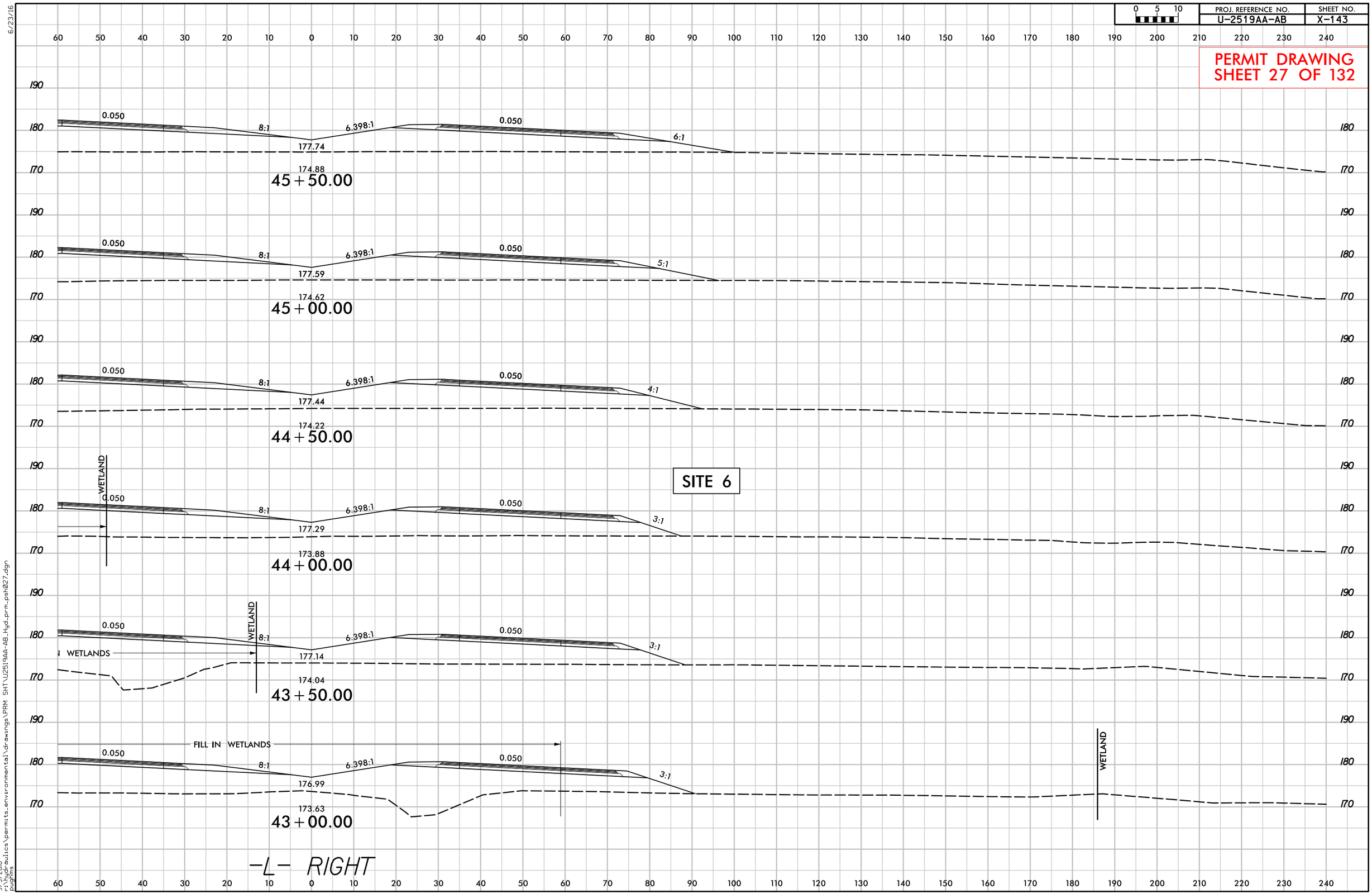
PERMIT DRAWING
SHEET 27 OF 132



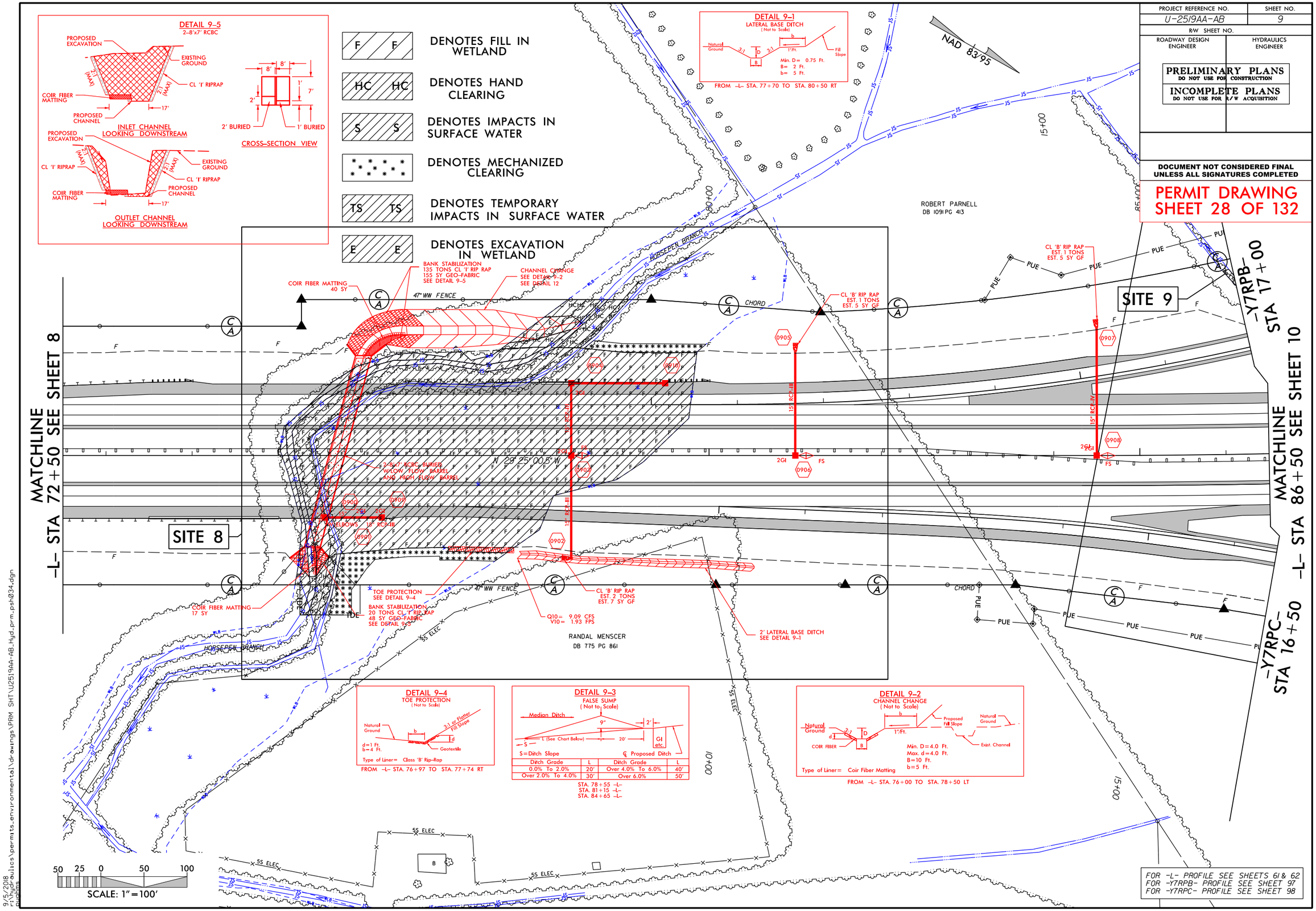
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 28 OF 132



FOR -L- PROFILE SEE SHEETS 61 & 62
FOR -Y7RPB- PROFILE SEE SHEET 97
FOR -Y7RPC- PROFILE SEE SHEET 98

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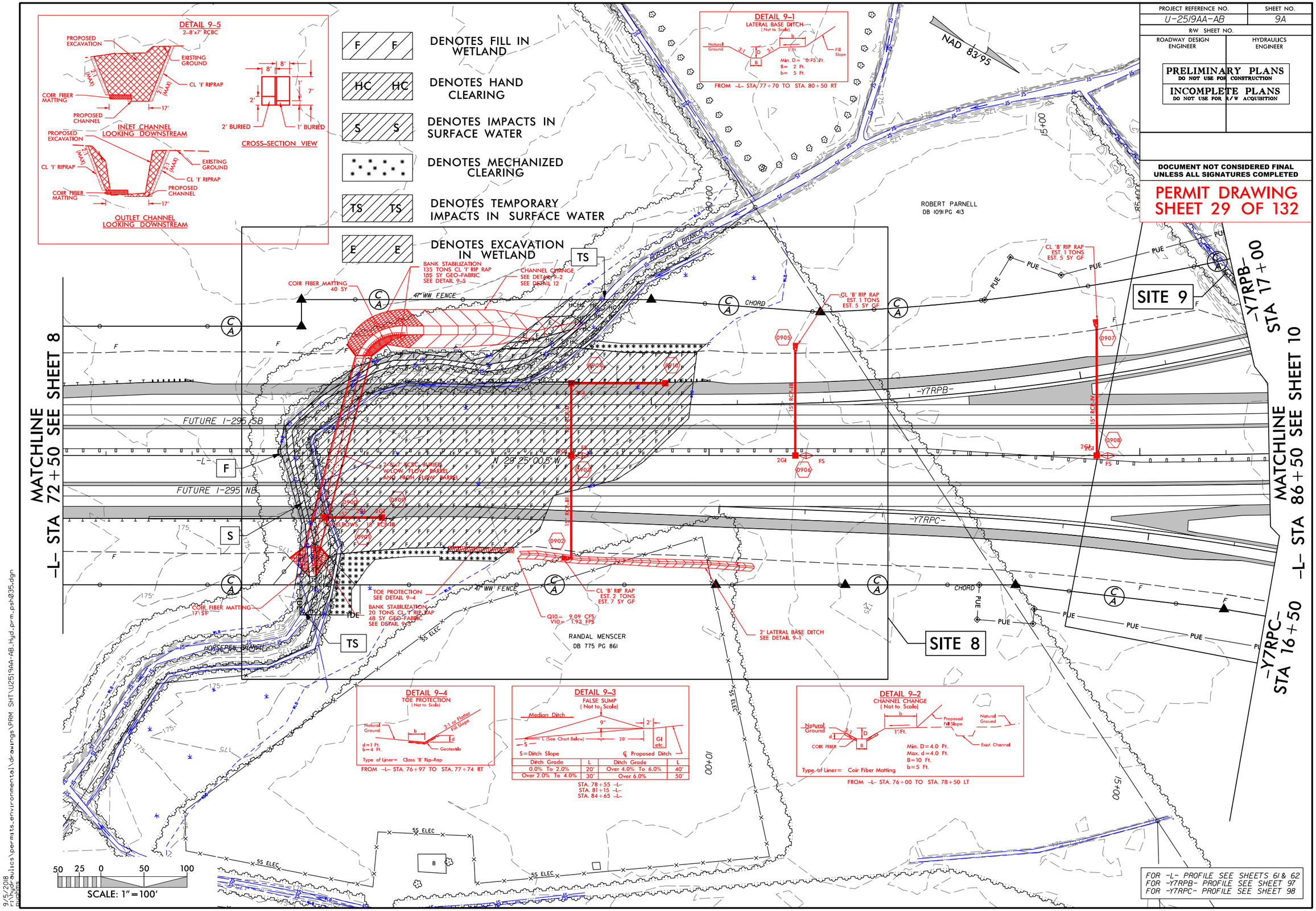
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	9A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 29 OF 132



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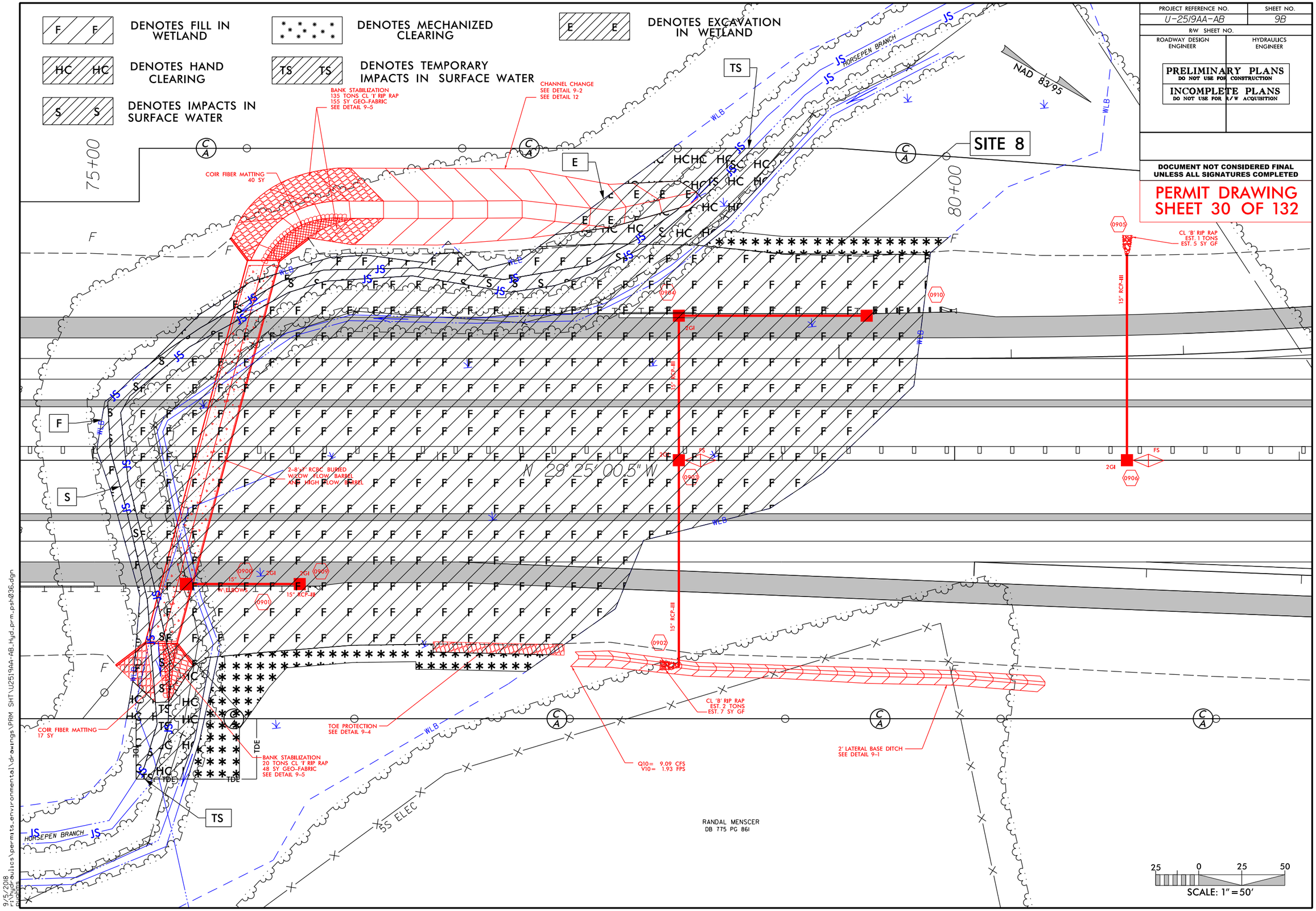
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	9B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 30 OF 132



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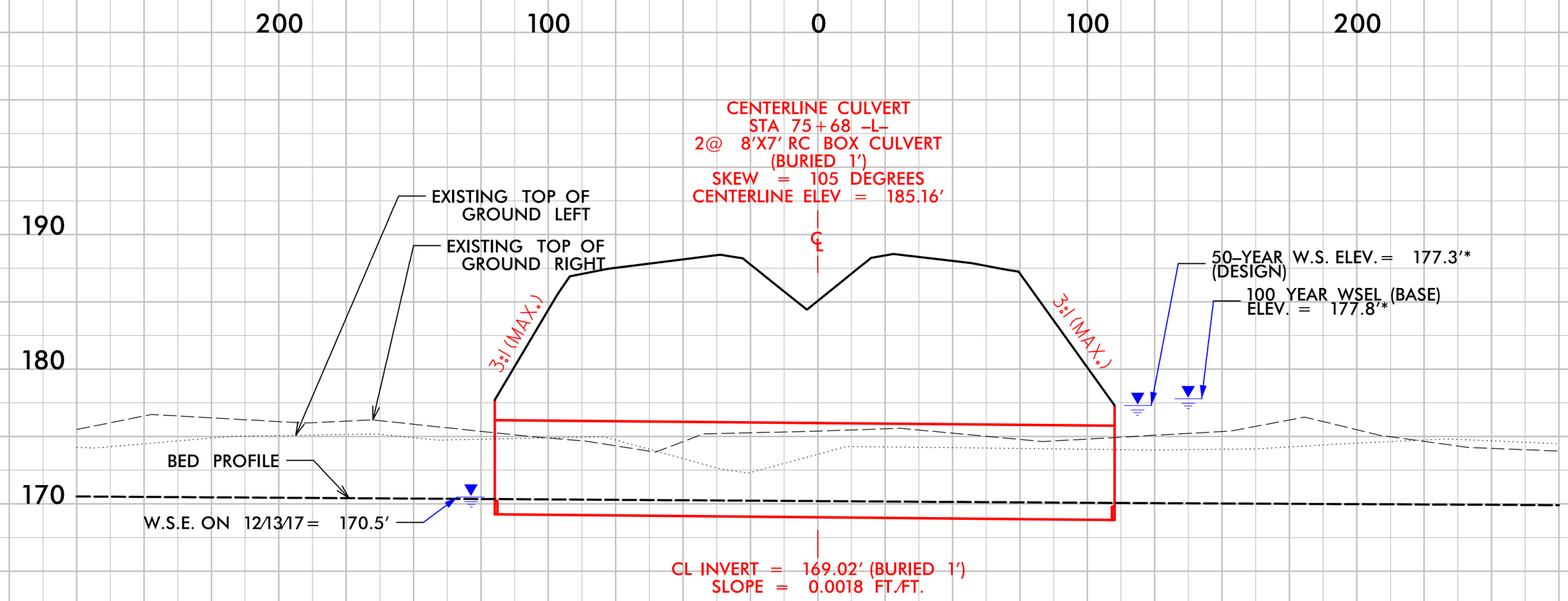
PERMIT DRAWING
SHEET 31 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	9C
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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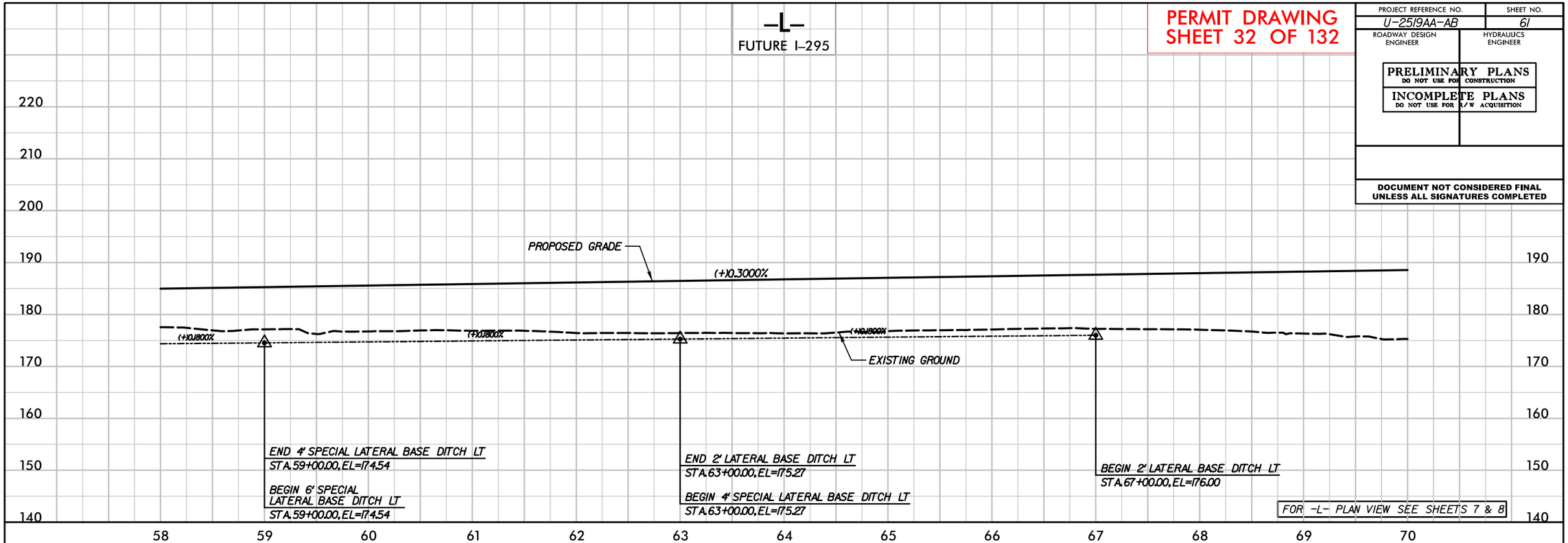
PERMIT DRAWING
SHEET 32 OF 132

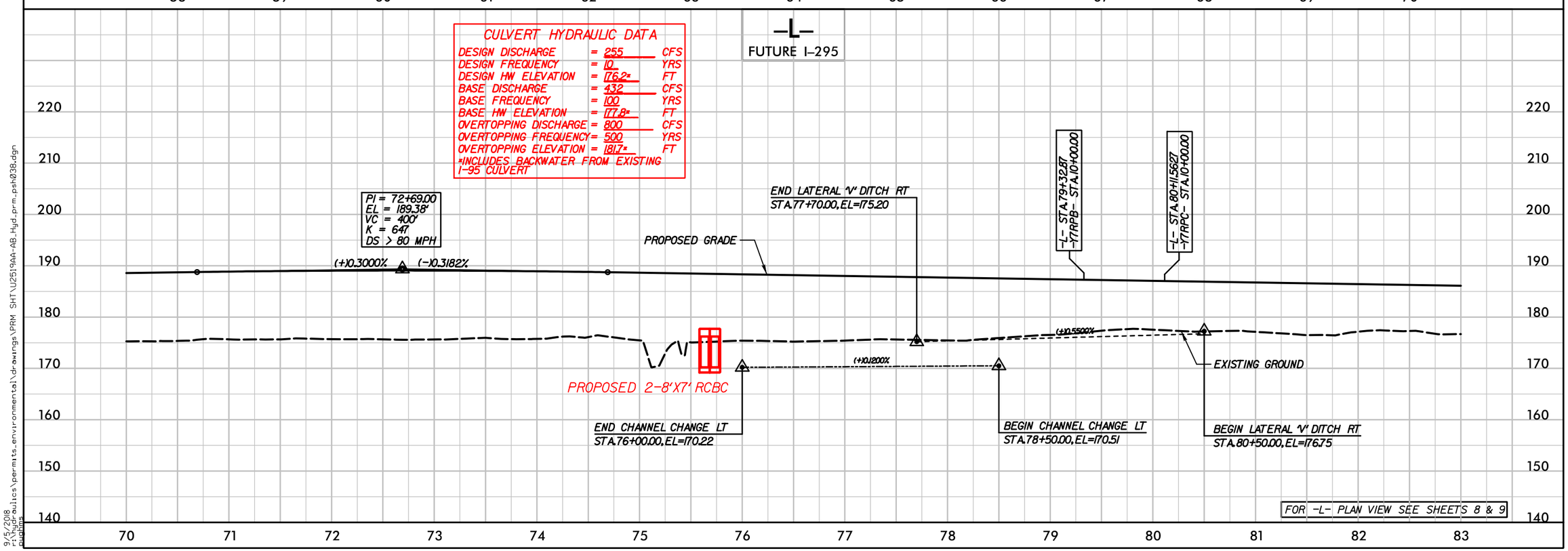
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	61
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





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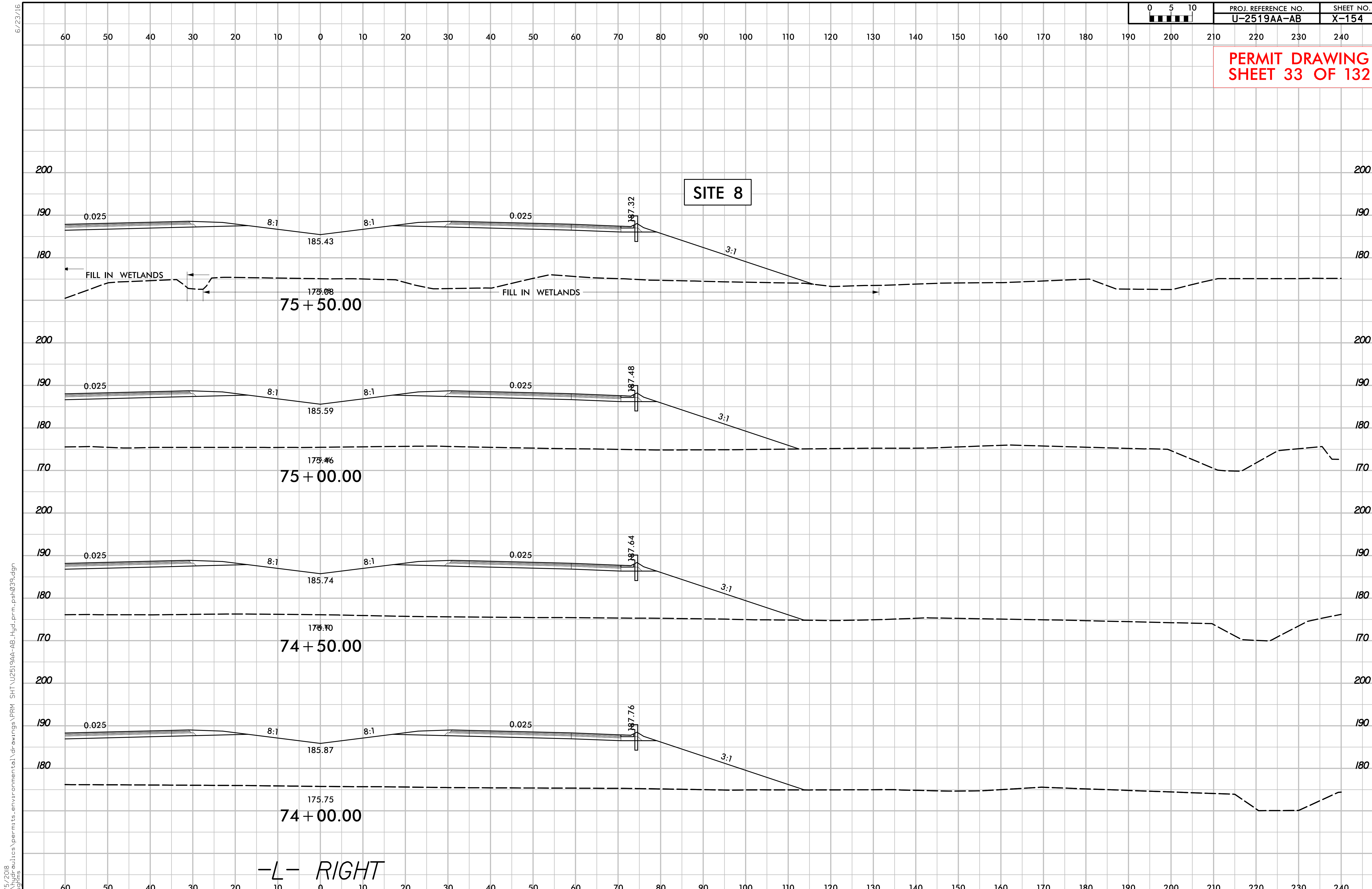
PROJ. REFERENCE NO.
U-2519AA-AB
SHEET NO.
X-154
PERMIT DRAWING
SHEET 33 OF 132
SITE 8
0.025
8:1
8:1
0.025
187.32
3:1
185.43
FILL IN WETLANDS
FILL IN WETLANDS
175.08
75 + 50.00
187.48
185.59
175.46
75 + 00.00
187.64
185.74
176.10
74 + 50.00
187.76
185.87
175.75
74 + 00.00
-L- RIGHT
6/23/16
9/5/2018
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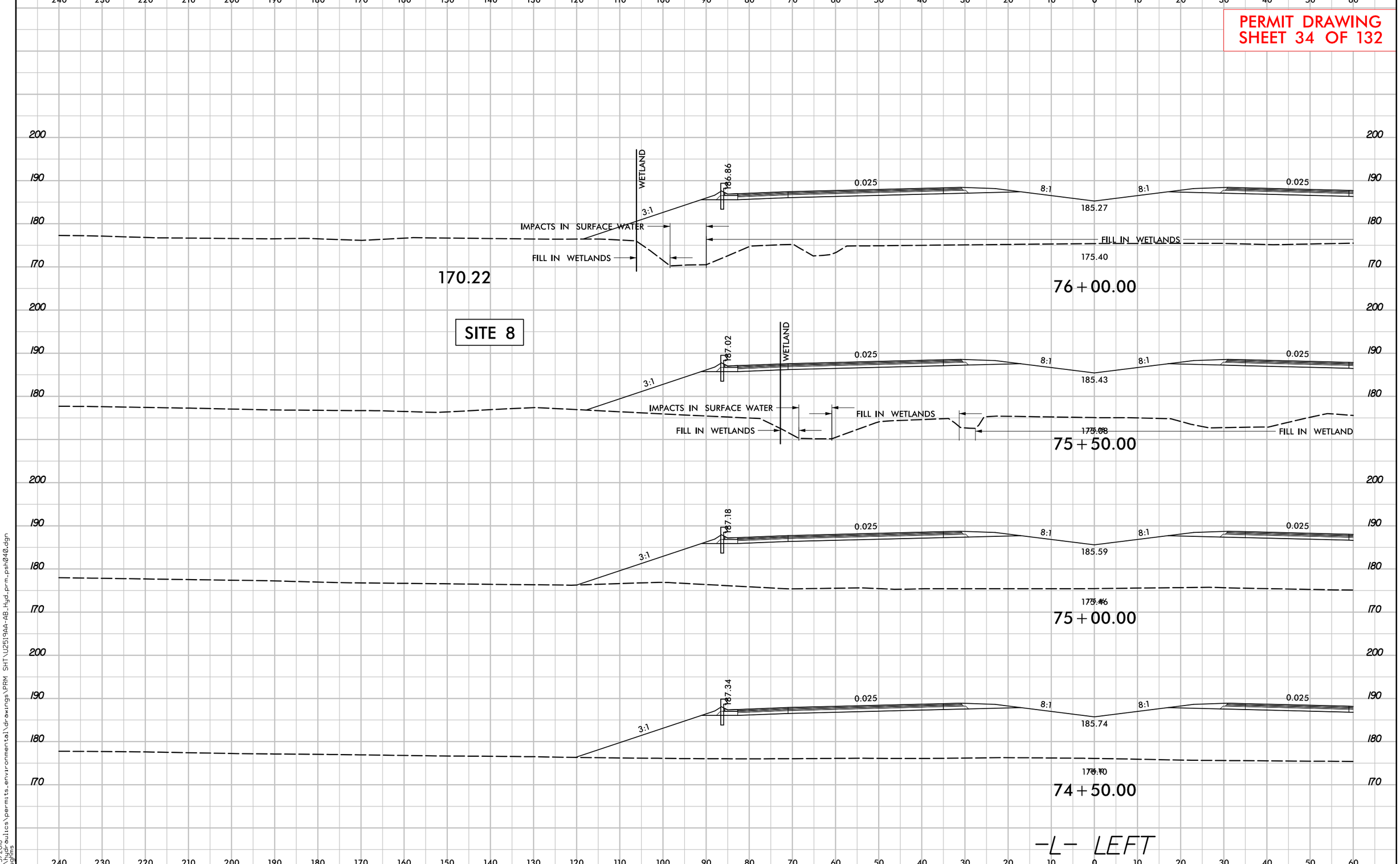
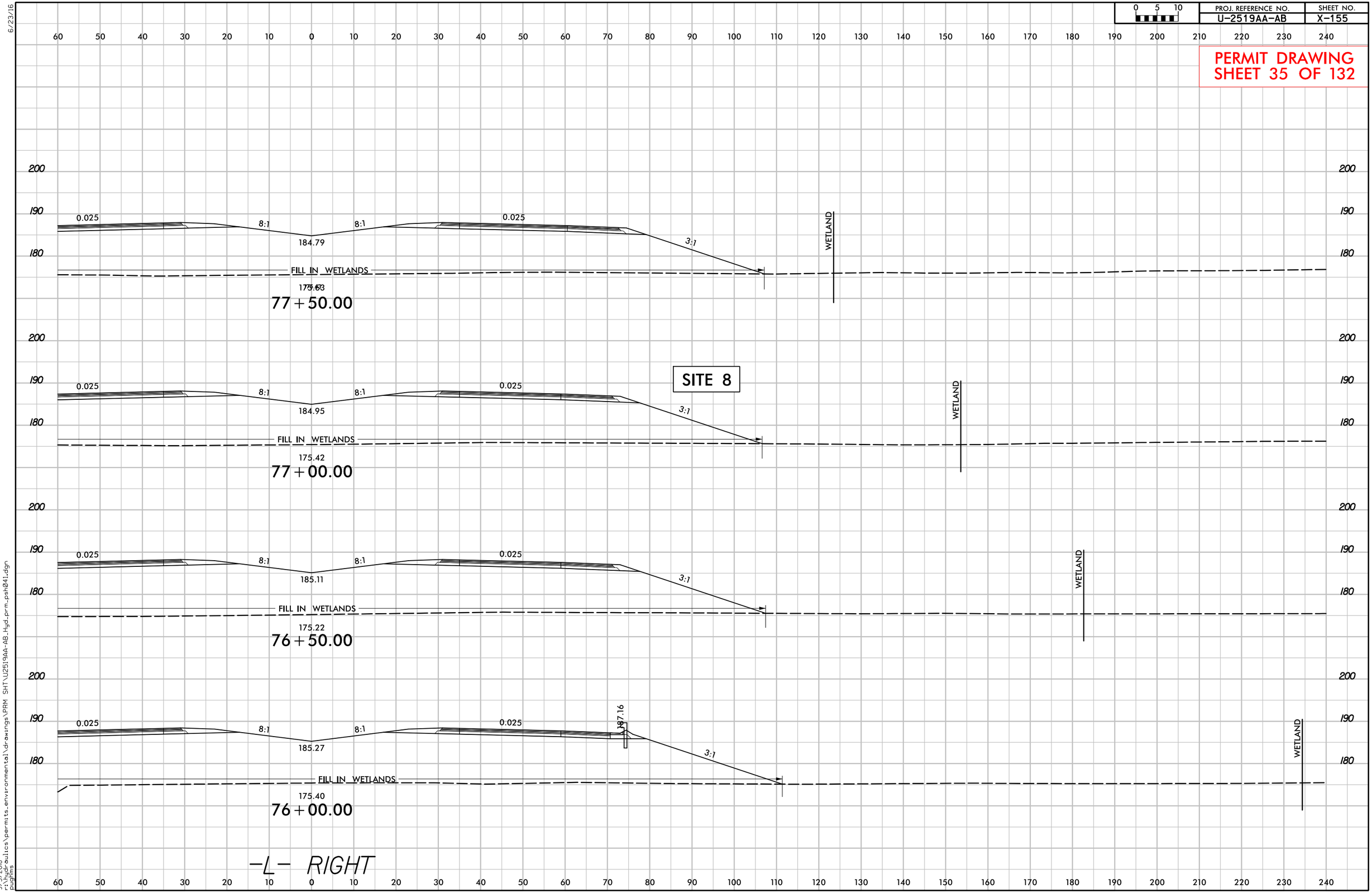
PERMIT DRAWING
SHEET 34 OF 132



PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-155

PERMIT DRAWING
SHEET 35 OF 132



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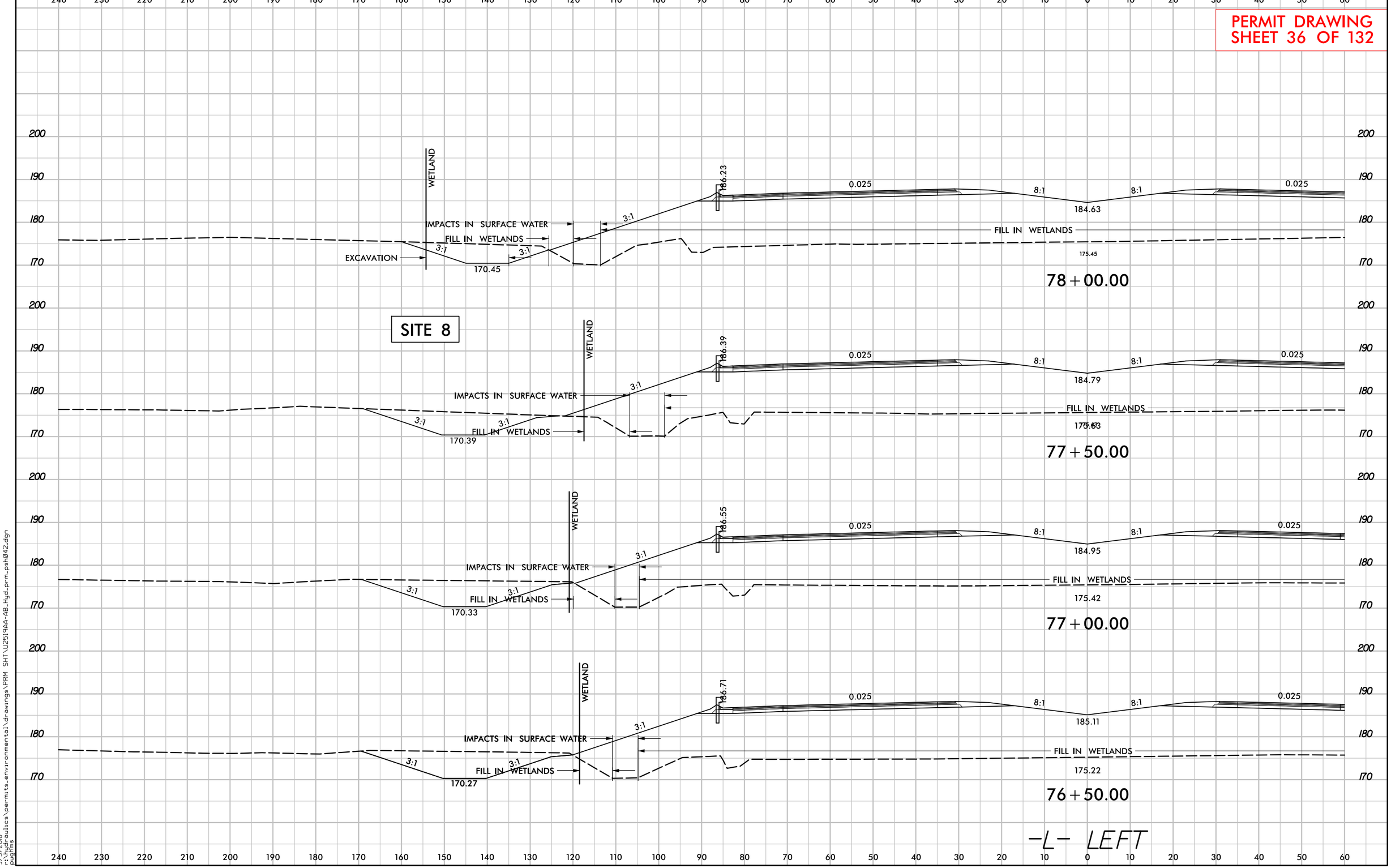
PERMIT DRAWING
SHEET 36 OF 132



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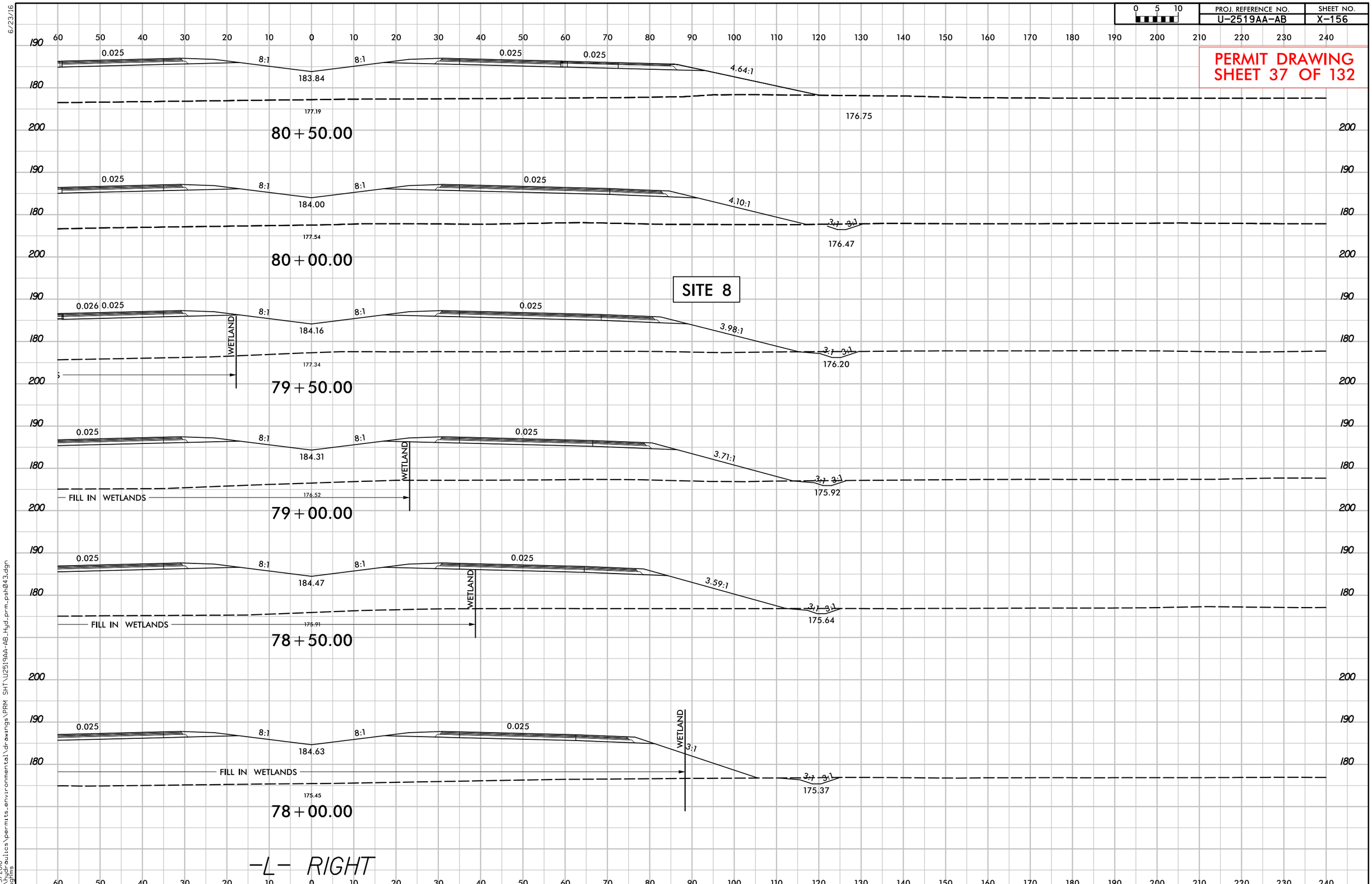
PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-156

PERMIT DRAWING
SHEET 37 OF 132

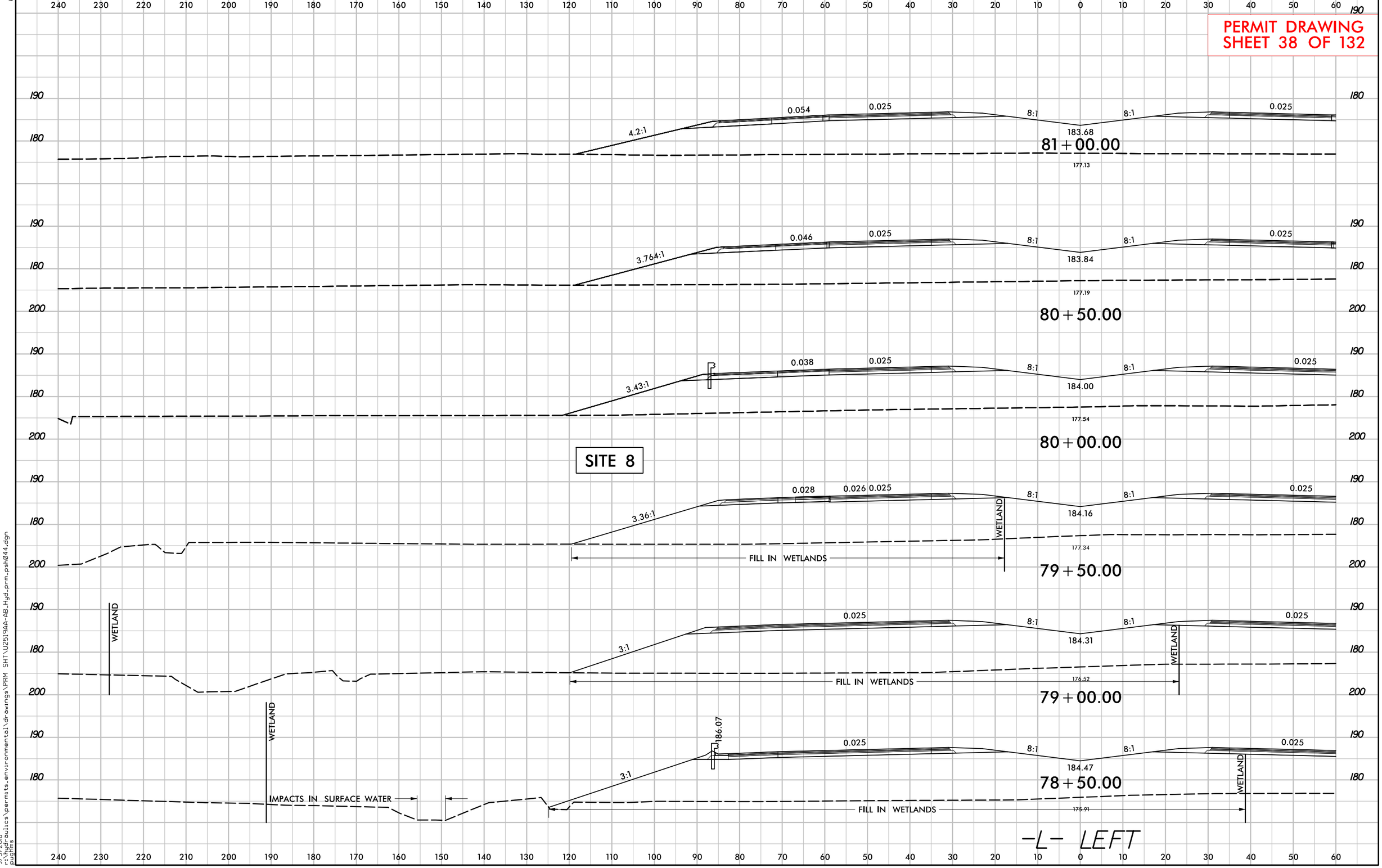


6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-30

0 5 10

PERMIT DRAWING
SHEET 38 OF 132



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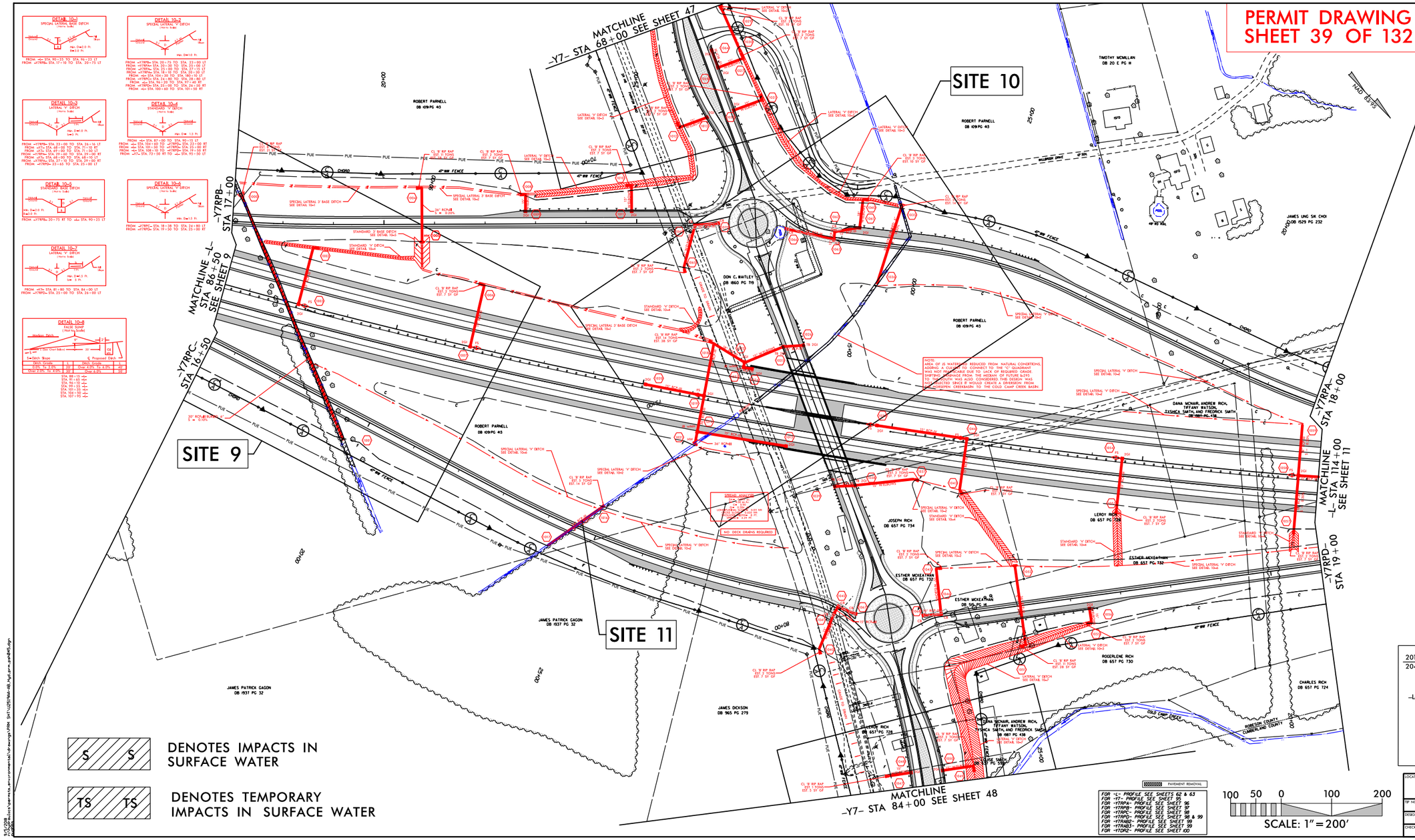
pughins

PERMIT DRAWING
SHEET 39 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



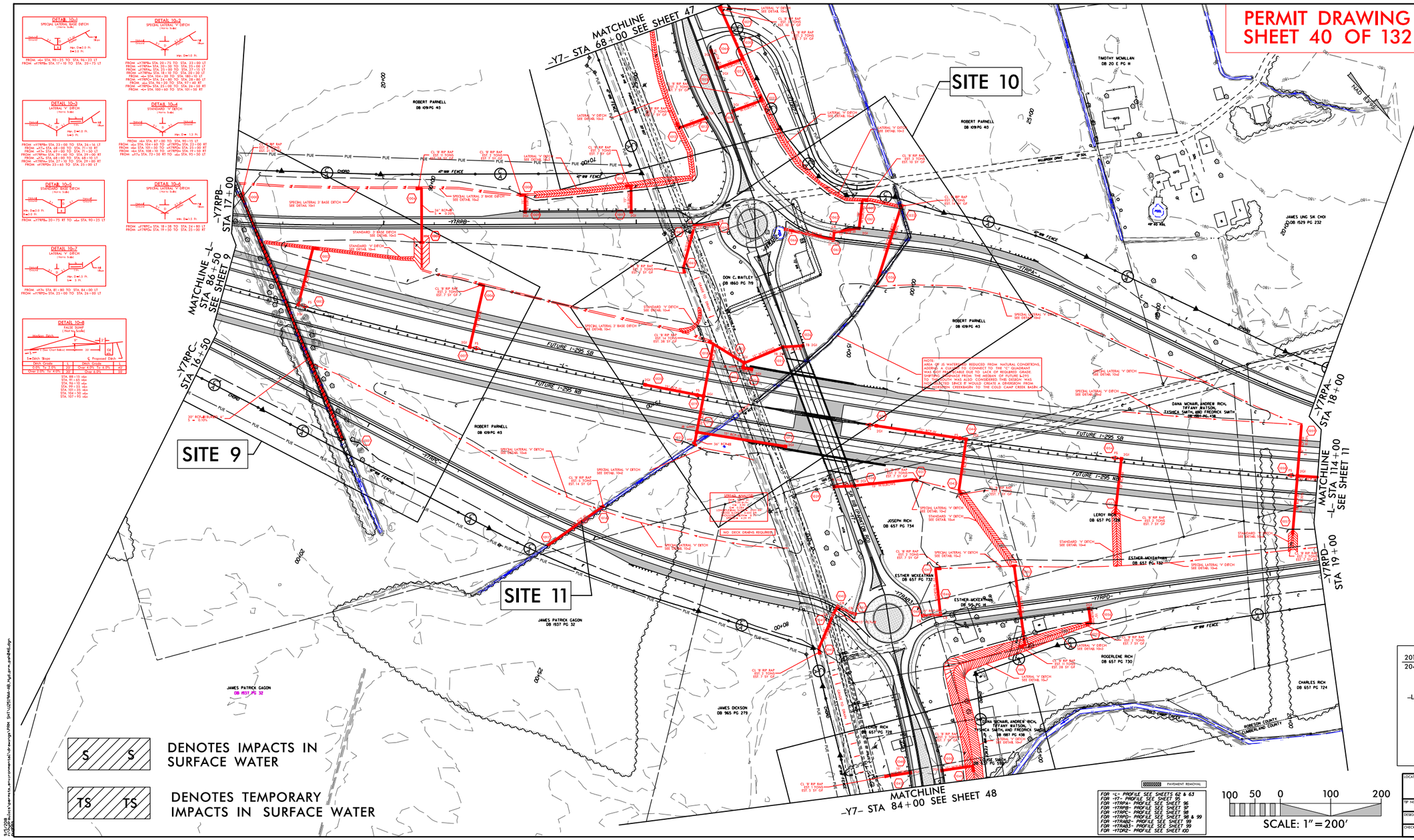
LOCATION:	I-95 / PARKTON ROAD
TIP NO.: U-2519AA-AB	COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF	
CHECKED BY: MFR	DATE: 01/23/18

PERMIT DRAWING
SHEET 40 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	10A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



LOCATION:	
I-95 / PARKTON ROAD	
TIP NO.: U-2519AA-AB	COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF	
CHECKED BY: MFR	DATE: 01/23/18

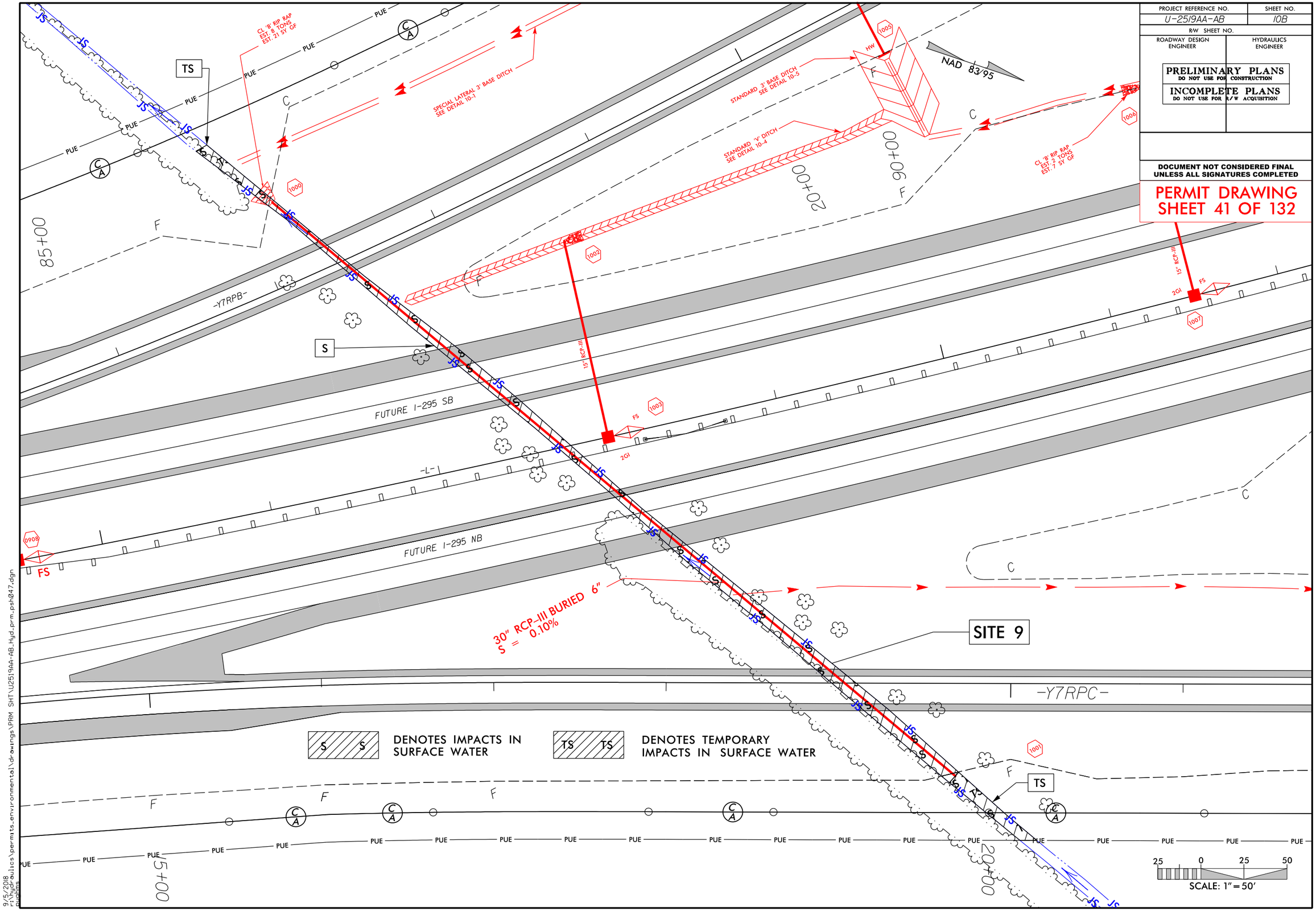
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	10B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 41 OF 132



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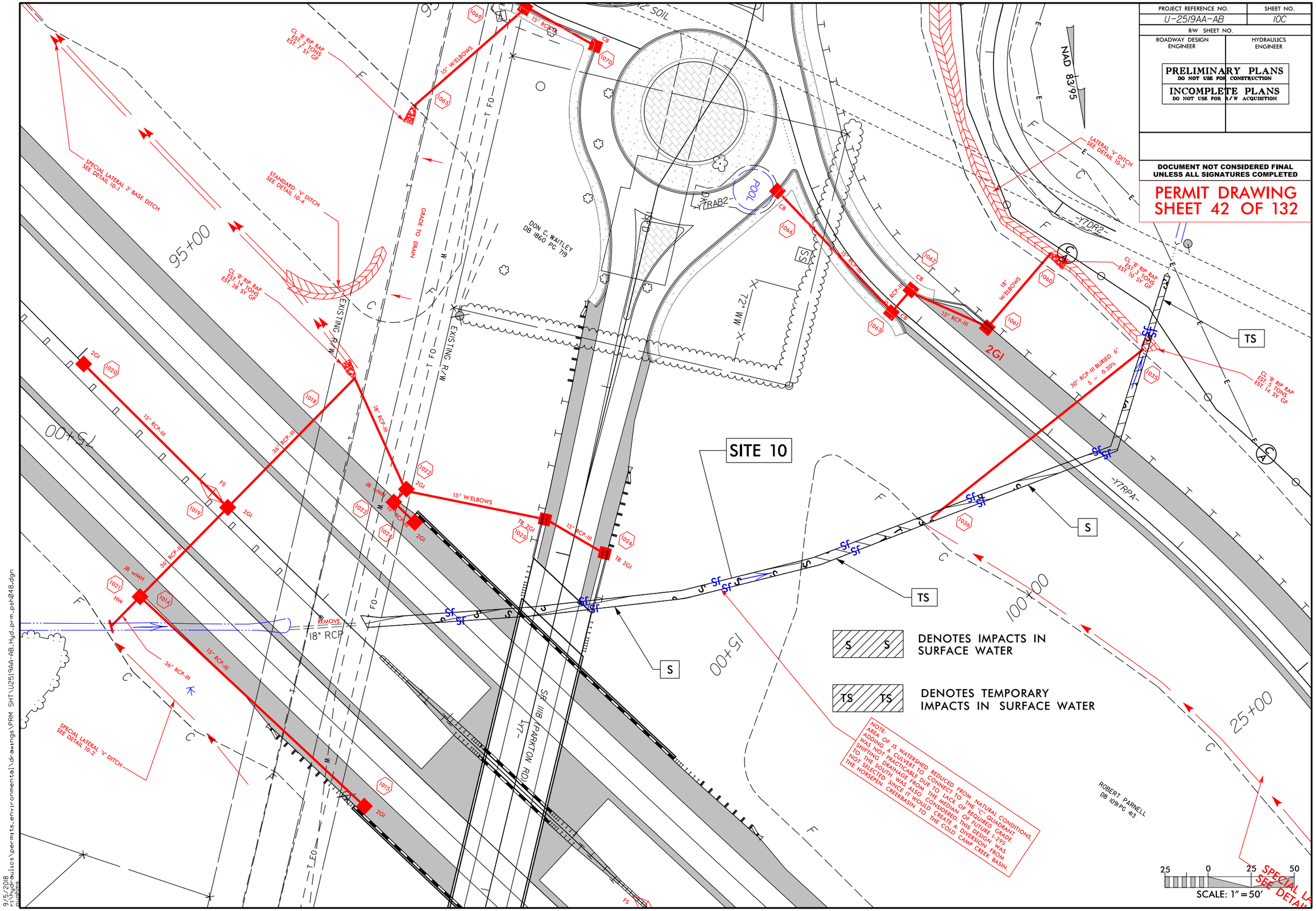
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	10C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

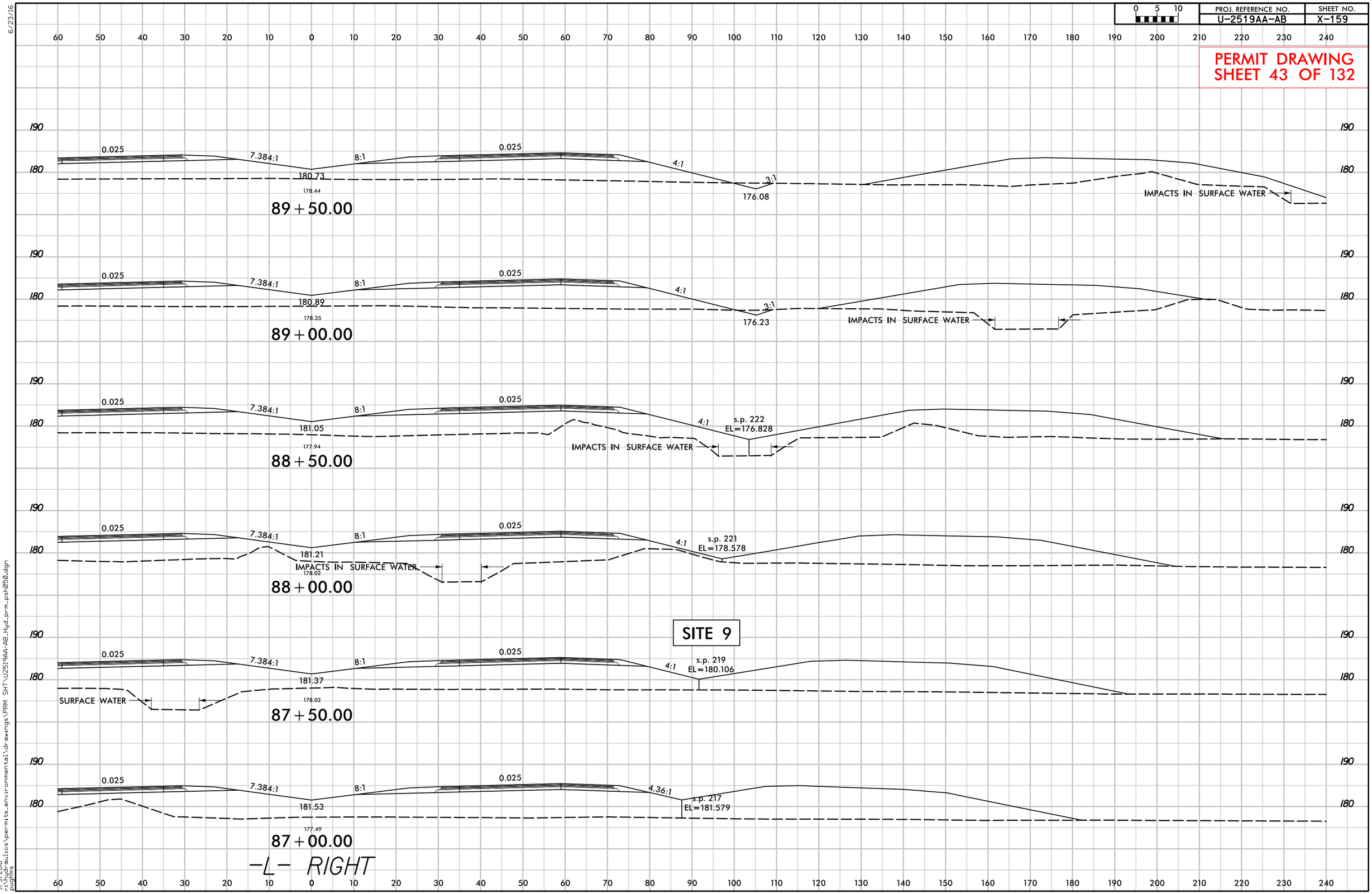
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 42 OF 132



PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-159

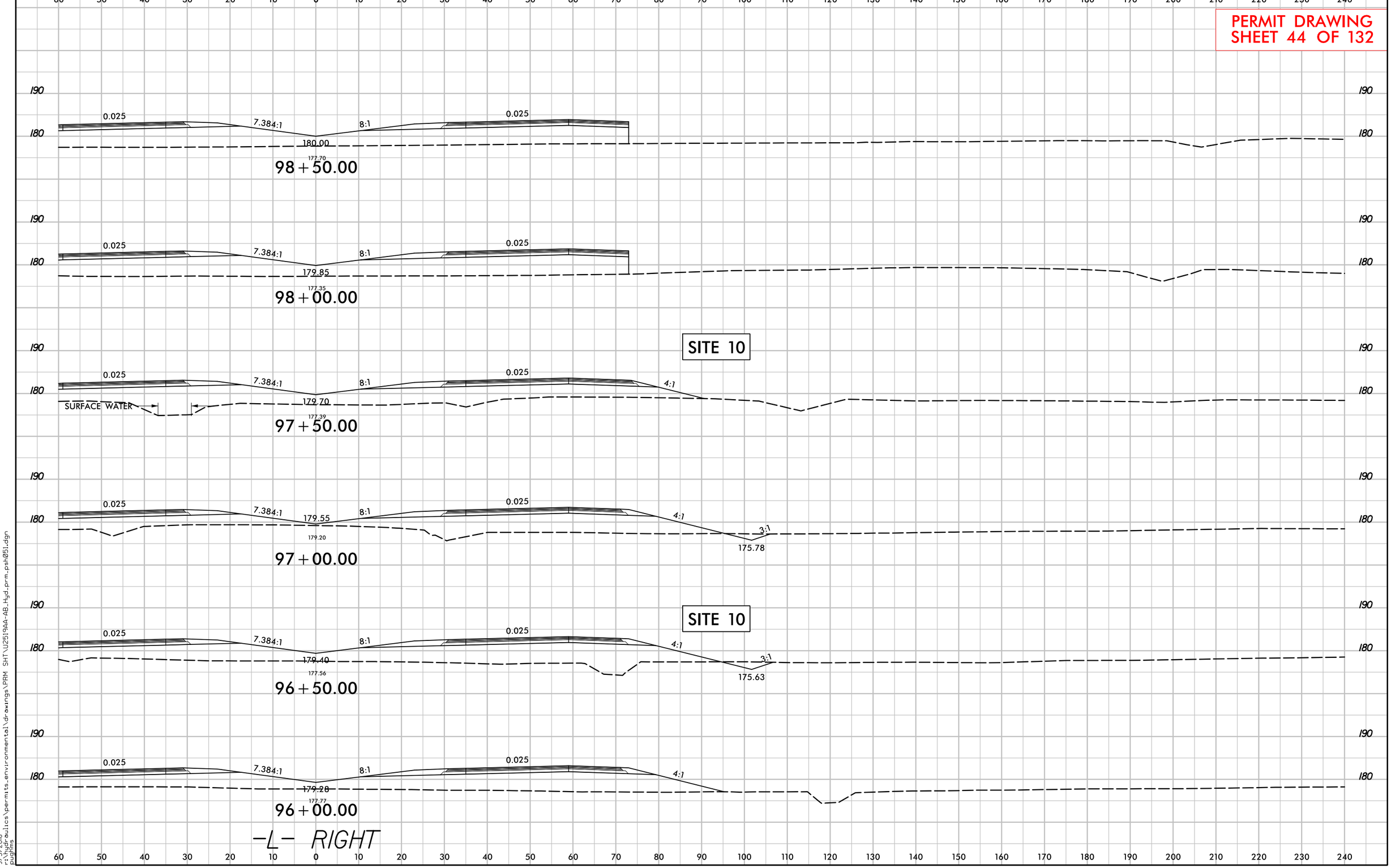
PERMIT DRAWING
SHEET 43 OF 132



PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-162

0 5 10

PERMIT DRAWING
SHEET 44 OF 132



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pughms

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

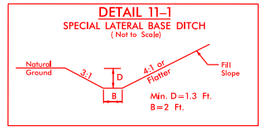
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

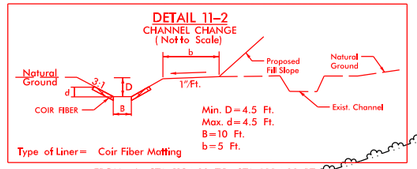
PERMIT DRAWING
SHEET 45 OF 132

DETAIL 11-1
SPECIAL LATERAL BASE DITCH
(Not to Scale)



FROM -L- STA. 115+00 TO STA. 122+00 LT

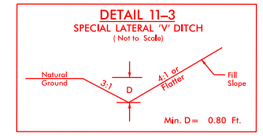
DETAIL 11-2
CHANNEL CHANGE
(Not to Scale)



Type of Liner= Coir Fiber Matting

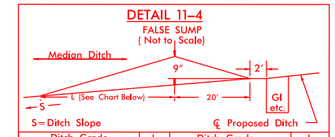
FROM -L- STA. 118+00 TO STA. 122+00 RT

DETAIL 11-3
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



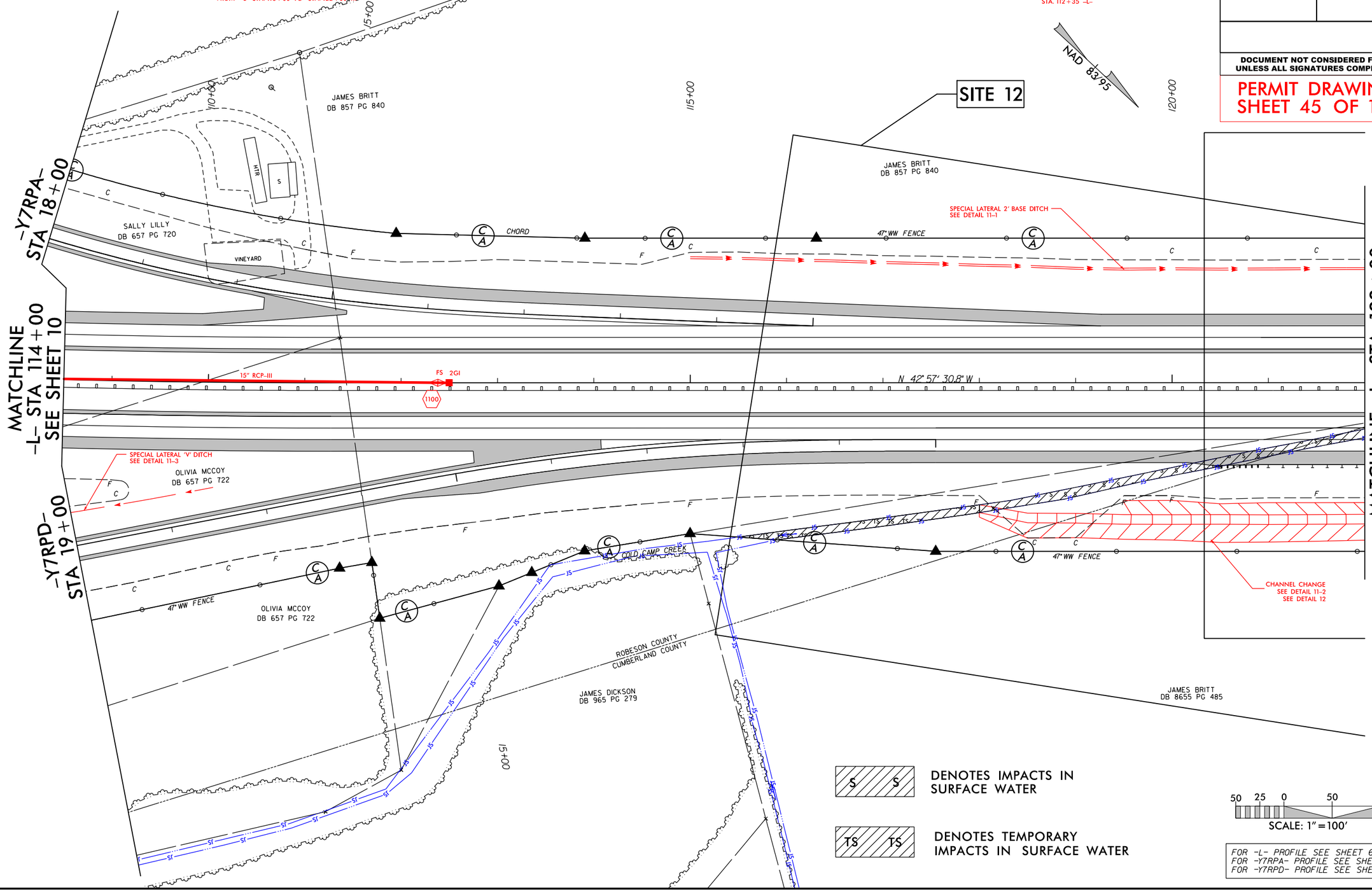
FROM -Y7RPD- STA. 17+50 TO STA. 19+00 RT

DETAIL 11-4
FALSE SUMP
(Not to Scale)



Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 112+35 -L-



FOR -L- PROFILE SEE SHEET 63
FOR -Y7RPA- PROFILE SEE SHEET 96
FOR -Y7RPD- PROFILE SEE SHEET 98

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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	11A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

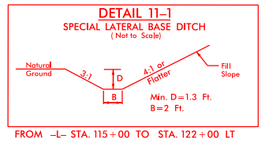
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

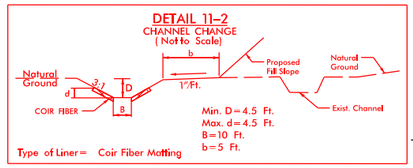
PERMIT DRAWING
SHEET 46 OF 132

DETAIL 11-1
SPECIAL LATERAL BASE DITCH
(Not to Scale)



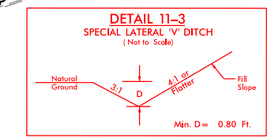
FROM -L- STA. 115+00 TO STA. 122+00 LT

DETAIL 11-2
CHANNEL CHANGE
(Not to Scale)



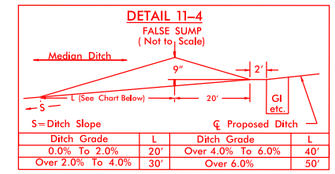
FROM -L- STA. 118+00 TO STA. 122+00 RT

DETAIL 11-3
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



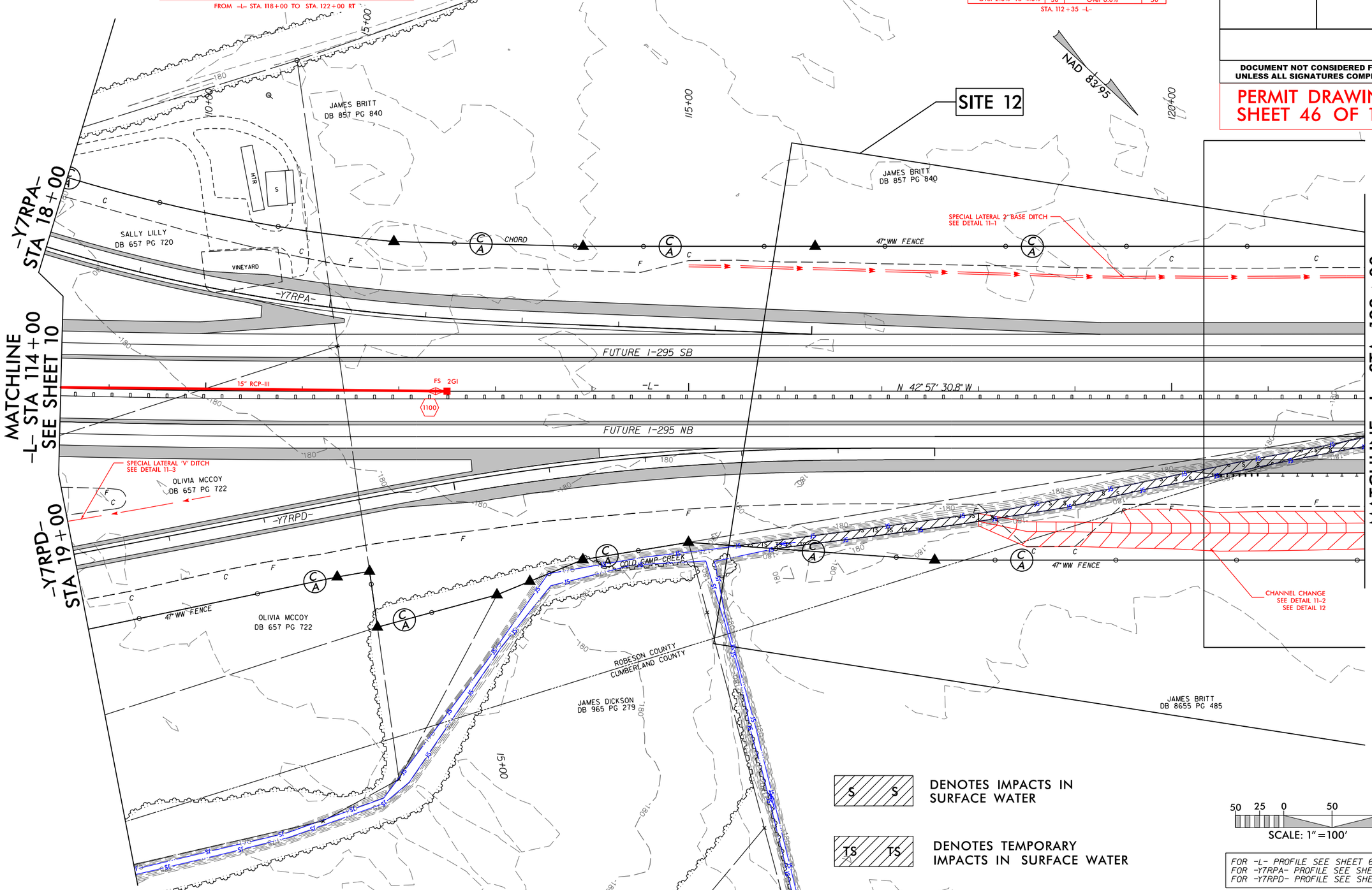
FROM -Y7RPD- STA. 17+50 TO STA. 19+00 RT

DETAIL 11-4
FALSE SUMP
(Not to Scale)



Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 112+35 -L-



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50 25 0 50 100
SCALE: 1" = 100'

FOR -L- PROFILE SEE SHEET 63
FOR -Y7RPA- PROFILE SEE SHEET 96
FOR -Y7RPD- PROFILE SEE SHEET 98

9/5/2018
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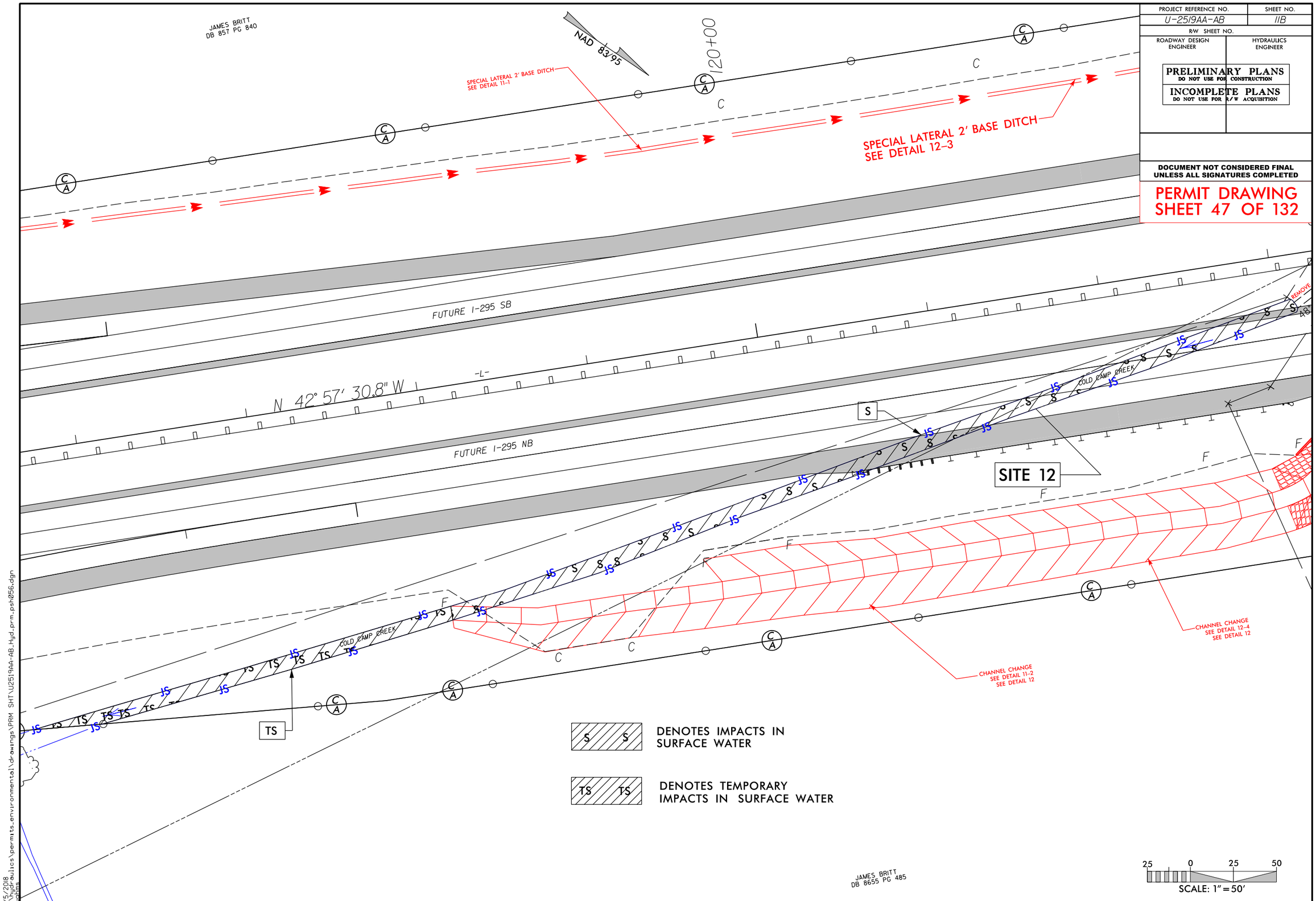
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	11B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 47 OF 132



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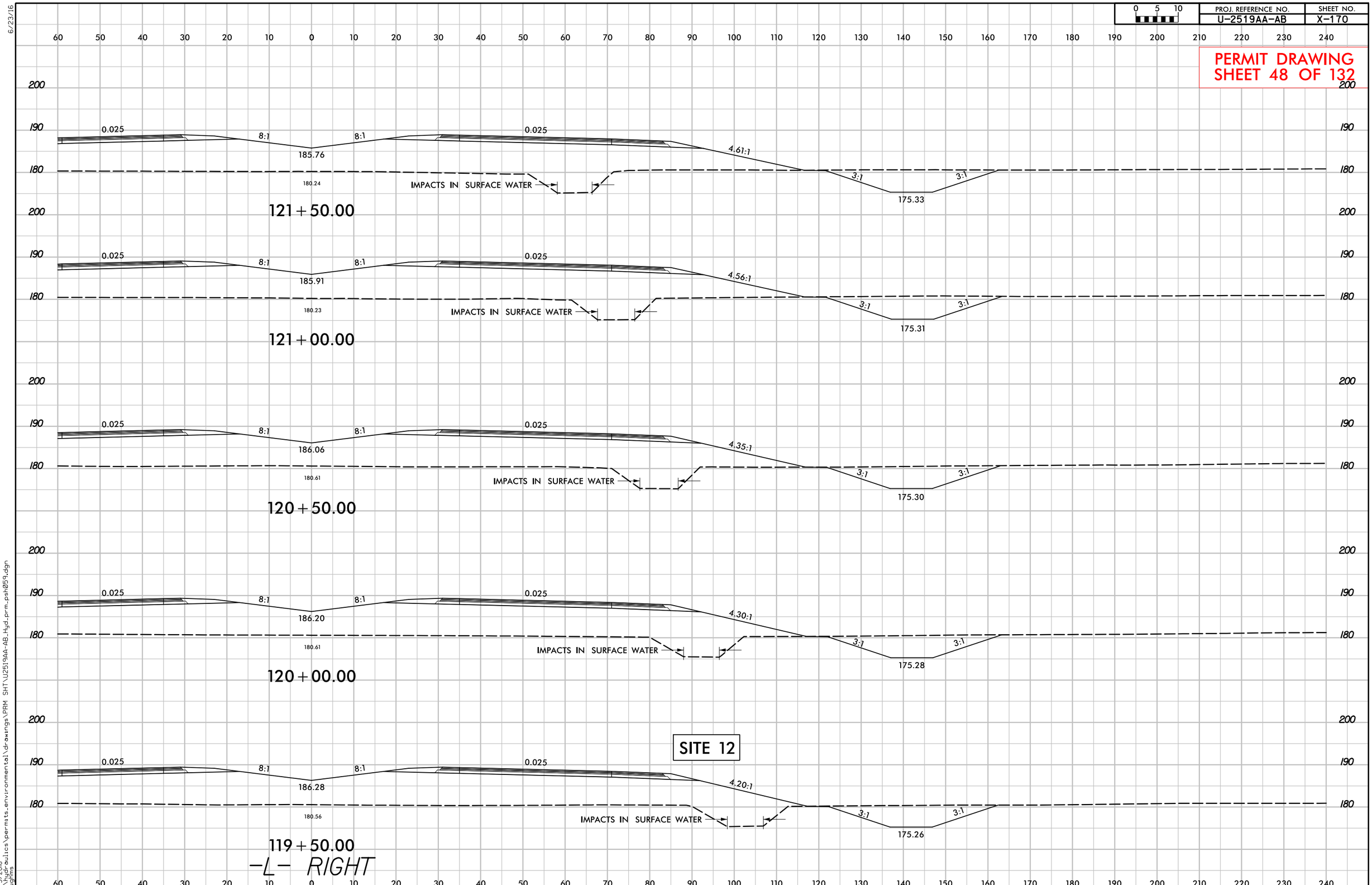
pughes

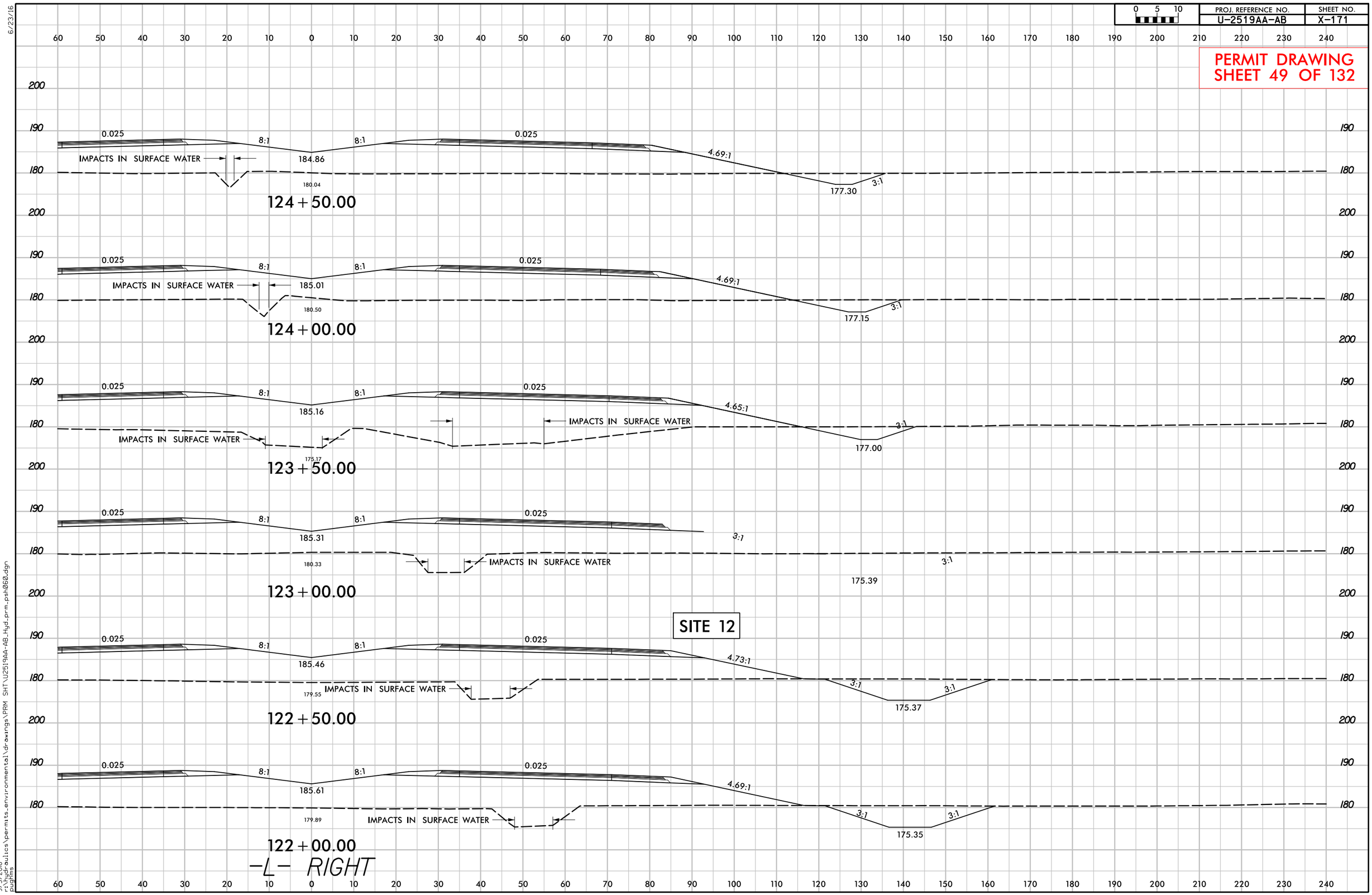
PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-170

PERMIT DRAWING
SHEET 48 OF 132



PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-171

PERMIT DRAWING
SHEET 49 OF 132



6/23/16

9/5/2018
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pughins

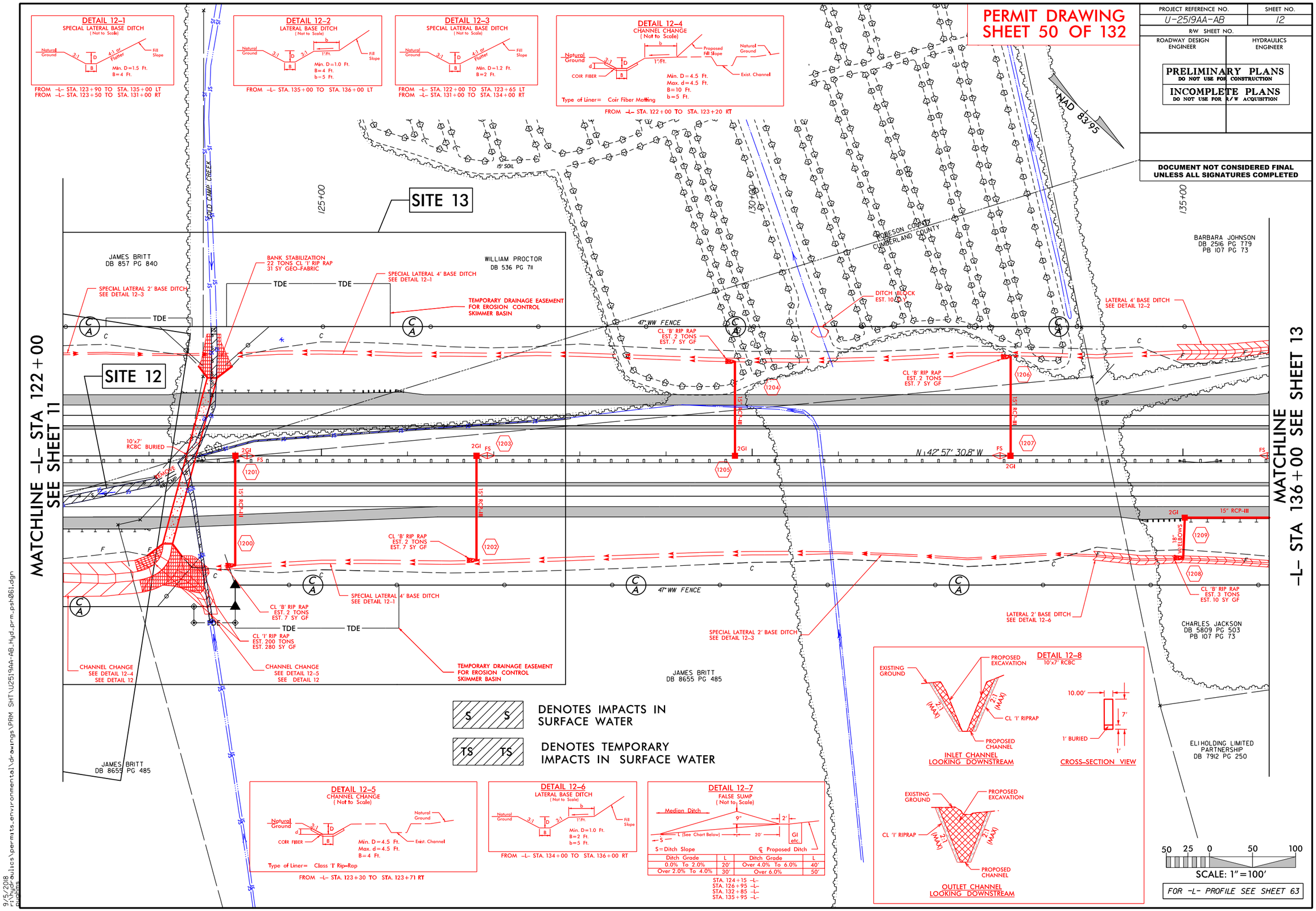
PERMIT DRAWING SHEET 50 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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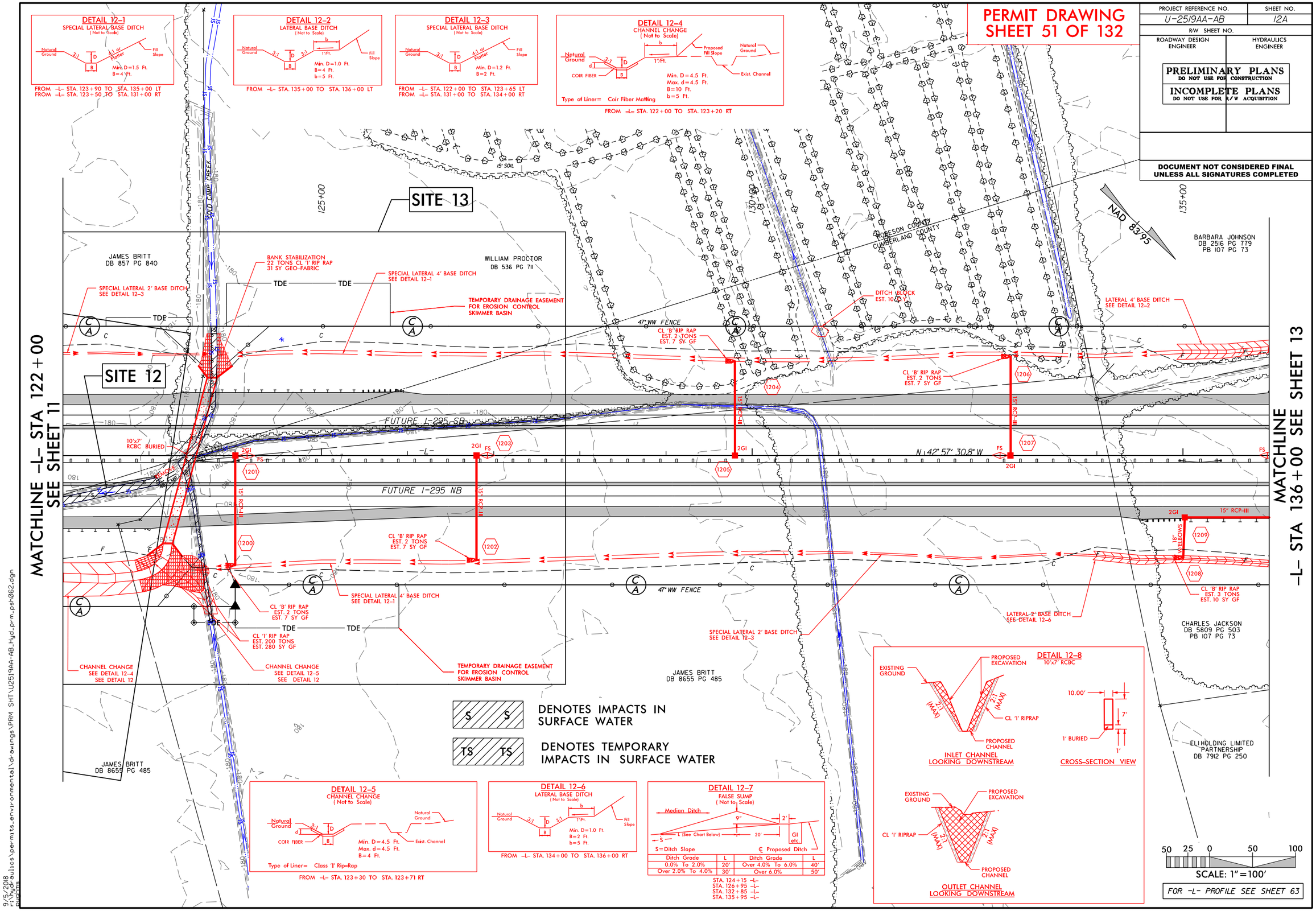
PERMIT DRAWING
SHEET 51 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	12A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



9/5/2018
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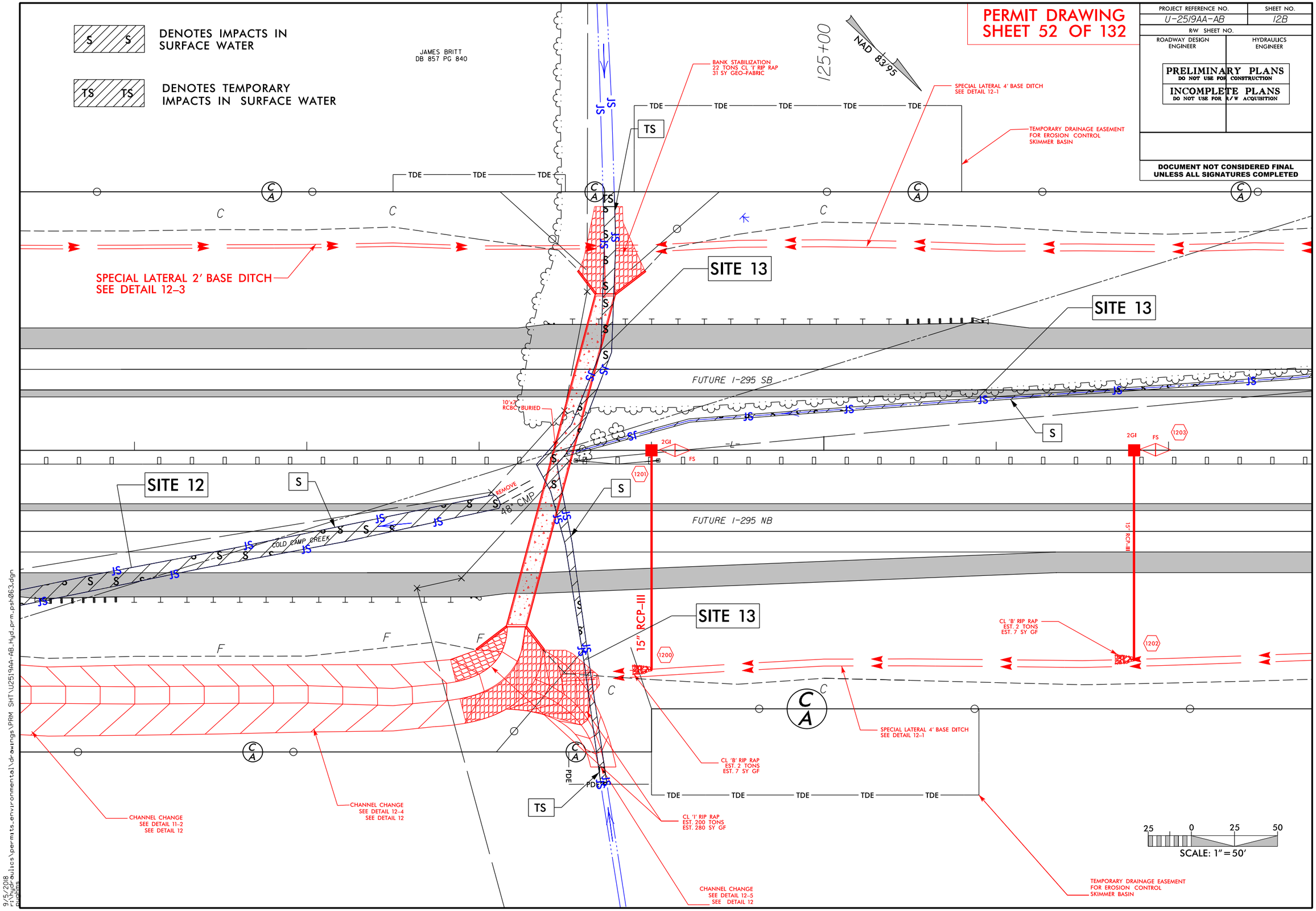
plotting


PERMIT DRAWING
SHEET 52 OF 132
PROJECT REFERENCE NO.
U-2519AA-AB
SHEET NO.
12B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
JAMES BRITT
DB 857 PG 840
125+00
NAD 83/95
BANK STABILIZATION
22 TONS CL 'I' RIP RAP
31 SY GEO-FABRIC
SPECIAL LATERAL 4' BASE DITCH
SEE DETAIL 12-1
TEMPORARY DRAINAGE EASEMENT
FOR EROSION CONTROL
SKIMMER BASIN
SPECIAL LATERAL 2' BASE DITCH
SEE DETAIL 12-3
SITE 13
SITE 12
FUTURE I-295 SB
FUTURE I-295 NB
10'x7' RCBC BURIED
REMOVE
48" CMP
COLD CAMP CREEK
15" RCP-III
CL 'B' RIP RAP
EST. 2 TONS
EST. 7 SY GF
CL 'I' RIP RAP
EST. 200 TONS
EST. 280 SY GF
CHANNEL CHANGE
SEE DETAIL 11-2
SEE DETAIL 12
CHANNEL CHANGE
SEE DETAIL 12-4
SEE DETAIL 12
CHANNEL CHANGE
SEE DETAIL 12-5
SEE DETAIL 12
SCALE: 1" = 50'
9/5/2018
rjohnson
hydraulics\permits_environmental\drawings\PRM SHT\U2519AA-AB_Hyd_prm_psh063.dgn

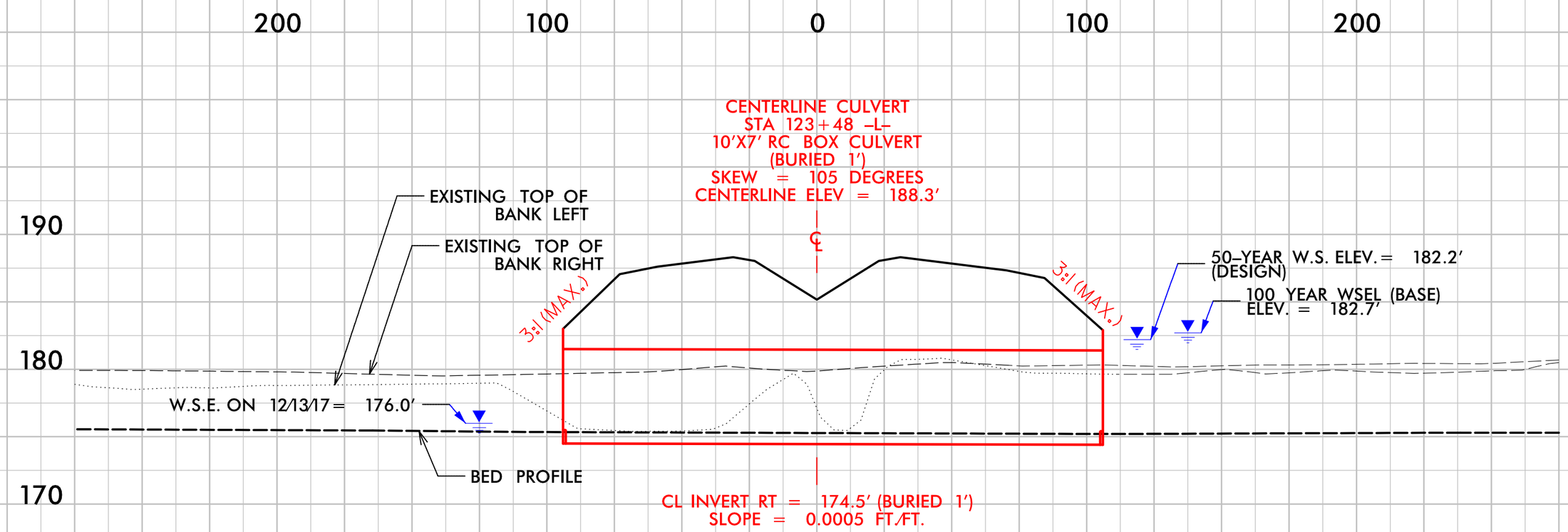
PERMIT DRAWING
SHEET 53 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	12C
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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9/5/2018
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pughms

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	63
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

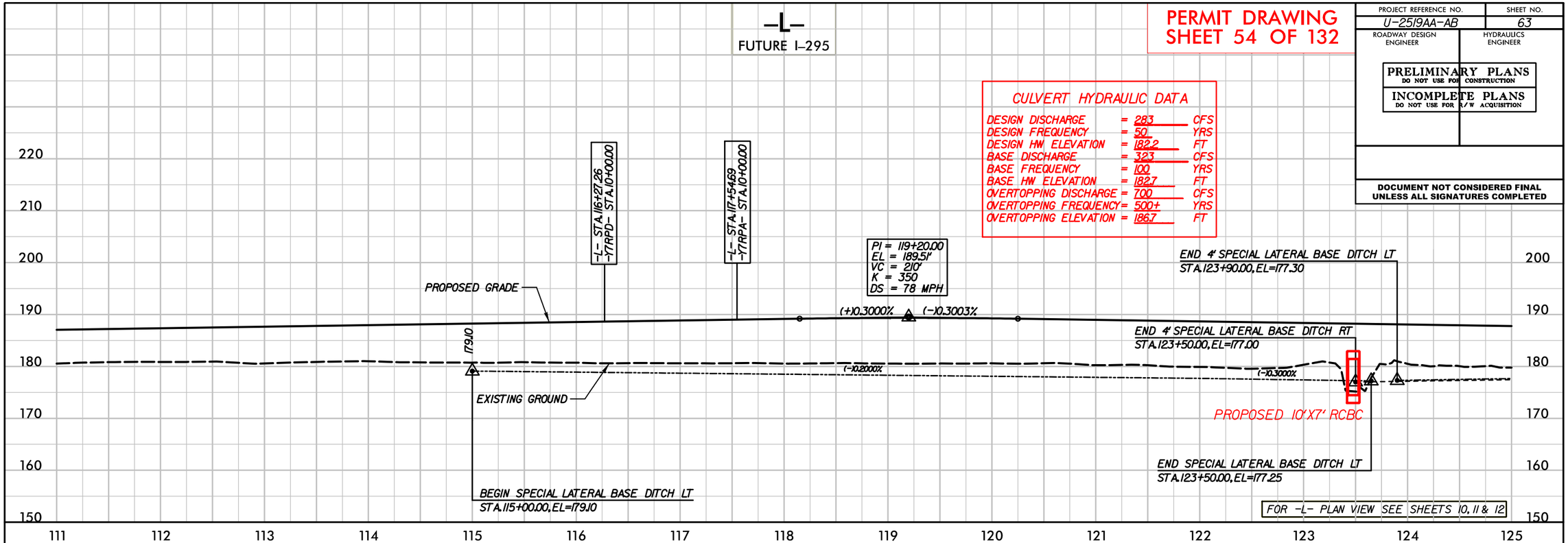
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

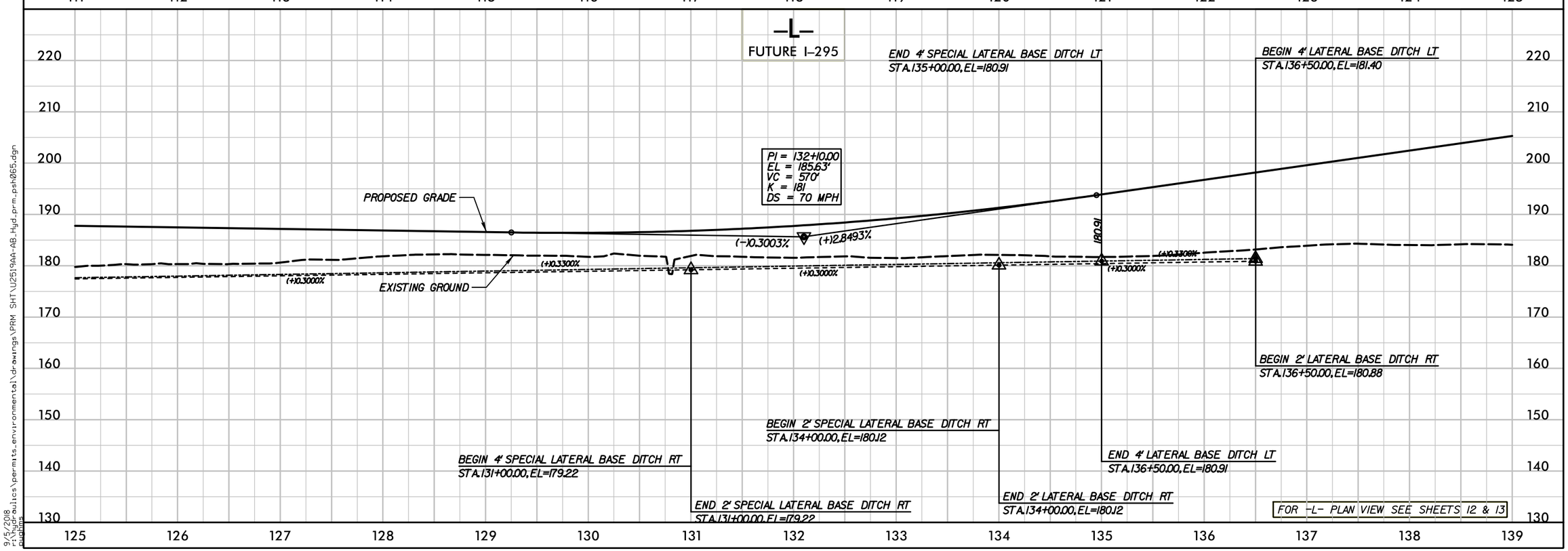
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 54 OF 132

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	283	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	182.2	FT
BASE DISCHARGE	=	323	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	182.7	FT
OVERTOPPING DISCHARGE	=	700	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	186.7	FT





9/5/2018
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6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-44

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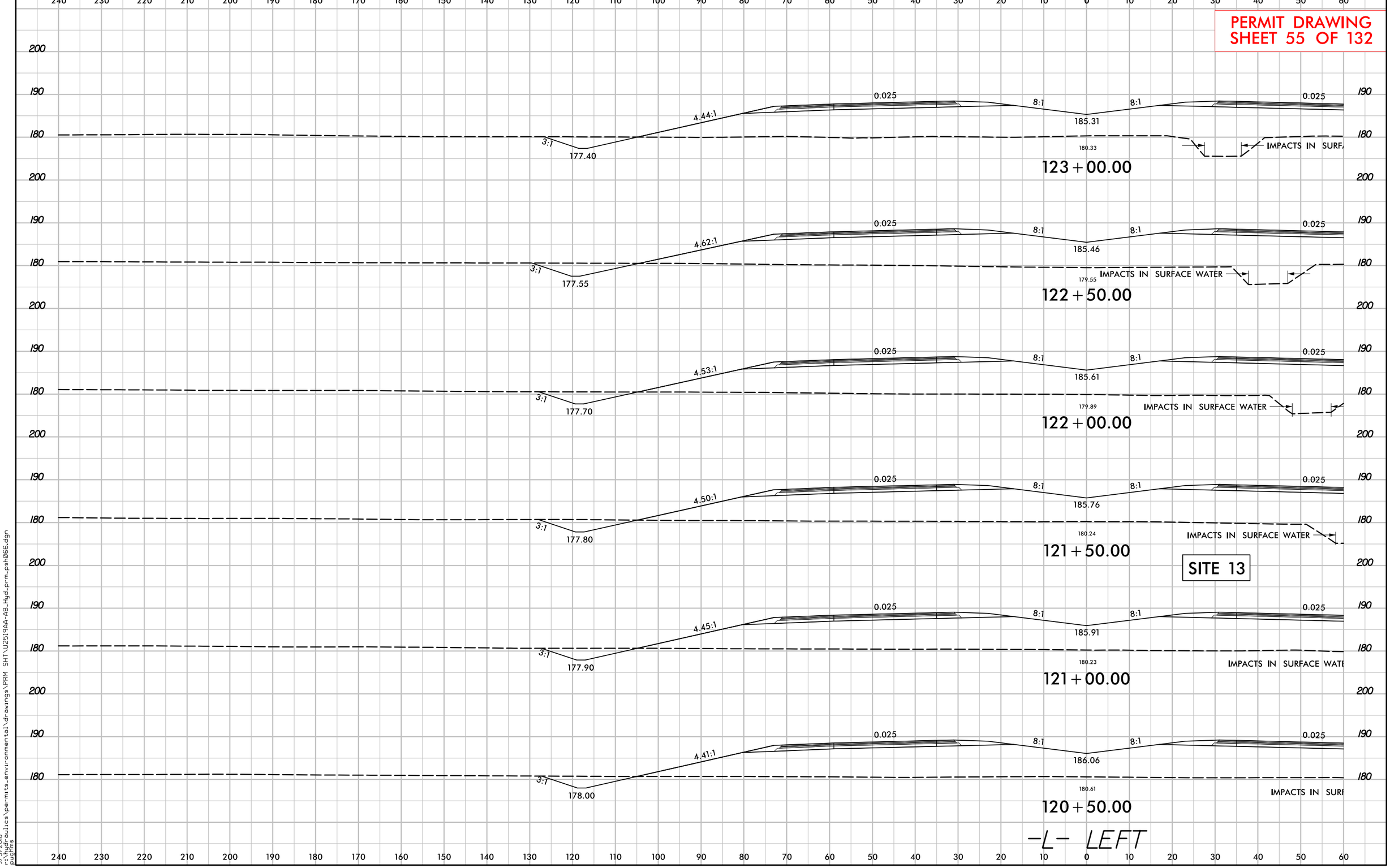
PERMIT DRAWING
SHEET 55 OF 132



9/5/2018
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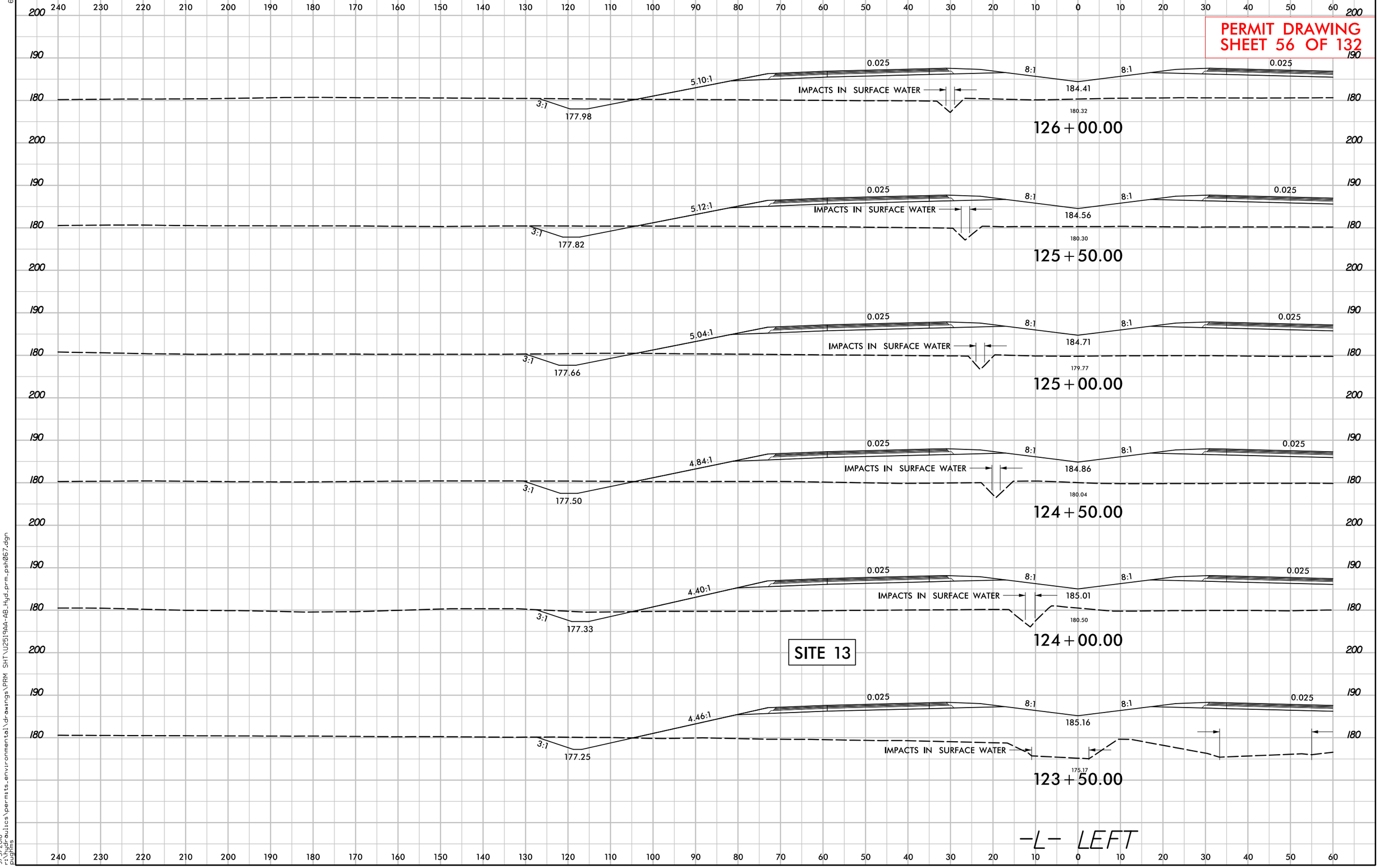
pughins

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-45

0 5 10

PERMIT DRAWING
SHEET 56 OF 132



PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 57 OF 132

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SCALE: 1" = 100'

NAD 83/95

MATCHLINE -L- STA 163+50 SEE SHEET 14

MATCHLINE -L- STA 177+00 -Y9- STA 15+50 SEE SHEET 16

TERRY SPELL

SITE 14

FUTURE I-295 SB

-L-

FUTURE I-295 NB

SR 1116 (LAKE UPCHURCH RD)

-Y9-

H.D. BOWEN JR.

47" WW FENCE

SPECIAL LATERAL 2' BASE DITCH SEE DETAIL 15-1

BED AND BANK STABILIZATION
CL 'II' RIPRAP
EST. 45 TONS CL II RIPRAP
EST. 210 SY GEOTEXTILE
SEE DETAIL 15-6

SPECIAL LATERAL 'V' DITCH SEE DETAIL 15-4

REMOVE

CLEAN OUT CHANNEL

BURY INVERT 0.5'

BURY INVERT 1.0'

HW

TDE

1501 1502 1503 1504 1505 1506 1507 1508

FS 2GI

15" RCP-IV

77" RCP-IV

CL 'B' RIPRAP
EST. 2 TONS
EST. 7 SY GF

BANK STABILIZATION
EST. 92 TONS CL II RIPRAP
EST. 135 SY GEOTEXTILE
SEE DETAIL 15-5

SPECIAL LATERAL 6' BASE DITCH SEE DETAIL 15-2

SPECIAL LATERAL 6' BASE DITCH
EST. 186 TONS CL II RIPRAP
EST. 239 SY GEOTEXTILE
SEE DETAIL 15-3

TS

165+00 170+00 175+00

R/W

CA

JS

SS ELEC

FOR -L- PROFILE SEE SHEETS 64 & 65
FOR -Y9- PROFILE SEE SHEET 102

DETAIL 15-1
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, B, 4:1 or Flatter, Fill Slope

Min. D=2.0 Ft.
B=2 Ft.

FROM STA. 163+50 -L- TO STA. 167+67 -L- RT
FROM STA. 166+28 -L- TO STA. 172+62 -L- LT
FROM STA. 171+00 -L- TO STA. 175+50 -L- RT

DETAIL 15-2
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, B, 4:1 or Flatter, Fill Slope

Min. D=4 Ft.
B=6 Ft.

FROM STA. 168+75 -L- TO STA. 170+00 -L- RT

DETAIL 15-3
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, d, D, B, Geotextile, 4:1 or Flatter, Fill Slope

Min. D=4 Ft.
Max. d=3 Ft.
B=6 Ft.

Type of Liner= CL II RIPRAP

FROM STA. 170+50 -L- TO STA. 171+00 -L- RT

DETAIL 15-4
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Natural Ground, 3:1, D, 4:1 or Flatter, Fill Slope

Min. D=1.5 Ft.

FROM STA. 175+50 -L- TO STA.179+00 -L- RT
FROM STA. 10+60 -Y9- TO STA. 12+00 -Y9- LT
FROM STA. 12+18 -Y9- TO STA. 15+35 -Y9- LT
FROM STA. 11+60 -Y9- TO STA. 15+50 -Y9- RT

DETAIL 15-5
BANK STABILIZATION
(Not to Scale)

Natural Ground, max. 2:1 to 1:1 EXISTING BANK, min. 2:1 TO 1:1 EXISTING BANK, d, CHANNEL BED (Variable), Natural Ground

Length=64 Ft.
d=4 Ft.
Est.= 92 Tons of Class II RIPRAP

STA. 169+00 -L- RT

DETAIL 15-6
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)

Natural Ground, Natural Bed Elevation, Natural Ground, 2', Geotextile, Channel Bed (Variable), ISFD

Length= 67 Ft.
Type of Liner= CL II RIPRAP - Keyed-In

STA. 173+00 -L- LT

7/23/2018
U2519AA_sld_prm_wet_psh_15.dgn
bpowell

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 58 OF 132

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 25' 0 50' 100'
SCALE: 1" = 100'

NAD 83/95

MATCHLINE -L- STA 163+50 SEE SHEET 14

MATCHLINE -L- STA 177+00 -Y9- STA 15+50 SEE SHEET 16

TERRY SPELL

165+00

170+00

175+00

SITE 14

FUTURE I-295 SB

-L-

FUTURE I-295 NB

47" WW FENCE

SR 1116 (LAKE UPCHURCH RD)
-Y9-

H.D. BOWEN JR.

TS

SPECIAL LATERAL 'V' DITCH SEE DETAIL 15-4

TDE

BURY INVERT 0.5'

HW

BED AND BANK STABILIZATION
CL 'II' RIPRAP
EST. 45 TONS CL II RIPRAP
EST. 210 SY GEOTEXTILE
SEE DETAIL 15-6

SPECIAL LATERAL 2' BASE DITCH SEE DETAIL 15-1

REMOVE

CLEAN OUT CHANNEL

BURY INVERT 1.0'

1501 1502 1503 1504 1506 1507 1508

FS 2GI

15" RCP-IV

77" RCP-IV

CL 'B' RIPRAP
EST. 2 TONS
EST. 7 SY GF

BANK STABILIZATION
EST. 92 TONS CL II RIPRAP
EST. 135 SY GEOTEXTILE
SEE DETAIL 15-5

SPECIAL LATERAL 6' BASE DITCH
EST. 186 TONS CL II RIPRAP
EST. 239 SY GEOTEXTILE
SEE DETAIL 15-3

SPECIAL LATERAL 6' BASE DITCH SEE DETAIL 15-2

SPECIAL LATERAL 'V' DITCH SEE DETAIL 15-4

ISFD

TS ELEC

145.45 SPOT

DETAIL 15-1
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, B, 4:1 or Flatter, Fill Slope

Min. D = 2.0 Ft.
B = 2 Ft.

FROM STA. 163+50 -L- TO STA. 167+67 -L- RT
FROM STA. 166+28 -L- TO STA. 172+62 -L- LT
FROM STA. 171+00 -L- TO STA. 175+50 -L- RT

DETAIL 15-2
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, B, 4:1 or Flatter, Fill Slope

Min. D = 4 Ft.
B = 6 Ft.

FROM STA. 168+75 -L- TO STA. 170+00 -L- RT

DETAIL 15-3
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, d, Geotextile, B, 4:1 or Flatter, Fill Slope

Min. D = 4 Ft.
Max. d = 3 Ft.
B = 6 Ft.

Type of Liner = CL II RIPRAP

FROM STA. 170+50 -L- TO STA. 171+00 -L- RT

DETAIL 15-4
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Natural Ground, 3:1, D, 4:1 or Flatter, Fill Slope

Min. D = 1.5 Ft.

FROM STA. 179+50 -L- TO STA. 179+00 -L- RT
FROM STA. 10+60 -Y9- TO STA. 12+00 -Y9- LT
FROM STA. 12+18 -Y9- TO STA. 15+35 -Y9- LT
FROM STA. 11+60 -Y9- TO STA. 15+50 -Y9- RT

DETAIL 15-5
BANK STABILIZATION
(Not to Scale)

Natural Ground, Min. 2:1 to 3:1 or Existing Slope, 7ft, CHANNEL BED (Variable), Min. 2:1 to 3:1 or Existing Slope, d, Natural Ground

Length = 64 Ft.
d = 4 Ft.
Est. = 92 Tons of Class II RIPRAP

STA. 169+00 -L- RT

DETAIL 15-6
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)

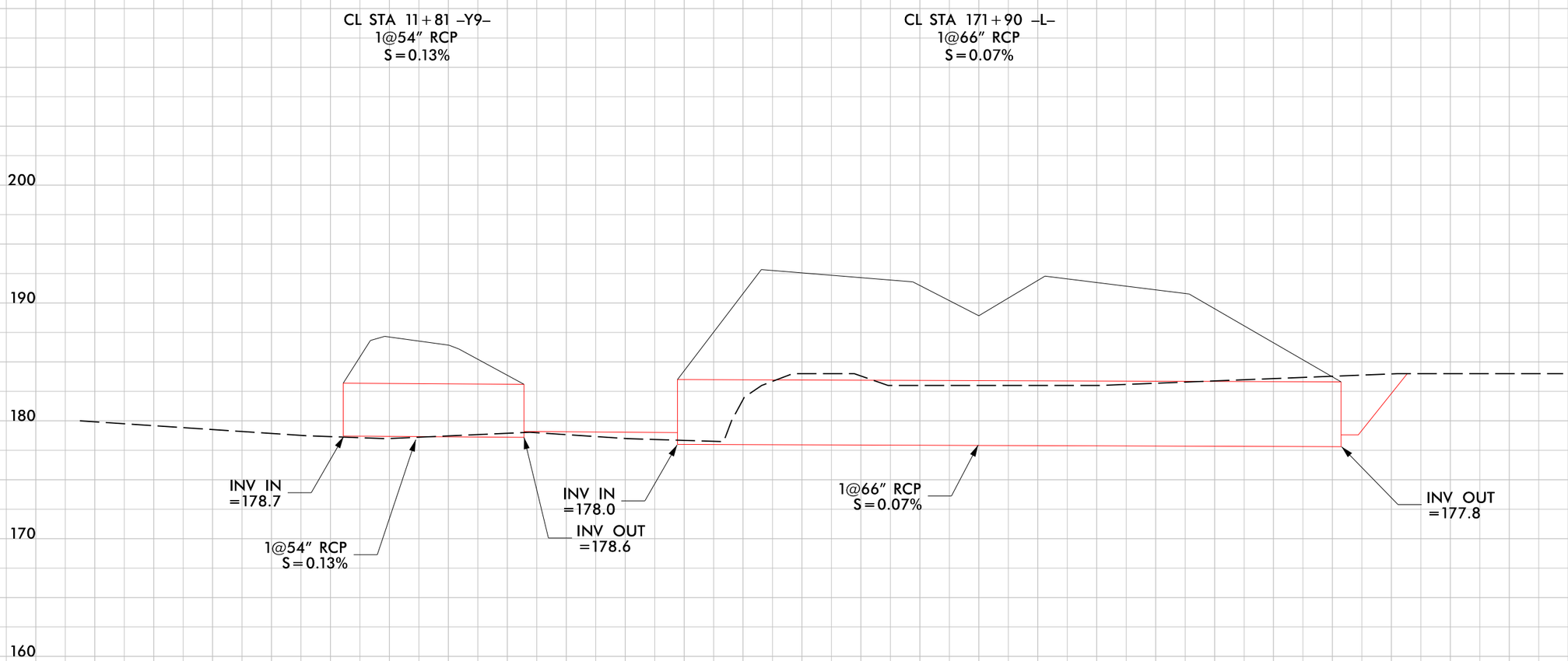
Natural Ground, Natural Bed Elevation, Natural Ground, 2', Geotextile, Channel Bed (Variable), ISFD

Length = 67 Ft.
Type of Liner = CL II RIPRAP - Keyed-In

STA. 173+00 -L- LT

FOR -L- PROFILE SEE SHEETS 64 & 65
FOR -Y9- PROFILE SEE SHEET 102

7/23/2018
U2519aa1gd_prm_wet_psh_15a_con.dgn
bar_rev


CL STA 11+81 -Y9-
1@54" RCP
S=0.13%
CL STA 171+90 -L-
1@66" RCP
S=0.07%
200
190
180
170
160
INV IN
=178.7
1@54" RCP
S=0.13%
INV IN
=178.0
INV OUT
=178.6
1@66" RCP
S=0.07%
INV OUT
=177.8

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

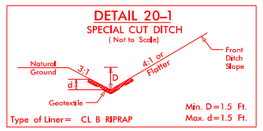
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

50' 25' 0 50' 100'
SCALE: 1" = 100'
NAD 83/95

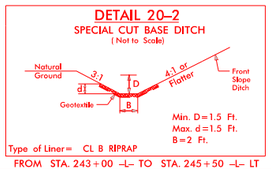
PERMIT DRAWING SHEET 60 OF 132

DETAIL 20-1
SPECIAL CUT DITCH
(Not to Scale)



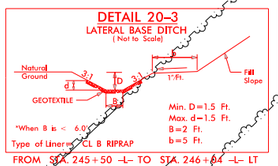
Type of Liner= CL B RIPRAP
FROM STA. 238+00 -L- TO STA. 243+00 -L- LT

DETAIL 20-2
SPECIAL CUT BASE DITCH
(Not to Scale)



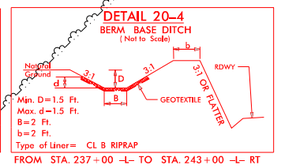
Type of Liner= CL B RIPRAP
FROM STA. 243+00 -L- TO STA. 245+50 -L- LT

DETAIL 20-3
LATERAL BASE DITCH
(Not to Scale)



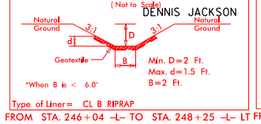
*When B is < 6.0'
Type of Liner= CL B RIPRAP
FROM STA. 245+50 -L- TO STA. 246+04 -L- LT

DETAIL 20-4
BERM BASE DITCH
(Not to Scale)



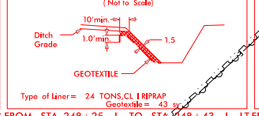
Type of Liner= CL B RIPRAP
FROM STA. 237+00 -L- TO STA. 243+00 -L- RT

DETAIL 20-5
STANDARD BASE DITCH
(Not to Scale)



*When B is < 6.0'
Type of Liner= CL B RIPRAP
FROM STA. 246+04 -L- TO STA. 248+25 -L- LT

DETAIL 20-6
RIP RAP AT EMBANKMENT
(Not to Scale)

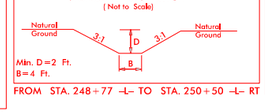


Type of Liner= 24 TONS,CL I RIPRAP
Geotextile= 43 sy
FROM STA. 248+25 -L- TO STA. 248+43 -L- LT

DETAIL 20-7
RIP RAP AT EMBANKMENT
(Not to Scale)

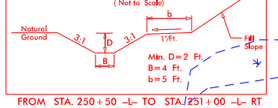
Type of Liner= 47 TONS,CL I RIPRAP
Geotextile= 67 sy
FROM STA. 248+45 -L- TO STA. 248+77 -L- LT

DETAIL 20-8
STANDARD BASE DITCH
(Not to Scale)

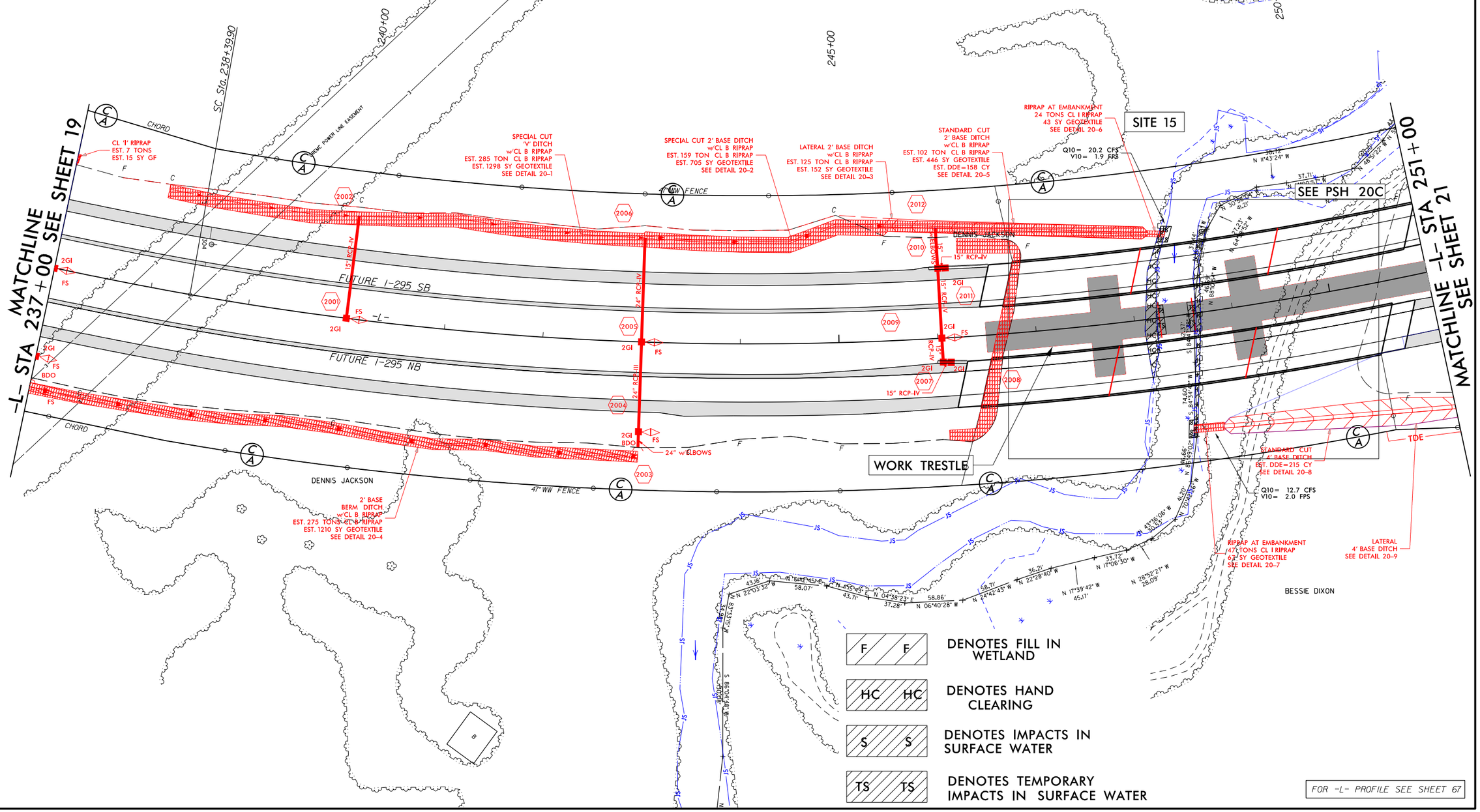


FROM STA. 248+77 -L- TO STA. 250+50 -L- RT

DETAIL 20-9
LATERAL BASE DITCH
(Not to Scale)



FROM STA. 250+50 -L- TO STA. 251+00 -L- RT



F F	DENOTES FILL IN WETLAND
HC HC	DENOTES HAND CLEARING
S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

FOR -L- PROFILE SEE SHEET 67

7/23/2018
U2519_hyd_prm_wet_psh_20.dgn
bpowell

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 61 OF 132

50' 25' 0 50' 100'
SCALE: 1" = 100'
NAD 83/95

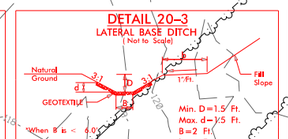
DETAIL 20-1
SPECIAL CUT DITCH
(Not to Scale)

Type of Liner= CL B RIPRAP
FROM STA. 238+00 -L- TO STA. 243+00 -L- LT

DETAIL 20-2
SPECIAL CUT BASE DITCH
(Not to Scale)

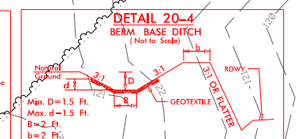
Type of Liner= CL B RIPRAP
FROM STA. 243+00 -L- TO STA. 245+50 -L- LT

DETAIL 20-3
LATERAL BASE DITCH
(Not to Scale)



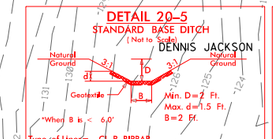
*When B is < 6.0'
Type of Liner= CL B RIPRAP
FROM STA. 245+50 -L- TO STA. 246+04 -L- LT

DETAIL 20-4
BERM BASE DITCH
(Not to Scale)



Type of Liner= CL B RIPRAP
FROM STA. 237+00 -L- TO STA. 243+00 -L- RT

DETAIL 20-5
STANDARD BASE DITCH
(Not to Scale)



*When B is < 6.0'
Type of Liner= CL B RIPRAP
FROM STA. 246+04 -L- TO STA. 248+25 -L- LT

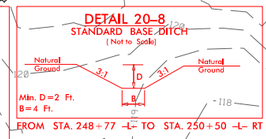
DETAIL 20-6
RIP RAP AT EMBANKMENT
(Not to Scale)

Type of Liner= 24 TONS,CL I RIPRAP
Geotextile= 43 sy
FROM STA. 248+25 -L- TO STA. 248+43 -L- LT

DETAIL 20-7
RIP RAP AT EMBANKMENT
(Not to Scale)

Type of Liner= 47 TONS,CL I RIPRAP
Geotextile= 67 sy
FROM STA. 248+45 -L- TO STA. 248+77 -L- LT

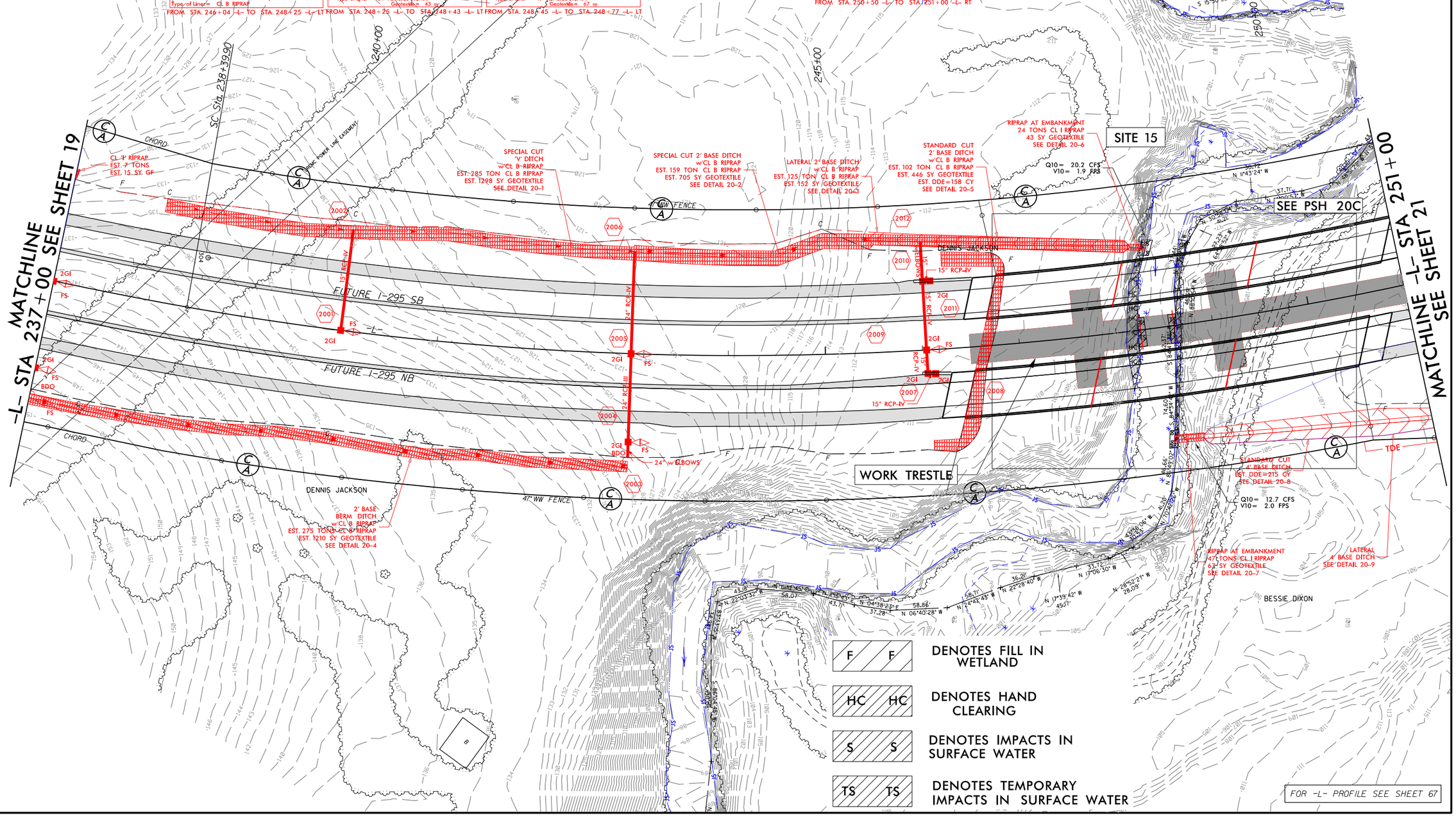
DETAIL 20-8
STANDARD BASE DITCH
(Not to Scale)



FROM STA. 248+77 -L- TO STA. 250+50 -L- RT

DETAIL 20-9
LATERAL BASE DITCH
(Not to Scale)

FROM STA. 250+50 -L- TO STA. 251+00 -L- RT



F F	DENOTES FILL IN WETLAND
HC HC	DENOTES HAND CLEARING
S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

FOR -L- PROFILE SEE SHEET 67

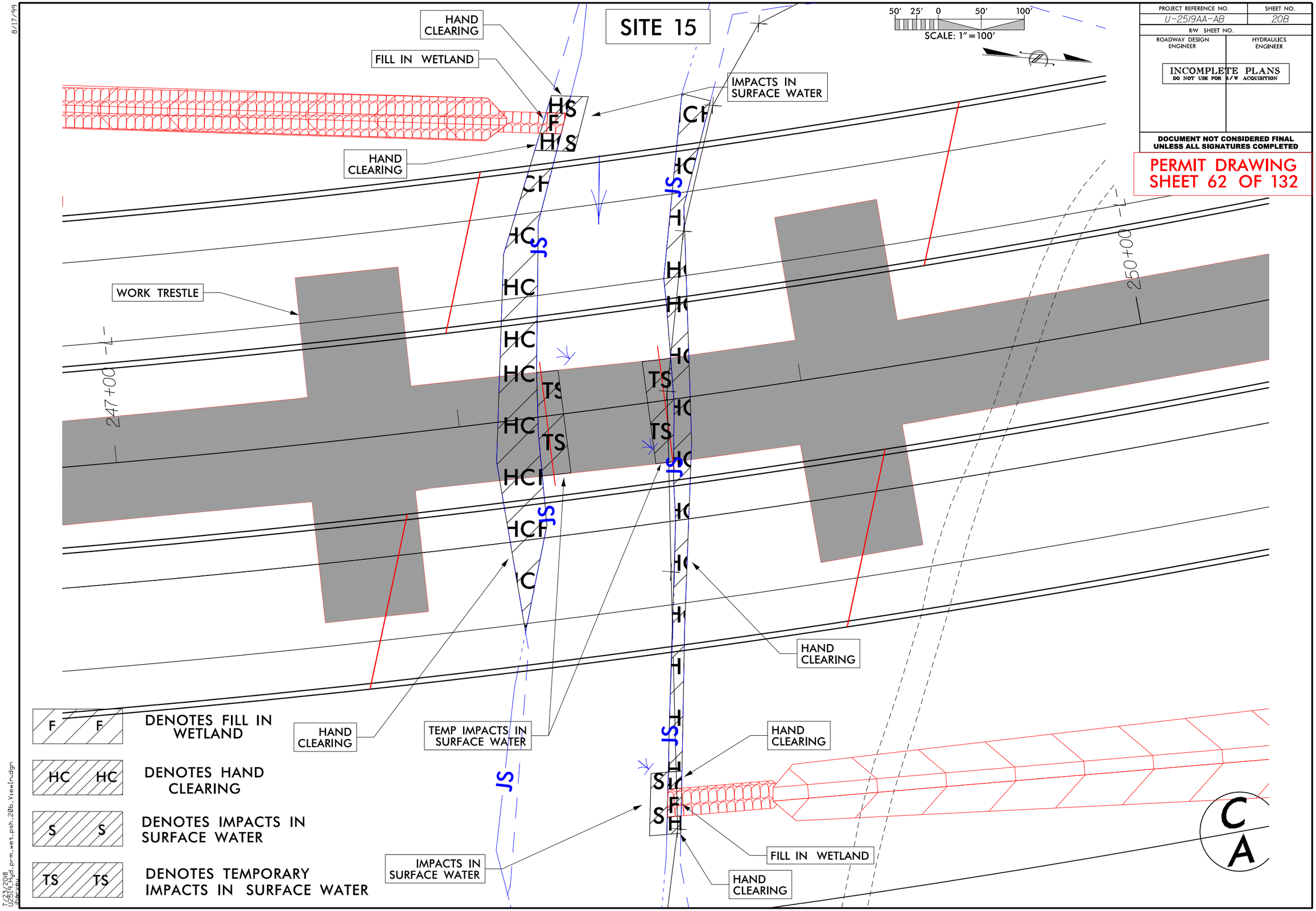
7/23/2018
U2519AA_hyd_prm_wet_psh_20a_con.dgn
bpowell

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	20B
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

PERMIT DRAWING
SHEET 62 OF 132



8/17/99

7/23/2018
U2519gd_prm_wet_psh_20b_Viewin.dgn
bbarvau

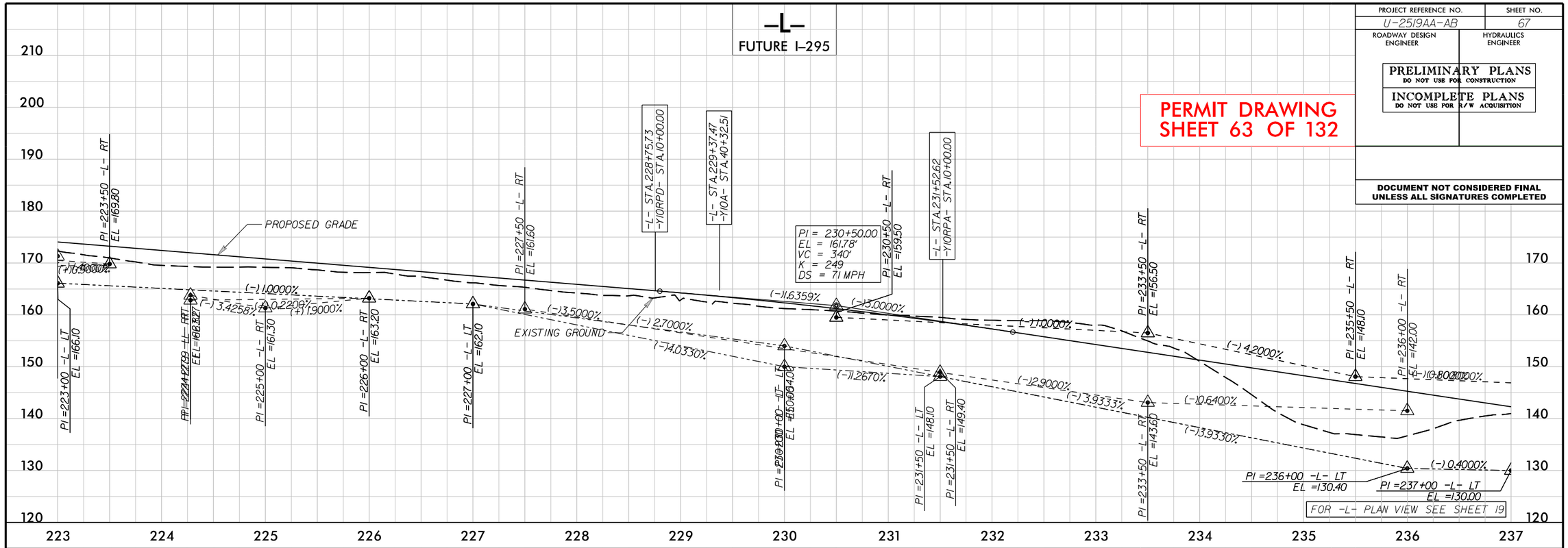
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	67
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

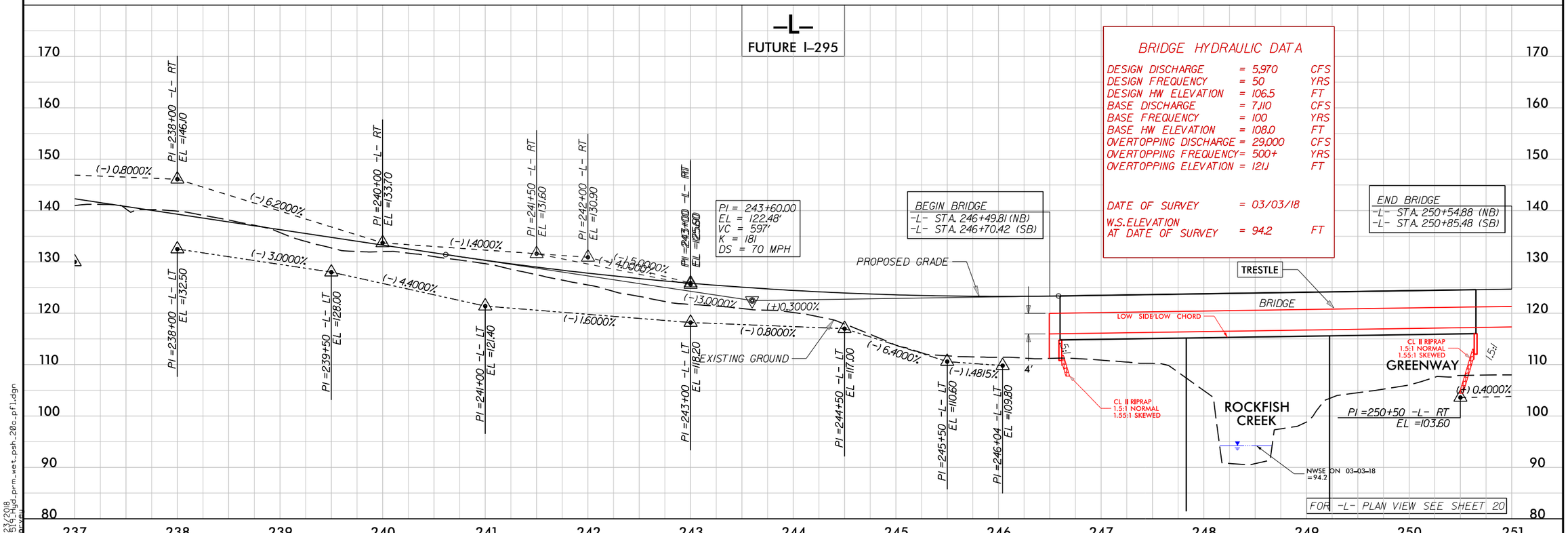
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 63 OF 132





7/23/2018
U2519AA_hyd_prm_wet_psh_20c_pfl.dgn
bpowell

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

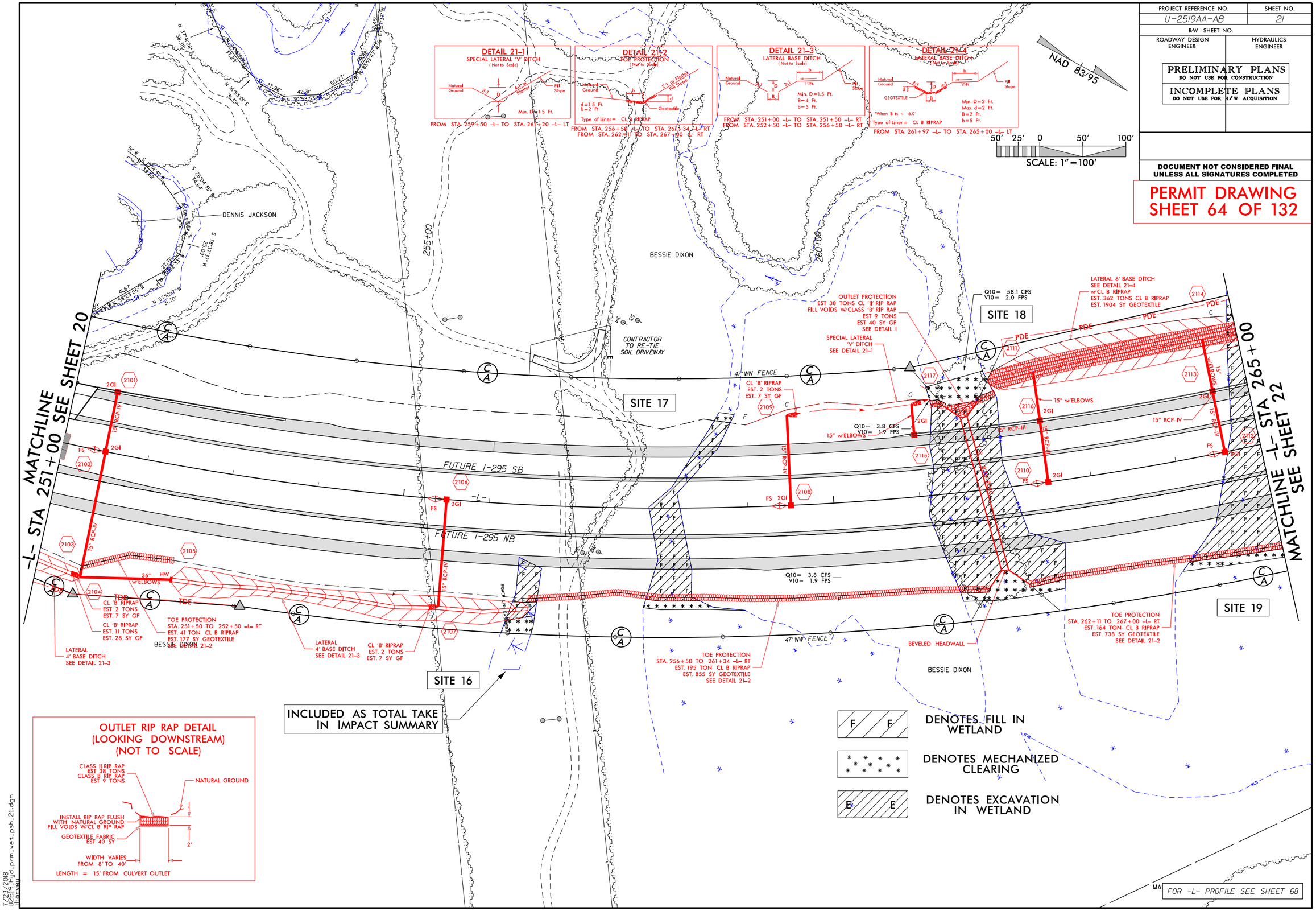
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 64 OF 132

NAD 83/95

SCALE: 1" = 100'



7/23/2018
U2519AA_hyd_prm_wet_psh_21.dgn
hbarnell

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 65 OF 132

NAD 83/95

SCALE: 1" = 100'

DETAIL 21-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D = 1.5 Ft.
FROM STA. 259+50 -L- TO STA. 261+20 -L- LT

DETAIL 21-2
TOE PROTECTION
(Not to Scale)
d = 1.5 Ft.
b = 2 Ft.
Type of Liner = CL B RIPRAP
FROM STA. 256+50 -L- TO STA. 261+34 -L- RT
FROM STA. 262+11 TO STA. 267+00 -L- RT

DETAIL 21-3
LATERAL BASE DITCH
(Not to Scale)
Min. D = 1.5 Ft.
B = 4 Ft.
b = 5 Ft.
FROM STA. 251+00 -L- TO STA. 251+50 -L- RT
FROM STA. 252+50 -L- TO STA. 256+50 -L- RT

DETAIL 21-4
LATERAL BASE DITCH
(Not to Scale)
Min. D = 2 Ft.
Max. d = 2 Ft.
B = 2' Ft.
b = 5 Ft.
Type of Liner = CL B RIPRAP
*When B is < 6.0'
FROM STA. 261+97 -L- TO STA. 263+00 -L- LT

MATCHLINE 251+00 SEE SHEET 20

MATCHLINE -L- STA 265+00 SEE SHEET 22

SITE 16

SITE 17

SITE 18

SITE 19

INCLUDED AS TOTAL TAKE IN IMPACT SUMMARY

FUTURE I-295 SB

FUTURE I-295 NB

DENNIS JACKSON

BESSIE DIXON

CONTRACTOR TO RE-TIE SOIL DRIVEWAY

47" WW FENCE

POWER PIPELINE

Q10 = 58.1 CFS
V10 = 2.0 FPS

Q10 = 3.8 CFS
V10 = 1.9 FPS

OUTLET PROTECTION
EST 38 TONS CL 'II' RIP RAP
FILL VOIDS W/CLASS 'B' RIP RAP
EST 9 TONS
EST 40 SY GF
SEE DETAIL I

SPECIAL LATERAL 'V' DITCH
SEE DETAIL 21-1

LATERAL 6' BASE DITCH
SEE DETAIL 21-4
w/CL B RIPRAP
EST. 262 TONS CL B RIPRAP
EST. 1904 SY GEOTEXTILE

15" w/ELBOWS

15" RCP-III

15" RCP-IV

36" HW w/ELBOWS

CL 'B' RIPRAP
EST. 2 TONS
EST. 7 SY GF

CL 'B' RIPRAP
EST. 11 TONS
EST. 28 SY GF

LATERAL 4' BASE DITCH
SEE DETAIL 21-3

TOE PROTECTION
STA. 251+50 TO 252+50 -L- RT
EST. 41 TON CL B RIPRAP
EST. 177 SY GEOTEXTILE
SEE DETAIL 21-2

LATERAL 4' BASE DITCH
SEE DETAIL 21-3

CL 'B' RIPRAP
EST. 2 TONS
EST. 7 SY GF

TOE PROTECTION
STA. 256+50 TO 261+34 -L- RT
EST. 195 TON CL B RIPRAP
EST. 855 SY GEOTEXTILE
SEE DETAIL 21-2

BEVELED HEADWALL

TOE PROTECTION
STA. 262+11 TO 267+00 -L- RT
EST. 164 TON CL B RIPRAP
EST. 738 SY GEOTEXTILE
SEE DETAIL 21-2

OUTLET RIP RAP DETAIL (LOOKING DOWNSTREAM) (NOT TO SCALE)

CLASS II RIP RAP
EST 38 TONS
CLASS B RIP RAP
EST 9 TONS

NATURAL GROUND

INSTALL RIP RAP FLUSH WITH NATURAL GROUND
FILL VOIDS W/CL B RIP RAP

GEOTEXTILE FABRIC
EST 40 SY

WIDTH VARIES FROM 8' TO 40'

LENGTH = 15' FROM CULVERT OUTLET

F F — DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

E E — DENOTES EXCAVATION IN WETLAND

FOR -L- PROFILE SEE SHEET 68

7/23/2018
U2519AA_hyd_prm_wet_psh_21a_con.dgn
jhorvat

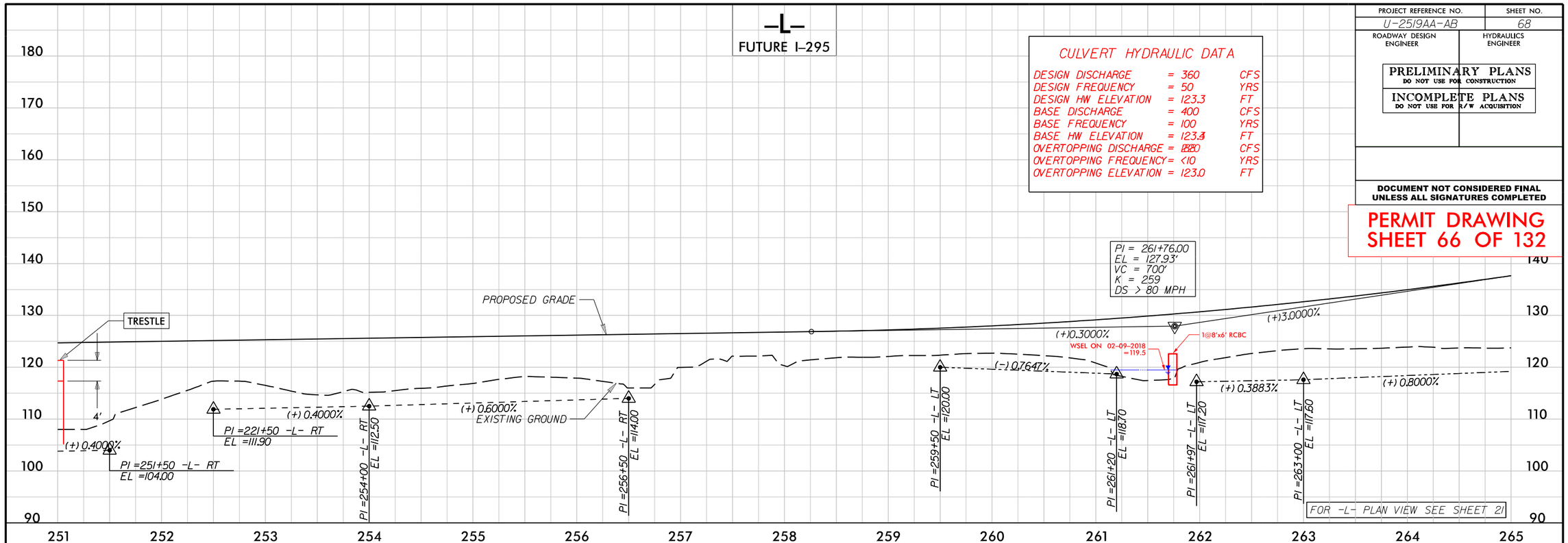
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	68
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

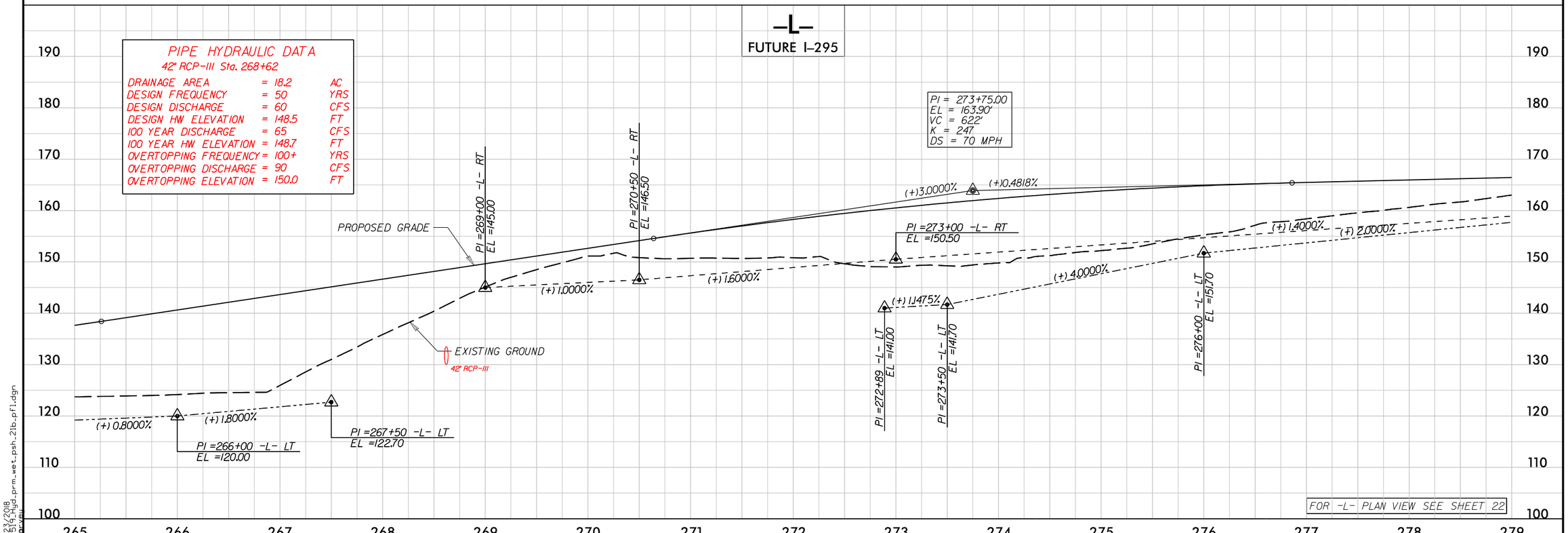
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 66 OF 132





7/23/2018
U2519AA_hyd_prm_wet_psh_21b_pfl.dgn
bpowell

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-102

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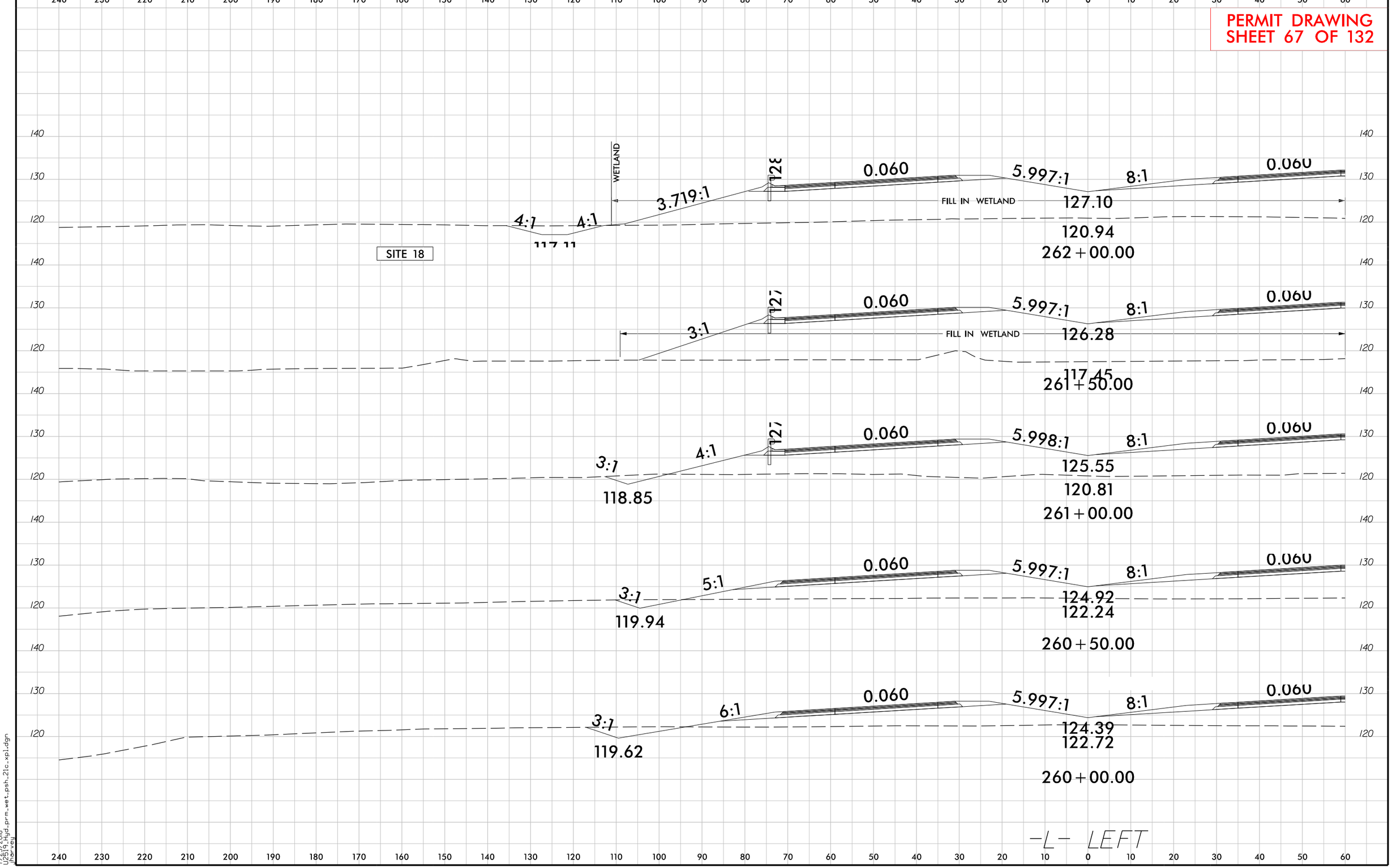
PERMIT DRAWING
SHEET 67 OF 132



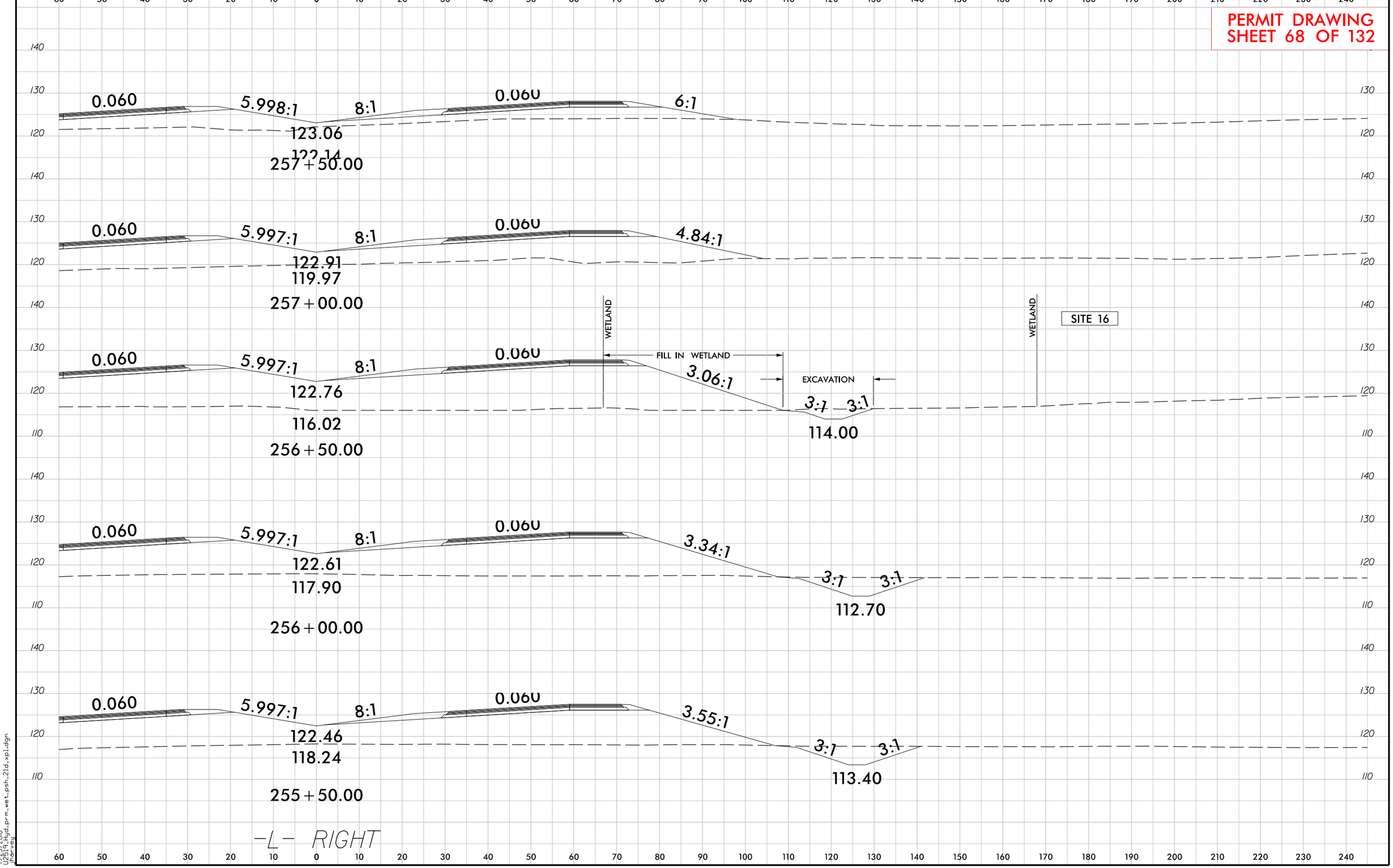
7/23/2018
U2519AA_prm_wet_psh_21c_xpl.dgn
jharvey

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-227

0 5 10

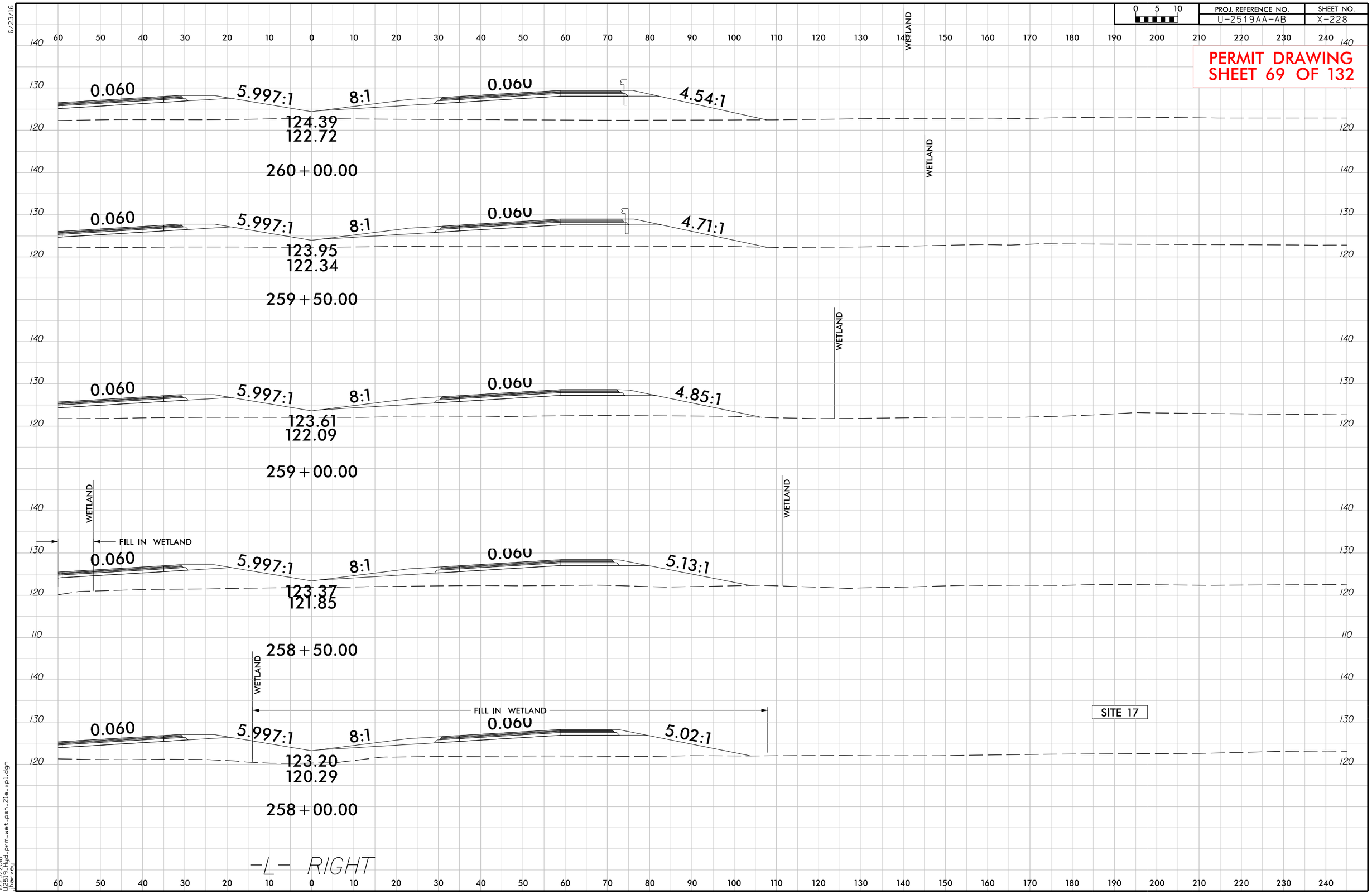
PERMIT DRAWING
SHEET 68 OF 132



7/23/2018
U2519AA_hydro_prm_wet_psh_21d.xpl.dgn
jhorvey

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-228

PERMIT DRAWING
SHEET 69 OF 132

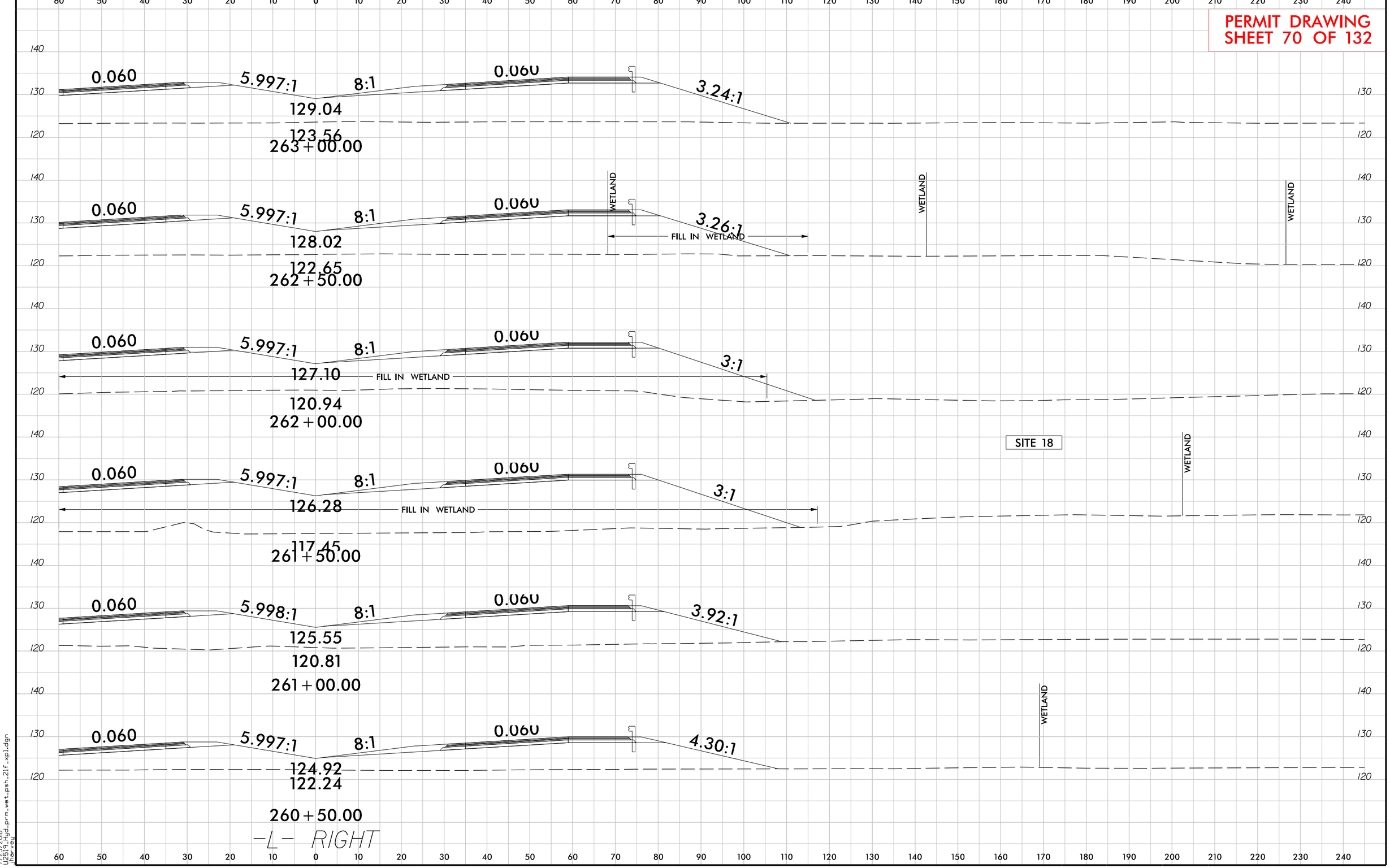


6/23/16

7/23/2018
U2519AA_dgn_prm_wet_psh_21e_xpl.dgn
jhorvey

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-229

PERMIT DRAWING
SHEET 70 OF 132



6/23/16

7/23/2018
U2519AA_hwd_prm_wet_psh_21f_xpl.dgn
jharvey

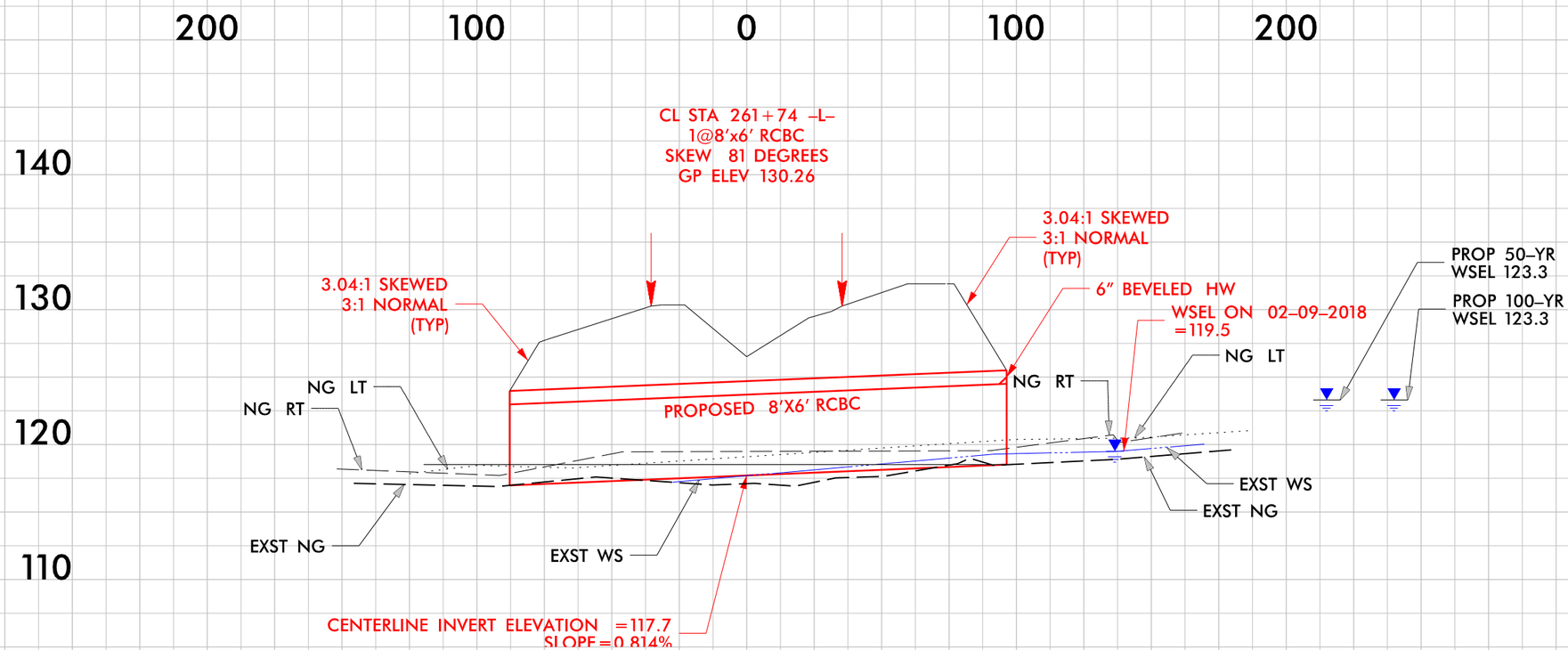
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	21G
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 71 OF 132



7/23/2018
U2519AA_hyd_prm_wet_psh_21g_Sect.dgn
bpowell

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 72 OF 132

SCALE: 1" = 100'

NAD 83/95

DETAIL 22-1
TOE PROTECTION
(Not to Scale)

Natural Ground; 2:1 or Flatter Fill Slope; b; d; Geotextile

d=1.5 Ft.
b=2 Ft.

Type of Liner= CL B RIPRAP

FROM STA. 265+00 -L- TO STA. 267+00 -L- RT

DETAIL 22-2
SPECIAL CUT BASE DITCH
(Not to Scale)

Natural Ground; 3:1; D; B; 4:1 or Flatter; Front Ditch Slope

Min. D=1.5 Ft.
B=4 Ft.

FROM STA. 269+00 -L- TO STA. 273+00 -L- RT

DETAIL 22-3
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground; 3:1; D; B; 4:1 or Flatter; Fill Slope

Min. D=1.5 Ft.
B=2 Ft.

FROM STA. 276+00 -L- TO STA. 280+00 -L- LT

DETAIL 22-4
SPECIAL CUT BASE DITCH
(Not to Scale)

Natural Ground; 3:1; D; B; 4:1 or Flatter; Front Ditch Slope

Min. D=1.5 Ft.
B=3 Ft.

FROM STA. 273+00 -L- TO STA. 279+00 -L- RT

DETAIL 22-5
LATERAL BASE DITCH
(Not to Scale)

Natural Ground; 3:1; D; 3:1; b; 1'-Ft.; Fill Slope; GEOTEXTILE; d; B

Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2 Ft.
b=5 Ft.

*When B is < 6.0'

Type of Liner= CL B RIPRAP

FROM STA. 272+89 -L- TO STA. 276+00 -L- LT

DETAIL 22-6
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground; 3:1; D; d; Geotextile; B; 4:1 or Flatter; Fill Slope; 44.6 Ft.; 72.87'

Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2 Ft.

Type of Liner= CL B RIPRAP

FROM STA. 276+00 -L- TO STA. 280+00 -L- LT

DETAIL 22-7
LATERAL BASE DITCH
(Not to Scale)

Natural Ground; 4:1; D; 4:1; b; 1'-Ft.; Fill Slope; GEOTEXTILE; d; B

Min. D=2 Ft.
Max. d=2 Ft.
B=6 Ft.
b=5 Ft.

*When B is < 6.0'

Type of Liner= CL B RIPRAP

FROM STA. 265+00 -L- TO STA. 267+50 -L- LT

INCLUDED AS ADDITIONAL AREA IN IMPACT SUMMARY

MATCHLINE -L- STA 265+00 SEE SHEET 21

MATCHLINE -L- STA 279+00 SEE SHEET 23

270+00

275+00

S 62°34'02" W
111.77'

LATERAL 6' BASE DITCH
SEE DETAIL 22-7
w/CL B RIPRAP
EST. 362 TONS CL B RIPRAP
EST. 1904 SY GEOTEXTILE

BESSIE DIXON

2203

2202

42" RCP-III

JB w/MH

ST. JAMES SQUARE INC.

LATERAL 2' BASE DITCH
w/CL B RIPRAP
EST. 129 TONS CL B RIPRAP
EST. 569 SY GEOTEXTILE
SEE DETAIL 22-5

SPECIAL LATERAL 2'
BASE DITCH w/CL B RIPRAP
EST. 207 TONS CL B RIPRAP
EST. 912 SY GEOTEXTILE
SEE DETAIL 22-6

2210

PDE

47" WW FENCE

CL 'B' RIPRAP
EST. 3 TONS
EST. 10 SY GF

2205

2208

2207

2GI

15" RCP-III

18" RCP-III

FUTURE I-295 SB

2206

FS

FUTURE I-295 NB

2209

2201

HW

TOE PROTECTION
STA. 262+11 TO 267+00 -L- RT
EST. 164 TON CL B RIPRAP
EST. 738 SY GEOTEXTILE
SEE DETAIL 22-1

SITE 19

BESSIE DIXON

SLOPE ARMORING
EST. 20 TONS CL I RIPRAP
EST. 44 SY GEOTEXTILE
SEE DETAIL 22-9

TDE

SPECIAL CUT
4' BASE DITCH
SEE DETAIL 22-2

ST. JAMES SQUARE INC.

47" WW FENCE

SPECIAL CUT
3' BASE DITCH
SEE DETAIL 22-4

BARBARA JOHNSON

MAUDE STREET HEIRS

DETAIL 22-9
SLOPE ARMORING
(Not to Scale)

Natural Ground; 3:1; D; C; 4:1 or Flatter; Front Slope Ditch; Geotextile; B

Max. d=4.5 Ft.

Type of Armoring= CL I RIPRAP

STA. 268+75 -L- RT

F F — DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

E E — DENOTES EXCAVATION IN WETLAND

FOR -L- PROFILE SEE SHEET 68

7/23/2018
U2519AA_hyd_prm_wet_psh_22.dgn
bar veal

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 73 OF 132

SCALE: 1" = 100'

NAD 83/95

DETAIL 22-1
TOE PROTECTION
(Not to Scale)
Natural Ground; 2:1 or Flatter Fill Slope; b; d; Geotextile
d=1.5 Ft.
b=2 Ft.
Type of Liner= CL B RIPRAP
FROM STA. 265+00 -L- TO STA. 267+00 -L- RT

DETAIL 22-2
SPECIAL CUT BASE DITCH
(Not to Scale)
Natural Ground; 3:1; D; 4:1 or Flatter; Front Ditch Slope; B
Min. D=1.5 Ft.
B=4 Ft.
FROM STA. 269+00 -L- TO STA. 273+00 -L- RT

DETAIL 22-3
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground; 3:1; D; 4:1 or Flatter; Fill Slope; B
Min. D=1.5 Ft.
B=2 Ft.
FROM STA. 276+00 -L- TO STA. 280+00 -L- LT

DETAIL 22-4
SPECIAL CUT BASE DITCH
(Not to Scale)
Natural Ground; 3:1; D; 4:1 or Flatter; Front Ditch Slope; B
Min. D=1.5 Ft.
B=3 Ft.
FROM STA. 273+00 -L- TO STA. 279+00 -L- RT

DETAIL 22-5
LATERAL BASE DITCH
(Not to Scale)
Natural Ground; 3:1; D; 3:1; b; 1'-Ft.; Fill Slope; d; GEOTEXTILE; B
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2 Ft.
b=5 Ft.
*When B is < 6.0'
Type of Liner= CL B RIPRAP
FROM STA. 272+89 -L- TO STA. 276+00 -L- LT

DETAIL 22-6
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground; 3:1; D; 4:1 or Flatter; Fill Slope; d; Geotextile; B
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2 Ft.
Type of Liner= CL B RIPRAP
FROM STA. 276+00 -L- TO STA. 280+00 -L- LT

DETAIL 22-7
LATERAL BASE DITCH
(Not to Scale)
Natural Ground; 4:1; D; 4:1; b; 1'-Ft.; Fill Slope; GEOTEXTILE; B
Min. D=2 Ft.
Max. d=2 Ft.
B=6 Ft.
b=5 Ft.
*When B is < 6.0'
Type of Liner= CL B RIPRAP
FROM STA. 265+00 -L- TO STA. 267+50 -L- LT

INCLUDED AS ADDITIONAL AREA IN IMPACT SUMMARY

LATERAL 6' BASE DITCH
SEE DETAIL 22-7
w/CL B RIPRAP
EST. 362 TONS CL B RIPRAP
EST. 1904 SY GEOTEXTILE

BESSIE DIXON

ST. JAMES SQUARE INC.

SPECIAL LATERAL 2' BASE DITCH w/CL B RIPRAP
EST. 207 TONS CL B RIPRAP
EST. 212 SY GEOTEXTILE
SEE DETAIL 22-6

LATERAL 2' BASE DITCH w/CL B RIPRAP
EST. 129 TONS CL B RIPRAP
EST. 369 SY GEOTEXTILE
SEE DETAIL 22-5

-L- STA 265+00 MATCHLINE SEE SHEET 21

MATCHLINE -L- STA 279+00 SEE SHEET 23

270+00

275+00

PDE

42" RCP-III

JB w/MH

47" WW FENCE

CL "B" RIPRAP
EST. 3 TONS
EST. 10 SY GF

15" RCP-III

FUTURE I-295 SB

FUTURE I-295 NB

GREU. (TL-3)

CAT-1

HW

TOE PROTECTION
STA. 262+11 TO 267+00 -L- RT
EST. 164 TON CL B RIPRAP
EST. 738 SY GEOTEXTILE
SEE DETAIL 22-1

SITE 19

SLOPE ARMORING
EST. 20 TONS CL I RIPRAP
EST. 44 SY GEOTEXTILE
SEE DETAIL 22-9

SPECIAL CUT 4' BASE DITCH
SEE DETAIL 22-2

TDE

SPECIAL CUT 3' BASE DITCH
SEE DETAIL 22-4

BARBARA JOHNSON

MAUDE STREET HEIRS

DETAIL 22-9
SLOPE ARMORING
(Not to Scale)
Natural Ground; 3:1; D; 4:1 or Flatter; Front Slope Armor; Geotextile; B
Max. d=4.5 Ft.
Type of Armoring= CL I RIPRAP
STA. 268+75 -L- RT

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

E E DENOTES EXCAVATION IN WETLAND

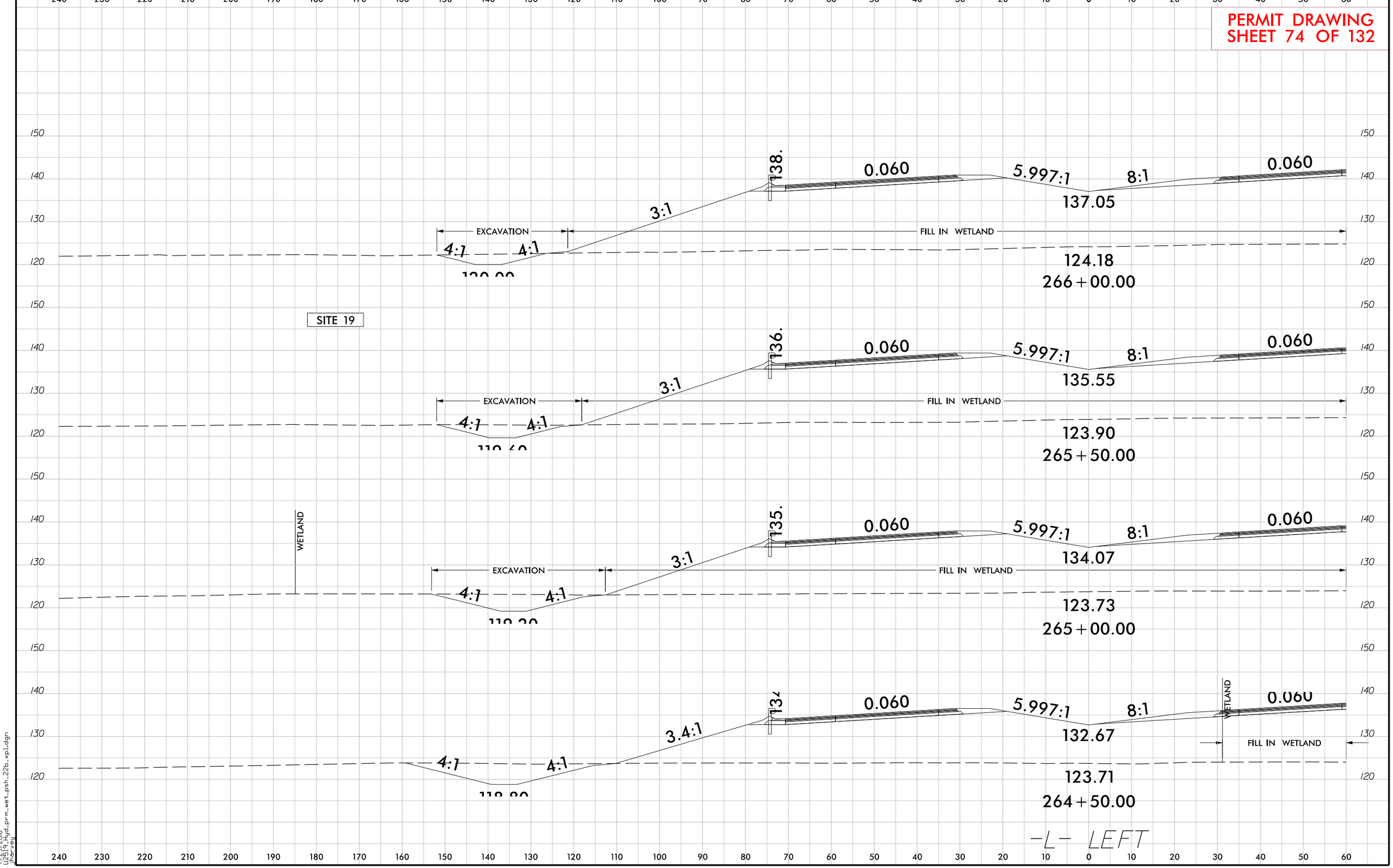
FOR -L- PROFILE SEE SHEET 68

7/23/2018
U2519AA_wd_prm_wet_psh_22a_con.dgn
bpowell

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-104

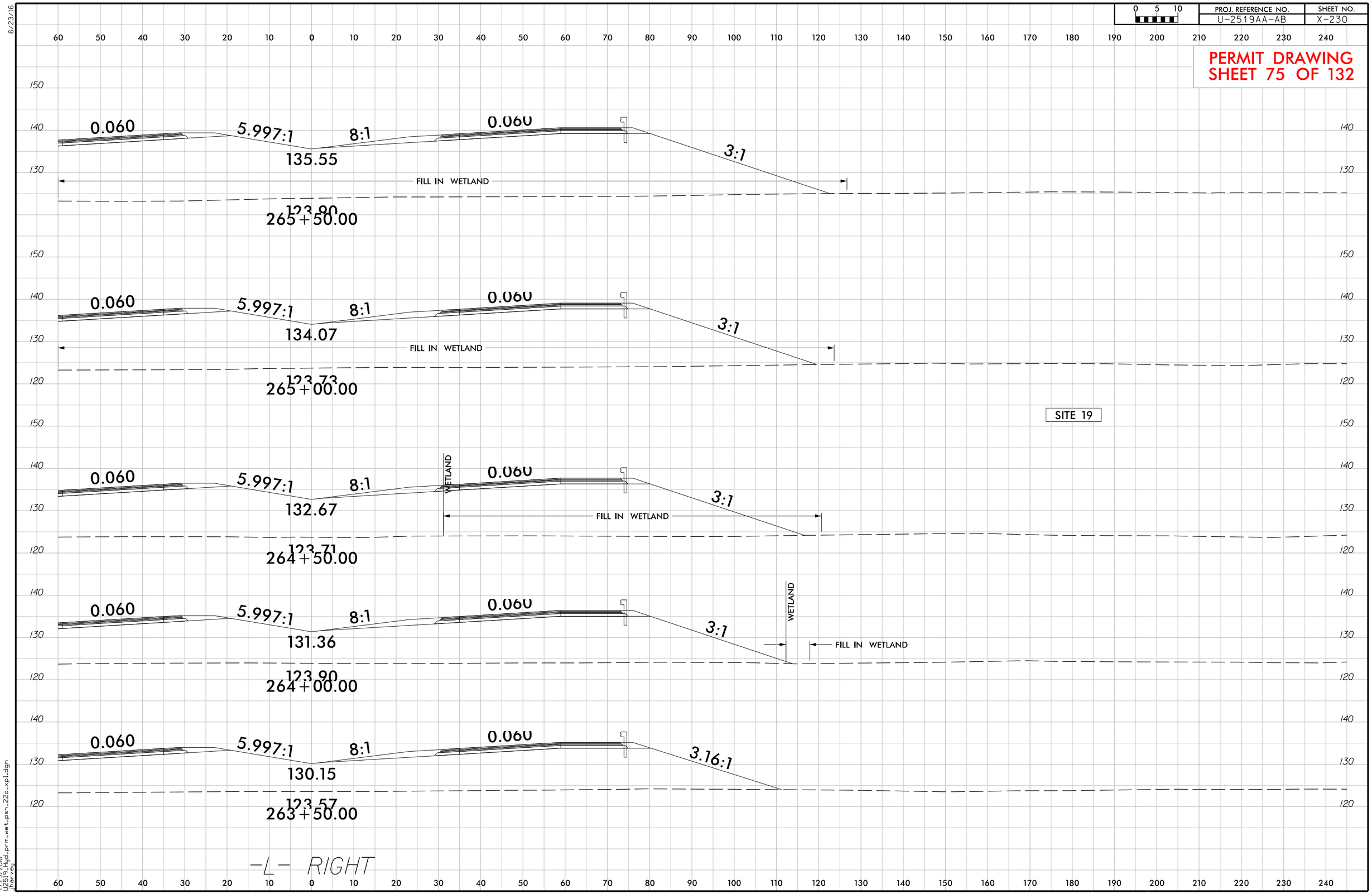
PERMIT DRAWING
SHEET 74 OF 132



7/23/2018
U2519AA_hyd_prm_wet_psh_22b_xpl.dgn
jharvey

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-230

PERMIT DRAWING
SHEET 75 OF 132

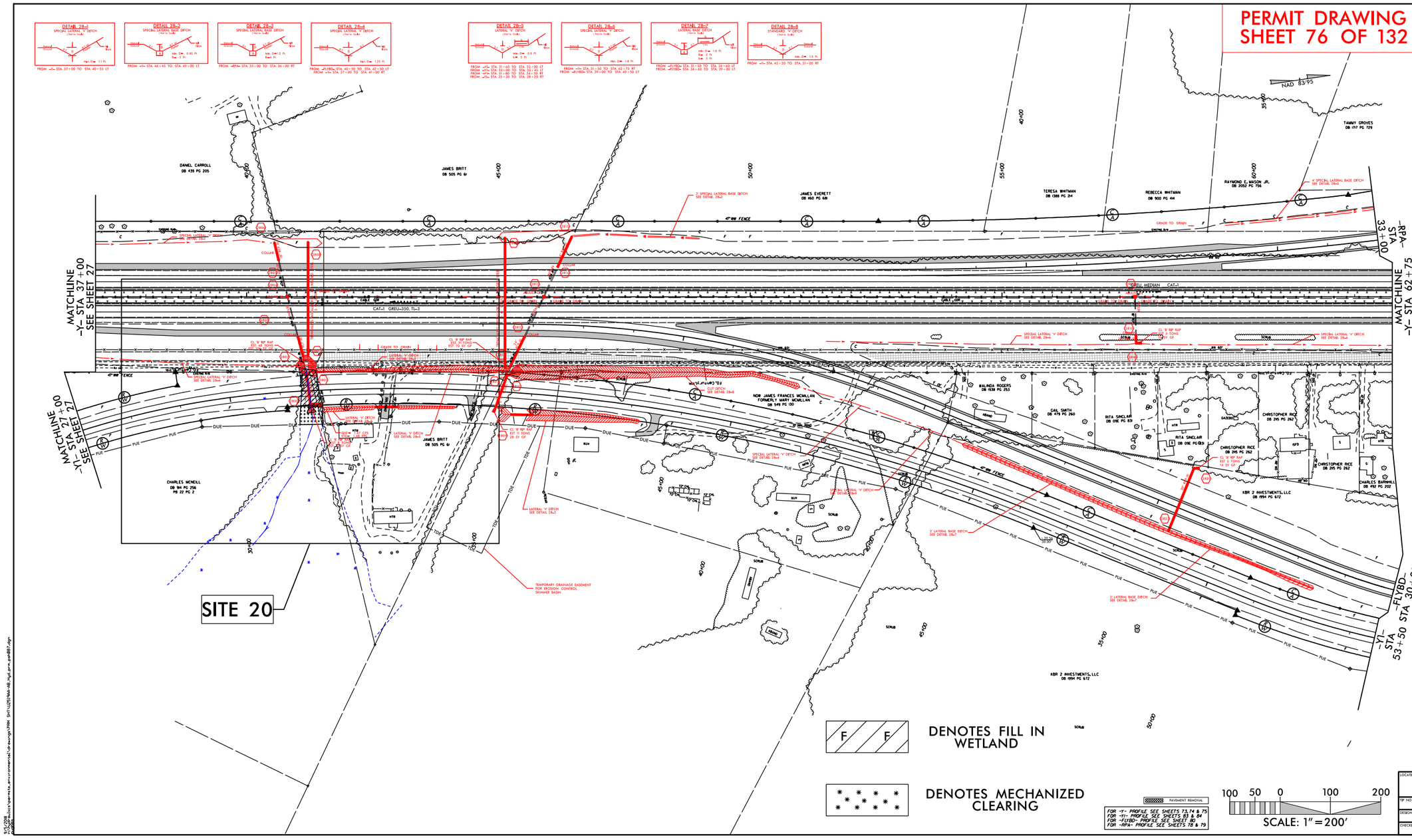


PERMIT DRAWING
SHEET 76 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



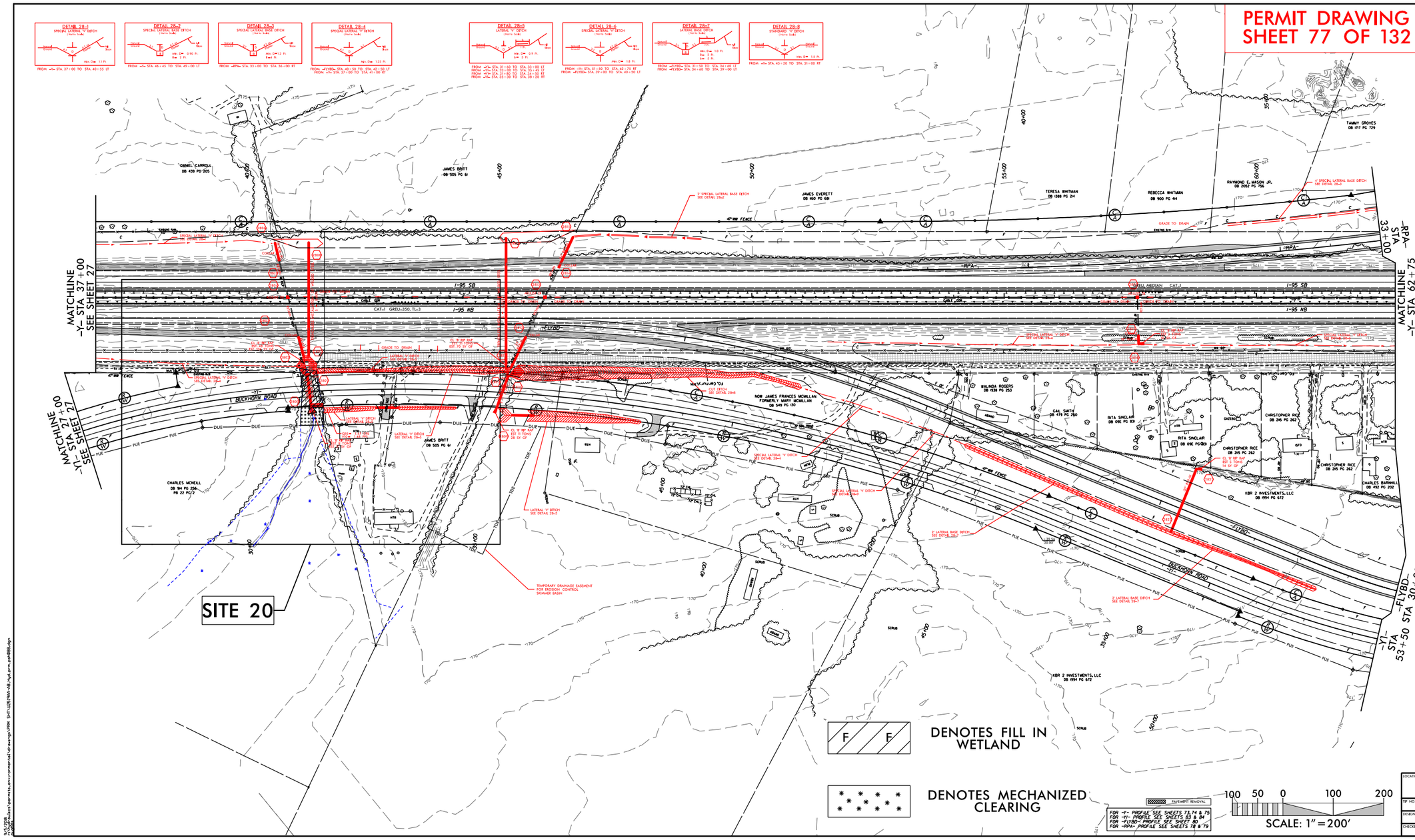
LOCATION:	I-95 / I-295
TIP NO.: U-2519AA-AB	COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF	
CHECKED BY: MFR	DATE: 01/23/18

PERMIT DRAWING
SHEET 77 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



LOCATION:	I-95 / I-295
TIP NO.: U-2519AA-AB	COUNTY: ROBESON / CUMBERLAND
DESIGNED BY:	JAF
CHECKED BY: MFR	DATE: 01/23/18

3/5/2018
jfarmer
C:\Users\jfarmer\AppData\Local\Temp\AMW (3)\U2519AA-AB_Hydr_prm_pm8888.dgn

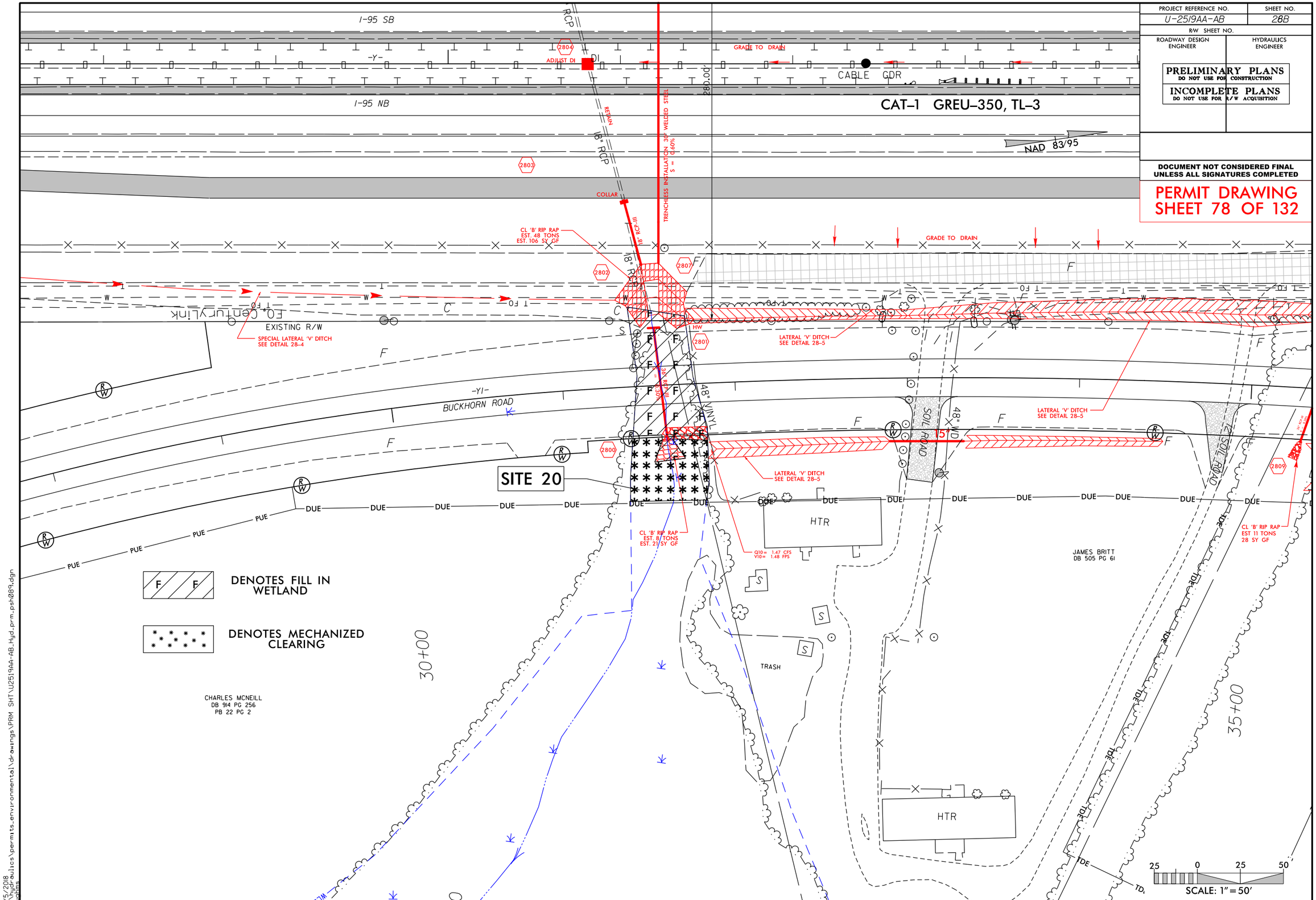
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	28B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 78 OF 132



9/5/2018
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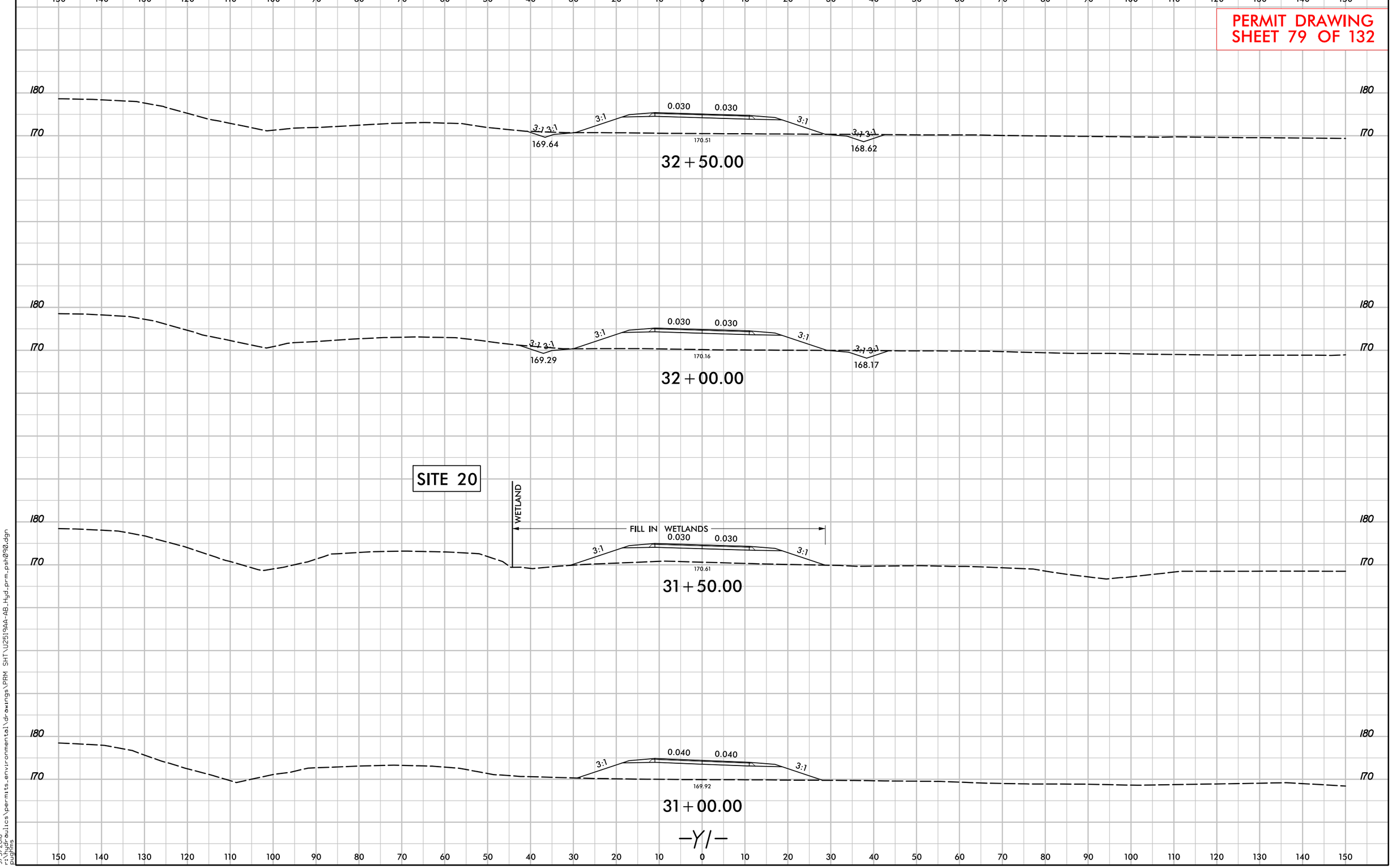
PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-354

0 5 10

PERMIT DRAWING
SHEET 79 OF 132



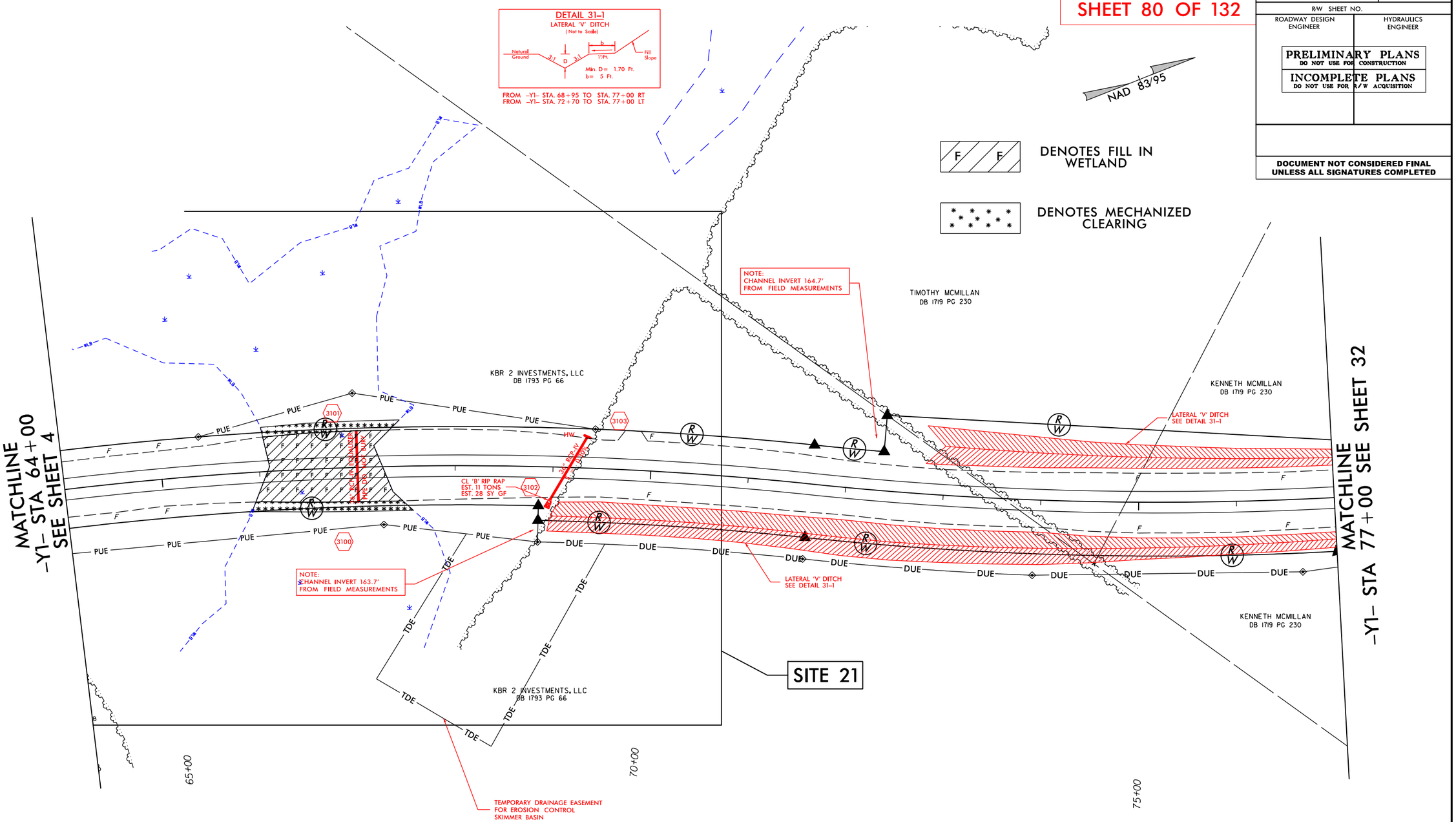
PERMIT DRAWING
SHEET 80 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



50 25 0 50 100
SCALE: 1" = 100'

FOR -Y1- PROFILE SEE SHEETS 84 & 85

9/5/2018
r:\hydraulics\permits_environmental\drawings\PRM SHT\U2519AA-AB_Hyd_prm_psh102.dgn

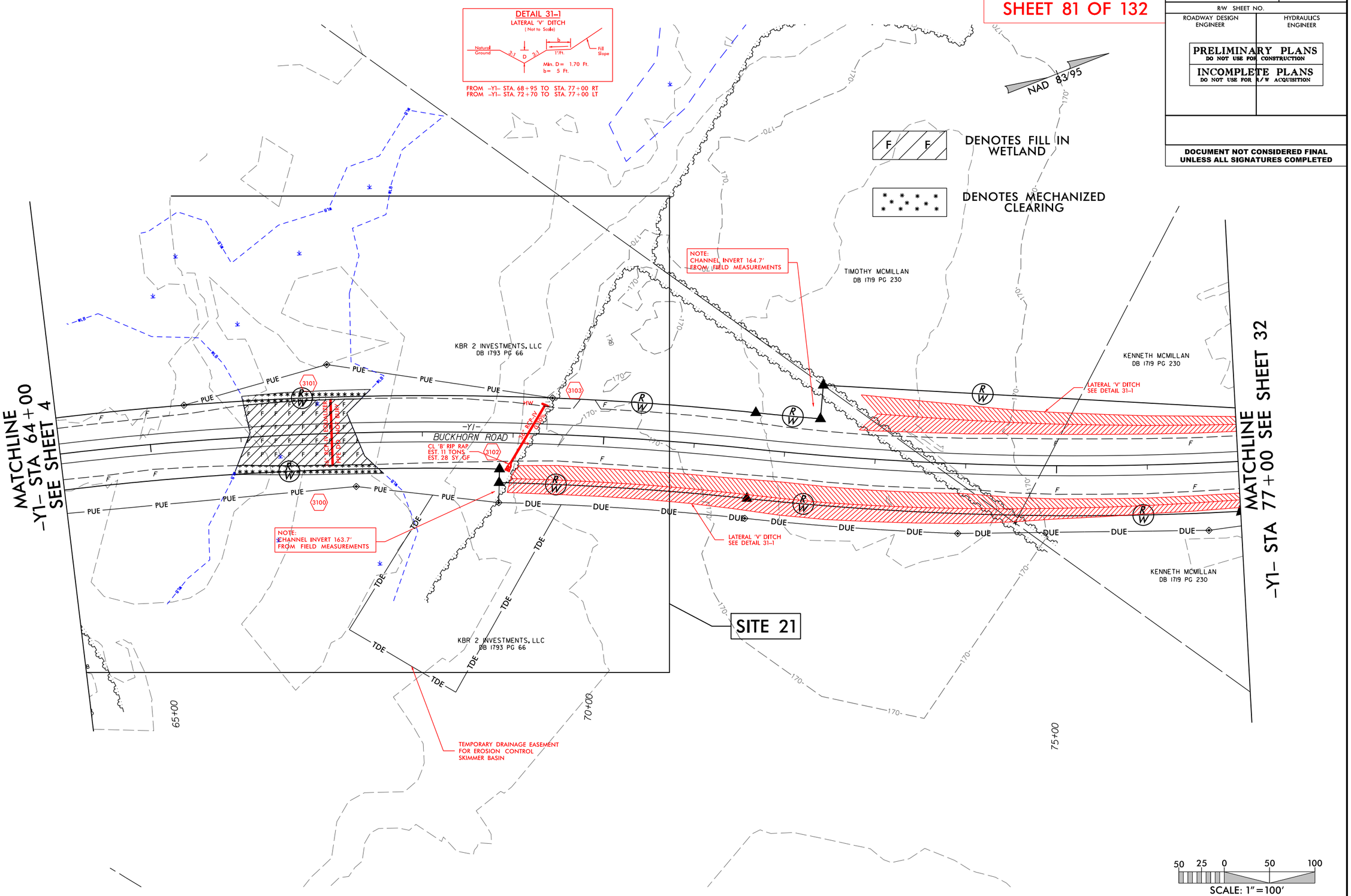
PERMIT DRAWING
SHEET 81 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	31A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOR -Y1- PROFILE SEE SHEETS 84 & 85

9/5/2018
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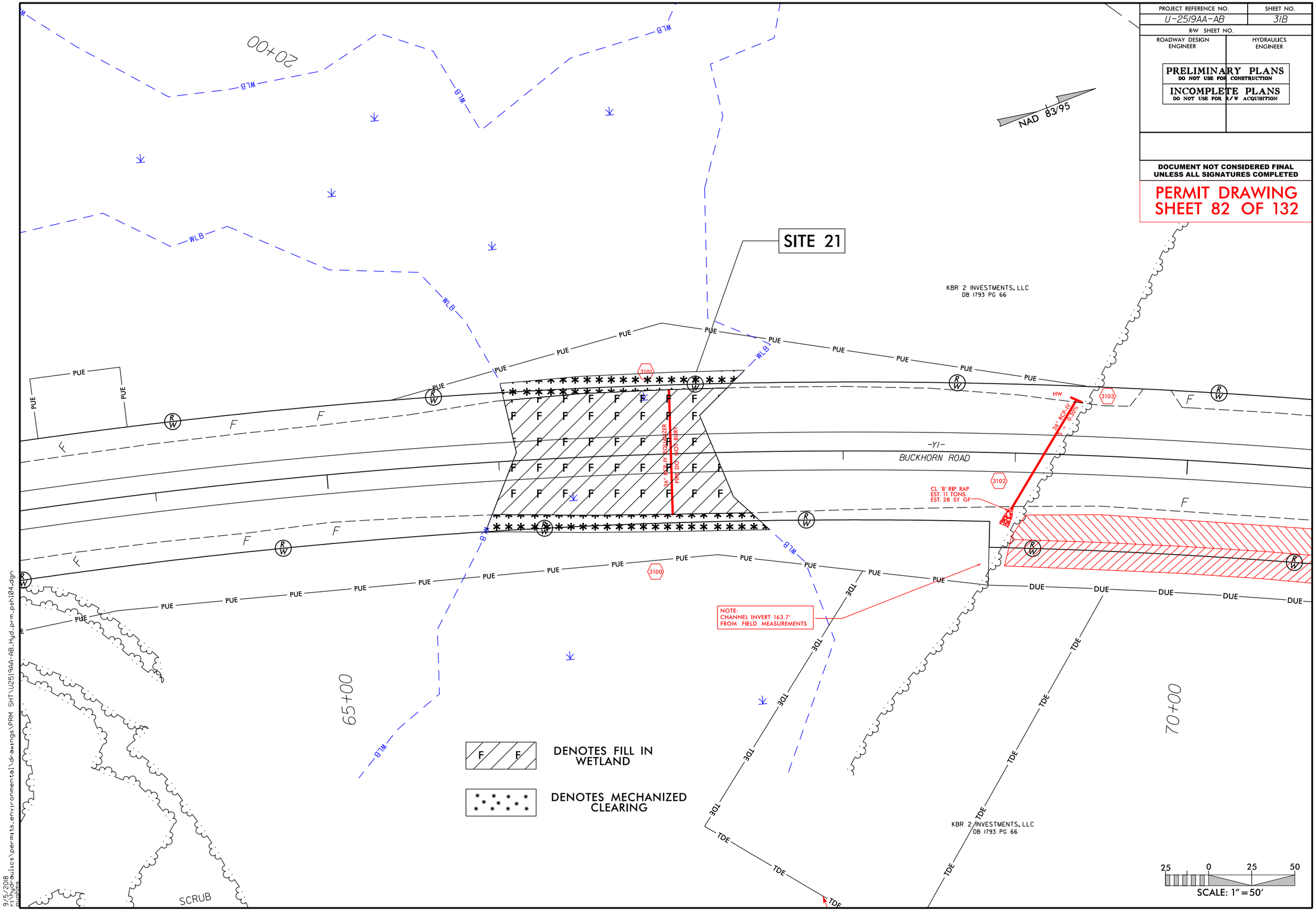
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	31B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 82 OF 132



9/5/2018
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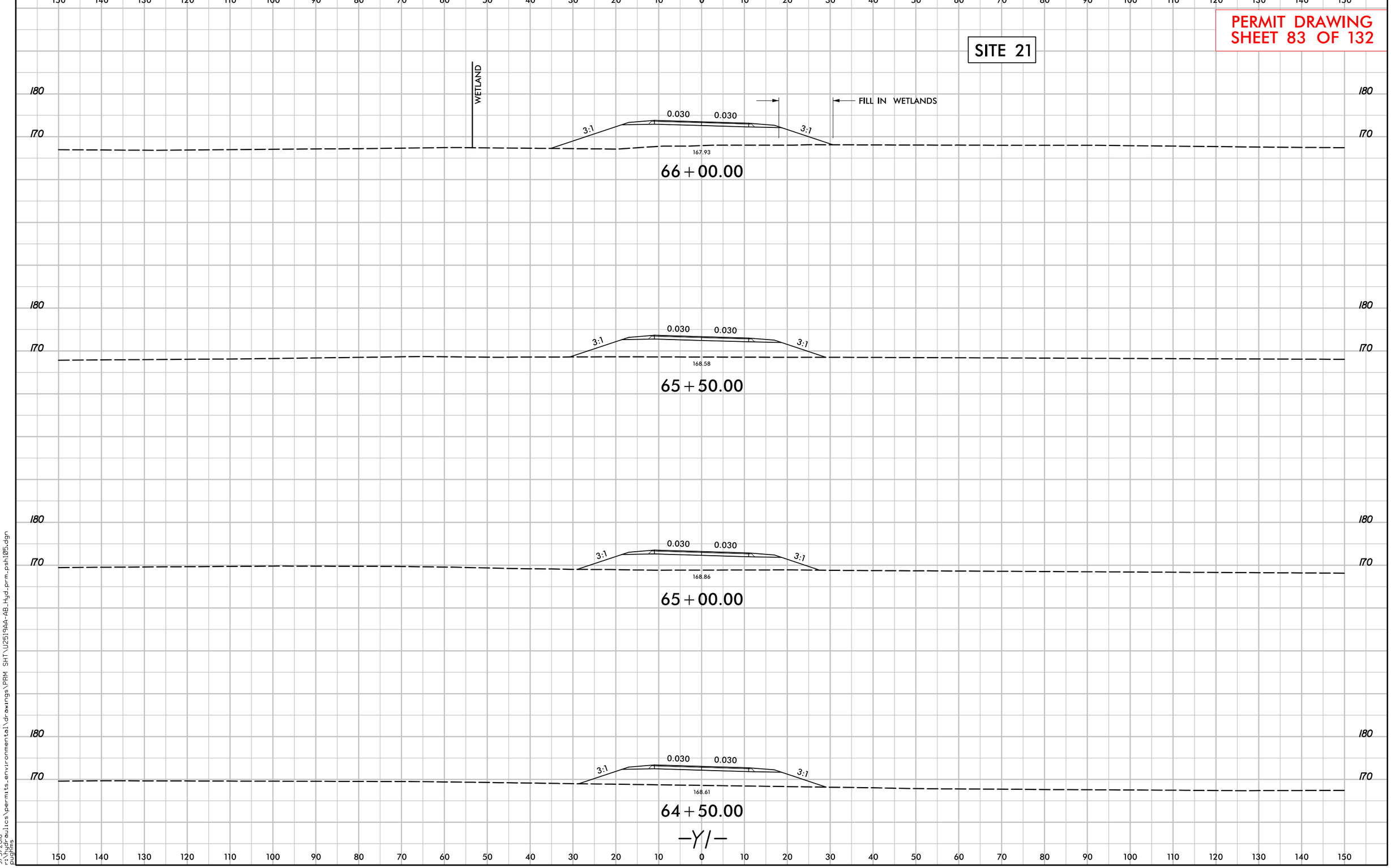
mpilgrim

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-2519AA-AB	X-371

PERMIT DRAWING
SHEET 83 OF 132

SITE 21



9/5/2018
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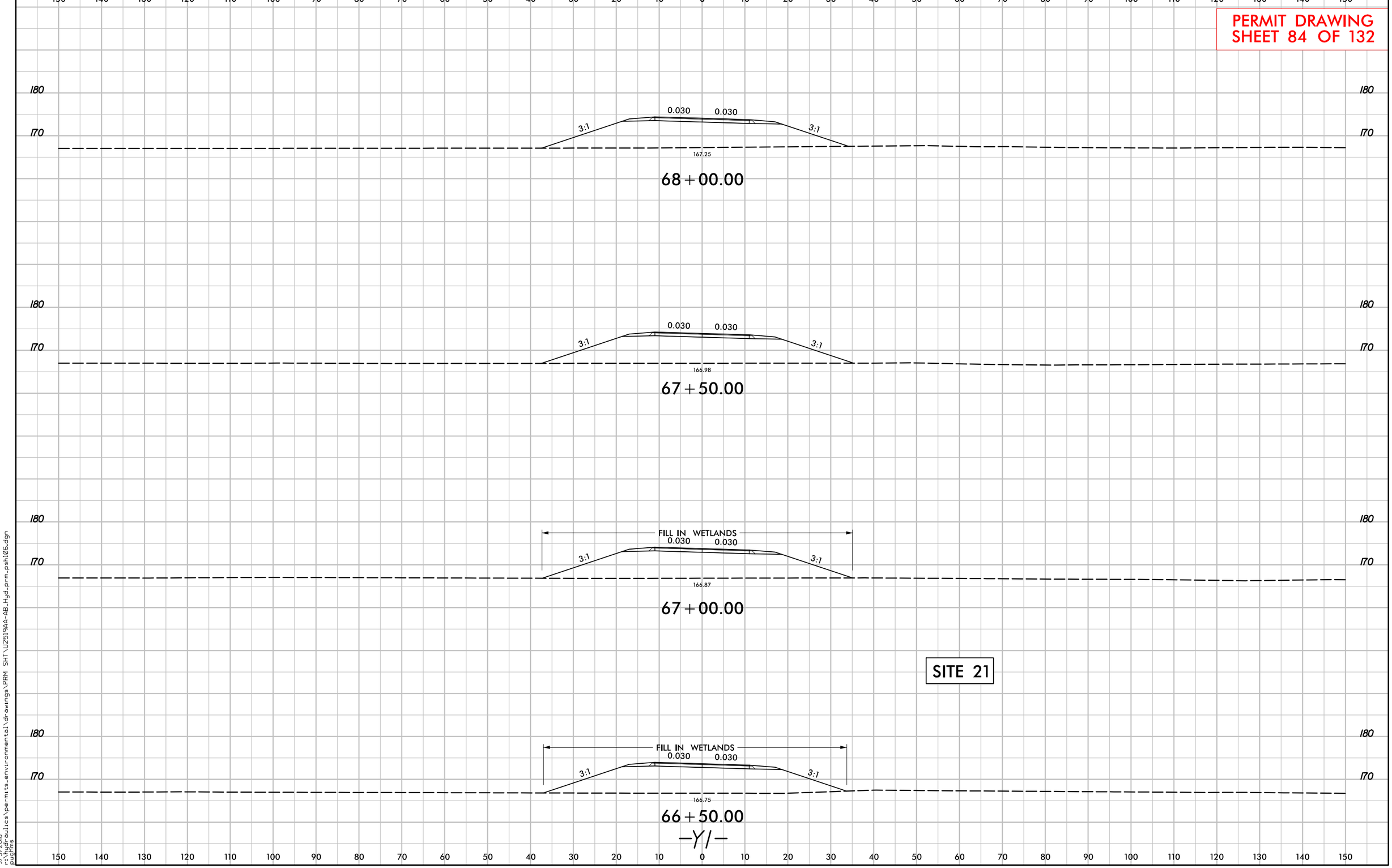
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-2519AA-AB	X-372

PERMIT DRAWING
SHEET 84 OF 132



PERMIT DRAWING
SHEET 85 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F — DENOTES FILL IN WETLAND

S S — DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 29-1
SPECIAL CUT DITCH HINGE
(Not to Scale)
FROM -L- STA. 85+00 TO STA. 92+70 RT

DETAIL 29-2
SPECIAL CUT DITCH
(Not to Scale)
FROM -RPD- STA. 27+50 TO -Y1- STA. 92+50 RT

DETAIL 29-3
LATERAL 'V' DITCH
(Not to Scale)
FROM -Y2- STA. 27+25 TO STA. 28+50 RT

DETAIL 29-4
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
FROM -L- STA. 83+00 TO STA. 85+88 LT

DETAIL 29-5
FALSE SUMP
(Not to Scale)

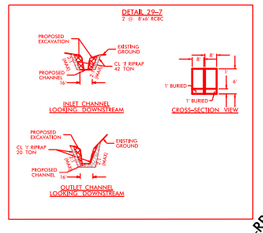
Back Slopes		Back Slopes	
2:1 or 1.5:1	10'	Over 4.0% To 6.0%	20'
Over 6.0% To 12.0%	30'	Over 6.0%	50'

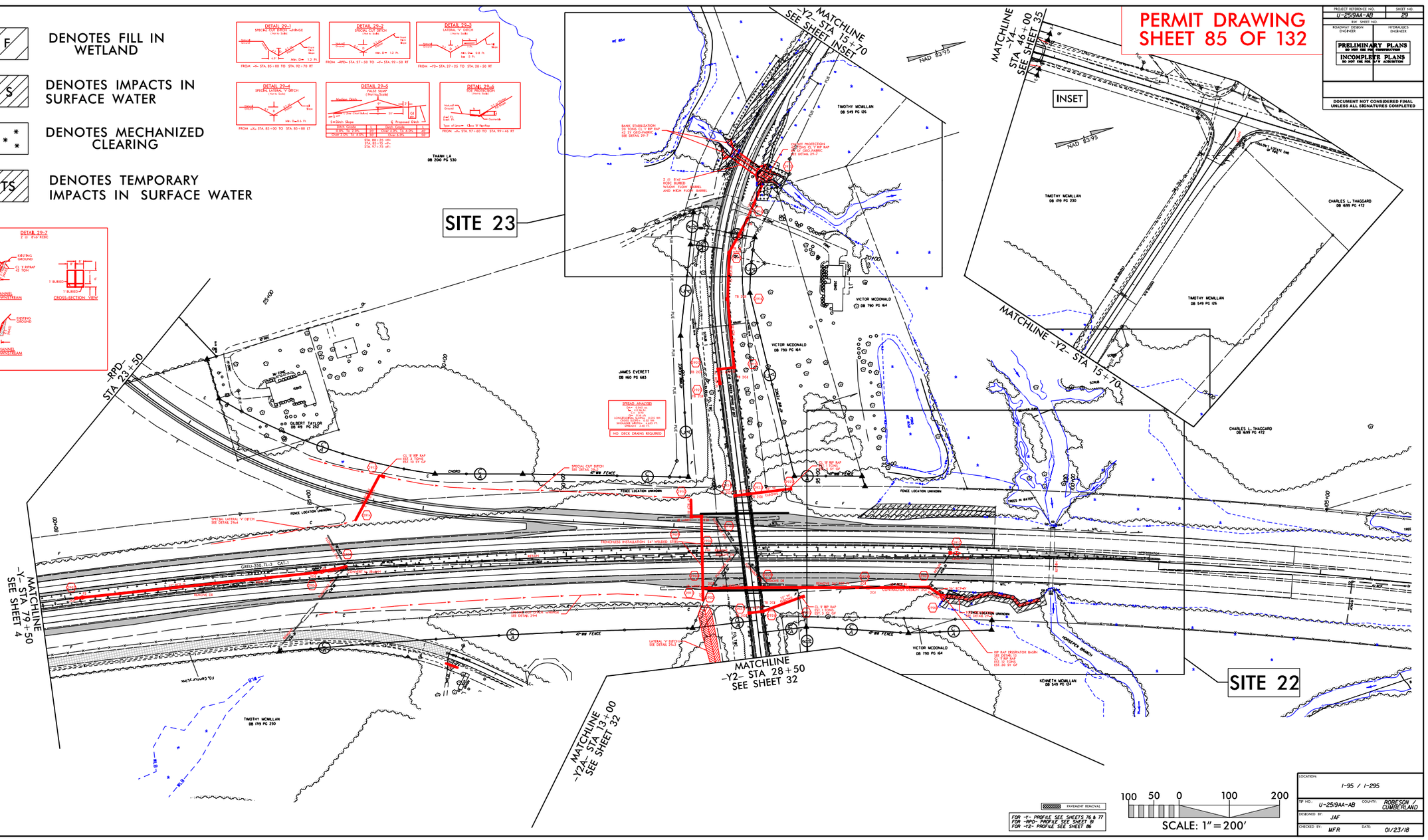
STA. 80+35 -L-
STA. 83+15 -L-
STA. 97+75 -L-

DETAIL 29-6
FOR PROTECTION
(Not to Scale)
FROM -L- STA. 97+60 TO STA. 99+46 RT

THAM LLC
DB 2090 PG 530

DETAIL 29-7
2'-0" 8'x4' BOX





PAVEMENT REMOVAL

FOR -Y- PROFILE SEE SHEETS 76 & 77
FOR -RPD- PROFILE SEE SHEET 31
FOR -Y2- PROFILE SEE SHEET 86

100 50 0 100 200
SCALE: 1" = 200'

LOCATION:	I-95 / I-295
TIP NO.: U-2519AA-AB	COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF	
CHECKED BY: MFR	DATE: 01/23/18

9/5/2018
\\ccs\projects.environmental\drawings\2519 (U-2519AA-AB)\u_2519aa_ps85PR1.dgn

PERMIT DRAWING
SHEET 86 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	29A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

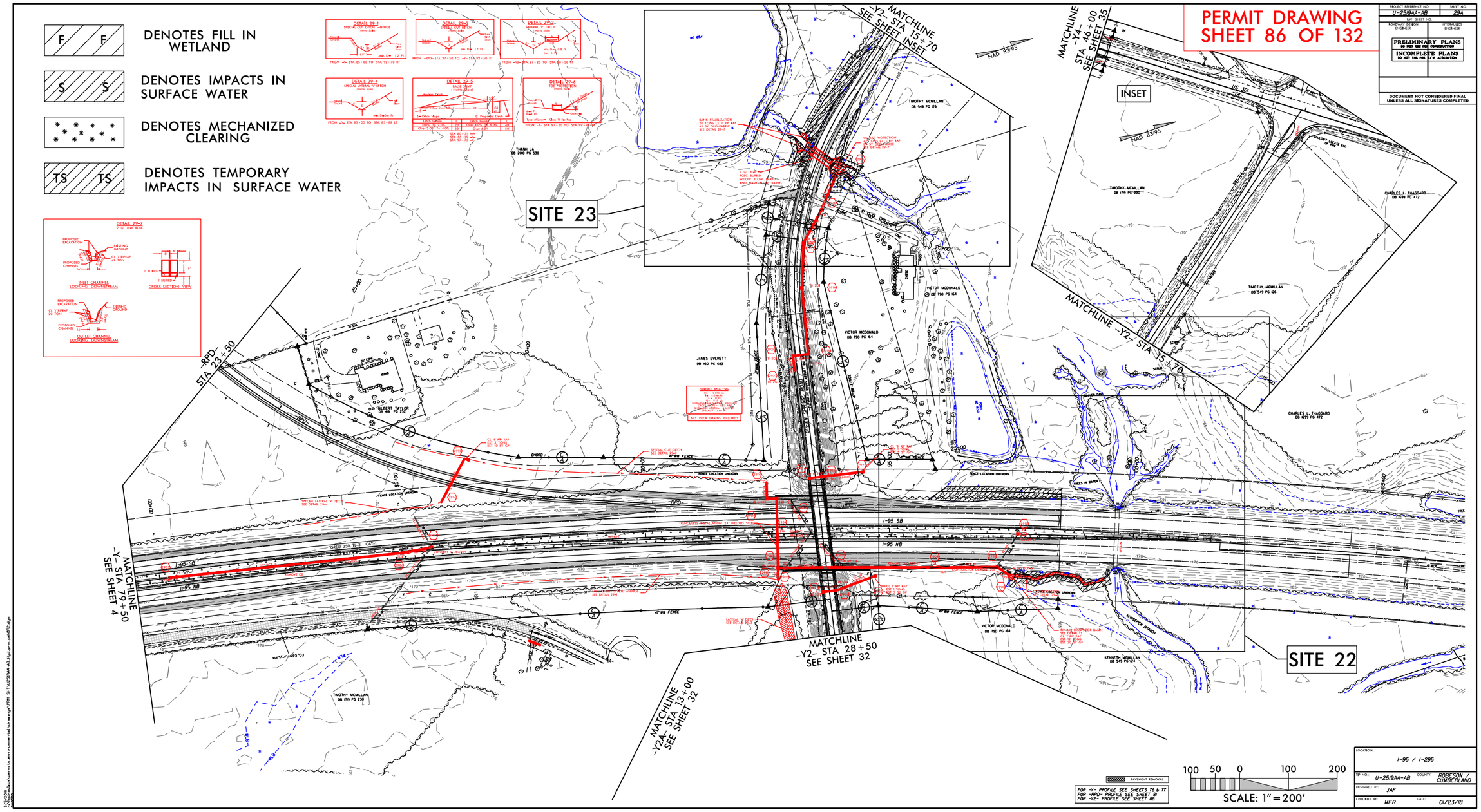
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F — DENOTES FILL IN WETLAND

S S — DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER



LOCATION:	I-95 / I-295
TIP NO.: U-2519AA-AB	COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF	
CHECKED BY: MFR	DATE: 01/23/18

9/26/2018
jfarmer
J:\Ecs\projects.environmental\drawings\R-2519AA-AB_Hydraulic.dgn

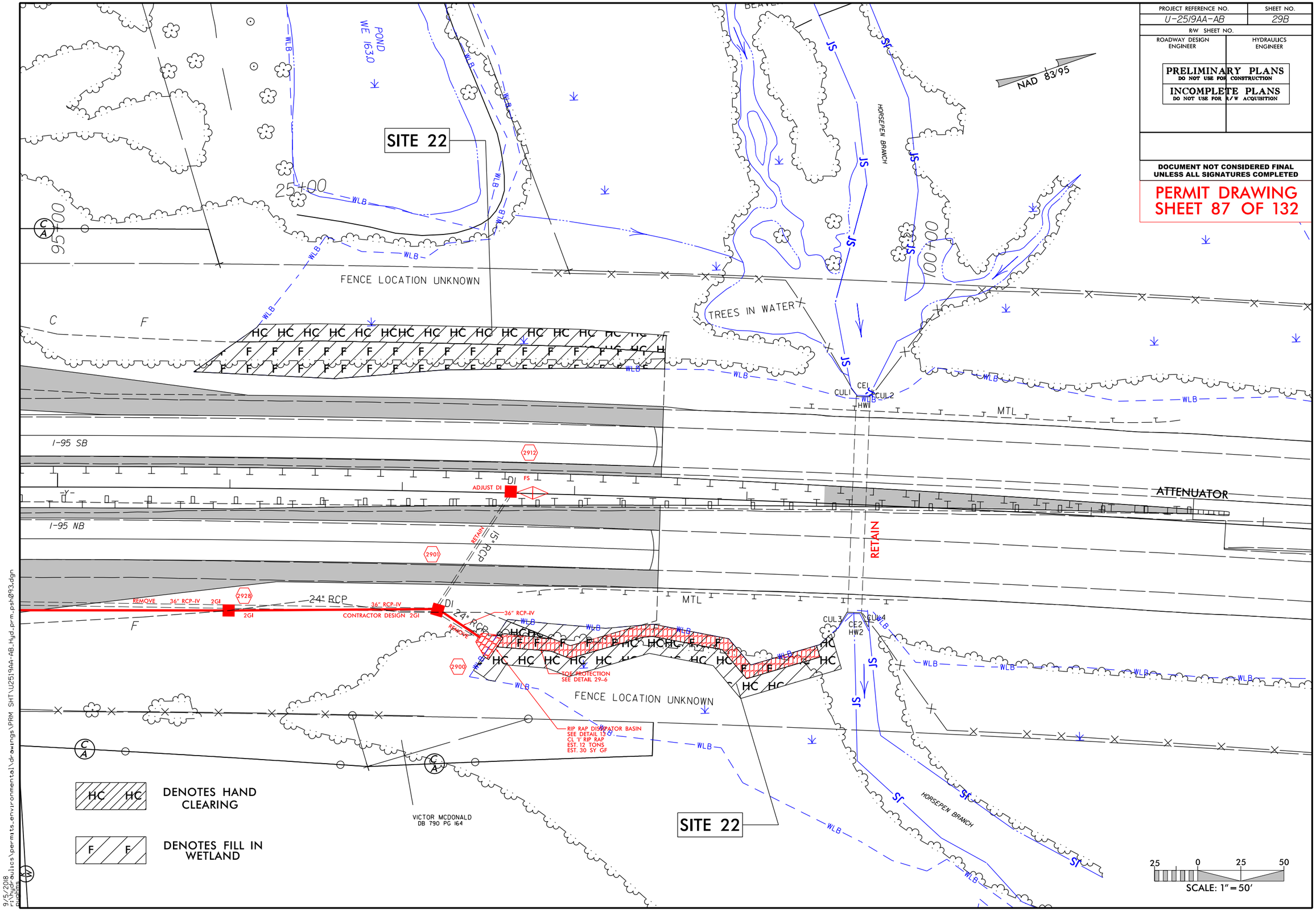
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	29B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 87 OF 132



9/5/2018
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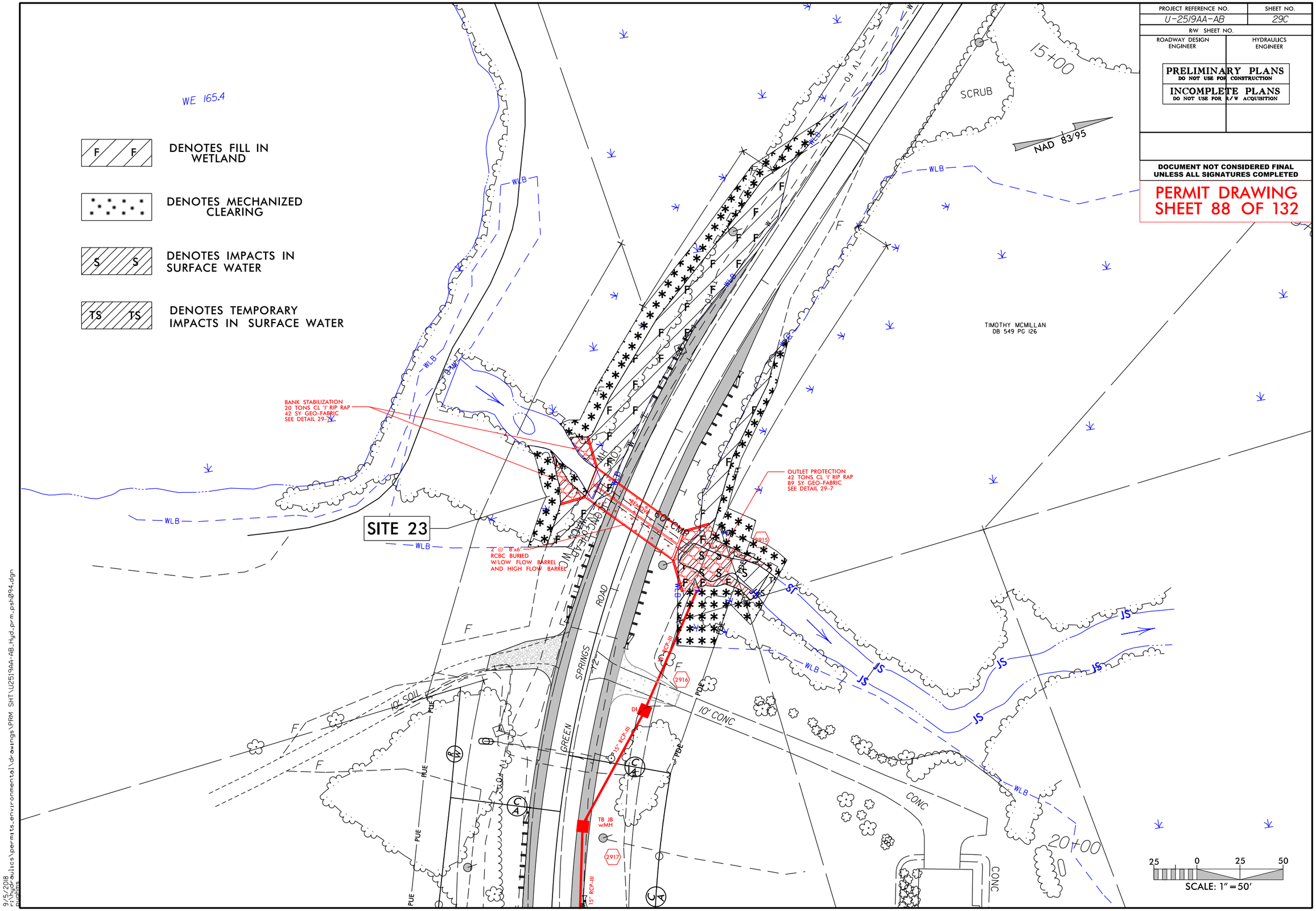
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	29C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 88 OF 132



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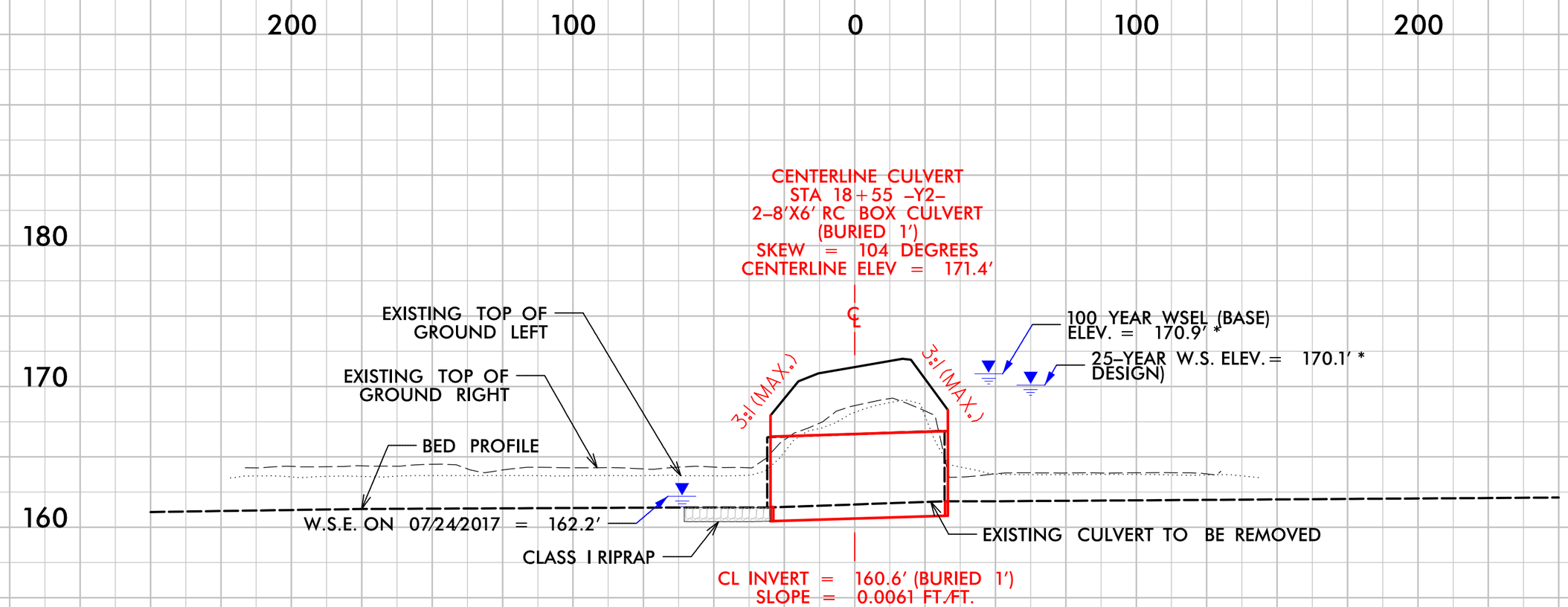
PERMIT DRAWING
SHEET 89 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	29D
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



6/23/16

9/5/2018
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pughms

PERMIT DRAWING
SHEET 90 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	86
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

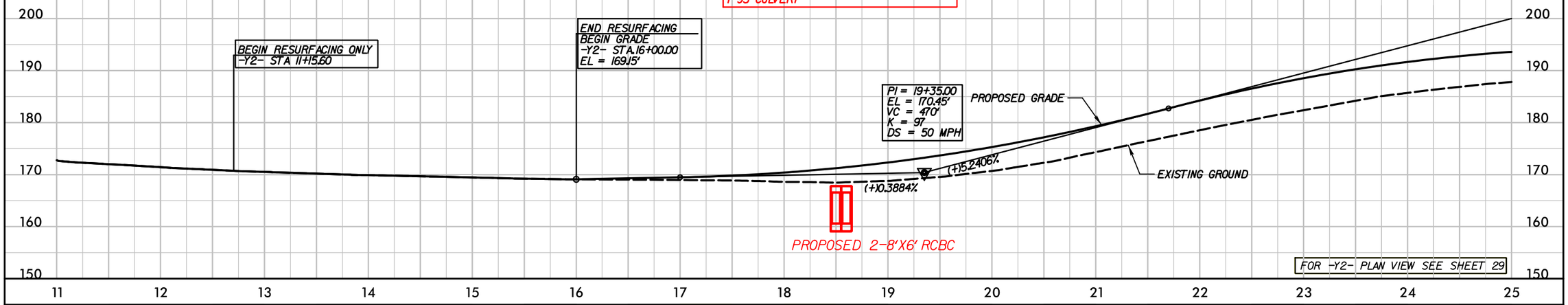
-Y2-

SR 1718 (GREEN SPRINGS RD)

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 487	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 170.1*	FT
BASE DISCHARGE	= 650	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 170.9*	FT
OVERTOPPING DISCHARGE	= 850	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 171.1*	FT

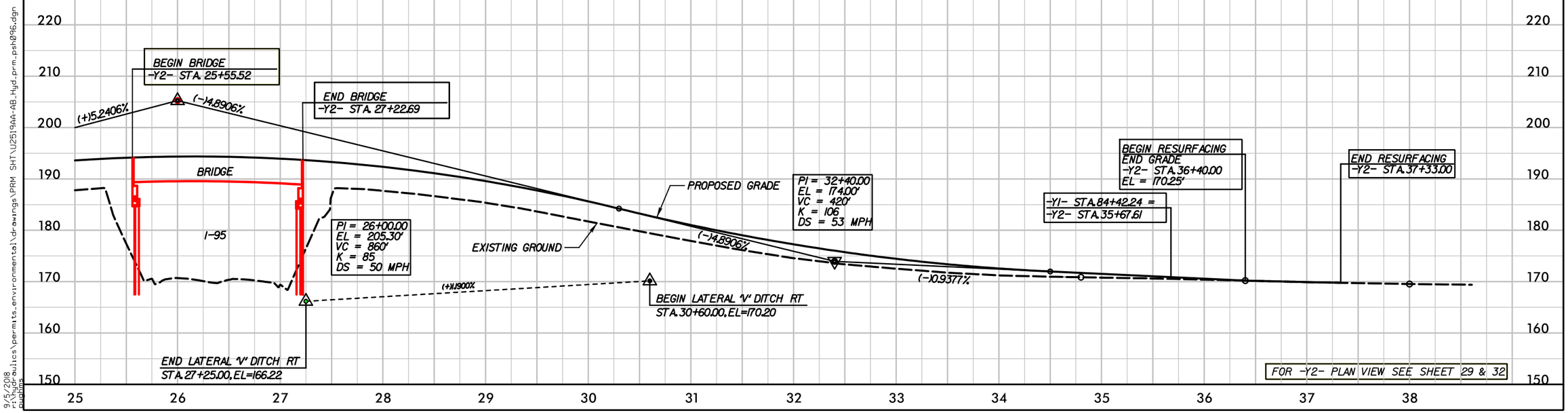
*INCLUDES BACKWATER FROM EXISTING I-95 CULVERT



FOR -Y2- PLAN VIEW SEE SHEET 29

-Y2-

SR 1718 (GREEN SPRINGS RD)



FOR -Y2- PLAN VIEW SEE SHEET 29 & 32

9/5/2018
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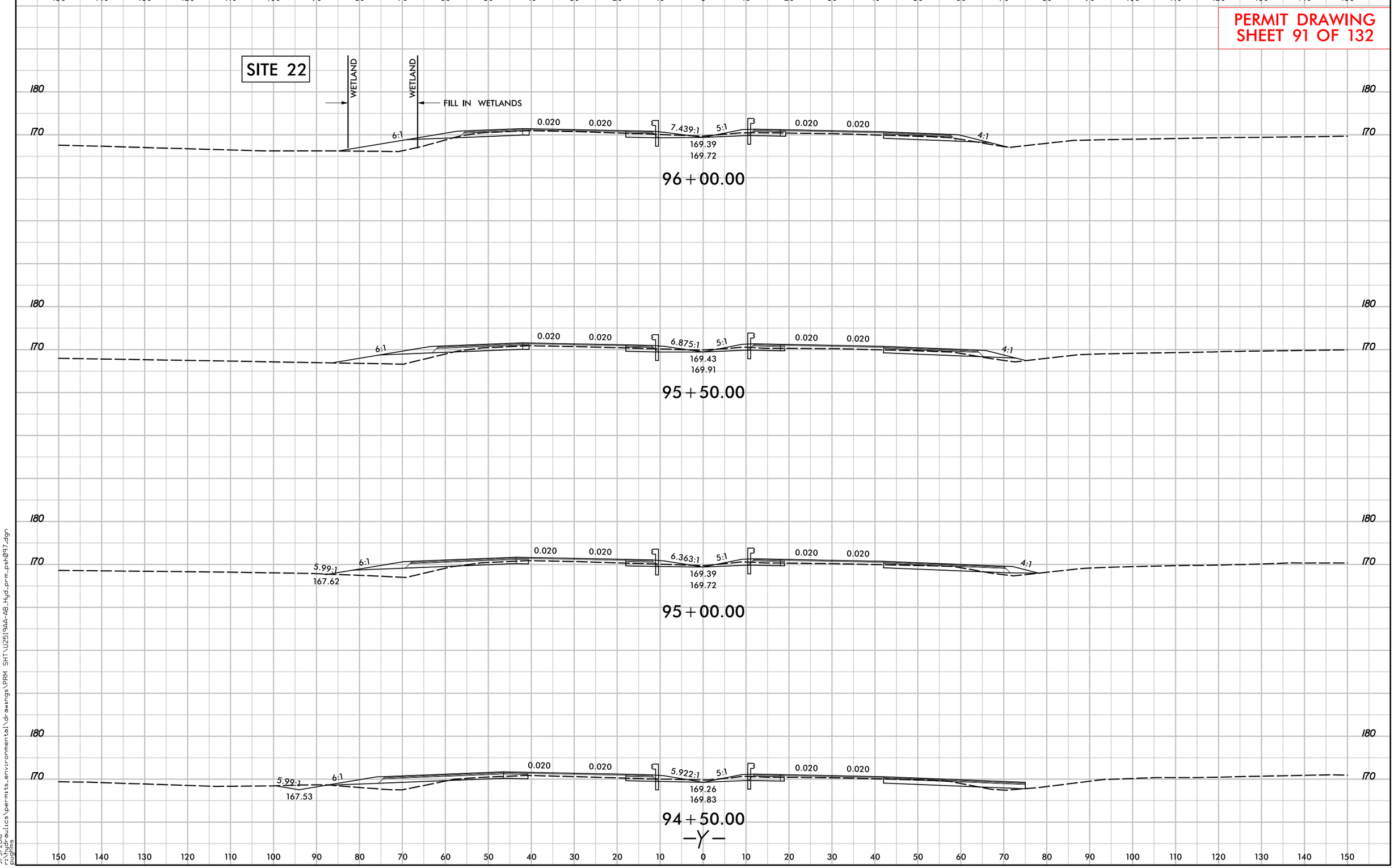
PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-342

0 5 10

PERMIT DRAWING
SHEET 91 OF 132

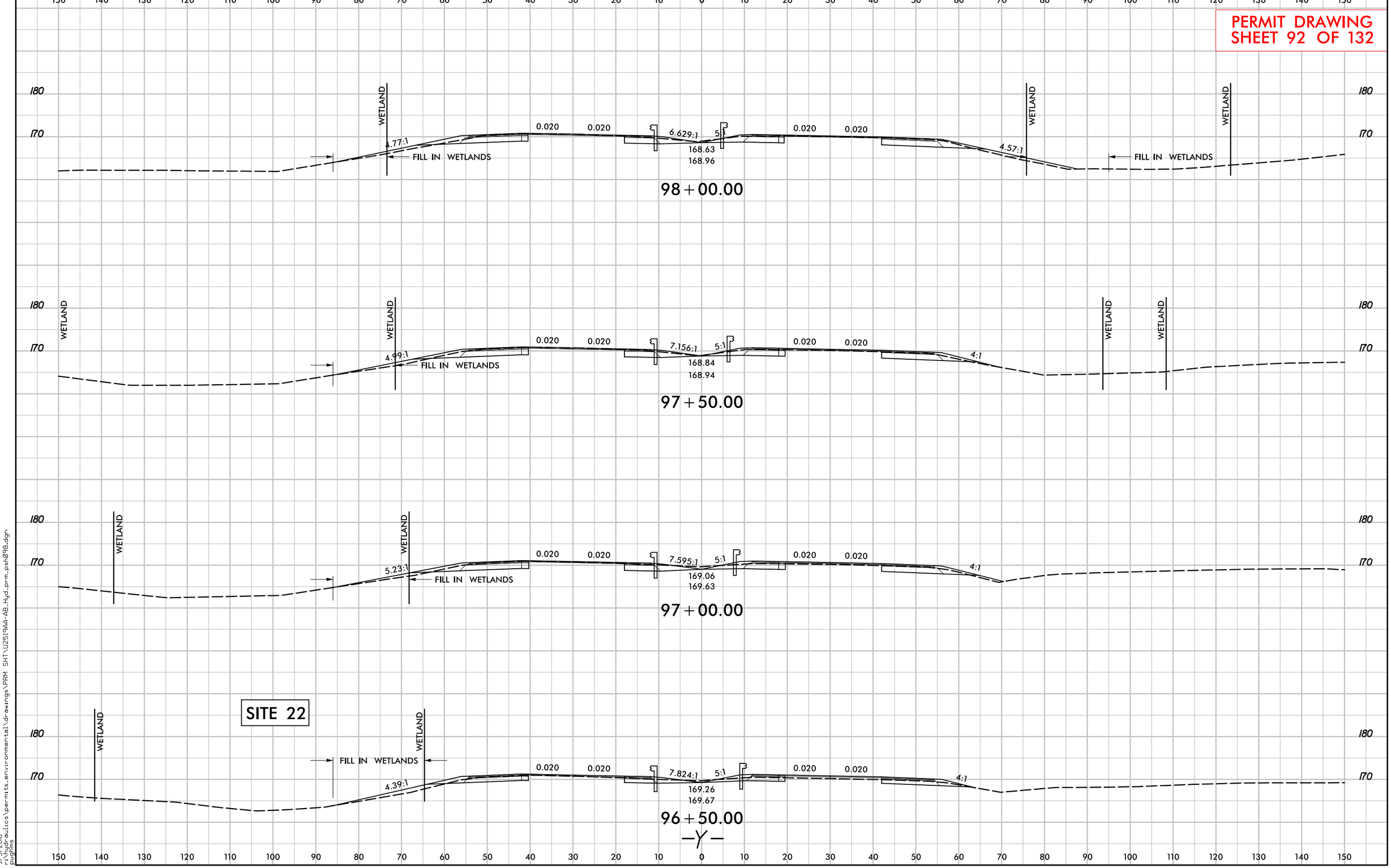


6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-343

0 5 10

PERMIT DRAWING
SHEET 92 OF 132



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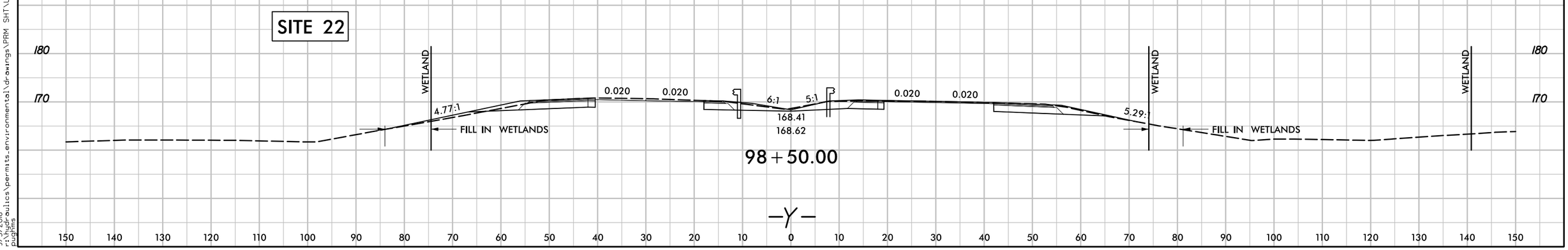
pughins

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-2519AA-AB	X-344

PERMIT DRAWING
SHEET 93 OF 132



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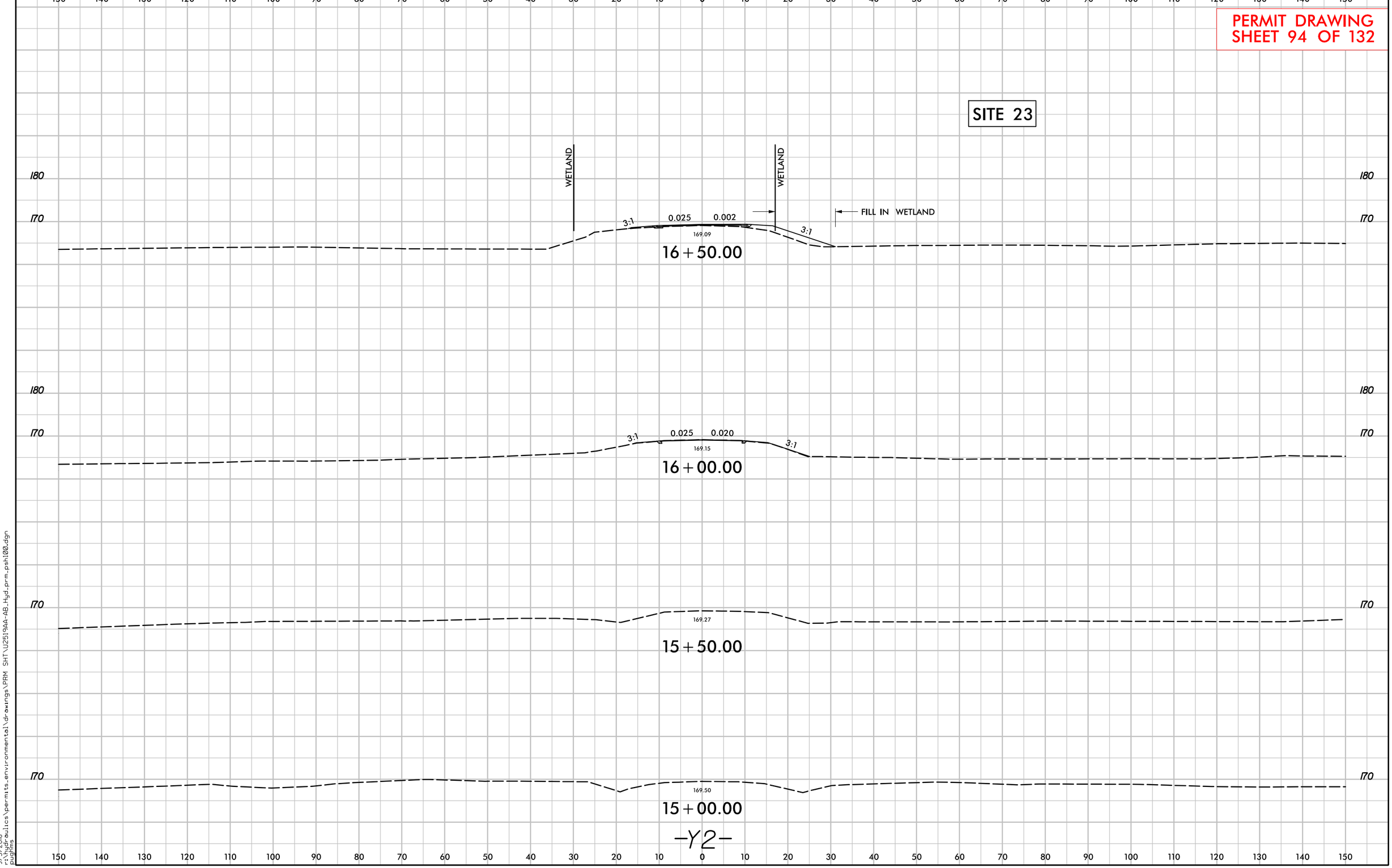
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-2519AA-AB	X-381

PERMIT DRAWING
SHEET 94 OF 132



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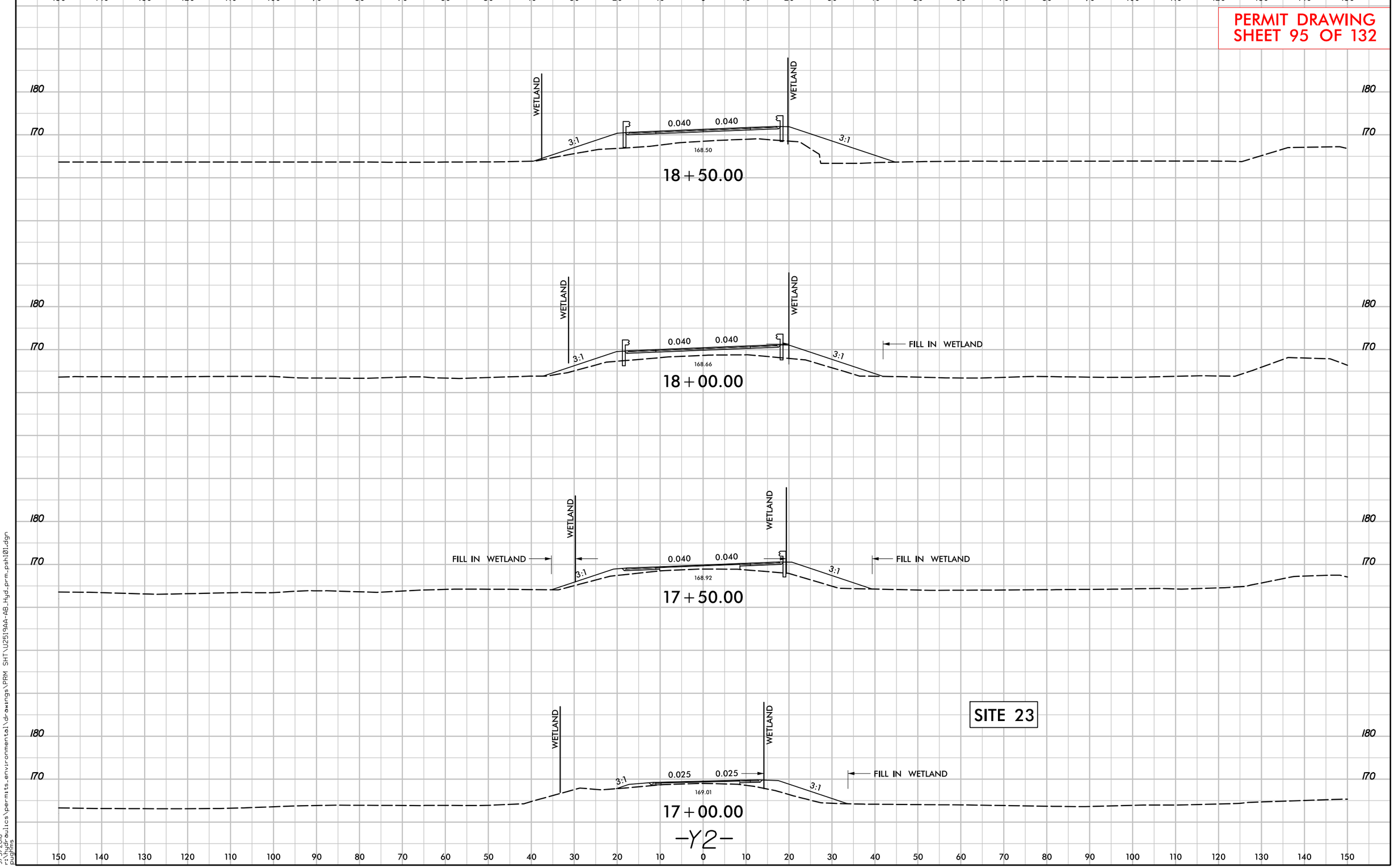
pughins

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-2519AA-AB	X-382

PERMIT DRAWING
SHEET 95 OF 132



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pughins

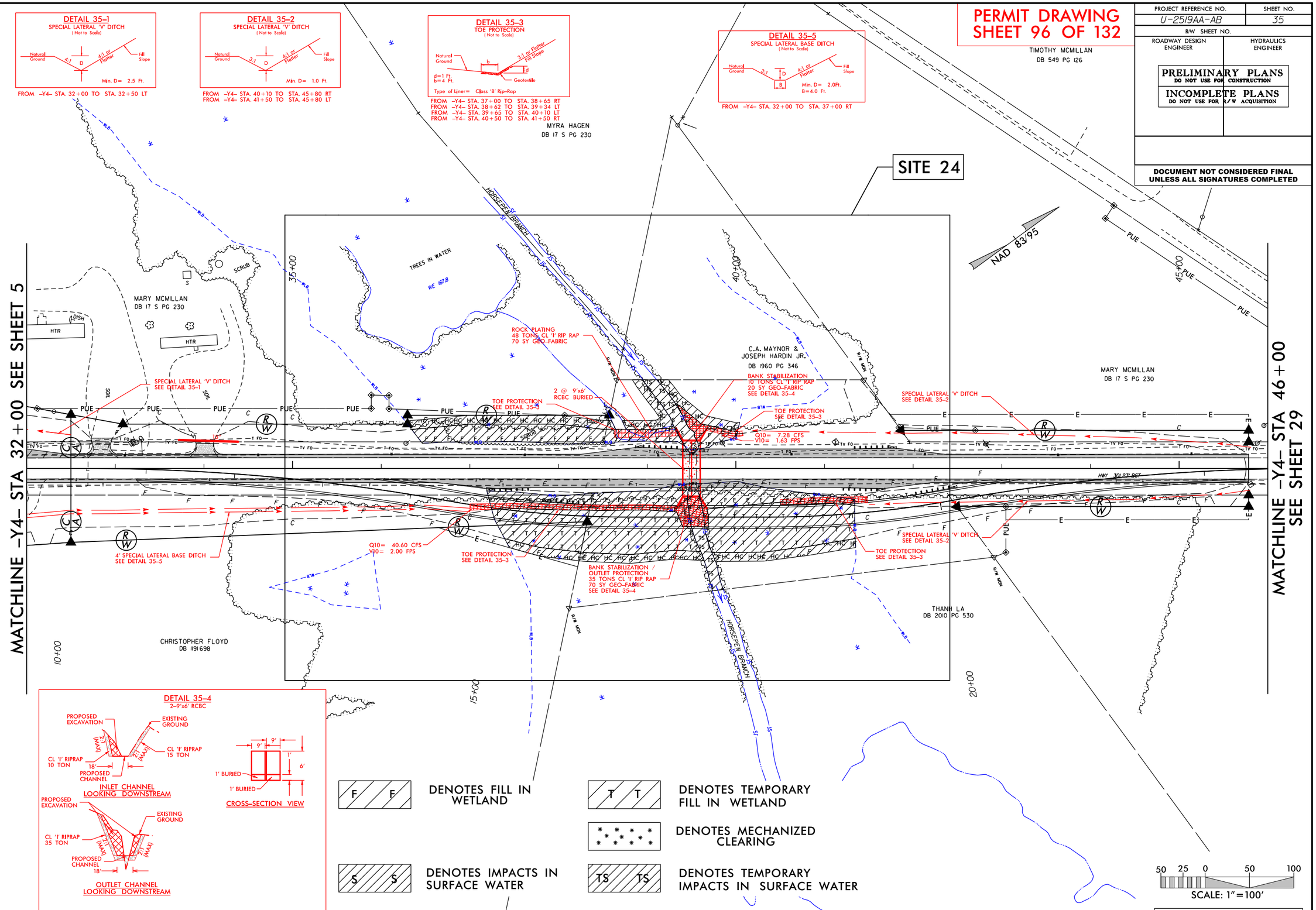
PERMIT DRAWING SHEET 96 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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pjohns

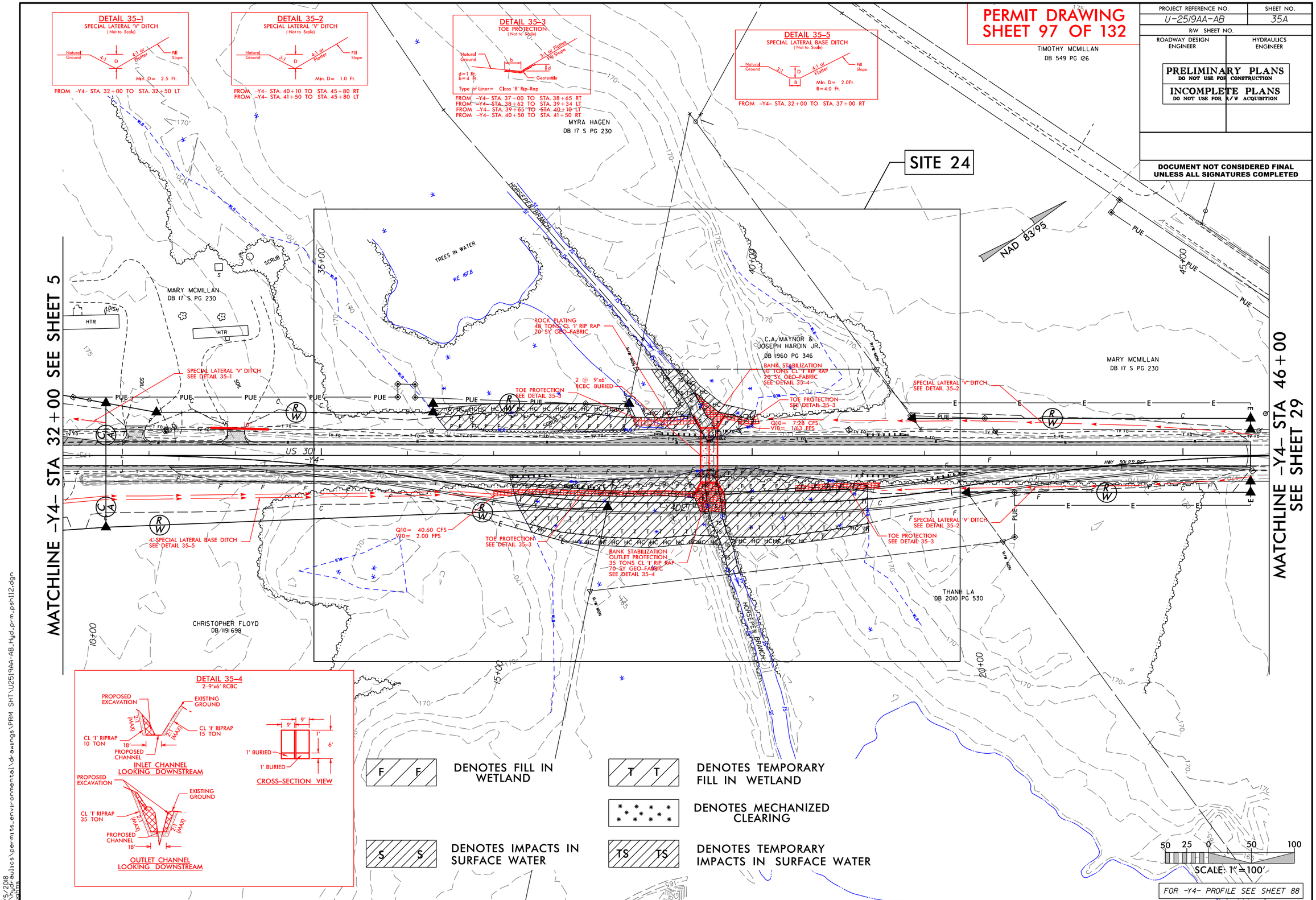
PERMIT DRAWING
SHEET 97 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	35A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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pgbhm

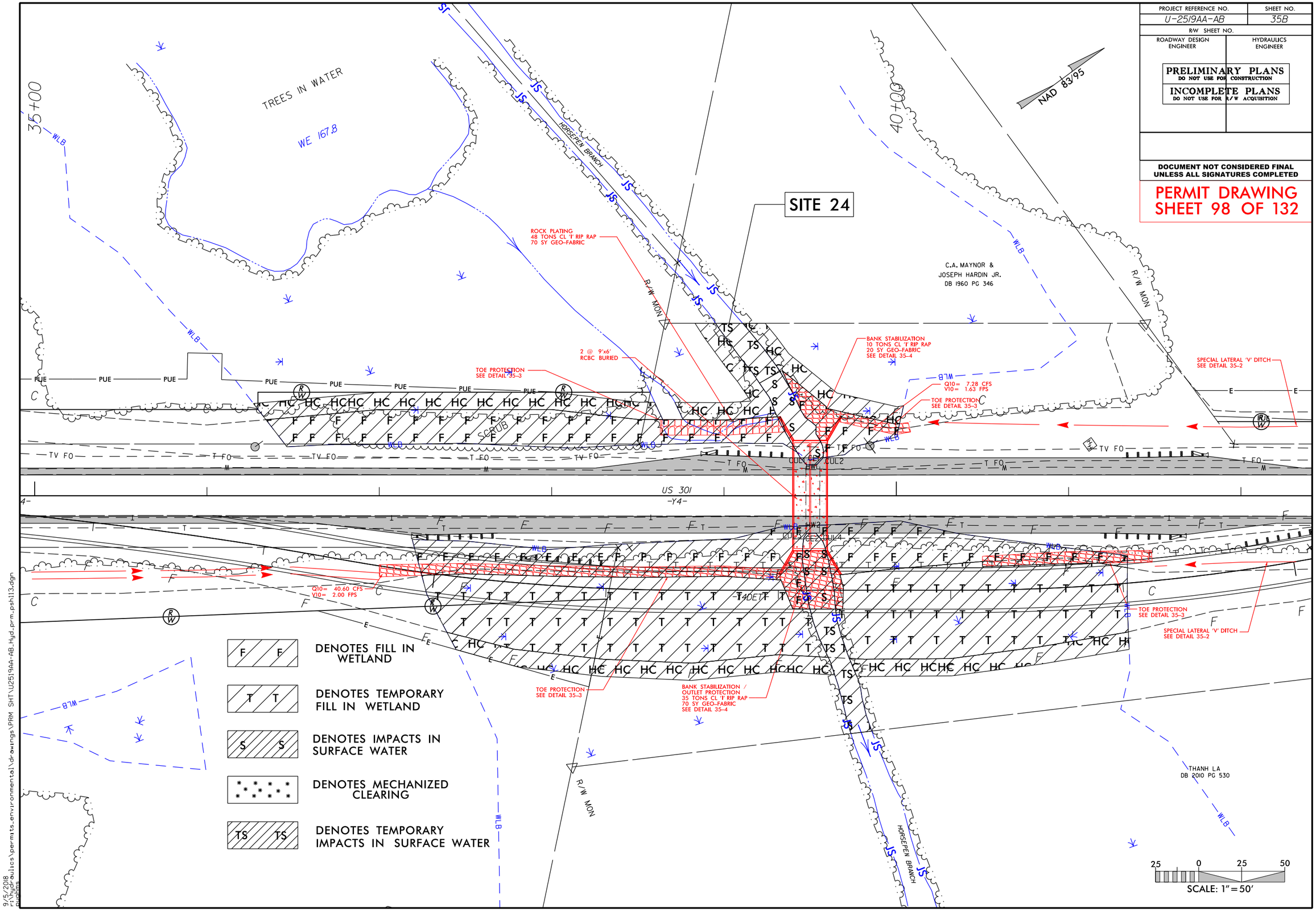
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	35B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 98 OF 132



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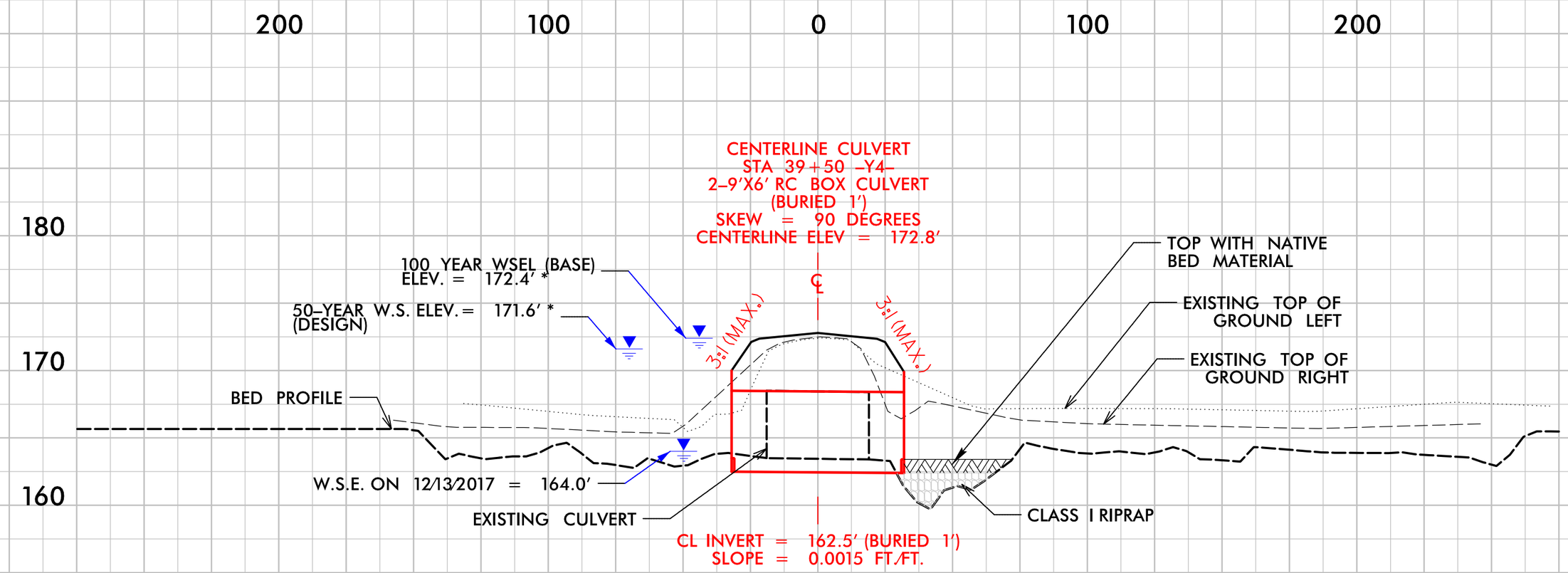
PERMIT DRAWING
SHEET 99 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	35C
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



6/23/16

9/5/2018
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pughms

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	88
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

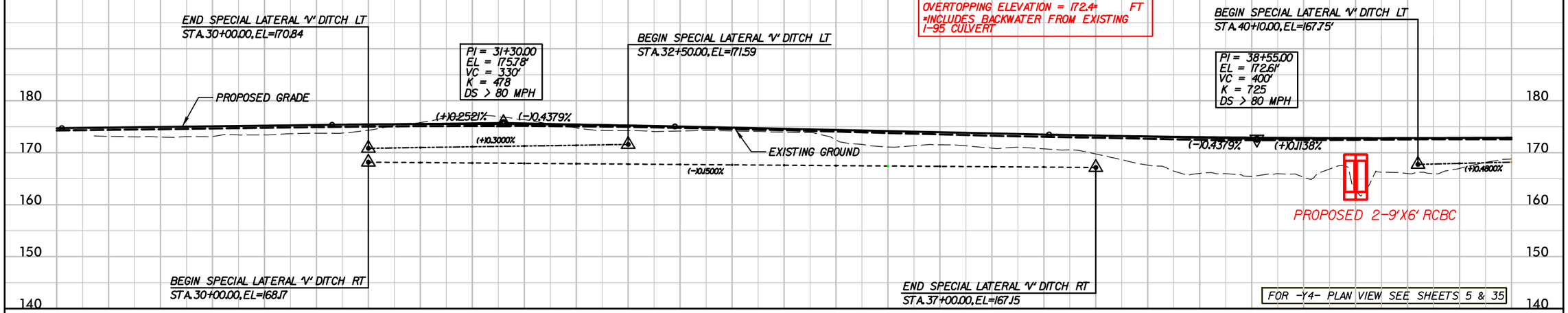
PERMIT DRAWING
SHEET 100 OF 132

-Y4-
US 301

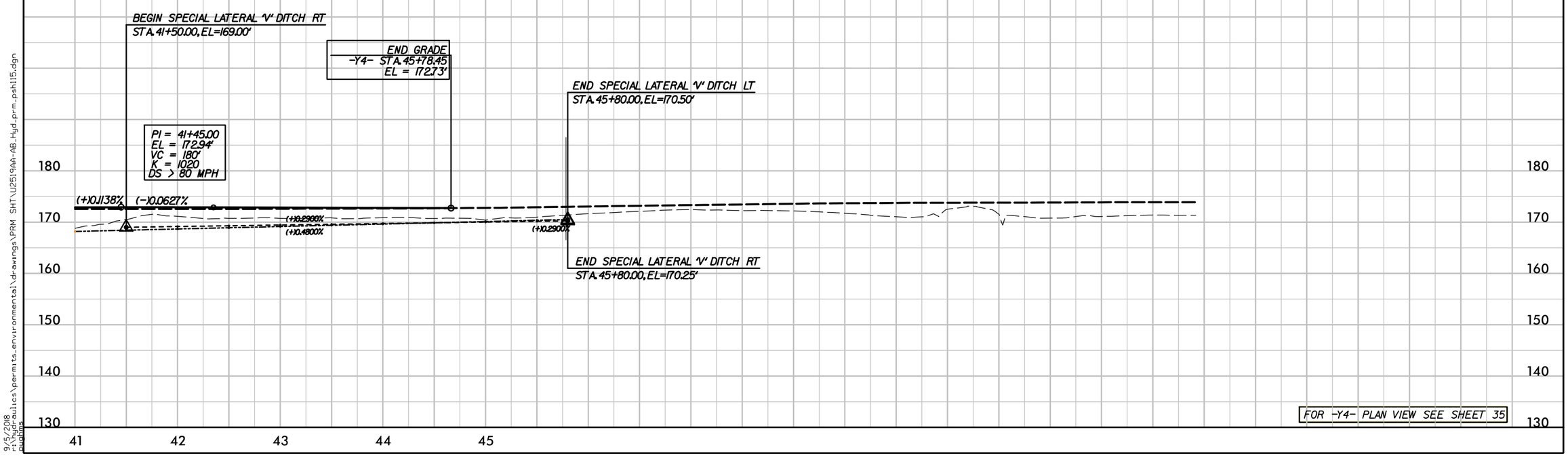
CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	544	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	171.6*	FT
BASE DISCHARGE	=	624	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	172.4*	FT
OVERTOPPING DISCHARGE	=	624	CFS
OVERTOPPING FREQUENCY	=	100	YRS
OVERTOPPING ELEVATION	=	172.4*	FT

*INCLUDES BACKWATER FROM EXISTING I-95 CULVERT



-Y4-
US 301



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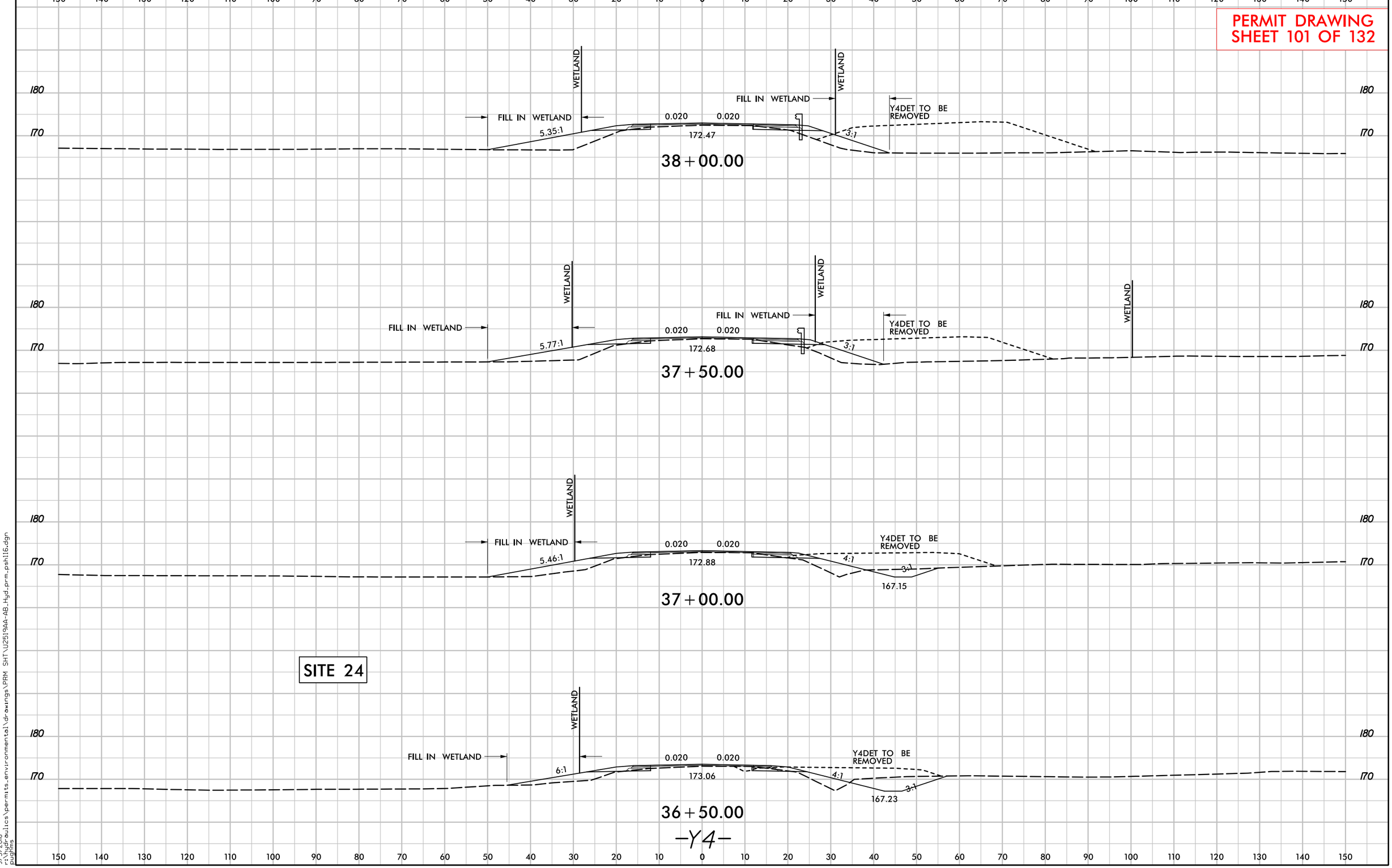
6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-414

0 5 10

PERMIT DRAWING
SHEET 101 OF 132



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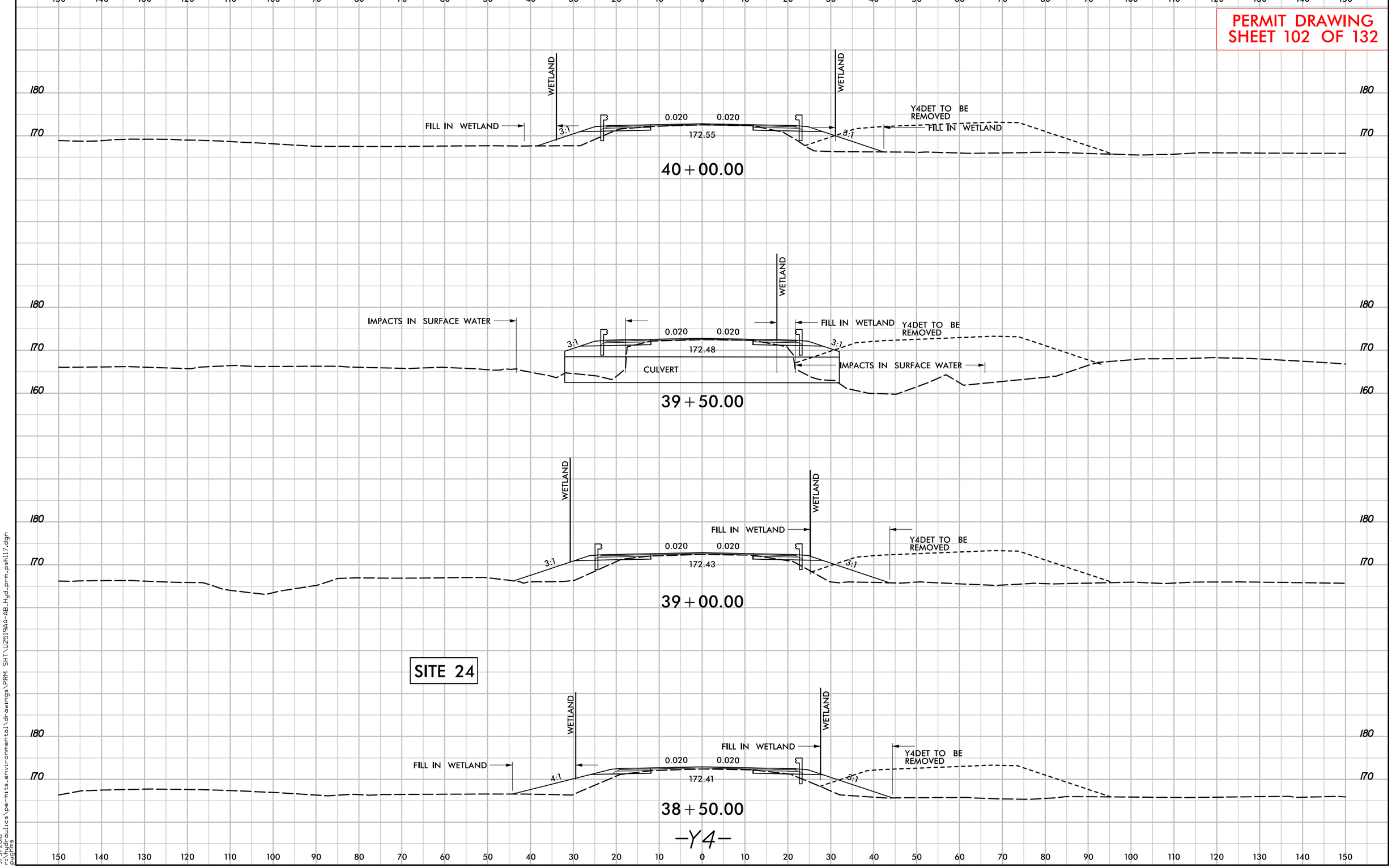
pughins

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-415

0 5 10

PERMIT DRAWING
SHEET 102 OF 132



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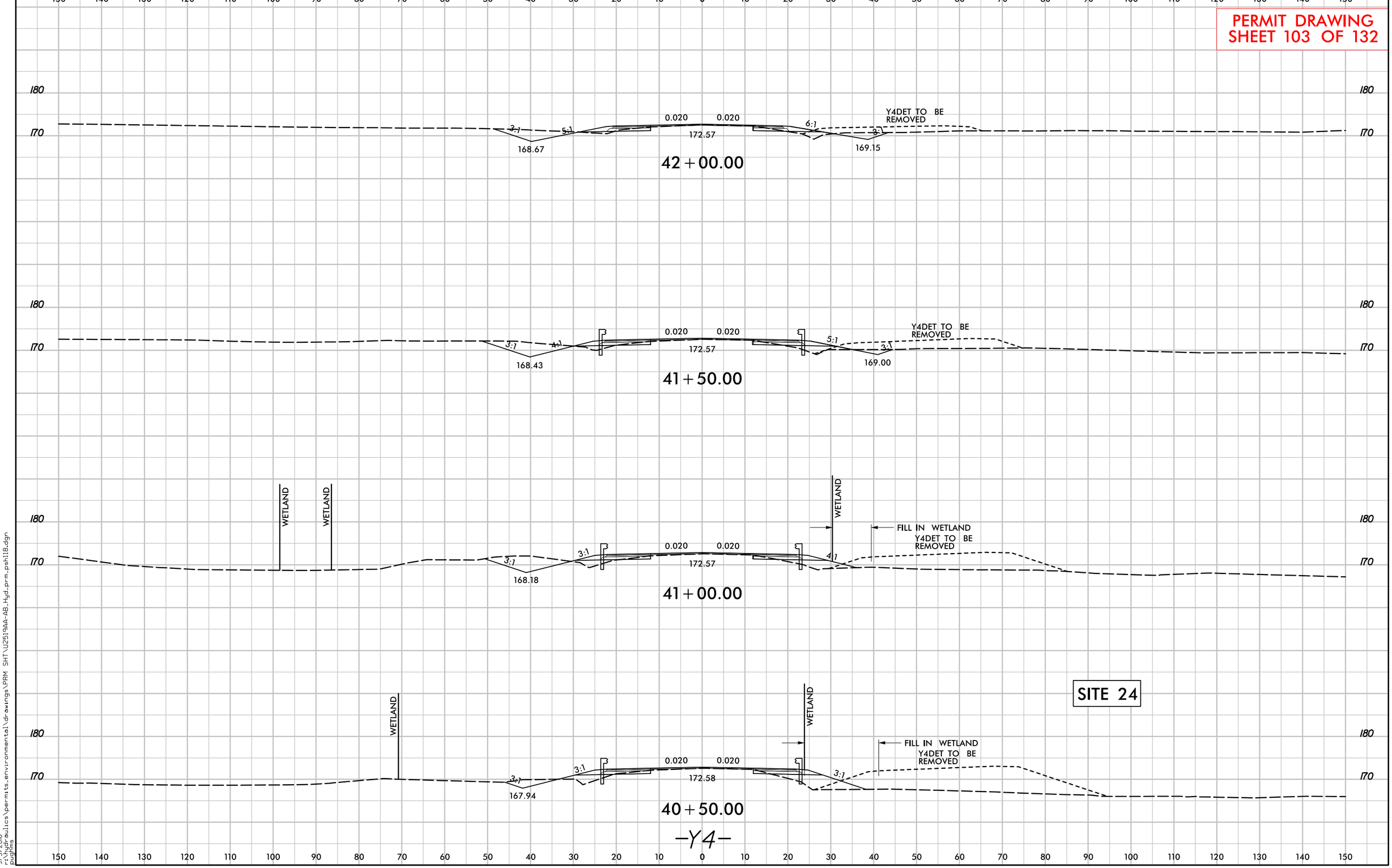
pughins

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-416

0 5 10

PERMIT DRAWING
SHEET 103 OF 132



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pughins

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 104 OF 132

DETAIL 34-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground — 6:1 — D — 6:1 or Flatter — Fill Slope
Min. D= 1.0 Ft.
FROM -Y4- STA. 16+32 TO STA. 20+50 RT

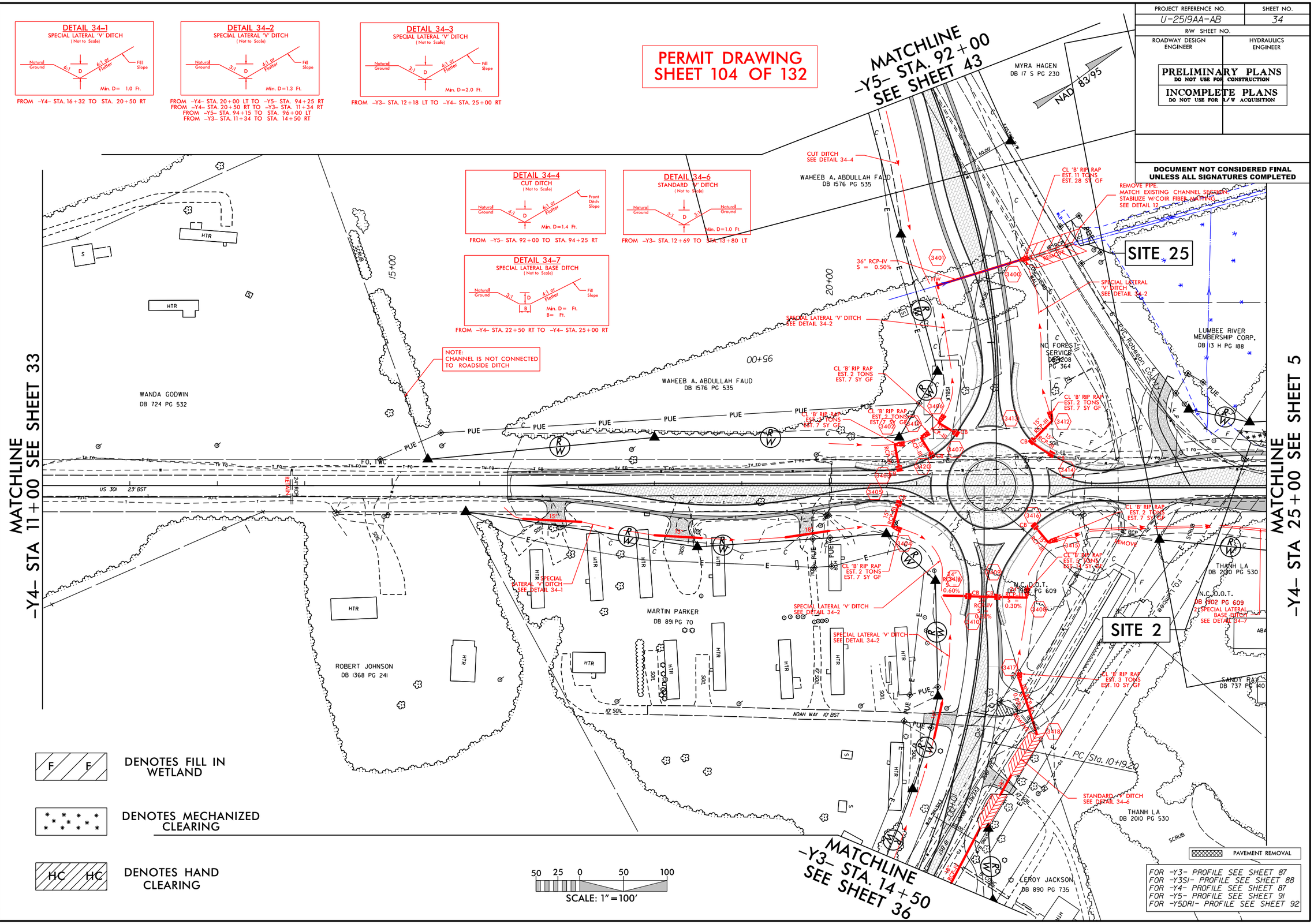
DETAIL 34-2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground — 3:1 — D — 4:1 or Flatter — Fill Slope
Min. D=1.3 Ft.
FROM -Y4- STA. 20+00 LT TO -Y5- STA. 94+25 RT
FROM -Y4- STA. 20+50 RT TO -Y3- STA. 11+34 RT
FROM -Y5- STA. 94+15 TO STA. 96+00 LT
FROM -Y3- STA. 11+34 TO STA. 14+50 RT

DETAIL 34-3
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground — 3:1 — D — 4:1 or Flatter — Fill Slope
Min. D=2.0 Ft.
FROM -Y3- STA. 12+18 LT TO -Y4- STA. 25+00 RT

DETAIL 34-4
CUT DITCH
(Not to Scale)
Natural Ground — 4:1 — D — 6:1 or Flatter — Front Ditch Slope
Min. D=1.4 Ft.
FROM -Y5- STA. 92+00 TO STA. 94+25 RT

DETAIL 34-6
STANDARD 'V' DITCH
(Not to Scale)
Natural Ground — 3:1 — D — 3:1 — Natural Ground
Min. D=1.0 Ft.
FROM -Y3- STA. 12+69 TO STA. 13+80 LT

DETAIL 34-7
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground — 3:1 — D — 4:1 or Flatter — Fill Slope
B
Min. D= Ft.
B= Ft.
FROM -Y4- STA. 22+50 RT TO -Y4- STA. 25+00 RT



F F — DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

HC HC — DENOTES HAND CLEARING

9/5/2018
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pbohne

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	34A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 105 OF 132

DETAIL 34-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground — 6:1 — D — 6:1 or Flatter — Fill Slope
Min. D= 1.0 Ft.
FROM -Y4- STA. 16+32 TO STA. 20+50 RT

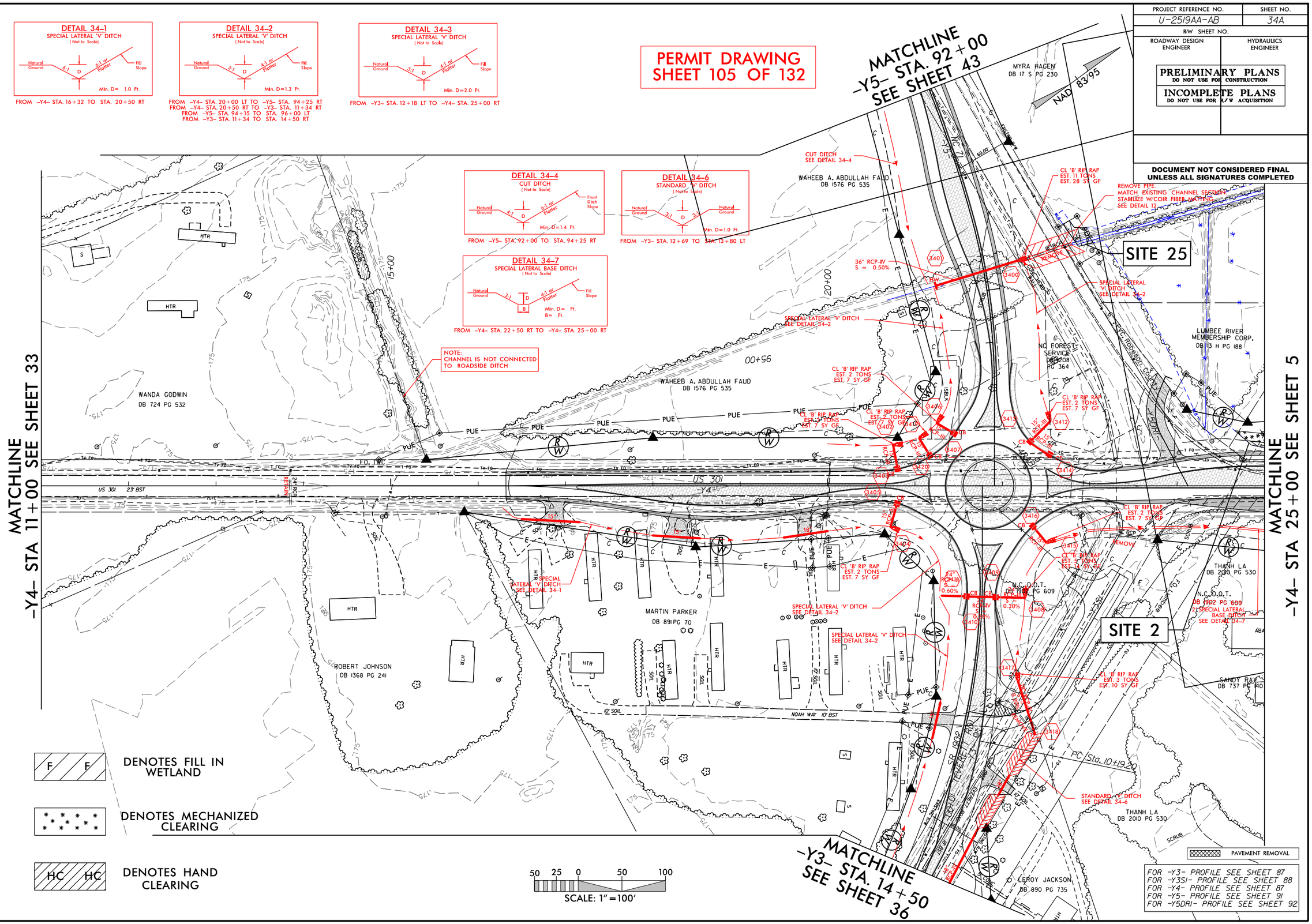
DETAIL 34-2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground — 3:1 — D — 4:1 or Flatter — Fill Slope
Min. D=1.3 Ft.
FROM -Y4- STA. 20+00 LT TO -Y5- STA. 94+25 RT
FROM -Y4- STA. 20+50 RT TO -Y3- STA. 11+34 RT
FROM -Y5- STA. 94+15 TO STA. 96+00 LT
FROM -Y3- STA. 11+34 TO STA. 14+50 RT

DETAIL 34-3
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground — 3:1 — D — 4:1 or Flatter — Fill Slope
Min. D=2.0 Ft.
FROM -Y3- STA. 12+18 LT TO -Y4- STA. 25+00 RT

DETAIL 34-4
CUT DITCH
(Not to Scale)
Natural Ground — 4:1 — D — 6:1 or Flatter — Front Ditch Slope
Min. D=1.4 Ft.
FROM -Y5- STA. 92+00 TO STA. 94+25 RT

DETAIL 34-6
STANDARD 'V' DITCH
(Not to Scale)
Natural Ground — 3:1 — D — 3:1 — Natural Ground
Min. D=1.0 Ft.
FROM -Y3- STA. 12+69 TO STA. 13+80 LT

DETAIL 34-7
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground — 3:1 — D — 4:1 or Flatter — Fill Slope — B
Min. D= Ft.
B= Ft.
FROM -Y4- STA. 22+50 RT TO -Y4- STA. 25+00 RT



F F — DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

HC HC — DENOTES HAND CLEARING

50 25 0 50 100
SCALE: 1" = 100'

9/5/2018
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pjohns

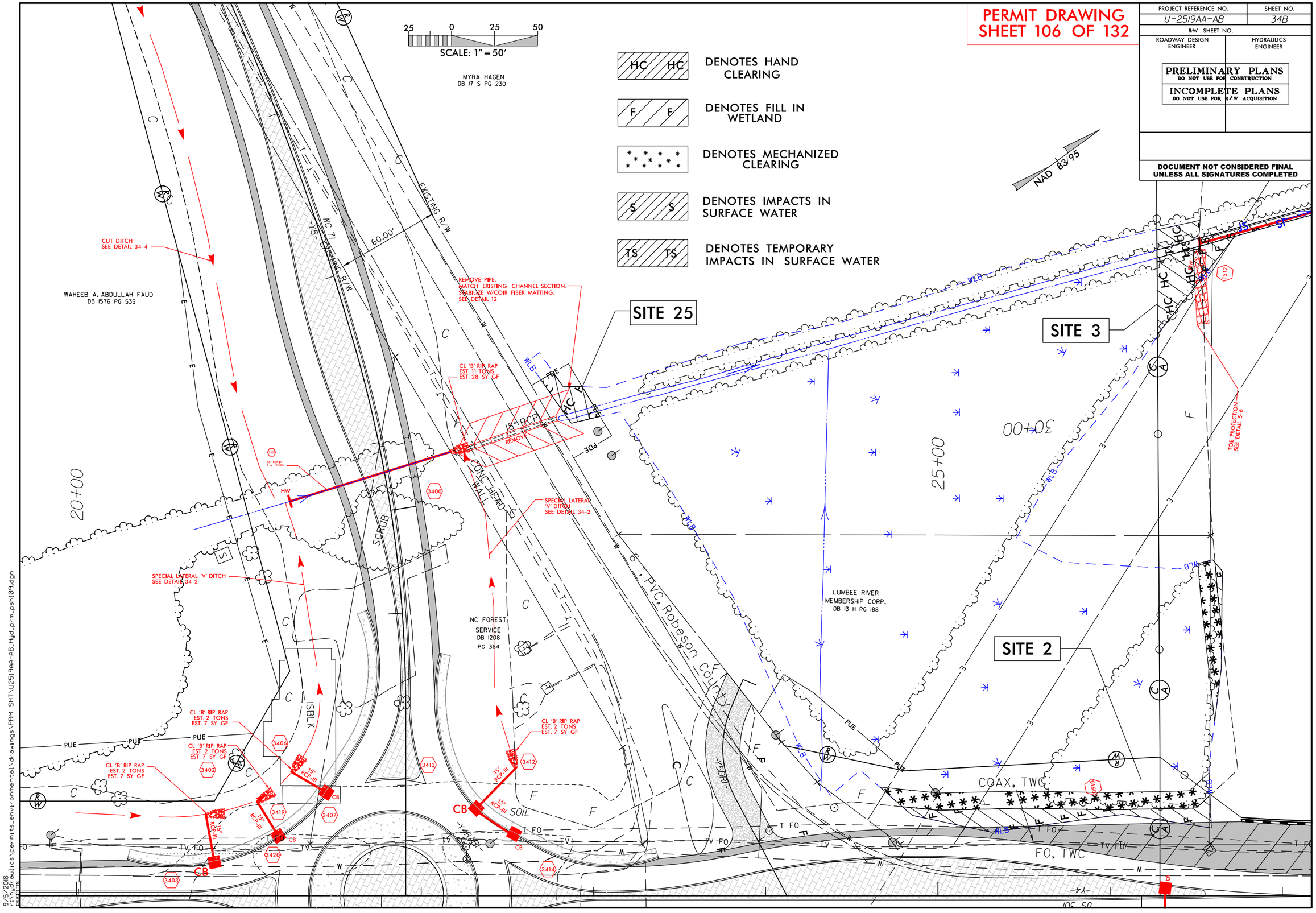
PERMIT DRAWING
SHEET 106 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	34B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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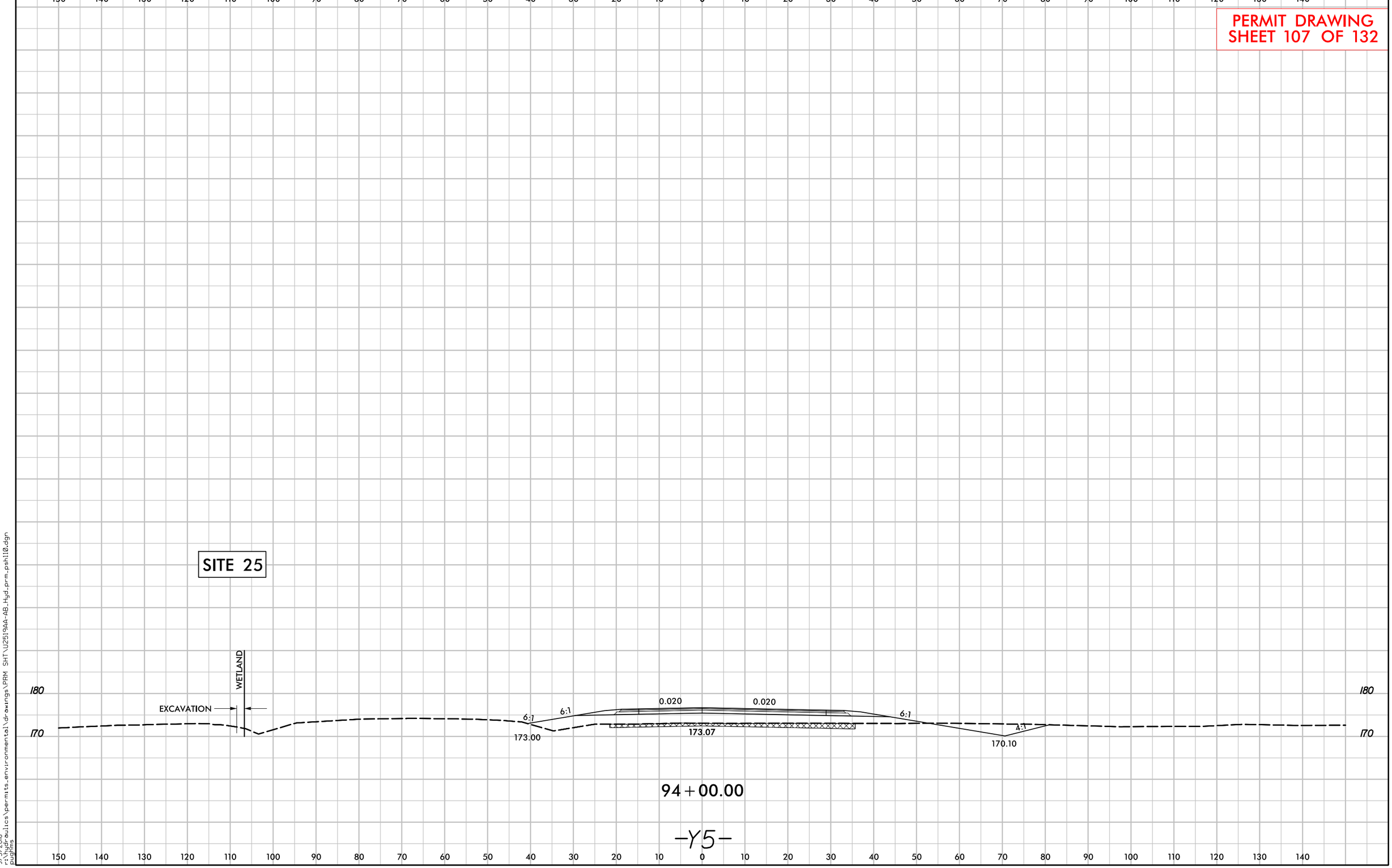
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-2519AA-AB	X-447

PERMIT DRAWING
SHEET 107 OF 132



9/5/2018
r:\hydraulics\permits_environmental\drawings\PRM SHT\U2519AA-AB_Hyd_prm_psh110.dgn
pughins

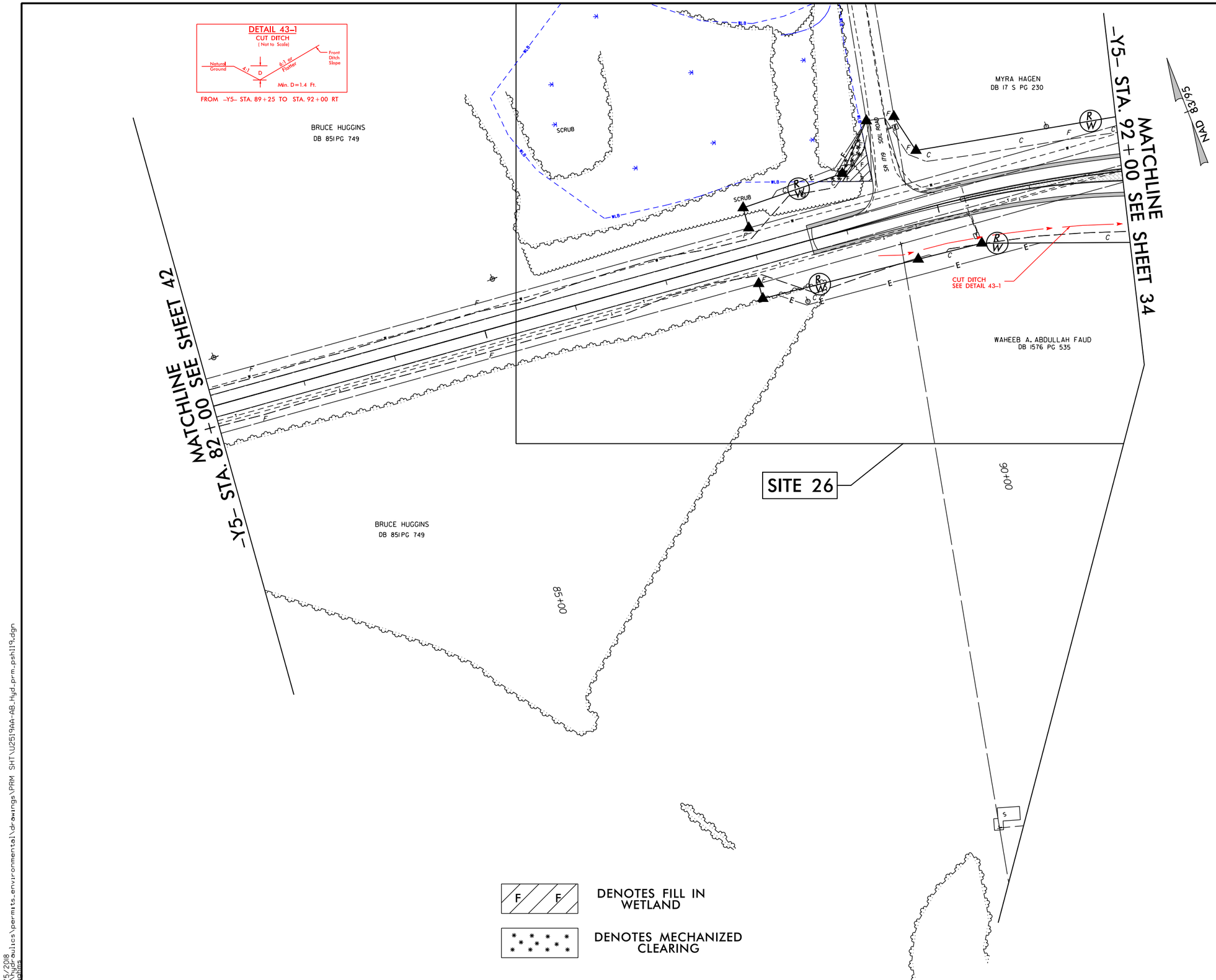
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	43
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 108 OF 132



9/5/2018
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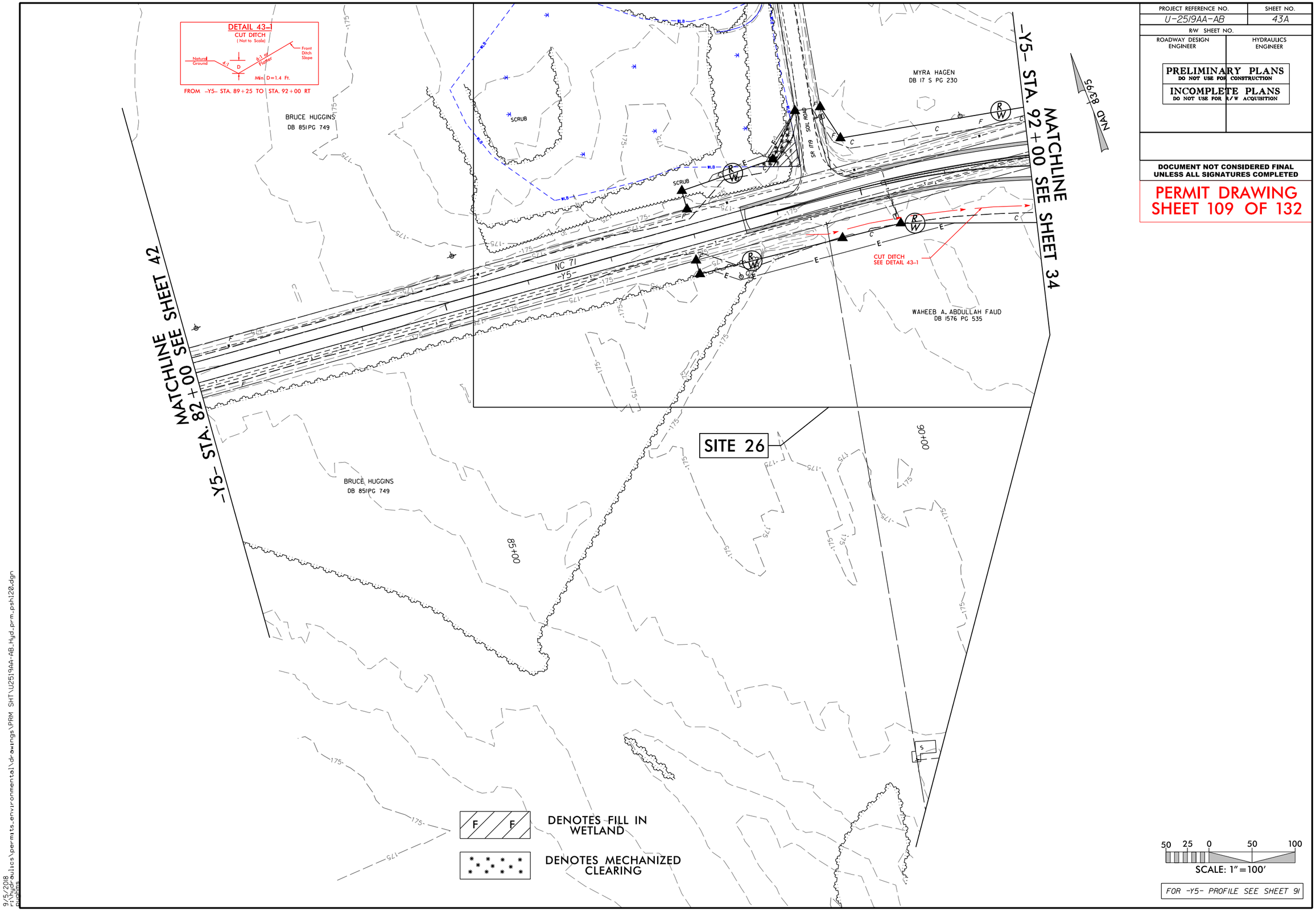
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	43A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 109 OF 132



9/5/2018
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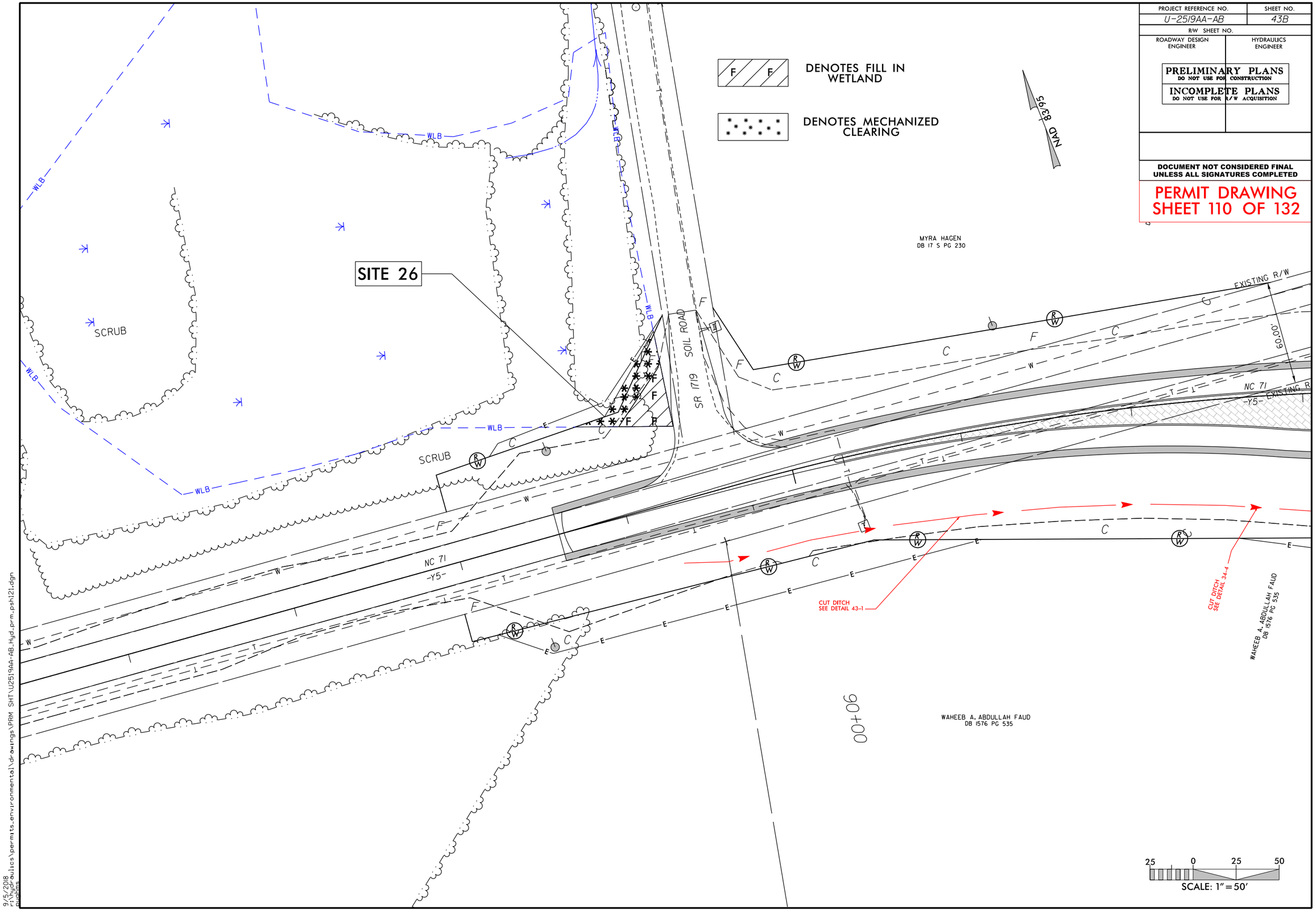
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	43B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 110 OF 132



9/5/2018
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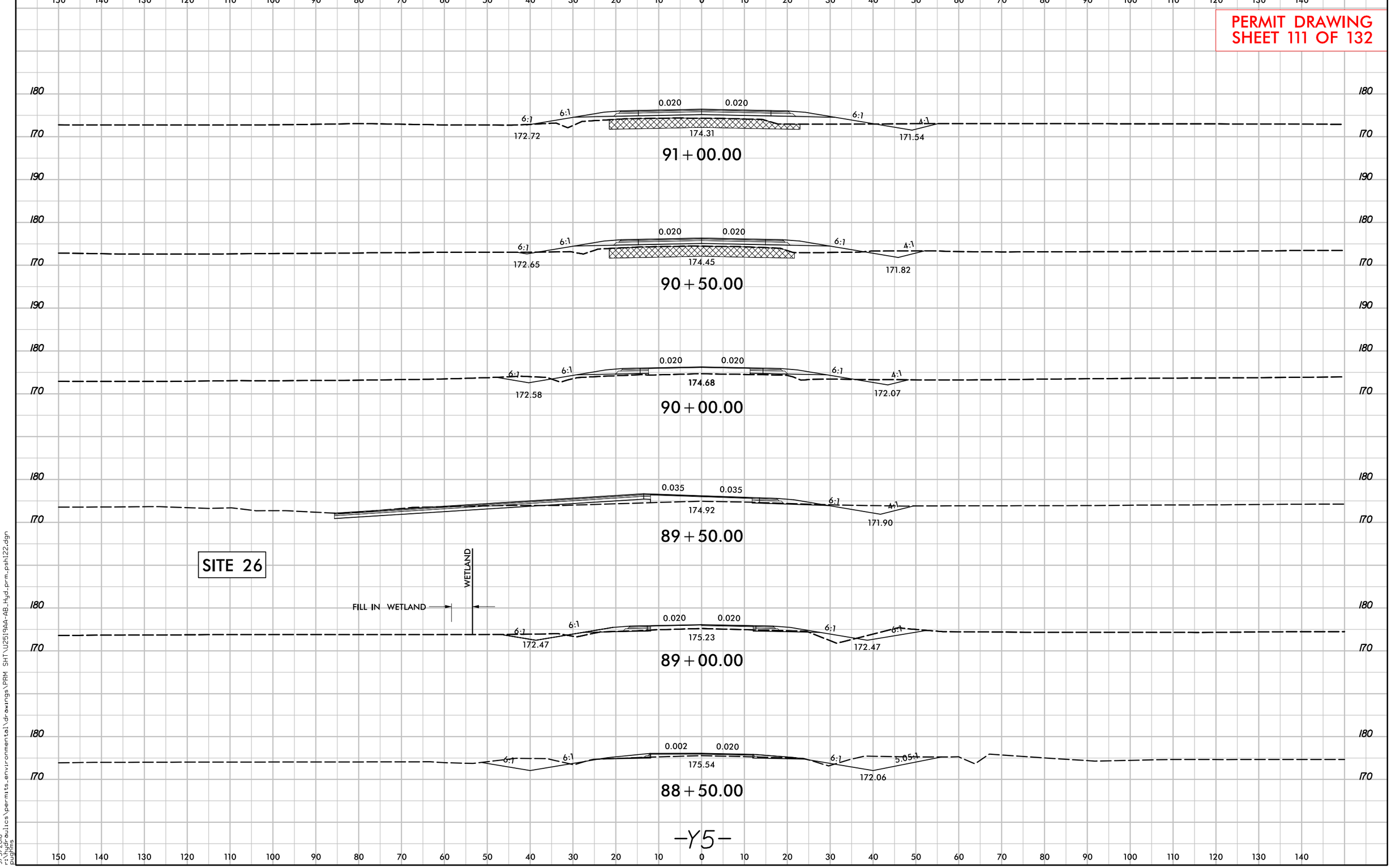
6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-446

0 5 10

PERMIT DRAWING
SHEET 111 OF 132



-Y5-

9/5/2018
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pughins

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	47
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

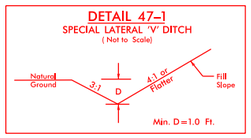
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

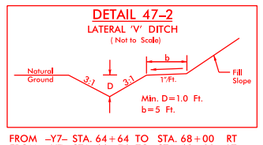
PERMIT DRAWING
SHEET 112 OF 132

DETAIL 47-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



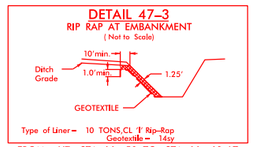
FROM -Y7- STA. 55+00 TO STA. 56+75 LT
FROM -Y7- STA. 56+75 TO STA. 59+40 LT
FROM -Y7- STA. 59+48 TO STA. 63+75 LT
FROM -Y7- STA. 63+75 TO STA. 64+50 LT

DETAIL 47-2
LATERAL 'V' DITCH
(Not to Scale)



FROM -Y7- STA. 64+64 TO STA. 68+00 RT
FROM -Y7- STA. 66+76 TO STA. 68+00 LT
FROM -Y7- STA. 64+50 TO STA. 66+50 LT

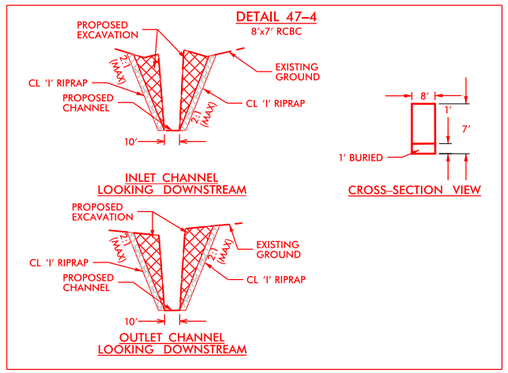
DETAIL 47-3
RIP RAP AT EMBANKMENT
(Not to Scale)



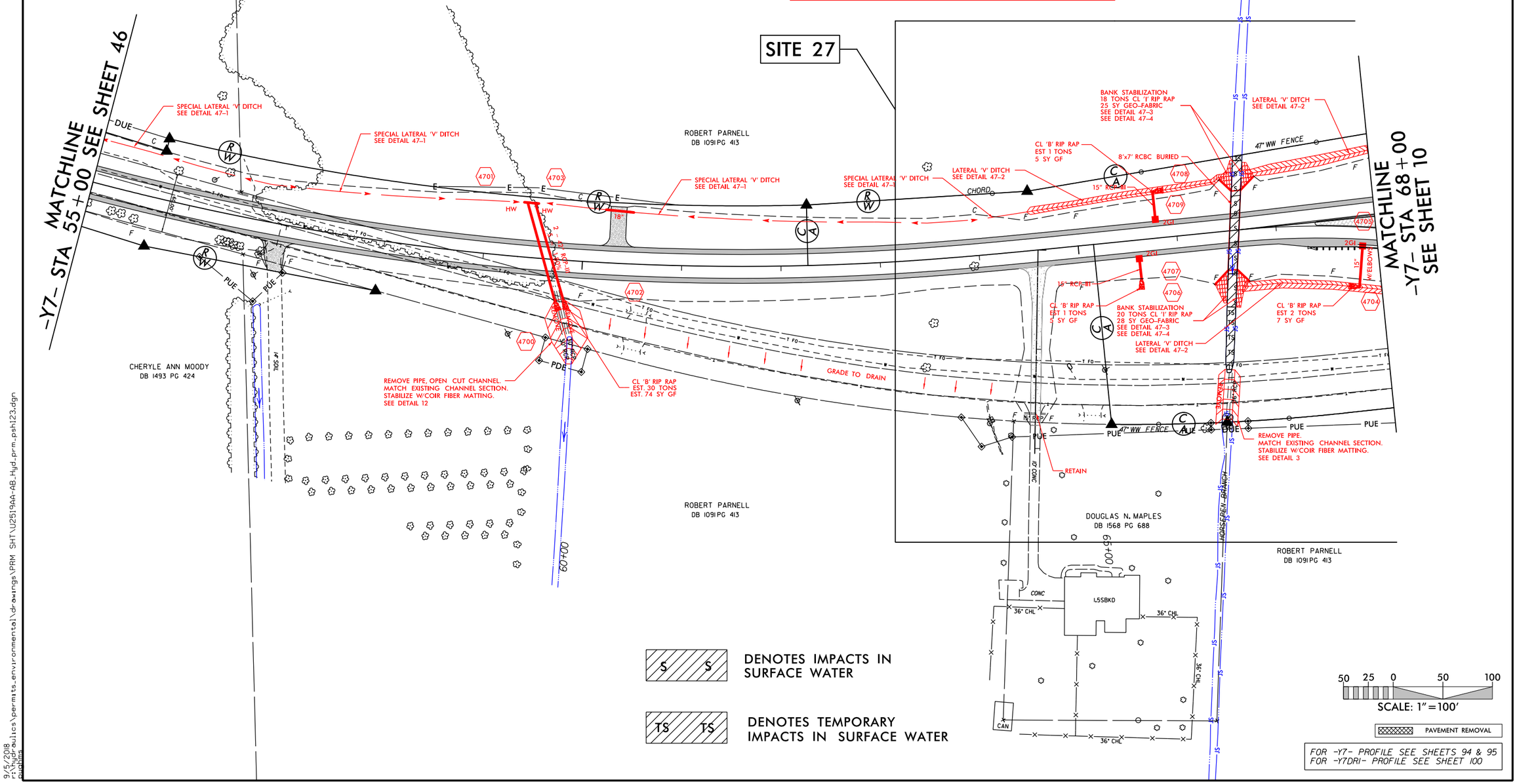
Type of Liner= 10 TONS,CL 'I' Rip-Rap
Geotextile= 14sy

FROM -Y7- STA. 66+50 TO STA. 66+60 LT
FROM -Y7- STA. 66+70 TO STA. 66+78 LT
FROM -Y7- STA. 66+39 TO STA. 66+46 RT
FROM -Y7- STA. 66+55 TO STA. 66+65 RT

DETAIL 47-4
8'x7' RCBC



NAD 83/95



FOR -Y7- PROFILE SEE SHEETS 94 & 95
FOR -Y7DRI- PROFILE SEE SHEET 100

9/5/2018
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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	47A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 113 OF 132

DETAIL 47-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

FROM -Y7- STA. 55+00 TO STA. 56+75 LT
FROM -Y7- STA. 56+75 TO STA. 59+40 LT
FROM -Y7- STA. 59+48 TO STA. 63+75 LT
FROM -Y7- STA. 63+75 TO STA. 64+50 LT

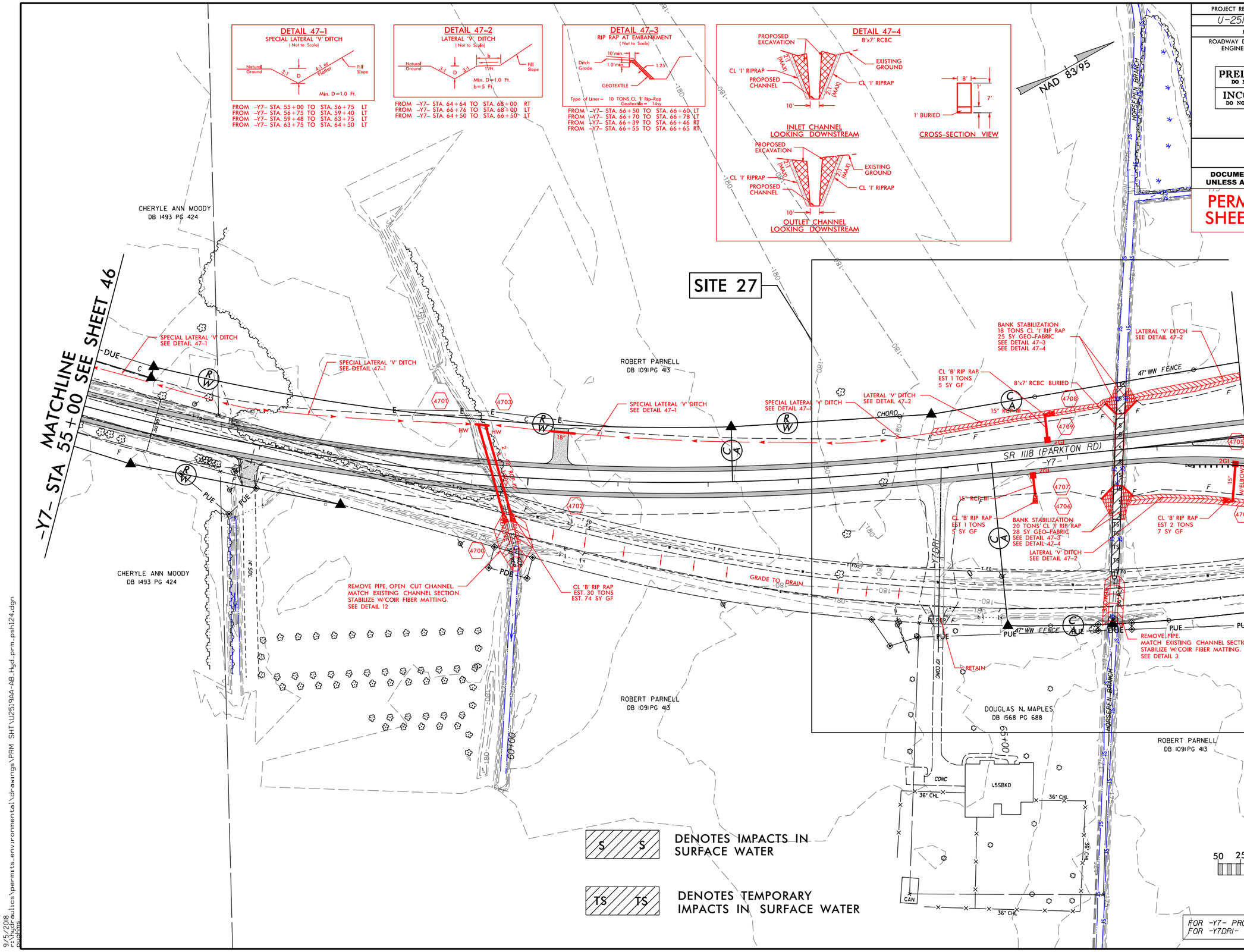
DETAIL 47-2
LATERAL 'V' DITCH
(Not to Scale)

FROM -Y7- STA. 64+64 TO STA. 68+00 RT
FROM -Y7- STA. 66+76 TO STA. 68+00 LT
FROM -Y7- STA. 64+50 TO STA. 66+50 LT

DETAIL 47-3
RIP RAP AT EMBANKMENT
(Not to Scale)

FROM -Y7- STA. 66+50 TO STA. 66+60 LT
FROM -Y7- STA. 66+70 TO STA. 66+78 LT
FROM -Y7- STA. 66+39 TO STA. 66+46 RT
FROM -Y7- STA. 66+55 TO STA. 66+65 RT

DETAIL 47-4
8'x7' RCBC



FOR -Y7- PROFILE SEE SHEETS 94 & 95
FOR -Y7DRI- PROFILE SEE SHEET 100

9/5/2018
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pjohns

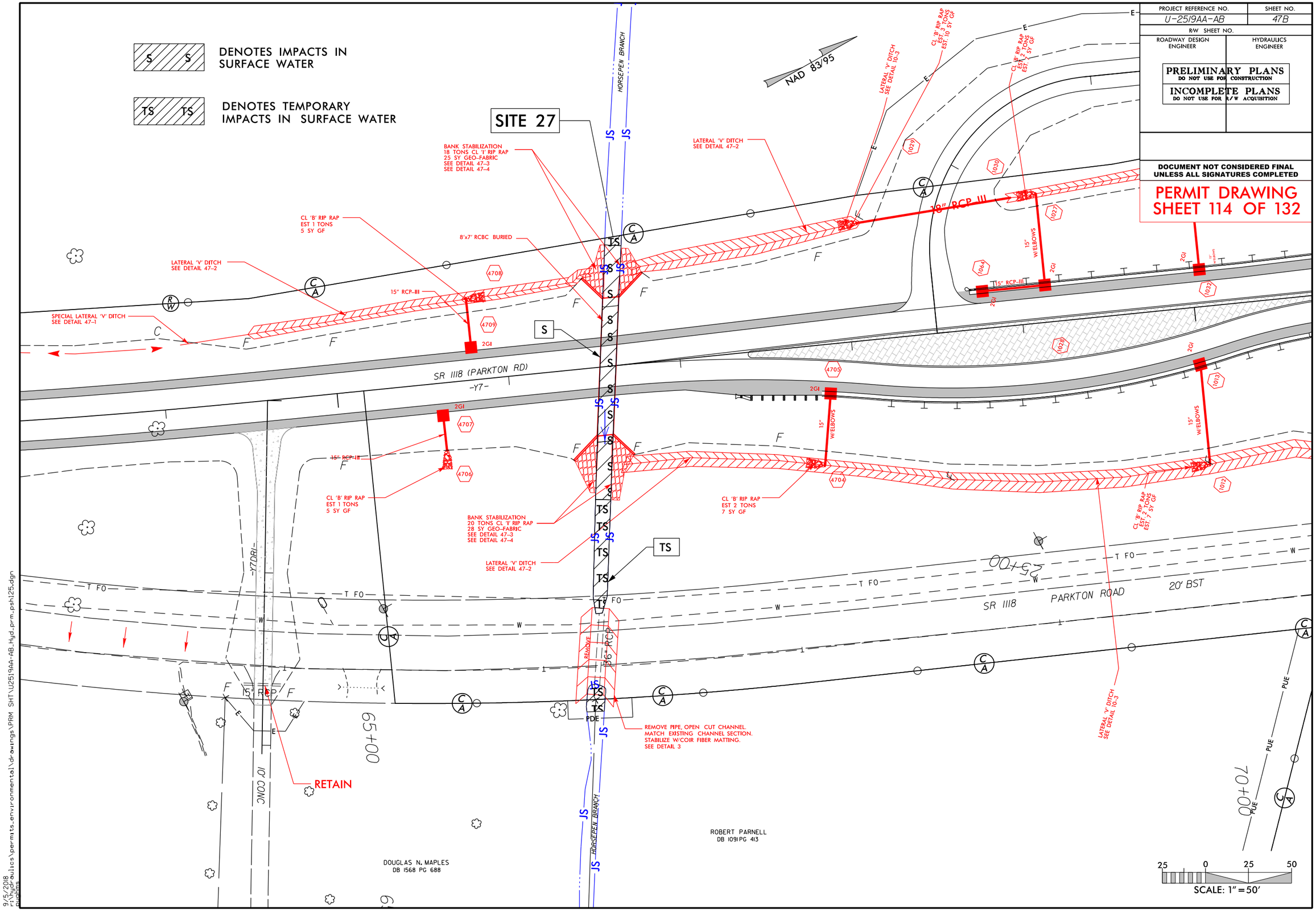
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	47B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 114 OF 132



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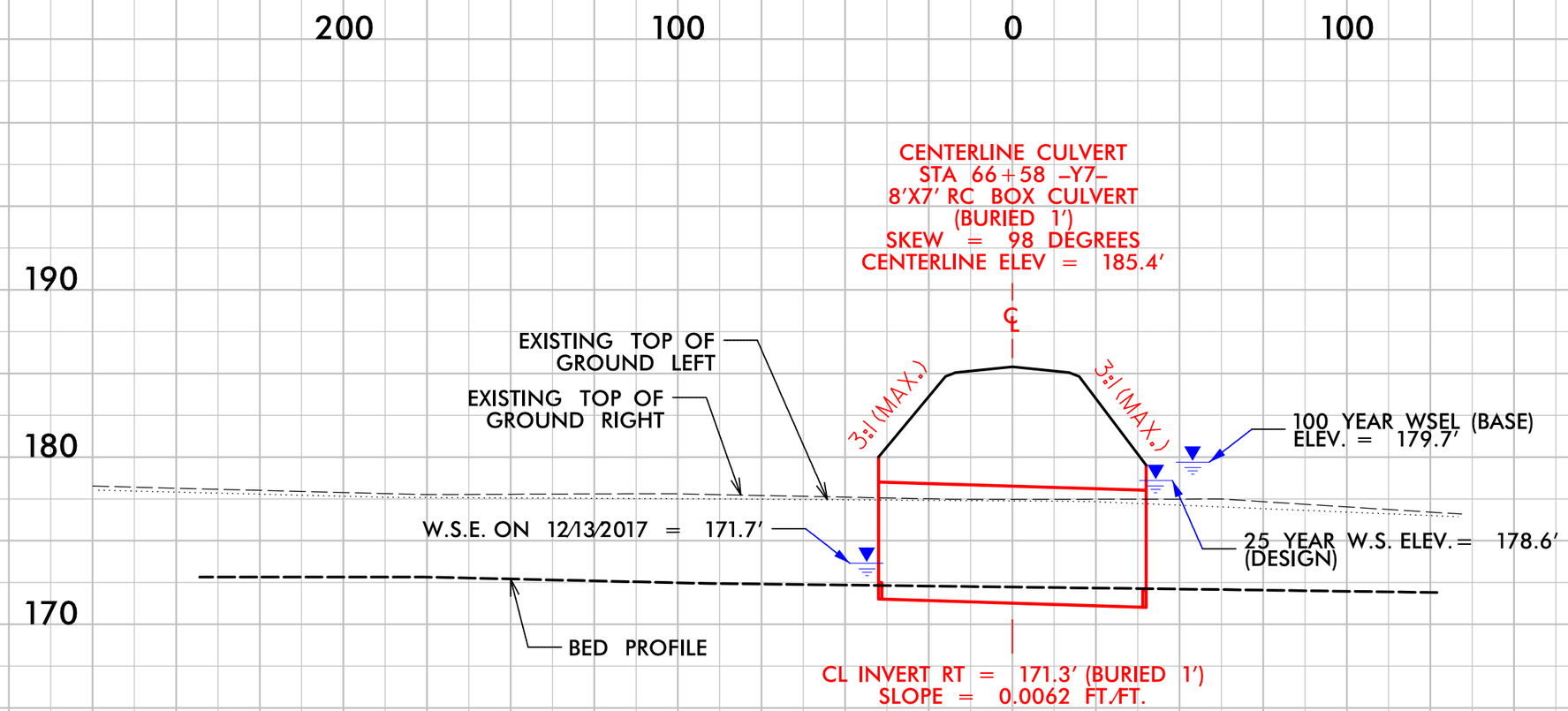
PERMIT DRAWING
SHEET 115 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	47C
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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pughms

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	95
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 116 OF 132

-Y7-
SR 1118 (PARKTON RD)

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 229	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 178.6	FT
BASE DISCHARGE	= 303	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 179.7	FT
OVERTOPPING DISCHARGE	= 800	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 182.5	FT

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 220	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 149.3	FT
BASE DISCHARGE	= 260	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 149.5	FT
OVERTOPPING DISCHARGE	= 75,200	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 175.3	FT
DATE OF SURVEY	= 02/28/18	
W.S.ELEVATION AT DATE OF SURVEY	= 146.4	FT

-Y7- STA.34+50.00
-Y7RPA- STA.34+13.57
-Y7RPB- STA.29+05.28

PI = 71+84.32
EL = 200.11'

PI = 71+65.06
EL = 199.72'

PI = 72+79.75
EL = 202.91'

PI = 72+98.05
EL = 202.54'

BEGIN BRIDGE
-Y7- STA.75+41.95

PI = 76+50.28
EL = 210.64'
VC = 687'
K = 151
DS = 60 MPH

END BRIDGE
-Y7- STA.77+30.45

PI = 79+94.78
EL = 202.89'

END LATERAL 'V' DITCH RT
STA.66+70.00, EL=175.50

PI = 66+25.16
EL = 183.53'
VC = 381'
K = 136
DS = 60 MPH

(+)3.0000%
(+)3.0000%
(+)2.0000%
(+)2.9299%
-Y7RAB2-
(-)2.0000%
(+)2.3000%
(+)2.3000%
(-)2.2500%
(-)2.2500%
(-)0.6000%
(+)0.3100%
(+)0.1000%
(+)0.3000%

PROPOSED GRADE
BRIDGE
EXISTING GROUND
PROPOSED 8'X7' RCBC

BEGIN LATERAL 'V' DITCH RT
STA.71+10.00, EL=177.57

BEGIN LATERAL 'V' DITCH LT
STA.68+10.00, EL=176.04

END LATERAL 'V' DITCH LT
STA.66+76.00, EL=175.62

END SPECIAL LATERAL 'V' DITCH LT
STA.66+50.00, EL=176.50

END LATERAL 'V' DITCH LT
STA.69+00.00, EL=176.31

BEGIN LATERAL 'V' DITCH LT
STA.71+50.00, EL=177.05

FOR -Y7- PLAN VIEW SEE SHEETS 10 & 47

-Y7-
SR 1118 (PARKTON RD)

-Y7- STA.46+50.00
-Y7RPC- STA.36+65.88
-Y7RPD- STA.28+83.28

PI = 81+09.07
EL = 200.44'

PI = 81+27.14
EL = 200.08'

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 272	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 179.1*	FT
BASE DISCHARGE	= 361	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 179.5*	FT
OVERTOPPING DISCHARGE	= 361	CFS
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING ELEVATION	= 179.5*	FT

*INCLUDES BACKWATER FROM EXISTING I-95 CULVERT

RESURFACE EXISTING PAVEMENT TO -Y7- STA.93+00.00

END GRADE
-Y7- STA.91+94.70
EL = 179.34

(+)2.0000%
(-)2.9331%
-Y7RAB3-
(-)2.0000%
(-)3.0000%

PI = 80+13.07
EL = 203.26'

PROPOSED GRADE

PI = 87+55.40
EL = 181.23'
VC = 350'
K = 136
DS = 60 MPH

(-)3.0000%
(-)0.4300%
(+)0.3600%
(+)0.3600%
(+)0.3000%
(-)0.3000%

EXISTING GROUND

END SPECIAL LATERAL 'V' DITCH LT
STA.87+50.00, EL=176.45

PROPOSED 2-10'X7' RCBC

BEGIN SPECIAL LATERAL 'V' DITCH LT
STA.92+00.00, EL=177.80

BEGIN LATERAL 'V' DITCH LT
STA.81+80.00, EL=174.74

END LATERAL 'V' DITCH LT
STA.84+65.00, EL=173.88

END LATERAL 'V' DITCH RT
STA.88+10.00, EL=175.21

BEGIN SPECIAL LATERAL 'V' DITCH RT
STA.91+00.00, EL=176.26

END SPECIAL LATERAL 'V' DITCH RT
STA.89+50.00, EL=175.72

BEGIN LATERAL 'V' DITCH RT
STA.89+50.00, EL=175.72

FOR -Y7- PLAN VIEW SEE SHEET 10 & 48

9/5/2018
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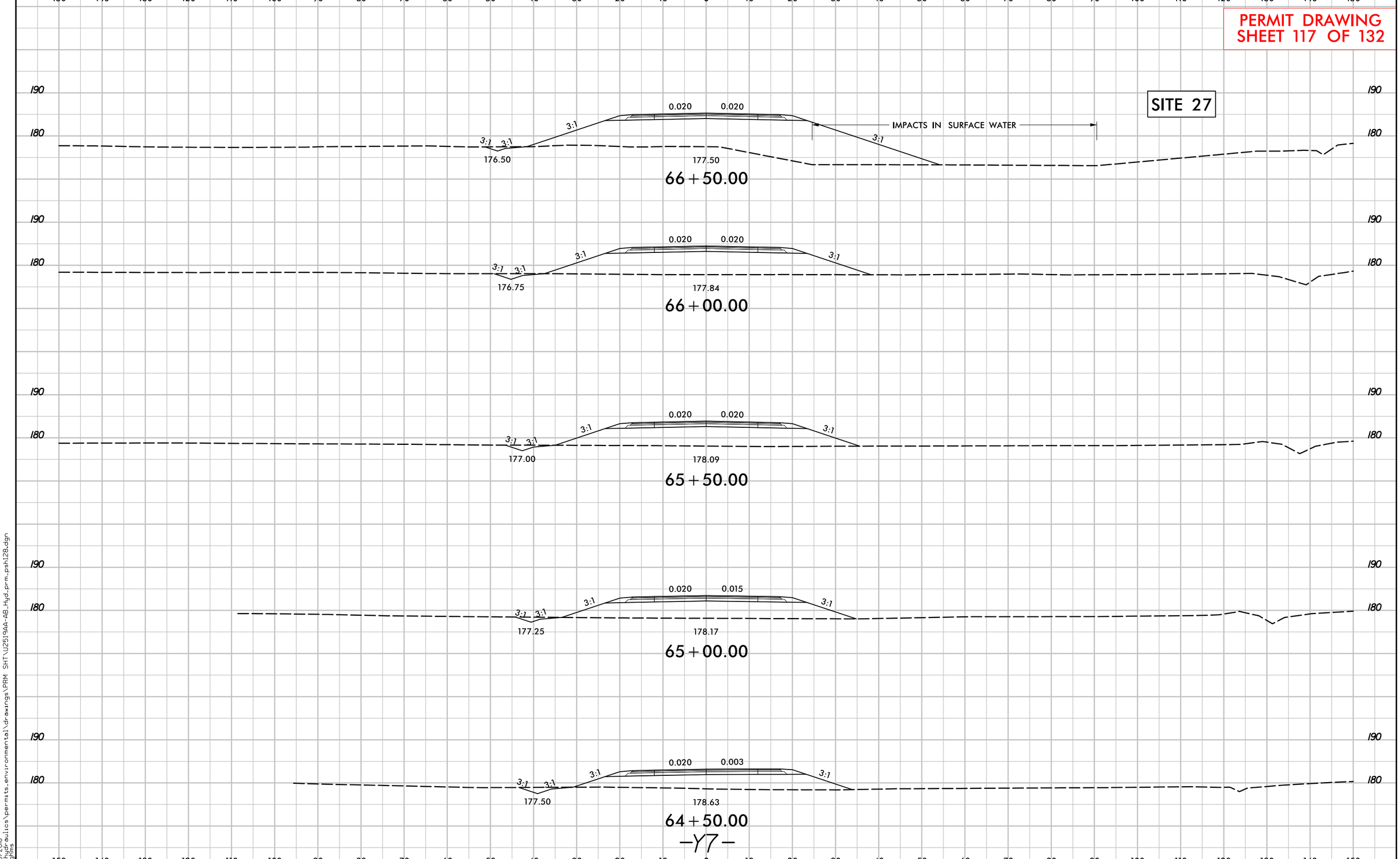
6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-471

0 5 10

PERMIT DRAWING
SHEET 117 OF 132

SITE 27



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plughms

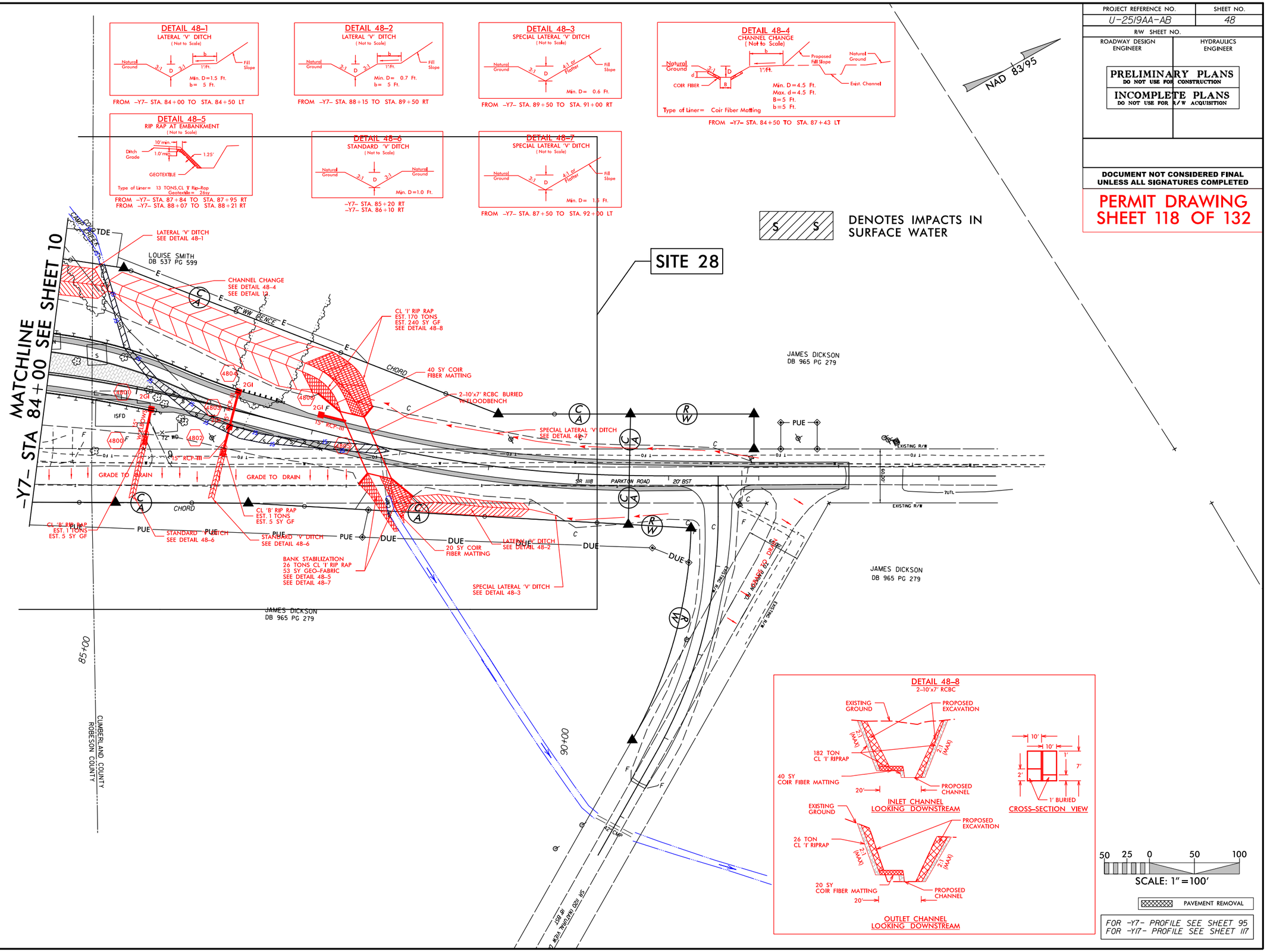
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	48
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 118 OF 132



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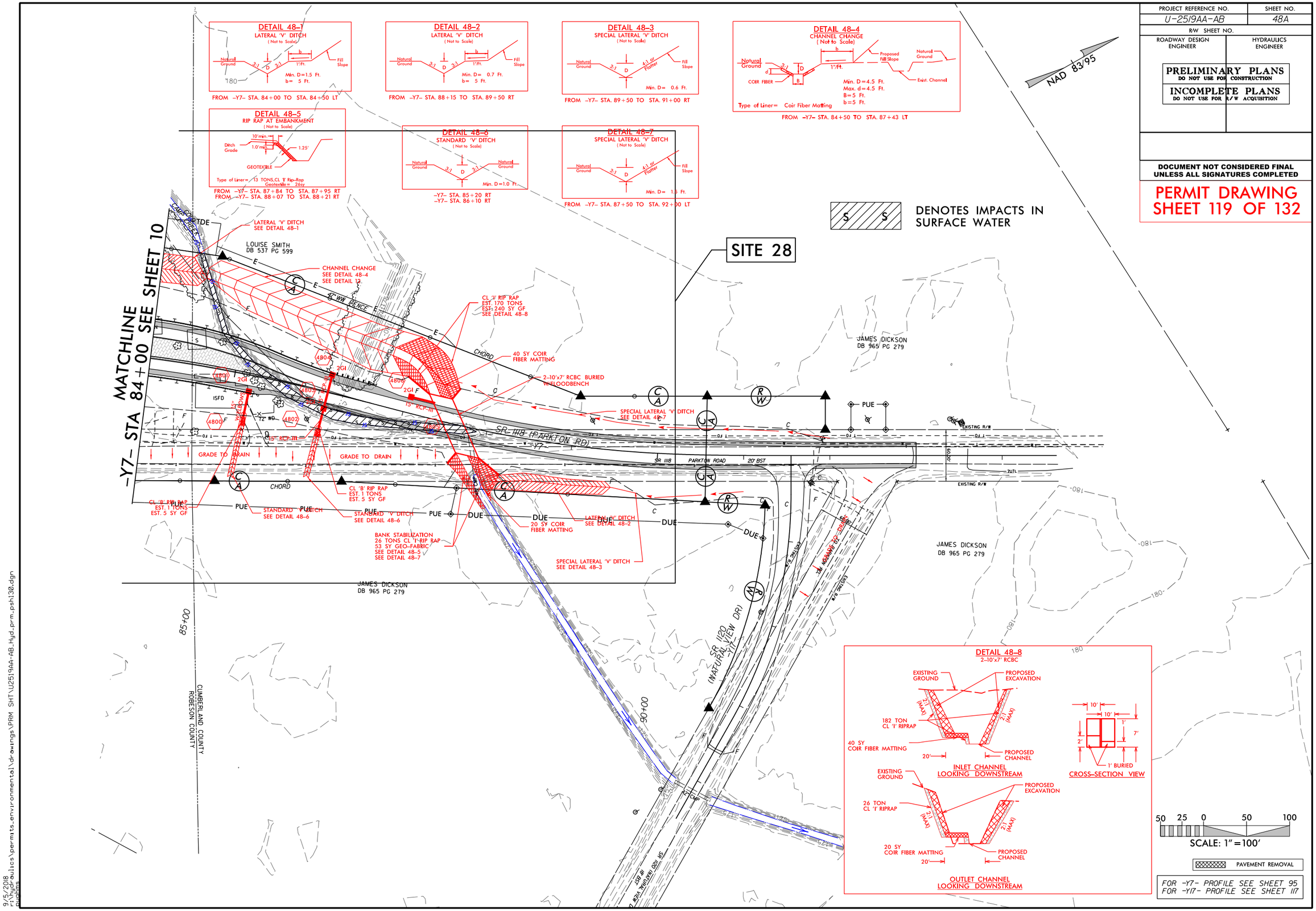
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	48A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 119 OF 132



9/5/2018
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pgbline

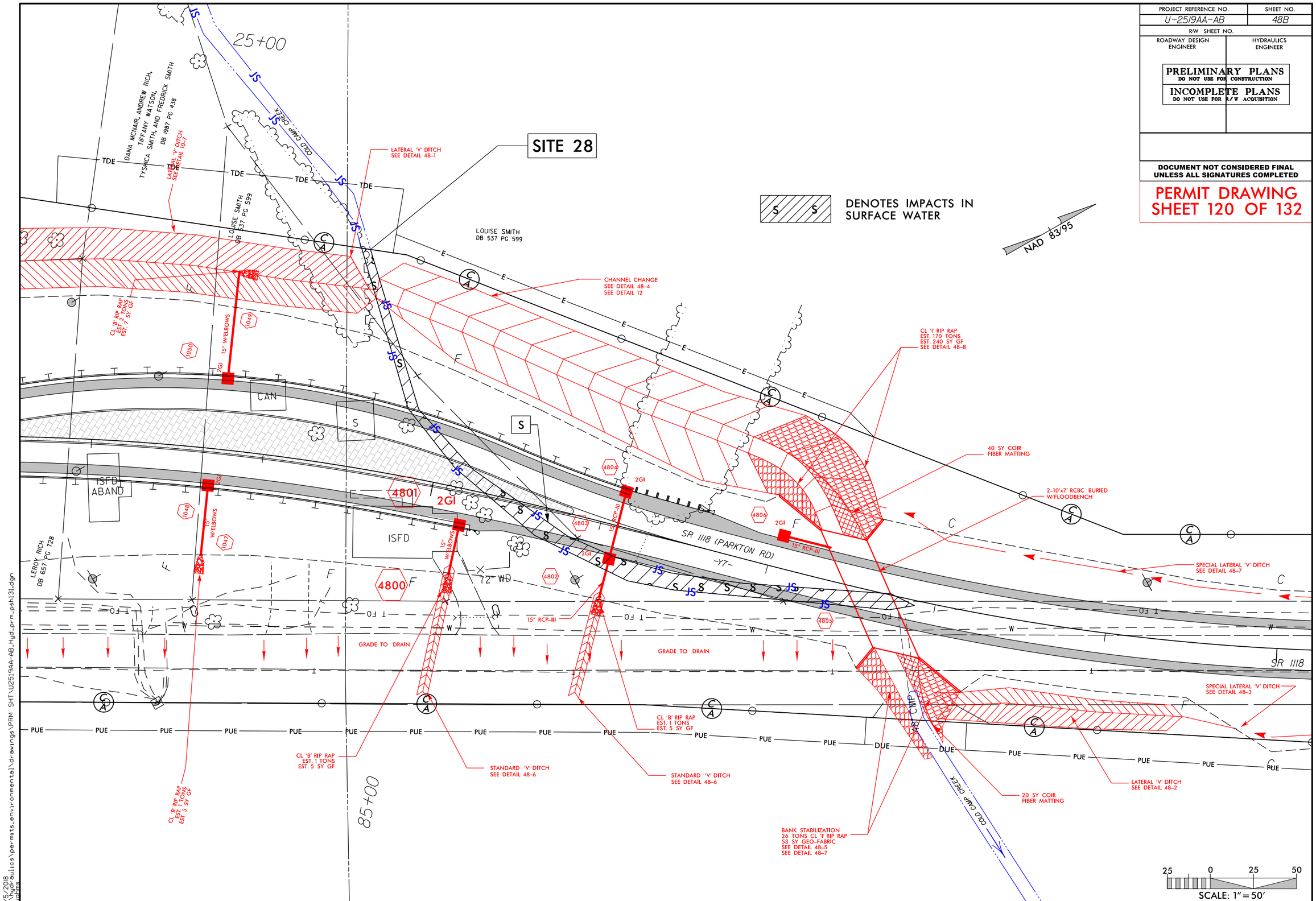
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	48B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 120 OF 132



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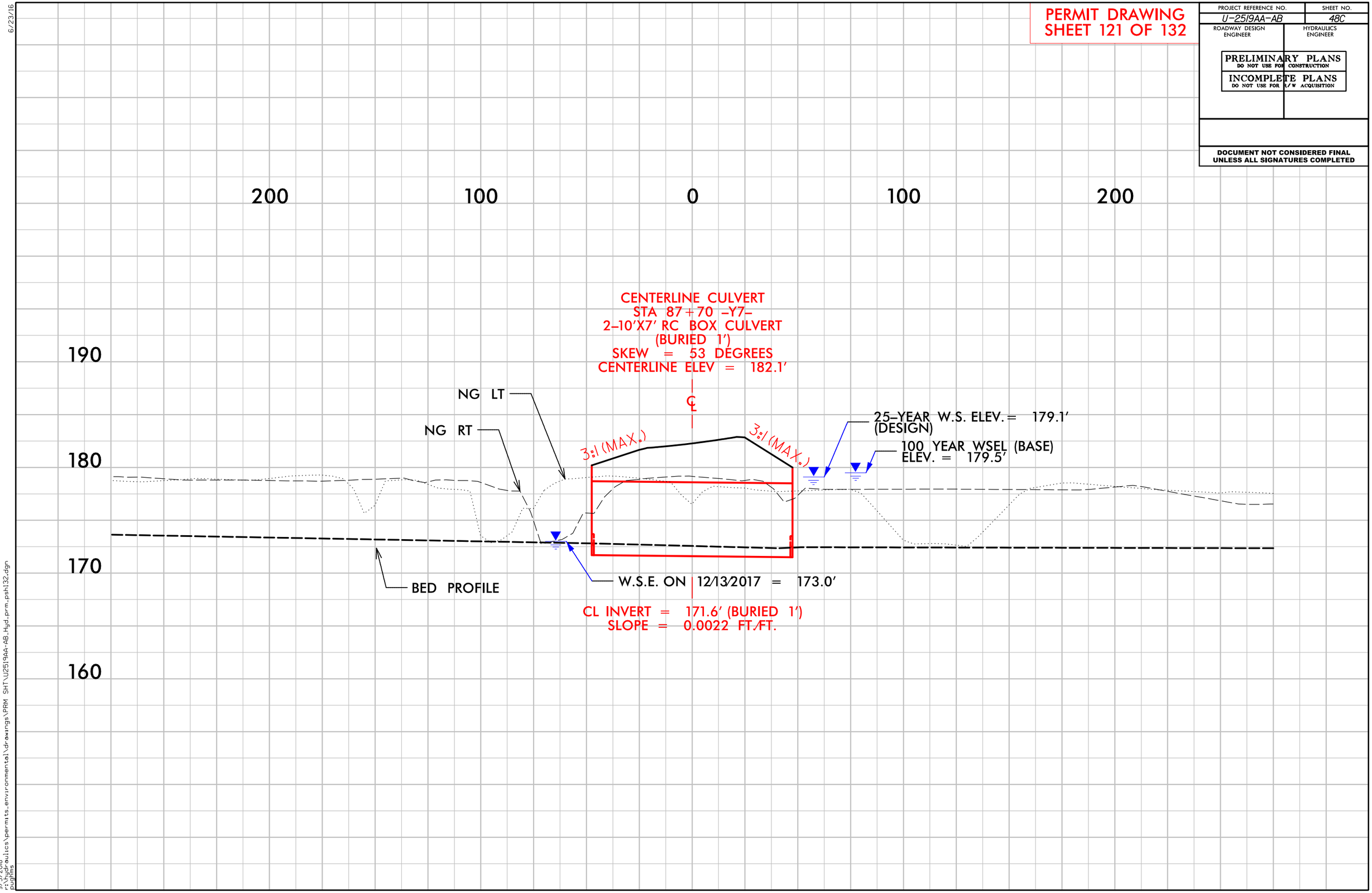
PERMIT DRAWING
SHEET 121 OF 132

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	48C
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



6/23/16

9/5/2018
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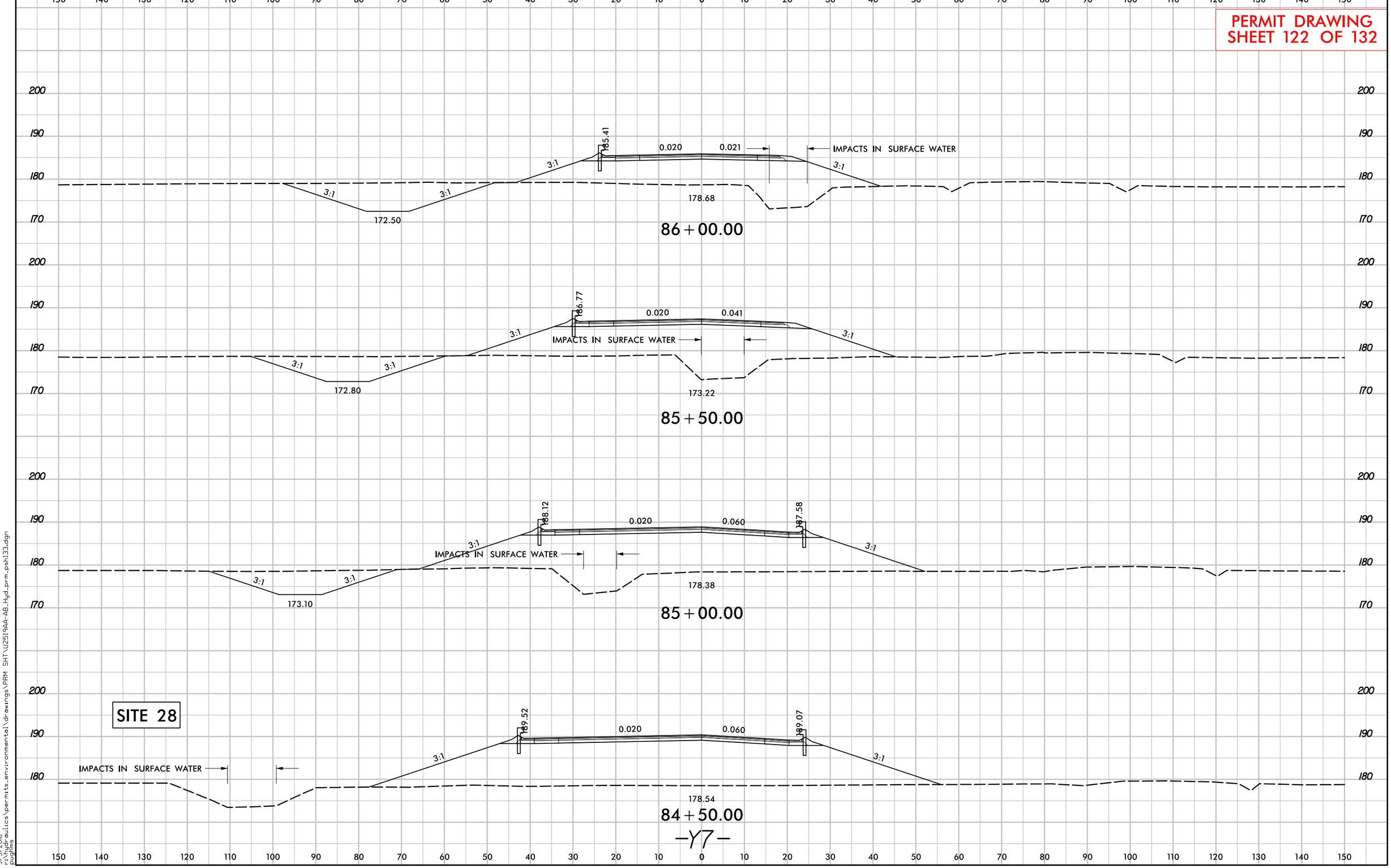
pughms

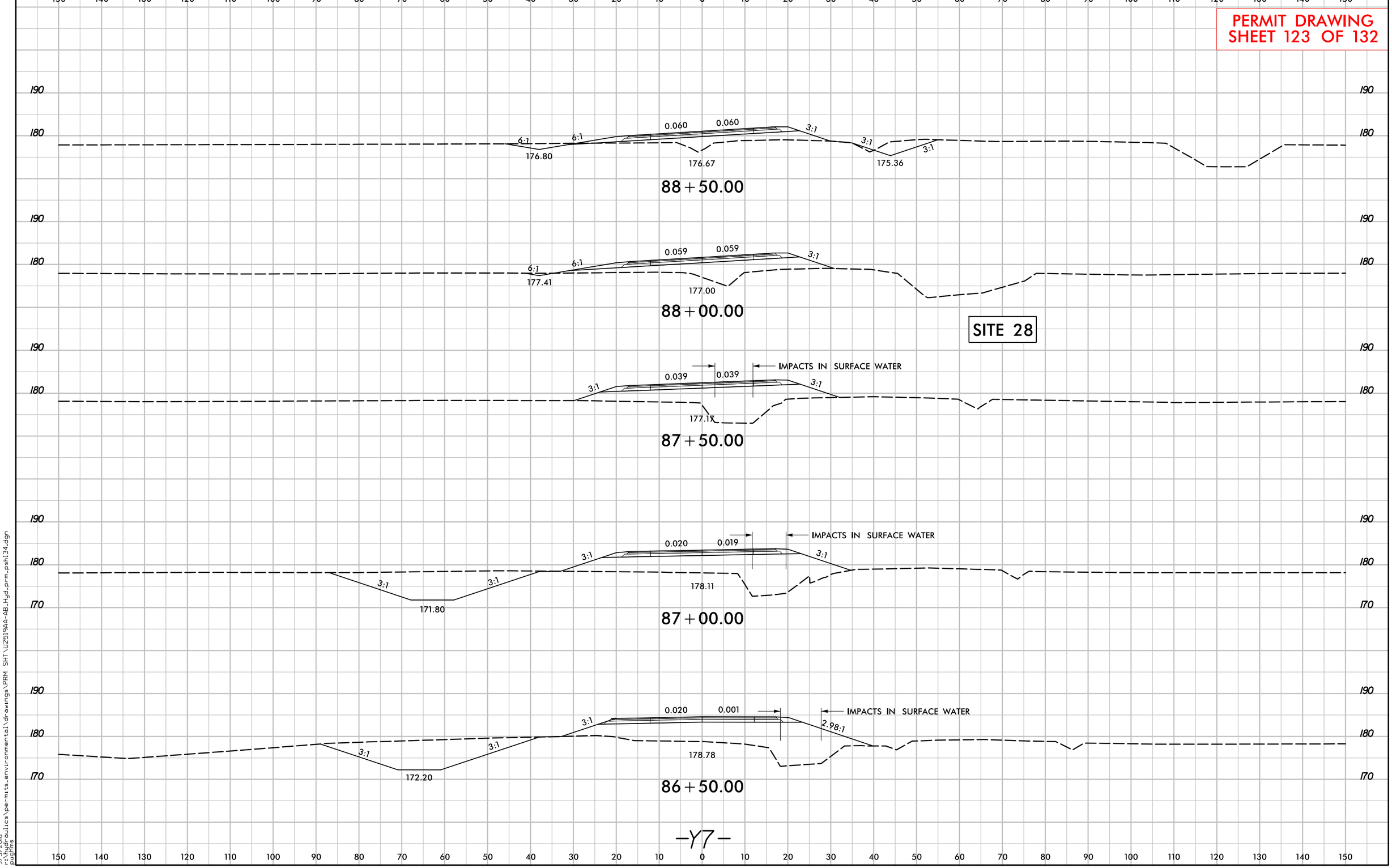
PERMIT DRAWING
SHEET 122 OF 132



6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2519AA-AB	X-484

PERMIT DRAWING
SHEET 123 OF 132



-Y7-

9/5/2018
R:\Hydraulics\permits_environmental\drawings\PRM SHT\U2519AA-AB_Hyd_prm_psh134.dgn
pughins

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	53
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 124 OF 132

SCALE: 1" = 100'

NAD 83/95

MATCHLINE -Y10B- STA 14+00 SEE SHEET 57

MATCHLINE -Y10- STA 55+00 SEE SHEET 18

MATCHLINE -Y10- STA 69+00 SEE SHEET 54

DETAIL 53-1
LATERAL BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
B=2 Ft.
b=5 Ft.
FROM STA. 13+00 -Y10- TO STA. 14+00 -Y10- LT

DETAIL 53-2
LATERAL BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2 Ft.
b=5 Ft.
*When B is < 6.0'
Type of Liner= CL B RIPRAP
FROM STA. 62+50 -Y10- TO STA. 63+00 -Y10- LT

DETAIL 53-3
TOE PROTECTION
(Not to Scale)
d=1.5 Ft.
b=2 Ft.
Type of Liner= CL B RIPRAP
FROM STA. 57+00 -Y10- TO STA. 58+00 -Y10- LT

DETAIL 53-4
SPECIAL CUT DITCH
(Not to Scale)
Min. D=1.5 Ft.
FROM STA. 63+00 -Y10- TO STA. 66+00 -Y10- LT

DETAIL 53-5
SPECIAL CUT BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
B=2 Ft.
FROM STA. 62+50 -Y10- TO STA. 67+00 -Y10- RT

CL 'B' RIPRAP
EST. 2 TONS
EST. 7 SY GF

LATERAL
2' BASE DITCH
SEE DETAIL 53-1

RECTANGULAR FOREBAY
CL I RIPRAP LINER
EST 35 TONS
EST 75 SY GFD
BOT EL=164.0'
BOT DIM=3.0'x18.0'
TOP DIM=15.0'x30.0'
SEE DETAIL 6

WEIR
EL=167.0'
WIDTH=5'

CL 'I' RIPRAP
EST. 11 TONS
EST. 22 SY GF

TOE PROTECTION
STA. 57+00 TO
58+00 -Y10- LT
EST. 34 TONS CL B RIPRAP
EST. 80 SY GEOTEXTILE
SEE DETAIL 53-3

DECK DRAIN DISSIPATOR PAD
EST. 7 TONS CL 'B' RIPRAP
EST. 20 SY GEOTEXTILE

CL 'B' RIPRAP
EST. 1 TONS
EST. 5 SY GF

CL I RIPRAP
EST. 4 TONS
EST. 12 SY GF

LATERAL 2'
BASE DITCH
w/CL B RIPRAP
EST. 23 TONS CL B RIPRAP
EST. 101 SY GEOTEXTILE
SEE DETAIL 53-2

SPECIAL CUT
'V' DITCH
SEE DETAIL 53-4

SPECIAL CUT
2' BASE DITCH
SEE DETAIL 53-5

WORK TRESTLE

SITE 29

-Y10B- POT Sta. 10+00.00 = -Y10- POC Sta. 55+95.01

PC Sta. 11+60.62

-Y10- BLACK BRIDGE ROAD

OLD PLANK ROAD -Y10B-

EDITH FITZGERALD

NELSON MONROE JACKSON

TONY HILL

ROBERT HILL

TERRY DENNIS HILL & WF

CAROLYN HILL WILLIAMS

LOUISE HILL

PAUL HILL

DENOTES EXCAVATION IN WETLAND

DENOTES HAND CLEARING

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

FOR -Y10- PROFILE SEE SHEETS 105 & 106
FOR -Y10B- PROFILE SEE SHEET 113

7/23/2018
U2519AA_hydr_prm_wet_psh_53.dgn
jhorvath

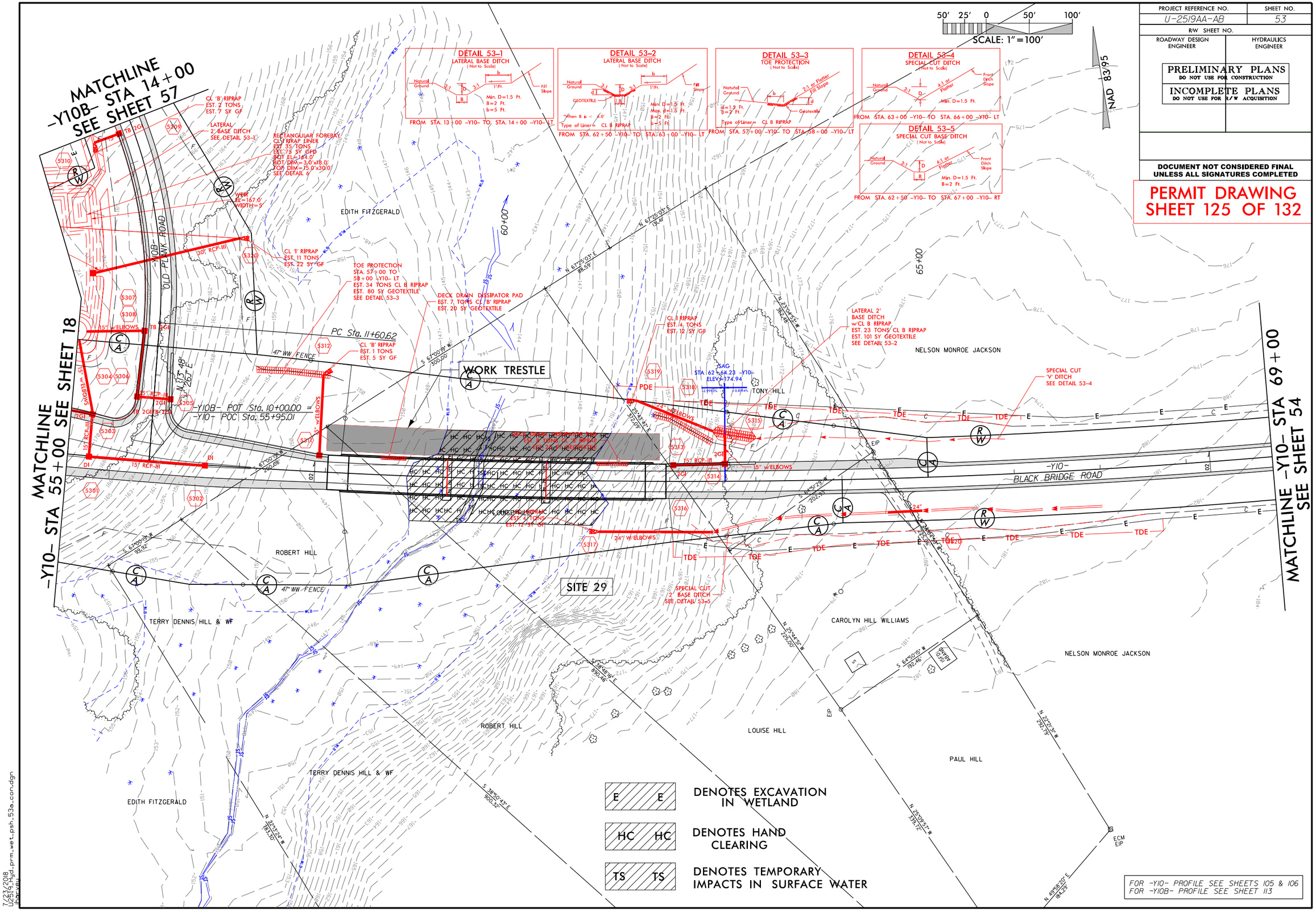
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	53
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 125 OF 132



7/23/2018
U2519AA_hyd_prm_wet_psh_53a_con.dgn
jhorvath

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	105
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

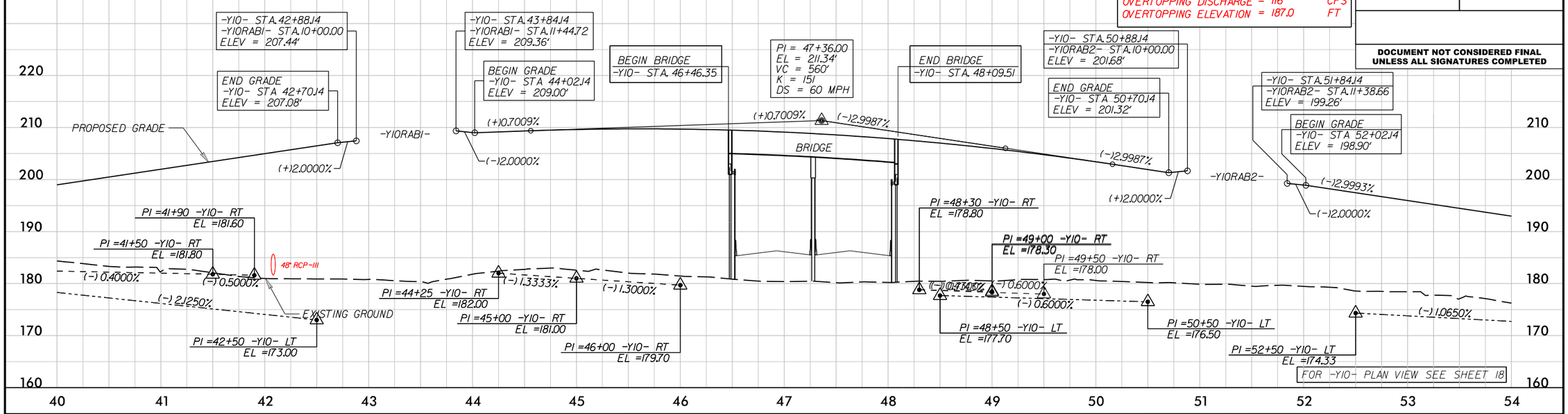
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y10-
SR 1115 (BLACK BRIDGE RD)

PERMIT DRAWING
SHEET 126 OF 132

PIPE HYDRAULIC DATA
48" RCP-III Sta. 42+08

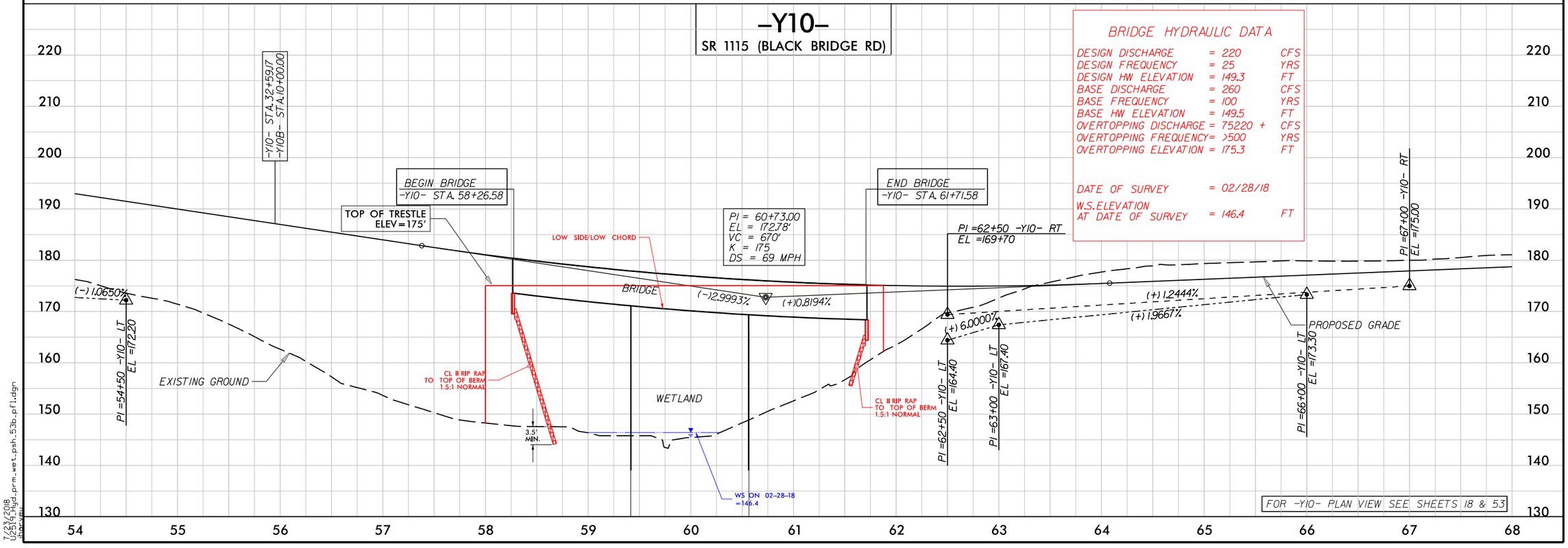
DRAINAGE AREA	= 33.4	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 65	CFS
DESIGN HW ELEVATION	= 185.4	FT
100 YEAR DISCHARGE	= 90	CFS
100 YEAR HW ELEVATION	= 185.8	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 116	CFS
OVERTOPPING ELEVATION	= 187.0	FT



-Y10-
SR 1115 (BLACK BRIDGE RD)

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 220	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 149.3	FT
BASE DISCHARGE	= 260	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 149.5	FT
OVERTOPPING DISCHARGE	= 75220 +	CFS
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING ELEVATION	= 175.3	FT
DATE OF SURVEY	= 02/28/18	
W.S.ELEVATION AT DATE OF SURVEY	= 146.4	FT



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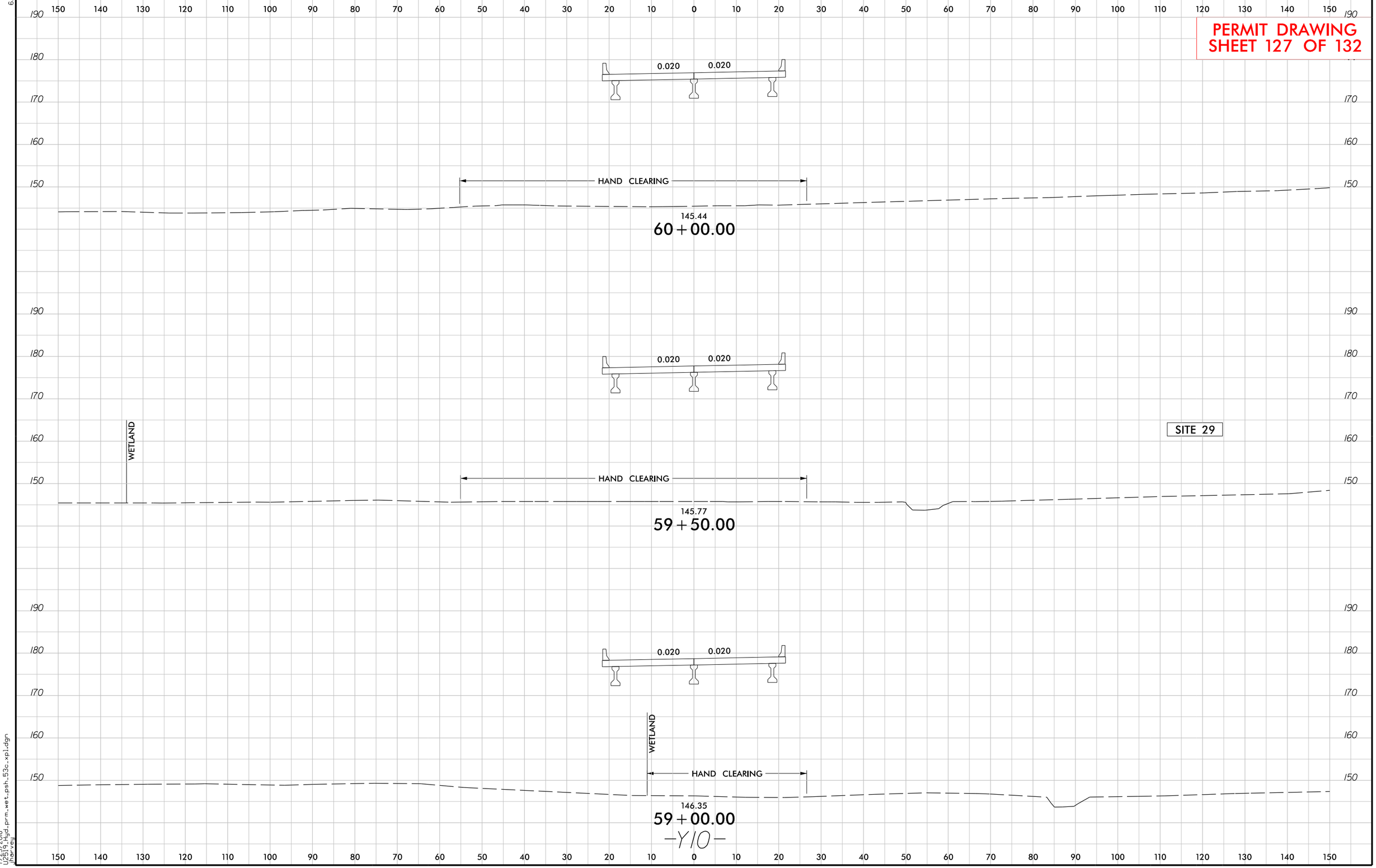
U2519_Hyd_prm_wet_psh_53b.pfl.dgn
jbarvan

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-2519AA-AB	X-564

PERMIT DRAWING
SHEET 127 OF 132



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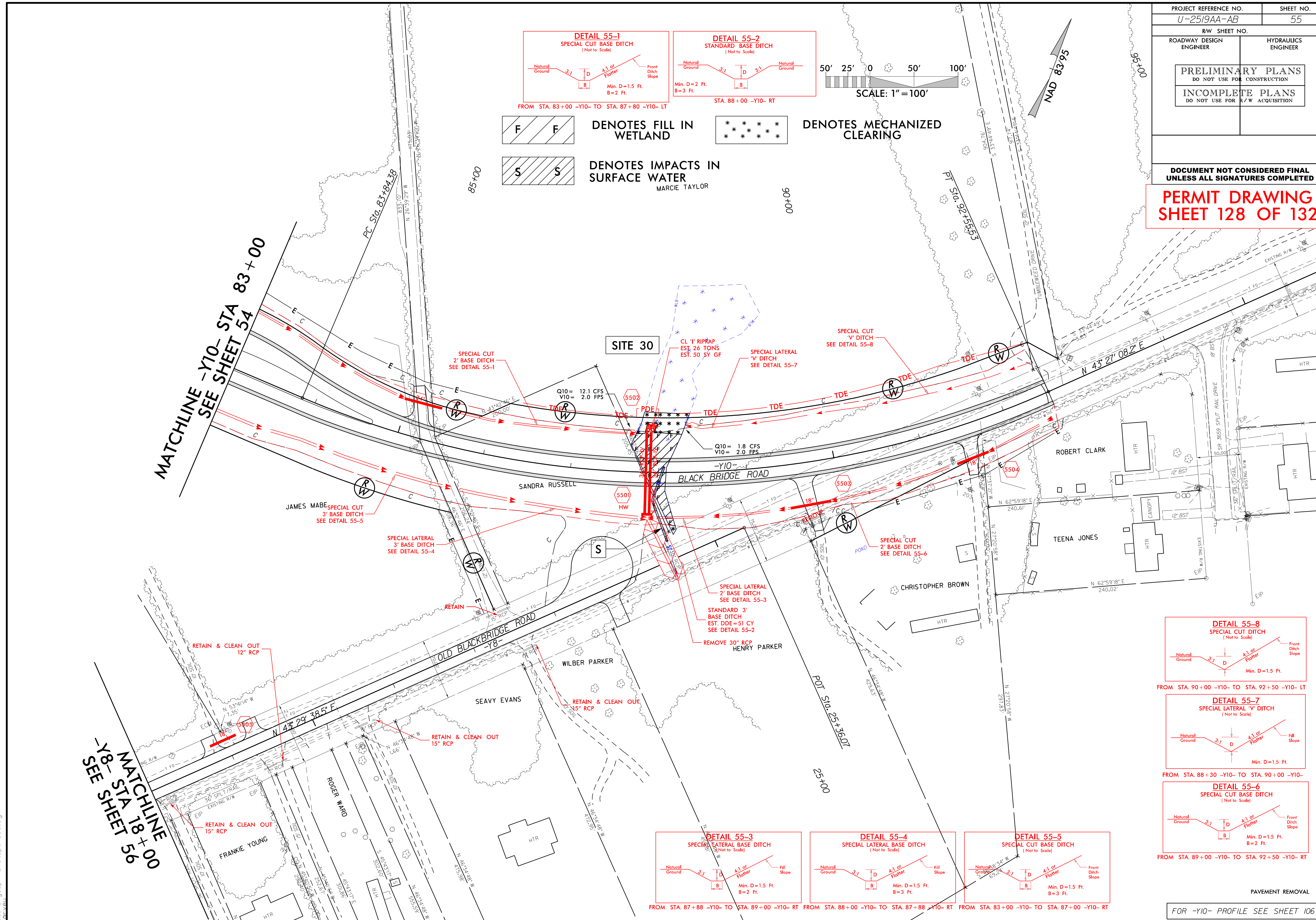
U2519AA_hydro_prm_wet_psh_53c_xp1.dgn
jhar-vey



7/23/2018
U2519_Hyd_prm_wet_psh_55.dgn
jharveu

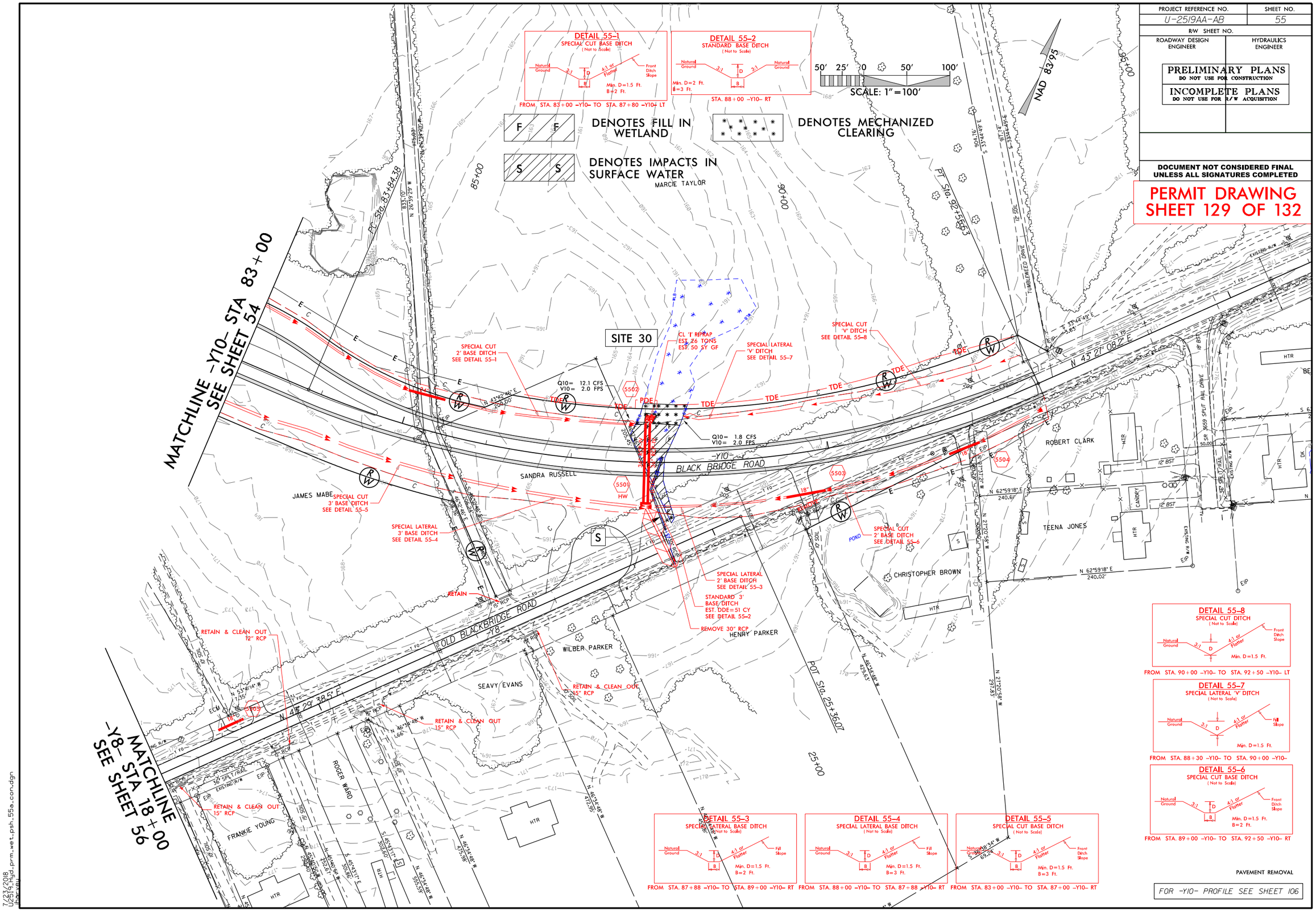
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	55
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 129 OF 132



PAVEMENT REMOVAL

FOR -Y10- PROFILE SEE SHEET 106

7/23/2018
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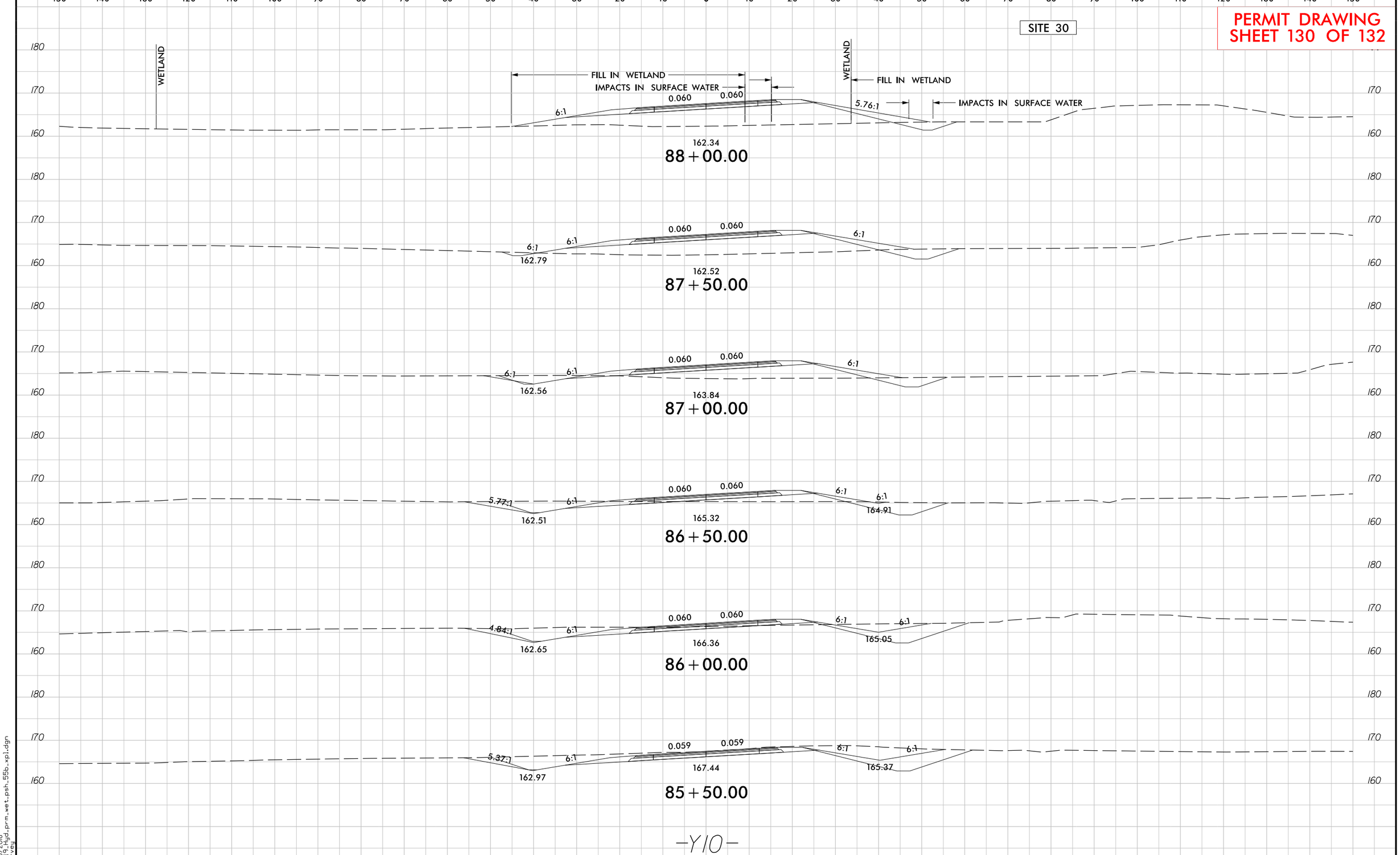
jbarvel

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-2519AA-AB	X-575

PERMIT DRAWING
SHEET 130 OF 132

SITE 30



-Y10-

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jharvey

WETLAND AND SURACE 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	-FLYBD- 20+10 to 23+24	ROADWAY FILL	0.57			0.04						
2	-Y4- 24+18 to 26+65	ROADWAY FILL	0.03			0.06						
3	-L- 30+88 to 31+69	54" RCP - IV	< 0.01				0.02	0.03	< 0.01	300	43	
4	-L- 36+56 to 37+03	36" RCP - III						< 0.01	< 0.01	78	35	
5	-L- 38+17 to 38+93	60" CMP PIPE REMOVAL					0.01		< 0.01		31	
6	-L- 37+55 to 44+55	ROADWAY FILL	2.20			0.28						
8	-L- 75+02 to 79+96	2 @ 8' x 7' RCBC	1.93		0.03	0.11	0.11	0.08	0.01	518	85	
		BANK STABILIZATION						< 0.01		35		
9	-L- 85+99 to 89+87	30" RCP - III						0.08	0.02	525	101	
10	-L- 97+22 to 99+80	ROADWAY FILL						0.05	0.01	445	110	
12	-L- 115+50 to 123+12	ROADWAY FILL						0.10	0.04	522	232	
13	-L- 123+72 to 123+74	ROADWAY FILL						0.06	< 0.01	736	19	
		BANK STABILIZATION						< 0.01		44		
14	-L- 168+35 to 173+74	72" RCP						0.11	< 0.01	515	42	
		BANK STABILIZATION						0.03		125		
15	-L- 248+32 to 248+51	DITCH RIP RAP	< 0.01				< 0.01	< 0.01		35		
		BRIDGE					0.05					
		WORKBRIDGE							0.01		30	
16	-L- 256+22 to 256+64 LT	ROADWAY FILL	0.06		0.01	0.01						
17	-L- 257+79 to 258+87	ROADWAY FILL	0.15			0.02						
18	-L- 261+09 to 262+60	8'x6' RCBC	0.50			0.09						
19	-L- 263+85 to 267+61	ROADWAY FILL	1.55		0.14	0.17						
20	-Y1- 31+39 to 31+80	ROADWAY FILL	0.06			0.03						
21	-Y1- 65+90 to 67+57	ROADWAY FILL	0.20			0.07						
TOTALS*:			7.27	0	0.18	0.89	0.20	0.51	0.12	3674	728	0

*Rounded totals are sum of actual impacts

NOTES:
Bank stabilization impacts not included in totals (Site 8, Site 13, Site 14)
Site 7: Eliminated; No Impacts
Site 11: Eliminated; No Impacts
Site 16: Wetlands will be total take of .0891 AC
Site 19: Wetlands in this area will add an additional area of .5189 AC (as noted on plans)

Revised 2018 Feb

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
08/07/2018
CUMBERLAND & ROBESON COUNTIES
U-2519AA & AB
34817.3.4

WETLAND AND SURACE 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)
22	-Y- 95+78 to 99+57	ROADWAY FILL	0.14				0.11					
23	-Y2- 15+90 to 19+16	2 @ 8' x 6' RCBC	0.15			0.13		0.01	< 0.01	49	6	
24	-Y4- 36+27 to 41+34	2 @ 9' X 6' RCBC	0.33	0.41			0.19	< 0.01	0.03	48	114	
		BANK STABILIZATION						0.03		79		
25	-Y5- 93+83 to 94+10	RCP					0.01					
26	-Y5- 88+85 to 89+44	ROADWAY FILL	0.01			0.02						
27	-Y7- 66+35 to 66+64	8' x 7' RCBC						0.02	0.02	90	87	
		BANK STABILIZATION						0.01		69		
28	-Y7- 84+38 to 87+88	2 @ 10' x 7'						0.07		416		
29	-Y10- 58+94 to 61+31	BRIDGE			0.02		0.34		0.02		83	
		WORKBRIDGE					0.11		< 0.01		31	
30	-Y10- 87+68 to 88+37	2@36" RCP	0.06			0.03		< 0.01		90		
TOTALS*:			0.69	0.41	0.02	0.18	0.76	0.12	0.08	693	321	0
PROJECT TOTALS*:			7.96	0.41	0.20	1.07	0.96	0.63	0.20	4367	1049	0

*Rounded totals are sum of actual impacts

NOTES:
Bank stabilization impacts not included in totals (Site 24, Site 27)

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
08/07/2018
CUMBERLAND & ROBESON COUNTIES
U-2519AA & AB
34817.3.4

Revised 2018 Feb

See Sheet 1A For Index of Sheets
See Sheet 1B For Standard Symbology Sheet

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2519AA&AB	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34817.3.4	NHP-1118(11)	P.E., ROW, UTILITIES & CONSTRUCTION

CUMBERLAND COUNTY /ROBESON COUNTY

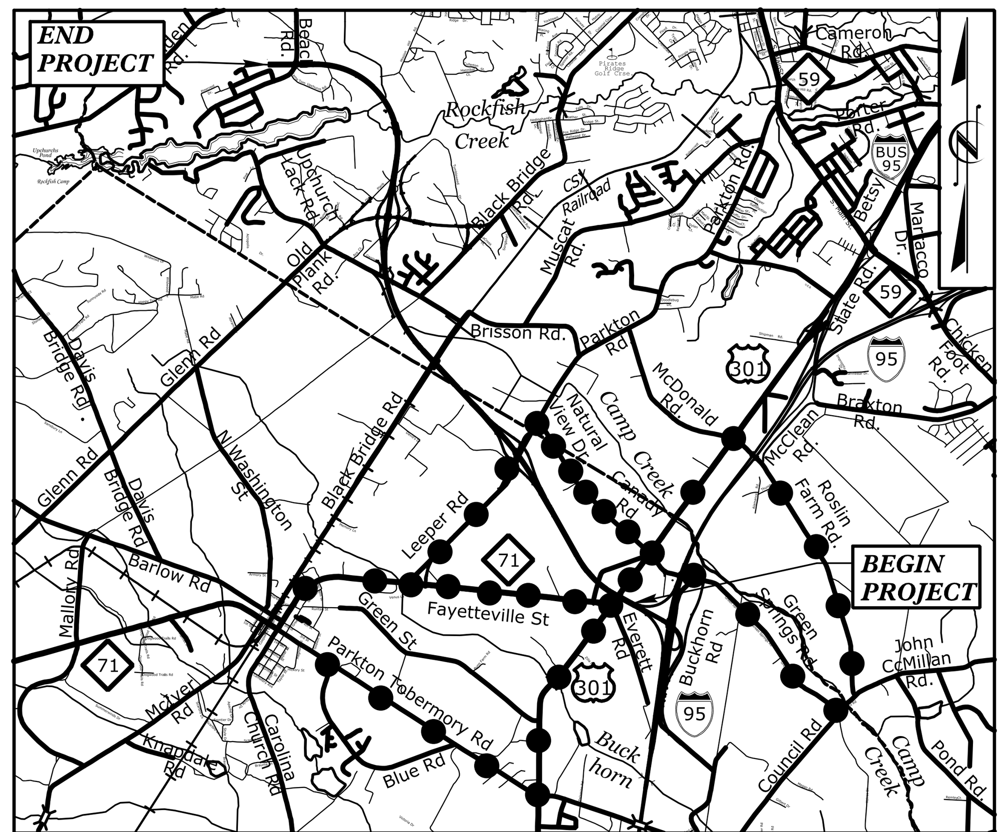
LOCATION: FUTURE I-295 - FAYETTEVILLE OUTER LOOP FROM I-95 IN ROBESON COUNTY TO SOUTH OF SR 1003 (CAMDEN ROAD) IN CUMBERLAND COUNTY

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING AND STRUCTURES

TIP PROJECT: U-2519AA&AB

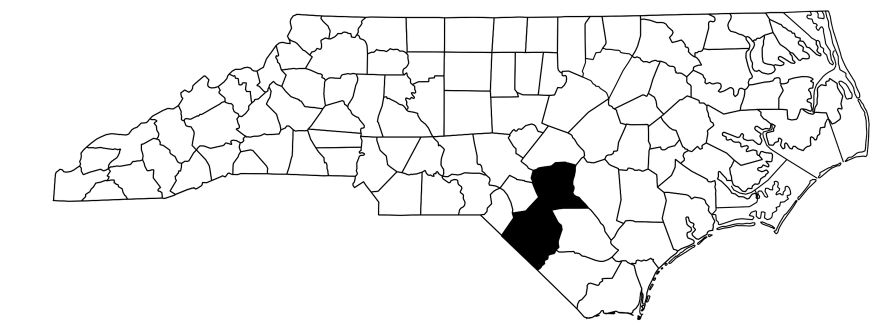
CONTRACT: C204043

RIGHT OF WAY PLANS



DETOUR ROUTE

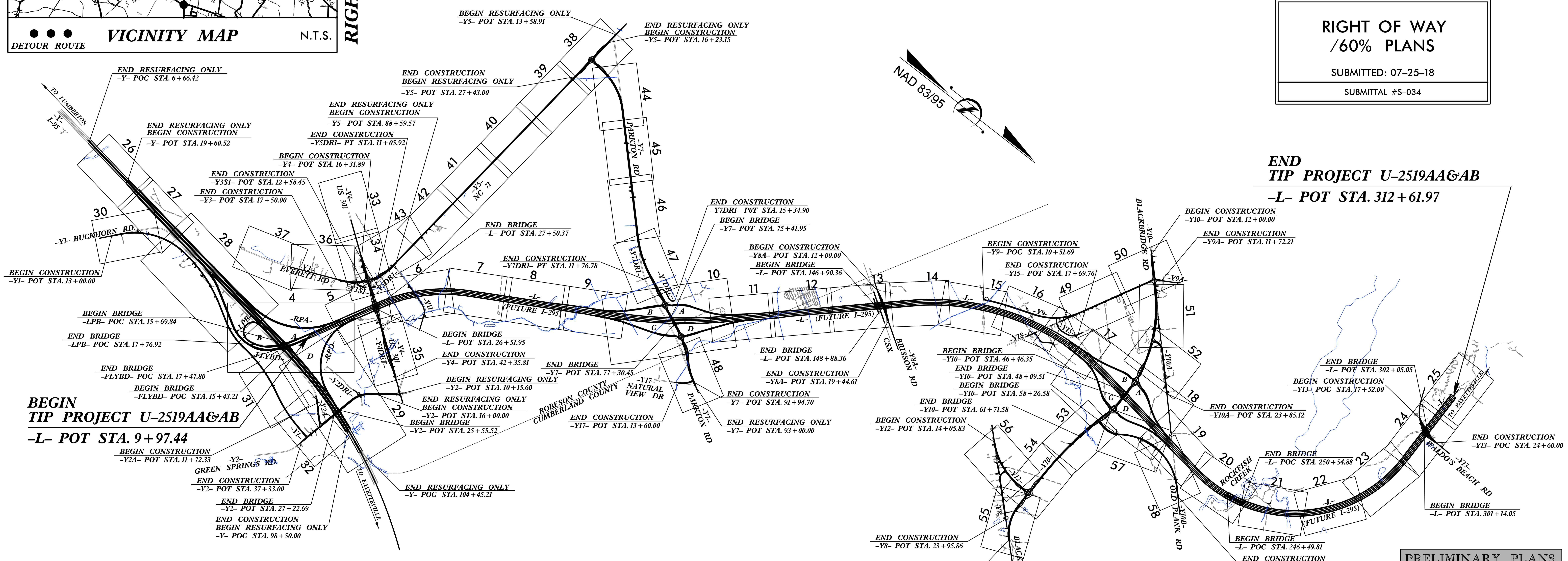
VICINITY MAP N.T.S.



RIGHT OF WAY /60% PLANS

SUBMITTED: 07-25-18

SUBMITTAL #S-034



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 25,000
ADT 2040 = 33,100
K = 8%
D = 55%
T = 12%*
V = 70 MPH
* (TTST = 4% + DUAL 8%)
FUNC. CLASSIFICATION = INTERSTATE STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2519AA & AB = 5.582 MILES
LENGTH STRUCTURE TIP PROJECT U-2519AA & AB = 0.150 MILES *
TOTAL LENGTH OF TIP PROJECT U-2519AA & AB = 5.732 MILES
* LENGTH BASED OFF NB BRIDGES

NCDOT CONTACT: K. ZAK HAMIDI, PE
PROJECT ENGINEER - DESIGN BUILD UNIT

PLANS PREPARED FOR THE NCDOT BY:
Balfour Beatty Infrastructure Inc. BRANCH CIVIL — A Joint Venture — in association with STV 100 Years

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: NOVEMBER 21, 2017

LETTING DATE: NOVEMBER 21, 2017

JOSEPH A. FREEMAN, PE
DESIGN PROJECT MANAGER

ETHAN P. WRIGHT, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

8/8/2018
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hydeja

INDEX OF SHEETS

1 ..... TITLE SHEET

1A ..... INDEX OF SHEETS

1B ..... CONVENTIONAL SYMBOLS

2A–1 THRU 2A–9 ..... TYPICAL SECTIONS

2B–1 THRU 2B–5 ..... SHEAR POINT DIAGRAMS

2B–6 ..... DETOUR DETAIL SHEET

2B–7 THRU 2B–9 ..... BRIDGE SKETCHES

3A THRU 3B ..... ALIGNMENT CURVE DATA

4 THRU 58 ..... PLAN SHEETS

59 THRU 117 ..... PROFILE SHEETS

X–0 THRU X–458 ..... CROSS SECTIONS

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	1A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL A Joint Venture in association with STV 100 Years

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

8/8/2018
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hudson

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	1B

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil
- Potential Contamination Area: Soil
- Known Contamination Area: Water
- Potential Contamination Area: Water
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- U/G Telephone Cable LOS B (S.U.E.*) — T
- U/G Telephone Cable LOS C (S.U.E.*) — T
- U/G Telephone Cable LOS D (S.U.E.*) — T
- U/G Telephone Conduit LOS B (S.U.E.*) — TC
- U/G Telephone Conduit LOS C (S.U.E.*) — TC
- U/G Telephone Conduit LOS D (S.U.E.*) — TC
- U/G Fiber Optics Cable LOS B (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS C (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS D (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line LOS B (S.U.E.*) — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole LOS A (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

8/8/2018
R:\Roadway\Proj\PSHU\2519AA-AB_rdy_psh01B.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2A-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL in association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PAVEMENT SCHEDULE

A1	6″ JOINTED CONCRETE PAVEMENT REINFORCED WITH WOVEN WIRE MESH
A2	7″ JOINTED CONCRETE TRUCK APRON REINFORCED WITH WIRE MESH
C1	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ.YD. IN EACH OF TWO LAYERS.
C2	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE TYPE S9.5D, AT AN AVERAGE RATE OF 168 LBS. PER SQ.YD. IN EACH OF TWO LAYERS.
C3	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ.YD. IN EACH OF TWO LAYERS.
C4	PROP. APPROX. 2.5″ ASPHALT CONCRETE SURFACE COURSE TYPE SF9.5A, AT AN AVERAGE RATE OF 125 LBS. PER SQ.YD. IN EACH OF TWO LAYERS.
C5	PROP. APPROX. 1.5″ ASPHALT CONCRETE SURFACE COURSE TYPE SF9.5A, AT AN AVERAGE RATE OF 100 LBS. PER SQ.YD.
C6	PROP. APPROX. 2.0″ ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ.YD.
C7	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1.5″ OR GREATER THAN 2″ IN DEPTH.
C8	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1.5″ OR GREATER THAN 2″ IN DEPTH.
C9	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1.5″ OR GREATER THAN 2″ IN DEPTH.
C10	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1″ OR GREATER THAN 1.5″ IN DEPTH.
C11	PROP. APPROX. 1.5″ ASPHALT CONCRETE SURFACE COURSE TYPE S9.5D, AT AN AVERAGE RATE OF 168 LBS. PER SQ.YD.
D1	PROP. APPROX. 2.5″ ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ.YD.
D2	PROP. APPROX. 3″ ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0D, AT AN AVERAGE RATE OF 342 LBS. PER SQ.YD.
D3	PROP. APPROX. 4″ ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ.YD.
D4	PROP. APPROX. 2.5″ ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ.YD.
D5	PROP. APPROX. 4″ ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ.YD.
D6	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2.5″ IN DEPTH OR GREATER THAN 4″ IN DEPTH.
D7	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2.5″ IN DEPTH OR GREATER THAN 4″ IN DEPTH.
D8	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0D, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2.5″ IN DEPTH OR GREATER THAN 4″ IN DEPTH.
E1	PROP. APPROX. 3″ ASPHALT CONCRETE BASE COURSE TYPE B25.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ.YD.
E2	PROP. APPROX. 12″ ASPHALT CONCRETE BASE COURSE TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ.YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3″ IN DEPTH OR GREATER THAN 5.5″ IN DEPTH.
J1	PROPOSED 8″ AGGREGATE BASE COURSE

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE.

PAVEMENT SCHEDULE

J2	PROPOSED 6″ AGGREGATE BASE COURSE
J3	PROPOSED VARIABLE DEPTH AGGREGATE BASE COURSE
M	MILLING (1.5″ TO 3.0″ IN DEPTH)
P	PRIME COAT AT A RATE OF 0.35 GAL PER SQ. YD.
R1	1′-6″ CURB & GUTTER
R2	2′-6″ CURB & GUTTER
R3	5″ MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R4	5″ MONOLITHIC CONCRETE ISLAND (KEYED-IN), RED COLORED AND STAMPED WITH A BRICK PATTERN
R5	SHOULDER BERM GUTTER
R6	REINFORCED SINGLE FACED CONCRETE BARRIER
S	4″ CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)
Y	PROPOSED RUMBLE STRIPS

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2A-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

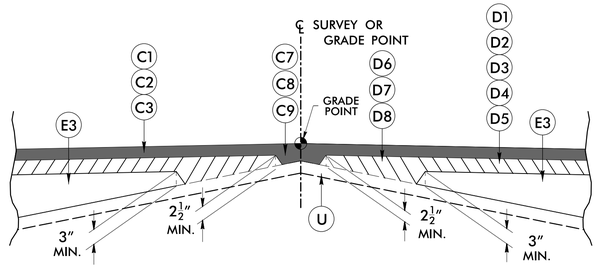
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL — A Joint Venture — in association with STV 100 Years

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

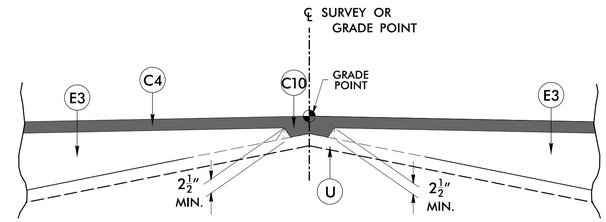
ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE.

PAVEMENT SCHEDULE	
A1	6" JOINTED CONCRETE PAVEMENT
A2	7" JOINTED CONCRETE TRUCK APRON
C1	3" SURFACE COURSE TYPE S9.5C
C2	3" SURFACE COURSE TYPE S9.5D
C3	3" SURFACE COURSE TYPE S9.5B
C4	2.5" SURFACE COURSE TYPE SF9.5A
C5	1.5" SURFACE COURSE TYPE SF9.5A
C6	2" SURFACE COURSE TYPE S9.5B
C7	VAR. S9.5C
C8	VAR. S9.5D
C9	VAR. S9.5B
C10	VAR. SF9.5A
C11	1.5" SURFACE COURSE TYPE S9.5D
D1	2.5" INTER. COURSE TYPE I19.0C
D2	3" INTER. COURSE TYPE I19.0D
D3	4" INTER. COURSE TYPE I19.0C
D4	2.5" INTER. COURSE TYPE I19.0B
D5	4" INTER. COURSE TYPE I19.0B
D6	VAR. DEPTH I19.0B
D7	VAR. DEPTH I19.0C
D8	VAR. DEPTH I19.0D
E1	3" BASE COURSE TYPE B25.0C
E2	12" BASE COURSE TYPE B25.0C
E3	VAR. B25.0C
J1	8" AGGREGATE BASE COURSE
J2	6" AGGREGATE BASE COURSE
J3	VAR. AGGREGATE BASE COURSE
M	MILLING
P	PRIME COAT
R1	1'-6" CURB & GUTTER
R2	2'-6" CURB & GUTTER
R3	5" MONO. ISLAND
R4	5" MONO. ISLAND (RED COLORED)
R5	SHOULDER BERM GUTTER
R6	SINGLE FACED CONCRETE BARRIER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING
Y	RUMBLE STRIPS



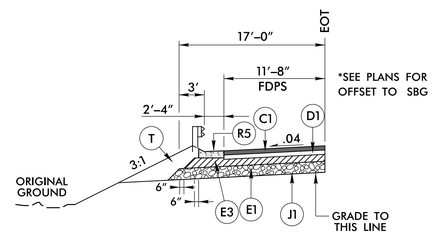
METHOD OF WEDGING DETAIL NO. 1

SEE PLANS FOR ALL WEDGING LOCATIONS



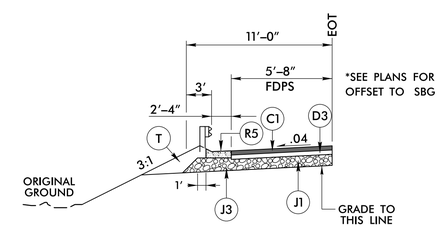
METHOD OF WEDGING DETAIL NO. 2

SEE PLANS FOR ALL WEDGING LOCATIONS
W/2 LAYERS



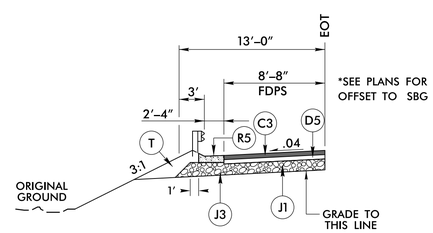
SHOULDER BERM GUTTER DETAIL NO. 3

SEE PLANS FOR LOCATION OF PROPOSED SHOULDER BERM GUTTER
USE WITH –L– TYPICAL SECTION



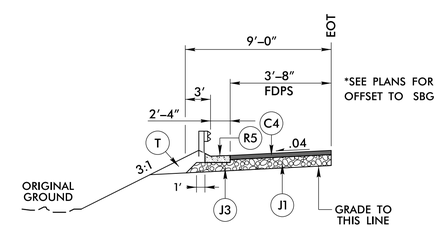
SHOULDER BERM GUTTER DETAIL NO. 4

SEE PLANS FOR LOCATION OF PROPOSED SHOULDER BERM GUTTER
USE WITH –Y7– TYPICAL SECTION



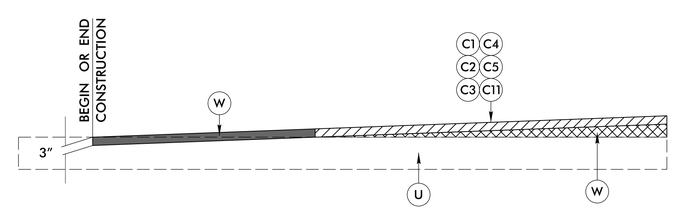
SHOULDER BERM GUTTER DETAIL NO. 5

SEE PLANS FOR LOCATION OF PROPOSED SHOULDER BERM GUTTER
USE WITH –Y10– TYPICAL SECTION



SHOULDER BERM GUTTER DETAIL NO. 6

SEE PLANS FOR LOCATION OF PROPOSED SHOULDER BERM GUTTER
USE WITH –Y2– TYPICAL SECTION



NOTE: MIRROR FOR END CONSTRUCTION

KEY–IN DETAIL NO. 7

TO BE USED AT ALL
TIE–IN LOCATIONS

NOTES: TYPICAL SECTIONS SHOWN FOR TANGENT SECTIONS ONLY, SEE PLANS AND STANDARD DRAWINGS FOR SUPERELEVATION DETAILS. SEE PLANS FOR LOCATIONS OF TURN LANES AND INTERSECTIONS / ROUNDABOUT.

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE.
*4:1 MAX SLOPE WITHIN ALL INTERCHANGE AREAS.
BEGIN STATIONS FOR RAMPS REFLECT GORE POINT ADJACENT TO MAINLINE PAVEMENT

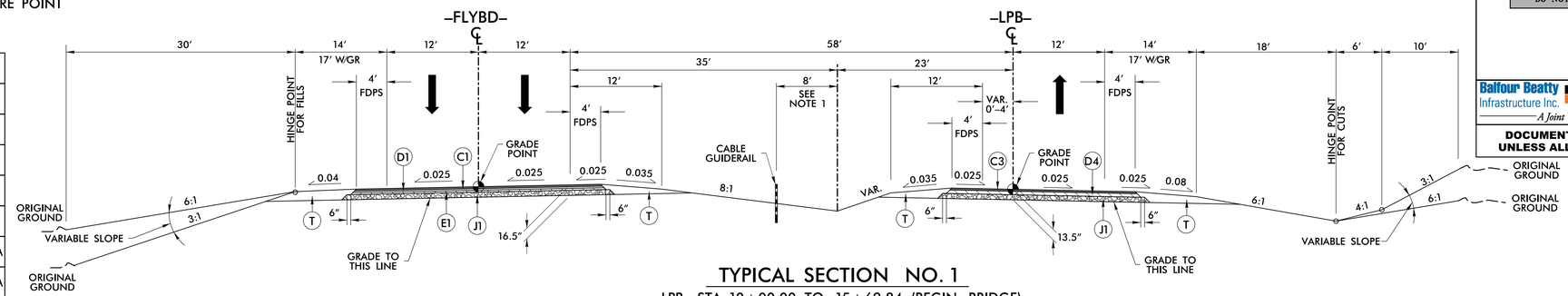
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2A-3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

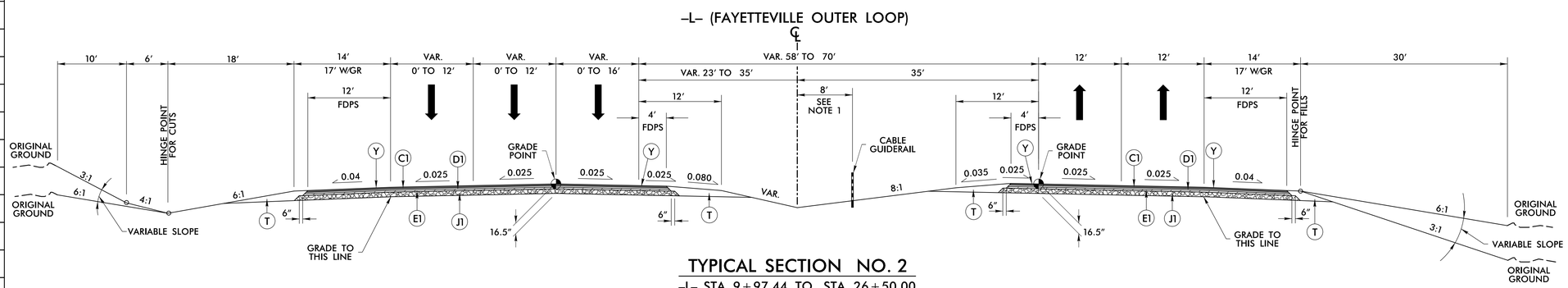
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PAVEMENT SCHEDULE	
A1	6" JOINTED CONCRETE PAVEMENT
A2	7" JOINTED CONCRETE TRUCK APRON
C1	3" SURFACE COURSE TYPE S9.5C
C2	3" SURFACE COURSE TYPE S9.5D
C3	3" SURFACE COURSE TYPE S9.5B
C4	2.5" SURFACE COURSE TYPE SF9.5A
C5	1.5" SURFACE COURSE TYPE SF9.5A
C6	2" SURFACE COURSE TYPE S9.5B
C7	VAR. S9.5C
C8	VAR. S9.5D
C9	VAR. S9.5B
C10	VAR. SF9.5A
C11	1.5" SURFACE COURSE TYPE S9.5D
D1	2.5" INTER. COURSE TYPE I19.0C
D2	3" INTER. COURSE TYPE I19.0D
D3	4" INTER. COURSE TYPE I19.0C
D4	2.5" INTER. COURSE TYPE I19.0B
D5	4" INTER. COURSE TYPE I19.0B
D6	VAR. DEPTH I19.0B
D7	VAR. DEPTH I19.0C
D8	VAR. DEPTH I19.0D
E1	3" BASE COURSE TYPE B25.0C
E2	12" BASE COURSE TYPE B25.0C
E3	VAR. B25.0C
J1	8" AGGREGATE BASE COURSE
J2	6" AGGREGATE BASE COURSE
J3	VAR. AGGREGATE BASE COURSE
M	MILLING
P	PRIME COAT
R1	1'-6" CURB & GUTTER
R2	2'-6" CURB & GUTTER
R3	5" MONO. ISLAND
R4	5" MONO. ISLAND (RED COLORED)
R5	SHOULDER BERM GUTTER
R6	SINGLE FACED CONCRETE BARRIER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING
Y	RUMBLE STRIPS



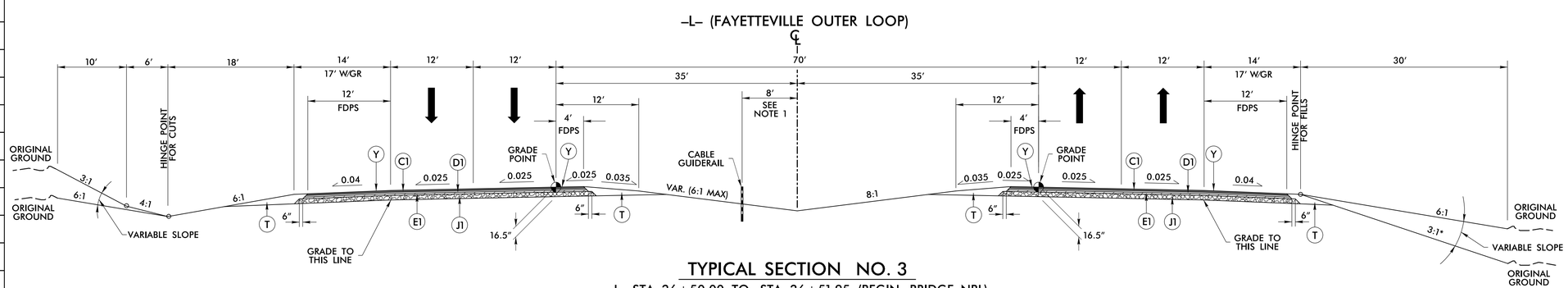
TYPICAL SECTION NO. 1

–LPB– STA. 10+00.00 TO 15+69.84 (BEGIN BRIDGE)
–LPB– STA. 17+76.92 (END BRIDGE) TO 24+34.73
–FLYBD– STA. 10+00.00 TO 15+43.21 (BEGIN BRIDGE)
–FLYBD– STA. 17+47.80 (END BRIDGE) TO 24+99.08
(NOTE 1: SEE PLANS FOR LOCATING CABLE GUIDERAIL LEFT OR RIGHT OF CENTERLINE)



TYPICAL SECTION NO. 2

–L– STA. 9+97.44 TO STA 26+50.00
(NOTE 1: SEE PLANS FOR LOCATING CABLE GUIDERAIL LEFT OR RIGHT OF CENTERLINE)



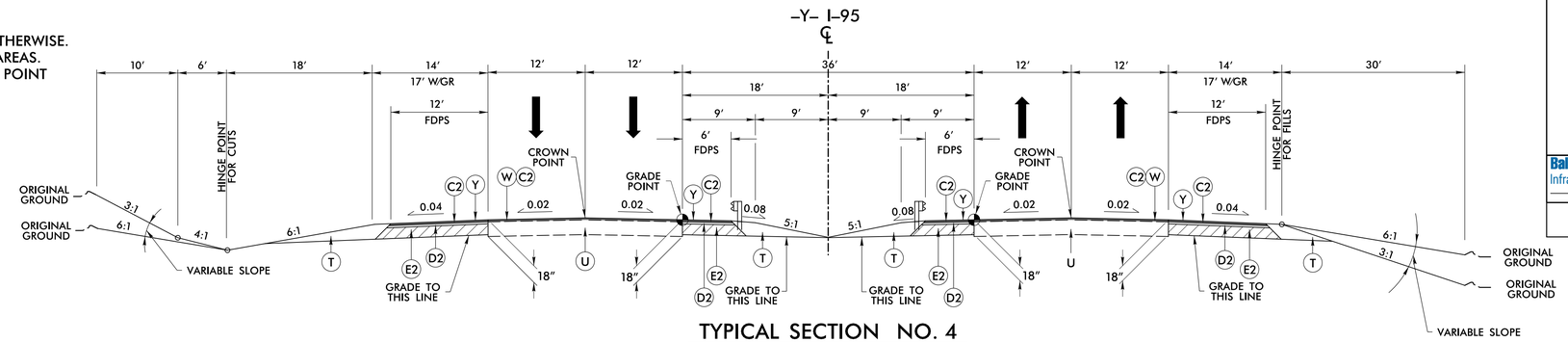
TYPICAL SECTION NO. 3

–L– STA. 26+50.00 TO STA 26+51.95 (BEGIN BRIDGE NBL)
–L– STA 27+50.37 (END BRIDGE NBL) TO STA 146+90.36 (BEGIN BRIDGE NBL)
–L– STA 148+88.36 (END BRIDGE NBL) TO STA 246+49.81 (BEGIN BRIDGE NBL)
–L– STA 250+54.88 (END BRIDGE NBL) TO STA 301+14.05 (BEGIN BRIDGE NBL)
–L– STA 302+05.05 (END BRIDGE NBL) TO STA 312+61.97
(NOTE 1: SEE PLANS FOR LOCATING CABLE GUIDERAIL LEFT OR RIGHT OF CENTERLINE)
* ROCK PLATED SLOPE PER NCDOT STD. 1802.01 (SEE PLANS FOR LOCATIONS)

NOTES: TYPICAL SECTIONS SHOWN FOR TANGENT SECTIONS ONLY, SEE PLANS AND STANDARD DRAWINGS FOR SUPERELEVATION DETAILS. SEE PLANS FOR LOCATIONS OF TURN LANES AND INTERSECTIONS / ROUNDABOUT.

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE.
*4:1 MAX SLOPE WITHIN ALL INTERCHANGE AREAS.
BEGIN STATIONS FOR RAMPS REFLECT GORE POINT ADJACENT TO MAINLINE PAVEMENT

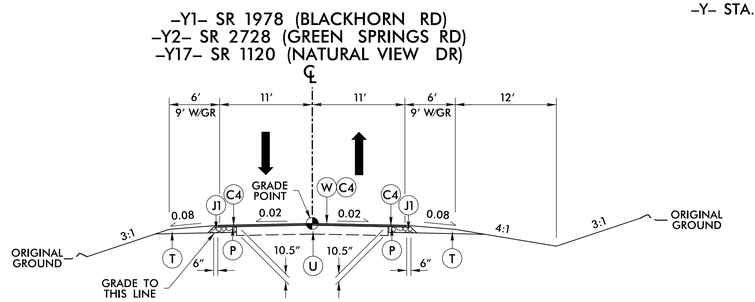
PAVEMENT SCHEDULE	
A1	6" JOINTED CONCRETE PAVEMENT
A2	7" JOINTED CONCRETE TRUCK APRON
C1	3" SURFACE COURSE TYPE S9.5C
C2	3" SURFACE COURSE TYPE S9.5D
C3	3" SURFACE COURSE TYPE S9.5B
C4	2.5" SURFACE COURSE TYPE SF9.5A
C5	1.5" SURFACE COURSE TYPE SF9.5A
C6	2" SURFACE COURSE TYPE S9.5B
C7	VAR. S9.5C
C8	VAR. S9.5D
C9	VAR. S9.5B
C10	VAR. SF9.5A
C11	1.5" SURFACE COURSE TYPE S9.5D
D1	2.5" INTER. COURSE TYPE I19.0C
D2	3" INTER. COURSE TYPE I19.0D
D3	4" INTER. COURSE TYPE I19.0C
D4	2.5" INTER. COURSE TYPE I19.0B
D5	4" INTER. COURSE TYPE I19.0B
D6	VAR. DEPTH I19.0B
D7	VAR. DEPTH I19.0C
D8	VAR. DEPTH I19.0D
E1	3" BASE COURSE TYPE B25.0C
E2	12" BASE COURSE TYPE B25.0C
E3	VAR. B25.0C
J1	8" AGGREGATE BASE COURSE
J2	6" AGGREGATE BASE COURSE
J3	VAR. AGGREGATE BASE COURSE
M	MILLING
P	PRIME COAT
R1	1'-6" CURB & GUTTER
R2	2'-6" CURB & GUTTER
R3	5" MONO. ISLAND
R4	5" MONO. ISLAND (RED COLORED)
R5	SHOULDER BERM GUTTER
R6	SINGLE FACED CONCRETE BARRIER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING
Y	RUMBLE STRIPS



TYPICAL SECTION NO. 4

-Y- STA. 19+60.52 TO 98+50.00

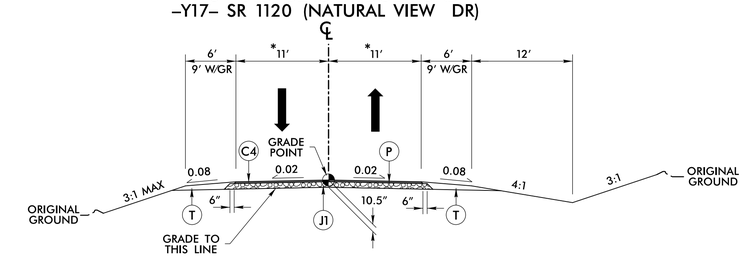
NOTE: RESURFACING ONLY WITH C11 TO CORRECT PAVEMENT MARKING OBLITERATIONS
-Y- STA. 6+66.42 TO 19+60.53
-Y- STA. 98+50.00 TO 104+45.21



TYPICAL SECTION NO. 5

-Y1- STA. 13+00.00 TO 17+84.20
-Y2- STA. 16+00.00 TO 16+50.00
-Y2- STA. 35+50.00 TO 36+40.00
-Y17- STA. 11+90.00 TO 13+60.00

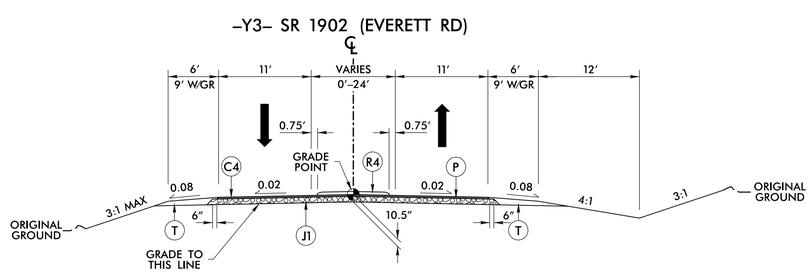
NOTE: RESURFACING ONLY
-Y2- STA. 11+05.00 TO 16+00.00
-Y2- STA. 36+40.00 TO 37+33.00



TYPICAL SECTION NO. 6

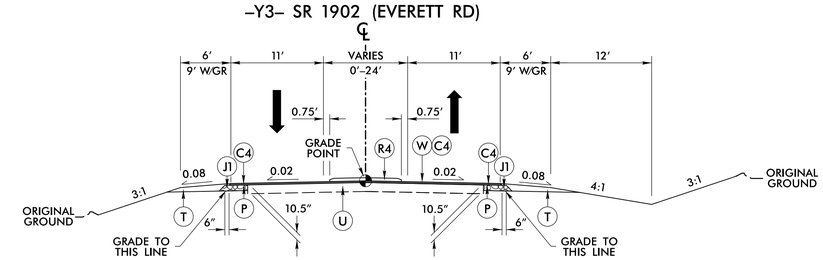
-Y1- STA. 17+84.20 TO 84+36.48
-Y2- STA. 16+50.00 TO 25+55.52 (BEGIN BRIDGE)
-Y2- STA. 27+22.69 (END BRIDGE) TO 35+50.00
-Y8- STA. 10+12.00 TO 13+88.00
-Y17- STA. 10+12.00 TO 11+90.00

* NOTE: 10.5' ON Y8



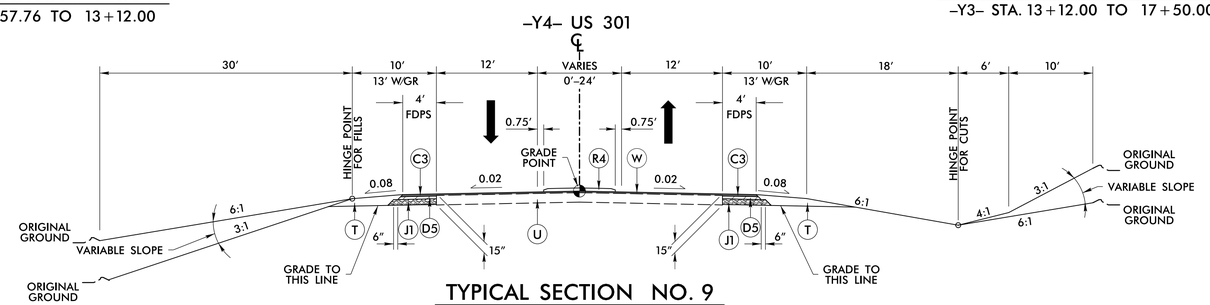
TYPICAL SECTION NO. 7

-Y3- STA. 11+57.76 TO 13+12.00



TYPICAL SECTION NO. 8

-Y3- STA. 13+12.00 TO 17+50.00



TYPICAL SECTION NO. 9

-Y4- STA. 16+31.89 TO 42+35.81
RESURFACING ONLY : STA. 42+35.81 TO 45+78.45

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2A-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL in association with STV 100 Years
A Joint Venture

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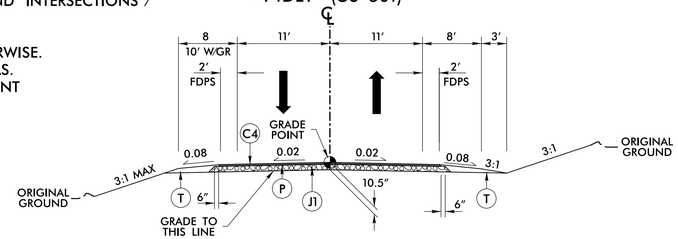
NOTES: TYPICAL SECTIONS SHOWN FOR TANGENT SECTIONS ONLY, SEE PLANS AND STANDARD DRAWINGS FOR SUPERELEVATION DETAILS. SEE PLANS FOR LOCATIONS OF TURN LANES AND INTERSECTIONS / ROUNDABOUT.

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE.
*4:1 MAX SLOPE WITHIN ALL INTERCHANGE AREAS.
BEGIN STATIONS FOR RAMPS REFLECT GORE POINT ADJACENT TO MAINLINE PAVEMENT

PAVEMENT SCHEDULE	
A1	6″ JOINTED CONCRETE PAVEMENT
A2	7″ JOINTED CONCRETE TRUCK APRON
C1	3″ SURFACE COURSE TYPE S9.5C
C2	3″ SURFACE COURSE TYPE S9.5D
C3	3″ SURFACE COURSE TYPE S9.5B
C4	2.5″ SURFACE COURSE TYPE SF9.5A
C5	1.5″ SURFACE COURSE TYPE SF9.5A
C6	2″ SURFACE COURSE TYPE S9.5B
C7	VAR. S9.5C
C8	VAR. S9.5D
C9	VAR. S9.5B
C10	VAR. SF9.5A
C11	1.5″ SURFACE COURSE TYPE S9.5D
D1	2.5″ INTER. COURSE TYPE I19.0C
D2	3″ INTER. COURSE TYPE I19.0D
D3	4″ INTER. COURSE TYPE I19.0C
D4	2.5″ INTER. COURSE TYPE I19.0B
D5	4″ INTER. COURSE TYPE I19.0B
D6	VAR. DEPTH I19.0B
D7	VAR. DEPTH I19.0C
D8	VAR. DEPTH I19.0D
E1	3″ BASE COURSE TYPE B25.0C
E2	12″ BASE COURSE TYPE B25.0C
E3	VAR. B25.0C
J1	8″ AGGREGATE BASE COURSE
J2	6″ AGGREGATE BASE COURSE
J3	VAR. AGGREGATE BASE COURSE
M	MILLING
P	PRIME COAT
R1	1′-6″ CURB & GUTTER
R2	2′-6″ CURB & GUTTER
R3	5″ MONO. ISLAND
R4	5″ MONO. ISLAND (RED COLORED)
R5	SHOULDER BERM GUTTER
R6	SINGLE FACED CONCRETE BARRIER
S	4″ CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING
Y	RUMBLE STRIPS

–Y4DET– (US 301)

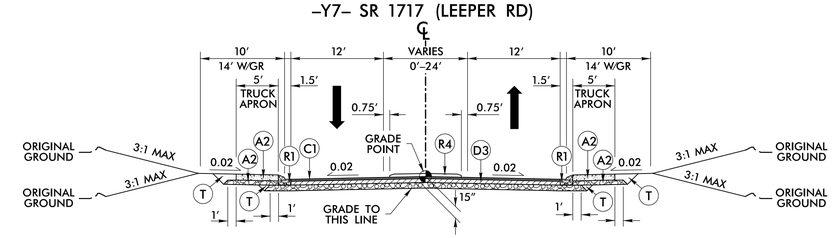


TYPICAL SECTION NO. 9A

–Y4DET– STA. 12+63.45 TO 21+87.47

PAVEMENT DESIGN FOR Y4DET WILL BE VERIFIED IN FUTURE SUBMITTAL

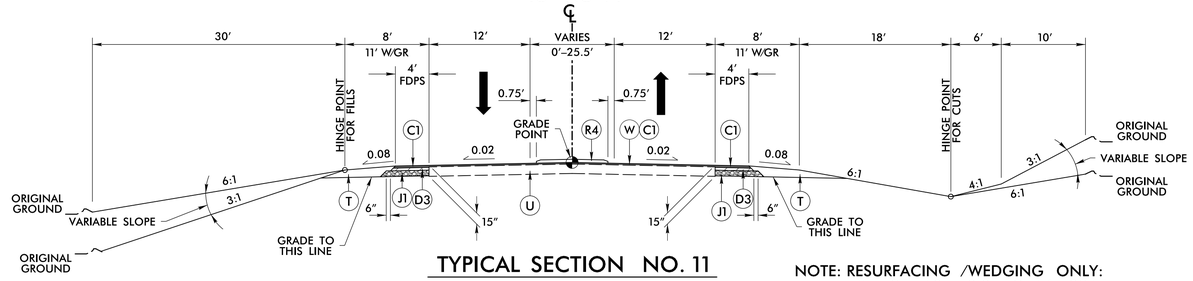
–Y5– NC 71
–Y7– SR 1717 (LEEPER RD)



TYPICAL SECTION NO. 10

–Y5– STA. 94+96.56 TO 95+97.03
–Y7– STA. 10+66.00 TO 11+43.08
–Y7– STA. 70+64.70 TO 71+65.06
–Y7– STA. 72+98.05 TO 73+79.93
–Y7– STA. 79+12.99 TO 79+94.78
–Y7– STA. 81+27.14 TO 82+17.94

–Y5– NC 71

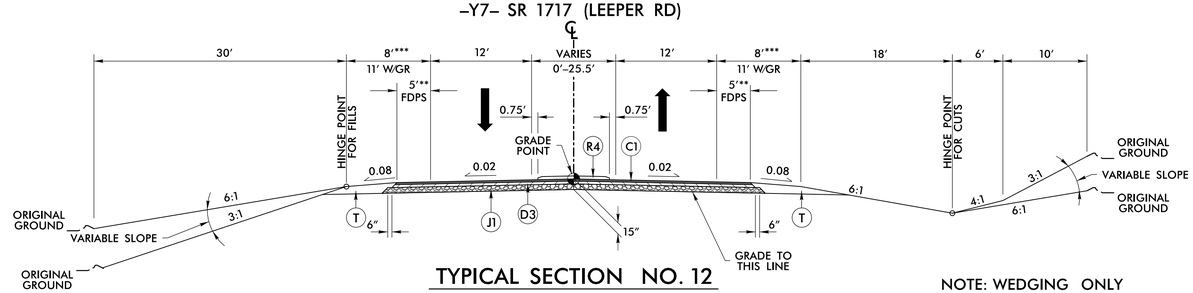


TYPICAL SECTION NO. 11

–Y5– STA. 16+23.15 TO 27+43.00
–Y5– STA. 88+59.87 TO 91+40.00

NOTE: RESURFACING /WEDGING ONLY:
–Y5– STA. 13+58.91 TO 16+23.15

–Y5– NC 71
–Y7– SR 1717 (LEEPER RD)

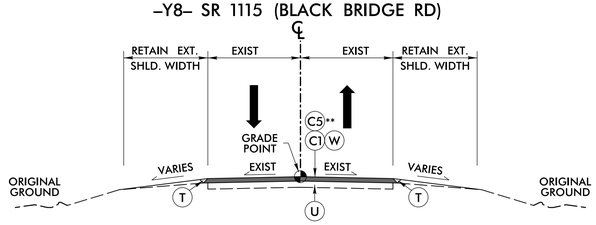


TYPICAL SECTION NO. 12

–Y5– STA. 91+40.00 TO 94+96.56
–Y7– STA. 11+43.08 TO 70+64.70
–Y7– STA. 73+79.93 TO 75+41.95 (BEGIN BRIDGE)
–Y7– STA. 77+30.45 (END BRIDGE) TO 79+12.99
–Y7– STA. 82+17.94 TO 91+94.70

NOTE: WEDGING ONLY
–Y7– STA. 91+94.70 TO 93+00.00
** NOTE: 4′ FDPS ON –Y5–
*** NOTE: 10′ (13′ W/GR) SHOULDER ON –Y5–

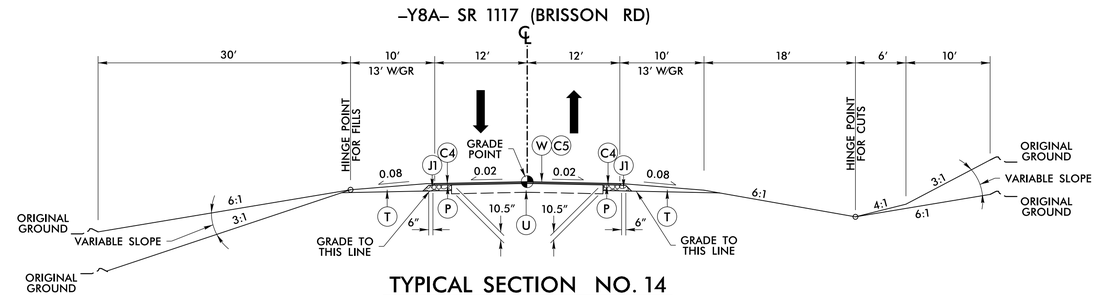
–Y2A–
–Y5– (NC 71)
–Y8– SR 1115 (BLACK BRIDGE RD)



TYPICAL SECTION NO. 13

–Y2A– STA. 10+00.00 TO 11+72.33
–Y5– STA. 27+43.00 TO 88+59.57
–Y8– STA. 13+88.00 TO 23+95.86
** NOTE: USE C5 FOR –Y8– WITH OVERLAY ONLY (NO GRADE)

–Y8A– SR 1117 (BRISSON RD)



TYPICAL SECTION NO. 14

–Y8A– STA. 12+00.00 TO 19+44.61

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2A-5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL — A Joint Venture — In association with STV 100 Years

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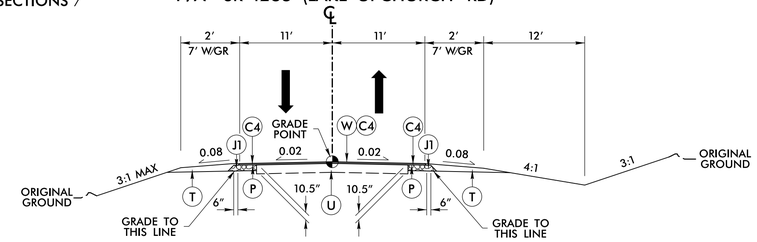
ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE.
*4:1 MAX SLOPE WITHIN ALL INTERCHANGE AREAS.
BEGIN STATIONS FOR RAMPS REFLECT GORE POINT ADJACENT TO MAINLINE PAVEMENT

PAVEMENT SCHEDULE	
A1	6″ JOINTED CONCRETE PAVEMENT
A2	7″ JOINTED CONCRETE TRUCK APRON
C1	3″ SURFACE COURSE TYPE S9.5C
C2	3″ SURFACE COURSE TYPE S9.5D
C3	3″ SURFACE COURSE TYPE S9.5B
C4	2.5″ SURFACE COURSE TYPE SF9.5A
C5	1.5″ SURFACE COURSE TYPE SF9.5A
C6	2″ SURFACE COURSE TYPE S9.5B
C7	VAR. S9.5C
C8	VAR. S9.5D
C9	VAR. S9.5B
C10	VAR. SF9.5A
C11	1.5″ SURFACE COURSE TYPE S9.5D
D1	2.5″ INTER. COURSE TYPE I19.0C
D2	3″ INTER. COURSE TYPE I19.0D
D3	4″ INTER. COURSE TYPE I19.0C
D4	2.5″ INTER. COURSE TYPE I19.0B
D5	4″ INTER. COURSE TYPE I19.0B
D6	VAR. DEPTH I19.0B
D7	VAR. DEPTH I19.0C
D8	VAR. DEPTH I19.0D
E1	3″ BASE COURSE TYPE B25.0C
E2	12″ BASE COURSE TYPE B25.0C
E3	VAR. B25.0C
J1	8″ AGGREGATE BASE COURSE
J2	6″ AGGREGATE BASE COURSE
J3	VAR. AGGREGATE BASE COURSE
M	MILLING
P	PRIME COAT
R1	1′-6″ CURB & GUTTER
R2	2′-6″ CURB & GUTTER
R3	5″ MONO. ISLAND
R4	5″ MONO. ISLAND (RED COLORED)
R5	SHOULDER BERM GUTTER
R6	SINGLE FACED CONCRETE BARRIER
S	4″ CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING
Y	RUMBLE STRIPS

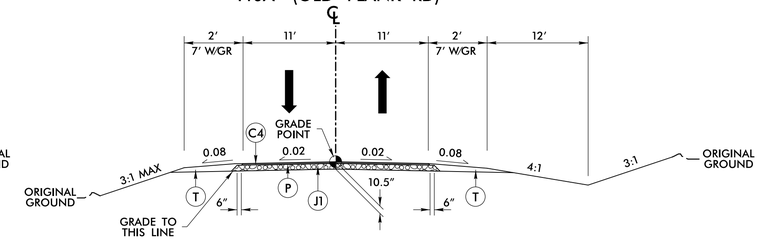
–Y9– SR 1288 (LAKE UPCHURCH RD)
–Y9A– SR 1288 (LAKE UPCHURCH RD)



TYPICAL SECTION NO. 15

–Y9– STA. 31+68.29 TO 53+21.71
–Y9A– STA. 10+18.57 TO 11+72.21

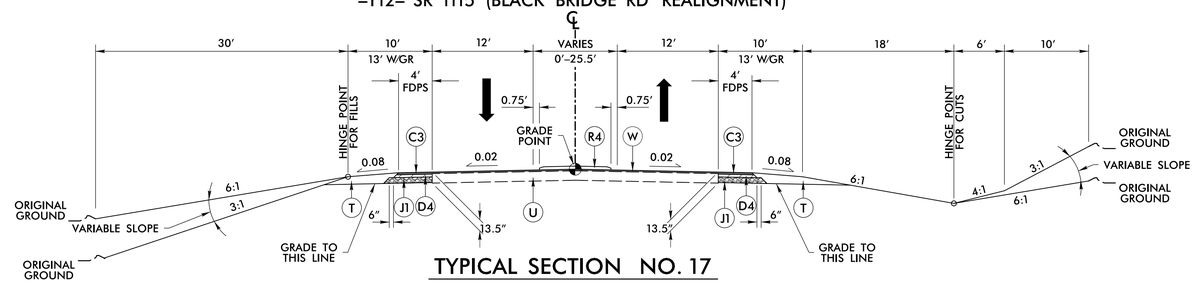
–Y9– SR 1288 (LAKE UPCHURCH RD)
–Y10A– (OLD PLANK RD)



TYPICAL SECTION NO. 16

–Y9– STA. 10+51.69 TO 31+68.29
–Y10A– STA. 10+18.00 TO 23+85.12

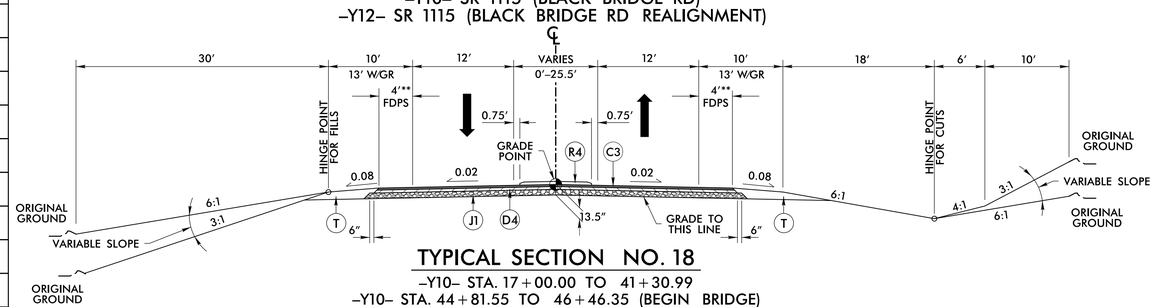
–Y10– SR 1115 (BLACK BRIDGE RD)
–Y12– SR 1115 (BLACK BRIDGE RD REALIGNMENT)



TYPICAL SECTION NO. 17

–Y10– STA. 12+00.00 TO 17+00.00
–Y10– STA. 91+00.00 TO 92+55.53
–Y12– STA. 14+05.83 TO 15+90.00

–Y10– SR 1115 (BLACK BRIDGE RD)
–Y12– SR 1115 (BLACK BRIDGE RD REALIGNMENT)

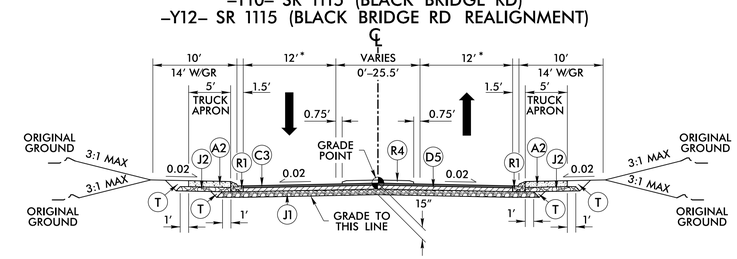


TYPICAL SECTION NO. 18

–Y10– STA. 17+00.00 TO 41+30.99
–Y10– STA. 44+81.55 TO 46+46.35 (BEGIN BRIDGE)
–Y10– STA. 48+09.51 (END BRIDGE) TO 49+90.52
–Y10– STA. 53+43.48 TO 58+26.58 (BEGIN BRIDGE)
–Y10– STA. 61+71.58 (END BRIDGE) TO 78+20.23
–Y10– STA. 81+86.49 TO 91+00.00
–Y12– STA. 15+90.00 TO 27+45.64

** NOTE: 2′ FDPS ON –Y12– (WITHOUT MEDIANS)

–Y3– SR 1902 (EVERETT RD)
–Y10– SR 1115 (BLACK BRIDGE RD)
–Y12– SR 1115 (BLACK BRIDGE RD REALIGNMENT)

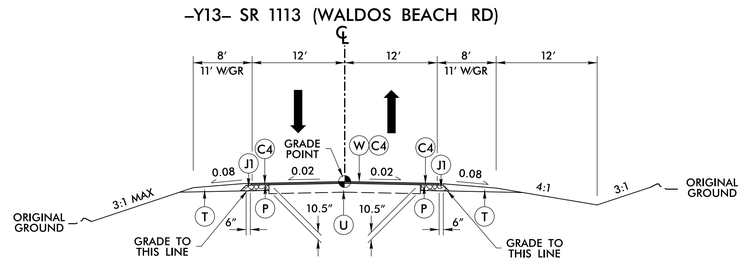


TYPICAL SECTION NO. 19

–Y3– STA. 10+67.14 TO 11+57.76
–Y10– STA. 41+30.99 TO 44+81.55
–Y10– STA. 49+90.52 TO 53+43.48
–Y10– STA. 78+20.23 TO 81+86.49
–Y12– STA. 27+45.64 TO 28+40.53

* NOTE: 11′ ON SR 1902 (EVERETT RD)

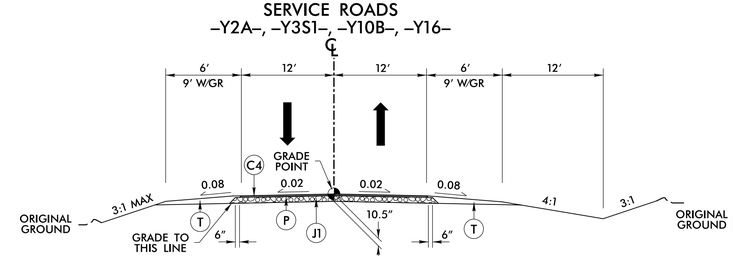
–Y13– SR 1113 (WALDOS BEACH RD)



TYPICAL SECTION NO. 20

–Y13– STA. 17+52.00 TO 24+60.00

SERVICE ROADS
–Y2A–, –Y3S1–, –Y10B–, –Y16–



TYPICAL SECTION NO. 21

–Y2A– STA. 11+72.33 TO 14+57.77
–Y3S1– STA. 10+29.45 TO 12+58.45
–Y10B– STA. 10+17.77 TO 38+63.40
–Y16– STA. 10+12.12 TO 13+18.17

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2A-6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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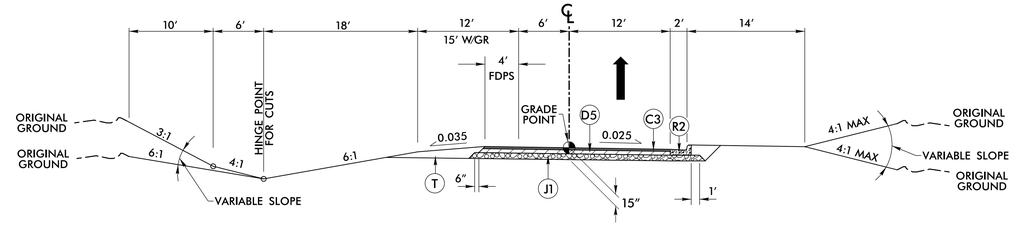
BEGIN STATIONS FOR RAMPS REFLECT GORE POINT ADJACENT TO MAINLINE PAVEMENT

PAVEMENT SCHEDULE	
A1	6″ JOINTED CONCRETE PAVEMENT
A2	7″ JOINTED CONCRETE TRUCK APRON
C1	3″ SURFACE COURSE TYPE S9.5C
C2	3″ SURFACE COURSE TYPE S9.5D
C3	3″ SURFACE COURSE TYPE S9.5B
C4	2.5″ SURFACE COURSE TYPE SF9.5A
C5	1.5″ SURFACE COURSE TYPE SF9.5A
C6	2″ SURFACE COURSE TYPE S9.5B
C7	VAR. S9.5C
C8	VAR. S9.5D
C9	VAR. S9.5B
C10	VAR. SF9.5A
C11	1.5″ SURFACE COURSE TYPE S9.5D
D1	2.5″ INTER. COURSE TYPE I19.0C
D2	3″ INTER. COURSE TYPE I19.0D
D3	4″ INTER. COURSE TYPE I19.0C
D4	2.5″ INTER. COURSE TYPE I19.0B
D5	4″ INTER. COURSE TYPE I19.0B
D6	VAR. DEPTH I19.0B
D7	VAR. DEPTH I19.0C
D8	VAR. DEPTH I19.0D
E1	3″ BASE COURSE TYPE B25.0C
E2	12″ BASE COURSE TYPE B25.0C
E3	VAR. B25.0C
J1	8″ AGGREGATE BASE COURSE
J2	6″ AGGREGATE BASE COURSE
J3	VAR. AGGREGATE BASE COURSE
M	MILLING
P	PRIME COAT
R1	1′-6″ CURB & GUTTER
R2	2′-6″ CURB & GUTTER
R3	5″ MONO. ISLAND
R4	5″ MONO. ISLAND (RED COLORED)
R5	SHOULDER BERM GUTTER
R6	SINGLE FACED CONCRETE BARRIER
S	4″ CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING
Y	RUMBLE STRIPS

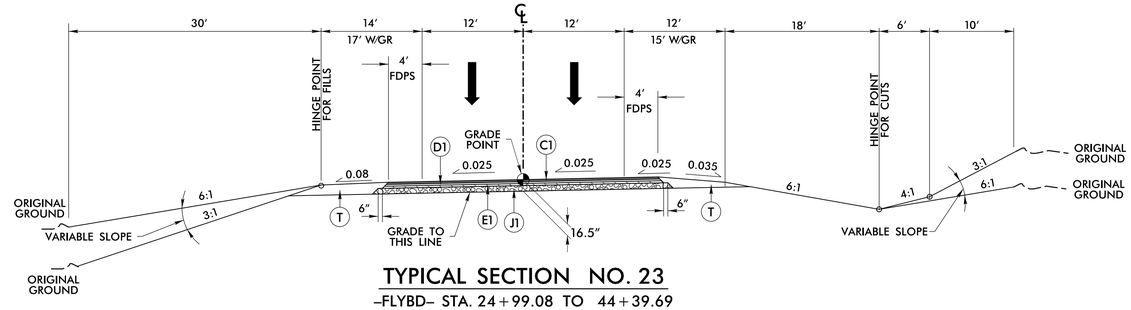
–LPB–



TYPICAL SECTION NO. 22

–LPB– STA. 24+34.73 TO 32+47.93

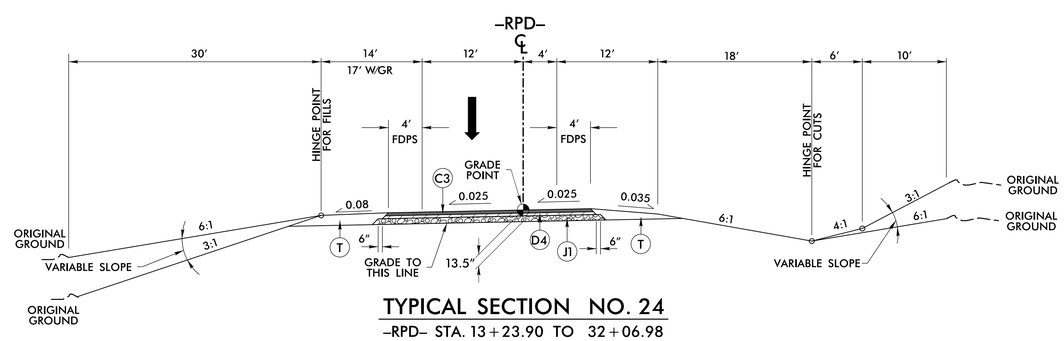
–FLYBD–



TYPICAL SECTION NO. 23

–FLYBD– STA. 24+99.08 TO 44+39.69

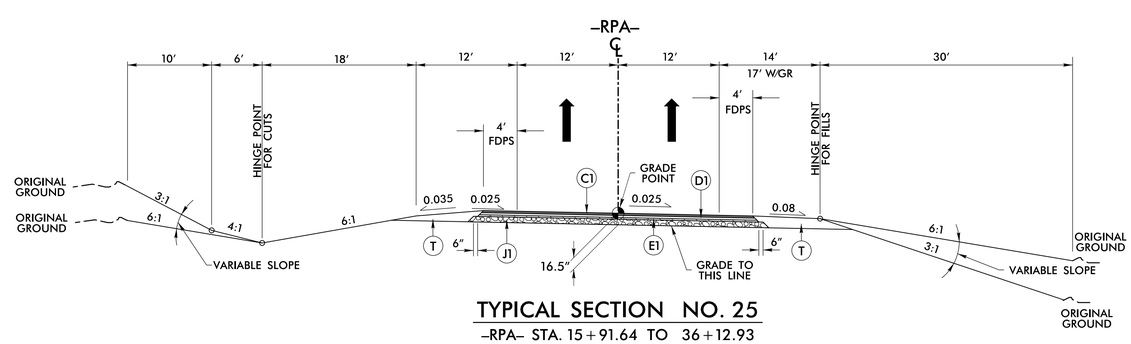
–RPD–



TYPICAL SECTION NO. 24

–RPD– STA. 13+23.90 TO 32+06.98

–RPA–



TYPICAL SECTION NO. 25

–RPA– STA. 15+91.64 TO 36+12.93

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2A-7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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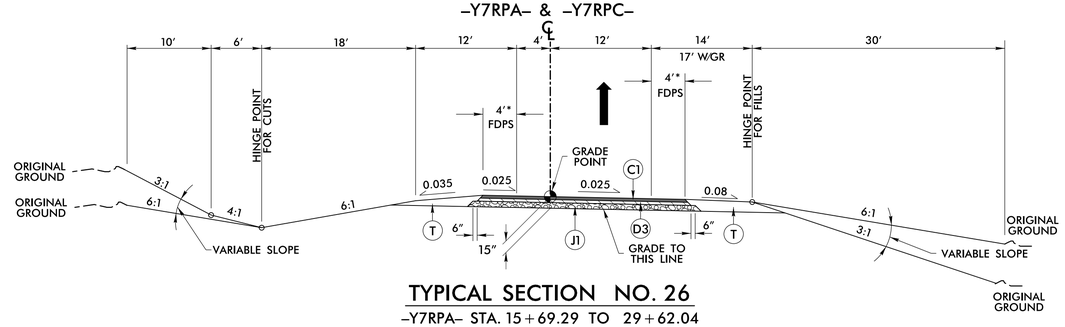
*4:1 MAX SLOPE WITHIN ALL INTERCHANGE AREAS.
BEGIN STATIONS FOR RAMPS REFLECT GORE POINT ADJACENT TO MAINLINE PAVEMENT

PAVEMENT SCHEDULE	
A1	6″ JOINTED CONCRETE PAVEMENT
A2	7″ JOINTED CONCRETE TRUCK APRON
C1	3″ SURFACE COURSE TYPE S9.5C
C2	3″ SURFACE COURSE TYPE S9.5D
C3	3″ SURFACE COURSE TYPE S9.5B
C4	2.5″ SURFACE COURSE TYPE SF9.5A
C5	1.5″ SURFACE COURSE TYPE SF9.5A
C6	2″ SURFACE COURSE TYPE S9.5B
C7	VAR. S9.5C
C8	VAR. S9.5D
C9	VAR. S9.5B
C10	VAR. SF9.5A
C11	1.5″ SURFACE COURSE TYPE S9.5D
D1	2.5″ INTER. COURSE TYPE I19.0C
D2	3″ INTER. COURSE TYPE I19.0D
D3	4″ INTER. COURSE TYPE I19.0C
D4	2.5″ INTER. COURSE TYPE I19.0B
D5	4″ INTER. COURSE TYPE I19.0B
D6	VAR. DEPTH I19.0B
D7	VAR. DEPTH I19.0C
D8	VAR. DEPTH I19.0D
E1	3″ BASE COURSE TYPE B25.0C
E2	12″ BASE COURSE TYPE B25.0C
E3	VAR. B25.0C
J1	8″ AGGREGATE BASE COURSE
J2	6″ AGGREGATE BASE COURSE
J3	VAR. AGGREGATE BASE COURSE
M	MILLING
P	PRIME COAT
R1	1′-6″ CURB & GUTTER
R2	2′-6″ CURB & GUTTER
R3	5″ MONO. ISLAND
R4	5″ MONO. ISLAND (RED COLORED)
R5	SHOULDER BERM GUTTER
R6	SINGLE FACED CONCRETE BARRIER
S	4″ CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING
Y	RUMBLE STRIPS

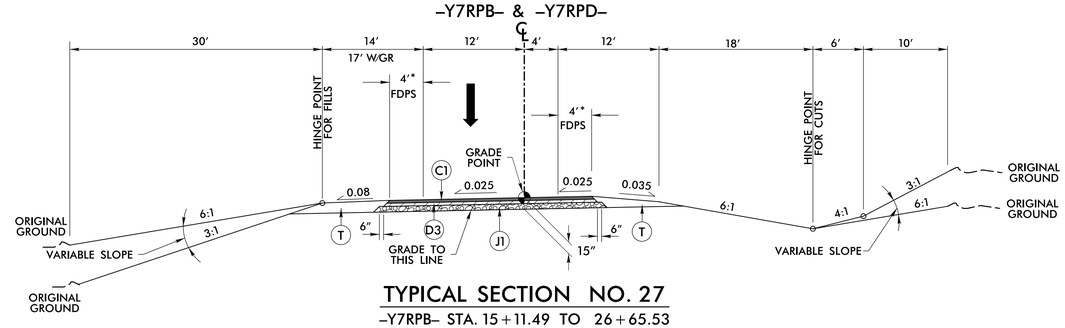
–Y7RPA– & –Y7RPC–



TYPICAL SECTION NO. 26

–Y7RPA– STA. 15+69.29 TO 29+62.04
–Y7RPC– STA. 15+44.21 TO 30+42.65

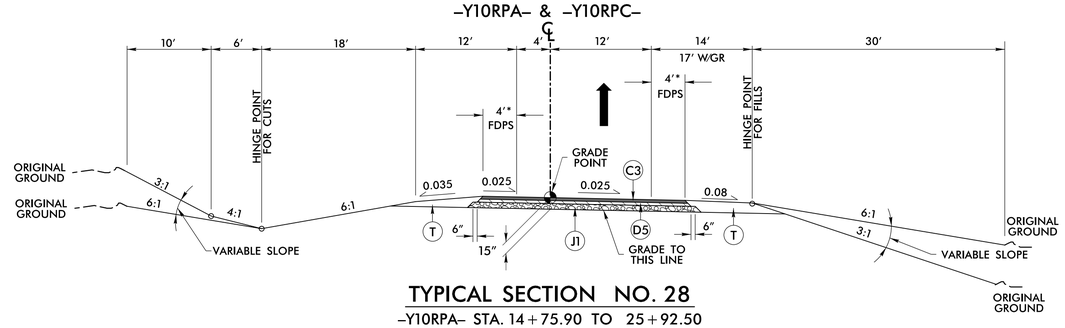
–Y7RPB– & –Y7RPD–



TYPICAL SECTION NO. 27

–Y7RPB– STA. 15+11.49 TO 26+65.53
–Y7RPD– STA. 14+79.25 TO 26+95.57

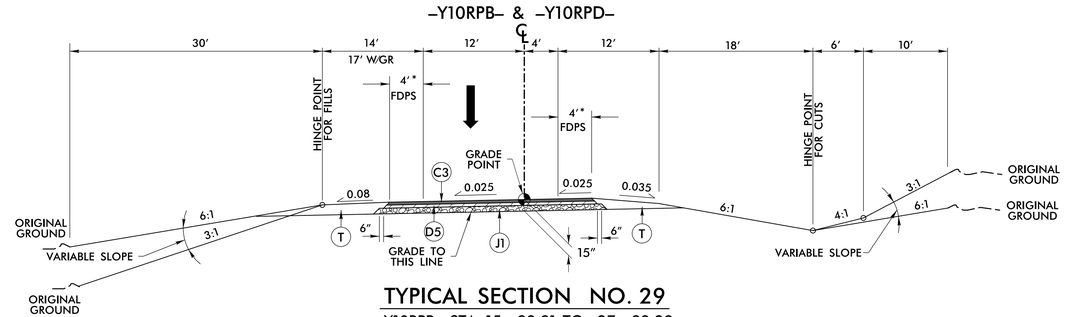
–Y10RPA– & –Y10RPC–



TYPICAL SECTION NO. 28

–Y10RPA– STA. 14+75.90 TO 25+92.50
–Y10RPC– STA. 16+66.25 TO 28+16.03

–Y10RPB– & –Y10RPD–



TYPICAL SECTION NO. 29

–Y10RPB– STA. 15+89.91 TO 27+83.29
–Y10RPD– STA. 14+36.11 TO 25+66.72

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2A-8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL — A Joint Venture — In association with STV 100 Years

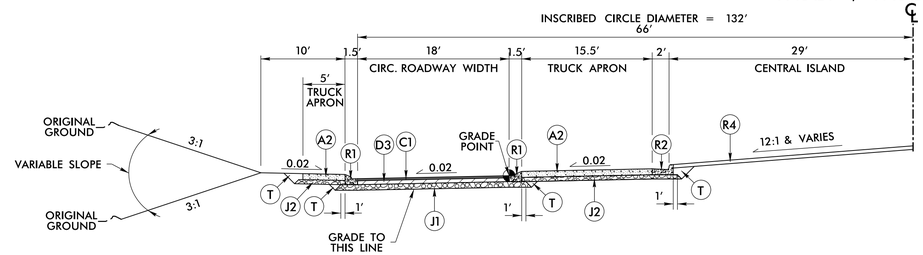
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTES: TYPICAL SECTIONS SHOWN FOR TANGENT SECTIONS ONLY, SEE PLANS AND STANDARD DRAWINGS FOR SUPERELEVATION DETAILS. SEE PLANS FOR LOCATIONS OF TURN LANES AND INTERSECTIONS / ROUNDABOUT.

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE.
*4:1 MAX SLOPE WITHIN ALL INTERCHANGE AREAS.
BEGIN STATIONS FOR RAMPS REFLECT GORE POINT ADJACENT TO MAINLINE PAVEMENT

PAVEMENT SCHEDULE	
A1	6″ JOINTED CONCRETE PAVEMENT
A2	7″ JOINTED CONCRETE TRUCK APRON
C1	3″ SURFACE COURSE TYPE S9.5C
C2	3″ SURFACE COURSE TYPE S9.5D
C3	3″ SURFACE COURSE TYPE S9.5B
C4	2.5″ SURFACE COURSE TYPE SF9.5A
C5	1.5″ SURFACE COURSE TYPE SF9.5A
C6	2″ SURFACE COURSE TYPE S9.5B
C7	VAR. S9.5C
C8	VAR. S9.5D
C9	VAR. S9.5B
C10	VAR. SF9.5A
C11	1.5″ SURFACE COURSE TYPE S9.5D
D1	2.5″ INTER. COURSE TYPE I19.0C
D2	3″ INTER. COURSE TYPE I19.0D
D3	4″ INTER. COURSE TYPE I19.0C
D4	2.5″ INTER. COURSE TYPE I19.0B
D5	4″ INTER. COURSE TYPE I19.0B
D6	VAR. DEPTH I19.0B
D7	VAR. DEPTH I19.0C
D8	VAR. DEPTH I19.0D
E1	3″ BASE COURSE TYPE B25.0C
E2	12″ BASE COURSE TYPE B25.0C
E3	VAR. B25.0C
J1	8″ AGGREGATE BASE COURSE
J2	6″ AGGREGATE BASE COURSE
J3	VAR. AGGREGATE BASE COURSE
M	MILLING
P	PRIME COAT
R1	1′-6″ CURB & GUTTER
R2	2′-6″ CURB & GUTTER
R3	5″ MONO. ISLAND
R4	5″ MONO. ISLAND (RED COLORED)
R5	SHOULDER BERM GUTTER
R6	SINGLE FACED CONCRETE BARRIER
S	4″ CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING
Y	RUMBLE STRIPS

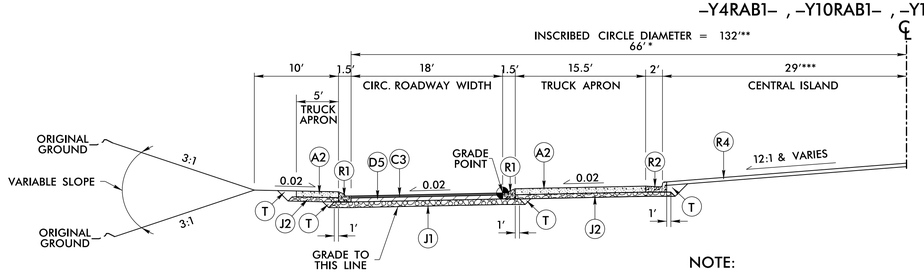
–Y7RAB1– , –Y7RAB2– & –Y7RAB3–



TYPICAL SECTION NO. 30

–Y7RAB1– STA. 10+00.00 TO 13+01.59
–Y7RAB2– STA. 10+00.00 TO 13+01.59
–Y7RAB3– STA. 10+00.00 TO 13+01.59

–Y4RAB1– , –Y10RAB1– , –Y10RAB2– & –Y10RAB3–

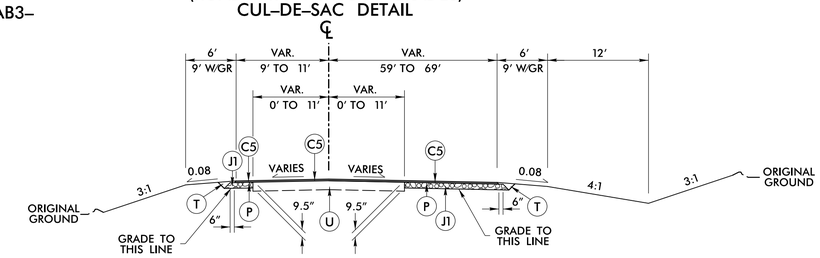


TYPICAL SECTION NO. 31

–Y4RAB1– STA. 10+00.00 TO 13+11.02
–Y10RAB1– STA. 10+00.00 TO 13+01.59
–Y10RAB2– STA. 10+00.00 TO 13+01.59
–Y10RAB3– STA. 10+00.00 TO 13+01.59

NOTE:
–Y4RAB1–
* 67.5′
** 135′
*** 30.5′

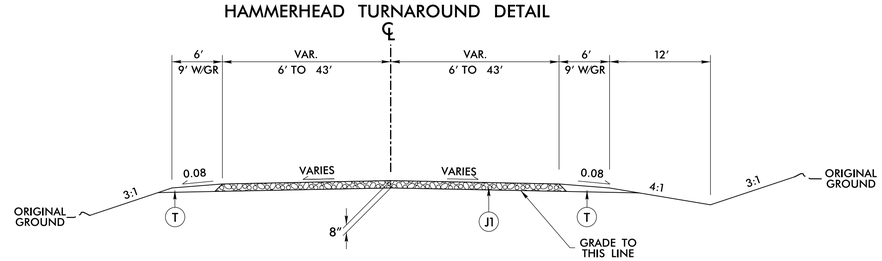
(ROADWAYS WITHOUT GRADES)
CUL–DE–SAC DETAIL



TYPICAL SECTION NO. 32

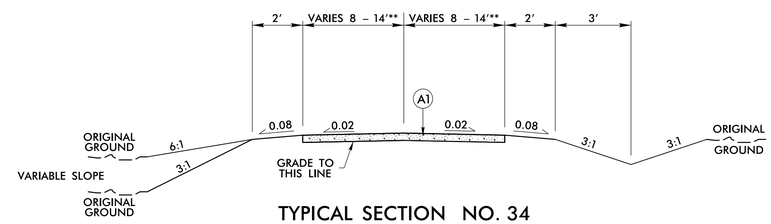
NOTE : SEE PLANS FOR LOCATIONS OF CUL–DE–SACS & AREA OF WIDENING

HAMMERHEAD TURNAROUND DETAIL



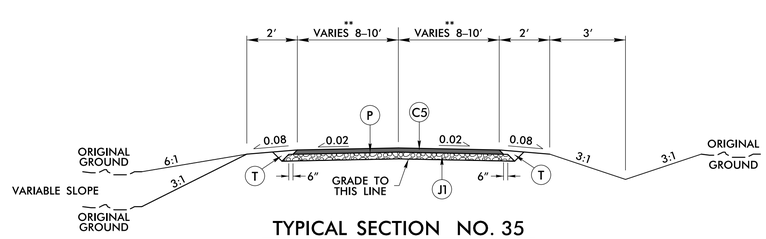
TYPICAL SECTION NO. 33

NOTE : SEE PLANS FOR LOCATIONS OF HAMMERHEAD TURNAROUNDS



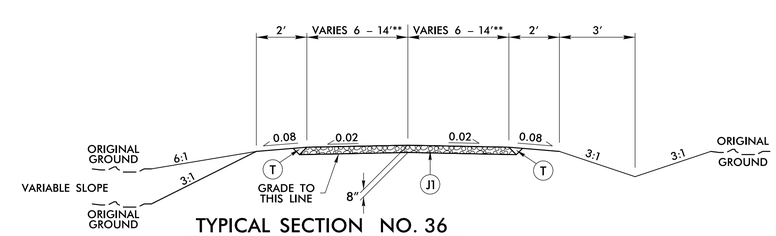
TYPICAL SECTION NO. 34

NOTE: EXISTING CONCRETE DRIVEWAYS
**NOTE: WIDTH AT TURNOUT VARIES TO EXISTING
SEE PLANS FOR LOCATION



TYPICAL SECTION NO. 35

NOTE: DRIVEWAYS WITH EXIST. ASPHALT
**NOTE: WIDTH AT TURNOUT VARIES TO EXISTING
SEE PLANS FOR LOCATION



TYPICAL SECTION NO. 36

–Y5DR1– STA. 10+05.53 TO 11+01.72
–Y15– STA. 10+11.00 TO 17+69.76
–Y18DR1– STA. 10+10.00 TO 16+24.52
SEE PLANS FOR LOCATION

NOTE: EXISTING GRAVEL AND SOIL DRIVEWAYS
**NOTE: WIDTH AT TURNOUT VARIES TO EXISTING

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2A-9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL — A Joint Venture — in association with STV 100 Years

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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2B-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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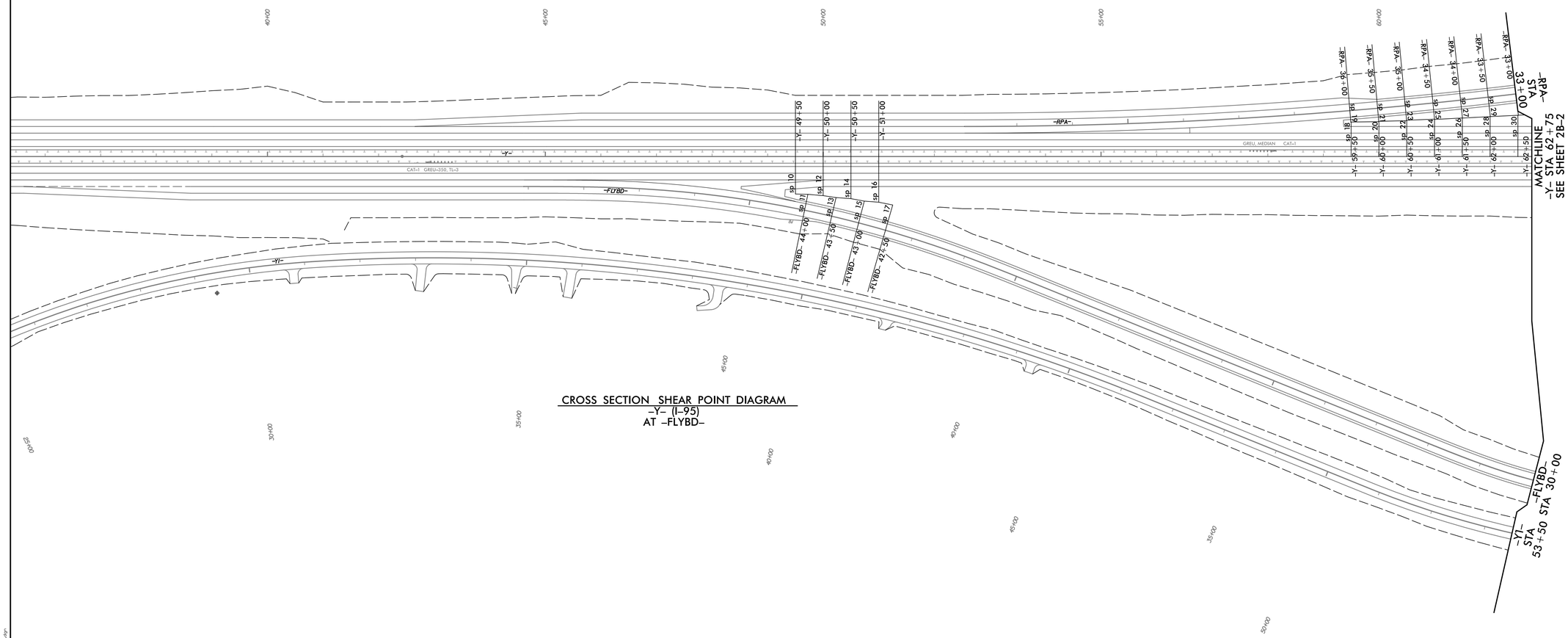
NAD 83/95

CROSS SECTION SHEAR POINT DIAGRAM
-Y- (I-95)
AT -RPA-



CROSS SECTION SHEAR POINT DIAGRAM
-Y- (I-95)
AT -FLYBD-

GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION:	I-95 / I-295
TIP NO.: U-2519AA-AB	COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF	
CHECKED BY: MFR	DATE: 01/23/18

8/8/2018
10:18:36 AM
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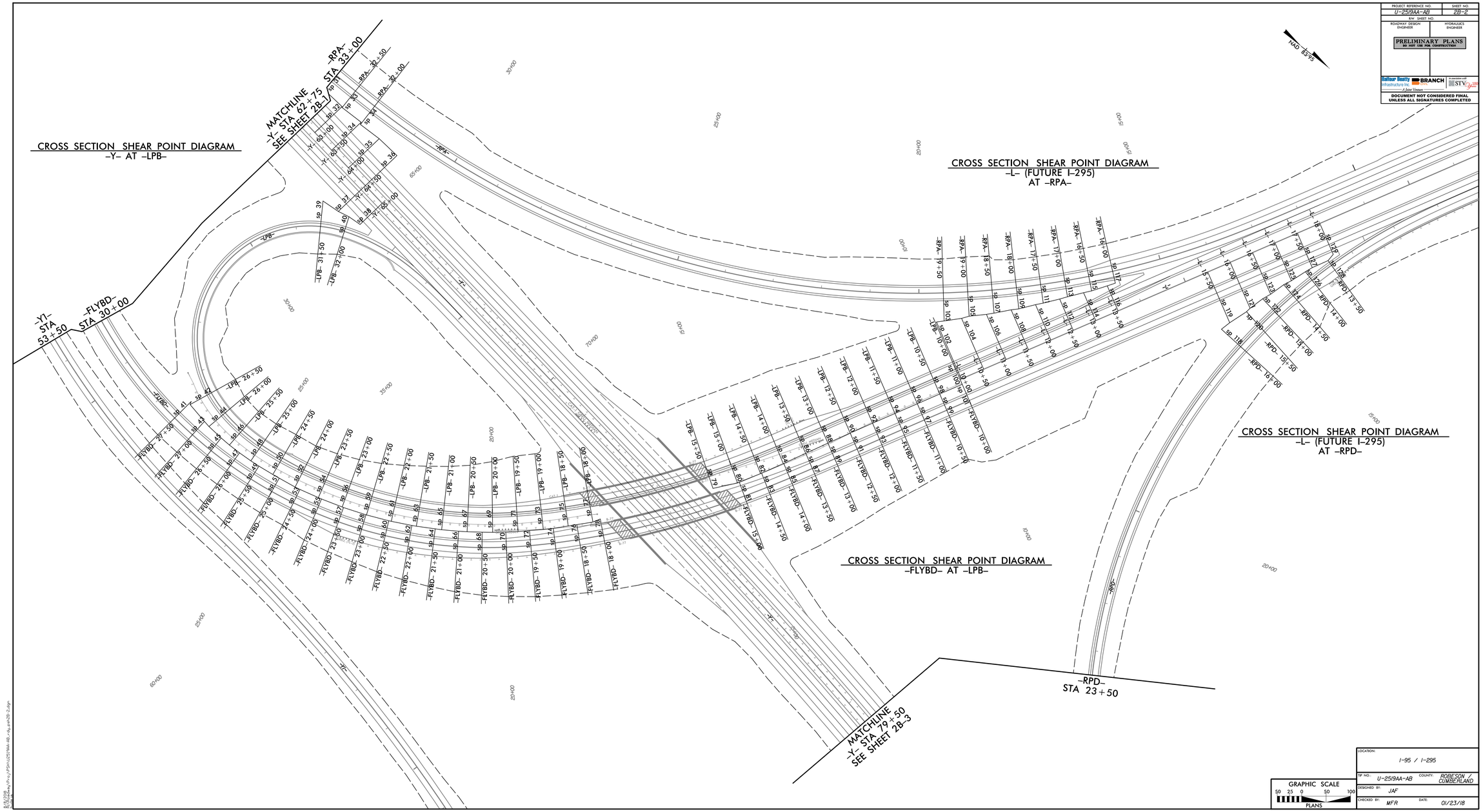

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2B-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Balfour Beatty Infrastructure Inc. — BRANCH — A Joint Venture — STV

8/24/2018
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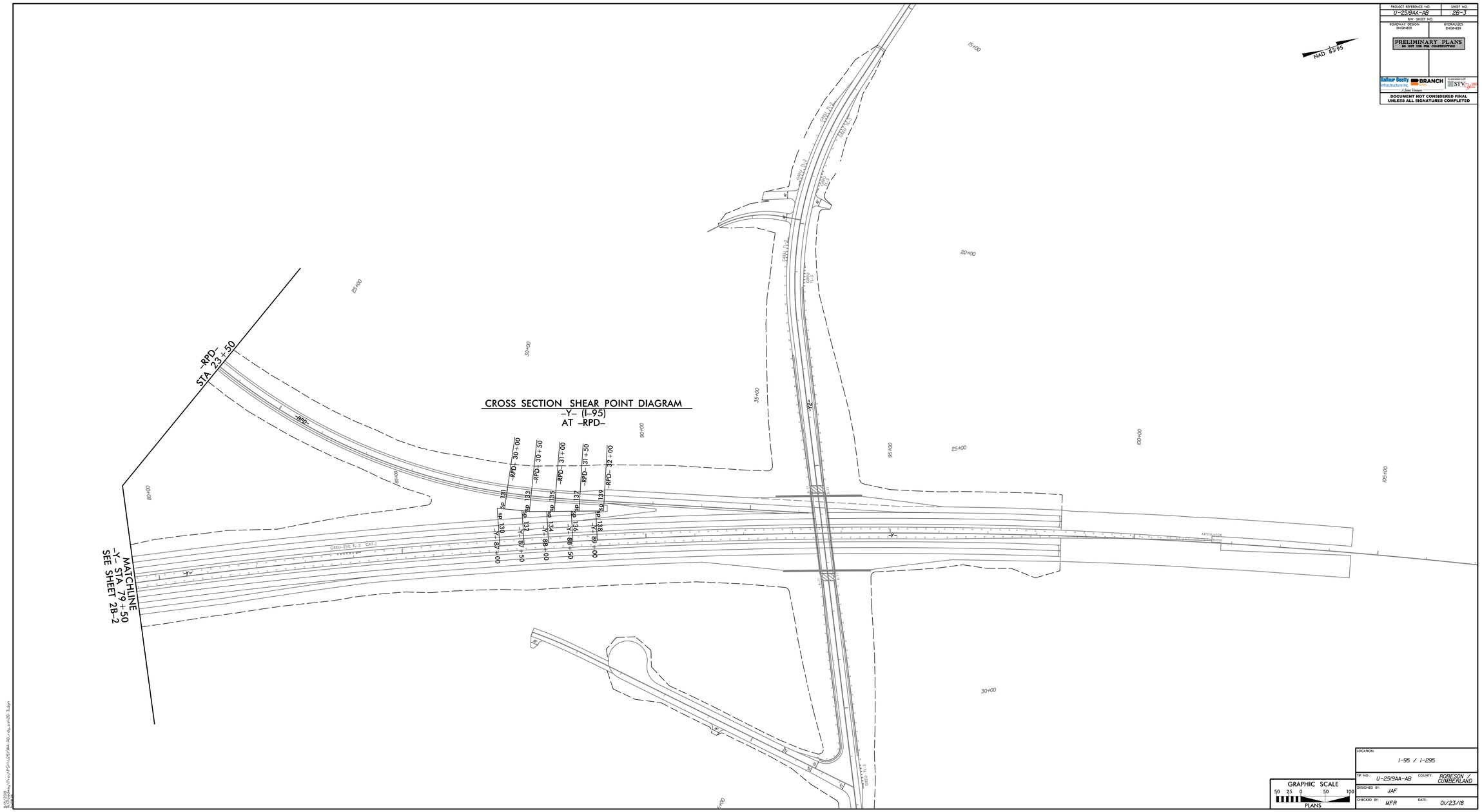
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	28-3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH
A Joint Venture
STV

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION:	I-95 / I-295
TIP NO.: U-2519AA-AB	COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF	
CHECKED BY: MFR	DATE: 01/23/18

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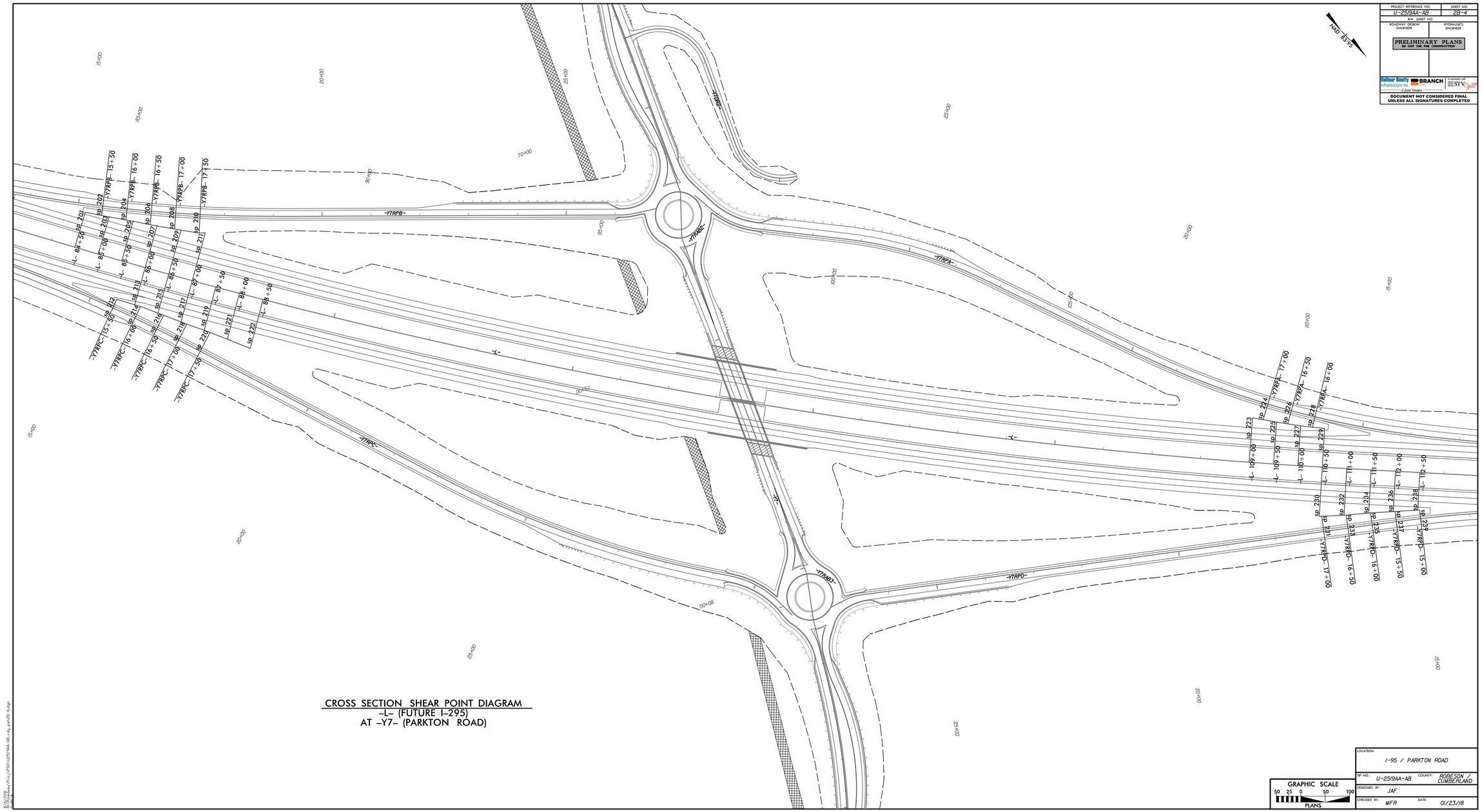
U:\Projects\U-2519AA-AB_rdy_psh\28-3.dgn
01/18/18



CROSS SECTION SHEAR POINT DIAGRAM
–L– (FUTURE I–295)
AT –Y7– (PARKTON ROAD)

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2B-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

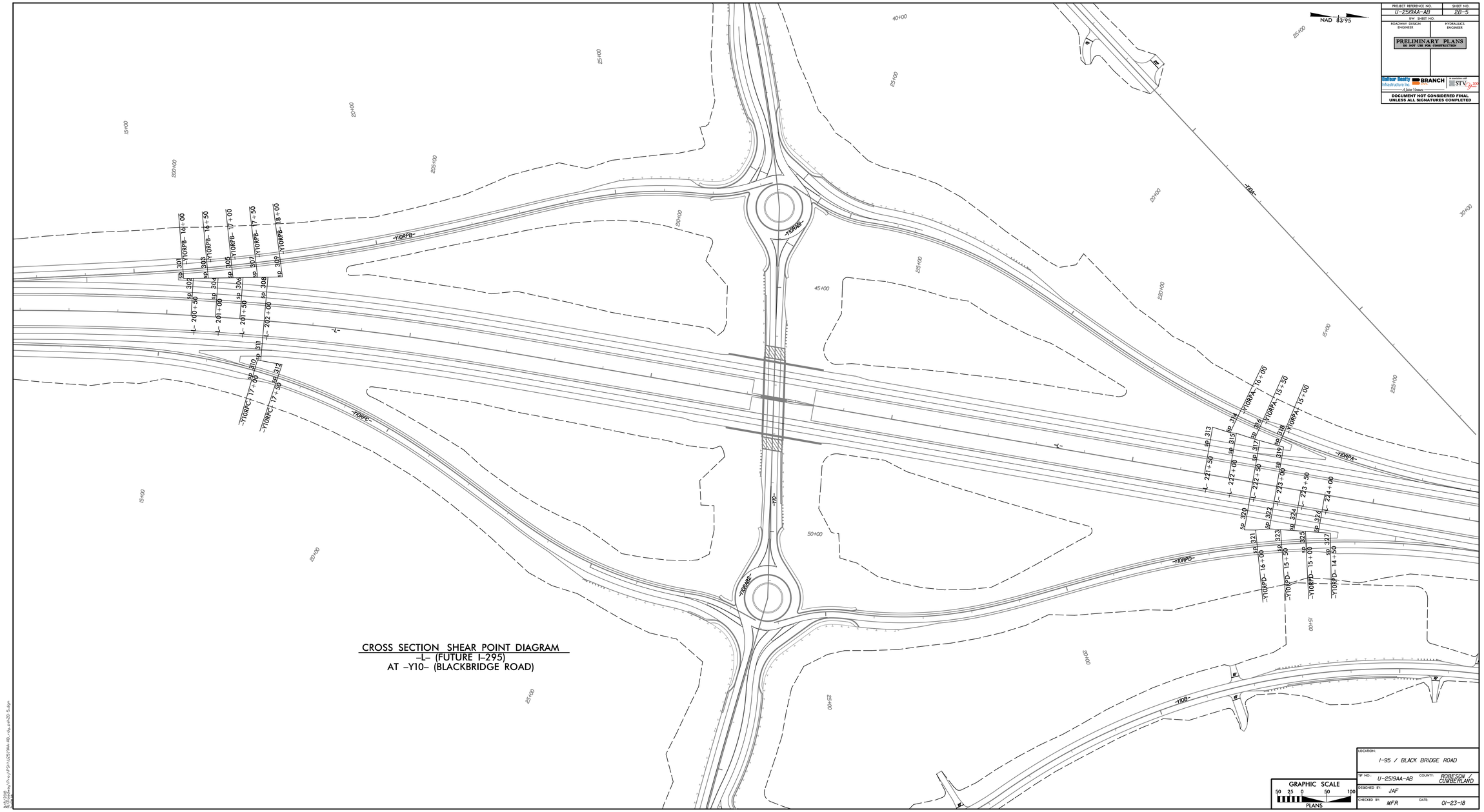
Balfour Beatty Infrastructure Inc. BRANCH
A Joint Venture
STV

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOCATION: I-95 / PARKTON ROAD	
TIP NO.: U-2519AA-AB	COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF	
CHECKED BY: MFR	DATE: 01/23/18

GRAPHIC SCALE
50 25 0 50 100
PLANS

8/8/2018
R:\Roadway\Proj\U2519AA-AB_rdy_psh30_4.dgn
bullock



CROSS SECTION SHEAR POINT DIAGRAM
–L– (FUTURE I–295)
AT –Y10– (BLACKBRIDGE ROAD)

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2B-5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH
A Joint Venture
STV

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOCATION: I-95 / BLACK BRIDGE ROAD

TIP NO.: U-2519AA-AB COUNTY: ROBESON / CUMBERLAND

DESIGNED BY: JAF

CHECKED BY: MFR DATE: 01-23-18

8/24/2018
pw:\\ecomp\Projects\PDP\U2519AA_AB_rdy_prel2B_5.dgn

DETOUR FOR -Y4-

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2B-6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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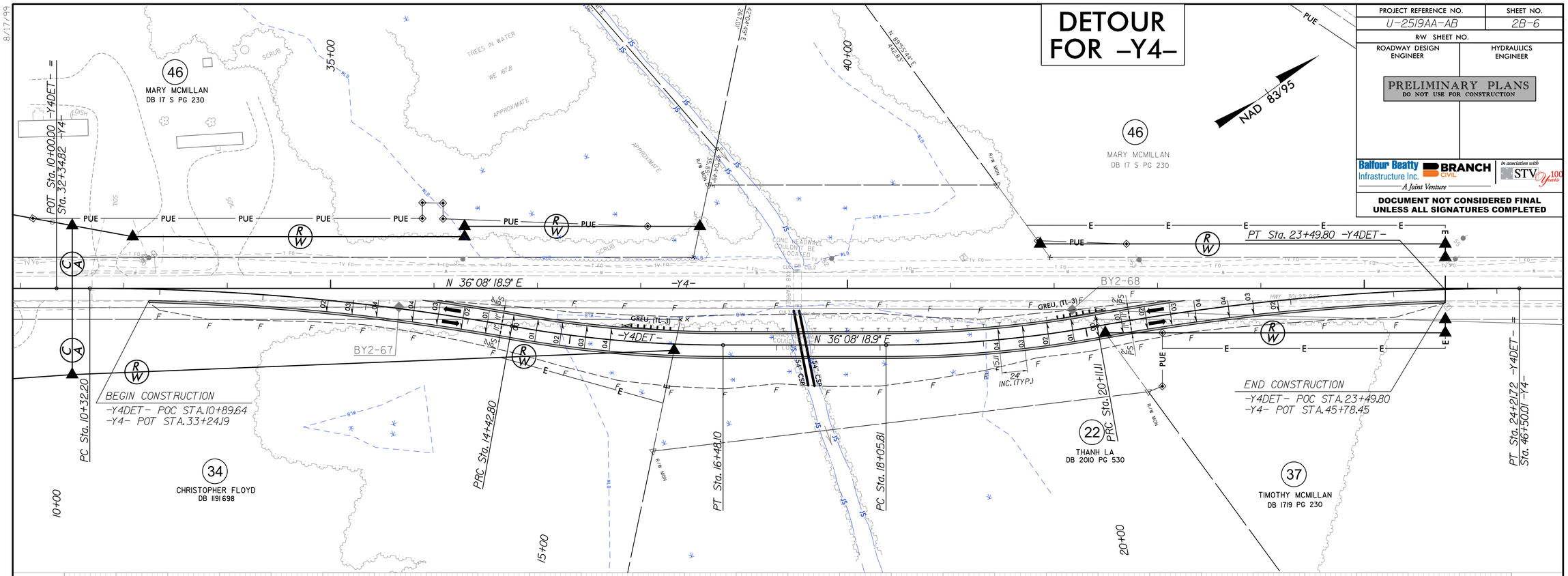
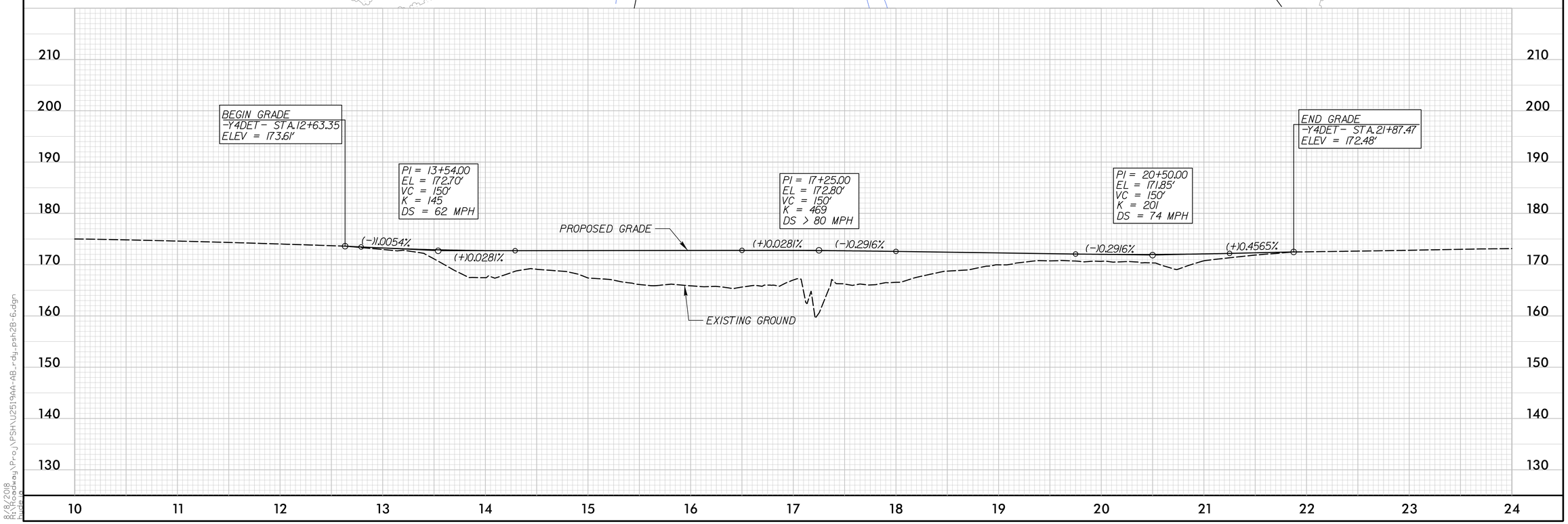
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





8/17/99
8/28/2018
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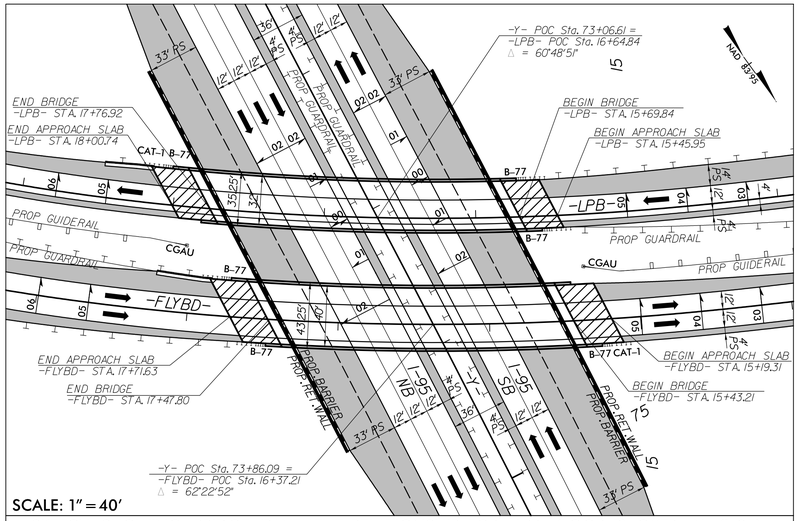
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2B-7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

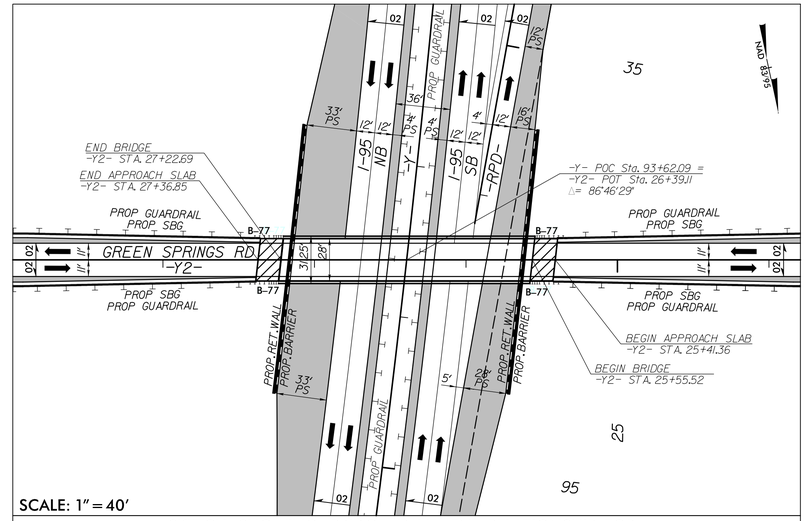
Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

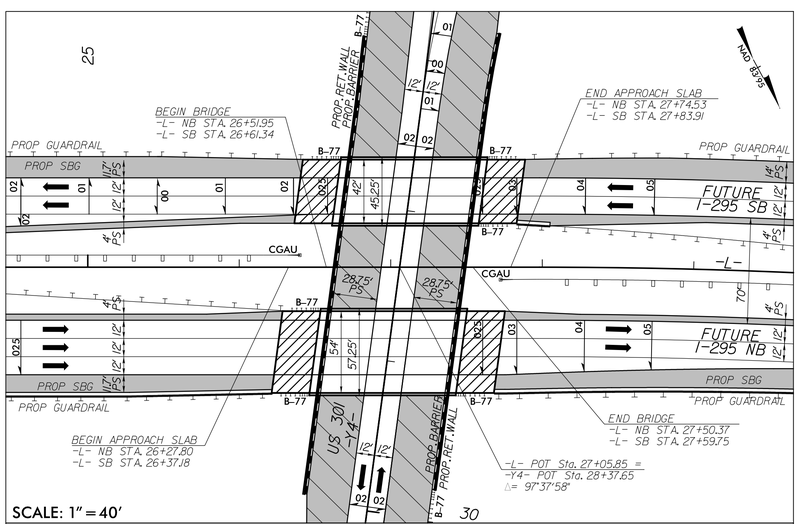
BRIDGE SKETCHES



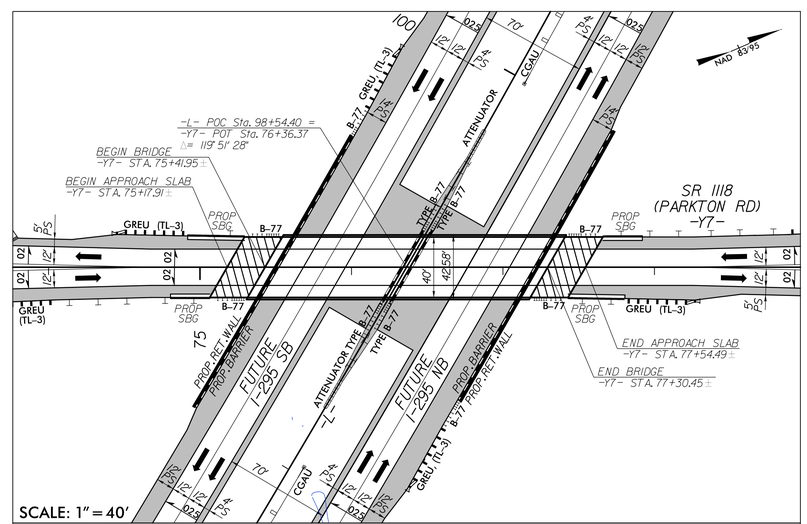
SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP FOR –LPB– (LOOP B) OVER –Y– (I–95) & –FLYBD– (FLYBD) OVER –Y– (I–95)



SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP FOR –Y2– (GREEN SPRINGS ROAD) OVER –Y– (I–95)



SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP FOR –L– (FUTURE I–295 SB) OVER –Y4 (US 301) & –L– (FUTURE I–295 NB) OVER –Y4 (US 301)



SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP FOR –Y7– (PARKTON ROAD) OVER –L– (FUTURE I–295)

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mjdale

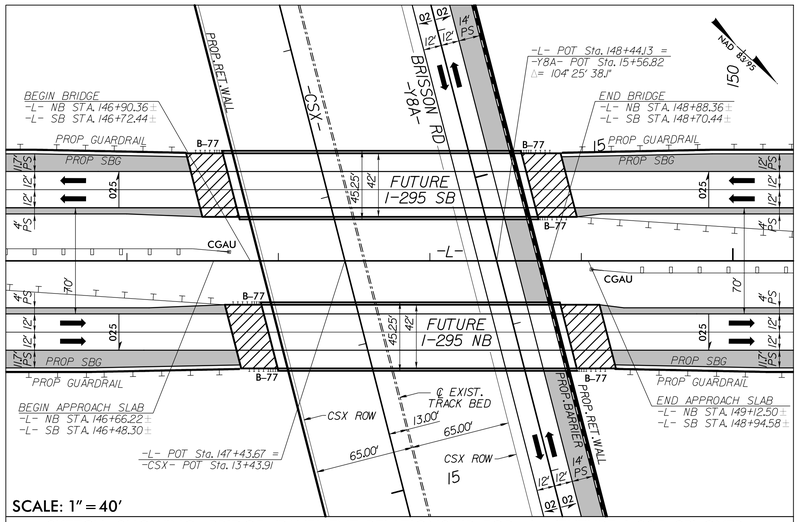
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2B-8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

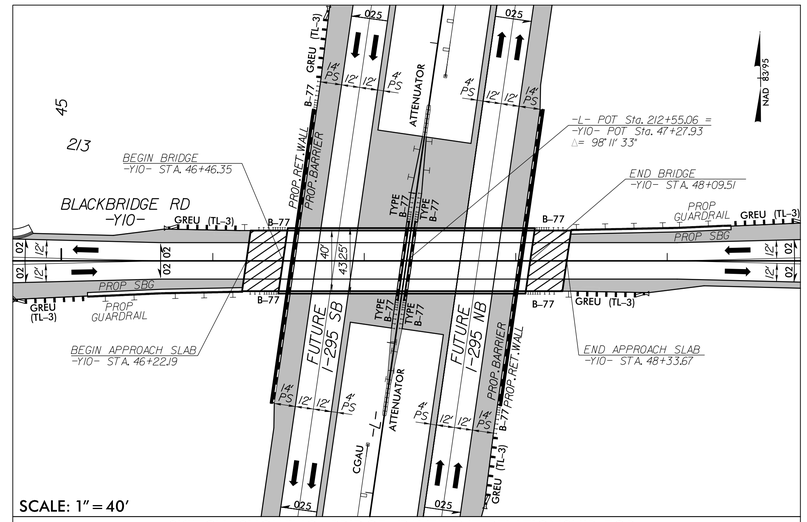
Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

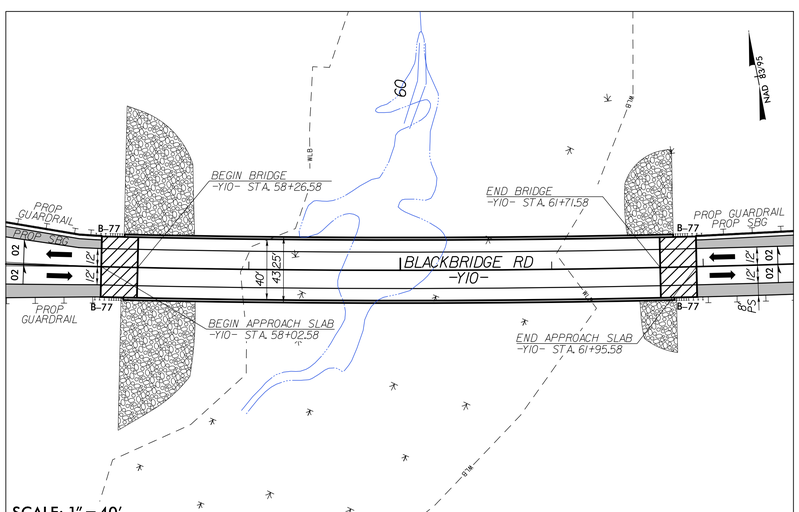
BRIDGE SKETCHES



SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP FOR –L– (FUTURE I–295 SB) OVER –Y8A (BRISSON ROAD)/CSXT & –L– (FUTURE I–295 NB) OVER –Y8A (BRISSON ROAD)/CSXT



SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP FOR –Y10 (BLACK BRIDGE ROAD) OVER –L– (FUTURE I–295)



SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP FOR –Y10 (BLACK BRIDGE ROAD) OVER WETLAND SYSTEM

8/8/2018
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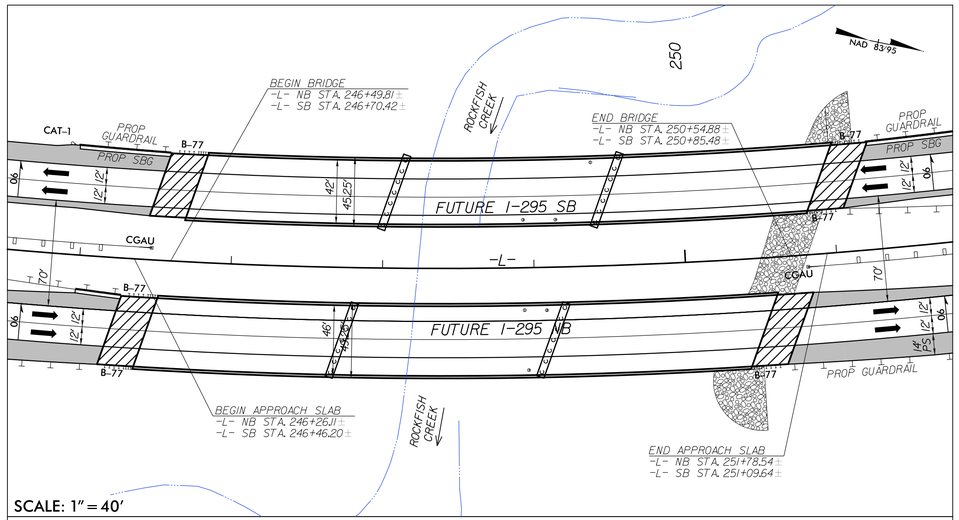
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	2B-9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

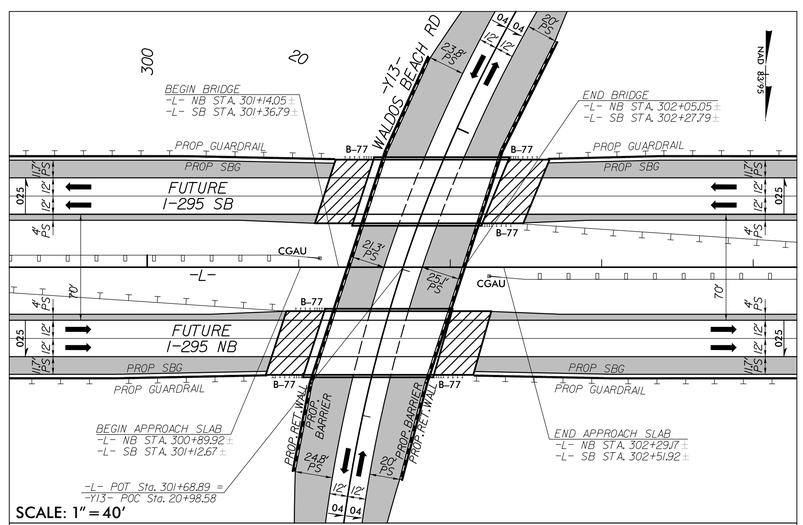
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BRIDGE SKETCHES



SCALE: 1" = 40'

SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP FOR
-L- (FUTURE I-295 SB) OVER ROCKFISH CREEK & -L- (FUTURE I-295 NB) OVER ROCKFISH CREEK



SCALE: 1" = 40'

SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP FOR -L- (FUTURE I-295 SB) OVER
-Y13- (WALDOS BEACH ROAD) & -L- (FUTURE I-295 NB) OVER -Y13- (WALDOS BEACH ROAD)

8/8/2018
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bhedge

ALIGNMENT CURVE DATA

NOTE:
* DESIGN EXCEPTION
** 25-30 MPH DESIGN SPEED APPROACHING ROUNDABOUT
*** STOP CONDITION AT INTERSECTION

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	3A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL — A Joint Venture — in association with STV 100 years

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CURVE & SPIRAL DATA -L-

PI Sta 38+52.65
△ = 30° 15' 31.8" (RT)
D = 1° 28' 08.8"
L = 2,059.65'
T = 1,054.45'
R = 3,900.00'
RUNOFF = 225'
DS = 70 MPH
e = 5%

PIs Sta 49+40.37
Θs = 1° 49' 04.9"
Ls = 247.50'
LT = 165.01'
ST = 82.51'

PI Sta 97+86.37
△ = 13° 32' 30.3" (LT)
D = 0° 30' 09.3"
L = 2,694.37'
T = 1,353.49'
R = 11,400.00'
RUNOFF = 122.5'
DS > 80 MPH
e = 2.5%

PIs Sta 155+62.28
Θs = 0° 59' 57.9"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

PI Sta 182+82.45
△ = 49° 40' 26.4" (RT)
D = 0° 59' 57.9"
L = 4,970.37'
T = 2,653.51'
R = 5,733.00'
DS = 75 MPH
e = 4%

PIs Sta 206+65.97
Θs = 0° 59' 57.9"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

PIs Sta 237+39.93
Θs = 2° 38' 10.7"
Ls = 300.00'
LT = 200.02'
ST = 100.02'

PI Sta 273+24.06
△ = 93° 48' 26.1" (LT)
D = 1° 45' 27.1"
L = 5,337.42'
T = 3,484.15'
R = 3,260.00'
DS = 70 MPH
e = 6%

PIs Sta 292+77.34
Θs = 2° 38' 10.7"
Ls = 300.00'
LT = 200.02'
ST = 100.02'

CURVE & SPIRAL DATA -FLYBD-

PIs Sta 14+33.18
Θs = 3° 10' 21.1"
Ls = 200.00'
LT = 133.35'
ST = 66.69'

PI Sta 16+70.65
△ = 10° 48' 23.8" (RT)
D = 3° 10' 21.1"
L = 340.63'
T = 170.82'
R = 1,806.00'
DS = 50 MPH
e = 5%

PIs Sta 19+51.80
Θs = 3° 10' 09.4"
Θs = 6° 20' 53.9"
Ls = 200.00'
LT = 111.34'
ST = 89.11'

PI Sta 25+83.84
△ = 62° 04' 29.8" (RT)
D = 6° 20' 42.2"
L = 978.32'
T = 543.38'
R = 903.00'
DS = 50 MPH
e = 6%

PIs Sta 30+85.53
Θs = 6° 20' 42.2"
Ls = 200.00'
LT = 133.42'
ST = 66.74'

PIs Sta 40+74.87
Θs = 2° 52' 45.1"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

PI Sta 44+26.61
△ = 16° 18' 20.7" (LT)
D = 2° 52' 45.1"
L = 566.33'
T = 285.09'
R = 1,990.00'
DS = 60 MPH
e = 5.5%

PIs Sta 47+74.53
Θs = 2° 52' 45.1"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

CURVE & SPIRAL DATA -LPB-

PIs Sta 14+33.19
Θs = 3° 18' 01.6"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

PI Sta 16+60.15
△ = 10° 33' 10.1" (RT)
D = 3° 18' 01.6"
L = 319.74'
T = 160.32'
R = 1,736.00'
DS = 50 MPH
e = 5%

PIs Sta 19+31.55
Θs = 3° 17' 58.6"
Θs = 6° 52' 44.7"
Ls = 200.00'
LT = 111.98'
ST = 88.53'

PI Sta 22+42.60
△ = 29° 58' 41.5" (RT)
D = 6° 52' 41.7"
L = 435.84'
T = 223.03'
R = 833.00'
DS = 50 MPH
e = 6%

PIs Sta 25+76.88
Θs = 6° 50' 48.5"
Θs = 24° 56' 33.5"
Ls = 200.00'
LT = 121.47'
ST = 83.48'

PI Sta 32+04.60
△ =134° 33' 08.9" (RT)
D = 24° 54' 40.4"
L = 540.13'
T = 549.19'
R = 230.00'
DS = 30 MPH
e = 8%

PI Sta 32+48.83
△ = 15° 10' 35.6" (RT)
D = 14° 19' 26.2"
L = 105.95'
T = 53.29'
R = 400.00'
DS = 38 MPH
e = 8%

PIs Sta 33+68.56
Θs = 14° 19' 26.2"
Ls = 200.00'
LT = 133.77'
ST = 67.07'

CURVE & SPIRAL DATA -RPA-

PIs Sta 13+04.60
Θs = 3° 34' 51.6"
Ls = 225.00'
LT = 150.03'
ST = 75.03'

PI Sta 23+26.73
△ = 55° 30' 23.6" (RT)
D = 3° 10' 59.2"
L = 1,743.79'
T = 947.16'
R = 1,800.00'
DS = 65 MPH
e = 8%

PIs Sta 32+11.59
Θs = 0° 45' 48.0"
Θs = 3° 34' 53.0"
Ls = 225.00'
LT = 136.87'
ST = 88.23'

PI Sta 38+21.69
△ = 6° 25' 11.2" (RT)
D = 0° 40' 43.9"
L = 945.67'
T = 473.33'
R = 8,440.00'
RUNOFF = 80'
DS = 65 MPH
e = 2.5%

CURVE & SPIRAL DATA -RPD-

PIs Sta 11+20.04
Θs = 4° 17' 49.9"
Ls = 180.00'
LT = 120.04'
ST = 60.03'

PI Sta 23+30.31
△ = 87° 34' 39.6" (LT)
D = 4° 46' 28.7"
L = 1,834.22'
T = 1,150.31'
R = 1,200.00'
DS = 60 MPH
e = 8%

PIs Sta 30+74.25
Θs = 4° 17' 49.9"
Ls = 180.00'
LT = 120.04'
ST = 60.03'

CURVE DATA -Y-

PI Sta 107+61.69
△ = 33° 16' 00.0" (RT)
D = 0° 29' 59.9"
L = 6,653.82'
T = 3,423.64'
R = 11,460.00'
RUNOFF = 60'
DS = 70 MPH
e = 2%

CURVE DATA -Y3SI-

PI Sta 10+72.66
△= 70° 57' 34.4" (LT)
D = 76° 23' 39.7"
L = 92.89'
T = 53.46'
R = 75.00'
DS = N/A

CURVE DATA -Y3-

PI Sta 12+38.04
△ = 19° 42' 43.0" (RT)
D = 7° 38' 22.0"
L = 258.03'
T = 130.30'
R = 750.00'
DS = ** MPH
e = 2%

PI Sta 15+09.45
△ = 10° 56' 35.2" (RT)
D = 3° 49' 11.0"
L = 286.49'
T = 143.68'
R = 1,500.00'
DS = 25 MPH **
e = 2%

CURVE DATA -Y4RABI-

PI Sta Undefined
△ = 180° 00' 00.0" (RT)
D = 115° 44' 56.6"
L = 155.51'
T = Undefined
R = 49.50'
DS = 25 MPH
e = 2%

PI Sta Undefined
△ = 180° 00' 00.0" (RT)
D = 115° 44' 56.6"
L = 155.51'
T = Undefined
R = 49.50'
DS = 25 MPH
e = 2%

CURVE DATA -Y1-

PI Sta 23+78.84
△ = 53° 46' 43.1" (RT)
D = 3° 22' 13.2"
L = 1,595.64'
T = 862.06'
R = 1,700.00'
RUNOFF = 107.2'
DS = 60 MPH
e = 4%

PI Sta 38+89.09
△ = 25° 44' 05.3" (RT)
D = 1° 41' 06.6"
L = 1,527.13'
T = 776.67'
R = 3,400.00'
RUNOFF = 80.4'
DS = 60 MPH
e = 3%

PI Sta 54+59.08
△ = 25° 23' 15.2" (LT)
D = 3° 22' 13.2"
L = 753.26'
T = 382.92'
R = 1,700.00'
RUNOFF = 80.4'
DS = 60 MPH
e = 4%

PI Sta 65+05.35
△ = 22° 29' 15.1" (RT)
D = 1° 41' 06.6"
L = 1,334.44'
T = 675.92'
R = 3,400.00'
RUNOFF = 80.4'
DS = 60 MPH
e = 3%

PI Sta 76+23.83
△ = 15° 24' 31.4" (LT)
D = 1° 41' 06.6"
L = 914.37'
T = 459.96'
R = 3,400.00'
RUNOFF = 80.4'
DS = 60 MPH
e = 3%

CURVE DATA -Y2-

PI Sta 19+70.48
△ = 40° 20' 07.7" (LT)
D = 8° 03' 30.5"
L = 500.53'
T = 261.14'
R = 711.00'
RUNOFF = 89.34'
DS = 45 MPH*
e = 4%

CURVE DATA -Y2A-

PI Sta 10+64.21
△= 5° 41' 35.1" (RT)
D = 5° 43' 46.5"
L = 99.36'
T = 49.72'
R = 1,000.00'
RUNOFF = 60'
DS = 70 MPH
e = 2%

CURVE & SPIRAL DATA -Y7-

PIs Sta 14+29.61
Θs = 3° 49' 11.0"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

PI Sta 19+19.76
△ = 31° 32' 00.0" (RT)
D = 3° 49' 11.0"
L = 825.54'
T = 423.51'
R = 1,500.00'
DS = 62 MPH
e = 6%

PIs Sta 23+88.48
Θs = 3° 49' 11.0"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

PIs Sta 54+98.21
Θs = 2° 14' 48.8"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

PI Sta 59+42.94
△ = 16° 52' 00.1" (LT)
D = 2° 14' 48.8"
L = 750.67'
T = 378.07'
R = 2,550.00'
DS = 62 MPH
e = 5%

PIs Sta 63+82.21
Θs = 2° 14' 48.8"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

PIs Sta 82+58.75
Θs = 3° 13' 51.5"
Ls = 150.00'
LT = 100.02'
ST = 50.02'

PI Sta 84+05.40
△ = 8° 18' 49.3" (RT)
D = 4° 18' 28.6"
L = 192.98'
T = 96.66'
R = 1,330.00'
DS = 60 MPH
e = 6%

PIs Sta 85+51.74
Θs = 3° 13' 51.5"
Ls = 150.00'
LT = 100.02'
ST = 50.02'

PIs Sta 87+51.74
Θs = 3° 13' 51.5"
Ls = 150.00'
LT = 100.02'
ST = 50.02'

PI Sta 88+98.38
△ = 8° 18' 47.7" (LT)
D = 4° 18' 28.6"
L = 192.97'
T = 96.66'
R = 1,330.00'
DS = 60 MPH
e = 6%

PIs Sta 90+44.71
Θs = 3° 13' 51.5"
Ls = 150.00'
LT = 100.02'
ST = 50.02'

CURVE DATA -Y4DET-

PI Sta 12+38.04
△ = 10° 13' 43.0" (RT)
D = 2° 29' 28.0"
L = 410.60'
T = 205.85'
R = 2,300.00'
RUNOFF = 96'
DS = 60 MPH
e = 4%

PI Sta 15+45.72
△ = 10° 13' 43.0" (LT)
D = 4° 58' 56.1"
L = 205.30'
T = 102.92'
R = 1,150.00'
RUNOFF = 96'
DS = 54 MPH
e = 4%

PI Sta 19+08.74
△ = 10° 13' 43.0" (LT)
D = 4° 58' 56.1"
L = 205.30'
T = 102.92'
R = 1,150.00'
RUNOFF = 96'
DS = 54 MPH
e = 4%

PI Sta 22+16.96
△ = 10° 13' 43.0" (RT)
D = 2° 29' 28.0"
L = 410.60'
T = 205.85'
R = 2,300.00'
RUNOFF = 96'
DS = 60 MPH
e = 4%

CURVE DATA -Y5DRI-

PI Sta 10+46.53
△ = 50° 38' 27.1" (LT)
D = 95° 29' 34.7"
L = 53.03'
T = 28.39'
R = 60.00'
DS = N/A

CURVE & SPIRAL DATA -Y5-

PI Sta 30+32.05
△ = 0° 17' 33.1" (LT)
D = 0° 34' 22.6"
L = 51.06'
T = 25.53'
R = 10,000.00'
DS = 60 MPH
e = EXIST

PI Sta 35+89.30
△ = 0° 18' 02.7" (RT)
D = 0° 34' 22.6"
L = 52.49'
T = 26.25'
R = 10,000.00'
DS = 60 MPH
e = EXIST

PI Sta 91+59.38
△ = 14° 46' 02.9" (RT)
D = 3° 49' 11.0"
L = 386.61'
T = 194.38'
R = 1,500.00'
DS = 25 MPH **
e = 2%

PI Sta 94+53.39
△ = 15° 27' 22.1" (RT)
D = 7° 38' 22.0"
L = 202.32'
T = 101.78'
R = 750.00'
DS = 25 MPH **
e = 2%

CURVE & SPIRAL DATA -Y7RPA-

PIs Sta 13+73.35
Θs = 3° 08' 53.2"
Ls = 200.00'
LT = 133.35'
ST = 66.69'

PI Sta 16+67.22
△ = 14° 13' 56.8" (RT)
D = 3° 08' 53.2"
L = 452.09'
T = 227.22'
R = 1,820.00'
DS = 60 MPH
e = 7%

PIs Sta 19+58.78
Θs = 3° 08' 53.2"
Ls = 200.00'
LT = 133.35'
ST = 66.69'

PI Sta 24+85.02
△ = 19° 17' 15.5" (LT)
D = 6° 21' 58.3"
L = 302.97'
T = 152.93'
R = 900.00'
RUNOFF = 192'
DS = 54 MPH
e = 8%

PI Sta 28+68.63
△ = 33° 19' 52.1" (RT)
D = 31° 49' 51.6"
L = 104.71'
T = 53.88'
R = 180.00'
DS = 25 MPH **
e = 2%

CURVE & SPIRAL DATA -Y7RPB-

PIs Sta 11+33.34
Θs = 2° 07' 19.4"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

PI Sta 14+98.28
△ = 12° 36' 29.6" (LT)
D = 2° 07' 19.4"
L = 594.15'
T = 298.28'
R = 2,700.00'
DS = 65 MPH
e = 6%

PIs Sta 18+60.82
Θs = 2° 07' 19.4"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

PI Sta 26+24.49
△ = 12° 02' 25.4" (LT)
D = 54° 03' 09.4"
L = 22.28'
T = 11.18'
R = 106.00'
DS = 25 MPH **
e = 2%

CURVE & SPIRAL DATA -Y7RPC-

PIs Sta 12+83.34
Θs = 1° 56' 08.4"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

PI Sta 14+75.07
△ = 4° 50' 21.0" (RT)
D = 1° 56' 08.4"
L = 250.00'
T = 125.07'
R = 2,960.00'
DS = 60 MPH
e = 5%

PIs Sta 16+66.67
Θs = 1° 56' 08.4"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

PI Sta 25+98.41
△ = 16° 16' 59.9" (LT)
D = 2° 48' 31.0"
L = 579.76'
T = 291.85'
R = 2,040.00'
RUNOFF = 120'
DS = 50 MPH
e = 5%

PI Sta 29+93.76
△ = 33° 18' 34.3" (RT)
D = 29° 50' 29.6"
L = 111.62'
T = 57.44'
R = 192.00'
DS = 25 MPH **
e = 2%

CURVE & SPIRAL DATA -Y7RPD-

PIs Sta 11+33.35
Θs = 2° 29' 28.0"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

PI Sta 13+18.54
△ = 5° 54' 03.2" (LT)
D = 2° 29' 28.0"
L = 236.88'
T = 118.54'
R = 2,300.00'
DS = 60 MPH
e = 6%

PIs Sta 15+03.56
Θs = 2° 29' 28.0"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

PI Sta 26+74.28
△ = 19° 46' 55.3" (LT)
D = 59° 40' 59.2"
L = 33.15'
T = 16.74'
R = 96.00'
DS = 25 MPH **
e = 2%

8/8/2018
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hilbert

ALIGNMENT CURVE DATA

NOTE:
* DESIGN EXCEPTION
** 25-30 MPH DESIGN SPEED APPROACHING ROUNDABOUT
*** STOP CONDITION AT INTERSECTION

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	3B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL — A Joint Venture — in association with STV 100 Years

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CURVE DATA -Y7DR2-

PI Sta 11+39.52
△ = 90° 00' 00.0" (RT)
D = 57° 17' 44.8"
L = 157.08'
T = 100.00'
R = 100.00'
DS = N/A

PI Sta 14+63.78
△ = 77° 52' 42.4" (LT)
D = 57° 17' 44.8"
L = 135.92'
T = 80.80'
R = 100.00'
DS = N/A

CURVE DATA -Y7RAB1-

PI Sta Undefined
△ = 180° 00' 00.0" (RT)
D = 119° 21' 58.3"
L = 150.80'
T = Undefined
R = 48.00'
DS = 25 MPH
e = 2%

PI Sta Undefined
△ = 180° 00' 00.0" (RT)
D = 119° 21' 58.3"
L = 150.80'
T = Undefined
R = 48.00'
DS = 25 MPH
e = 2%

CURVE DATA -Y7RAB2-

PI Sta 14+35.18
△ = 167° 24' 41.2" (LT)
D = 119° 21' 58.3"
L = 140.25'
T = 435.18'
R = 48.00'
DS = 25 MPH
e = 2%

PI Sta 15+75.43
△ = 192° 35' 18.8" (LT)
D = 119° 21' 58.3"
L = 161.34'
T = 435.18'
R = 48.00'
DS = 25 MPH
e = 2%

CURVE DATA -Y7RAB3-

PI Sta 13+66.04
△ = 203° 07' 28.6" (LT)
D = 119° 21' 58.3"
L = 170.17'
T = 234.62'
R = 48.00'
DS = 25 MPH
e = 2%

PI Sta 12+34.62
△ = 156° 52' 31.4" (LT)
D = 119° 21' 58.3"
L = 131.42'
T = 234.62'
R = 48.00'
DS = 25 MPH
e = 2%

CURVE DATA -Y8-

PI Sta 13+67.44
△ = 64° 01' 36.1" (LT)
D = 35° 48' 35.5"
L = 178.80'
T = 100.03'
R = 160.00'
RUNOFF = 56'
DS = 25 MPH
e = 4%

CURVE DATA -Y8DRI-

PI Sta 10+49.99
△= 49° 39' 33.4" (RT)
D = 71° 37' 11.0"
L = 69.34'
T = 37.02'
R = 80.00'
RUNOFF = 60'
DS = 70 MPH
e = 2%

CURVE DATA -Y10-

PI Sta 32+54.79
△ = 37° 53' 20.2" (RT)
D = 1° 41' 06.6"
L = 2,248.38'
T = 1,167.03'
R = 3,400.00'
RUNOFF = 112'
DS = 60 MPH
e = 4%

PI Sta 64+52.98
△ = 14° 28' 24.1" (LT)
D = 0° 42' 26.5"
L = 2,046.12'
T = 1,028.54'
R = 8,100.00'
RUNOFF = 56'
DS = 60 MPH
e = 2%

PI Sta 88+46.25
△ = 47° 05' 17.3" (LT)
D = 5° 24' 18.9"
L = 871.15'
T = 461.87'
R = 1,060.00'
RUNOFF = 168'
DS = 55 MPH
e = 6%

CURVE & SPIRAL DATA -Y10RPA-

PIs Sta 11+33.35
Θs = 3° 08' 53.2"
Ls = 200.00'
LT = 133.35'
ST = 66.69'

PI Sta 15+03.09
△ = 18° 54' 35.0" (RT)
D = 3° 08' 53.2"
L = 600.67'
T = 303.09'
R = 1,820.00'
DS = 60 MPH
e = 7%

PIs Sta 18+67.35
Θs = 3° 08' 53.2"
Ls = 200.00'
LT = 133.35'
ST = 66.69'

PIs Sta 21+34.12
Θs = 7° 26' 27.6"
Ls = 200.00'
LT = 133.45'
ST = 66.77'

PI Sta 23+31.10
△ = 19° 13' 42.4" (LT)
D = 7° 26' 27.6"
L = 258.41'
T = 130.43'
R = 770.00'
RUNOFF = 192'
DS = 50 MPH
e = 8%

PI Sta 25+17.08
△ = 25° 31' 48.9" (RT)
D = 22° 22' 52.2"
L = 114.07'
T = 58.00'
R = 256.00'
DS = 25 MPH **
e = 2%

CURVE & SPIRAL DATA -Y10RPB-

PIs Sta 15+13.34
Θs = 1° 28' 22.4"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

PI Sta 18+45.69
△ = 7° 48' 52.0" (LT)
D = 1° 28' 22.4"
L = 530.55'
T = 265.69'
R = 3,890.00'
DS = 60 MPH
e = 4%

PIs Sta 21+77.22
Θs = 1° 28' 22.4"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

PIs Sta 24+44.00
Θs = 7° 26' 27.6"
Ls = 200.00'
LT = 133.45'
ST = 66.77'

PI Sta 25+93.28
△ = 12° 15' 55.8" (RT)
D = 7° 26' 27.6"
L = 164.84'
T = 82.73'
R = 770.00'
RUNOFF = 192'
DS = 35 MPH
e = 6%

PIs Sta 27+25.28
△ = 22° 03' 19.1" (LT)
D = 22° 22' 52.2"
L = 98.54'
T = 49.89'
R = 256.00'
DS = 25 MPH **
e = 2%

CURVE & SPIRAL DATA -Y10RPC-

PIs Sta 14+33.38
Θs = 4° 46' 28.7"
Ls = 200.00'
LT = 133.38'
ST = 66.71'

PI Sta 17+73.78
△ = 25° 42' 13.8" (RT)
D = 4° 46' 28.7"
L = 538.34'
T = 273.78'
R = 1,200.00'
DS = 60 MPH
e = 8%

PIs Sta 21+05.05
Θs = 4° 46' 28.7"
Ls = 200.00'
LT = 133.38'
ST = 66.71'

PIs Sta 23+71.79
Θs = 7° 26' 27.6"
Ls = 200.00'
LT = 133.45'
ST = 66.77'

PI Sta 25+79.08
△ = 20° 42' 56.7" (LT)
D = 7° 26' 27.6"
L = 278.40'
T = 140.74'
R = 770.00'
RUNOFF = 192'
DS = 35 MPH
e = 6%

PI Sta 27+62.17
△ = 20° 07' 41.8" (RT)
D = 22° 22' 52.2"
L = 89.93'
T = 45.44'
R = 256.00'
DS = 25 MPH **
e = 2%

CURVE & SPIRAL DATA -Y10RPD-

PIs Sta 11+33.35
Θs = 3° 08' 53.2"
Ls = 200.00'
LT = 133.35'
ST = 66.69'

PI Sta 15+15.44
△ = 19° 39' 55.1" (LT)
D = 3° 08' 53.2"
L = 624.67'
T = 315.44'
R = 1,820.00'
DS = 60 MPH
e = 7%

PIs Sta 18+91.35
Θs = 3° 08' 53.2"
Ls = 200.00'
LT = 133.35'
ST = 66.69'

PIs Sta 21+58.12
Θs = 7° 26' 27.6"
Ls = 200.00'
LT = 133.45'
ST = 66.77'

PI Sta 23+39.26
△ = 16° 55' 43.4" (RT)
D = 7° 26' 27.6"
L = 227.51'
T = 114.59'
R = 770.00'
RUNOFF = 192'
DS = 35 MPH
e = 6%

PI Sta 25+05.52
△ = 23° 32' 34.1" (LT)
D = 22° 22' 52.2"
L = 105.19'
T = 53.35'
R = 256.00'
DS = 25 MPH **
e = 2%

CURVE DATA -Y10RABI-

PI Sta 10+48.00
△ = 89° 59' 59.8" (LT)
D = 119° 21' 58.3"
L = 75.40'
T = 48.00'
R = 48.00'
DS = 25 MPH
e = 2%

PI Sta 11+23.40
△ = 90° 00' 00.0" (LT)
D = 119° 21' 58.3"
L = 75.40'
T = 48.00'
R = 48.00'
DS = 25 MPH
e = 2%

PI Sta 11+98.80
△ = 90° 00' 00.0" (LT)
D = 119° 21' 58.3"
L = 75.40'
T = 48.00'
R = 48.00'
DS = 25 MPH
e = 2%

PI Sta 12+74.19
△ = 89° 59' 59.8" (LT)
D = 119° 21' 58.3"
L = 75.40'
T = 48.00'
R = 48.00'
DS = 25 MPH
e = 2%

CURVE DATA -Y9-

PI Sta 13+87.07
△= 6° 28' 50.2" (RT)
D = 0° 58' 01.9"
L = 670.05'
T = 335.38'
R = 5,924.00'
RUNOFF = 70'
DS = 60 MPH
e = 2.5%

PI Sta 28+99.07
△= 42° 18' 45.1" (LT)
D = 3° 49' 11.0"
L = 1,107.74'
T = 580.49'
R = 1,500.00'
RUNOFF = 112'
DS = 60 MPH
e = 4%

CURVE DATA -Y10RAB2-

PI Sta 10+48.00
△ = 90° 00' 00.0" (LT)
D = 119° 21' 58.3"
L = 75.40'
T = 48.00'
R = 48.00'
DS = 25 MPH
e = 2%

PI Sta 11+23.40
△ = 89° 59' 59.9" (LT)
D = 119° 21' 58.3"
L = 75.40'
T = 48.00'
R = 48.00'
DS = 25 MPH
e = 2%

PI Sta 11+98.80
△ = 90° 00' 00.0" (LT)
D = 119° 21' 58.3"
L = 75.40'
T = 48.00'
R = 48.00'
DS = 25 MPH
e = 2%

PI Sta 12+74.19
△ = 89° 59' 59.9" (LT)
D = 119° 21' 58.3"
L = 75.40'
T = 48.00'
R = 48.00'
DS = 25 MPH
e = 2%

CURVE DATA -Y9A-

PI Sta 15+10.58
△= 5° 21' 34.0" (LT)
D = 3° 00' 00.0"
L = 178.65'
T = 89.39'
R = 1,909.86'
RUNOFF = 60'
DS = 70 MPH
e = 2%

CURVE DATA -Y10RAB3-

PI Sta 10+48.00
△ = 90° 00' 00.0" (LT)
D = 119° 21' 58.3"
L = 75.40'
T = 48.00'
R = 48.00'
DS = 25 MPH
e = 2%

PI Sta 11+23.40
△ = 90° 00' 00.0" (LT)
D = 119° 21' 58.3"
L = 75.40'
T = 48.00'
R = 48.00'
DS = 25 MPH
e = 2%

PI Sta 11+98.80
△ = 90° 00' 00.0" (LT)
D = 119° 21' 58.3"
L = 75.40'
T = 48.00'
R = 48.00'
DS = 25 MPH
e = 2%

PI Sta 12+74.19
△ = 89° 59' 58.8" (LT)
D = 119° 21' 58.3"
L = 75.40'
T = 48.00'
R = 48.00'
DS = 25 MPH
e = 2%

CURVE DATA -Y12-

PI Sta 20+21.86
△ = 41° 24' 21.8" (LT)
D = 3° 30' 54.3"
L = 1,177.96'
T = 616.02'
R = 1,630.00'
RUNOFF = 168'
DS = 65 MPH
e = 6%

CURVE DATA -Y10A-

PI Sta 12+20.76
△= 70° 16' 08.0" (RT)
D = 22° 10' 29.9"
L = 316.88'
T = 182.96'
R = 260.00'
RUNOFF = 112'
DS = 30 MPH ***
e = 4%

CURVE DATA -Y10B-

PI Sta 14+11.03
△ = 50° 19' 45.8" (LT)
D = 10° 45' 55.8"
L = 467.51'
T = 250.41'
R = 533.00'
RUNOFF = 84'
DS = 40 MPH
e = 4%

PI Sta 28+51.92
△ = 82° 18' 56.5" (RT)
D = 4° 05' 36.3"
L = 2,010.92'
T = 1,223.79'
R = 1,400.00'
RUNOFF = 84'
DS = 40 MPH
e = 3%

CURVE DATA -Y10DRI-

PI Sta 10+42.93
△= 43° 30' 37.0" (LT)
D = 71° 37' 11.0"
L = 60.75'
T = 31.93'
R = 80.00'
RUNOFF = 70'
DS = 60 MPH
e = 2.5%

PI Sta 10+97.13
△= 35° 11' 48.7" (RT)
D = 71° 37' 11.0"
L = 49.14'
T = 25.38'
R = 80.00'
RUNOFF = 112'
DS = 60 MPH
e = 4%

CURVE DATA -Y13-

PI Sta 12+82.42
△ = 6° 57' 34.0" (LT)
D = 1° 54' 35.5"
L = 364.40'
T = 182.42'
R = 3,000.00'
RUNOFF = 96'
DS = 50 MPH
e = 4%

PI Sta 16+09.69
△ = 24° 20' 05.0" (LT)
D = 8° 30' 09.0"
L = 286.21'
T = 145.29'
R = 673.87'
DS = 50 MPH
e = EXIST

PI Sta 20+70.72
△ = 37° 03' 56.0" (LT)
D = 6° 00' 00.0"
L = 617.76'
T = 320.12'
R = 954.93'
DS = 50 MPH
e = EXIST

CURVE DATA -Y15-

PI Sta 12+40.69
△ = 56° 54' 23.6" (LT)
D = 19° 05' 54.9"
L = 297.96'
T = 162.57'
R = 300.00'
DS = 30 MPH
e = NC

PI Sta 14+24.40
△ = 0° 56' 14.7" (RT)
D = 0° 58' 12.5"
L = 96.63'
T = 48.31'
R = 5,906.00'
DS = 30 MPH
e = NC

PI Sta 16+34.69
△ = 56° 43' 52.9" (LT)
D = 19° 05' 54.9"
L = 297.04'
T = 161.98'
R = 300.00'
DS = 30 MPH
e = NC

CURVE DATA -Y17-

PI Sta 11+85.68
△ = 29° 32' 55.6" (RT)
D = 10° 44' 58.8"
L = 274.88'
T = 140.57'
R = 533.00'
RUNOFF = 76'
DS = 40 MPH
e = 4%

CURVE DATA -Y18DRI-

PI Sta 12+66.08
△= 50° 29' 50.5" (LT)
D = 71° 37' 11.0"
L = 70.51'
T = 37.73'
R = 80.00'
RUNOFF = 70'
DS = 60 MPH
e = 2.5%

PI Sta 15+42.92
△= 54° 38' 08.4" (RT)
D = 71° 37' 11.0"
L = 76.29'
T = 41.32'
R = 80.00'
RUNOFF = 112'
DS = 60 MPH
e = 4%

8/8/2018
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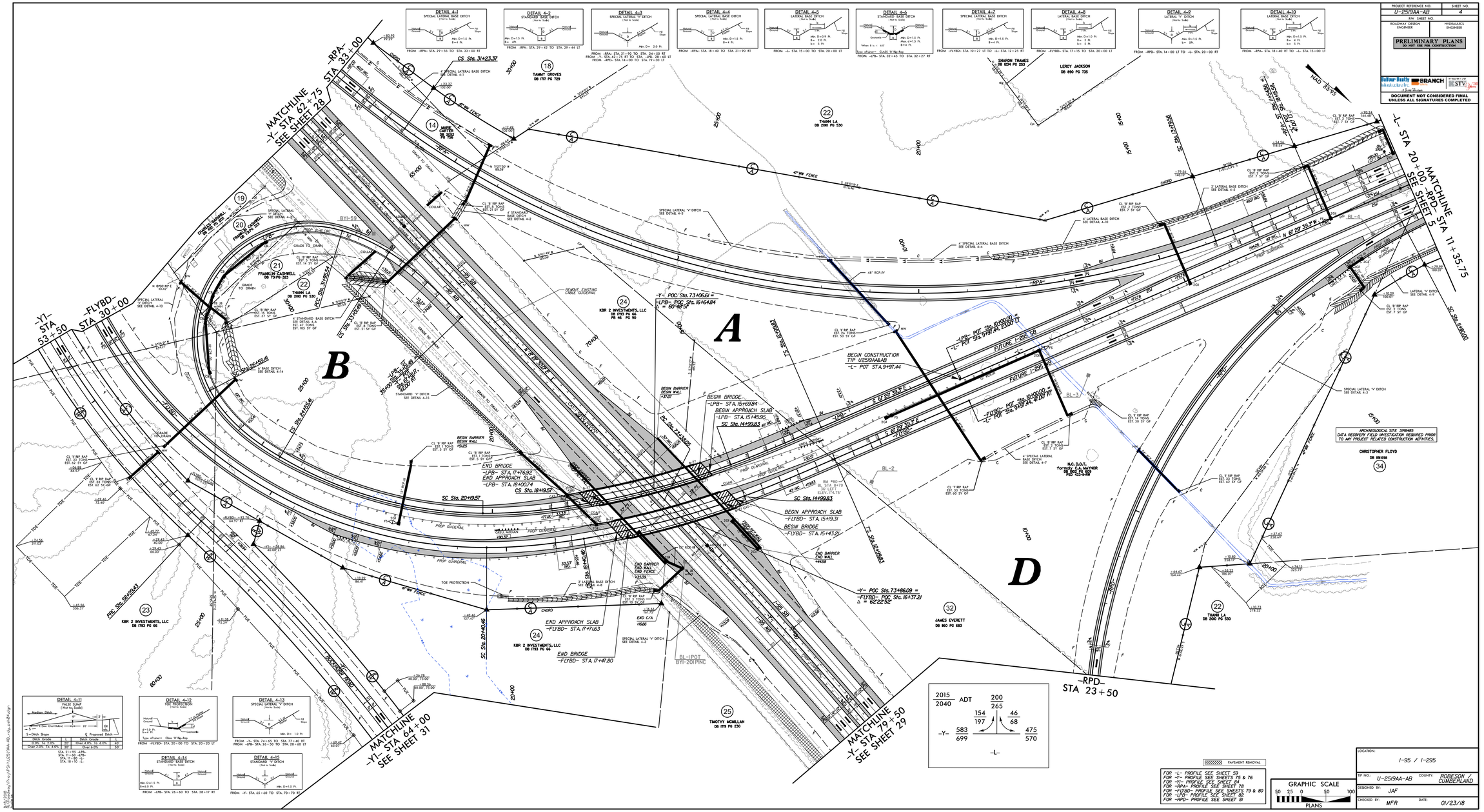
bdeal


PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. U-2519AA-AB
SHEET NO. 4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DETAIL 4-1 SPECIAL LATERAL BASE DITCH
DETAIL 4-2 STANDARD BASE DITCH
DETAIL 4-3 SPECIAL LATERAL "V" DITCH
DETAIL 4-4 SPECIAL LATERAL BASE DITCH
DETAIL 4-5 LATERAL BASE DITCH
DETAIL 4-6 STANDARD BASE DITCH
DETAIL 4-7 SPECIAL LATERAL BASE DITCH
DETAIL 4-8 LATERAL BASE DITCH
DETAIL 4-9 LATERAL "V" DITCH
DETAIL 4-10 LATERAL BASE DITCH
DETAIL 4-11 FALSE SUMP
DETAIL 4-12 TOE PROTECTION
DETAIL 4-13 SPECIAL LATERAL "V" DITCH
DETAIL 4-14 STANDARD BASE DITCH
DETAIL 4-15 STANDARD "V" DITCH
A
B
D
-RPA- STA 33+00
MATCHLINE -Y- STA 62+75 SEE SHEET 28
-Y- STA 53+50
-FLYBD- STA 30+00
MATCHLINE -Y- STA 64+00 SEE SHEET 31
MATCHLINE -Y- STA 79+50 SEE SHEET 29
MATCHLINE -L- STA 20+00 -RPD- SEE SHEET 5
-L- STA 11+35.75
-RPD- STA 23+50
-L- POT STA.9+97.44
BEGIN CONSTRUCTION TIP U2519AA&AB
-L- POT STA.9+97.44
BEGIN BRIDGE -LPB- STA. 15+69.84
BEGIN APPROACH SLAB -LPB- STA. 15+45.66
SC Sta. 14+99.83
END BRIDGE -LPB- STA. 17+76.92
END APPROACH SLAB -LPB- STA. 18+00.74
CS Sta. 18+19.57
SC Sta. 20+19.57
BEGIN APPROACH SLAB -FLYBD- STA. 15+19.31
BEGIN BRIDGE -FLYBD- STA. 15+43.21
END APPROACH SLAB -FLYBD- STA. 17+71.63
END BRIDGE -FLYBD- STA. 17+47.80
-Y- POC Sta. 7.3+06.61 = -LPB- POT Sta. 16+64.84 Δ = 60°40'53"
-Y- POC Sta. 7.3+86.09 = -FLYBD- POC Sta. 16+37.21 Δ = 62°22'52"
-LPB- POT Sta. 0+00.00 = -L- POT Sta. 9+97.44, 41.00' LT
-FLYBD- POT Sta. 0+00.00 = -L- POT Sta. 9+97.44, 41.00' RT
FUTURE L-295 SB
FUTURE L-295 NB
ARCHAEOLOGICAL SITE 31RB485
DATA RECOVERY FIELD INVESTIGATION REQUIRED PRIOR TO ANY PROJECT RELATED CONSTRUCTION ACTIVITIES.
2015 ADT 200
2040 265
-Y- 583 / 699
154 / 197
46 / 68
475 / 570
-L-
PAVEMENT REMOVAL
FOR -L- PROFILE SEE SHEET 59
FOR -Y- PROFILE SEE SHEETS 75 & 76
FOR -Y1- PROFILE SEE SHEET 85
FOR -RPA- PROFILE SEE SHEET 78
FOR -FLYBD- PROFILE SEE SHEETS 79 & 80
FOR -LPB- PROFILE SEE SHEET 82
FOR -RPD- PROFILE SEE SHEET 81
GRAPHIC SCALE
50 25 0 50 100
PLANS
LOCATION: I-95 / I-295
TIP NO. U-2519AA-AB
COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF
CHECKED BY: MFR
DATE: 01/23/18

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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A Joint Venture

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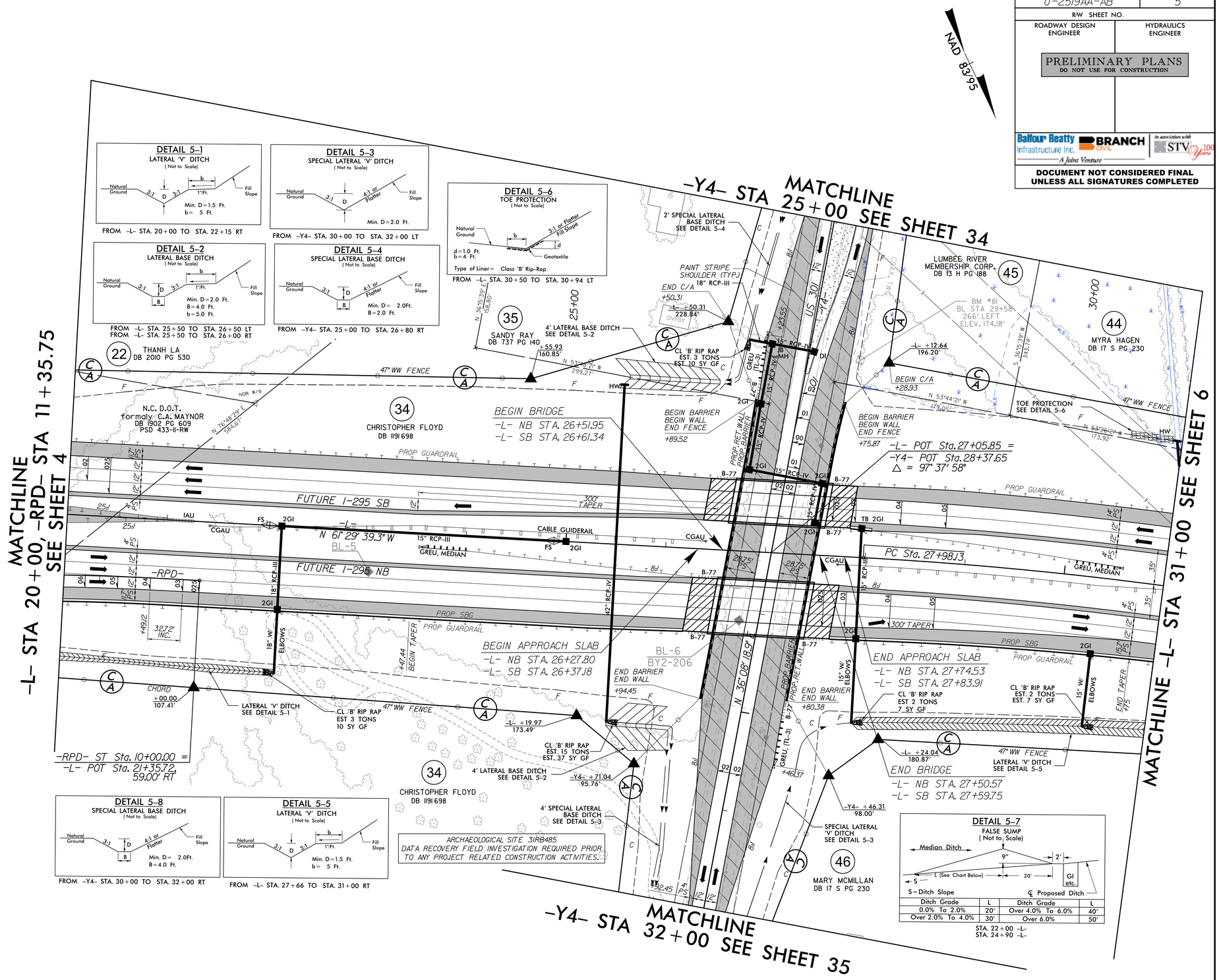

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

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hubb0

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DETAIL 6-3
FALSE SUMP
(Not to Scale)

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 32+10 -L-
STA. 35+60 -L-
STA. 37+60 -L-
STA. 43+40 -L-

DETAIL 6-5
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)

Length= 18.0 Ft.
Type of Liner= CL 'I' Rip-Rap - Keyed-In

STA. -L- 31+57 RT
STA. -L- 37+66 RT

DETAIL 6-1
LATERAL 'V' DITCH
(Not to Scale)

Min. D=1.5 Ft.
b= 5 Ft.

FROM -L- STA. 31+00 TO STA. 31+60 RT

DETAIL 6-2
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Min. D=2.0 Ft.
B=8 Ft.

FROM -L- STA. 44+75 TO STA. 45+00 LT

DETAIL 6-7
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Min. D=2.0 Ft.
Max. d=2.0 Ft.
B=8 Ft.

Type of Liner= Class 'B' Rip-Rap

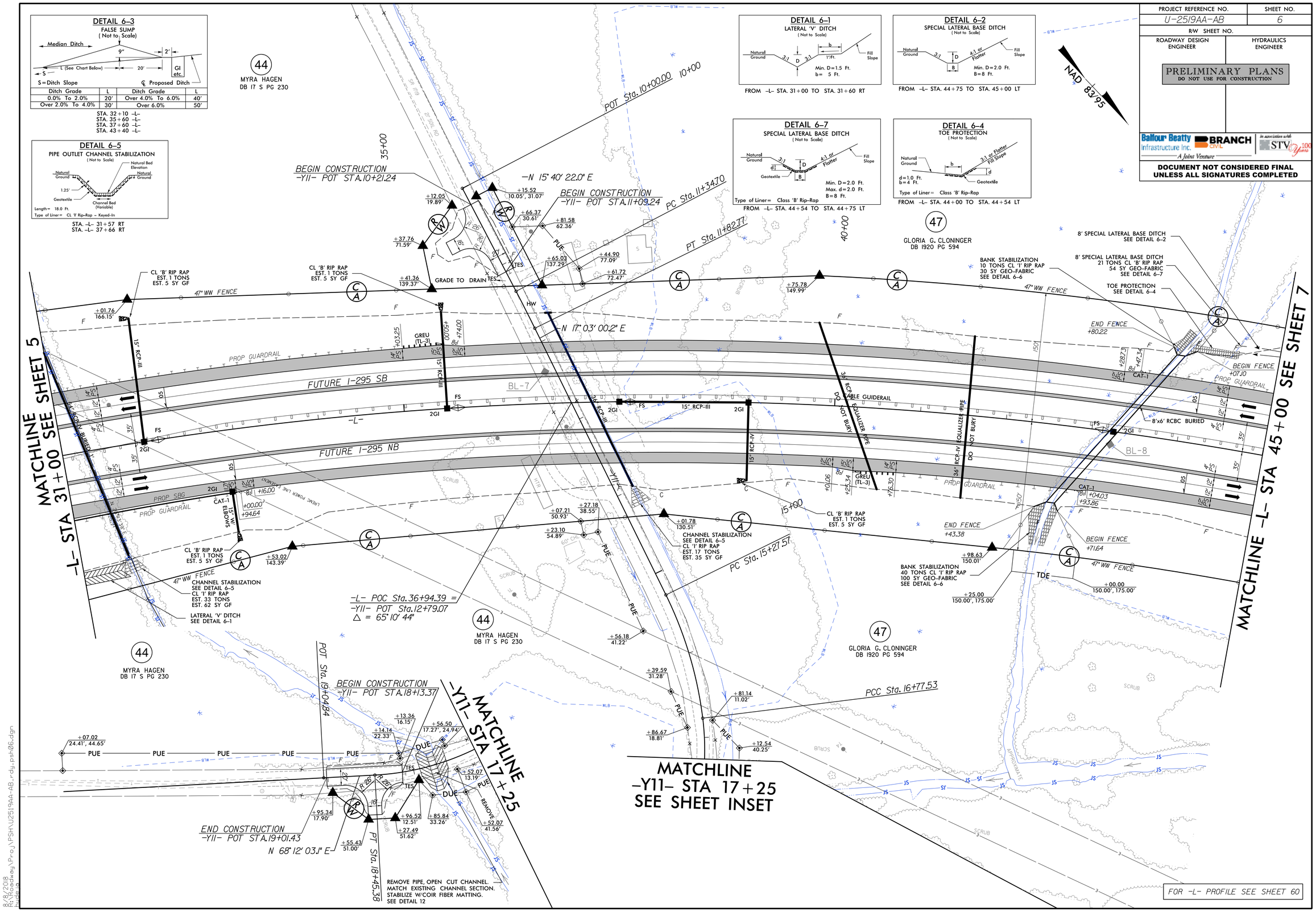
FROM -L- STA. 44+54 TO STA. 44+75 LT

DETAIL 6-4
TOE PROTECTION
(Not to Scale)

d=1.0 Ft.
b=4 Ft.

Type of Liner= Class 'B' Rip-Rap

FROM -L- STA. 44+00 TO STA. 44+54 LT



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hudspeth

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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A Joint Venture

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DETAIL 7-3
SPECIAL LATERAL BASE DITCH
(Not to Scale)

FROM -L- STA. 45+00 TO STA. 46+00 LT

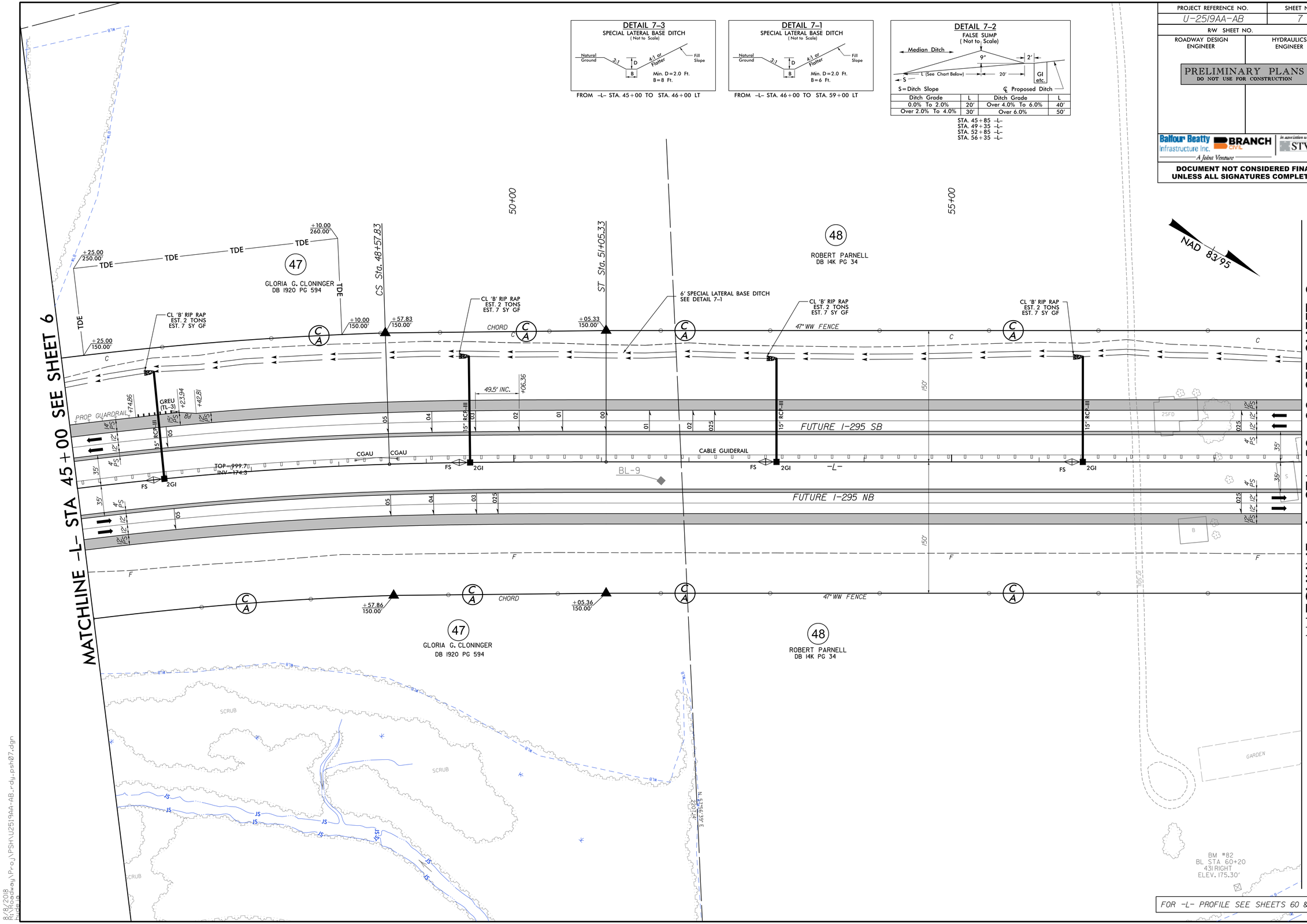
DETAIL 7-1
SPECIAL LATERAL BASE DITCH
(Not to Scale)

FROM -L- STA. 46+00 TO STA. 59+00 LT

DETAIL 7-2
FALSE SUMP
(Not to Scale)

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 45+85 -L-
STA. 49+35 -L-
STA. 52+85 -L-
STA. 56+35 -L-



FOR -L- PROFILE SEE SHEETS 60 & 61

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hulsey

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
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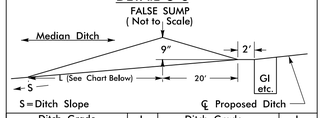
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

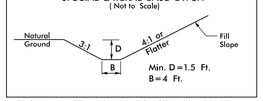
DETAIL 8-3
FALSE SUMP
(Not to Scale)



Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

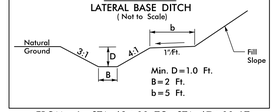
STA. 59+85 -L-
STA. 63+35 -L-
STA. 66+85 -L-
STA. 69+45 -L-

DETAIL 8-1
SPECIAL LATERAL BASE DITCH
(Not to Scale)



FROM -L- STA. 59+00 TO STA. 63+00 LT

DETAIL 8-2
LATERAL BASE DITCH
(Not to Scale)



FROM -L- STA. 63+00 TO STA. 67+00 LT

NAD 83/95

MATCHLINE -L- STA 59+00 SEE SHEET 7

MATCHLINE -L- STA 72+50 SEE SHEET 9

60+00 65+00 70+00

48
ROBERT PARNELL
DB 14K PG 34

CL 'B' RIP RAP
EST. 2 TONS
EST. 7 SY GF

4' SPECIAL LATERAL BASE DITCH
SEE DETAIL 8-1

2' LATERAL BASE DITCH
SEE DETAIL 8-2

47" WW FENCE

ROCK PLATING
150 TONS CL 'I' RIP RAP
240 SY GF

+30.00
264.00'

+86.00
223.00'

+30.00
150.00'

+22.00
150.00'

300' TAPER

BEGIN TAPER +53.12

+34.00

+55.26

+50.00

PROP. GUARDRAIL

PROP SBG

CAT-1

2GI

15" RCP-III

FUTURE I-295 SB

CABLE GUIDERAIL

FS

-L-

BL-11

N 29° 25' 00.5" W

FUTURE I-295 NB

BL-10

GREU, (TL-3)

+75.96

+99.96

CL 'B' RIP RAP
EST. 1 TONS
EST. 5 SY GF

48
ROBERT PARNELL
DB 14K PG 34

APPROXIMATE

S 39°00'20" E
85.80'

S 12°45'20" E
86.46'

S 51°00'20" E
146.52'

S 11°00'20" E
98.40'

FOR -L- PROFILE SEE SHEET 61

8/8/2018
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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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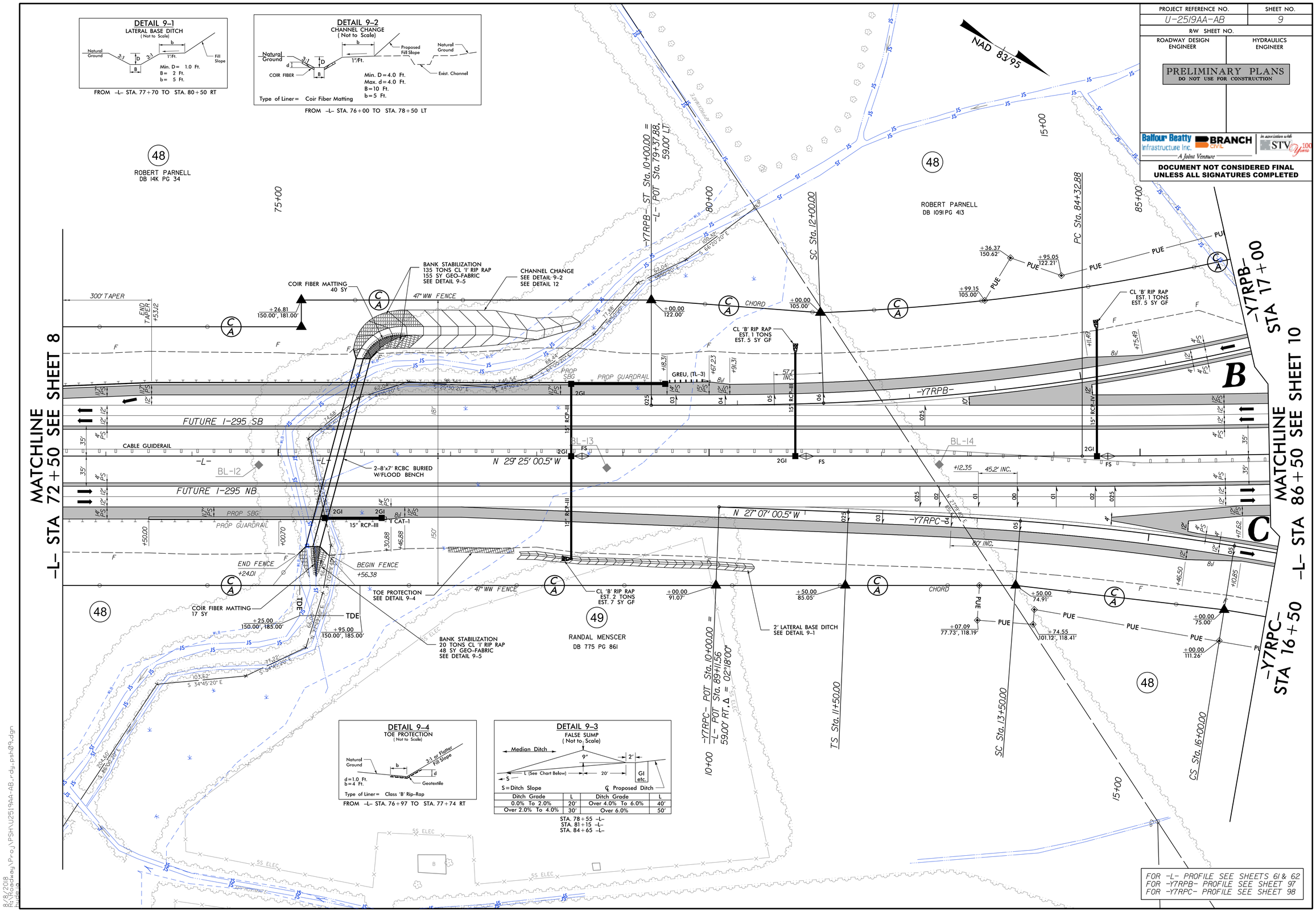

DETAIL 9-1
LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, B, 3:1, b, 1:1 Ft., Fill Slope

Min. D = 1.0 Ft.
B = 2 Ft.
b = 5 Ft.

FROM -L- STA. 77+70 TO STA. 80+50 RT

DETAIL 9-2
CHANNEL CHANGE
(Not to Scale)

Natural Ground, 3:1, D, d, COIR FIBER, B, b, 1:1 Ft., Proposed Fill Slope, Natural Ground, Exist. Channel

Min. D = 4.0 Ft.
Max. d = 4.0 Ft.
B = 10 Ft.
b = 5 Ft.

Type of Liner = Coir Fiber Matting

FROM -L- STA. 76+00 TO STA. 78+50 LT

DETAIL 9-4
TOE PROTECTION
(Not to Scale)

Natural Ground, b, 3:1 or Flatter Fill Slope, d, Geotextile

d = 1.0 Ft.
b = 4 Ft.

Type of Liner = Class 'B' Rip-Rap

FROM -L- STA. 76+97 TO STA. 77+74 RT

DETAIL 9-3
FALSE SUMP
(Not to Scale)

Median Ditch, 9", 2', L (See Chart Below), 20', GI etc., S

S = Ditch Slope
℄ Proposed Ditch

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 78+55 -L-
STA. 81+15 -L-
STA. 84+65 -L-

FOR -L- PROFILE SEE SHEETS 61 & 62
FOR -Y7RPB- PROFILE SEE SHEET 97
FOR -Y7RPC- PROFILE SEE SHEET 98

8/8/2018
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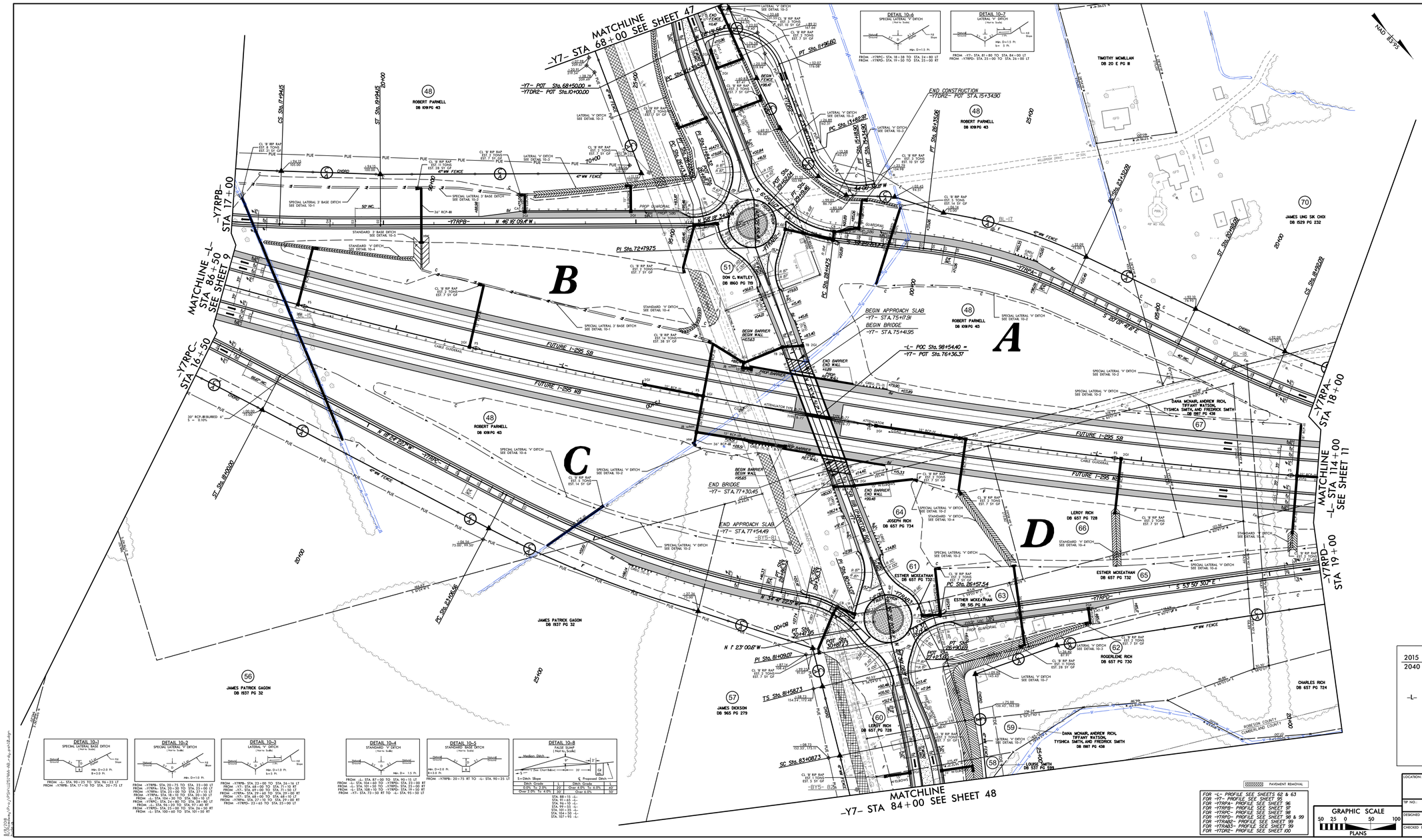
bridge



DETAIL 10-4
SPECIAL LATERAL "V" DITCH
(Not To Scale)
Min. D=1.5 Ft.

DETAIL 10-7
LATERAL "V" DITCH
(Not To Scale)
Min. D=1.5 Ft.
b= 5 Ft.

FROM -Y7RPC- STA 18+38 TO STA 24+80 LT
FROM -Y7RPD- STA. 19+50 TO STA. 23+00 RT

FROM -Y7- STA. 81+80 TO STA. 84+00 LT
FROM -Y7RPD- STA. 23+00 TO STA. 26+00 LT

DETAIL 10-1
SPECIAL LATERAL BASE DITCH
(Not To Scale)
Min. D=2.0 Ft.
B=3.0 Ft.

FROM -Y7RPB- STA. 20+75 TO STA. 24+16 LT
FROM -L- STA. 90+25 TO STA. 96+25 LT

DETAIL 10-2
SPECIAL LATERAL "V" DITCH
(Not To Scale)
Min. D=1.0 Ft.

FROM -Y7RPB- STA. 20+75 TO STA. 23+00 LT
FROM -Y7RPA- STA. 20+30 TO STA. 23+80 LT
FROM -Y7RPA- STA. 33+80 TO STA. 37+15 LT
FROM -Y7RPD- STA. 19+50 TO STA. 23+00 RT
FROM -L- STA. 104+30 TO STA. 105+15 LT
FROM -Y7RPC- STA. 24+80 TO STA. 28+80 LT
FROM -L- STA. 96+20 TO STA. 97+40 RT
FROM -Y7RPD- STA. 23+00 TO STA. 26+00 RT
FROM -L- STA. 100+80 TO STA. 101+50 RT

DETAIL 10-3
LATERAL "V" DITCH
(Not To Scale)
Min. D=1.0 Ft.
b=3 Ft.

FROM -Y7RPB- STA. 23+00 TO STA. 26+16 LT
FROM -Y7- STA. 68+00 TO STA. 71+10 RT
FROM -Y7- STA. 69+00 TO STA. 71+50 LT
FROM -Y7RPB- STA. 23+00 TO STA. 26+00 RT
FROM -Y7- STA. 68+00 TO STA. 68+10 LT
FROM -Y7RPA- STA. 37+10 TO STA. 39+00 RT
FROM -Y7RPD- 23+68 TO STA. 23+00 LT

DETAIL 10-4
STANDARD "V" DITCH
(Not To Scale)
Min. D= 1.5 Ft.

FROM -Y7RPB- STA. 87+00 TO STA. 90+15 LT
FROM -L- STA. 104+60 TO -Y7RPD- STA. 23+00 RT
FROM -L- STA. 101+50 TO -Y7RPD- STA. 23+00 RT
FROM -L- STA. 108+10 TO -Y7DR2- STA. 19+50 RT
FROM -Y7- STA. 73+50 RT TO -L- STA. 93+50 LT

DETAIL 10-5
STANDARD "A" DITCH
(Not To Scale)
Min. D=2.0 Ft.
B=3.0 Ft.

FROM -Y7RPB- 20+75 RT TO -L- STA. 90+25 LT

DETAIL 10-8
FALSE SUMP
(Not To Scale)

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	30'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	35'	Over 6.0%	50'

STA. 88+15 -L-
STA. 91+65 -L-
STA. 97+50 -L-
STA. 99+35 -L-
STA. 101+35 -L-
STA. 104+80 -L-
STA. 107+95 -L-

PAVEMENT REMOVAL

FOR -L- PROFILE SEE SHEETS 62 & 63
FOR -Y7- PROFILE SEE SHEET 95
FOR -Y7RPA- PROFILE SEE SHEET 96
FOR -Y7RPB- PROFILE SEE SHEET 97
FOR -Y7RPC- PROFILE SEE SHEET 98
FOR -Y7RPD- PROFILE SEE SHEET 98 & 99
FOR -Y7RAB2- PROFILE SEE SHEET 99
FOR -Y7RAB3- PROFILE SEE SHEET 99
FOR -Y7DR2- PROFILE SEE SHEET 100

2015/2040 ADT
-L- 200/265 21/32 7/14 42/66 16/24 38/56 226/299 50/80
-Y7- 200/265 21/32 7/14 42/66 16/24 38/56 226/299 50/80

GRAPHIC SCALE
50 25 0 50 100
PLANS

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Dewberry
BRANCH
STV

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOCATION: I-95 / PARKTON ROAD

TIP NO.: U-2519AA-AB
COUNTY: ROBESON / CUMBERLAND

DESIGNED BY: JAF
CHECKED BY: MFR
DATE: 01/23/18

NAD 83/92

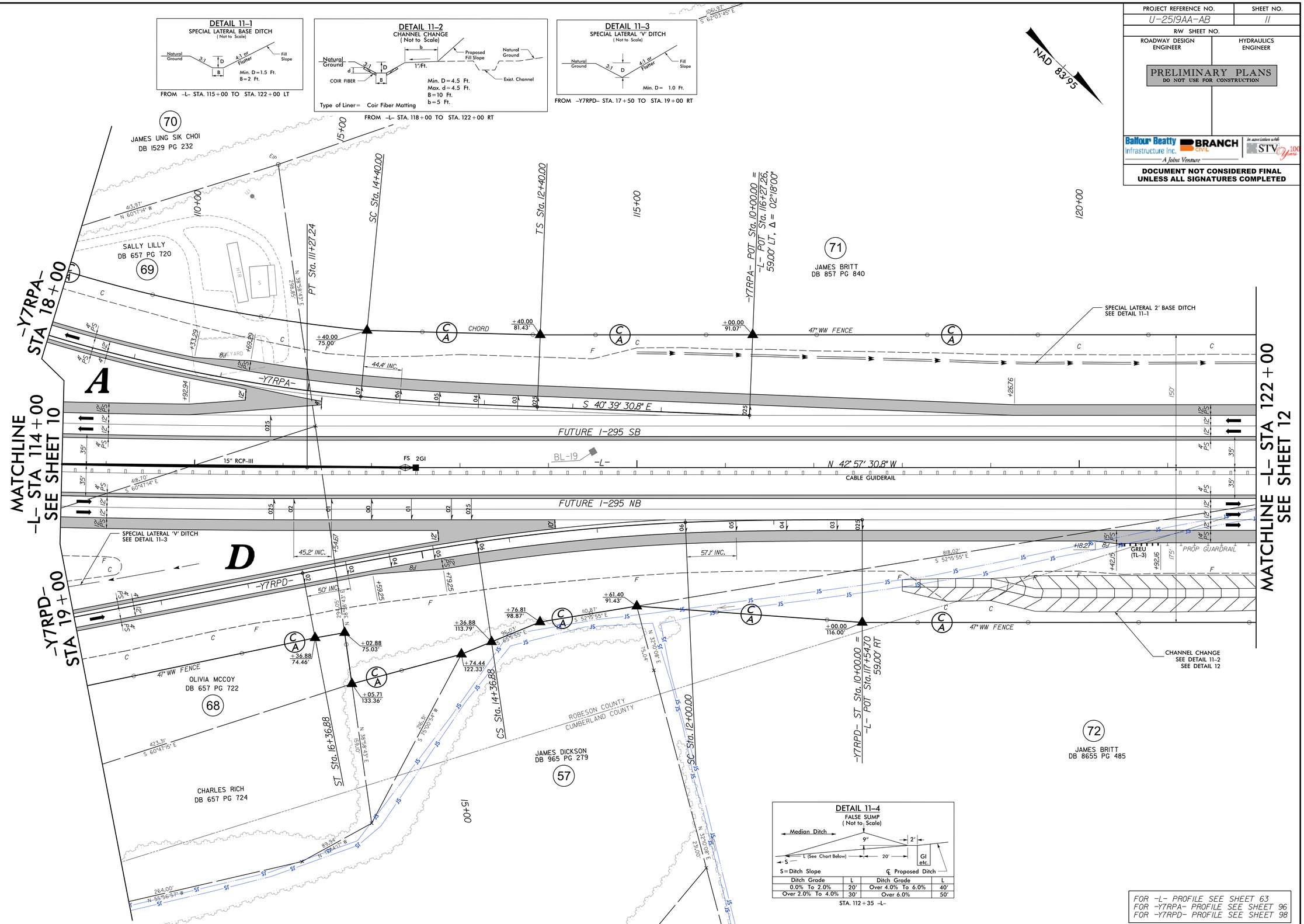
8/15/2018
jafarrell@stv.com
U:\PROJECTS\U2519AA-AB_r-9_pm10.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



8/8/2018
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bjdale

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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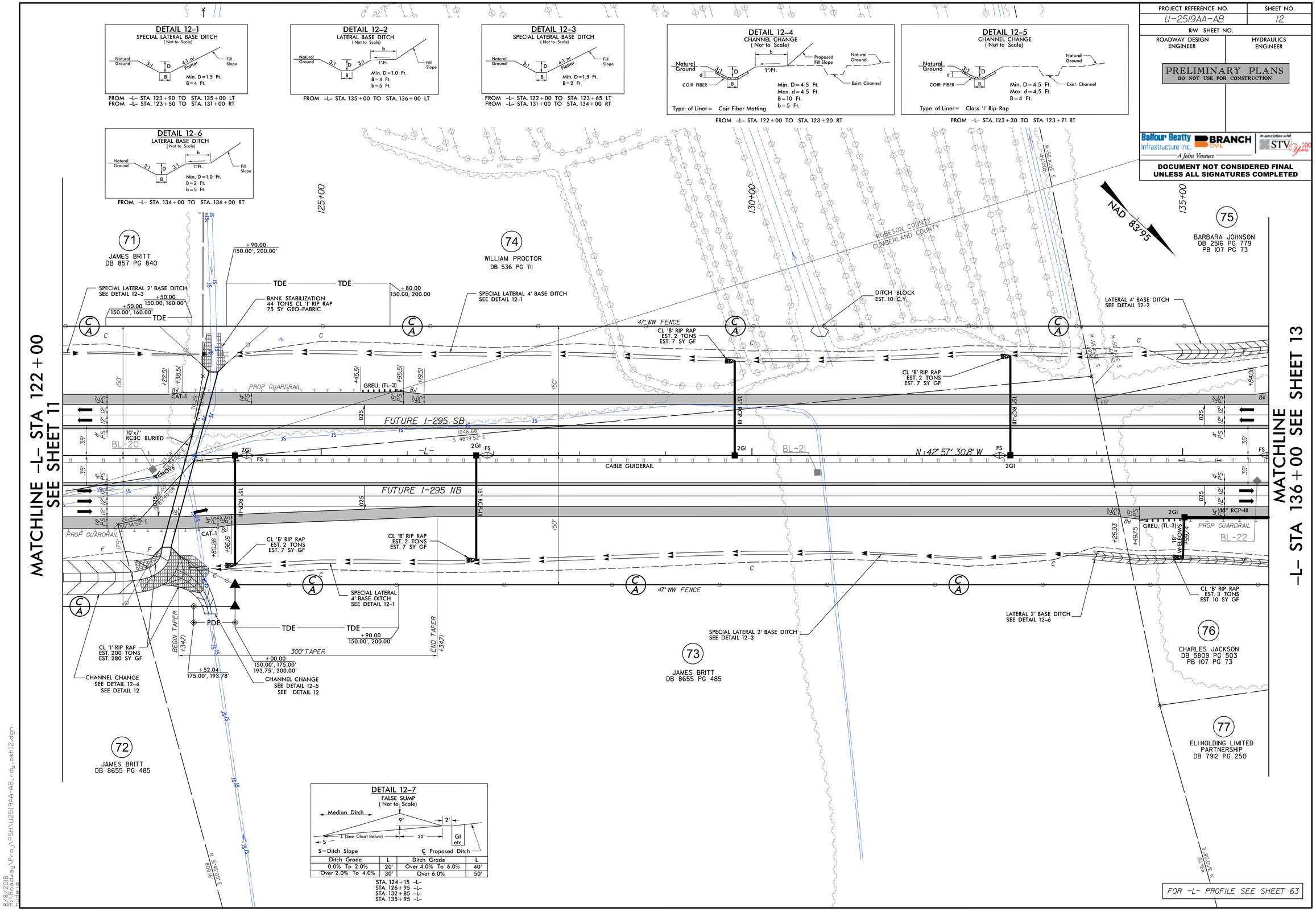
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOR -L- PROFILE SEE SHEET 63

8/6/2018
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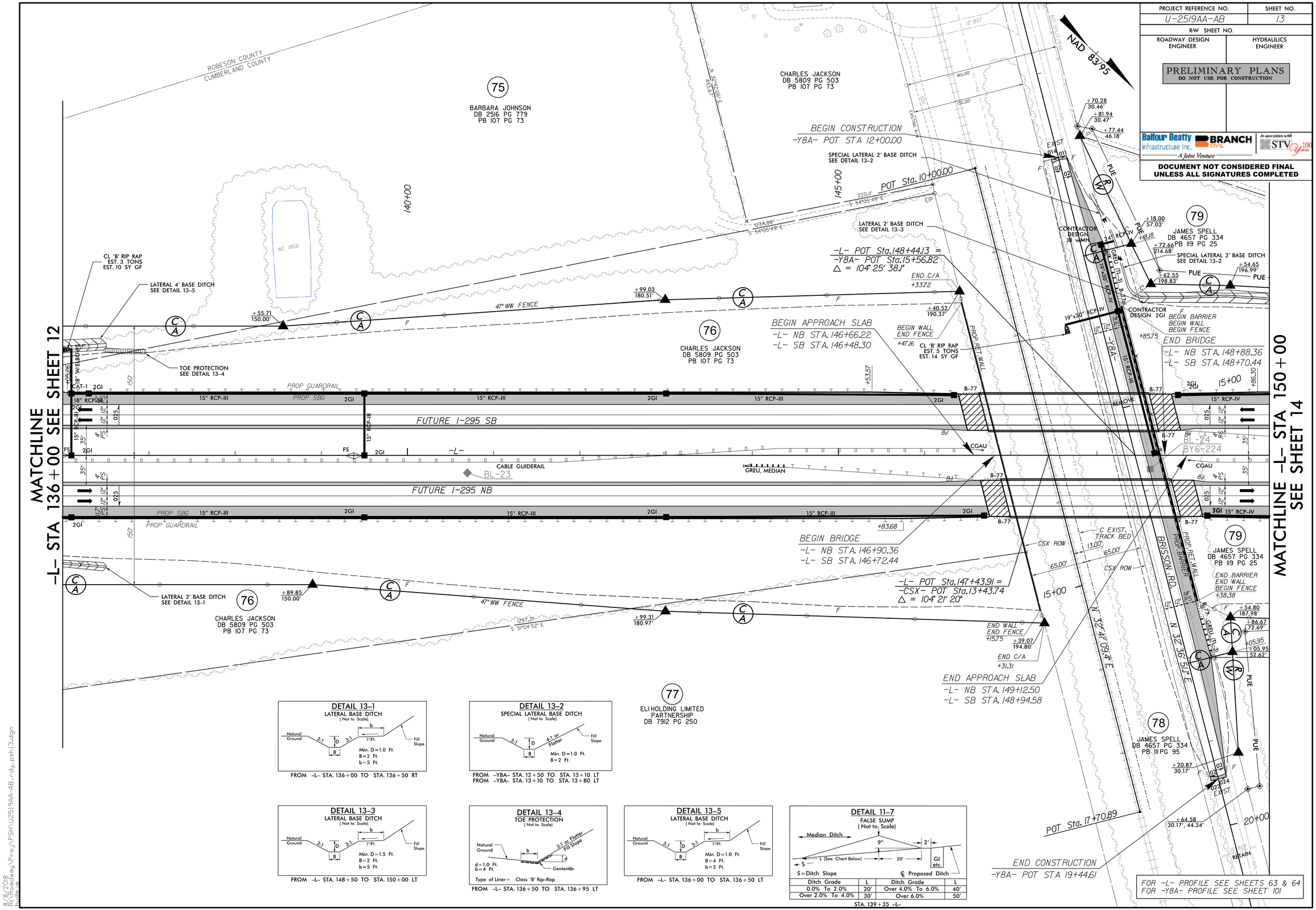
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DETAIL 13-1
LATERAL BASE DITCH
(Not to Scale)

FROM -L- STA. 136+00 TO STA. 136+50 RT

DETAIL 13-2
SPECIAL LATERAL BASE DITCH
(Not to Scale)

FROM -Y8A- STA. 12+50 TO STA. 13+10 LT
FROM -Y8A- STA. 13+10 TO STA. 13+80 LT

DETAIL 13-3
LATERAL BASE DITCH
(Not to Scale)

FROM -L- STA. 148+50 TO STA. 150+00 LT

DETAIL 13-4
TOE PROTECTION
(Not to Scale)

Type of Liner= Class 'B' Rip-Rap

FROM -L- STA. 136+50 TO STA. 136+95 LT

DETAIL 13-5
LATERAL BASE DITCH
(Not to Scale)

FROM -L- STA. 136+00 TO STA. 136+50 LT

DETAIL 11-7
FALSE SUMP
(Not to Scale)

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 139+35 -L-

8/8/2018
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bjdale

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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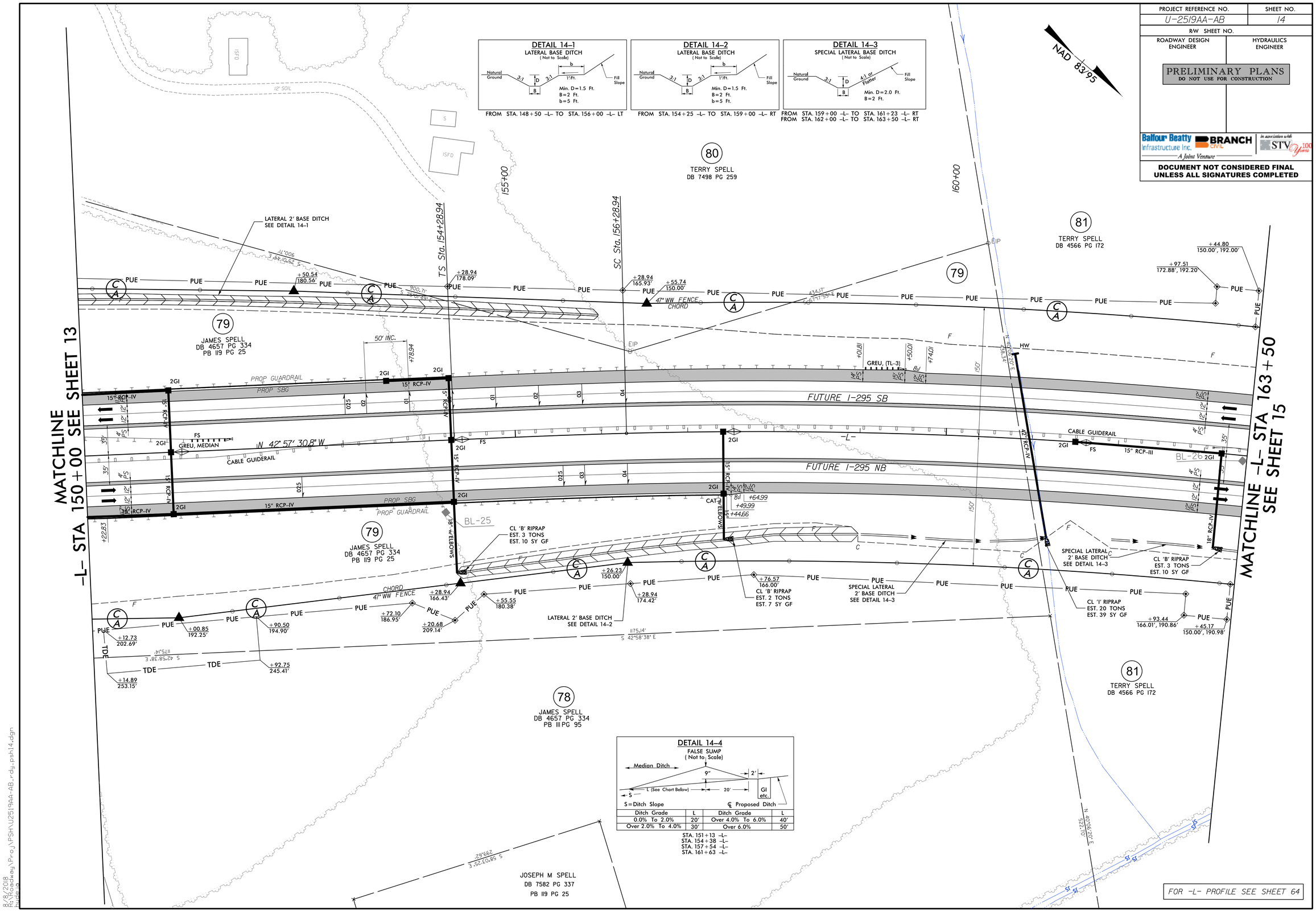
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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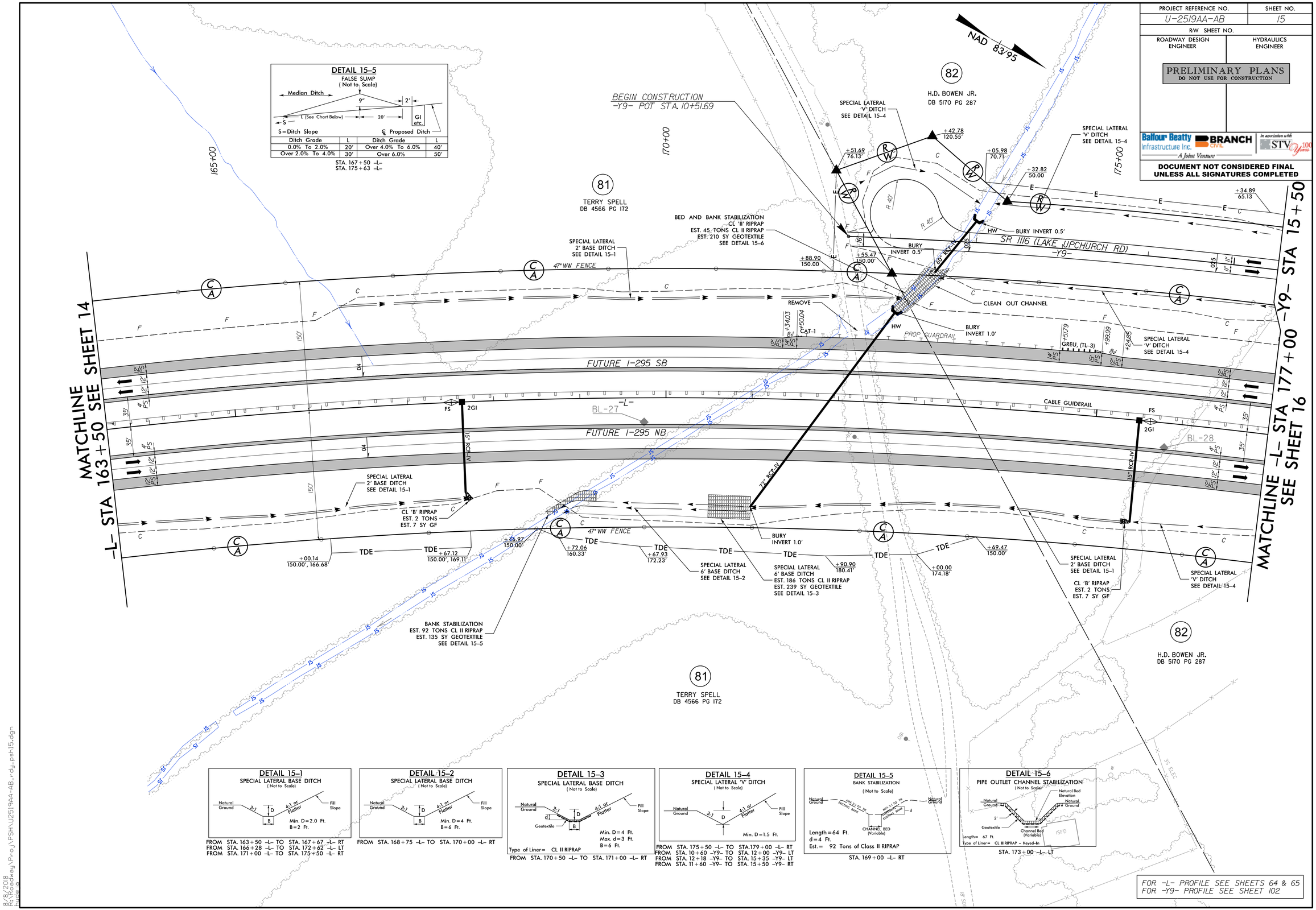
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DETAIL 15-5
FALSE SUMP
(Not to Scale)

Median Ditch; 9"; 2'; L (See Chart Below); S; 20'; GI etc.; S=Ditch Slope; ℄ Proposed Ditch

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 167+50 -L-
STA. 175+63 -L-

DETAIL 15-1
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground; 3:1; D; B; 4:1 or Flatter; Fill Slope; Min. D=2.0 Ft. B=2 Ft.

FROM STA. 163+50 -L- TO STA. 167+67 -L- RT
FROM STA. 166+28 -L- TO STA. 172+62 -L- LT
FROM STA. 171+00 -L- TO STA. 175+50 -L- RT

DETAIL 15-2
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground; 3:1; D; B; 4:1 or Flatter; Fill Slope; Min. D=4 Ft. B=6 Ft.

FROM STA. 168+75 -L- TO STA. 170+00 -L- RT

DETAIL 15-3
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground; 3:1; d; D; B; Geotextile; 4:1 or Flatter; Fill Slope; Min. D=4 Ft. Max. d=3 Ft. B=6 Ft.

Type of Liner= CL II RIPRAP

FROM STA. 170+50 -L- TO STA. 171+00 -L- RT

DETAIL 15-4
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Natural Ground; 3:1; D; 4:1 or Flatter; Fill Slope; Min. D=1.5 Ft.

FROM STA. 175+50 -L- TO STA.179+00 -L- RT
FROM STA. 10+60 -Y9- TO STA. 12+00 -Y9- LT
FROM STA. 12+18 -Y9- TO STA. 15+35 -Y9- LT
FROM STA. 11+60 -Y9- TO STA. 15+50 -Y9- RT

DETAIL 15-5
BANK STABILIZATION
(Not to Scale)

Natural Ground; MIN. 2:1 TO 3:1 EXISTING BANK; MIN. 2:1 TO 3:1 EXISTING BANK; d; CHANNEL BED (Variable); Natural Ground

Length=64 Ft.
d=4 Ft.
Est.= 92 Tons of Class II RIPRAP

STA. 169+00 -L- RT

DETAIL 15-6
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)

Natural Ground; Natural Bed Elevation; Natural Ground; 2'; Geotextile; Channel Bed (Variable); ISFD; Length= 67 Ft.
Type of Liner= CL II RIPRAP - Keyed-In

STA. 173+00 -L- LT

8/8/2018
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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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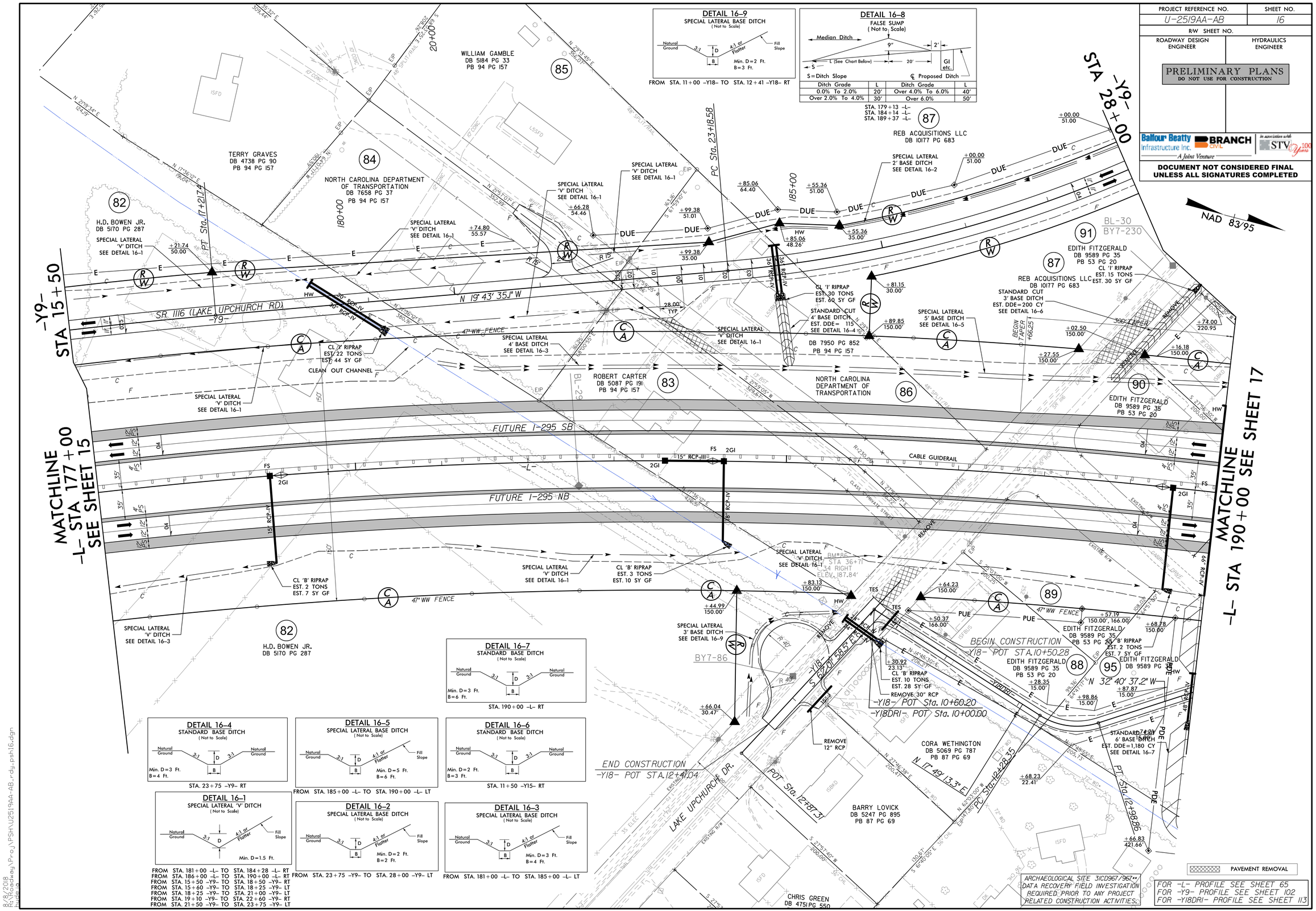
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DETAIL 16-9
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, B, 4:1 or Flatter, Fill Slope
Min. D=2 Ft.
B=3 Ft.

FROM STA. 11+00 -Y18- TO STA. 12+41 -Y18- RT

DETAIL 16-8
FALSE SUMP
(Not to Scale)

Median Ditch, 9", 2', L (See Chart Below), 20', GI etc., S
S=Ditch Slope
℄ Proposed Ditch

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 179+13 -L-
STA. 184+14 -L-
STA. 189+37 -L-

DETAIL 16-7
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, 3:1, Natural Ground, B
Min. D=3 Ft.
B=6 Ft.

STA. 190+00 -L- RT

DETAIL 16-4
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, 3:1, Natural Ground, B
Min. D=3 Ft.
B=4 Ft.

STA. 23+75 -Y9- RT

DETAIL 16-5
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, 4:1 or Flatter, Fill Slope, B
Min. D=5 Ft.
B=6 Ft.

FROM STA. 185+00 -L- TO STA. 190+00 -L- LT

DETAIL 16-6
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, 3:1, Natural Ground, B
Min. D=2 Ft.
B=3 Ft.

STA. 11+50 -Y15- RT

DETAIL 16-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Natural Ground, 3:1, D, 4:1 or Flatter, Fill Slope
Min. D=1.5 Ft.

FROM STA. 181+00 -L- TO STA. 184+28 -L- RT
FROM STA. 186+00 -L- TO STA. 190+00 -L- RT
FROM STA. 15+50 -Y9- TO STA. 18+50 -Y9- RT
FROM STA. 15+60 -Y9- TO STA. 18+25 -Y9- LT
FROM STA. 18+25 -Y9- TO STA. 21+00 -Y9- LT
FROM STA. 19+10 -Y9- TO STA. 22+60 -Y9- RT
FROM STA. 21+50 -Y9- TO STA. 23+75 -Y9- LT

DETAIL 16-2
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, 4:1 or Flatter, Fill Slope, B
Min. D=2 Ft.
B=2 Ft.

FROM STA. 23+75 -Y9- TO STA. 28+00 -Y9- LT

DETAIL 16-3
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, 4:1 or Flatter, Fill Slope, B
Min. D=3 Ft.
B=4 Ft.

FROM STA. 181+00 -L- TO STA. 185+00 -L- LT

8/8/2018
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hilgrim

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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A Joint Venture

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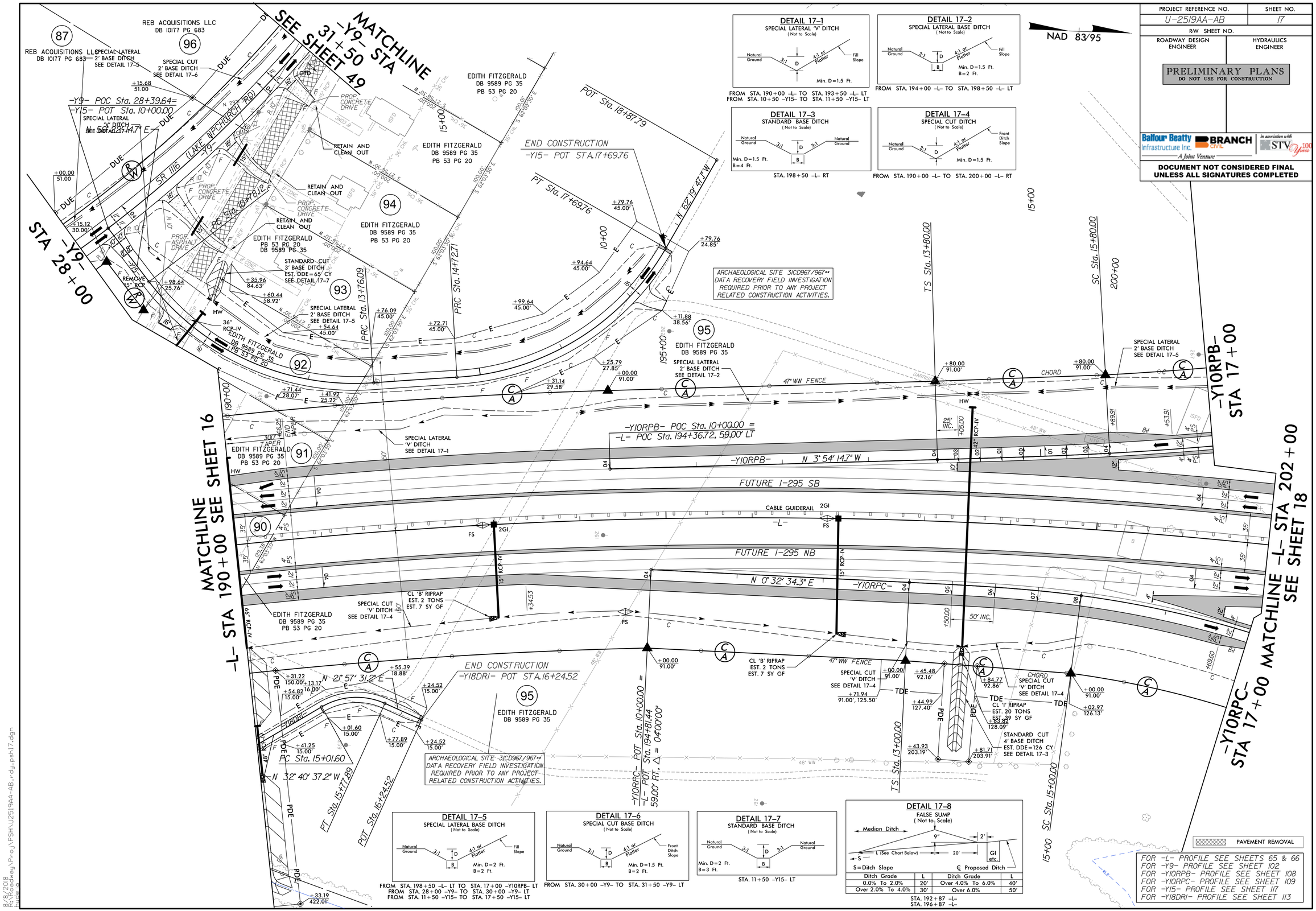
NAD 83/95



DETAIL 17-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Natural Ground, 3:1, D, 4:1 or Flatter, Fill Slope
Min. D=1.5 Ft.

FROM STA. 190+00 -L- TO STA. 193+50 -L- LT
FROM STA. 10+50 -Y15- TO STA. 11+50 -Y15- LT

DETAIL 17-2
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, B, 4:1 or Flatter, Fill Slope
Min. D=1.5 Ft.
B=2 Ft.

FROM STA. 194+00 -L- TO STA. 198+50 -L- LT

DETAIL 17-3
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, B, 3:1, Natural Ground
Min. D=1.5 Ft.
B=4 Ft.

STA. 198+50 -L- RT

DETAIL 17-4
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground, 3:1, D, 4:1 or Flatter, Front Ditch Slope
Min. D=1.5 Ft.

FROM STA. 190+00 -L- TO STA. 200+00 -L- RT

DETAIL 17-5
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, B, 4:1 or Flatter, Fill Slope
Min. D=2 Ft.
B=2 Ft.

FROM STA. 198+50 -L- LT TO STA. 17+00 -Y10RPB- LT
FROM STA. 28+00 -Y9- TO STA. 30+00 -Y9- LT
FROM STA. 11+50 -Y15- TO STA. 17+50 -Y15- LT

DETAIL 17-6
SPECIAL CUT BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, B, 4:1 or Flatter, Front Ditch Slope
Min. D=1.5 Ft.
B=2 Ft.

FROM STA. 30+00 -Y9- TO STA. 31+50 -Y9- LT

DETAIL 17-7
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, B, 3:1, Natural Ground
Min. D=2 Ft.
B=3 Ft.

STA. 11+50 -Y15- LT

DETAIL 17-8
FALSE SUMP
(Not to Scale)

Median Ditch, 9", 2', L (See Chart Below), S, 20', GI etc.
S=Ditch Slope
℄ Proposed Ditch

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 192+87 -L-
STA. 196+87 -L-

FOR -L- PROFILE SEE SHEETS 65 & 66
FOR -Y9- PROFILE SEE SHEET 102
FOR -Y10RPB- PROFILE SEE SHEET 108
FOR -Y10RPC- PROFILE SEE SHEET 109
FOR -Y15- PROFILE SEE SHEET 117
FOR -Y18DRI- PROFILE SEE SHEET 113

8/8/2018
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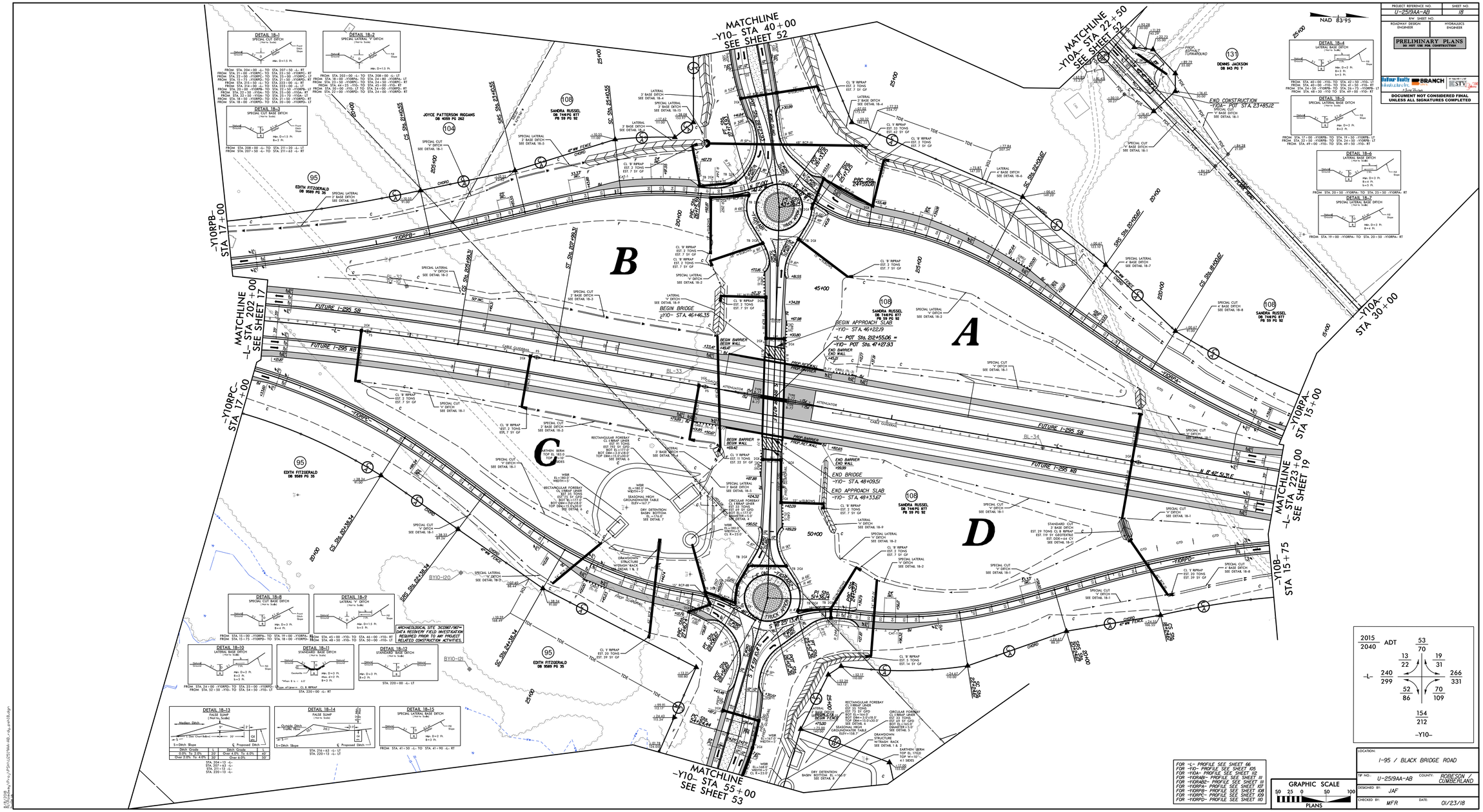
hudson


MATCHLINE -Y10- STA 40+00 SEE SHEET 52
MATCHLINE -Y10A- STA 22+50 SEE SHEET 52
MATCHLINE -L- STA 202+00 SEE SHEET 17
MATCHLINE -L- STA 223+00 SEE SHEET 19
MATCHLINE -Y10- STA 55+00 SEE SHEET 53
-Y10RPB- STA 17+00
-Y10RPC- STA 17+00
-Y10RPA- STA 15+00
-Y10A- 30+00
-Y10B- STA 15+75
A
B
C
D
FUTURE I-295 SB
FUTURE I-295 NB
BEGIN BRIDGE -Y10- STA 46+46.35
BEGIN APPROACH SLAB -Y10- STA 46+22.9
-L- POT Sta. 812+55.06 = -Y10- POT Sta. 46+21.93
END BRIDGE -Y10- STA 48+09.51
END APPROACH SLAB -Y10- STA 48+33.67
END CONSTRUCTION -Y10A- POT STA 23+85.12
JOYCE PATTERSON RIGGANS DB 4059 PG 262
SANDRA RUSSEL DB 746 PG 877 PB 59 PG 92
EDITH FITZGERALD DB 9589 PG 35
DENNIS JACKSON DB 843 PG 7
NAD 83/95
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
ARCHAEOLOGICAL SITE 31CU067/767 DATA REVIEW/ FIELD INVESTIGATION REQUIRED PRIOR TO ANY PROJECT RELATED CONSTRUCTION ACTIVITIES.
FOR -L- PROFILE SEE SHEET 66
FOR -Y10- PROFILE SEE SHEET 106
FOR -Y10A- PROFILE SEE SHEET 112
FOR -Y10RAB- PROFILE SEE SHEET 111
FOR -Y10RAC- PROFILE SEE SHEET 111
FOR -Y10RPA- PROFILE SEE SHEET 107
FOR -Y10RPB- PROFILE SEE SHEET 108
FOR -Y10RPC- PROFILE SEE SHEET 109
FOR -Y10RPD- PROFILE SEE SHEET 110
GRAPHIC SCALE
PLANS
2015 ADT 53/70
2040 ADT 13/22 19/31 240/299 266/331 52/86 70/109 154/212
-L- -Y10-
LOCATION: I-95 / BLACK BRIDGE ROAD
TIP NO.: U-2519AA-AB
COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF
CHECKED BY: MFR
DATE: 01/23/18

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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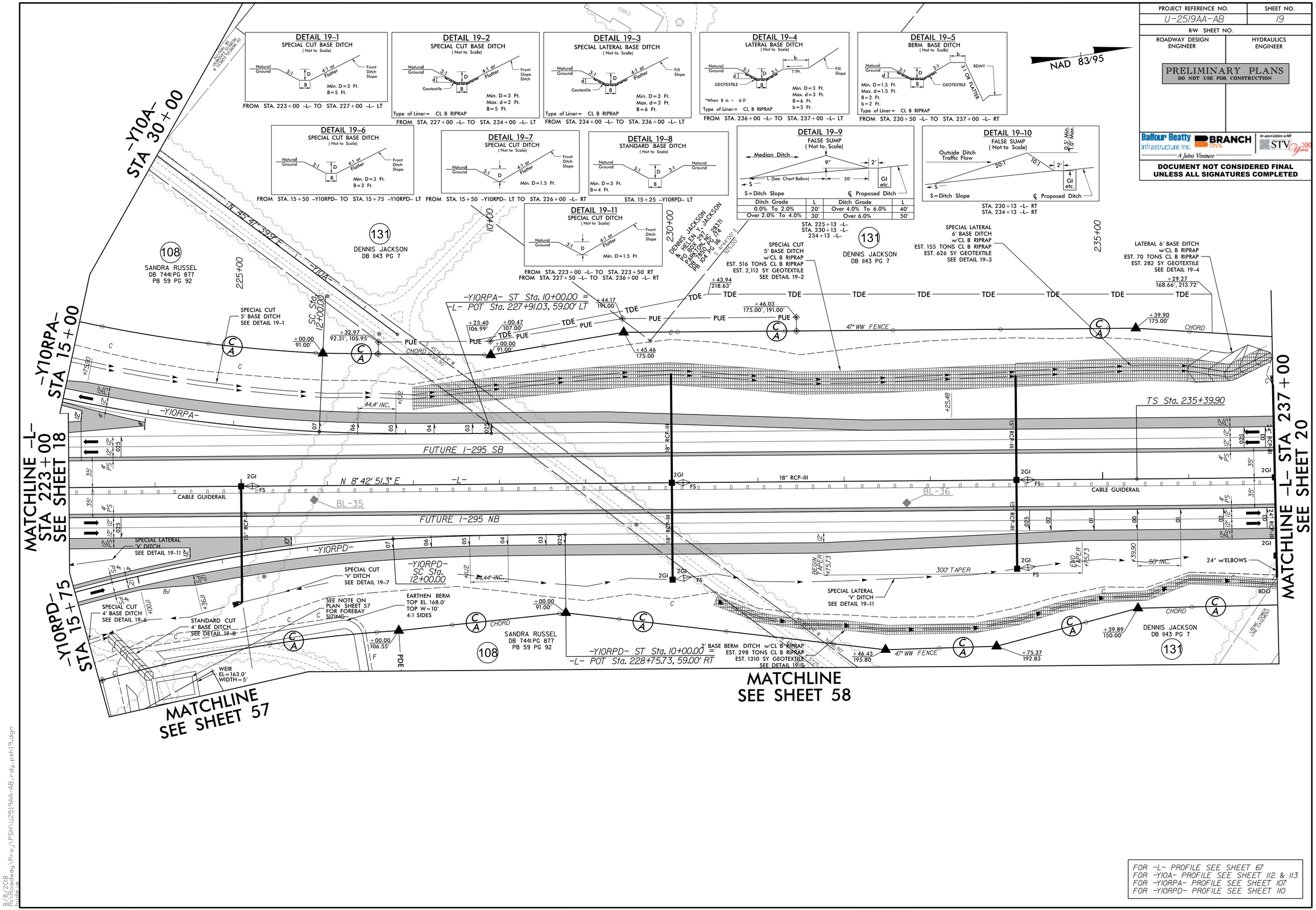

FOR -L- PROFILE SEE SHEET 67
FOR -Y10A- PROFILE SEE SHEET 112 & 113
FOR -Y10RPA- PROFILE SEE SHEET 107
FOR -Y10RPD- PROFILE SEE SHEET 110

8/8/2018
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hudgins

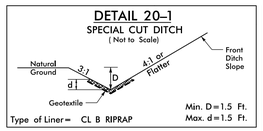
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | STV
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

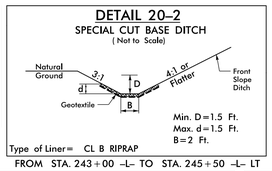
DETAIL 20-1
SPECIAL CUT DITCH
(Not to Scale)



Type of Liner= CL B RIPRAP

FROM STA. 238+00 -L- TO STA. 243+00 -L- LT

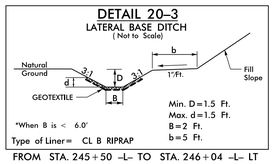
DETAIL 20-2
SPECIAL CUT BASE DITCH
(Not to Scale)



Type of Liner= CL B RIPRAP

FROM STA. 243+00 -L- TO STA. 245+50 -L- LT

DETAIL 20-3
LATERAL BASE DITCH
(Not to Scale)

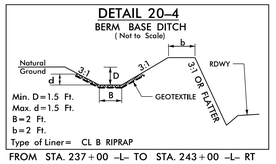


*When B is < 6.0'

Type of Liner= CL B RIPRAP

FROM STA. 245+50 -L- TO STA. 246+04 -L- LT

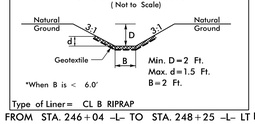
DETAIL 20-4
BERM BASE DITCH
(Not to Scale)



Type of Liner= CL B RIPRAP

FROM STA. 237+00 -L- TO STA. 243+00 -L- RT

DETAIL 20-5
STANDARD BASE DITCH
(Not to Scale)

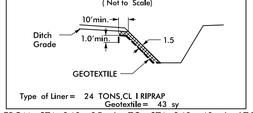


*When B is < 6.0'

Type of Liner= CL B RIPRAP

FROM STA. 246+04 -L- TO STA. 248+25 -L- LT

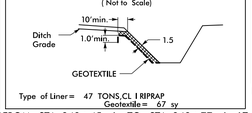
DETAIL 20-6
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 24 TONS,CL I RIPRAP
Geotextile= 43 sy

FROM STA. 248+25 -L- TO STA. 248+43 -L- LT

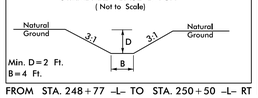
DETAIL 20-7
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 47 TONS,CL I RIPRAP
Geotextile= 67 sy

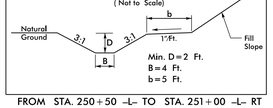
FROM STA. 248+45 -L- TO STA. 248+77 -L- LT

DETAIL 20-8
STANDARD BASE DITCH
(Not to Scale)

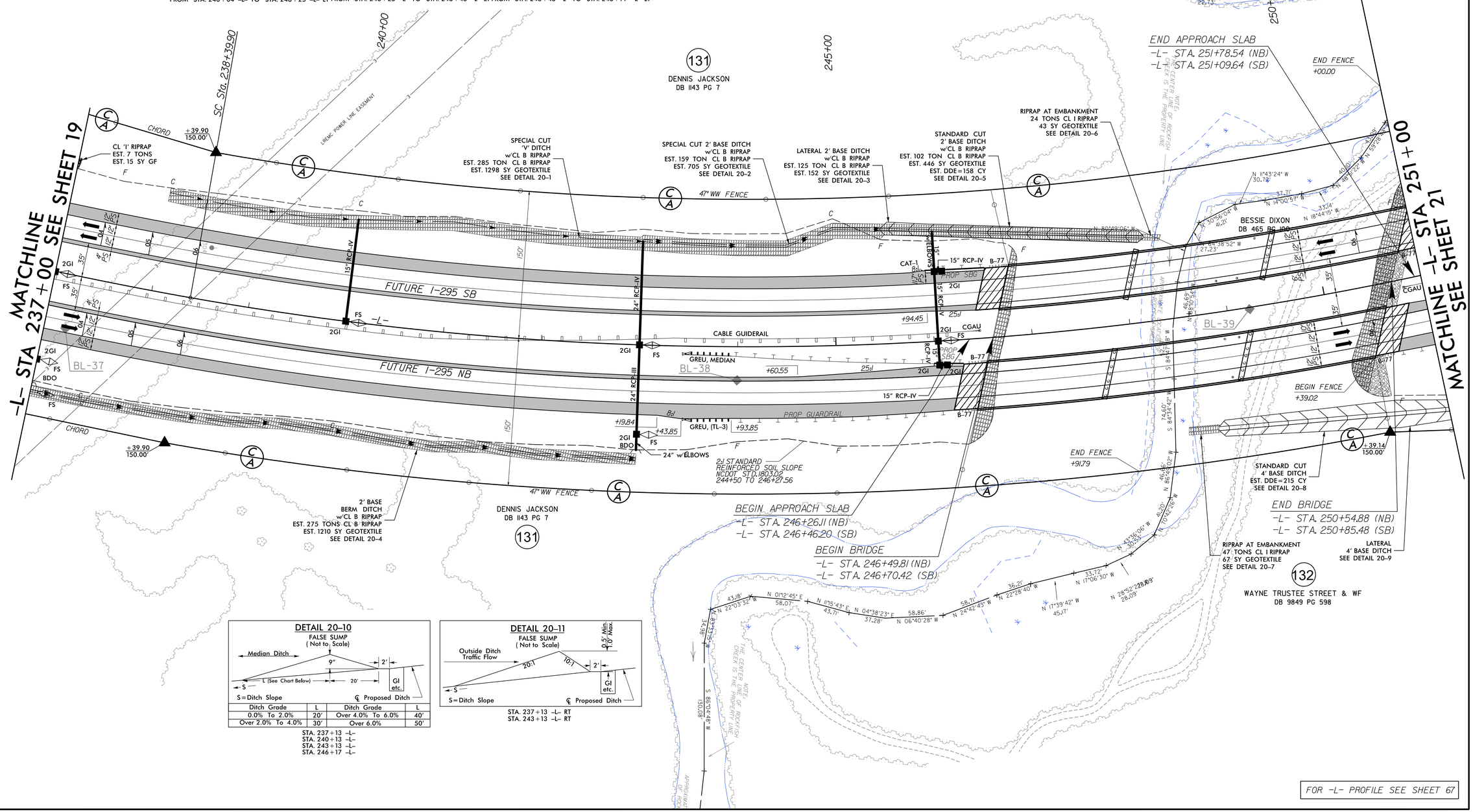


FROM STA. 248+77 -L- TO STA. 250+50 -L- RT

DETAIL 20-9
LATERAL BASE DITCH
(Not to Scale)



FROM STA. 250+50 -L- TO STA. 251+00 -L- RT



DETAIL 20-10
FALSE SUMP
(Not to Scale)

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 237+13 -L-
STA. 240+13 -L-
STA. 243+13 -L-
STA. 246+17 -L-

DETAIL 20-11
FALSE SUMP
(Not to Scale)

STA. 237+13 -L- RT
STA. 243+13 -L- RT

FOR -L- PROFILE SEE SHEET 67

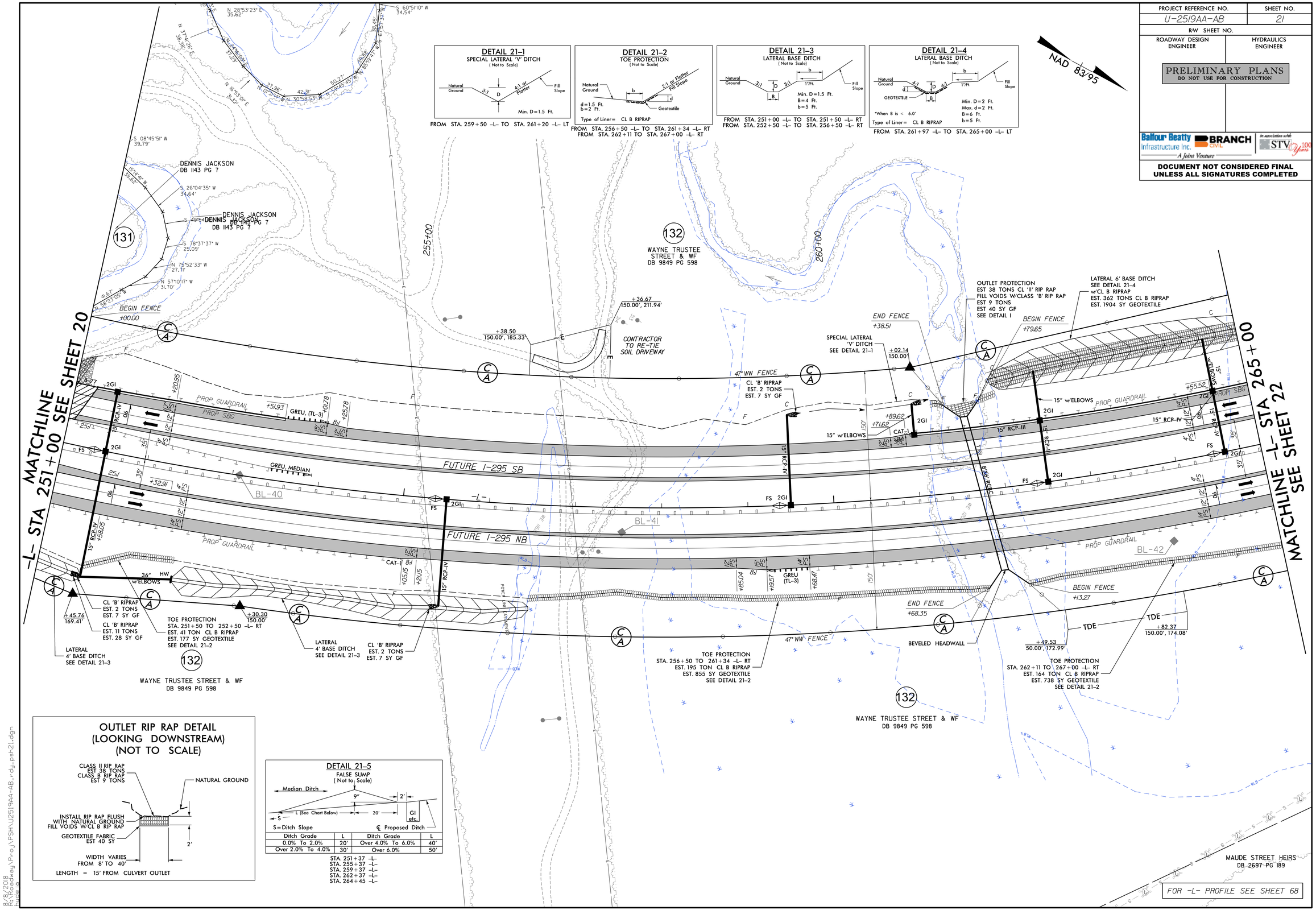
8/6/2018
R:\Roadway\Proj\PSH\U2519AA-AB_rdy_psh20.dgn
hulsey

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



8/8/2018
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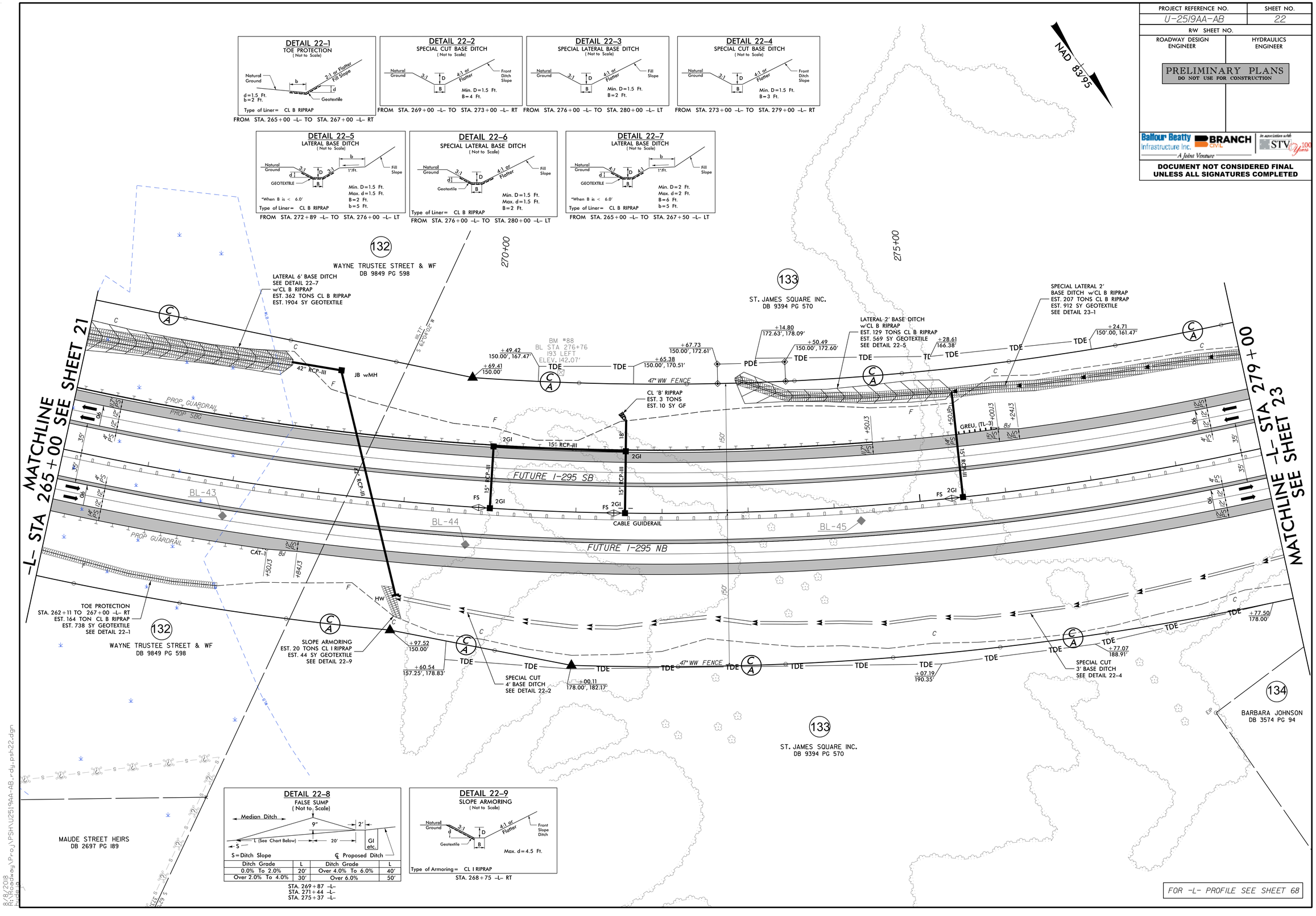
hvale

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

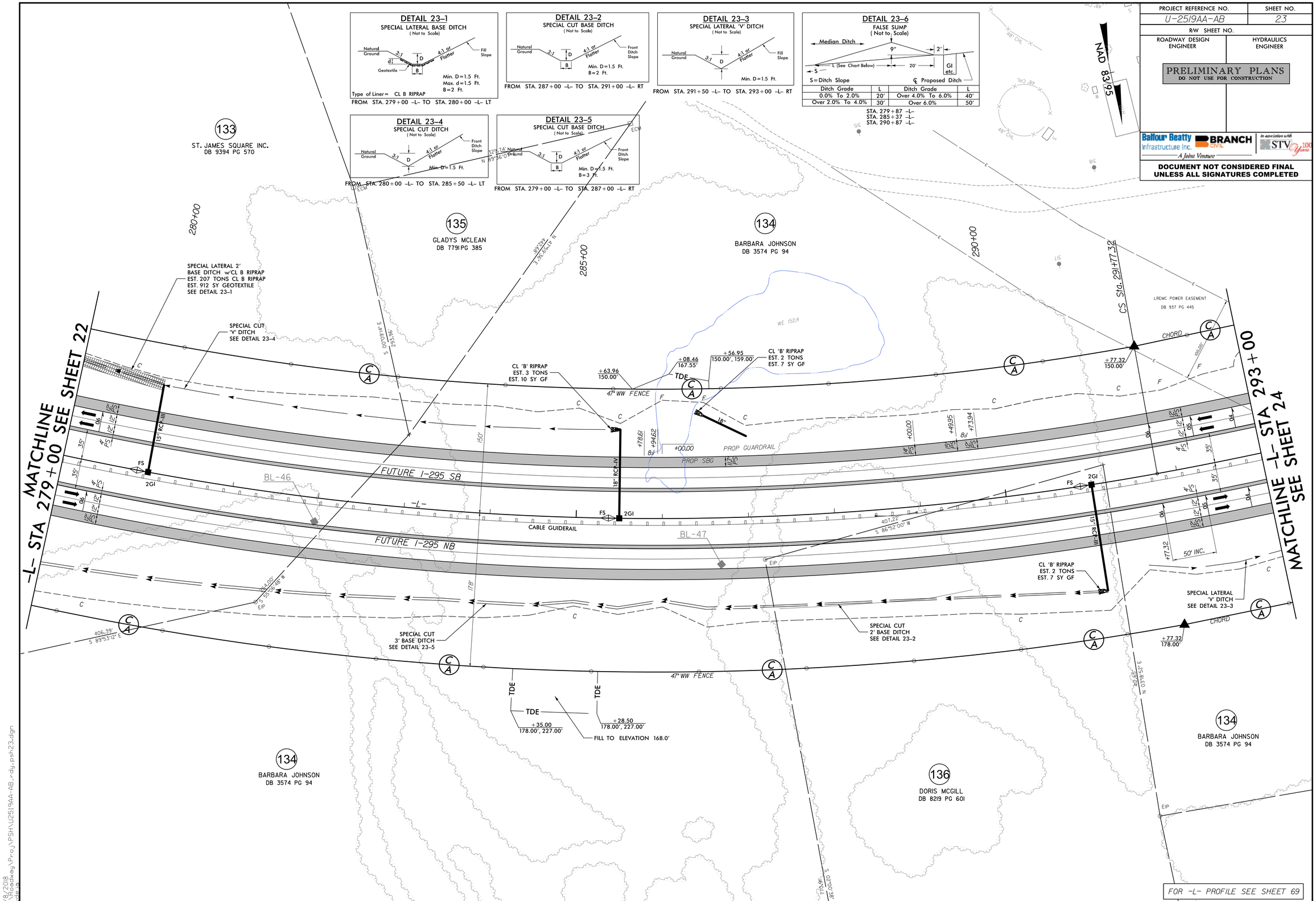


PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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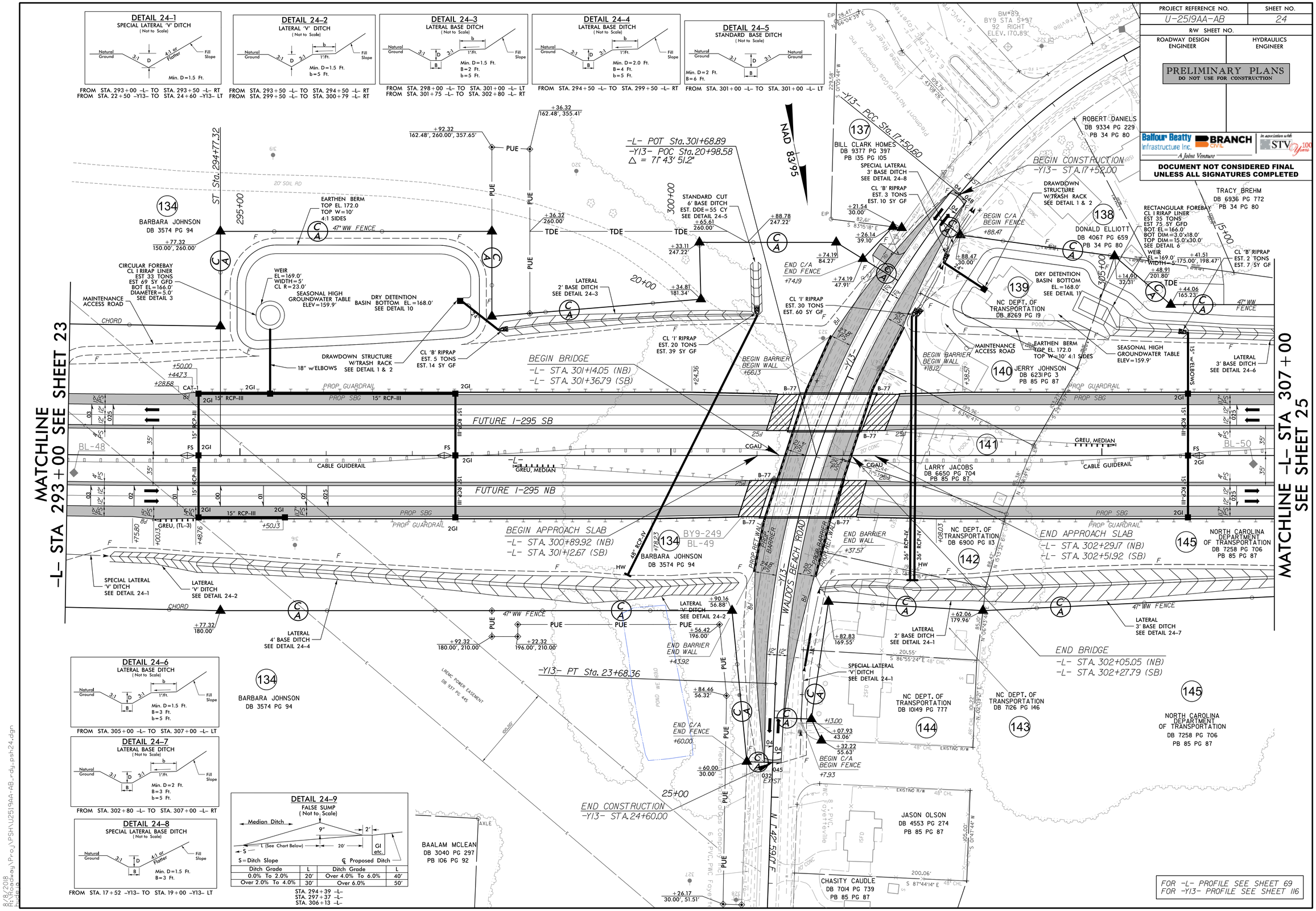
bridge

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

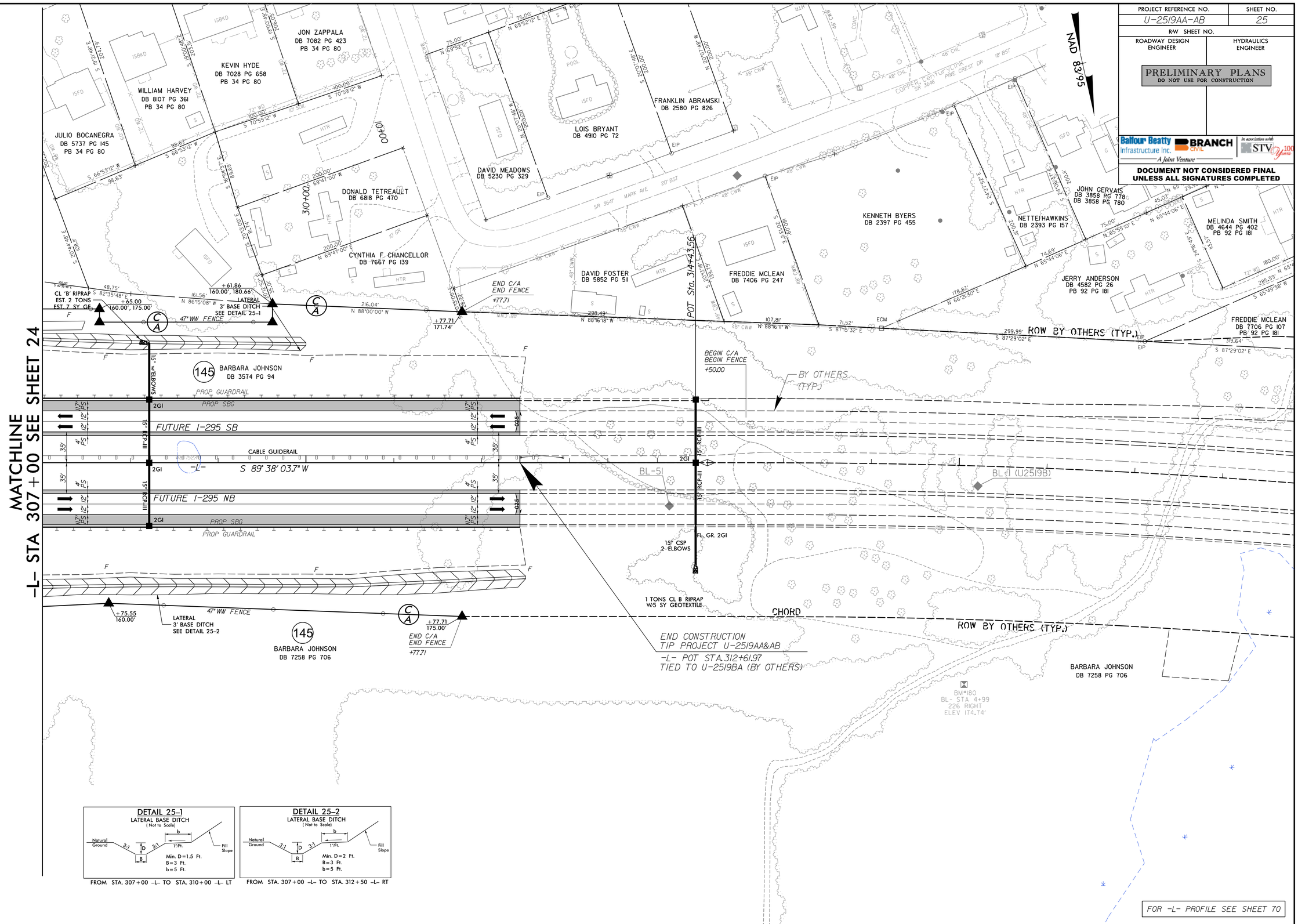


PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DETAIL 25-1
LATERAL BASE DITCH
(Not to Scale)

FROM STA. 307+00 -L- TO STA. 310+00 -L- LT

DETAIL 25-2
LATERAL BASE DITCH
(Not to Scale)

FROM STA. 307+00 -L- TO STA. 312+50 -L- RT

8/8/2008
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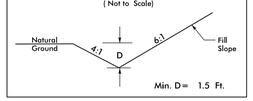
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

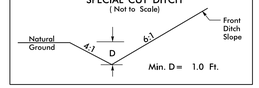
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DETAIL 26-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



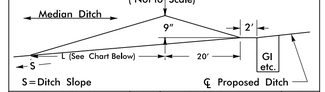
FROM -Y- STA. 17+50 TO STA. 23+00 LT

DETAIL 26-2
SPECIAL CUT DITCH
(Not to Scale)



FROM -Y- STA. 22+00 TO STA. 22+80 RT
FROM -Y- STA. 22+80 TO STA. 23+00 RT

DETAIL 26-3
FALSE SUMP
(Not to Scale)

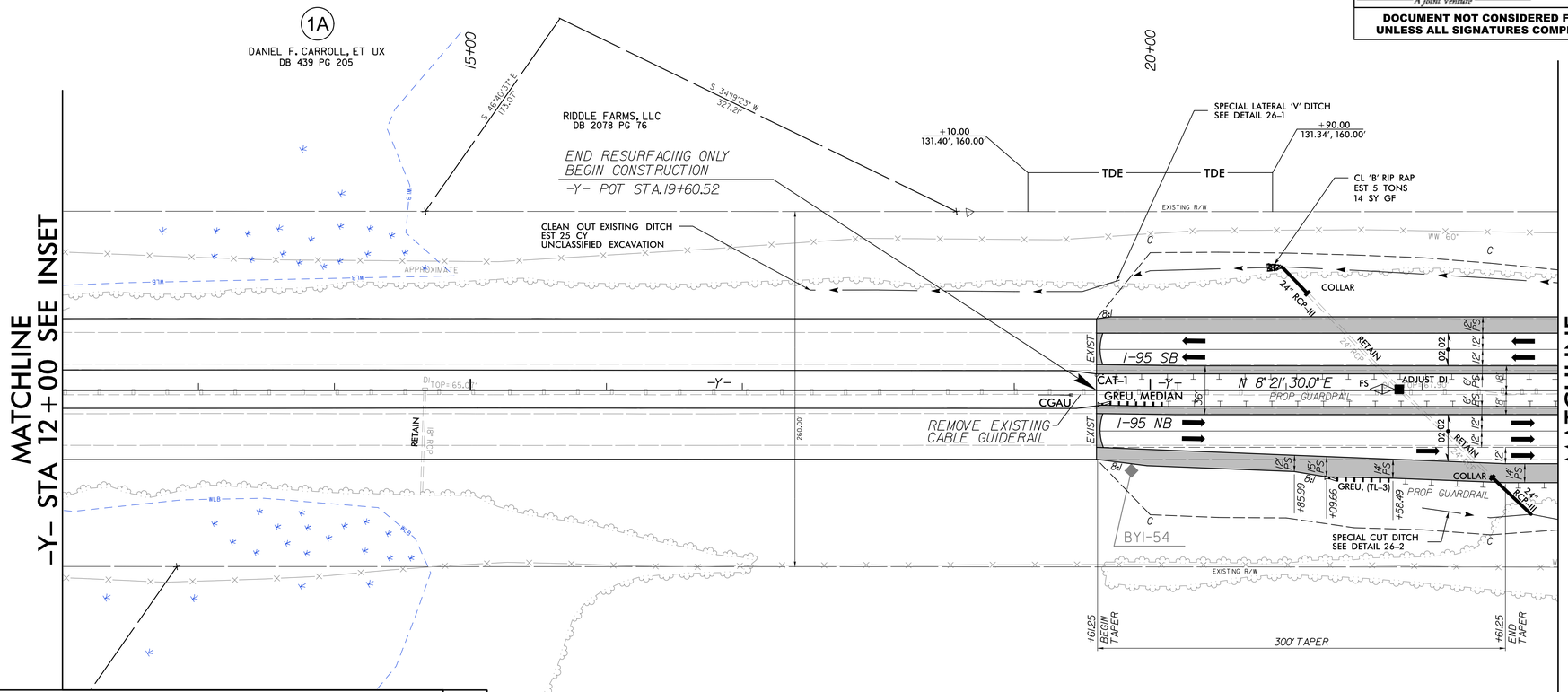


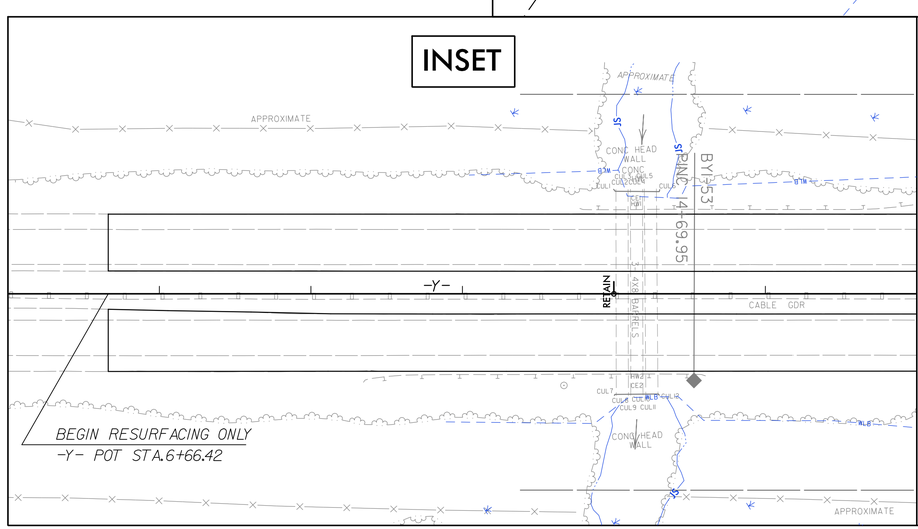
S = Ditch Slope ℄ Proposed Ditch

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 21+70 -Y-

NAD 83/95





FOR -Y- PROFILE SEE SHEETS 71 & 72

8/6/2018
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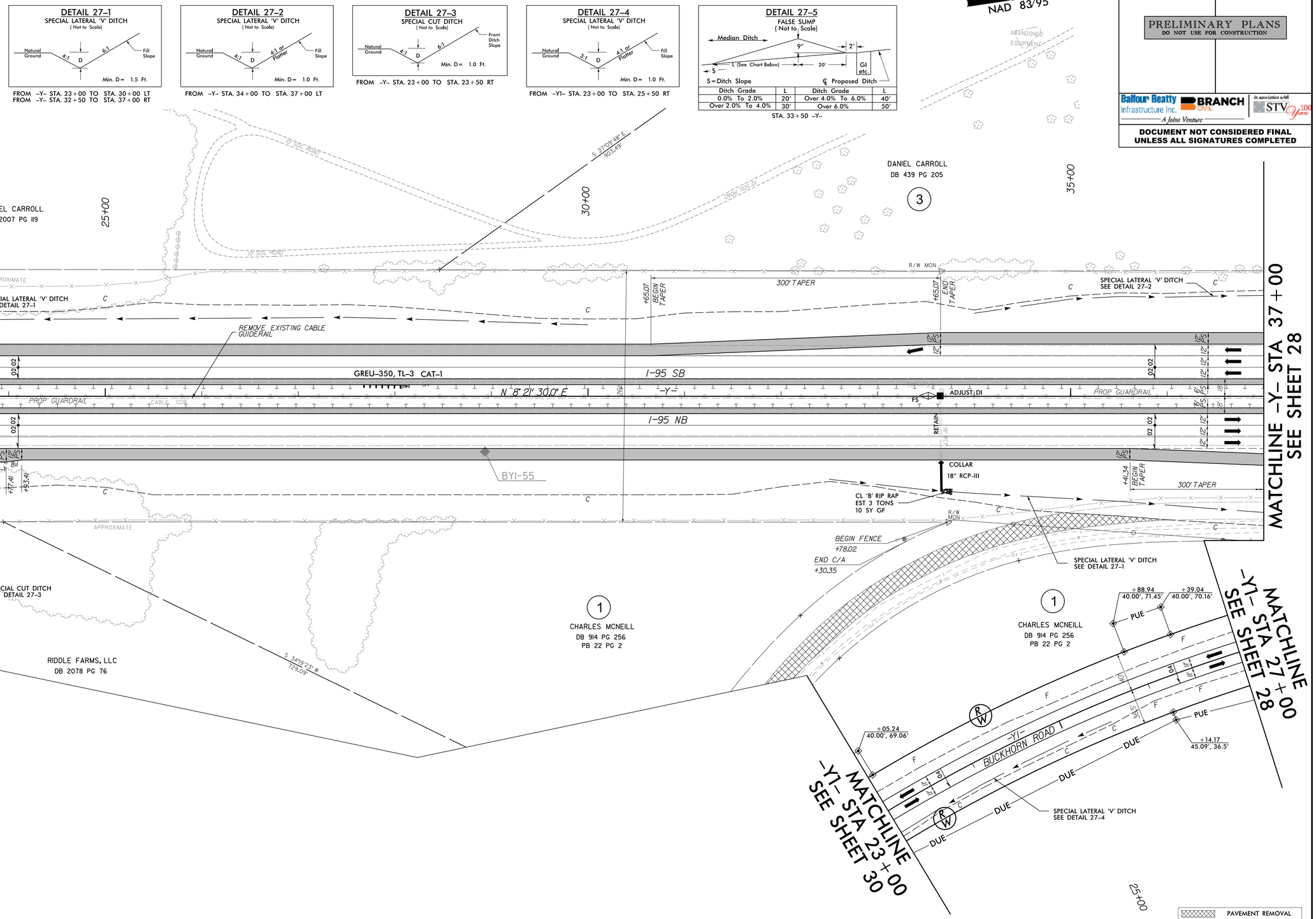
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	27
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOR -Y- PROFILE SEE SHEETS 72 & 73
FOR -Y1- PROFILE SEE SHEET 83

8/8/2018
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hjdelp

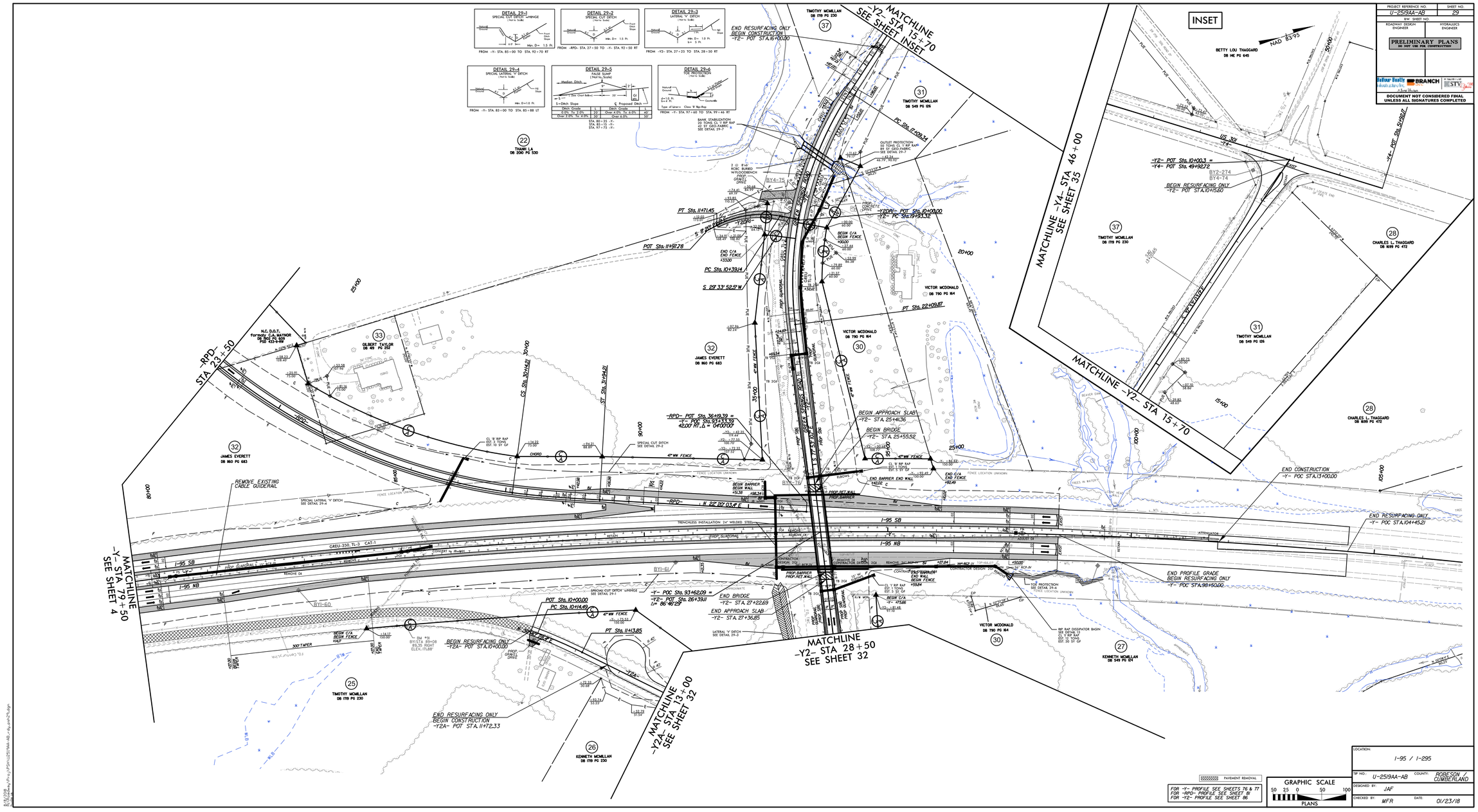
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DaVoe Beatty Architects, PA — BRANCH — STV

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOCATION:	I-95 / I-295
TIP NO.: U-2519AA-AB	COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF	
CHECKED BY: MFR	DATE: 01/23/18

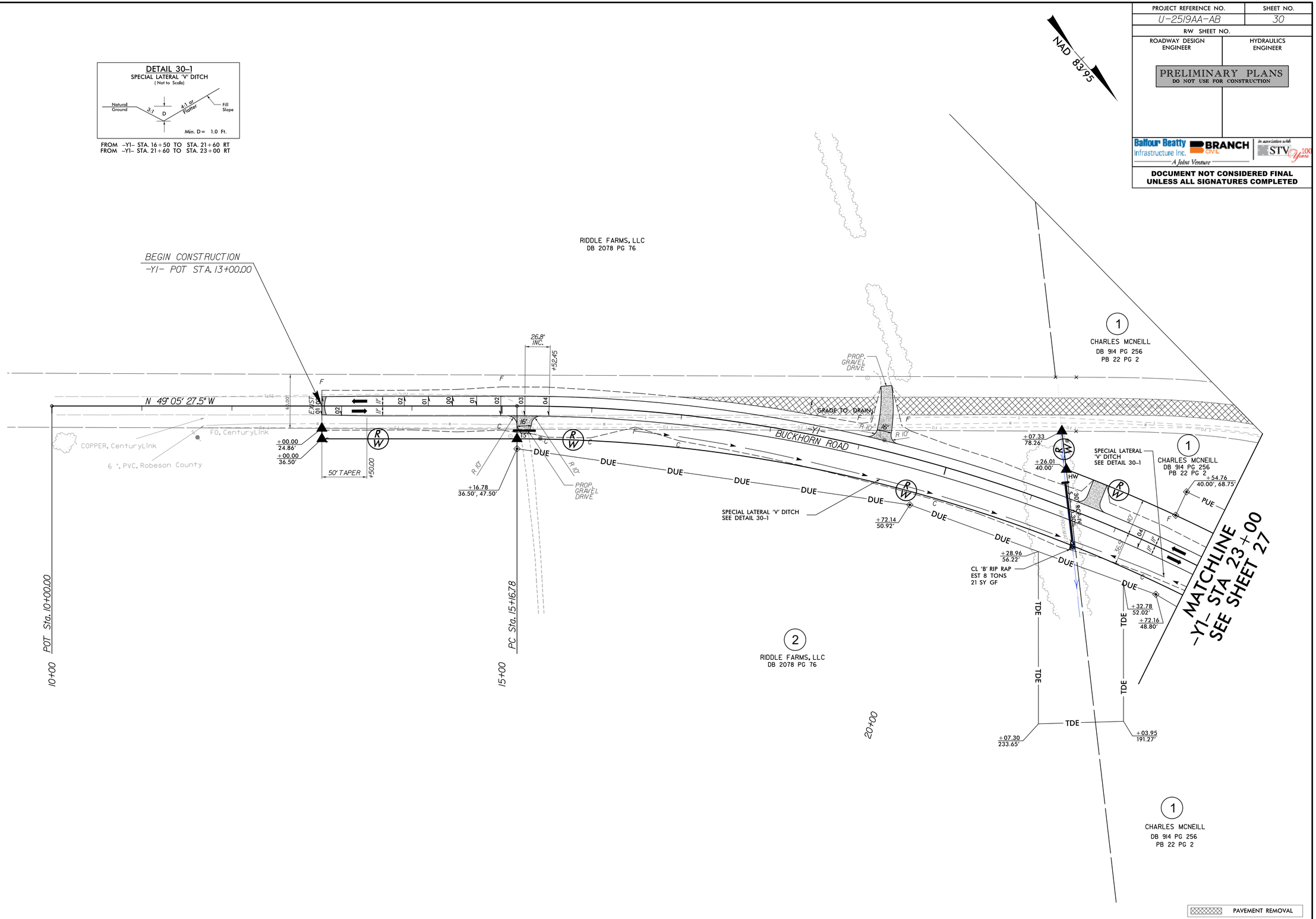

DETAIL 29-1
SPECIAL CUT DITCH w/HINGE
DETAIL 29-2
SPECIAL CUT DITCH
DETAIL 29-3
LATERAL 'V' DITCH
DETAIL 29-4
SPECIAL LATERAL 'V' DITCH
DETAIL 29-5
FALSE Guard
DETAIL 29-6
FOR PROTECTION
END RESURFACING ONLY
BEGIN CONSTRUCTION
-Y2- POT STA.16+00.00
-Y2- MATCHLINE STA 15+70
SEE SHEET INSET
INSET
NAD 83/95
BETTY LOU THAGGARD
DB 14E PG 645
US 301
-Y4-
-Y2- POT Sta. 10+00.3 =
-Y4- POT Sta. 49+92.72
BEGIN RESURFACING ONLY
-Y2- POT STA.10+19.20
-Y4- POT Sta. 51+89.11
MATCHLINE -Y4- STA 46+00
SEE SHEET 35
MATCHLINE -Y2- STA 15+70
TIMOTHY MCMILLAN
DB 1719 PG 230
TIMOTHY MCMILLAN
DB 549 PG 126
CHARLES L. THAGGARD
DB 1699 PG 472
PROJECT REFERENCE NO.
U-2519AA-AB
SHEET NO.
29
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DATE: 1/23/2018
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED
-RPD- STA 23+50
N.C. D.O.T.
formerly C.A. WATNOR
DB 1601 PG 509
PID 103-9-418
GILBERT TAYLOR
DB 49 PG 252
JAMES EVERETT
DB 860 PG 683
REMOVE EXISTING
CABLE GUIDERAIL
MATCHLINE
-Y- STA 79+50
SEE SHEET 4
I-95 SB
I-95 NB
-RPD- N 22°27'03.4"E
TRENCHLESS INSTALLATION 24" WELDED STEEL
GREU-350, TL-3 CAT-1
POT Sta. 10+00.00
PC Sta. 10+14.49
PT Sta. 11+13.85
BEGIN RESURFACING ONLY
-Y2A- POT STA.10+00.00
END RESURFACING ONLY
BEGIN CONSTRUCTION
-Y2A- POT STA.11+72.33
-Y2A-
MATCHLINE
-Y2A- STA 13+00
SEE SHEET 32
MATCHLINE
-Y2- STA 28+50
SEE SHEET 32
-Y- POC Sta. 93+62.09 =
-Y2- POT Sta. 26+39.11
Δ= 86°46'29"
END BRIDGE
-Y2- STA. 27+22.69
END APPROACH SLAB
-Y2- STA. 27+36.85
BEGIN APPROACH SLAB
-Y2- STA. 25+41.36
BEGIN BRIDGE
-Y2- STA. 25+55.52
END CONSTRUCTION
-Y- POC STA.13+00.00
END RESURFACING ONLY
-Y- POC STA.104+45.21
END PROFILE GRADE
BEGIN RESURFACING ONLY
-Y- POC STA.98+50.00
VICTOR MCDONALD
DB 790 PG 164
KENNETH MCMILLAN
DB 549 PG 124
KENNETH MCMILLAN
DB 1719 PG 230
PAVEMENT REMOVAL
FOR -Y- PROFILE SEE SHEETS 76 & 77
FOR -RPD- PROFILE SEE SHEET 81
FOR -Y2- PROFILE SEE SHEET 86
GRAPHIC SCALE
50 25 0 50 100
PLANS
LOCATION:
I-95 / I-295
TIP NO.: U-2519AA-AB
COUNTY: ROBESON / CUMBERLAND
DESIGNED BY: JAF
CHECKED BY: MFR
DATE: 01/23/18

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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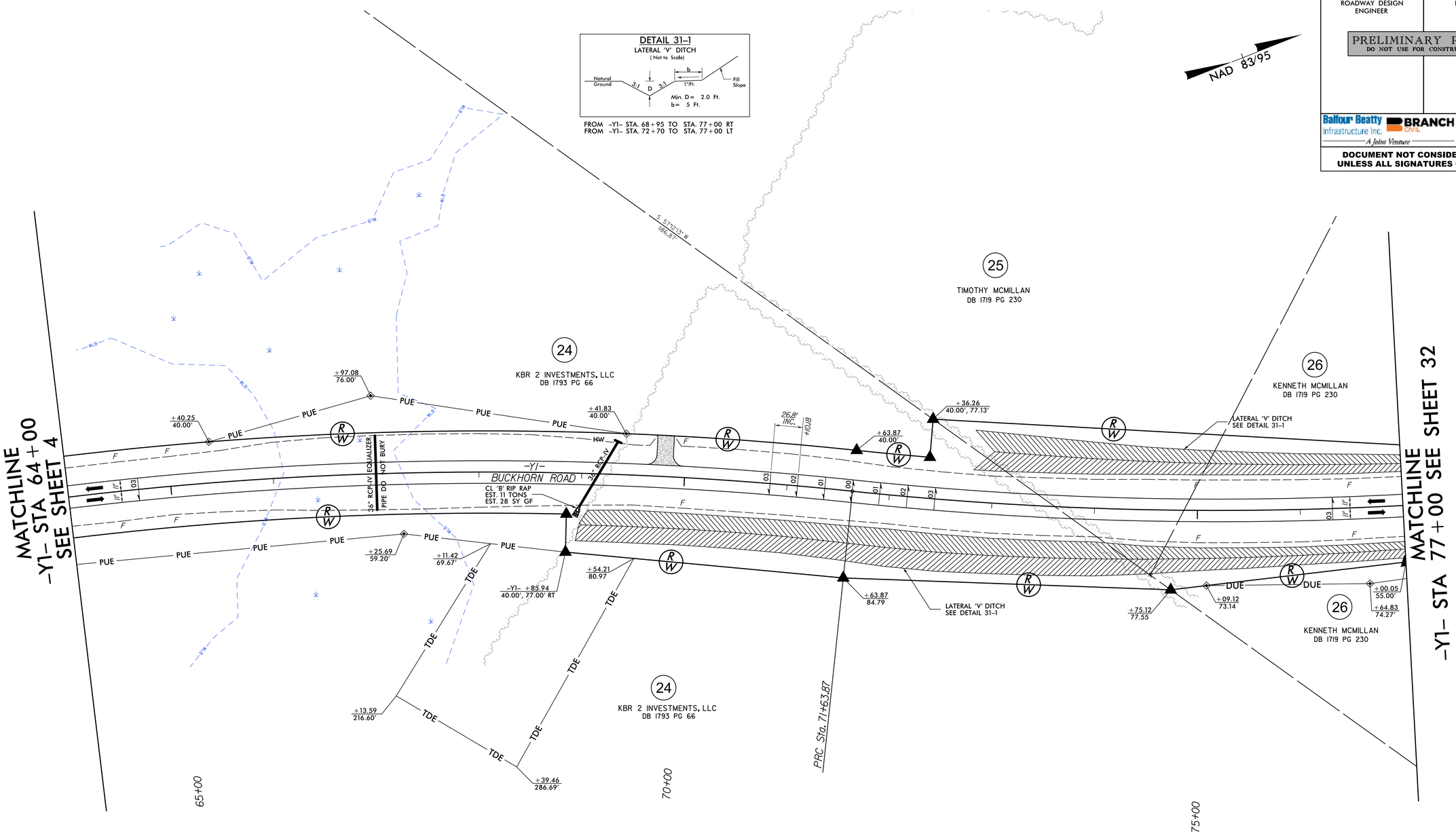
bhedge

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOR -Y1- PROFILE SEE SHEETS 84 & 85

8/8/2018
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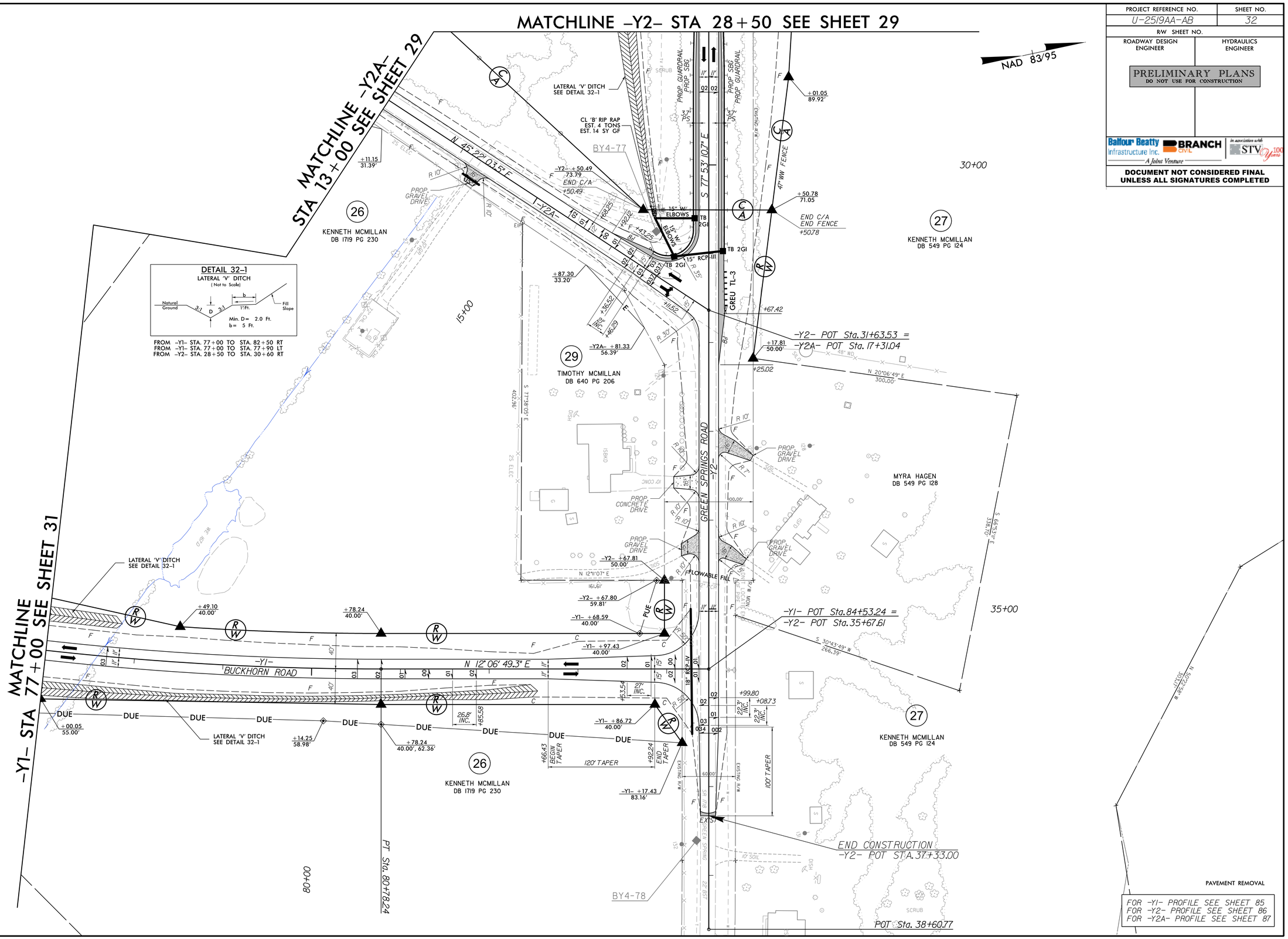
bjdeb

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PAVEMENT REMOVAL

FOR -Y1- PROFILE SEE SHEET 85
FOR -Y2- PROFILE SEE SHEET 86
FOR -Y2A- PROFILE SEE SHEET 87

8/8/2018
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hudgins

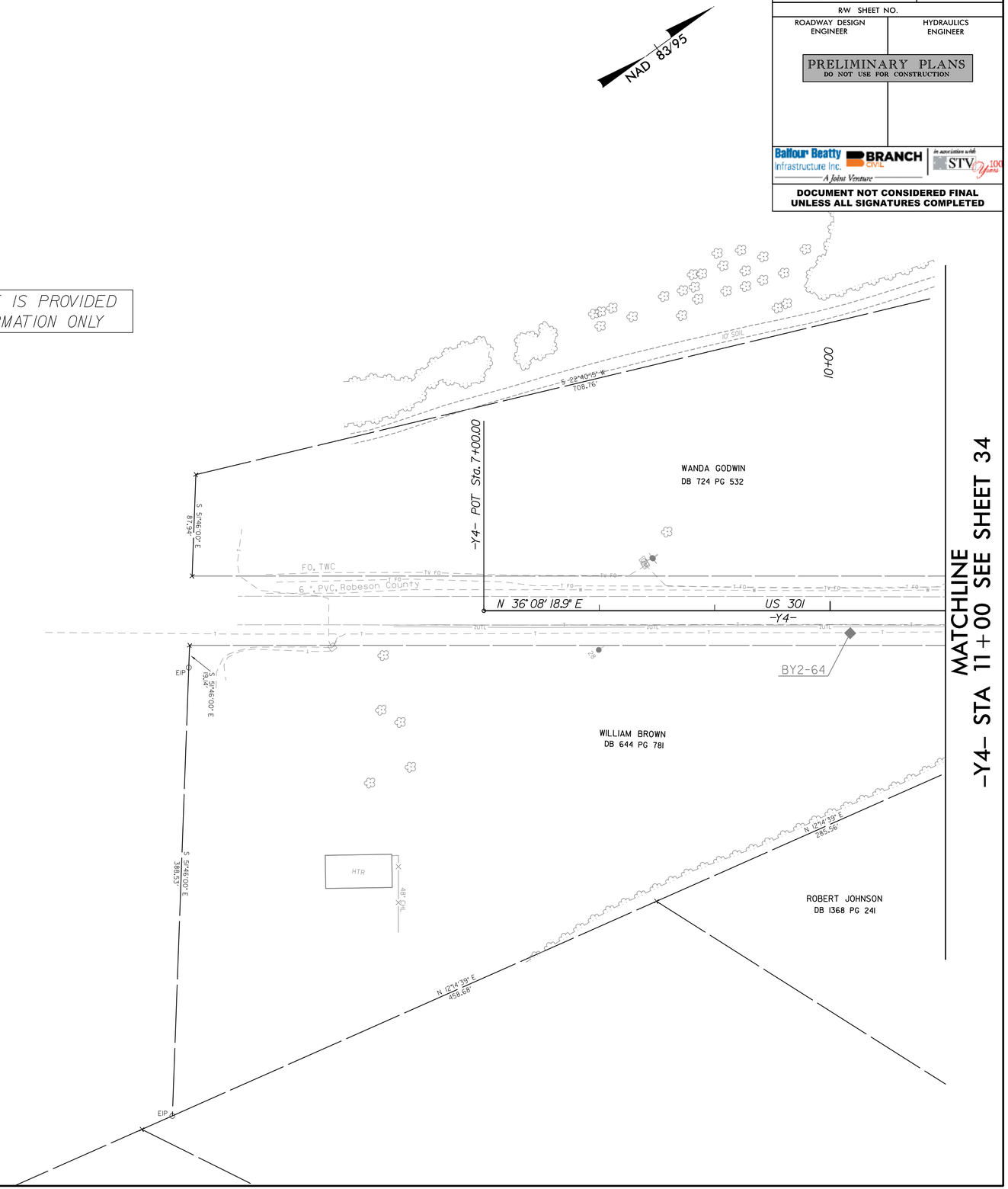
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL — A Joint Venture — In association with STV 100 Years

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS SHEET IS PROVIDED FOR INFORMATION ONLY



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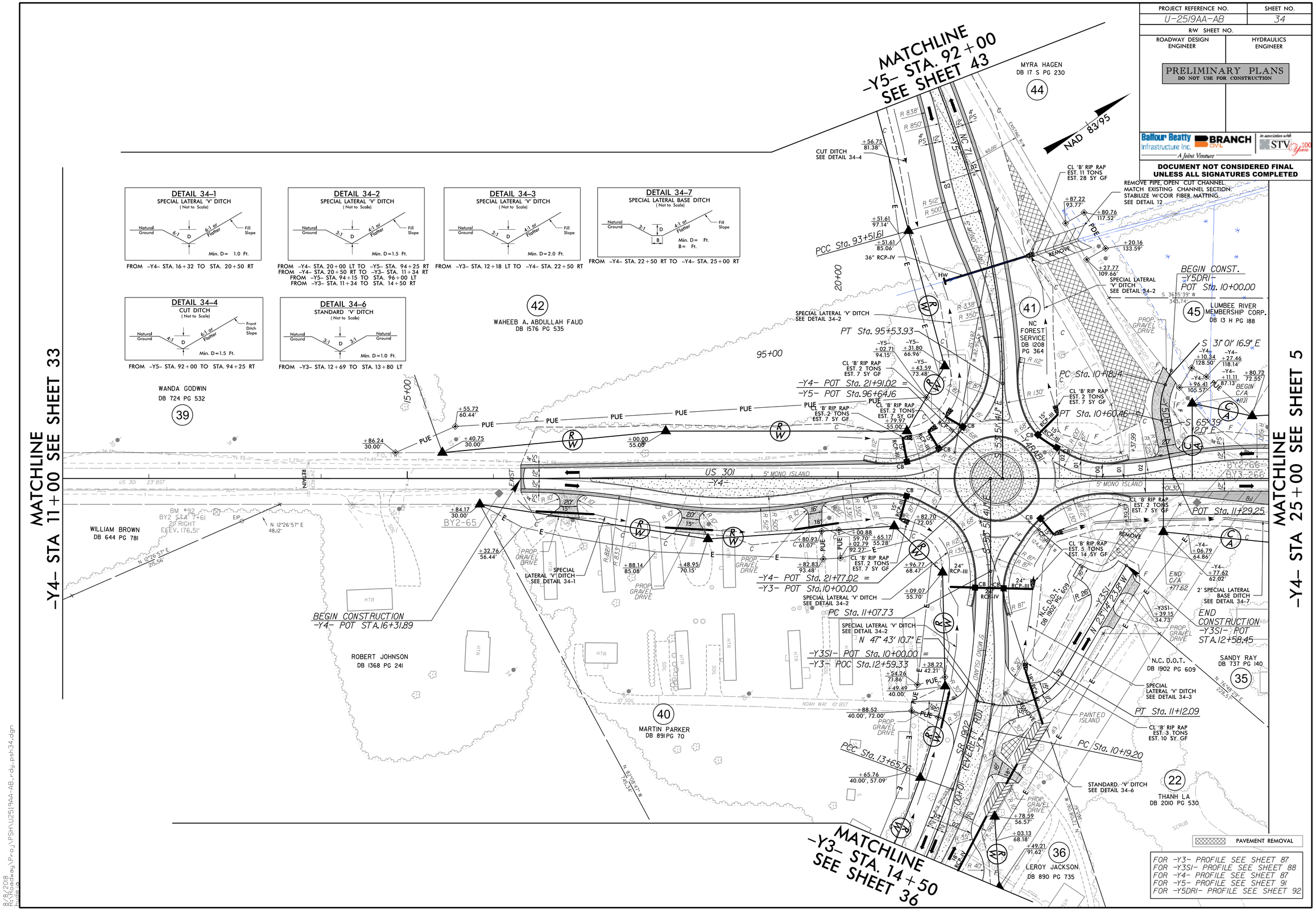
hjelp

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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bwiles

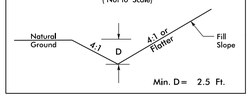
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

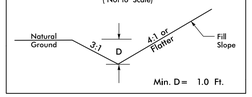
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DETAIL 35-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



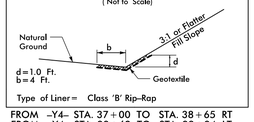
FROM -Y4- STA. 32+00 TO STA. 32+50 LT

DETAIL 35-2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



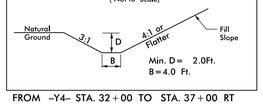
FROM -Y4- STA. 40+10 TO STA. 45+80 RT
FROM -Y4- STA. 41+50 TO STA. 45+80 LT

DETAIL 35-3
TOE PROTECTION
(Not to Scale)

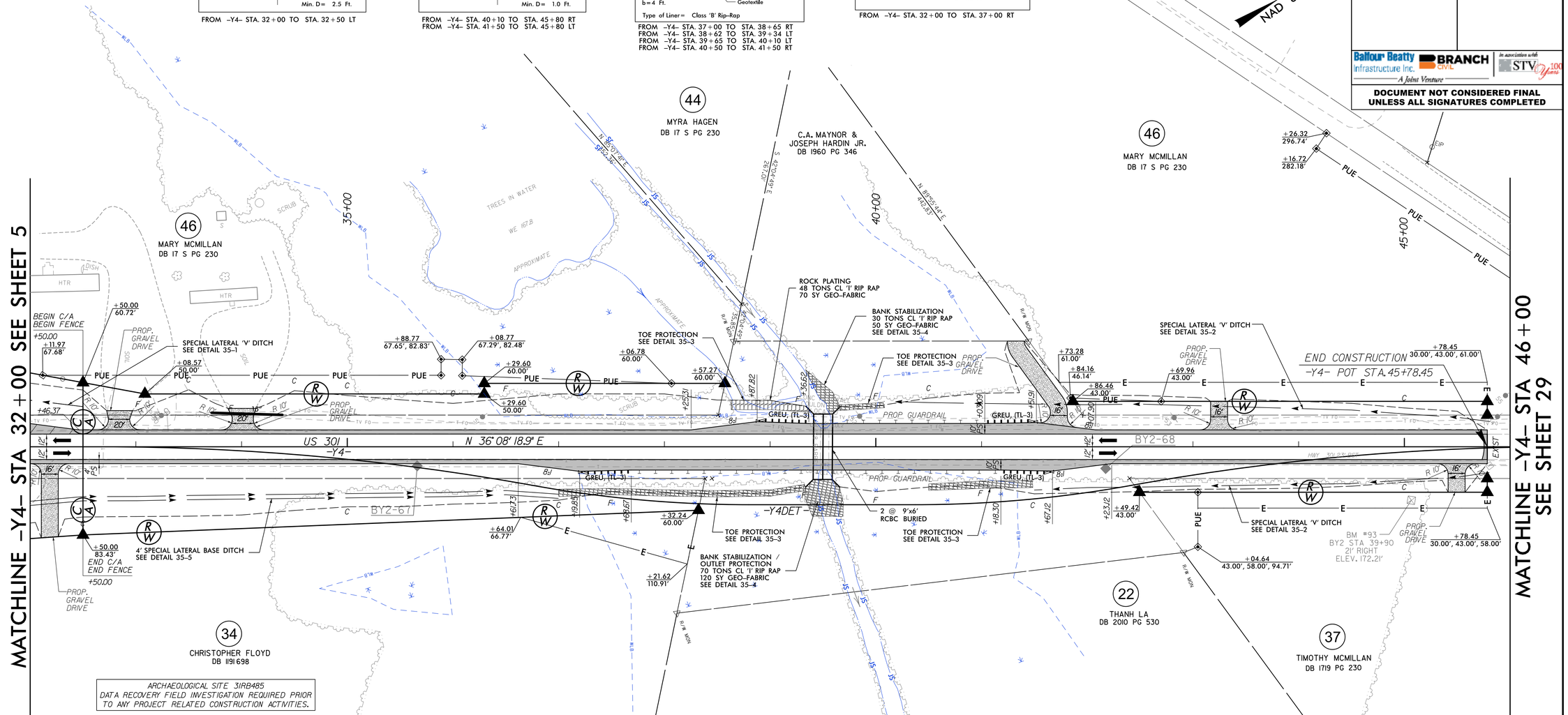


FROM -Y4- STA. 37+00 TO STA. 38+65 RT
FROM -Y4- STA. 38+62 TO STA. 39+34 LT
FROM -Y4- STA. 39+65 TO STA. 40+10 LT
FROM -Y4- STA. 40+50 TO STA. 41+50 RT

DETAIL 35-5
SPECIAL LATERAL BASE DITCH
(Not to Scale)



FROM -Y4- STA. 32+00 TO STA. 37+00 RT



FOR -Y4- PROFILE SEE SHEET 88

8/8/2018
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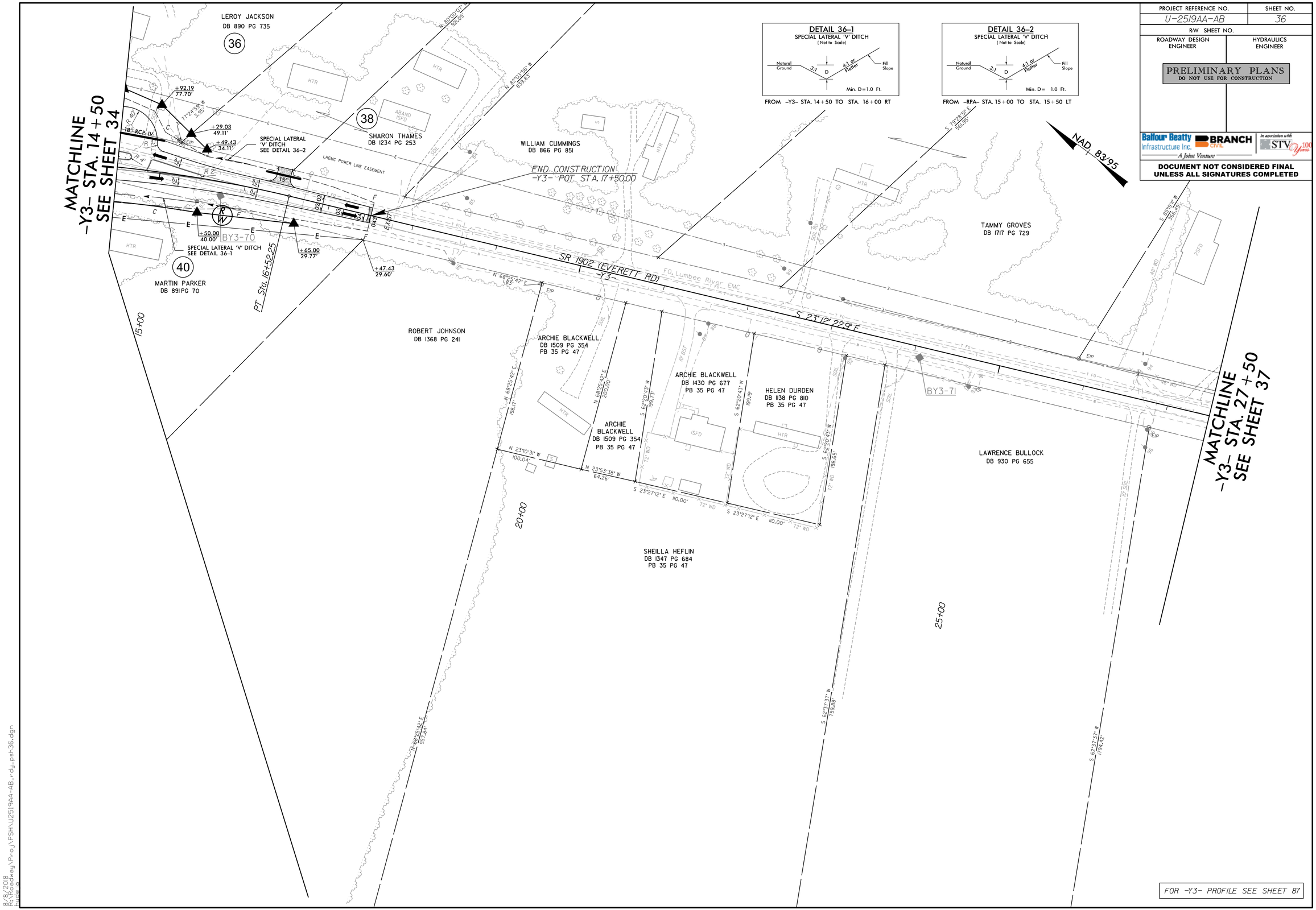
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	36
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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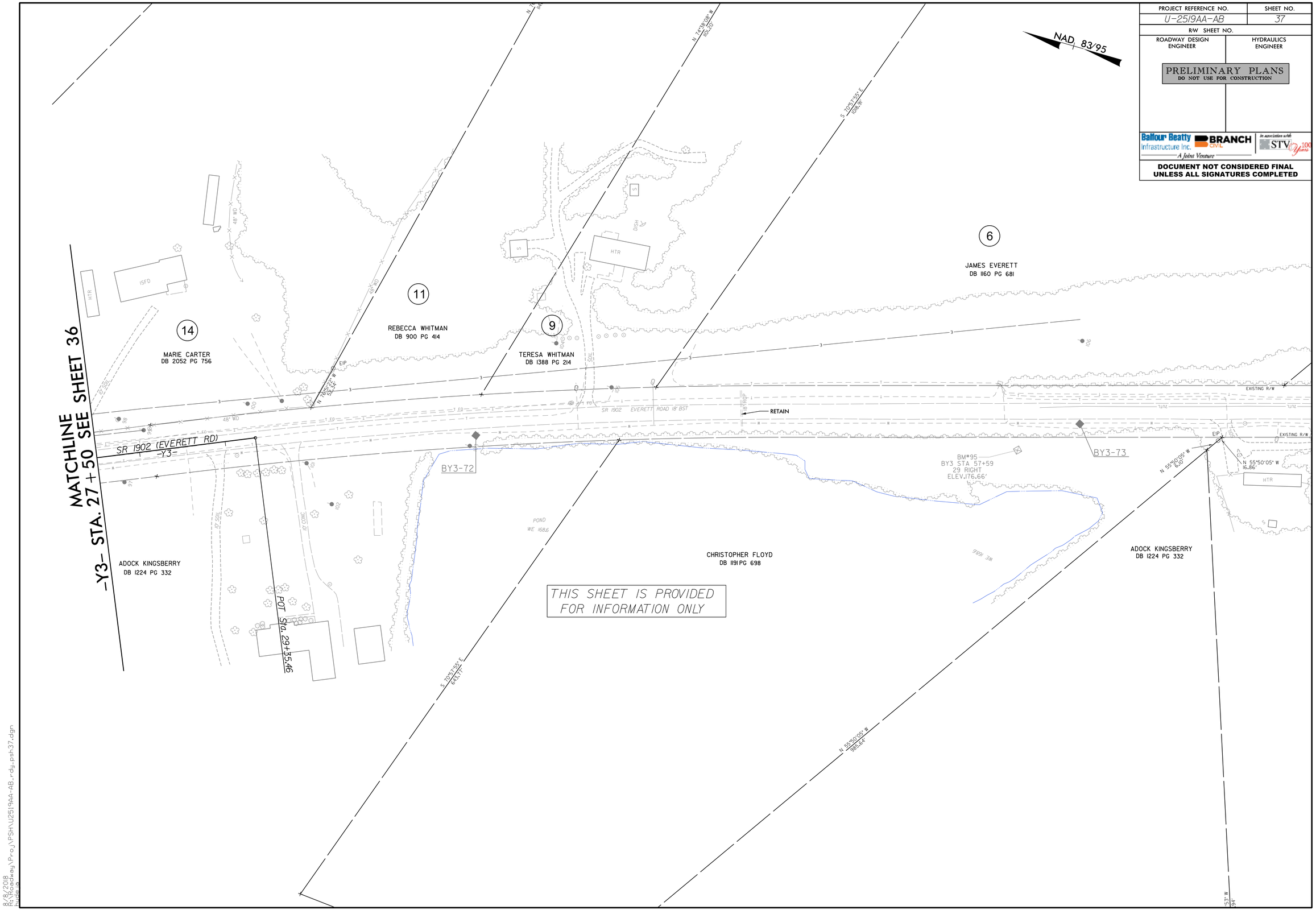
hudgins

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	37
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL A Joint Venture — In association with STV 100 Years

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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mwhite

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	38
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

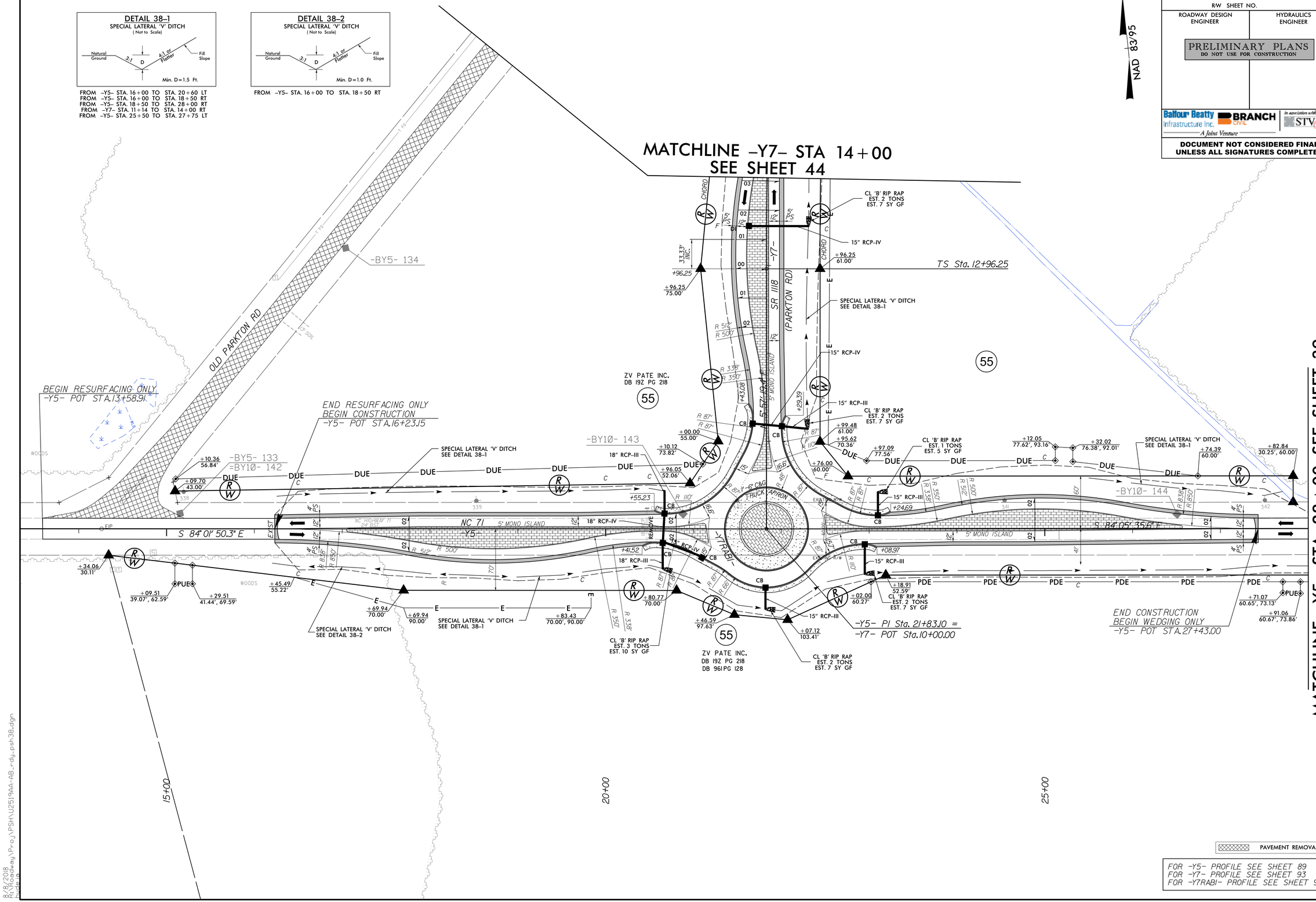
NAD 83/95

DETAIL 38-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

FROM -Y5- STA. 16+00 TO STA. 20+60 LT
FROM -Y5- STA. 16+00 TO STA. 18+50 RT
FROM -Y5- STA. 18+50 TO STA. 28+00 RT
FROM -Y7- STA. 11+14 TO STA. 14+00 RT
FROM -Y5- STA. 25+50 TO STA. 27+75 LT

DETAIL 38-2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

FROM -Y5- STA. 16+00 TO STA. 18+50 RT



PAVEMENT REMOVAL

FOR -Y5- PROFILE SEE SHEET 89
FOR -Y7- PROFILE SEE SHEET 93
FOR -Y7RABI- PROFILE SEE SHEET 99

8/8/2018
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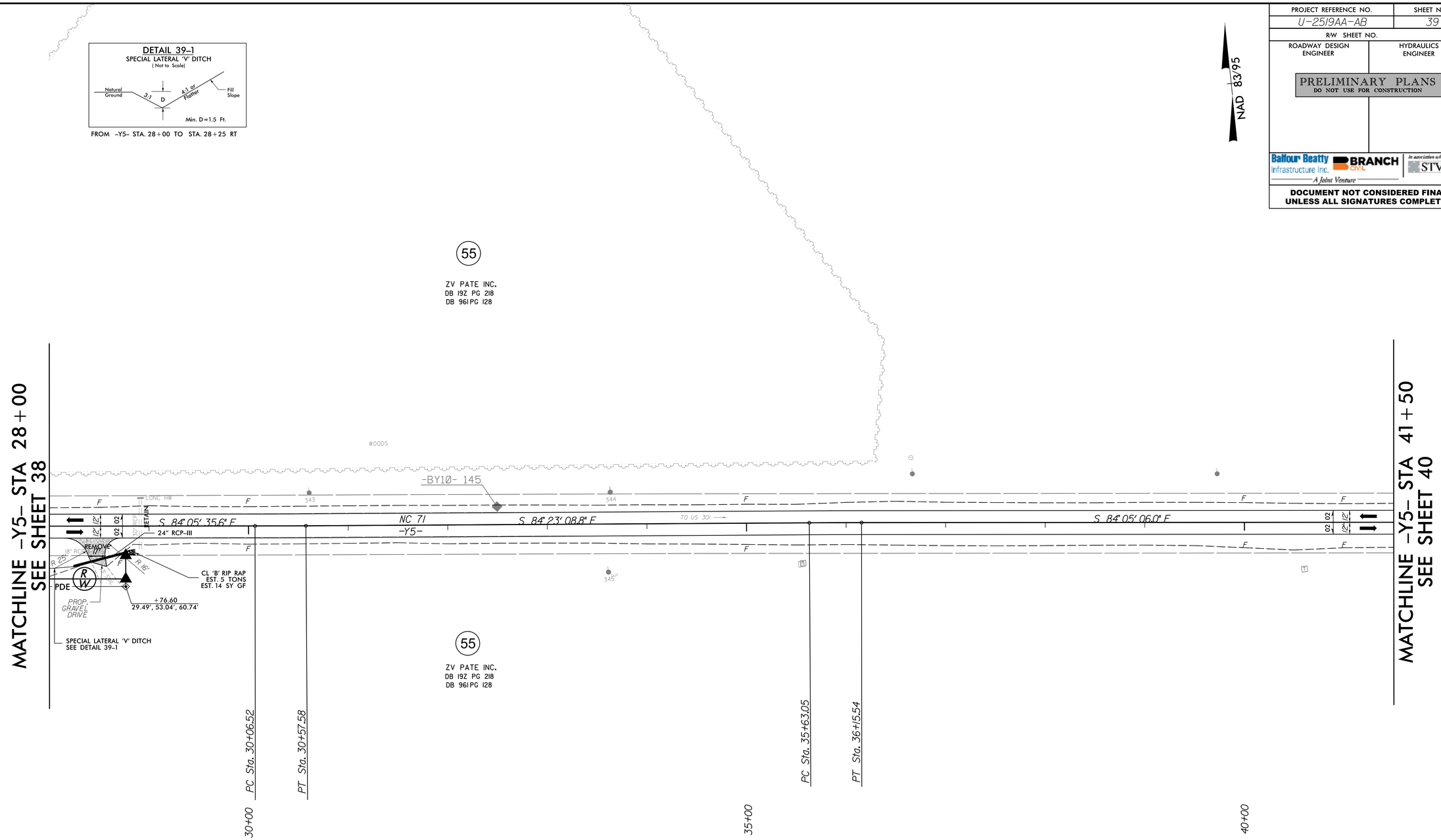
bridge

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	39
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOR -Y5- PROFILE SEE SHEET 89

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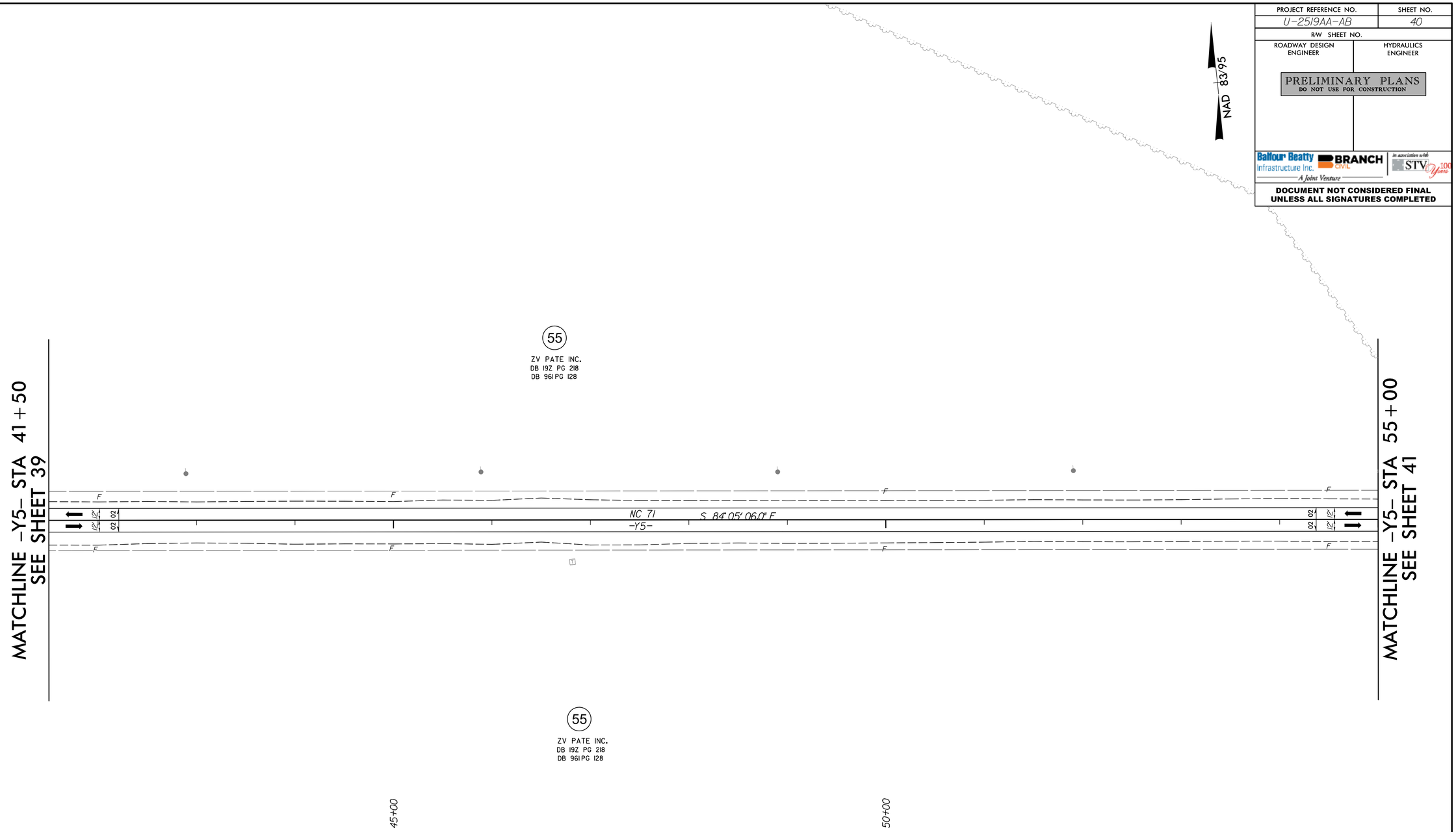
hudg0

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	40
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL A Joint Venture
In association with STV 100 Years

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOR -Y5- PROFILE SEE SHEET 89 & 90

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bjdeb

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	41
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL A Joint Venture In association with STV 100 Years

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/95

FOR -Y5- PROFILE SEE SHEET 90

8/8/2018
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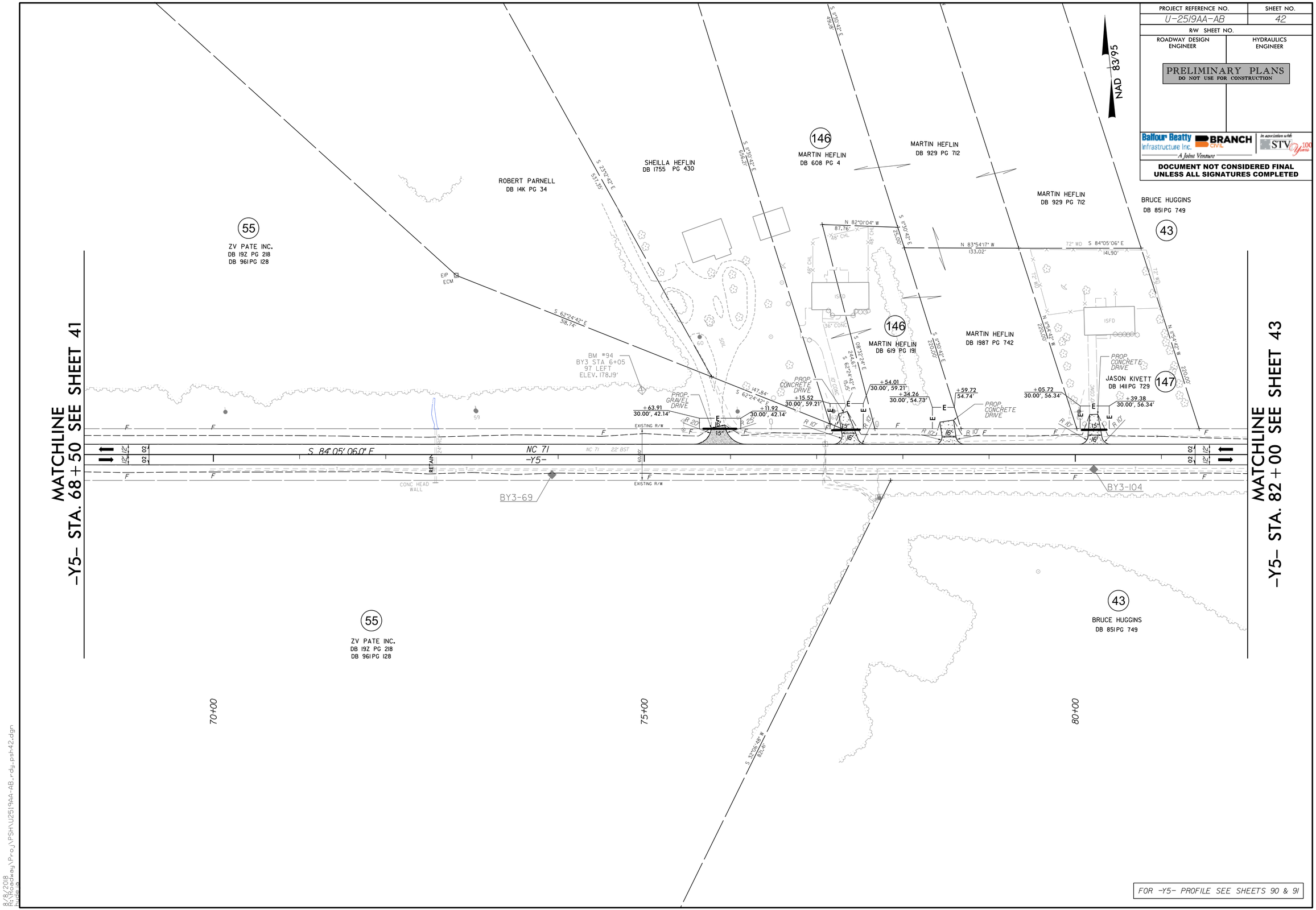
hudgins

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	42
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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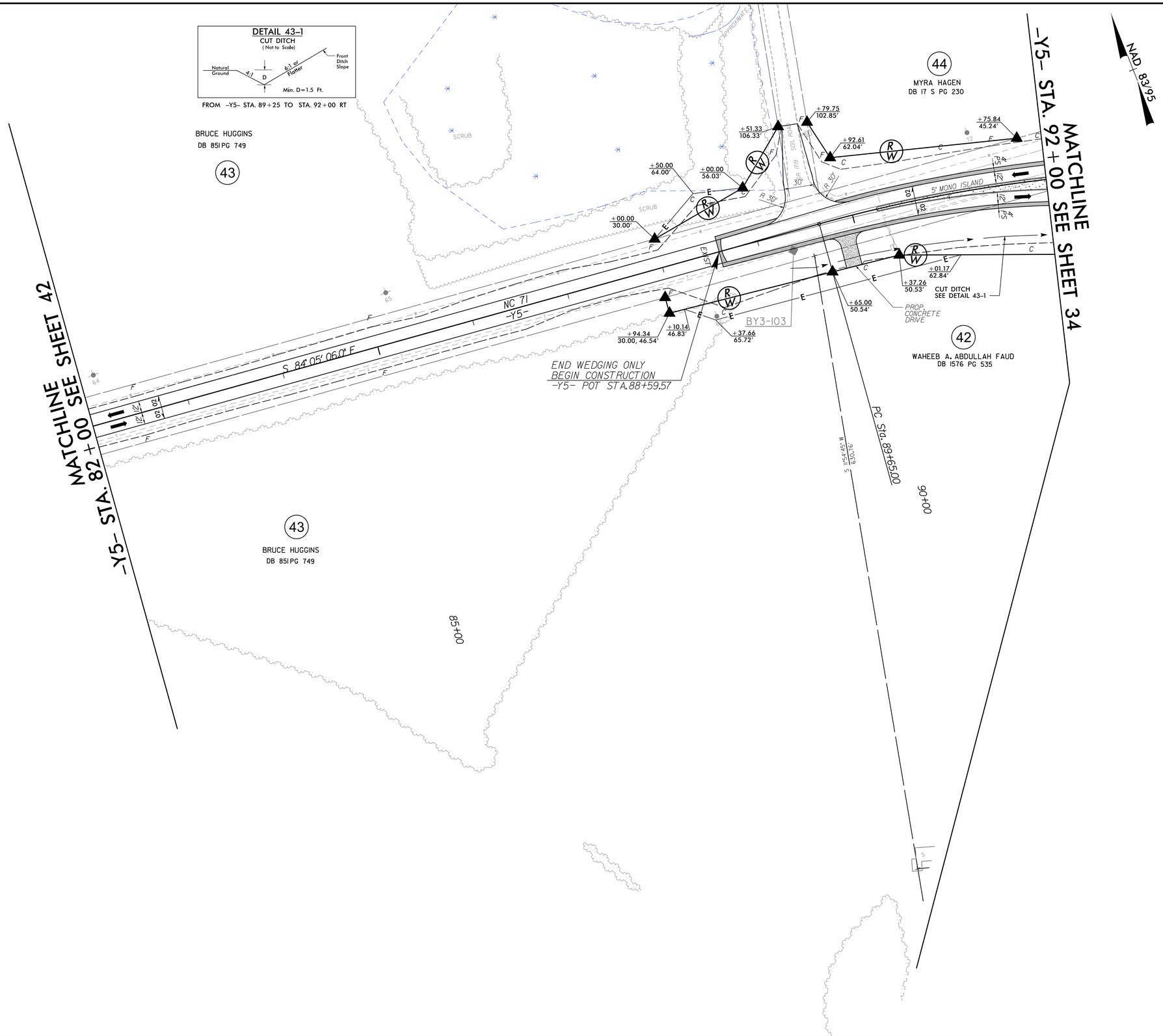
hjdeLo

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	43
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL A Joint Venture — In association with STV 100 Years

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOR -Y5- PROFILE SEE SHEET 91

8/8/2018
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hyde.b

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	44
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

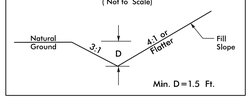
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

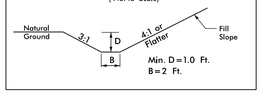
NAD 83/95

DETAIL 44-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



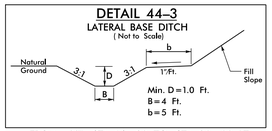
FROM -Y7- STA. 14+00 TO STA. 15+50 RT
FROM -Y7- STA. 20+00 TO STA. 26+50 RT
FROM -Y7- STA. 20+00 TO STA. 27+50 LT

DETAIL 44-2
SPECIAL LATERAL BASE DITCH
(Not to Scale)



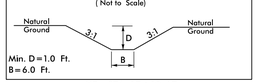
FROM -Y7- STA. 15+60 TO STA. 20+00

DETAIL 44-3
LATERAL BASE DITCH
(Not to Scale)

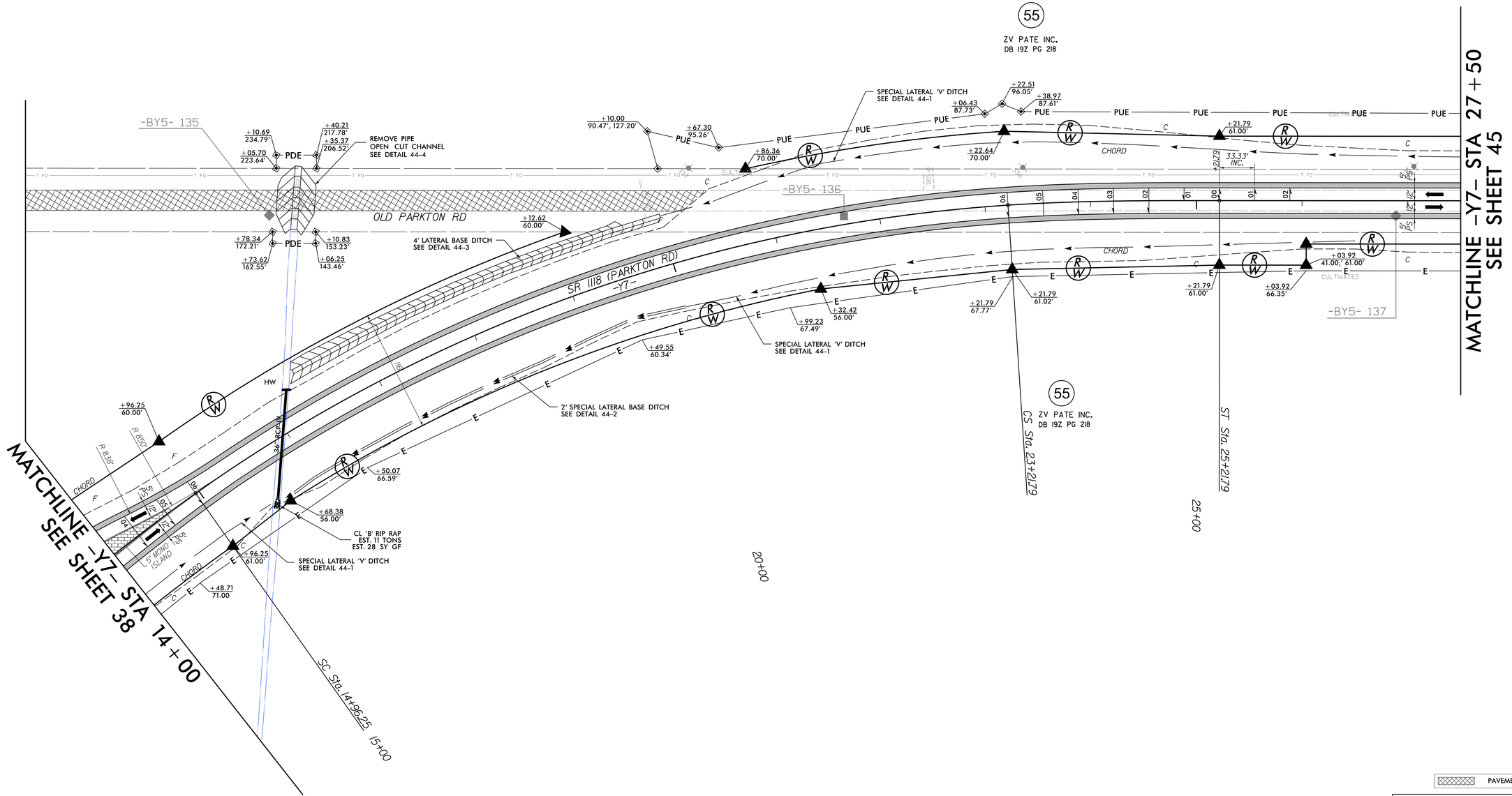


FROM -Y7- STA. 16+30 TO STA. 20+00 LT

DETAIL 44-4
STANDARD BASE DITCH
(Not to Scale)



-Y7- STA. 17+10 LT



PAVEMENT REMOVAL

FOR -Y7- PROFILE SEE SHEET 93

8/8/2018
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bwhite

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	45
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

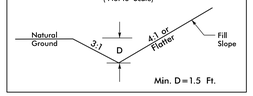
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

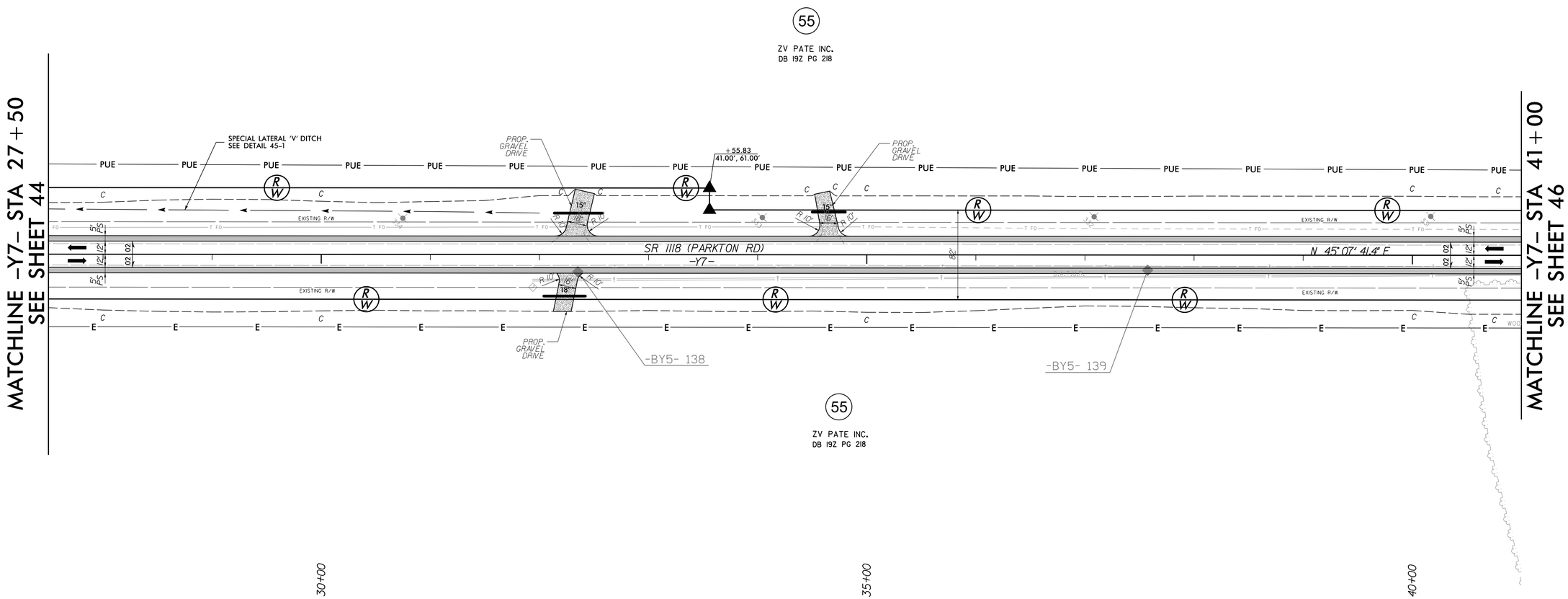
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/95

DETAIL 45-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



FROM -Y7- STA. 27+50 TO STA. 32+00 LT



FOR -Y7- PROFILE SEE SHEETS 93 & 94

8/8/2018
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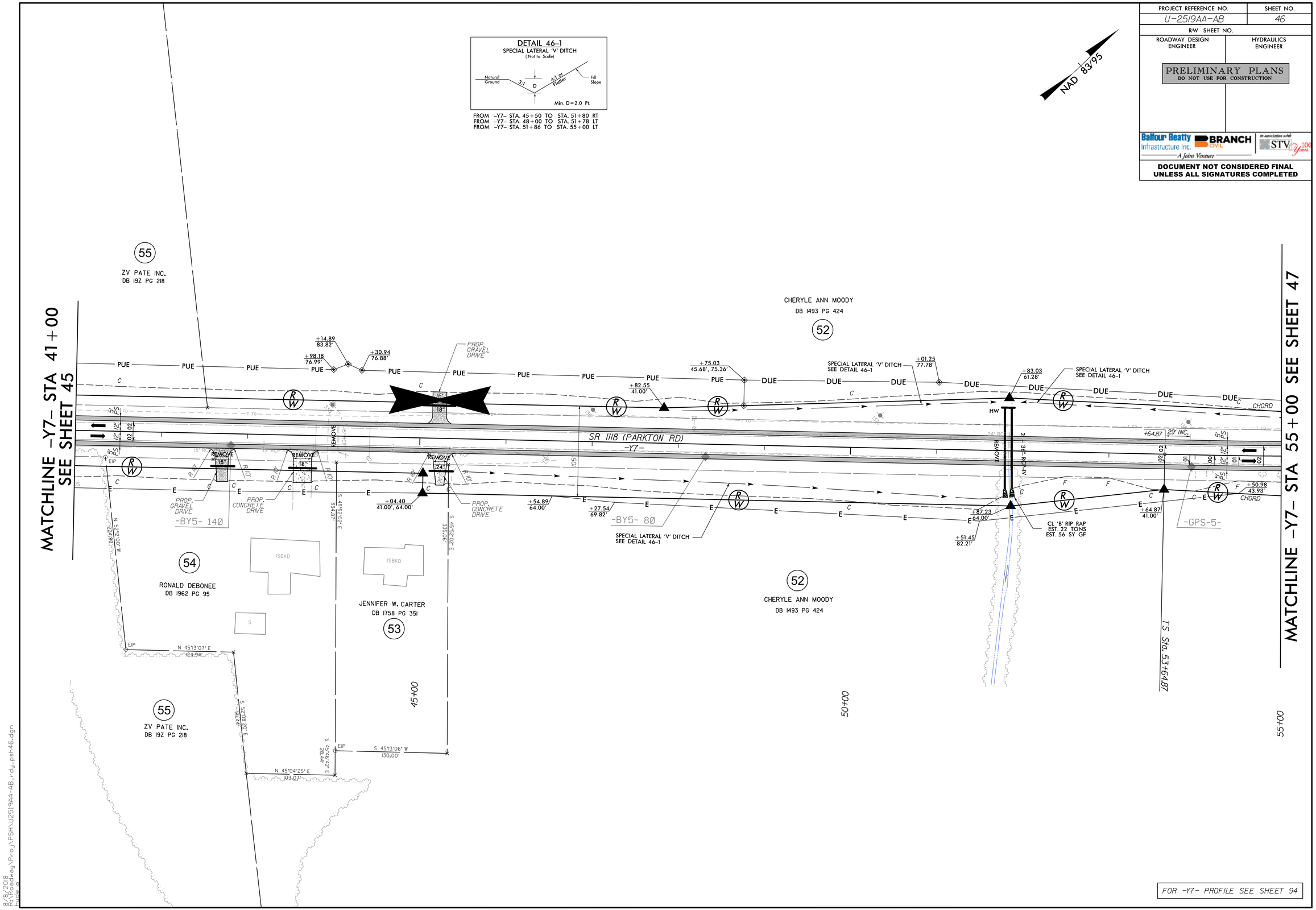
hudson

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	46
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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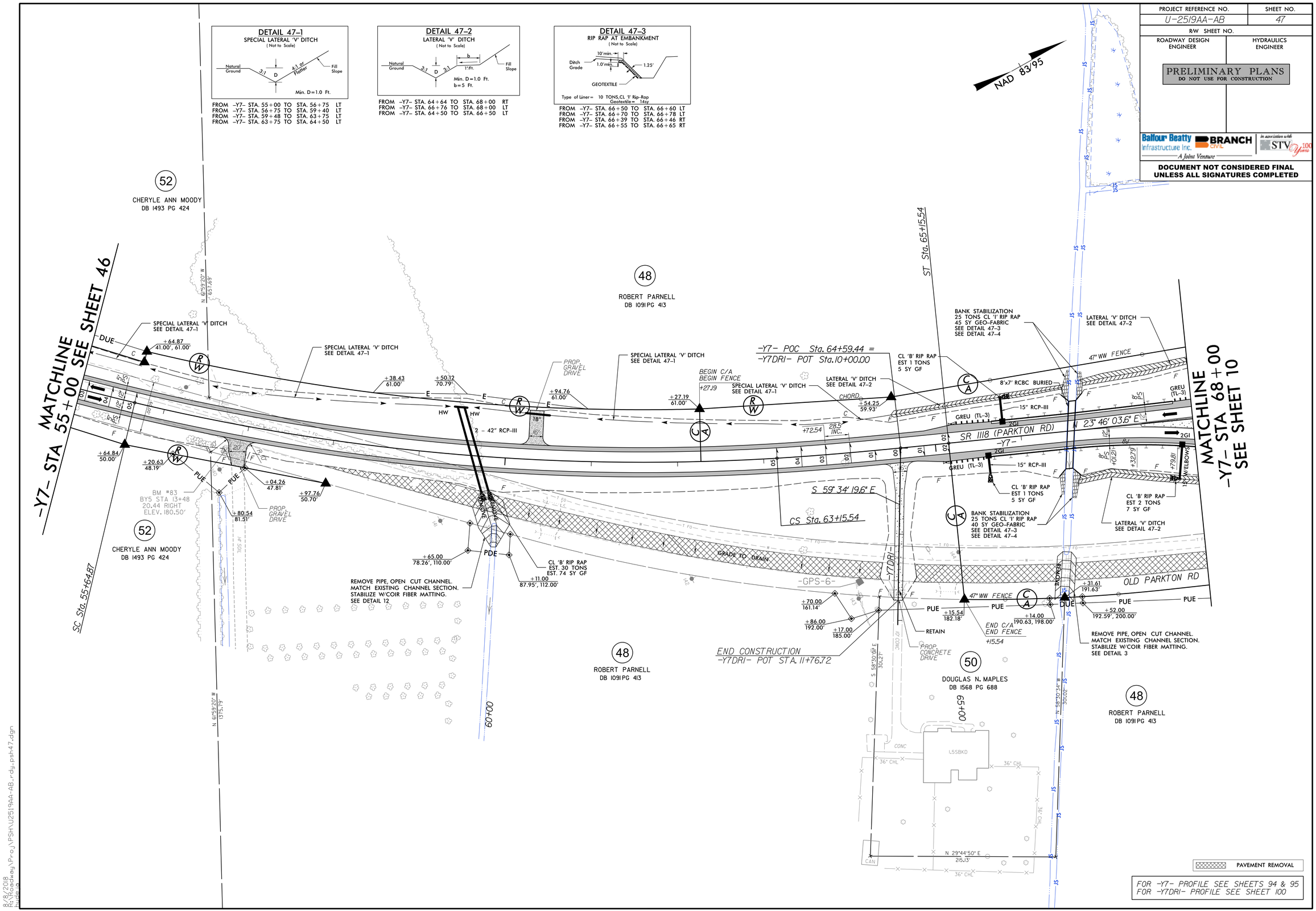
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	47
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



8/8/2018
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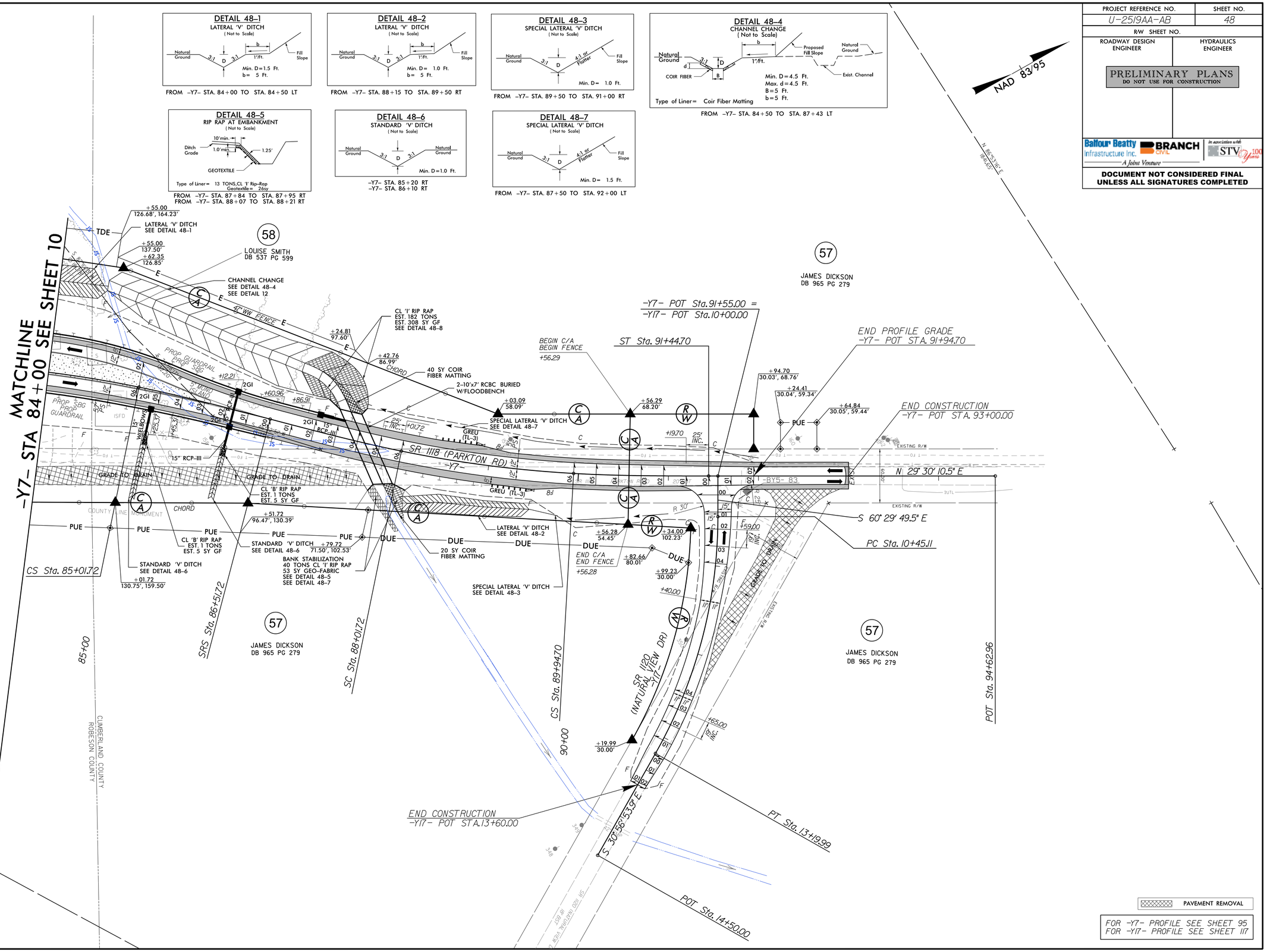
bjdale

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	48
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOR -Y7- PROFILE SEE SHEET 95
FOR -Y17- PROFILE SEE SHEET 117

8/9/2018
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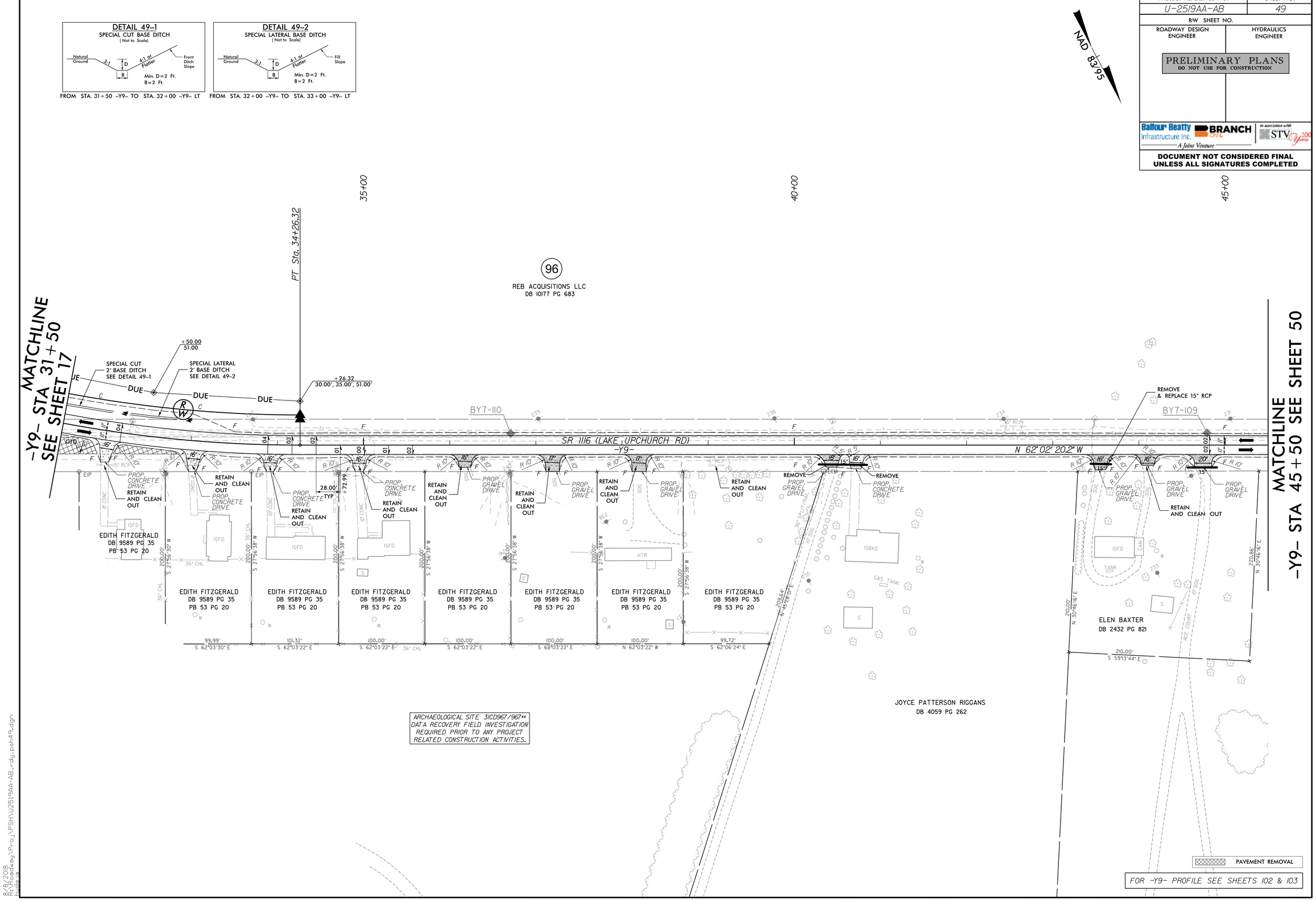
bjdeb

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	49
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



8/8/2018
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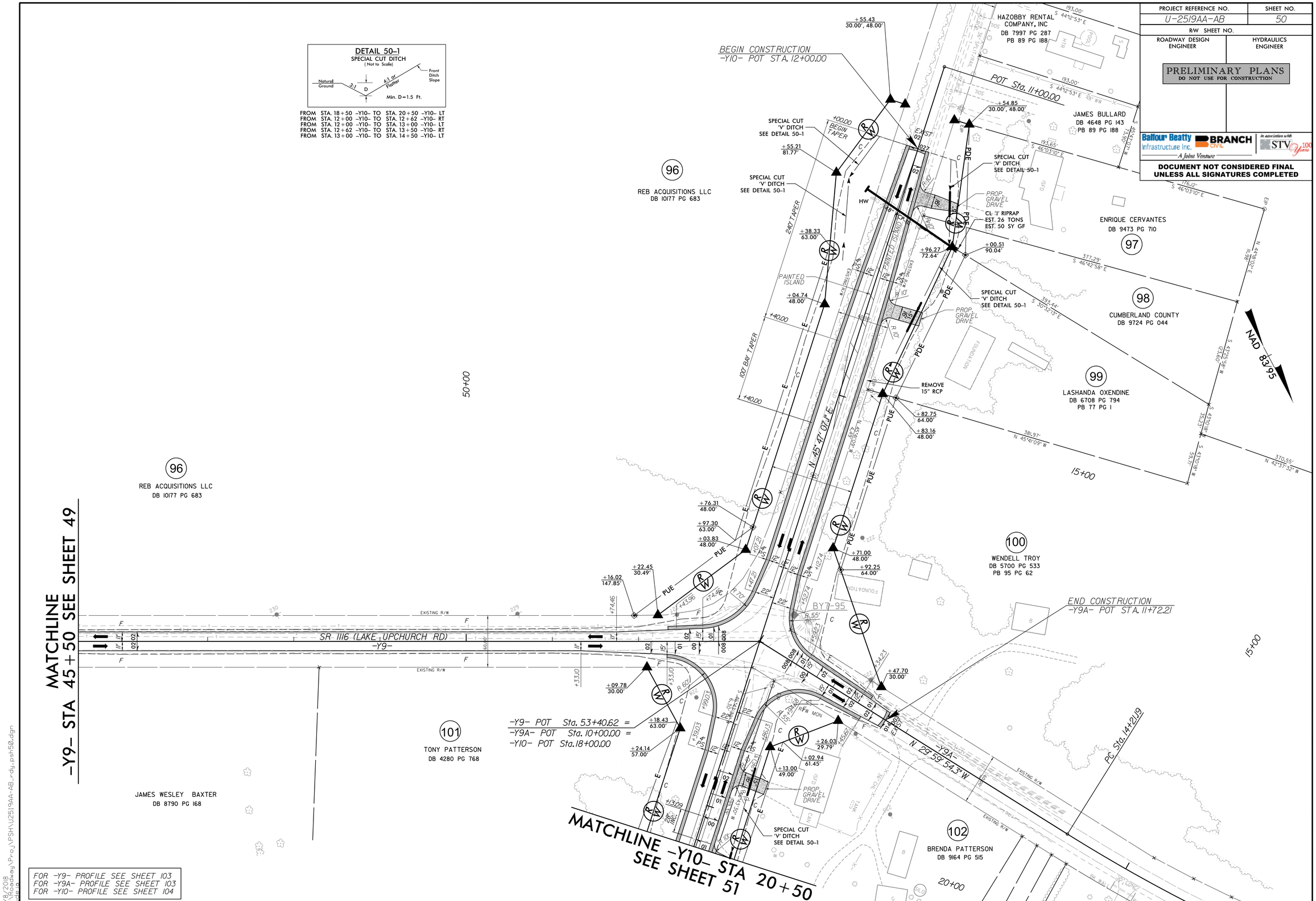
bjdeb

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	50
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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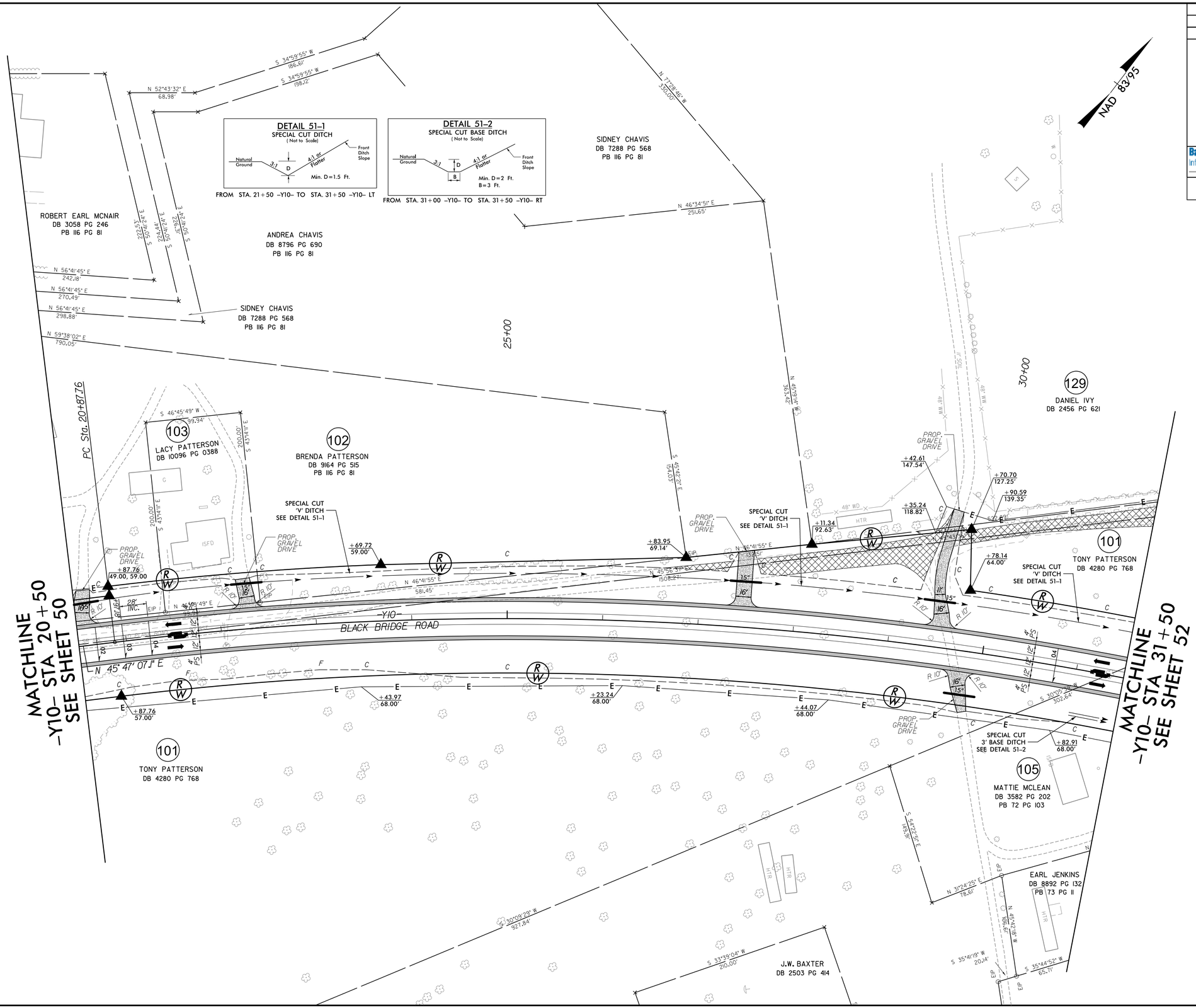
hide 10

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	51
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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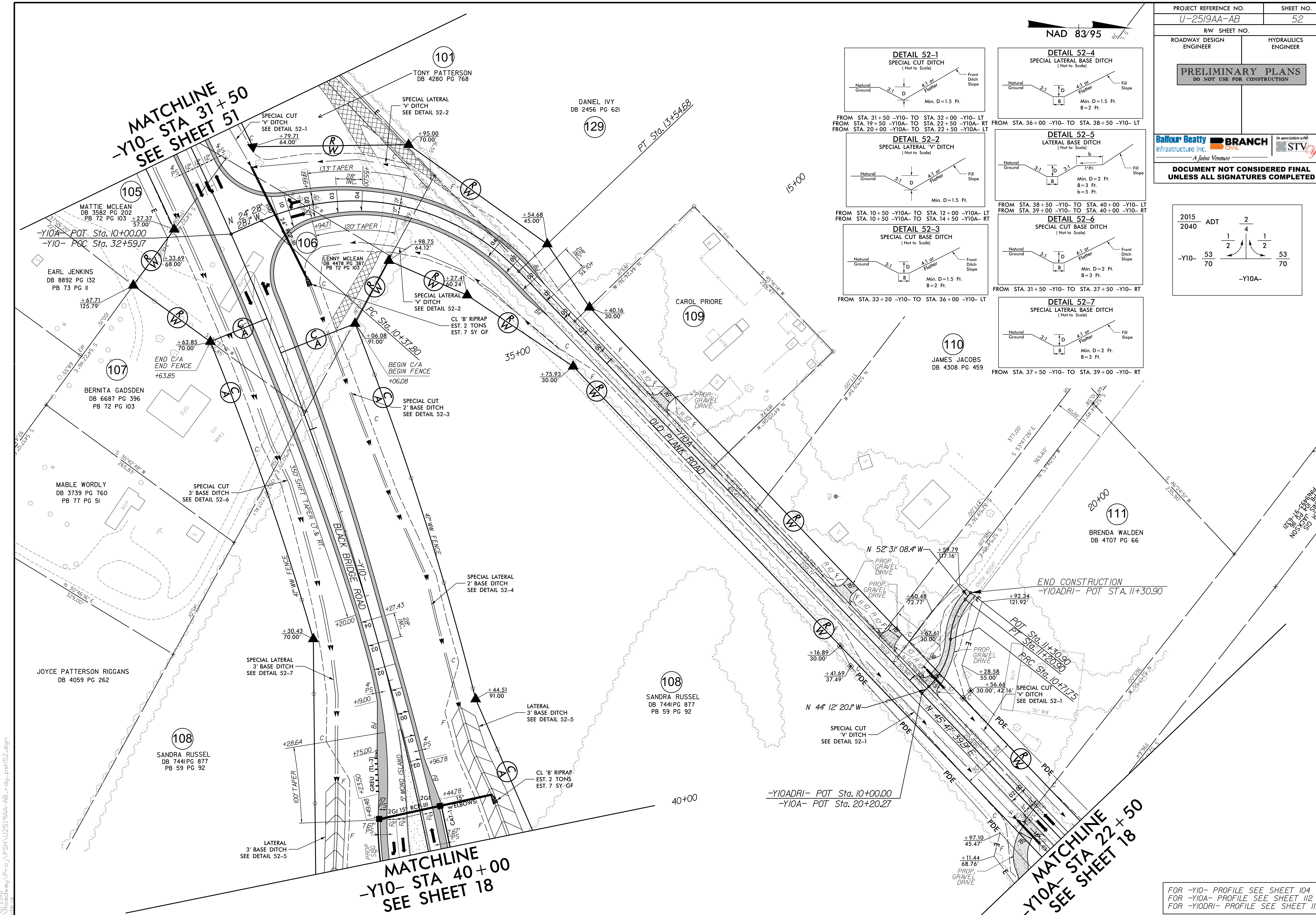
bridge



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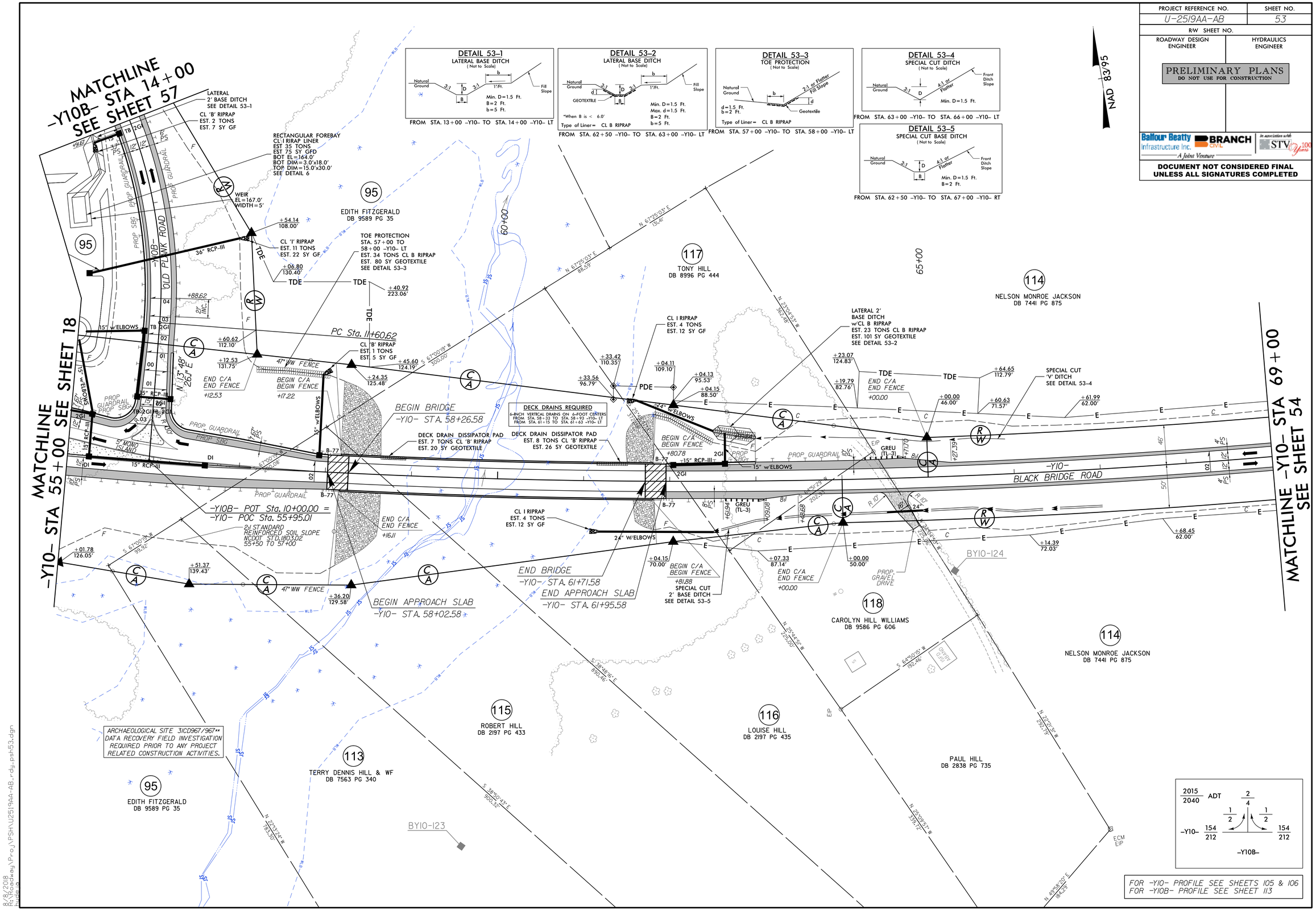
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	53
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



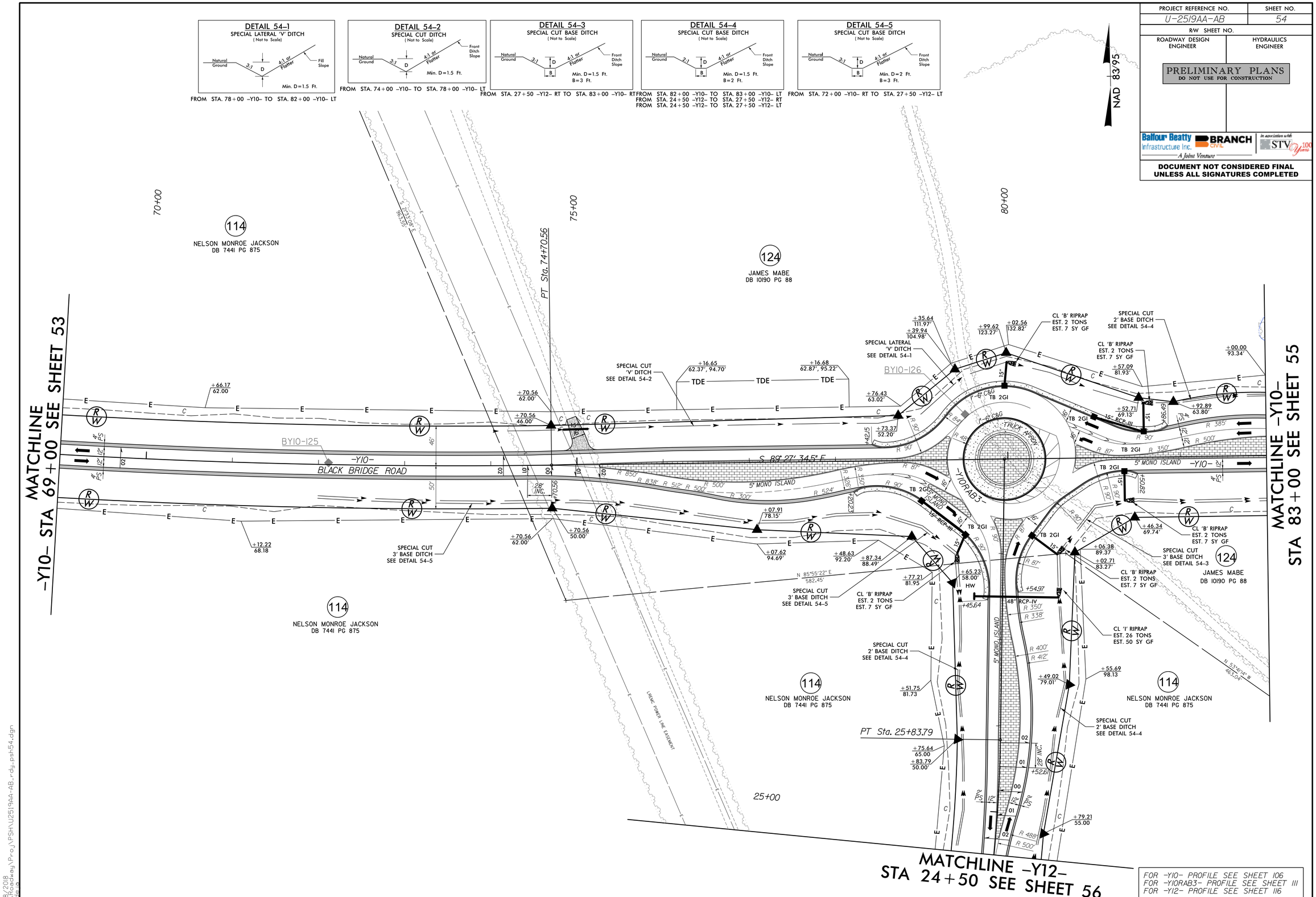
8/8/2018
R:\Roadway\Proj\PSH\U2519AA-AB_rdy_psh53.dgn
hidle

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	54
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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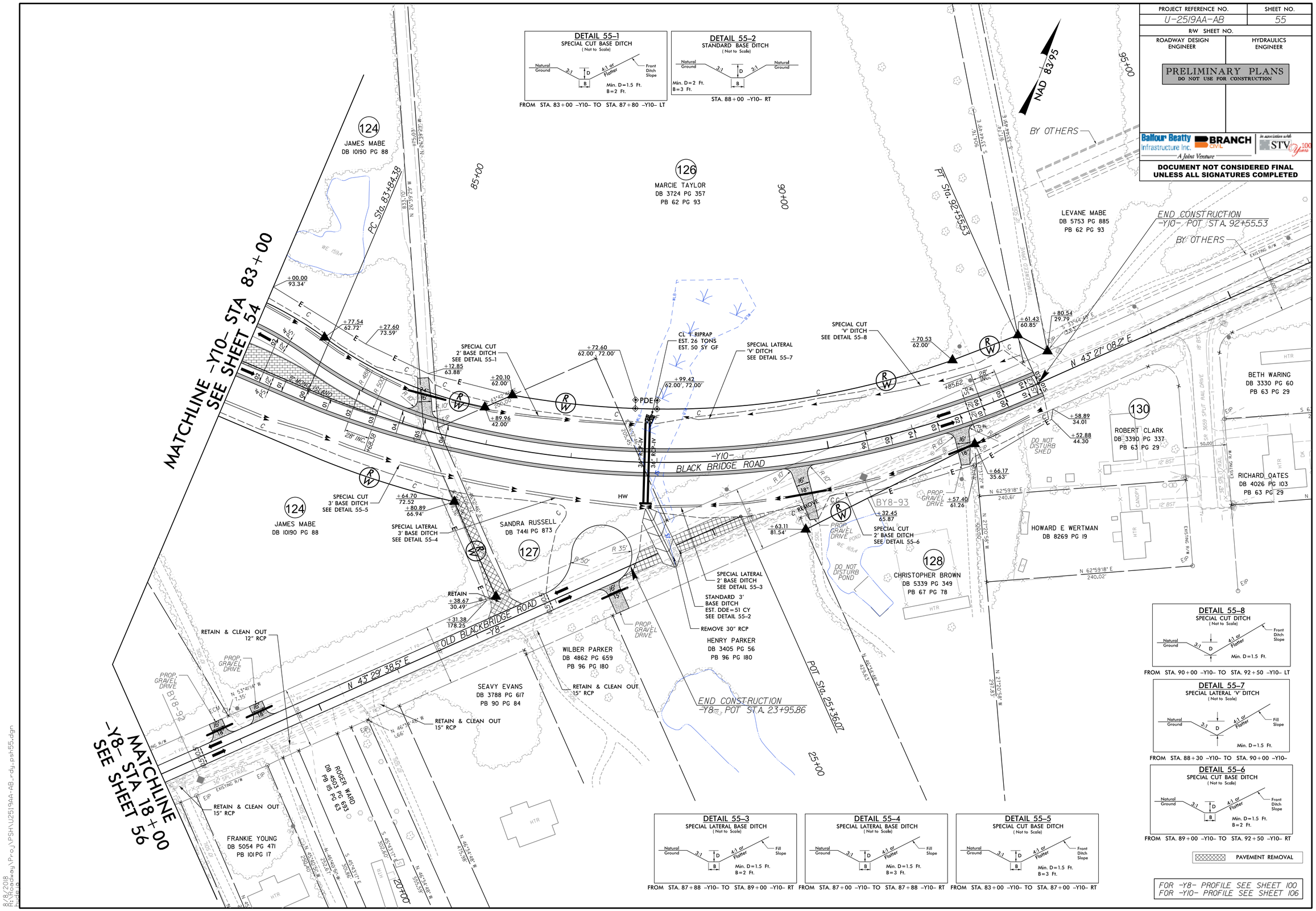
hide 9

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	55
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DETAIL 55-1
SPECIAL CUT BASE DITCH
(Not to Scale)
Natural Ground, 3:1, D, B, 4:1 or Flatter, Front Ditch Slope
Min. D = 1.5 Ft.
B = 2 Ft.
FROM STA. 83+00 -Y10- TO STA. 87+80 -Y10- LT

DETAIL 55-2
STANDARD BASE DITCH
(Not to Scale)
Natural Ground, 3:1, D, 3:1, Natural Ground, B
Min. D = 2 Ft.
B = 3 Ft.
STA. 88+00 -Y10- RT

DETAIL 55-8
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground, 3:1, D, 4:1 or Flatter, Front Ditch Slope
Min. D = 1.5 Ft.
FROM STA. 90+00 -Y10- TO STA. 92+50 -Y10- LT

DETAIL 55-7
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 3:1, D, 4:1 or Flatter, Fill Slope
Min. D = 1.5 Ft.
FROM STA. 88+30 -Y10- TO STA. 90+00 -Y10-

DETAIL 55-6
SPECIAL CUT BASE DITCH
(Not to Scale)
Natural Ground, 3:1, D, 4:1 or Flatter, B, Front Ditch Slope
Min. D = 1.5 Ft.
B = 2 Ft.
FROM STA. 89+00 -Y10- TO STA. 92+50 -Y10- RT

DETAIL 55-3
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 3:1, D, 4:1 or Flatter, B, Fill Slope
Min. D = 1.5 Ft.
B = 2 Ft.
FROM STA. 87+88 -Y10- TO STA. 89+00 -Y10- RT

DETAIL 55-4
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 3:1, D, 4:1 or Flatter, B, Fill Slope
Min. D = 1.5 Ft.
B = 3 Ft.
FROM STA. 87+00 -Y10- TO STA. 87+88 -Y10- RT

DETAIL 55-5
SPECIAL CUT BASE DITCH
(Not to Scale)
Natural Ground, 3:1, D, 4:1 or Flatter, B, Front Ditch Slope
Min. D = 1.5 Ft.
B = 3 Ft.
FROM STA. 83+00 -Y10- TO STA. 87+00 -Y10- RT

PAVEMENT REMOVAL

FOR -Y8- PROFILE SEE SHEET 100
FOR -Y10- PROFILE SEE SHEET 106

8/8/2018
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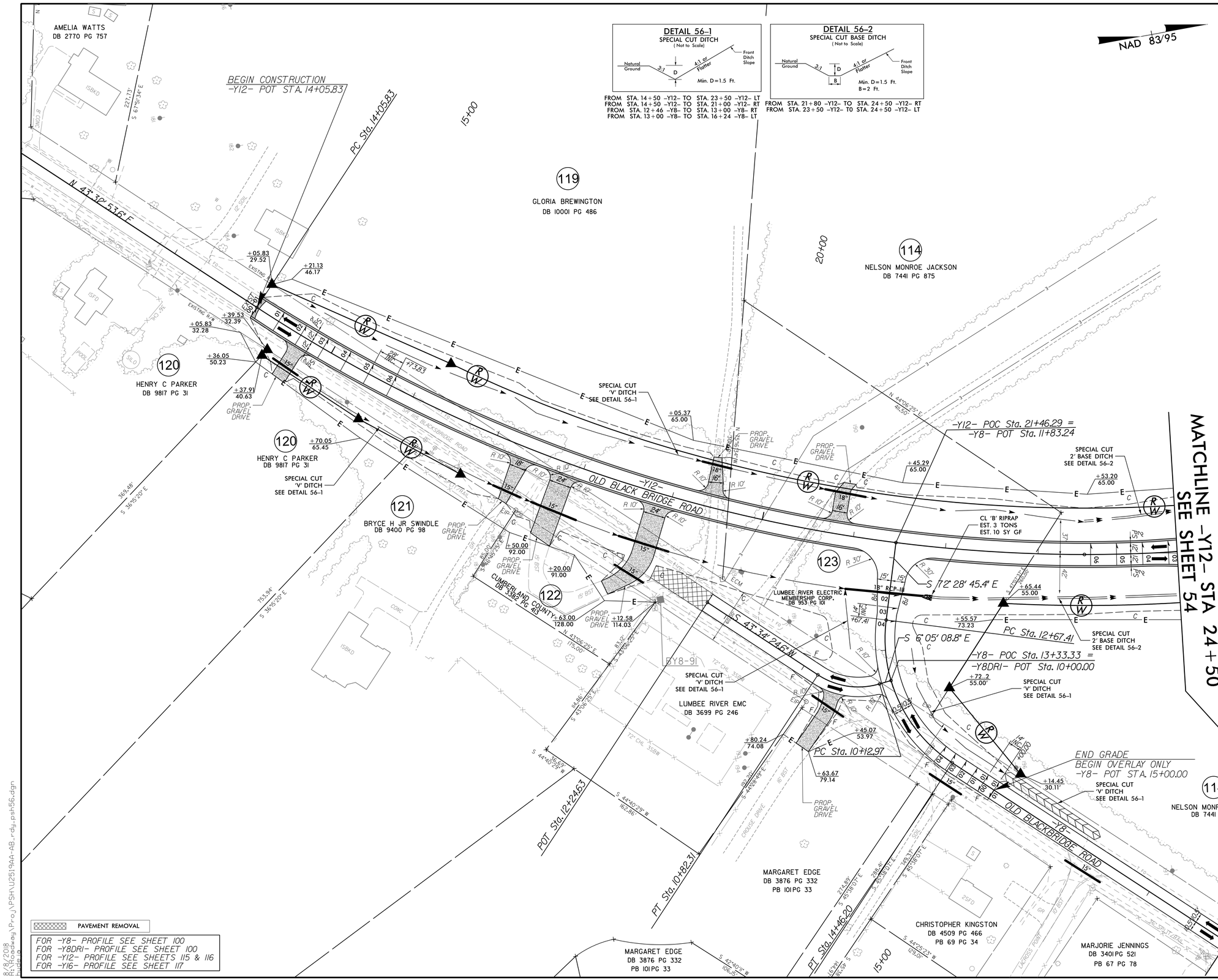
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	56
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



8/9/2018
R:\Roadway\Proj\PSH\U2519AA-AB_rdy_psh56.dgn
bridge

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	57
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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A Joint Venture

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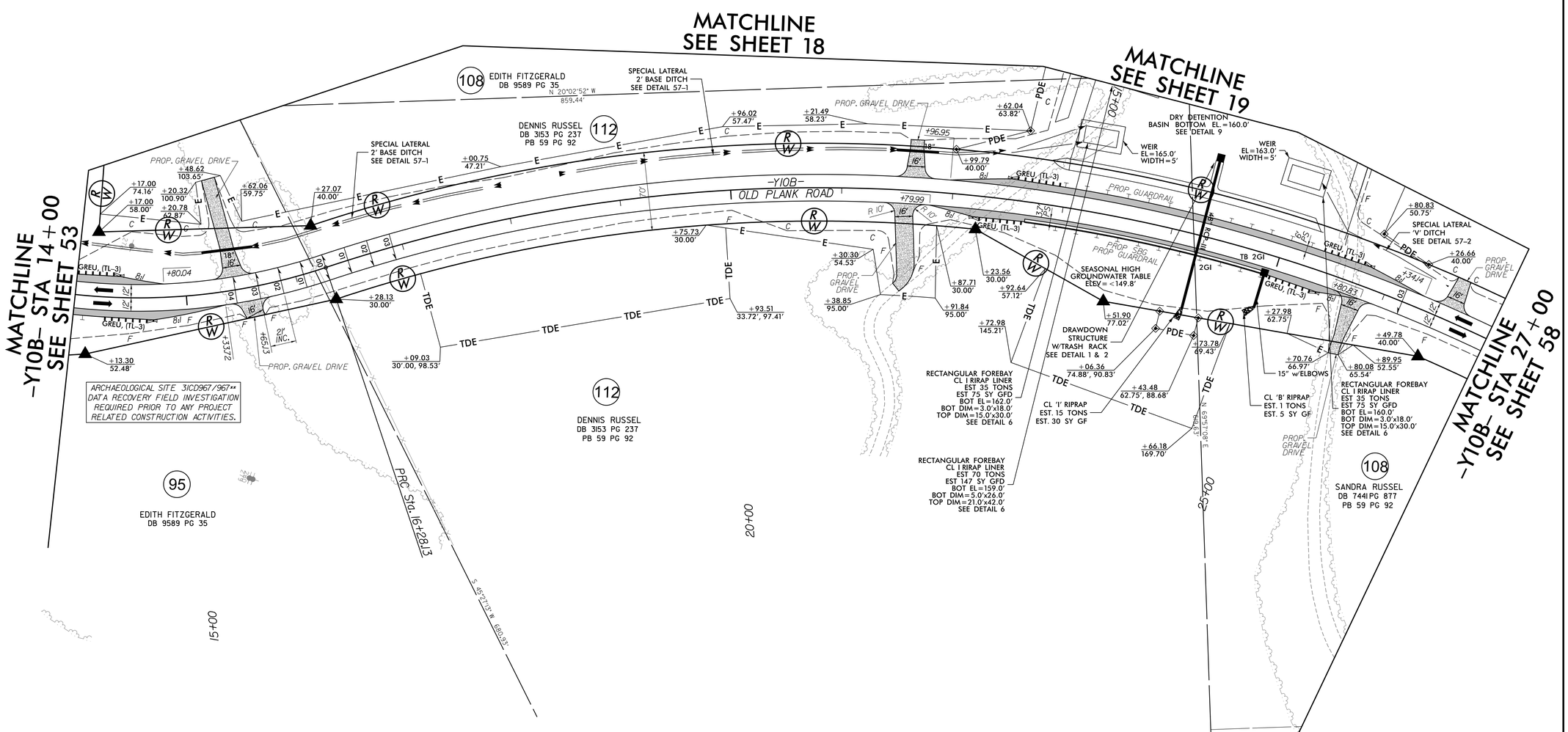

FOR -Y10B- PROFILE SEE SHEETS 113 & 114

8/8/2018
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hudson

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	58
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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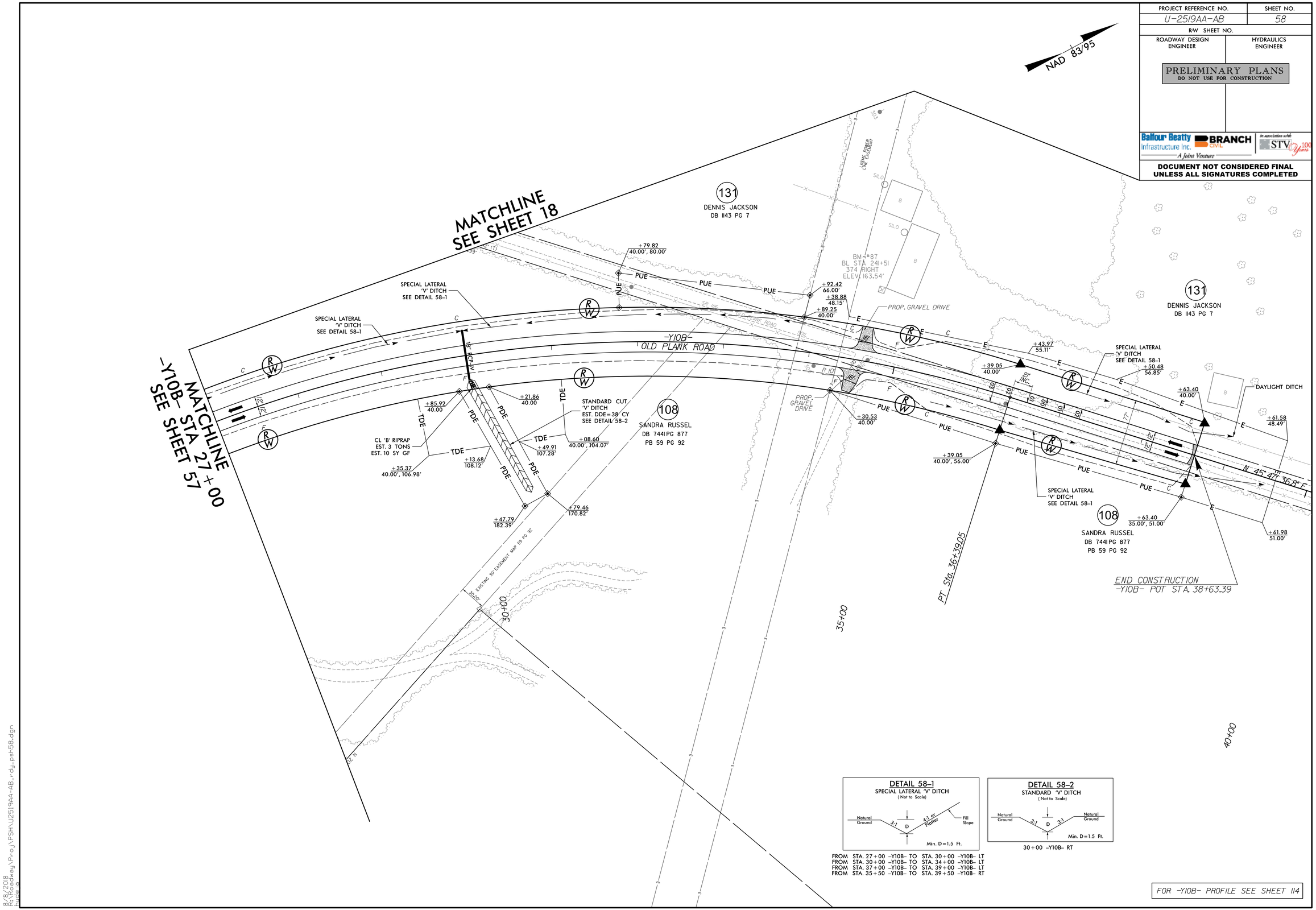

DETAIL 58-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

DETAIL 58-2
STANDARD 'V' DITCH
(Not to Scale)

30 + 00 -Y10B- RT

FROM STA. 27 + 00 -Y10B- TO STA. 30 + 00 -Y10B- LT
FROM STA. 30 + 00 -Y10B- TO STA. 34 + 00 -Y10B- LT
FROM STA. 37 + 00 -Y10B- TO STA. 39 + 00 -Y10B- LT
FROM STA. 35 + 50 -Y10B- TO STA. 39 + 50 -Y10B- RT

FOR -Y10B- PROFILE SEE SHEET 114

8/8/2018
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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	59
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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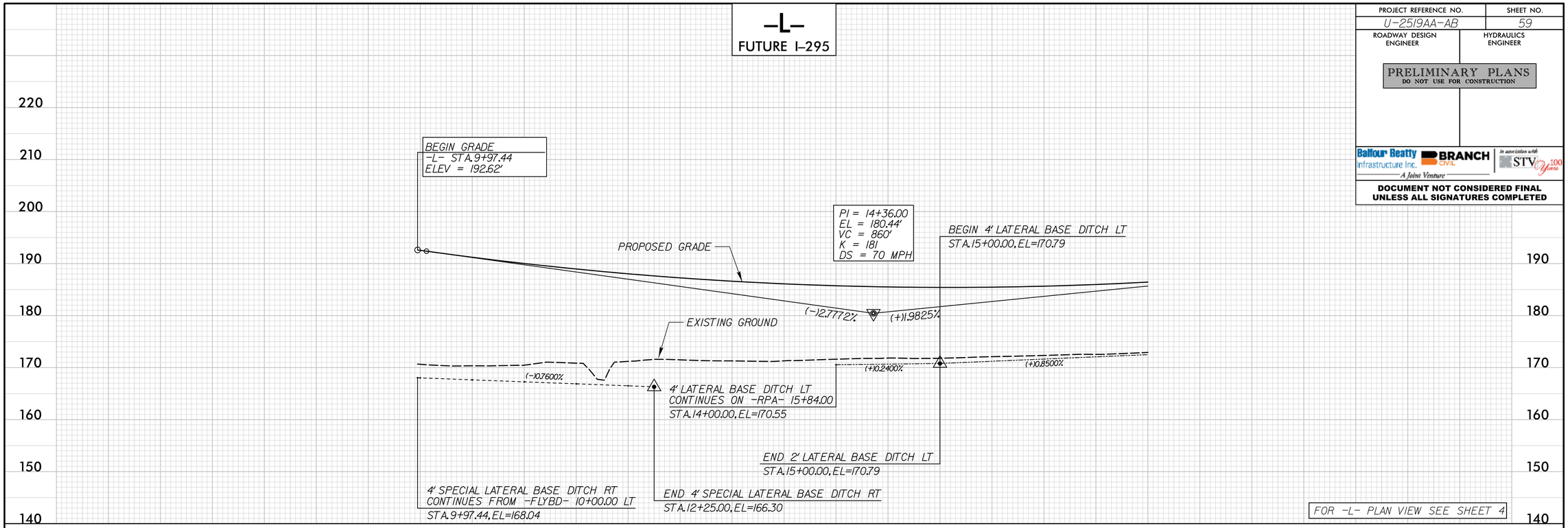
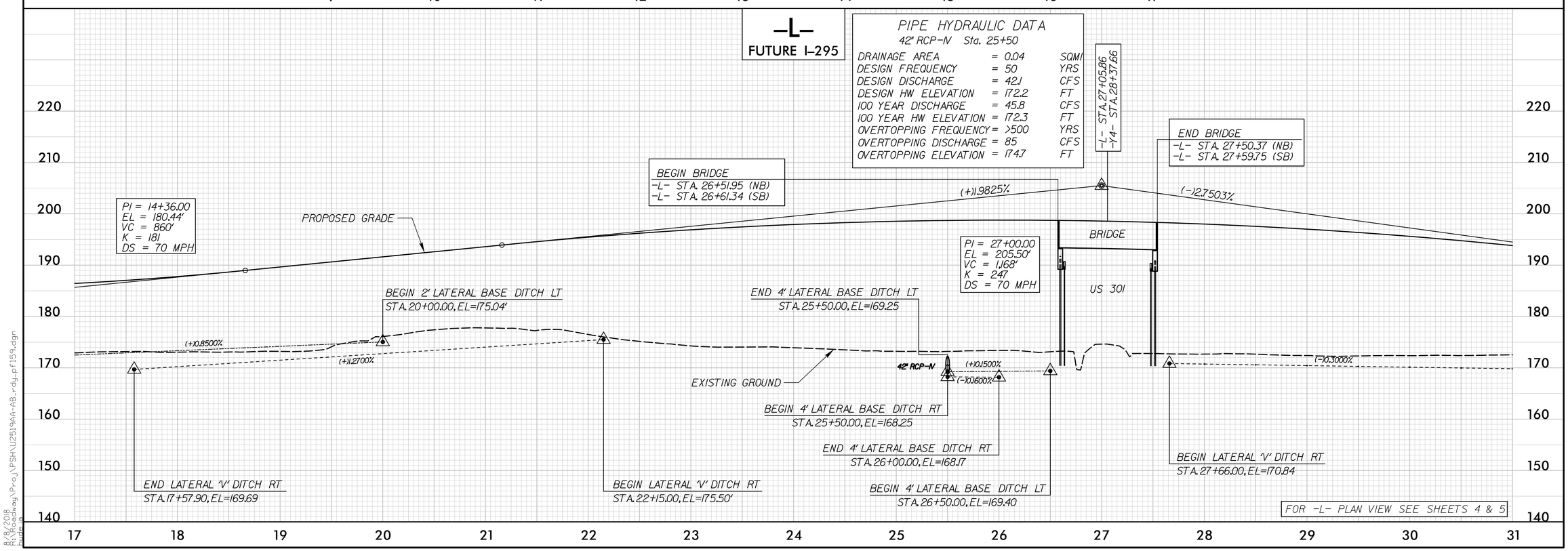
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	60
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV | A Joint Venture

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-L- FUTURE I-295

PIPE HYDRAULIC DATA
54" RCP-IV Sta. 31+27

DRAINAGE AREA	=	0.05	SQMI
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	66.9	CFS
DESIGN HW ELEVATION	=	173.2	FT
100 YEAR DISCHARGE	=	71.9	CFS
100 YEAR HW ELEVATION	=	173.5	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	153	CFS
OVERTOPPING ELEVATION	=	182.2	FT

PIPE HYDRAULIC DATA
36" RCP-IV Sta. 37+19

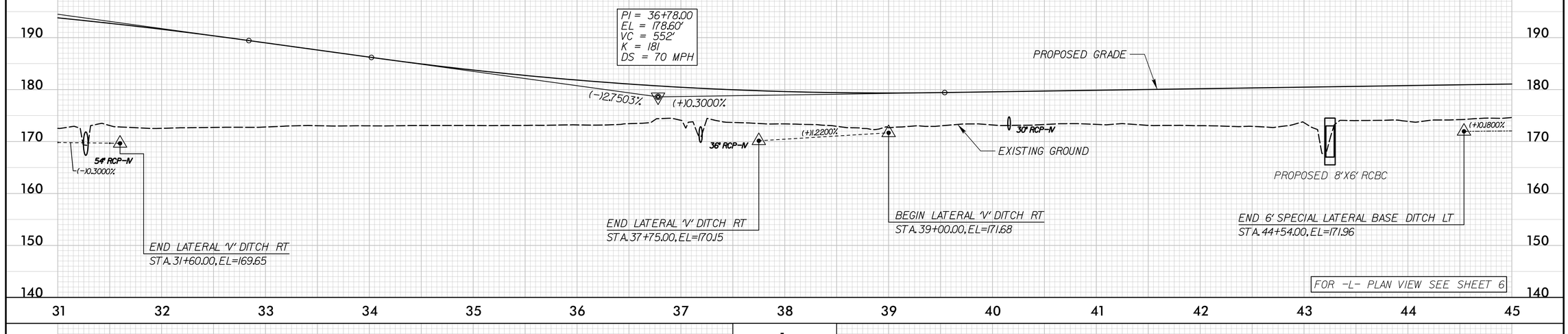
DRAINAGE AREA	=	0.02	SQMI
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	16.5	CFS
DESIGN HW ELEVATION	=	173.6	FT
100 YEAR DISCHARGE	=	18.1	CFS
100 YEAR HW ELEVATION	=	173.7	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	53	CFS
OVERTOPPING ELEVATION	=	180.4	FT

PIPE HYDRAULIC DATA
30" RCP-IV Sta. 40+16

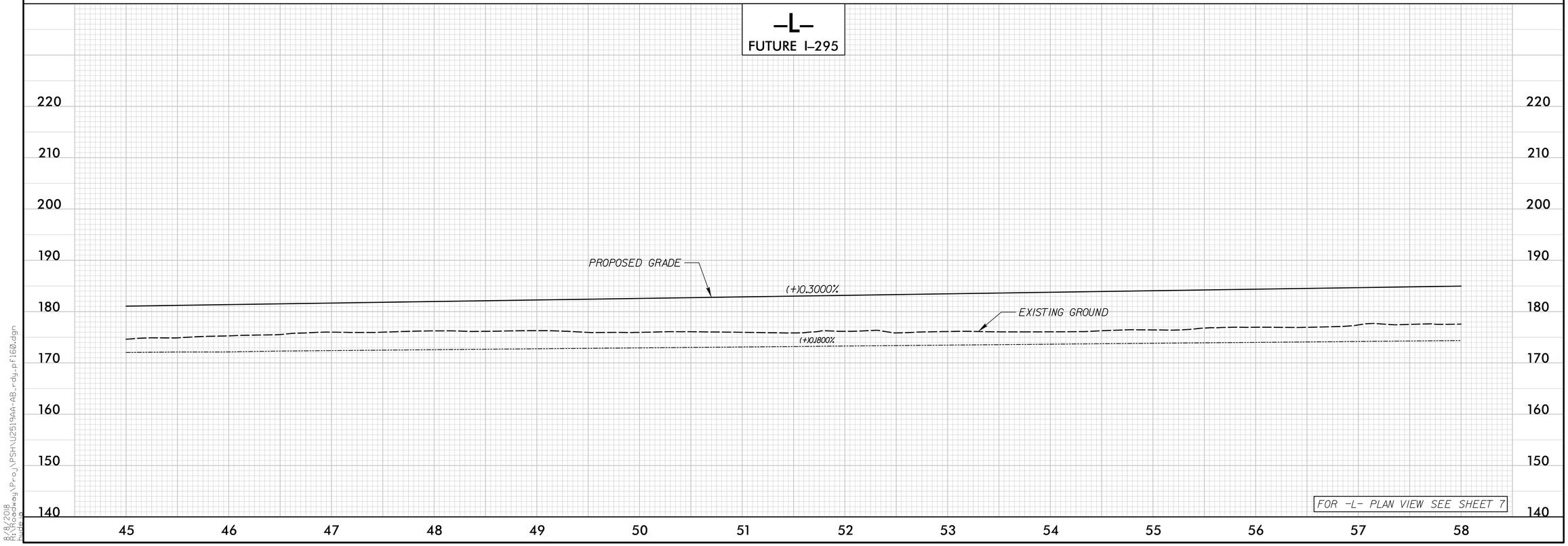
DRAINAGE AREA	=	0.02	SQMI
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	15.3	CFS
DESIGN HW ELEVATION	=	174.7	FT
100 YEAR DISCHARGE	=	16.5	CFS
100 YEAR HW ELEVATION	=	174.8	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	58	CFS
OVERTOPPING ELEVATION	=	180.6	FT

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	230	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	172.8	FT
BASE DISCHARGE	=	260	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	173.6	FT
OVERTOPPING DISCHARGE	=	500	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	179.4	FT



-L- FUTURE I-295



8/8/2018
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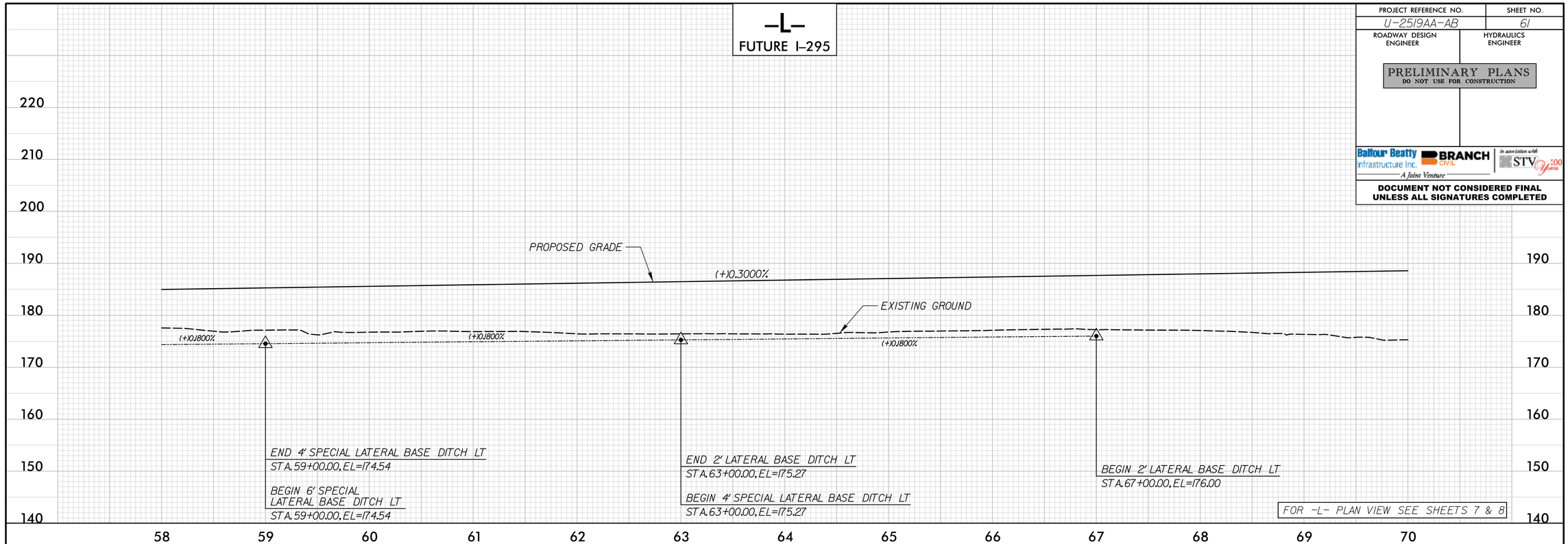
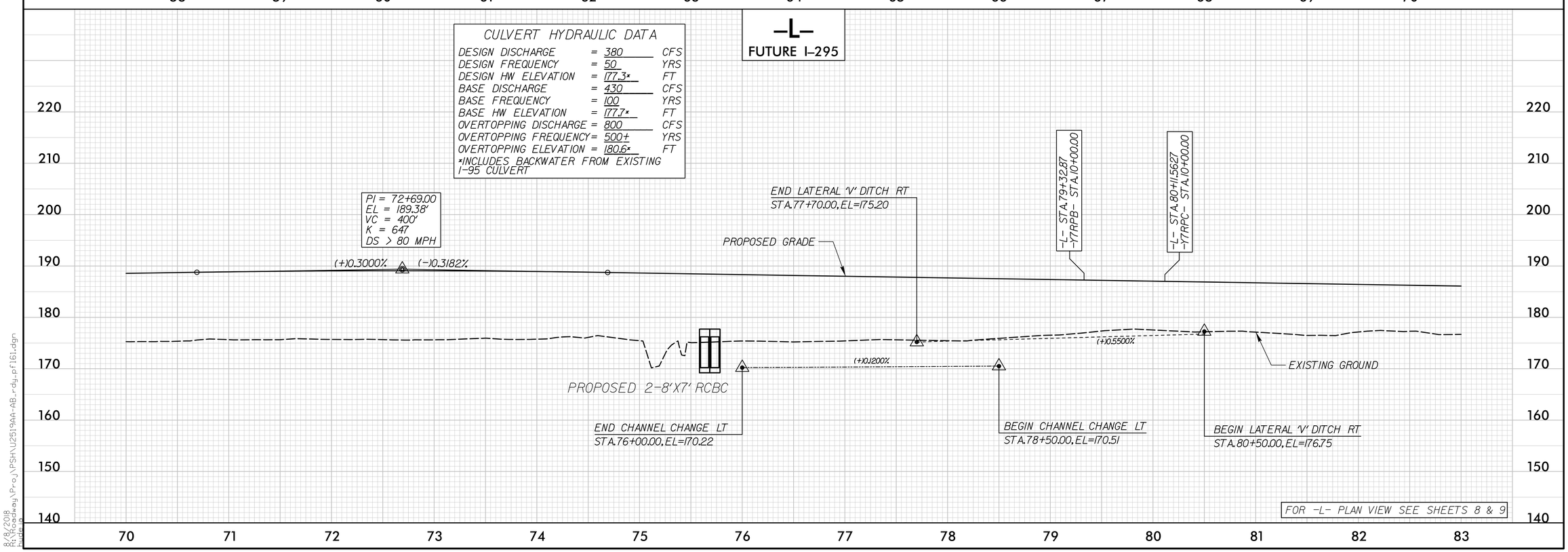
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	61
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





8/8/2018
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mwade

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	62
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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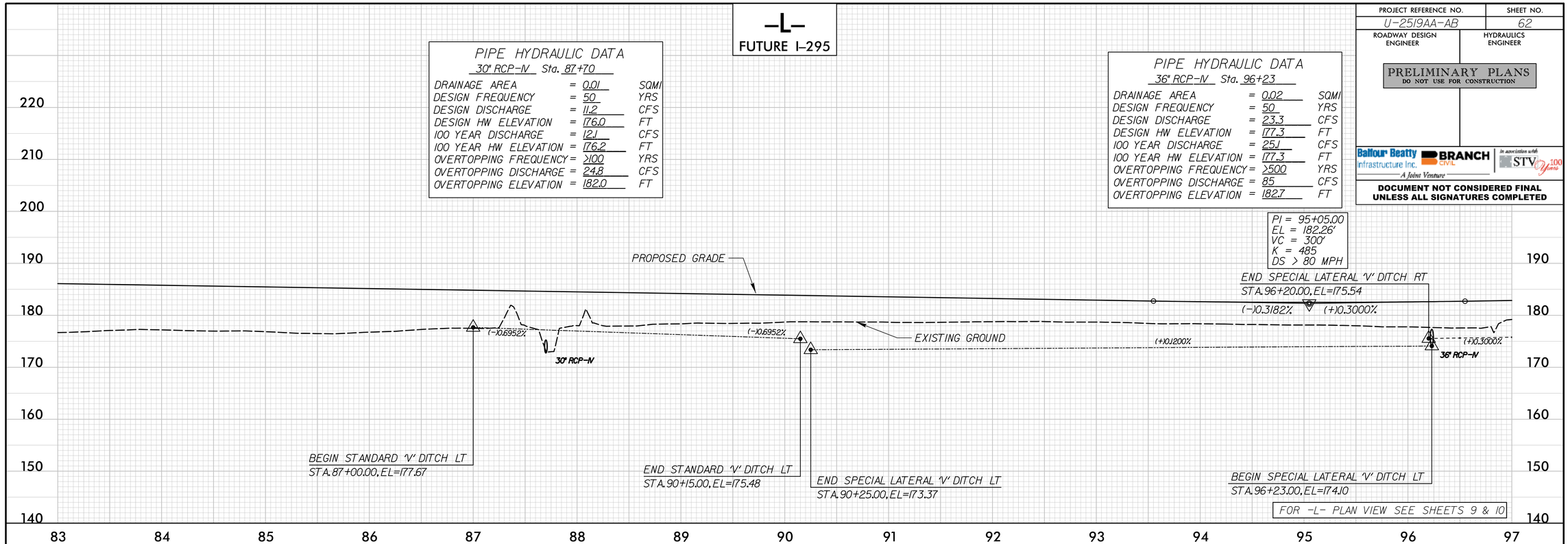
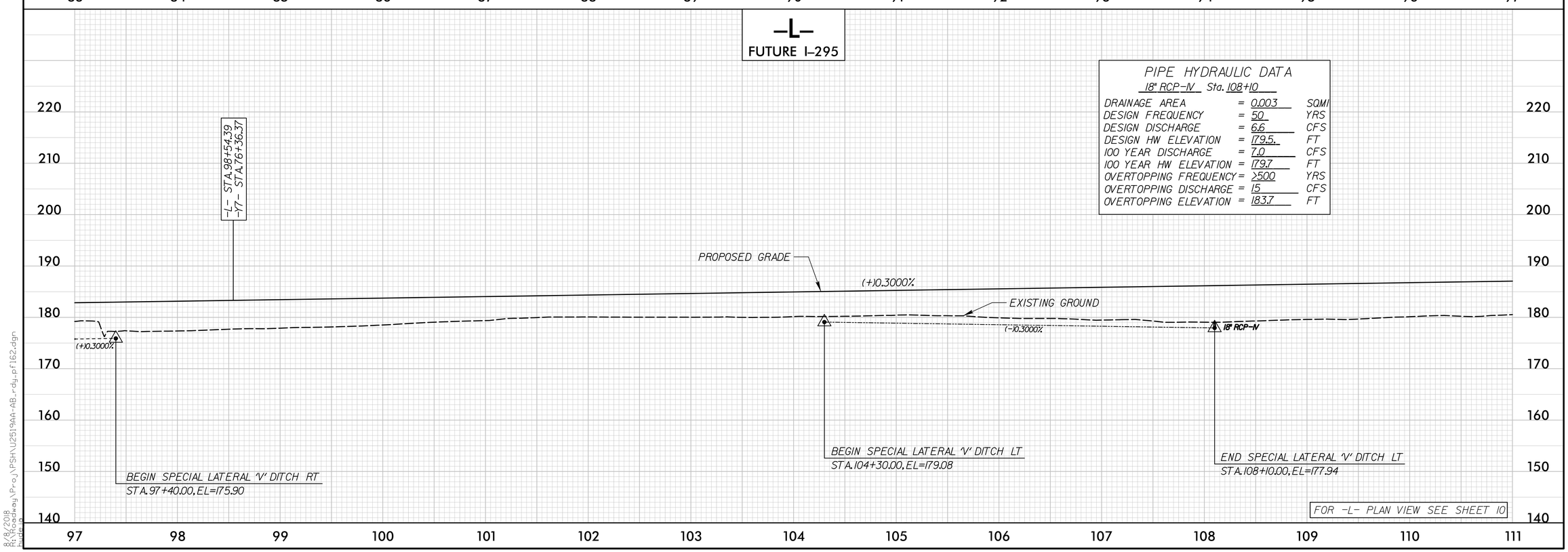
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





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mwatson

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	63
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 years
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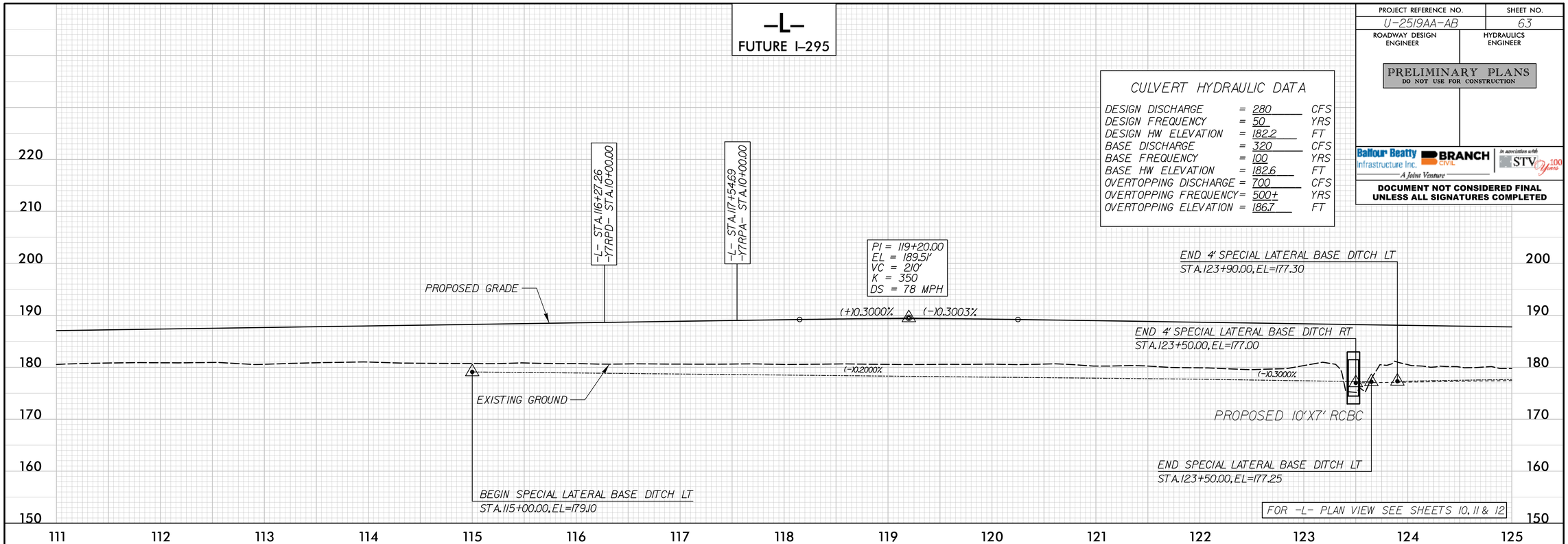
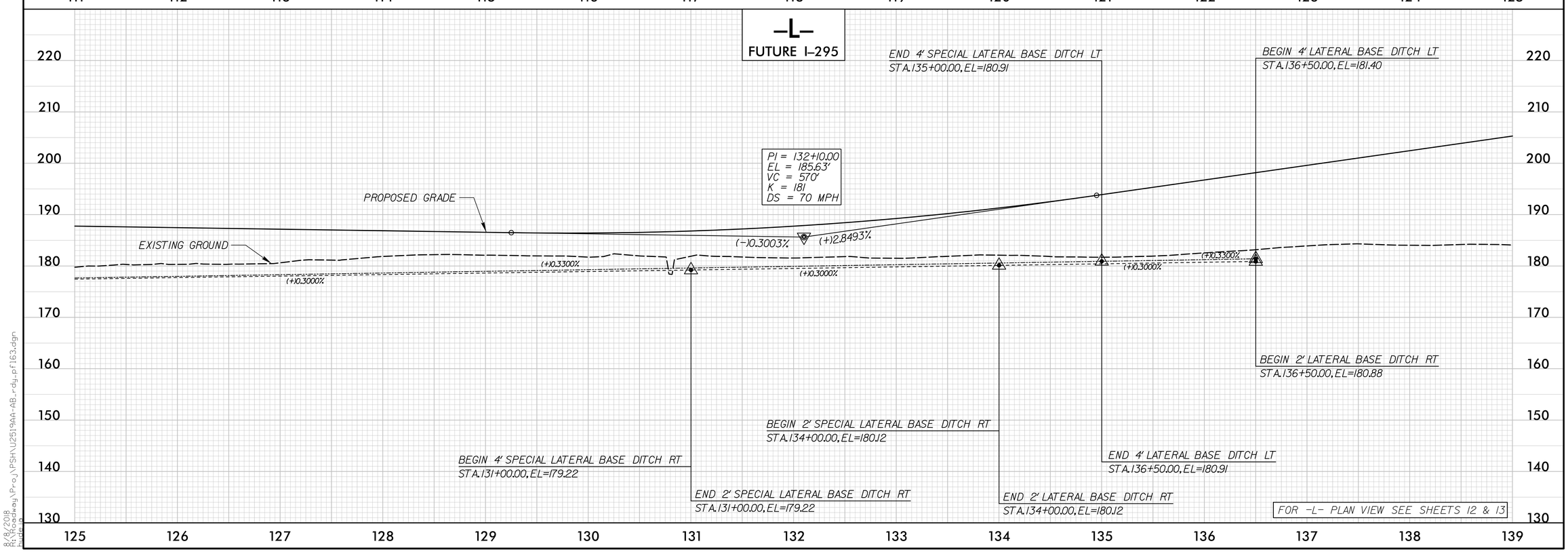
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	280	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	182.2	FT
BASE DISCHARGE	=	320	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	182.6	FT
OVERTOPPING DISCHARGE	=	700	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	186.7	FT





8/8/2018
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bwade

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	64
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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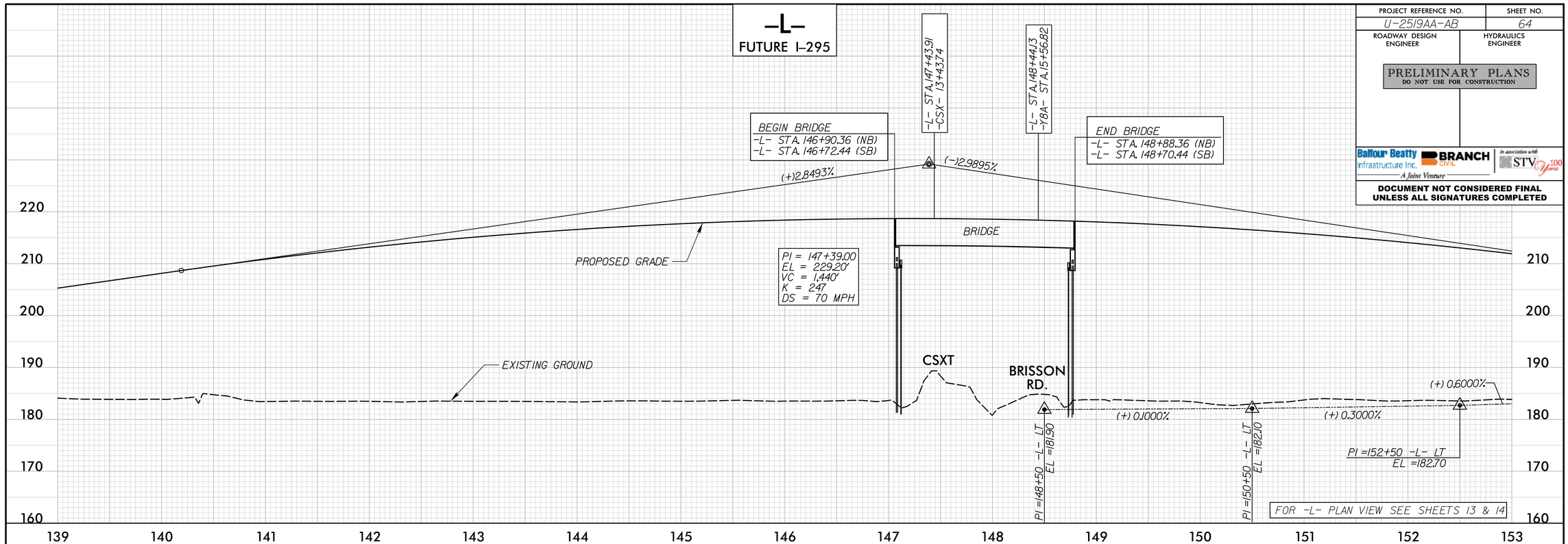
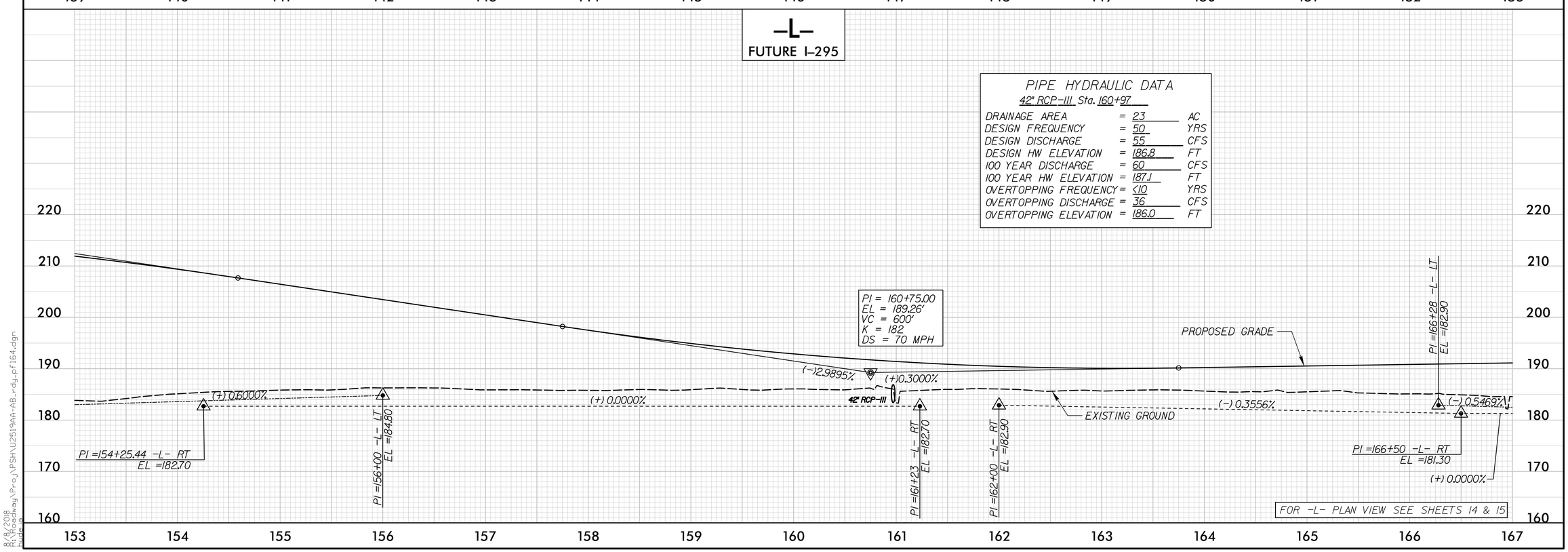
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	65
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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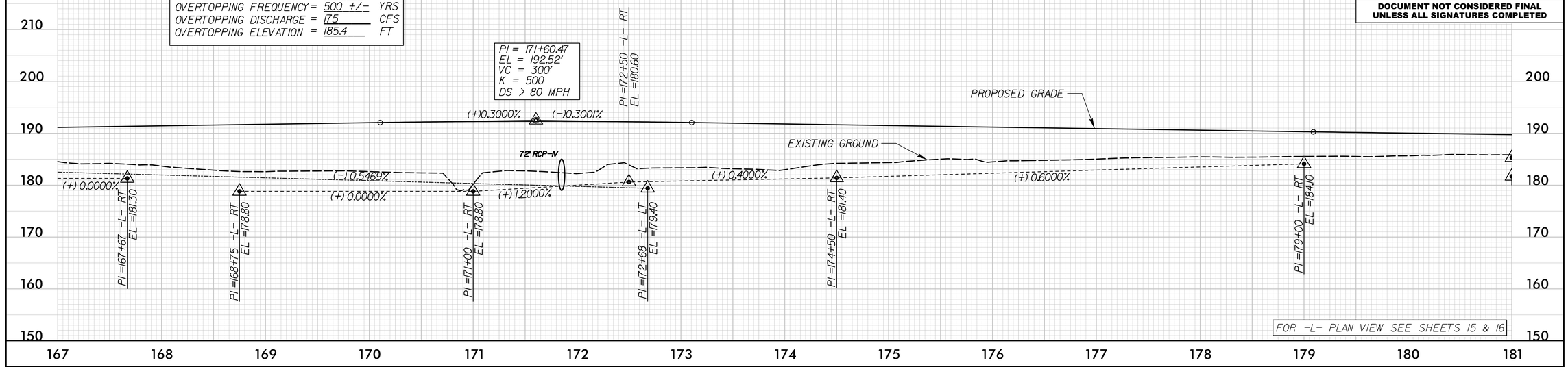
-L- FUTURE I-295

PIPE HYDRAULIC DATA
72" RCP-IV Sta. 171+85

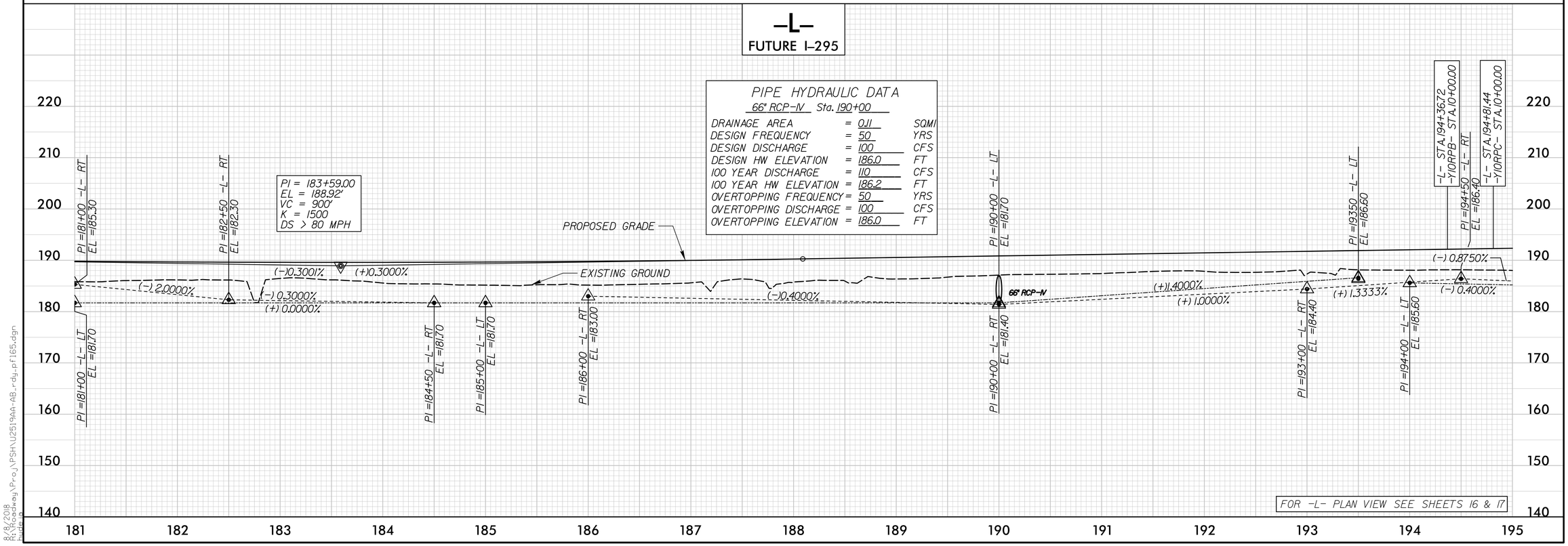
DRAINAGE AREA	=	0.18	SQMI
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	140	CFS
DESIGN HW ELEVATION	=	184.4	FT
100 YEAR DISCHARGE	=	140	CFS
100 YEAR HW ELEVATION	=	184.7	FT
OVERTOPPING FREQUENCY	=	500 +/-	YRS
OVERTOPPING DISCHARGE	=	175	CFS
OVERTOPPING ELEVATION	=	185.4	FT



-L- FUTURE I-295

PIPE HYDRAULIC DATA
66" RCP-IV Sta. 190+00

DRAINAGE AREA	=	0.11	SQMI
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	100	CFS
DESIGN HW ELEVATION	=	186.0	FT
100 YEAR DISCHARGE	=	110	CFS
100 YEAR HW ELEVATION	=	186.2	FT
OVERTOPPING FREQUENCY	=	50	YRS
OVERTOPPING DISCHARGE	=	100	CFS
OVERTOPPING ELEVATION	=	186.0	FT



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	66
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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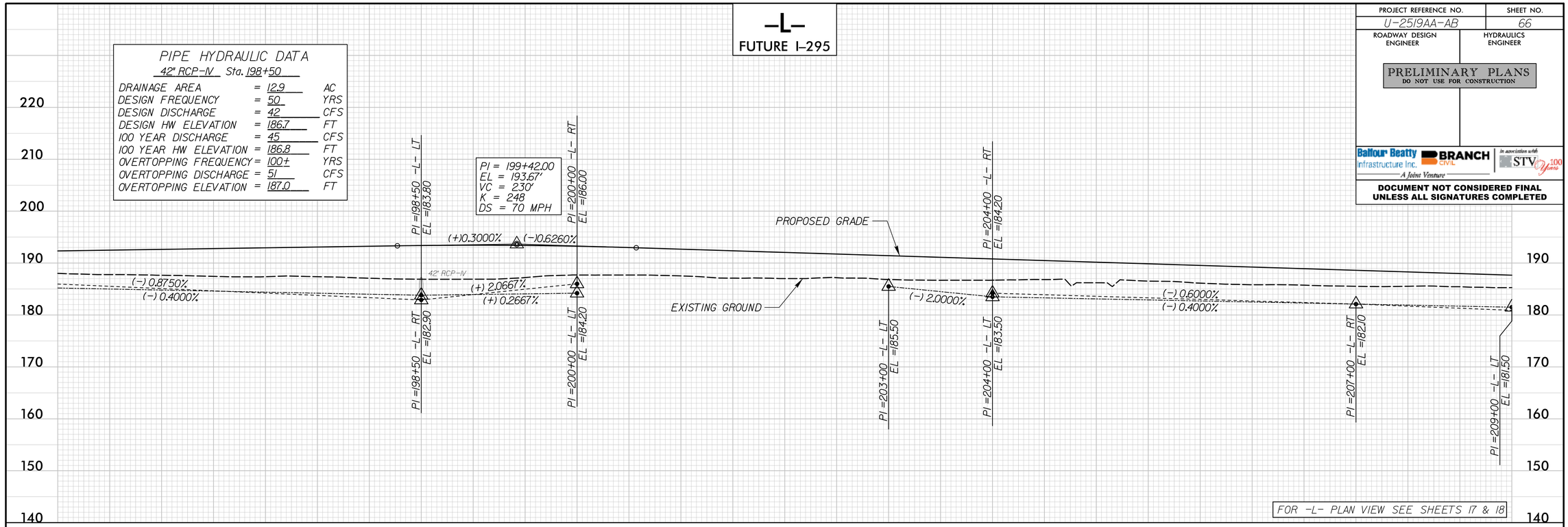
-L- FUTURE I-295

PIPE HYDRAULIC DATA
42" RCP-IV Sta. 198+50

DRAINAGE AREA	= 12.9	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 42	CFS
DESIGN HW ELEVATION	= 186.7	FT
100 YEAR DISCHARGE	= 45	CFS
100 YEAR HW ELEVATION	= 186.8	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 51	CFS
OVERTOPPING ELEVATION	= 187.0	FT



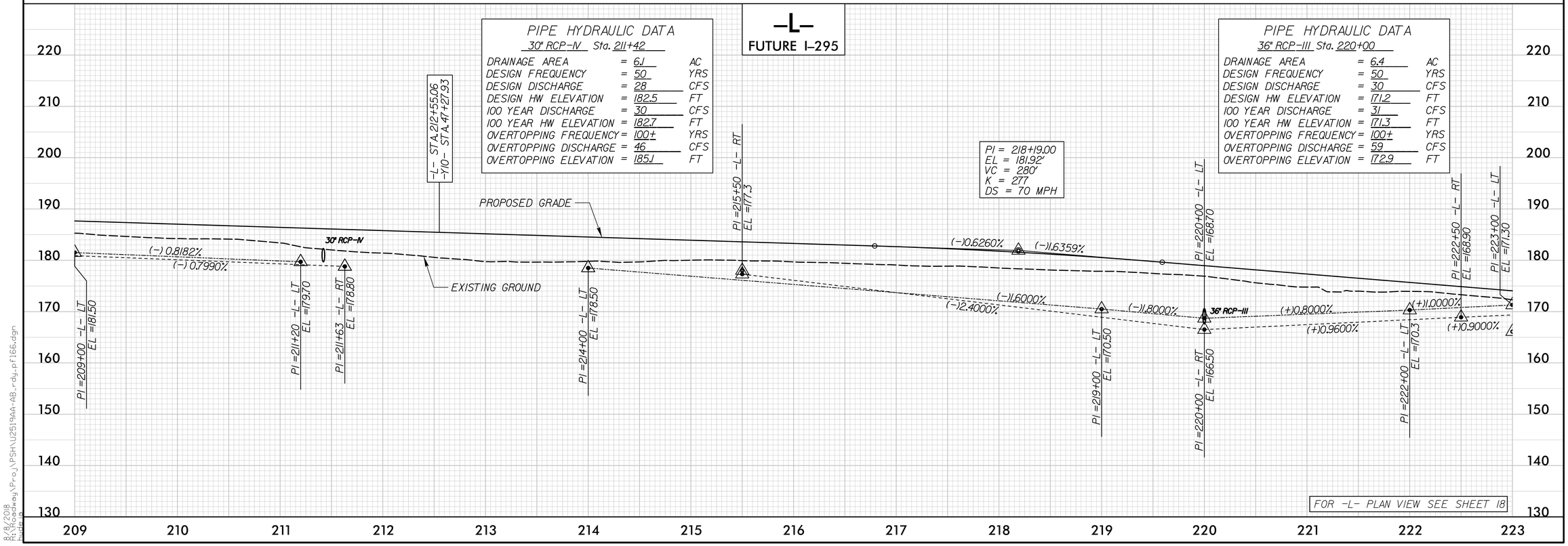
-L- FUTURE I-295

PIPE HYDRAULIC DATA
30" RCP-IV Sta. 211+42

DRAINAGE AREA	= 6.1	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 28	CFS
DESIGN HW ELEVATION	= 182.5	FT
100 YEAR DISCHARGE	= 30	CFS
100 YEAR HW ELEVATION	= 182.7	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 46	CFS
OVERTOPPING ELEVATION	= 185.1	FT

PIPE HYDRAULIC DATA
36" RCP-III Sta. 220+00

DRAINAGE AREA	= 6.4	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 30	CFS
DESIGN HW ELEVATION	= 171.2	FT
100 YEAR DISCHARGE	= 31	CFS
100 YEAR HW ELEVATION	= 171.3	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 59	CFS
OVERTOPPING ELEVATION	= 172.9	FT



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mwalsh

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	67
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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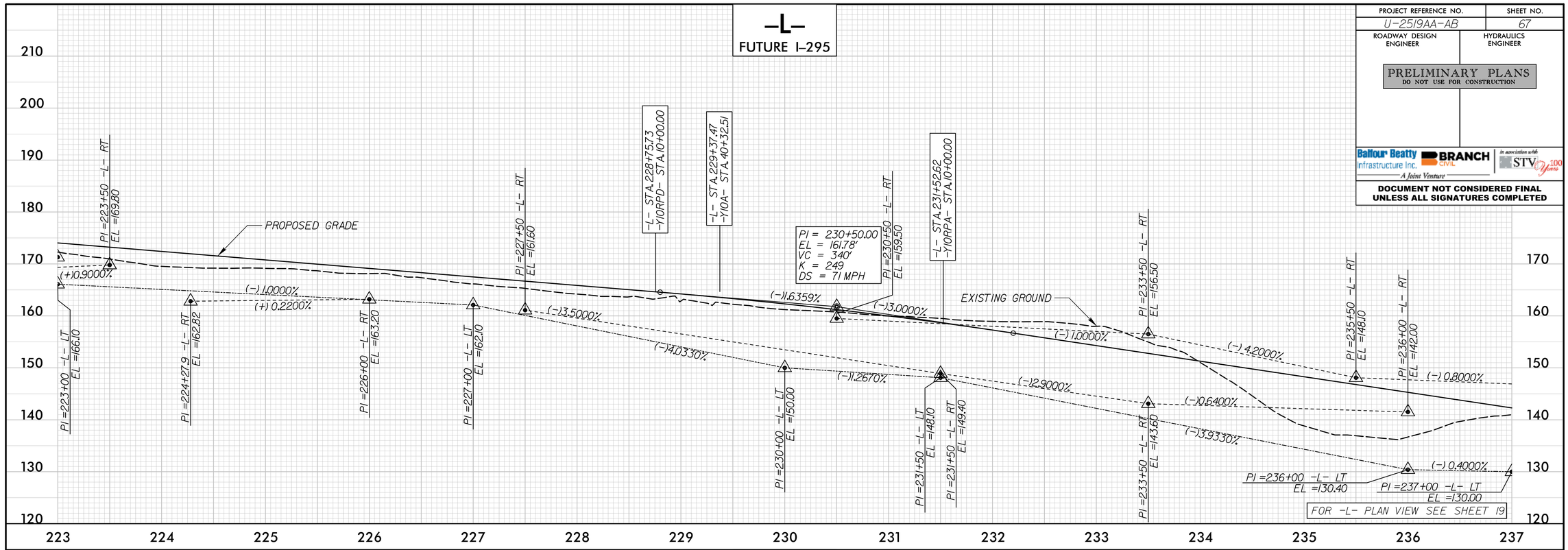

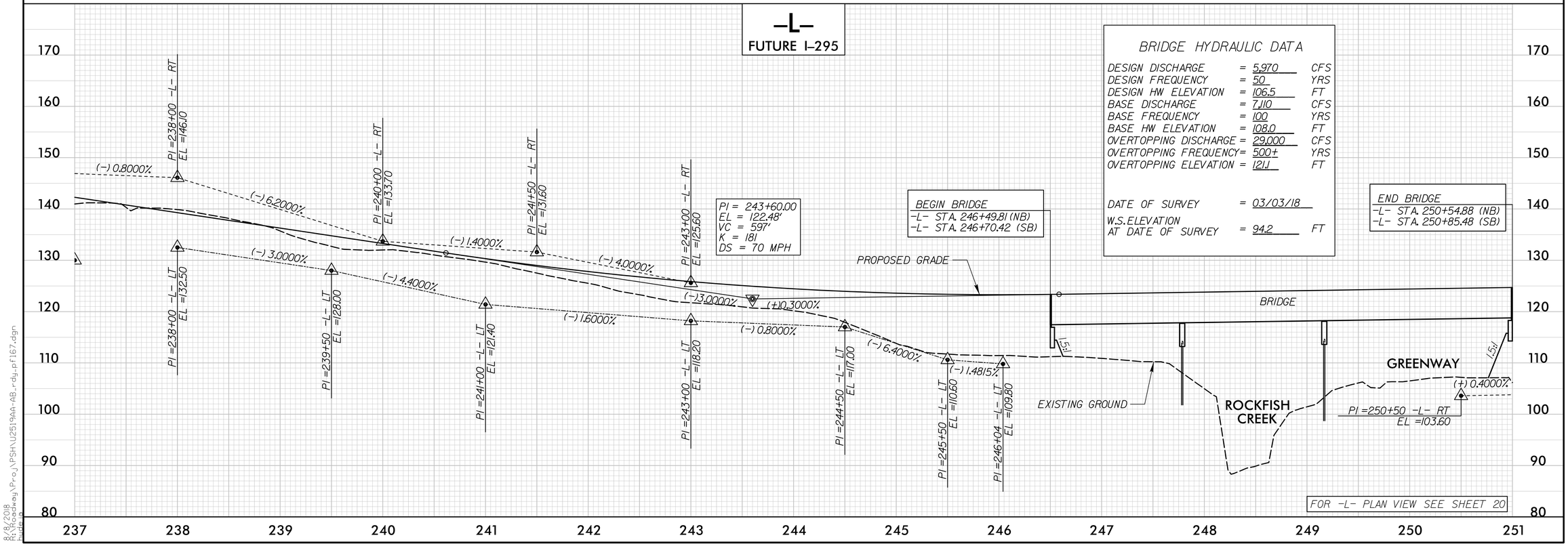

8/8/2018
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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	68
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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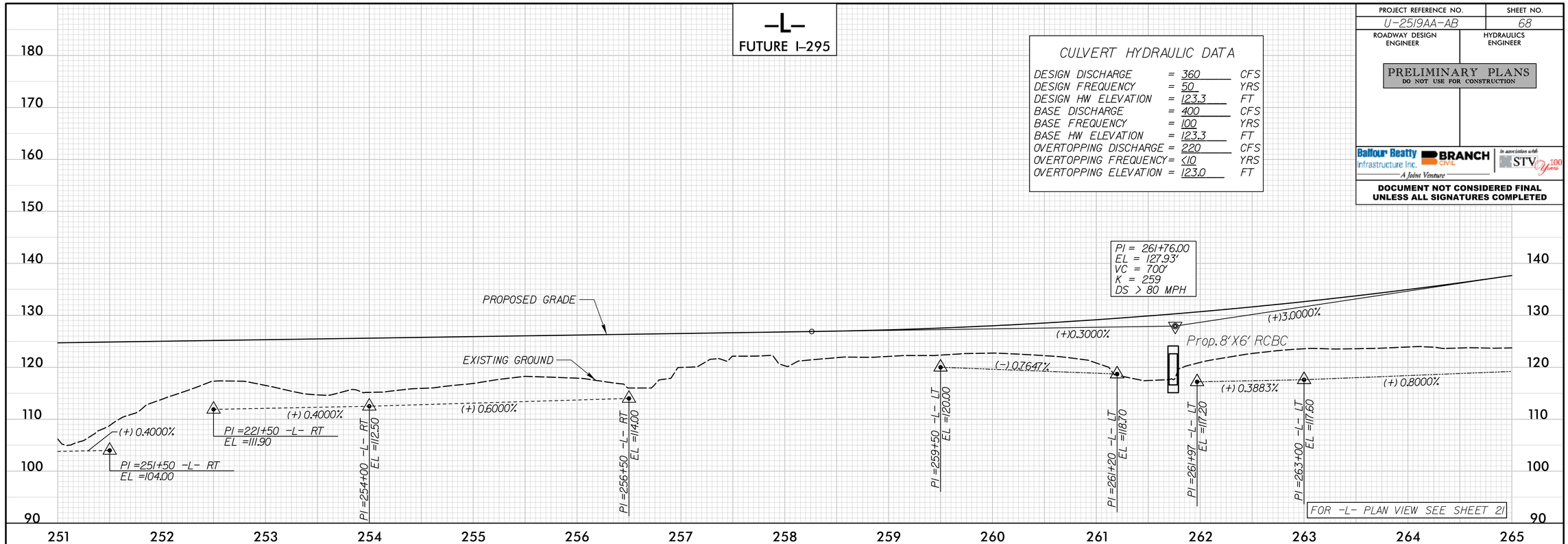
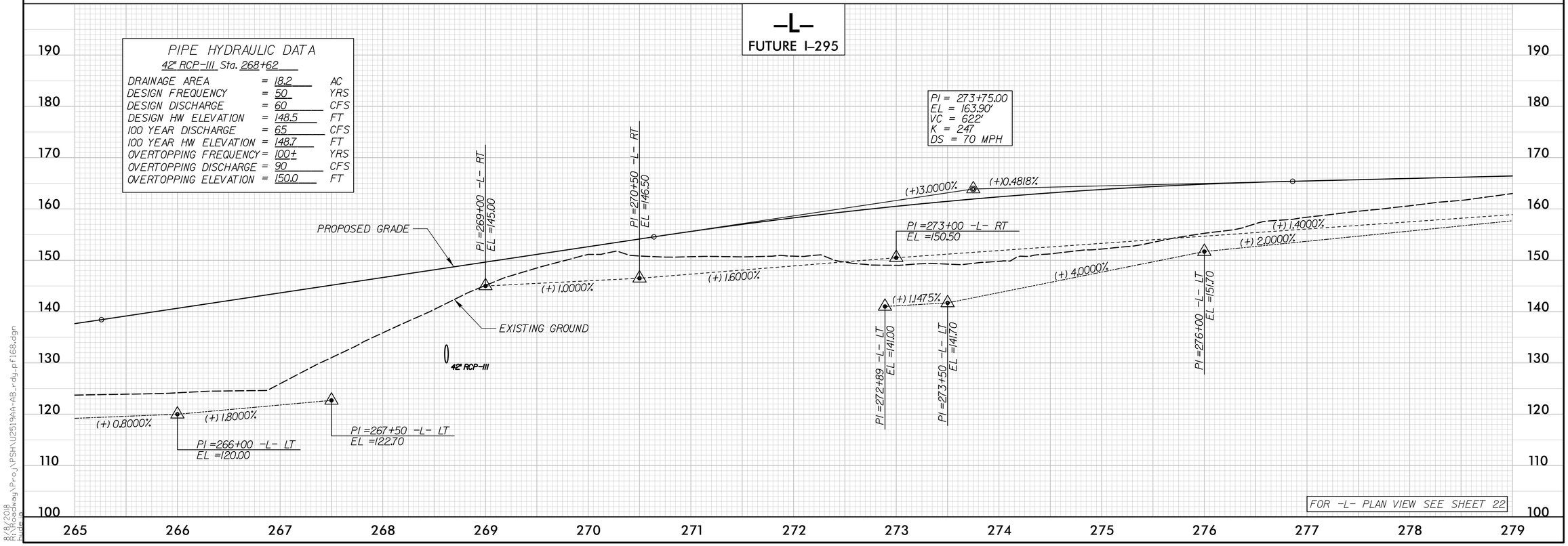


CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	360	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	123.3	FT
BASE DISCHARGE	=	400	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	123.3	FT
OVERTOPPING DISCHARGE	=	220	CFS
OVERTOPPING FREQUENCY	=	<10	YRS
OVERTOPPING ELEVATION	=	123.0	FT



PIPE HYDRAULIC DATA
42" RCP-III Sta. 268+62

DRAINAGE AREA	=	18.2	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	60	CFS
DESIGN HW ELEVATION	=	148.5	FT
100 YEAR DISCHARGE	=	65	CFS
100 YEAR HW ELEVATION	=	148.7	FT
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING DISCHARGE	=	90	CFS
OVERTOPPING ELEVATION	=	150.0	FT

8/8/2018
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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	69
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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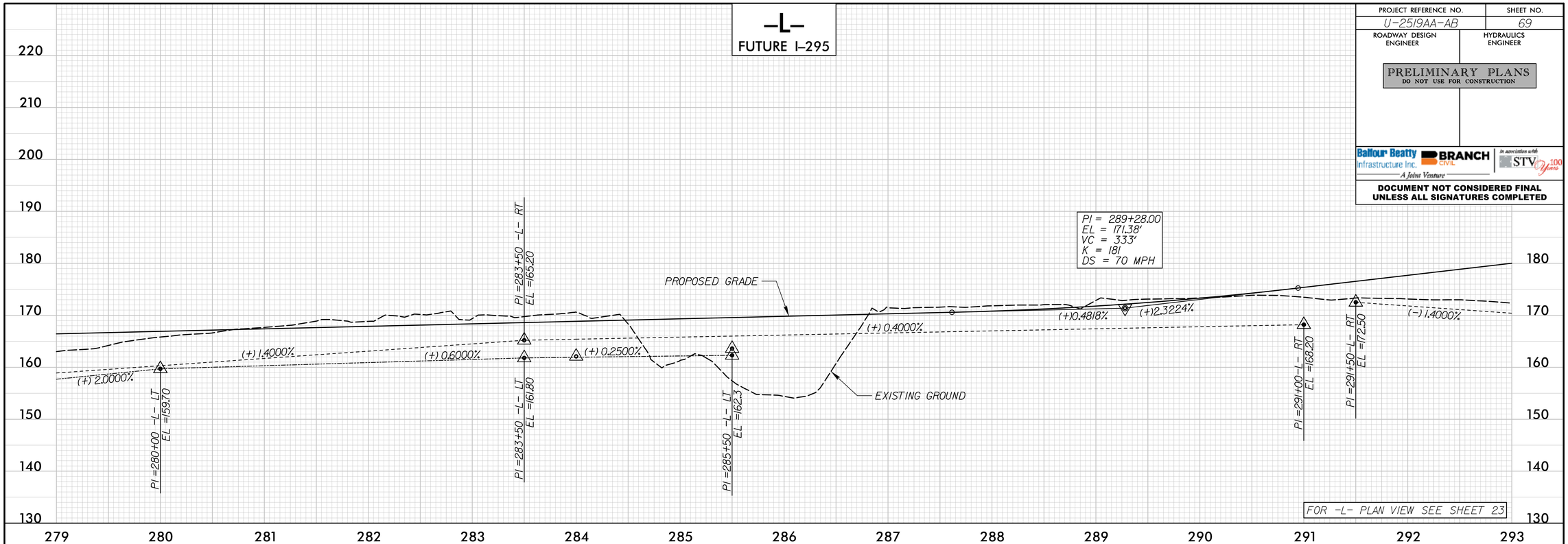

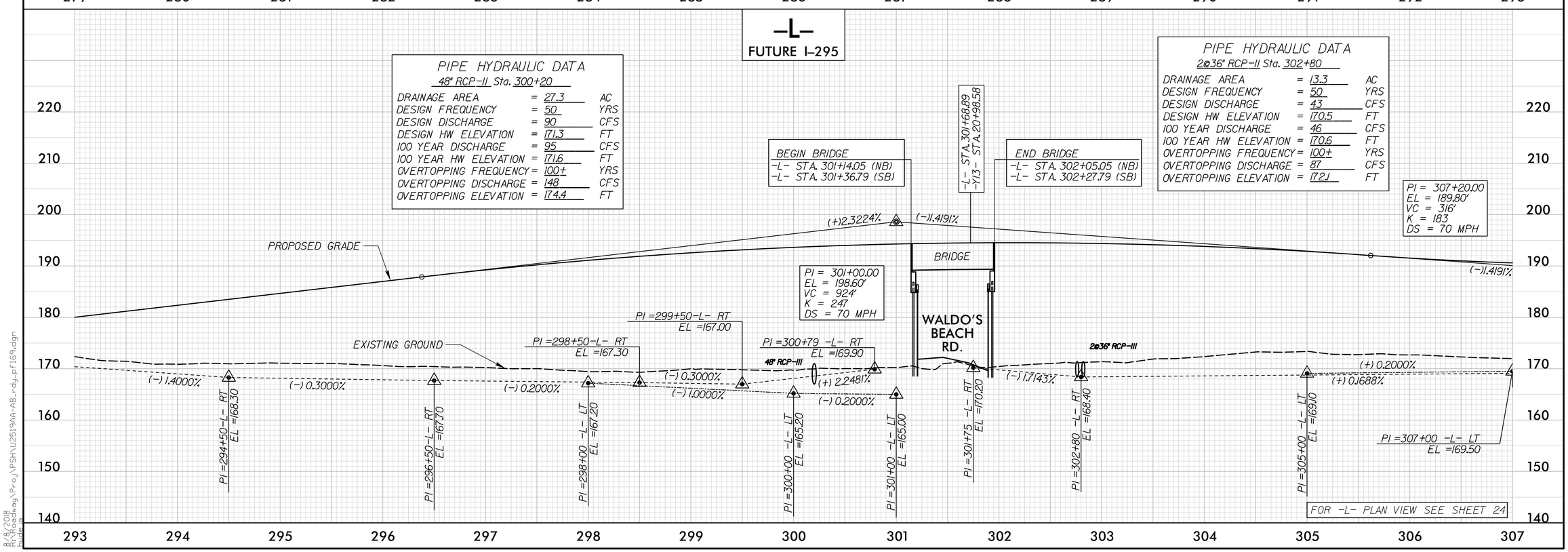

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mwalsh

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	70
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
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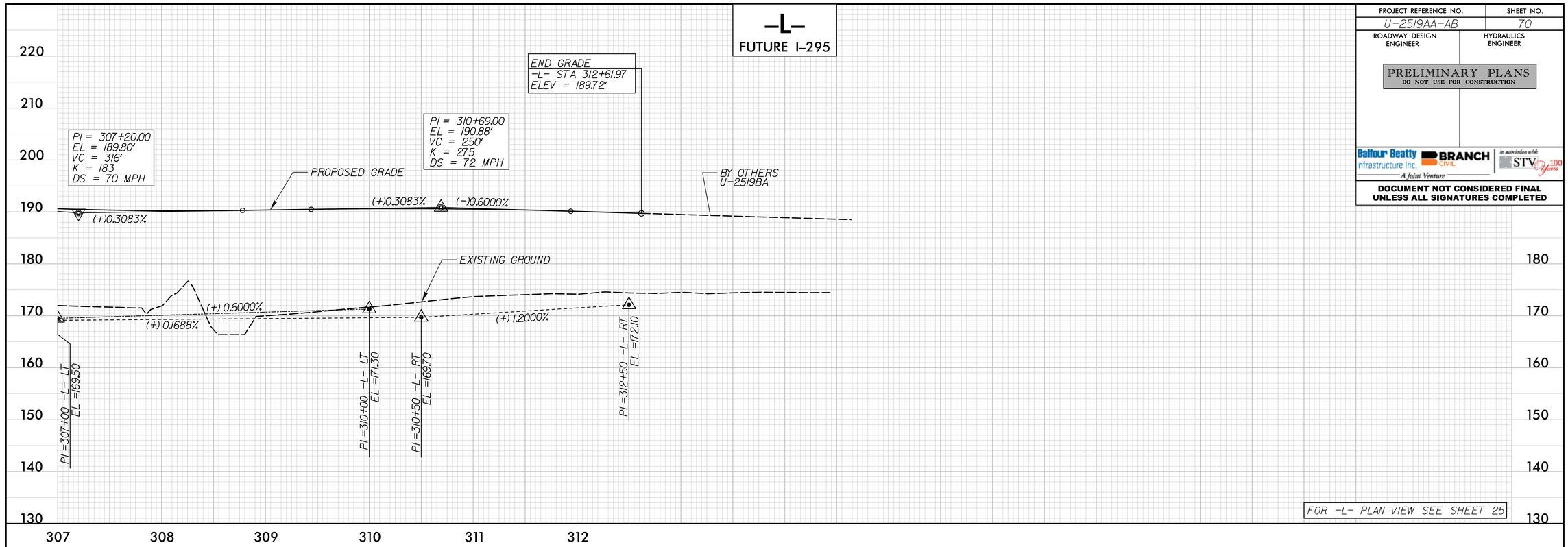
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOR -L- PLAN VIEW SEE SHEET 25

8/8/2018
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hu1dap

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	71
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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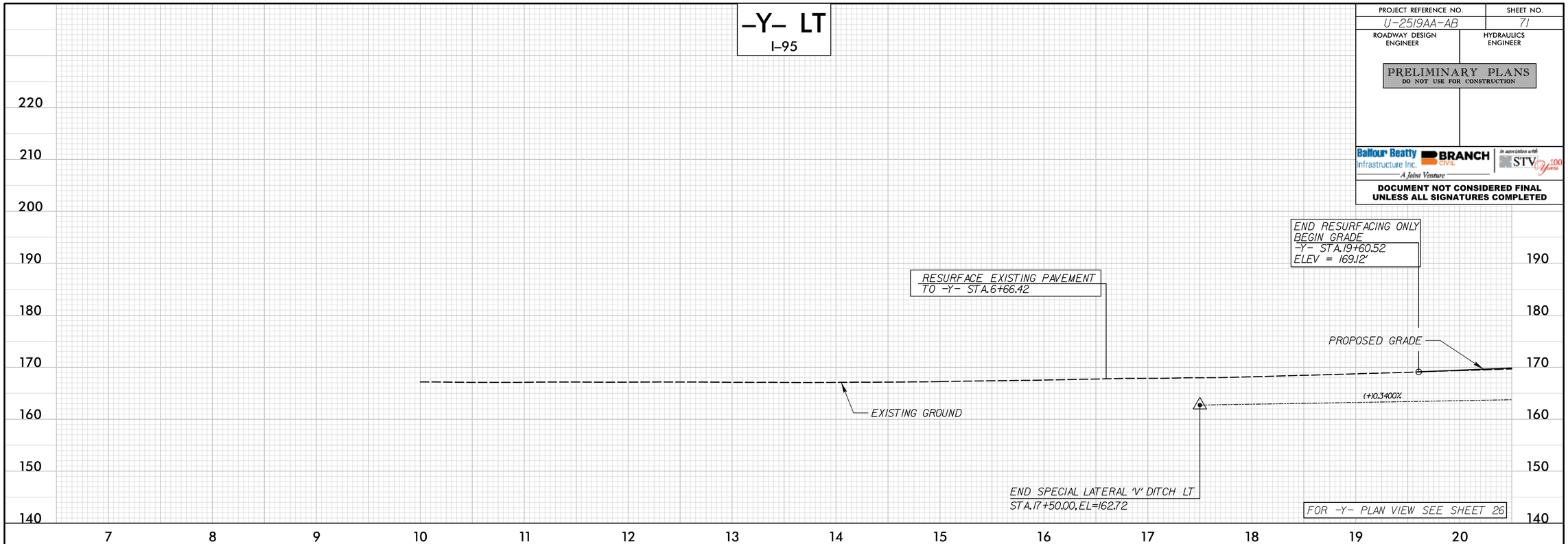
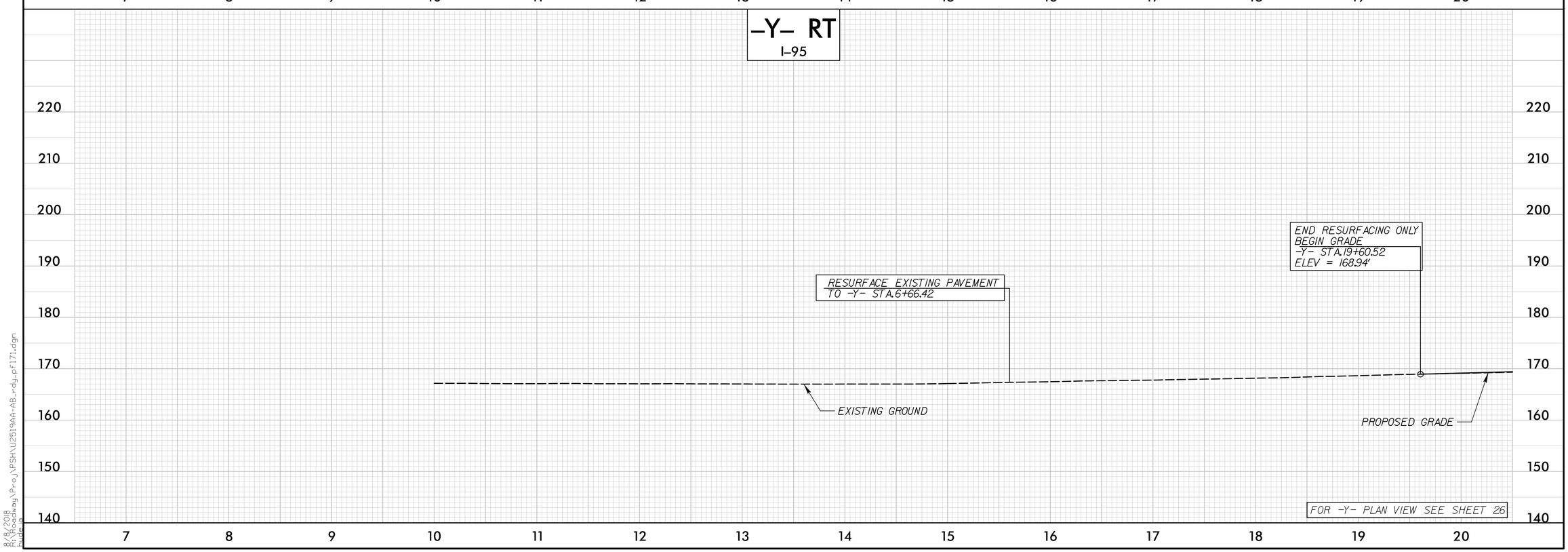
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





8/8/2018
R:\Roadway\Proj\PSH\U2519AA-AB_rdy_pf71.dgn
mwatson

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	72
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

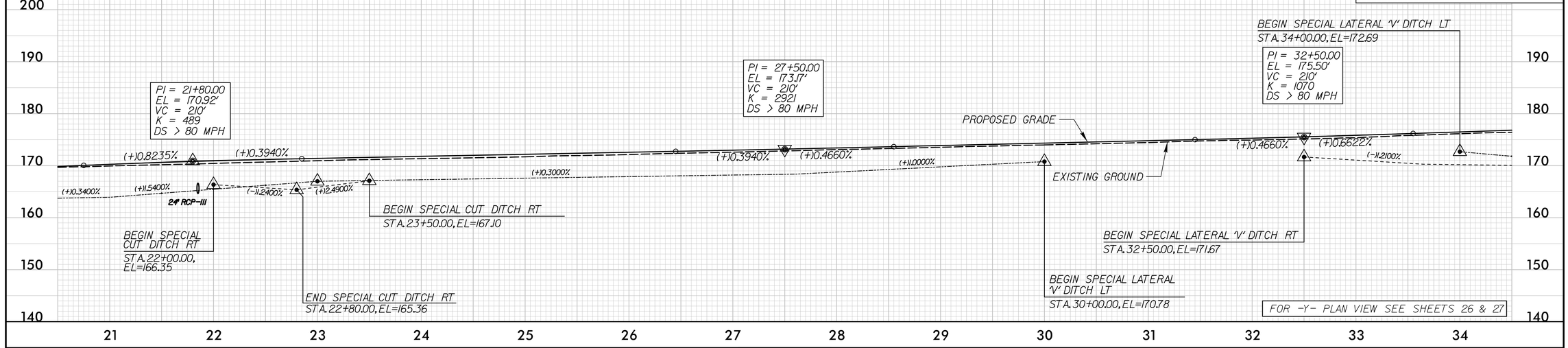
PIPE HYDRAULIC DATA

24" RCP-III Sta. 21+85

DRAINAGE AREA	=	0.003	SQMI
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	7.9	CFS
DESIGN HW ELEVATION	=	166.8	FT
100 YEAR DISCHARGE	=	8.4	CFS
100 YEAR HW ELEVATION	=	166.8	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	26	CFS
OVERTOPPING ELEVATION	=	170.4	FT

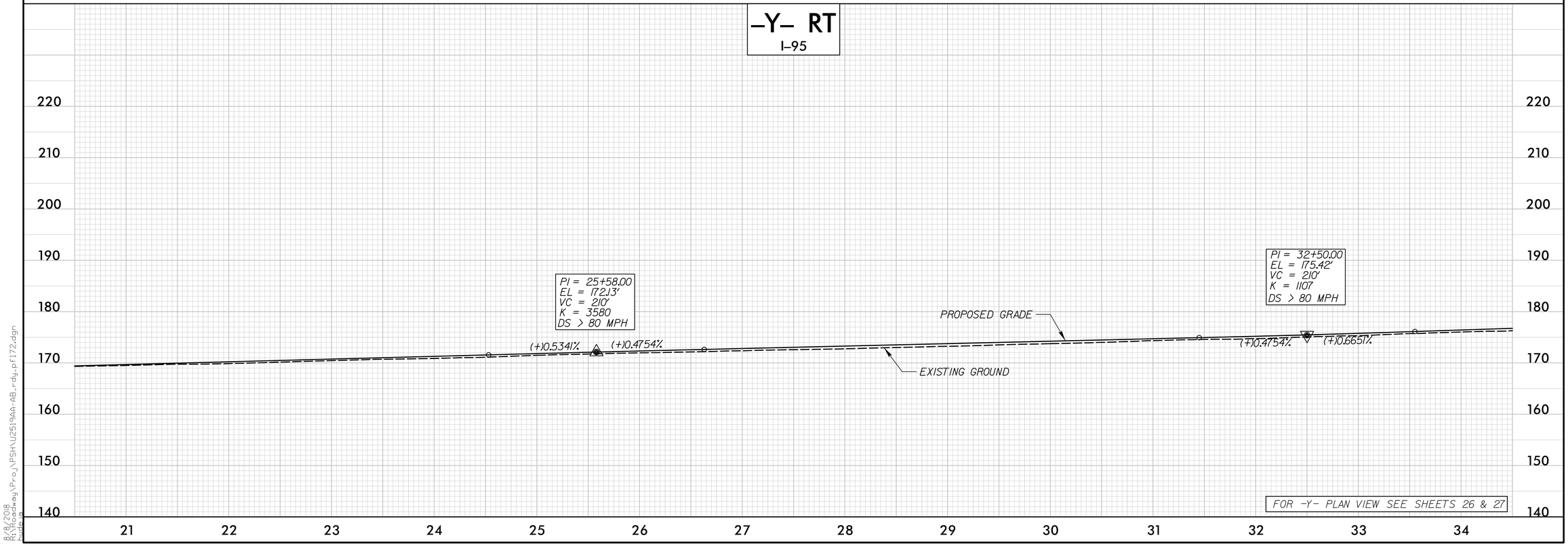
-Y- LT

I-95



-Y- RT

I-95



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mwade

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	73
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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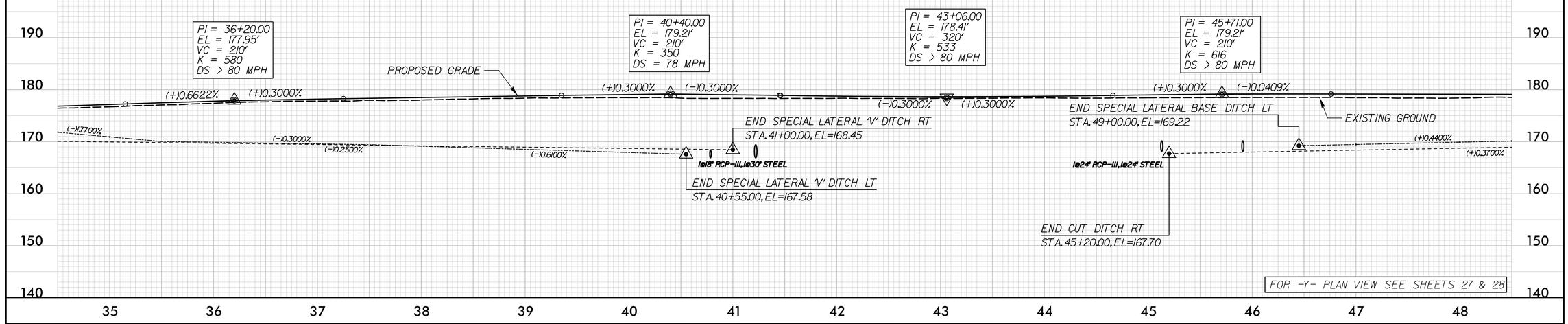
-Y- LT
I-95

PIPE HYDRAULIC DATA
1@18" RCP-III, 1@30" STEEL Sta. 41+22

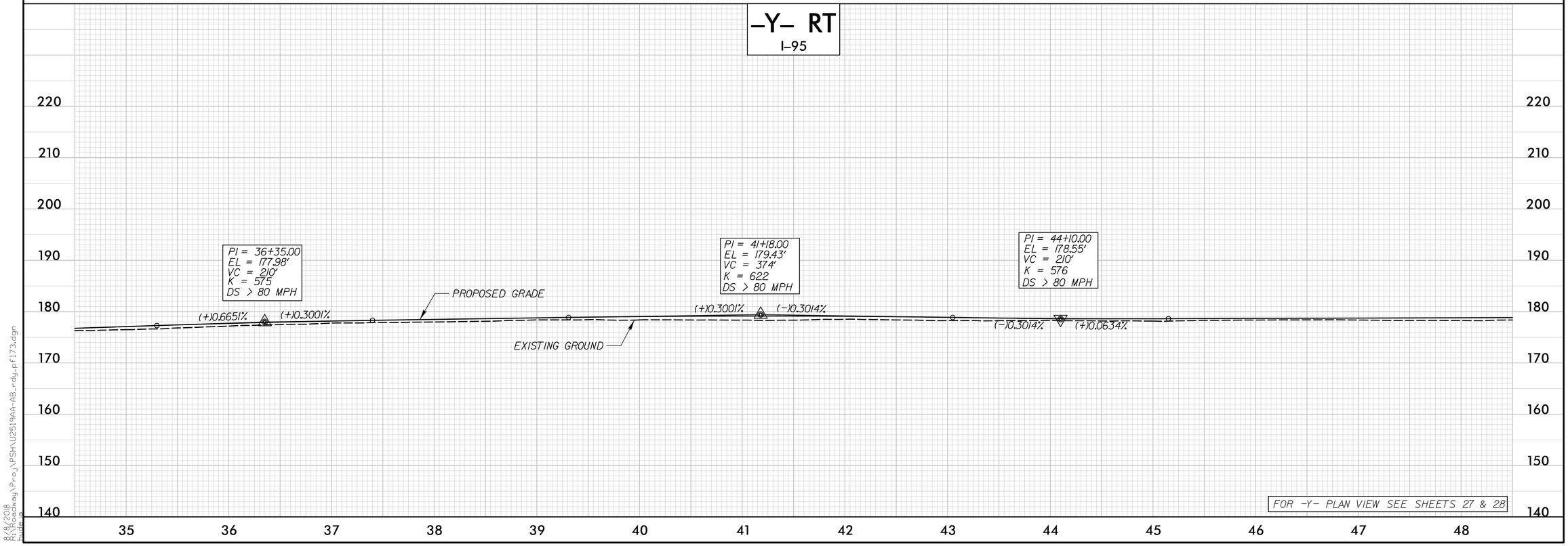
DRAINAGE AREA	=	0.03	SQMI
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	27.6	CFS
DESIGN HW ELEVATION	=	170.2	FT
100 YEAR DISCHARGE	=	29.9	CFS
100 YEAR HW ELEVATION	=	170.8	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	85	CFS
OVERTOPPING ELEVATION	=	178.7	FT

PIPE HYDRAULIC DATA
1@24" RCP-III, 1@24" STEEL Sta. 45+13

DRAINAGE AREA	=	0.03	SQMI
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	31.0	CFS
DESIGN HW ELEVATION	=	171.9	FT
100 YEAR DISCHARGE	=	33.9	CFS
100 YEAR HW ELEVATION	=	172.6	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	71	CFS
OVERTOPPING ELEVATION	=	178.8	FT



-Y- RT
I-95



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mwebb

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	74
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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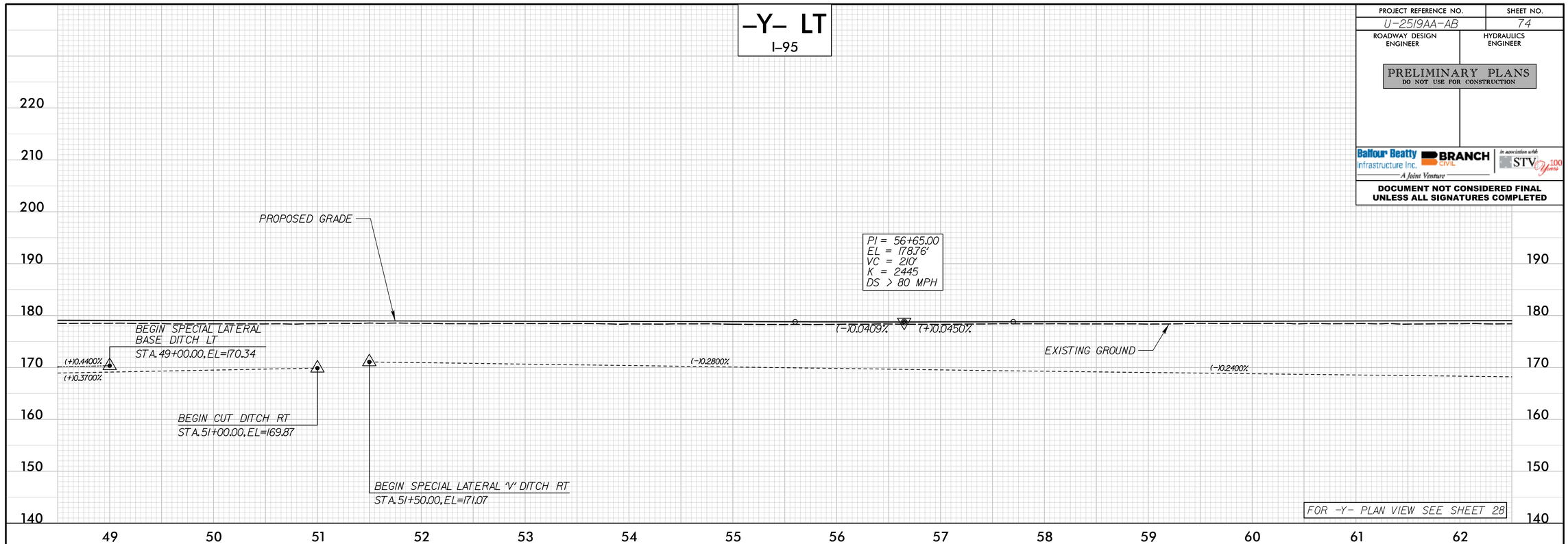

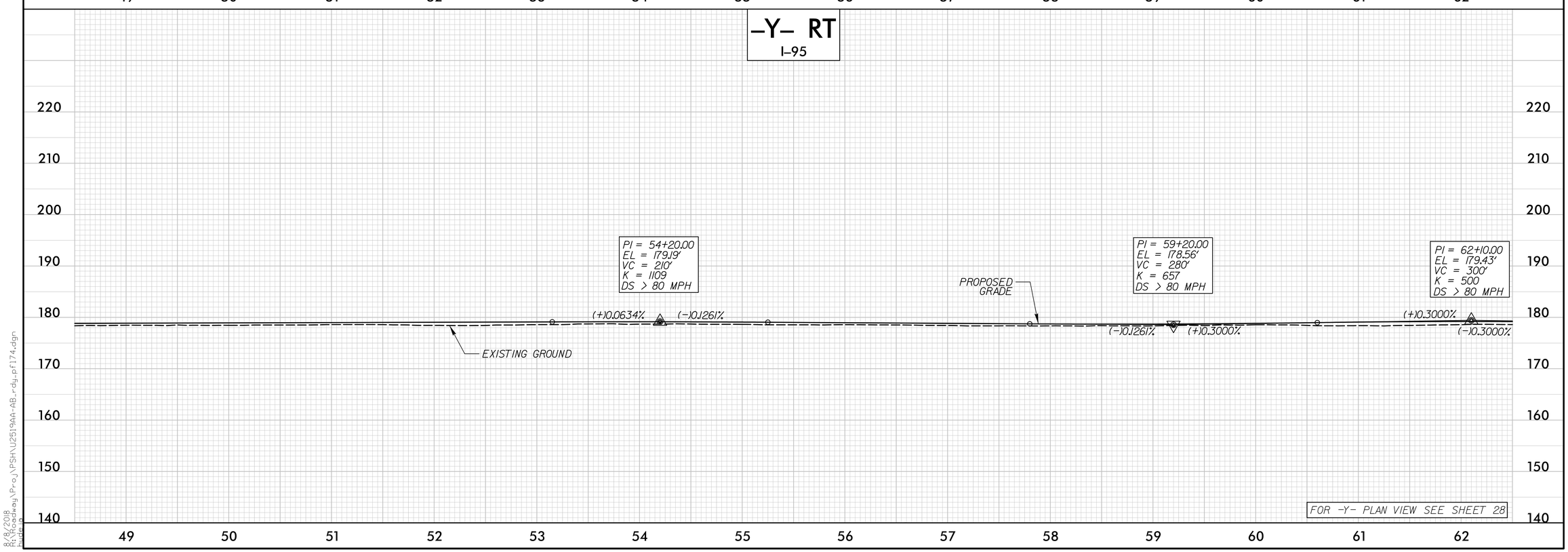

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mwatson

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	75
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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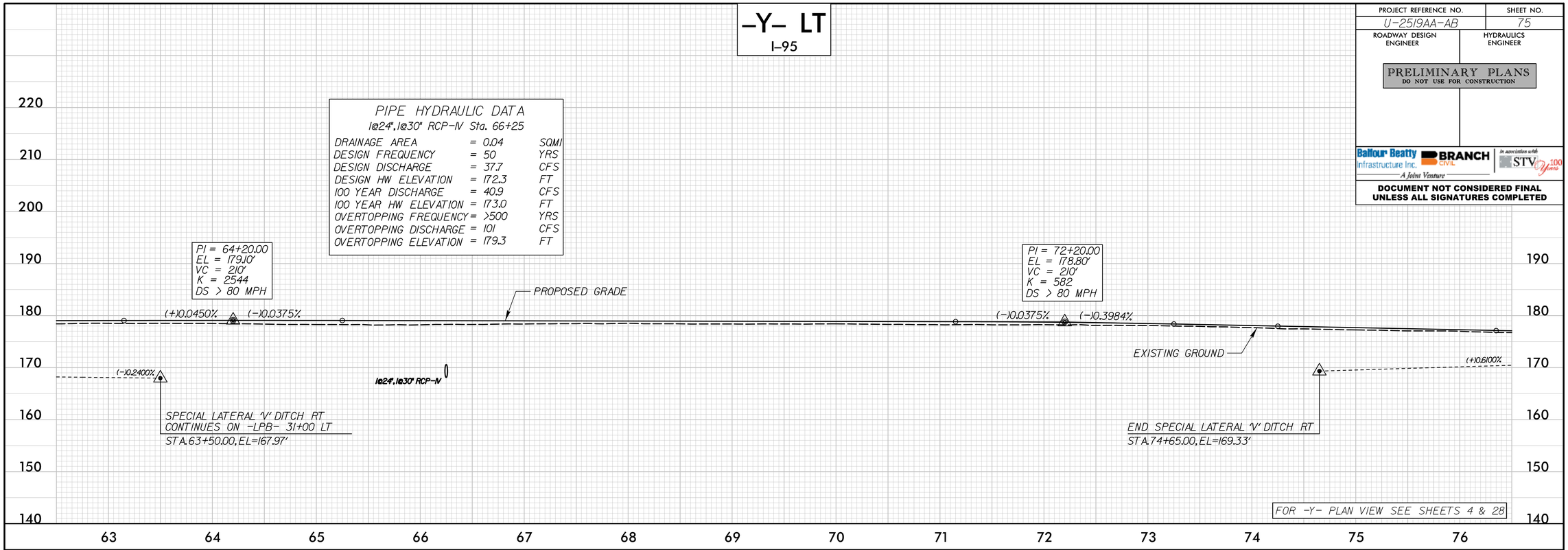
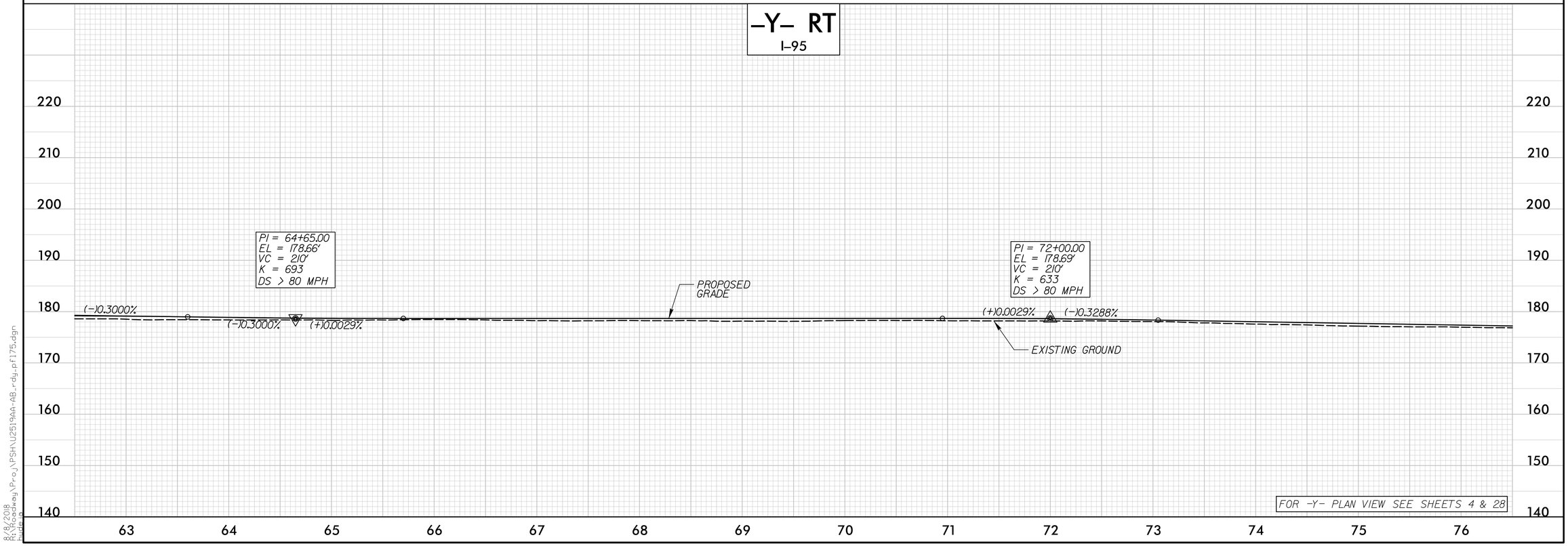
-Y- LT
I-95



PIPE HYDRAULIC DATA		
1@24", 1@30" RCP-IV Sta. 66+25		
DRAINAGE AREA	= 0.04	SQMI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 37.7	CFS
DESIGN HW ELEVATION	= 172.3	FT
100 YEAR DISCHARGE	= 40.9	CFS
100 YEAR HW ELEVATION	= 173.0	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= 101	CFS
OVERTOPPING ELEVATION	= 179.3	FT

-Y- RT
I-95



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	76
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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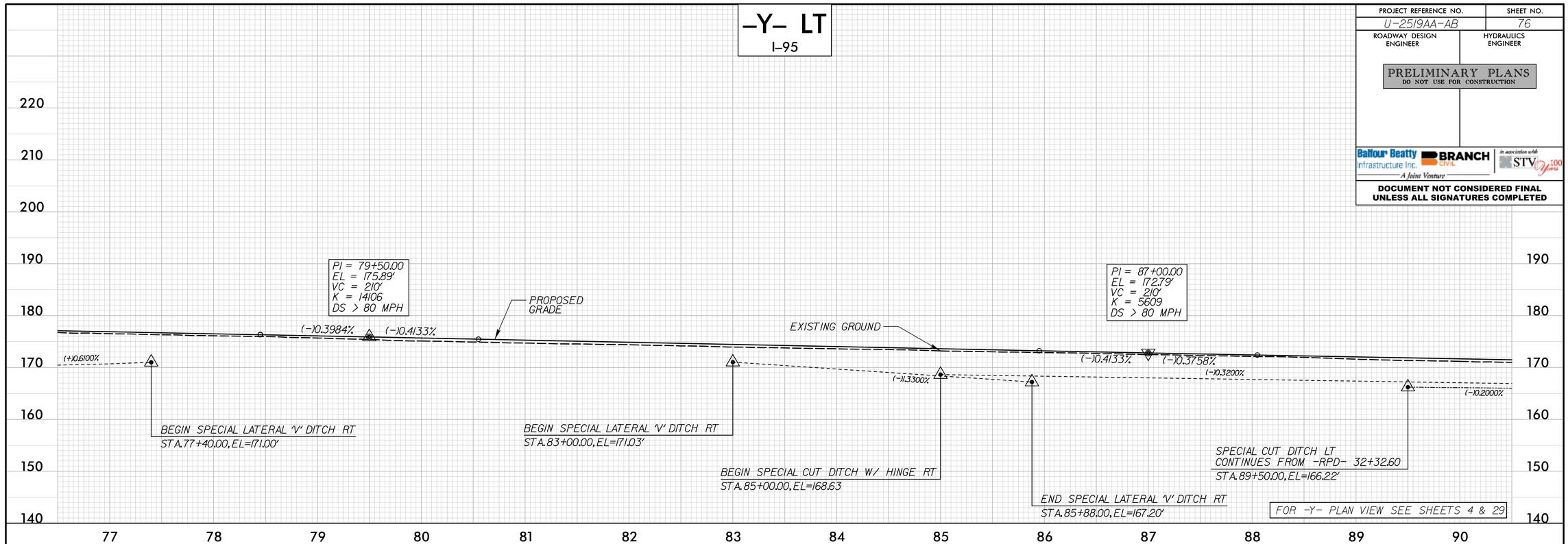

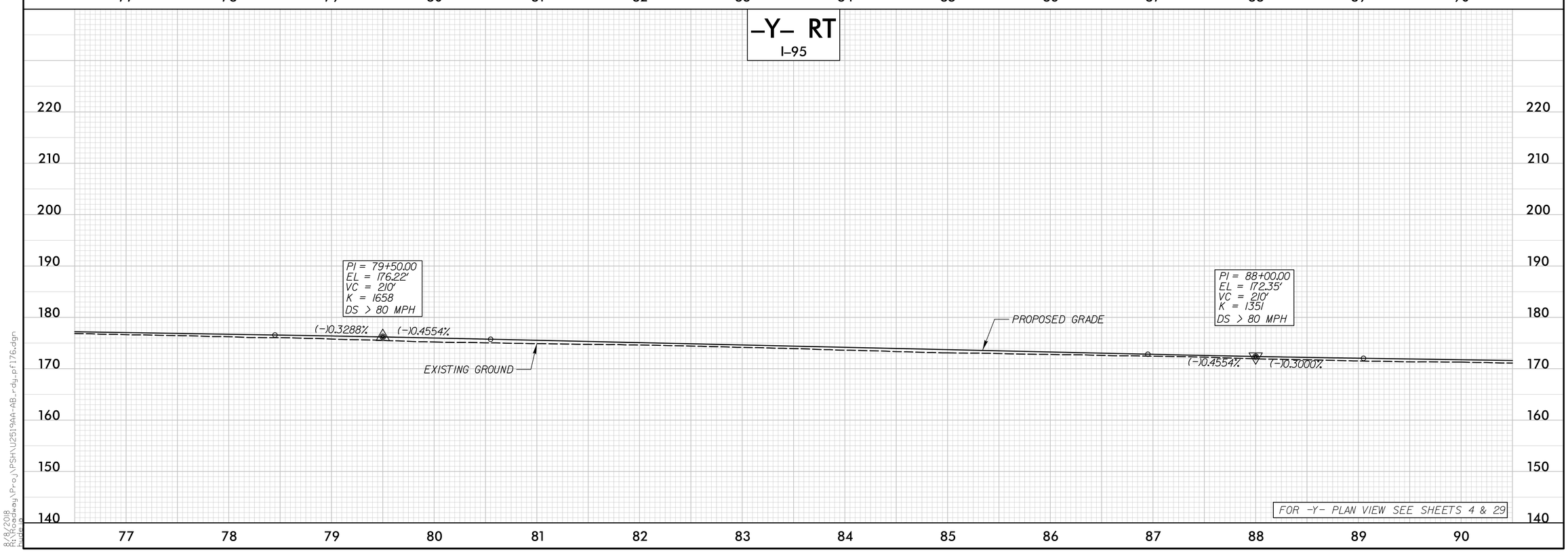

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mwebb

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	77
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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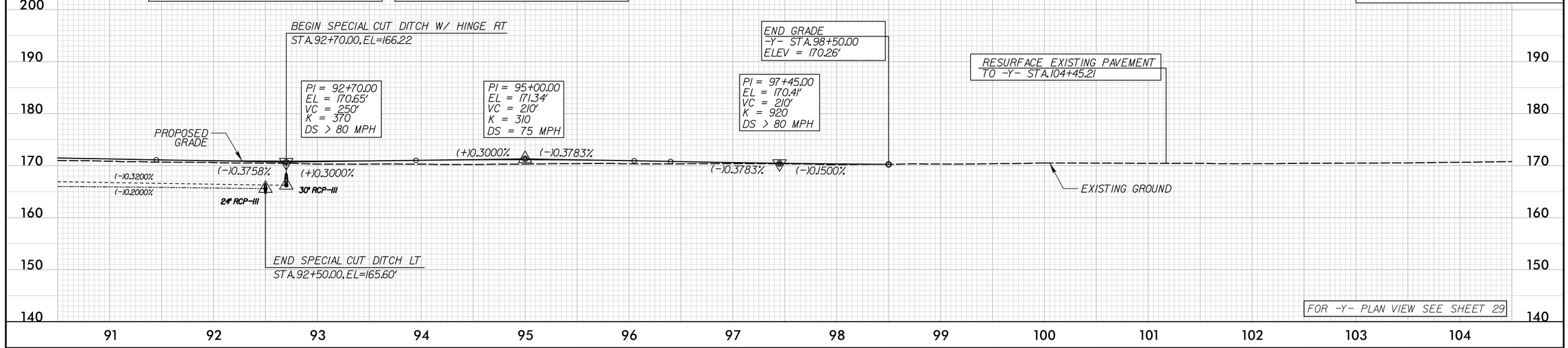
-Y- LT
I-95

PIPE HYDRAULIC DATA
24" RCP-III Sta. 92+50

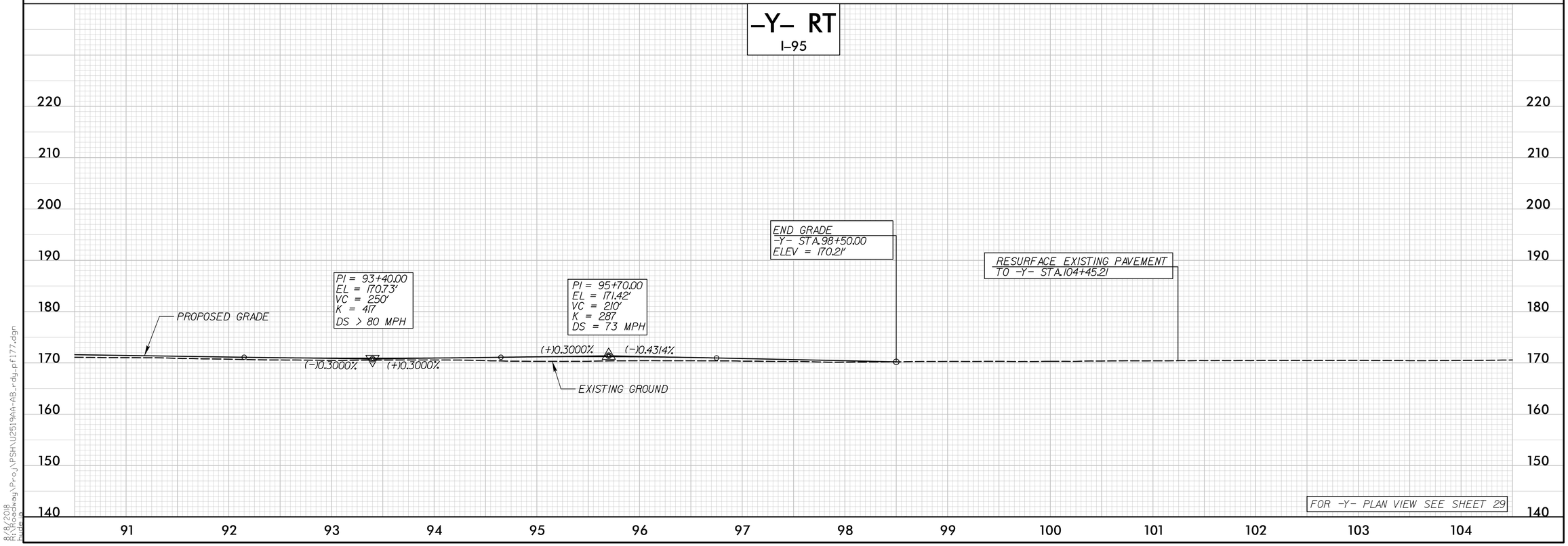
DRAINAGE AREA	= 0.008	SQMI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 11.7	CFS
DESIGN HW ELEVATION	= 166.8	FT
100 YEAR DISCHARGE	= 12.5	CFS
100 YEAR HW ELEVATION	= 166.8	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= 38	CFS
OVERTOPPING ELEVATION	= 171.0	FT

PIPE HYDRAULIC DATA
30" RCP-III Sta. 92+70

DRAINAGE AREA	= 0.01	SQMI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 22.1	CFS
DESIGN HW ELEVATION	= 168.9	FT
100 YEAR DISCHARGE	= 23.7	CFS
100 YEAR HW ELEVATION	= 168.9	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= 48	CFS
OVERTOPPING ELEVATION	= 171.6	FT



-Y- RT
I-95



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mwade

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	78
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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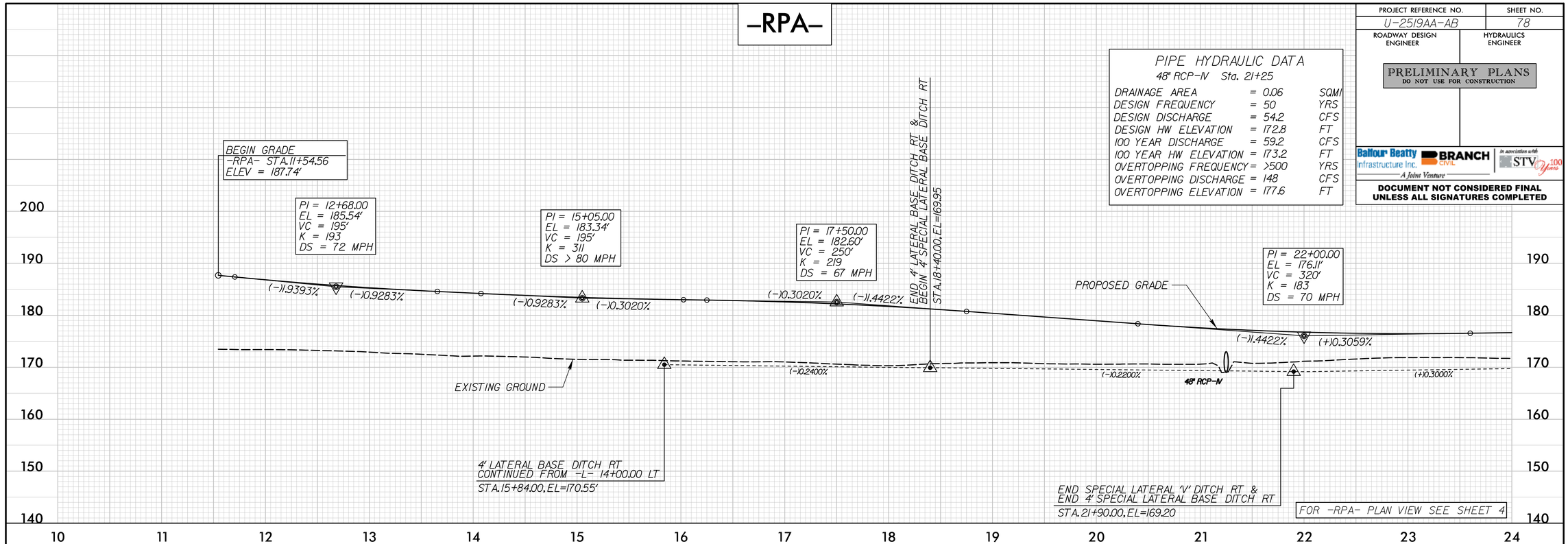
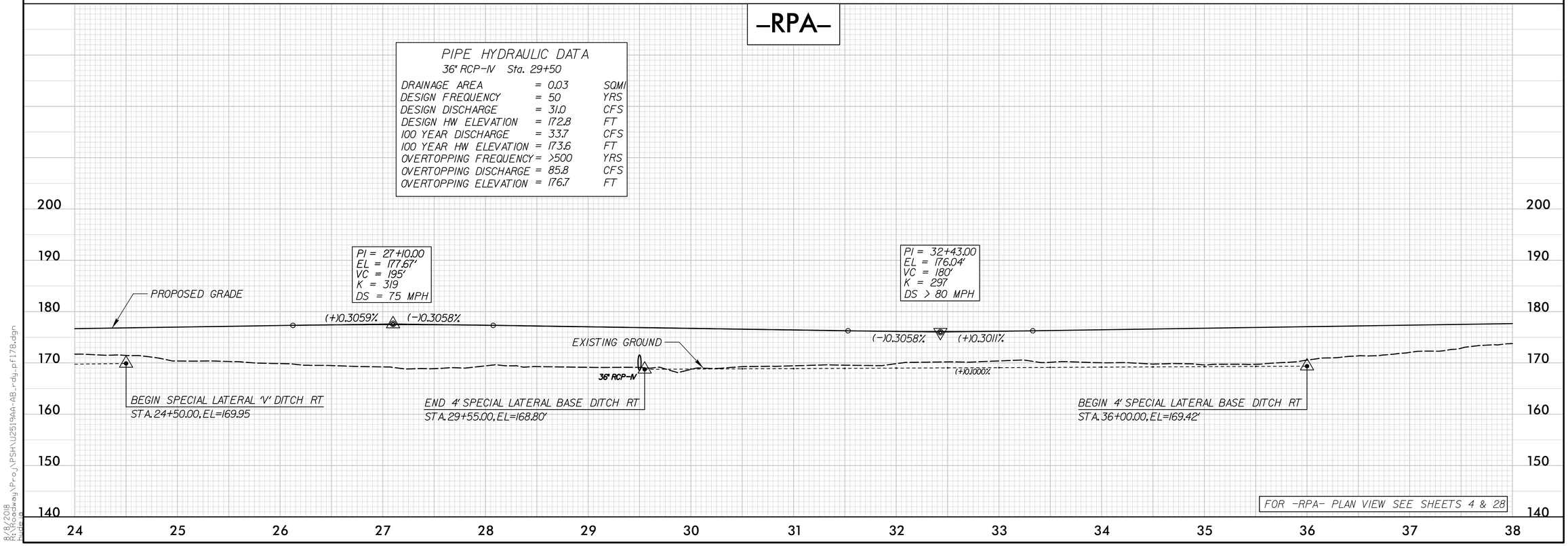
-RPA-



-RPA-



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	79
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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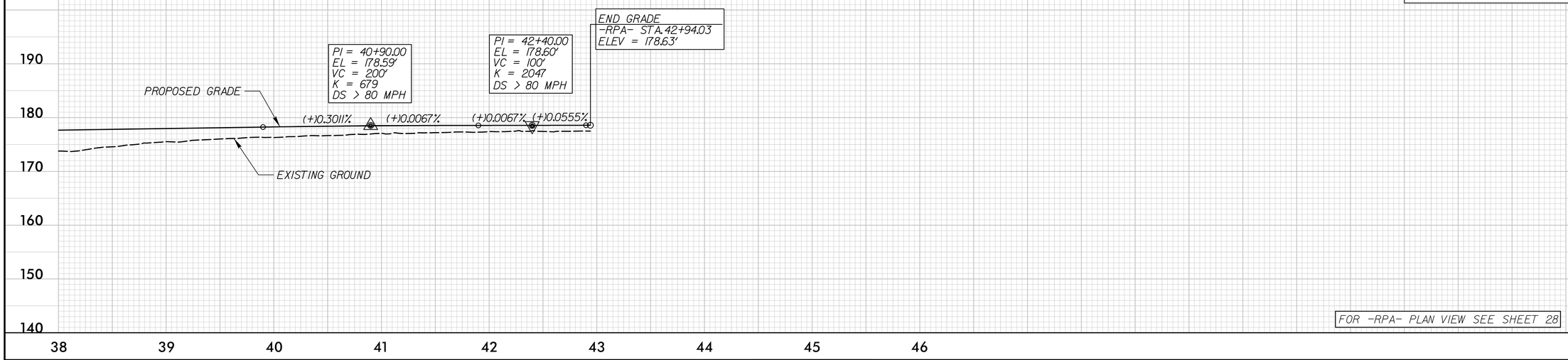
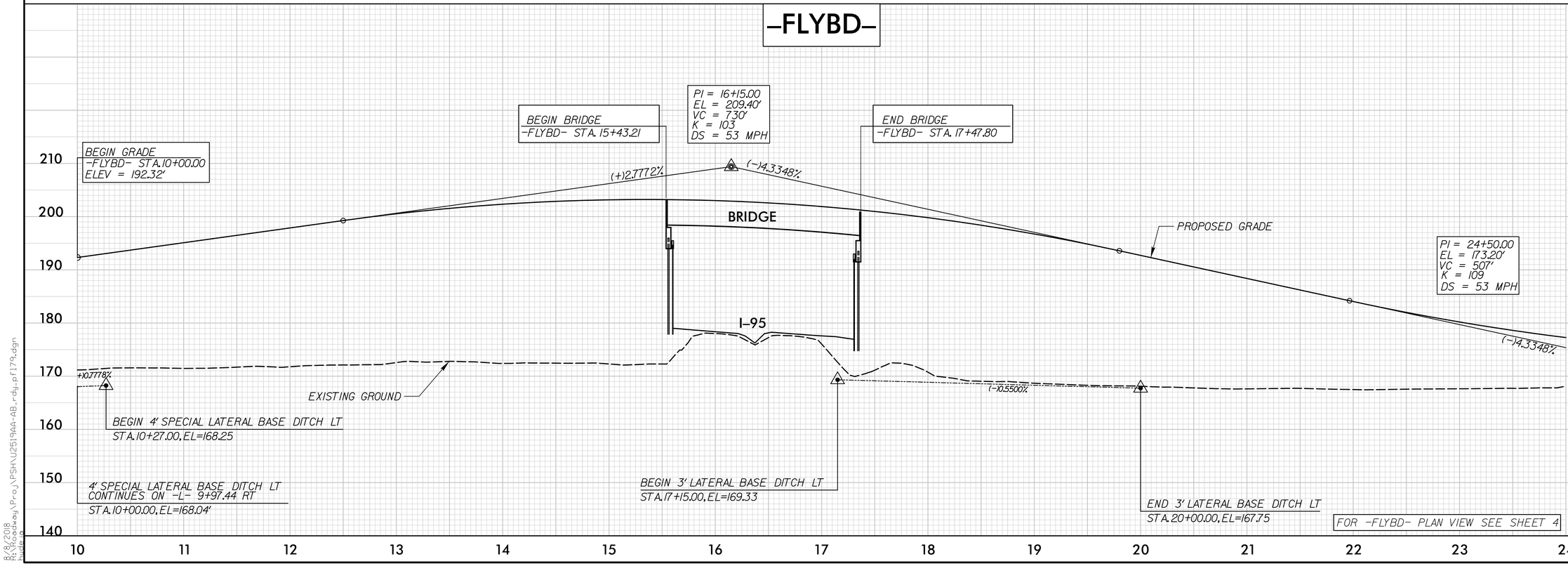
-RPA-



FOR -RPA- PLAN VIEW SEE SHEET 28

-FLYBD-



FOR -FLYBD- PLAN VIEW SEE SHEET 4

8/8/2018
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mwalsh

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	80
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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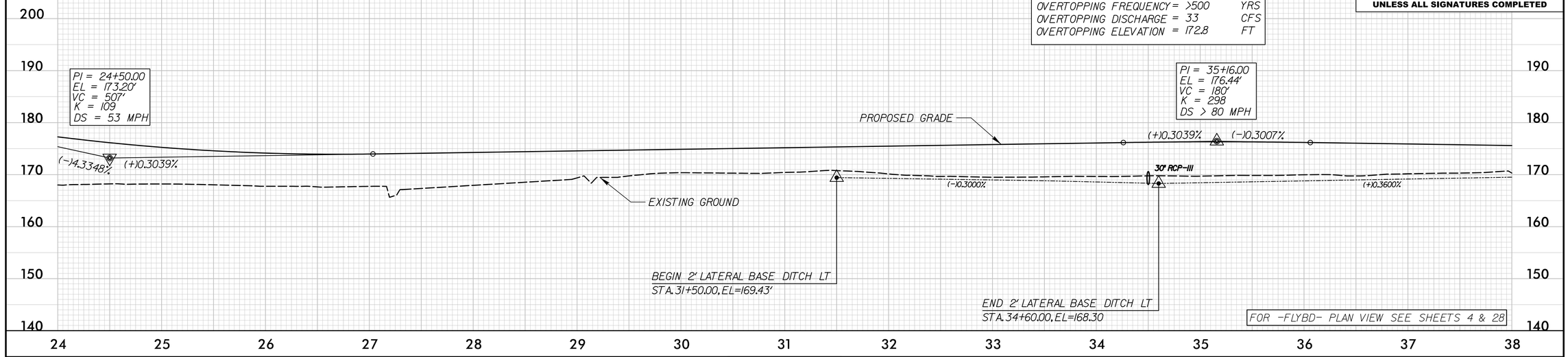
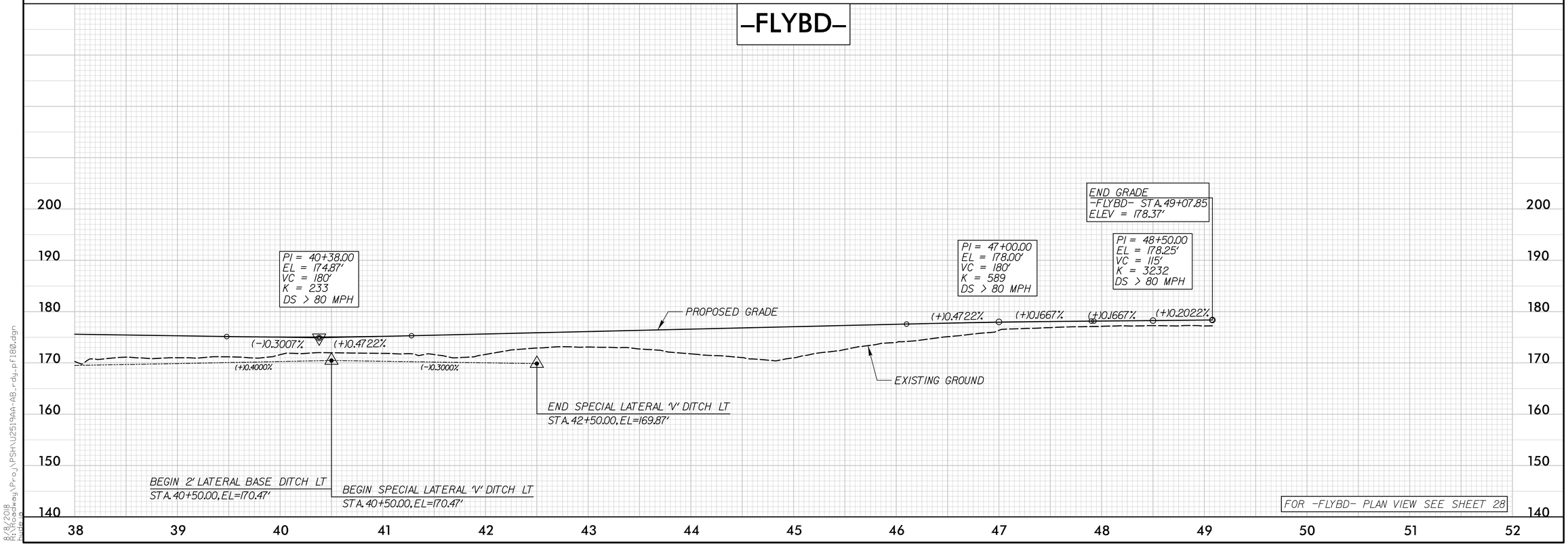
-FLYBD-

PIPE HYDRAULIC DATA
30" RCP-III Sta. 34+50

DRAINAGE AREA	=	0.004	SQMI
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	10.1	CFS
DESIGN HW ELEVATION	=	171.3	FT
100 YEAR DISCHARGE	=	10.7	CFS
100 YEAR HW ELEVATION	=	171.9	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	33	CFS
OVERTOPPING ELEVATION	=	172.8	FT



-FLYBD-



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	81
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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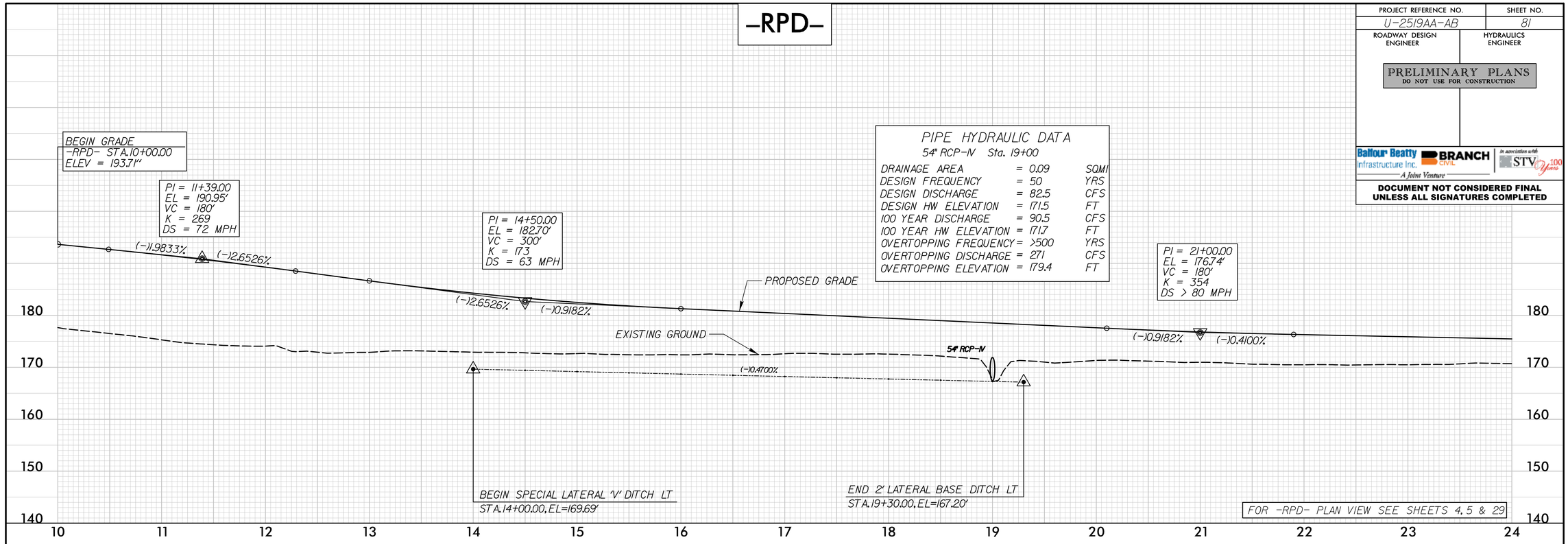
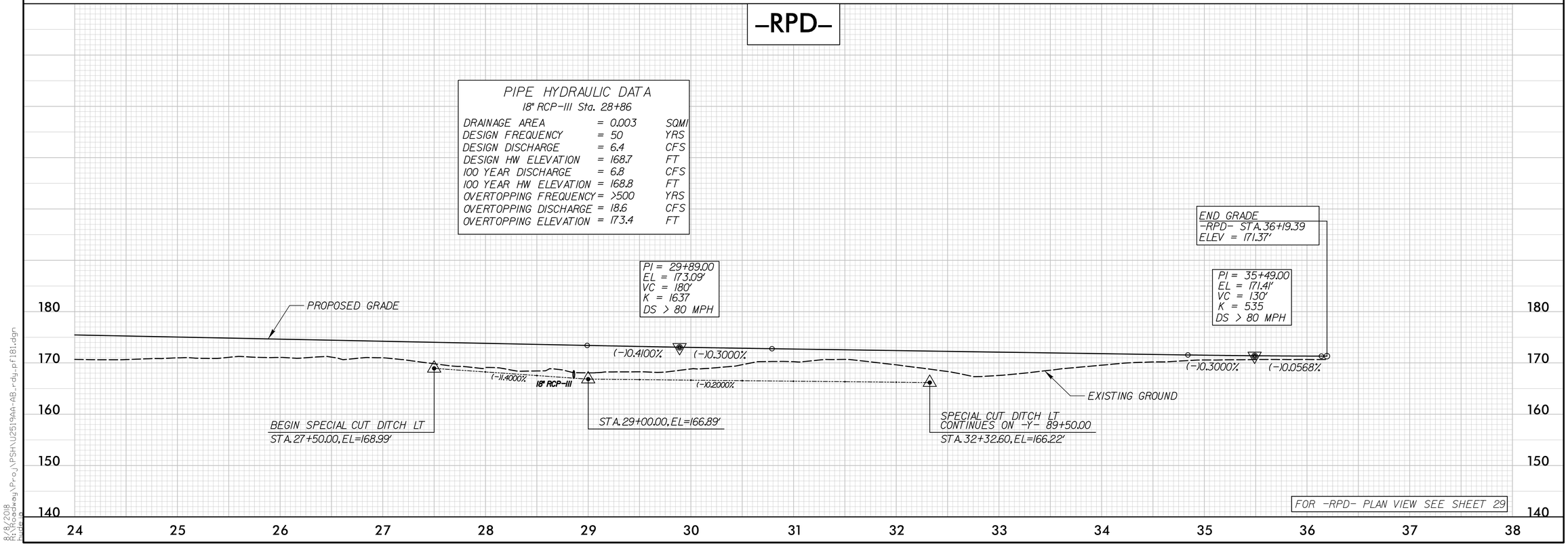
-RPD-



PIPE HYDRAULIC DATA
54" RCP-IV Sta. 19+00

DRAINAGE AREA	=	0.09	SQMI
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	82.5	CFS
DESIGN HW ELEVATION	=	171.5	FT
100 YEAR DISCHARGE	=	90.5	CFS
100 YEAR HW ELEVATION	=	171.7	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	271	CFS
OVERTOPPING ELEVATION	=	179.4	FT

-RPD-



PIPE HYDRAULIC DATA
18" RCP-III Sta. 28+86

DRAINAGE AREA	=	0.003	SQMI
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	6.4	CFS
DESIGN HW ELEVATION	=	168.7	FT
100 YEAR DISCHARGE	=	6.8	CFS
100 YEAR HW ELEVATION	=	168.8	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	18.6	CFS
OVERTOPPING ELEVATION	=	173.4	FT

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mwalsh

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	82
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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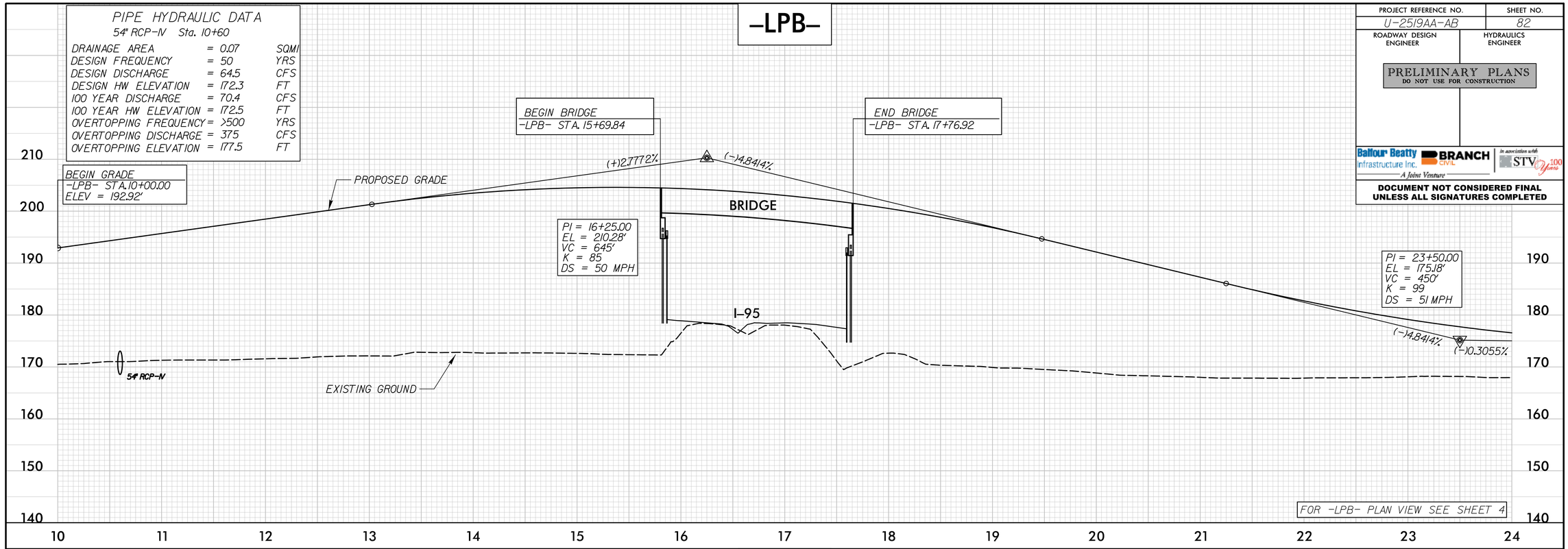
-LPB-

PIPE HYDRAULIC DATA
54" RCP-IV Sta. 10+60

DRAINAGE AREA	= 0.07	SQMI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 64.5	CFS
DESIGN HW ELEVATION	= 172.3	FT
100 YEAR DISCHARGE	= 70.4	CFS
100 YEAR HW ELEVATION	= 172.5	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= 375	CFS
OVERTOPPING ELEVATION	= 177.5	FT



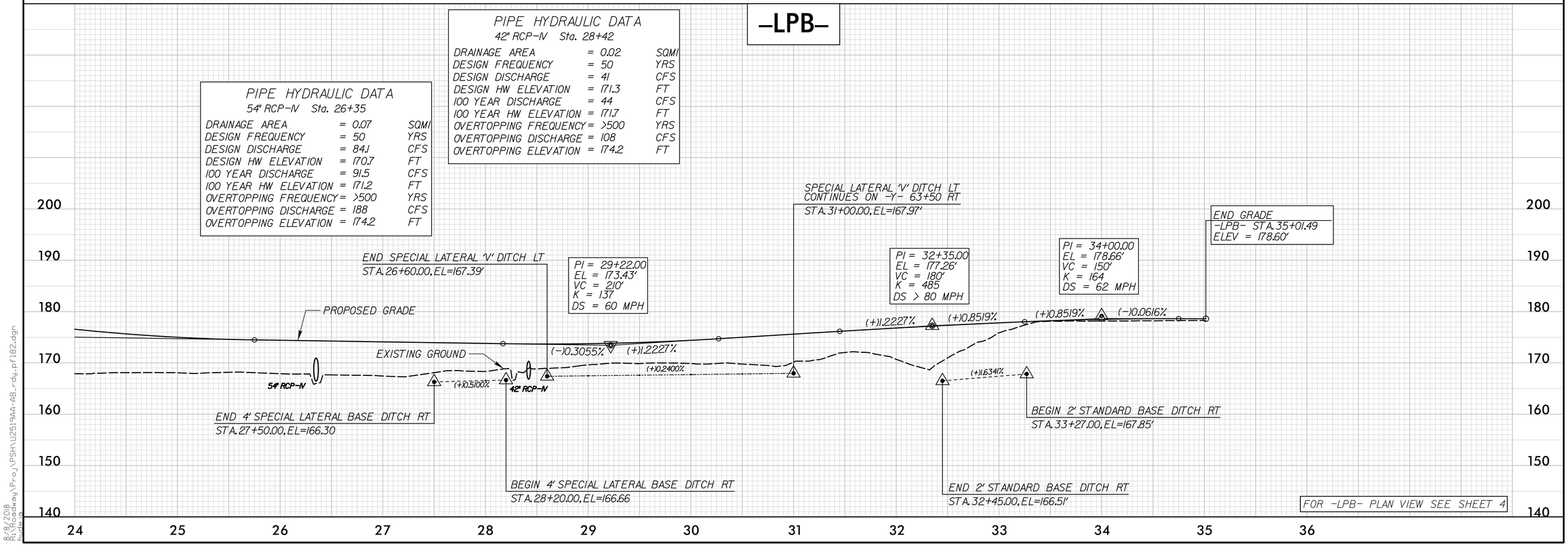
-LPB-

PIPE HYDRAULIC DATA
42" RCP-IV Sta. 28+42

DRAINAGE AREA	= 0.02	SQMI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 41	CFS
DESIGN HW ELEVATION	= 171.3	FT
100 YEAR DISCHARGE	= 44	CFS
100 YEAR HW ELEVATION	= 171.7	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= 108	CFS
OVERTOPPING ELEVATION	= 174.2	FT

PIPE HYDRAULIC DATA
54" RCP-IV Sta. 26+35

DRAINAGE AREA	= 0.07	SQMI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 84.1	CFS
DESIGN HW ELEVATION	= 170.7	FT
100 YEAR DISCHARGE	= 91.5	CFS
100 YEAR HW ELEVATION	= 171.2	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= 188	CFS
OVERTOPPING ELEVATION	= 174.2	FT



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mwade

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	83
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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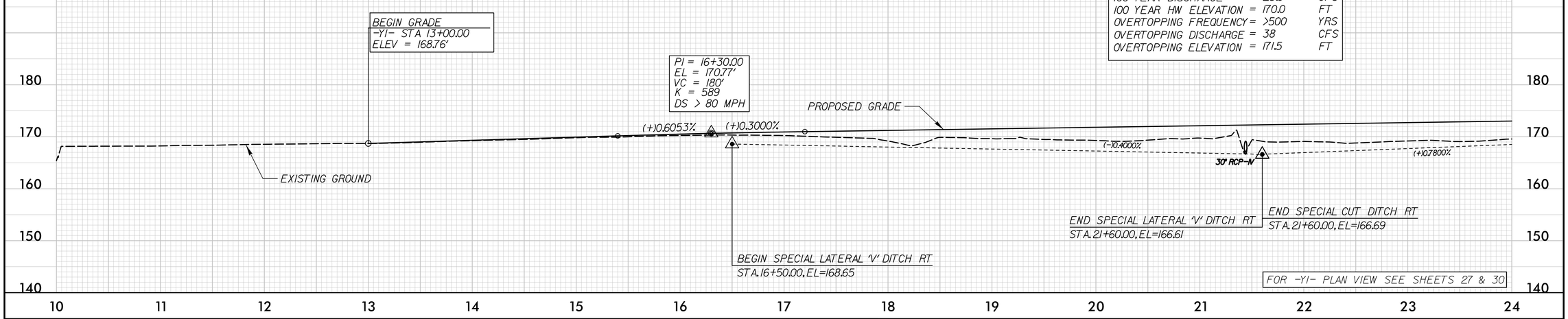
-Y1-
SR 1978 (BUCKHORN RD)

PIPE HYDRAULIC DATA
30" RCP-IV Sta. 21+44

DRAINAGE AREA	=	15.0	SQMI
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	20.3	CFS
DESIGN HW ELEVATION	=	169.7	FT
100 YEAR DISCHARGE	=	23.9	CFS
100 YEAR HW ELEVATION	=	170.0	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	38	CFS
OVERTOPPING ELEVATION	=	171.5	FT



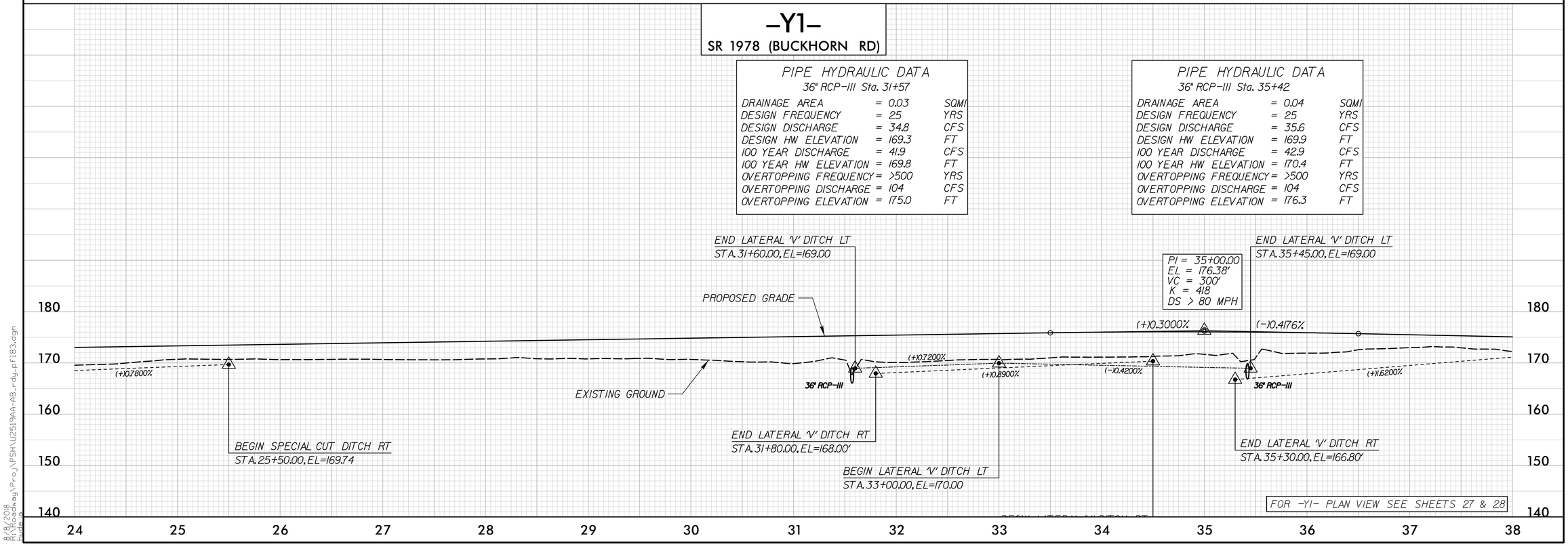
-Y1-
SR 1978 (BUCKHORN RD)

PIPE HYDRAULIC DATA
36" RCP-III Sta. 31+57

DRAINAGE AREA	=	0.03	SQMI
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	34.8	CFS
DESIGN HW ELEVATION	=	169.3	FT
100 YEAR DISCHARGE	=	41.9	CFS
100 YEAR HW ELEVATION	=	169.8	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	104	CFS
OVERTOPPING ELEVATION	=	175.0	FT

PIPE HYDRAULIC DATA
36" RCP-III Sta. 35+42

DRAINAGE AREA	=	0.04	SQMI
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	35.6	CFS
DESIGN HW ELEVATION	=	169.9	FT
100 YEAR DISCHARGE	=	42.9	CFS
100 YEAR HW ELEVATION	=	170.4	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	104	CFS
OVERTOPPING ELEVATION	=	176.3	FT



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mwlee

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	84
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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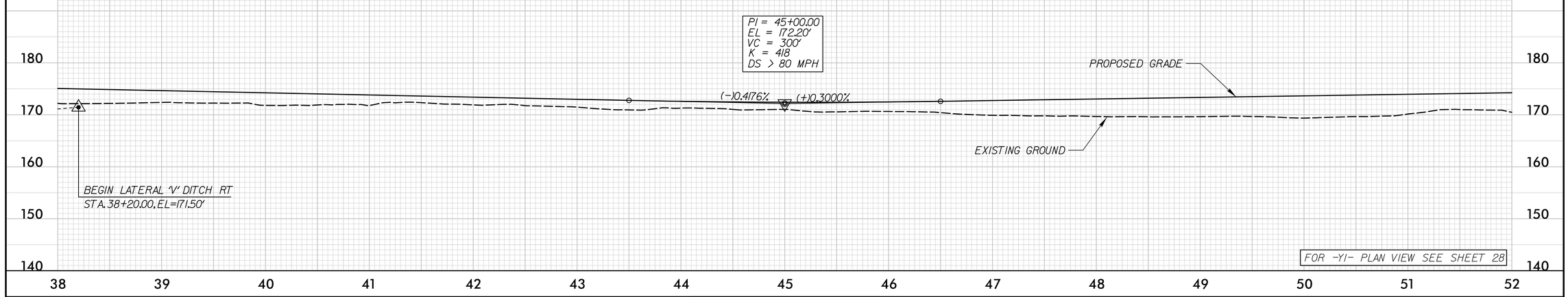
-Y1-
SR 1978 (BUCKHORN RD)

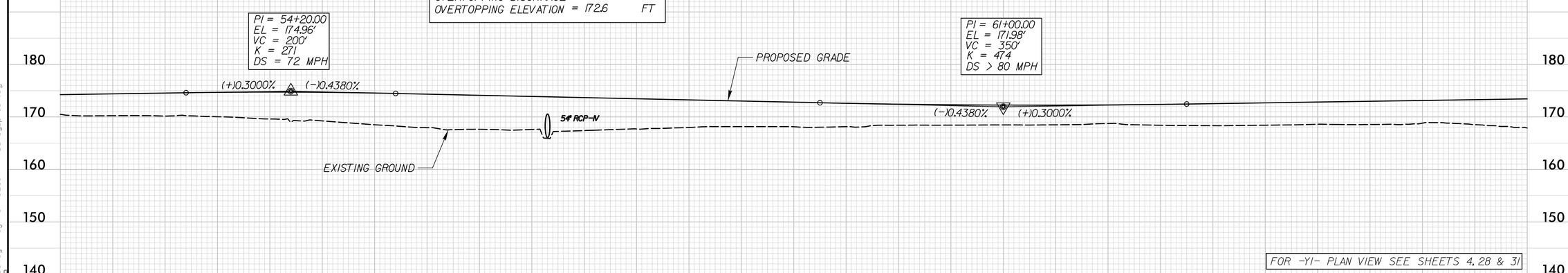


FOR -Y1- PLAN VIEW SEE SHEET 28

-Y1-
SR 1978 (BUCKHORN RD)

PIPE HYDRAULIC DATA
54" RCP-IV Sta. 56+65

DRAINAGE AREA	= 0.08	SQMI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 91	CFS
DESIGN HW ELEVATION	= 169.9	FT
100 YEAR DISCHARGE	= 99.3	CFS
100 YEAR HW ELEVATION	= 170.2	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= 169	CFS
OVERTOPPING ELEVATION	= 172.6	FT



FOR -Y1- PLAN VIEW SEE SHEETS 4, 28 & 31

8/8/2018
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mwalsh

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	85
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
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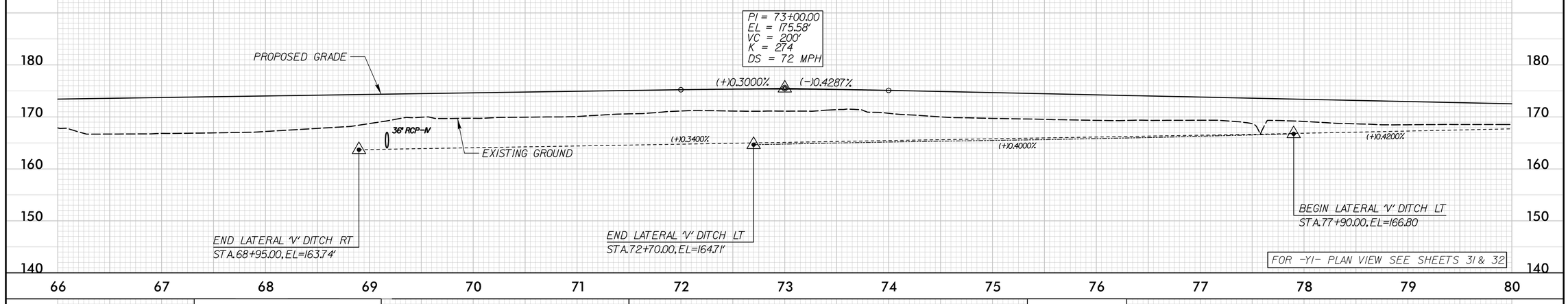
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

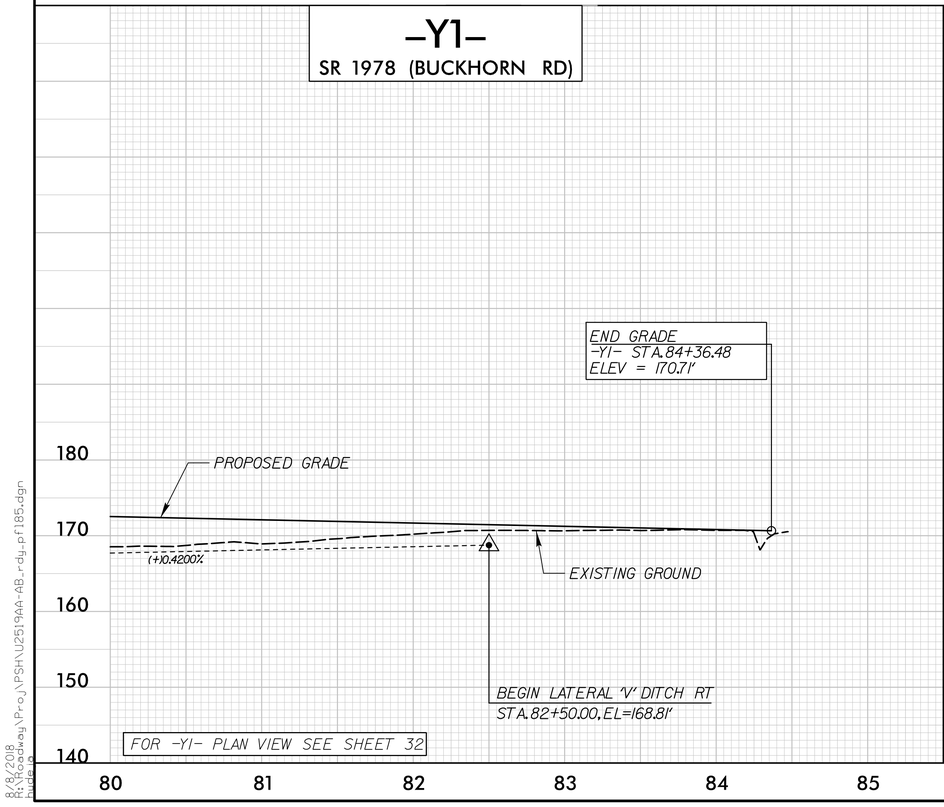
-Y1-
SR 1978 (BUCKHORN RD)

PIPE HYDRAULIC DATA
36" RCP-IV Sta. 69+17

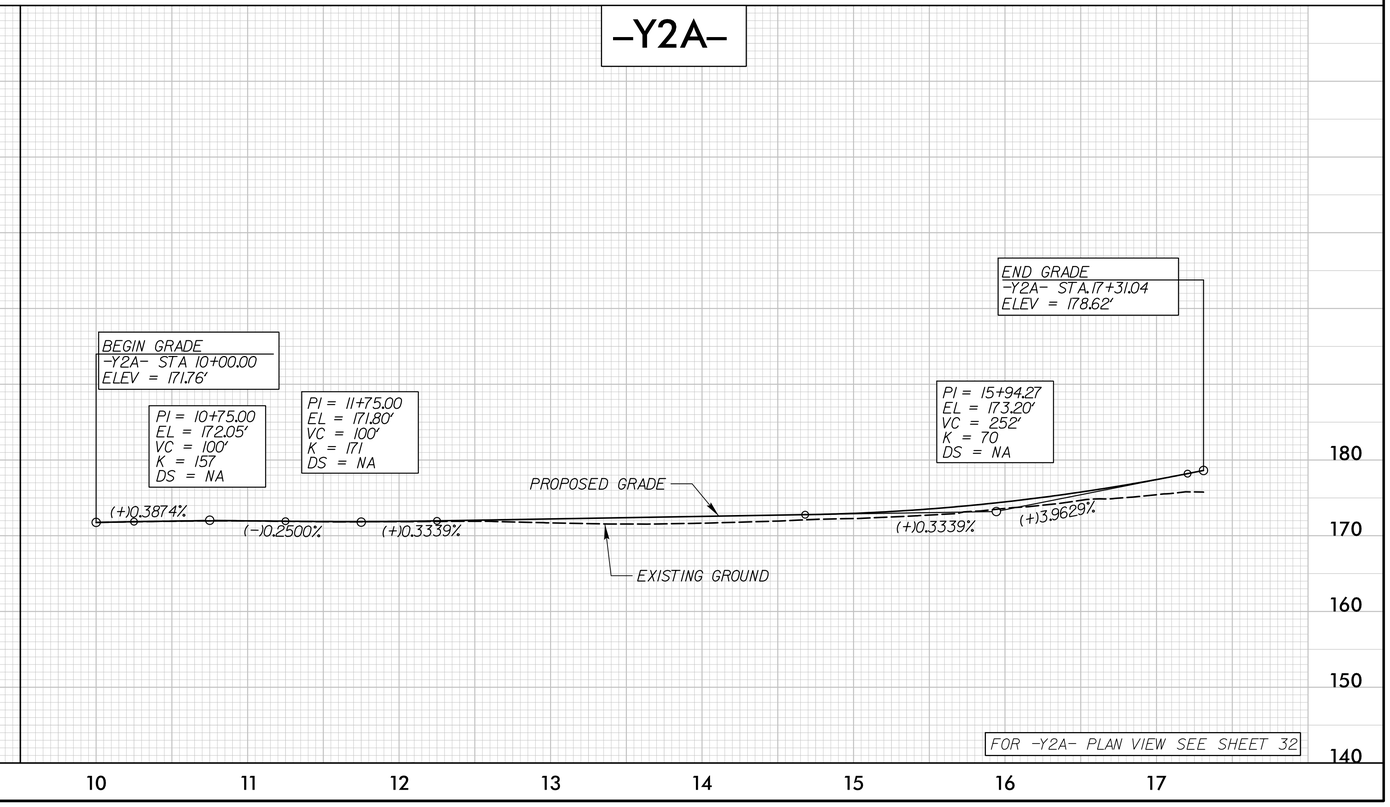
DRAINAGE AREA	= 0.04	SQMI
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 37.7	CFS
DESIGN HW ELEVATION	= 167.2	FT
100 YEAR DISCHARGE	= 45.1	CFS
100 YEAR HW ELEVATION	= 168.6	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= 97	CFS
OVERTOPPING ELEVATION	= 172.6	FT



-Y1-
SR 1978 (BUCKHORN RD)



-Y2A-



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	86
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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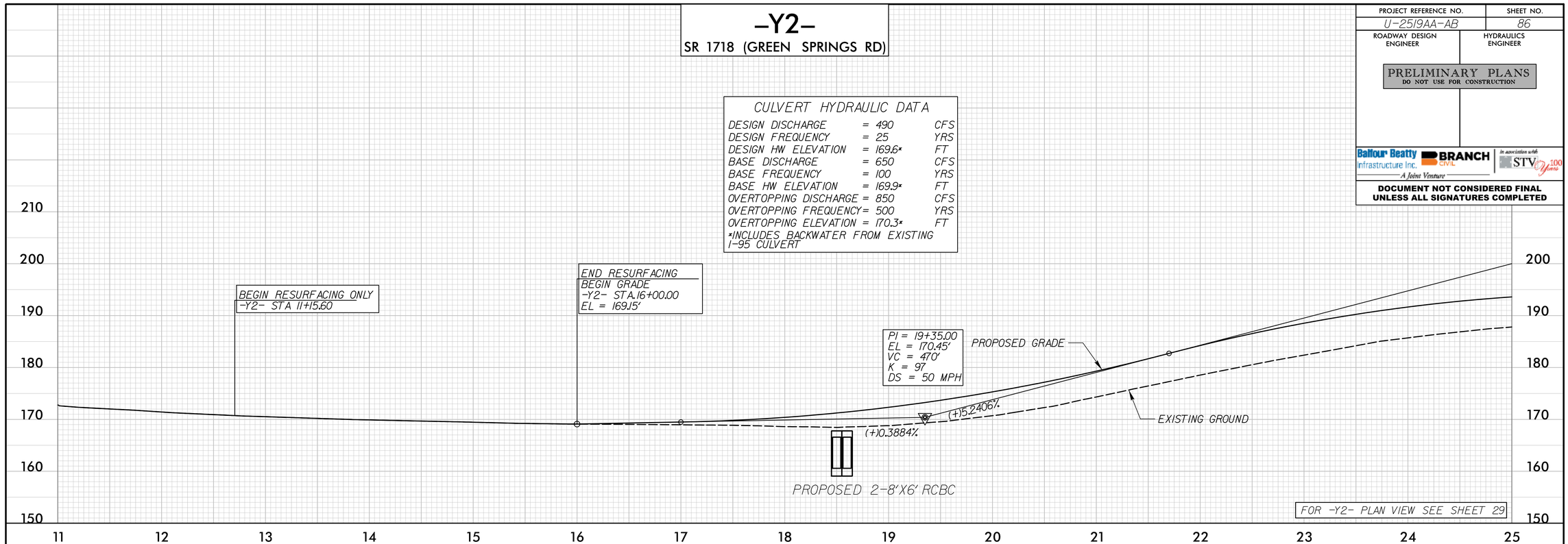
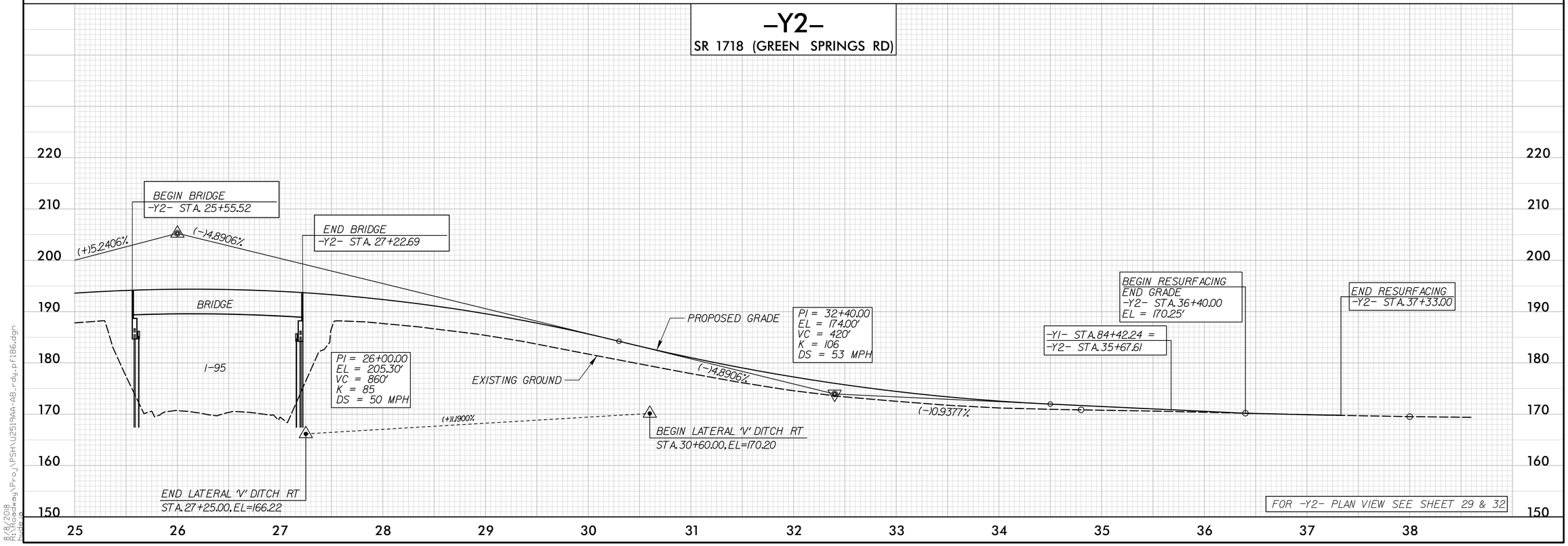
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y2-
SR 1718 (GREEN SPRINGS RD)



-Y2-
SR 1718 (GREEN SPRINGS RD)



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	87
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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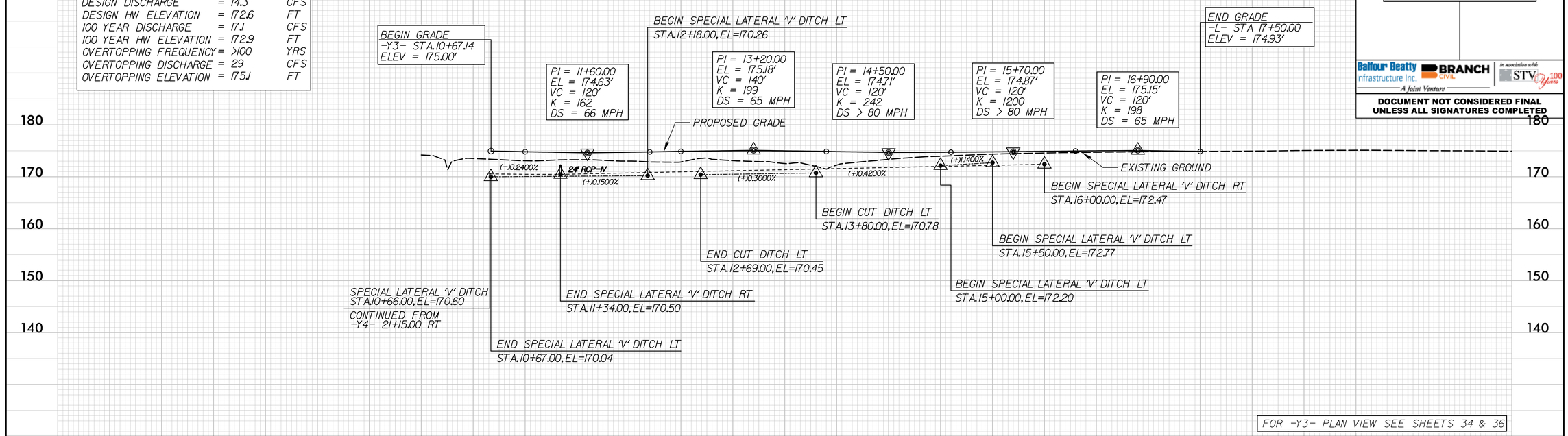
-Y3-
SR 1902 (EVERETT RD)

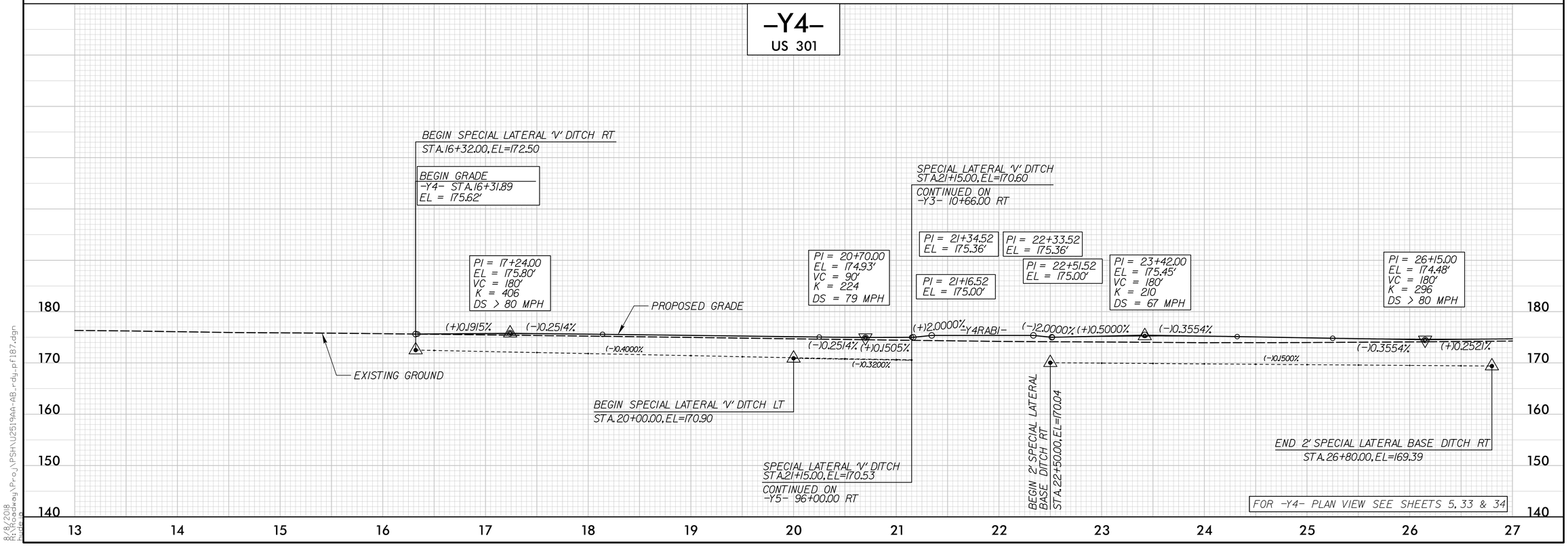
PIPE HYDRAULIC DATA
24" RCP-IV Sta. 11+34

DRAINAGE AREA	= 0.02	SQMI
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 14.3	CFS
DESIGN HW ELEVATION	= 172.6	FT
100 YEAR DISCHARGE	= 17.1	CFS
100 YEAR HW ELEVATION	= 172.9	FT
OVERTOPPING FREQUENCY	= >100	YRS
OVERTOPPING DISCHARGE	= 29	CFS
OVERTOPPING ELEVATION	= 175.1	FT



FOR -Y3- PLAN VIEW SEE SHEETS 34 & 36

-Y4-
US 301



FOR -Y4- PLAN VIEW SEE SHEETS 5, 33 & 34

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Pwdate: 10

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	88
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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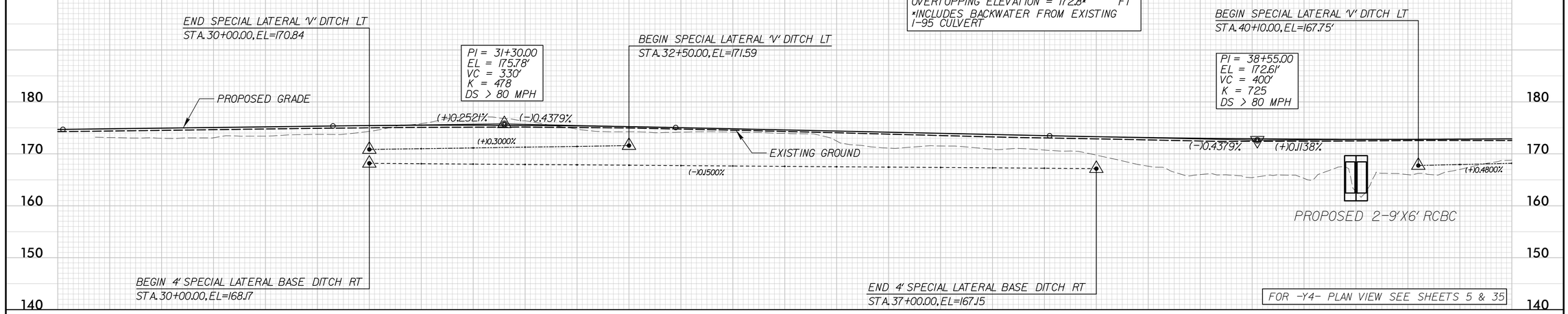
-Y4-
US 301

CULVERT HYDRAULIC DATA

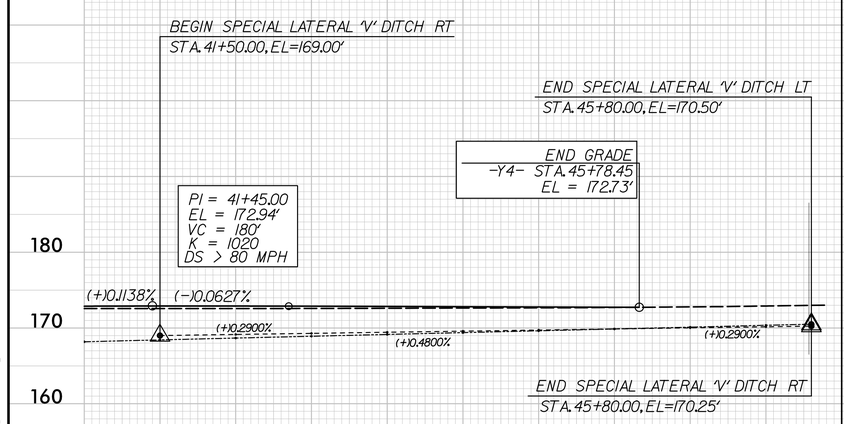
DESIGN DISCHARGE	=	550	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	170.9*	FT
BASE DISCHARGE	=	600	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	171.1*	FT
OVERTOPPING DISCHARGE	=	800	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	172.8*	FT

*INCLUDES BACKWATER FROM EXISTING I-95 CULVERT



FOR -Y4- PLAN VIEW SEE SHEETS 5 & 35

-Y4-
US 301

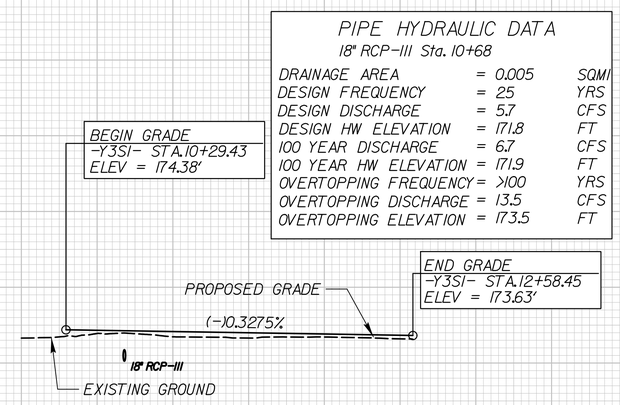


FOR -Y4- PLAN VIEW SEE SHEET 35

-Y3S1-

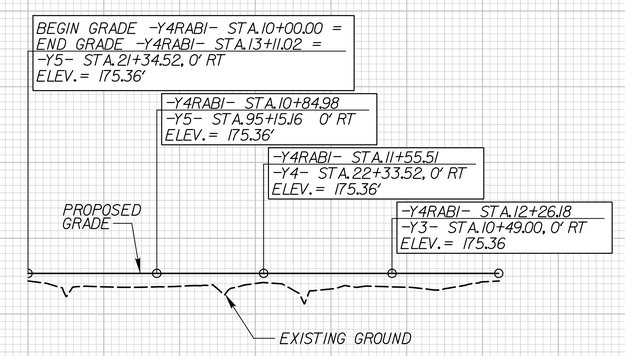
PIPE HYDRAULIC DATA
18" RCP-III Sta. 10+68

DRAINAGE AREA	=	0.005	SQMI
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	5.7	CFS
DESIGN HW ELEVATION	=	171.8	FT
100 YEAR DISCHARGE	=	6.7	CFS
100 YEAR HW ELEVATION	=	171.9	FT
OVERTOPPING FREQUENCY	=	>100	YRS
OVERTOPPING DISCHARGE	=	13.5	CFS
OVERTOPPING ELEVATION	=	173.5	FT



FOR -Y3SI- PLAN VIEW SEE SHEET 34

-Y4RAB1-



FOR -Y4RABI- PLAN VIEW SEE SHEET 34

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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	89
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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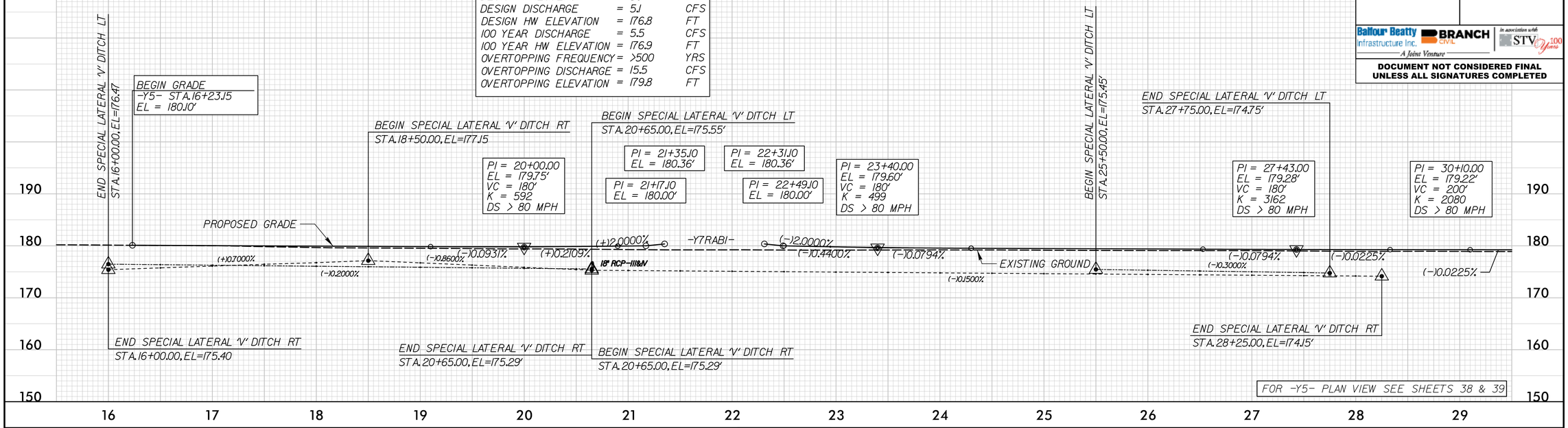
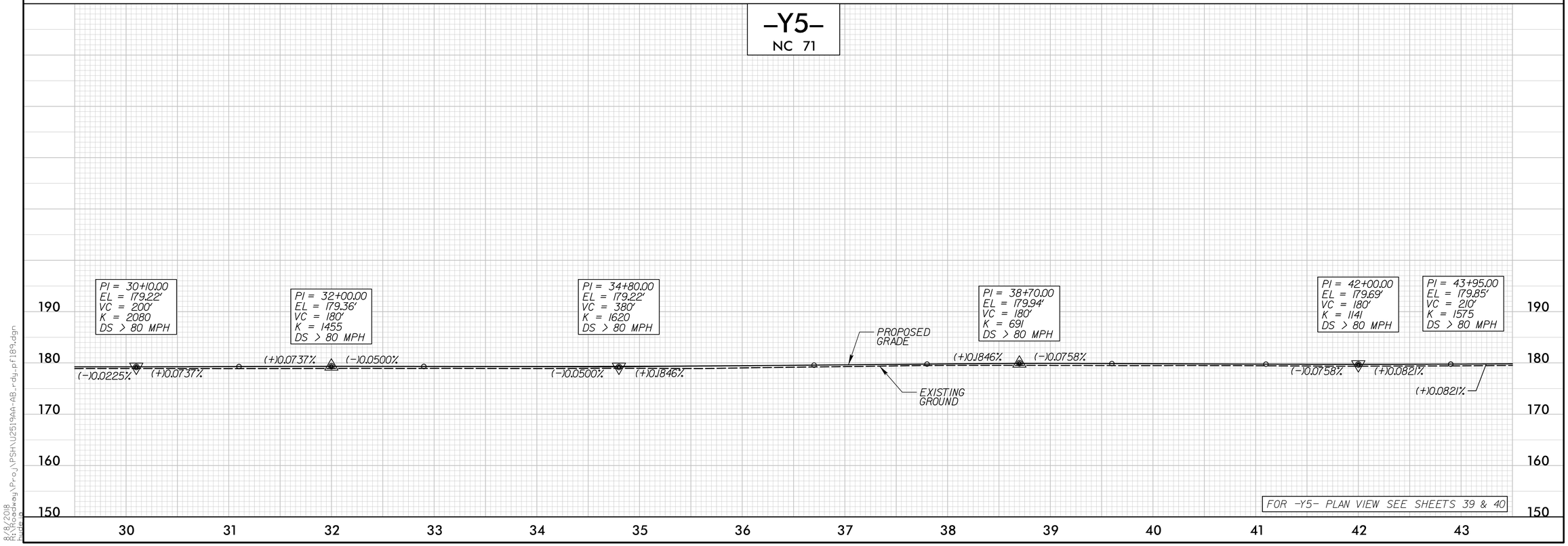
-Y5-
NC 71

PIPE HYDRAULIC DATA
18" RCP-III&IV Sta. 20+66

DRAINAGE AREA	= 0.004	SQMI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 5.1	CFS
DESIGN HW ELEVATION	= 176.8	FT
100 YEAR DISCHARGE	= 5.5	CFS
100 YEAR HW ELEVATION	= 176.9	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= 15.5	CFS
OVERTOPPING ELEVATION	= 179.8	FT



-Y5-
NC 71



8/8/2018
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mwlee

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	90
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
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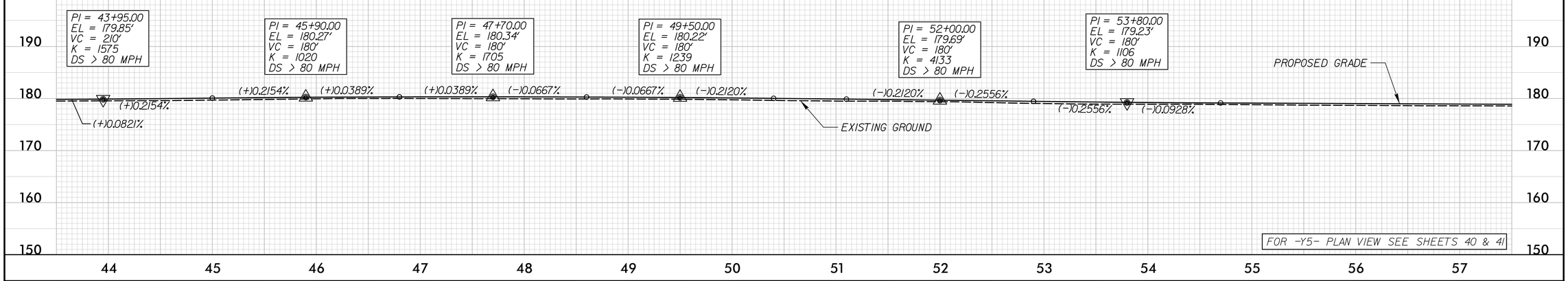
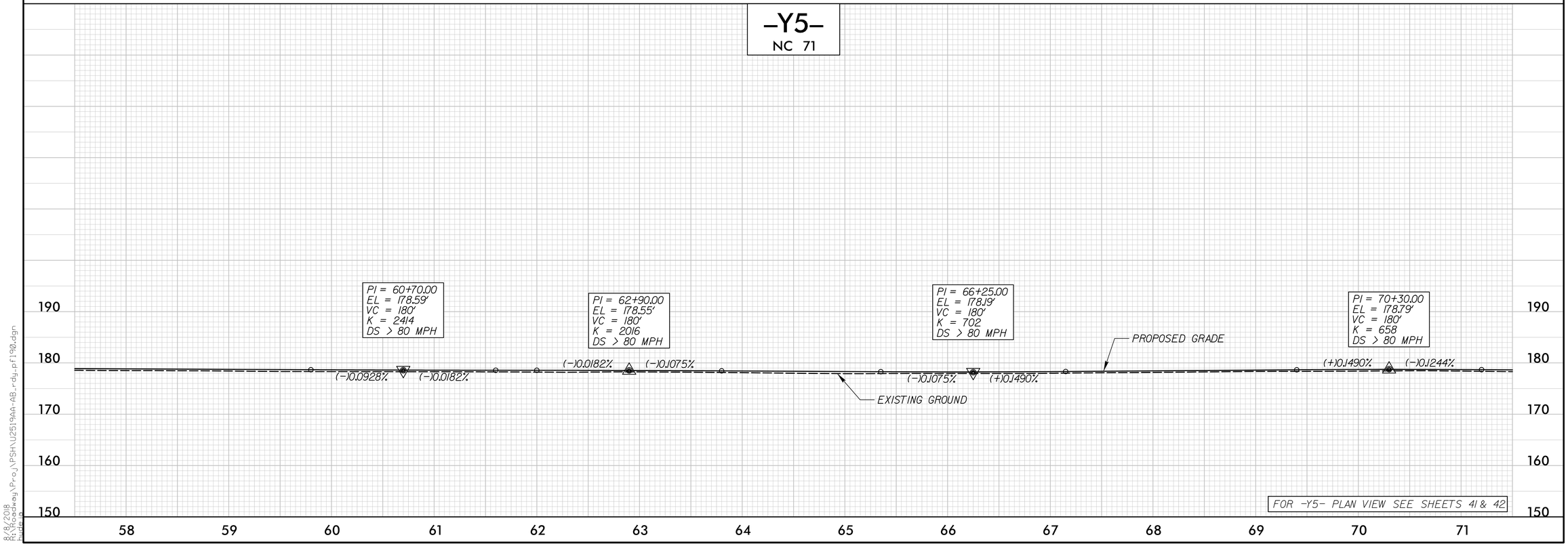
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y5-
NC 71



FOR -Y5- PLAN VIEW SEE SHEETS 40 & 41

-Y5-
NC 71



FOR -Y5- PLAN VIEW SEE SHEETS 41 & 42

8/8/2018
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mwalsh

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	91
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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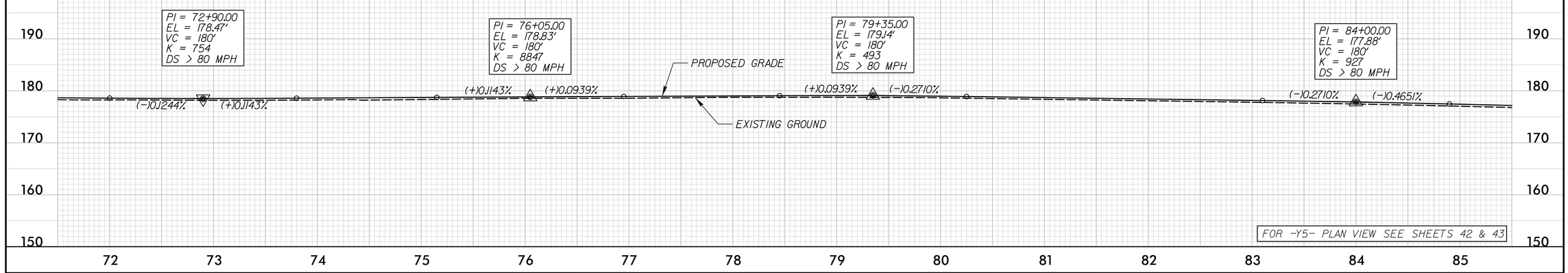
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y5-
NC 71

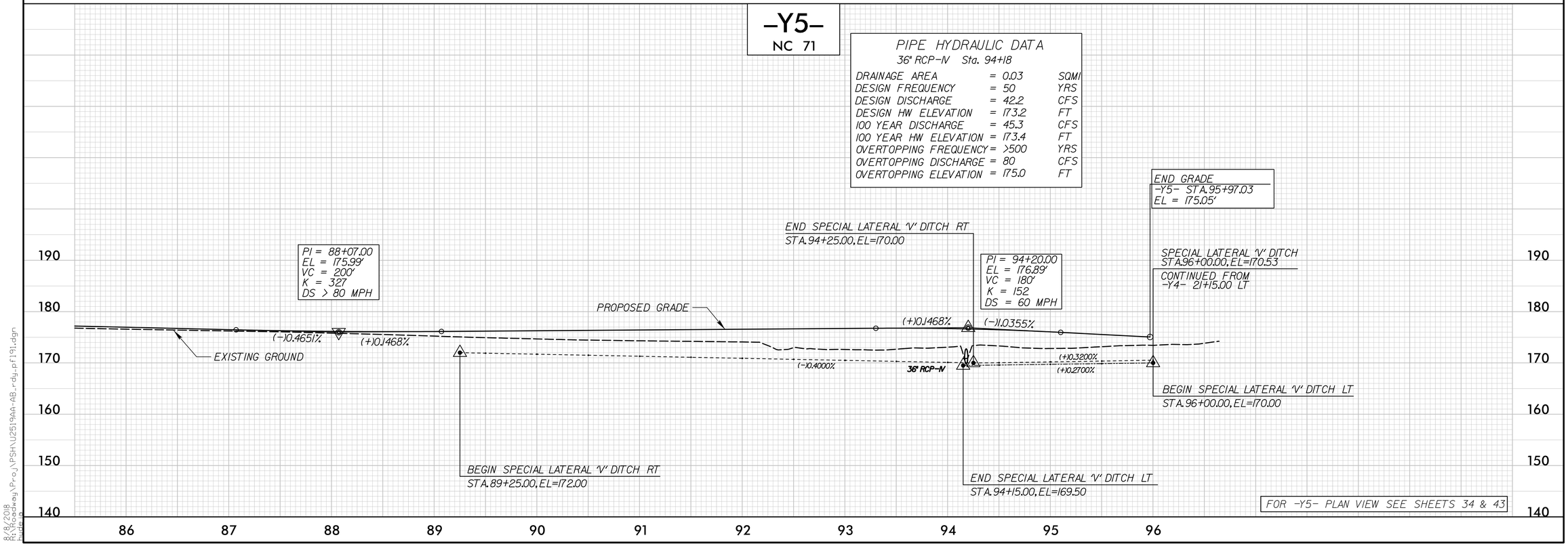


FOR -Y5- PLAN VIEW SEE SHEETS 42 & 43

-Y5-
NC 71

PIPE HYDRAULIC DATA
36" RCP-IV Sta. 94+18

DRAINAGE AREA	= 0.03	SQMI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 42.2	CFS
DESIGN HW ELEVATION	= 173.2	FT
100 YEAR DISCHARGE	= 45.3	CFS
100 YEAR HW ELEVATION	= 173.4	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= 80	CFS
OVERTOPPING ELEVATION	= 175.0	FT



FOR -Y5- PLAN VIEW SEE SHEETS 34 & 43

8/8/2018
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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	92
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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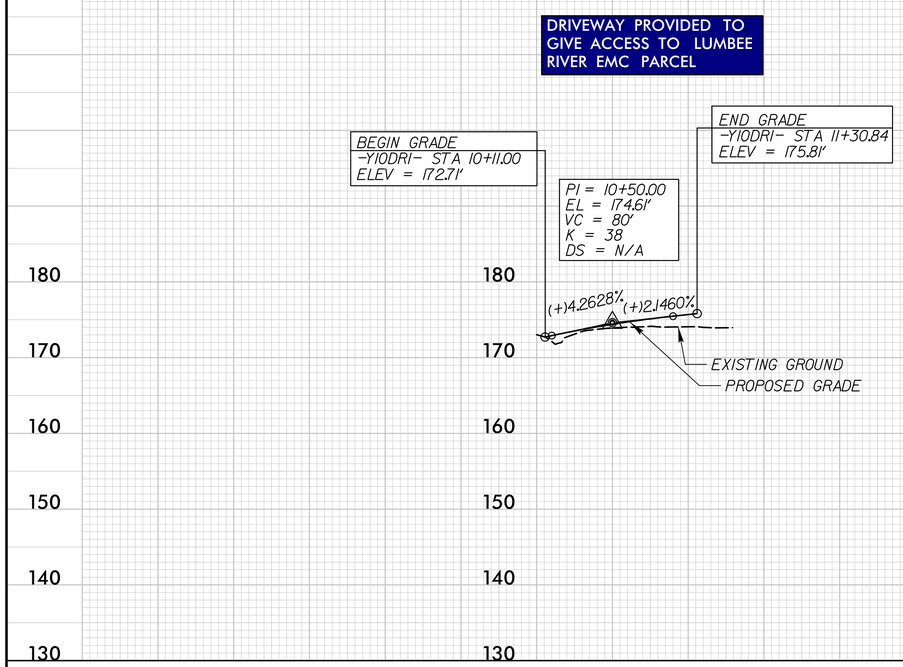
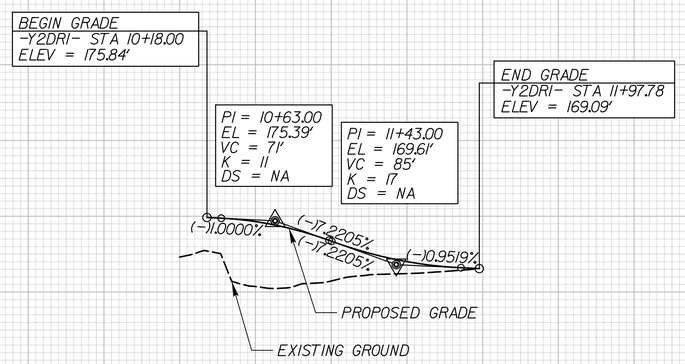
-Y5DR1-



FOR -Y5DRI- PLAN VIEW SEE SHEET 34

-Y2DR1-



FOR -Y2DRI- PLAN VIEW SEE SHEET 29

8/8/2018
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bwiggins

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	93
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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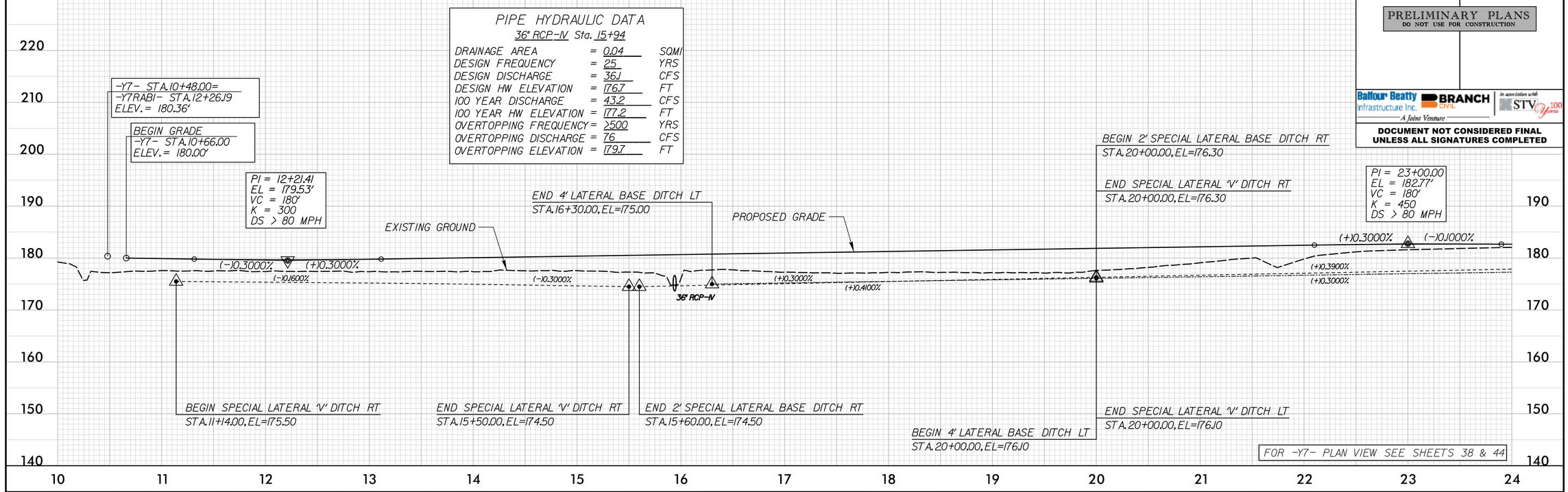
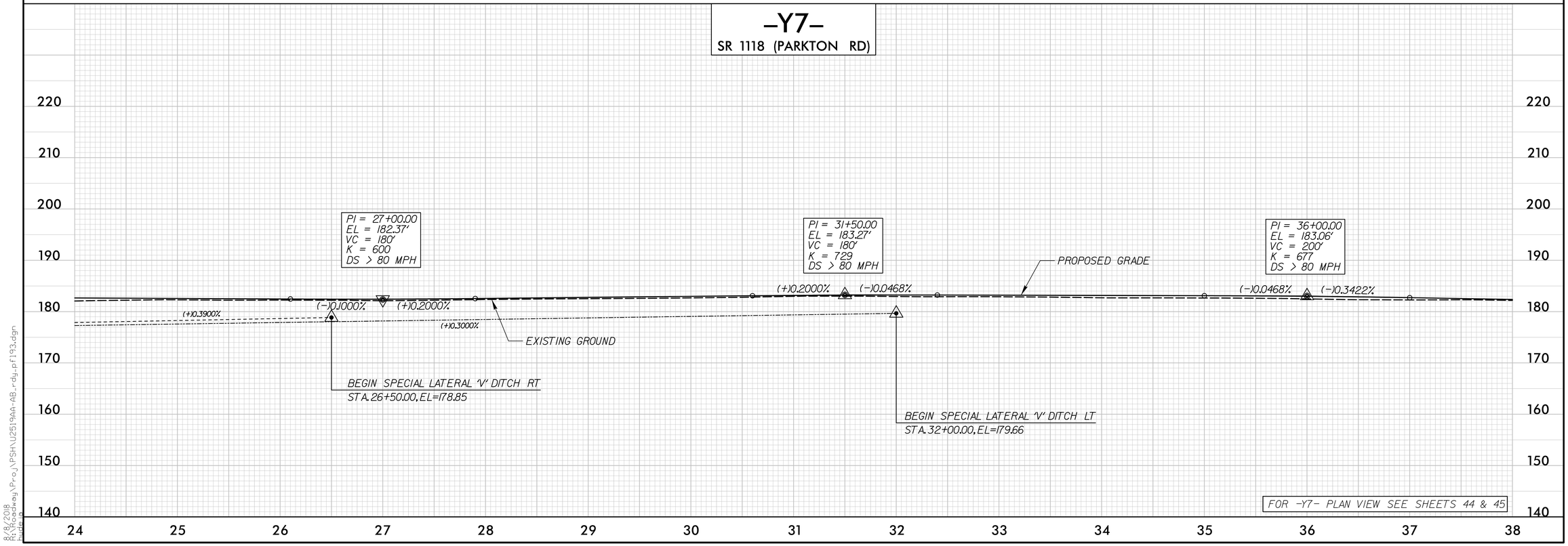
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y7-
SR 1118 (PARKTON RD)



-Y7-
SR 1118 (PARKTON RD)



8/8/2018
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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	94
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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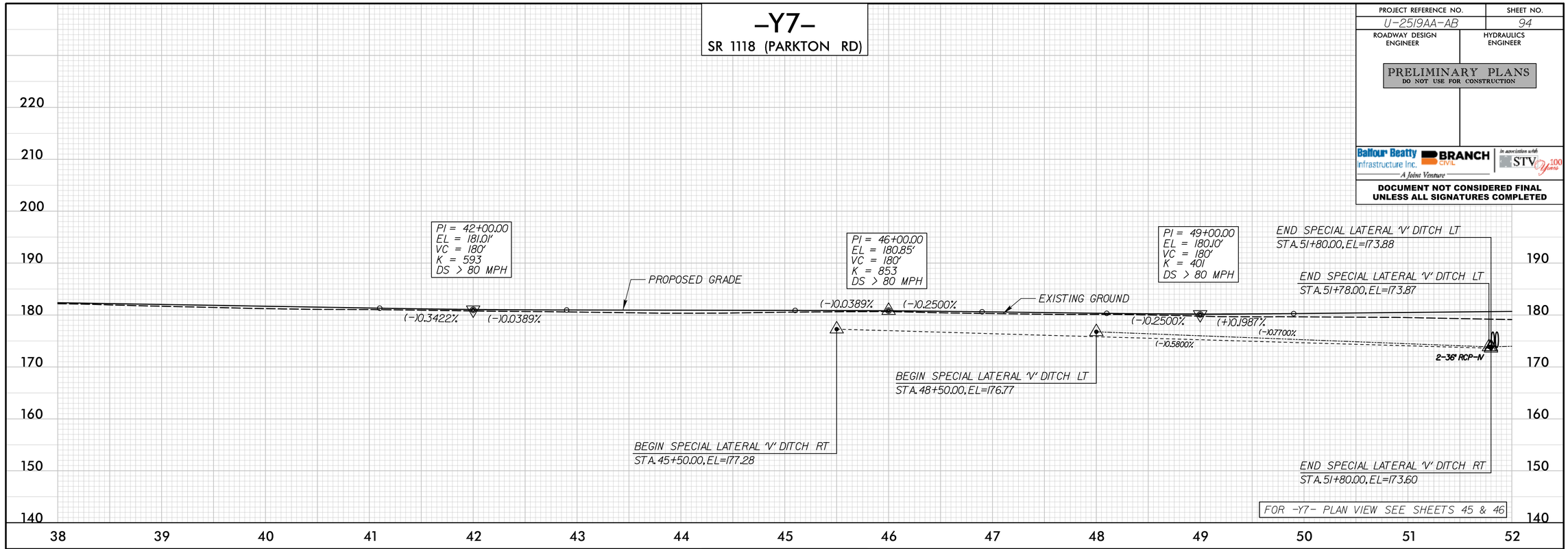
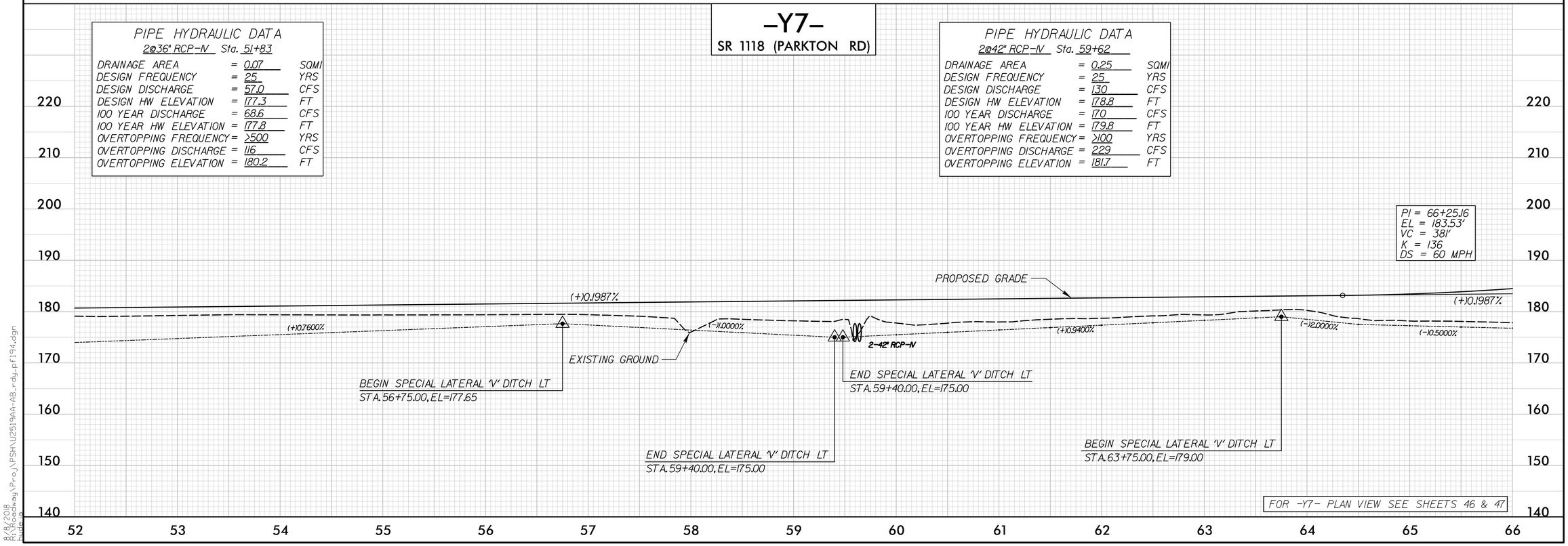
-Y7-
SR 1118 (PARKTON RD)



-Y7-
SR 1118 (PARKTON RD)



8/8/2018
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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	95
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 years
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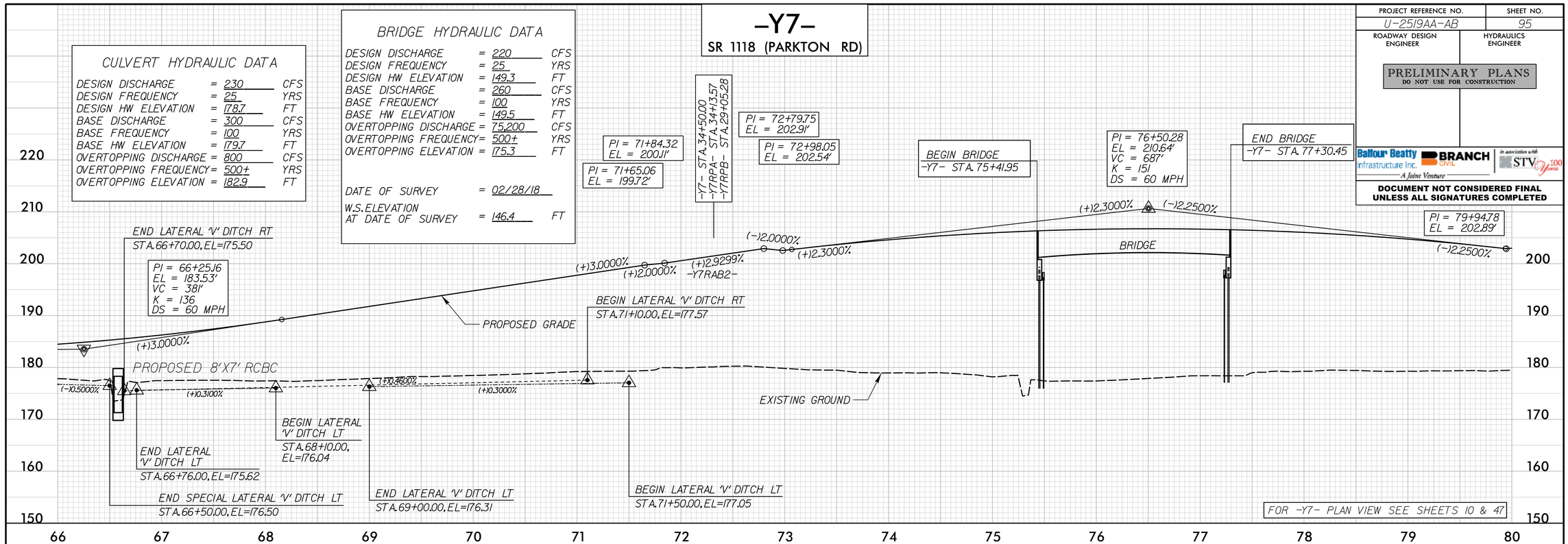
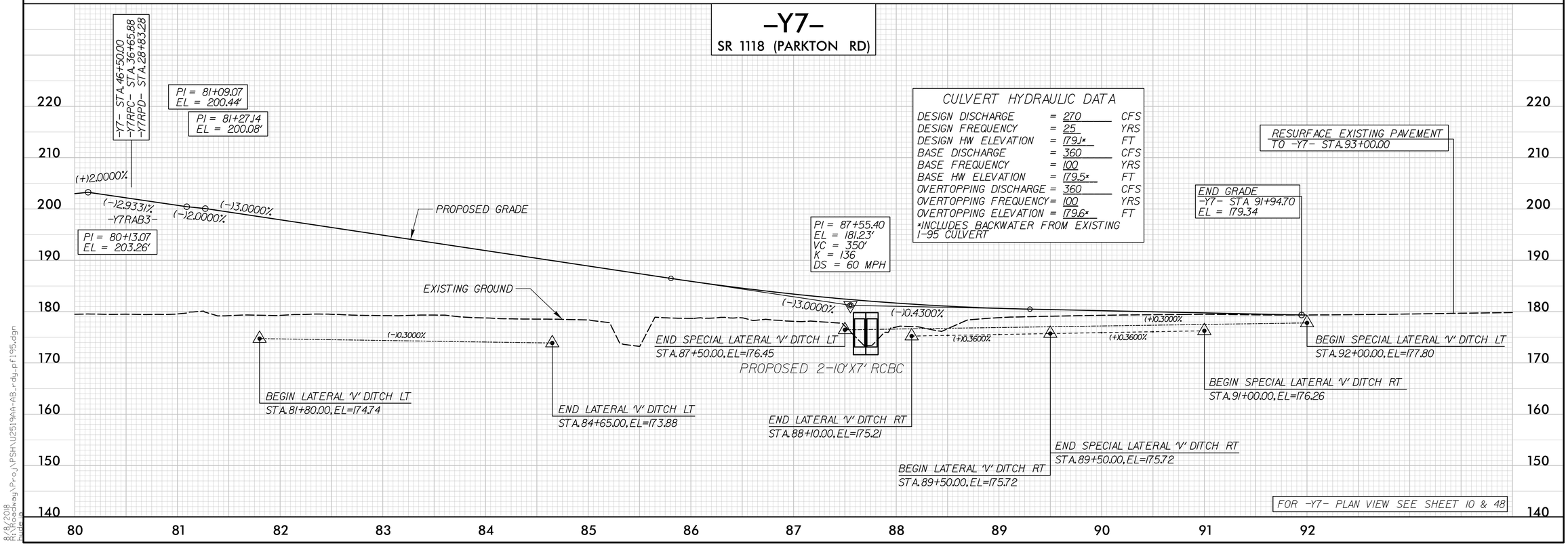
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y7-
SR 1118 (PARKTON RD)



-Y7-
SR 1118 (PARKTON RD)



8/8/2018
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mwade

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	96
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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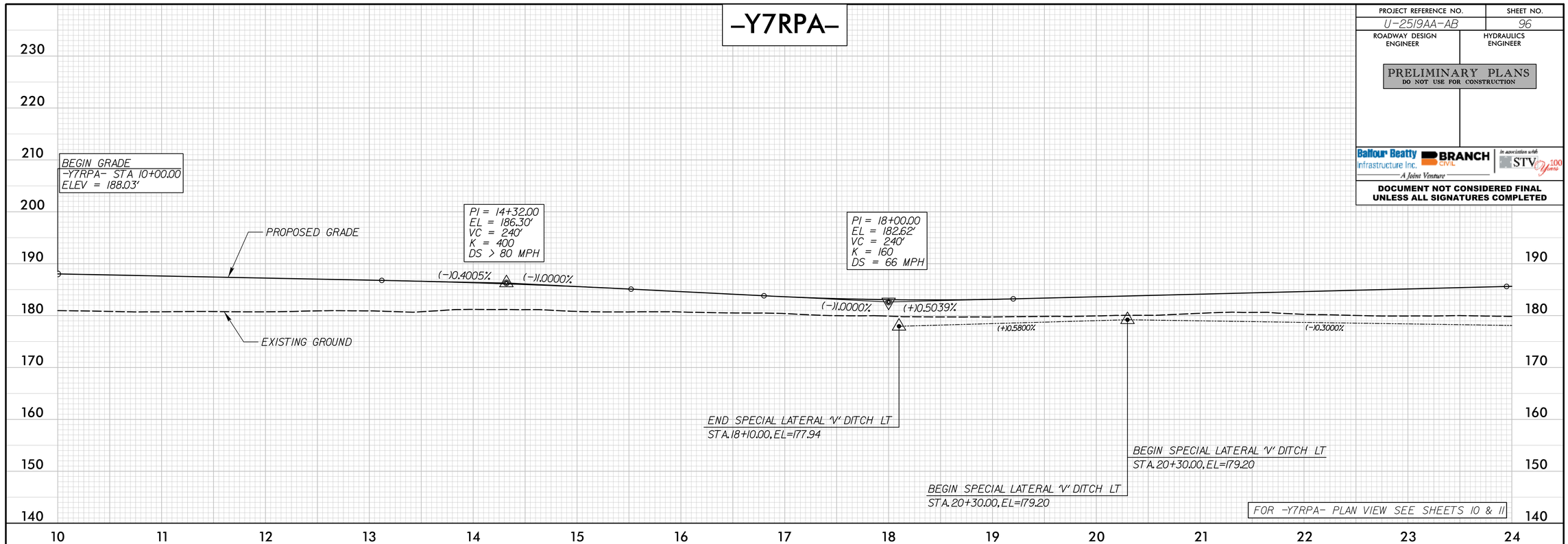

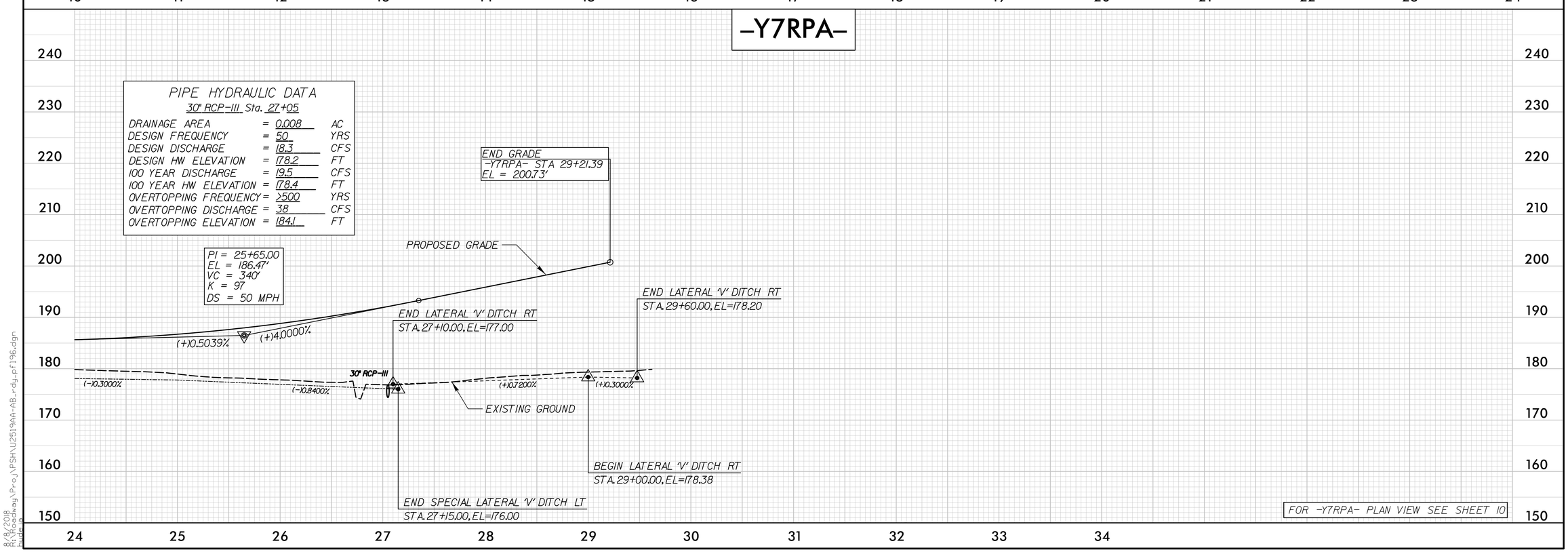

8/8/2018
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mwebb

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	97
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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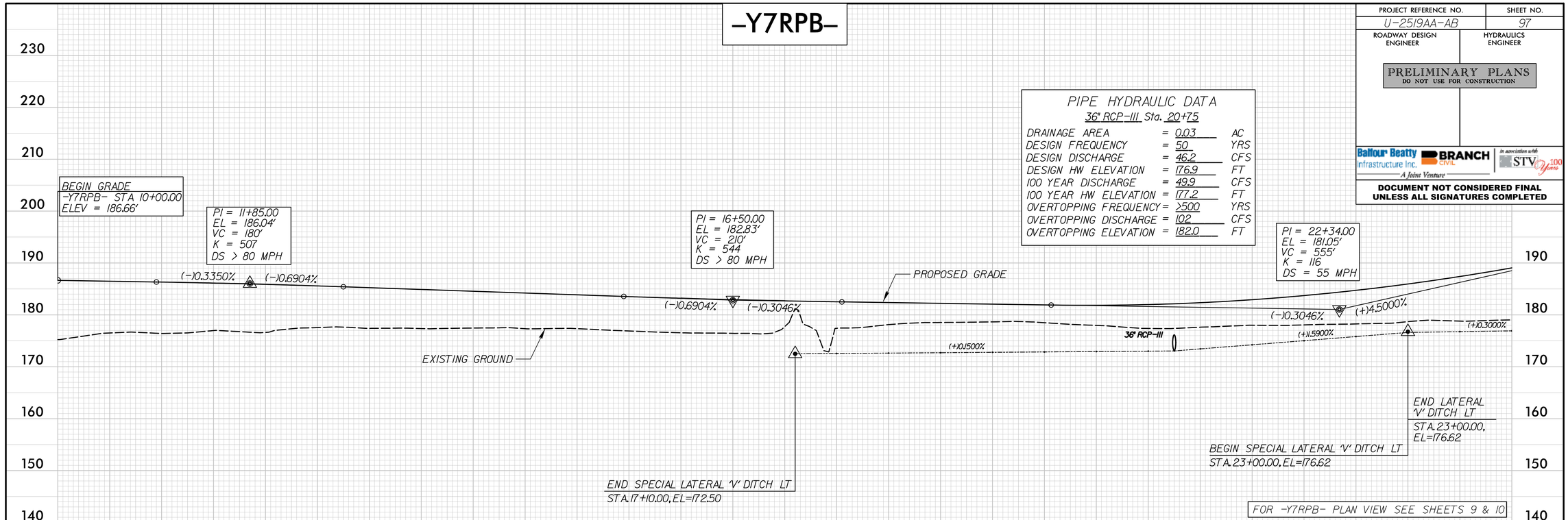
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y7RPB-

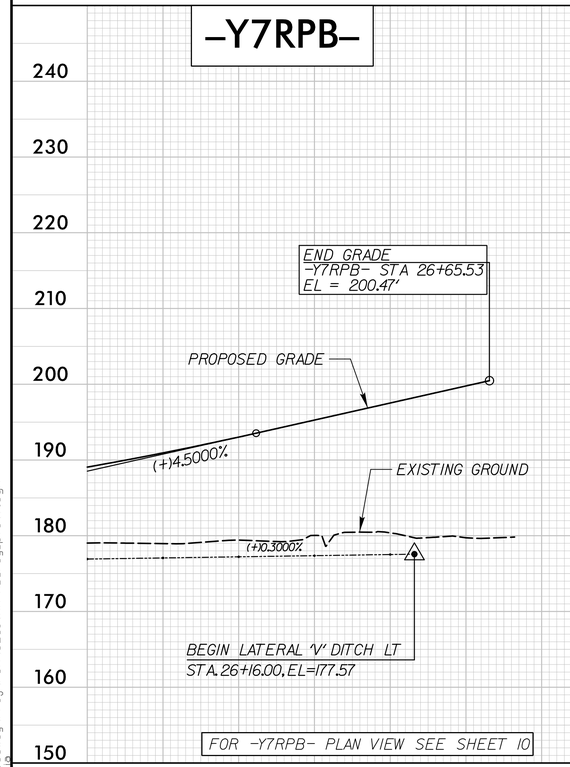


PIPE HYDRAULIC DATA

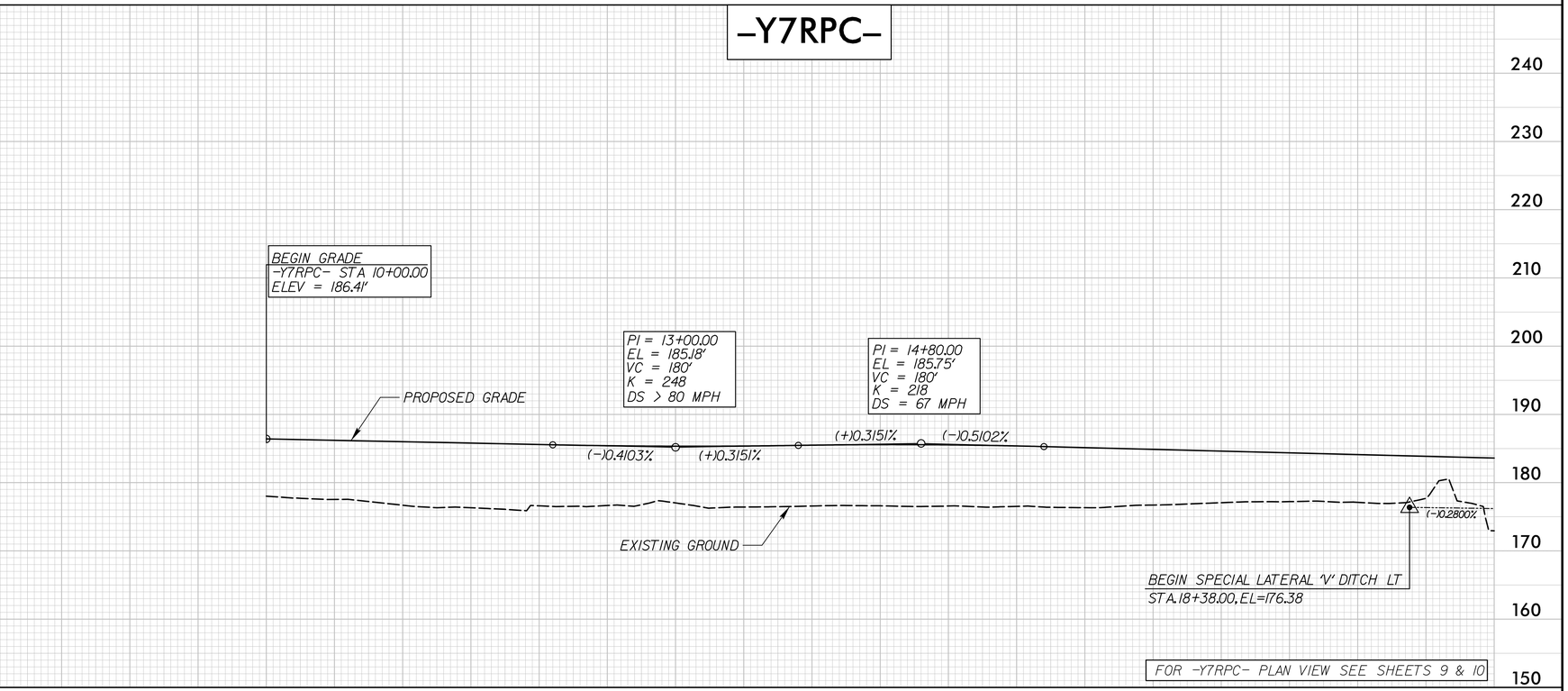
36" RCP-III Sta. 20+75

DRAINAGE AREA	=	0.03	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	46.2	CFS
DESIGN HW ELEVATION	=	176.9	FT
100 YEAR DISCHARGE	=	49.9	CFS
100 YEAR HW ELEVATION	=	177.2	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	102	CFS
OVERTOPPING ELEVATION	=	182.0	FT

-Y7RPB-



-Y7RPC-



8/8/2018
R:\Roadway\Proj\PSH\U2519AA-AB_rdy_pf197.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	98
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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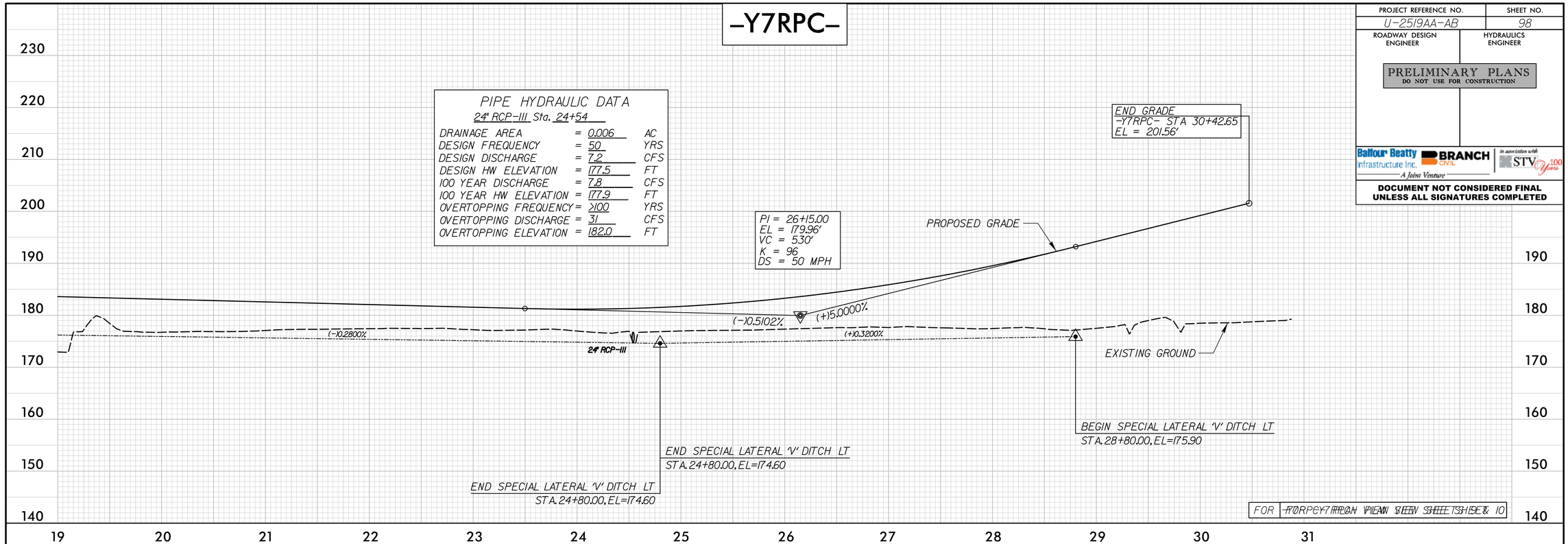
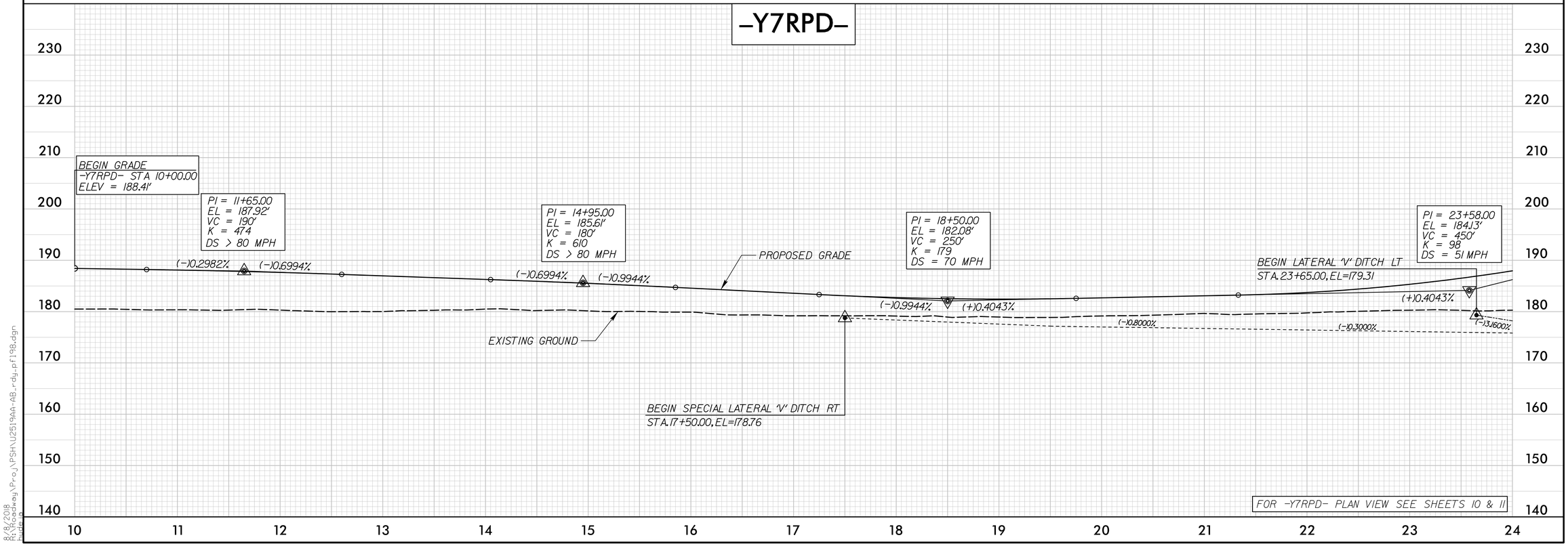
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y7RPC-



-Y7RPD-



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	99
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

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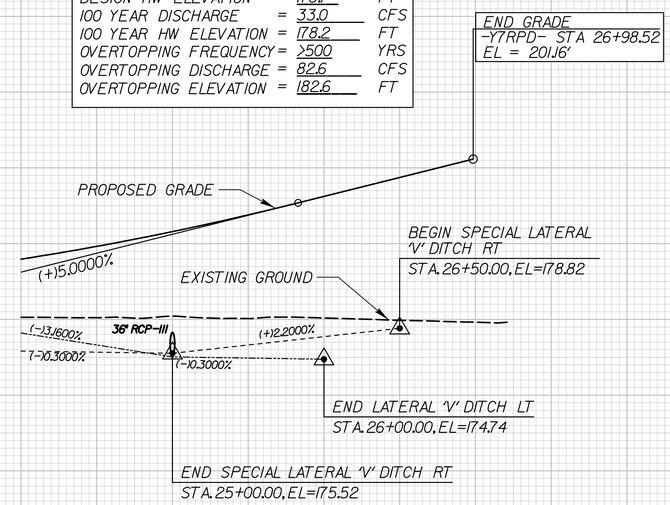
-Y7RPD-

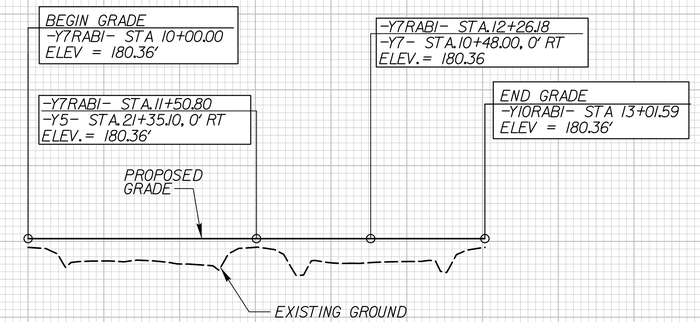
PIPE HYDRAULIC DATA
36" RCP-III Sta. 25+00

DRAINAGE AREA	=	0.02	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	30.7	CFS
DESIGN HW ELEVATION	=	178.1	FT
100 YEAR DISCHARGE	=	33.0	CFS
100 YEAR HW ELEVATION	=	178.2	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	82.6	CFS
OVERTOPPING ELEVATION	=	182.6	FT



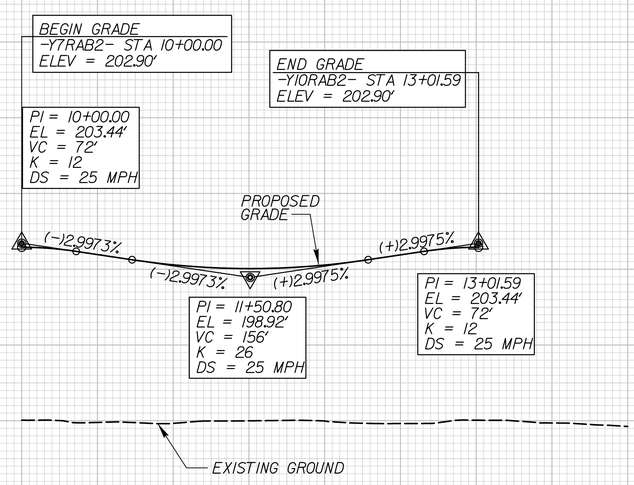
FOR -Y7RPD- PLAN VIEW SEE SHEET 10

-Y7RAB1-



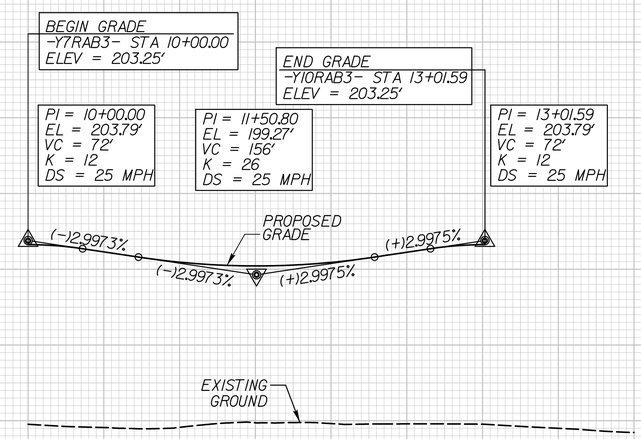
FOR -Y7RAB1- PLAN VIEW SEE SHEET 38

-Y7RAB2-



FOR -Y7RAB2- PLAN VIEW SEE SHEET 10

-Y7RAB3-



FOR -Y7RAB3- PLAN VIEW SEE SHEET 10

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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	100
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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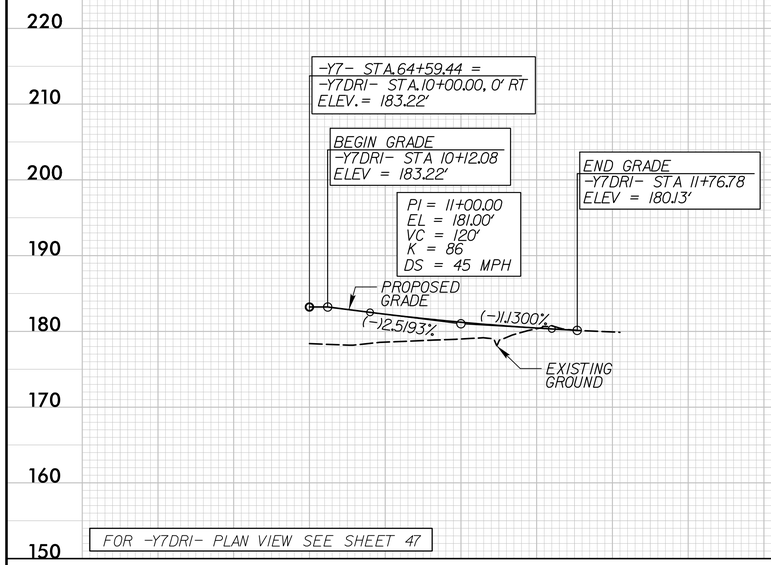
-Y7DR1-

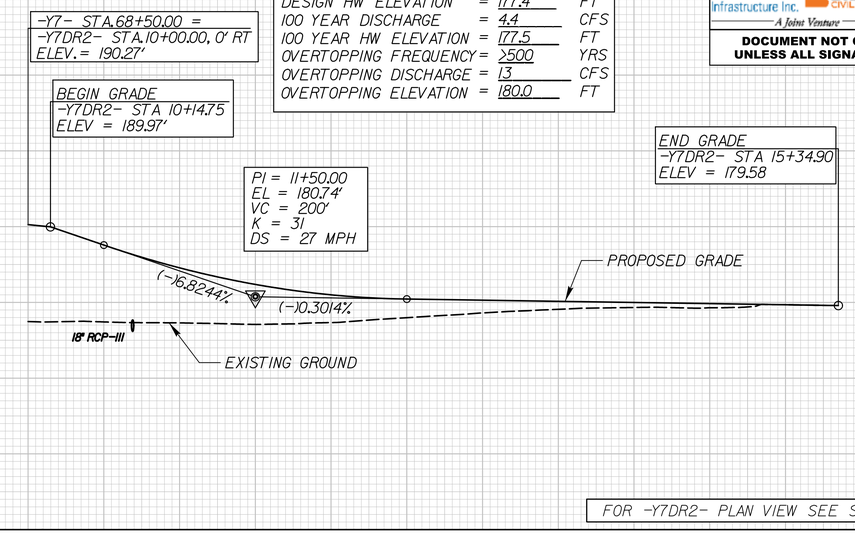


FOR -Y7DR1- PLAN VIEW SEE SHEET 47

-Y7DR2-

PIPE HYDRAULIC DATA
18" RCP-III Sta. 10+96

DRAINAGE AREA	=	0.002	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	4.1	CFS
DESIGN HW ELEVATION	=	177.4	FT
100 YEAR DISCHARGE	=	4.4	CFS
100 YEAR HW ELEVATION	=	177.5	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	13	CFS
OVERTOPPING ELEVATION	=	180.0	FT

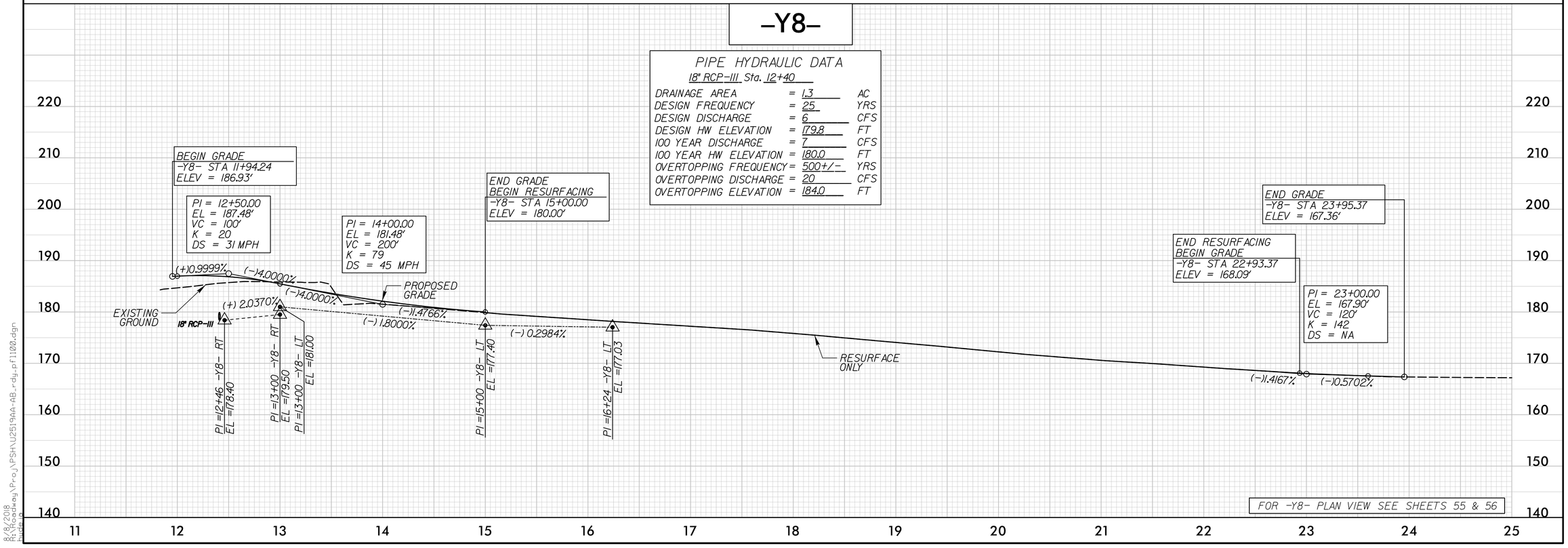


FOR -Y7DR2- PLAN VIEW SEE SHEET 47

-Y8-

PIPE HYDRAULIC DATA
18" RCP-III Sta. 12+40

DRAINAGE AREA	=	1.3	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	6	CFS
DESIGN HW ELEVATION	=	179.8	FT
100 YEAR DISCHARGE	=	7	CFS
100 YEAR HW ELEVATION	=	180.0	FT
OVERTOPPING FREQUENCY	=	500+/-	YRS
OVERTOPPING DISCHARGE	=	20	CFS
OVERTOPPING ELEVATION	=	184.0	FT



FOR -Y8- PLAN VIEW SEE SHEETS 55 & 56

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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	101
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. BRANCH CIVIL — A Joint Venture — In association with STV 100 Years

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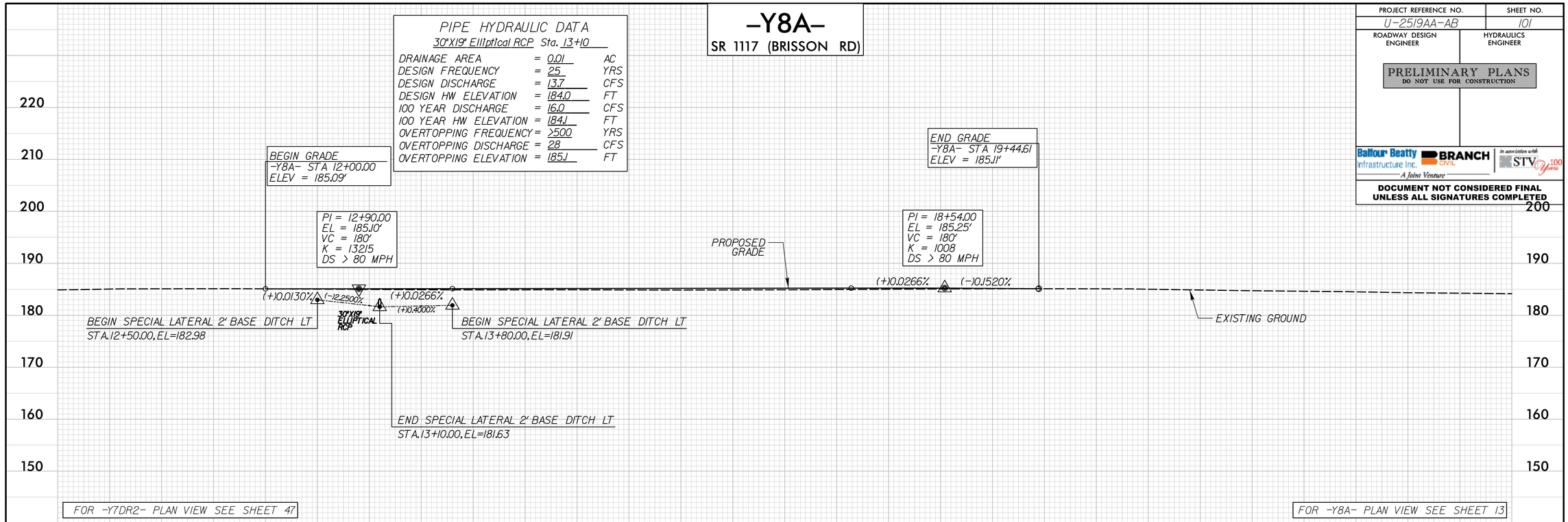
-Y8A-

SR 1117 (BRISSON RD)

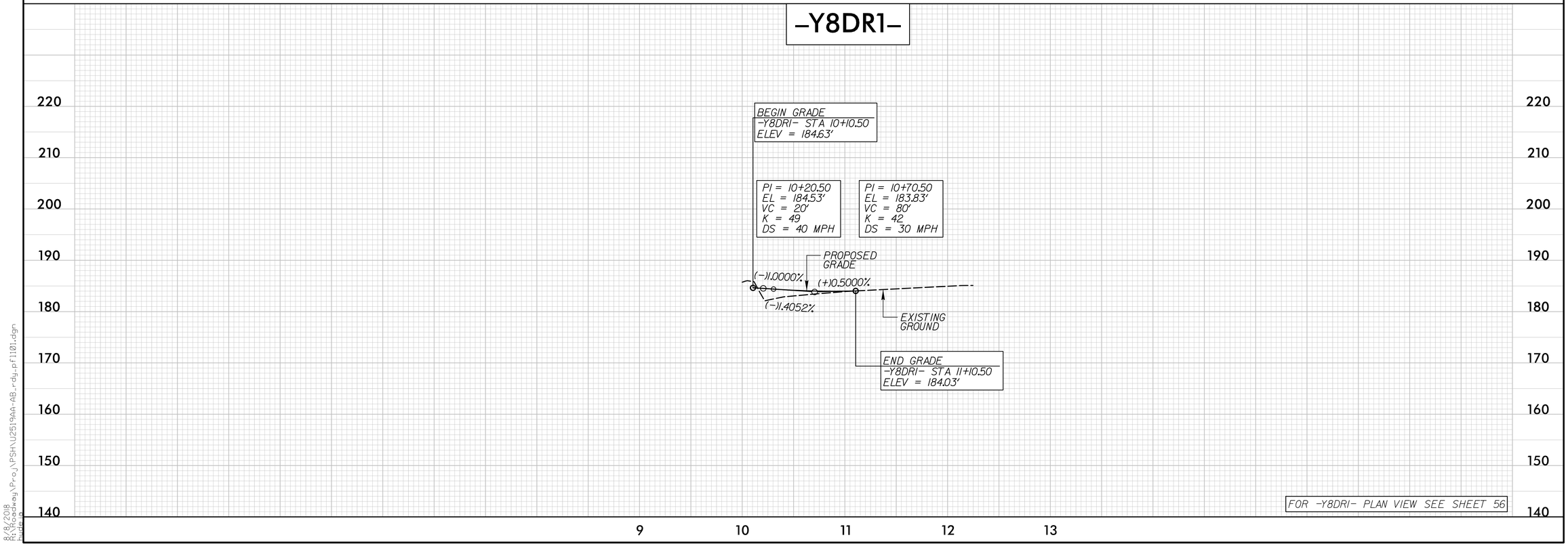
PIPE HYDRAULIC DATA

30"X19" Elliptical RCP Sta. 13+10

DRAINAGE AREA	=	0.01	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	13.7	CFS
DESIGN HW ELEVATION	=	184.0	FT
100 YEAR DISCHARGE	=	16.0	CFS
100 YEAR HW ELEVATION	=	184.1	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	28	CFS
OVERTOPPING ELEVATION	=	185.1	FT



-Y8DR1-



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	102
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

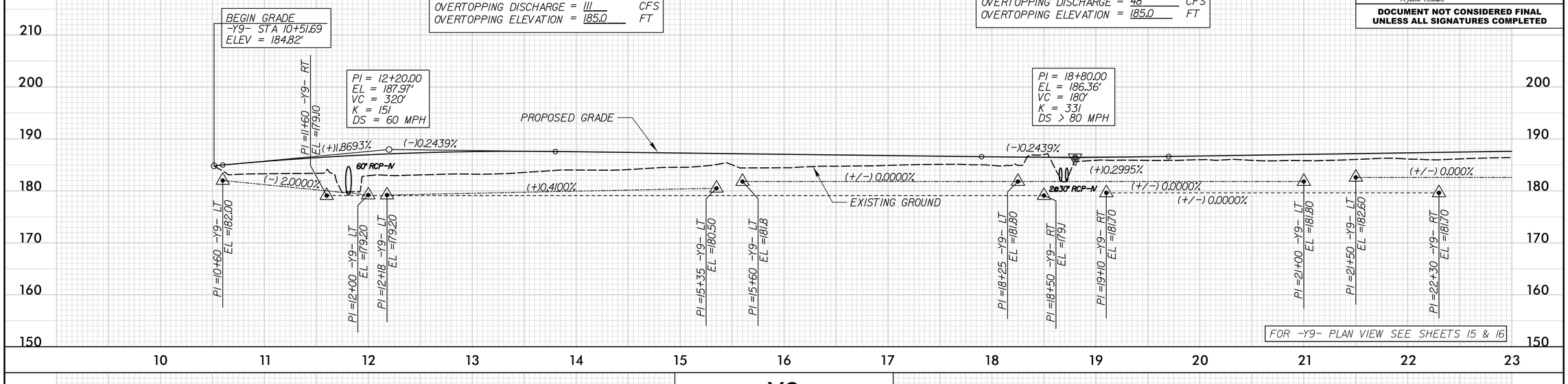
-Y9-
SR 1116 (LAKE UPCHURCH RD)

PIPE HYDRAULIC DATA
60" RCP-IV Sta. 11+81

DRAINAGE AREA	=	0.13	SQMI
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	100	CFS
DESIGN HW ELEVATION	=	184.7	FT
100 YEAR DISCHARGE	=	120	CFS
100 YEAR HW ELEVATION	=	186.0	FT
OVERTOPPING FREQUENCY	=	25+	YRS
OVERTOPPING DISCHARGE	=	111	CFS
OVERTOPPING ELEVATION	=	185.0	FT

PIPE HYDRAULIC DATA
2@30" RCP-IV Sta. 18+69

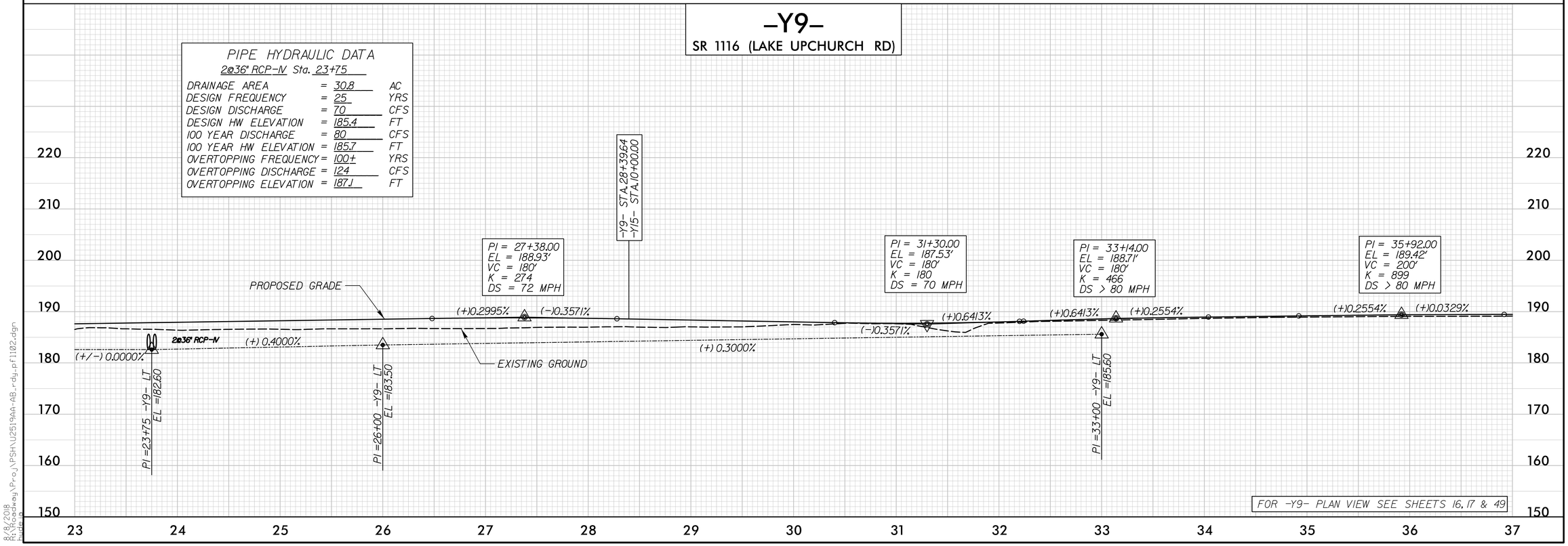
DRAINAGE AREA	=	19.7	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	45	CFS
DESIGN HW ELEVATION	=	184.9	FT
100 YEAR DISCHARGE	=	55	CFS
100 YEAR HW ELEVATION	=	185.4	FT
OVERTOPPING FREQUENCY	=	25+	YRS
OVERTOPPING DISCHARGE	=	48	CFS
OVERTOPPING ELEVATION	=	185.0	FT



-Y9-
SR 1116 (LAKE UPCHURCH RD)

PIPE HYDRAULIC DATA
2@36" RCP-IV Sta. 23+75

DRAINAGE AREA	=	30.8	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	70	CFS
DESIGN HW ELEVATION	=	185.4	FT
100 YEAR DISCHARGE	=	80	CFS
100 YEAR HW ELEVATION	=	185.7	FT
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING DISCHARGE	=	124	CFS
OVERTOPPING ELEVATION	=	187.1	FT



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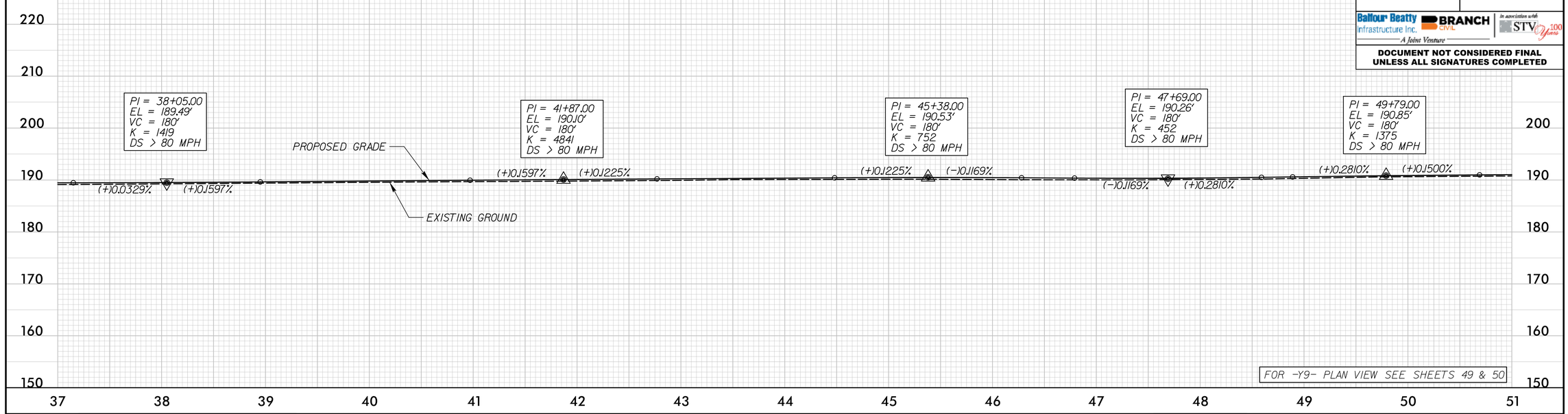
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	103
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

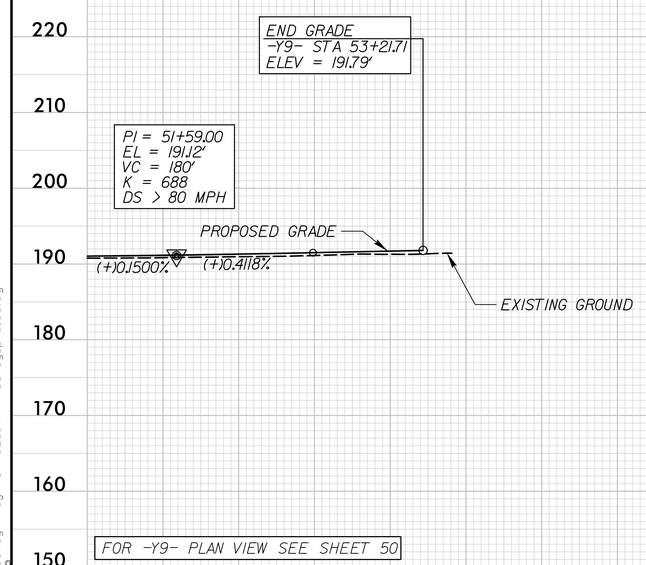
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y9-
SR 1116 (LAKE UPCHURCH RD)



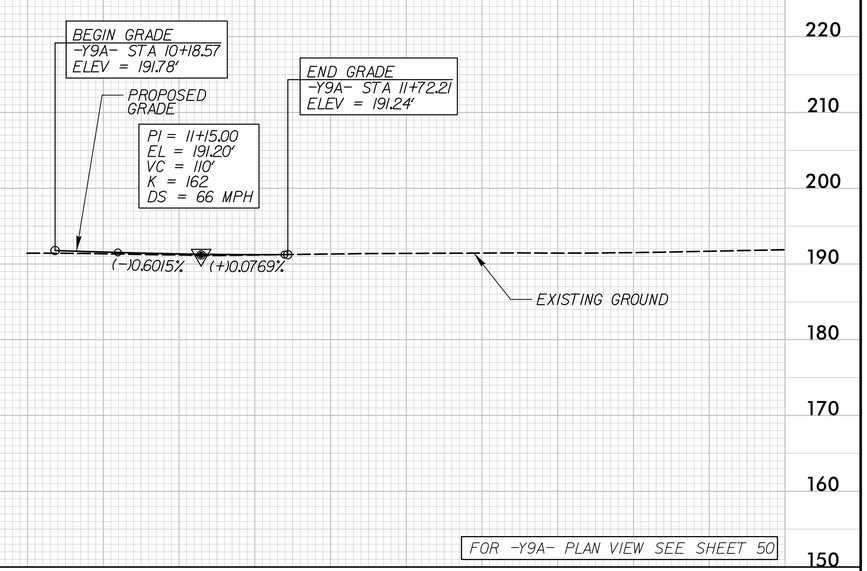
FOR -Y9- PLAN VIEW SEE SHEETS 49 & 50

-Y9-
SR 1116 (LAKE UPCHURCH RD)



FOR -Y9- PLAN VIEW SEE SHEET 50

-Y9A-



FOR -Y9A- PLAN VIEW SEE SHEET 50

8/8/2018
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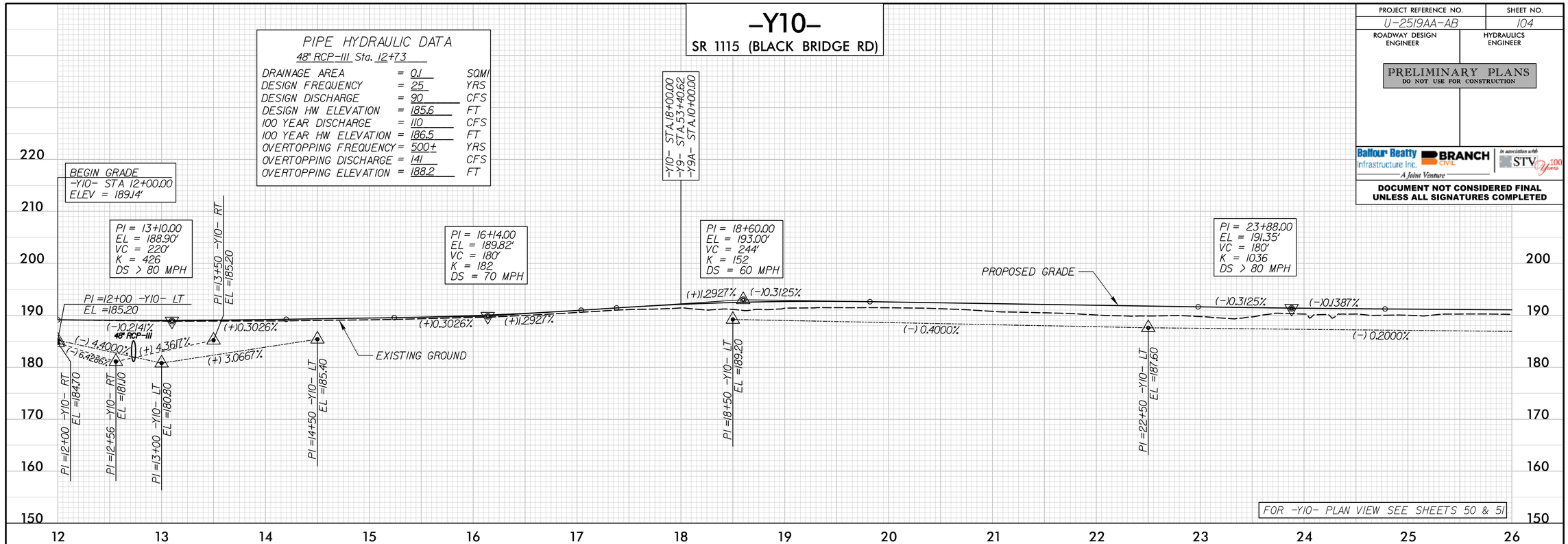
PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	104
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

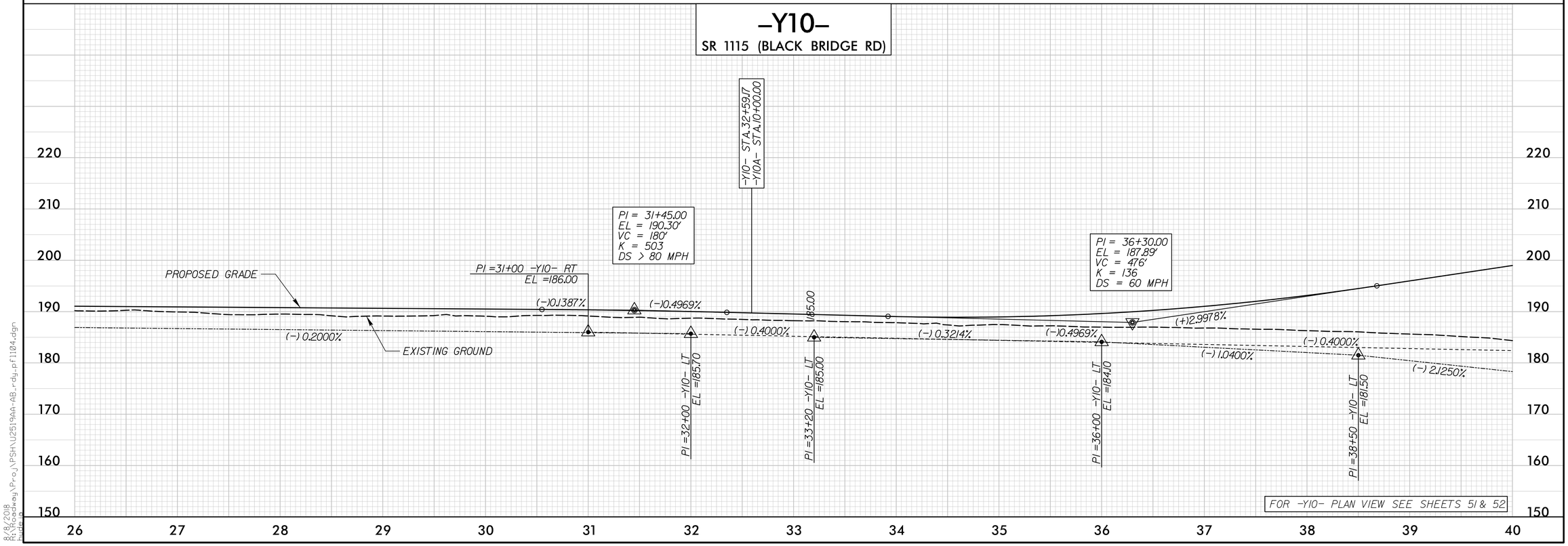
Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV | 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y10-
SR 1115 (BLACK BRIDGE RD)



-Y10-
SR 1115 (BLACK BRIDGE RD)



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	105
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
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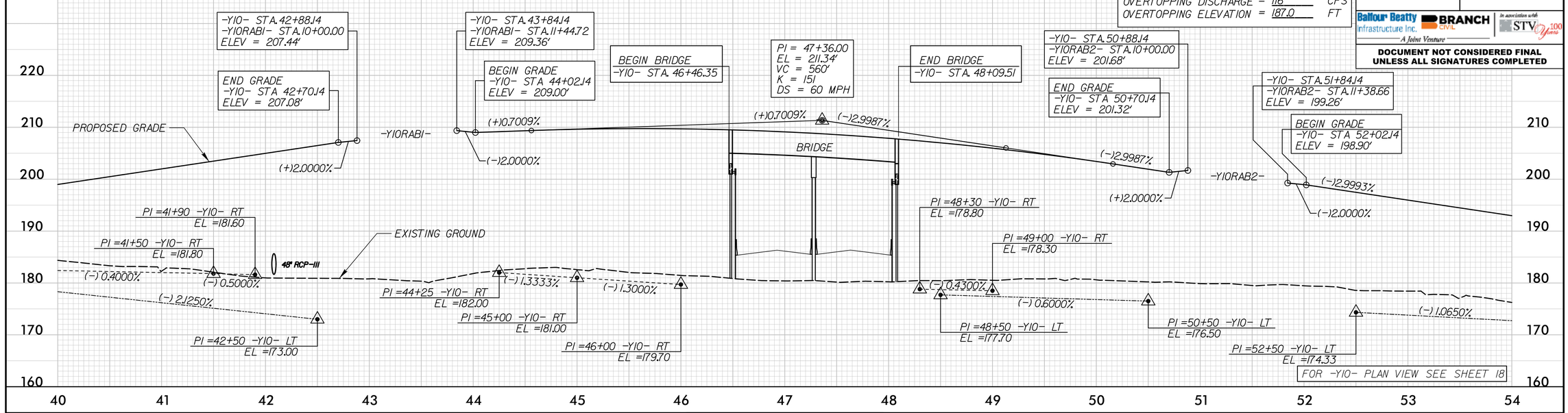
-Y10-
SR 1115 (BLACK BRIDGE RD)

PIPE HYDRAULIC DATA
48" RCP-III Sta. 42+08

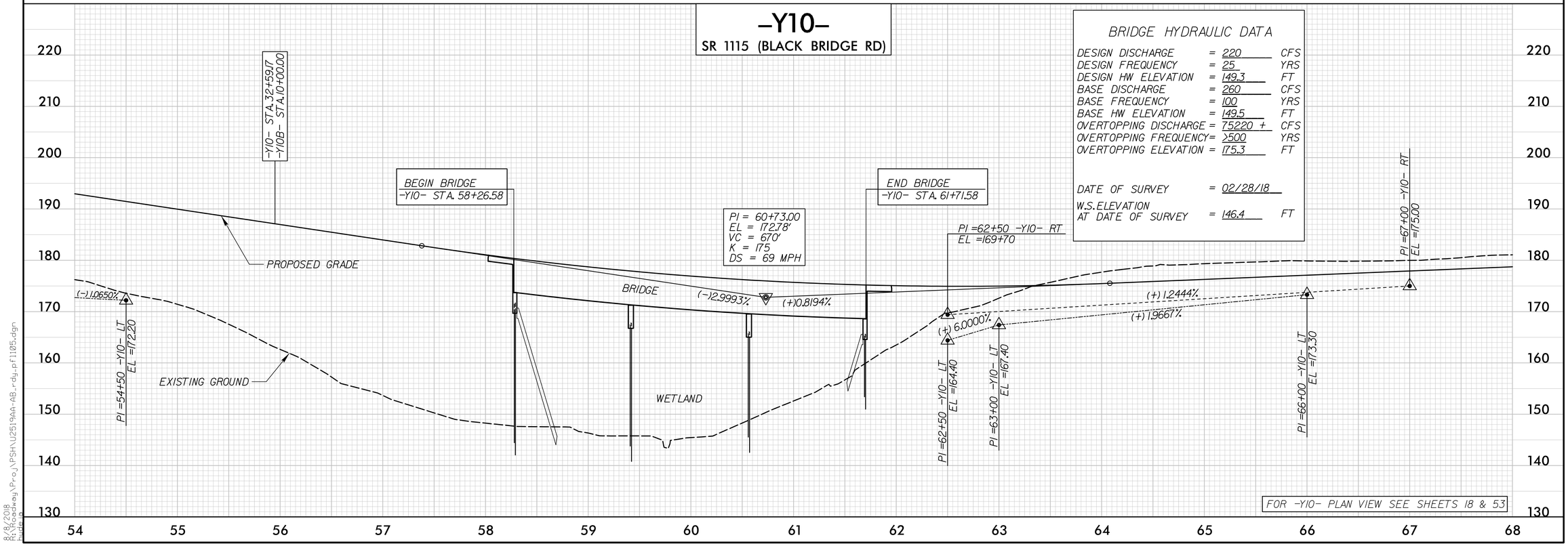
DRAINAGE AREA	=	33.4	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	65	CFS
DESIGN HW ELEVATION	=	185.4	FT
100 YEAR DISCHARGE	=	90	CFS
100 YEAR HW ELEVATION	=	185.8	FT
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING DISCHARGE	=	116	CFS
OVERTOPPING ELEVATION	=	187.0	FT



-Y10-
SR 1115 (BLACK BRIDGE RD)

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	220	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	149.3	FT
BASE DISCHARGE	=	260	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	149.5	FT
OVERTOPPING DISCHARGE	=	75220 +	CFS
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING ELEVATION	=	175.3	FT
DATE OF SURVEY	=	02/28/18	
W.S. ELEVATION AT DATE OF SURVEY	=	146.4	FT



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mwade

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	106
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 years
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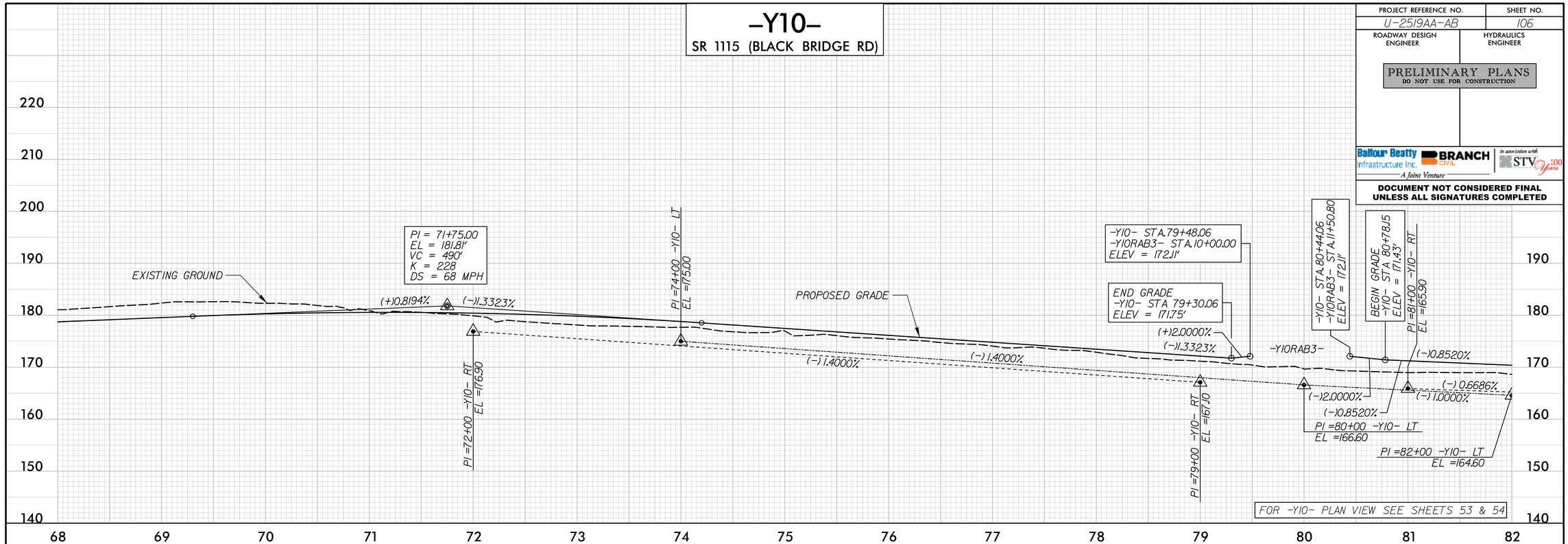
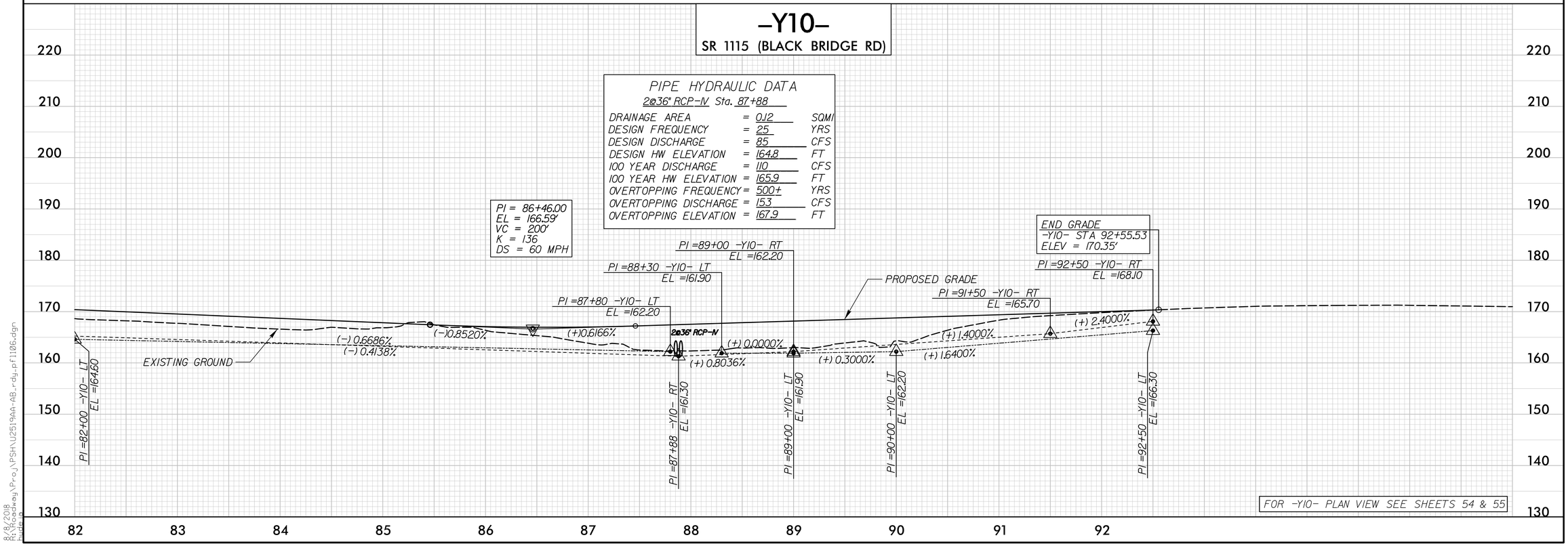
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y10-
SR 1115 (BLACK BRIDGE RD)



-Y10-
SR 1115 (BLACK BRIDGE RD)



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	107
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
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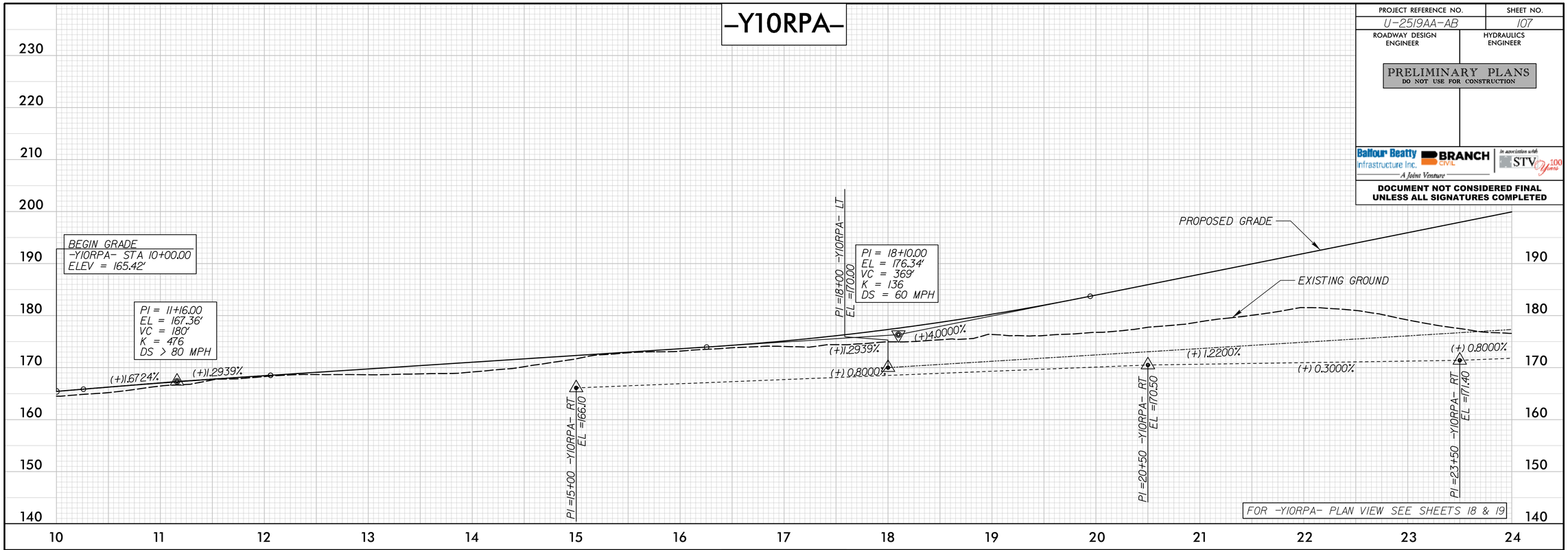
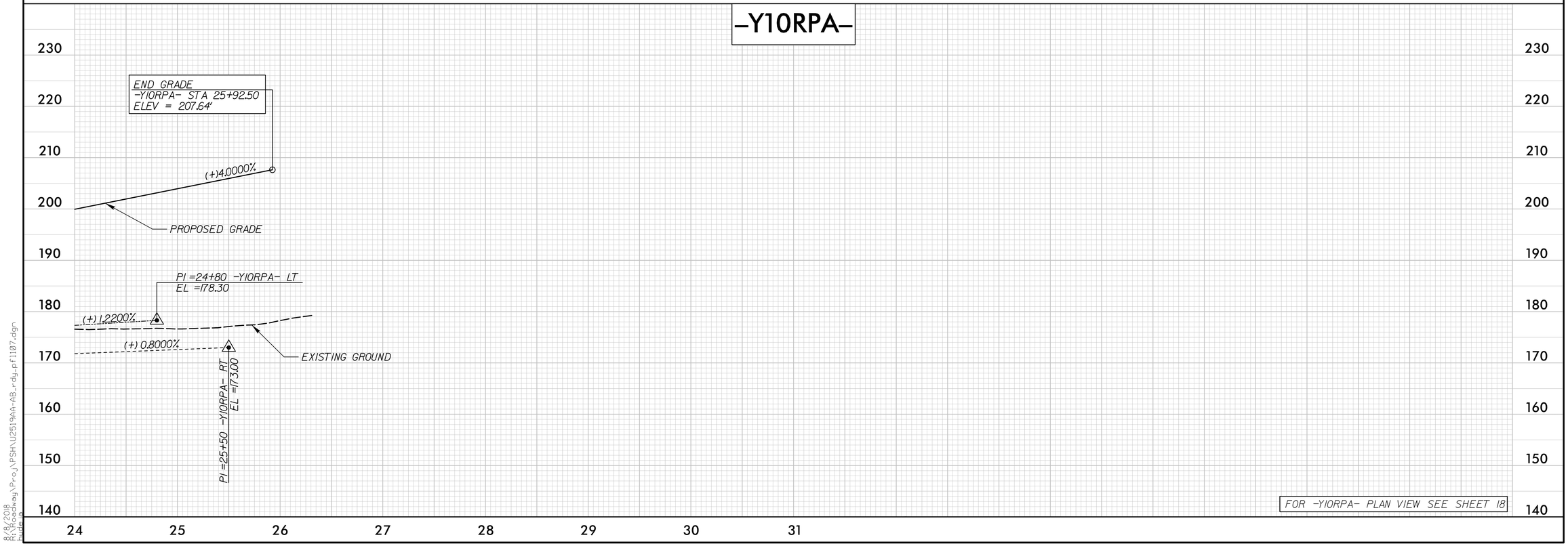
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	108
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
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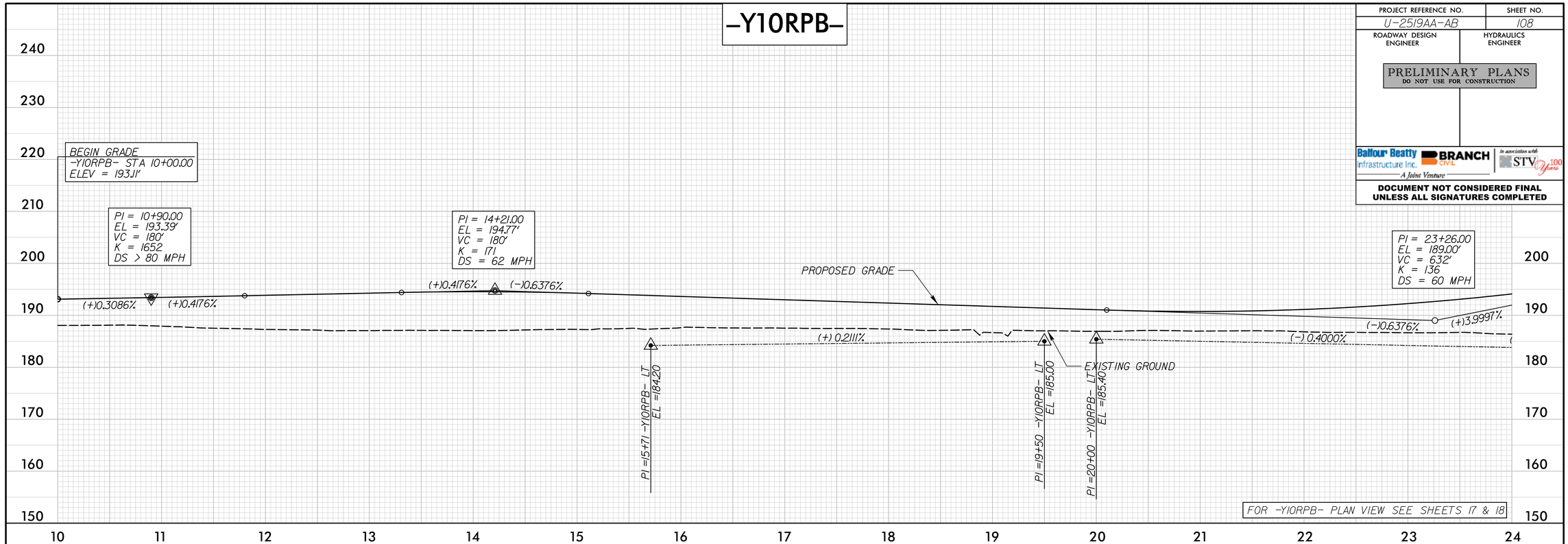
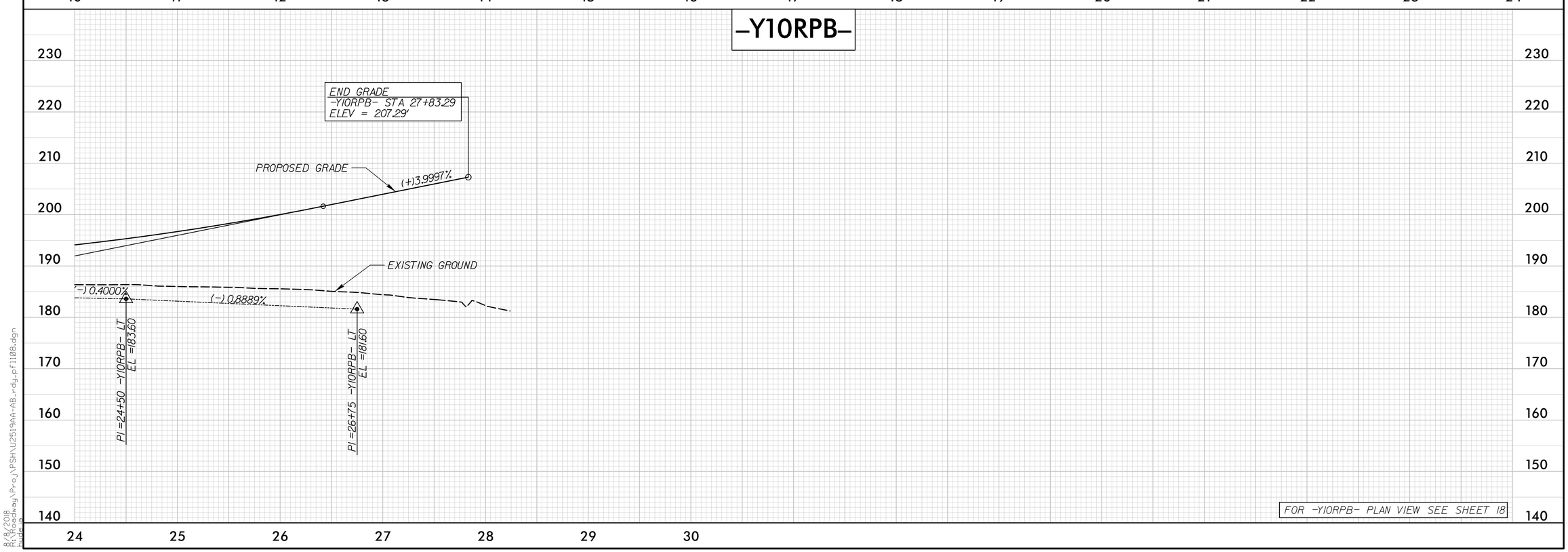
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





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mwade

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	109
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
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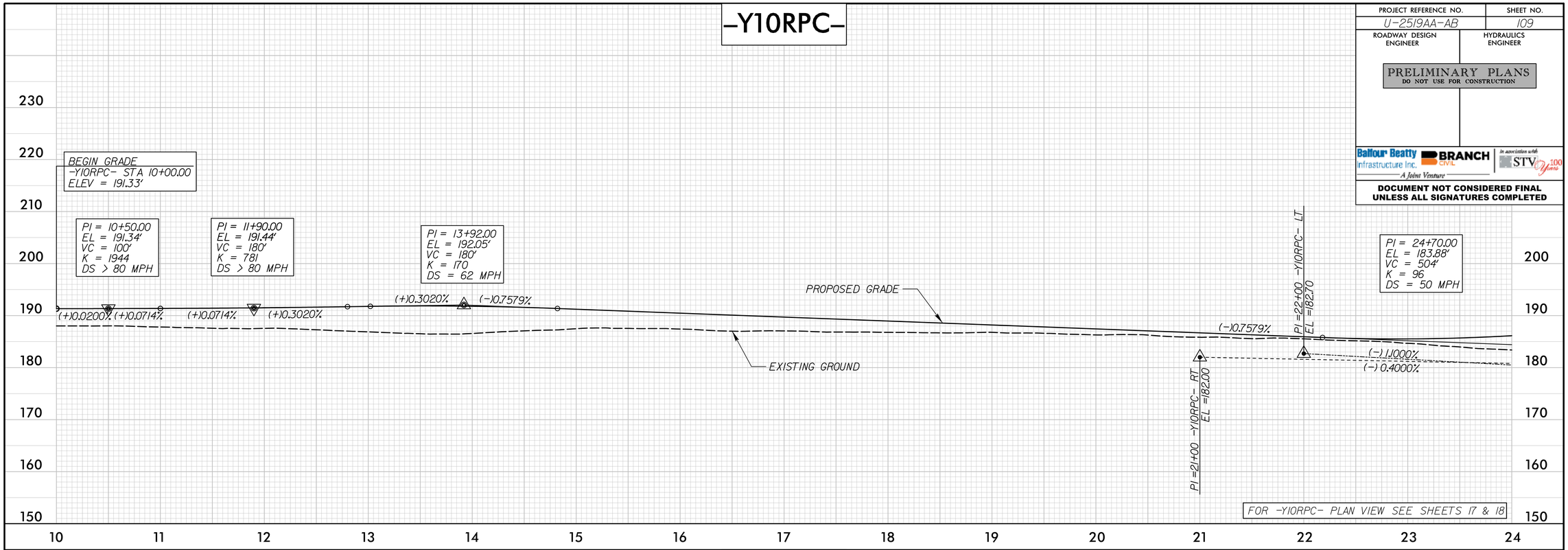
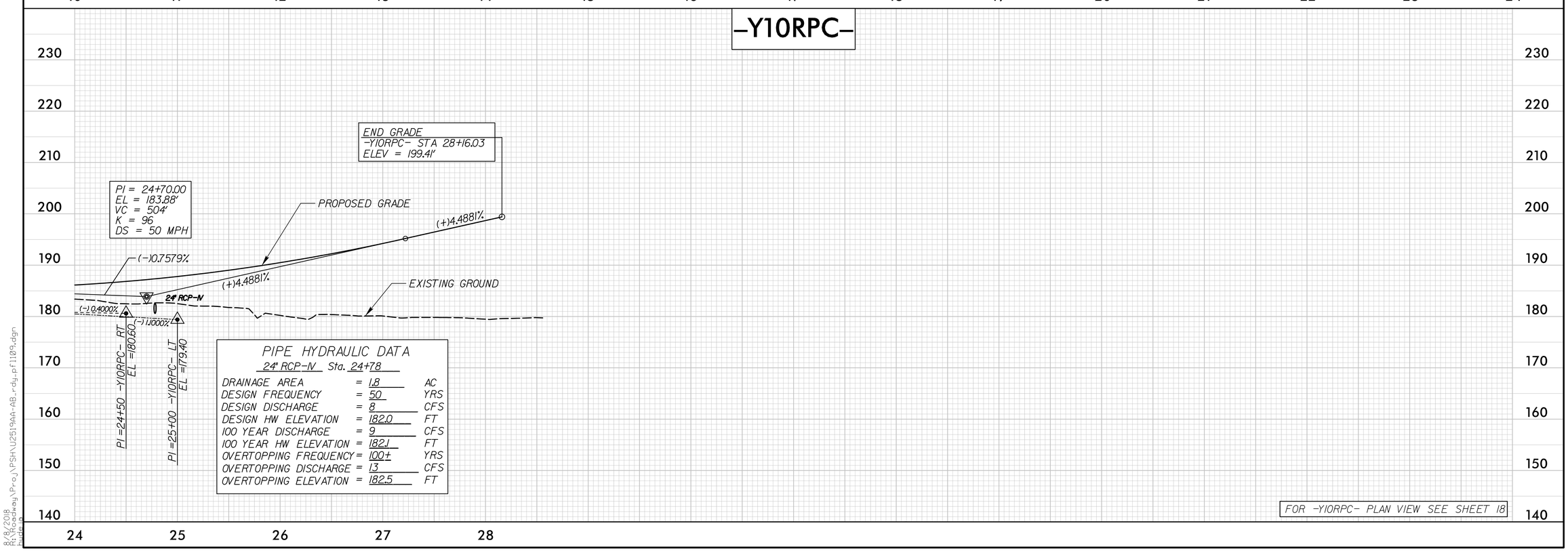
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





PIPE HYDRAULIC DATA

24" RCP-IV Sta. 24+78

DRAINAGE AREA	=	1.8	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	8	CFS
DESIGN HW ELEVATION	=	182.0	FT
100 YEAR DISCHARGE	=	9	CFS
100 YEAR HW ELEVATION	=	182.1	FT
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING DISCHARGE	=	13	CFS
OVERTOPPING ELEVATION	=	182.5	FT

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pwdarb

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	110
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Balfour Beatty Infrastructure Inc. | BRANCH CIVIL | In association with STV 100 Years
A Joint Venture

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

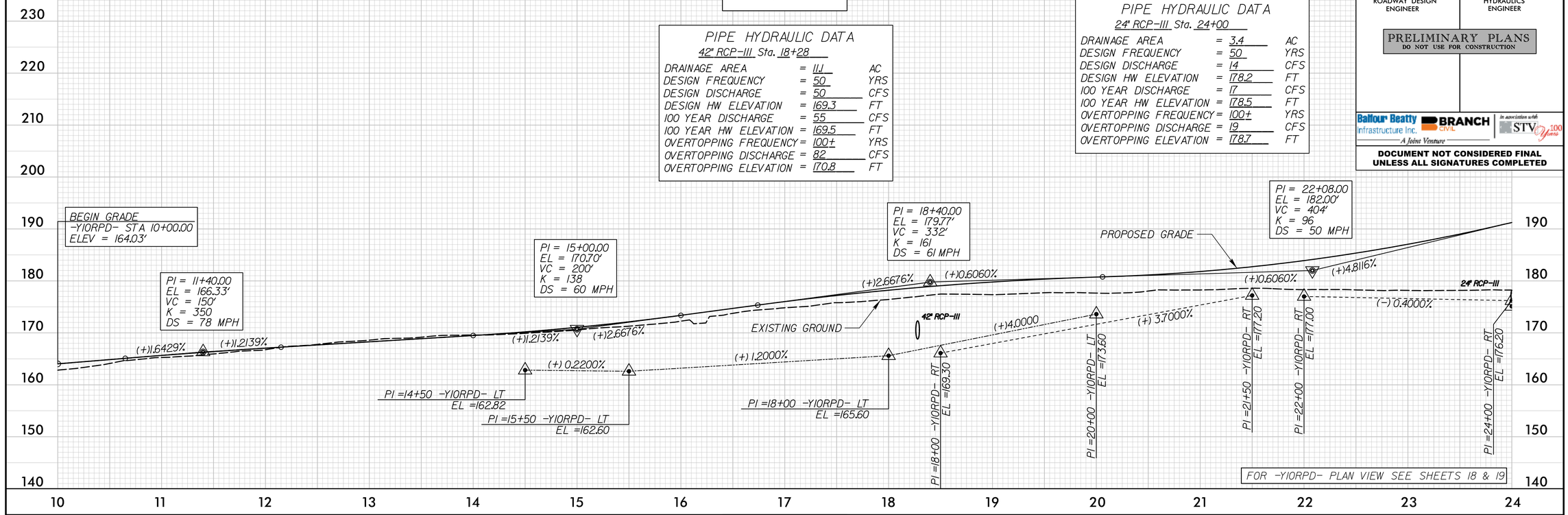
-Y10RPD-

PIPE HYDRAULIC DATA
42" RCP-III Sta. 18+28

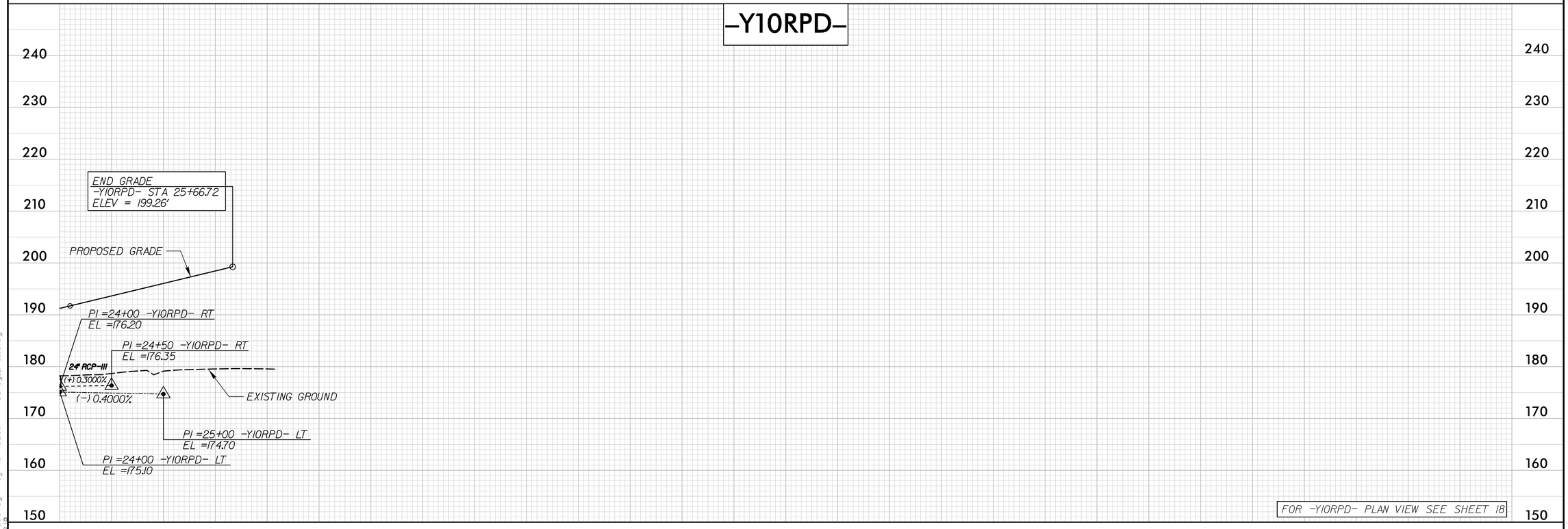
DRAINAGE AREA	=	11.1	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	50	CFS
DESIGN HW ELEVATION	=	169.3	FT
100 YEAR DISCHARGE	=	55	CFS
100 YEAR HW ELEVATION	=	169.5	FT
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING DISCHARGE	=	82	CFS
OVERTOPPING ELEVATION	=	170.8	FT

PIPE HYDRAULIC DATA
24" RCP-III Sta. 24+00

DRAINAGE AREA	=	3.4	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	14	CFS
DESIGN HW ELEVATION	=	178.2	FT
100 YEAR DISCHARGE	=	17	CFS
100 YEAR HW ELEVATION	=	178.5	FT
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING DISCHARGE	=	19	CFS
OVERTOPPING ELEVATION	=	178.7	FT



-Y10RPD-



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	111
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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A Joint Venture

DOCUMENT NOT CONSIDERED FINAL
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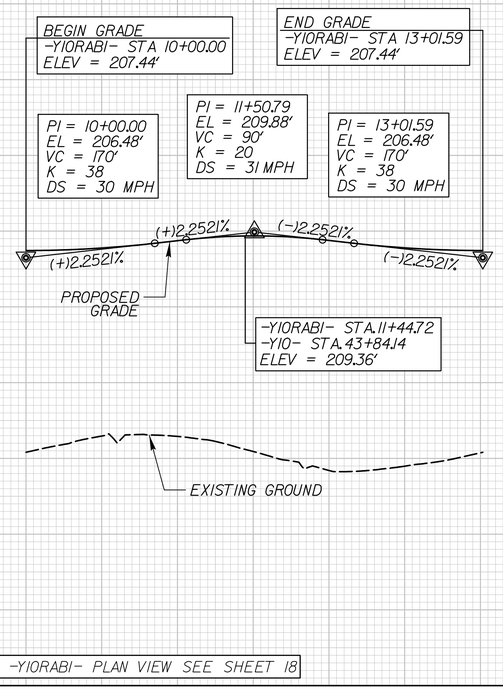
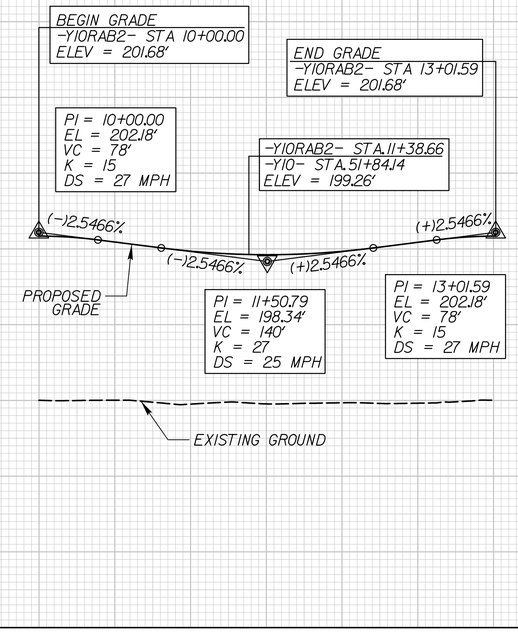
-Y10RAB1-



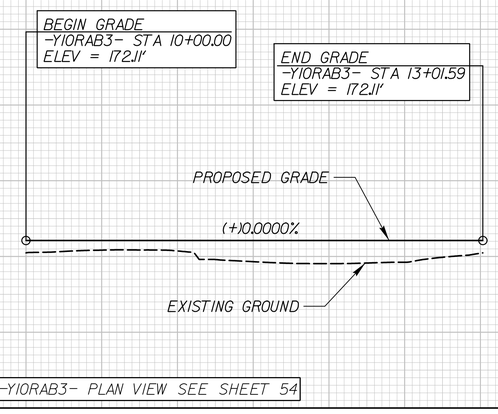
FOR -Y10RAB1- PLAN VIEW SEE SHEET 18

-Y10RAB2-



FOR -Y10RAB2- PLAN VIEW SEE SHEET 18

-Y10RAB3-



FOR -Y10RAB3- PLAN VIEW SEE SHEET 54

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bwade

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	112
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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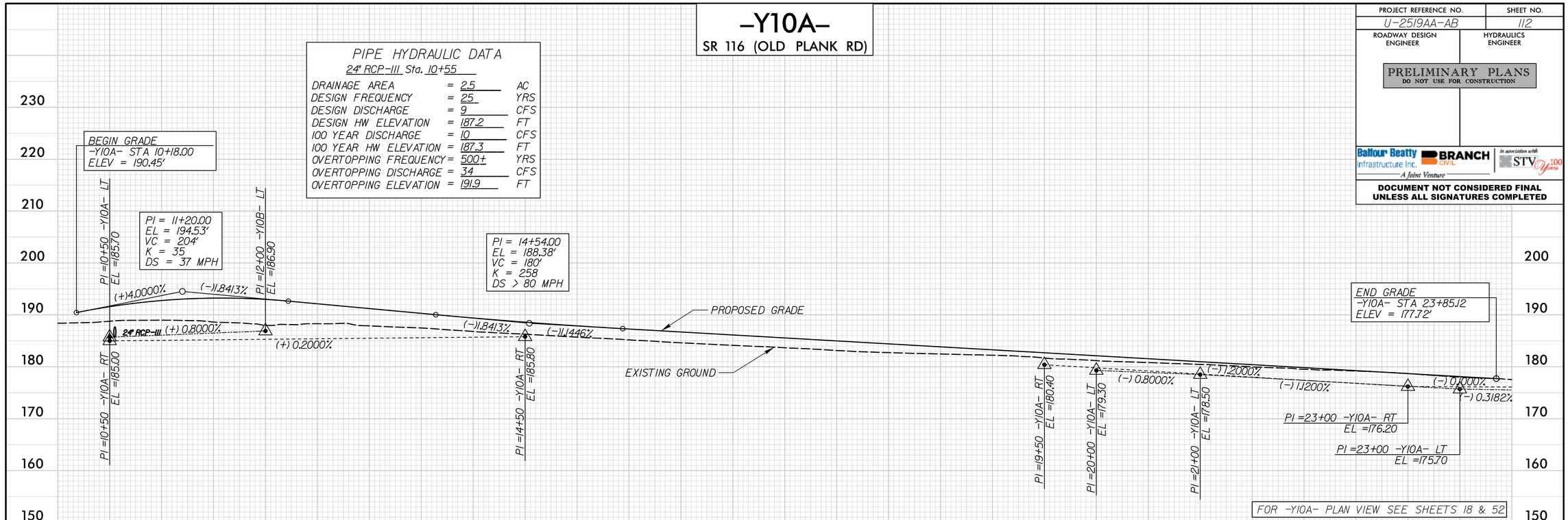
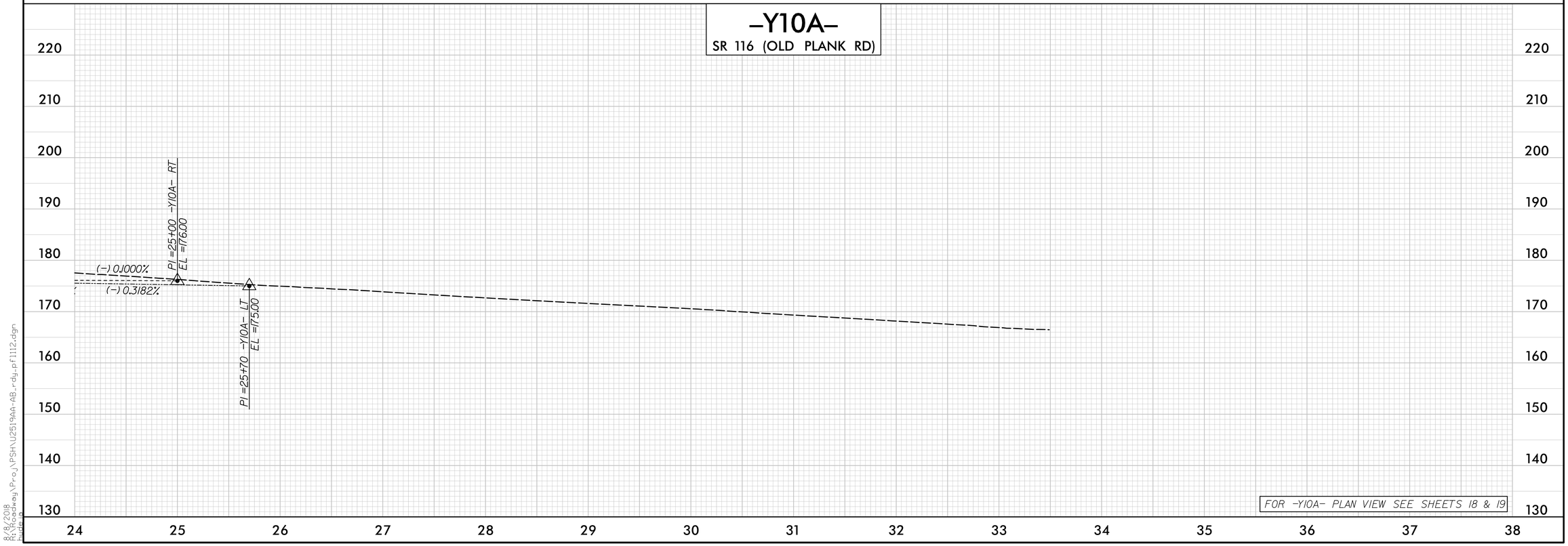
-Y10A-
SR 116 (OLD PLANK RD)

PIPE HYDRAULIC DATA
24" RCP-III Sta. 10+55

DRAINAGE AREA	=	2.5	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	9	CFS
DESIGN HW ELEVATION	=	187.2	FT
100 YEAR DISCHARGE	=	10	CFS
100 YEAR HW ELEVATION	=	187.3	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	34	CFS
OVERTOPPING ELEVATION	=	191.9	FT



-Y10A-
SR 116 (OLD PLANK RD)



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	113
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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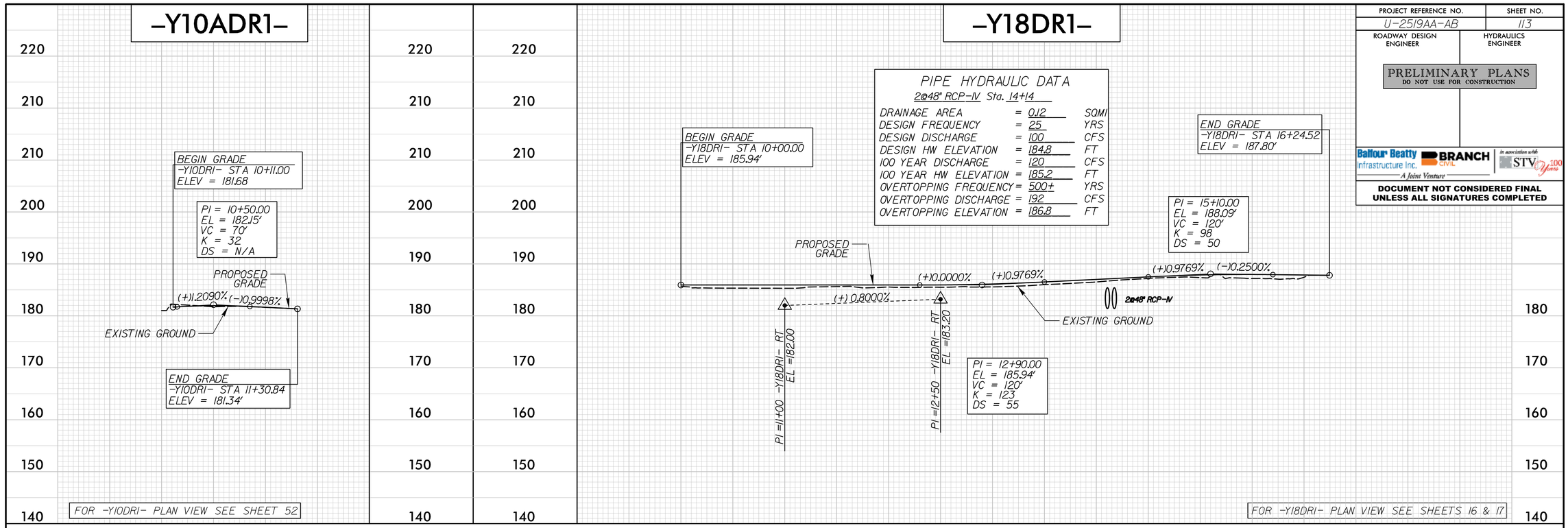

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mwade

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	114
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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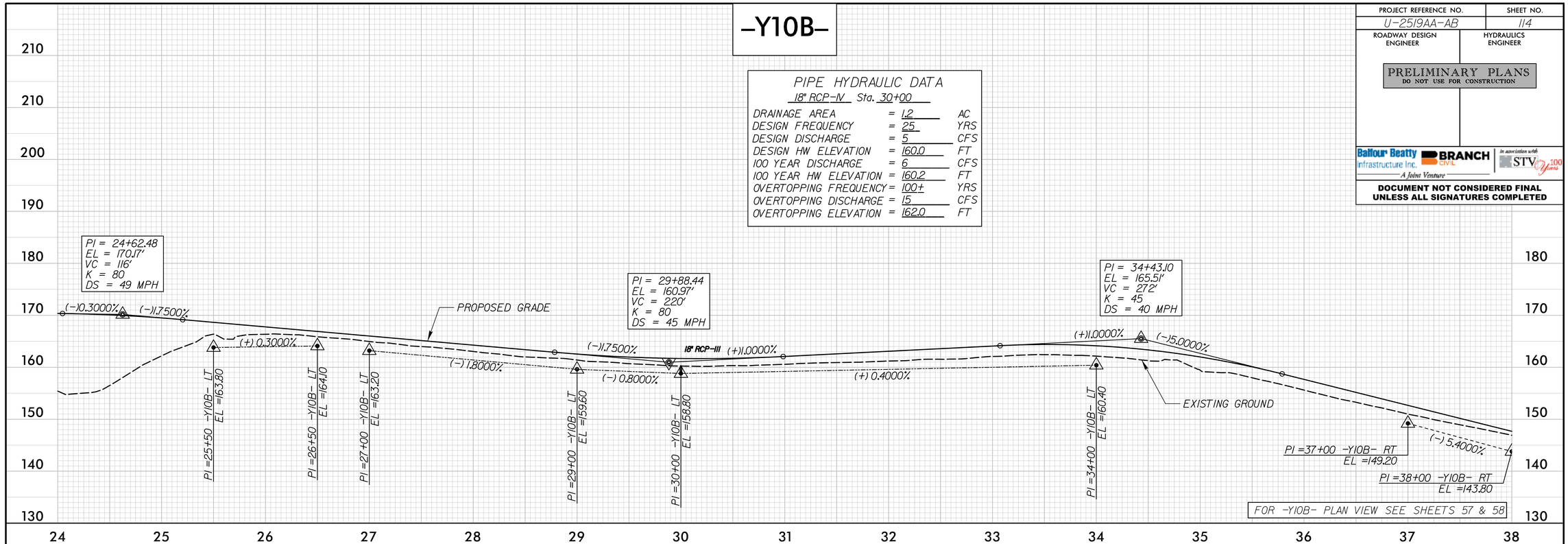
-Y10B-

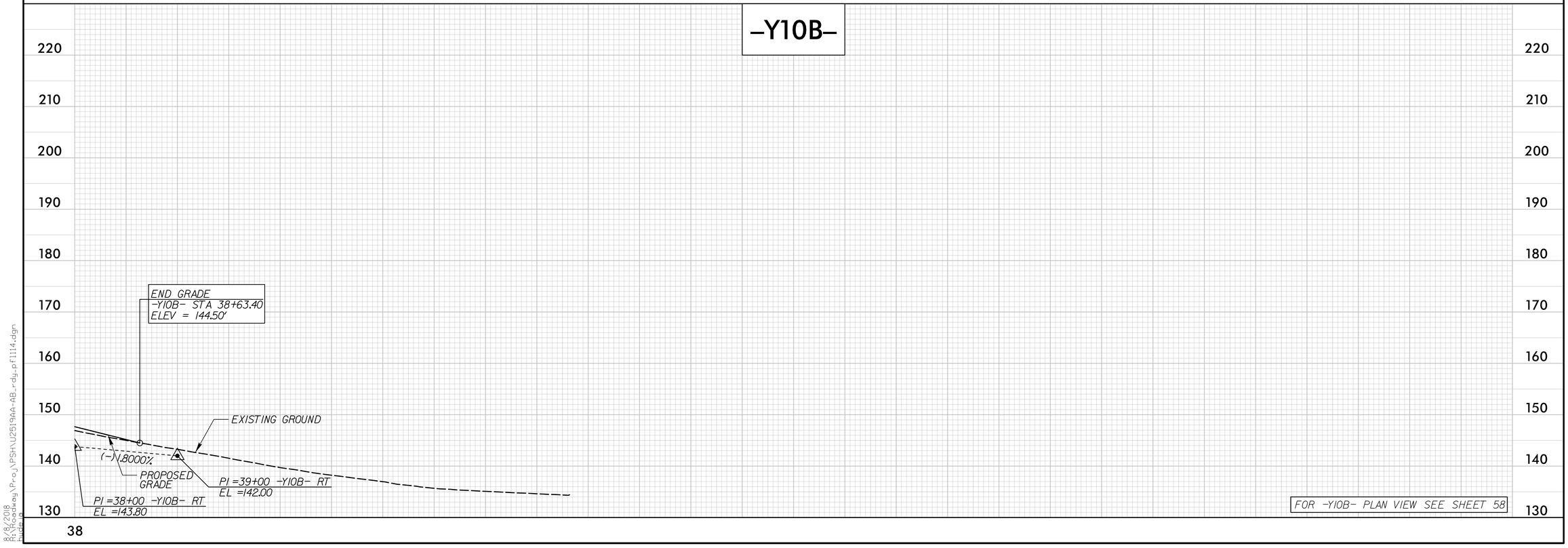
PIPE HYDRAULIC DATA

18" RCP-IV Sta. 30+00

DRAINAGE AREA	=	1.2	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	5	CFS
DESIGN HW ELEVATION	=	160.0	FT
100 YEAR DISCHARGE	=	6	CFS
100 YEAR HW ELEVATION	=	160.2	FT
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING DISCHARGE	=	15	CFS
OVERTOPPING ELEVATION	=	162.0	FT



-Y10B-



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	115
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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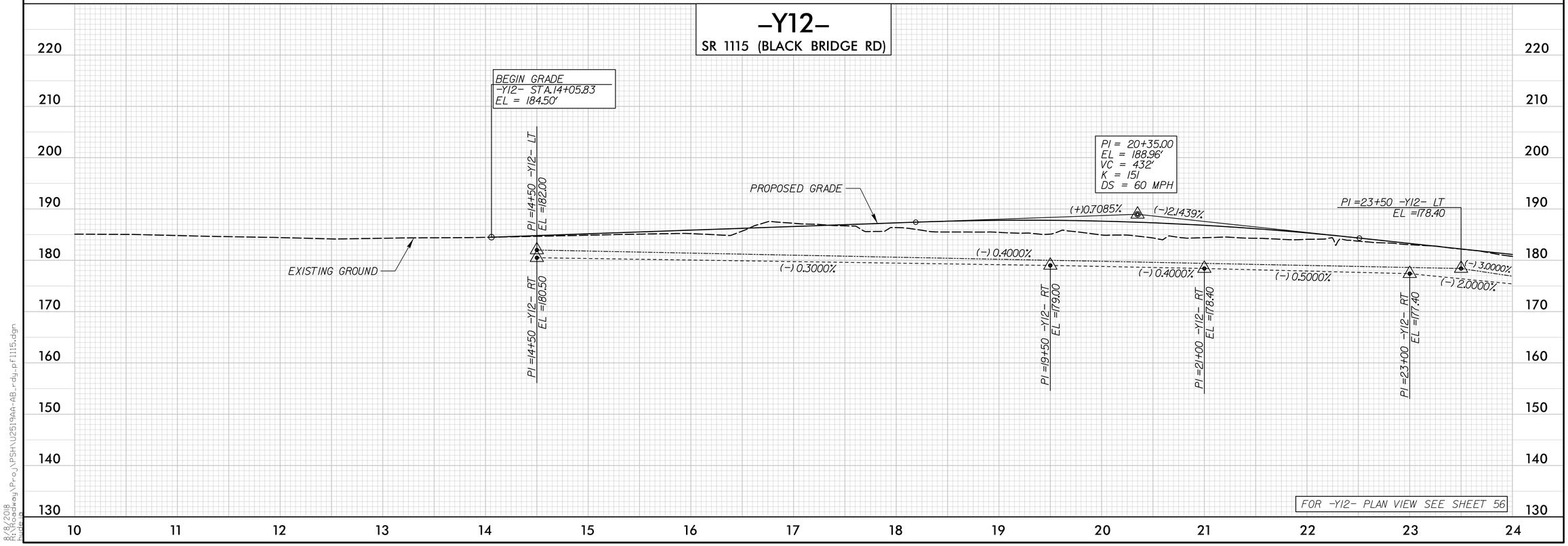
-Y12-

SR 1115 (BLACK BRIDGE RD)



FOR -Y12- PLAN VIEW SEE SHEET 56

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mwade

PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	116
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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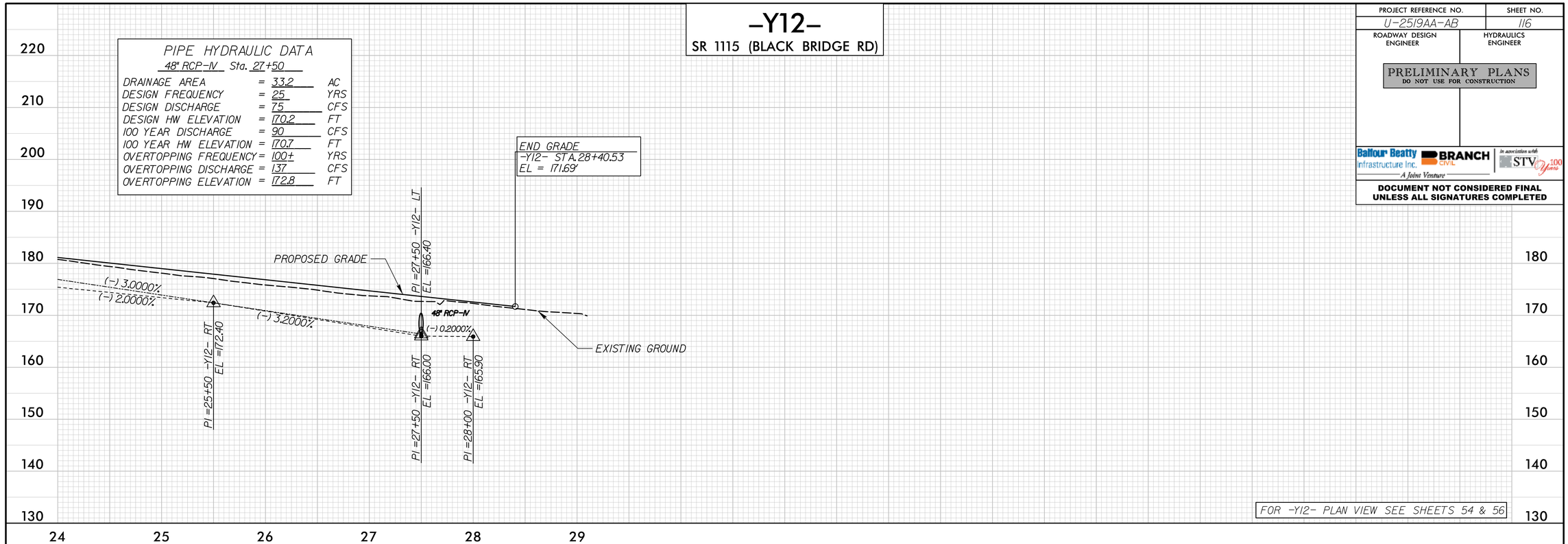
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

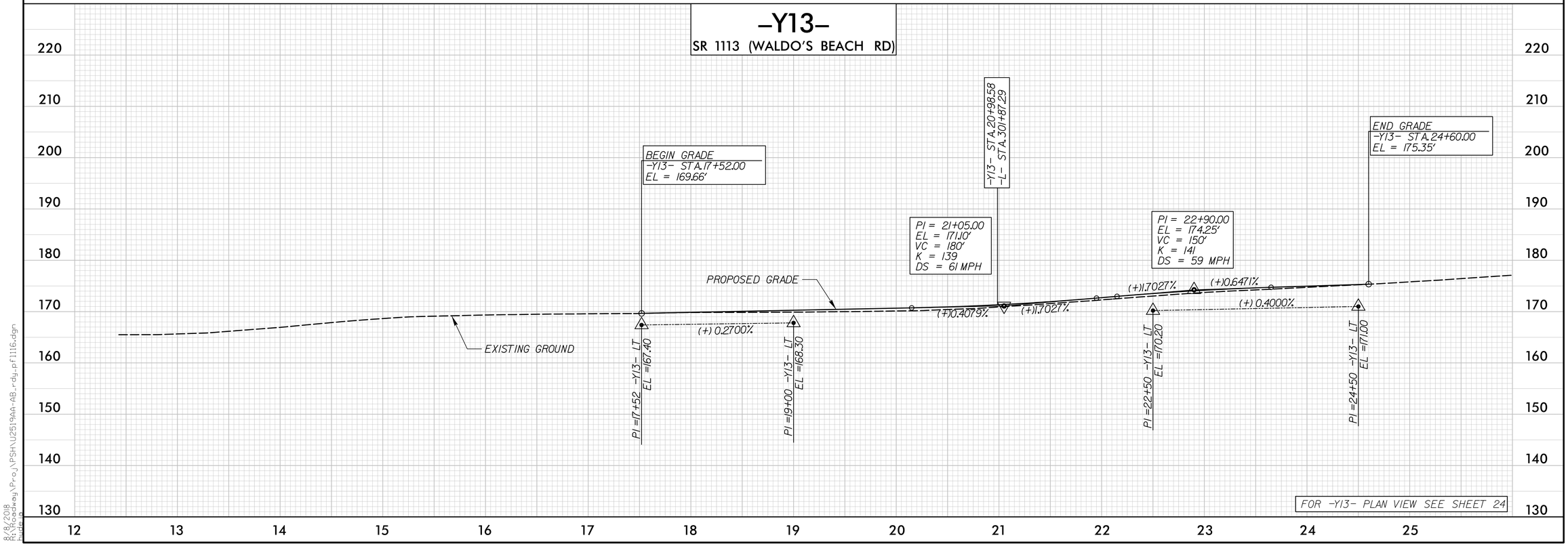
-Y12-

SR 1115 (BLACK BRIDGE RD)



-Y13-

SR 1113 (WALDO'S BEACH RD)



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PROJECT REFERENCE NO.	SHEET NO.
U-2519AA-AB	117
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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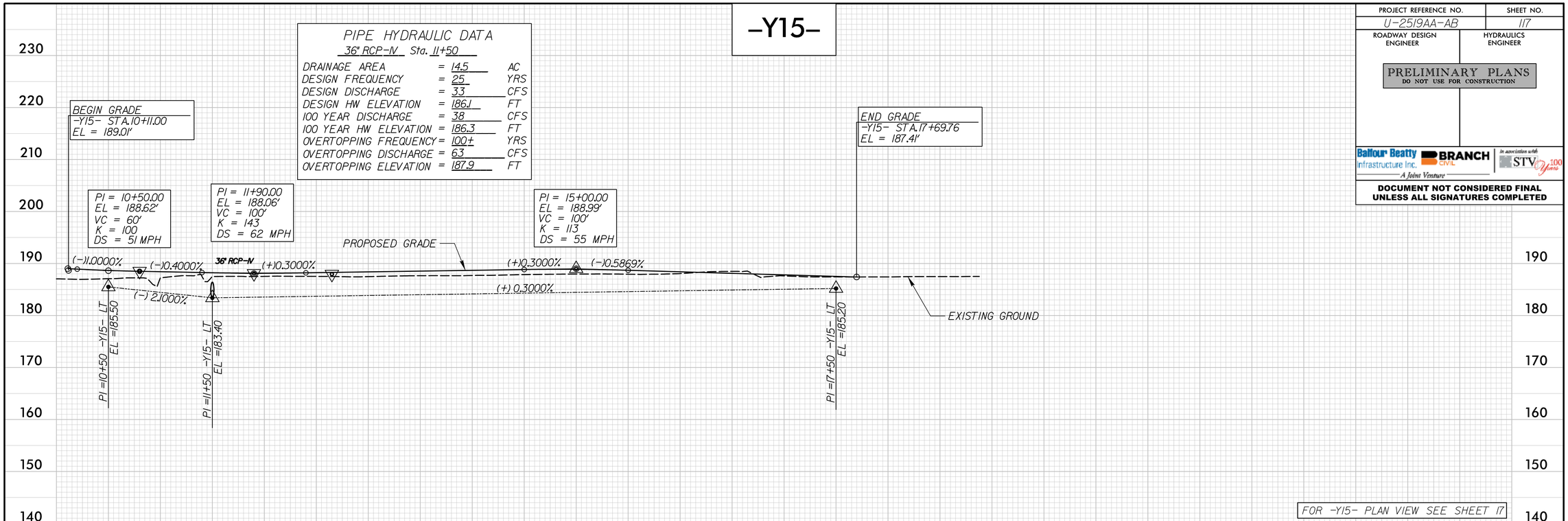
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y15-

PIPE HYDRAULIC DATA

36" RCP-IV Sta. 11+50

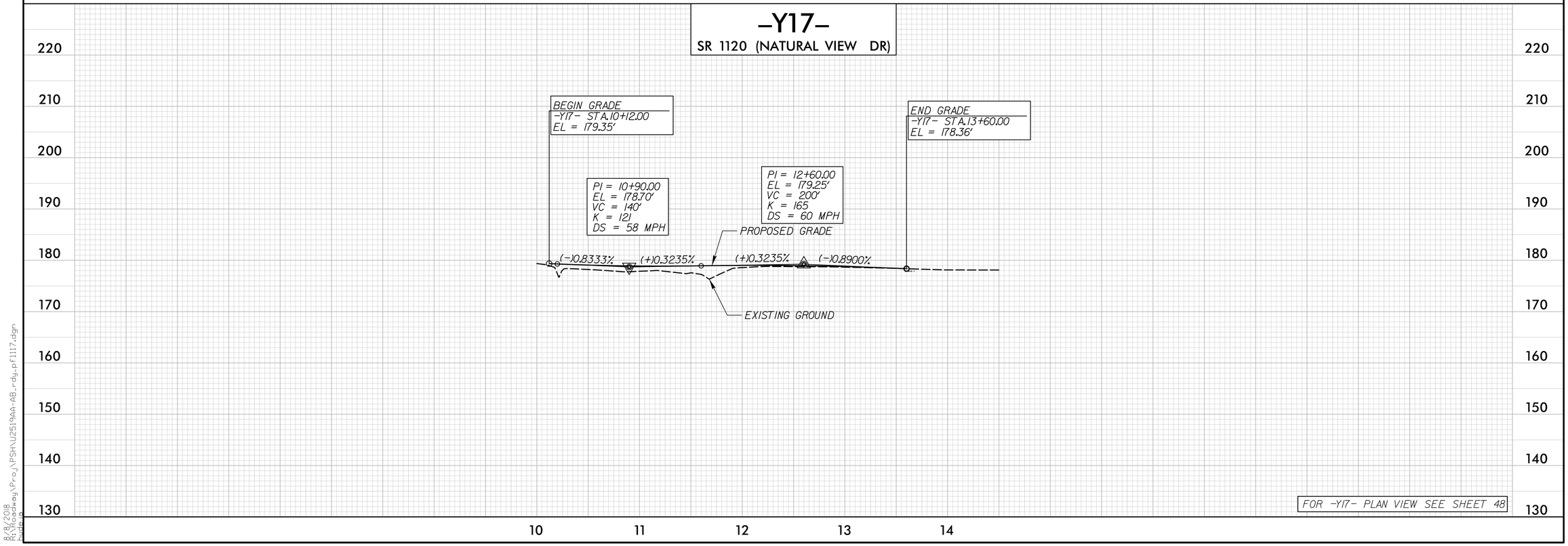
DRAINAGE AREA	=	14.5	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	33	CFS
DESIGN HW ELEVATION	=	186.1	FT
100 YEAR DISCHARGE	=	38	CFS
100 YEAR HW ELEVATION	=	186.3	FT
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING DISCHARGE	=	63	CFS
OVERTOPPING ELEVATION	=	187.9	FT



FOR -Y15- PLAN VIEW SEE SHEET 17

-Y17-

SR 1120 (NATURAL VIEW DR)



FOR -Y17- PLAN VIEW SEE SHEET 48

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