STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

March 16, 2023

Mr. Stephen Brumagin
U.S. Army Corps of Engineers
Charlotte Regulatory Field Office
8430 University Executive Park Drive, Suite 615
Charlotte, NC 28262

Mr. Dave Wanucha
N.C. Division of Water Resources
Winston-Salem Regional Office
450 West Hanes Mill Road, Suite 300
Winston-Salem, NC 27105

ATTN: Mr. Steve Brumagin and Mr. Dave Wanucha

SUBJECT: **Application for Section 404 Individual Permit Modification and Section 401 Water Quality Certification Modification** for the proposed widening and extension of Big Mill Farm Road and widening of Hopkins Road from I-40 Business/US 421 to West Mountain Street with a new partial cloverleaf interchange at I-40 Business/US 421, Forsyth County, Division 9.
STIP No. U-5760. WBS Element No. 46381.1.1

Dear Mr. Brumagin and Mr. Wanucha:

The North Carolina Department of Transportation (NCDOT) Highway Division 9 proposes to widen and extend Big Mill Farm Road and widen Hopkins Road from I-40 Business/US 421 to West Mountain Street with a new partial cloverleaf interchange at I-40 Business/US 421 (STIP No. U-5760) in Forsyth County. STIP No. U-5760 was previously authorized under a Section 404/401 Individual Permit. The Individual Section 404 Permit (Action ID # SAW-2016-01337) was authorized by Mr. Monte Matthews of the US Army Corps of Engineers (USACE) on August 10, 2020 and the associated Individual Section 401 Water Quality Certification (NCDWR Project # 20200628) was authorized by Ms. Amy Chapman of the NC Division of Water Resources (NCDWR) on July 13, 2020.

Due to constructability, practicability, and maintenance concerns, the NCDOT Geotechnical and Construction Units recommended modifications to the previously proposed retaining walls along the western side of Big Mill Farm Road, within loop D of the partial cloverleaf interchange, and within loop B of the partial cloverleaf interchange. These critical design modifications would shorten the overall wall heights and revise the associated slope and drainage, resulting in an increase in permanent and temporary impacts to stream SD at Impact Site 1B.

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
DIVISION 9
375 SILAS CREEK PARKWAY
WINSTON SALEM, NC 27127

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Website: ncdot.gov

Location:
375 SILAS CREEK PARKWAY
WINSTON-SALEM, NC 27127

During the utilities final design phase of the project, a conflict was identified between an existing gravity fed sewer line and the proposed two-barrel box culvert carrying Kerners Mill Creek, north of Hopkins Road, at Impact Site 4A. In coordination with Winston-Salem/Forsyth County Public Utilities staff and NCDOT, Kimley-Horn staff selected a sewer line relocation from three alternatives. The proposed 12-inch sewer line will be installed within a 20-inch steel encasement pipe downstream of the proposed culvert at Impact Site 4A. The proposed steel encasement pipe will be fastened to subgrade concrete support piers located outside on either side of the stream to provide additional stabilization. Additionally, channel improvements including a constructed riffle and rock vein are proposed on the downstream side of the proposed two-barrel box culvert carrying Kerners Mill Creek, north of Hopkins Road, at Impact Site 4A. This minor modification has been designed to provide additional protection and stabilization for the proposed sewer line relocation under Kerners Mill Creek and will minimize scour and erosion downstream of the proposed box culvert. This design change would result in an increase in permanent channel improvement impacts and a decrease in temporary channel improvement impacts to Kerners Mill Creek at Impact Site 4A.

In addition to this updated cover letter, the application package consists of an updated NC Division of Mitigation Services (NCDMS) in-lieu fee (ILF) program acceptance letter, updated figures with recent mapping, Bat Habitat Assessment Report, updated permit impact drawings, and modified plan sheets.

PURPOSE AND NEED

The applicant's stated purpose for the project from the previously authorized Individual Permit has not changed.

> "The primary purpose of the project is to reduce congestion. Additional purposes for this project include improving mobility and access to major highways in west Kernersville as well as accommodating economic development expansion in the area. South Main Street in Kernersville as traffic approaches I-40 frequently experiences queuing and slowdowns due to congestion. Hopkins Road also experiences congestion as it serves as a regional connection to the I-40 and South Main Street interchange."

SEPA DOCUMENT STATUS

As stated in the previously authorized Individual Permit, a Minimum Criteria Determination Checklist (MCDC) for the proposed project was completed in October 2018. Additionally, due to the modifications to the previously permitted design and the time elapsed since the MCDC, a NCDOT Consultation Form was completed and approved on February 25, 2022 that stated the original Administrative Action remains valid.

ALTERNATIVES ANALYSIS

The STIP No. U-5760 alternatives evaluated as part of the previously authorized Individual Permit have not changed. Alternative B, as described in the previously authorized Individual Permit, was selected as the the preferred detailed study alternative.

Sewer Relocation Alternatives

During the utilities final design phase of the project, a conflict was identified between an existing gravity fed sewer line and the proposed two-barrel box culvert carrying Kerners Mill Creek, north of Hopkins Road, at Impact Site 4A. In coordination with Winston-Salem/Forsyth County Public Utilities staff and NCDOT, Kimley-Horn staff evaluated multiple alternative sewer line relocations. Three alternatives were studied in detail as displayed in Figure 4 and Figure 5 below as the purple route, the orange route, and the green route.

The purple route alternative would cross Kerners Mill Creek upstream of the proposed culvert before crossing under Big Mill Farm Road to tie back into the existing line. This route was determined to be impracticable since it would not provide an appreciable amount of cover to the streambed due to the depth constraints of a gravity sewer line. Additionally, the purple route would require an adjacent water line to be relocated further up the stream, resulting in increased impacts to Kerners Mill Creek and its riparian zone.

The orange route alternative would be cast into the proposed culvert base/sill along the downstream side of Kerners Mill Creek before tying back into the existing line. This route was determined to be impracticable by the NCDOT and Winston Salem/Forsyth County Public Utilities due to maintenance concerns with conflicting utilities (sewer and culvert) and restricted access to the sewer line due to the location below a structure.

Due to the constraints outlined above, the green route was selected as the preferred sewer relocation alternative and carried forward to detailed design. The green route would cross Kerners Mill Creek downstream of the proposed culvert at Impact Site 4A. Based on the approved sewer design, the proposed 12-inch sewer line will be installed within a 20-inch steel encasement pipe. Due to the existing gravity sewer elevation, the encasement pipe will be exposed approximately 2-3 inches above the proposed constructed riffle. The proposed sewer line was lowered as much as possible while maintaining the minimum slope requirements for gravity-fed sewer lines and meeting the tie in elevation of the receiving existing sewer. The proposed steel encasement pipe will be fastened to subgrade concrete support piers located outside on either side of the stream to provide additional stabilization. Additionally, channel improvements including a constructed riffle and rock vein are proposed on the downstream side of the proposed culvert at Impact Site 4A. This minor modification has been designed to provide additional protection and stabilization for the proposed sewer line relocation under Kerners Mill Creek and will minimize scour and erosion downstream of the proposed box culvert. This design change would result in an increase in permanent channel improvement impacts and a decrease in temporary channel improvement impacts to Kerners Mill Creek at Impact Site 4A.

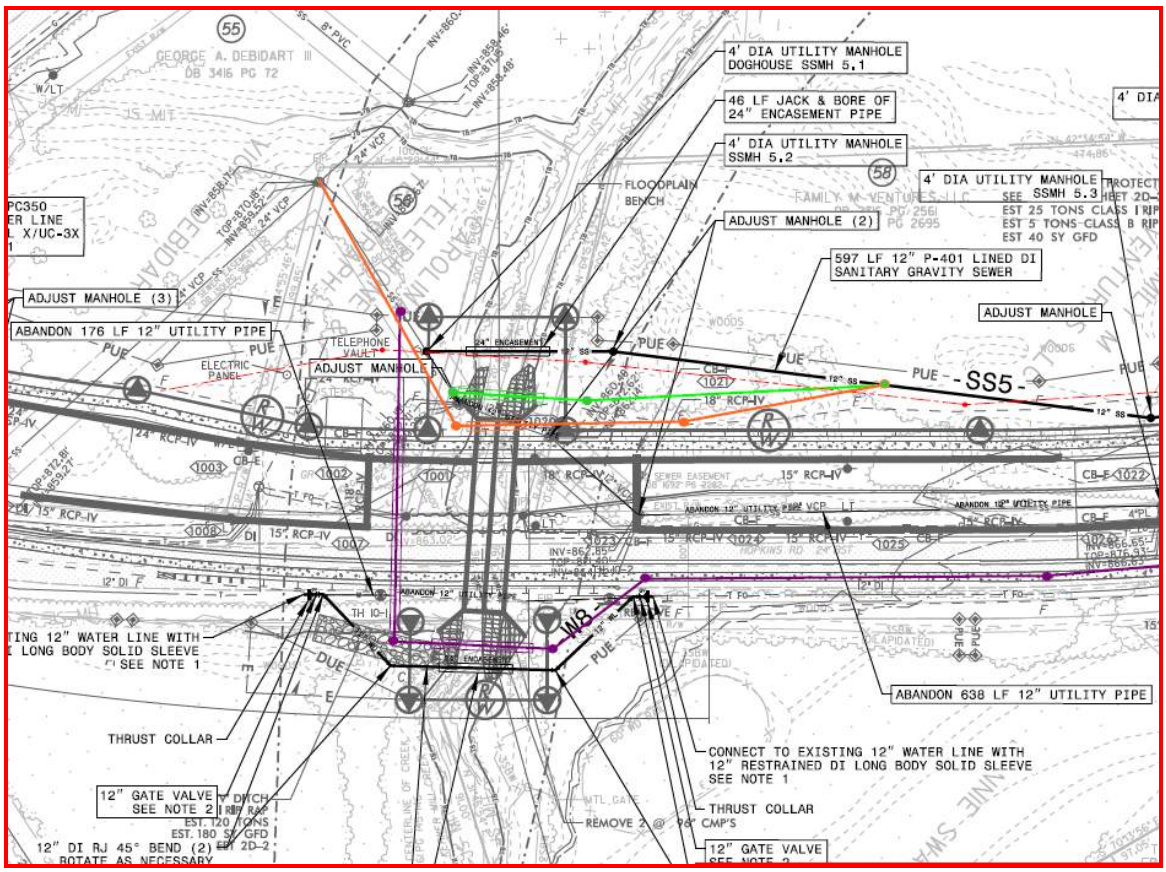


Figure 1*: The figure above displays the multiple sewer line relocation alternatives that were considered at the crossing of Kerners Mill Creek at Impact Site 4A: the purple route, the orange route, and the green route. Options to cross through the culvert sill (orange route) or cross on the upstream side (purple route) were determined to be impracticable. The green route was selected to be carried forward for detailed design at Impact Site 4A.*

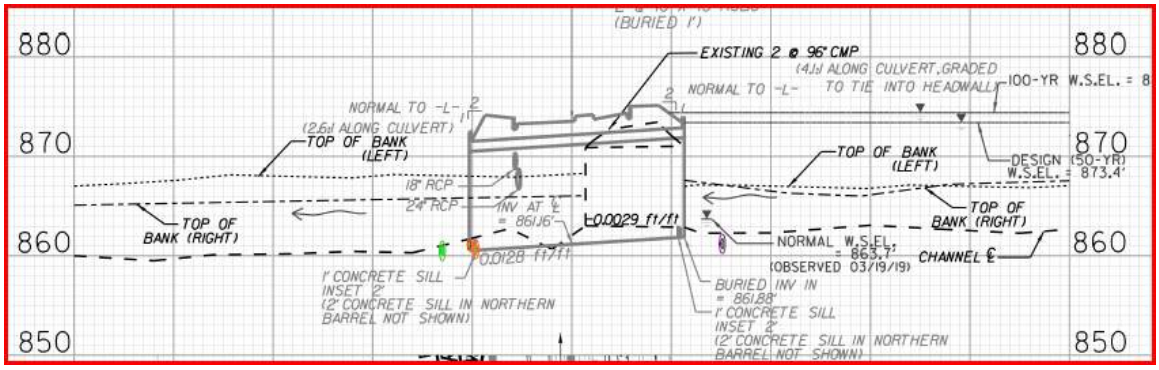


Figure 2*: The figure above displays the profile view for the multiple preliminary sewer line relocation alternatives that were considered at the crossing of Kerners Mill Creek at Impact Site 4A: the purple route, the orange route, and the green route. The green route was selected to be carried forward for detailed design at Impact Site 4A.*

RESOURCE STATUS

Jurisdictional features identified within the project study corridor have not changed since the previously authorized Individual Permit.

The status of anadromous fish waters, Primary Nursery Areas (PNA), designated High Quality Waters (HQW), Outstanding Resource Waters (ORW), water supply watersheds (WS-I or WS-II), impaired waters, and benthic or fish monitoring data for STIP No. U-5760 remains the same as the previously authorized Individual Permit.

IMPACTS TO WATERS OF THE UNITED STATES

Surface Waters

Total surface water impacts resulting from the proposed project include 1,495 linear feet of permanent stream impacts and 247 linear feet of temporary stream impacts. The proposed modifications to the previously permitted STIP No. U-5760 design will result in an overall increase of 123 linear feet of permanent stream impacts and an overall decrease of 19 linear of temporary stream impacts:

- Impact Site 1B – As a result of the proposed modification to the retaining wall height, the associated fill slope, and resulting drainage revisions along the western side of Big Mill Farm Road at Impact Site 1B, the total permanent stream impacts will increase from 522 linear feet to 610 linear feet, which is an increase of 88 linear feet. The total permanent stream impacts resulting from channel improvements at Impact Site 1B are proposed to increase from 20 linear feet to 33 linear feet, which is an increase of 13 linear feet. The total temporary stream impacts as a result of channel improvements at Impact Site 1B are proposed to increase by 4 linear feet, from 20 linear feet to 24 linear feet.

- Impact Site 4A – As a result of the proposed channel improvements that include the addition of a constructed riffle and rock vein downstream of the proposed two-barrel box culvert carrying Kerners Mill Creek to provide protection and stabilization of the relocated sewer line at Impact Site 4A, the total permanent stream impacts resulting from channel improvements will increase from 30 linear feet to 52 linear feet, which is an increase in 22 linear feet. The previously permitted 61 linear feet of permanent stream impacts as a result of the culvert extension at Impact Site 4A will not change as a result of the design modifications. The total temporary stream impacts as a result of channel improvements at Impact Site 4A are proposed to decrease by 23 linear feet, from 28 linear feet to 5 linear feet.

No temporary or permanent open water impacts will result from the proposed project. The jurisdictional stream impacts are summarized below in **Table 1**.

Table 1. STIP No. U-5760 Stream Impacts in the Yadkin River Basin

Permit Site No.	Stream Name/ JD Packet ID	I/P Flow Status	Impact Type	Permanent Impacts (ft)	Temp. Impacts (ft)	Impacts requiring USACE mitigation[1] (ft)	Impacts requiring NCDWR mitigation (ft)	Mitigation Ratio
1A	SD	P	Culvert Extension	25	-	56	-	2:1
			Channel Improvements	31	82			
1B	SD	P	Culvert Extension	610	-	643	643	2:1
			Channel Improvements	33	24			
2A	SN	P	Fill	233	10	233	233	2:1
2B	SN	P	Culvert	24	-	49	49	2:1
			Channel Improvements	25	10			
2C	SN	P	Fill	82	10	82	82	2:1
4A	Kerners Mill Creek	P	Culvert Extension	61	-	113	-	2:1
			Channel Improvements	52	5			
4B	Kerners Mill Creek	P	Channel Improvements	35	19	35	-	2:1
6A	SS	P	Culvert	122	-	192	-	2:1
			Channel Change	70	22			
6B	SS	P	Culvert	82		92	-	2:1
			Channel Improvements	10	65			
TOTALS (ft)				**1,495**	**247**	**1,495**	**1,007**	**-**

NOTES: I = Intermittent; P = Perennial; [1]Mitigation for bank stabilization not required by USACE. Red font indicates updated impacts as a result of the plan modifications.

Wetlands

No changes to wetland impact amounts or types will result from the design modifications to the previously permitted STIP No. U-5760.

MITIGATION OPTIONS

Avoidance and Minimization

Avoidance and minimization have been employed in the project corridor to the maximum extent practicable. While the proposed STIP No. U-5760 design has been modified, the minimization measures implemented for the proposed project outlined in the previously authorized Individual Permit remain the same.

Proposed stream impacts (1,495 linear feet) for the proposed project increased slightly from the impacts calculated for the MCDC (1,430 linear feet). This increase is due to the preliminary nature of the MCDC and the assumption of 25 linear feet of impact beyond the slope stakes which have largely been reduced during final design. In addition, several design enhancements have been incorporated to minimize impacts, including proposed 2:1 slopes and shifting the southbound right turn lane further south to minimize impacts near Kerners Mill Creek.

Measures taken to avoid and/or minimize final proposed wetland impacts outlined in the previously authorized Individual Permit remains the same.

Compensatory Mitigation

Compensatory mitigation requirements for the proposed project are summarized below in **Table 2.** This project will result in unavoidable permanent impacts to 1,495 linear feet of stream and 0.11 acre of riparian wetland.

The USACE is requiring compensatory mitigation to be provided at a 2:1 ratio for the 1,495 linear feet of permanent perennial stream impacts and the 0.11 acre of permanent wetlands impacts resulting from the project. To fulfill this compensatory mitigation requirement, the project will secure 0.22 acre of wetland credits and 2,990 linear feet of stream credits from the NC Division of Mitigation Services (NCDMS) In-Lieu Fee program (**Table 2**). The previously issued Compensatory Mitigation Responsibility Transfer Form and a NCDMS Mitigation Acceptance Letter for the additional 123 linear feet of permanent stream impacts requiring mitigation as a result of the plan modifications are attached as part of this permit application package.

Table 2. STIP No. U-5760 Required Compensatory Mitigation Summary

	Stream Impacts (ft)	Wetland Impacts (ac)
Impacts Requiring Mitigation	1,495	0.11
Required DMS Mitigation (2:1)	1,495	0.11
Total DMS Mitigation	2,990	0.22

NOTES: Red font indicates updated impacts as a result of the plan modifications.

FEDERALLY PROTECTED SPECIES

Plants and animals with a Federal classification of Endangered (E) or Threatened (T) are protected under the provisions of Section 7 and Section 9 of the Endangered Species Act (ESA) of 1973, as amended. As of February 7, 2023, the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) database lists one federally Endangered species, Schweinitz's sunflower (*Helianthus schweinitzii*), and one federally Proposed Endangered species, tricolored bat (*Perimyotis subflavus*), with potential to occur within the project vicinity. The bald eagle (*Haliaeetus leucocephalus*), which is protected under the Bald and Golden Eagle Protection Act (BGPA), also has potential to occur within the vicinity of the project study corridor. The NC Natural Heritage Program (NCNHP) element occurrence database records (updated January 2023) indicates there are no known federally listed species occurrences in or within 1.0 mile of the project study corridor.

Schweinitz's sunflower is endemic to the Piedmont of North and South Carolina and typically occurs in full to partial sun and is found in areas with poor soils, such as thin clays that vary from wet to dry. The species is also found along roadside rights-of-way, maintained power lines and other utility rights-of-way, edges of thickets and old pastures, clearings and edges of upland oak-pine-hickory woods and Piedmont longleaf pine forests, and other sunny or semi-sunny habitats where disturbances (e.g., mowing, clearing, grazing, blow downs, storms, frequent fire) help create open or partially open areas for sunlight. It is intolerant of full shade and excessive competition from other vegetation. Small pockets of suitable habitat for Schweinitz's sunflower are present within the project corridor along the roadside and railroad corridors. Although these areas provide potentially suitable habitat, the regular mowing maintenance schedule and herbicide application within these areas would likely inhibit the plant's success. Kimley-Horn biologists conducted pedestrian surveys for Schweinitiz's sunflower within areas of suitable habitat on October 26, 2021, and no individuals were observed. A review of the NCNHP database records (updated January 2023) indicates that there are no known occurrences of Schweinitz's sunflower in or within 1.0 mile of the project corridor. Due to the lack of known occurrences and the lack of observed individuals, it has been determined that the proposed project will have "No Effect" on the Schweinitz's sunflower.

The tricolored bat is not currently listed as threatened or endangered under the Endangered Species Act (ESA) but is proposed for listing as endangered. A review of the NCNHP database records (updated January 2023) indicates that there are no known occurrences of the tricolored bat in or within 1.0 mile of the project study corridor. Three Oaks Engineering biologists (Mary Frazer and Tess Moody) conducted a habitat assessment for tricolored bat within the project corridor on August 4, 2022 following the guidance set forth in NCDOT's Standard Operating Procedures (SOP) Preliminary Bat Habitat Assessments (Structures, Caves & Mines) (2022). In summary, Three Oaks Engineering biologists concluded that based on the marginal habitat present in the project study corridor and the lack of tricolored bat records from the county, any effects to the species should be discountable. Should the species become listed prior to project construction, the Biological Conclusion for the tricolored bat is "May Affect, Not Likely to Adversely Affect". The above referenced information is included in the Bat Habitat Assessment report that is attached as part of this permit package.

The bald eagle is protected by the Bald Eagle and Golden Eagle Protection Act (BGPA). Habitat for the bald eagle primarily consists of mature forest in proximity to large bodies of open water for foraging. Large dominant trees are utilized for nesting sites, typically within 1.0 mile of open water. A desktop-GIS assessment of the project study corridor, as well as the area within a 1.13-mile radius (1.0 mile plus 660 feet) of the project limits, was performed. Numerous man-made ponds, large enough and sufficiently open to be considered potential feeding sources, were previously identified within or near the project corridor. Some forested natural areas within the study corridor contain trees of sufficient size for bald eagle nests. Therefore, a survey of the project study corridor and the area within 660 feet of the project limits was conducted on May 10, 2016. No bald eagle nests or individuals were observed. In addition, a review of the NCNHP records (updated January 2023) indicates no known occurrences of the bald eagle within 1.0 mile of the project study corridor. Due to the lack of known occurrences, the lack of observed individuals, and the minimal impact anticipated for this project, it was determined that the proposed project would have "No Effect" on the bald eagle in 2016.

Since the May 2016 bald eagle survey, two of the ponds adjacent to the project corridor have been drained. The trees that provided potential nesting habitat along these ponds have been removed. There is no longer foraging or nesting habitat to support the bald eagle. The remaining ponds within the project vicinity are small and do not cumulatively contain enough habitat to support nesting eagles. Therefore, it is still anticipated that the proposed project will have "No Effect" on the bald eagle.

CULTURAL RESOURCES

The information detailed in this section in the previously authorized Individual Permit remains the same.

FEMA COMPLIANCE

The information detailed in this section in the previously authorized Individual Permit remains the same.

INDIRECT AND CUMULATIVE EFFECTS

The information detailed in this section in the previously authorized Individual Permit remains the same.

WILD AND SCENIC RIVERS

The status of Wild and Scenic Rivers or any rivers included in the list of study rivers (Public Law 90-542, as amended) or North Carolina Natural and Scenic Rivers for STIP No. U-5760 remains the same as the previously authorized Individual Permit.

ESSENTIAL FISH HABITAT

The status of essential fish habitat afforded protection under the Magnuson-Stevens Act of 1996 (16 U.S.C 1801 *et seq*.) for STIP No. U-5760 remains the same as the previously authorized Individual Permit.

REGULATORY APPROVALS

Application is hereby made for a Department of the Army Section 404 Individual Permit Modification as required for the above-described activities for the proposed project. We are also hereby requesting a Section 401 Water Quality Certification Modification from NCDWR. In compliance with Section 143-215.3D (e) of the NCAC, we will provide you permission to debit the WBS number for $570.00 to act as payment for processing the Section 401 permit. We are providing two copies of this application to NCDWR for their review and approval.

Thank you for your time and assistance with this project. Please contact me at (336) 747-7800 or aeuliss@ncdot.gov if you have any questions or need additional information.

Sincerely,

Amy Euliss

Amy Euliss
NCDOT Division 9, Environmental Officer

cc: Amy Chapman, NCDWR
Beth Harmon, Division of Mitigation Services
Everett Loving, PE Kimley-Horn
Monte Matthews, USACE
Connie James, PE NCDOT Division 9 Project Manager
Mezak Tucker, PE NCDOT Division 9 Construction Engineer
Thomas Smith, CPESC NCDOT Division 9&10 Roadside Environmental Field Operations

TIP# U-5760
Figures

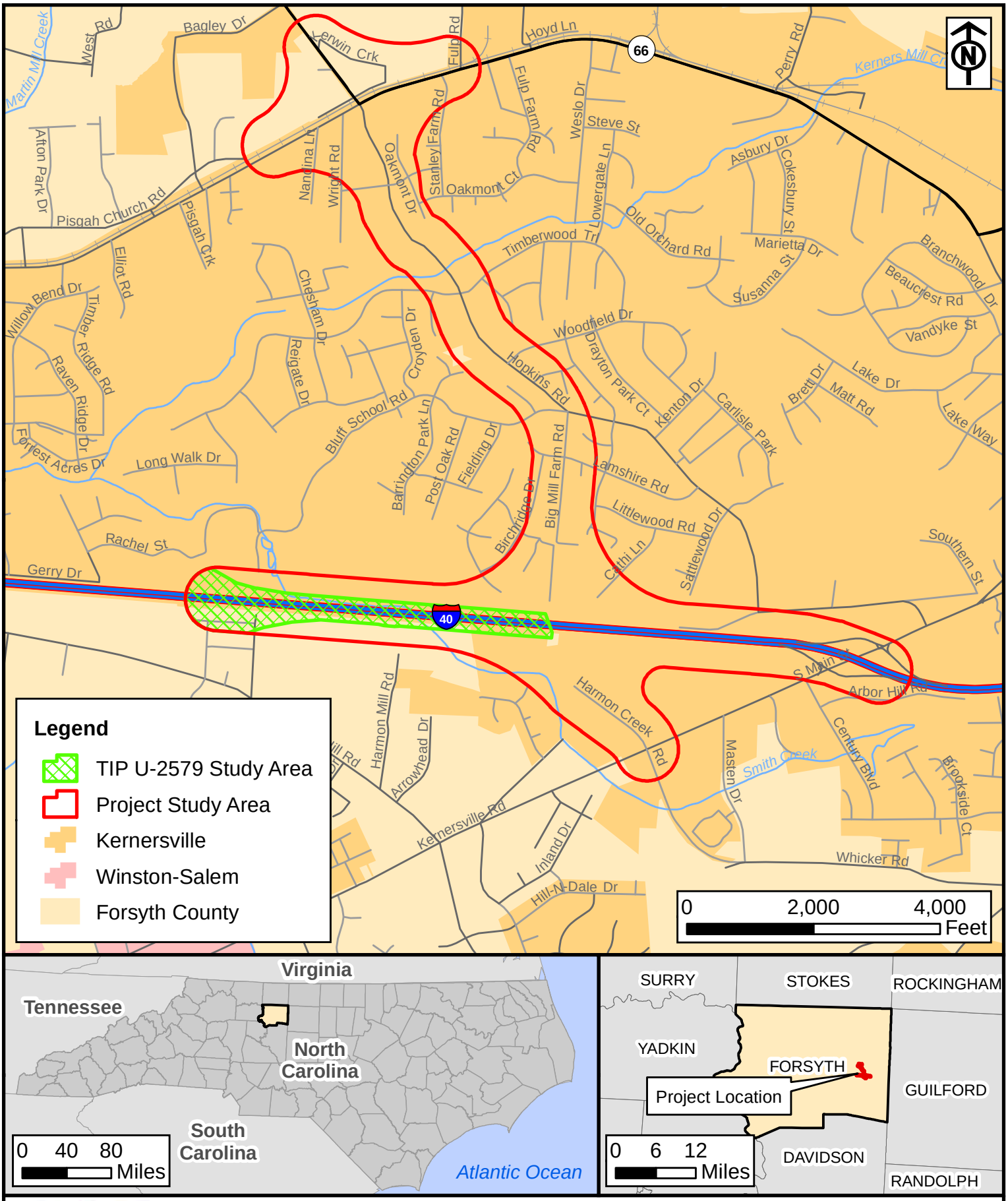


Figure 1: Vicinity Map
STIP No. U-5760
Kernersville, Forsyth County, NC
February 2023

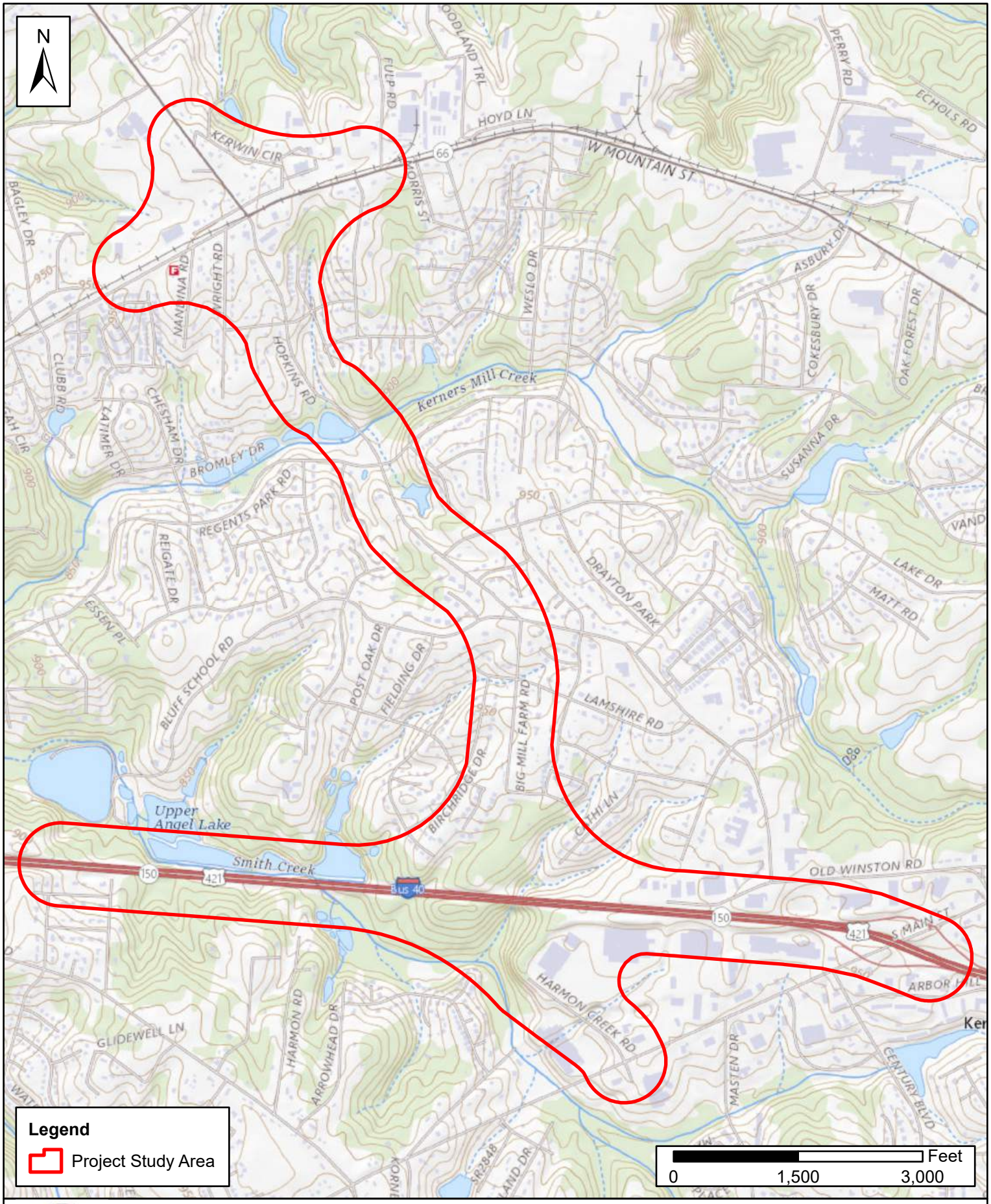


Figure 2: USGS Topographic Map
STIP No. U-5760
Kernersville, Forsyth County, NC
February 2023

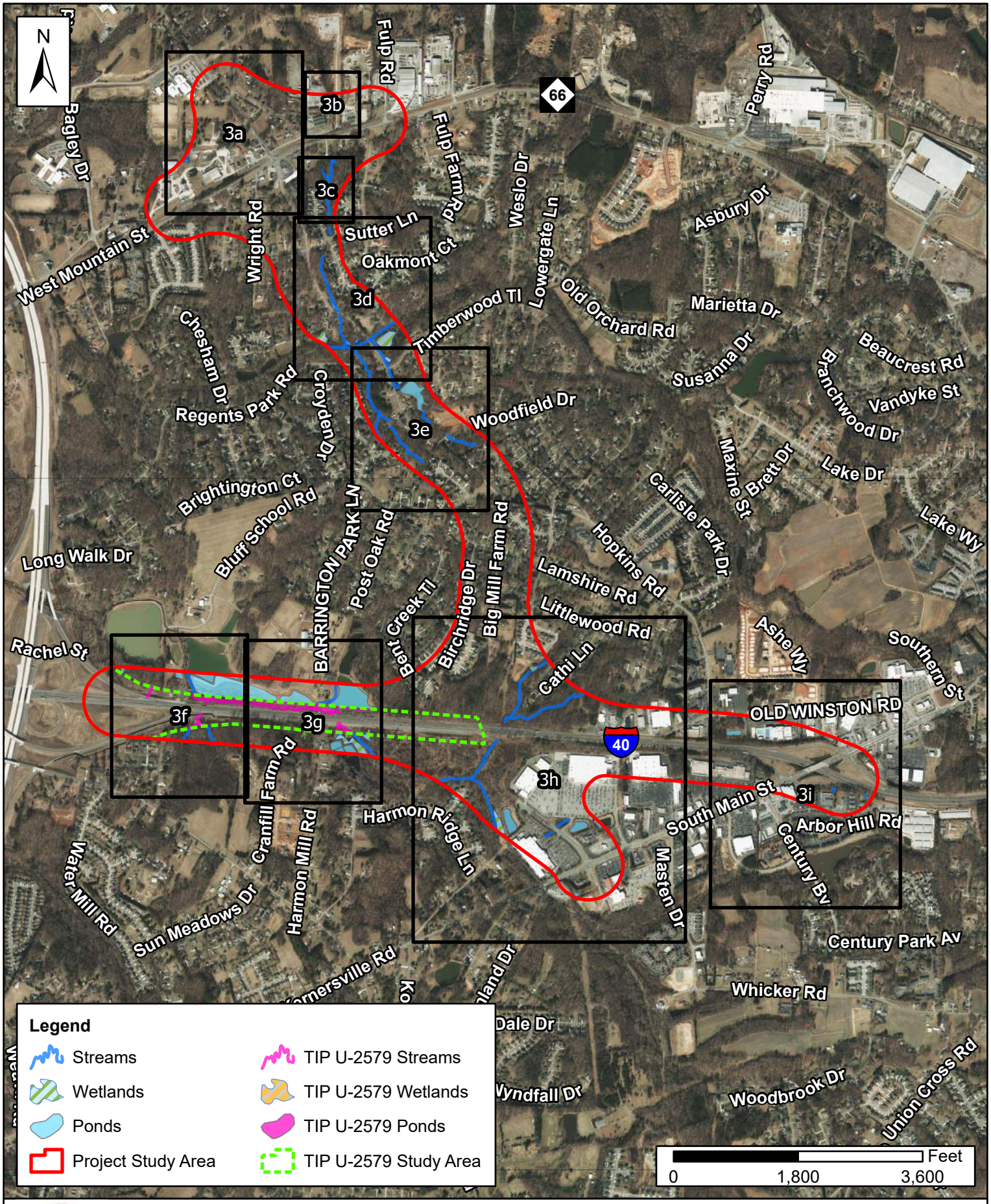


Figure 3: Jurisdictional Features Index Map
STIP No. U-5760
Kernersville, Forsyth County, NC
February 2023

Figure 3a: Jurisdictional Features Map
STIP No. U-5760
Kernersville, Forsyth County, NC
February 2023

Figure 3b: Jurisdictional Features Map
STIP No. U-5760
Kernersville, Forsyth County, NC
February 2023

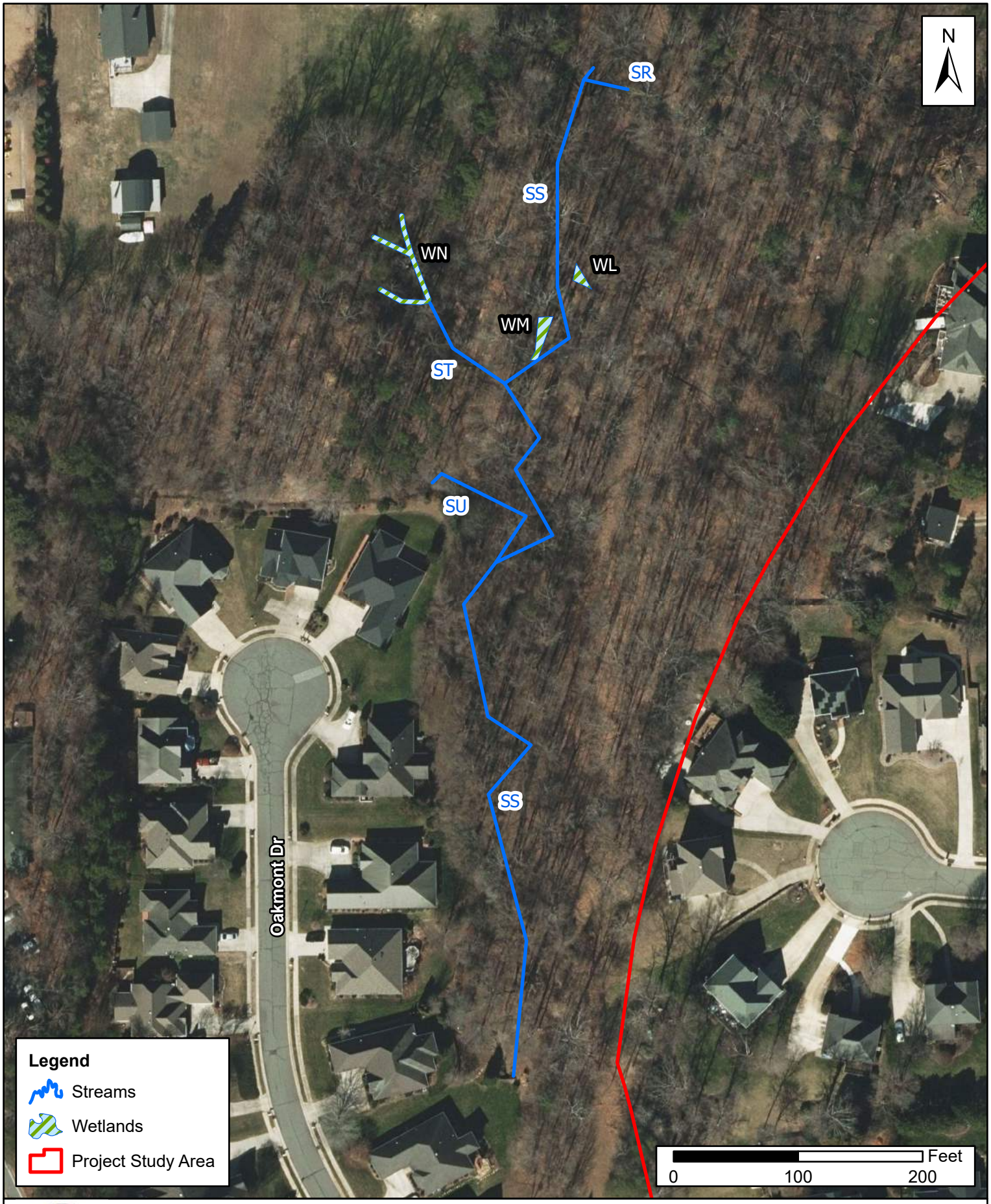


Figure 3c: Jurisdictional Features Map
STIP No. U-5760
Kernersville, Forsyth County, NC
February 2023

Figure 3d: Jurisdictional Features Map
STIP No. U-5760
Kernersville, Forsyth County, NC
February 2023

Figure 3e: Jurisdictional Features Map
STIP No. U-5760
Kernersville, Forsyth County, NC
February 2023

Figure 3f: Jurisdictional Features Map
STIP No. U-5760
Kernersville, Forsyth County, NC
February 2023

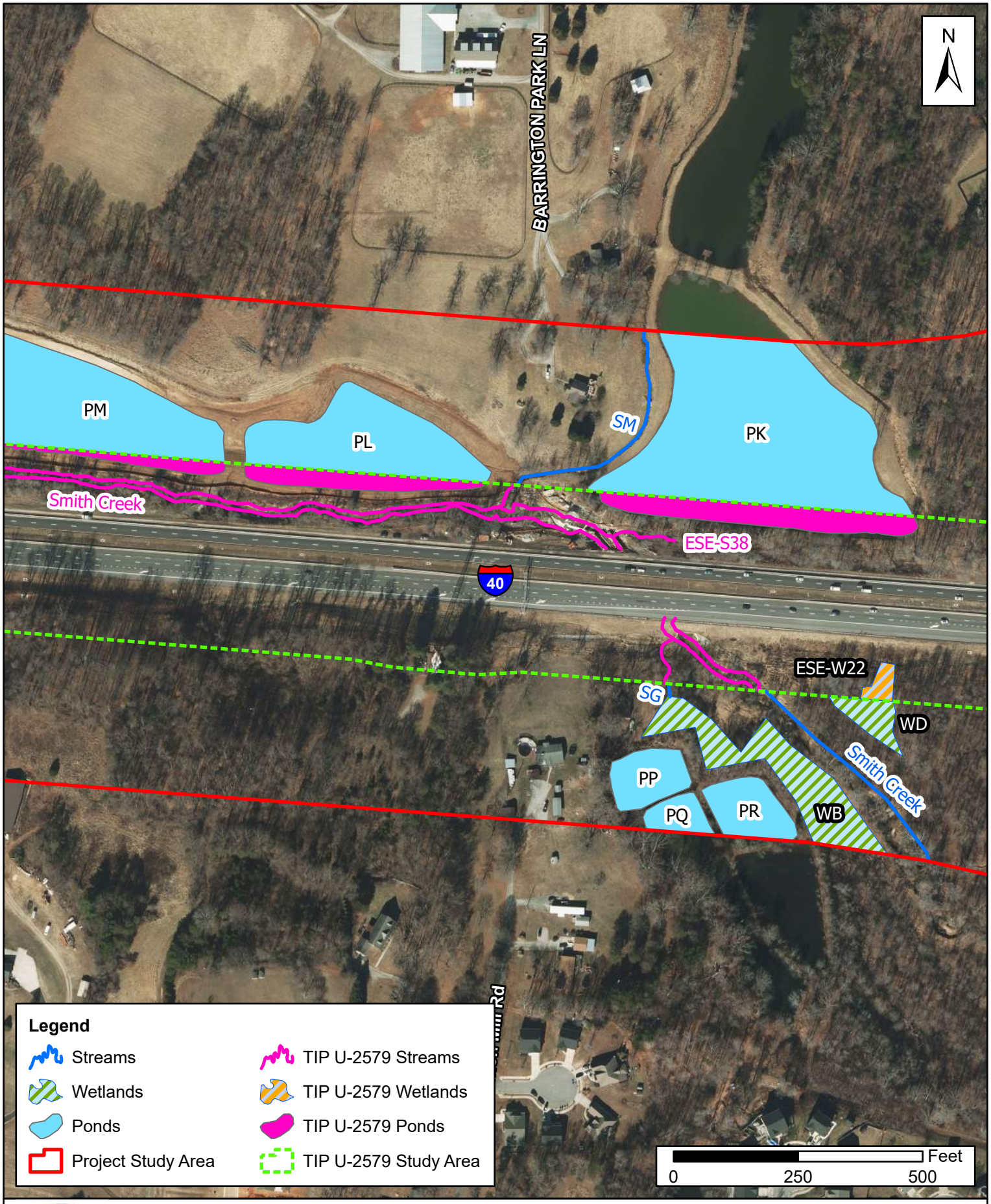


Figure 3g: Jurisdictional Features Map
STIP No. U-5760
Kernersville, Forsyth County, NC
February 2023

Figure 3h: Jurisdictional Features Map
STIP No. U-5760
Kernersville, Forsyth County, NC
March 2023

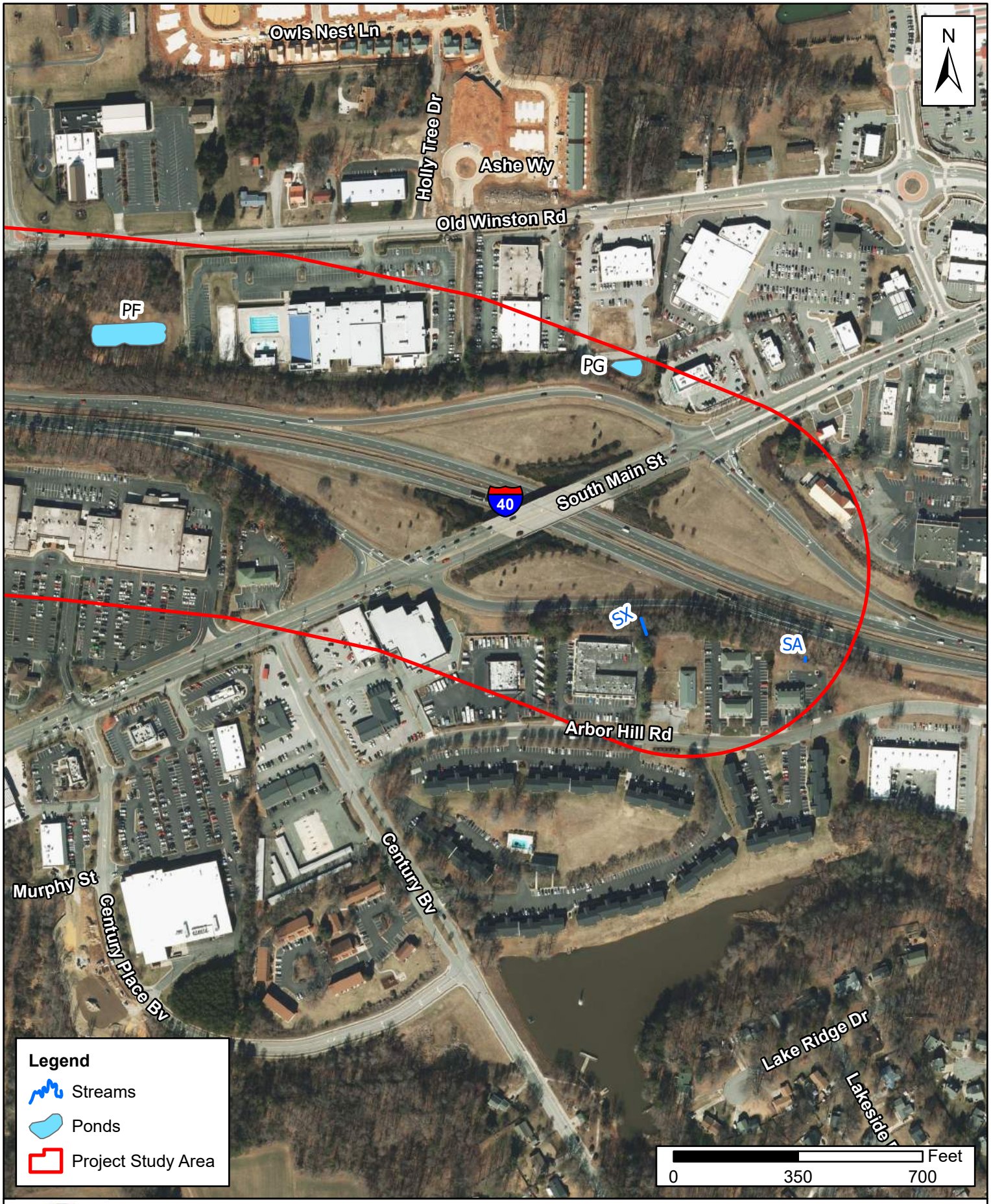


Figure 3i: Jurisdictional Features Map
STIP No. U-5760
Kernersville, Forsyth County, NC
February 2023

Figure 4: NRCS Soil Survey Map
STIP No. U-5760
Kernersville, Forsyth County, NC
February 2023

TIP# U-5760
NC DMS Mitigation
Acceptance Letter

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
TIM BAUMGARTNER
Director

NORTH CAROLINA
Environmental Quality

April 13, 2020

Ms. Amy Euliss
NCDOT Division 9 Environmental Officer
North Carolina Department of Transportation
375 Silas Creek Parkway
Winston-Salem, North Carolina 27127

Dear Ms. Euliss:

Subject: Mitigation Acceptance Letter:

Division 9, TIP Number U-5760, Kernersville Southern Loop (Phase I) Forsyth County, WBS No 46381.1.1

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the stream and wetland mitigation for the subject project. Based on the information supplied by you in April 2020, the impacts are located in CU 03040101 of the Yadkin River basin in the Central Piedmont (CP) Eco-Region, and are as follows:

Stream & Wetlands	River Basin	CU Location	Eco-Region	Stream			Wetlands		
				Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh
Impacts	Yadkin	03040101	CP	0	0	1,372.0	0.11	0	0

*Some of the stream and wetland impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details.

DMS commits to implementing sufficient compensatory stream and wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies in accordance with the In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from DMS.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-707-8420.

Sincerely,

Elizabeth Harmon

James B. Stanfill
DMS Asset Management Supervisor

Cc: Ms. Nicholle Braspennickx, USACE – Asheville Regulatory Field Office
Mr. Monte Matthews, USACE – Raleigh Regulatory Field Office
Ms. Amy Chapman, NC Division of Water Resources – Raleigh
Mr. Dave Wanucha, NC Division of Water Resources
File: U-5760 – Division 9

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
MARC RECKTENWALD
Director

NORTH CAROLINA
Environmental Quality

February 23, 2023

Ms. Amy Euliss
Division 9 PDEA Engineer
North Carolina Department of Transportation
375 Silas Creek Parkway
Winston-Salem, North Carolina 27127-7167

Dear Ms. Euliss:

Subject: DMS Mitigation Acceptance Letter:

U-5760, Kernersville Southern Loop (Phase I), Forsyth County

References: USACE 404 Individual Permit issued August 10, 2020 (USACE Action ID 2016-01337)

NCDWR 401 Water Quality Certification issued July 13, 2020 (NCDWR ID 2020-0628)

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the additional compensatory mitigation for the subject project. Based on the information supplied by you on February 22, 2023, the impacts are located in CU 03040101 of the Yadkin River basin in the Central Piedmont (CP) Eco-Region, and are as follows:

Table 1 – Additional Impacts (feet / acres)

Yadkin 03040101 CP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	**123.000**	0	0	0	0	0	0	0

*NOTE: Some of the stream impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details.

This additional impact and associated mitigation needs were not projected by the NCDOT in the 2023 impact data. DMS is currently providing stream and wetland mitigation for the impacts associated with this project located in cataloging unit 03040101 of the Yadkin River basin as required by the 404 and 401 permits issued in August 2020 and July 20020, as shown in the below table (in mitigation credits)

Table 2 – Current Permitted Impacts and Associated Mitigation Requirements provided by DMS (based on issued permits) and Revised Anticipated Impacts (based on mitigation request)

Impact Type	Total Permitted Impacts (feet / acre / sq ft)	Mitigation Provided by DMS per Issued Permits (Credits)	Additional Impact (for approval)	Revised Total Impacts*
Stream (warm)	1,372.000	2,744.000	123.000	**1,495.000**
Riparian Wetland	0.110	0.220	0	0.110

*Some of the additional stream impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details. DMS will provide the amount of mitigation as determined by the regulatory agencies.

DMS commits to implementing additional sufficient compensatory stream mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies using the delivery timeline listed in Section F.3.c.iii of the In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from DMS.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-707-8420.

Sincerely,

Elizabeth Harmon

for James B. Stanfill
DMS Deputy Director

cc: Mr. Monte Matthews, USACE – Raleigh Regulatory Field Office
Ms. Amy Chapman, Division of Water Resources, Wetlands/401 Unit
File: U-5760 – Division 9

TIP# U-5760
Bat Habitat
Assessment

Bat Habitat Assessment

For

Hopkins Road/Big Mill Farm Road Proposed Widening and Interchange at US 421 / NC 150 / Business I-40
Forsyth County, NC, TIP No. U-5760
WBS Element No. 46381.1.1

Prepared for:

NCDOT
The North Carolina Department of Transportation
Division 9
375 Silas Creek Parkway
Winston-Salem, NC 27127
(336) 747-7800

Prepared by:

Three Oaks Engineering
324 Blackwell Street, Suite 1200
Durham, NC 27701
(919) 732-1300

August 2022

The North Carolina Department of Transportation (NCDOT, Division 9) proposes widening Hopkins Road (SR 2649) and Big Mill Farm Road and constructing an interchange at US 421 / NC 150 / Business I-40, in Forsyth County, NC, TIP No. U-5760. Three Oaks Engineering (Three Oaks) was contracted to conduct inspections for protected bat species for the proposed project.

The Northern Long-eared Bat (*Myotis septentrionalis*; NLEB) is listed by the United States Fish and Wildlife Service (USFWS) as occurring in Forsyth County (USFWS 2022). The Little Brown Bat (*Myotis lucifugus*) and the Tricolored Bat (*Perimyotis subflavus*), which may become federally listed in the future, may also be found in Forsyth County.

SURVEY METHODS

The habitat assessment followed the guidance set forth in NCDOT's Standard Operating Procedures (SOP) Preliminary Bat Habitat Assessments (Structures, Caves & Mines) (2022). Bat habitat assessment forms were completed as specified in the SOP. All surveys performed were consistent with the protocols stipulated in the USFWS National White-Nose Syndrome Decontamination Protocol (USFWS 2020), North Carolina's White-Nose Syndrome Surveillance and Response Plan (NCWRC 2016), and the NCDOT White-Nose Syndrome Decontamination Protocol (NCDOT 2014). No acoustic or mist-net surveys were conducted.

Spatial data containing records for active and inactive mine locations were obtained from the U.S. Geological Survey Mineral Resources On-Line Spatial Data website (USGS 2022) to check for mine locations within a half-mile of the project.

SURVEY FINDINGS

On August 4, 2022, Three Oaks Engineering biologists (Mary Frazer and Tess Moody) assessed the U-5760 project study area for potential bat habitat. Bat habitat assessment forms are attached.

The South Main Street Bridge over US 421/NC 150 (Bridge 167) had crevices suitable for roosting and evidence of bats was found at the bridge. Staining and guano were observed under the western expansion joint. The size of the guano was indicative of Big Brown Bats (*Eptesicus fuscus*). One bat was present at the eastern expansion joint on the south side of the bridge. The bat appeared to be a Big Brown Bat (see Photos 1 and 2 below). Habitat adjacent to the bridge was maintained/disturbed (commercial development). Traffic noise at the bridge tended to be loud.

Photo 1. Bat in bridge 167 crevice

Photo 2. Guano with tape measure at bridge 176

There were seven culverts in the project study area large enough to meet the NCDOT criteria for requiring inspection (at least 3 ft in diameter and 60 ft long). See Figure 1 for locations (attached). Four of the culverts conveyed water to/from stormwater detention basins in a shopping area south of US 421; a couple of these culvert openings could not be accessed as they were fenced off. Pipes in the northern half of the project were too small to require inspection. No evidence of bats was found in any of the culverts inspected. Two abandoned buildings (barns) were also inspected for bats, but no evidence of bats was found. Data forms for the bridge, culverts, and abandoned buildings are attached.

Although there were scattered locations of fragmented wooded habitat, much of the project study area consisted of maintained/disturbed habitat, with shopping malls and parking lots in the southeastern portion of the project study area (PSA), and suburban housing in the northern portion of the PSA. Marginal roosting or foraging habitat for bats may occur in in patchy forested habitat or along a couple of wooded streams in the PSA.

No caves or mines were observed within the project footprint. According to the USGS mines database there are no mines within a half mile of the project study area (USGS 2020).

Northern long-eared bat

Suitable summer habitat for the NLEB is generally characterized as forested areas with trees larger than three inches in diameter at breast height (DBH). Summer roost sites include tree cavities or crevices, loose bark of live or dead trees, and abandoned buildings. Much of the PSA was not suitable for forest interior species such as the NLEB due to development. According to the North Carolina Natural Heritage Program (NHP) Biotics Database, most recently updated in July 2022, the nearest NLEB record is 57.2 miles northwest of the project (EO ID 32156) in Wilkes County near Stone Mountain State Park. EO

32156 represents a site with an observation in 2001. NLEB are not known from Forsyth County or any of the surrounding counties (NHP 2022).

NABat (the North American Bat Monitoring Program) stationary point surveys (which are better at detecting NLEB than mobile surveys) have only recorded NLEB in one county in the Piedmont: Wake County in 2017. Aside from that, there were no NLEB recordings anywhere between highways I-95 and US 221 from 2015-2021 (Han Li, pers. comm. to Cheryl Gregory, April 7, 2022). As such, NLEB presence is highly unlikely in the U-5760 PSA.

Based on the marginal habitat present in the project study area and the lack of NLEB records from the region, any effects to the species should be discountable. **The Biological Conclusion for NLEB is May Affect, Not Likely to Adversely Affect**.

Little Brown Bat

The Little Brown Bat will readily use man-made structures such as buildings and bridges for roosting. This species has not been observed in Forsyth County, but has been observed in Stokes County, an adjacent county. The nearest NHP (2022) record is 21.5 miles north of the PSA in Stokes County dating from 2001 (EO ID 36076).

Based on the marginal habitat present in the PSA and the lack of Little Brown Bat records from the county, any effects to the species should be discountable. **Should the species become proposed for federal listing, the Biological Conclusion for the Little Brown Bat is May Affect, Not Likely to Adversely Affect**.

Tricolored Bat

Tricolored Bats are generally associated with forested landscapes. In summer, they will roost in tree foliage, or sometimes in buildings. They are also known to roost in culverts. The species has not been observed in Forsyth County, but has been observed in adjacent Stokes and Rockingham Counties. The nearest NHP (2022) record is 21.6 miles north of the project study area in Stokes County, dating from 2001 (EO ID 36242).

Based on the marginal habitat present in the PSA and the lack of Tricolored Bat records from the county, any effects to the species should be discountable. **Should the species become proposed for federal listing, the Biological Conclusion for the Tricolored Bat is May Affect, Not Likely to Adversely Affect**.

REFERENCES

North Carolina Department of Transportation (NCDOT) 2014. NCDOT WNS Decontamination Protocol for North Carolina.

North Carolina Department of Transportation (NCDOT) 2022. Standard Operating Procedures (SOP) Preliminary Bat Habitat Assessments (Structures, Caves & Mines). https://connect.ncdot.gov/resources/Environmental/EAU/BSG/Documents/NCDOT%20SOP%202022%20Prelim%20Bat%20Habitat%20Assessment%20Struc%20Cave%20Mine.pdf (Accessed May 6, 2022).

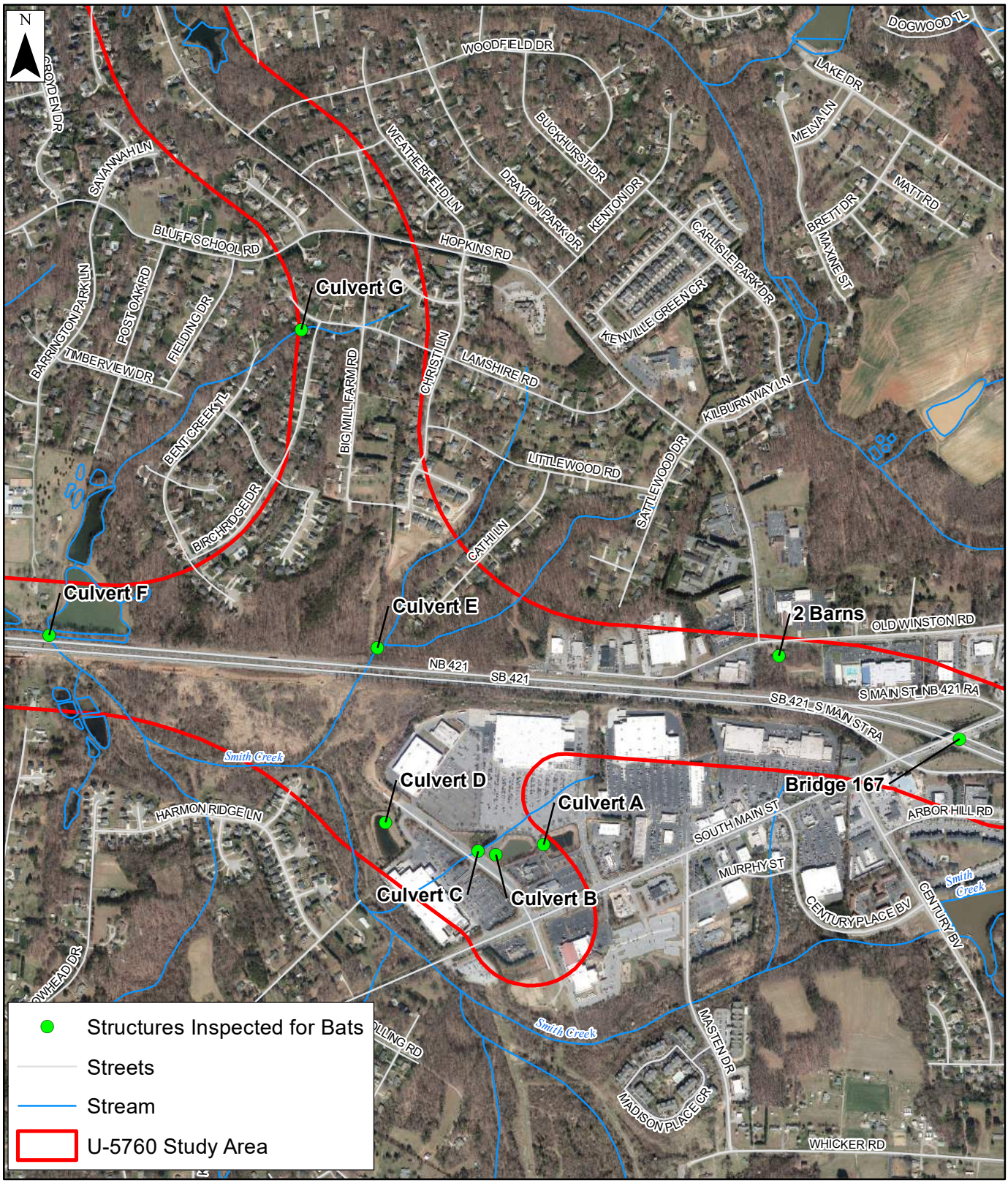
North Carolina Natural Heritage Program (NCNHP). North Carolina Natural Heritage Data Explorer (web application; https://ncnhde.natureserve.org/). July 2022 Quarterly Dataset. (Accessed August 24, 2022.)

North Carolina Wildlife Resources Commission (NCWRC) 2016. North Carolina's White-nose Syndrome Surveillance and Response Plan. https://www.ncwildlife.org/Portals/0/Learning/documents/Profiles/Mammals/NC%20WNS%20Surveillance%20%20Response%20Plan%202016.pdf (Accessed August 24, 2022).

United States Fish and Wildlife Service (USFWS) 2020. National White-Nose Syndrome Decontamination Protocol. Available at: https://s3.us-west-2.amazonaws.com/prod-is-cms-assets/wns/prod/56f60a70-0e5b-11eb-8166-337c3d472ee8-Final-October2020%20revised%20WNS%20Decon%20Protocol-with%20cover%20letter.pdf (Accessed August 24, 2022).

United States Fish and Wildlife Service (USFWS). 2022. Information for Planning and Consulting (IPac). https://ipac.ecosphere.fws.gov/ (Accessed August 30, 2022).

U.S. Geological Survey (USGS), Mineral Resources On-Line Spatial Data Website. 2022. http://mrdata.usgs.gov/mrds/find-mrds.php (Accessed August 24, 2022).



Prepared For:

Hopkins Rd/Big Mill Farm Rd Proposed Improvements TIP U-5760

Bat Habitat Assessment

Forsyth County, North Carolina

Date:	August 2022
Scale:	0 250 500 Feet
Job No.:	22-312
Drawn By: NMSO	Checked By: MF

Figure

1

(1)

Bat Habitat Assessment Form

NCDOT Bridges

Observers: Frazer Moody
Date: 8/5/22
County: Forsyth
Crossing (Name of the feature intersected): 421 / 150

TIP or DOT project number: U-5760
Bridge Road (Name of facility carried) S. Main St.
Bridge Number: 167

% Surrounding habitat w/in 1 mi. of project footprint (approx)
Urban/Commercial 100 Suburban/Residential ____
Herb/Shrub/Grassland ____ Agricultural ____
Deciduous/Evergreen/Mixed Forest ____
Woody Wetland/Herb Wetland/Open Water ____

Any trees >3" DBH within project footprint? N/A yes (no)

Complete this section for Indiana bat counties (Avery: Cranberry Mine area only, Cherokee, Clay, Graham, Haywood, Jackson, Macon, Rutherford: Bat Cave/Lake Lure area only, Swain)

Any shaggy trees or snags >5" DBH? N/A yes no
If yes to shag/snag, how much sunlight do they receive during the day? N/A 1-3 hours 4-6 hours 7+ hours
If yes to shag/snag, list species of habitat trees >5" dbh ____
If snags >5"DBH are present in sunlit areas, provide photos and location.
If large hollow trees are present, provide photos and location.

Presence of:	In project footprint		In vicinty (0.5 mi)	
Caves	yes	(no)	yes	(no)
Abandoned mines	yes	(no)	yes	(no)

If 'yes' to any of the above, provide photos, description, and location.

Major water source in project footprint (N/A) river stream/creek pond lake swamp
Suitable drinking habitat in the form of non-stagnant, smooth or slack water? yes (no) N/A

Structure specific questions:

Artificial lighting	unknown	(yes)	no		
Guard rails	none	(concrete)	timber	metal	
Deck type	concrete	(metal)	timber	open grid	
Beam type	none	concrete	(steel)	timber	
End/back wall type	(concrete)	timber	masonry		
Creosote evidence				yes	(no)
Suitable roosting crevices present (½ - 1¼" wide)				(yes)	no
Deck drains				yes	(no)

Max height of bridge deck above ground or water (ft): ____

Bridge alignment	N/S	E/W	NW/SE	(NE/SW)	
Human disturbance under bridge	high	med	(low)	none	

staining + guano at western bent/exp joint. One bat present at eastern exp. joint on side of bridge

Evidence of bats using bridge? (photos needed) (yes) **no**

Below section completed only if bats/evidence of bats observed:

Emergence count performed? (If yes, complete form next page) yes (no) → pics
Evidence of bats using bird nests, if present? yes (no)
Type of Evidence (circle all that apply) (guano) staining (bats observed)
Roost Type (crevice) open area
Roost Material metal (concrete)
Bat species present (list all species): Likely big brown bats
Notes (list each species locations and estimated number of each species): guano large - 1 cm

Bat Habitat Assessment Form

(A)

NCDOT Culverts

Observers: _____ TIP or DOT project number: U-5760
Date: _____ Time 10 AM Road Name/SR Number: entrance to Walmart
County: _____ Structure #: _____
Crossing (Name of the feature intersected): UT to Smith Creek (Harmon Mill Creek?)

% Surrounding habitat w/in 1 mi. of project footprint (approx)
Urban/commercial_____ Suburban/residential_____
Herb/Shrub/Grassland_____ Agricultural_____
Deciduous/Evergreen/Mixed Forest_____
Woody Wetland/Herb Wetland/Open Water_____

Any trees >3" DBH within project footprint? N/A yes no

Complete this section for Indiana bat counties (Avery: Cranberry Mine area only, Cherokee, Clay, Graham, Haywood, Jackson, Macon, Rutherford: Bat Cave/Lake Lure area only, Swain)
Any shaggy trees or snags >5" DBH? N/A yes no
If yes to shag/snag, how much sunlight do they receive during the day? N/A 1-3 hours 4-6 hours 7+ hours
If yes to shag/snag, list spp of habitat trees >5" dbh _____
If large hollow trees or snags >5"DBH are present in sunlit areas, provide photos and location.

Presence of:	In project footprint		In vicinty (0.5 mi)	
caves	yes	no	yes	no
abandoned mines	yes	no	yes	no

If 'yes' to any of the above, provide description and location.

Major water source in project footprint: N/A river stream/creek pond lake swamp
Suitable drinking habitat in the form of non stagnant, smooth or slack water areas? yes no N/A
Structure specific questions:
Guard rails none concrete timber metal
Culvert material concrete timber metal plastic
Number of barrels: 1 (double, triple, etc.)
Culvert height: 3.5' Culvert width: 3.5' Culvert length: 100'
If culvert is buried (sedimentation) observed narrowest opening height: —
Culvert type pipe box arch other_____
Openings protected from high winds yes no
Crevices present: yes no
Rough surfaces, imperfections, bird nests yes no
Human disturbance in culvert high med low none
Depth of water in culvert (if applicable) 1'

could not access w. end of culvert - fenced off

Below section completed only if bats/evidence of bats observed: Evidence of bats using? yes no
Emergence count performed? (If yes, complete form) yes no
Evidence of bats using bird nests, if present? yes no
Type of evidence guano staining bats
Bat species present:
Notes (include description of bat location within culvert, sedimentation buildup, drainage inlets inside culvert, etc.)

leads to stormwater pond

B

Bat Habitat Assessment Form

NCDOT Culverts

Observers: Frazer, Moody
TIP or DOT project number: U-5760
Date: 8/4 Time _____
Road Name/SR Number: Harmon Creek Rd
County: _____
Structure #: _____
Crossing (Name of the feature intersected): UT to Smith Creek (or Harmon Mill?)

% Surrounding habitat w/in 1 mi. of project footprint (approx)
Urban/commercial 100 Suburban/residential _____
Herb/Shrub/Grassland _____ Agricultural _____
Deciduous/Evergreen/Mixed Forest _____
Woody Wetland/Herb Wetland/Open Water _____

Any trees >3" DBH within project footprint? N/A yes no

Complete this section for Indiana bat counties (Avery: Cranberry Mine area only, Cherokee, Clay, Graham, Haywood, Jackson, Macon, Rutherford: Bat Cave/Lake Lure area only, Swain)
Any shaggy trees or snags >5" DBH? N/A yes no
If yes to shag/snag, how much sunlight do they receive during the day? N/A 1-3 hours 4-6 hours 7+ hours
If yes to shag/snag, list spp of habitat trees >5" dbh _____
If large hollow trees or snags >5"DBH are present in sunlit areas, provide photos and location.

Presence of:	In project footprint		In vicinity (0.5 mi)	
caves	yes	no	yes	no
abandoned mines	yes	no	yes	no

If 'yes' to any of the above, provide description and location.

Major water source in project footprint: N/A river stream/creek pond (stormwater) lake swamp
Suitable drinking habitat in the form of non stagnant, smooth or slack water areas? yes no N/A

Structure specific questions:
Guard rails none concrete timber metal
Culvert material concrete timber metal plastic
Number of barrels: 1 (double, triple, etc.)
Culvert height: 3.5 ft Culvert width: 3.5 ft Culvert length: ~200 ft
If culvert is buried (sedimentation) observed narrowest opening height: —
Culvert type pipe box arch other _____
Openings protected from high winds yes no
Crevices present: yes no
Rough surfaces, imperfections, bird nests yes no
Human disturbance in culvert high med low none
Depth of water in culvert (if applicable) 1/2 ft

could not access w. end of culvert as it was fenced off

Below section completed only if bats/evidence of bats observed: Evidence of bats using? yes no
Emergence count performed? (If yes, complete form) yes no
Evidence of bats using bird nests, if present? yes no
Type of evidence guano staining bats
Bat species present:
Notes (include description of bat location within culvert, sedimentation buildup, drainage inlets inside culvert, etc.)

drains stormwater pond

Bat Habitat Assessment Form

(C)

NCDOT Culverts

Observers: _____ TIP or DOT project number: U-5760
Date: 8/4 Time _____ Road Name/SR Number: entrance to Kohls
County: _____ Structure #: _____
Crossing (Name of the feature intersected): UT to Smith Creek

% Surrounding habitat w/in 1 mi. of project footprint (approx)
Urban/commercial 100 Suburban/residential _____
Herb/Shrub/Grassland _____ Agricultural _____
Deciduous/Evergreen/Mixed Forest _____
Woody Wetland/Herb Wetland/Open Water _____

Any trees >3" DBH within project footprint? N/A (yes) no

Complete this section for Indiana bat counties (Avery: Cranberry Mine area only, Cherokee, Clay, Graham, Haywood, Jackson, Macon, Rutherford: Bat Cave/Lake Lure area only, Swain)
Any shaggy trees or snags >5" DBH? N/A yes no
If yes to shag/snag, how much sunlight do they receive during the day? N/A 1-3 hours 4-6 hours 7+ hours
If yes to shag/snag, list spp of habitat trees >5" dbh _____
If large hollow trees or snags >5"DBH are present in sunlit areas, provide photos and location.

Presence of:	In project footprint		In vicinity (0.5 mi)	
caves	yes	(no)	yes	(no)
abandoned mines	yes	(no)	yes	(no)

If 'yes' to any of the above, provide description and location.

Major water source in project footprint: N/A river (stream/creek) pond lake swamp
Suitable drinking habitat in the form of non stagnant, smooth or slack water areas? yes (no) N/A
Structure specific questions:
Guard rails (none) concrete timber metal
Culvert material (concrete) timber metal plastic
Number of barrels: 1 (double, triple, etc.)
Culvert height: 6' Culvert width: 5' Culvert length: ~150'
If culvert is buried (sedimentation) observed narrowest opening height: —
Culvert type pipe (box) arch other _____
Openings protected from high winds (yes) no
Crevices present: (yes) no
Rough surfaces, imperfections, bird nests (yes) no
Human disturbance in culvert high med low (none)
Depth of water in culvert (if applicable) 1 - 18"

Below section completed only if bats/evidence of bats observed: Evidence of bats using? yes (no)
Emergence count performed? (If yes, complete form) yes no
Evidence of bats using bird nests, if present? yes no
Type of evidence guano staining bats
Bat species present:
Notes (include description of bat location within culvert, sedimentation buildup, drainage inlets inside culvert, etc.)

D

Bat Habitat Assessment Form

NCDOT Culverts

Observers: Frazer Moody
Date: 8/4 Time 11:30 A
County: Forsyth
Crossing (Name of the feature intersected): UT to Smith

TIP or DOT project number: U-5760
Road Name/SR Number: Lowe's detension pond (feeds in)
Structure #:

% Surrounding habitat w/in 1 mi. of project footprint (approx)

Urban/commercial 100 Suburban/residential
Herb/Shrub/Grassland Agricultural
Deciduous/Evergreen/Mixed Forest
Woody Wetland/Herb Wetland/Open Water

Any trees >3" DBH within project footprint? N/A yes no

Complete this section for Indiana bat counties (Avery: Cranberry Mine area only, Cherokee, Clay, Graham, Haywood, Jackson, Macon, Rutherford: Bat Cave/Lake Lure area only, Swain)

Any shaggy trees or snags >5" DBH? N/A yes no
If yes to shag/snag, how much sunlight do they receive during the day? N/A 1-3 hours 4-6 hours 7+ hours
If yes to shag/snag, list spp of habitat trees >5" dbh
If large hollow trees or snags >5"DBH are present in sunlit areas, provide photos and location.

Presence of:	In project footprint		In vicinty (0.5 mi)	
caves	yes	no	yes	no
abandoned mines	yes	no	yes	no

If 'yes' to any of the above, provide description and location.

Major water source in project footprint: N/A river stream/creek pond lake swamp
Suitable drinking habitat in the form of non stagnant, smooth or slack water areas? yes no N/A

Structure specific questions:

Guard rails	none	concrete	timber	metal
Culvert material	concrete	timber	metal	plastic

Number of barrels: 1 (double, triple, etc.)
Culvert height: 4' Culvert width: 4' Culvert length: ~580'
If culvert is buried (sedimentation) observed narrowest opening height:

Culvert type	pipe	box	arch	other
Openings protected from high winds	yes	no		
Crevices present:	yes	no		
Rough surfaces, imperfections, bird nests	yes	no		
Human disturbance in culvert	high	med	low	none

Depth of water in culvert (if applicable) 1/2"

Below section completed only if bats/evidence of bats observed: Evidence of bats using? yes no

Emergence count perfomed? (If yes, complete form)	yes	no	
Evidence of bats using bird nests, if present?	yes	no	
Type of evidence	guano	staining	bats

Bat species present:

Notes (include description of bat location within culvert, sedimentation buildup, drainage inlets inside culvert, etc.)

outlet of detension pond is a spillway

Bat Habitat Assessment Form

(E)

NCDOT Culverts

Observers: Frazer Moody
Date: 8/5 Time 1:20 p
County: Forsyth
Crossing (Name of the feature intersected): (perennial) UT to Smith Creek

TIP or DOT project number: U-5760
Road Name/SR Number: 421 / 150 central
Structure #:

% Surrounding habitat w/in 1 mi. of project footprint (approx)

Urban/commercial_____ Suburban/residential_____
Herb/Shrub/Grassland_____ Agricultural_____
Deciduous/Evergreen/Mixed Forest_____
Woody Wetland/Herb Wetland/Open Water_____

Any trees >3" DBH within project footprint? N/A (yes) no

Complete this section for Indiana bat counties (Avery: Cranberry Mine area only, Cherokee, Clay, Graham, Haywood, Jackson, Macon, Rutherford: Bat Cave/Lake Lure area only, Swain)

Any shaggy trees or snags >5" DBH? N/A yes no
If yes to shag/snag, how much sunlight do they receive during the day? N/A 1-3 hours 4-6 hours 7+ hours
If yes to shag/snag, list spp of habitat trees >5" dbh _____
If large hollow trees or snags >5"DBH are present in sunlit areas, provide photos and location.

Presence of:	In project footprint		In vicinty (0.5 mi)	
caves	yes	(no)	yes	no
abandoned mines	yes	(no)	yes	no

If 'yes' to any of the above, provide description and location.

Major water source in project footprint: N/A river (stream/creek) pond lake swamp
Suitable drinking habitat in the form of non stagnant, smooth or slack water areas? (yes) no N/A
Structure specific questions:

Guard rails	(none)	concrete	timber	metal
Culvert material	(concrete)	timber	metal	plastic

Number of barrels: 1 (double, triple, etc.)
Culvert height: 6.5' Culvert width: 6' Culvert length: 200'
If culvert is buried (sedimentation) observed narrowest opening height: —

Culvert type	pipe	(box)	arch	other_____
Openings protected from high winds	(yes)	no		
Crevices present:	yes	(no)		
Rough surfaces, imperfections, bird nests	(yes)	no		
Human disturbance in culvert	high	med	low	(none)

Depth of water in culvert (if applicable) 1" to 20"

Below section completed only if bats/evidence of bats observed: Evidence of bats using? yes (no)

Emergence count performed? (If yes, complete form)	yes	no	
Evidence of bats using bird nests, if present?	yes	no	
Type of evidence	guano	staining	bats

Bat species present:

Notes (include description of bat location within culvert, sedimentation buildup, drainage inlets inside culvert, etc.)

Bat Habitat Assessment Form

(F)

NCDOT Culverts

Observers: Frazer Moody
Date: 8/5/22 Time
County: Forsyth
Crossing (Name of the feature intersected): Smith Creek (large ponds @ NW)

TIP or DOT project number: U-5760
Road Name/SR Number: 421/150
Structure #:

% Surrounding habitat w/in 1 mi. of project footprint (approx)

Urban/commercial ____ Suburban/residential ____
Herb/Shrub/Grassland ____ Agricultural ____
Deciduous/Evergreen/Mixed Forest ____
Woody Wetland/Herb Wetland/Open Water ____

Any trees >3" DBH within project footprint? N/A yes no

Complete this section for Indiana bat counties (Avery: Cranberry Mine area only, Cherokee, Clay, Graham, Haywood, Jackson, Macon, Rutherford: Bat Cave/Lake Lure area only, Swain)

Any shaggy trees or snags >5" DBH? N/A yes no
If yes to shag/snag, how much sunlight do they receive during the day? N/A 1-3 hours 4-6 hours 7+ hours
If yes to shag/snag, list spp of habitat trees >5" dbh
If large hollow trees or snags >5"DBH are present in sunlit areas, provide photos and location.

Presence of:	In project footprint		In vicinty (0.5 mi)	
caves	yes	no	yes	no
abandoned mines	yes	no	yes	no

If 'yes' to any of the above, provide description and location.

Major water source in project footprint: N/A river stream/creek pond lake swamp
Suitable drinking habitat in the form of non stagnant, smooth or slack water areas? yes no N/A

Structure specific questions:

Guard rails: none concrete timber metal
Culvert material: concrete timber metal plastic
Number of barrels: 3 (double, triple, etc.)
Culvert height: 8' Culvert width: 8' Culvert length: ~175'
If culvert is buried (sedimentation) observed narrowest opening height: —
Culvert type: pipe box arch other
Openings protected from high winds: yes no
Crevices present: yes no
Rough surfaces, imperfections, bird nests: yes no
Human disturbance in culvert: high med low none
Depth of water in culvert (if applicable) 6" - 20"

Swallow & phoebe nests

Below section completed only if bats/evidence of bats observed: Evidence of bats using? yes no
Emergence count performed? (If yes, complete form) yes no
Evidence of bats using bird nests, if present? yes no
Type of evidence: guano staining bats
Bat species present:
Notes (include description of bat location within culvert, sedimentation buildup, drainage inlets inside culvert, etc.)

Bat Habitat Assessment Form

(G)

NCDOT Culverts

Observers: Frazer Moody
Date: 8/5/22 Time 2 pm
County: Forsyth
Crossing (Name of the feature intersected): UT to Smith Creek

TIP or DOT project number: U-5760
Road Name/SR Number: Selwyck Ln
Structure #:

% Surrounding habitat w/in 1 mi. of project footprint (approx)

Urban/commercial_____ Suburban/residential_____
Herb/Shrub/Grassland_____ Agricultural_____
Deciduous/Evergreen/Mixed Forest_____
Woody Wetland/Herb Wetland/Open Water_____

Any trees >3" DBH within project footprint? N/A yes no

Complete this section for Indiana bat counties (Avery: Cranberry Mine area only, **Cherokee, Clay, Graham, Haywood, Jackson, Macon, Rutherford:** Bat Cave/Lake Lure area only, **Swain)**

Any shaggy trees or snags >5" DBH? N/A yes no
If yes to shag/snag, how much sunlight do they receive during the day? N/A 1-3 hours 4-6 hours 7+ hours
If yes to shag/snag, list spp of habitat trees >5" dbh _____
If large hollow trees or snags >5"DBH are present in sunlit areas, provide photos and location.

Presence of:	In project footprint		In vicinity (0.5 mi)	
caves	yes	no	yes	no
abandoned mines	yes	no	yes	no

If 'yes' to any of the above, provide description and location.

Major water source in project footprint: N/A river stream/creek pond lake swamp
Suitable drinking habitat in the form of non stagnant, smooth or slack water areas? yes no N/A
Structure specific questions:

Guard rails: none concrete timber metal
Culvert material: concrete timber metal plastic
Number of barrels: 1 (double, triple, etc.)
Culvert height: 3' Culvert width: 3' Culvert length: 200'
If culvert is buried (sedimentation) observed narrowest opening height: ~~23~~ 30"
Culvert type: pipe box arch other_____
Openings protected from high winds: yes no
Crevices present: yes no
Rough surfaces, imperfections, bird nests: yes no
Human disturbance in culvert: high med low none
Depth of water in culvert (if applicable) —

Below section completed only if bats/evidence of bats observed: Evidence of bats using? yes no
Emergence count performed? (If yes, complete form) yes no
Evidence of bats using bird nests, if present? yes no
Type of evidence: guano staining bats
Bat species present:
Notes (include description of bat location within culvert, sedimentation buildup, drainage inlets inside culvert, etc.)

Kenners Mill Cr. @ Hopkins Rd
2 bl. CMP too short <60'

Habitat Assessment Form

NCDOT Abandoned Structures

Surveyors: Frazar, Moody
TIP or DOT project number: U-5760
Date/Time: 8/2/22
Road Name/SR Number: Hopkins Rd + Old Winston Rd
County: Forsyth
Lat/Long: SG quadrant
Property Owner & contact info, if known:
Structure number:
Canopy closure @ structure 0-25% 26-50% (51-75%) 76-100%
%Surrounding habitat w/in 1 mi. urban/commercial: suburban/residential:
natural/rural: agricultural:
Distance to nearest woodlot (approx): (>1000 feet) <1000 feet
Is there a water source w/in 1 mi.? yes no
type: river stream/creek lake swamp pond

Structure type: house trailer (barns) shed other:
Structure condition: intact/well sealed a few small access ways
(many/large access ways (open doors/windows)) empty shell of a building
Roof type: (metal) asphalt shingle other:
Structure description: 2 old wooden barns

Regular human use/disturbance: yes (no)
Structure size(ft) length: 25 width: 20 height: 17
Is there evidence of bat use on structure exterior (guano, staining) ? yes (no)
If yes, describe what and where:

If structure interior can be accessed safely:
Noticable airflow inside: (yes) no
Interior air temp vs outside: (varies by sec/floor) same warmer than outside cooler than outside

Are there inaccessible areas of the structure that could house bats (e.g., attics, ceiling spaces):
If yes, describe: central room in larger barn - could only be observed thru window

Is there evidence of bat roosting in structure interior (guano, staining, moth wings)?
If yes, describe what and where:

Can bat genus/species be determined?
Bat species present:
Take photographs of bats or evidence of bats (guano, staining).

If there is evidence of bats but no bats are observed, please check the building for night roosting after 11 PM. If there are parts of the structure that cannot be accessed for inspection, conduct an emergence count at sunset (see next page).

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

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Location

Forsyth County, North Carolina

Local office

Asheville Ecological Services Field Office

(828) 258-3939
(828) 258-5330

160 Zillicoa Street
Asheville, NC 28801-1082

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

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2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Reptiles

NAME	STATUS
Bog Turtle Glyptemys muhlenbergii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6962	SAT

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Schweinitz's Sunflower Helianthus schweinitzii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3849	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

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There are no critical habitats at this location.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON

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Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Chimney Swift Chaetura pelagica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Prairie Warbler Dendroica discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler Protonotaria citrea This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird Euphagus carolinus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

NOT FOR CONSULTATION

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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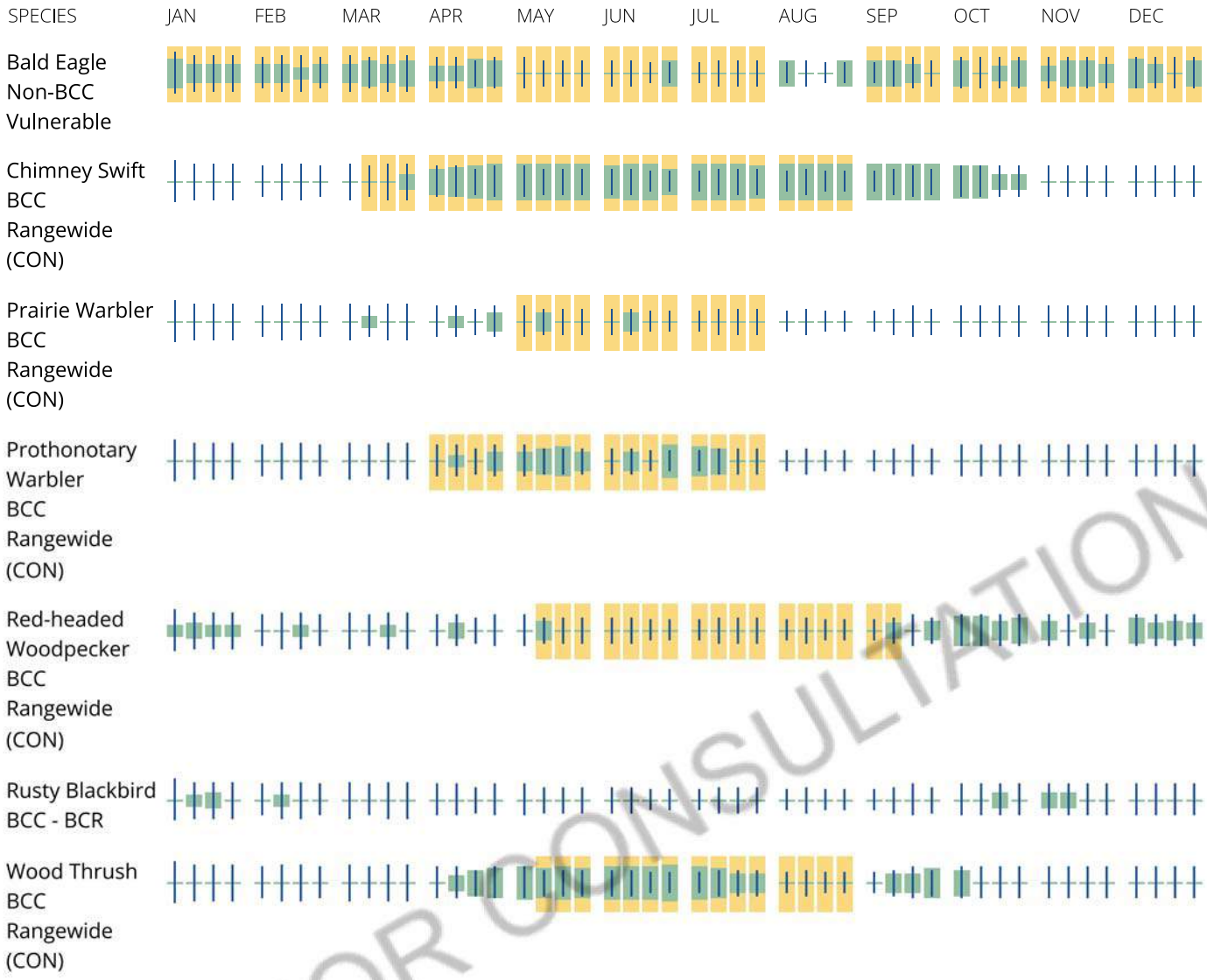
■ probability of presence ■ breeding season | survey effort – no data



NOT FOR CONSULTATION

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid

cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

NOT FOR CONSULTATION

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

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Coastal Barrier Resources System

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

There are no known coastal barriers at this location.

Data limitations

The CBRS boundaries used in IPaC are representations of the controlling boundaries, which are depicted on the official CBRS maps. The boundaries depicted in this layer are not to be considered authoritative for in/out determinations close to a CBRS boundary (i.e., within the "CBRS Buffer Zone" that appears as a hatched area on either side of the boundary). For projects that are very close to a CBRS boundary but do not clearly intersect a unit, you may contact the Service for an official determination by following the instructions here: https://www.fws.gov/service/coastal-barrier-resources-system-property-documentation

Data exclusions

CBRS units extend seaward out to either the 20- or 30-foot bathymetric contour (depending on the location of the unit). The true seaward extent of the units is not shown in the CBRS data, therefore projects in the offshore areas of units (e.g., dredging, breakwaters, offshore wind energy or oil and gas projects) may be subject to CBRA even if they do not intersect the CBRS data. For additional information, please contact CBRA@fws.gov.

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Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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TIP# U-5760
Adjacent Property
Owners Table

PROJ. REFERENCE NO.	SHEET NO.
U-5760	3P-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME	DEED BOOK
3	4,5	ARNOLD G. KING & HELEN H. PRINCE	DB 2250 PG 829 DB 3267 PG 197
4	5	ROSS D. WALL & PATRICIA O. WALL	DB 2188 PG 355
51	9	CYNTHIA COULOMBE & ROBERT COULOMBE	DB 3343 PG 2309 PB 24 PG 149
53	9,10	TIMBER TRAILS RECREATION ASSOCIATION, INC.	DB 1187 PG 1618 PB 24 PG 149
54	10	TOWN OF KERNERSVILLE	DB 3391 PG 3427
57	10	DONNIE LEE SWAIM & BERNICE BROWN SWAIM	DB 883 PG 379 DB 887 PG 197 DB 1010 PG 715 PB 61 PG 145-146
58	10	FAMILY M VENTURES, LLC	DB 2716 PG 2561 DB 1976 PG 2695
60	10	SCOTT K. SWAIM	DB 1916 PG 3664
62	10	JOHN C. LOVE, CAREN L. BULLOCK & HOWARD C. BULLOCK	DB 2411 PG 3317
64	10,11	ERIC A. MCFARLIN & SHAWN R. MCFARLIN	DB 2712 PG 174 PB 39 PG 42
66	11	JASON D. SMITH & REGINA V. SMITH	DB 2481 PG 2119 PB 39 PG 42
99	5,6	RICHARD M. MARTIN, II	DB 3049 PG 74
101	5	TRIAD COMMERCIAL CORPORATION	DB 1019 PG 193
N/A	5	FRED WRIGHT & LATONYA WRIGHT	DB 2558 PG 657 PB 25 PG 181

PARCEL No.	SHEET No.	PROPERTY OWNER NAME	DEED BOOK

TIP# U-5760
Photo Pages
Impact Site 4A

Photo 1 – This photo depicts the view directly downstream of the existing culvert outlet carrying Kerners Mill Creek under Hopkins Road at Impact Site 4A. The previously permitted 61 linear feet of permanent stream impacts as a result of the culvert extension at Site 4A will not change as a result of the design modifications.

Photo 2 – This photo depicts the view slightly further downstream of the existing culvert outlet carrying Kerners Mill Creek under Hopkins Road at Impact Site 4A. Note the large scour hole at the base of the culvert outlet.

Photo 3 – This photo depicts the view of the existing sewer crossing below Kerners Mill Creek at Impact Site 4A. The proposed 12-inch sewer line realignment will be installed within in a 20-inch steel encasement pipe fastened to subgrade concrete support piers located outside on either side of the stream to provide additional stabilization.

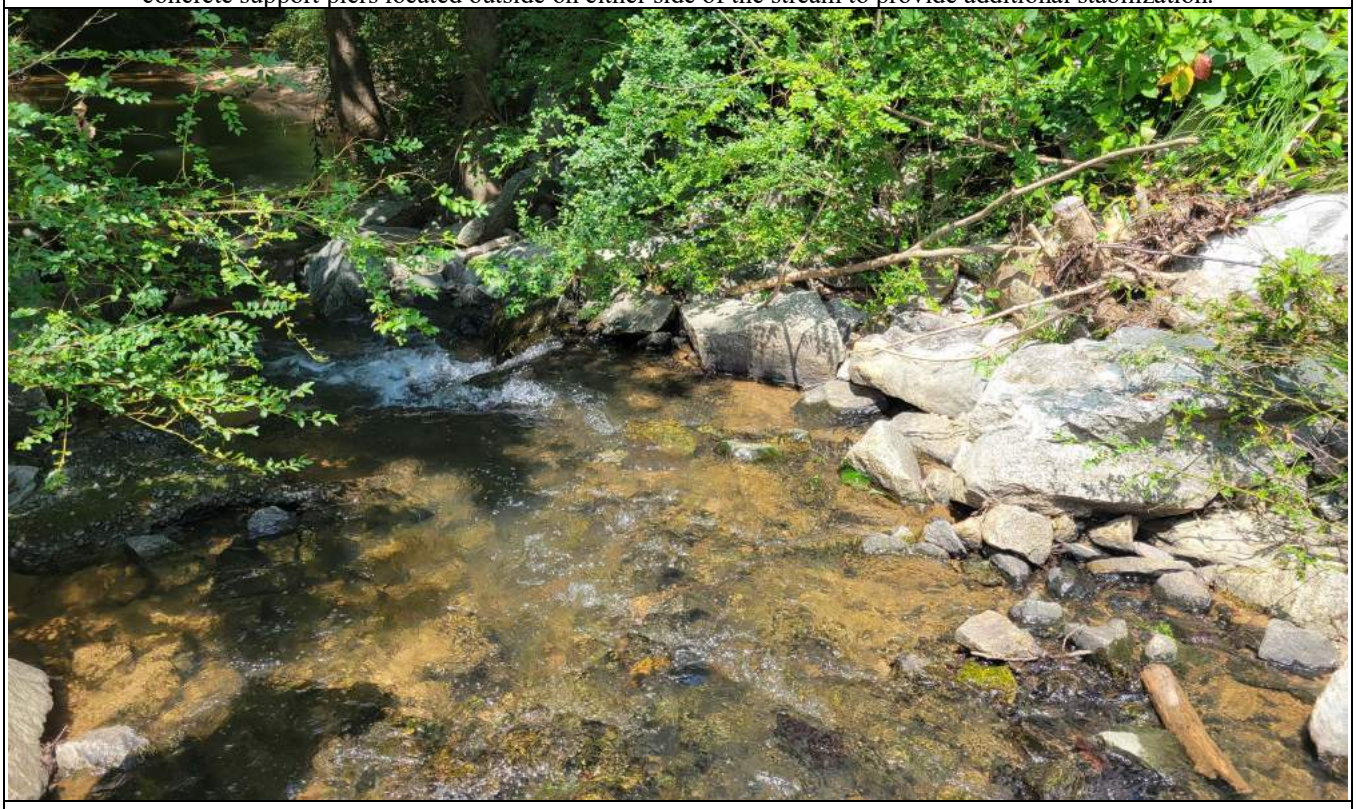


Photo 4 – This photo depicts the view of Kerners Mill Creek downstream of the existing sewer crossing at Impact Site 4A.

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

(Version 2.08; Released April 2018)

WBS Element:	TIP No.: U-5760	County(ies): Forsyth	Page 1 of 2

General Project Information

WBS Element:		**TIP Number:**	U-5760	**Project Type:**	**Date:** 2/20/2023
NCDOT Contact:	Galen Cail, P.E.	**Contractor / Designer:**	Bryan Vickery, P.E.		
Address:	1000 Birch Ridge Drive Raleigh, NC 27610	**Address:**	Kimley-Horn 421 Fayetteville Street Suite 600 Raleigh, NC, 27601		
Phone:	(919)-707-6700	**Phone:**	(919)-653-2905		
Email:	gcail@ncdot.gov	**Email:**	bryan.vickery@kimley-horn.com		
City/Town:	Kernersville	**County(ies):**	Forsyth		
River Basin(s):	Yadkin-Pee Dee	**CAMA County?**	No		
Wetlands within Project Limits?	Yes				

Project Description

Project Length (lin. miles or feet):	2.034 miles	**Surrounding Land Use:**	Commercial/Residential
	Proposed Project		**Existing Site**
Project Built-Upon Area (ac.)	45.9 ac.		28.9 ac.
Typical Cross Section Description:	Big Mill Farm Rd. and Hopkins Rd. will have single 12' Lanes with turn lanes at intersections. Grade Separation over Bus-40. Bus-40 is 3 12' lanes in each direction with a 30' grass median.		Bus-40 is 3 12' lanes in each direction. Hopkins Rd. has one 12' lane in each direction with Big Mill Farm Rd. has one 10' lane in each direction and transitions into a gravel road with 9' lanes the is a dead end before it would meet BUS-40.
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 14,900	Year:	Existing: 10,700 Year:
General Project Narrative:	This is a Division 9 managed project. Existing drainage patterns to be maintained to the best extent practical. The only noteworthy drainage pattern change is the diversion of		

Waterbody Information

Surface Water Body (1):	Kerners Mill Creek	**NCDWR Stream Index No.:**	12-94-12-2-(0.3)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	None		
Other Stream Classification:	None		None		
Impairments:	None		None		
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Kerners Mill Creek, SV, SS, SN		**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	No	**Dissipator Pads Provided in Buffer?**	No
Deck Drains Discharge Over Water Body?	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)					

WBS Element:	TIP No.: U-5760	County(ies): Forsyth

Additional Waterbody Information

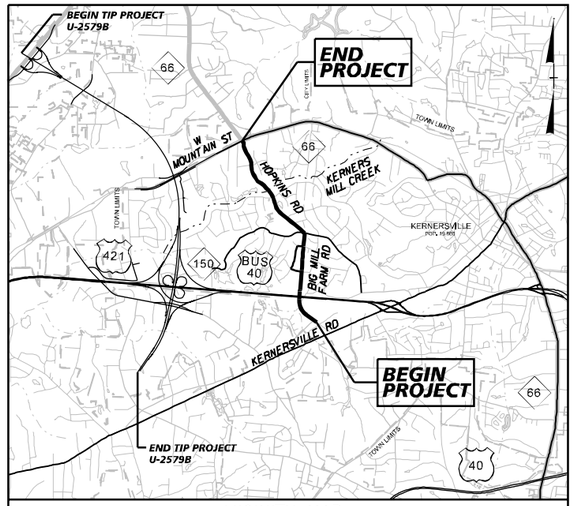
Surface Water Body (2):	Smith Creek	**NCDWR Stream Index No.:**	12-94-12-2-1		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?		Comments:			
NRTR Stream ID:	Smith Creek, SH, SI, SM, SG, SD, SJ, ESE-S38		**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)					

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
5	13+35 -Y1LPD- (LT) 15+00 -Y1LPD- (LT)	(2)Smith Creek	0.0	4.0	3.0	0.8	79	165	2.10%	1.0	2.0	1.3	2.1	No	No
5	55+40 -Y1- (MD) 56+25 -Y1- (MD)	(2)Smith Creek	0.0	6.0	4.0	0.9	90	85	1.50%	0.2	1.1	0.2	1.1	No	No
5	56+25 -Y1- (MD) 57+00 -Y1- (MD)	(2)Smith Creek	0.0	6.0	4.0	0.0	3	75	2.90%	0.1	1.2	0.2	1.3	No	No
5	57+00 -Y1- (MD) 58+00 -Y1- (MD)	(2)Smith Creek	0.0	6.0	5.0	0.2	19	100	0.90%	0.6	1.1	0.7	1.2	No	No
5	58+00 -Y1- (MD) 62+65 -Y1- (MD)	(2)Smith Creek	0.0	6.0	5.0	0.6	58	465	1.50%	1.7	1.8	2.2	1.9	No	No
5	62+65 -Y1- (MD) 68+15 -Y1- (MD)	(2)Smith Creek	0.0	6.0	4.0	0.4	36	550	1.30%	1.1	1.6	1.4	1.7	No	No
5,14	68+15 -Y1- (MD) 72+15 -Y1- (MD)	(2)Smith Creek	0.0	6.0	4.0	0.5	50	400	1.30%	1.5	1.7	1.9	1.8	No	No
6	44+50 -L- (RT) 45+50 -L- (RT)	(2)Smith Creek	0.0	3.0	3.0	0.8	76	100	1.00%	1.1					No
8	13+00 -Y4- (LT) 14+00 -Y4- (LT)	(2)Smith Creek	0.0	3.0	3.0	0.1	9	100	2.50%	0.1	1.3	0.2	1.4	No	No
14	72+15 -Y1- (MD) 75+65 -Y1- (MD)	(2)Smith Creek	0.0	6.0	4.0	0.4	44	350	1.30%	1.3	1.6	1.6	1.7	No	No
14	75+65 -Y1- (MD) 80+15 -Y1- (MD)	(2)Smith Creek	0.0	6.0	4.0	0.6	56	450	1.30%	1.6	1.7	2.1	1.9	No	No
14	80+15 -Y1- (MD) 83+15 -Y1- (MD)	(2)Smith Creek	0.0	6.0	4.0	0.4	37	300	1.30%	1.1	1.6	1.4	1.7	No	No
14	80+50 -Y1- (LT) 80+80 -Y1- (LT)	(2)Smith Creek	0.0	4.0	3.0	0.1	8	30	2.40%	0.2	1.4	0.3	1.5	No	No
14,15	83+15 -Y1- (MD) 86+25 -Y1- (MD)	(2)Smith Creek	0.0	6.0	4.0	0.4	38	310	0.80%	1.1	1.3	1.4	1.4	No	No
15	86+25 -Y1- (MD) 89+65 -Y1- (MD)	(2)Smith Creek	0.0	6.0	4.0	0.4	41	340	0.80%	1.2	1.3	1.5	1.4	No	No
15	88+00 -Y1- (RT) 89+50 -Y1- (MD)	(2)Smith Creek	0.0	6.0	6.0	0.6	56	150	2.30%	1.4	2.0	1.7	2.1	No	No
15	89+65 -Y1- (MD) 92+65 -Y1- (MD)	(2)Smith Creek	0.0	6.0	4.0	0.4	35	300	0.90%	1.0	1.5	1.3	1.6	No	No

09/08/99

TIP PROJECT: U-5760

See Sheet 1B For Conventional Plan Sheet Symbols



VICINITY MAP

PERMIT DRAWING
SHEET 1 OF 28

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

FORSYTH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5760	1	

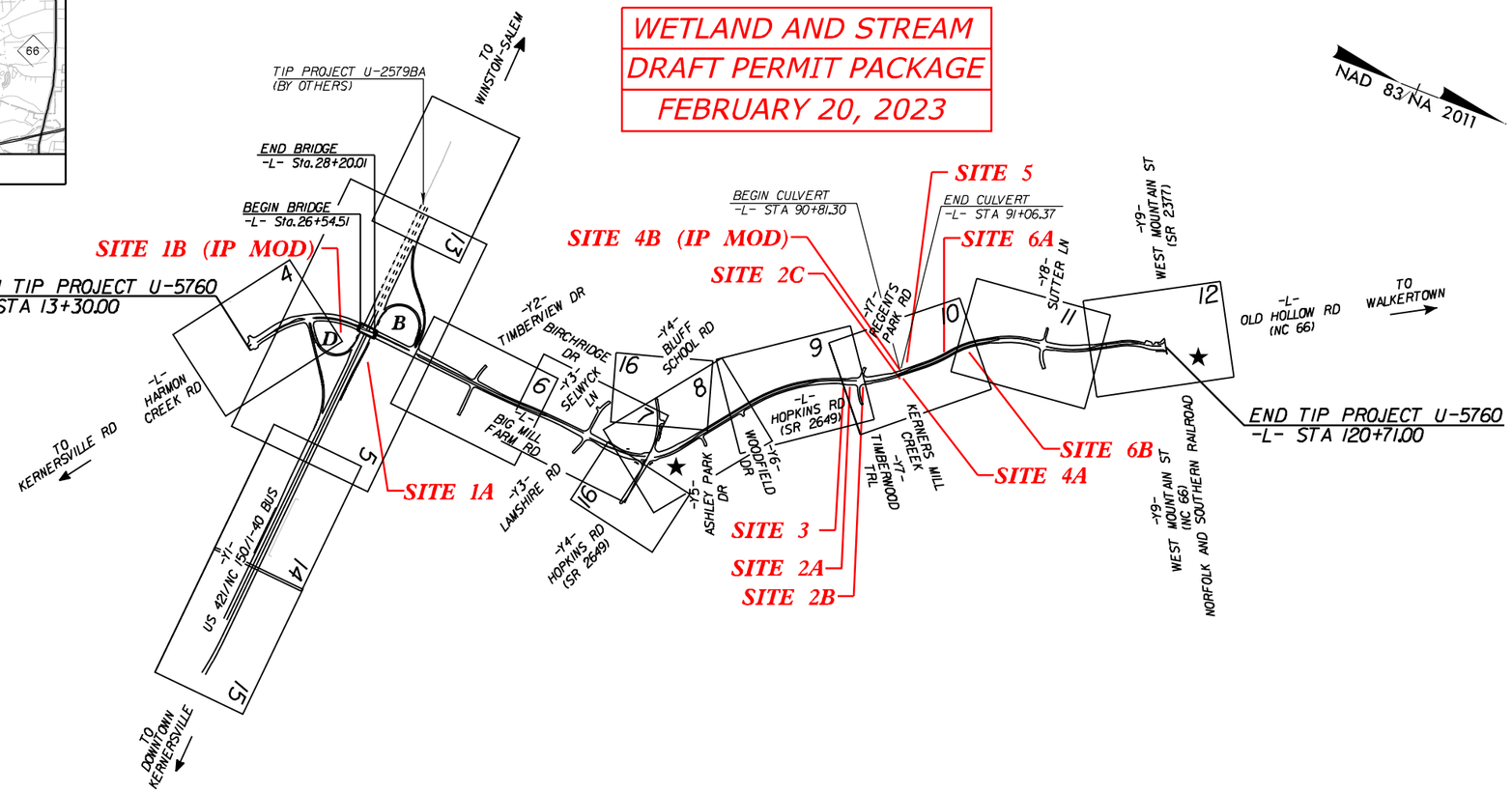
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
46381.1.1		P.E.
46381.2.1		R/W
46381.2.1		UTL
46381.3.1		CONST.

LOCATION: HOPKINS ROAD/BIG MILL FARM ROAD IN KERNERSVILLE FROM SOUTH OF US 421/I-40 BUS/NC 150 TO NC 66 (W MOUNTAIN ST)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS, CULVERTS, RETAINING WALLS, AND STRUCTURES

WETLAND AND STREAM
DRAFT PERMIT PACKAGE
FEBRUARY 20, 2023

NAD 83/NA 2011



★ TRAFFIC SIGNAL

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS LIMITED TO POINTS AS SHOWN ON THE PLANS
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF KERNERSVILLE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT:

$FILE$

$DATE$

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

5 2.5 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

AADT 2023	=	10,700
AADT 2040	=	14,900
K	=	10%
D	=	60%
T	=	3%*
V	=	50 MPH

* (TTST 1% + DUAL 2%)

FUNCTIONAL CLASSIFICATION:
URBAN COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5760	=	1.998 MILES
LENGTH STRUCTURES TIP PROJECT U-5760	=	0.036 MILES
TOTAL LENGTH TIP PROJECT U-5760	=	2.034 MILES

PLANS PREPARED FOR THE NCDOT BY:

Kimley»Horn

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 15, 2022

LETTING DATE:
APRIL 15, 2025

JEFFREY W. MOORE, P.E.
PROJECT ENGINEER

EVERETT J. LOVING, P.E.
PROJECT DESIGN ENGINEER

W. AL BLANTON, P.E., P.L.S.
PROJECT TEAM LEAD
NCDOT DIVISION 9

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

5/14/99

REVISIONS

$DATE$

Kimley»Horn ©2020
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

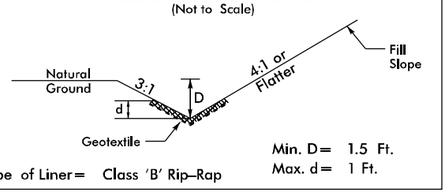
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	2D-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PERMIT DRAWING
SHEET 2 OF 28

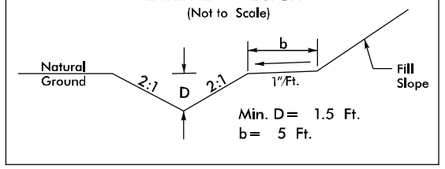
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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



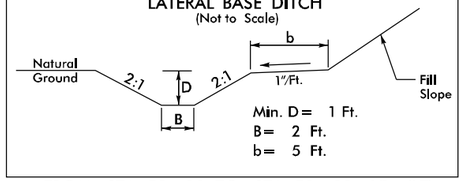
FROM STA. 60+10 TO STA. 61+50 –Y1– (RT)

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



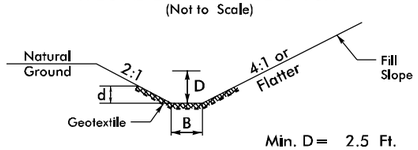
FROM STA. 58+90 TO STA. 59+50 –Y1– (LT)

DETAIL 3
LATERAL BASE DITCH
(Not to Scale)



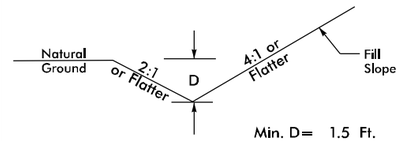
FROM STA. 58+30 TO STA. 58+80 –Y1– (LT)

DETAIL 4
SPECIAL LATERAL BASE DITCH
(Not to Scale)



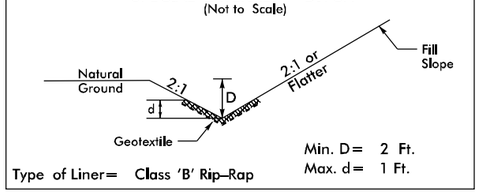
FROM STA. 16+15 TO STA. 17+00 –Y1RPB– (LT)

DETAIL 5
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



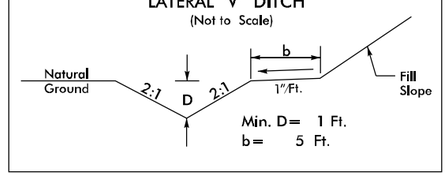
FROM STA. 29+50 TO STA. 32+00 –L– (LT)
FROM STA. 46+00 TO STA. 47+25 –L– (RT)
FROM STA. 51+50 TO STA. 52+10 –L– (RT)
FROM STA. 103+30 TO STA. 106+00 –L– (LT)
FROM STA. 111+85 TO STA. 116+50 –L– (LT)
FROM STA. 80+50 TO STA. 80+80 –Y1– (LT)
FROM STA. 94+00 TO STA. 97+00 –Y1– (LT)
FROM STA. 14+57 TO STA. 15+85 –Y1RPB– (RT)
FROM STA. 13+35 TO STA. 15+00 –Y1LPD– (LT)

DETAIL 6
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



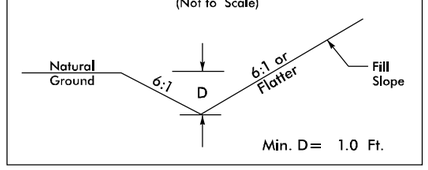
FROM STA. 29+00 TO STA. 29+50 –L– (LT)
FROM STA. 54+40 TO STA. 55+75 –L– (RT)

DETAIL 7
LATERAL 'V' DITCH
(Not to Scale)



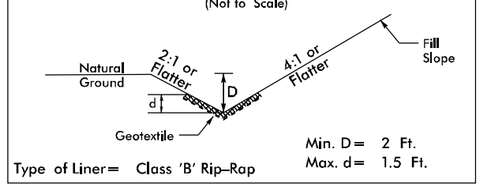
FROM STA. 28+35 TO STA. 29+00 –L– (LT)

DETAIL 8
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



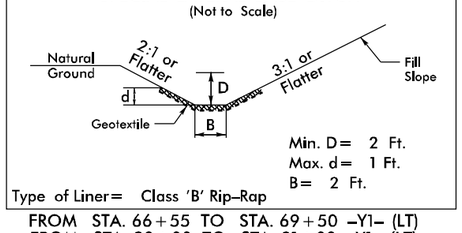
FROM STA. 88+00 TO STA. 89+50 –Y1– (RT)

DETAIL 9
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



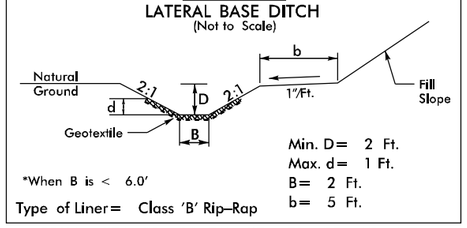
FROM STA. 80+80 TO STA. 82+00 –Y1– (LT)
FROM STA. 89+50 TO STA. 90+00 –Y1– (LT)
FROM STA. 10+31.24 TO STA. 11+00 –Y1RPD– (LT)

DETAIL 10
SPECIAL LATERAL BASE DITCH
(Not to Scale)



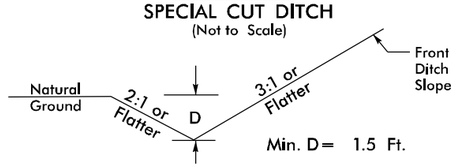
FROM STA. 66+55 TO STA. 69+50 –Y1– (LT)
FROM STA. 90+00 TO STA. 91+00 –Y1– (LT)

DETAIL 11
LATERAL BASE DITCH
(Not to Scale)



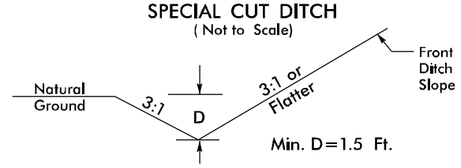
FROM STA. 91+00 TO STA. 91+50 –Y1– (LT)

DETAIL 12
SPECIAL CUT DITCH
(Not to Scale)



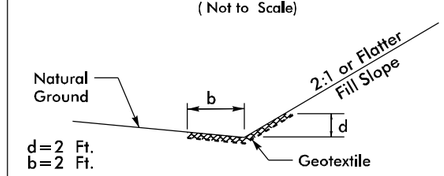
FROM STA. 47+25 TO STA. 48+25 –L– (RT)
FROM STA. 49+00 TO STA. 51+50 –L– (RT)
FROM STA. 55+75 TO STA. 58+00 –L– (RT)
FROM STA. 111+65 TO STA. 114+00 –L– (RT)

DETAIL 13
SPECIAL CUT DITCH
(Not to Scale)



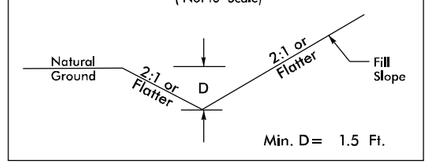
FROM STA. 43+00 TO STA. 44+50 –L– (RT)
FROM STA. 44+50 TO STA. 45+50 –L– (RT)
FROM STA. 14+10 TO STA. 15+75 –Y2– (LT)
FROM STA. 15+75 TO STA. 17+00 –Y2– (LT)

DETAIL 14
TOE PROTECTION
(Not to Scale)



FROM STA. 65+00 TO STA. 67+00 –L– (RT)
FROM STA. 109+50 TO STA. 111+50 –L– (RT)
FROM STA. 101+50 TO STA. 101+98 –L– (LT)
FROM STA. 14+00 TO STA. 15+15 –Y8– (LT)
FROM STA. 15+50 TO STA. 15+95 –Y8– (LT)
FROM STA. 19+00 TO STA. 21+00 –Y1RPB– (LT)

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



FROM STA. 35+00 TO STA. 37+00 –L– (RT)
FROM STA. 37+00 TO STA. 38+50 –L– (RT)
FROM STA. 58+00 TO STA. 60+20 –L– (RT)
FROM STA. 96+00 –L– TO STA. 98+00 –L– (RT)
FROM STA. 13+00 TO STA. 14+00 –Y4– (LT)
FROM STA. 19+85 TO STA. 20+00 –Y4– (RT)
FROM STA. 10+50 TO STA. 11+50 –Y5– (RT)
FROM STA. 12+35 TO STA. 13+50 –Y7– (RT)
FROM STA. 14+87 TO STA. 16+70 –Y7– (RT)

5/14/99

REVISIONS

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
U-5760	2D-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

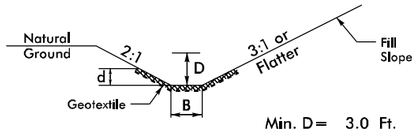
Kimley»Horn ©2020
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 3 OF 28

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DETAIL 16
SPECIAL LATERAL BASE DITCH
(Not to Scale)

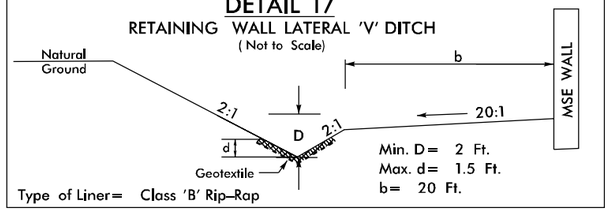


Min. D= 3.0 Ft.
Max. d= 2.5 Ft.
B= 3.0 Ft.

Type of Liner= Class I Rip–Rap

FROM STA. 83+50 TO STA. 85+75 –L– (RT)
FROM STA. 90+00 TO STA. 90+75 –L– (RT)

DETAIL 17
RETAINING WALL LATERAL 'V' DITCH
(Not to Scale)

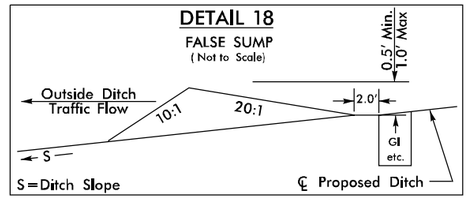


Min. D= 2 Ft.
Max. d= 1.5 Ft.
b= 20 Ft.

Type of Liner= Class 'B' Rip–Rap

FROM STA. 22+25 TO STA. 26+50 –L– (LT)

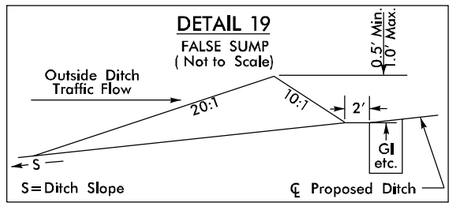
DETAIL 18
FALSE SUMP
(Not to Scale)



S=Ditch Slope ℄ Proposed Ditch

STA. 42+70 –Y1– (LT)
STA. 47+85 –Y1– (LT)
STA. 51+00 –Y1– (LT)
STA. 72+28 –Y1– (LT)
STA. 12+50 –Y1RPB– (LT)
STA. 14+45 –Y1RPB– (LT)
STA. 15+85 –Y1RPB– (RT)

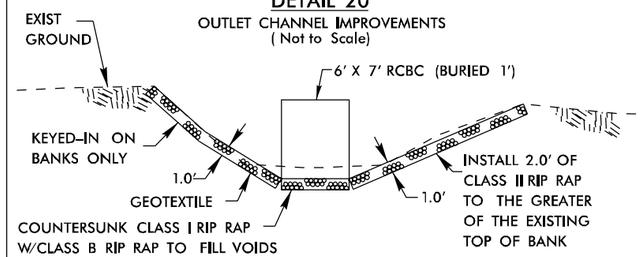
DETAIL 19
FALSE SUMP
(Not to Scale)



S=Ditch Slope ℄ Proposed Ditch

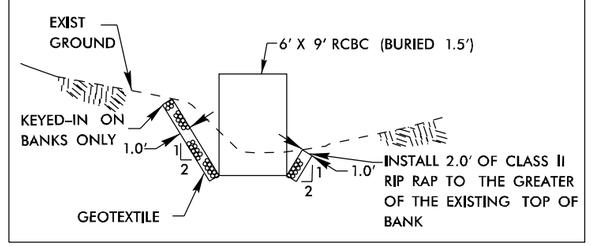
STA. 19+15 –Y1RPD– (LT)
STA. 18+00 –Y1RPD– (RT)
STA. 16+65 –Y1RPD– (LT)

DETAIL 20
OUTLET CHANNEL IMPROVEMENTS
(Not to Scale)



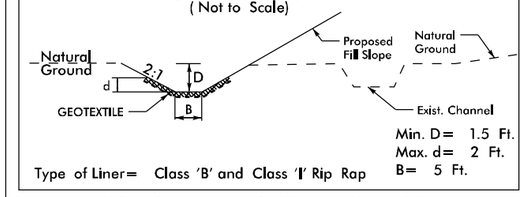
STA. 22+20 –L– (LT)

DETAIL 21
INLET CHANNEL IMPROVEMENTS
(Not to Scale)



STA. 58+75 –Y1– (LT)

DETAIL 22
CHANNEL CHANGE
(Not to Scale)

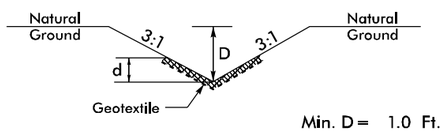


Min. D= 1.5 Ft.
Max. d= 2 Ft.
B= 5 Ft.

Type of Liner= Class 'B' and Class 'I' Rip Rap

FROM STA. 98+00 TO STA. 98+65 –L– (RT)

DETAIL 23
STANDARD 'V' DITCH
(Not to Scale)

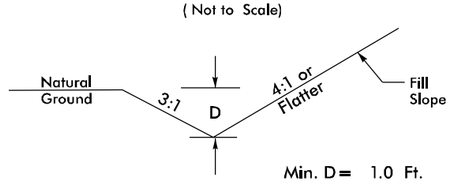


Min. D= 1.0 Ft.
Max. d= 1.0 Ft.

Type of Liner= Class 'B' Rip–Rap

STA. 22+00 –Y1RPB– (LT)

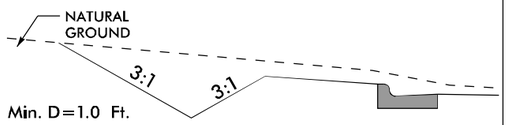
DETAIL 24
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.0 Ft.

FROM STA. 80+50 TO STA. 82+30 –L– (LT)

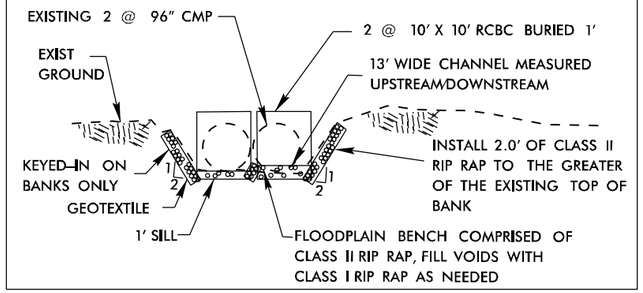
DETAIL 25
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



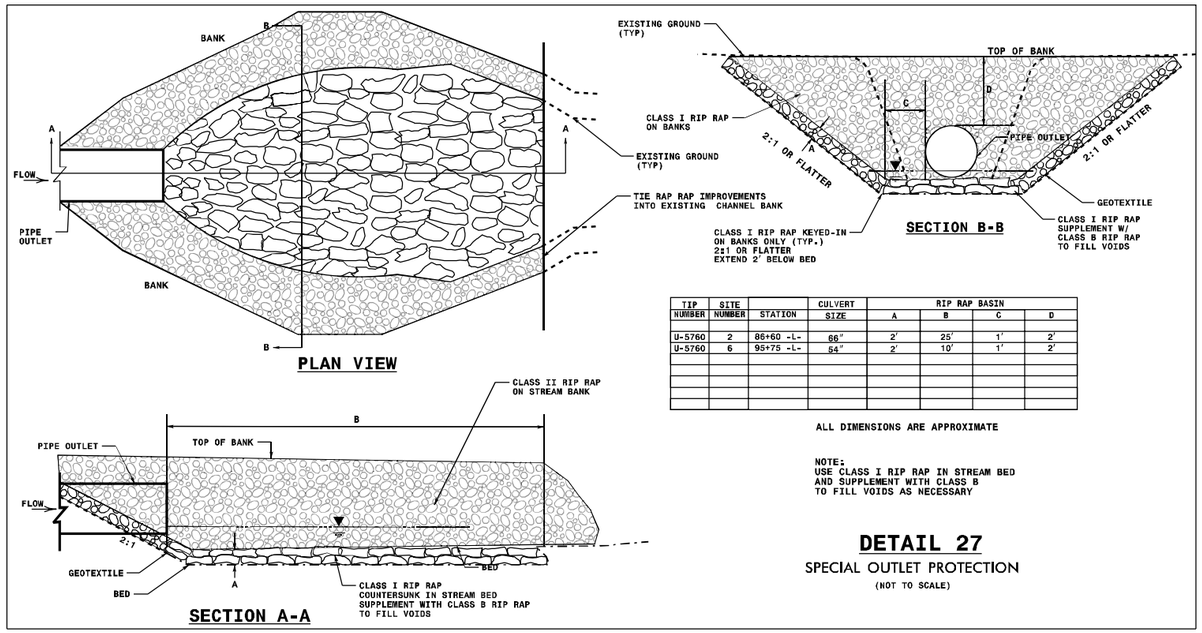
Min. D=1.0 Ft.

FROM STA. 82+75 TO STA. 83+00 –L– (LT)
FROM STA. 83+50 TO STA. 85+90 –L– (LT)

DETAIL 26
INLET /OUTLET CHANNEL IMPROVEMENTS
(Not to Scale)



91+00 –L–

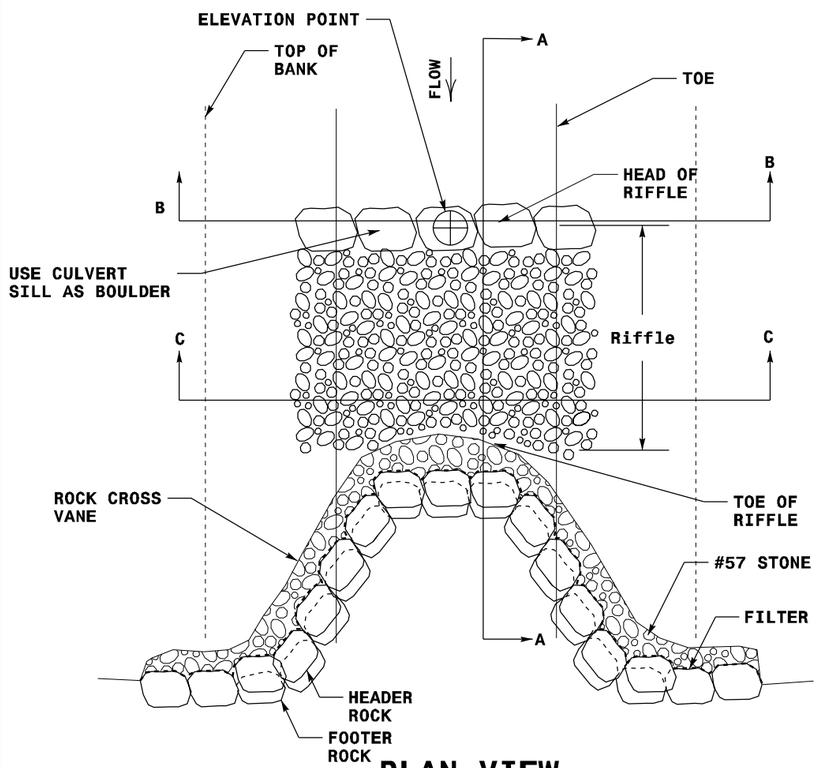


TIP NUMBER	SITE NUMBER	STATION	CULVERT SIZE	RIP RAP BASIN A	B	C	D
U-5760	2	86+60 -L-	66"	2'	25'	1'	2'
U-5760	6	95+75 -L-	54"	2'	10'	1'	2'

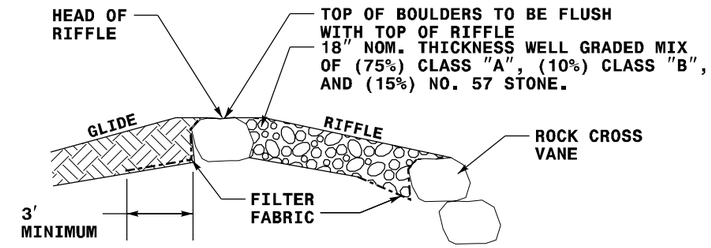
ALL DIMENSIONS ARE APPROXIMATE

NOTE:
USE CLASS I RIP RAP IN STREAM BED AND SUPPLEMENT WITH CLASS B TO FILL VOIDS AS NECESSARY

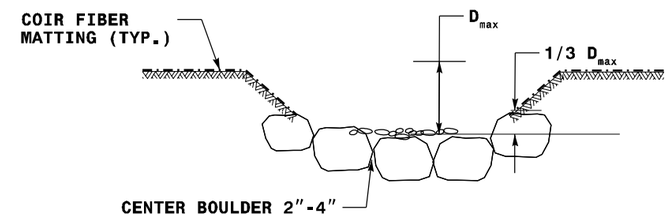
DETAIL 27
SPECIAL OUTLET PROTECTION
(NOT TO SCALE)



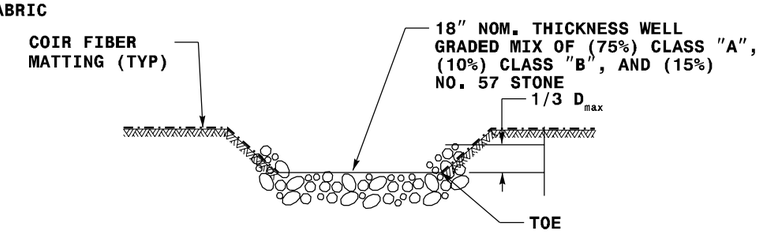
PLAN VIEW



SECTION A-A



SECTION B-B



SECTION C-C

REACH	1
Wbkf (ft)	24.6
Dmax (ft)	2.1

NOTE:
BOULDER SHOULD BE NATIVE STONES OR SHOT ROCK, ANGULAR AND OBLONG, WITH AN AXIS APPROXIMATELY 3 L_x, 2.5 W_x, 2 D

CONSTRUCTED RIFFLE DETAIL

NOT TO SCALE

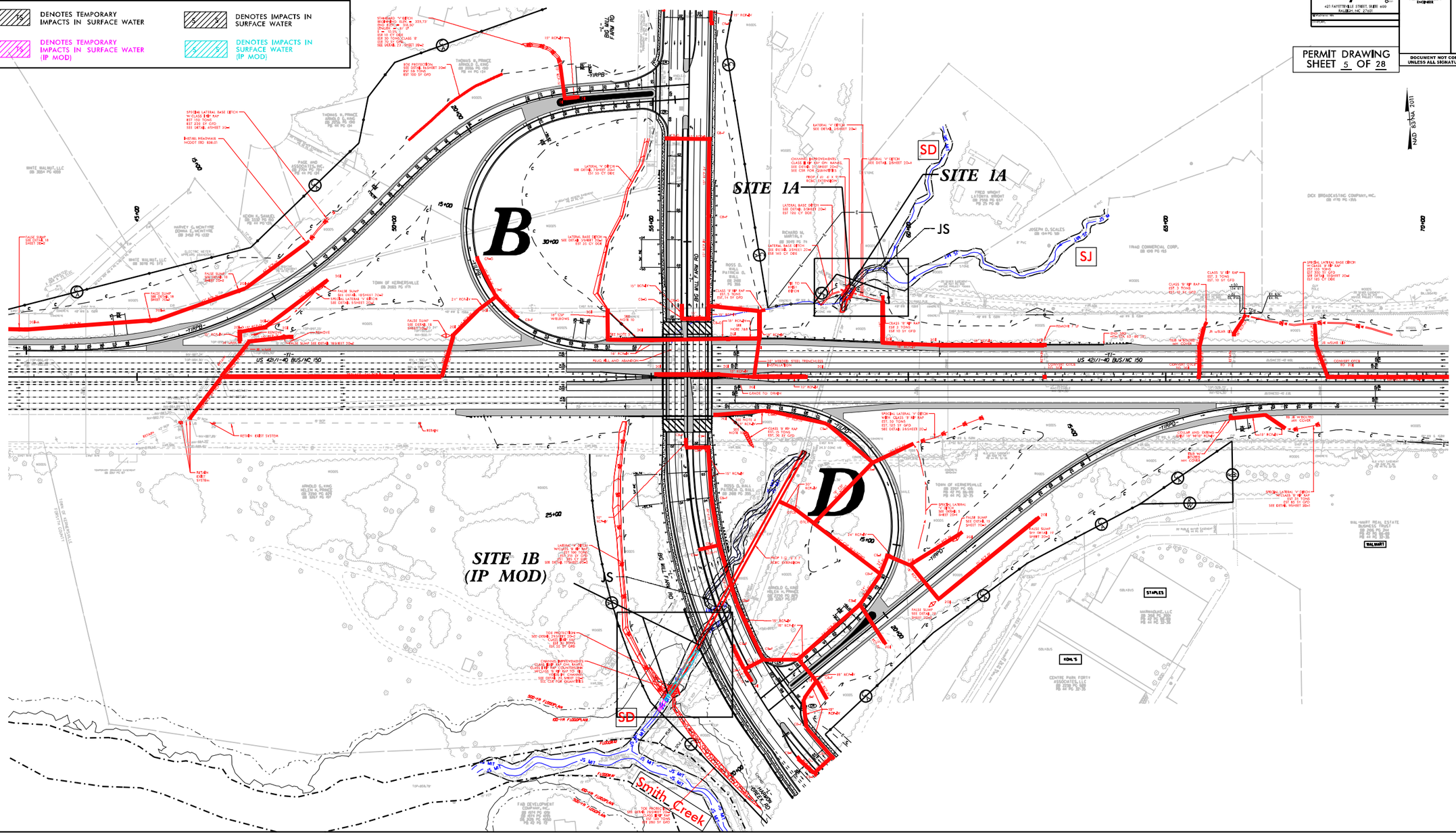
REVISIONS

5/14/99

$DATE$

LEGEND

- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER (IP MOD)
- DENOTES IMPACTS IN SURFACE WATER (IP MOD)



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421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

PROJECT REFERENCE NO.	SHEET NO.
U-5702	5
ROADWAY DESIGN ENGINEER	STRUCTURES ENGINEER

PERMIT DRAWING
SHEET 5 OF 28

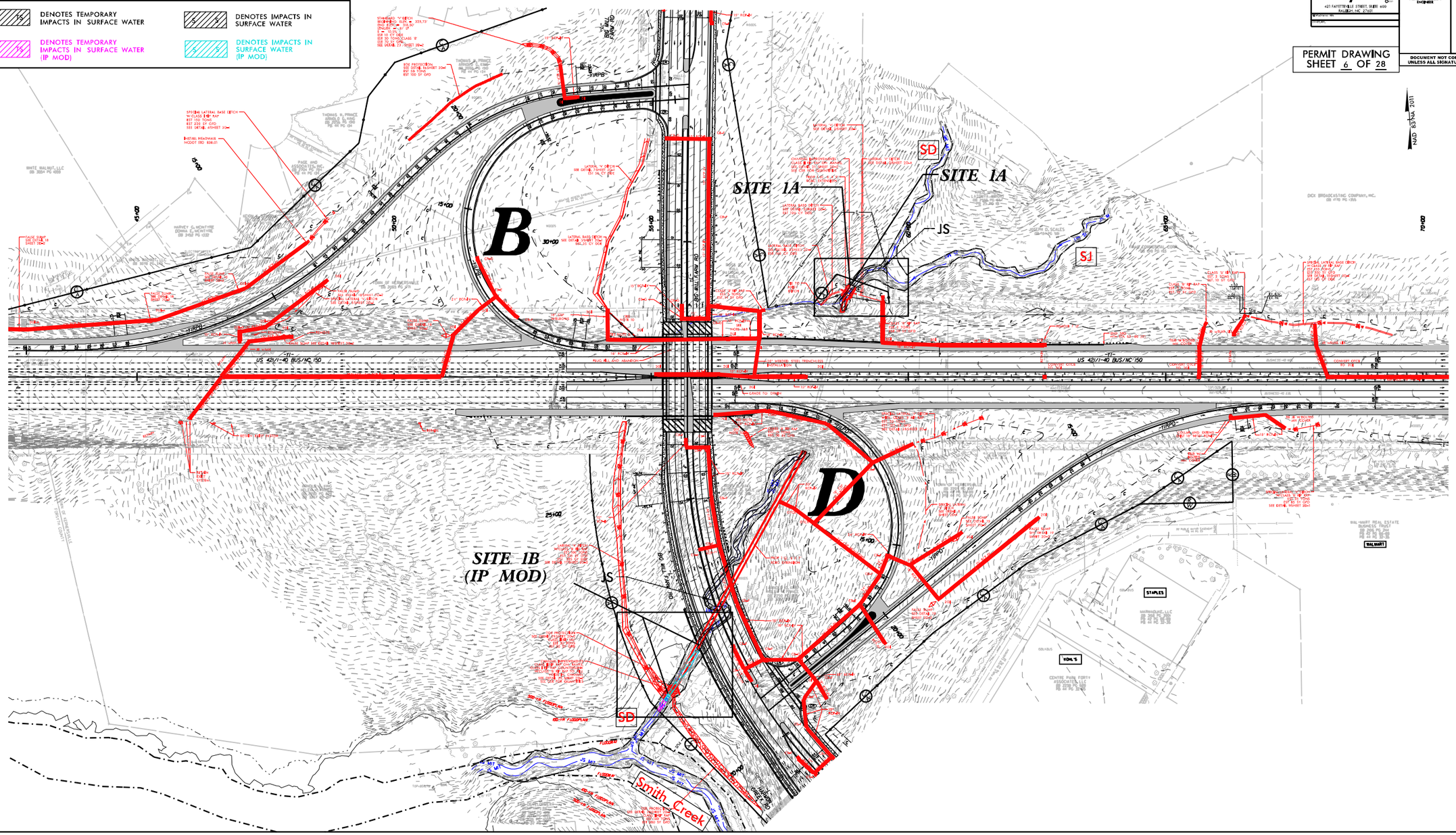
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

$DATE$

LEGEND

TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER	S / S — DENOTES IMPACTS IN SURFACE WATER
TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER (IP MOD)	S / S — DENOTES IMPACTS IN SURFACE WATER (IP MOD)



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PROJECT REFERENCE NO.	SHEET NO.
U-5702	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 6 OF 28

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REVISIONS

$DATE$

LEGEND

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER	S S DENOTES IMPACTS IN SURFACE WATER

5/14/99

REVISIONS

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RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 7 OF 28

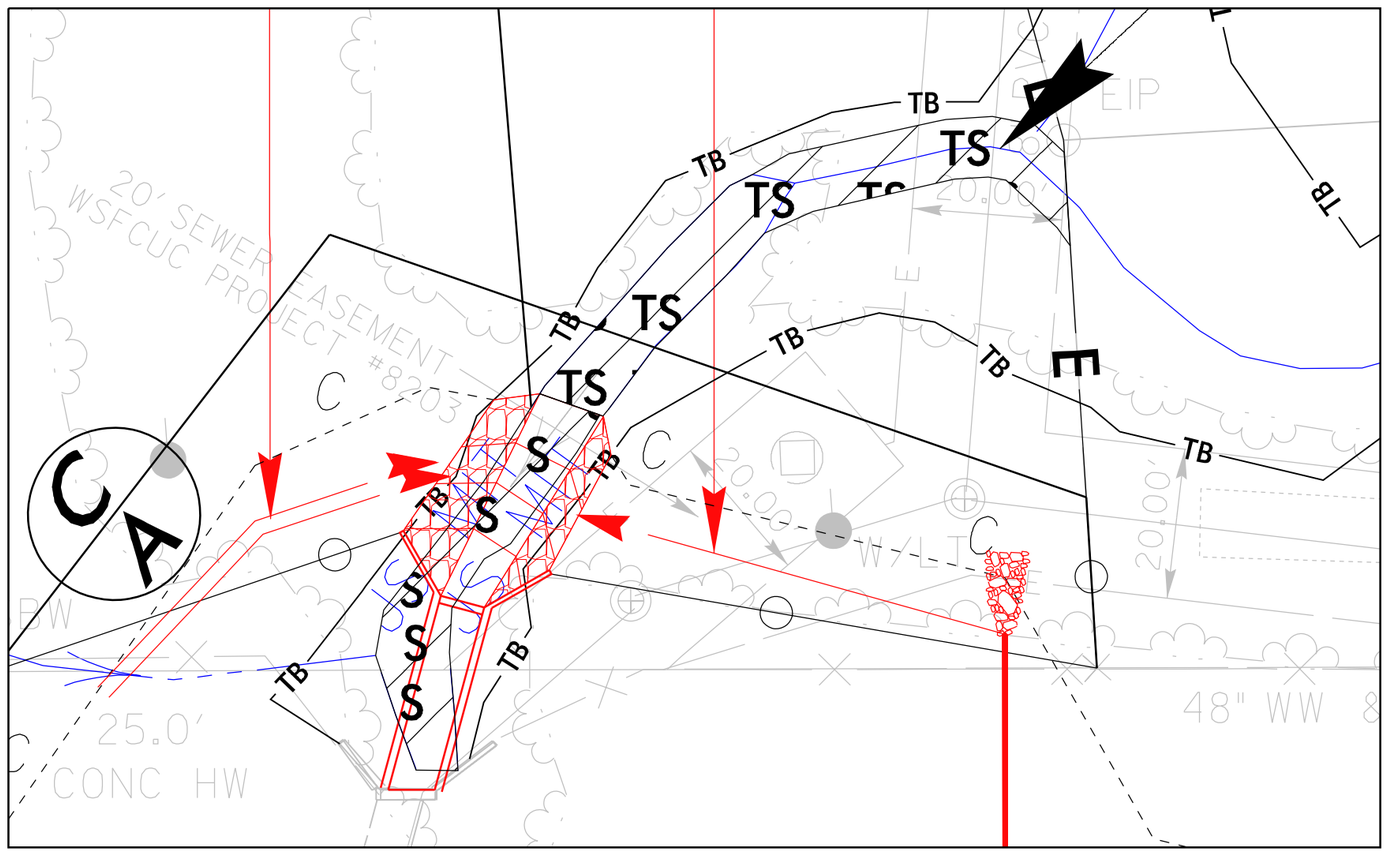
PROJECT REFERENCE NO.	SHEET NO.
U-5760	5A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NA 2011

SITE IMPACT ZOOM: 1"=20'



DETAIL SHEET FOR SITE 1A

$DATE$

LEGEND

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

5/14/99

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RIGHT-OF-WAY REV.

CONST. REV.

PERMIT DRAWING
SHEET 8 OF 28

PROJECT REFERENCE NO.	SHEET NO.
U-5760	5A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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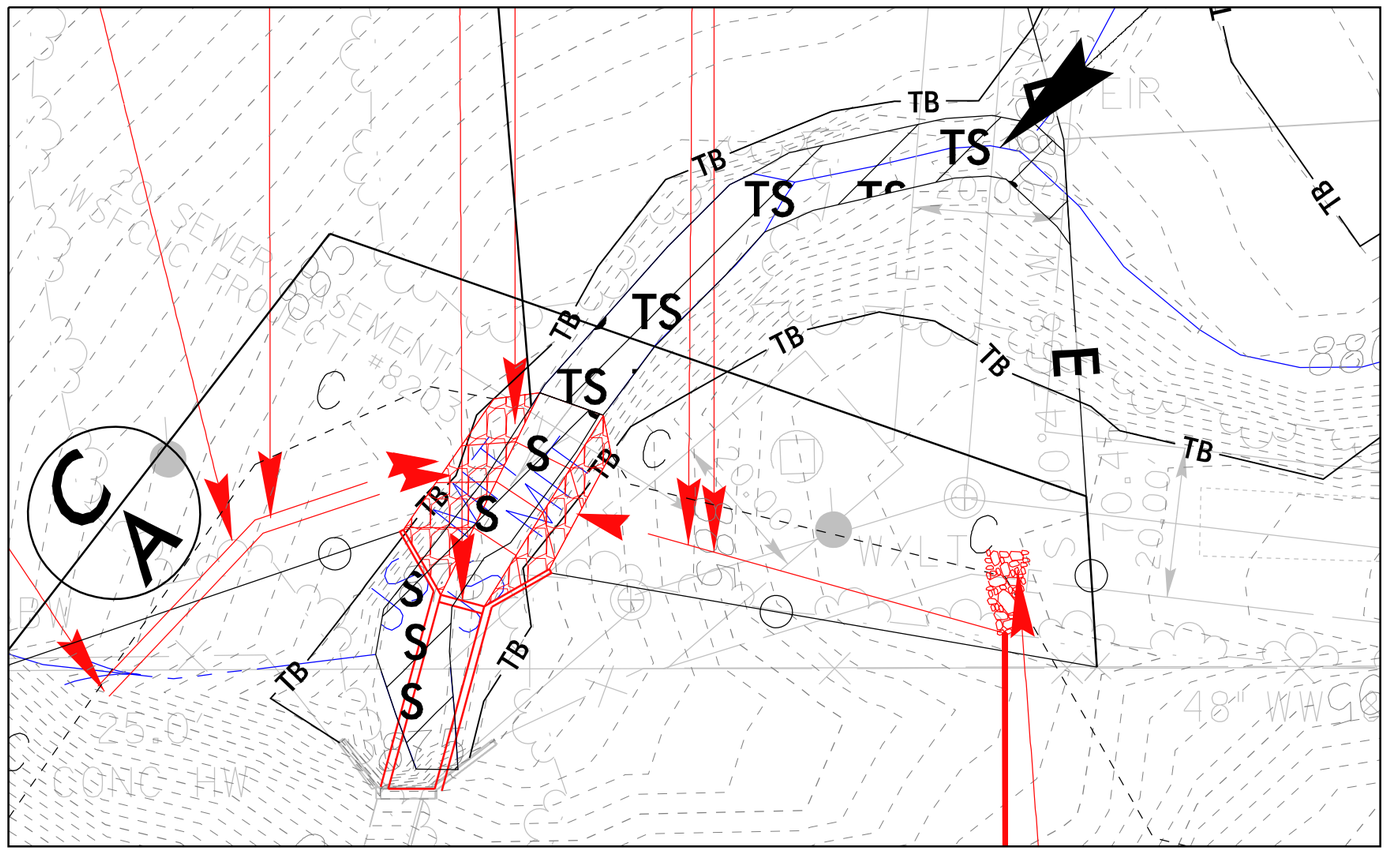
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NA 2011

SITE IMPACT ZOOM: 1"=20'



DETAIL SHEET FOR SITE 1A

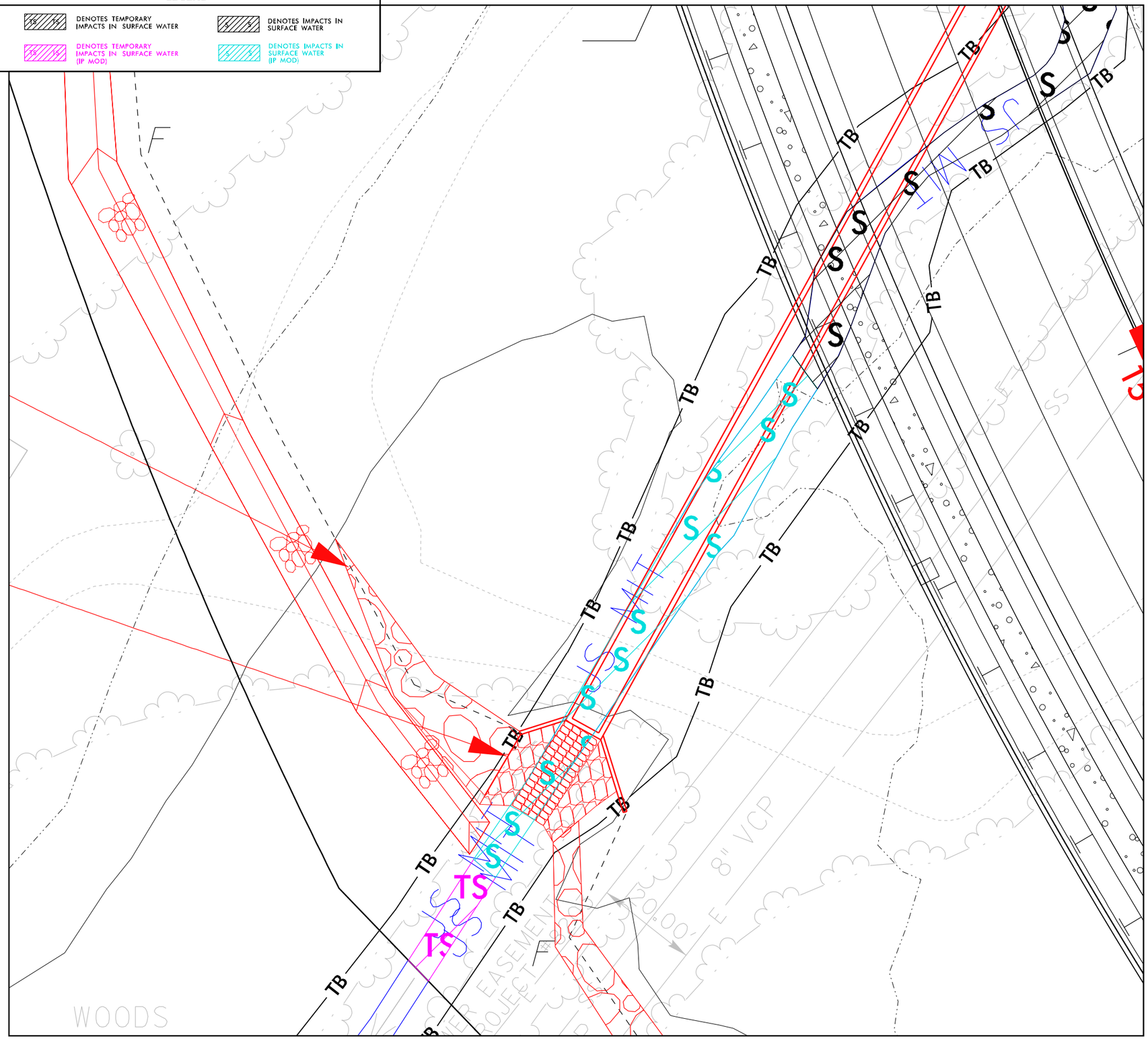
$DATE$

5/14/99

REVISIONS

LEGEND

- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- S S — DENOTES IMPACTS IN SURFACE WATER
- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER (IP MOD)
- S S — DENOTES IMPACTS IN SURFACE WATER (IP MOD)



NAD 83/NA 2011

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RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 9 OF 28

PROJECT REFERENCE NO.	SHEET NO.
U-5760	5B
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SITE IMPACT ZOOM: 1"=20'

DETAIL SHEET FOR SITE 1B (IP MOD)

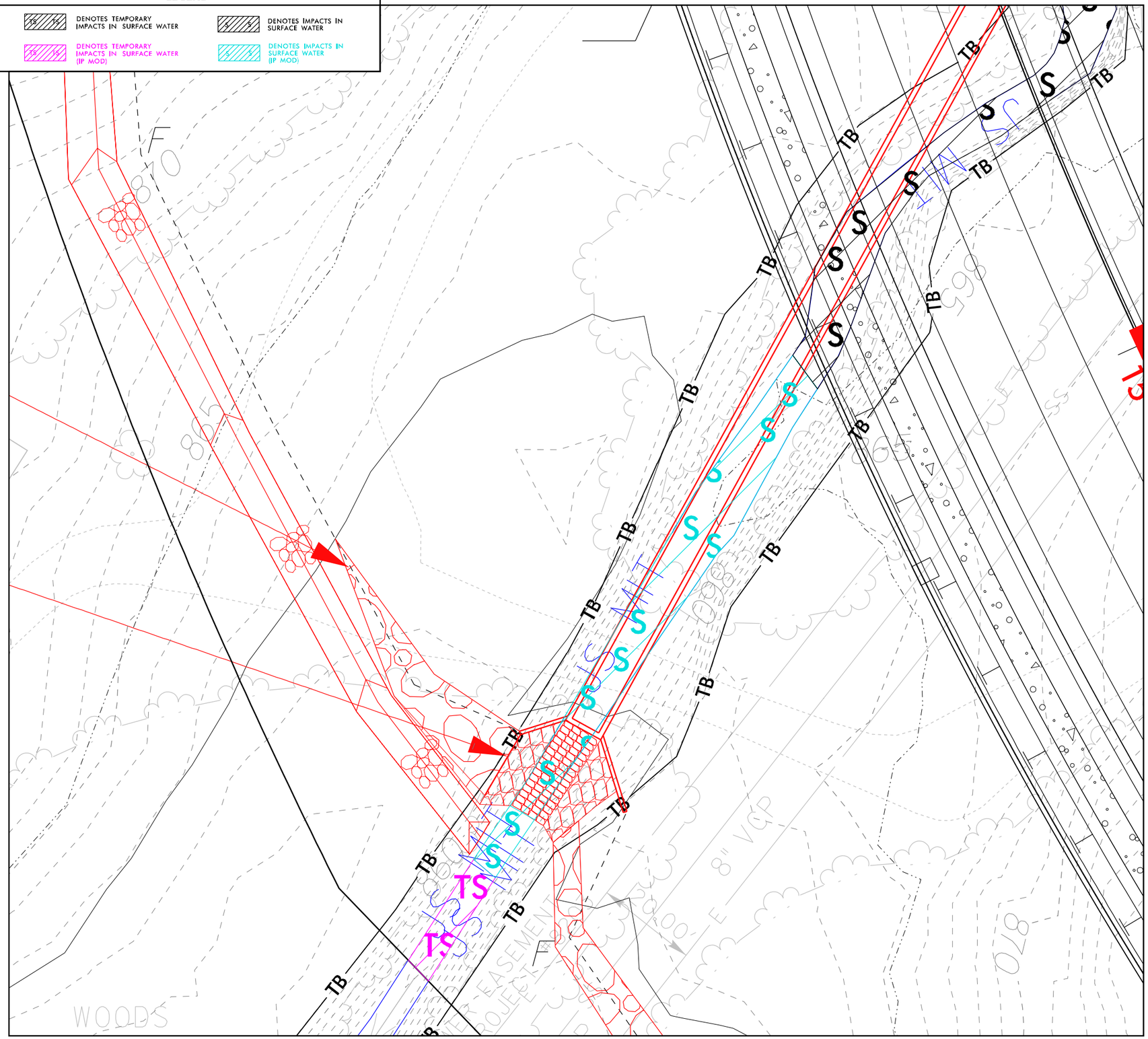
$DATE$

5/14/99

REVISIONS

LEGEND

- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- S S — DENOTES IMPACTS IN SURFACE WATER
- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER (IP MOD)
- S S — DENOTES IMPACTS IN SURFACE WATER (IP MOD)



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RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 10 OF 28

PROJECT REFERENCE NO.	SHEET NO.
U-5760	5B
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SITE IMPACT ZOOM: 1"=20'

DETAIL SHEET FOR SITE 1B (IP MOD)

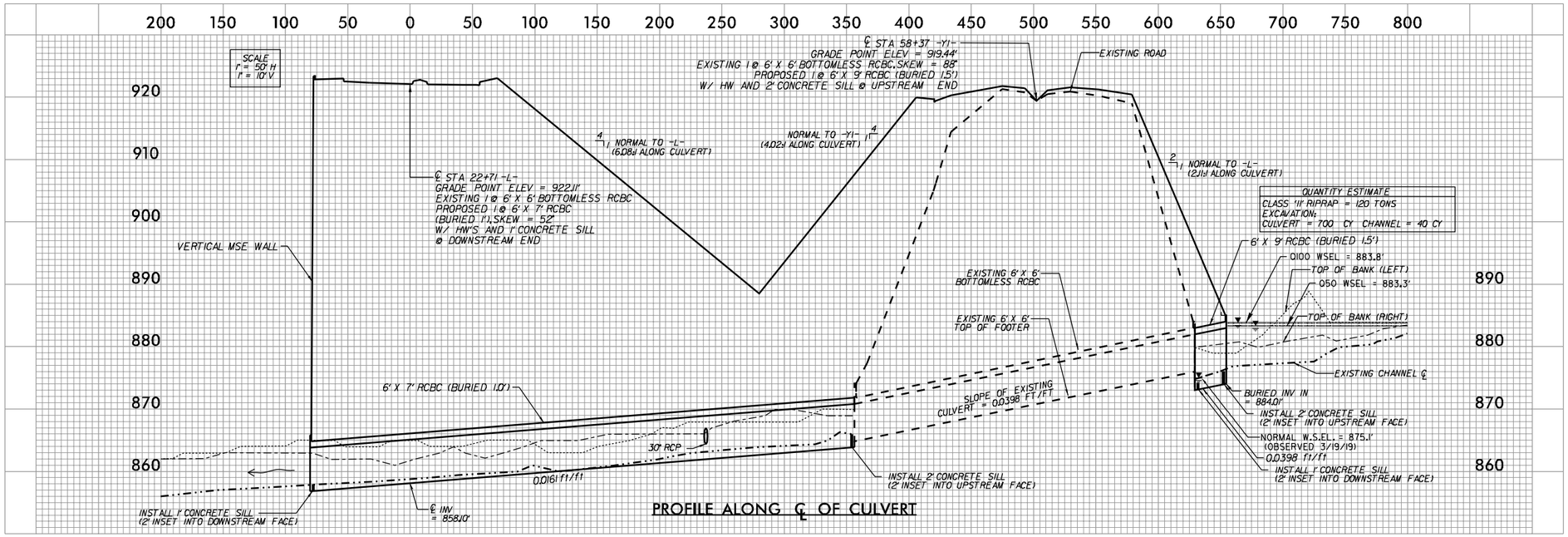
$DATE$

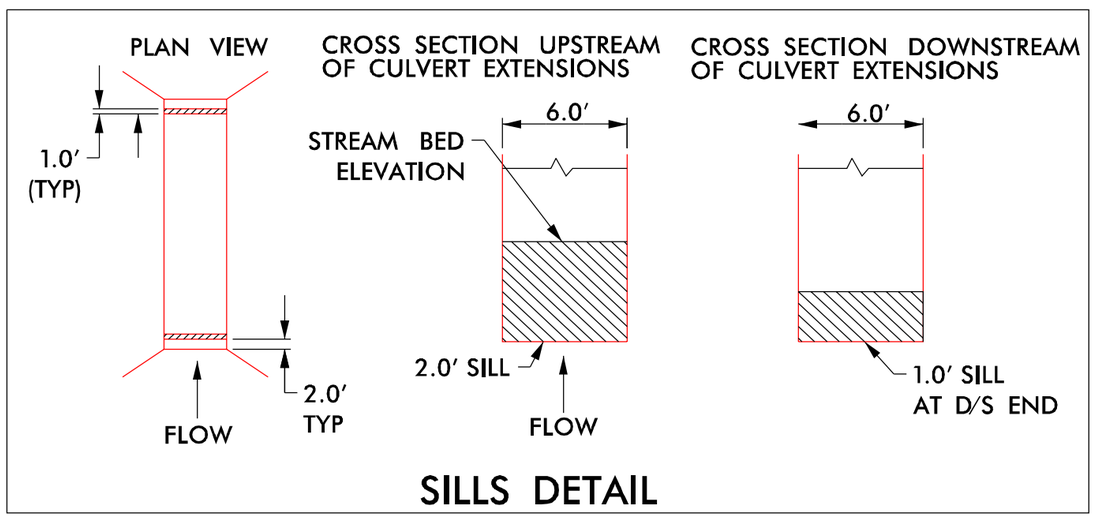
Kimley»Horn © 2020	PROJECT REFERENCE NO.	SHEET NO.
421 FAYETTEVILLE STREET, SUITE 600 RALEIGH, NC 27601	U-5760	
RIGHT-OF-WAY REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST. REV.		

PERMIT DRAWING
SHEET 11 OF 28

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SITE 1A /1B – CULVERT EXTENSION





SILLS DETAIL

NOTE: NATIVE BED MATERIAL SHALL BE PLACED IN THE PROPOSED CULVERT EXTENSIONS BETWEEN SILLS. NATIVE MATERIALS CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL. IF RIP RAP IS USED, THE NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FACILITATE ANIMAL PASSAGE. THE TOP SURFACE OF THE NATURAL STREAM BED MATERIAL SHALL BE PLACED AND LEVELED TO A FLAT SURFACE TO ALLOW FOR ANIMAL PASSAGE. NATIVE MATERIAL AND RIP RAP ARE SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

REVISIONS

5/14/99

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
U-5760	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 12 OF 28

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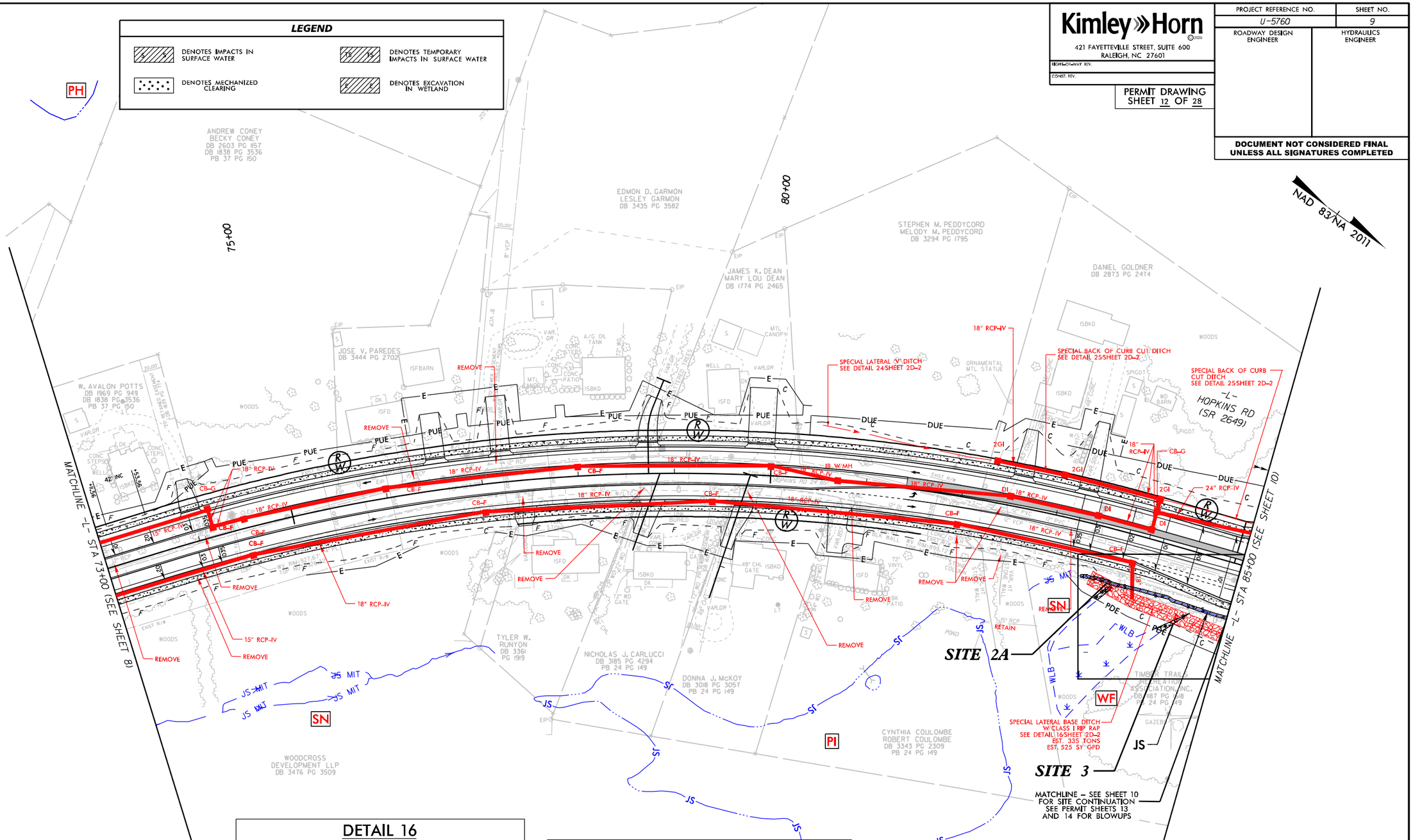
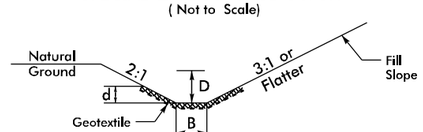


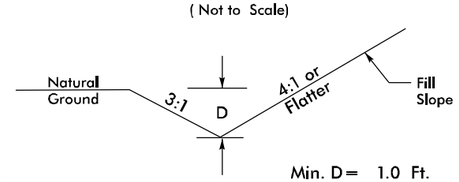
DETAIL 16
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D= 3.0 Ft.
Max. d= 2.5 Ft.
B= 3.0 Ft.
Type of Liner= Class I Rip-Rap

FROM STA. 83+50 TO STA. 85+75 -L- (RT)
FROM STA. 90+00 TO STA. 90+75 -L- (RT)

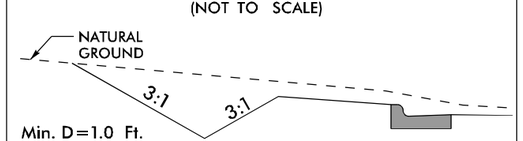
DETAIL 24
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.0 Ft.

FROM STA. 80+50 TO STA. 82+30 -L- (LT)

DETAIL 25
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



Min. D=1.0 Ft.

FROM STA. 82+30 TO STA. 85+90 -L- (LT)

(44) HUNTER P. COFER
DB 3333 PG 2638

SEE SHEET 19 FOR -L- PROFILE
SEE SHEET 29 FOR -DRW2-, -DRW3- AND -DRW4- PROFILES

REVISIONS
ROW. REV. - 5/12/22 - ADJUSTED PUE ON PARCELS 40, 42, 43, 44, 46, 48 AND 50. - JWM
ROW. REV. - 8/11/22 - EXPANDED TCE ON PARCEL 43. - JWM

5/14/99

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
U-5760	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 13 OF 28

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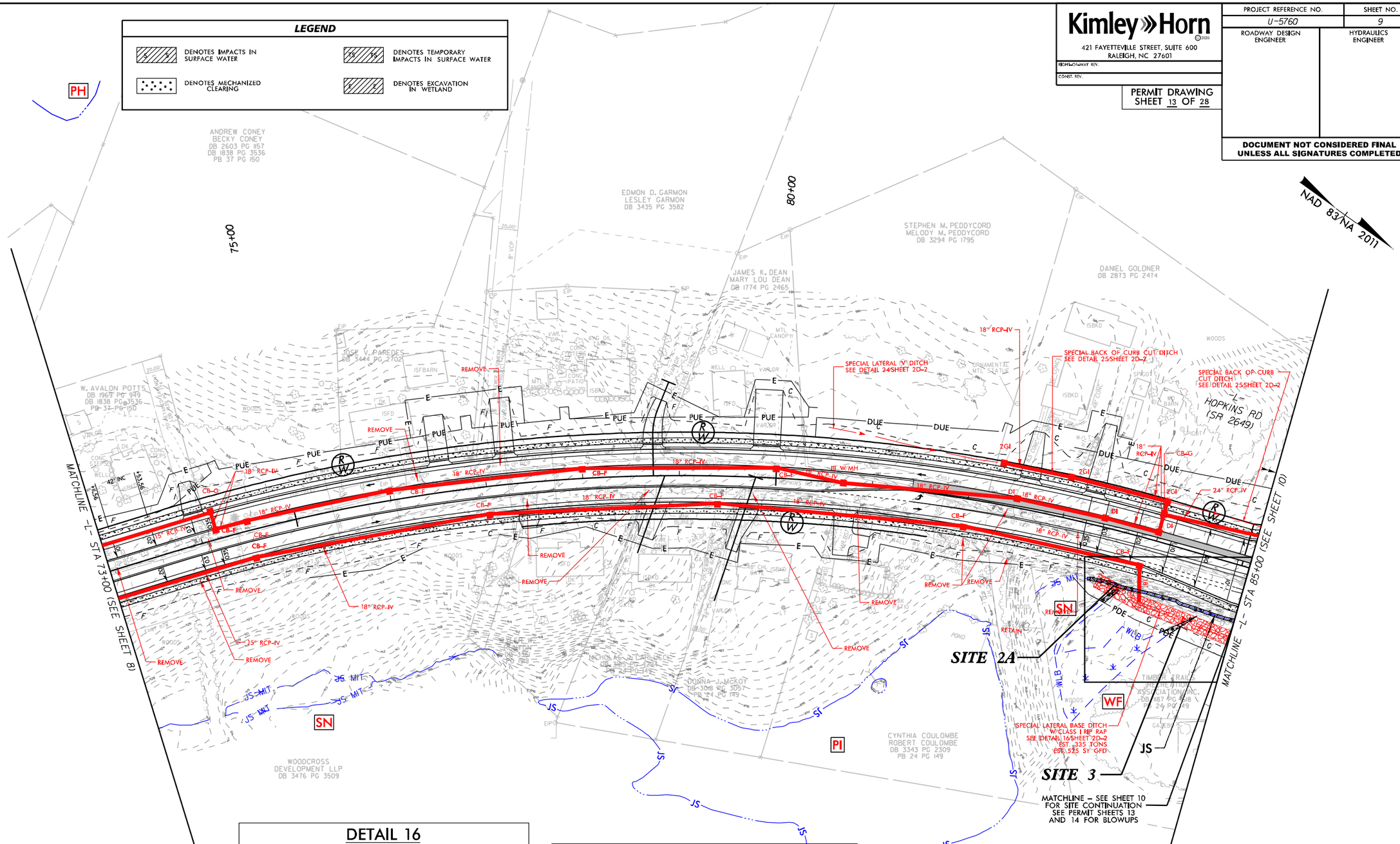
5/14/99

REVISIONS

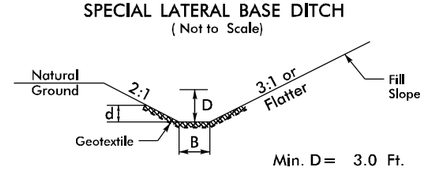
ROW. REV. – 5/12/22 – ADJUSTED PUE ON PARCELS 40, 42, 43, 44, 46, 48 AND 50. – JWM
ROW. REV. – 8/11/22 – EXPANDED TCE ON PARCEL 43. – JWM

LEGEND

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES EXCAVATION IN WETLAND



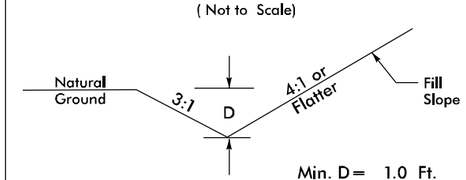
DETAIL 16
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D= 3.0 Ft.
Max. d= 2.5 Ft.
B= 3.0 Ft.
Type of Liner= Class I Rip-Rap

FROM STA. 83+50 TO STA. 85+75 –L– (RT)
FROM STA. 90+00 TO STA. 90+75 –L– (RT)

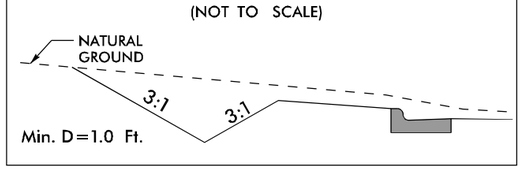
DETAIL 24
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.0 Ft.

FROM STA. 80+50 TO STA. 82+30 –L– (LT)

DETAIL 25
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



Min. D=1.0 Ft.

FROM STA. 82+30 TO STA. 85+90 –L– (LT)

(44) HUNTER P. COFER
DB 3333 PG 2638

SEE SHEET 19 FOR -L- PROFILE
SEE SHEET 29 FOR -DRW2-, -DRW3- AND -DRW4- PROFILES

$DATE$

LEGEND

DENOTES IMPACTS IN SURFACE WATER	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING	DENOTES EXCAVATION IN WETLAND

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RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 14 OF 28

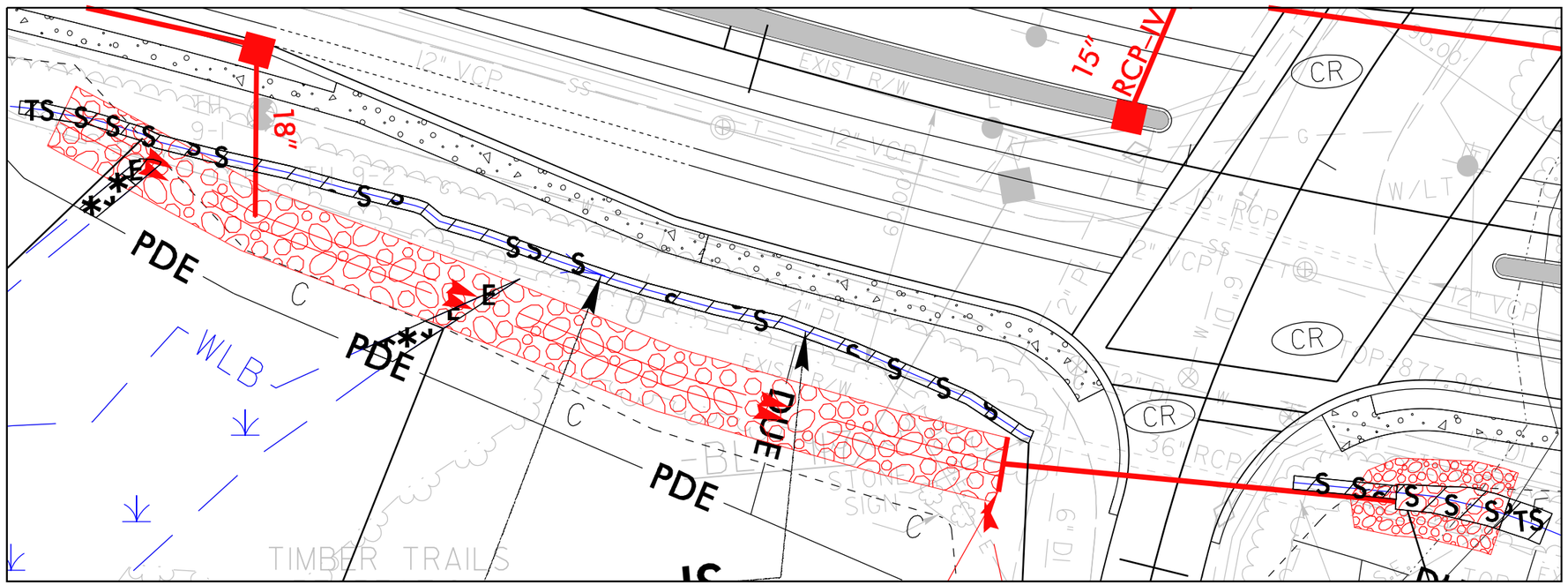
PROJECT REFERENCE NO.	SHEET NO.
U-5760	9A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NA 2011

SITE IMPACT ZOOM: 1"=30'



DETAIL SHEET FOR SITES 2A, 2B, 3

REVISIONS

5/14/99

$DATE$

5/14/99

REVISIONS

LEGEND

DENOTES IMPACTS IN SURFACE WATER	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING	DENOTES EXCAVATION IN WETLAND

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RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 15 OF 28

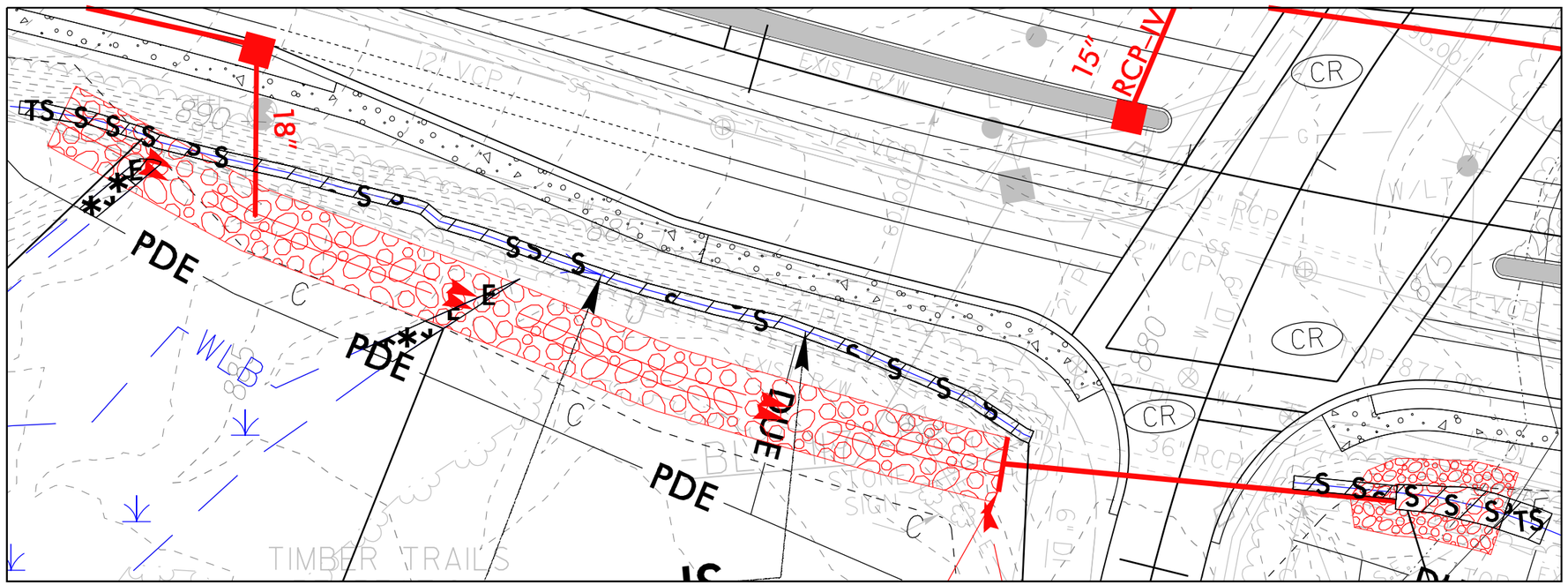
PROJECT REFERENCE NO.	SHEET NO.
U-5760	9A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NA 2011

SITE IMPACT ZOOM: 1"=30'

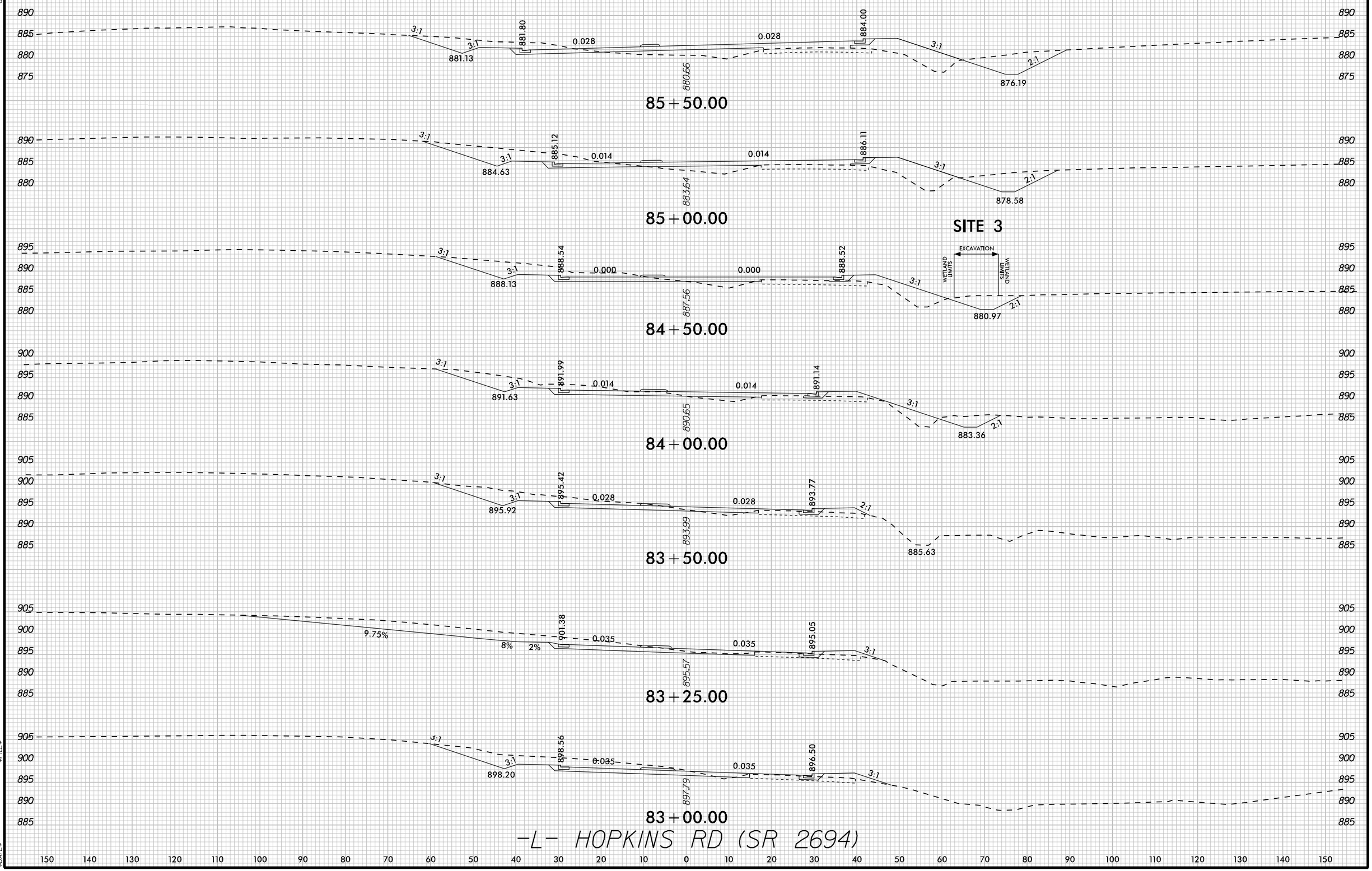


DETAIL SHEET FOR SITES 2A, 2B, 3

$DATE$

PERMIT DRAWING
SHEET 16 OF 28

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-5760	X-39



8/23/99

$FILE$

$DATE$

LEGEND

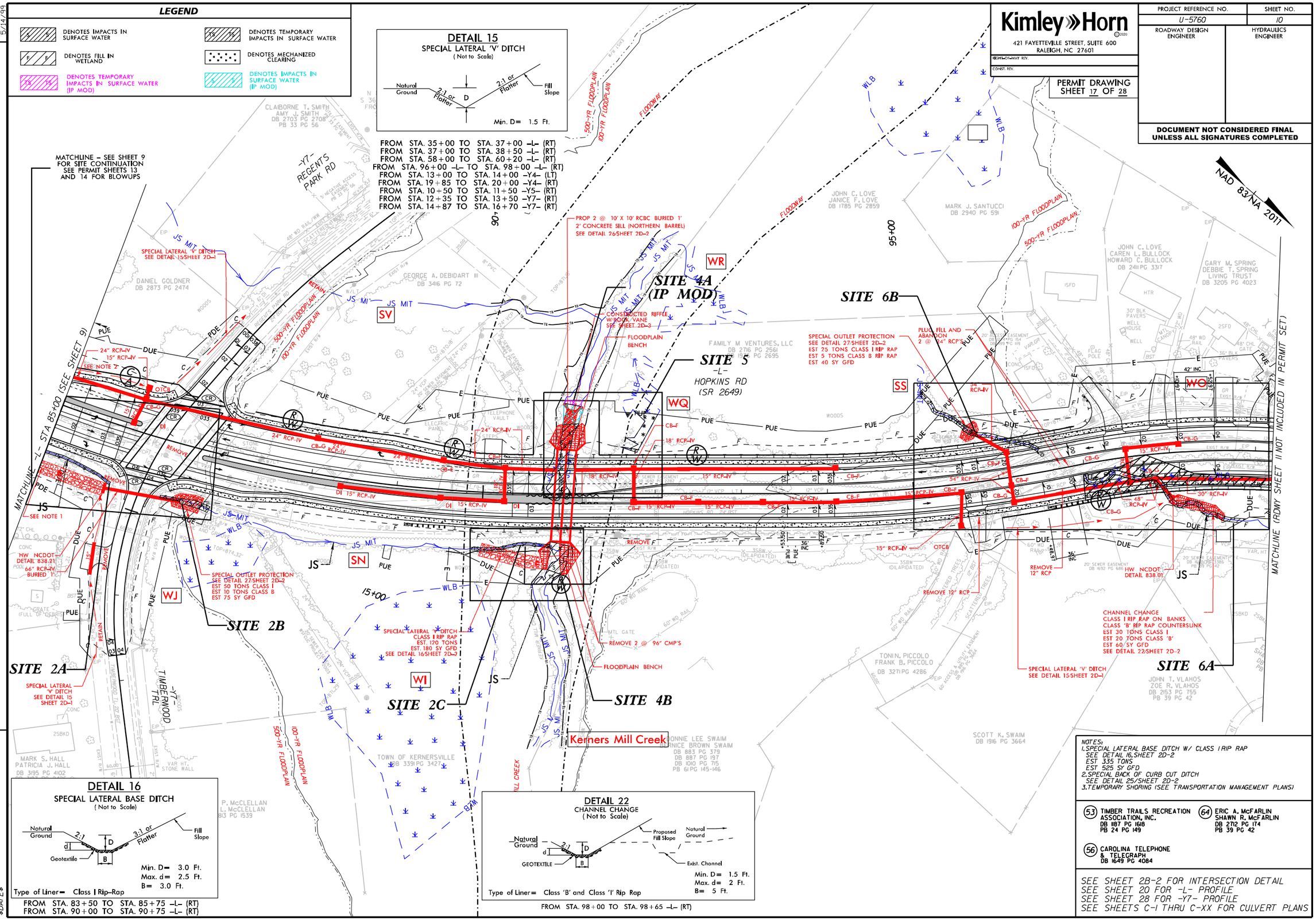
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES FILL IN WETLAND
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER (IP MOD)
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES IMPACTS IN SURFACE WATER (IP MOD)

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

Natural Ground — 2:1 or Flatter — D — 2:1 or Flatter — Fill Slope

Min. D= 1.5 Ft.

FROM STA. 35+00 TO STA. 37+00 –L– (RT)
FROM STA. 37+00 TO STA. 38+50 –L– (RT)
FROM STA. 58+00 TO STA. 60+20 –L– (RT)
FROM STA. 96+00 –L– TO STA. 98+00 –L– (RT)
FROM STA. 13+00 TO STA. 14+00 –Y4– (LT)
FROM STA. 19+85 TO STA. 20+00 –Y4– (RT)
FROM STA. 10+50 TO STA. 11+50 –Y5– (RT)
FROM STA. 12+35 TO STA. 13+50 –Y7– (RT)
FROM STA. 14+87 TO STA. 16+70 –Y7– (RT)



DETAIL 16
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground — 2:1 — D — 3:1 or Flatter — Fill Slope — d — Geotextile — B

Min. D= 3.0 Ft.
Max. d= 2.5 Ft.
B= 3.0 Ft.

Type of Liner= Class I Rip-Rap

FROM STA. 83+50 TO STA. 85+75 –L– (RT)
FROM STA. 90+00 TO STA. 90+75 –L– (RT)

DETAIL 22
CHANNEL CHANGE
(Not to Scale)

Natural Ground — 2:1 — D — d — GEOTEXTILE — B — Proposed Fill Slope — Natural Ground — Exist. Channel

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

Type of Liner= Class 'B' and Class 'I' Rip Rap

FROM STA. 98+00 TO STA. 98+65 –L– (RT)

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RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 17 OF 28

PROJECT REFERENCE NO.	SHEET NO.
U-5760	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTES:
1. SPECIAL LATERAL BASE DITCH W/ CLASS I RIP RAP
   SEE DETAIL 16/SHEET 2D-2
   EST 335 TONS
   EST 525 SY GFD
2. SPECIAL BACK OF CURB CUT DITCH
   SEE DETAIL 25/SHEET 2D-2
3. TEMPORARY SHORING (SEE TRANSPORTATION MANAGEMENT PLANS)

(53) TIMBER TRAILS RECREATION ASSOCIATION, INC.
DB 1187 PG 1618
PB 24 PG 149

(64) ERIC A. McFARLIN SHAWN R. McFARLIN
DB 2712 PG 174
PB 39 PG 42

(56) CAROLINA TELEPHONE & TELEGRAPH
DB 1649 PG 4084

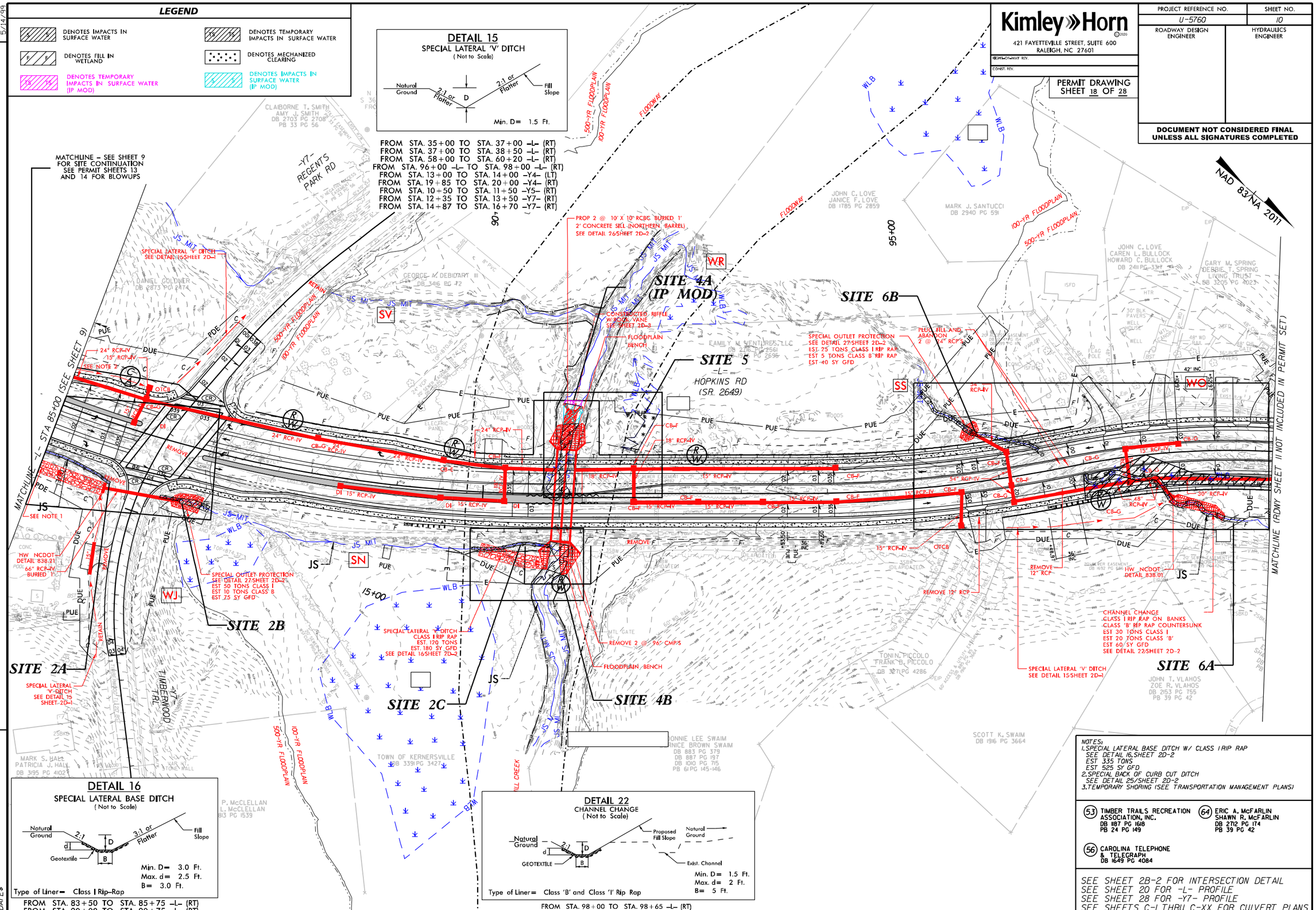
SEE SHEET 2B-2 FOR INTERSECTION DETAIL
SEE SHEET 20 FOR -L- PROFILE
SEE SHEET 28 FOR -Y7- PROFILE
SEE SHEETS C-1 THRU C-XX FOR CULVERT PLANS

REVISIONS 5/14/99

$DATE$

LEGEND

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER (IP MOD)
- DENOTES IMPACTS IN SURFACE WATER (IP MOD)



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

Natural Ground — 2:1 or Flatter — D — 2:1 or Flatter — Fill Slope

Min. D= 1.5 Ft.

DETAIL 16
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground — 2:1 — d — D — B — Geotextile — 3:1 or Flatter — Fill Slope

Min. D= 3.0 Ft.
Max. d= 2.5 Ft.
B= 3.0 Ft.

Type of Liner= Class I Rip-Rap

FROM STA. 83+50 TO STA. 85+75 -L- (RT)
FROM STA. 90+00 TO STA. 90+75 -L- (RT)

DETAIL 22
CHANNEL CHANGE
(Not to Scale)

Natural Ground — 2:1 — d — D — B — GEOTEXTILE — Proposed Fill Slope — Natural Ground — Exist. Channel

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

Type of Liner= Class 'B' and Class 'I' Rip Rap

FROM STA. 98+00 TO STA. 98+65 -L- (RT)

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RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 18 OF 28

PROJECT REFERENCE NO.	SHEET NO.
U-5760	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTES:
1. SPECIAL LATERAL BASE DITCH W/ CLASS I RIP RAP
SEE DETAIL 16, SHEET 2D-2
EST 335 TONS
EST 525 SY GFD
2. SPECIAL BACK OF CURB CUT DITCH
SEE DETAIL 25/SHEET 2D-2
3. TEMPORARY SHORING (SEE TRANSPORTATION MANAGEMENT PLANS)

(53) TIMBER TRAILS RECREATION ASSOCIATION, INC.
DB 1187 PG 1618
PB 24 PG 149

(64) ERIC A. McFARLIN
SHAWN R. McFARLIN
DB 2712 PG 174
PB 39 PG 42

(56) CAROLINA TELEPHONE & TELEGRAPH
DB 1649 PG 4084

SEE SHEET 2B-2 FOR INTERSECTION DETAIL
SEE SHEET 20 FOR -L- PROFILE
SEE SHEET 28 FOR -Y7- PROFILE
SEE SHEETS C-1 THRU C-XX FOR CULVERT PLANS

REVISIONS

5/14/99

$DATE$

5/14/99

REVISIONS

LEGEND

DENOTES IMPACTS IN SURFACE WATER	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND	DENOTES MECHANIZED CLEARING

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RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 19 OF 28

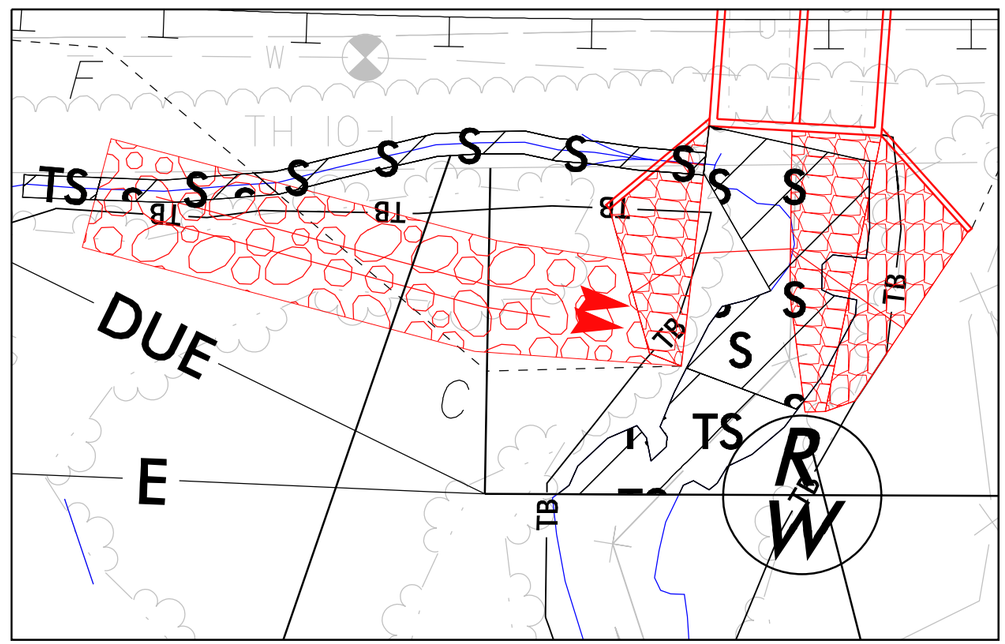
PROJECT REFERENCE NO.	SHEET NO.
U-5760	10A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NA 2011

SITE IMPACT ZOOM: 1"=20'



DETAIL SHEET FOR SITES 2C, 4B

$DATE$

5/14/99

REVISIONS

LEGEND

S S — DENOTES IMPACTS IN SURFACE WATER	TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F — DENOTES FILL IN WETLAND	DENOTES MECHANIZED CLEARING

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RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 20 OF 28

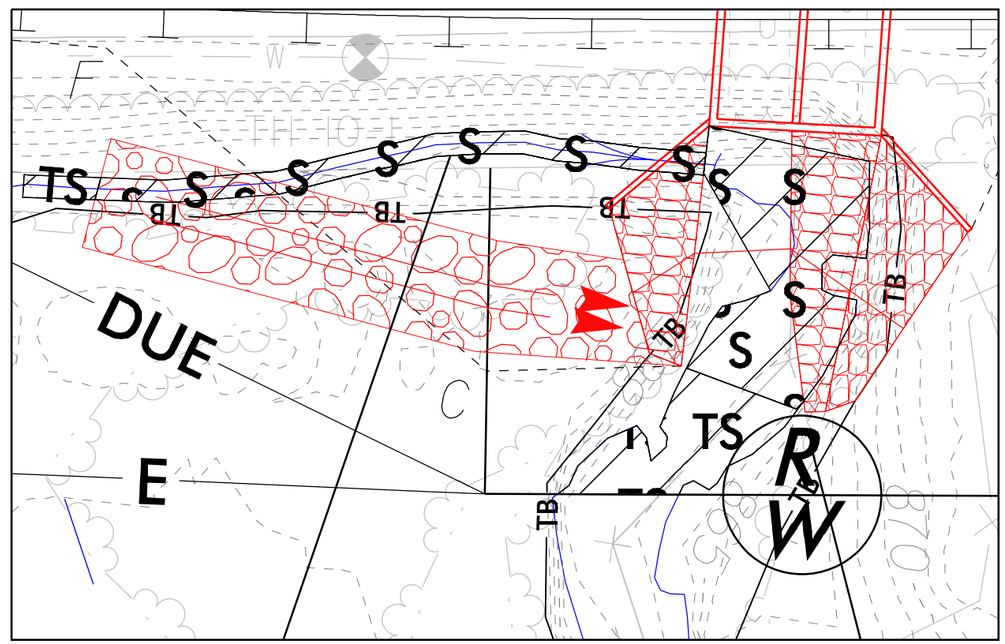
PROJECT REFERENCE NO.	SHEET NO.
U-5760	10A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NA 2011

SITE IMPACT ZOOM: 1”=20’



DETAIL SHEET FOR SITES 2C, 4B

$DATE$

5/14/99

REVISIONS

LEGEND

DENOTES IMPACTS IN SURFACE WATER	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND	DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER (IP MOD)	DENOTES IMPACTS IN SURFACE WATER (IP MOD)

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RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 21 OF 28

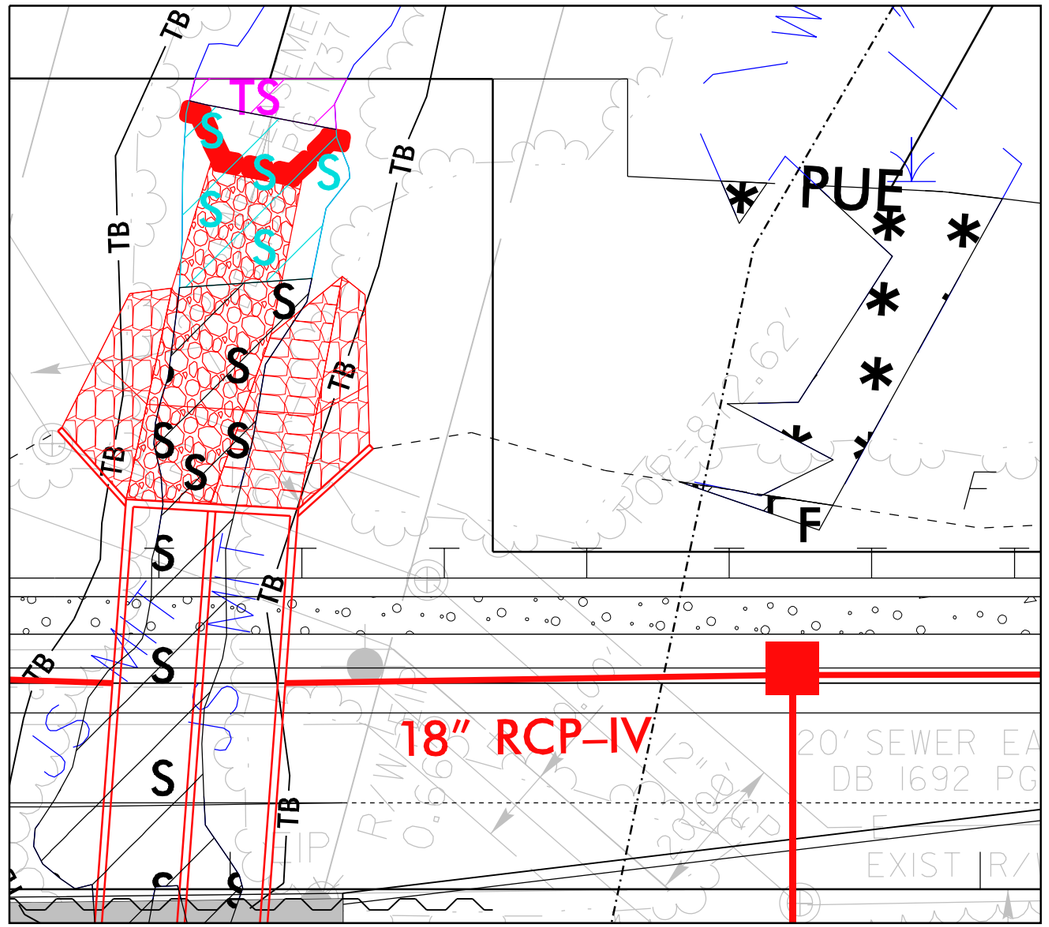
PROJECT REFERENCE NO.	SHEET NO.
U-5760	10B
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NA 2011

SITE IMPACT ZOOM: 1"=20'



DETAIL SHEET FOR SITES 4A, 5 (IP MOD)

$DATE$

5/14/99

REVISIONS

LEGEND

DENOTES IMPACTS IN SURFACE WATER	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND	DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER (IP MOD)	DENOTES IMPACTS IN SURFACE WATER (IP MOD)

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RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 22 OF 28

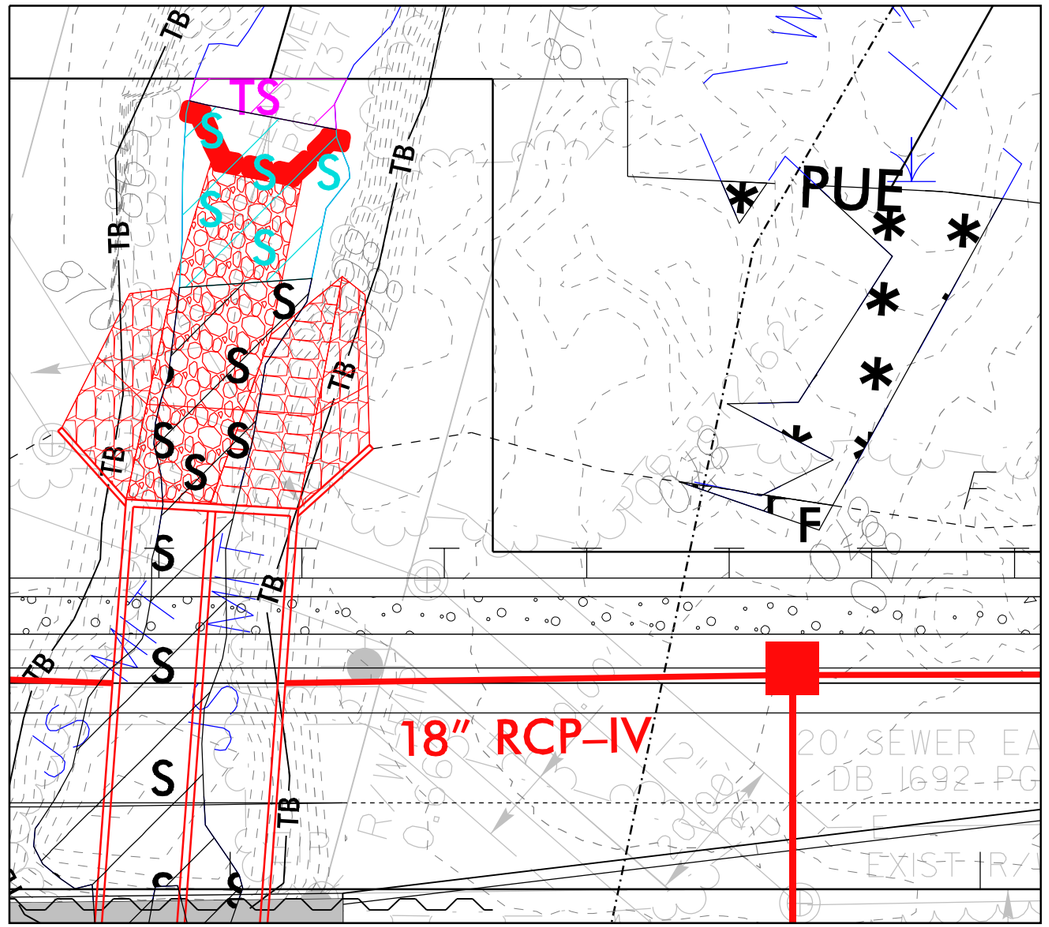
PROJECT REFERENCE NO.	SHEET NO.
U-5760	10B
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NA 2011

SITE IMPACT ZOOM: 1"=20'



DETAIL SHEET FOR SITES 4A, 5 (IP MOD)

$DATE$

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RALEIGH, NC 27601

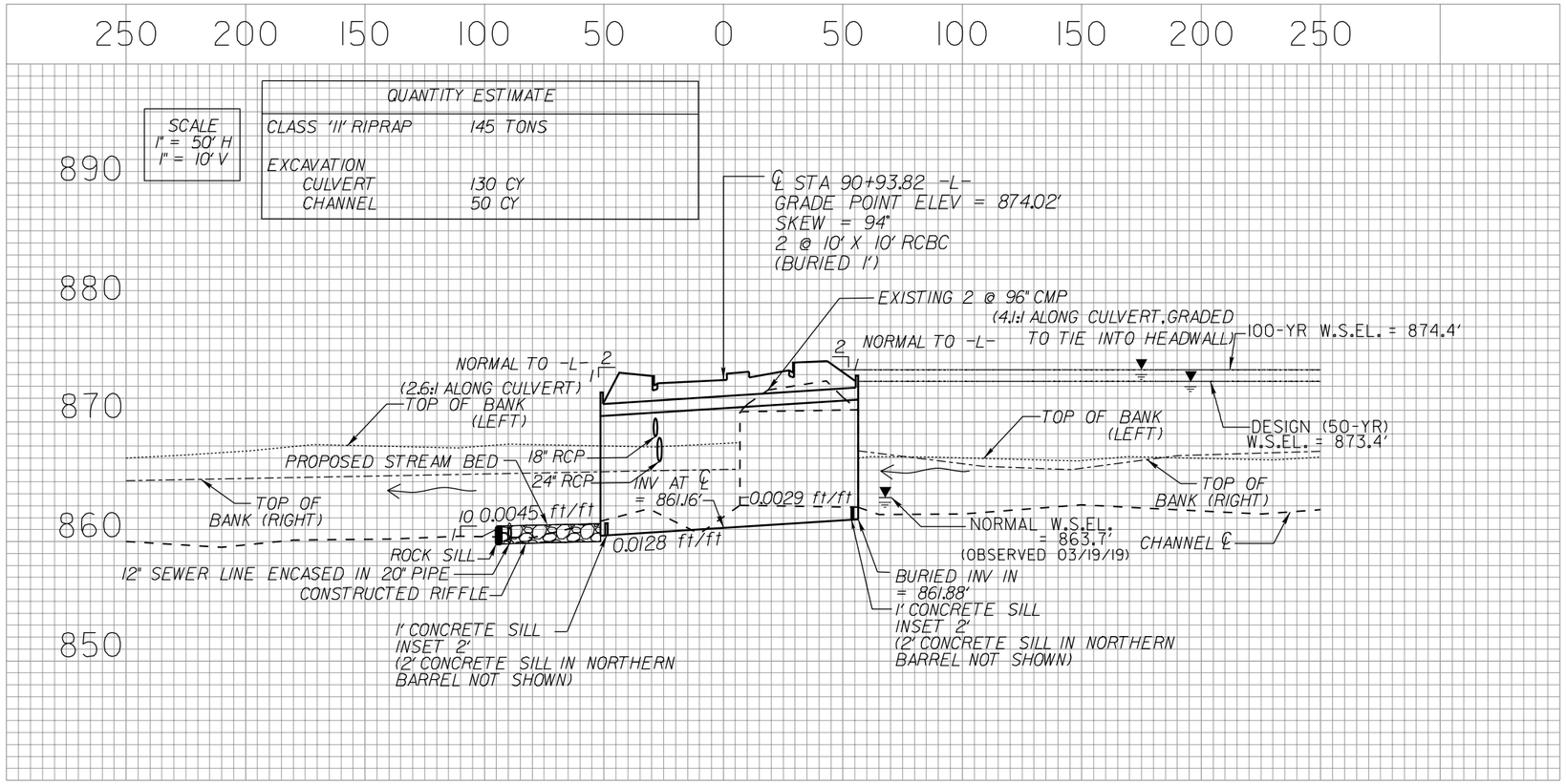
RIGHT-OF-WAY REV.
CONST. REV.

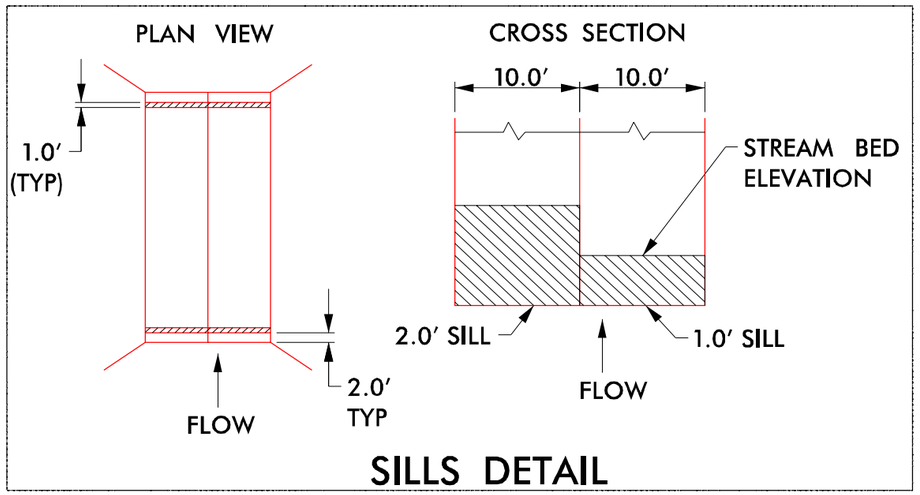
PERMIT DRAWING
SHEET 23 OF 28

PROJECT REFERENCE NO.	SHEET NO.
U-5760	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SITE 4A /4B – CULVERT REPLACEMENT





SILLS DETAIL

NOTE: FOR CUT CONDITION, USE CLASS II RIP RAP FLOODPLAIN BENCH BORDER WITH NATURAL GROUND COVERED WITH COIR FIBER MAT INSIDE BORDER. IN FILL CONDITION, USE CLASS II RIP RAP FILL THROUGHOUT WITH NATIVE BED MATERIAL FILLING THE VOIDS ON TOP.

NOTE: NATIVE BED MATERIAL SHALL BE PLACED BETWEEN THE SILLS IN THE LOW FLOW CULVERT. NATIVE MATERIALS CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL. IF RIP RAP IS USED, THE NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FACILITATE ANIMAL PASSAGE. THE TOP SURFACE OF THE NATURAL STREAM BED MATERIAL SHALL BE PLACED AND LEVELED TO A FLAT SURFACE TO ALLOW FOR ANIMAL PASSAGE. THE HIGH FLOW BARRELS SHALL BE BACK FILLED WITH NATIVE MATERIAL AND/OR RIP RAP. NATIVE MATERIAL AND RIP RAP ARE SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

REVISIONS

5/14/99

$DATE$

5/14/99

REVISIONS

LEGEND

DENOTES IMPACTS IN SURFACE WATER	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND	DENOTES MECHANIZED CLEARING

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RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 24 OF 28

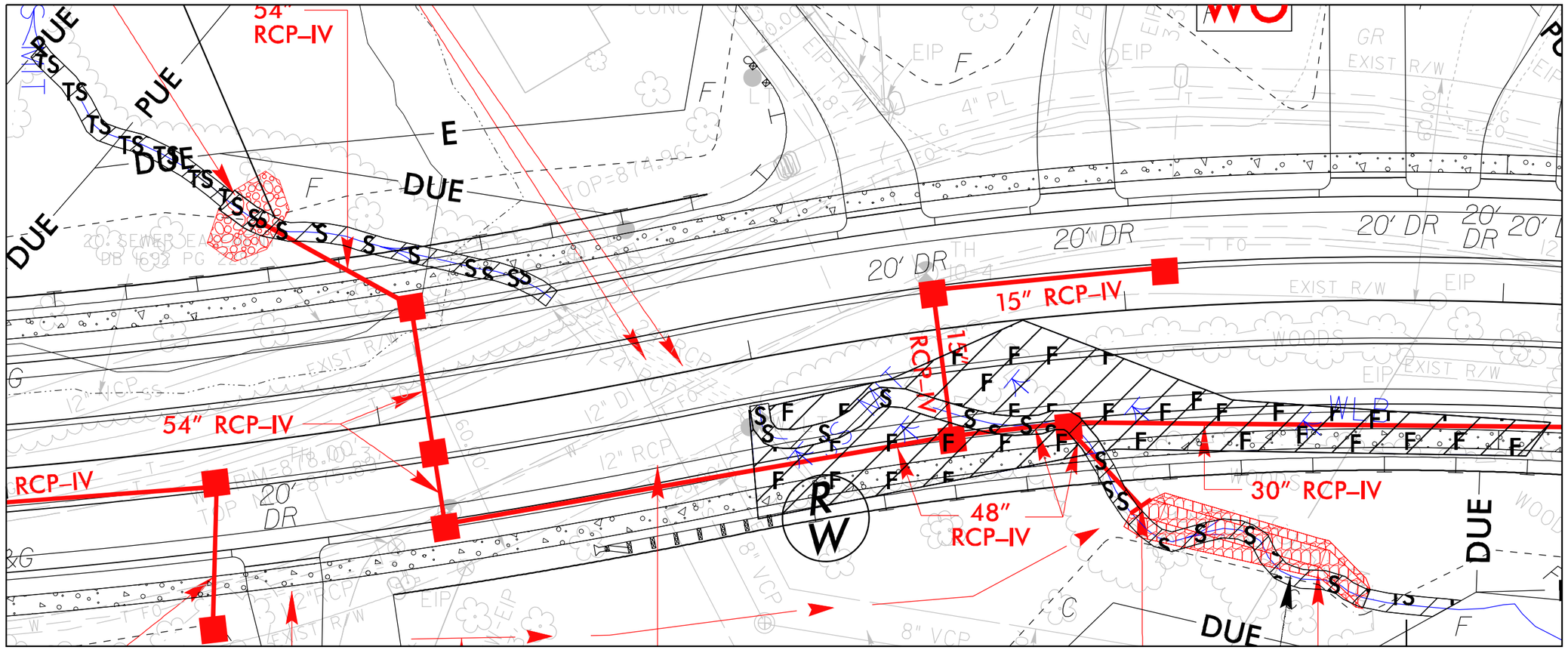
PROJECT REFERENCE NO.	SHEET NO.
U-5760	10C
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NA 2011

SITE IMPACT ZOOM: 1”=30’



DETAIL SHEET FOR SITES 6A, 6B

$DATE$

5/14/99

REVISIONS

LEGEND

DENOTES IMPACTS IN SURFACE WATER	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND	DENOTES MECHANIZED CLEARING

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RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 25 OF 28

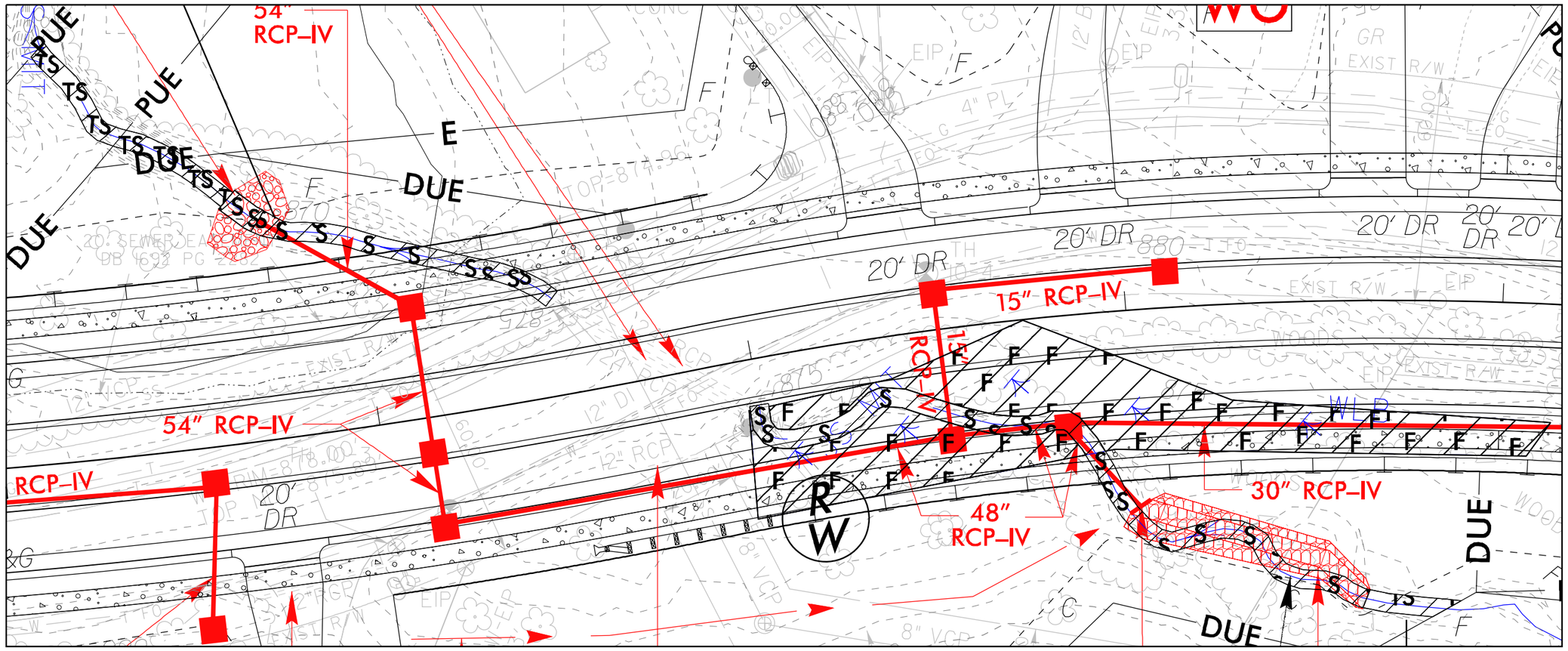
PROJECT REFERENCE NO.	SHEET NO.
U-5760	10C
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NA 2011

SITE IMPACT ZOOM: 1"=30'

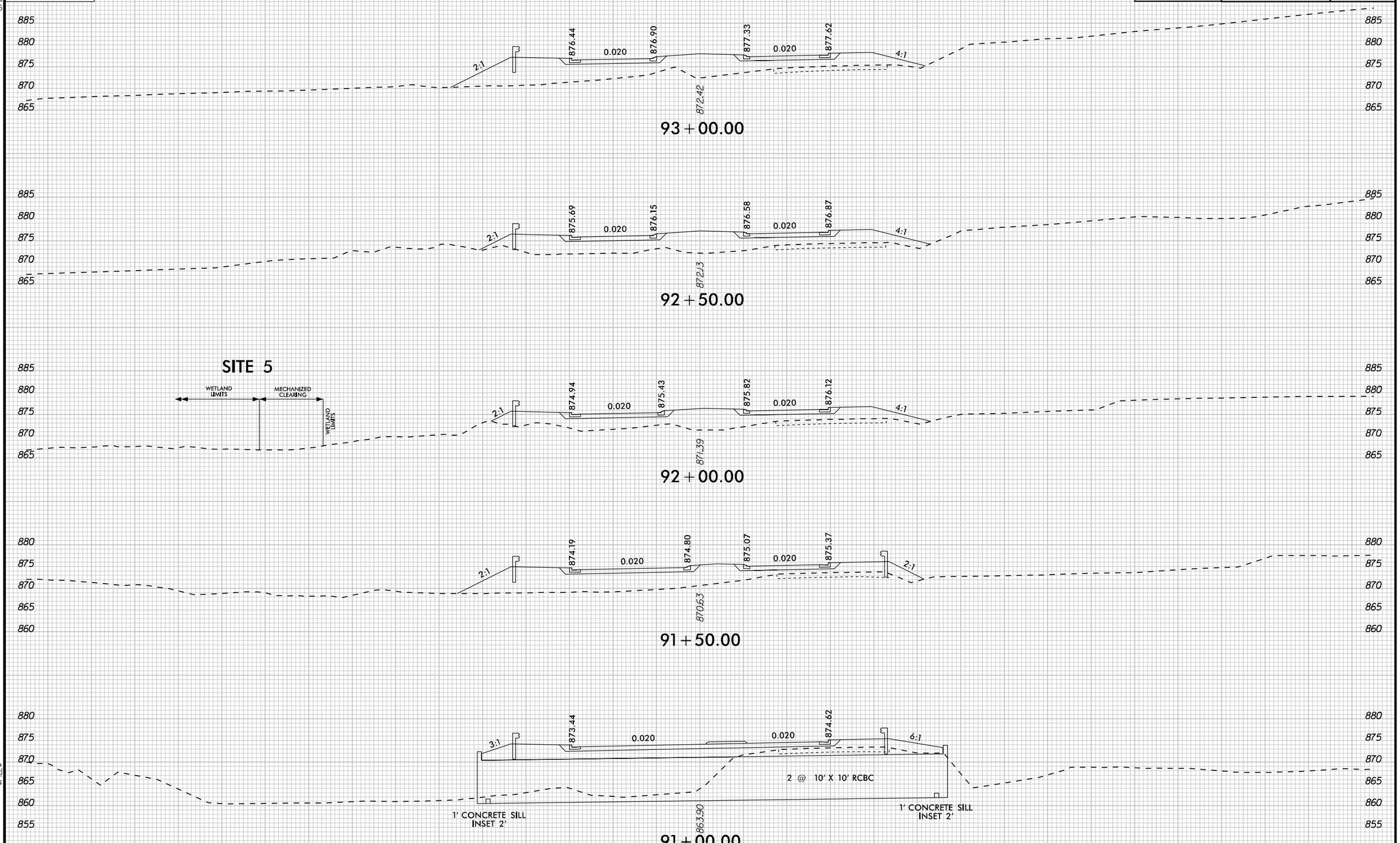


DETAIL SHEET FOR SITES 6A, 6B

$DATE$

PERMIT DRAWING
SHEET 26 OF 28

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-5760	X-42

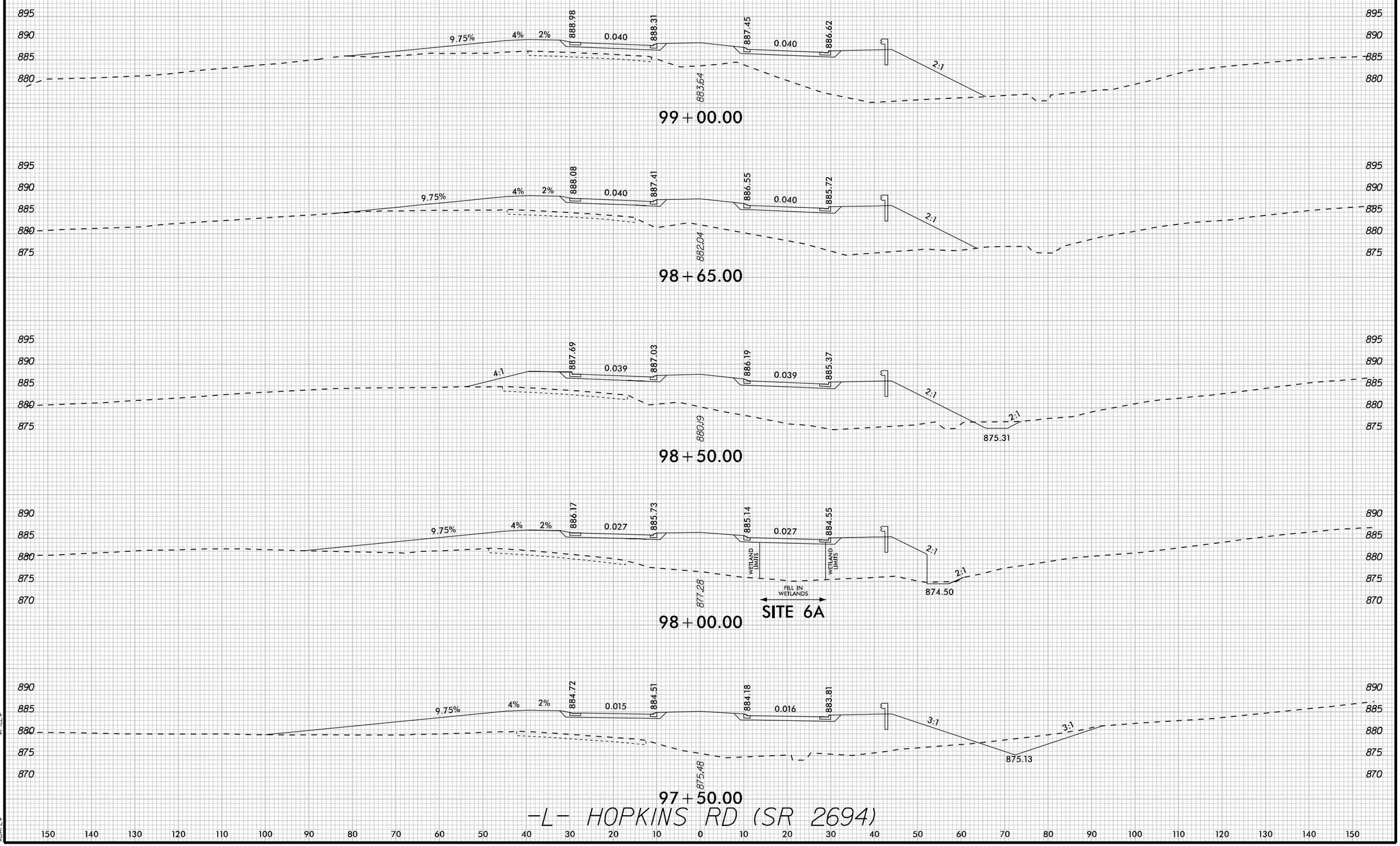


8/23/99

$FILE$

$DATE$

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-5760	X-45



8/23/99

$FILE$

$DATE$

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)
1A	58+66/59+59 -Y1- (LT)	1 @ 6' x 9' RCBC Extension						< 0.01		25		
	58+66/59+59 -Y1- (LT)	Channel Improvements						< 0.01	0.02	31	82	
1B	21+97/25+90 -L- (RT)	1 @ 6' x 7' RCBC Extension						0.11		610		
	21+97/25+90 -L- (RT)	Channel Improvements						< 0.01	< 0.01	33	24	
2A	83+40/85+80 -L- (RT)	Roadway Fill			< 0.01	< 0.01		0.02	< 0.01	233	10	
2B	86+38/86+80 -L- (RT)	66" RCP						< 0.01		24		
		Channel Improvements						< 0.01	< 0.01	25	10	
2C	89+96/90+79 -L- (RT)	Roadway Fill						< 0.01	< 0.01	82	10	
3	83+60/84+62 -L- (RT)	Roadway Fill			< 0.01	< 0.01						
4A	90+74/91+16 -L- (LT)	2 @ 10' x 10' RCBC						0.02		61		
		Channel Improvements						0.02	< 0.01	52	5	
4B	90+59/91+00 -L- (RT)	Channel Improvements						0.01	< 0.01	35	19	
5	91+60/92+06 -L- (LT)	Roadway Fill	< 0.01			0.01						
6A	96+98/98+87 -L- (RT)	48" RCP						0.01		122		
		Channel Change						< 0.01	< 0.01	70	22	
		Roadway Fill	0.09									
6B	95+22/96+53 -L- (LT)	54" RCP						< 0.01		82		
		Channel Improvements						< 0.01	< 0.01	10	65	
TOTALS*:			0.09		< 0.01	0.01		0.24	0.04	1495	247	0

*Rounded totals are sum of actual impacts

NOTES:

= Impacts affected by IP Mod

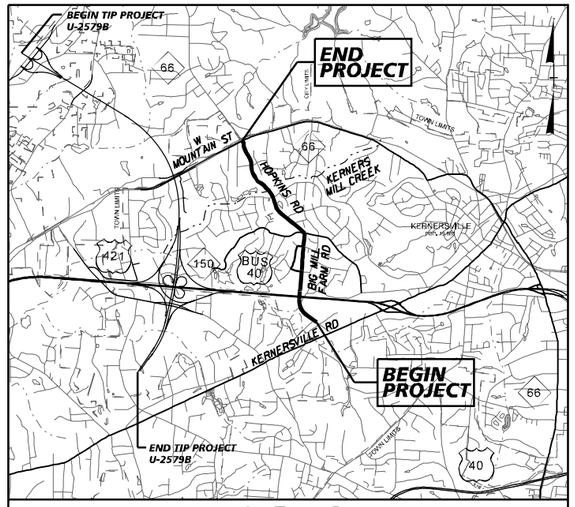
NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
02/20/2023
FORSYTH
U-5760
46381.1.1

Revised 2018 Feb

09/08/99

TIP PROJECT: U-5760

See Sheet 1B For Conventional Plan Sheet Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

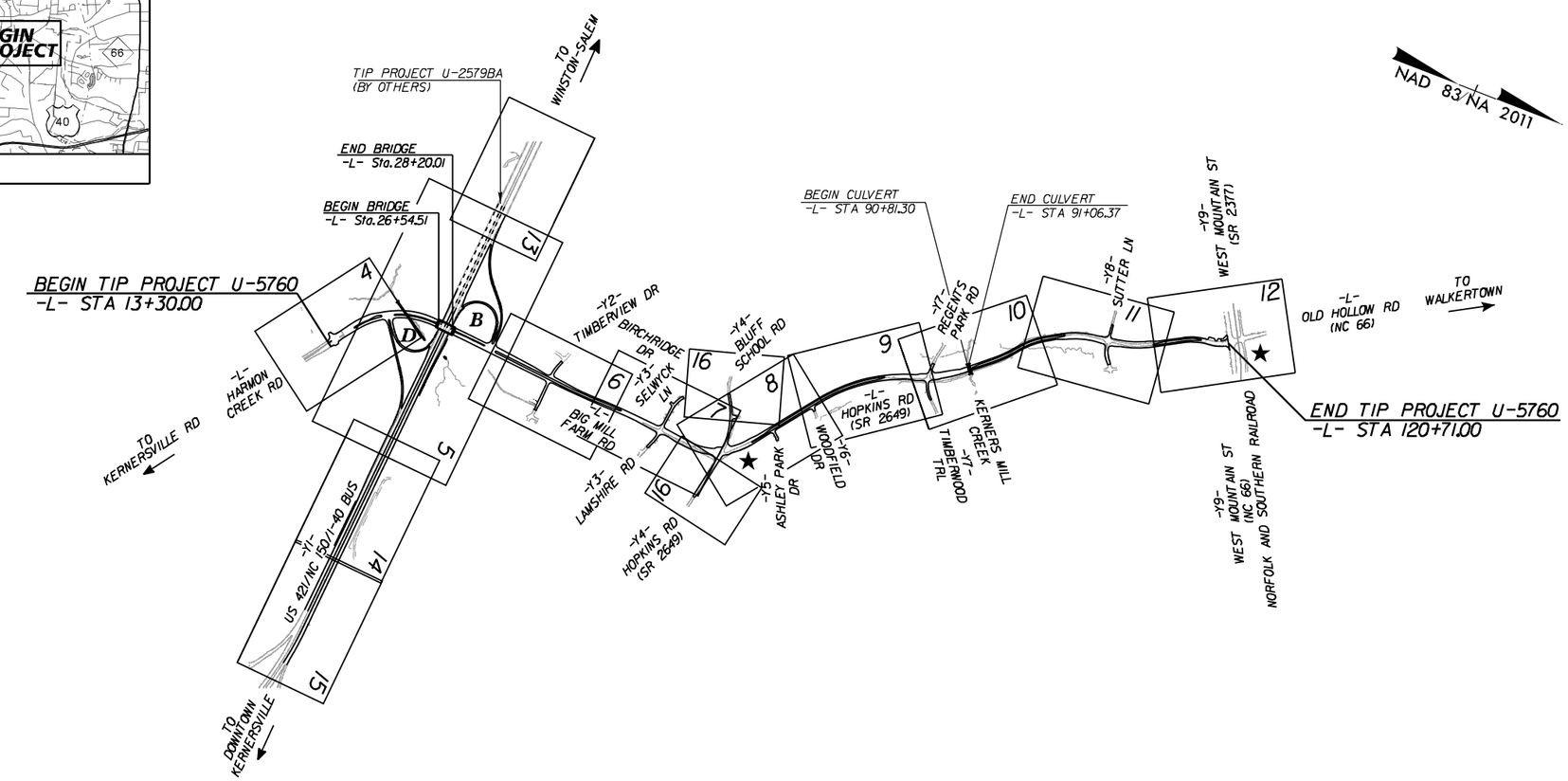
FORSYTH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5760	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
46381.1.1		P.E.
46381.2.1		R/W
46381.2.1		UTL
46381.3.1		CONST.

LOCATION: HOPKINS ROAD/BIG MILL FARM ROAD IN KERNERSVILLE FROM SOUTH OF US 421/I-40 BUS/NC 150 TO NC 66 (W MOUNTAIN ST)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS, CULVERTS, RETAINING WALLS, AND STRUCTURES



★ TRAFFIC SIGNAL

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS LIMITED TO POINTS AS SHOWN ON THE PLANS
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF KERNERSVILLE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

5 2.5 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

AADT 2023	=	10,700
AADT 2040	=	14,900
K	=	10%
D	=	60%
T	=	3%*
V	=	50 MPH

* (TTST 1% + DUAL 2%)

FUNCTIONAL CLASSIFICATION:
URBAN COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5760	=	1.998 MILES
LENGTH STRUCTURES TIP PROJECT U-5760	=	0.036 MILES
TOTAL LENGTH TIP PROJECT U-5760	=	2.034 MILES

PLANS PREPARED FOR THE NCDOT BY: Kimley»Horn

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: APRIL 15, 2022

LETTING DATE: APRIL 15, 2025

JEFFREY W. MOORE, P.E.
PROJECT ENGINEER

EVERETT J. LOVING, P.E.
PROJECT DESIGN ENGINEER

W. AL BLANTON, P.E., P.L.S.
PROJECT TEAM LEAD
NCDOT DIVISION 9

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

K:\RAL_Roadway\011036312 - U-5760 Big Mill Farm Road\Roadway\Proj\U5760_rdy_1st.dgn

2/6/2023

PROJECT REFERENCE NO.	SHEET NO.
U-5760	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin (EIP)
- Computed Property Corner
- Existing Concrete Monument (ECM)
- Parcel/Sequence Number 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary
- Proposed Wetland Boundary
- Existing Endangered Animal Boundary
- Existing Endangered Plant Boundary
- Existing Historic Property Boundary
- 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
- Well
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

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

RAILROADS:

- Standard Gauge
- RR Signal Milepost
- Switch
- RR Abandoned
- RR Dismantled

RIGHT OF WAY & PROJECT CONTROL:

- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Secondary Horiz and Vert Control Point
- Vertical Benchmark
- Existing Right of Way Monument
- Proposed Right of Way Monument (Rebar and Cap)
- Proposed Right of Way Monument (Concrete)
- Existing Permanent Easement Monument
- Proposed Permanent Easement Monument (Rebar and Cap)
- Existing C/A Monument
- Proposed C/A Monument (Rebar and Cap)
- Proposed C/A Monument (Concrete)
- Existing Right of Way Line
- Proposed Right of Way Line
- Existing Control of Access Line
- Proposed Control of Access Line
- Proposed ROW and CA Line
- Existing Easement Line
- Proposed Temporary Construction Easement
- Proposed Temporary Drainage Easement
- Proposed Permanent Drainage Easement
- Proposed Permanent Drainage/Utility Easement
- Proposed Permanent Utility Easement
- Proposed Temporary Utility Easement
- Proposed Aerial Utility Easement

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut
- Proposed Slope Stakes Fill
- Proposed Curb Ramp
- 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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

* SUE – Subsurface Utility Engineering
LOS – Level of Service – A,B,C or D (Accuracy)

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line Test Hole (SUE – LOS A)*
- U/G Power Line (SUE – LOS B)*
- U/G Power Line (SUE – LOS C)*
- U/G Power Line (SUE – LOS D)*

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole
- Telephone Pedestal
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole
- U/G Telephone Test Hole (SUE – LOS A)*
- U/G Telephone Cable (SUE – LOS B)*
- U/G Telephone Cable (SUE – LOS C)*
- U/G Telephone Cable (SUE – LOS D)*
- U/G Telephone Conduit (SUE – LOS B)*
- U/G Telephone Conduit (SUE – LOS C)*
- U/G Telephone Conduit (SUE – LOS D)*
- U/G Fiber Optics Cable (SUE – LOS B)*
- U/G Fiber Optics Cable (SUE – LOS C)*
- U/G Fiber Optics Cable (SUE – LOS D)*

WATER:

- Water Manhole
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line Test Hole (SUE – LOS A)*
- U/G Water Line (SUE – LOS B)*
- U/G Water Line (SUE – LOS C)*
- U/G Water Line (SUE – LOS D)*
- Above Ground Water Line

TV:

- TV Pedestal
- TV Tower
- U/G TV Cable Hand Hole
- U/G TV Test Hole (SUE – LOS A)*
- U/G TV Cable (SUE – LOS B)*
- U/G TV Cable (SUE – LOS C)*
- U/G TV Cable (SUE – LOS D)*
- U/G Fiber Optic Cable (SUE – LOS B)*
- U/G Fiber Optic Cable (SUE – LOS C)*
- U/G Fiber Optic Cable (SUE – LOS D)*

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line Test Hole (SUE – LOS A)*
- U/G Gas Line (SUE – LOS B)*
- U/G Gas Line (SUE – LOS C)*
- U/G Gas Line (SUE – LOS D)*
- Above Ground Gas Line

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line
- Above Ground Sanitary Sewer
- SS Force Main Line Test Hole (SUE – LOS A)*
- SS Force Main Line (SUE – LOS B)*
- SS Force Main Line (SUE – LOS C)*
- SS Force Main Line (SUE – LOS D)*

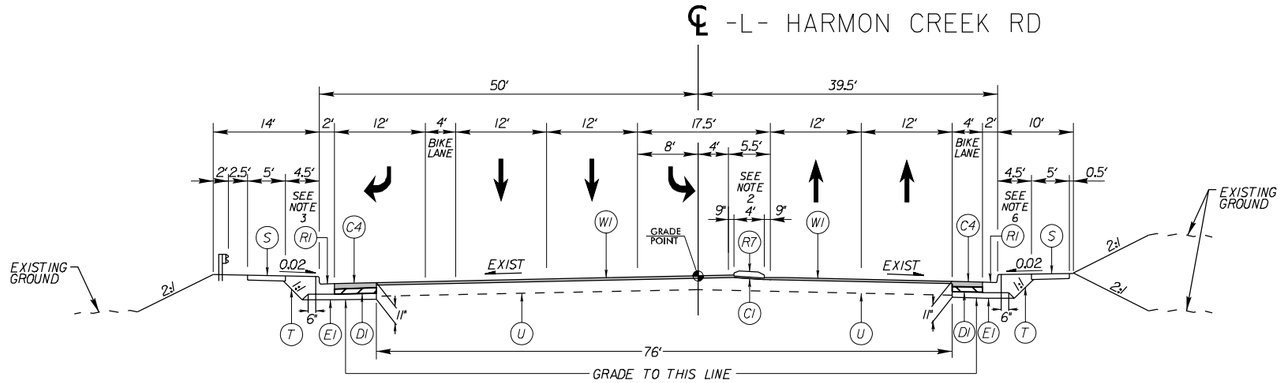
MISCELLANEOUS:

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

03/10/2021
K:\RAL_Roadway\Oll\036312 – U-5760 Big Mill Farm Road\Roadway\Proj\U5760_rdy_1studgn
2/6/2023

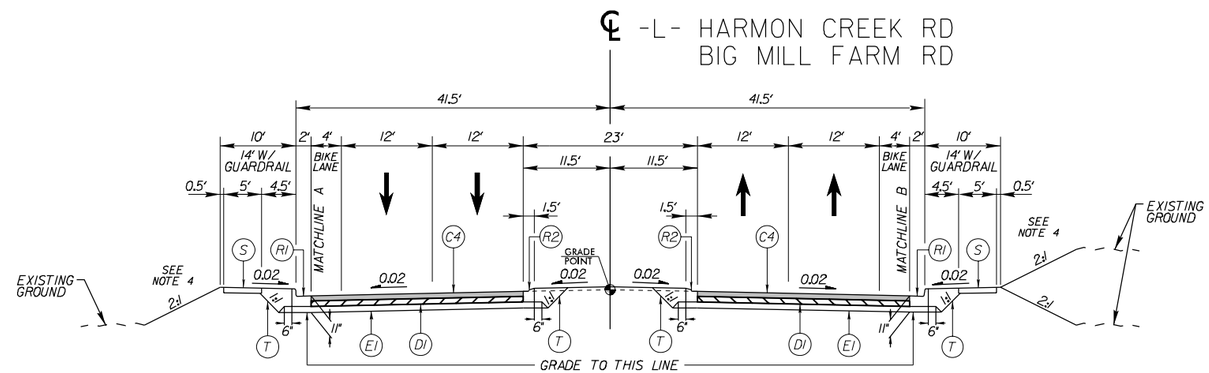
Kimley»Horn © 2020	PROJECT REFERENCE NO.	SHEET NO.
421 FAYETTEVILLE STREET, SUITE 600 RALEIGH, NC 27601	U-5760	2A-1
RIGHT-OF-WAY REV.	ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
CONST. REV.		

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



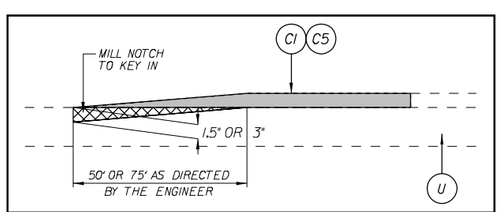
TYPICAL SECTION NO. 1

-L- STA 13+30.00 TO 14+86.93

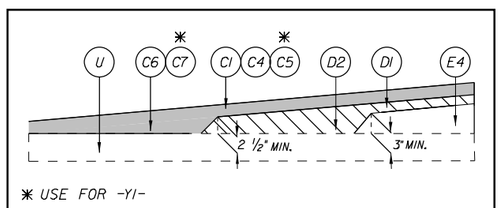


TYPICAL SECTION NO. 2

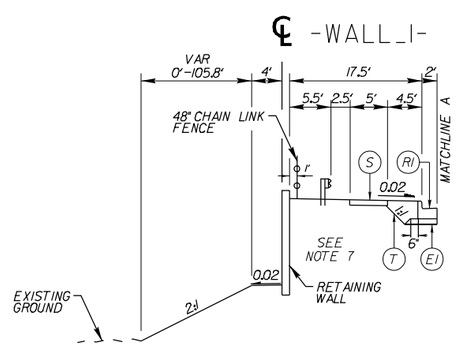
-L- STA 14+86.93 TO 26+54.51 (BEGIN BRIDGE)
-L- STA 28+20.01 (END BRIDGE) TO 40+33.74



INCIDENTAL MILLING DETAIL

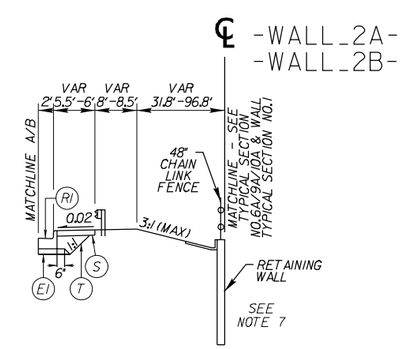


WEDGING DETAIL (W1) FOR RESURFACING



TYPICAL SECTION NO. 2A

-L- STA 15+00.00 TO 23+00.00 (LT)



TYPICAL SECTION NO. 2B

-L- STA 26+30.75 TO 26+54.51 (RT)
-L- STA 28+20.01 TO 28+63.91 (LT)

NOTES:
1. FOR FILL OR CUT SLOPE HEIGHTS < 5', USE 4:1 SLOPES.
   FOR FILL OR CUT SLOPE HEIGHTS 5' < 10', USE 3:1 SLOPES.
   FOR FILL OR CUT SLOPE HEIGHTS > 10', USE 2:1 SLOPES.
2. RETAIN EXIST CONC ISLAND FROM -L- STA 13+30.00 TO 13+66.77.
3. RETAIN EXIST 2'-6" C&G FROM -L- STA 13+30.00 TO 13+80.92 (LT).
4. USE 4:1 (MAX) SLOPES INSIDE INTERCHANGE FROM -L- STA 21+66.86 TO 25+80.10 (RT) AND FROM -L- STA 29+44.26 TO 32+07.93 (LT).
5. PAVEMENT EDGE SLOPES 1:1 UNLESS OTHERWISE INDICATED.
6. USE PROPOSED VALLEY GUTTER FROM 13+30.00 TO 13+76.65 RT.
7. SEE STRUCTURES PLANS FOR MORE INFORMATION.

PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

C1	PROPOSED APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ.YD.
C2	PROPOSED APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 165 LBS. PER SQ.YD.
C3	PROPOSED APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 138 LBS. PER SQ.YD. IN EACH OF TWO LAYERS.
C4	PROPOSED APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ.YD. IN EACH OF TWO LAYERS.
C5	PROPOSED APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ.YD. IN EACH OF TWO LAYERS.
C6	PROPOSED VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ.YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH.
C7	PROPOSED 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.
D1	PROPOSED APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ.YD.
D2	PROPOSED 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" OR GREATER THAN 4" IN DEPTH.
E1	PROPOSED APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ.YD.
E2	PROPOSED APPROX. 4.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ.YD.
E3	PROPOSED APPROX. 8.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 485 LBS. PER SQ.YD. IN EACH OF TWO LAYERS.
E4	PROPOSED 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" OR GREATER THAN 5.5" IN DEPTH.
J	PROPOSED 6" AGGREGATE BASE COURSE
K	PROPOSED 12" CLASS IV SUBGRADE STABILIZATION
L	SELECT GRANULAR MATERIAL
N	GEOTEXTILE FOR SOIL STABILIZATION
P	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ.YD.
R1	PROPOSED 2'-6" CONCRETE CURB & GUTTER
R2	PROPOSED 1'-6" CONCRETE CURB & GUTTER
R3	PROPOSED 8" X 12" CONCRETE CURB
R4	PROPOSED SHOULDER BERM GUTTER
R5	PROPOSED EXPRESSWAY GUTTER
R6	PROPOSED CONCRETE VALLEY GUTTER
R7	PROPOSED 5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R8	SINGLE FACED PRECAST CONCRETE BARRIER
S	PROPOSED 4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	VARIABLE DEPTH MILLING
W1	WEDGING DETAIL FOR RESURFACING (SEE DETAIL, SHEET 2A-3)
Y	MILLED RUMBLE STRIPS

REVISIONS

5/14/99 DESIGN REV. - 10/07/22 - ADJUSTED WALL 1 TYP AND ADDED WALL 2A & 2B - JWM

2/6/2023

Kimley»Horn
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

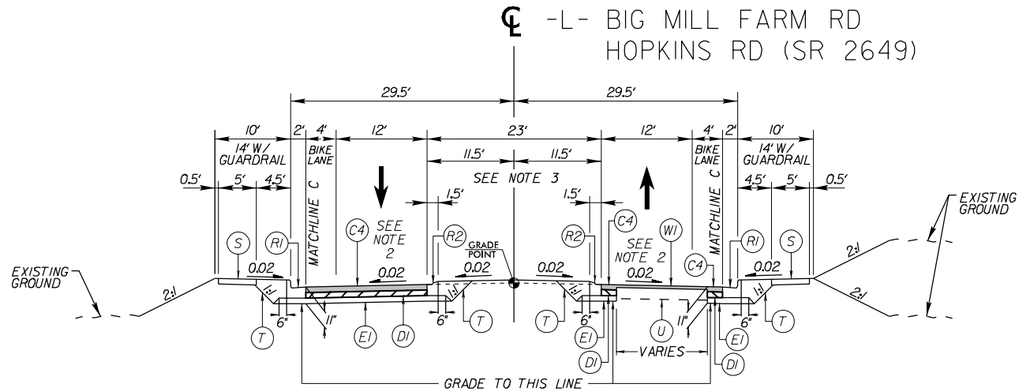
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	2A-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

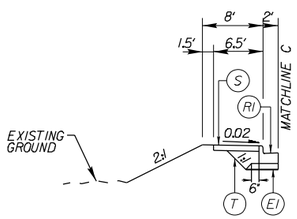
PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN)

C1	1.5" S9.5B
C2	1.5" S9.5C
C3	2.5" S9.5B
C4	3" S9.5B
C5	3" S9.5C
C6	VAR. DEPTH S9.5B
C7	VAR. DEPTH S9.5C
D1	4" 119.0C
D2	VAR. DEPTH 119.0C
E1	4" B25.0C
E2	4.5" B25.0C
E3	8.5" B25.0C
E4	VAR. DEPTH B25.0C
J	6" AGGREGATE BASE COURSE
K	12" CLASS IV SUBGRADE STABILIZATION
L	SELECT GRANULAR MATERIAL
N	GEOTEXTILE FOR SOIL STABILIZATION
P	PRIME COAT
R1	2'-6" CONCRETE CURB & GUTTER
R2	1'-6" CONCRETE CURB & GUTTER
R3	8" X 12" CURB
R4	SHOULDER BERM GUTTER
R5	EXPRESSWAY GUTTER
R6	VALLEY GUTTER
R7	5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R8	SINGLE FACED PRECAST CONCRETE BARRIER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W1	WEDGING
Y	MILLED RUMBLE STRIPS



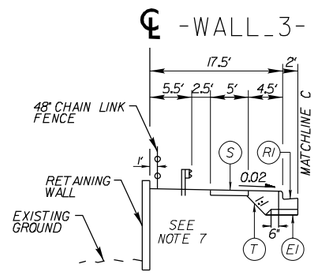
TYPICAL SECTION NO. 3

-L- STA 40+33.74 TO 118+22.00



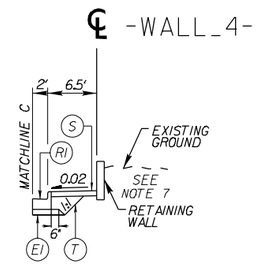
TYPICAL SECTION NO. 3A

-L- STA 40+87.00 TO 43+10.28 (LT)
-L- STA 51+37.43 TO 53+42.63 (RT)
-L- STA 54+32.16 TO 56+42.27 (LT)
-L- STA 84+09.69 TO 85+68.43 (RT)
-L- STA 116+82.00 TO 118+22.00 (LT)
-L- STA 116+82.00 TO 117+25.00 (RT)



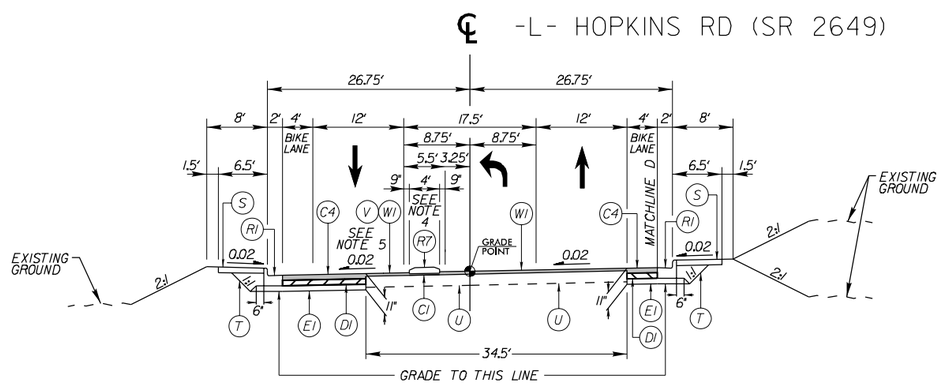
TYPICAL SECTION NO. 3B

-L- STA 52+00.00 TO 53+23.18 (LT)



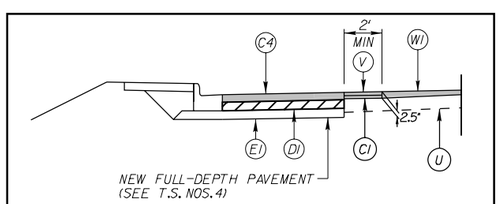
TYPICAL SECTION NO. 3C

-L- STA 117+25.00 TO 118+22.00 (RT)

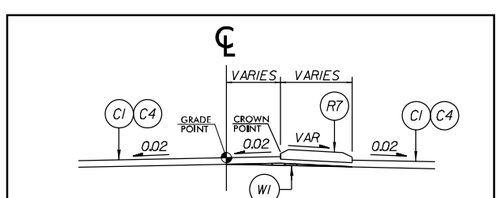


TYPICAL SECTION NO. 4

-L- STA 118+22.00 TO 120+71.00



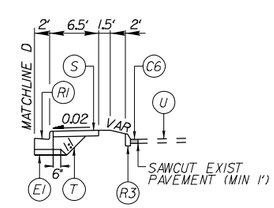
DETAIL FOR BENCH MILLING (-L-)



SUPERELEVATION TREATMENT ADJACENT TO PROPOSED CHANNELIZATION

APPLIES TO -L-

NOTES:
1. FOR FILL OR CUT SLOPE HEIGHTS < 5', USE 4:1 SLOPES.
   FOR FILL OR CUT SLOPE HEIGHTS 5' < 10', USE 3:1 SLOPES.
   FOR FILL OR CUT SLOPE HEIGHTS > 10', USE 2:1 SLOPES.
2. RETAIN EXIST PAVEMENT (SEE WEDGING DETAIL, SHEET 2A-1) FROM -L- STA 55+25.00 TO 59+50.00 (RT), STA 61+50.00 TO 76+25.00 (RT), STA 80+75.00 TO 85+75.00 (RT), STA 99+25.00 TO 113+00.00 (LT), AND STA 115+00.00 TO 118+22.00 (LT/RT). SAWCUT EXIST PAVEMENT MINIMUM OF 1' FROM GUTTER EDGE.
3. SEE PLANS FOR ROADWAY GEOMETRY AND ISLAND (R7) LOCATIONS.
4. INSTALL 5" MONOLITHIC CONCRETE MEDIAN FROM -L- STA 118+22.00 TO 120+24.00.
5. USE DETAIL FOR BENCH MILLING ADJACENT TO WIDENING (SEE DETAIL, THIS SHEET).
6. PAVEMENT EDGE SLOPES 1:1 UNLESS OTHERWISE INDICATED.
7. SEE STRUCTURES PLANS FOR MORE INFORMATION.



TYPICAL SECTION NO. 4A

-L- STA 119+65.00 TO 120+53.52 (RT)

REVISIONS

DESIGN REV. - 10/07/22 - REVISED NOTE 5 & ADDED NOTE 7. - JWM

5/14/99

2/6/2023

5/14/99

REVISIONS

DESIGN REV. - 10/07/22 - REVISED TYP 5, & 5B FOR WALL UPDATES. - JWM

2/6/2023

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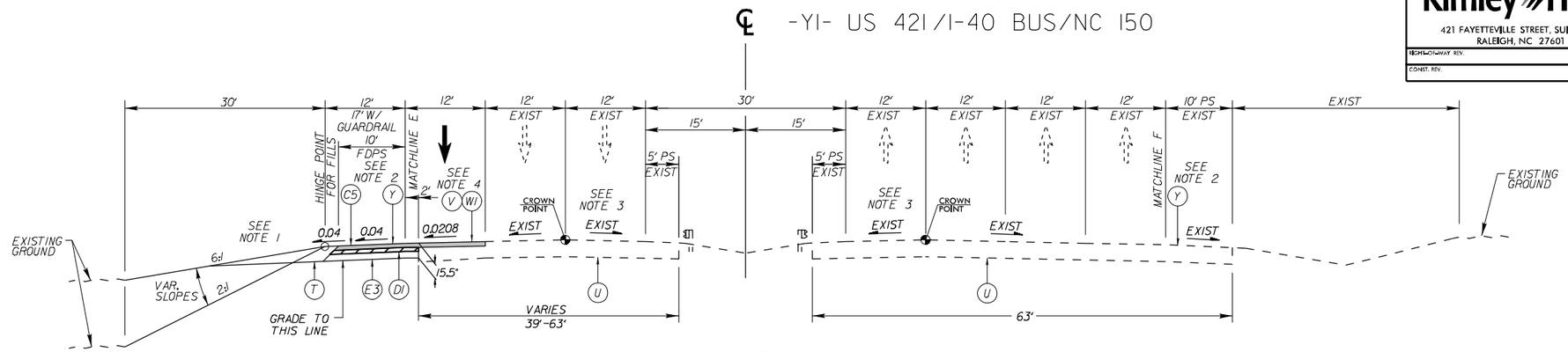
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

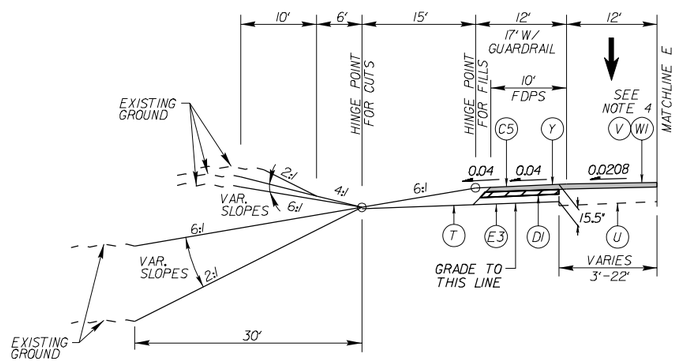
PROJECT REFERENCE NO.	SHEET NO.
U-5760	2A-3
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



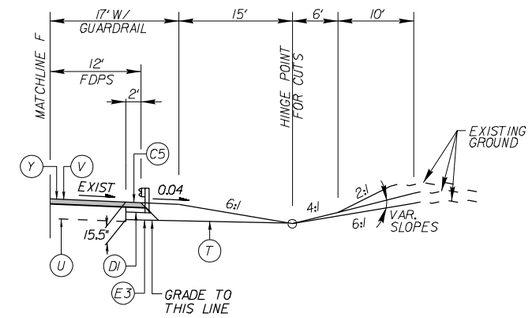
TYPICAL SECTION NO. 5

-Y1- STA 41+50.00 TO 53+35.00



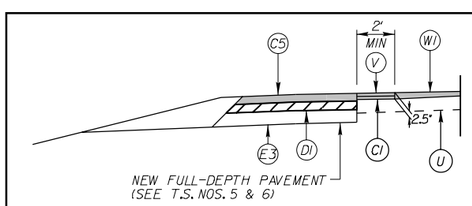
TYPICAL SECTION NO. 5A

-Y1- STA 41+50.00 TO 42+85.00 (LT)

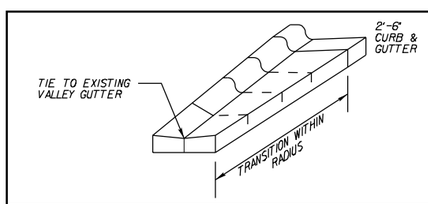


TYPICAL SECTION NO. 5B

-Y1- STA 51+20.00 TO 53+35.00 (RT)

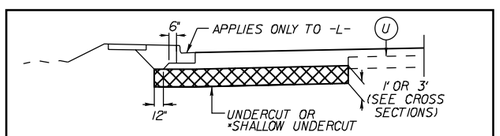


DETAIL FOR BENCH MILLING (-Y1-)



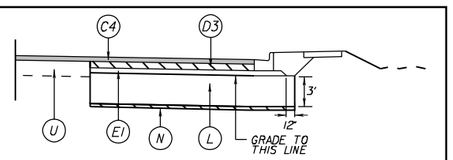
DETAIL FOR TRANSITION FROM 2'-6" C&G TO VALLEY GUTTER

APPLIES TO -Y2-, -Y3-, -Y7-, AND -Y8-



-L- STA 22+25.00 TO 23+25.00 (LT) (SEE T.S. NO. 2)
-L- STA 32+50.00 TO 34+50.00 (LT/RT) (SEE T.S. NO. 2)
*-L- STA 118+00.00 TO 120+50.00 (LT/RT) (SEE T.S. NOS. 3 & 4)
*-Y4- STA 14+50.00 TO 16+50.00 (LT/RT) (SEE T.S. NO. 16)

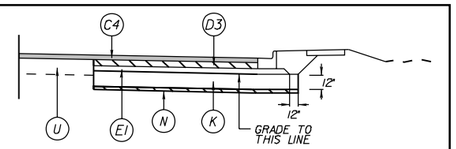
DETAIL FOR UNDERCUT EXCAVATION/SHALLOW UNDERCUT



USE DETAIL 1 FOR SUBGRADE STABILIZATION WITH CURB AND GUTTER SECTION AS FOLLOWS:

-L- STA 32+50.00 TO 34+50.00 (LT/RT) (SEE T.S. NO. 2)

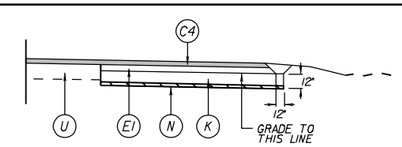
DETAIL 1 FOR SUBGRADE STABILIZATION



USE DETAIL 2 FOR SUBGRADE STABILIZATION WITH CURB AND GUTTER SECTION AS FOLLOWS:

-L- STA 118+00.00 TO 120+50.00 (LT/RT) (SEE T.S. NOS. 3 & 4)

DETAIL 2 FOR SUBGRADE STABILIZATION



USE DETAIL 3 FOR SUBGRADE STABILIZATION WITH SHOULDER SECTION AS FOLLOWS:

Y4- STA 14+50.00 TO 16+50.00 (LT/RT) (SEE T.S. NO. 16)

DETAIL 3 FOR SUBGRADE STABILIZATION

PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

C1	1.5" S9.5B
C2	1.5" S9.5C
C3	2.5" S9.5B
C4	3" S9.5B
C5	3" S9.5C
C6	VAR. DEPTH S9.5B
C7	VAR. DEPTH S9.5C
D1	4" I19.0C
D2	VAR. DEPTH I19.0C
E1	4" B25.0C
E2	4.5" B25.0C
E3	8.5" B25.0C
E4	VAR. DEPTH B25.0C
J	6" AGGREGATE BASE COURSE
K	12" CLASS IV SUBGRADE STABILIZATION
L	SELECT GRANULAR MATERIAL
N	GEOTEXTILE FOR SOIL STABILIZATION
P	PRIME COAT
R1	2'-6" CONCRETE CURB & GUTTER
R2	1'-6" CONCRETE CURB & GUTTER
R3	8" X 12" CURB
R4	SHOULDER BERM GUTTER
R5	EXPRESSWAY GUTTER
R6	VALLEY GUTTER
R7	5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R8	SINGLE FACED PRECAST CONCRETE BARRIER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W1	WEDGING
Y	MILLED RUMBLE STRIPS

NOTES:
1. USE 4:1 (MAX) SLOPES INSIDE INTERCHANGE FROM -Y1- STA 45+89.44 TO 52+47.87 (LT).
2. INSTALL MILLED RUMBLE STRIPS FROM -Y1- STA 24+12.00 TO 41+50.00 (LT) AND FROM -Y1- STA 32+46.00 TO 53+35.00 (RT).
3. MATCH EXISTING CROWN POINT AS CONSTRUCTED BY U-2579BA (BY OTHERS) FROM -Y1- STA 41+50.00 TO 53+35.00.
4. USE DETAIL FOR BENCH MILLING ADJACENT TO WIDENING (SEE DETAIL, THIS SHEET).
5. PAVEMENT EDGE SLOPES 1:1 UNLESS OTHERWISE INDICATED.

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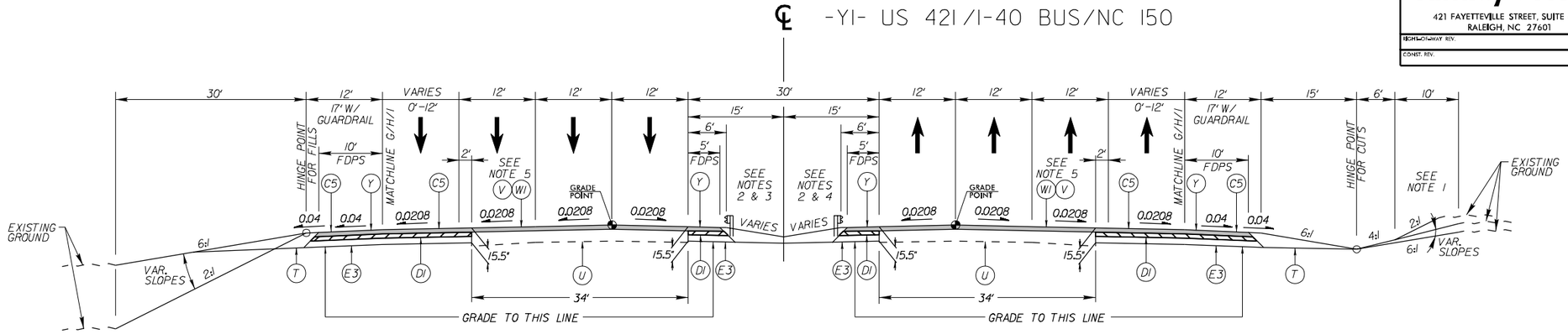
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601
RIGHT-OF-WAY REV.
CONST. REV.

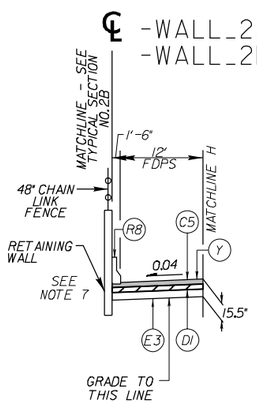
PROJECT REFERENCE NO.	SHEET NO.
U-5760	2A-4
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



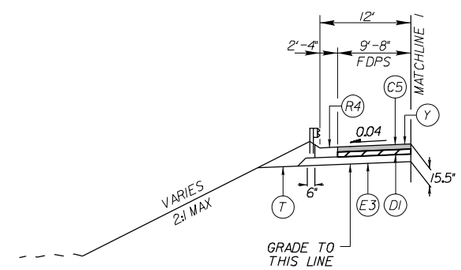
TYPICAL SECTION NO. 6

-Y1- STA 53+35.00 TO 97+22.00 (LT)
-Y1- STA 53+35.00 TO 90+85.00 (RT)



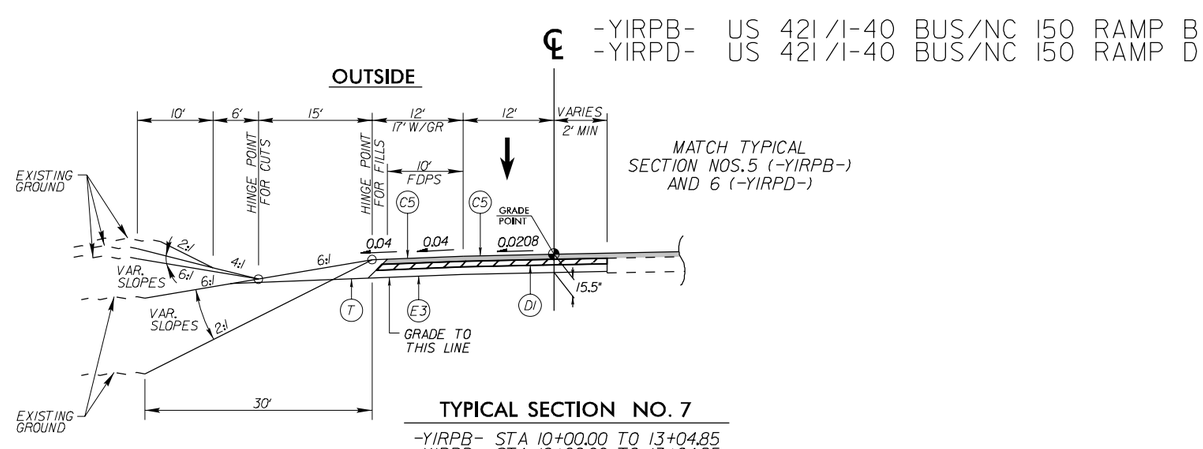
TYPICAL SECTION NO. 6A

-Y1- STA 54+69.81 TO 56+76.00 (LT)
-Y1- STA 54+55.00 TO 56+51.05 (RT)



TYPICAL SECTION NO. 6B

-Y1- STA 56+76.00 TO 63+80.00 (LT)
-Y1- STA 77+50.00 TO 83+00.00 (RT)



TYPICAL SECTION NO. 7

-YIRPB- STA 10+00.00 TO 13+04.85
-YIRPD- STA 10+00.00 TO 13+04.85

PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN)

C1	1.5" S9.5B
C2	1.5" S9.5C
C3	2.5" S9.5B
C4	3" S9.5B
C5	3" S9.5C
C6	VAR. DEPTH S9.5B
C7	VAR. DEPTH S9.5C
D1	4" I19.0C
D2	VAR. DEPTH I19.0C
E1	4" B25.0C
E2	4.5" B25.0C
E3	8.5" B25.0C
E4	VAR. DEPTH B25.0C
J	6" AGGREGATE BASE COURSE
K	12" CLASS IV SUBGRADE STABILIZATION
L	SELECT GRANULAR MATERIAL
N	GEOTEXTILE FOR SOIL STABILIZATION
P	PRIME COAT
R1	2'-6" CONCRETE CURB & GUTTER
R2	1'-6" CONCRETE CURB & GUTTER
R3	8" X 12" CURB
R4	SHOULDER BERM GUTTER
R5	EXPRESSWAY GUTTER
R6	VALLEY GUTTER
R7	5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R8	SINGLE FACED PRECAST CONCRETE BARRIER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W1	WEDGING
Y	MILLED RUMBLE STRIPS

NOTES:
1. USE 4:1 SLOPES (MAX) INSIDE INTERCHANGE FROM -Y1- STA 58+73.11 TO 65+26.80 (RT).
2. REMOVE AND REPLACE EXIST 4' MEDIAN PAVED SHOULDER WITH 5' FULL-DEPTH PAVED SHOULDER. REMOVE AND RESET EXIST GUARDRAIL 1' BEHIND NEW SHOULDER.
3. TIE SLOPE TO EXISTING MEDIAN DITCH FROM -Y1- STA 90+85.00 TO 97+22.00 (LT).
4. RETAIN EXIST MEDIAN GUARDRAIL FROM -Y1- STA 90+85.00 TO 97+22.00 (RT).
5. USE DETAIL FOR BENCH MILLING ADJACENT TO WIDENING (SEE DETAIL, SHEET 2A-3).
6. PAVEMENT EDGE SLOPES 1:1 UNLESS OTHERWISE INDICATED.
7. SEE STRUCTURES PLANS FOR MORE INFORMATION.

REVISIONS
DESIGN REV. - 10/07/22 - REVISED TYP 6A & 6B FOR WALL UPDATES AND ADDED NOTE 7. - JWM

5/14/99
2/6/2023

5/14/99

REVISIONS

DESIGN REV. - 10/07/22 - REVISED TYP 9 & 10, ADDED TYP 9A & 10A, MOVED TYP 11 TO SHEET 2A-6, AND REVISED NOTES. - JWM

2/6/2023

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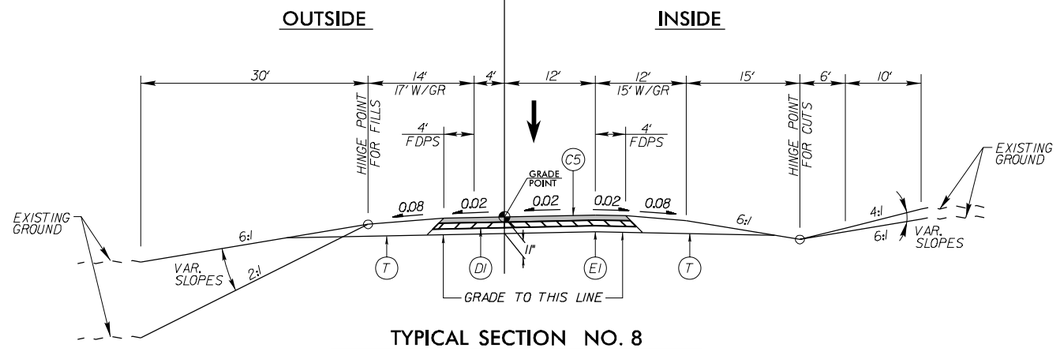
RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	2A-5
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

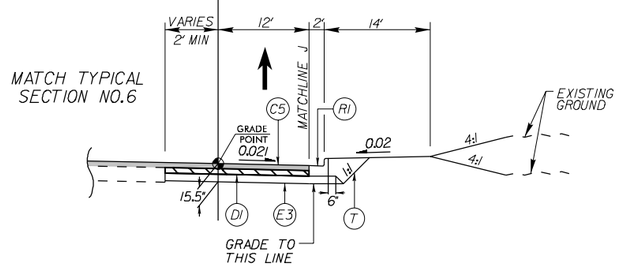
-YIRPB- US 421/I-40 BUS/NC 150 RAMP B
-YIRPD- US 421/I-40 BUS/NC 150 RAMP D



TYPICAL SECTION NO. 8

-YIRPB- STA 13+04.85 TO 21+12.76
-YIRPD- STA 13+04.85 TO 19+86.45

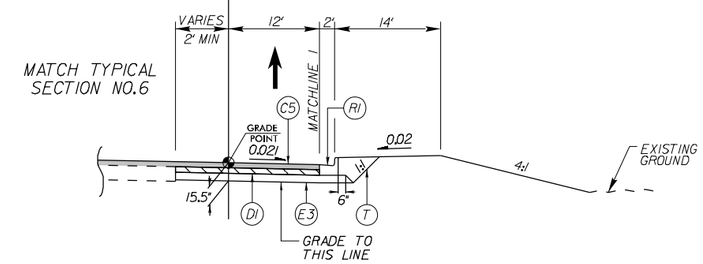
-YILPB- US 421/I-40 BUS/NC 150 LOOP B



TYPICAL SECTION NO. 9

-YILPB- STA 10+00.00 TO 12+23.27

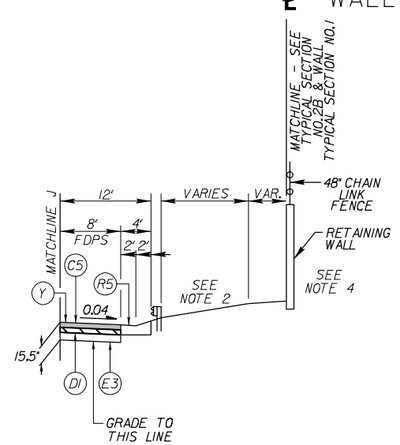
-YILPD- US 421/I-40 BUS/NC 150 LOOP D



TYPICAL SECTION NO. 10

-YILPD- STA 10+00.00 TO 12+23.42

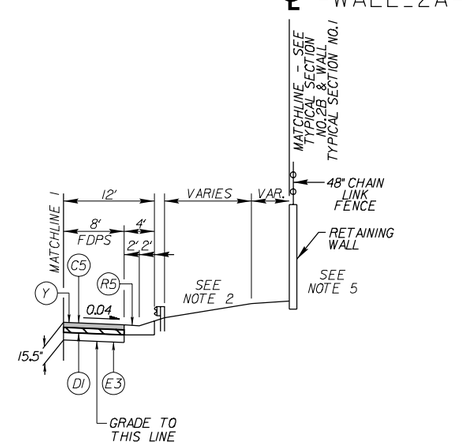
-WALL_2B-



TYPICAL SECTION NO. 9A

-YILPB- STA 10+00.00 TO 10+58.42

-WALL_2A-



TYPICAL SECTION NO. 10A

-YILPD- STA 10+00.00 TO 10+45.64

PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)	
C1	1.5" S9.5B
C2	1.5" S9.5C
C3	2.5" S9.5B
C4	3" S9.5B
C5	3" S9.5C
C6	VAR. DEPTH S9.5B
C7	VAR. DEPTH S9.5C
D1	4" B19.0C
D2	VAR. DEPTH B19.0C
E1	4" B25.0C
E2	4.5" B25.0C
E3	8.5" B25.0C
E4	VAR. DEPTH B25.0C
J	6" AGGREGATE BASE COURSE
K	12" CLASS IV SUBGRADE STABILIZATION
L	SELECT GRANULAR MATERIAL
N	GEOTEXTILE FOR SOIL STABILIZATION
P	PRIME COAT
R1	2'-6" CONCRETE CURB & GUTTER
R2	1'-6" CONCRETE CURB & GUTTER
R3	8" X 12" CURB
R4	SHOULDER BERM GUTTER
R5	EXPRESSWAY GUTTER
R6	VALLEY GUTTER
R7	5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R8	SINGLE FACED PRECAST CONCRETE BARRIER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W1	WEDGING
Y	MILLED RUMBLE STRIPS

NOTES:
1. SEE PLANS FOR CURB TRANSITION.
2. SEE CROSS-SECTIONS FOR CROSS SLOPES.
3. PAVEMENT EDGE SLOPES 1:1 UNLESS OTHERWISE INDICATED.
4. CONSTRUCT RETAINING WALL -WALL_2B- FROM -YILPB- STA 10+00.00 TO 10+55.50. SEE STRUCTURES PLANS FOR MORE INFORMATION.
5. CONSTRUCT RETAINING WALL -WALL_2A- FROM -YILPD- STA 10+00.00 TO 10+32.00. SEE STRUCTURES PLANS FOR MORE INFORMATION.

5/14/99

REVISIONS

DESIGN REV. – 10/07/22 – ADDED TYP 11, MOVED TYP 14 TO SHEET 2A-7, REMOVED NOTE 2, AND REVISED NOTES. – JWM

2/6/2023

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421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

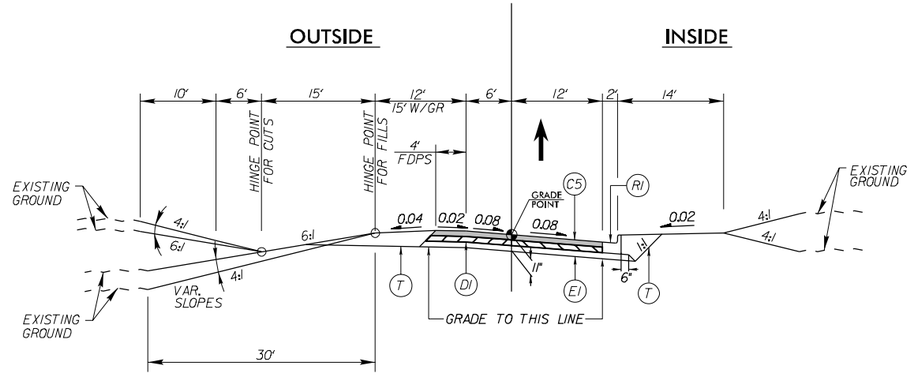
RIGHT-OF-WAY REV.

CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	2A-6
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

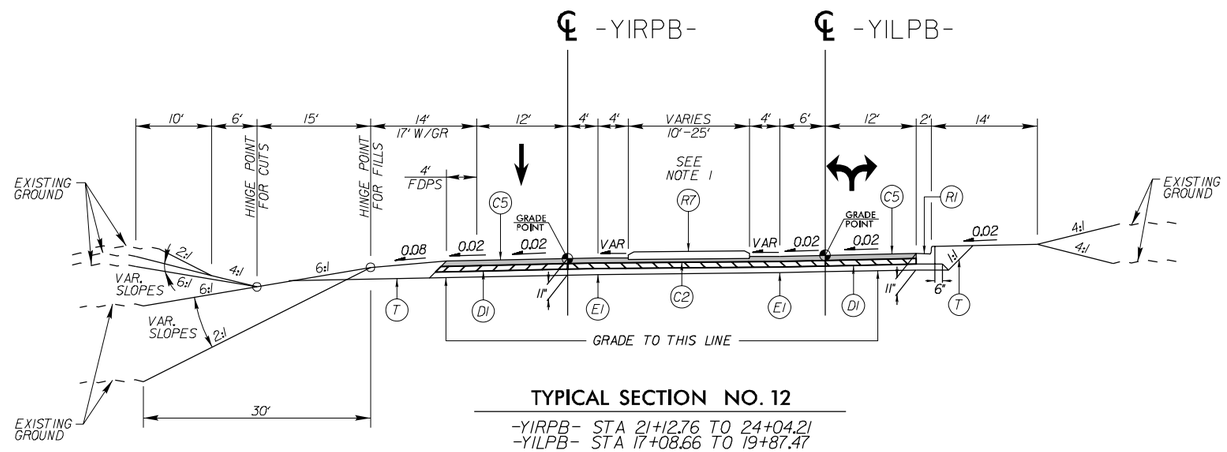
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

℄ -YILPB- US 421/I-40 BUS/NC 150 LOOP B
-YILPD- US 421/I-40 BUS/NC 150 LOOP D



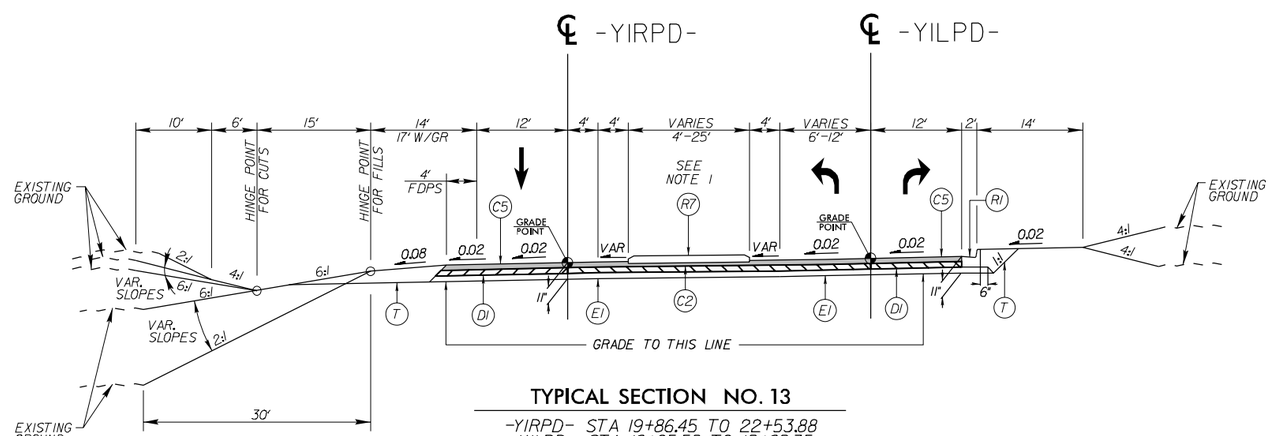
TYPICAL SECTION NO. 11

-YILPB- STA 12+23.27 TO 17+08.66
-YILPD- STA 12+23.42 TO 16+05.58



TYPICAL SECTION NO. 12

-YIRPB- STA 21+12.76 TO 24+04.21
-YILPB- STA 17+08.66 TO 19+87.47



TYPICAL SECTION NO. 13

-YIRPD- STA 19+86.45 TO 22+53.88
-YILPD- STA 16+05.58 TO 18+68.35

PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN)

C1	1.5" S9.5B
C2	1.5" S9.5C
C3	2.5" S9.5B
C4	3" S9.5B
C5	3" S9.5C
C6	VAR. DEPTH S9.5B
C7	VAR. DEPTH S9.5C
D1	4" 119.0C
D2	VAR. DEPTH 119.0C
E1	4" B25.0C
E2	4.5" B25.0C
E3	8.5" B25.0C
E4	VAR. DEPTH B25.0C
J	6" AGGREGATE BASE COURSE
K	12" CLASS IV SUBGRADE STABILIZATION
L	SELECT GRANULAR MATERIAL
N	GEOTEXTILE FOR SOIL STABILIZATION
P	PRIME COAT
R1	2'-6" CONCRETE CURB & GUTTER
R2	1'-6" CONCRETE CURB & GUTTER
R3	8" X 12" CURB
R4	SHOULDER BERM GUTTER
R5	EXPRESSWAY GUTTER
R6	VALLEY GUTTER
R7	5" MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R8	SINGLE FACED PRECAST CONCRETE BARRIER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W1	WEDGING
Y	MILLED RUMBLE STRIPS

NOTES:
1. SEE PLANS FOR ISLAND (R7) LOCATIONS.
2. PAVEMENT EDGE SLOPES 1:1 UNLESS OTHERWISE INDICATED.

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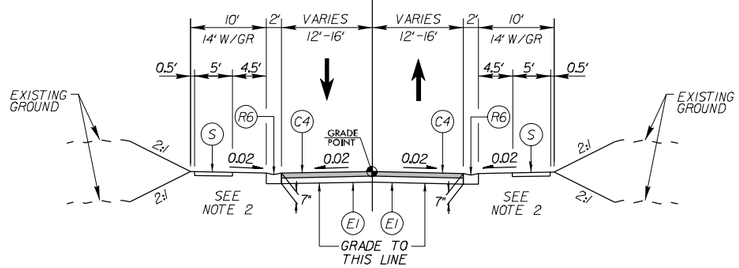
RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	2A-7
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

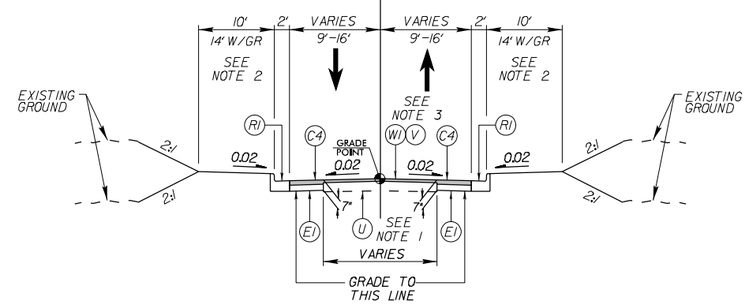
℄ -Y2- TIMBERVIEW DR
-Y3- SELWYCK LN/LAMSHIRE RD
-Y8- E SUTTER LN



TYPICAL SECTION NO. 14

-Y2- STA 11+22.00 TO 13+28.41
-Y2- STA 13+83.42 TO 17+40.00
-Y3- STA 12+25.00 TO 14+78.61
-Y3- STA 15+33.63 TO 16+75.00
-Y8- STA 14+03.52 TO 15+25.00

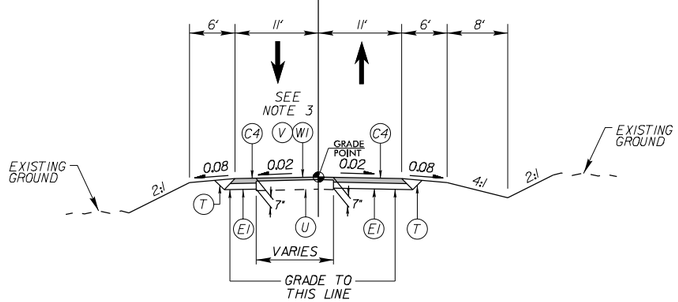
℄ -Y3- SELWYCK LN/LAMSHIRE RD
-Y5- ASHLEY PARK DR
-Y6- WOODFIELD DR
-Y7- REGENTS PARK RD/TIMBERWOOD TRL
-Y8- SUTTER LN



TYPICAL SECTION NO. 15

-Y3- STA 10+50.00 TO 12+25.00 (USE R6)
-Y3- STA 16+75.00 TO 17+50.00 (USE R6)
-Y5- STA 10+27.50 TO 10+58.16
-Y6- STA 10+27.91 TO 10+65.63
-Y7- STA 13+03.16 TO 13+66.27
-Y7- STA 14+47.04 TO 14+90.83
-Y8- STA 12+77.96 TO 13+27.52
-Y8- STA 15+25.00 TO 16+30.00 (USE R6)

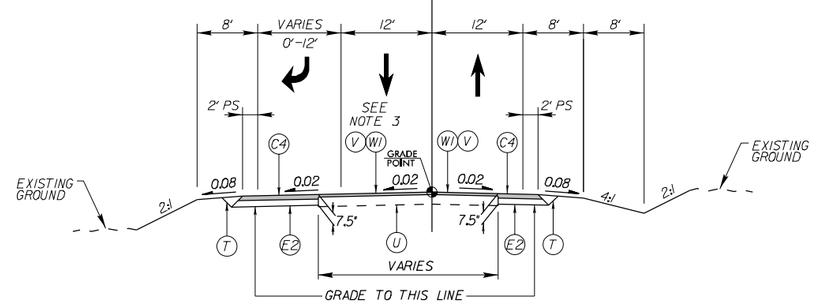
℄ -Y4- BLUFF SCHOOL RD



TYPICAL SECTION NO. 16

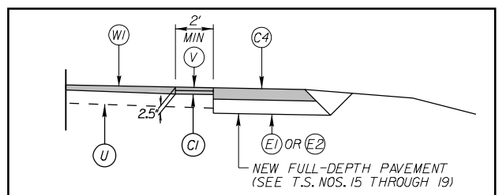
-Y4- STA 12+00.00 TO 18+03.16

℄ -Y4- HOPKINS RD (SR 2694)



TYPICAL SECTION NO. 17

-Y4- STA 19+04.18 TO 24+55.00



DETAIL FOR BENCH MILLING (-Y-)

PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN)

C1	1.5" S9.5B
C2	1.5" S9.5C
C3	2.5" S9.5B
C4	3" S9.5B
C5	3" S9.5C
C6	VAR. DEPTH S9.5B
C7	VAR. DEPTH S9.5C
D1	4" I19.0C
D2	VAR. DEPTH I19.0C
E1	4" B25.0C
E2	4.5" B25.0C
E3	8.5" B25.0C
E4	VAR. DEPTH B25.0C
J	6" AGGREGATE BASE COURSE
K	12" CLASS IV SUBGRADE STABILIZATION
L	SELECT GRANULAR MATERIAL
N	GEOTEXTILE FOR SOIL STABILIZATION
P	PRIME COAT
R1	2'-6" CONCRETE CURB & GUTTER
R2	1'-6" CONCRETE CURB & GUTTER
R3	8" X 12" CURB
R4	SHOULDER BERM GUTTER
R5	EXPRESSWAY GUTTER
R6	VALLEY GUTTER
R7	5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R8	SINGLE FACED PRECAST CONCRETE BARRIER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W1	WEDGING
Y	MILLED RUMBLE STRIPS

NOTES:
1. REMOVE AND REPLACE EXIST PAVEMENT FROM -Y7- STA 13+25.00 TO 13+66.27 AND FROM STA 14+47.04 TO 15+50.00.
2. SEE PLANS FOR SIDEWALK LOCATIONS ALONG -Y2- AND -Y8-.
3. USE DETAIL FOR BENCH MILLING ADJACENT TO WIDENING (SEE DETAIL, THIS SHEET).
4. PAVEMENT EDGE SLOPES 1:1 UNLESS OTHERWISE INDICATED.

REVISIONS
DESIGN REV. - 10/07/22 - ADDED TYP 14, MOVED TYP 18 TO SHEET 2A-8, AND REVISED NOTE 2. - JWM

5/14/99

2/6/2023

5/14/99

REVISIONS

DESIGN REV. - 10/07/22 - ADDED TYP 18 & WALL TYP 1, REVISED NOTES 1 THRU 6 & ADDED NOTES 7 TO 8, AND UPDATED TYP 18, 19, 20, & BRIDGE TYP 1 PER NOTES. - JWM

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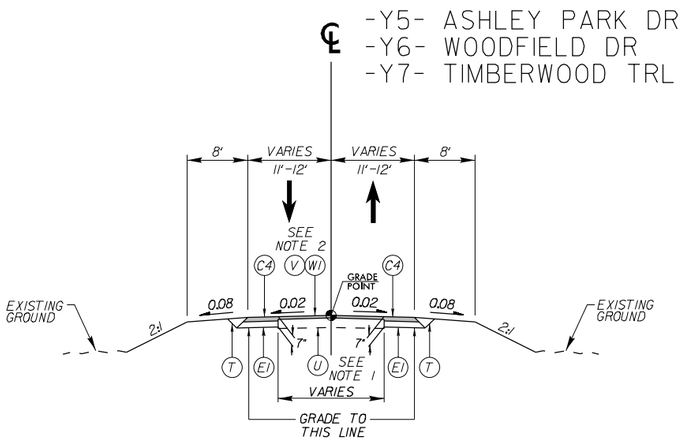
RIGHT-OF-WAY REV.
CONST. REV.

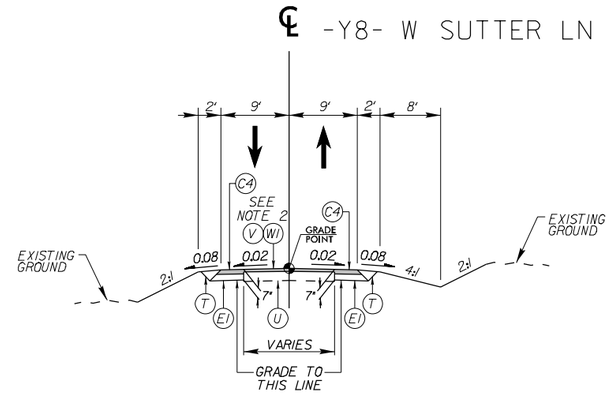
PROJECT REFERENCE NO.	SHEET NO.
U-5760	2A-8
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



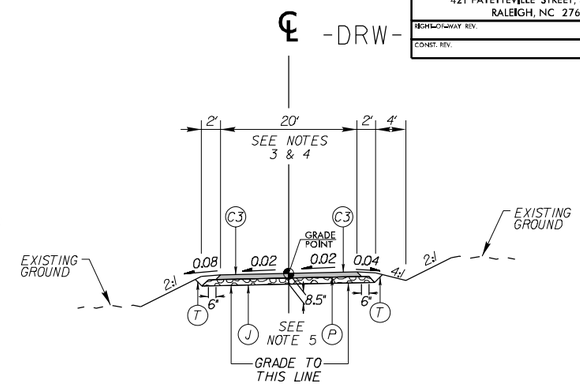
TYPICAL SECTION NO. 18

-Y5- STA 10+58.16 TO 11+42.00
-Y6- STA 10+65.63 TO 10+75.00
-Y7- STA 12+50.00 TO 13+03.16
-Y7- STA 14+90.83 TO 16+70.00



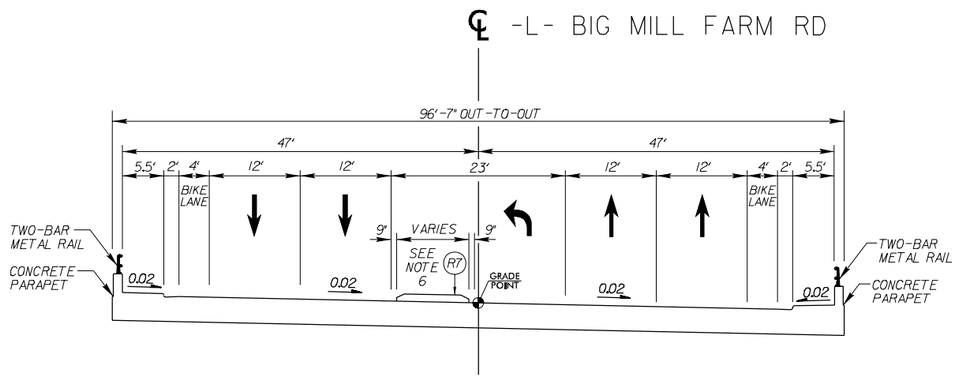
TYPICAL SECTION NO. 19

-Y8- STA 11+75.00 TO 12+77.96



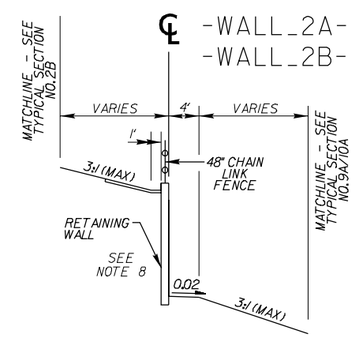
TYPICAL SECTION NO. 20

-DRW1- STA 10+29.50 TO 11+30.00
-DRW2- STA 10+20.00 TO 10+70.50
-DRW3- STA 10+31.43 TO 10+67.00
-DRW4- STA 10+30.72 TO 10+80.00
-DRW5- STA 10+20.00 TO 10+58.50



BRIDGE TYPICAL SECTION NO. 1

-L- STA 26+54.51 TO 28+20.01



WALL TYPICAL SECTION NO. 1

-WALL_2A- STA 10+00.00 TO 12+38.97
-WALL_2B- STA 10+00.00 TO 12+78.67

PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

C1	1.5" S9.5B
C2	1.5" S9.5C
C3	2.5" S9.5B
C4	3" S9.5B
C5	3" S9.5C
C6	VAR. DEPTH S9.5B
C7	VAR. DEPTH S9.5C
D1	4" I19.0C
D2	VAR. DEPTH I19.0C
E1	4" B25.0C
E2	4.5" B25.0C
E3	8.5" B25.0C
E4	VAR. DEPTH B25.0C
J	6" AGGREGATE BASE COURSE
K	12" CLASS IV SUBGRADE STABILIZATION
L	SELECT GRANULAR MATERIAL
N	GEOTEXTILE FOR SOIL STABILIZATION
P	PRIME COAT
R1	2'-6" CONCRETE CURB & GUTTER
R2	1'-6" CONCRETE CURB & GUTTER
R3	8" X 12" CURB
R4	SHOULDER BERM GUTTER
R5	EXPRESSWAY GUTTER
R6	VALLEY GUTTER
R7	5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R8	SINGLE FACED PRECAST CONCRETE BARRIER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W1	WEDGING
Y	MILLED RUMBLE STRIPS

NOTES:
1. REMOVE AND REPLACE EXIST PAVEMENT FROM -Y7- STA 13+25.00 TO 13+66.27 AND FROM STA 14+47.04 TO 15+50.00.
2. USE DETAIL FOR BENCH MILLING ADJACENT TO WIDENING (SEE DETAIL, SHEET 2A-7).
3. SEE PLANS FOR PAVEMENT WIDTH.
4. SEE CROSS-SECTIONS FOR CROSS-SLOPES.
5. CONSTRUCT ALL DRIVEWAYS TO LIMITS SHOWN ON PLANS AND WITH ASPHALT PAVEMENT UNLESS OTHERWISE NOTED.
6. SURFACE MOUNTED (STRUCTURE ITEM).
7. PAVEMENT EDGE SLOPES 1:1 UNLESS OTHERWISE INDICATED.
8. SEE STRUCTURE PLANS FOR MORE INFORMATION.

2/6/2023

5/14/99

K:\RAL_Roadway\OU036312 - U-5760 Big Mill Farm Road\Roadway\Proj\U5760_rdy_psh_2B-1.dgn

2/6/2023

PROJECT REFERENCE NO.	SHEET NO.
U-5760	2B-1

ROADWAY DESIGN ENGINEER

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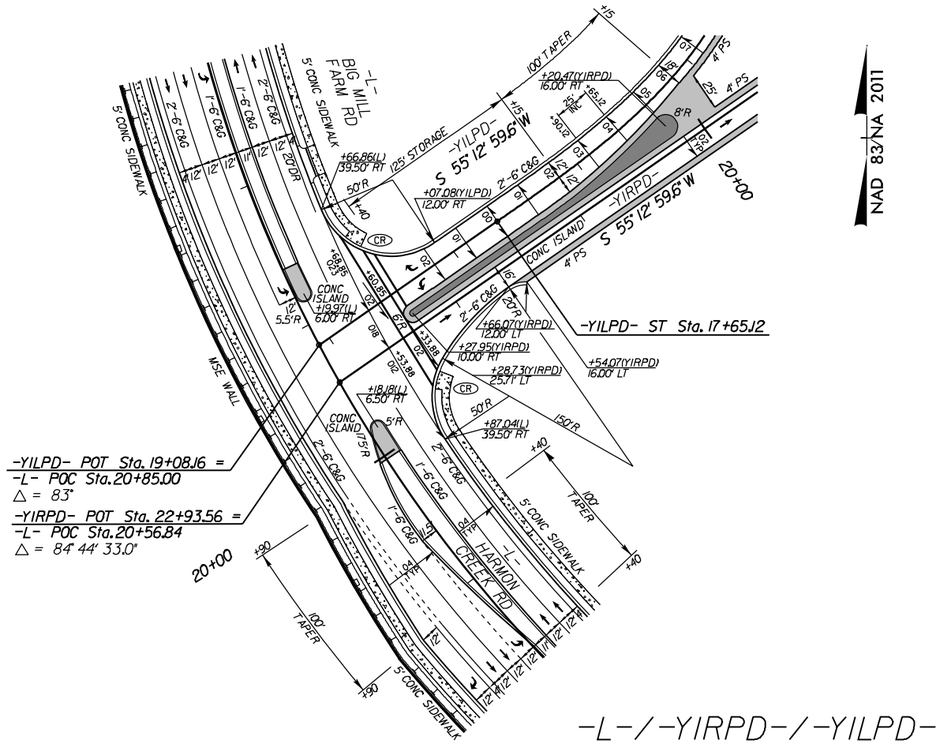
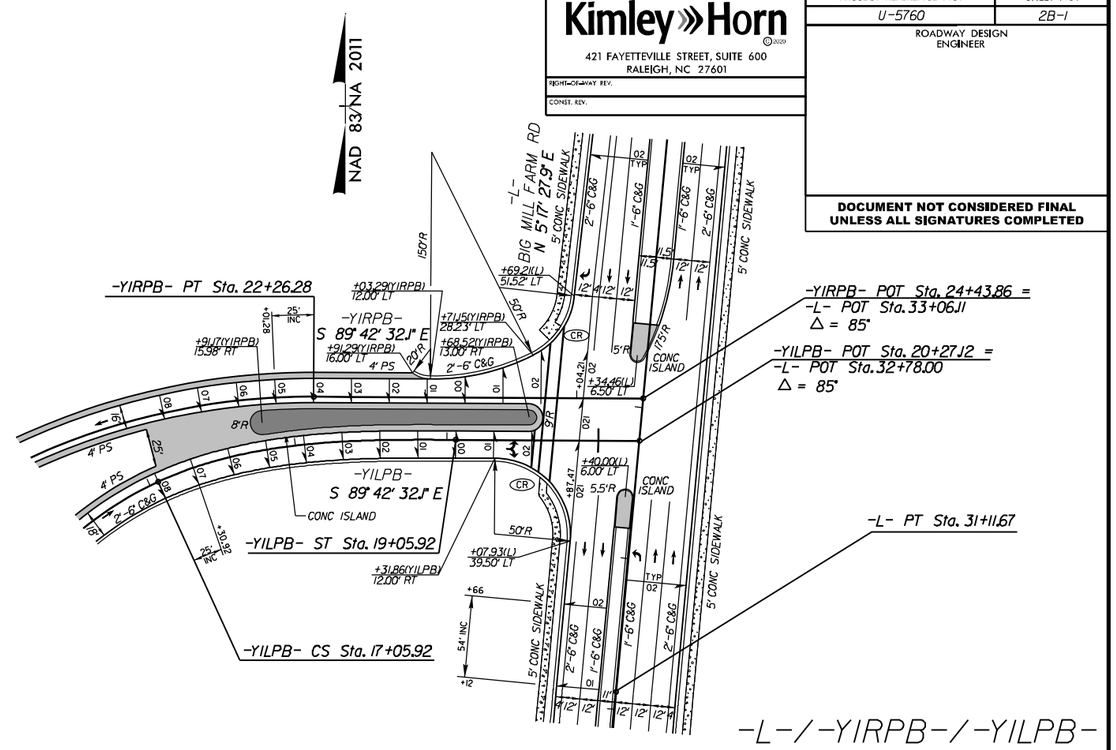


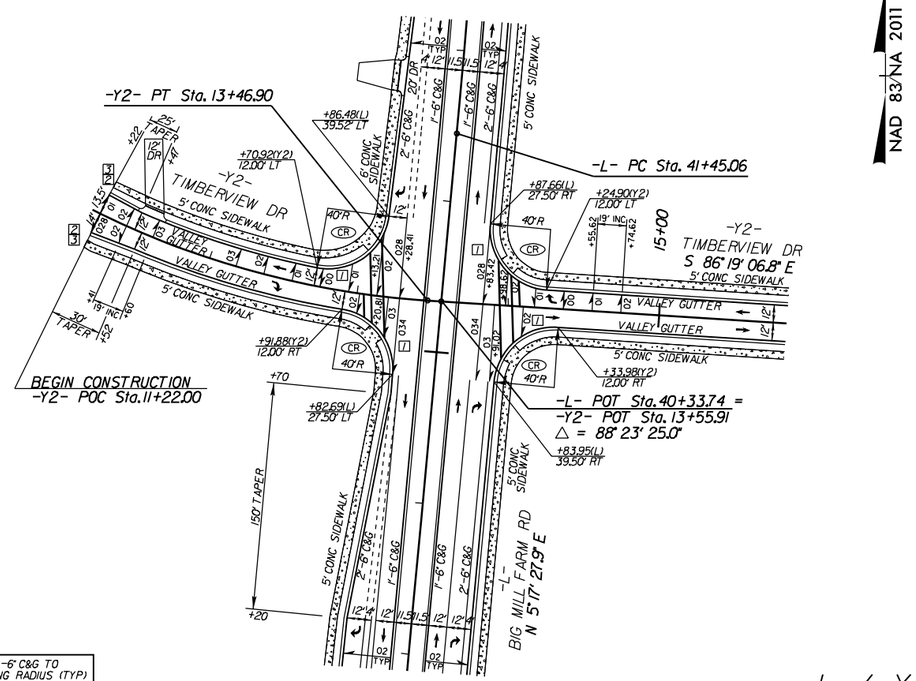
-L-/-YIRPD-/-YILPD-

SEE SHEET NOS.4 AND 5 FOR PLAN



-L-/-YIRPB-/-YILPB-

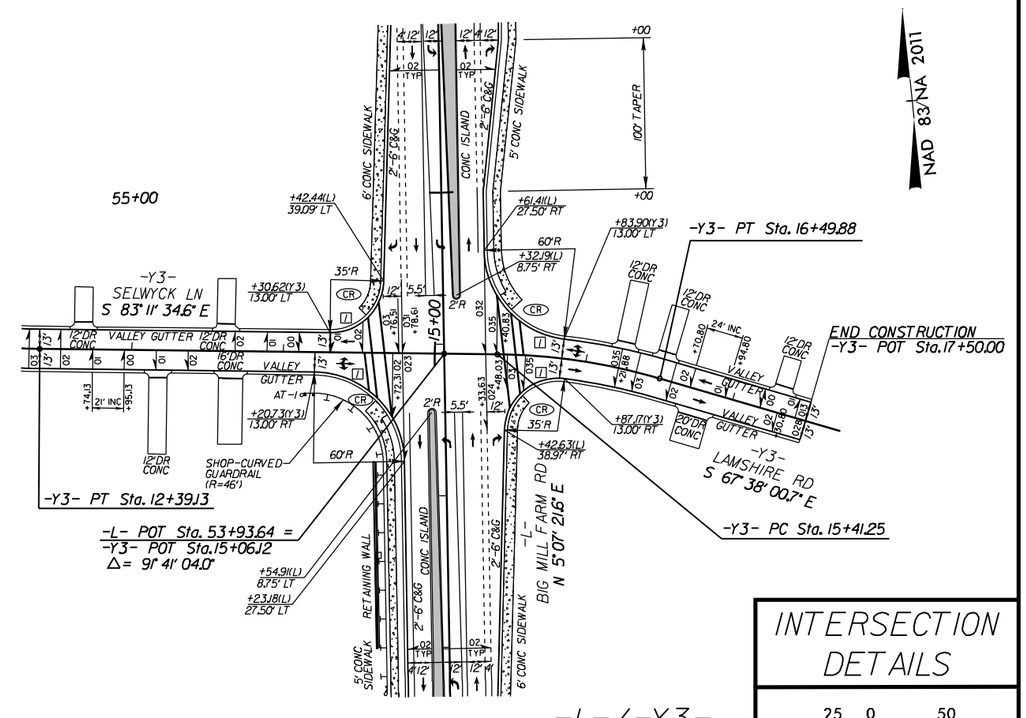
SEE SHEET NOS.5 AND 6 FOR PLAN



-L-/-Y2-

SEE SHEET NO.6 FOR PLAN

1 TRANSITION FROM 2'-6" C&G TO VALLEY GUTTER ALONG RADIUS (TYP) SEE DETAIL, SHEET 2A-3
2 TIE TO EXISTING VALLEY CURB
3 TIE TO EXISTING SIDEWALK



-L-/-Y3-

SEE SHEET NO.7 FOR PLAN

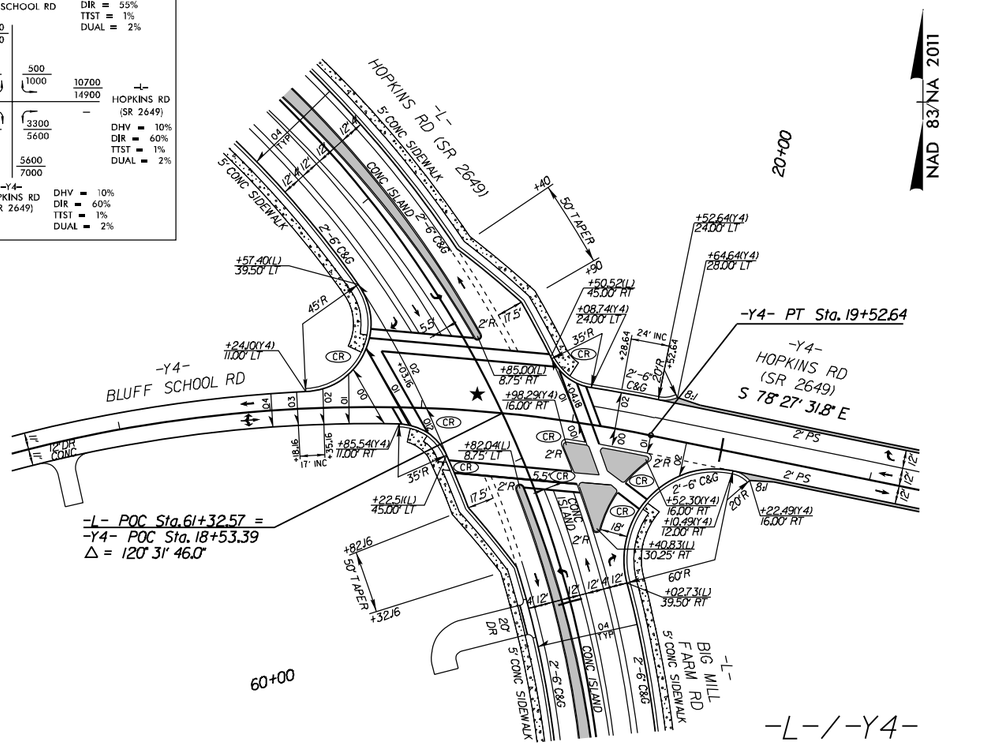
1 TRANSITION FROM 2'-6" C&G TO VALLEY GUTTER ALONG RADIUS (TYP) SEE DETAIL, SHEET 2A-3

INTERSECTION DETAILS

25 0 50

5/14/99

2023 ADT / 2040 ADT		
-Y4- BLUFF SCHOOL RD		DHV = 9%, DIR = 55%, TTST = 1%, DUAL = 2%
-L- BIG MILL FARM RD	DHV = 10%, DIR = 60%, TTST = 1%, DUAL = 2%	
-L- HOPKINS RD (SR 2649)	DHV = 10%, DIR = 60%, TTST = 1%, DUAL = 2%	
-Y4- HOPKINS RD (SR 2649)	DHV = 10%, DIR = 60%, TTST = 1%, DUAL = 2%	



★ TRAFFIC SIGNAL

-L-/-Y4-

SEE SHEET NOS. 7 AND 8 FOR PLAN

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CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	2B-2

ROADWAY DESIGN ENGINEER

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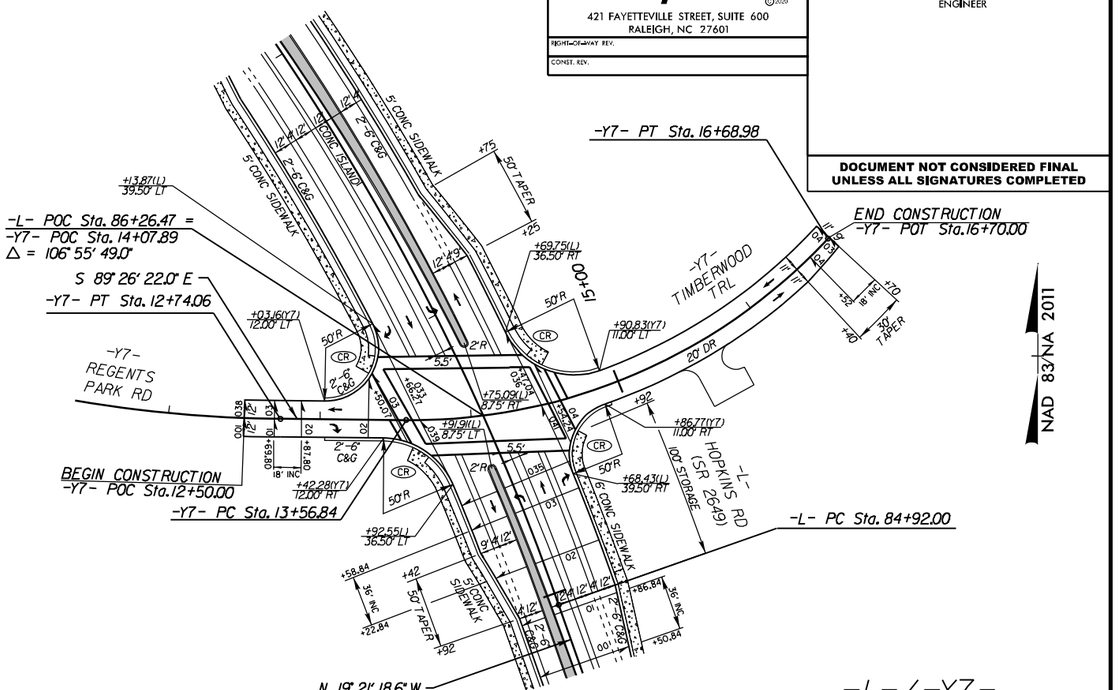
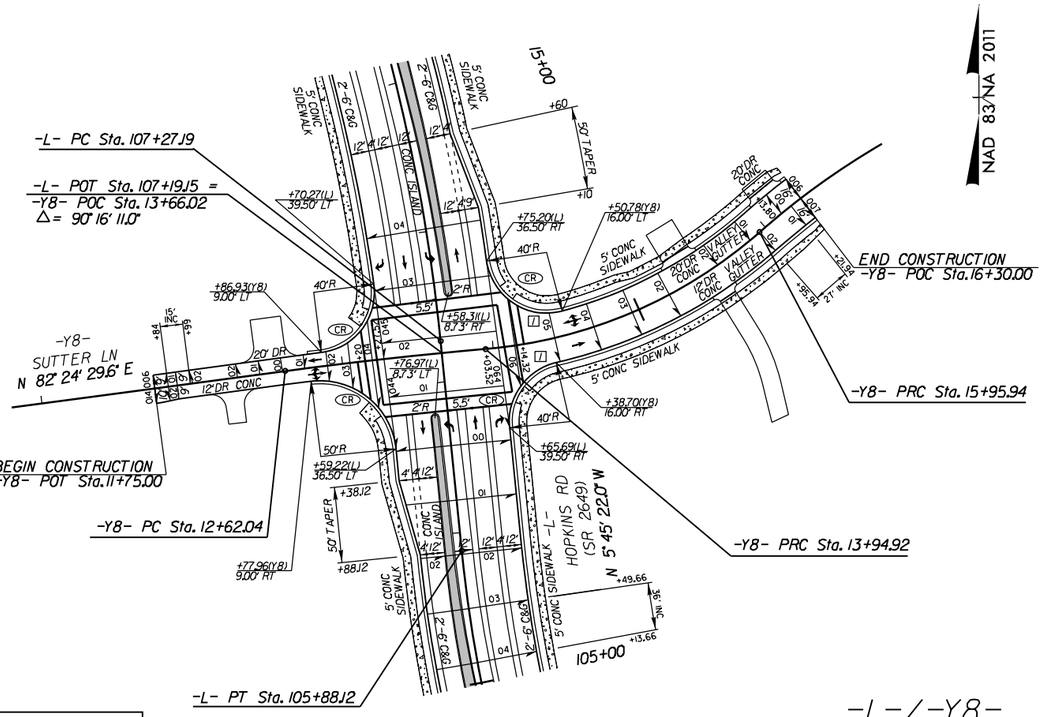


-L-/-Y7-

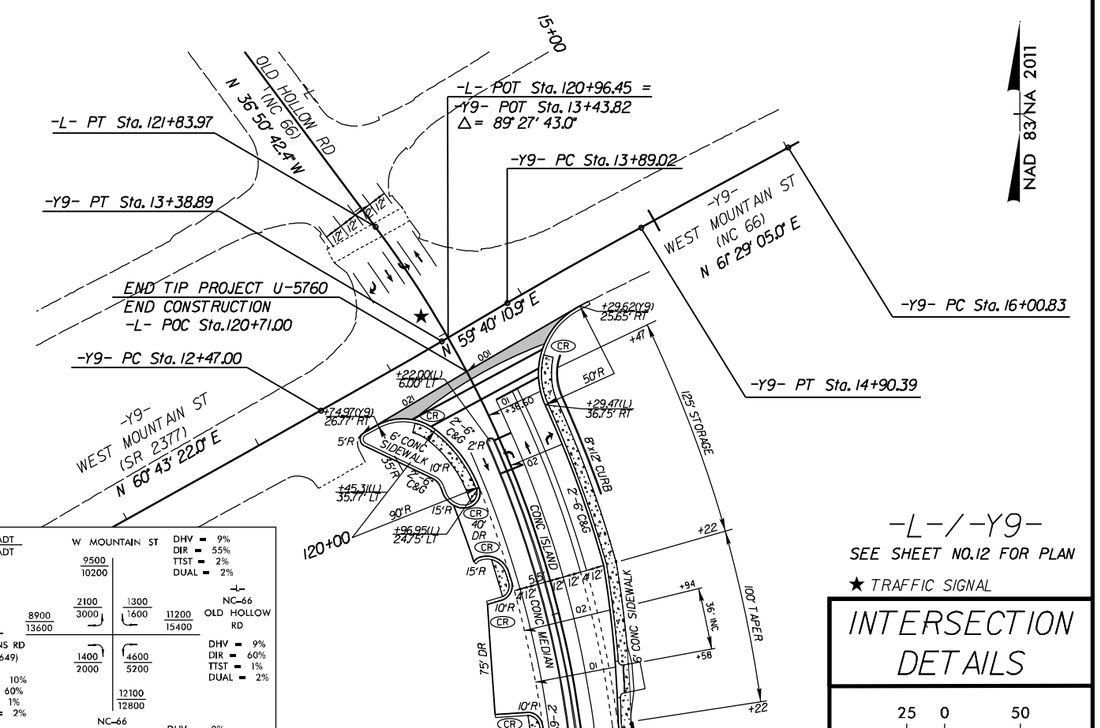
SEE SHEET NOS. 9 AND 10 FOR PLAN



[1] TRANSITION FROM 2'-6" C&G TO VALLEY GUTTER ALONG RADIUS (TYP) SEE DETAIL, SHEET 2A-3

-L-/-Y8-

SEE SHEET NO. 11 FOR PLAN



2023 ADT / 2040 ADT		
W MOUNTAIN ST		DHV = 9%, DIR = 55%, TTST = 2%, DUAL = 2%
-L- HOPKINS RD (SR 2649)	DHV = 10%, DIR = 60%, TTST = 1%, DUAL = 2%	
-L- NC-66 OLD HOLLOW RD		DHV = 9%, DIR = 60%, TTST = 1%, DUAL = 2%
NC-66 W MOUNTAIN ST		DHV = 9%, DIR = 55%, TTST = 2%, DUAL = 2%

-L-/-Y9-

SEE SHEET NO. 12 FOR PLAN

★ TRAFFIC SIGNAL

INTERSECTION DETAILS

25 0 50

K:\RAL_Roadway\01036312 - U-5760 Big Mill Farm Road\Roadway\Proj\U5760_rdy_psh_2B-2.dgn

2/6/2023

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REVISIONS

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RIGHT-OF-WAY REV.
CONST. REV.

25 0 50

PROJECT REFERENCE NO.	SHEET NO.
U-5760	2B-3
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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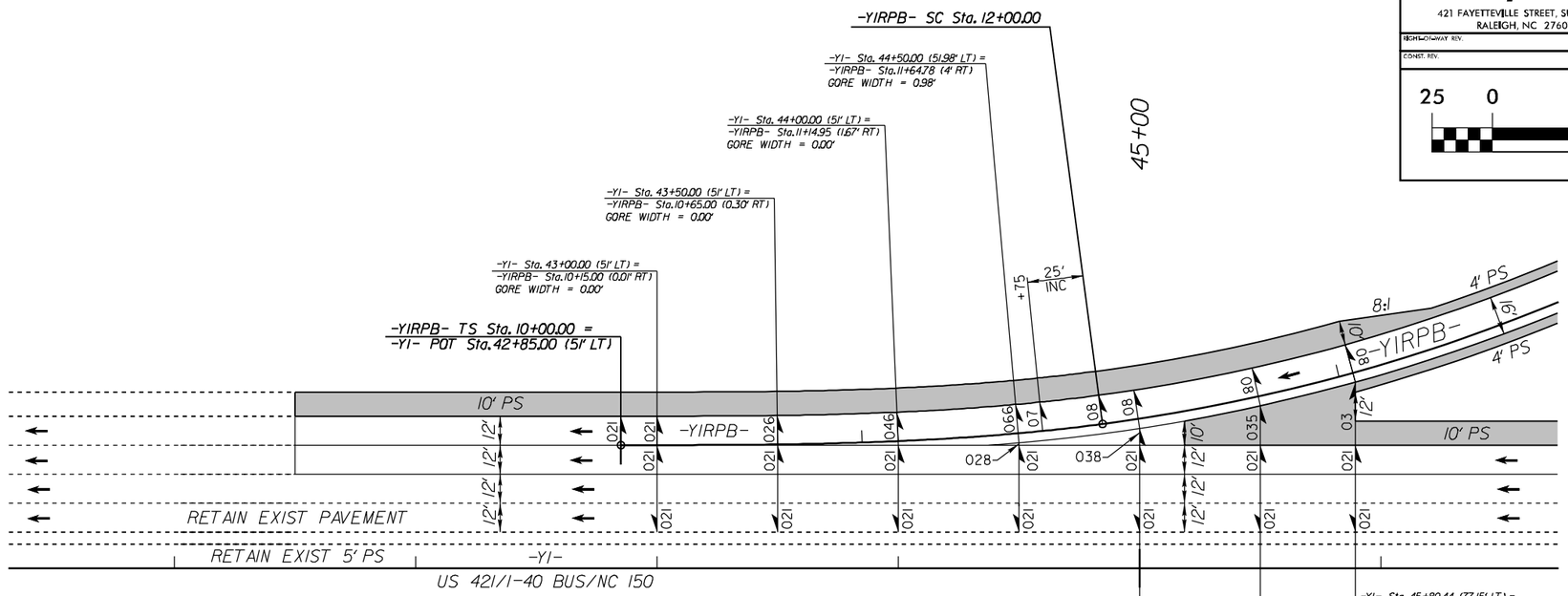
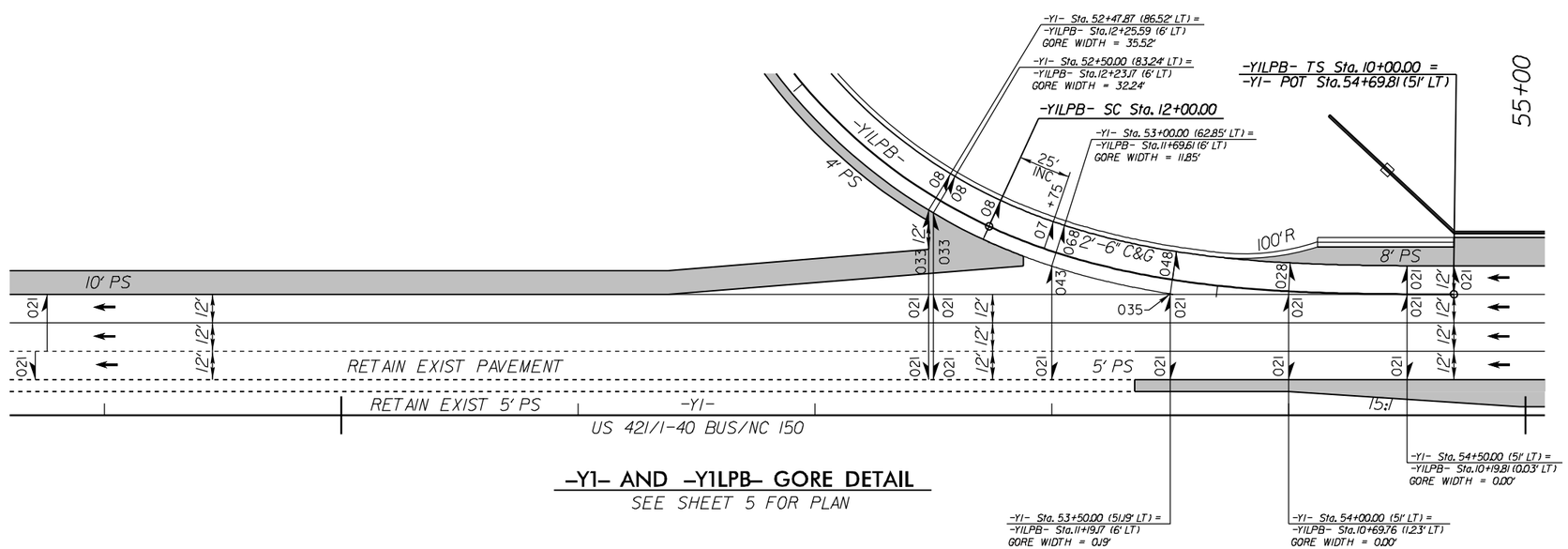


-Y1- AND -Y1RPB- GORE DETAIL

SEE SHEET 5 FOR PLAN



-Y1- AND -Y1LPB- GORE DETAIL

SEE SHEET 5 FOR PLAN

2/6/2023

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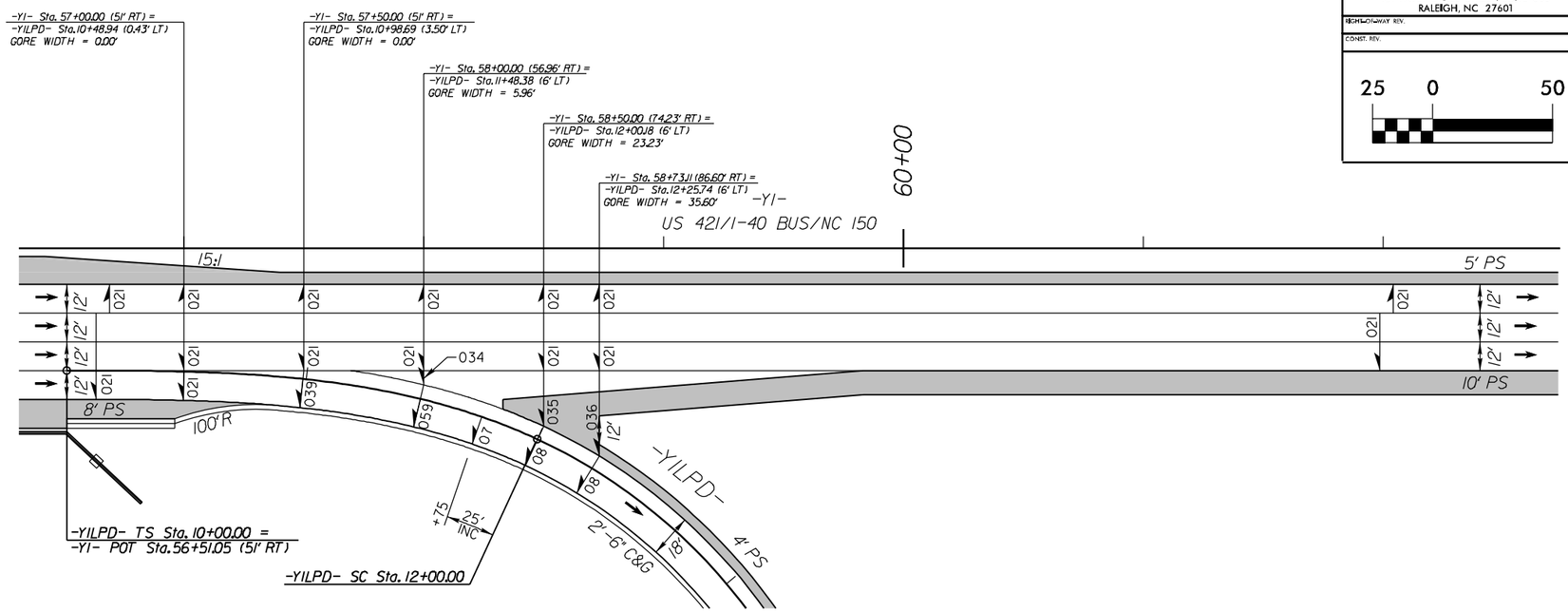
RIGHT-OF-WAY REV.
CONST. REV.

25 0 50

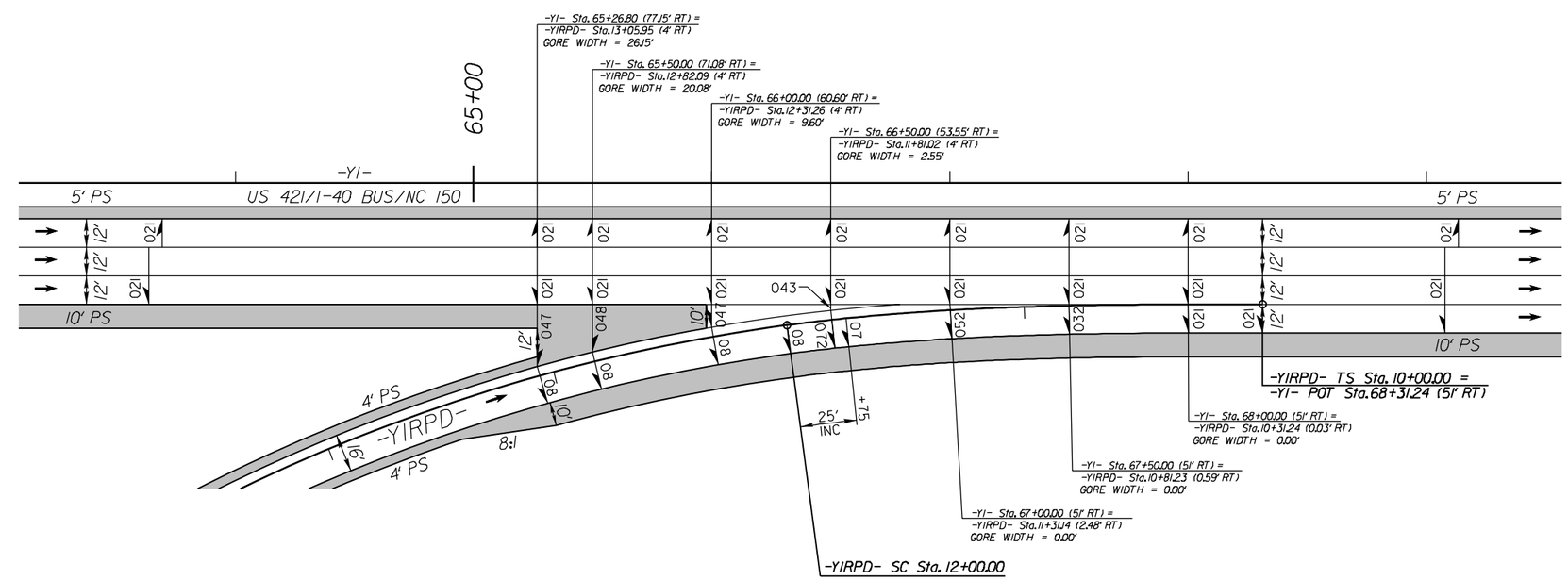
PROJECT REFERENCE NO.	SHEET NO.
U-5760	2B-4
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



-Y1- AND -Y1LPD- GORE DETAIL

SEE SHEET 5 FOR PLAN



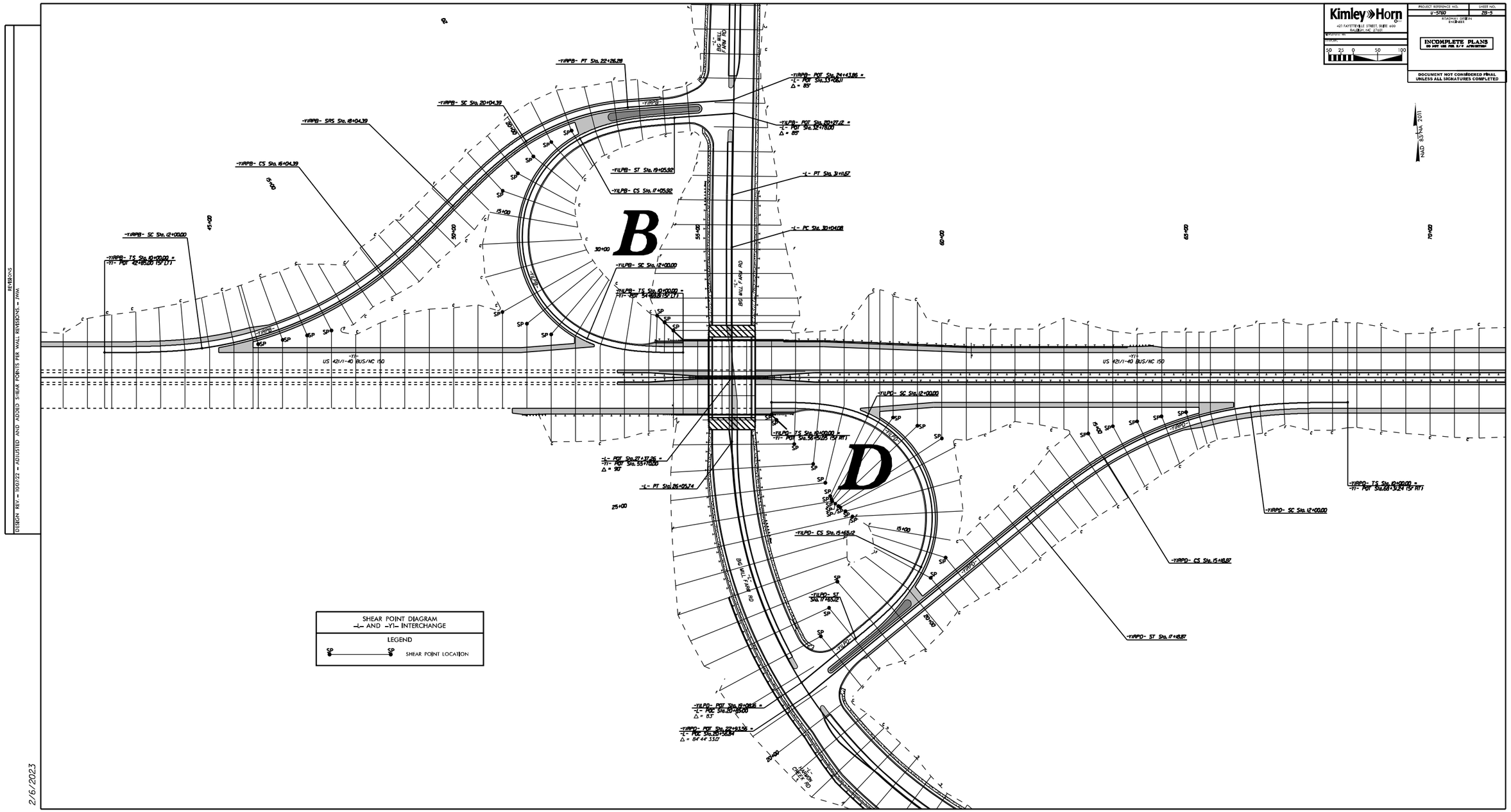
-Y1- AND -Y1RPD- GORE DETAIL

SEE SHEET 5 FOR PLAN

REVISIONS

5/14/99

2/6/2023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RALEIGH, NC 27601
PROJECT REFERENCE NO.
U-5702
SHEET NO.
28-5
ROADWAY DESIGN ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
DESIGN REV - 100/22 - ADJUSTED AND ADDED SHEAR POINTS FOR WALL REVISIONS - JWW
REVISIONS
2/6/2023
B
D
-YIRPB- PT Sta. 22+26.28
-YIRPB- SC Sta. 20+04.39
-YIRPB- SRS Sta. 18+04.39
-YIRPB- CS Sta. 16+04.39
-YIRPB- SC Sta. 12+00.00
-YIRPB- TS Sta. 10+00.00 =
-Y1- POT 42+85.20 15' LT
-YILPB- ST Sta. 19+05.92
-YILPB- CS Sta. 17+05.92
-YILPB- SC Sta. 12+00.00
-YILPB- TS Sta. 10+00.00 =
-Y1- POT 54+09.81 15' LT
-L- POT Sta. 33+06.11
Δ = 85°
-YILPB- POT Sta. 20+27.12 =
-L- POT Sta. 32+11.00
Δ = 85°
-L- PT Sta. 31+11.67
-L- PC Sta. 30+04.08
BIG WILL FARM RD
US 421/I-40 BUS/NC 150
-YILPD- SC Sta. 12+00.00
-YILPD- TS Sta. 10+00.00 =
-Y1- POT Sta. 58+50.05 15' RT
-L- POT Sta. 27+37.36 =
-Y1- POT Sta. 55+16.00
Δ = 90°
-L- PT Sta. 26+25.74
-YILPD- CS Sta. 15+65.12
-YILPD- ST Sta. 17+60.12
-YILPD- POT Sta. 19+00.15 =
-L- POC Sta. 20+18.00
Δ = 8.5°
-YIRPD- POT Sta. 22+93.36 =
-L- POC Sta. 21+20.94
Δ = 84° 44' 33.0"
-YIRPD- SC Sta. 12+00.00
-YIRPD- TS Sta. 10+00.00 =
-Y1- POT Sta. 68+32.24 15' RT
-YIRPD- CS Sta. 15+18.87
-YIRPD- ST Sta. 17+18.87
SHEAR POINT DIAGRAM
-L- AND -Y1- INTERCHANGE
LEGEND
SHEAR POINT LOCATION

5/14/99

REVISIONS

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RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	2D-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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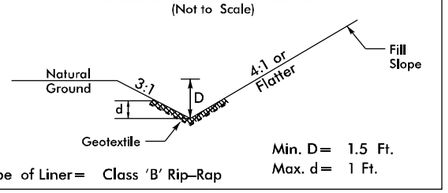
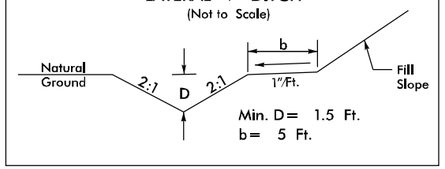
DETAIL 1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



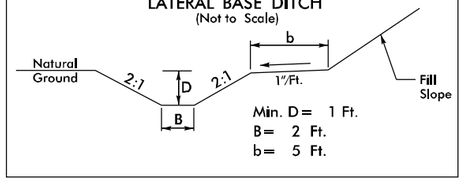
FROM STA. 60+10 TO STA. 61+50 –Y1– (RT)

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



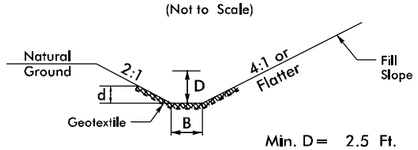
FROM STA. 58+90 TO STA. 59+50 –Y1– (LT)

DETAIL 3
LATERAL BASE DITCH
(Not to Scale)



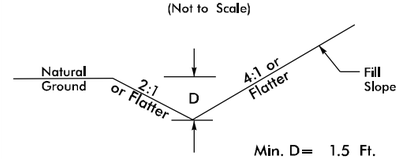
FROM STA. 28+64 TO STA. 29+50 –L– (LT)
FROM STA. 58+30 TO STA. 58+80 –Y1– (LT)

DETAIL 4
SPECIAL LATERAL BASE DITCH
(Not to Scale)



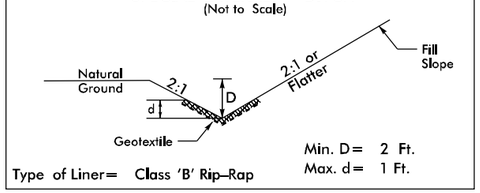
FROM STA. 16+15 TO STA. 17+00 –Y1RPB– (LT)

DETAIL 5
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



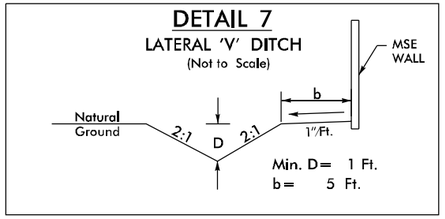
FROM STA. 46+00 TO STA. 47+25 –L– (RT)
FROM STA. 51+50 TO STA. 52+10 –L– (RT)
FROM STA. 103+30 TO STA. 106+00 –L– (LT)
FROM STA. 111+85 TO STA. 116+50 –L– (LT)
FROM STA. 80+50 TO STA. 80+80 –Y1– (LT)
FROM STA. 94+00 TO STA. 97+00 –Y1– (LT)
FROM STA. 14+57 TO STA. 15+85 –Y1RPB– (RT)
FROM STA. 13+35 TO STA. 15+00 –Y1LPD– (LT)

DETAIL 6
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



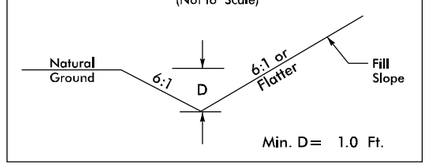
FROM STA. 54+40 TO STA. 55+75 –L– (RT)

DETAIL 7
LATERAL 'V' DITCH
(Not to Scale)



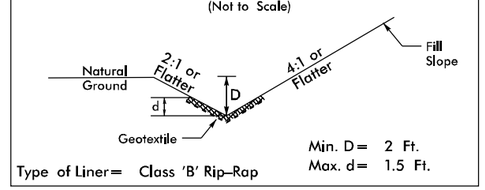
FROM STA. 29+50 TO STA. 32+00 –L– (LT)

DETAIL 8
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



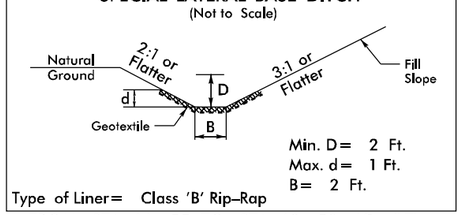
FROM STA. 88+00 TO STA. 89+50 –Y1– (RT)

DETAIL 9
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



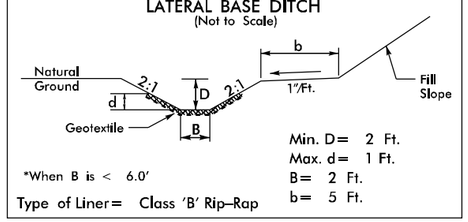
FROM STA. 80+80 TO STA. 82+00 –Y1– (LT)
FROM STA. 89+50 TO STA. 90+00 –Y1– (LT)
FROM STA. 10+31.24 TO STA. 11+00 –Y1RPD– (LT)

DETAIL 10
SPECIAL LATERAL BASE DITCH
(Not to Scale)



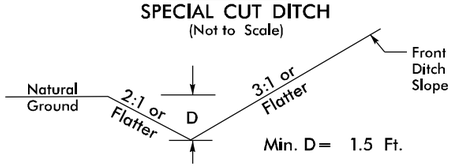
FROM STA. 66+55 TO STA. 69+50 –Y1– (LT)
FROM STA. 90+00 TO STA. 91+00 –Y1– (LT)

DETAIL 11
LATERAL BASE DITCH
(Not to Scale)



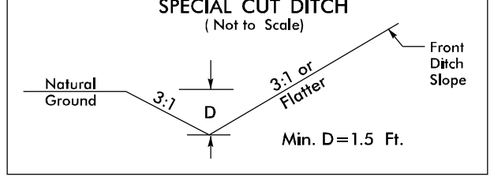
FROM STA. 91+00 TO STA. 91+50 –Y1– (LT)

DETAIL 12
SPECIAL CUT DITCH
(Not to Scale)



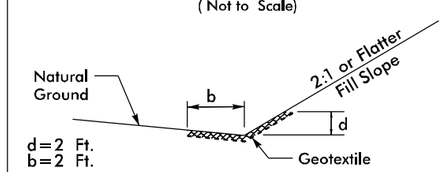
FROM STA. 47+25 TO STA. 48+25 –L– (RT)
FROM STA. 49+00 TO STA. 51+50 –L– (RT)
FROM STA. 55+75 TO STA. 58+00 –L– (RT)
FROM STA. 111+65 TO STA. 114+00 –L– (RT)

DETAIL 13
SPECIAL CUT DITCH
(Not to Scale)



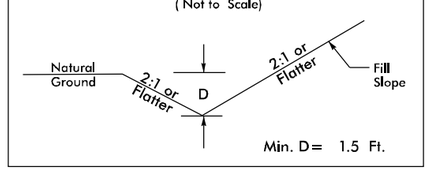
FROM STA. 43+00 TO STA. 44+50 –L– (RT)
FROM STA. 44+50 TO STA. 45+50 –L– (RT)
FROM STA. 14+10 TO STA. 15+75 –Y2– (LT)
FROM STA. 15+75 TO STA. 17+00 –Y2– (LT)

DETAIL 14
TOE PROTECTION
(Not to Scale)



FROM STA. 65+00 TO STA. 67+00 –L– (RT)
FROM STA. 109+50 TO STA. 111+50 –L– (RT)
FROM STA. 101+50 TO STA. 101+98 –L– (LT)
FROM STA. 14+00 TO STA. 15+15 –Y8– (LT)
FROM STA. 15+50 TO STA. 15+95 –Y8– (LT)
FROM STA. 19+00 TO STA. 21+00 –Y1RPB– (LT)

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



FROM STA. 35+00 TO STA. 37+00 –L– (RT)
FROM STA. 37+00 TO STA. 38+50 –L– (RT)
FROM STA. 58+00 TO STA. 60+20 –L– (RT)
FROM STA. 96+00 –L– TO STA. 98+00 –L– (RT)
FROM STA. 13+00 TO STA. 14+00 –Y4– (LT)
FROM STA. 19+85 TO STA. 20+00 –Y4– (RT)
FROM STA. 10+50 TO STA. 11+50 –Y5– (RT)
FROM STA. 12+35 TO STA. 13+50 –Y7– (RT)
FROM STA. 14+87 TO STA. 16+70 –Y7– (RT)

2/6/2023

5/14/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
U-5760	2D-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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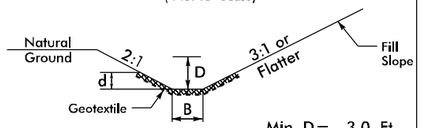
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DETAIL 16
SPECIAL LATERAL BASE DITCH
(Not to Scale)

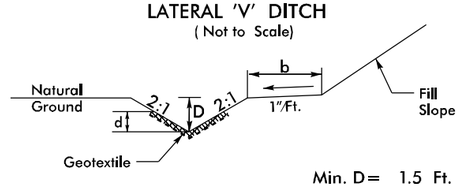


Min. D= 3.0 Ft.
Max. d= 2.5 Ft.
B= 3.0 Ft.

Type of Liner= Class I Rip-Rap

FROM STA. 83+50 TO STA. 85+75 -L- (RT)
FROM STA. 90+00 TO STA. 90+75 -L- (RT)

DETAIL 17
LATERAL 'V' DITCH
(Not to Scale)

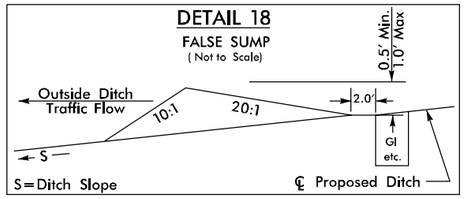


Min. D= 1.5 Ft.
Max. d= 1.0 Ft.
b= 5 Ft.

Type of Liner= Class 'B' Rip-Rap

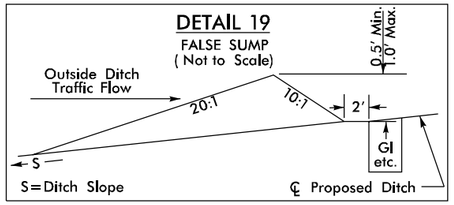
FROM STA. 22+80 TO STA. 26+50 -L- (LT)

DETAIL 18
FALSE SUMP
(Not to Scale)



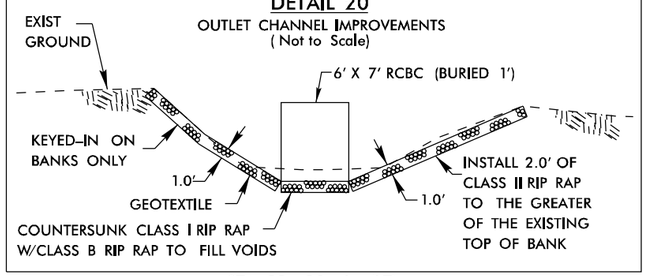
STA. 42+70 -Y1- (LT)
STA. 47+85 -Y1- (LT)
STA. 51+00 -Y1- (LT)
STA. 72+28 -Y1- (LT)
STA. 12+50 -Y1RPB- (LT)
STA. 14+45 -Y1RPB- (LT)
STA. 15+85 -Y1RPB- (RT)

DETAIL 19
FALSE SUMP
(Not to Scale)



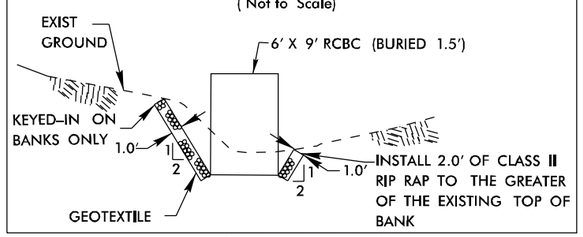
STA. 19+15 -Y1RPD- (LT)
STA. 18+00 -Y1RPD- (RT)
STA. 16+65 -Y1RPD- (LT)

DETAIL 20
OUTLET CHANNEL IMPROVEMENTS
(Not to Scale)



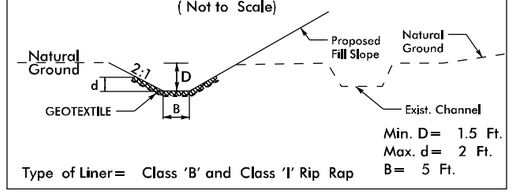
STA. 22+20 -L- (LT)

DETAIL 21
INLET CHANNEL IMPROVEMENTS
(Not to Scale)



STA. 58+75 -Y1- (LT)

DETAIL 22
CHANNEL CHANGE
(Not to Scale)

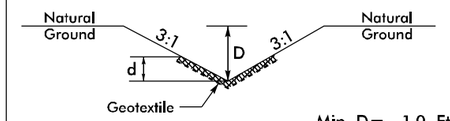


Min. D= 1.5 Ft.
Max. d= 2 Ft.
B= 5 Ft.

Type of Liner= Class 'B' and Class 'I' Rip Rap

FROM STA. 98+00 TO STA. 98+65 -L- (RT)

DETAIL 23
STANDARD 'V' DITCH
(Not to Scale)

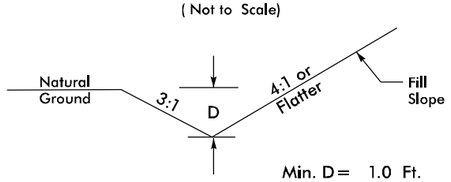


Min. D= 1.0 Ft.
Max. d= 1.0 Ft.

Type of Liner= Class 'B' Rip-Rap

STA. 22+00 -Y1RPB- (LT)

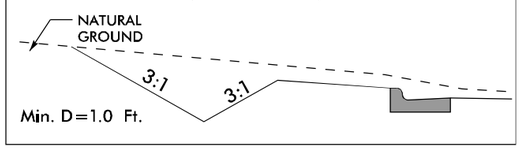
DETAIL 24
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.0 Ft.

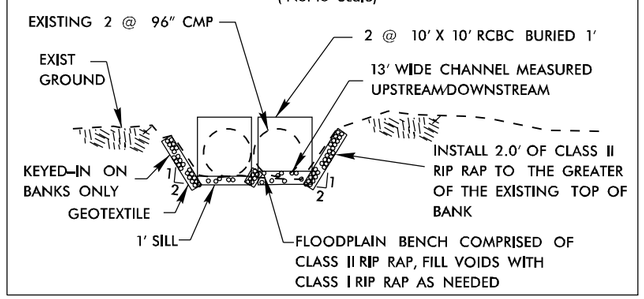
FROM STA. 80+50 TO STA. 82+30 -L- (LT)

DETAIL 25
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)

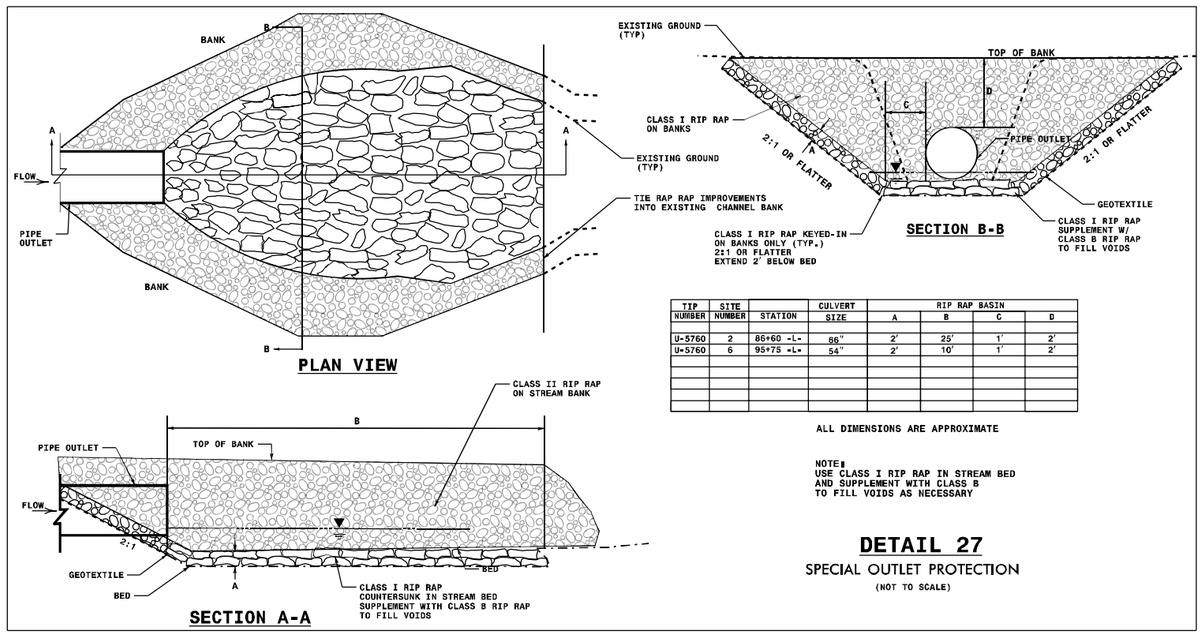


FROM STA. 82+75 TO STA. 83+00 -L- (LT)
FROM STA. 83+50 TO STA. 85+90 -L- (LT)

DETAIL 26
INLET /OUTLET CHANNEL IMPROVEMENTS
(Not to Scale)



91+00 -L-



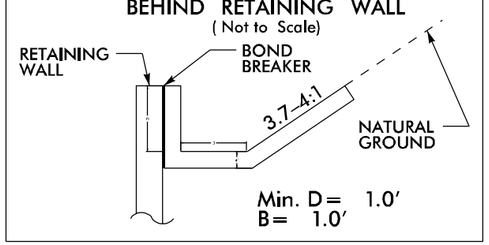
TIP NUMBER	SITE NUMBER	STATION	CULVERT SIZE	RIP RAP BASIN A	B	C	D
U-5760	2	86+60 -L-	86"	2'	25'	1'	2'
U-5760	6	95+75 -L-	54"	2'	10'	1'	2'

ALL DIMENSIONS ARE APPROXIMATE

NOTE:
USE CLASS I RIP RAP IN STREAM BED AND SUPPLEMENT WITH CLASS B TO FILL VOIDS AS NECESSARY

DETAIL 27
SPECIAL OUTLET PROTECTION
(NOT TO SCALE)

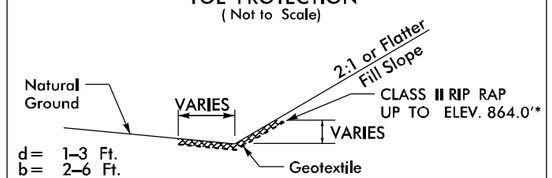
DETAIL 28
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)



Min. D= 1.0'
B= 1.0'

FROM STA. 26+30 TO STA. 26+60 -L- (RT)
FROM STA. 28+14 TO STA. 28+64 -L- (RT)

DETAIL 29
TOE PROTECTION
(Not to Scale)



Type of Liner= Class II Rip-Rap
*1' above 100-yr Floodplain (Elevation = 863.0')

FROM STA. 19+22 TO STA. 21+66 -L- (LT)
FROM STA. 21+81 TO STA. 22+28 -L- (LT)

2/6/2023

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421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

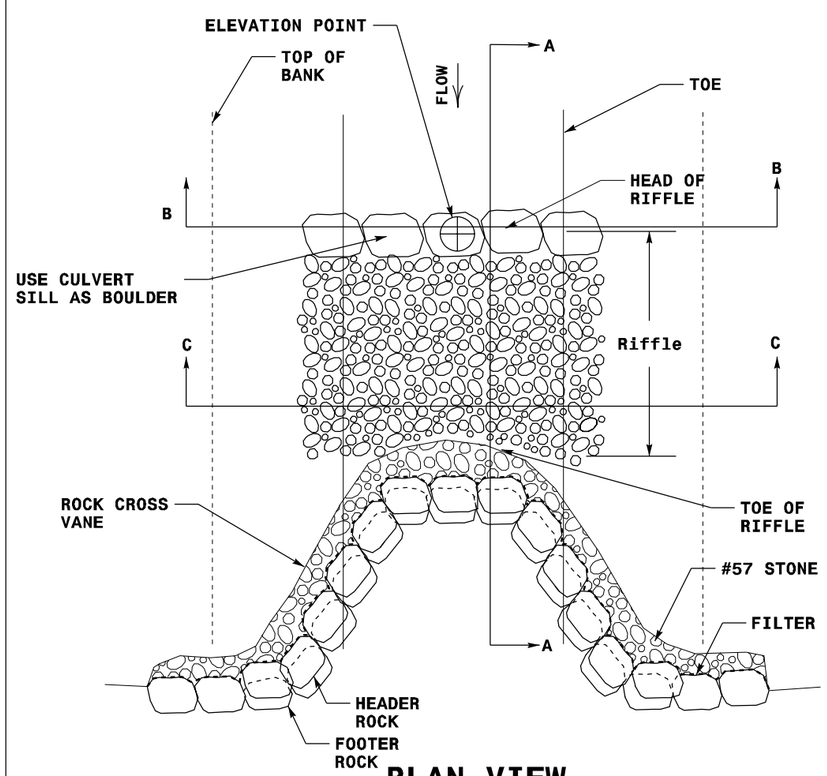
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	2D-3
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

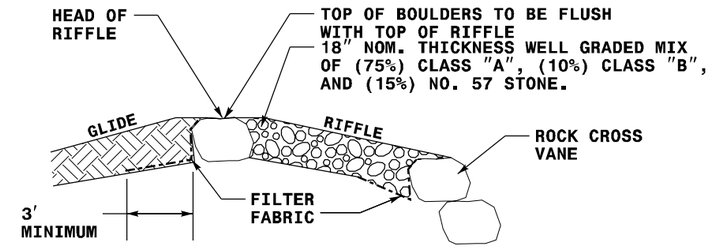
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

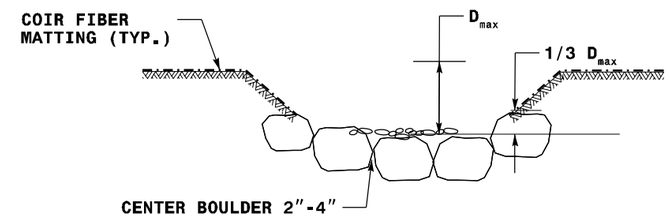
5/14/99



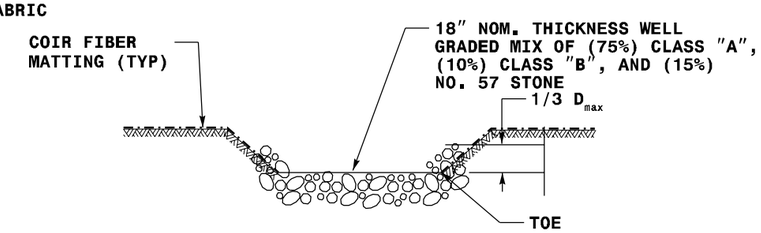
PLAN VIEW



SECTION A-A



SECTION B-B



SECTION C-C

REACH	1
Wbkf (ft)	24.6
Dmax (ft)	2.1

NOTE:
BOULDER SHOULD BE NATIVE STONES OR SHOT ROCK, ANGULAR AND OBLONG, WITH AN AXIS APPROXIMATELY 3 L_x, 2.5 W_x, 2 D

CONSTRUCTED RIFFLE DETAIL

NOT TO SCALE

2/6/2023

COMPUTED BY: SMS DATE: 3/22/2022
CHECKED BY: EJL DATE: 3/22/2022

PROJECT REFERENCE NO.	SHEET NO.
U-5760	3B-1

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421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

REVISIONS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT EXCAVATION	EMBANKMENT +15%	BORROW	TOTAL WASTE
AREA 1 PHASE I					
-L- 13+30.00 TO 40+00.00	10826	2425	393895	383069	2425
RCBC -L- 22+70.99	740				740
-Y1- 41+50.00 TO 90+22.00	31299		31786	487	350
-Y1LPB- 10+00.00 TO 16+99.41	40508	200	243		40465
-Y1LPD- 10+00.00 TO 15+75.27	99		84632	84533	
-Y1RPB- 10+00.00 TO 24+04.21	21938	200	6309		15829
-Y1RPD- 10+00.00 TO 22+53.88	35306	200	20751		14755
AREA 1 PHASE II					
-Y1- 53+35.00 TO 97+22.00	2753		183		2570
AREA 2 PHASE I					
-L- 40+00.00 TO 41+00.00	457				457
-L- 41+00.00 TO 46+50.00	1977		329		1648
-L- 59+00.00 TO 96+00.00	2673		10278	7605	
RCBC -L- 90+93.82 (LT)	90				90
-L- 96+00.00 TO 97+00.00	24		2475	2451	
-L- 97+00.00 TO 120+71.00	1393		7852	6459	
-Y2- 12+50.00 TO 13+66.27	243	100	699	456	100
-Y2- 14+47.04 TO 16+70.00	935	100	363		672
-Y4- 11+75.00 TO 13+27.52	1305	300	397		1208
-Y7- 14+03.52 TO 16+30.00	67		68	1	
-Y8- 10+29.50 TO 11+30.00	12		1206	1194	
-DRW2- 10+20.00 TO 10+70.50			51	51	
SUBTOTAL (SHEET 3B-1)	152995	3525	561517	486305	81309

NOTE: EARTHWORK QUANTITES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

2/6/2023

COMPUTED BY: SMS DATE: 3/22/2022
CHECKED BY: EJL DATE: 3/22/2022

PROJECT REFERENCE NO.	SHEET NO.
U-5760	3B-2

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421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

REVISIONS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT EXCAVATION	EMBANKMENT +15%	BORROW	TOTAL WASTE
AREA 2 PHASE I					
-L- 41+00.00 TO 46+00.00	1078		1535	457	
-L- 46+00.00 TO 59+00.00	12255		7958		4297
-L- 59+00.00 TO 96+00.00	1858		9976	8188	
RCBC -L- 90+93.82 (RT)	90				90
-L- 97+00.00 TO 120+71.00	666		9775	9109	
-Y3- 10+50.00 TO 14+78.61	104		2926	2822	
-Y3- 15+33.63 TO 17+50.00	16		1347	1331	
-Y4- 12+00.00 TO 17+50.00	203		38		165
-Y4- 19+04.18 TO 24+55.00	437	100	1082	645	100
-Y5- 10+27.50 TO 11+42.00	50		66	16	
-Y6- 10+27.91 TO 10+75.00	10		46	36	
-Y7- 14+47.04 TO 16+70.00	102		438	336	
-Y8- 11+75.00 TO 13+27.52	24		201	177	
-DRW1- 10+29.50 TO 11+30.00	822				822
-DRW3- 10+31.43 TO 10+67.00	3		70	67	
-DRW4- 10+30.72 TO 10+80.00	4		109	105	
-DRW5- 10+20.00 TO 10+58.50	25		6		19
AREA 2 PHASE III					
-L- 40+00.00 TO 46+00.00	168		166		2
-L- 59+00.00 TO 120+71.00	855		1156	300	
SUBTOTAL (SHEET 3B-2)	18770	100	36893	23519	5495
SUBTOTAL (SHEET 3B-1)	152995	3525	561517	486305	81309
LOSS DUE TO CLEARING AND GRUBBING	-4500			4500	
ADDITIONAL UNDERCUT FROM GEOTECH RECS		1200	1380	1380	1200
WASTE IN LIEU OF BORROW				-82828	-82828
EST. 5% TO REPLACE TOPSOIL ON BORROW PIT				21664	
TOTALS	167265	4825	599786	454518	5175
SAY	167300			454600	

NOTE: EARTHWORK QUANTITES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

2/6/2023

Kimley»Horn
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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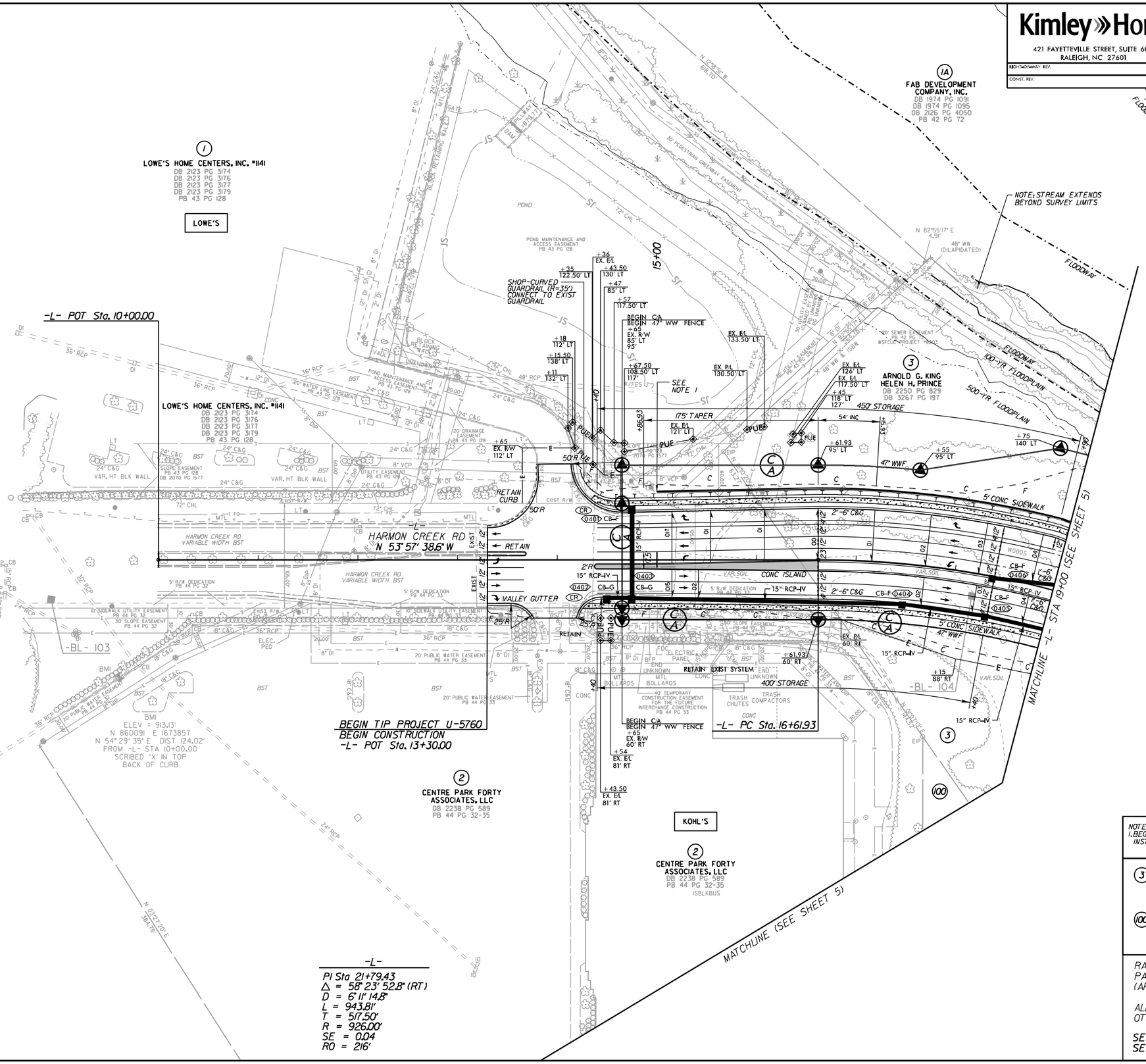


-L-
PI Sta 21+79.43
Δ = 58° 23' 52.8" (RT)
D = 6° 11' 14.8"
L = 943.81'
T = 517.50'
R = 926.00'
SE = 0.04
RO = 216'

NOTE:
1. BEGIN RETAINING WALL -WALL_I- -L- STA 15+00.00 (68.75' LT) INST ALL 48" CL FENCE 1' INSIDE WALL (TYP)

3 ARNOLD G. KING
HELEN H. PRINCE
DB 2250 PG 829
DB 3267 PG 197

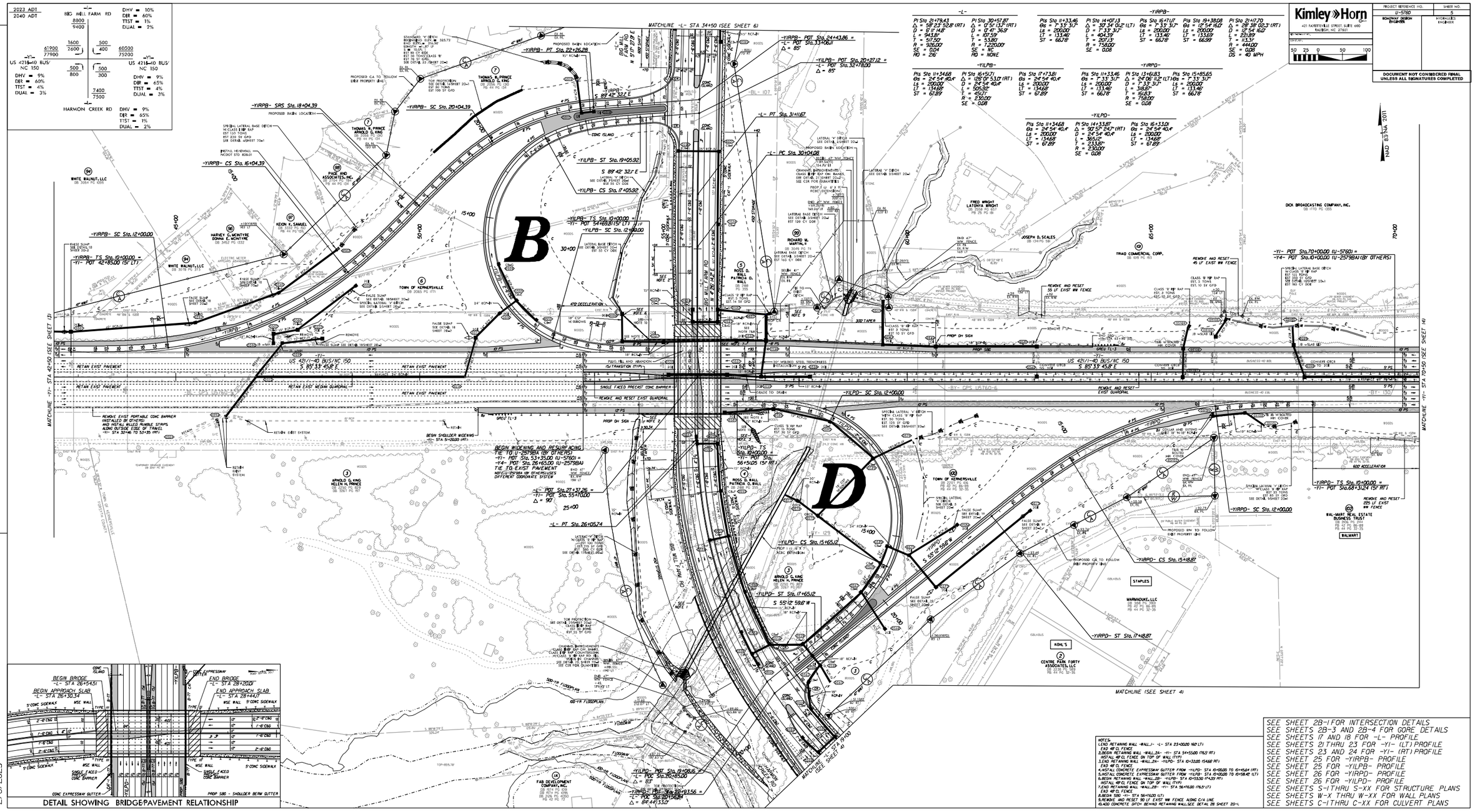
100 TOWN OF KERNERSVILLE
DB 2207 PG 106
PB 42 PG 86-89
PB 44 PG 32-35

RADII DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE NOTED (APPLIES TO ALL SHEETS)

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED (APPLIES TO ALL SHEETS)

SEE SHEET 17 FOR -L- PROFILE
SEE SHEETS W-1 THRU W-XX FOR WALL PLANS

REVISIONS
5/14/99
ROW. REV. – 5/12/22 – ADDED PARCEL 1A. – JWM
2/6/2023



SEE SHEET 2B-1 FOR INTERSECTION DETAILS	
SEE SHEETS 2B-3 AND 2B-4 FOR GORE DETAILS	
SEE SHEETS 17 AND 18 FOR -L- PROFILE	
SEE SHEETS 21 THRU 23 FOR -Y1- (LT) PROFILE	
SEE SHEETS 23 AND 24 FOR -Y1- (RT) PROFILE	
SEE SHEET 25 FOR -YIRPB- PROFILE	
SEE SHEET 25 FOR -YILPB- PROFILE	
SEE SHEET 26 FOR -YIRPD- PROFILE	
SEE SHEET 26 FOR -YILPD- PROFILE	
SEE SHEETS S-1 THRU S-XX FOR STRUCTURE PLANS	
SEE SHEETS W-X THRU W-XX FOR WALL PLANS	
SEE SHEETS C-1 THRU C-XX FOR CULVERT PLANS	

NOTES:
1.END RETAINING WALL -WALL.1- -L- STA 23+00.00 (62' LT)
EXD 48"CL FENCE
2.BEGIN RETAINING WALL -WALL.2A- -Y1- STA 54+55.00 (76.5' RT)
INSTALL 48"CL FENCE ON TOP OF WALL (TYP)
3.END RETAINING WALL -WALL.2A- -YILPD- STA 10+32.00 (54.68' RT)
EXD 48"CL FENCE
4.INSTALL CONCRETE EXPRESSWAY GUTTER FROM -YILPD- STA 10+00.00 TO 10+45.64 (RT)
5.INSTALL CONCRETE EXPRESSWAY GUTTER FROM -YILPD- STA 10+00.00 TO 10+58.42 (LT)
6.BEGIN RETAINING WALL -WALL.2B- -YILPD- STA 10+55.00 (74.55' RT)
INSTALL 48"CL FENCE ON TOP OF WALL (TYP)
7.END RETAINING WALL -WALL.2B- -Y1- STA 56+76.00 (76.5' LT)
EXD 48"CL FENCE
8.BEGIN SDD -Y1- STA 56+75.00 (LT)
9.REMOVE AND RESET 90 LF EXIST WW FENCE ALONG C/A LINE.
10.ADD CONCRETE DITCH BEHIND RETAINING WALL.SEE DETAIL 2B SHEET 20-1.

Kimley»Horn
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NA 2011

REVISIONS
5/14/99 ROW. REV. – 9/22/22 – ADJUSTED PROPOSED C/A LINE ON PARCELS 7, 9, AND 10. ADDED TCE TO PARCEL 7. CONVERTED PUE TO TCE ON PARCEL 10. – JWM

2/6/2023

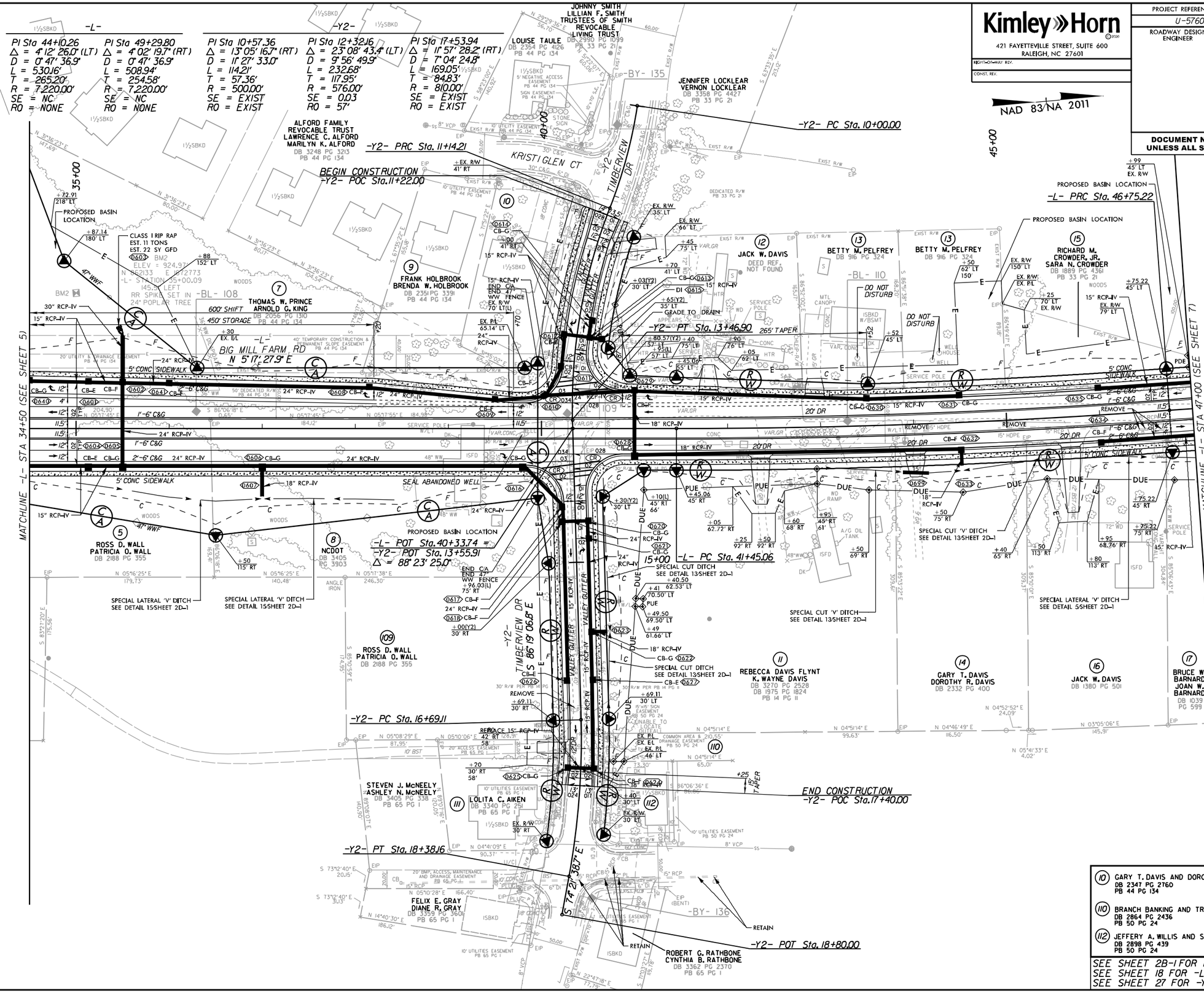
-L-
PI Sta 44+10.26
Δ = 4° 12' 26.0" (LT)
D = 0° 47' 36.9"
L = 530.16'
T = 265.20'
R = 7,220.00'
SE = NC
RO = NONE

PI Sta 49+29.80
Δ = 4° 02' 19.7" (RT)
D = 0° 47' 36.9"
L = 508.94'
T = 254.58'
R = 7,220.00'
SE = NC
RO = NONE

-Y2-
PI Sta 10+57.36
Δ = 13° 05' 16.7" (RT)
D = 11° 27' 33.0"
L = 114.21'
T = 57.36'
R = 500.00'
SE = EXIST
RO = EXIST

PI Sta 12+32.16
Δ = 23° 08' 43.4" (LT)
D = 9° 56' 49.9"
L = 232.68'
T = 117.95'
R = 576.00'
SE = 0.03
RO = 57'

PI Sta 17+53.94
Δ = 11° 57' 28.2" (RT)
D = 7° 04' 24.8"
L = 169.05'
T = 84.83'
R = 810.00'
SE = EXIST
RO = EXIST



(10) GARY T. DAVIS AND DOROTHY R. DAVIS
DB 2347 PG 2760
PB 44 PG 134

(110) BRANCH BANKING AND TRUST COMPANY
DB 2864 PG 2436
PB 50 PG 24

(112) JEFFERY A. WILLIS AND SHARON C. WILLIS
DB 2898 PG 439
PB 50 PG 24

SEE SHEET 2B-1 FOR INTERSECTION DETAIL
SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 27 FOR -Y2- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
U-5760	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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RIGHT-OF-WAY REV.
CONST. REV.

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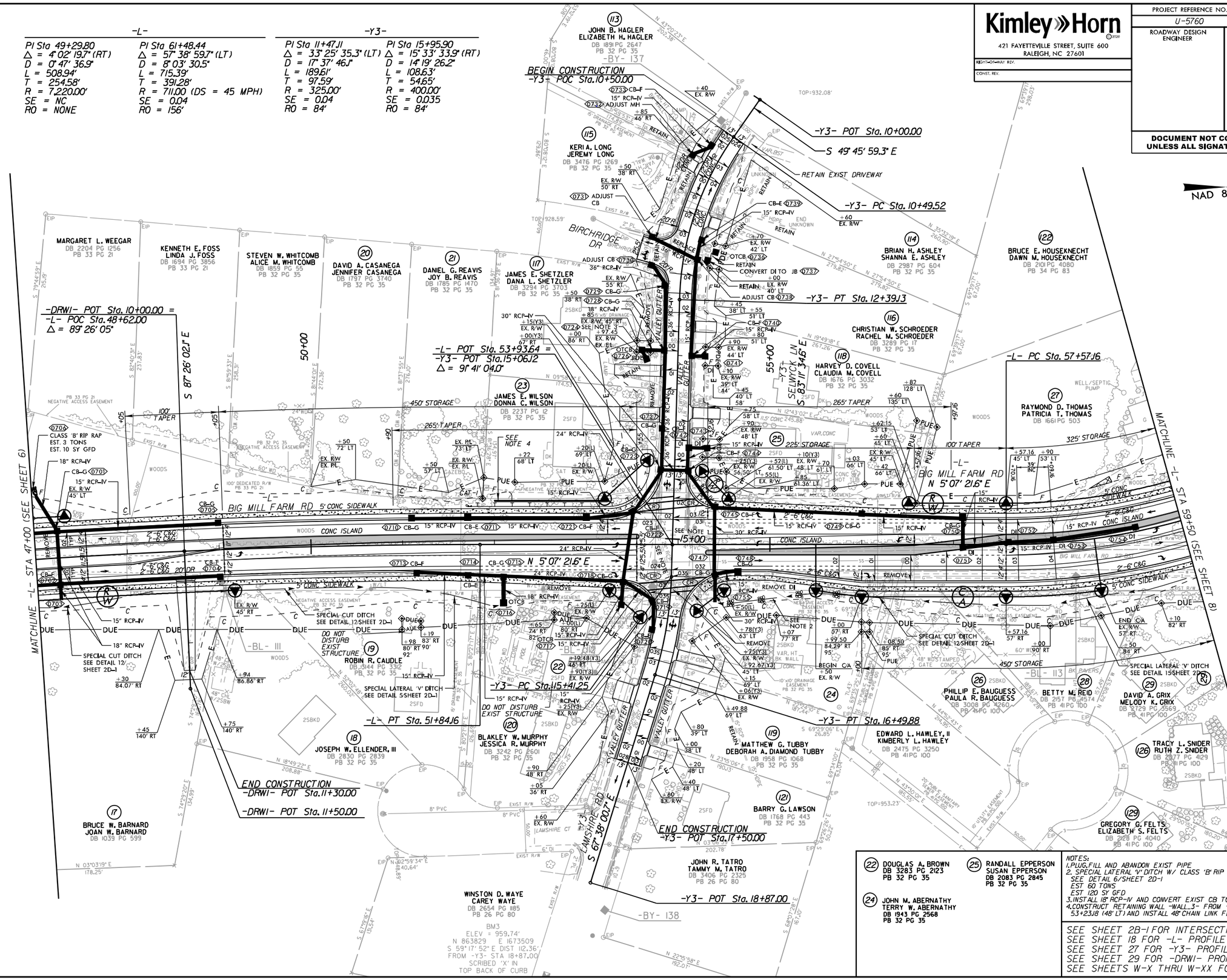
-L-	-Y3-
PI Sta 49+29.80	PI Sta 11+47.11
△ = 4° 02' 19.7" (RT)	△ = 33° 25' 35.3" (LT)
D = 0° 47' 36.9"	D = 17° 37' 46.1"
L = 508.94'	L = 189.61'
T = 254.58'	T = 97.59'
R = 7,220.00'	R = 325.00'
SE = NC	SE = 0.04
RO = NONE	RO = 84'
PI Sta 61+48.44	PI Sta 15+95.90
△ = 57° 38' 59.7" (LT)	△ = 15° 33' 33.9" (RT)
D = 8° 03' 30.5"	D = 14° 19' 26.2"
L = 715.39'	L = 108.63'
T = 391.28'	T = 54.65'
R = 711.00 (DS = 45 MPH)	R = 400.00'
SE = 0.04	SE = 0.035
RO = 156'	RO = 84'



(22) DOUGLAS A. BROWN DB 3283 PG 2123 PB 32 PG 35

(24) JOHN M. ABERNATHY TERRY W. ABERNATHY DB 1943 PG 2568 PB 32 PG 35

(25) RANDALL EPPERSON SUSAN EPPERSON DB 2083 PG 2845 PB 32 PG 35

NOTES:
1. PLUG, FILL AND ABANDON EXIST PIPE
2. SPECIAL LATERAL 'V' DITCH W/ CLASS 'B' RIP RAP
SEE DETAIL 6/SHEET 2D-1
EST 60 TONS
EST 120 SY GFD
3. INSTALL 18" RCP-IV AND CONVERT EXIST CB TO JB
4. CONSTRUCT RETAINING WALL -WALL 3- FROM -L- STA 52+00.00 TO 53+23 JB (48' LT) AND INSTALL 48" CHAIN LINK FENCE 1' INSIDE WALL

SEE SHEET 2B-1 FOR INTERSECTION DETAILS
SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 27 FOR -Y3- PROFILE
SEE SHEET 29 FOR -DRWI- PROFILE
SEE SHEETS W-X THRU W-XX FOR WALL PLANS

REVISIONS
ROW REV. - 5/12/22 - ADDED DO NOT DISTURB EXIST STRUCTURE LABELS TO PARCELS 19, AND 22. CONVERTED AUE TO DUE ON PARCEL 28. - JWM

5/14/99

2/6/2023

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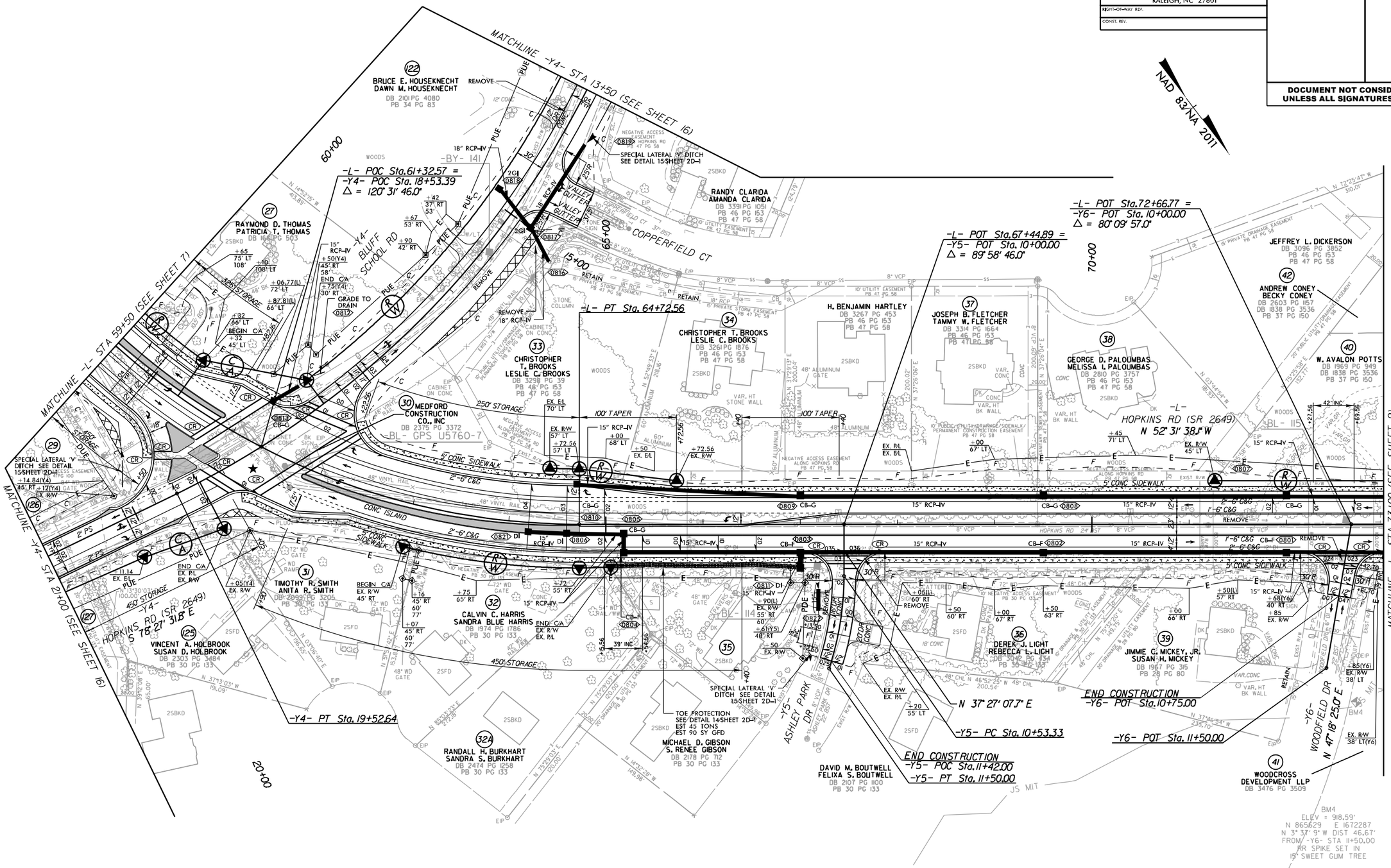
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



-L-	-Y4-	-Y5-
PI Sta 61+48.44	PI Sta 16+19.08	PI Sta 11+02.06
Δ = 57° 38' 59.7" (LT)	Δ = 43° 29' 40.1" (RT)	Δ = 18° 27' 42.9" (RT)
D = 8° 03' 30.5"	D = 6° 11' 14.8"	D = 19° 05' 54.9"
L = 715.39'	L = 702.95'	L = 96.73'
T = 391.28'	T = 369.38'	T = 48.79'
R = 711.00' (DS = 45 MPH)	R = 926.00'	R = 300.00'
SE = 0.04	SE = 0.04	SE = SEE PLANS
RO = 156'	RO = SEE PLANS	RO = SEE PLANS

(29) DAVID A. GRIX, MELODY K. GRIX, DB 2729 PG 3569, PB 41 PG 100
(35) SHAWAN GABRIEL, KEISHA GABRIEL, DB 3307 PG 70, PB 30 PG 133
(126) TRACY L. SNIDER, RUTH Z. SNIDER, DB 2077 PG 4129, PB 41 PG 100
(127) DAVID S. HARDISON, CYNTHIA G. HARDISON, DB 1841 PG 3145, PB 30 PG 133

★ TRAFFIC SIGNAL
REMOVAL OF EXIST ASPHALT PAVEMENT

SEE SHEET 2B-2 FOR INTERSECTION DETAIL
SEE SHEET 19 FOR -L- PROFILE
SEE SHEET 28 FOR -Y4- PROFILE
SEE SHEET 28 FOR -Y5- PROFILE
SEE SHEET 28 FOR -Y6- PROFILE

REVISIONS
ROW. REV. - 5/12/22 - ADDED PARCEL 32A. COVERTED PUE TO TCE ON PARCELS 32 AND 32A. - JWM.

5/14/99
2/6/2023

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RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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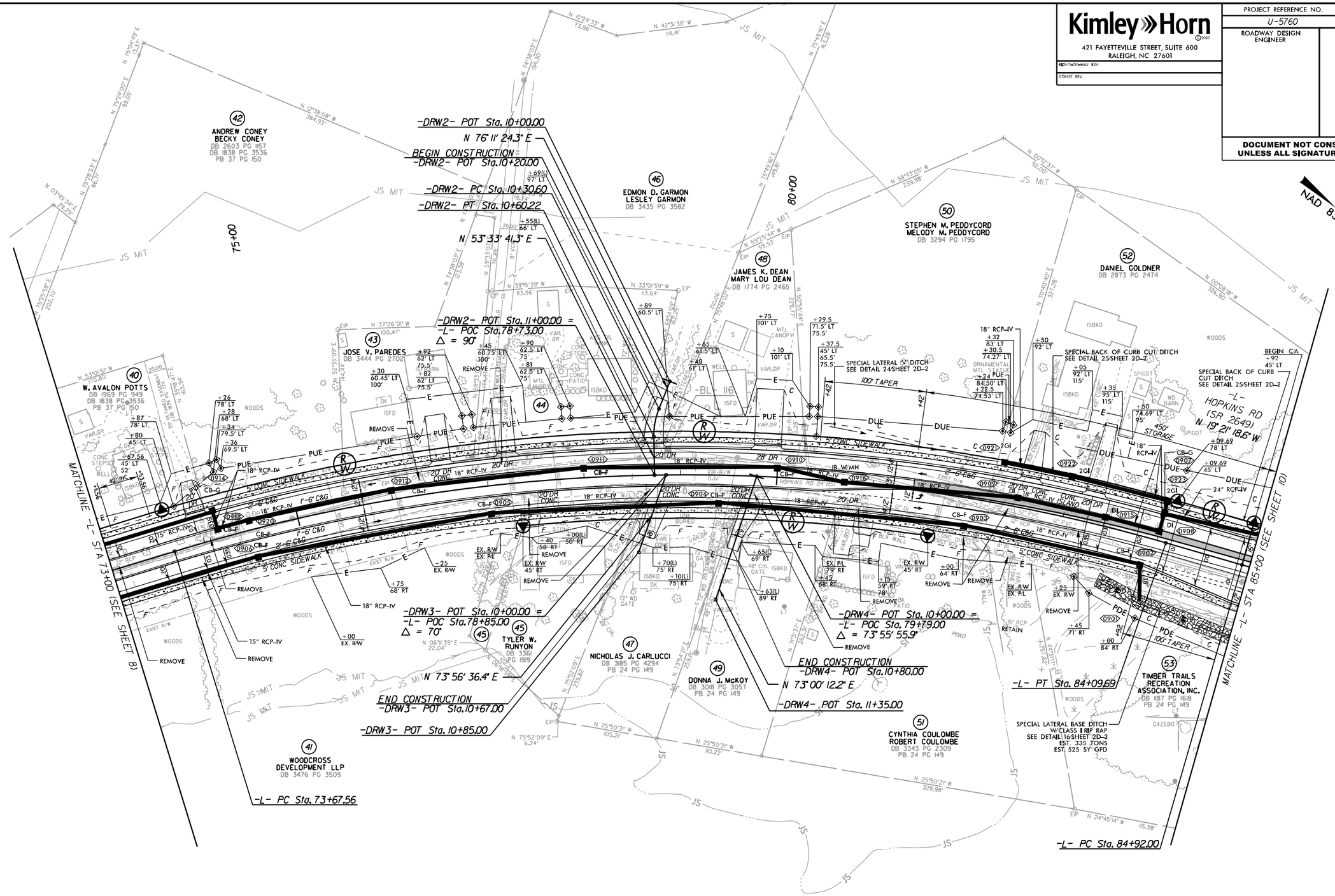

-L-	
PI Sta 79+03.68	PI Sta 87+87.62
Δ = 33° 10' 19.5" (RT)	Δ =20° 56' 13.1" (LT)
D = 3° 10' 59.2"	D = 3° 34' 51.6"
L = 1,042.13'	L = 584.66'
T = 536.13'	T = 295.63'
R = 1,800.00'	R = 1,600.00'
SE = 0.035	SE = 0.035
RO = 147'	RO = 126'

-DRW2-
PI Sta 10+45.61
Δ = 22° 37' 43.0" (LT)
D = 76° 23' 39.7"
L = 29.62'
T = 15.01'
R = 75.00'

(44) HUNTER P. COFER
DB 3333 PG 2638

SEE SHEET 19 FOR -L- PROFILE
SEE SHEET 29 FOR -DRW2-, -DRW3- AND -DRW4- PROFILES

REVISIONS

ROW. REV. - 5/12/22 - ADJUSTED PUE ON PARCELS 40, 42, 43, 44, 46, 48 AND 50. - JWM.
ROW. REV. - 8/11/22 - EXPANDED TCE ON PARCEL 43. - JWM.

5/14/99

2/6/2023

5/14/99

REVISIONS

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RIGHT-OF-WAY REV.

CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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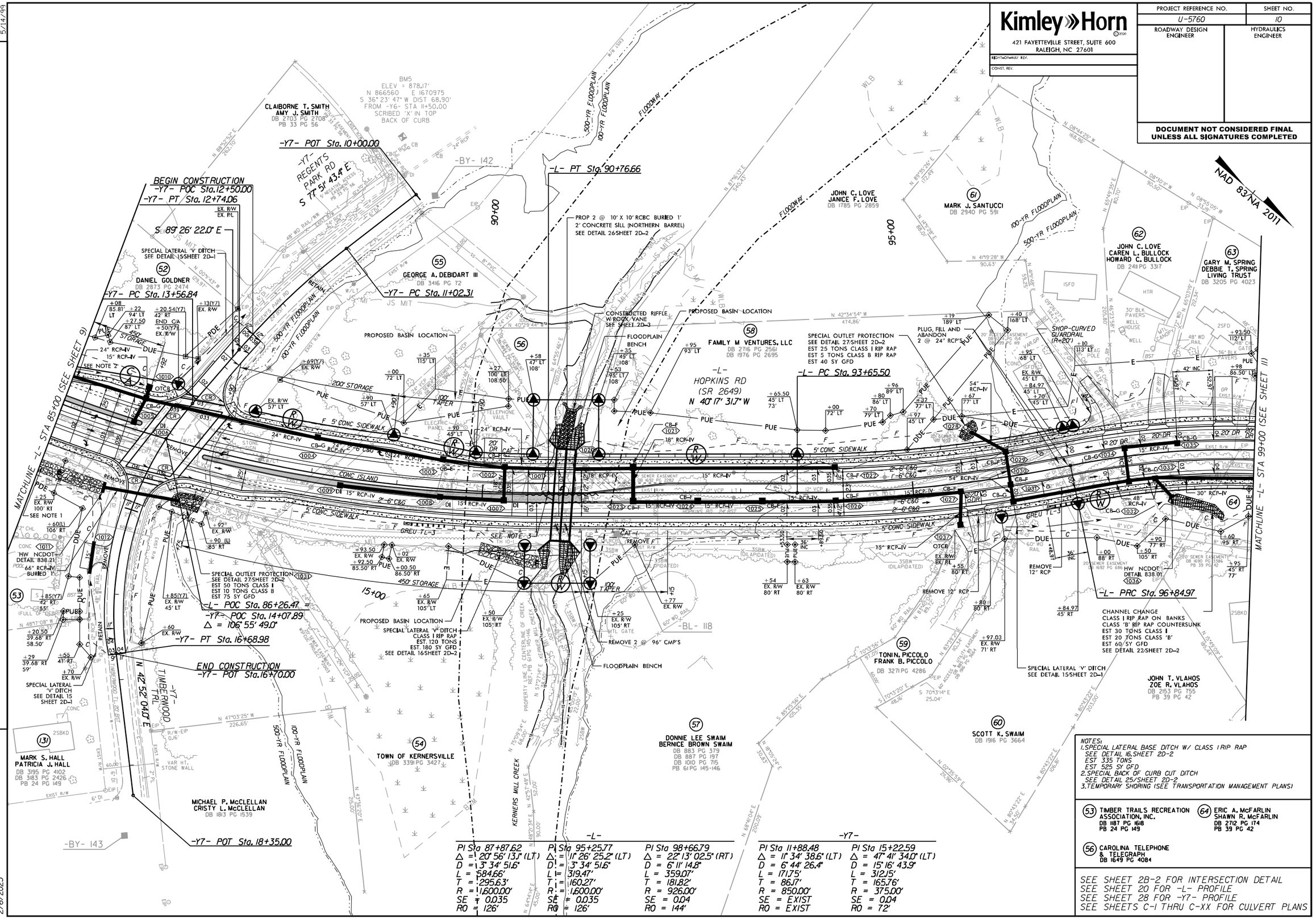

NOTES:
1. SPECIAL LATERAL BASE DITCH W/ CLASS I RIP RAP
SEE DETAIL 16/SHEET 2D-2
EST 335 TONS
EST 525 SY GFD
2. SPECIAL BACK OF CURB CUT DITCH
SEE DETAIL 25/SHEET 2D-2
3. TEMPORARY SHORING (SEE TRANSPORTATION MANAGEMENT PLANS)

(53) TIMBER TRAILS RECREATION ASSOCIATION, INC.
DB 1187 PG 1618
PB 24 PG 149

(64) ERIC A. McFARLIN
SHAWN R. McFARLIN
DB 2712 PG 174
PB 39 PG 42

(56) CAROLINA TELEPHONE & TELEGRAPH
DB 1649 PG 4084

SEE SHEET 2B-2 FOR INTERSECTION DETAIL
SEE SHEET 20 FOR -L- PROFILE
SEE SHEET 28 FOR -Y7- PROFILE
SEE SHEETS C-1 THRU C-XX FOR CULVERT PLANS

-L-		
PI Sta 87+87.62	PI Sta 95+25.77	PI Sta 98+66.79
Δ = 20° 56' 13.1" (LT)	Δ = 11° 26' 25.2" (LT)	Δ = 22° 13' 02.5" (RT)
D = 3° 34' 51.6"	D = 3° 34' 51.6"	D = 6° 11' 14.8"
L = 584.66'	L = 319.47'	L = 359.07'
T = 295.63'	T = 160.27'	T = 181.82'
R = 1,600.00'	R = 1,600.00'	R = 926.00'
SE = 0.035	SE = 0.035	SE = 0.04
RO = 126'	RO = 126'	RO = 144'

-Y7-	
PI Sta 11+88.48	PI Sta 15+22.59
Δ = 11° 34' 38.6" (LT)	Δ = 47° 41' 34.0" (LT)
D = 6° 44' 26.4"	D = 15° 16' 43.9"
L = 171.75'	L = 312.15'
T = 86.17'	T = 165.76'
R = 850.00'	R = 375.00'
SE = EXIST	SE = 0.04
RO = EXIST	RO = 72'

2/6/2023

-L-		-Y8-	
PI Sta 103+98.92	PI Sta 109+77.84	PI Sta 13+28.49	PI Sta 14+98.60	PI Sta 16+75.58
Δ = 23° 45' 32.4" (RT)	Δ = 23° 35' 45.6" (LT)	Δ = 2° 41' 25.3" (RT)	Δ = 36° 26' 07.9" (LT)	Δ = 17° 12' 22.7" (RT)
D = 6° 11' 14.8"	D = 4° 46' 28.7"	D = 2° 01' 28.5"	D = 18° 11' 20.9"	D = 10° 44' 58.8"
L = 383.99'	L = 494.19'	L = 132.88'	L = 200.31'	L = 160.06'
T = 194.79'	T = 250.65'	T = 66.45'	T = 103.67'	T = 80.64'
R = 926.00'	R = 1,200.00'	R = 2,830.00'	R = 315.00'	R = 533.00'
SE = 0.04	SE = 0.04	SE = SEE PLANS	SE = SEE PLANS	SE = EXIST
RO = SEE PLANS	RO = 168'	RO = SEE PLANS	RO = SEE PLANS	RO = EXIST

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RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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NAD 83/NA 2011

-Y8- POT Sta. 10+00.00
BEGIN CONSTRUCTION
-Y8- POT Sta. 11+75.00

-Y8- PC Sta. 12+62.04
CLEAN OUT PIPE ENTRANCE

-L- POT Sta. 107+19.15 =
-Y8- POC Sta. 13+66.02
Δ = 90° 16' 11.0"

-L- PT Sta. 105+88.12

-L- PC Sta. 107+27.19

-DRW5- POT Sta. 10+00.00
BEGIN CONSTRUCTION
-DRW5- POT Sta. 10+20.00
S 72° 07' 30.6" W

-L- PT Sta. 112+21.38

-Y8- PRC Sta. 13+94.92

-L- PC Sta. 102+04.13

-L- PT Sta. 100+44.05

-Y8- PRC Sta. 15+95.94

END CONSTRUCTION
-Y8- POC Sta. 16+30.00

-Y8- PT Sta. 17+55.00

-DRW5- POT Sta. 11+00.00 =
-L- POC Sta. 109+81.00
Δ = 90°

-L- STA 113+00 (SEE SHEET 12)

MATCHLINE -L- STA 99+00 (SEE SHEET 10)

-L- HOPKINS RD (SR 2649)
N 29° 30' 54.4" W

-Y8- SUTTER LN
N 82° 24' 29.6" E

N 29° 21' 07.5" W

N 5° 45' 22.0" W

450' STORAGE
420' STORAGE
460' STORAGE

65 SANDRA M. GONZALEZ DB 3455 PG 2983
70 GROVER W. PARKS JANICE A. PARKS DB 1250 PG 643
72 ROBERT J. GLASTETTER PAMELA J. GLASTETTER DB 2733 PG 2506
68 BRUCE A. WALL DEBBIE E. WALL DB 1835 PG 2313 DB 2625 PG 2351
STEPHEN ALLEN JONES DB 2510 PG 4276 PB 41 PG 51
74 BRIAN D. LOCKHART TAMMY G. LOCKHART DB 3312 PG 1772 PB 23 PG 44
76 HOWARD P. ELLIS JO LISA ELLIS DB 2226 PG 4417 PB 23 PG 44
79 ANNIE F. PONCE ARMANDO R. PONCE DB 2143 PG 3524 PB 23 PG 44
82 JERRY M. DUNCAN PAMELA M. DUNCAN DB 2656 PG 2252 PB 23 PG 44
KAREN E. ARMOUR DB 1985 PG 768 PB 23 PG 44
80 BRADLEY K. ALBERT DB 2781 PG 4092 PB 23 PG 44
85 JOHN M. KANE PATRICK B. KANE DB 1218 PG 1651 PB 23 PG 44
86 633 HOPKINS LLC DB 2790 PG 2136
63 GARY M. SPRING DEBBIE T. SPRING LIVING TRUST DB 3205 PG 4023
74 TIMOTHY C. MARTIN MICHELLE A. MARTIN DB 2669 PG 2554 PB 41 PG 51
134 DONALD G. SAULS TAMMY L. SAULS DB 3413 PG 4175 PB 39 PG 42
77 TUNNIE M. SHEPHERD LORI J. SHEPHERD DB 3389 PG 2084 PB 39 PG 42
64 ERIC A. McFARLIN SHAWN R. McFARLIN DB 2712 PG 174 PB 39 PG 42
66 JASON D. SMITH REGINA V. SMITH DB 2481 PG 2119 PB 39 PG 42
67 CHRISTOPHER B. ELLINGSON ELIZABETH S. ELLINGSON DB 3201 PG 1606 PB 39 PG 42
69 BARRY D. COLLINS LINDA S. COLLINS DB 1964 PG 821 PB 39 PG 42
71 KENNETH G. BOONE CYNTHIA U. BOONE DB 3417 PG 2491 PB 39 PG 42
73 STEPHEN S. FULLER DEIDRA E. FULLER DB 3246 PG 319 PB 39 PG 42
75 BUILDER PRODUCTS INC. DB 2937 PG 3671 PB 39 PG 42
32 SECU-RE INC. DB 3274 PG 410 PB 39 PG 42
ROBERT E. NEMENZ ARLENE A. NEMENZ DB 1980 PG 2721 PB 39 PG 42
JAMEHL SHEGOG DB 2516 PG 3429 PB 39 PG 42
78 DENNIS L. BELCHER BEVERLY C. BELCHER DB 3247 PG 4322 PB 39 PG 42
81 WILFORD A. SORRELL SANDRA SORRELL DB 3200 PG 425 PB 39 PG 42
83 SUE INGRAM REVOCABLE TRUST OF 1999 DB 3438 PG 940 PB 39 PG 42
84 ANNIE K. McHONE DB 3087 PG 4132 PB 39 PG 42
33

-BY- 147 BM6
ELEV = 906.24'
N 868475 E 1670646
-Y8- STATION 17+37.71
15.78' LEFT
SCRIBED 'X' IN TOP
BACK OF CURB

NOTES:
1. TOE PROTECTION
DETAIL 14/SHEET 2D-2
EST 15 TONS
EST 30 SY GFD

SEE SHEET 2B-2 FOR INTERSECTION DETAIL
SEE SHEET 20 FOR -L- PROFILE
SEE SHEET 29 FOR -Y8- & -DRW5- PROFILES

REVISIONS
ROW. REV. - 5/12/22 - ADDED DO NOT DISTURB EXIST STRUCTURE LABEL TO PARCEL 74, REDUCED PDE ON PARCELS 83, 84 AND 86. ADJUSTED PUE ON PARCEL 83. - JWM

5/14/99

2/6/2023

PROJECT REFERENCE NO.	SHEET NO.
U-5760	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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RIGHT-OF-WAY REV.
CONST. REV.

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NAD 83/NA 2011

REVISIONS

5/14/99 ROW. REV. – 5/12/22 – ADDED DRIVEWAY ON PARCEL 92, ADDED DO NOT DISTURB EXIST STRUCTURE LABEL TO PARCEL 93, REDUCED PDE & DUE ON PARCEL 86. – JWM.
ROW. REV. – 12/12/22 – ELIMINATED JOINT DRIVEWAY AND LEFT TURN LANE INTO PARCEL 86 & 89, ADDED DRIVEWAY ON PARCEL 86 & 89, REVISED PROPOSED EASEMENTS. – JWM.

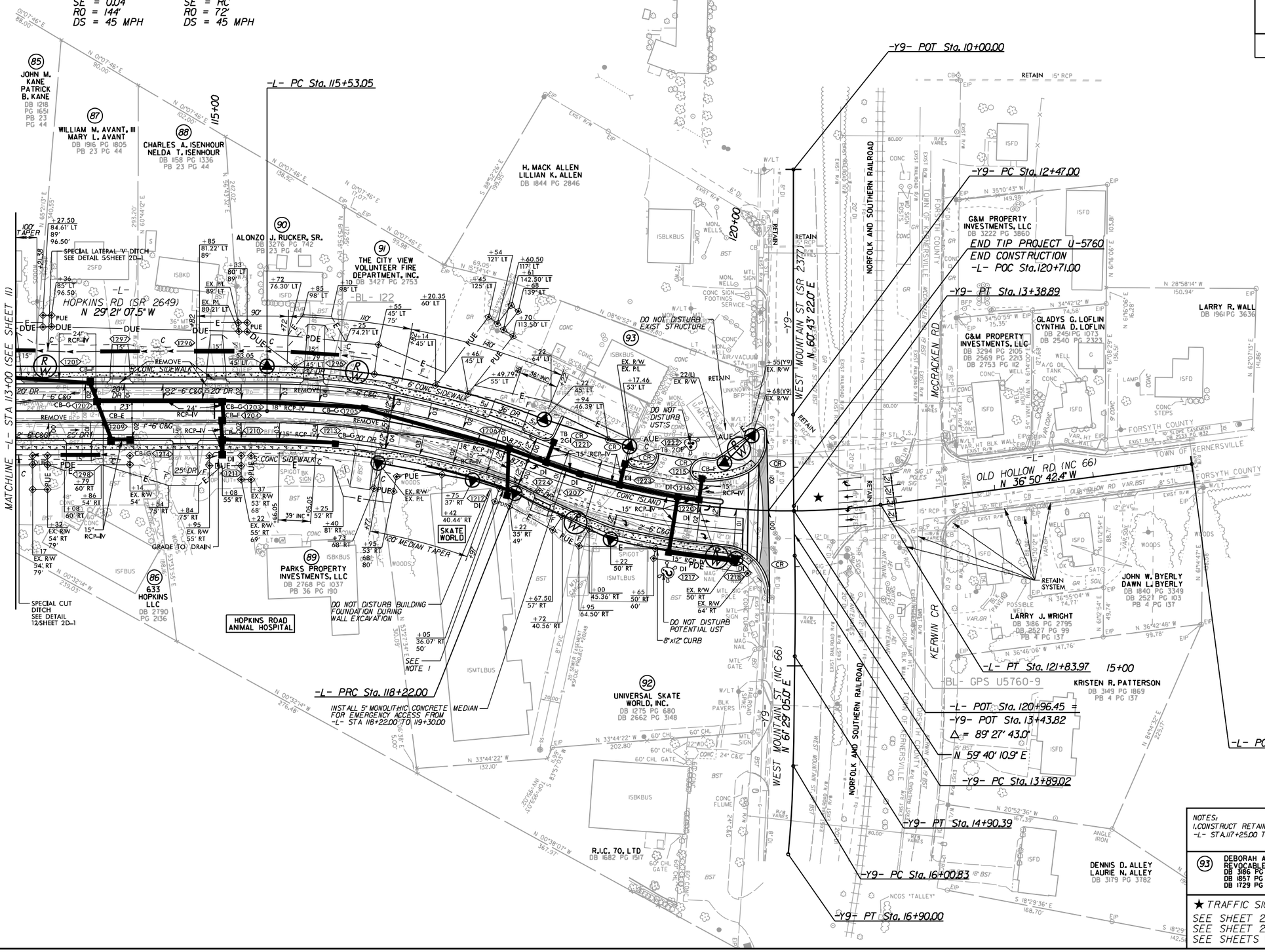
2/6/2023

-L-

PI Sta 116+89.16	PI Sta 120+07.00
Δ = 21° 40' 28.2" (RT)	Δ = 29° 10' 03.1" (LT)
D = 8° 03' 30.5"	D = 8° 03' 30.5"
L = 268.97'	L = 361.97'
T = 136.11'	T = 184.99'
R = 711.00'	R = 711.00'
SE = 0.04	SE = RC
RO = 144'	RO = 72'
DS = 45 MPH	DS = 45 MPH

-Y9-

PI Sta 12+92.95	PI Sta 14+39.71	PI Sta 16+45.44
Δ = 1° 03' 11.1" (LT)	Δ = 1° 48' 54.1" (RT)	Δ = 4° 51' 55.9" (RT)
D = 1° 08' 45.3"	D = 1° 47' 25.8"	D = 5° 27' 24.3"
L = 91.90'	L = 101.37'	L = 89.17'
T = 45.95'	T = 50.69'	T = 44.61'
R = 5,000.00'	R = 3,200.00'	R = 1,050.00'



NOTES:
1. CONSTRUCT RETAINING WALL -WALL_4- FROM -L- STA.117+25.00 TO 118+22.00 (RT)

★ TRAFFIC SIGNAL
SEE SHEET 2B-2 FOR INTERSECTION DETAIL
SEE SHEET 21 FOR -L- PROFILE
SEE SHEETS W-XX THRU W-XX FOR WALL PLANS

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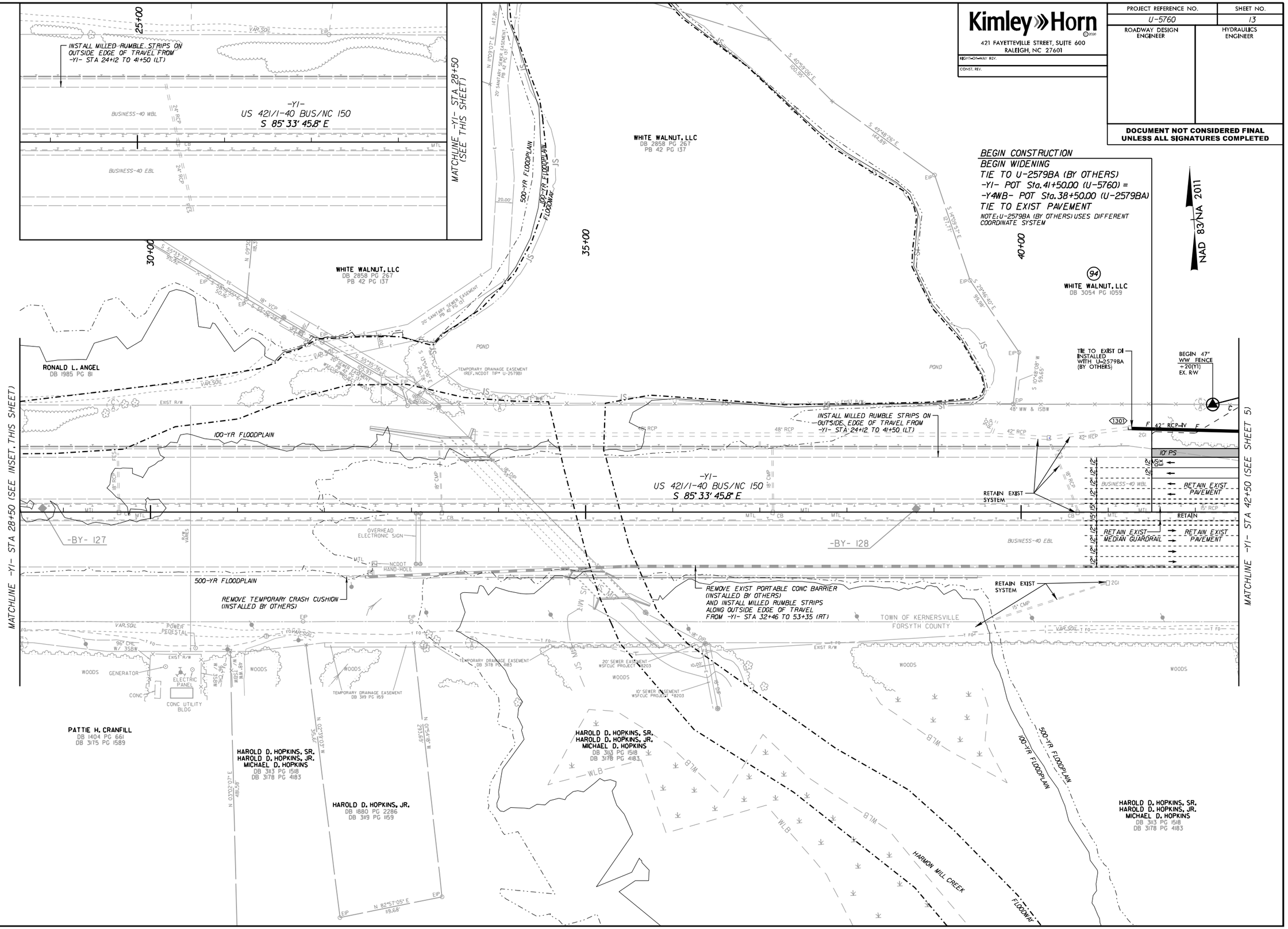
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



REVISIONS

ROW. REV. - 6/22/22 - COMBINED PARCELS 94 AND 95 INTO PARCEL 94. - JWM

5/14/99

2/6/2023

Kimley»Horn
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

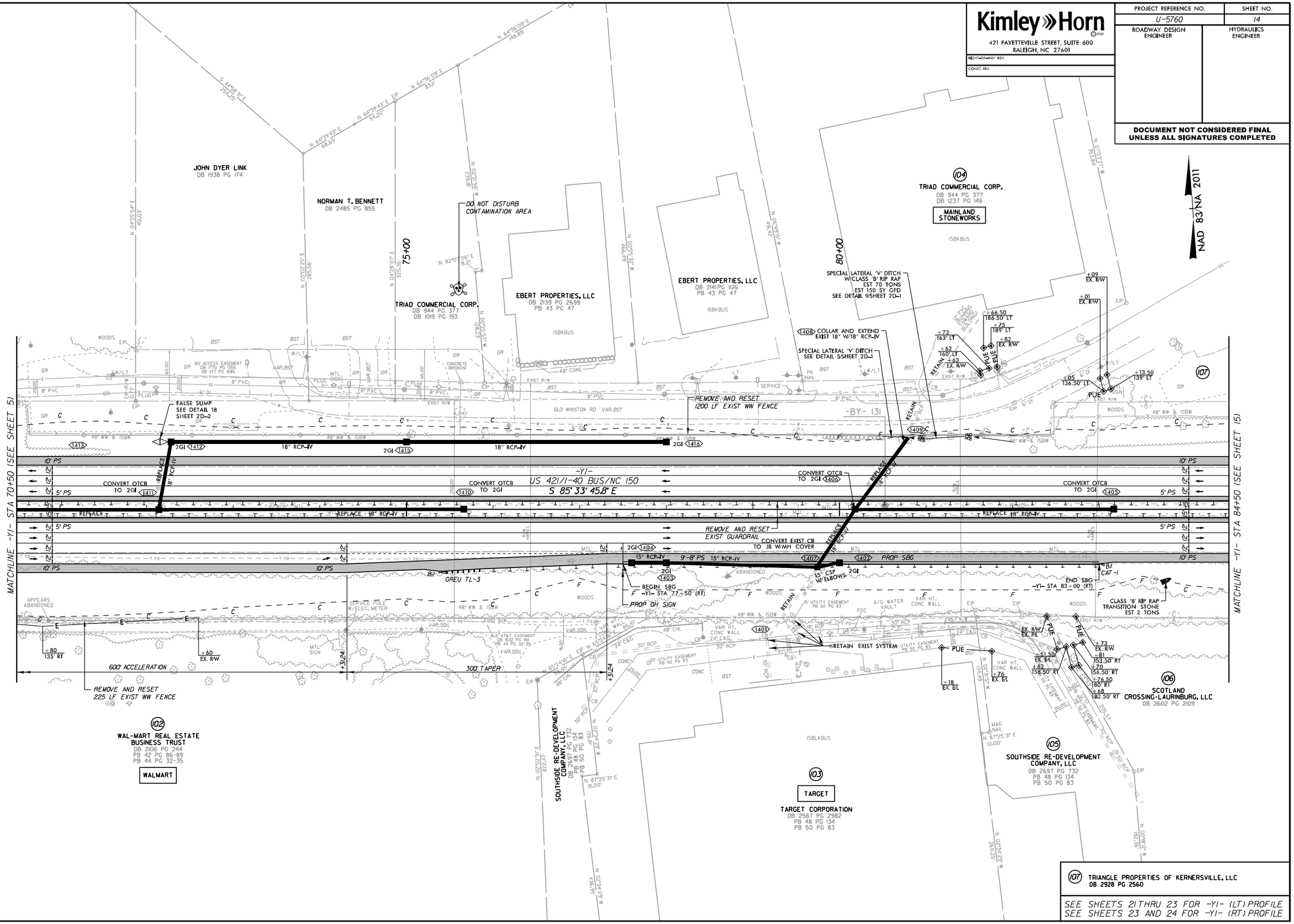
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

5/14/99



107 TRIANGLE PROPERTIES OF KERNERSVILLE, LLC
DB 2928 PG 2560

SEE SHEETS 21 THRU 23 FOR -Y1- (LT) PROFILE
SEE SHEETS 23 AND 24 FOR -Y1- (RT) PROFILE

2/6/2023

5/14/99

REVISIONS

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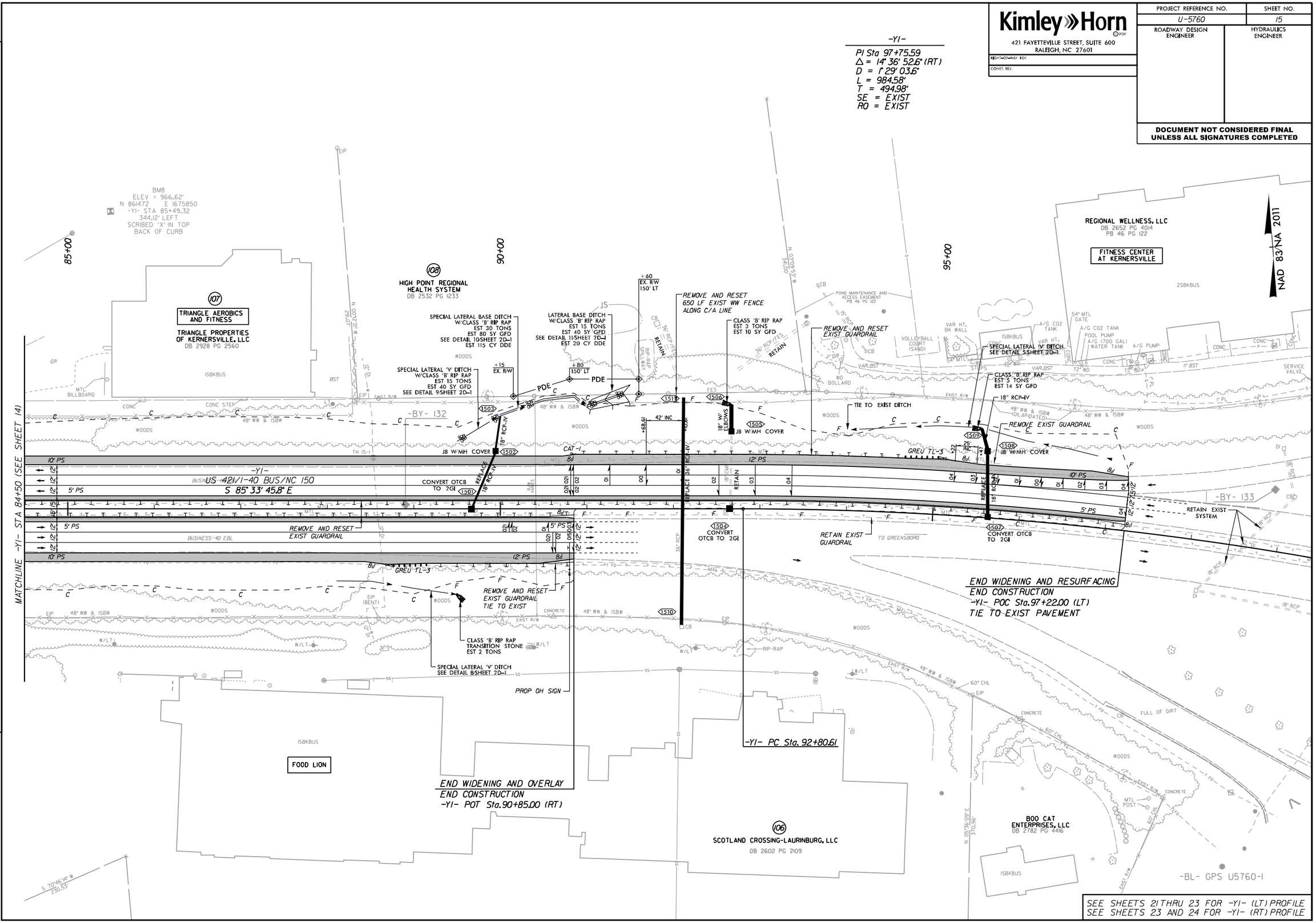
421 FAYETTEVILLE STREET, SUITE 600 RALEIGH, NC 27601	U-5760	15
RIGHT-OF-WAY REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST. REV.		

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



2/6/2023

5/14/99

REVISIONS

ROW. REV. – 6/22/22 – REVISED DRIVEWAY DESIGN AND REMOVED TCE ON PARCEL 123. – JWM
ROW. REV. – 8/1/22 – REDUCED TCE ON PARCEL 129 – JWM

2/6/2023

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421 FAYETTEVILLE STREET, SUITE 600 RALEIGH, NC 27601	U-5760	16
RIGHT-OF-WAY REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST. REV.		

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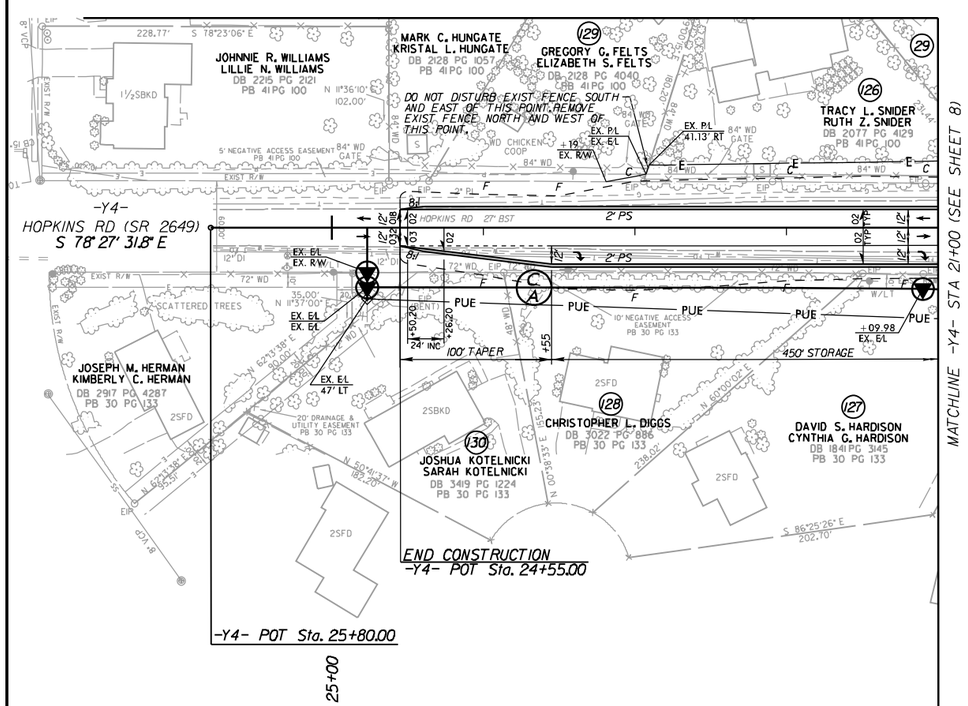
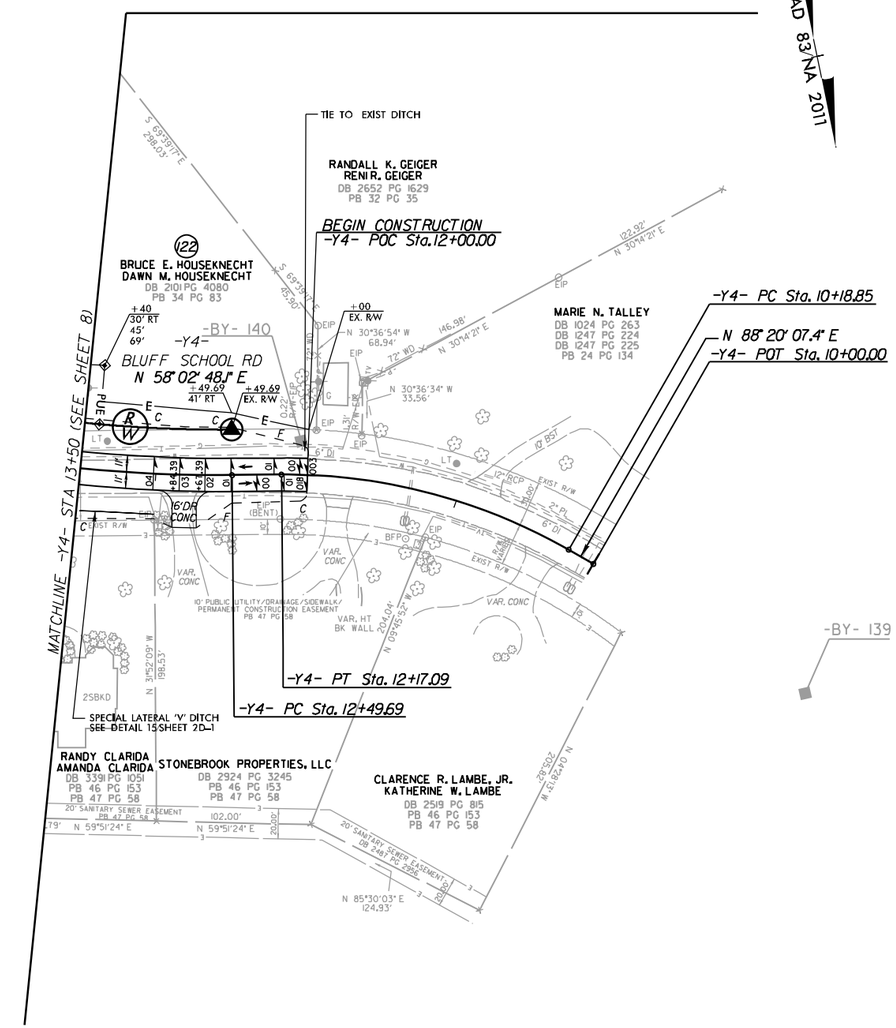
NAD 83/NA 2011





-Y4-
PI Sta 11+20.34
Δ = 30° 17' 19.3" (LT)
D = 15° 16' 43.9"
L = 198.24'
T = 101.49'
R = 375.00'
SE = 0.04
RO = 68'

(29) DAVID A. GRIX
MELODY K. GRIX
DB 2729 PG 3569
PB 41 PG 100

SEE SHEET 28 FOR -Y4- PROFILE

SEE SHEET 28 FOR -Y4- PROFILE

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RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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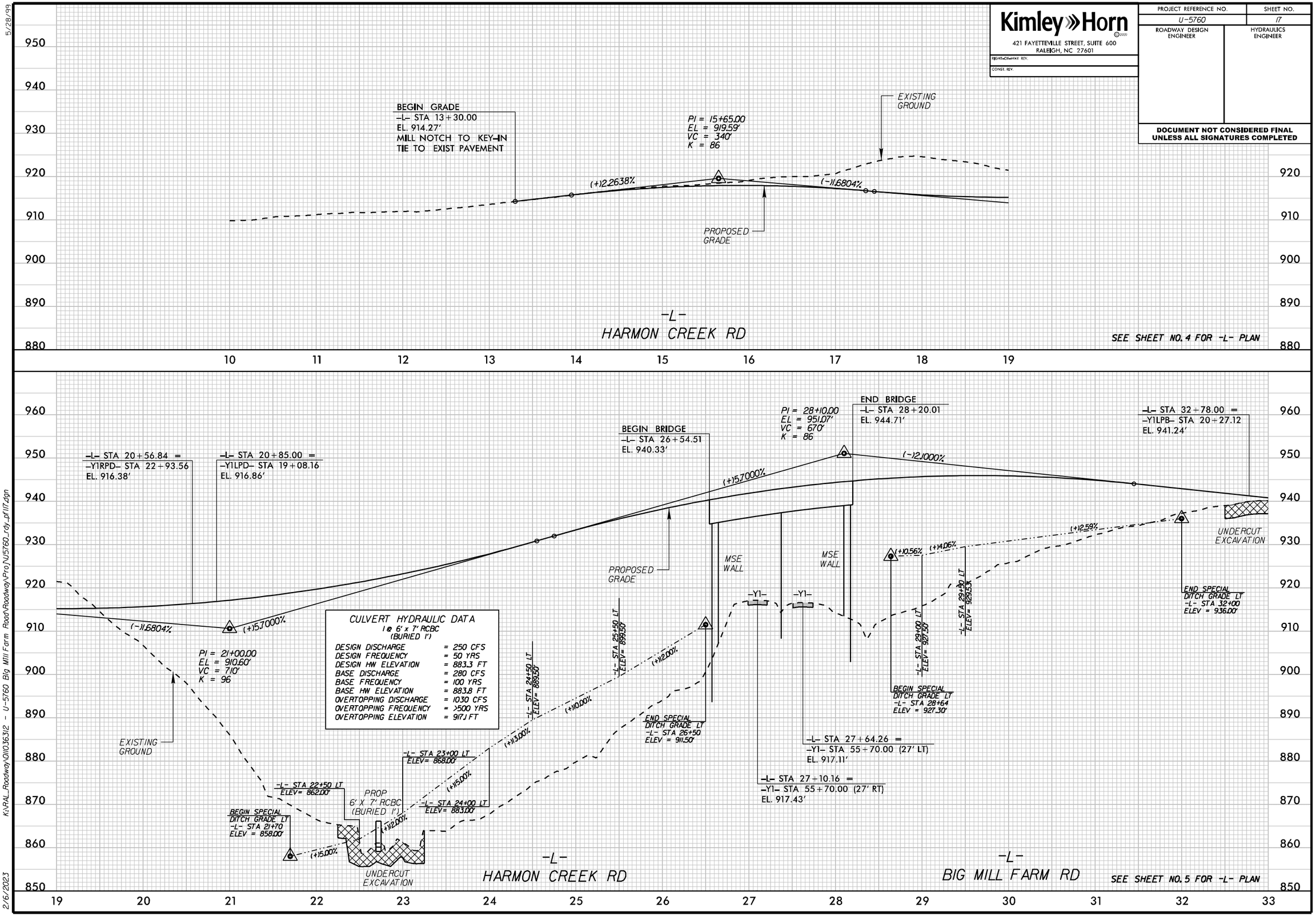

CULVERT HYDRAULIC DATA
1 @ 6' x 7' RCBC
(BURIED 1')

DESIGN DISCHARGE	= 250 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 883.3 FT
BASE DISCHARGE	= 280 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 883.8 FT
OVERTOPPING DISCHARGE	= 1030 CFS
OVERTOPPING FREQUENCY	= >500 YRS
OVERTOPPING ELEVATION	= 917.1 FT

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RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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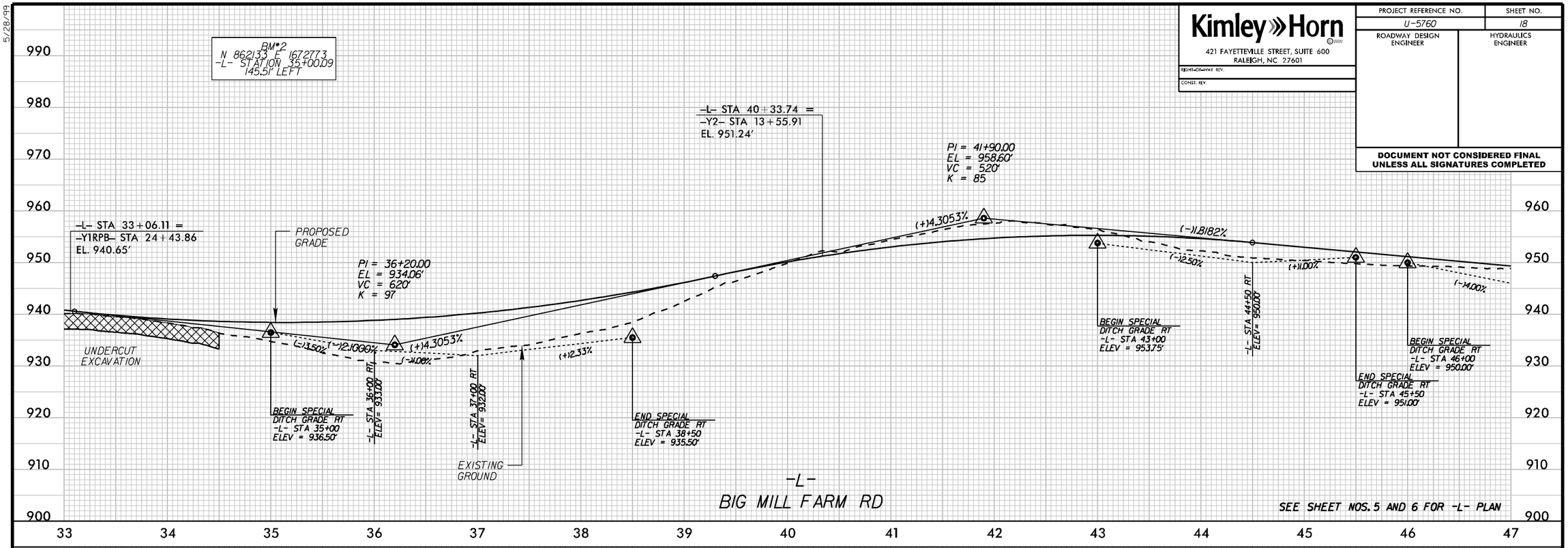

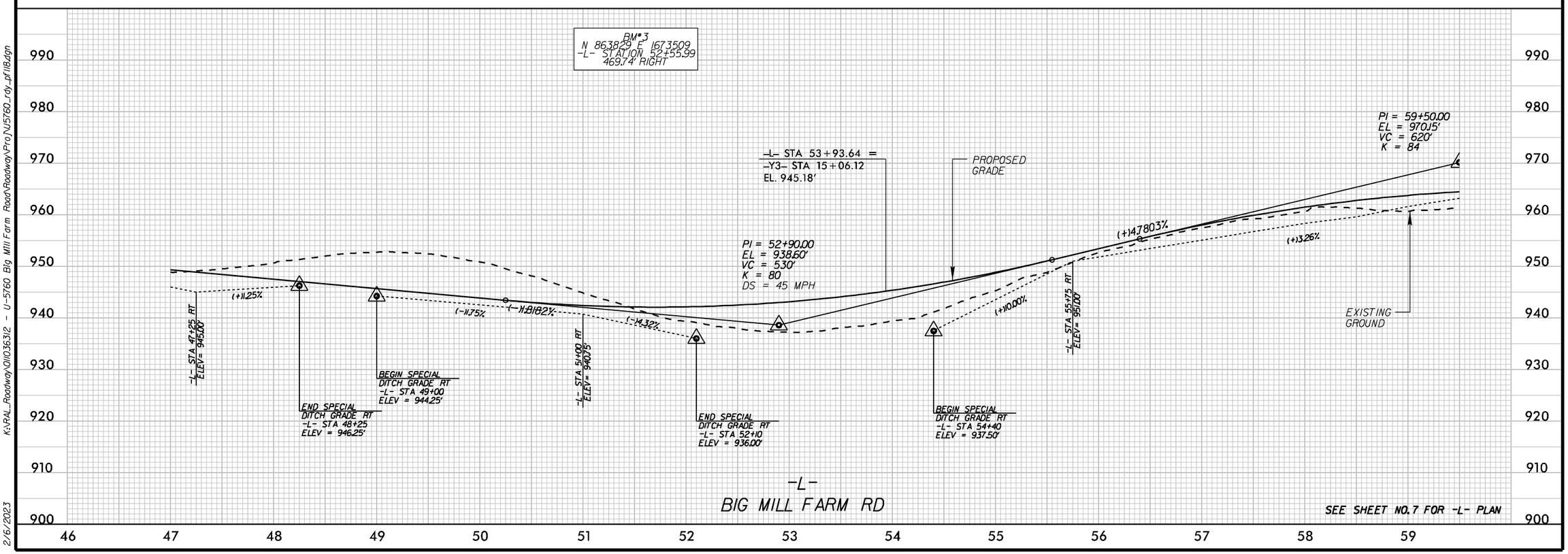

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2/6/2023

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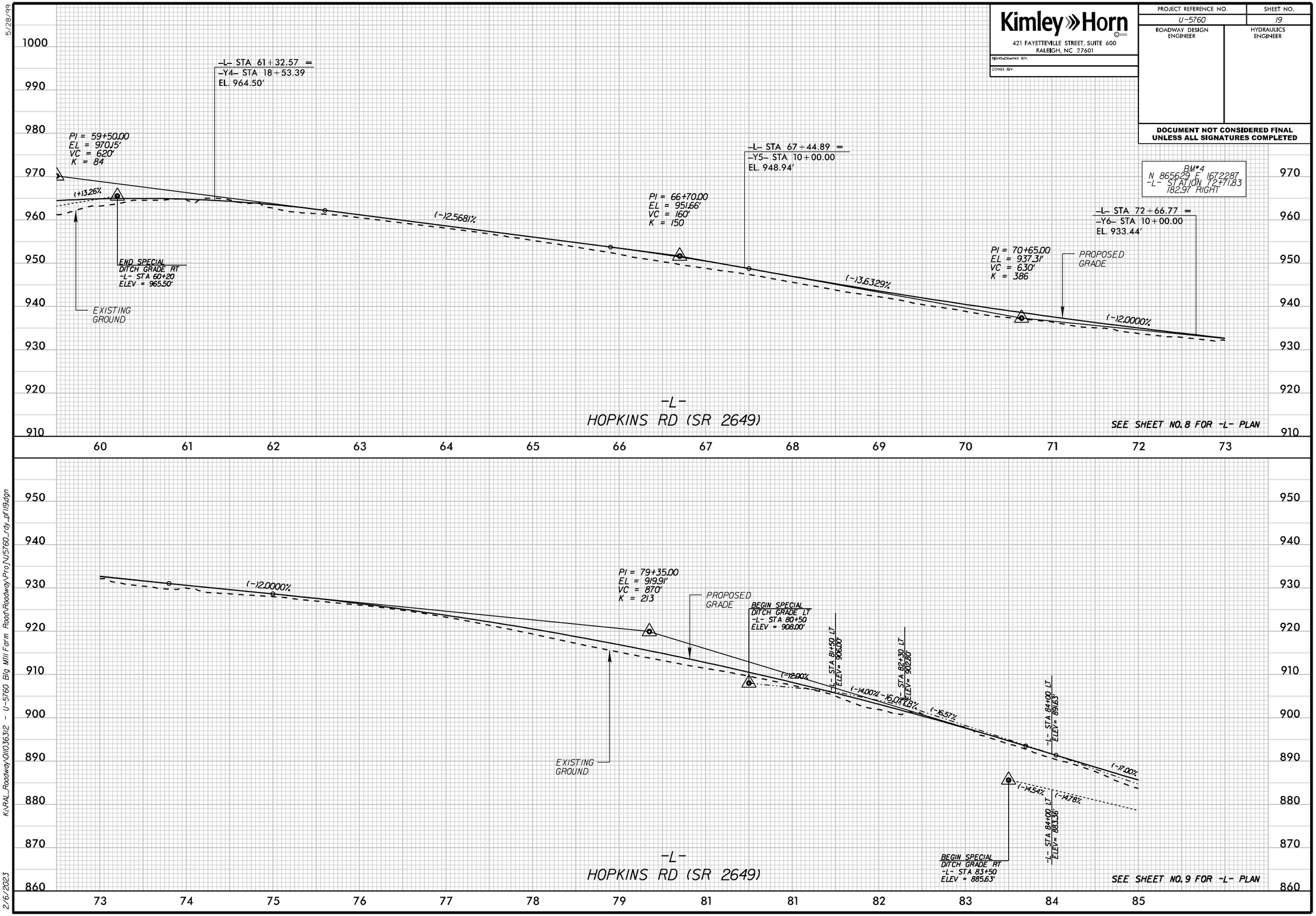
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



5/28/99

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2/6/2023

PROJECT REFERENCE NO.	SHEET NO.
U-5760	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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RIGHT-OF-WAY REV.
CONST. REV.

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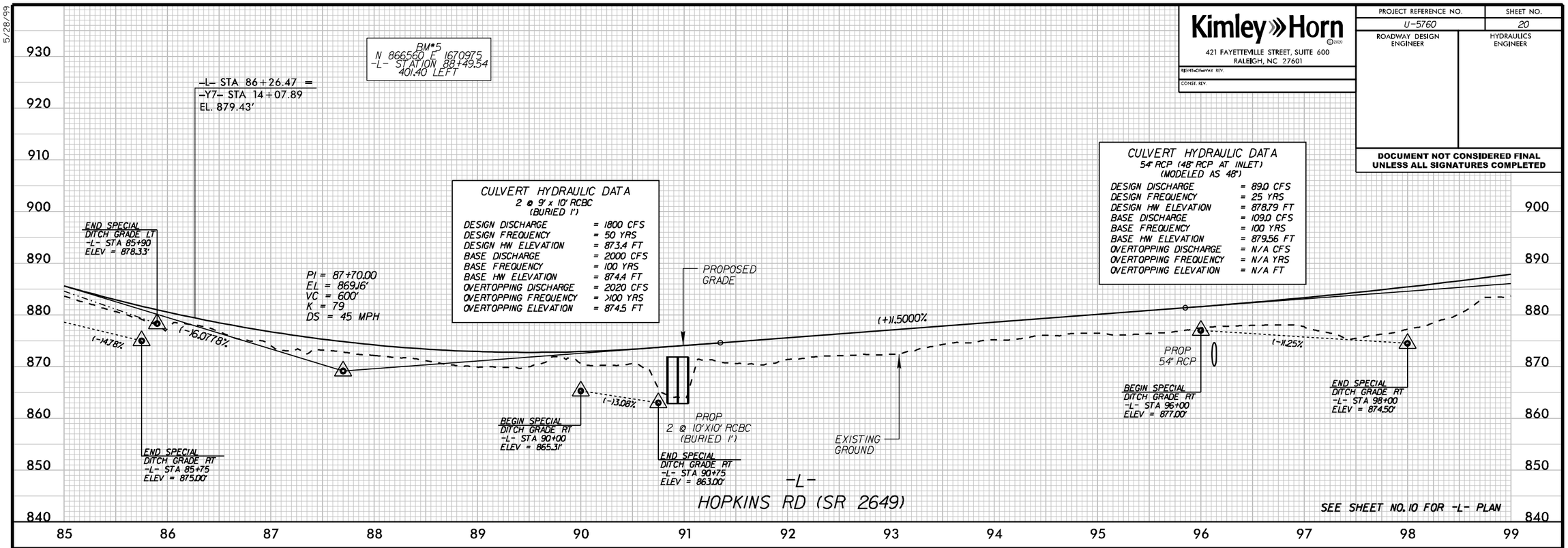

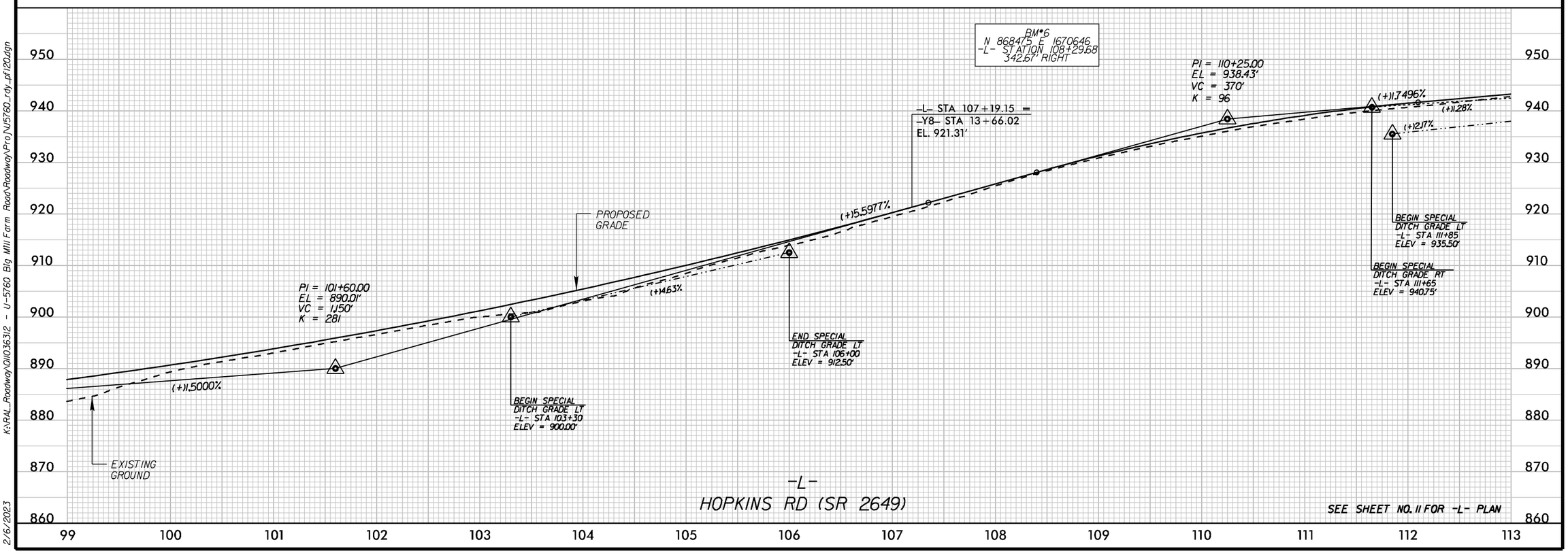

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RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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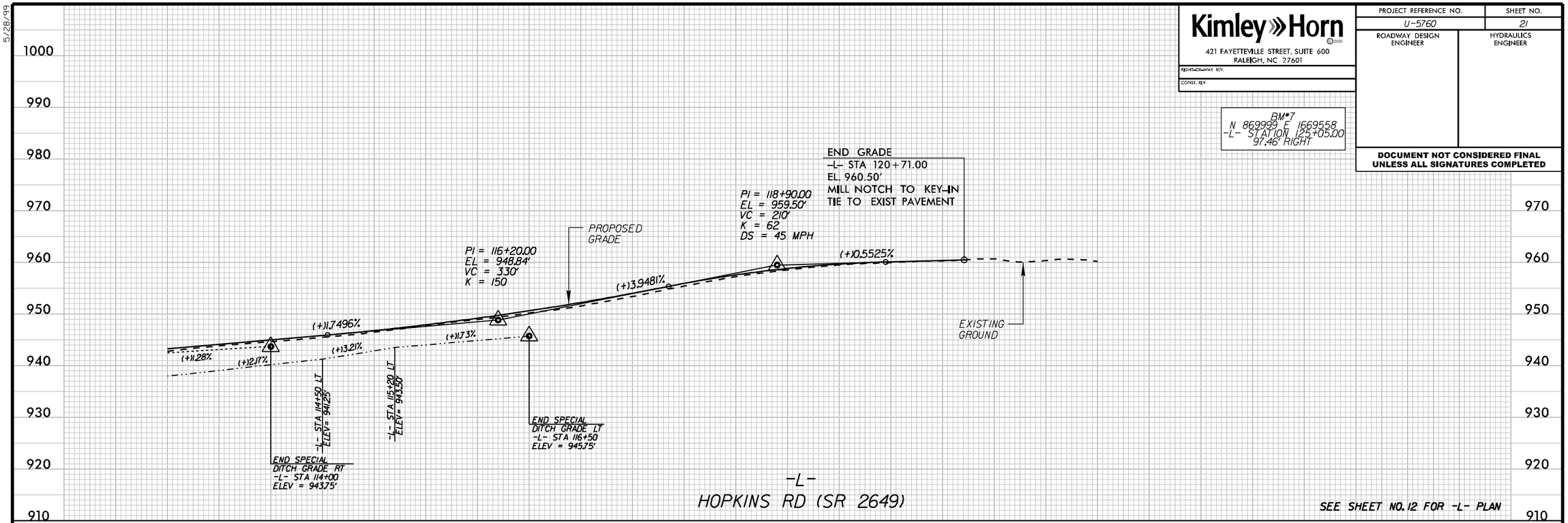
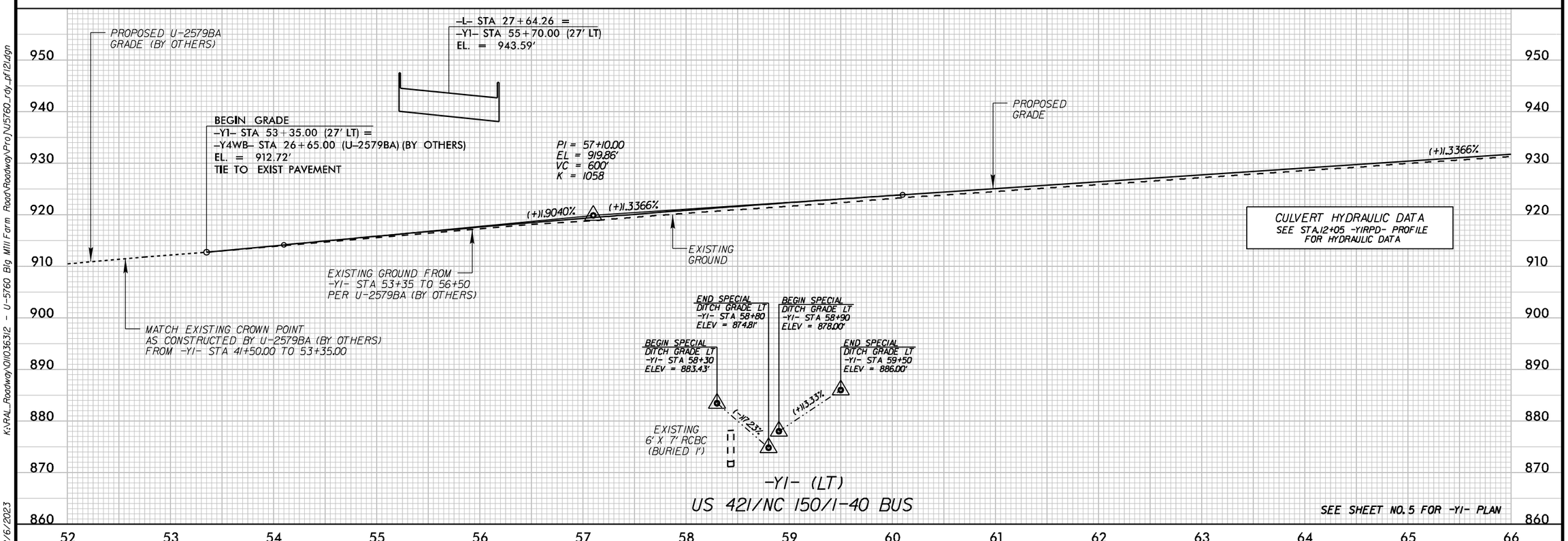
BM#7
N 869999 E 1669558
-L- STATION 125+05.00
97.46' RIGHT





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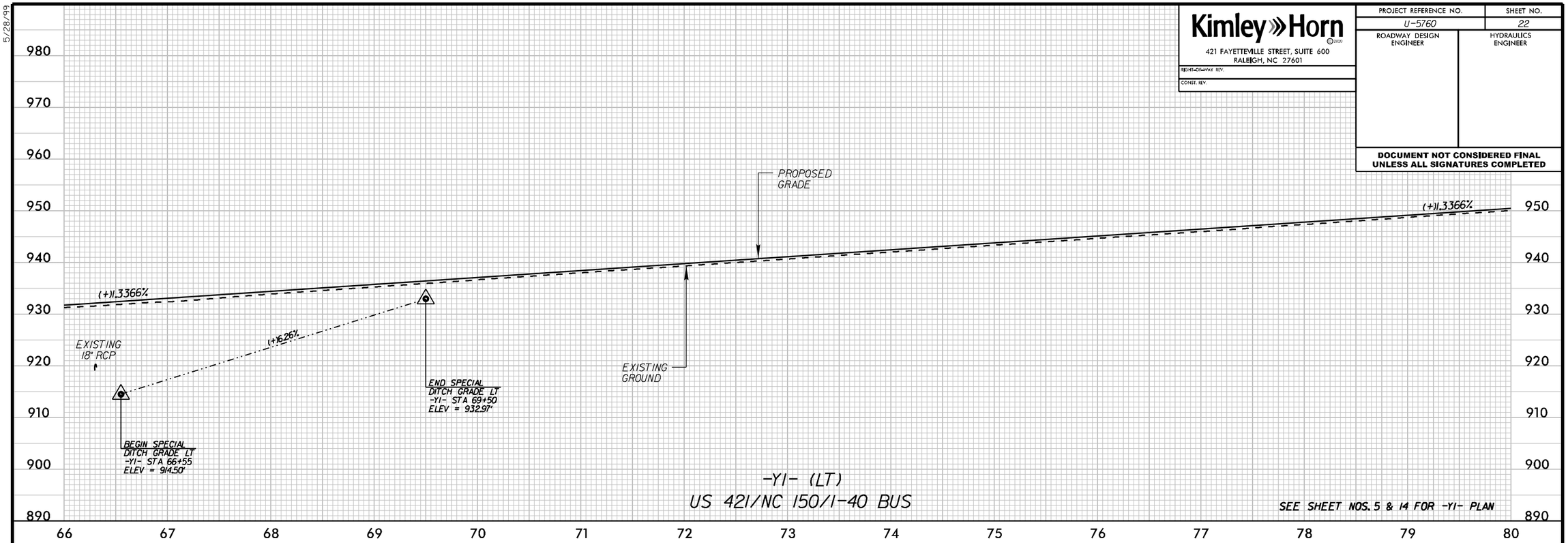
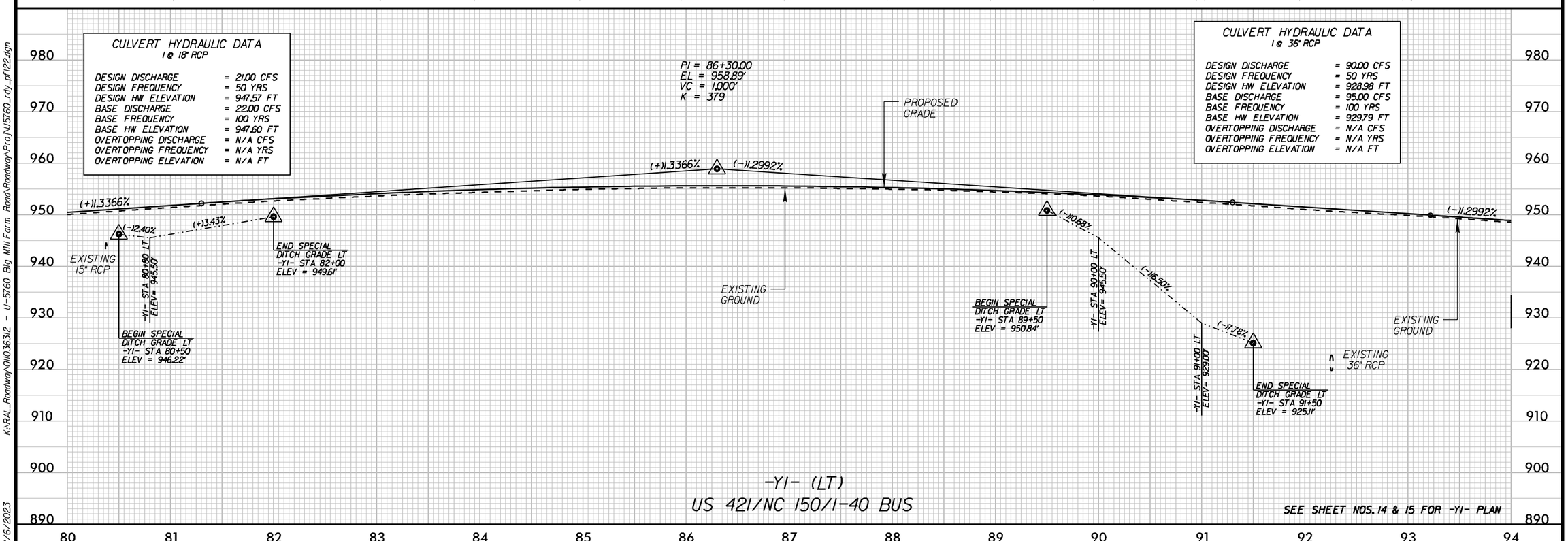
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





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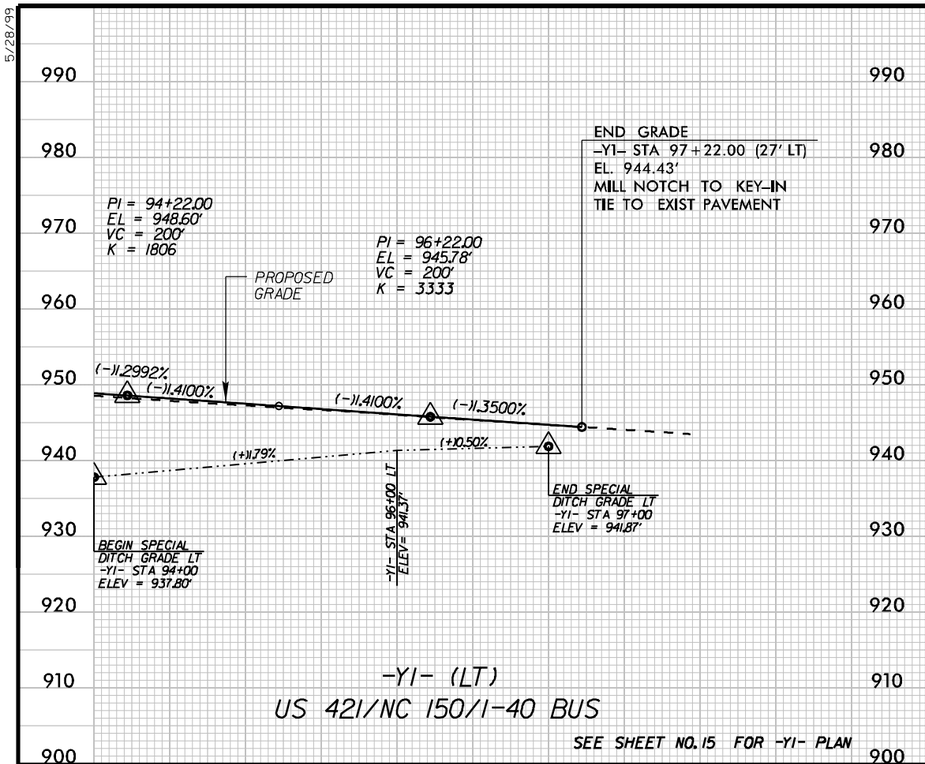
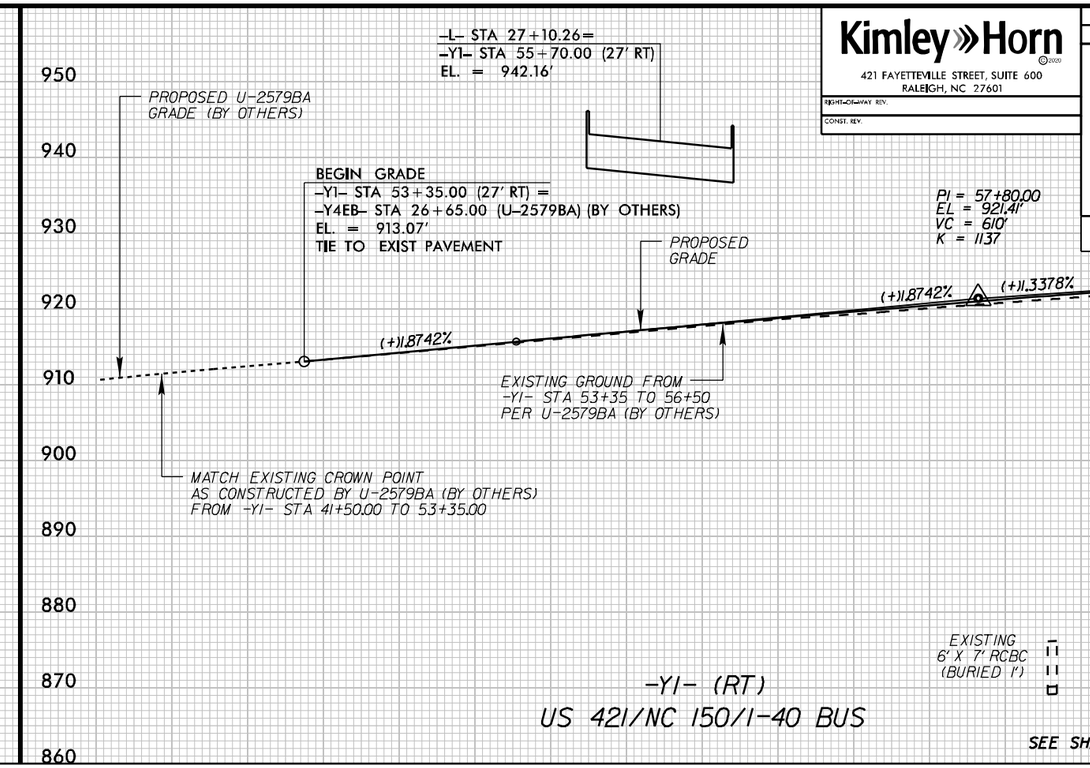
2/6/2023

5/28/99





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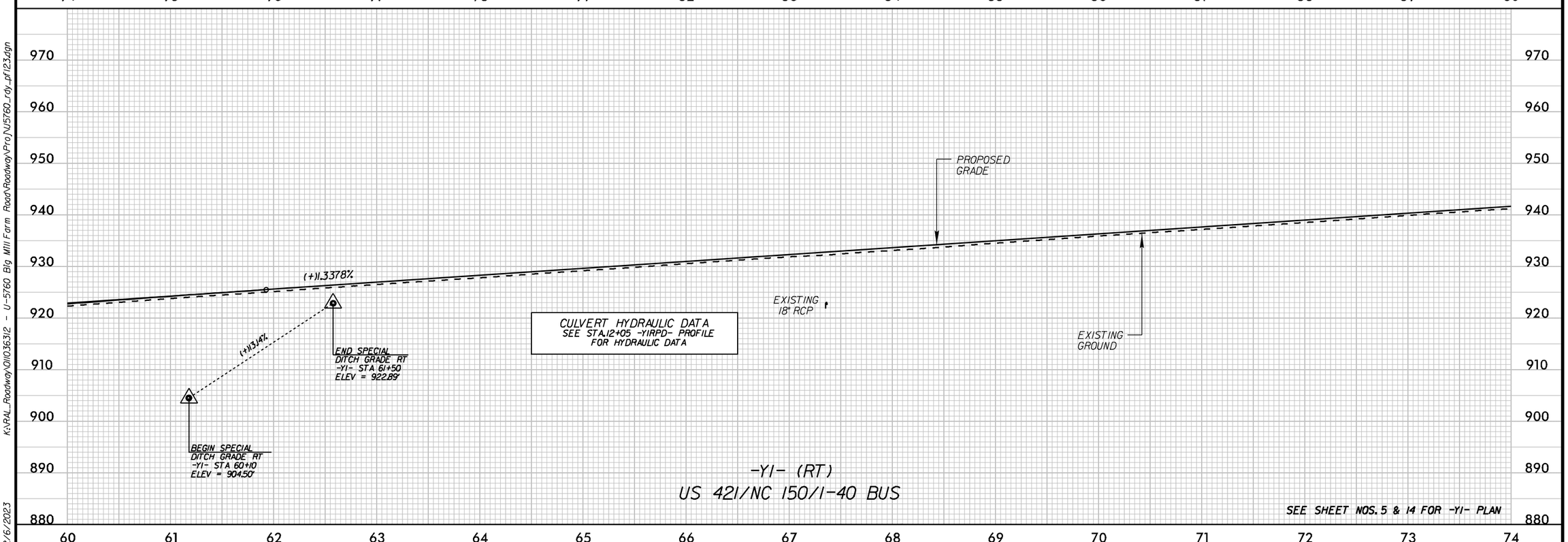
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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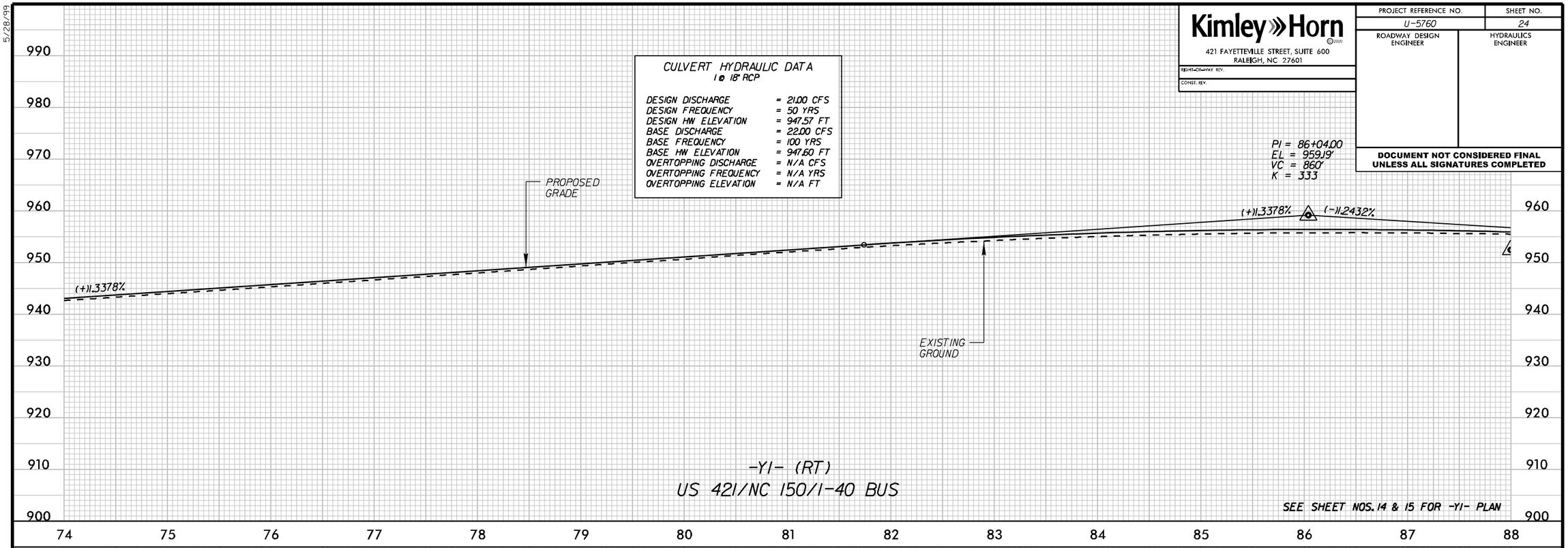
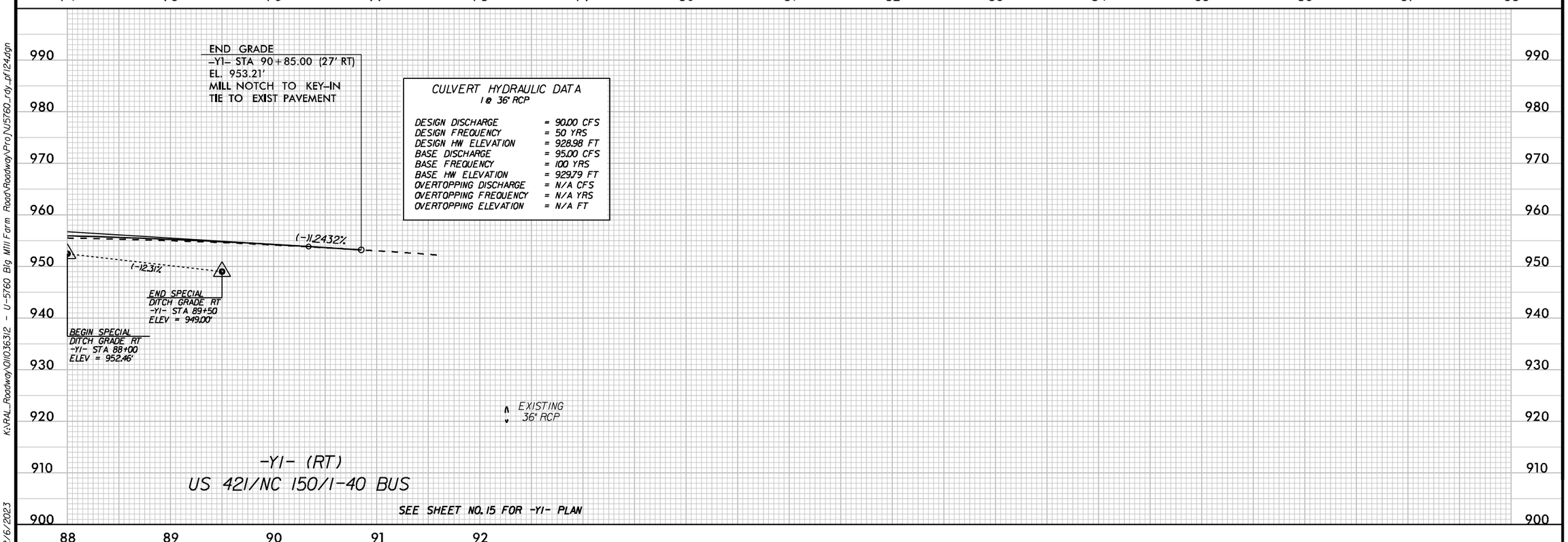
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





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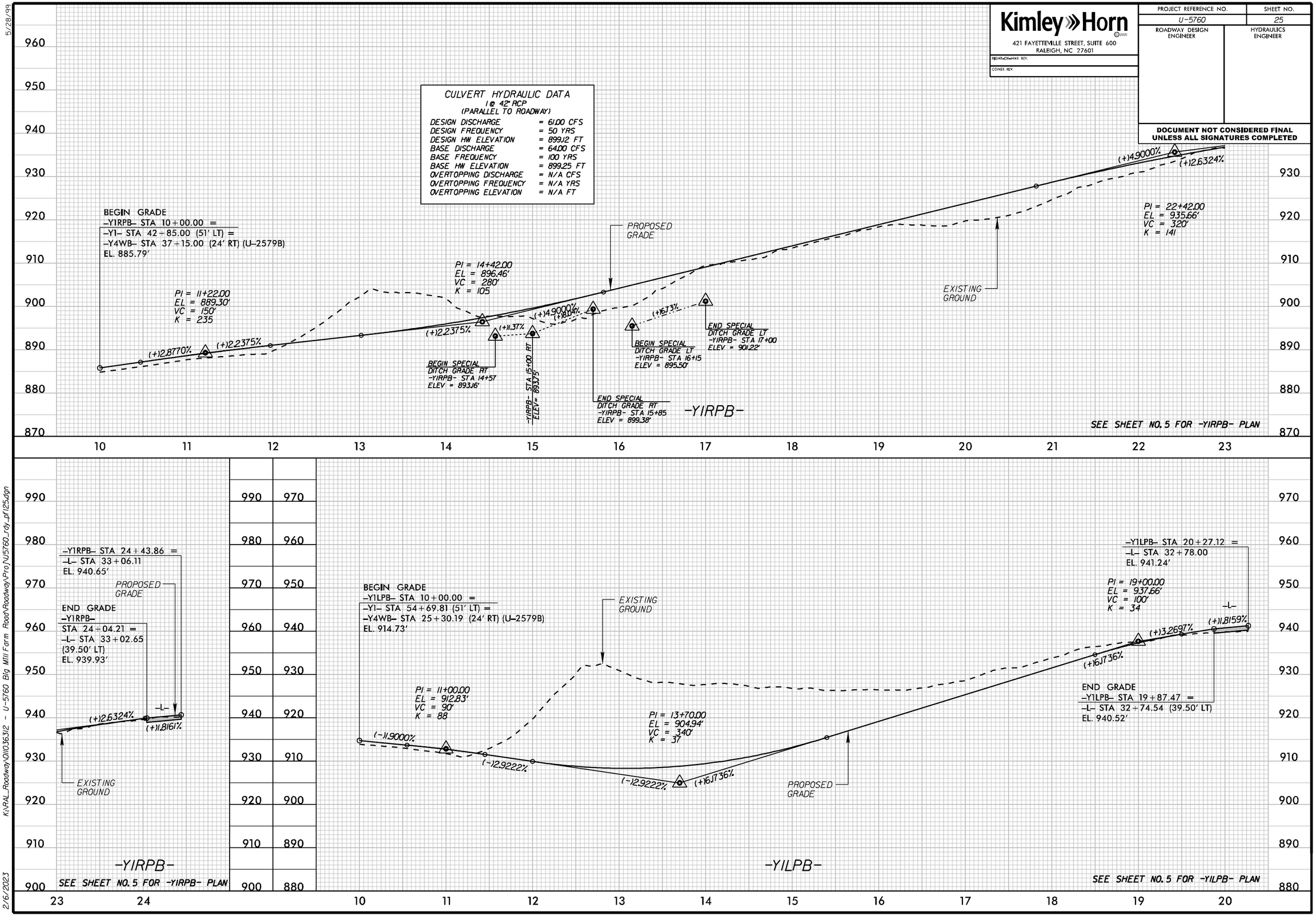
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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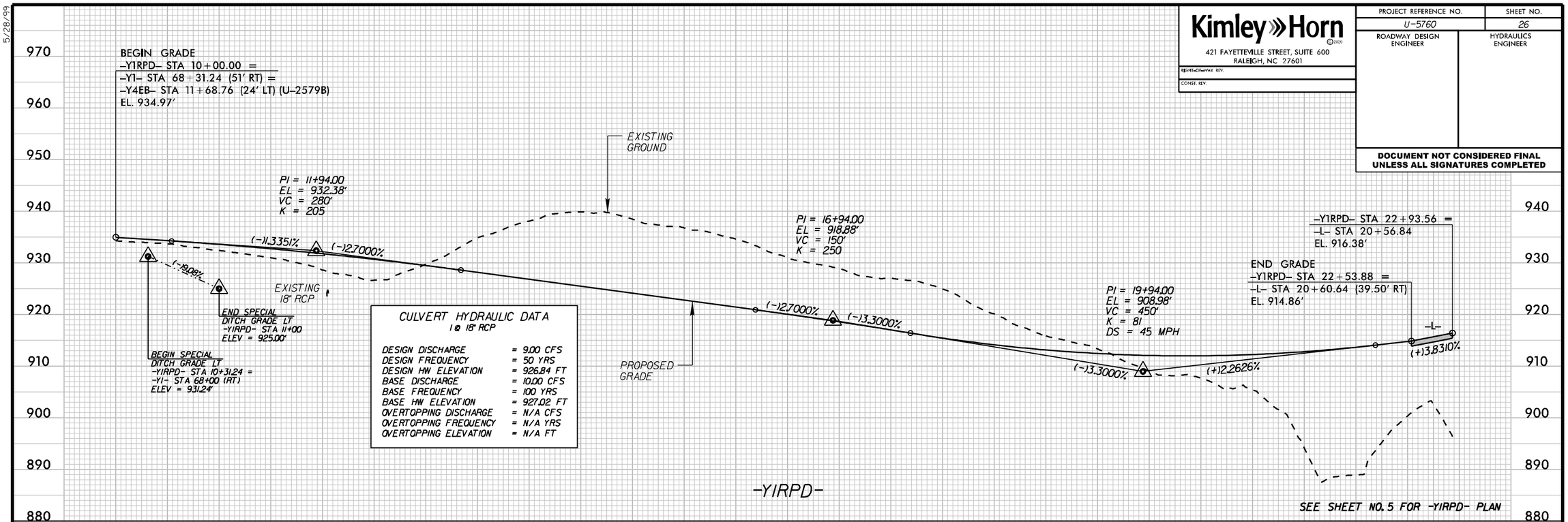
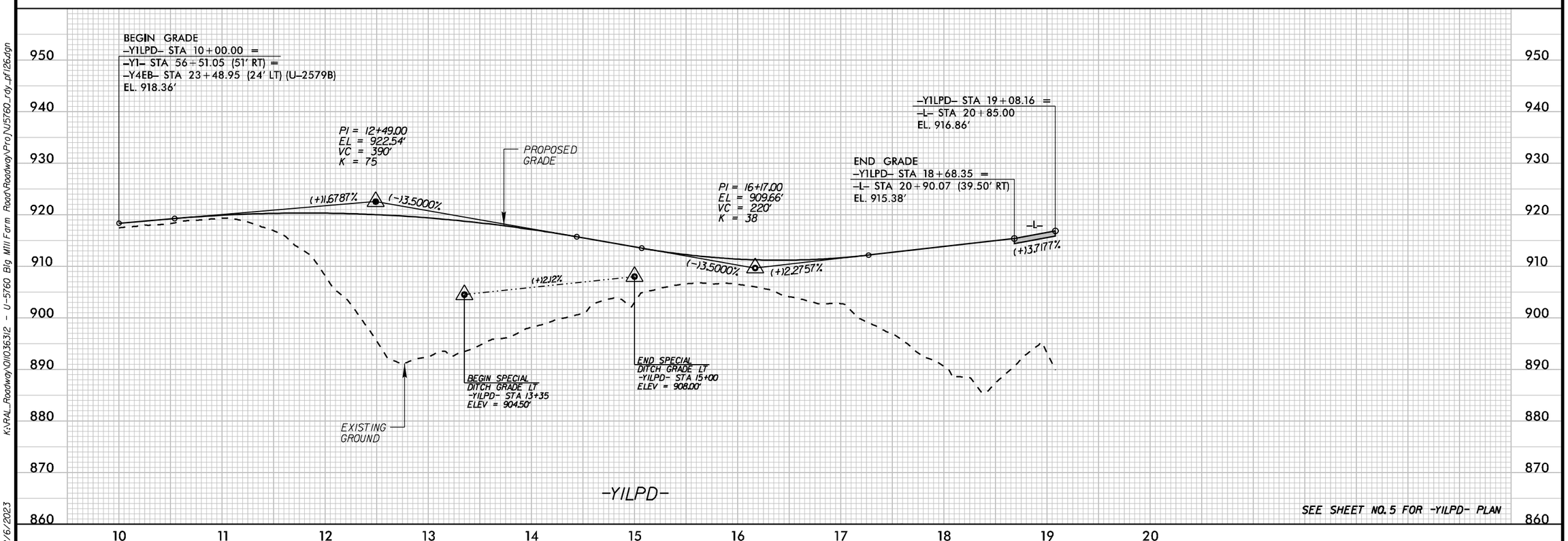
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





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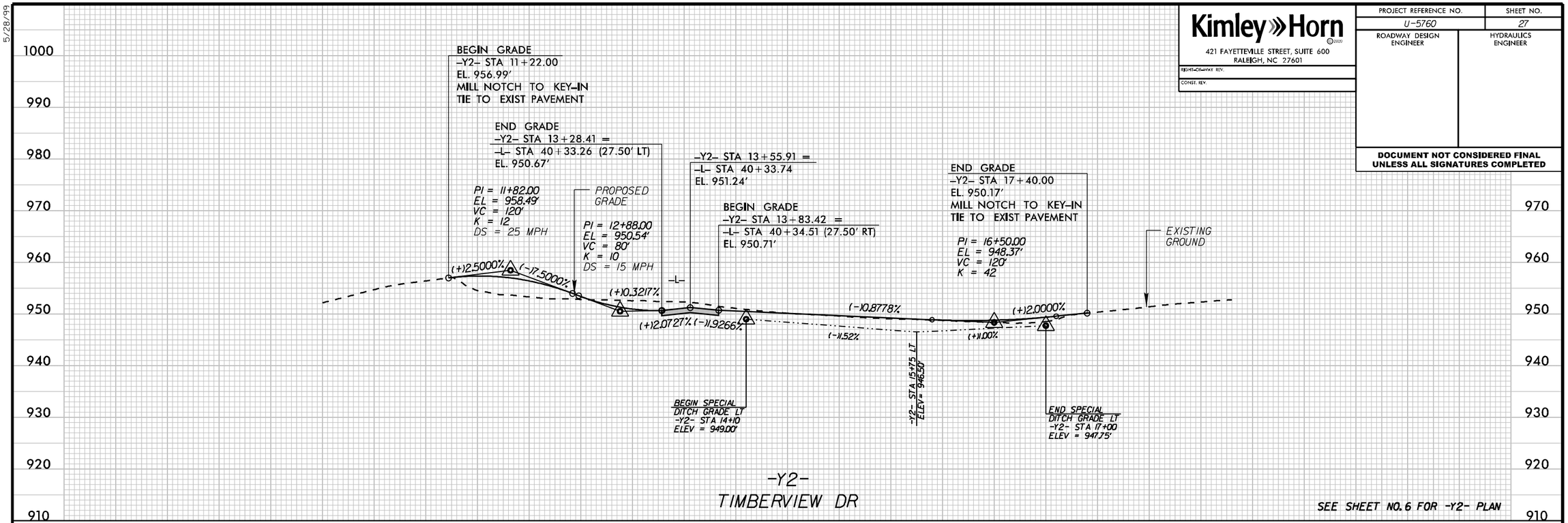
RIGHT-OF-WAY REV.
CONST. REV.

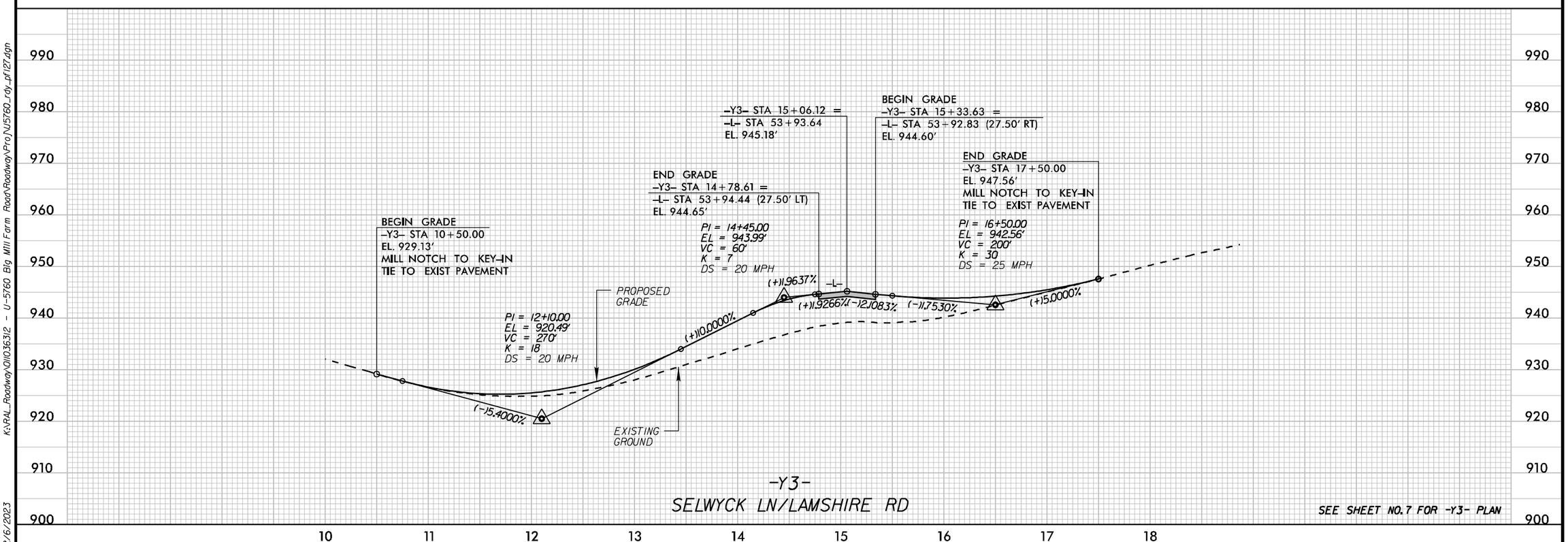
PROJECT REFERENCE NO.	SHEET NO.
U-5760	27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



-Y2-
TIMBERVIEW DR

SEE SHEET NO. 6 FOR -Y2- PLAN



-Y3-
SELWYCK LN/LAMSHIRE RD

SEE SHEET NO. 7 FOR -Y3- PLAN

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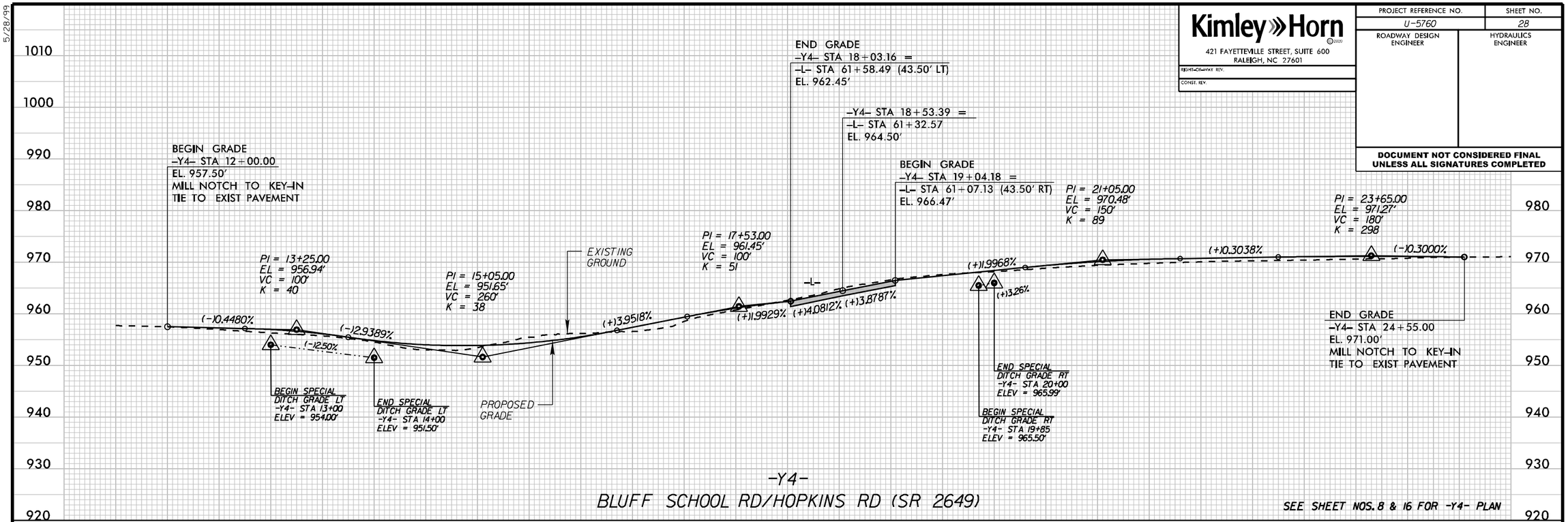
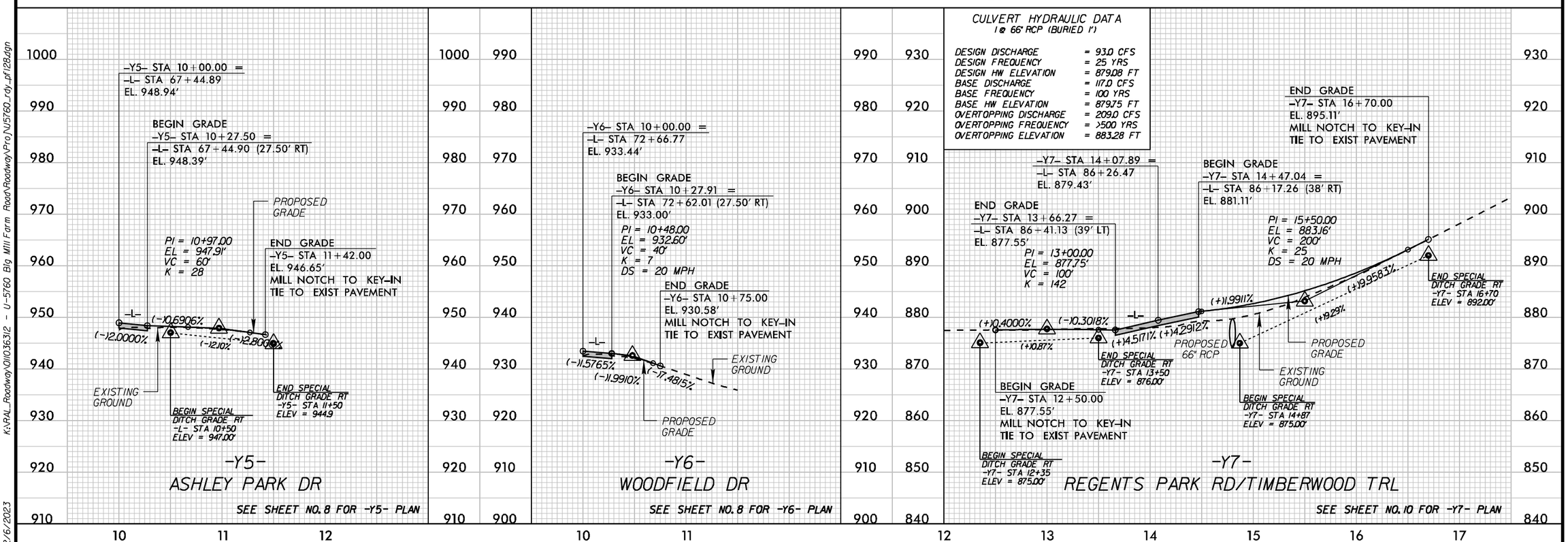
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
U-5760	28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





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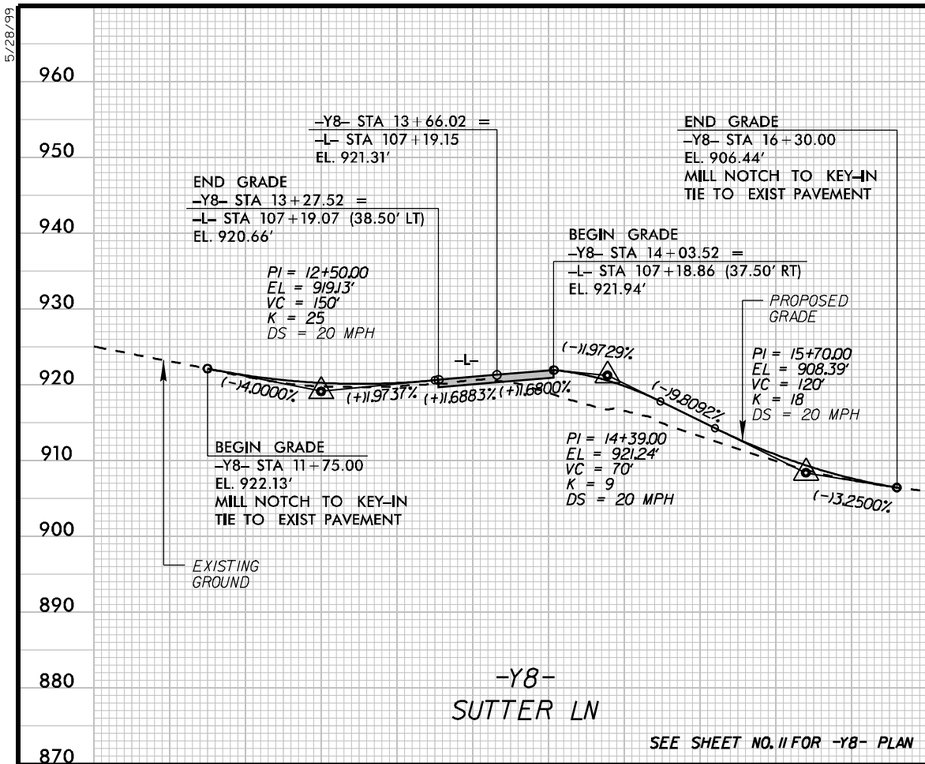
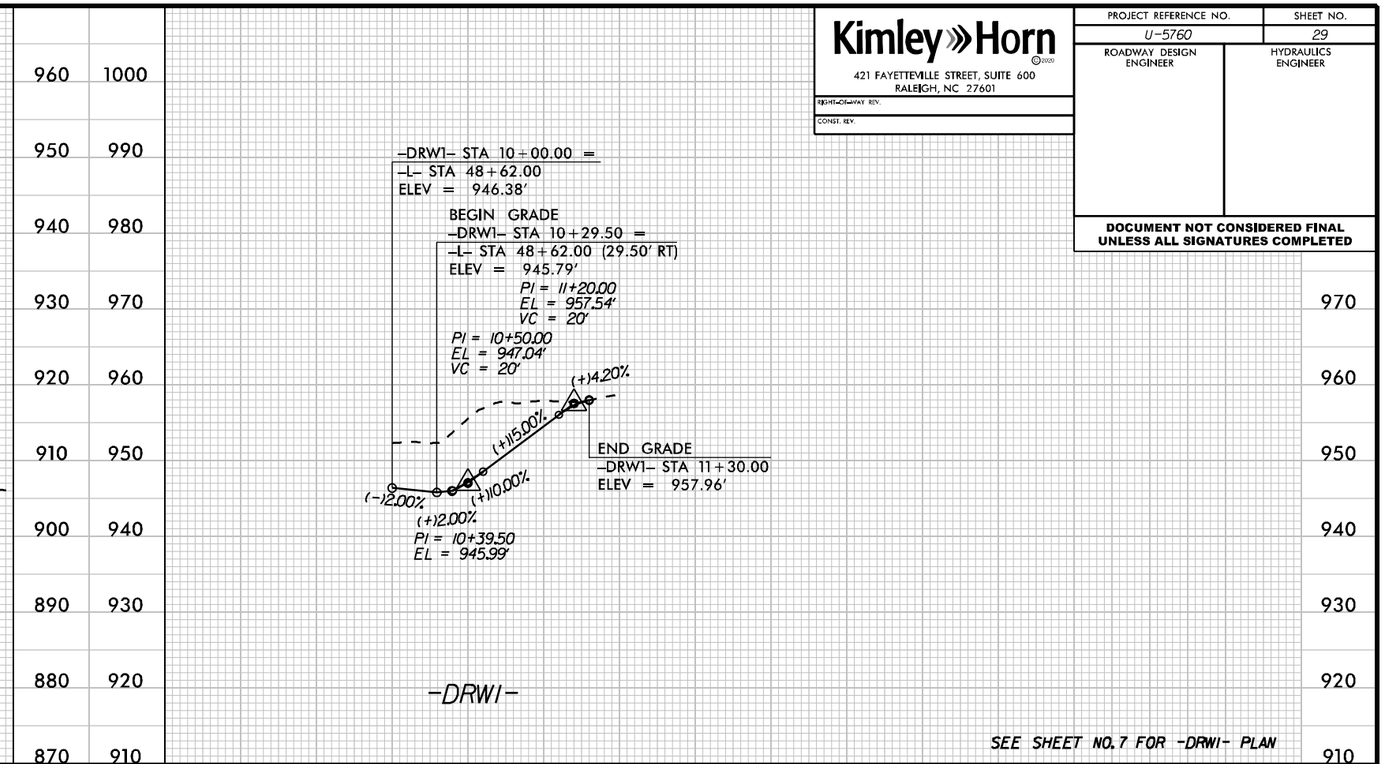
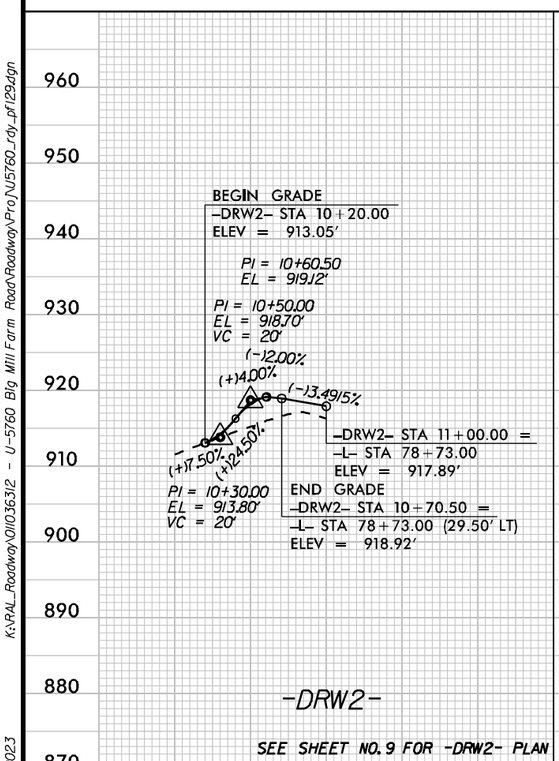
RIGHT-OF-WAY REV.
CONST. REV.

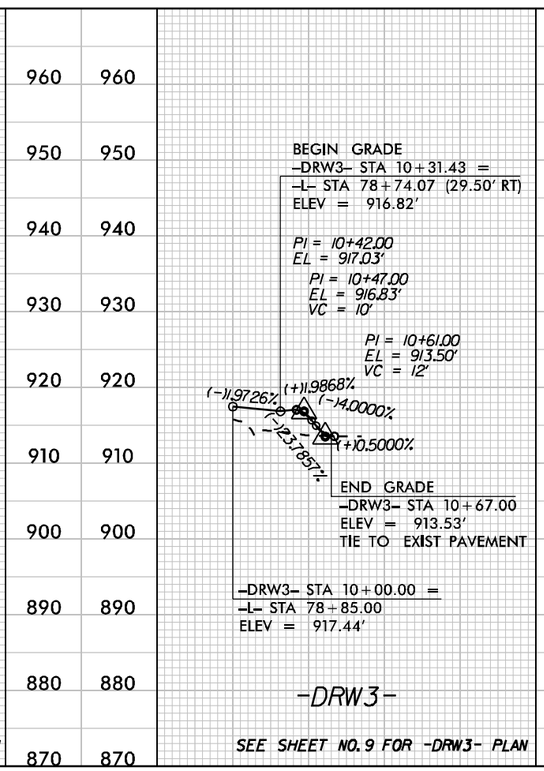
PROJECT REFERENCE NO.	SHEET NO.
U-5760	29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

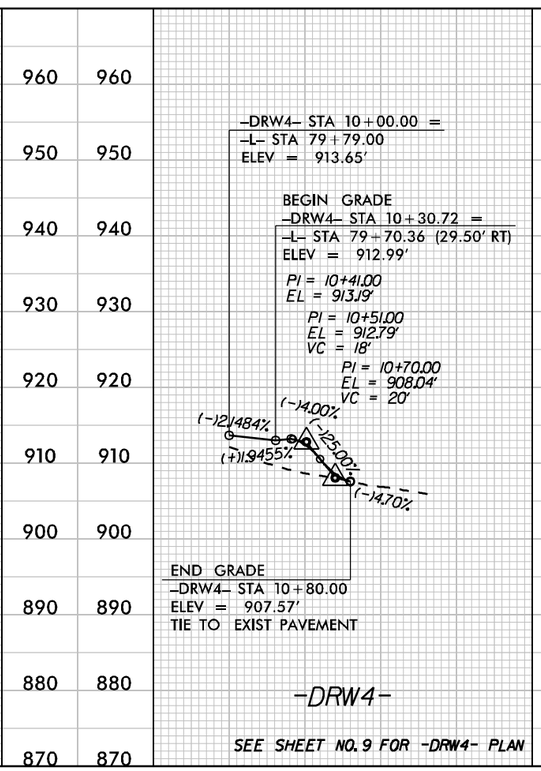
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

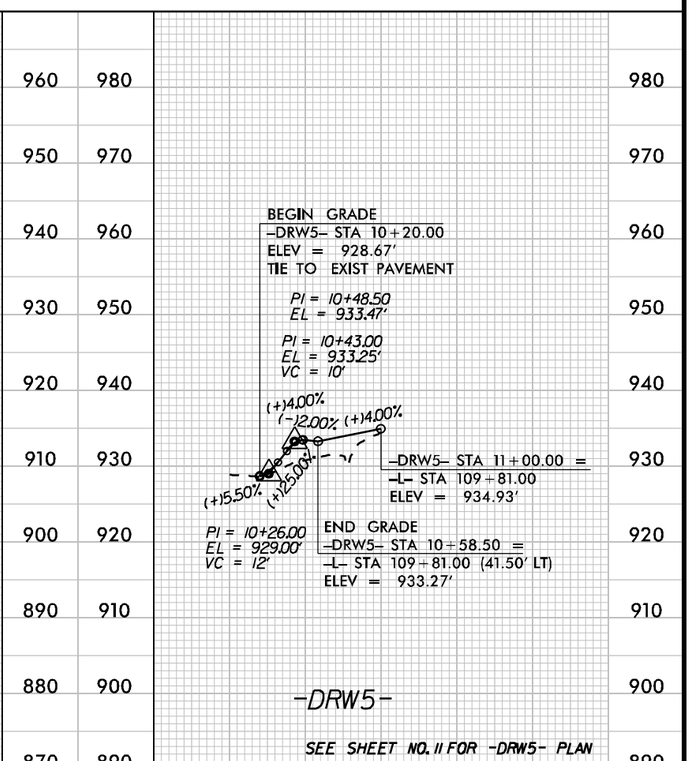












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