STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

February 8, 2011

U. S. Army Corps of Engineers
Wilmington Regulatory Field Office
69 Darlington Ave.
Wilmington, NC 28402-1890

Attn: Mr. Ronnie Smith
NCDOT Coordinator

Subject: **Application for Section 404 Individual Permit and Section 401 Water Quality Certification,** NC 211 widening from north of NC 73 in West End to east of SR 1208 (traffic circle) in Pinehurst, Moore County. Federal Aid No. STP-211(5); State Project 8.1560601; TIP No. R-2812.

Debit $570.00 from WBS Element 34504.1.1.

Dear Sir:

The North Carolina Department of Transportation (NCDOT) proposes to widen NC 211 to a four lane divided facility with a 23-foot raised grass median, from NC 73 in West End to the traffic circle in Pinehurst. The length of the proposed project is approximately 7.2 miles.

This application package consists of the cover letter, ENG Form 4345, US Fish and Wildlife (USFWS) concurrence letter, Ecosystem Enhancement Program (EEP) confirmation letter, Hydraulic Design Review (4B and 4C) meeting minutes, Stormwater Management Plan, permit drawings, and roadway plans.

Project Schedule

This project calls for a review date of August 30, 2011 and a letting date of October 18, 2011. However, these let dates may advance as additional funds become available.

This project has been accelerated to enable NCDOT to complete the project prior to the US Open golf tournaments in June 2014. The Village of Pinehurst and the general public have indicated a desire to complete the project prior to commencement of the golf tournaments since NC 211 will be heavily travelled by golf patrons, etc. during this timeframe.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
NATURAL ENVIRONMENT UNIT
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-431-2000

FAX: 919-431-2001

WEBSITE: WWW.NCDOT.ORG

LOCATION:
4701 Atlantic Ave.,
Suite 116
Raleigh, NC 27604

Purpose and Need

The purpose of this project is to improve the level of safety along NC 211 and to improve the traffic carrying capacity of the roadway in order to meet the needs of existing and anticipated development in the project area.

Summary of Impacts

The proposed project lies in the Southern Piedmont Physiographic Province, primarily in the Cape Fear River Basin (HUC 03030004, sub-basin 03-06-14). A small section (approximately 0.5 mile) is located within the Lumber River Basin (HUC 03040203, sub basin 03-07-50); however, none of the jurisdictional resources in the project area are within the Lumber River drainage basin.

This project will impact 388 linear feet of jurisdictional streams (374 linear feet of permanent impacts, 14 linear feet of temporary impacts) and 1.90 acres of impacts to riparian wetlands (1.30 acres of permanent fill, <0.01 acre of temporary fill, 0.15 acre of excavation, and 0.45 acre of mechanized clearing). No impacts to jurisdictional resources will occur due to the relocation or installation of utilities in the project area.

Summary of Mitigation

Throughout the design and NEPA process this project has been designed to avoid and minimize impacts to jurisdictional areas. EEP will provide mitigation as required for 374 linear feet of stream impacts (including bank stabilization) and for the 1.90 acres of riparian wetland impacts for the proposed project.

NEPA DOCUMENT STATUS

An Environmental Assessment (EA) was approved October 30, 1998. A Finding of No Significant Impact (FONSI) was approved on July 14, 2008. The EA and FONSI have been provided to regulatory review agencies. Additional copies will be provided upon request.

INDEPENDENT UTILITY

The subject project is in compliance with 23 CFR Part 771.111(f) which lists the Federal Highway Administration (FHWA) characteristics of independent utility of a project:

(1) The project connects logical termini and is of sufficient length to address environmental matters on a broad scope;
(2) The project is usable and a reasonable expenditure, even if no additional transportation improvements are made in the area;
(3) The project does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

RESOURCE STATUS

Wetland delineations within R-2812 were conducted using the field delineation method outlined in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and the North Carolina Division of Water Quality's (DWQ) *Identification Methods for the Origins of Intermittent and Perennial Streams*, respectively.

Within the R-2812 project area three streams, two jurisdictional ponds, and four wetlands were identified. Jurisdictional areas were verified by United States Army Corp of Engineers (USACE) representative Kim Garvey. An official notification of jurisdictional determination was issued by the USACE on April 2, 2010.

IMPACTS TO WATERS OF THE UNITED STATES

The project is located in the Cape Fear River and Lumber River Basins in Moore County; however, none of the jurisdictional resources in the project area are within the Lumber River drainage basin. Jurisdictional resources are part of Hydrologic Cataloging Unit 03030004 of the South Atlantic-Gulf Coast Region. Broad Branch Creek (NCDWQ classification WS III; Index # 18-23-3-1-1), Joe's Fork Creek (including a man made pond created by damming a downstream portion of the creek), a perennial tributary of Joe's Fork Creek, and a man-made pond which is connected to a tributary to Joe's Fork Creek located outside of the project study area (NCDWQ classification WS III; Index # 18-23-3-1). There are four riparian wetlands located within the project area. Final design impact and mitigation data can be found on Tables 1 and 2.

There are no designated Outstanding Resource Waters (ORW), High Quality Waters (HQW), Water Supply I (WS-I), Water Supply (WS-II), or 303 (d) listed waters within 1.0 mile of the project area.

Impacts to Jurisdictional Streams

Stream impacts for R-2812 occur at Sites 3 and 4. Impacts include 296 linear feet of permanent impacts that will result from extension or replacement of pipes and a culvert and the construction of the fill slopes necessary for the widening of NC 211. Bank stabilization will result in 78 linear feet of permanent stream impacts. Additionally, 14 linear feet of temporary stream impacts will occur at Site 4 to allow for possible construction access for the extension of the 60 inch reinforced concrete pipe at that location. Jurisdictional stream impacts are summarized below in Table 1.

Table 1. Impacts to Jurisdictional Streams

Site	Stream Name	Classification	Impact Type	Impact Length (ft)	Mitigation Ratio	Mitigation Required (ft)
3	Tributary to Joe's Fork Creek	Perennial	Extension of 10 x 7 RCBC	163	2:1	326**
			Bank Stabilization	42	1:1*	
4	Broad Branch Creek	Perennial	Replacement of 60" RCP	133	2:1	266**
			Bank Stabilization	36	1:1*	
			Temporary Dewatering	14	NA	NA
Totals:				**388**	**NA**	**592**

*1:1 mitigation, as required by NCDWQ for all sites where impacts(permanent stream impacts plus bank stabilization) equals or exceeds 150 linear feet, is proposed as the impacts are a result of bank stabilization and will not result in loss of stream quality or function.**Exceeds total mitigation required by NCDWQ for stream impacts exceeding 150 linear feet.

Impacts to Jurisdictional Ponds

The proposed project will result in impacts to jurisdictional ponds at Sites 1 and 2. Impacts to 0.13 acres will result from the placement of permanent fill necessary for construction of the fill slopes necessary for the widening of the NC 211. Additionally, 2.83 acres of temporary surface water impacts resulting from the temporary dewatering of the pond at Site 1 to allow construction access for extension of the 10 x 7 RCBC and fill slopes necessary for the widening of NC 211. Impacts to jurisdictional ponds are summarized in Table 2.

Table 2. Surface water impacts to Ponds

Site	Impact Type	Impact Area (ac)
1	Temporary Dewatering	2.83*
	Permanent fill	0.12
2	Permanent fill	0.01
Total		**2.96**

*Flow of the stream will be maintained during construction

Impacts to Wetlands

The proposed project will result in impacts to riparian wetlands at Sites 1, 2, 3, and 4. Impacts consist of 1.30 acres of permanent fill and 0.15 acres of excavation within the wetlands. These impacts are a result of the extension or replacement of pipes and culvert and the construction of the fill slopes necessary for the widening of NC 211. Temporary impacts to < 0.01 acre of wetlands may be necessary to allow for construction access at Site 1. Additionally, the proposed project will result in 0.44 acres of mechanized clearing necessary to allow for construction access. Impacts to wetlands are summarized in Table 3.

Table 3. Impacts to Jurisdictional Wetlands

Site	Impact Type	Permanent Impacts (acres)	Mitigation Ratio	Mitigation Required (acres)
1	Permanent Fill	0.19	2:1	0.38
	Mechanized Clearing	0.08	1:1	0.08
	Temporary Impacts	<0.01	NA	NA
2	Permanent Fill	0.04	1:1*	0.08
	Excavation	0.02		
	Mechanized Clearing	0.02		
3	Permanent Fill	0.70	2:1	1.40
	Excavation	0.13	2:1	0.26
	Mechanized Clearing	0.21	1:1	0.21
4	Permanent Fill	0.37	2:1	0.74
	Mechanized Clearing	0.14	1:1	0.14
Totals		**1.90**	**NA**	**3.29**

*1:1 mitigation is proposed for this wetland, which is located adjacent to a pond. The hydric soil criterion is not consistently met throughout the wetland. Furthermore, the interconnectivity of the wetland/pond and nearby wetlands (located outside of the project area) has been severed. Although the USACE has not declared this an isolated wetland, the system no longer interacts with nearby wetlands except duringhigh water events resulting in overflow from the pond.

Impacts to wetlands have increased since the FONSI was approved in June 2007. In 2010 NCDOT shifted the alignment to the south between stations -L- 39 + 05.52 and -L- 133 + 16.02,-L- 253 + 34.50 and –L- 317 + 10.00, in order to minimize impacts to an apartment building and utilities. The alignment shift will result in 8 fewer families relocated and a cost savings of $1, 875,000. Furthermore, impacts to the red-cockaded woodpecker (RCW) will be reduced as the new alignment will result in a decrease in pine BA removed from 704.32 sq. ft. to 487.62 sq. ft. and a decrease in forested habitat removed from 10.07 to 8.23 acres in the MOOR 35 partition.

FEDERALLY PROTECTED SPECIES

Plants and animals with a Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of September 22, 2010 the USFWS lists four federally protected species for Moore County, which are indicated in Table 4 below.

Table 4. Federally Protected Species Listed for Moore County

Common Name	Scientific Name	Federal Status	Biological Conclusion	Habitat Present
Red-cockaded woodpecker	*Picoides borealis*	E	May affect, not likely to adversely affect	Yes
Cape Fear shiner	*Notropis mekistocholas*	E	No Effect	No
American chaffseed	*Schwalbea Americana*	E	No Effect	Yes
Michaux's sumac	*Rhus michauxii*	E	No Effect	Yes

Red Cockaded Woodpecker

Surveys for the red cockaded woodpecker, American chaffseed, and Michaux's sumac were conducted from June through August 2009 by J.H Carter and Associates (JCA) biologists. RCW nesting habitat is found throughout the project area corridor. Active and inactive RCW clusters are located within 0.5 miles of the project area.

NCDOT received USFWS concurrence (October 8, 2009) for a biological conclusion of "May affect, not likely to adversely affect." In 2010 NCDOT shifted the alignment to the south between stations -L- 39 + 05.52 and -L- 133 + 16.02,-L- 253 + 34.50 and –L- 317 + 10.00, in order to minimize impacts to an apartment building and utilities. As a result of the new alignment and loss of RCW habitat due to private landowner activities, foraging numbers were recalculated by JCA. The new foraging numbers did not result in a take.

Impacts to RCW foraging and nesting habitat are addressed in the BA (JCA 2009) and BA Addendum (JCA 2010). Due to the fact that all impacted RCW clusters will meet SMS guidelines post-project, with suitable and potentially suitable habitat and no active RCW cavity trees will be removed or taken, the biological conclusion of **"May affect, not likely to adversely affect"** provided in the EA remains valid. USFWS concurred with this determination in a letter dated February 8, 2011.

Michaux's Sumac

Suitable habitat for Michaux's sumac is present in the project area within the canopy gaps of upland forests and pine stands and within regularly maintained powerline right of ways. No specimens were observed during the 24 man hour plant surveys conducted during June through August 2009.

In 2010 NCDOT shifted the alignment to the south between stations -L- 39 + 05.52 and -L- 133 + 16.02,-L- 253 + 34.50 and –L- 317 + 10.00. In these areas, Michaux's sumac habitat ranged from unsuitable habitat due to pine straw raking near West End, to marginally suitable in upland forests near Pinehurst. No Michaux's sumac was found during a January 2011 survey in either area where realignment will occur, however, additional surveys will be conducted within these areas during the appropriate survey window (May-October 2011) prior to construction.

The proposed project will not affect this species. A search NCNHP records on January 13, 2011 indicates there are no known populations of Michaux's sumac located within 1-mileof the project area. Therefore the biological conclusion of **"No Effect"** provided in the EA remains valid.

American Chaffseed

Suitable habitat for American chaffseed is present within the project area in pine-scrub oak sandhill habitats, however, fire has been absent in the area for many years. No specimens were observed during the 24 man hour plant surveys conducted during June through August 2009.

In 2010 NCDOT shifted the alignment to the south between stations -L- 39 + 05.52 and -L- 133 + 16.02,-L- 253 + 34.50 and –L- 317 + 10.00. Habitat within these areas was considered unsuitable due to fire suppression for decades. No American chaffseed was found during a survey conducted in June 2007 for a non-NCDOT related project in the subject area near West End and no American chaffseed was found in January 2011 in either subject areas. No American chaffseed was found during a January 2011 survey in either area where realignment will occur, however, these areas will be reassessed during the appropriate survey window (May-October 2011) prior to construction.

A search of NCNHP records on January 13, 2011 indicates that there are no known populations of Michaux's sumac located within 1-mile of the project area. Therefore, the biological conclusion of **"No Effect"** provided in the EA remains valid.

Cape Fear Shiner

The project area was evaluated for potential habitat for the Cape Fear shiner in April 2000. Habitat for the Cape Fear shiner does not occur within the project area. This fish prefers large waters with gravel, cobble, and boulder substrate, none of which is present in the project area. A search of NCNHP records on January 13, 2011 indicates no known populations of the Cape Fear shiner within 1-mile of the project area. Therefore, the biological conclusion of **"No Effect"** provided in the EA remains valid.

MITIGATION OPTIONS

The USACE has adopted, through the Council on Environmental Quality (CEQ), a wetland mitigation policy that embraces the concept of "no net loss of wetlands" and sequencing. The purpose of this policy is to restore and maintain the chemical, biological, and physical integrity of the waters of the United States. CEQ has defined mitigation of wetland and surface water impacts to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts (40 CFR 1508.20).

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning phase and minimization measures were incorporated as part of the project design. Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts.

Avoidance and Minimization

Avoidance and minimization has been employed in the project area to the maximum extent practicable. The following measures were implemented:

- NCDOT's Best Management Practices (BMPs) for the Protection of Surface Waters will be enforced.
- Bank stabilization activities will not place rip rap on the stream bottom
- Wetland impacts have been reduced to a minimum by keeping roadway fill slopes at 2:1 in these locations.

- Preformed scour holes have been utilized at various locations to diffuse velocities from storm water that drains into the wetlands or jurisdictional streams.
- The outlets of pipes carrying storm water are located as far away from jurisdictional resources as possible.
- Culverts and pipes will be buried 1-foot below the stream bed or natural ground at crossings to maintain normal stream flow and stream characteristics.
- The culvert outlet at the UT to Joe's Fork Creek (Site 1) will discharge directly into a pond that will be maintained after construction.
- All ditches were designed to be stable and control velocities. When possible ditches were flattened and provided a wider base at the outlet of the ditch
- At areas near jurisdictional features velocities where checked to ensure they are non-erosive and the outlet would not negatively impact the feature.
- During construction NCDOT Division 8 will put orange fencing around RCW cavity trees located within the right-of-way (cavity tree #s 357E and 1839). RCW cavity trees will be marked and GPS coordinates and a "do not disturb" message will be placed on design plans.
- The 2010 revised project design resulted in a decrease in pine BA removed from 704 sq. ft. to 488 sq. ft. and a decrease in forested habitat removed from 10.1 to 8.2 acres in the MOOR 35 partition.
- During construction at Site 1, flow of the stream will be maintained through the pond during construction.
- In order to preserve the red-cockaded woodpecker habitat, no unnecessary cutting of any pine trees 10 inches or greater in diameter at breast height, beyond the slope stake limits is to occur between the following stations: 96+00 through 15+00, 214+00 through 264+00, 285+00 through 329+00, and 339+00 through 415+00.
- It was determined at LEDPA that the project's footprint was reduced, minimizing impacts to the natural environment within the project and, thus, minimizing impacts to foraging habitat.
- The typical section has been reduced through the use of a curb and gutter typical section for a portion of the project, thus, narrowing the project footprint.
- A 23-foot raised island, the narrowest acceptable median width, thus reducing the project footprint.
- The best fit alignment, utilizing a combination of north side, south side, and symmetrical widening, has allowed for impacts to wetlands, streams, residences and businesses.

Compensatory Mitigation

Mitigation requirements for R-2812 are summarized in the table below. Impacts requiring mitigation are 1.90 acres of riparian wetlands and 296 linear feet of streams. Mitigation will be provided by the EEP.

Stabilizing the bank of a stream does not require fill in the stream bed or result in loss of stream function or quality and therefore, under Section 404 of the Clean Water Act, does not constitute Loss of Waters of the U.S. and is not subject to compensatory mitigation, however, NCDWQ requires 1:1 mitigation for all sites where impacts (permanent stream impacts plus bank stabilization) equals or exceeds 150 linear feet. Furthermore, the proposed bank stabilization activities are necessary to prevent erosion and sedimentation,

i.e. preventing bank destabilization and minimizing impacts to the environment. Stream and wetland mitigation requirements are summarized in Tables 6 and 7.

Table 6. Stream Mitigation Summary

Site No.	Mitigation Ratio	Total Impacts (ft)	Mitigation Required
3	2:1	163	326**
	1:1	42	
4	2:1	133	266**
	1:1	36	
Totals:		**374**	**592**

**Exceeds total mitigation required by NCDWQ for stream impacts exceeding 150 linear feet.

Table 7. Wetland Mitigation Summary

Site No.	Mitigation Ratio	Impact Amount (acres)	Mitigation Required
1	2:1	0.19	0.38
1	1:1	0.08	0.08
2	1:1	0.08	0.08
3	2:1	0.83	1.66
3	1:1	0.21	0.21
4	2:1	0.37	0.74
4	1:1	0.14	0.14
Totals:		**1.69**	**3.29**

CULTURAL RESOURCES

The North Carolina Department of Cultural Resources, State Historic Preservation Office (SHPO) conducted a review of the project and determined that two properties (Yadkin Road Marker #1 and Yadkin Road Marker #2) are eligible as objects for the National Register of Historic Places under Criterion A, because they illustrate the national trend, centered on the sesquicentennial celebrations of 1923 to commemorate places of historical interest (letter dated March 28, 2000). SHPO concurred that the proposed project will have no effect on either marker and on April 20, 2000 signed a concurrence form to this effect (Appendix A20 in EA).

FEMA COMPLIANCE

There are no streams with FEMA designated flood zones for the proposed project.

UTILITY IMPACTS

No jurisdictional impacts will result from the removal or relocation of utilities.

INDIRECT AND CUMULATIVE EFFECTS

HNTB North Carolina, P.C. was requested by the North Carolina Department of Transportation (NCDOT) to review available information related to the TIP R-2812 Transportation Improvement Project (TIP) in Moore County. Other than a grassed

median, which will limit the amount of left turns that can be made from NC 211, the proposed four-lane road on existing location will have uncontrolled access. The total length of the project will be approximately 8 miles. The purpose of this review was to provide information requested by the North Carolina Department of Environment and Natural Resources (DENR), Division of Water Quality (DWQ) relative to a Section 401 water quality certification application by NCDOT for the TIP R-2812 project. DWQ requested information related to any downstream water quality impacts that might occur due to indirect and cumulative effects of the project. The review consisted of a two step process:

- Estimate the land use changes that might occur as a result of constructing TIP R-2812
- Calculate any change in surface water flow in the potentially impacted watershed area that would result from induced land use changes

Key Conclusions of the Analysis Are:

1. Without construction of TIP R-2812 (Scenario 1 – "No Build"), a total of 3,480 households and 2,644 jobs are forecasted to be added to the Impact Area between 2000 and 2020, which represents a forecasted increase of 26% of households and 20% of jobs.

2. The Nicks Creek and Little River Water Supply Watersheds (both of which are WS-III) limit development to two dwelling units per acre or 24% built-upon area for the low density option. Built-upon area can increase to 50% for the high density option, which requires developers to control for the 1" storm. In addition, 10% of the watersheds can be built at a 70% impervious surface coverage without stormwater control if the remaining 90% of the watersheds are developed under the low density requirements (10/70 Provision).

The Drowning Creek Water Supply Watershed (WS-II) is slightly more stringent. Only one dwelling unit per acre is permitted or 12% built-upon area for the low density option. Built-upon area can increase to 30% for the high density option. Similar to the other watersheds, the 10/70 Provision is allowed in this watershed. All of these requirements are for the non-critical areas of the watersheds, which encompass about 95% of the entire area.

3. There are no 303(d) water bodies located within the Impact Area of TIP R-2812.

4. Two "Build" scenarios were identified: a "Probable-Case" and a "Worst-Case". The "Probable-Case" (Scenario 2) forecasted an additional 523 households and 397 jobs over the "No-Build" Scenario within the Impact Area between 2000 and 2020 as a result of TIP R-2812. The "Worst-Case" (Scenario 3) forecasted an additional 871 households and 661 jobs over the "No-Build" Scenario within the Impact Area between 2000 and 2020 as a result of TIP R-2812.

5. The hydrological analysis in the Appendix indicates that widening NC 211 from West End to the traffic circle in Pinehurst would have minimal effects on the peak discharge rates and runoff volumes within the affected watershed basins.

WILD AND SCENIC RIVERS

This project will not impact any designated 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.

ESSENTIAL FISH HABITAT

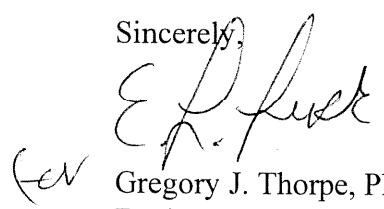
The project will not impact any essential fish habitat afforded protection under the Magnuson-Stevens Act of 1996 (16 U.S.C 1801 *et seq.*).

REGULATORY APPROVALS

Application is hereby made for a Department of the Army Section 404 Individual Permit as required for the above-described activities for the proposed TIP project R-2812. We are also hereby requesting a Section 401 Water Quality Certification from the Division of Water Quality. In compliance with Section 143-215.3D(e) of the NCAC, we will provide $570 to act as payment for processing the Section 401 permit. We are providing five copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their review and approval.

A copy of this application will be posted on the NCDOT website at http://www.ncdot.org/doh/preconstruct/pe/permits.html. Thank you for your time and assistance with this project. Please contact Erica McLamb at emclamb@ncdot.gov or (919) 431-1595 if you have any questions or need additional information.

Sincerely,



Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA

cc:
w/attachment
Mr. Brian Wrenn, NCDWQ (5 Copies)
Ms. Jennifer Derby, USEPA

w/o attachment (see website for attachments)
Dr. David Chang, P.E., Hydraulics
Mr. Mark Staley, Roadside Environmental
Mr. Greg Perfetti, P.E., Structure Design
Mr. Dewayne Sykes, P.E., Utilities
Mr. Tim Johnson, P.E., Division 8 Engineer
Mr. Art King, Division 8 Environmental Officer
Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design

Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Mr. Elmo Vance, PDEA
Mr. Scott McLendon, USACE
Ms. Beth Harmon, EEP
Mr. Phillip Ayscue, NCDOT External Audit Branch
Mr. Drew Joyner, PE, Human Environment
Mr. Clarence W. Coleman, P.E., FHWA

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT
(33 CFR 325)

OMB APPROVAL NO. 0710-0003
EXPIRES: 31 August 2012

Public reporting burden for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This Information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME:
First - Middle - Last –
Company – NCDOT
E-mail Address –

8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
First - Middle - Last –
Company –
E-mail Address –

6. APPLICANT'S ADDRESS.
Address - 1598 Mail Service Center
City – Raleigh State – NC Zip – 27699-1598 Country – USA

9. AGENT'S ADDRESS
Address -
City – State – Zip – Country –

7. APPLICANT'S PHONE NOs. W/AREA CODE.
a. Residence b. Business c. Fax
919-431-1595

10. AGENT'S PHONE NOs. W/AREA CODE
a. Residence b. Business c. Fax

STATEMENT OF AUTHORIZATION

11. I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

_____
APPLICANT'S SIGNATURE DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)
R-2812 (Widening of NC 211 from north of NC 73 in West End to east of SR 1208 (traffic circle) in Pinehurst, NC.

13. NAME OF WATERBODY, IF KNOWN (if applicable)
Joe's Fork Creek
UT to Joe's Fork Creek, and Broad Branch Creek

14. PROJECT STREET ADDRESS (if applicable)
Address
City - State – Zip -

15. LOCATION OF PROJECT
Latitude: °N 35.2075
Longitude: °W 79.4928

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)
State Tax Parcel ID Municipality Moore County
Section – Township – Range –

17. DIRECTIONS TO THE SITE

18. Nature of Activity (Description of project, include all features)

Widening of NC 211 to a four laned divided facility with 23 foot grassed median.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The purpose of this project is to improve the level of safety along NC 211 and to improve the traffic carrying capacity of the roadway in order to meet the needs of existing and anticipated development in the project area.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Construction of roadway and extension and or replacement of pipes and culverts.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
Please see attached permit drawings.		

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres 1.90 acres of impacts to riparian wetlands (1.90 acre of permanent impacts and <0.01 acre of temporary impacts)

Or

Liner Feet 388 linear feet of jurisdictional streams (374 linear feet of permanent impacts, 14 linear feet of temporary impacts)

23. Description of Avoidance, Minimization, and Compensation (see instructions)

Please see cover letter

24. Is Any Portion of the Work Already Complete? Yes ☐ No ☑ IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

Address – Please see attached list in the permit drawing package.

City – State – Zip –

26. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

E. L. Luck 2-8-11

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

February 8, 2011

Gregory J. Thorpe, Ph.D.
North Carolina Department of Transportation
Project Development and Environmental Analysis
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Dr. Thorpe:

This letter is in response to your letter of February 1, 2011 which provided the U.S. Fish and Wildlife Service (Service) with the biological determination of the North Carolina Department of Transportation that the widening of NC 211 from West End to Pinehurst in Moore County (TIP No. R-2812) may affect, but is not likely to adversely affect the federally endangered red-cockaded woodpecker (RCW, *Picoides borealis*). These comments are provided in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

The Service previously provided Section 7 concurrence in letters dated February 25, 2004; August 25, 2004; and October 8, 2009. Since our last concurrence, the project alignment has changed slightly. This alignment shift has reduced the amount of pine basal area and pine acreage removed from the MOOR 35 RCW foraging partition. The alignment shift did not affect any other active foraging partition. However, also since the October 8, 2009 concurrence, other non-NCDOT projects have occurred and removed additional pine acreage and basal area within both MOOR 35 and SOPI 50, thus reducing the overall pre-project foraging habitat within the partitions. Regardless, both RCW clusters will still meet the Standard for Managed Stability guidelines post-project when both suitable and potentially suitable habitat are counted. No active RCW cavity trees will be removed.

Based on the information provided and other available information, the Service concurs with your determination that the project may affect, but is not likely to adversely affect the RCW. We believe that the requirements of Section 7(a)(2) of the ESA have been satisfied. We remind you that obligations under Section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered in this review; (2) this action is subsequently modified in a manner that was not considered in this review; or (3) a new species is listed or critical habitat determined that may be affected by this identified action.

The Service appreciates the opportunity to review this project. If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520 (Ext. 32).

Sincerely,

Gary Jordan

for Pete Benjamin
Field Supervisor

cc: Ronnie Smith, USACE, Wilmington, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Militscher, USEPA, Raleigh, NC
John Sullivan, FHWA, Raleigh, NC
David Harris, NCDOT, Raleigh, NC

Ecosystem Enhancement PROGRAM

February 8, 2011

Mr. Gregory J. Thorpe, Ph.D.
Manager, Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

R-2812, NC 211 from NC 73 in West End to the Traffic Circle in Pinehurst, Moore County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the stream and riparian wetland mitigation for the subject project. Based on the information supplied by you on January 27, 2011, the impacts are located in CU 03030004 of the Cape Fear River Basin in the Southern Piedmont (SP) Eco-Region, and are as follows:

Cape Fear 03030004 SP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1 (at 3:1)	Zone 2 (at 1.5:1)
Impacts (feet/acres)	0	0	296	1.90	0	0	0	0
Mitigation Units (at 2:1)	0	0	592	2.78	0	0	0	0
Mitigation Units (at 1:1)	0	0	0	0.51	0	0	0	0
Mitigation Units (TOTAL)	**0**	**0**	**592**	**3.29**	**0**	**0**	**0**	**0**

EEP commits to implementing sufficient stream and riparian wetland mitigation credits to offset the impacts associated with this project in accordance with the N.C. Department of Environment and Natural Resources' Ecosystem Enhancement Program 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 EEP.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,

William D. Gilmore, P.E.
EEP Director

cc: Mr. Ronnie Smith, USACE – Wilmington Regulatory Field Office
Mr. Brian Wrenn, Division of Water Quality, Wetlands/401 Unit
File: R-2812

Subject: Minutes from the Interagency 4C Hydraulic Design/Permit Drawings Review Meeting on February 25, 2009 for R-2812 in Moore County

Team Members:

Richard Spencer-USACE	(absent)
Gary Jordan-USFWS	(absent)
Travis Wilson-NCWRC	(absent)
Polly Lespinasse-NCDWQ	(absent)
Kathy Matthews-EPA	(present)
Felix Davila-FHWA	(present)
David Harris-REU	(absent)
Jimmy Goodnight-Roadway	(absent)
John Frye- Structures	(present)
Elmo Vance-PDEA	(absent)
Rachelle Beauregard- NEU	(present)
John Olinger-Division 8	(present)

Participants:
Marshall Clawson, NCDOT Hydraulics
Bill Zerman, NCDOT Hydraulics
Mark Staley, NCDOT REU
Erin McLamb, NCDOT NEU
Marissa Rodman, NCDOT NEU
Brian Wrenn-NCDWQ
Jonathan Henderson, HDR
James Rice, HDR
Wyatt Yelverton, HDR
Vickie Miller, HDR

General Introduction was iniatated by Marshall Clawson. Introductions were made by all in attendance. Jonathan Henderson started the review by leading into each permit impact site (4 total). Only plan sheets with permit impact sites were reviewed.

Site 1 (Sheet 21):

Culvert extension and roadway widening to the north and south sides. The pond will be temporarily drained for construction and TDE provided. The TS will be removed from the drawings. Flow of the stream will be maintained during construction.

Riprap at the culvert outlet is not needed due to the 0.5% slope and water will be backed up in the culvert.

NEU clarified that there is no stream on the inlet side; this is a wetland per NEU conversations with Richard Spencer.

Concerns about the extra costs of larger pipe, pipe length, more excavation, soil material, etc. were discussed due to burying the pipe 2 feet on the outlet side of this site especially if the pipe is actually going to be backed up from the pond. This depth of pipe was to tie the new pipe to the existing pond bottom elevation.

Site 2 (Sheet 23):

The pond will be breached and drained for construction. Wetlands are adjacent to the pond.

NEU will have Richard Spencer review the additional wetlands at this site for additional impacts. As a follow up to the meeting, the additional mapped wetlands are below the embankment and are not impacted by the project. No additional impact is calculated at this site.

NEU stated that they are looking into the potential for mitigation at this site.

Site 3 (Sheets 23/24):

Proposed culvert extension to the north side and there will be no impacts on south side. There are a number of utilities at this location and reason for roadway widening and culvert extension to one side.

Due to a hatching angle issue, it appears that the channel impacts may not have been calculated. This will be verified.

If there is rip rap on the channel banks for stabilization, this should be noted at the bottom of the Impact Summary Sheets.

Site 4 (Sheet 28):

The existing 48" CSP will be replaced with a new 60" pipe that will be bored and jacked under the existing roadway. A junction box was added to assist in decreasing the velocity of flow. The drainage at this site will be maintained through the existing pipe during the bore and jack.

Flip the bore and jack detail and label bore and jack on the plan sheets.

If there is rip rap on the channel banks for stabilization, this should be noted at the bottom of the Impact Summary Sheets.

General comments ended.
Meeting Adjourned

Subject: Minutes from the Interagency 4B Hydraulic Design Review Meeting on March 12, 2008 for R-2812 in Moore County

Team Members:

Richard Spencer-USACE	(not present)
Gary Jordan-USFWS	(present)
Travis Wilson-NCWRC	(not present)
Polly Lespinasse-NCDWQ	(present)
Chris Militscher-EPA	(not present)
Kathy Matthews-EPA	(present)
Felix Davila-FHWA	present)
Elmo Vance-PDEA	(present)

Participants:
Marshall Clawson, NCDOT Hydraulics
John Olinger, NCDOT DIV 8
Tim Goins, NCDOT Roadway Design
Dean Noland, NCDOT Roadway Design
James Rice, HDR
Wyatt Yelverton, HDR
Vickie Miller, HDR
Jonathan Henderson, HDR
David Harris-REU
Jimmy Goodnight-Roadway
Roy Girolami-Structures
Rachelle Beauregard-NEU

General Introduction was iniatated by Marshall Clawson. Introductions were made by all in attendance. Jonathan Henderson started the review by describing the project limits and typical sections. Only plan sheets with permit impact sites were reviewed.

Sheet 4-16:

No wetlands or jurisdictional streams.

Sheet 17:

Polly Lespinasse asked about streams at stations 186+00 and 195+00. Rachelle responded that they were not jurisdictional.

Sheet 18-20:

No wetlands or jurisdictional streams.

Sheet 21:

Wetland and pond at station 245+00. Culvert extension and roadway widening to the North side, into pond. Pond will be drained for construction and TDE provided. Existing 6'X6' RCBC was extended south with a 72" CSP. John Olinger stated that pipe extension is rusted and in poor condition and should be replaced.

2:1 slopes with guardrail.

Pipe systems outlet onto rip-rap pads away from wetland limits.

Rachelle Beauregard stated that there is no stream inside the wetland as shown on the plans, only a wetland at this site.

Sheet 22:

No wetlands or jurisdictional streams.

Sheet 23:

Wetland and pond at station 270+00. Wetland on south side will not be impacted by the project. Pond will be drained for construction and TDE provided. No proposed drainage outlet at this site.

2:1 slopes with guardrail.

Potentially more wetlands around pond to be drained. NEU will investigate for impacts related to draining pond.

Question was asked about wetland connectivity. Wetlands are not connected across existing roadway. Pond could potentially be spring fed.

Sheet 24:

Wetland and jurisdictional stream at station 279+00. Proposed culvert extension and roadway widening to north side. Existing 10'X6' RCBC extended south with bottomless 117"X79" CM arch. John Olinger stated that this arch was in good condition and does not need to be replaced, no impacts on south side.

2:1 slopes with guardrail.

Pipe systems outlet onto rip-rap pads away from wetland limits.

Sheet 25-27:

No wetlands or jurisdictional streams.

Sheet 28:

Wetland and jurisdictional stream at station 340+50. Existing 48" CSP in poor condition. New pipe will be bored and jacked to line up with the stream at the construction limits.

Existing pond upstream from crossing.

John Olinger stated that the shoulder is failing above the existing CSP pipe and the pipe is in poor condition.

2:1 slopes with guardrail.

Sheet 29-30:

No wetlands or jurisdictional streams.

Sheet 31:

Rachelle Beauregard questioned jurisdiction of stream at station 384+50. HDR provided pictures of area which did not appear jurisdictional. Roadway improvements do not impact 24" crossing on –Y16- so area will not be rechecked.

Sheet 32-33:

No wetlands or jurisdictional streams.

General comments ended.
Meeting Adjourned

STORMWATER MANAGEMENT PLAN

Project: 34504.1.1
TIP No. R-2812
Moore County

5/1/2009

James Rice, P.E. (HDR Engineering),
Marshal Clawson, P.E. (NCDOT Hydraulics Unit)

ROADWAY DESCRIPTION

R-2812 consists of widening NC 211 from NC 73 in West End to the traffic circle In Pinehurst. Two different typical-sections are included for this widening project. The first section, from the beginning of the project continuing approximately 2.5 miles consists of an open shoulder section with a raised median. The second section continues approximately 5 miles from this point to the end of the project, it is a curb and gutter section with the same raised median. The project impacts three jurisdictional streams, Unnamed Tributary to Joe's Fork, Joe's Fork and Board Branch. Table 1 lists these streams and the proposed crossing structures. The project drainage system consists of cross pipes, grated inlets with associated pipe systems, tail ditches, and lateral storm water ditches.

Table 1. List of Stream Crossings in Project R-2812

Site #	Station	Stream Name	Drainage area	Proposed Structure
1	-L- 245+05	UT to Joe's Fork	0.5 Sq Mi	Extend U/S w/ 6x7 and D/S w/ 6x8 RCBC buried 1' and 2' respectively
2	-L- 278+75	Joe's Fork	1.2 Sq Mi	Replace Exist w/ 10x7 RCBC buried 1'
3	-L- 340+60	Board Branch	368 Ac	60" RCP

ENVIRONMENTAL DESCRIPTION

The project is located within the Cape Fear River Basin. The primary receiving waters are Joe's Fork to Nicks Creek. The NCDWQ surface water classification is WS-III.

There are four wetland sites that will be impacted by the proposed project. These wetland sites are located around the previously mentioned streams plus one adjacent to a pond at Station 270+00. Wetland impacts have been reduced to a minimum by keeping roadway fill slopes at 2:1 at these locations.

BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES

The primary goal of Best Management Practices (BMPs) is to prevent degradation of the states surface waters by the location, construction and operation of the highway system. The BMPs are activities, practices and procedures taken to prevent or reduce stormwater pollution. The BMPs and measures that will be used on this project to reduce stormwater impacts are preformed scour holes and the submergence of culverts below stream beds, grass swales and other methods to diffuse flow.

PREFORMED SCOUR HOLES

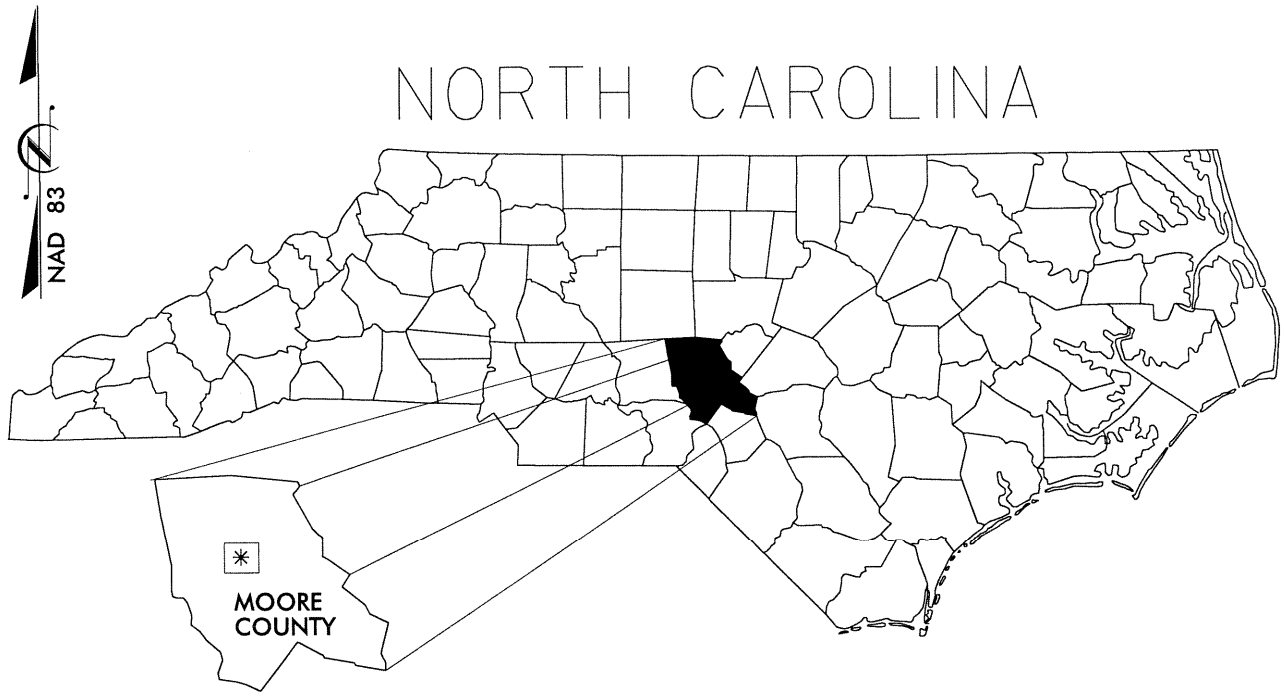
Preformed scour holes have been utilized at various locations in this project to diffuse velocities from storm systems that drain into the wetlands or the jurisdictional streams. Where topography or discharge would not allow the use of preformed scour holes the velocities where checked for the two year storm to ensure non-erosive velocities leaving the pipe outlet protection. These outlets were also located as far away from jurisdictional features as possible.

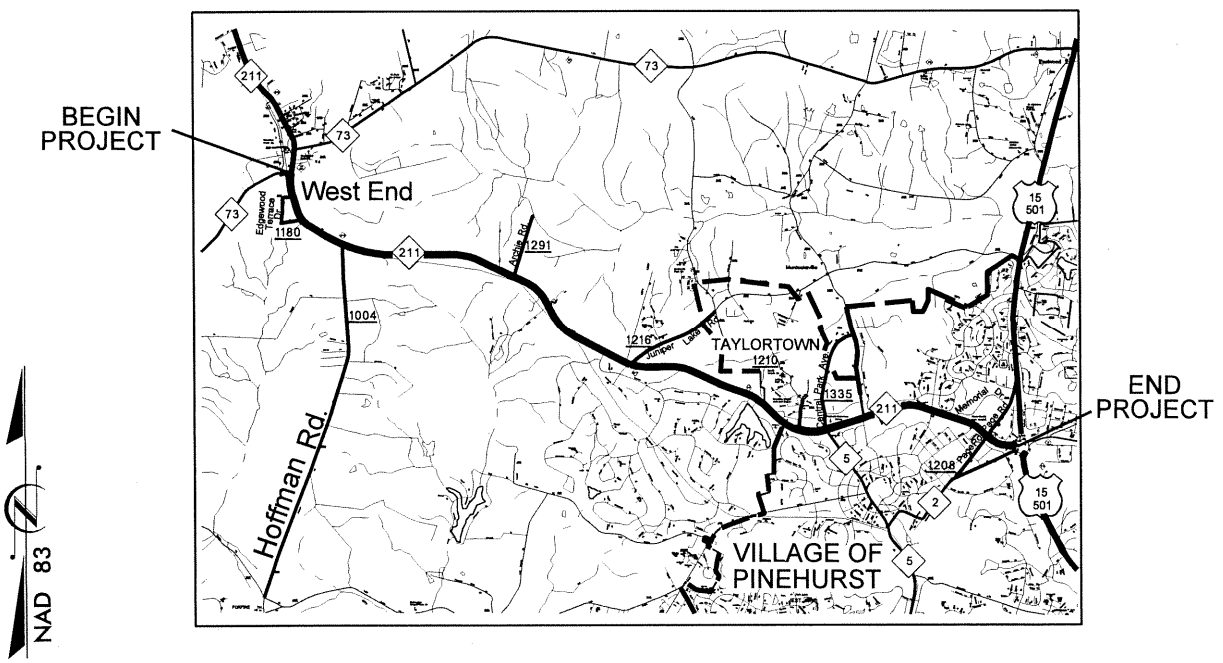
CULVERT SUBMERGENCE

The culverts shown in Table 1, along with all cross pipes in the proposed project will be buried 1-foot below the stream bed or natural ground at the crossings to maintain the normal stream flow and channel characteristics. The culvert outlet at the Unnamed Tributary to Joe's Fork discharges directly into a pond that will be maintained after construction. The Tributary to Joe's Fork outlet will be submerged approximately four feet from the normal water surface elevation.

GRASS SWALES

All ditches were designed to be stable and control velocities. At areas near jurisdictional features velocities where checked to ensure they were non-erosive and the outlet would not negatively impact the feature. Some additional measures taken to provide non-erosive velocities included flattening ditch slopes and providing a wider base at the outlet of the ditch. An example of these efforts can be seen at Site 3, where a ditch outlets outside the wetlands upstream of the culvert that conveys Joe's Fork.





VICINITY MAPS

NORTH CAROLINA

DIVISION OF HIGHWAYS

MOORE COUNTY

PROJECT: 34504.1.1 (R-2812)

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES	SITE NO.
1	ESTELLE BRADSHAW	1106 EDGEWOOD DR CHARLESTON, WV 25302	1
2	RICHARD HAMOR	302 GOLDEN GROVE CR PIEDMONT, SC 29673	1
3	BAPTIST CHILDRENS HOME	P.O. BOX 338 THOMASVILLE, NC 27361	2
4	PHILIP BROWN	1700 CARTHAGE ST SANFORD, NC 27330	3
5	NANCY J. SMITH TIMKO	RR2 NORTH MAIN ANTRIM, NH 03440	4
6	BEN KAY	202 COUNTRY CLUB DR MELBOURN, FL 32940	4
7	MICHAEL T ROBINSON	P.O BOX 985 PINEHURST, NC 28370	4
8	VILLAGE OF PINEHURST	PO BOX 5589 PINEHURST, NC 28374	4

NORTH CAROLINA

DIVISION OF HIGHWAYS

MOORE COUNTY

PROJECT: 34504.1.1 (R-2812)

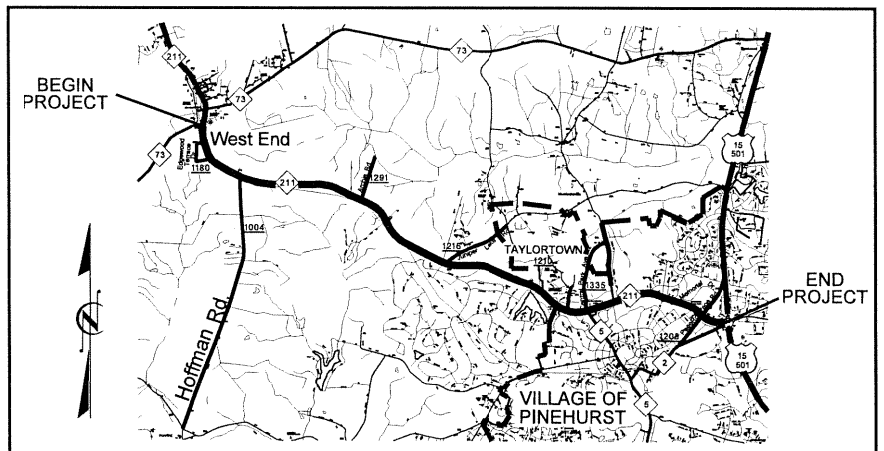
SHEET 2 OF 31 09/14/10

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- Sta. 245+00	Extend Exist 72"CMP	0.19			0.08						
1	-L- Sta. 245+00 LT	Fill in Pond						0.12				
1	-L- Sta. 245+00 LT	Drain Pond							2.83			
1	-L- Sta. 245+00 RT	Construction		<0.01								
2	-L- Sta. 270+00 LT	Pond and Wetland	0.04		0.02	0.02		0.01				
3	-L- Sta. 280+00	10x7 RCBC	0.70		0.13	0.21		0.03		163		
3	-L- Sta. 280+00 LT	Bank Stabilization								42		
4	-L- Sta. 340+50	60" RCP	0.37			0.14		0.02	<0.01	133	14	
4	-L- Sta. 340+50 LT	Bank Stabilization								36		
TOTALS:			1.30	0.00	0.15	0.45	0.00	0.18	2.83	374	14	0

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT 34504.1.1 (R-2812)
MOORE COUNTY
NC 211 FROM NC 73 IN WEST END
TO THE TRAFFIC CIRCLE IN PINEHURST

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

Permit Drawing
Sheet 4 of 31

MOORE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2812	1	

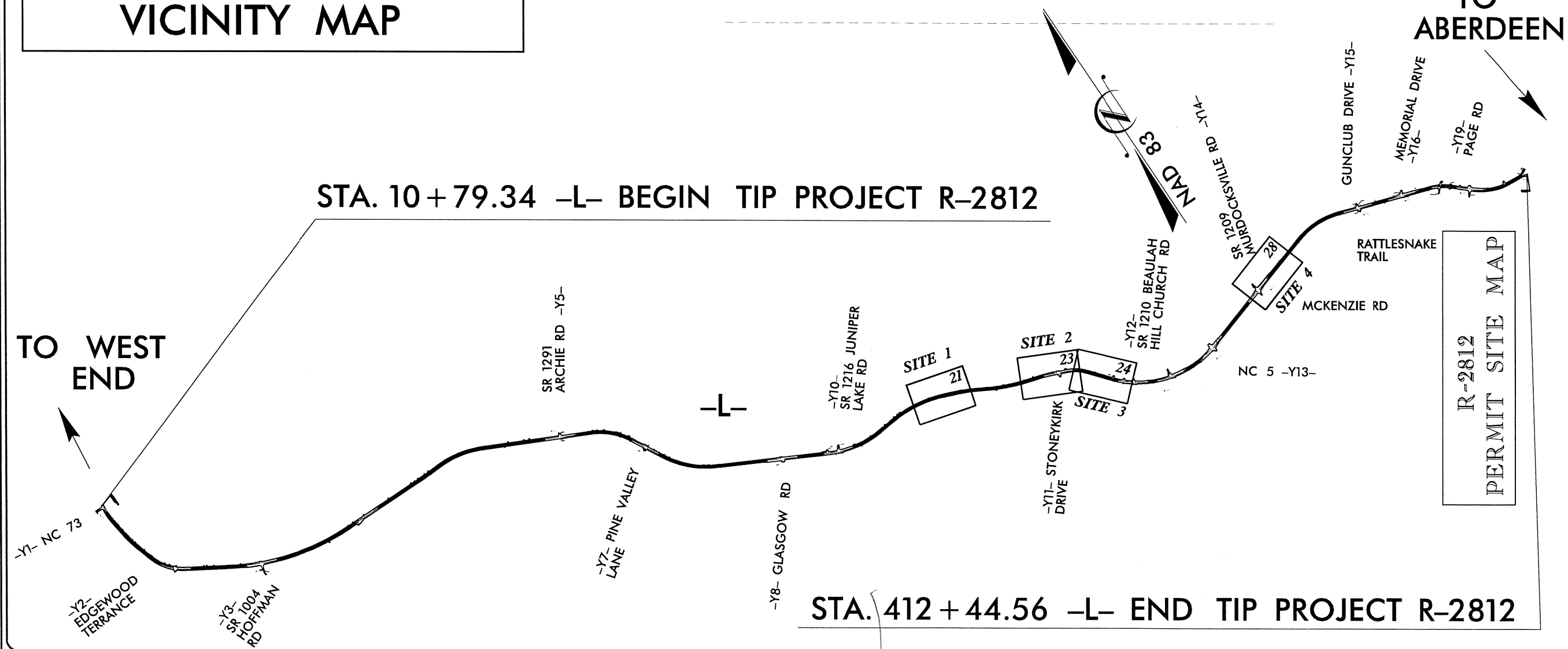
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34504.1.1	STP-211 (5)	P.E.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

LOCATION: NC 211 FROM NC 73 IN WEST END TO THE TRAFFIC CIRCLE IN PINEHURST

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CURB & GUTTER SIGNALS, AND SIGNING



STA. 10+79.34 -L- BEGIN TIP PROJECT R-2812

STA. 412+44.56 -L- END TIP PROJECT R-2812

TIP PROJECT: R-2812

34504.1.1

WBS:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2004 = 15300
ADT 2025 = 20500
DHV = 9 %
D = 52 %
T = 5 % *
V = 50 MPH

* TTST 2 DUAL 3

PROJECT LENGTH

LENGTH ROADWAY F.A. PROJECT STP-211(5) = 7.61 MI.
TOTAL LENGTH STATE PROJECT 34504.1.1 = 7.61 MI.

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 20, 2008

LETTING DATE: JUNE 15, 2010

JIMMY GOODNIGHT, PE
PROJECT ENGINEER

TIM GOINS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

9/13/2010
r-2812_hyd_permits_tsh.dgn
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PROJECT REFERENCE NO.	SHEET NO.
R-2812	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 5 of 31

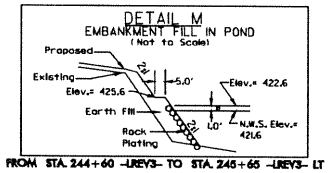
REVISIONS

01/09/09 REVISED THE LIMITS OF THE POND AND THE LIMITS OF THE TDE ON PARCEL 98

05/14/08 ADDED PUE ON PARCEL NOS.96 & 98.REVISED TOE ON PARCEL NO.98.

8/17/99

DETAIL M
EMBANKMENT FILL IN POND
(Not to Scale)



FROM STA. 244+60 -LREV3- TO STA. 245+65 -LREV3- LT

-L-

PI Sta 243+84.89
Θs = 1°54' 35.5"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

PI Sta 248+52.07
Θs = 1°54' 35.5"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

-L-

PI Sta 236+79.95
Δ = 24°46' 23.8" (RT)
D = 1°54' 35.5"
L = 1,297.13'
T = 658.86'
R = 3,000.00'

PI Sta 249+84.62
Δ = 2°30' 59.2" (RT)
D = 1°54' 35.5"
L = 131.76'
T = 65.89'
R = 3,000.00'

NAD 83

240

245

DRAIN POND

EMBANKMENT FILL IN POND
SEE DETAIL 'M'

SITE 1

① ESTELLE BRADSHAW

② JENNIE MCKENZIE ESTATE

LEGEND

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

MATCH LINE SEE SHEET 20 -L- STA 235+85

MATCH LINE SEE SHEET 22 -L- STA 249+85

LATERAL 'A' DITCH SEE DETAIL D

TIE TO EXISTING DITCH

CLASS 'I' RIP RAP EST. 2 TONS 7 SY FILTER FABRIC

CLASS 'A' RIP RAP EST.2 TONS 6 SY FILTER FABRIC

CLASS 'I' RIP RAP EST. 2 TONS 6 SY FILTER FABRIC

CS Sta. 243+18.22

END J.S.

BEGIN J.S.

ST Sta. 245+18.22

TS Sta. 247+18.73

SC Sta. 249+18.73

EXISTING DITCH SPILLS OUT

S 67° 32' 45.6" E

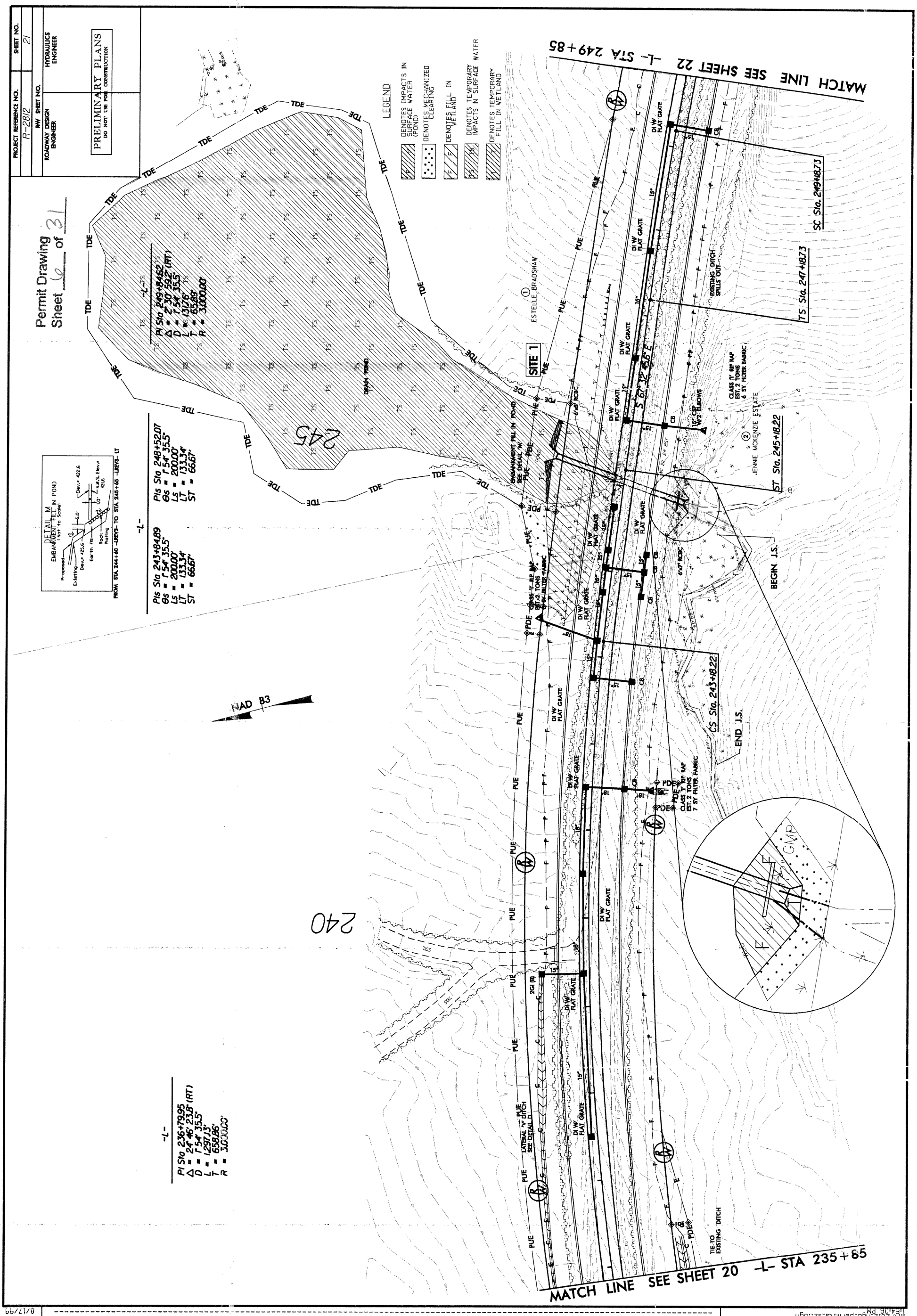
6'x7' RCBC

6'x8' RCBC

2GI (R)

GMP

1/3/2012 10:16:26 PM hyd_permits_s21.dgn



REVISIONS

01/09/09 REVISED THE LIMITS OF THE POND AND THE LIMITS OF THE TDE ON PARCEL 98

05/14/09 ADDED PUE ON PARCEL NOS.96,& 98.REVISED TCE ON PARCEL NO.98.

8/17/99

1/3/2011 \r2812_hyd-permits_s21.dgn 1:54:36 PM

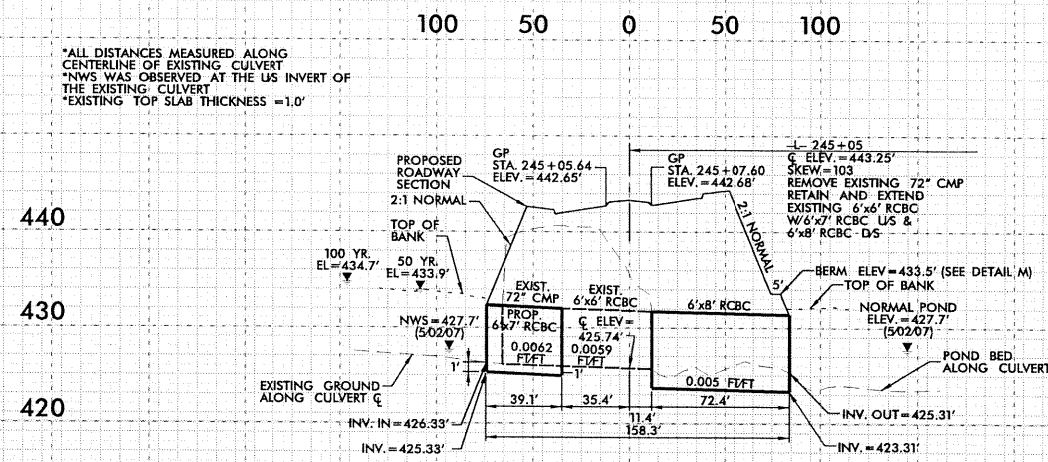
PROJECT REFERENCE NO.	SHEET NO.
R-2233AA	CSR-21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

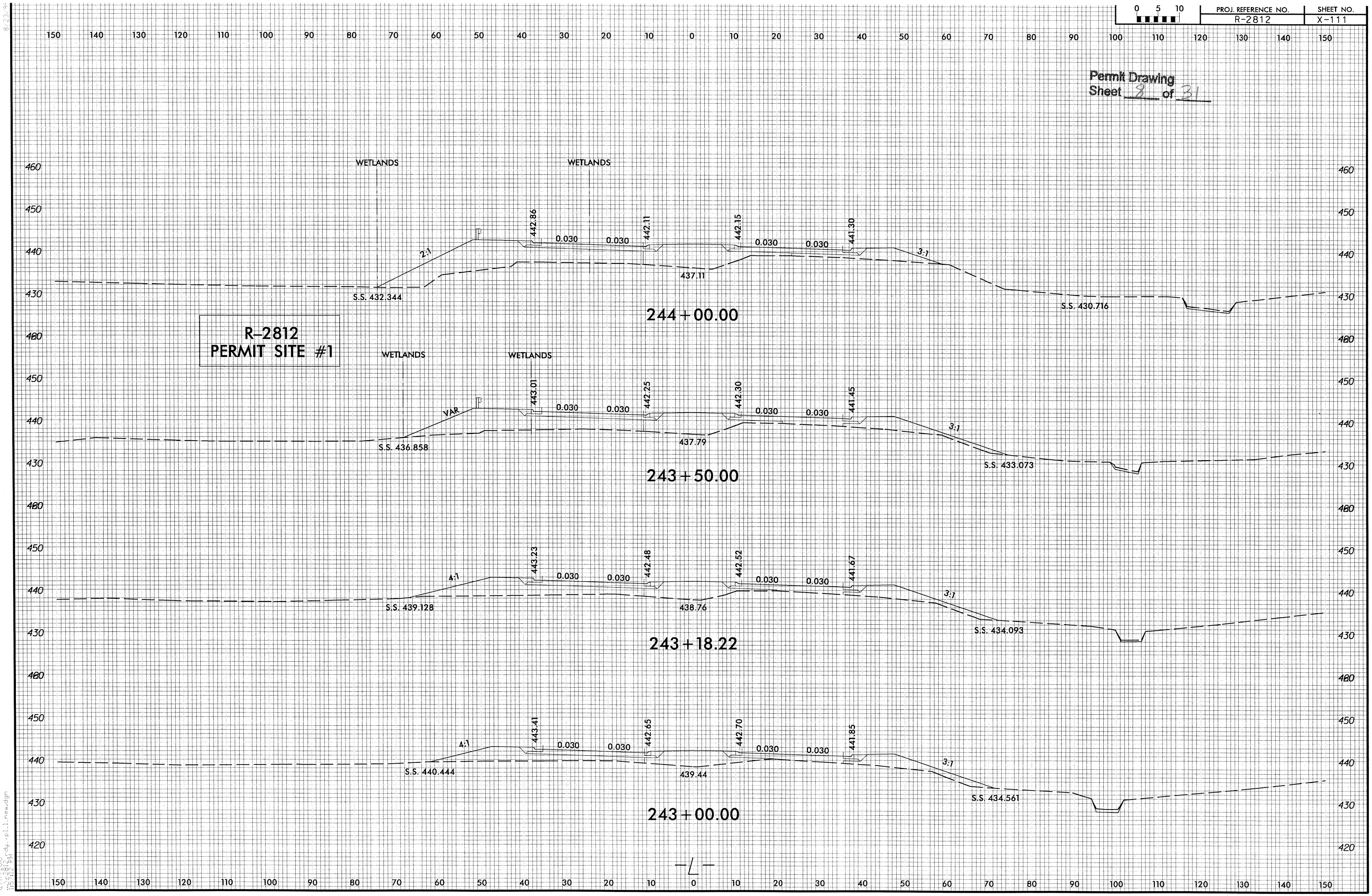
Permit Drawing
Sheet 1 of 31

SITE 1 R-2812

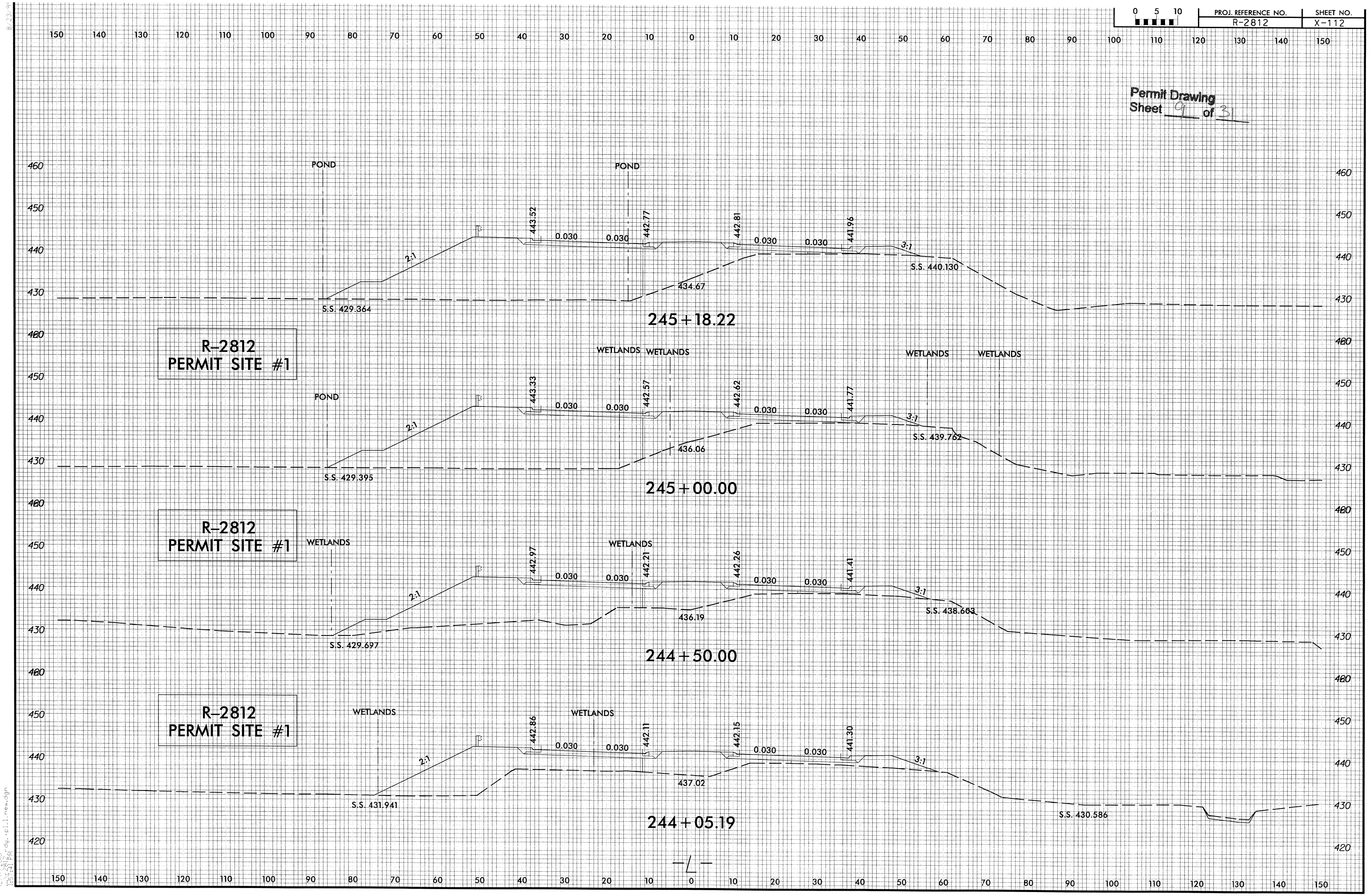


PROFILE ALONG ℄ OF CULVERT

5/28/99
9/13/2010
r:\zbridge\r-2812\design_010808\Permits\Revised Permits\r2812_hyd_per_psh21_csr.dgn



PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-111
Permit Drawing
Sheet 8 of 31
R-2812
PERMIT SITE #1
WETLANDS
WETLANDS
2:1
442.86
0.030
0.030
442.11
442.15
0.030
0.030
441.30
3:1
437.11
S.S. 432.344
S.S. 430.716
244+00.00
WETLANDS
WETLANDS
VAR
443.01
0.030
0.030
442.25
442.30
0.030
0.030
441.45
3:1
437.79
S.S. 436.858
S.S. 433.073
243+50.00
4:1
443.23
0.030
0.030
442.48
442.52
0.030
0.030
441.67
3:1
438.76
S.S. 439.128
S.S. 434.093
243+18.22
4:1
443.41
0.030
0.030
442.65
442.70
0.030
0.030
441.85
3:1
439.44
S.S. 440.444
S.S. 434.561
243+00.00
-L-



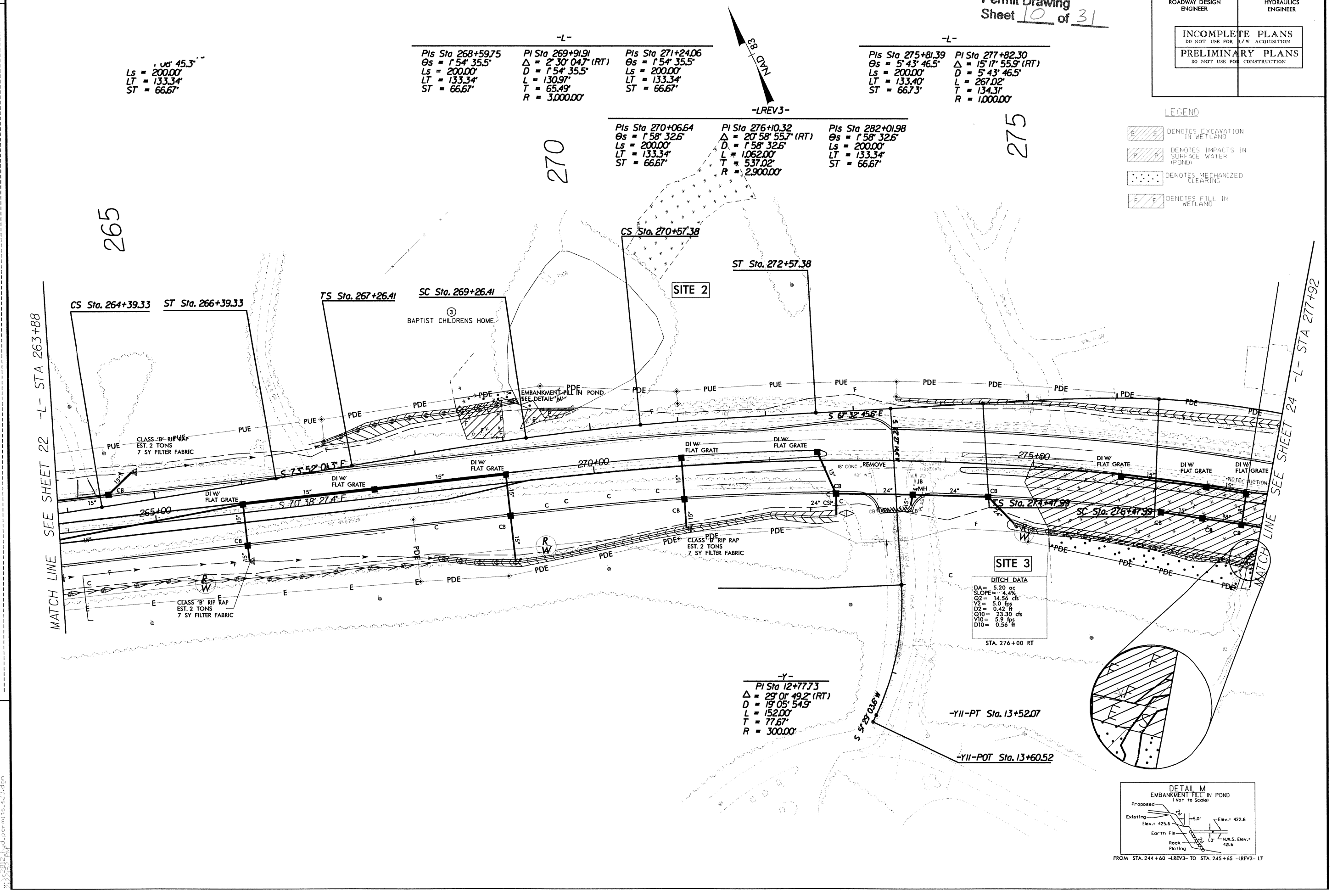
PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-112
Permit Drawing
Sheet 9 of 31
POND
POND
443.52
0.030
0.030
442.77
442.81
0.030
0.030
441.96
2:1
3:1
S.S. 440.130
434.67
S.S. 429.364
245+18.22
R-2812
PERMIT SITE #1
WETLANDS
WETLANDS
WETLANDS
WETLANDS
POND
443.33
0.030
0.030
442.57
442.62
0.030
0.030
441.77
2:1
3:1
S.S. 439.762
436.06
S.S. 429.395
245+00.00
R-2812
PERMIT SITE #1
WETLANDS
WETLANDS
442.97
0.030
0.030
442.21
442.26
0.030
0.030
441.41
2:1
3:1
S.S. 438.603
436.19
S.S. 429.697
244+50.00
R-2812
PERMIT SITE #1
WETLANDS
WETLANDS
442.86
0.030
0.030
442.11
442.15
0.030
0.030
441.30
2:1
3:1
437.02
S.S. 431.941
S.S. 430.586
244+05.19

PROJECT REFERENCE NO.	SHEET NO.
R-2812	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 10 of 31



REVISIONS

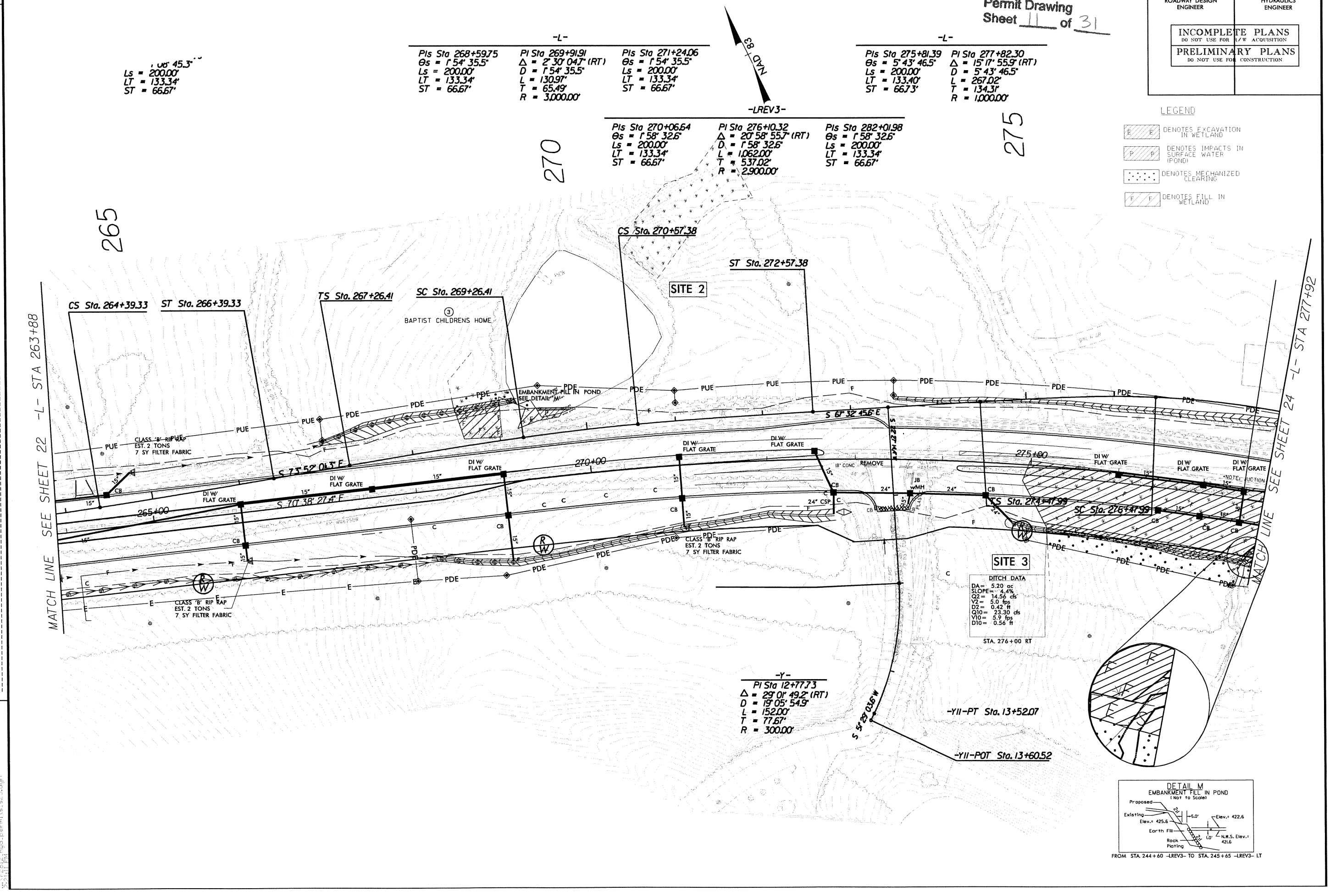
8/17/99

12/17/2010
R-2812_hyd_permits_s23.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2812	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

Permit Drawing
Sheet 11 of 31



REVISIONS

12/17/2010

PROJECT REFERENCE NO.	SHEET NO.
R-2812	44
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 12 of 31

-LREV3-

PI = 262+50.00
EL = 463.66'
VC = 117'
K = 152
(-LREV3- = 262+51.67)

PI = 264+00.00
EL = 457.04'
VC = 100'
K = 242
(-LREV3- = 264+02.35)

PI = 267+00.00
EL = 442.56'
VC = 150'
K = 100
(-LREV3- = 267+03.46)

PI = 271+50.00
EL = 427.60'
VC = 210'
K = 466

465.48

(-)3.6393%
(-)4.4133%
(-)4.4133%
(-)4.8267%
(-)4.8267%
(-)3.3244%
(-)3.3244%
(-)3.7750%

SDG @ 2.53%
SDG @ 4.10%
SDG @ 3.56%
SDG @ 5.28%
2' BASE DITCH @ 6.24%
2' BASE DITCH @ 9.31%
2' BASE DITCH @ 7.53%
2' BASE DITCH @ 5.78%
2' BASE DITCH @ 1.70%
2' BASE DITCH @ 0.60%
2' BASE DITCH @ 0.50%
2' BASE DITCH @ 1.73%
LAT 'V' DITCH @ 6.00%
LAT 'V' DITCH @ 3.00%
4' BASE DITCH @ 6.00%

STA.263+00.00 LT ELEV. 458.12
STA.265+00.00 LT ELEV. 449.91
STA.265+50.00 RT ELEV. 448.72
STA.267+00.00 LT ELEV. 439.35
STA.268+00.00 RT ELEV. 433.13
STA.268+50.00 LT ELEV. 425.39
STA.269+00.00 LT ELEV. 422.50
STA.269+00.00 RT ELEV. 425.60
STA.270+00.00 RT ELEV. 423.90
STA.271+00.00 RT ELEV. 423.30
STA.272+00.00 RT ELEV. 422.80
STA.272+75.00 RT ELEV. 431.50
STA.273+50.00 LT ELEV. 437.40
STA.274+00.00 LT ELEV. 410.80
STA.274+75.00 RT ELEV. 410.00
STA.275+00.00 RT ELEV. 408.50
STA.276+00.00 RT ELEV. 402.50

413.15

SITE 2

STA.268+80

-LREV3-

PI = 284+90.00
EL = 436.78'
VC = 400'
K = 205
(-LREV3- = 284+53.72)

PI = 288+25.00
EL = 446.70'
VC = 200'
K = 389
(-LREV3- = 287+89.73)

450.97

(+)4.9159%
(+)4.9159%
(+)2.9612%
(+)2.9612%
(+)2.4468%
(-)3.7750%

SDG @ 5.56%
SDG @ 4.96%
SDG @ 4.35%
SDG @ 2.84%
SDG @ 1.74%
4' BASE DITCH @ 7.49%
4' BASE DITCH @ 10.60%
4' BASE DITCH @ 9.70%
4' BASE DITCH @ 9.00%
4' BASE DITCH @ 1.98%
4' BASE DITCH @ 1.53%
2' BASE DITCH @ 1.15%
2' BASE DITCH @ 3.12%
2' BASE DITCH @ 5.79%
2' BASE DITCH @ 3.56%
2' BASE DITCH @ 3.50%
LAT 'V' DITCH @ 3.00%
2' BASE DITCH @ 3.74%
2' BASE DITCH @ 2.20%
LAT 'V' DITCH @ 1.76%
LAT 'V' DITCH @ 6.00%

STA.276+00.00 RT ELEV. 402.50
STA.276+50.00 LT ELEV. 405.10
STA.276+50.00 RT ELEV. 400.63
STA.277+00.00 LT ELEV. 401.80
STA.277+50.00 RT ELEV. 398.87
STA.277+87.00 RT ELEV. 398.30
STA.278+00.00 LT ELEV. 401.80
STA.278+55.00 LT ELEV. 396.80
STA.278+75.00 LT ELEV. 397.03
STA.279+50.00 RT ELEV. 400.80
STA.280+50.00 LT ELEV. 404.00
STA.280+00.00 LT ELEV. 399.50
STA.281+00.00 LT ELEV. 409.30
STA.281+25.00 RT ELEV. 413.90
STA.282+00.00 LT ELEV. 418.00
STA.282+00.00 RT ELEV. 414.76
STA.284+00.00 LT ELEV. 429.11
STA.284+00.00 RT ELEV. 421.00
STA.284+50.00 LT ELEV. 431.59
STA.286+50.00 LT ELEV. 440.28
STA.287+50.00 LT ELEV. 443.12
STA.287+80.00 RT ELEV. 439.00
STA.288+30.00 RT ELEV. 440.75

413.15

SITE 3

STA.278+75

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 455	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 405.2	FT
BASE DISCHARGE	= 530	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 406.5	FT
OVERTOPPING DISCHARGE	= 1225	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 413.0	FT

PI = 278+02.30
EL = 402.98'
VC = 850'
K = 98

12/7/2010
11:28:52 AM
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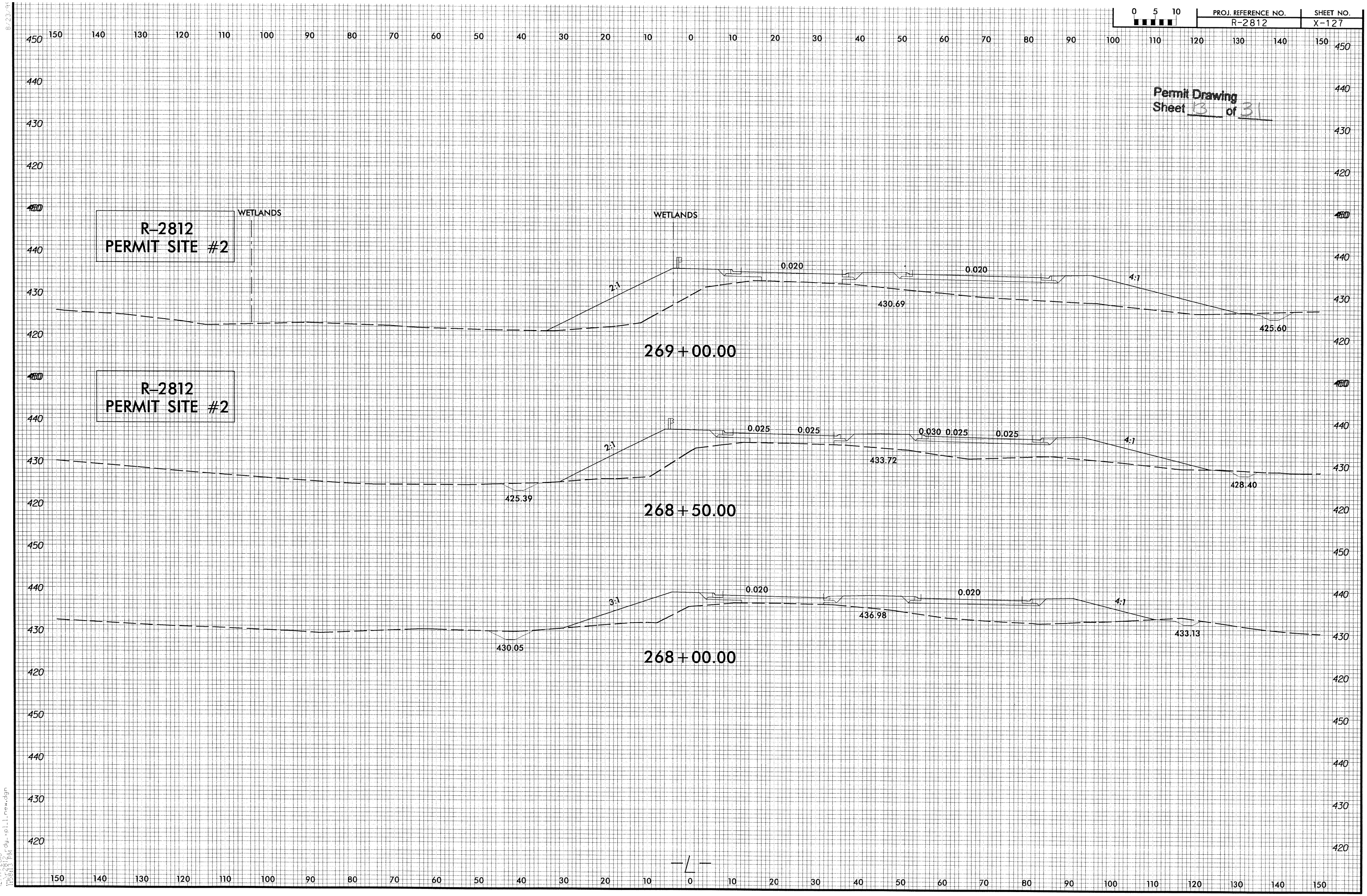
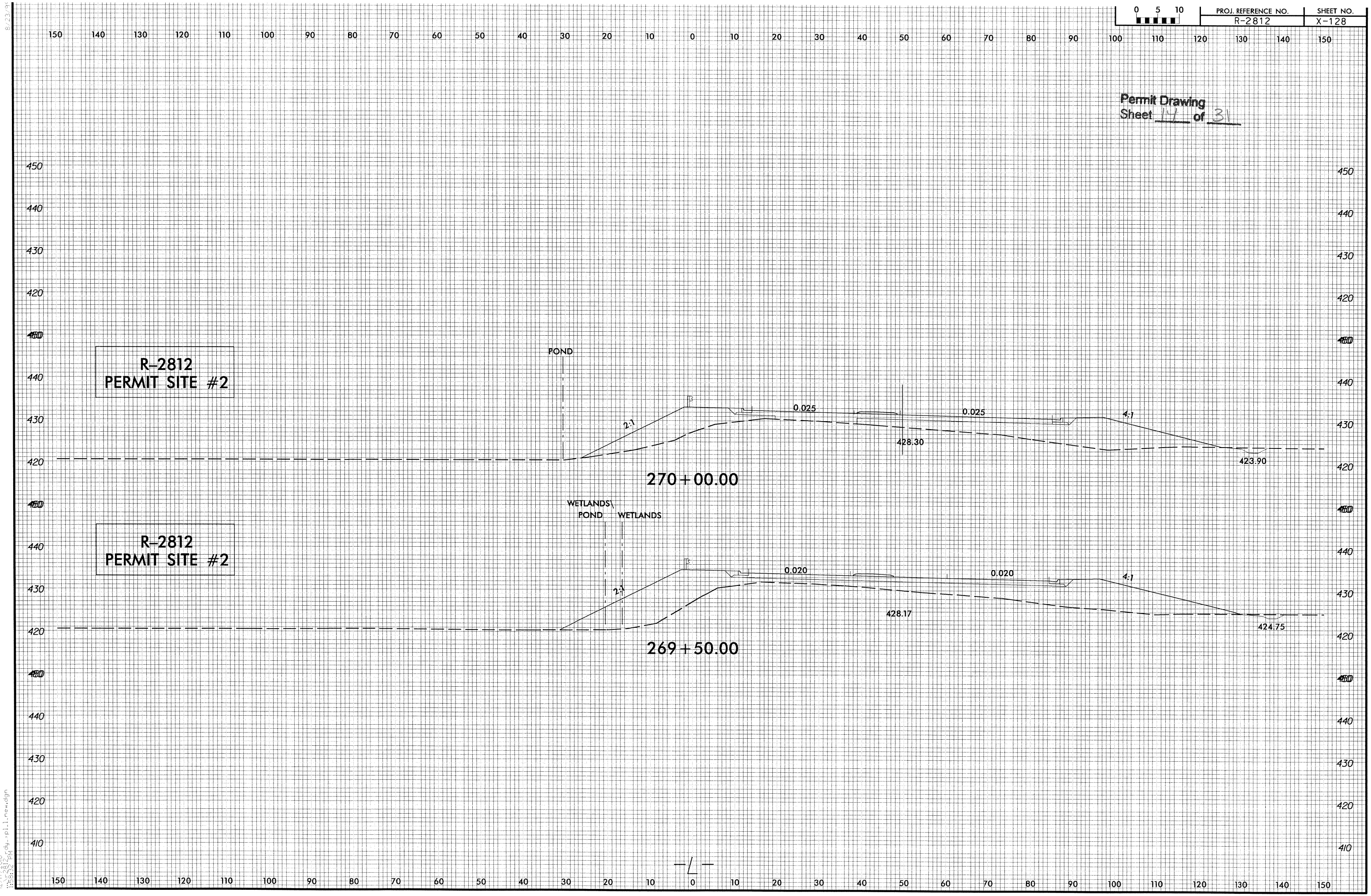


PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-127
Permit Drawing
Sheet 13 of 31
R-2812
PERMIT SITE #2
WETLANDS
WETLANDS
2:1
0.020
0.020
4:1
430.69
425.60
269+00.00
R-2812
PERMIT SITE #2
2:1
0.025
0.025
0.030
0.025
0.025
4:1
433.72
425.39
428.40
268+50.00
3:1
0.020
0.020
4:1
436.98
430.05
433.13
268+00.00
-L-



PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-128
Permit Drawing
Sheet 14 of 31
R-2812
PERMIT SITE #2
POND
2:1
0.025
0.025
4:1
428.30
423.90
270+00.00
WETLANDS\
POND
WETLANDS
R-2812
PERMIT SITE #2
2:1
0.020
0.020
4:1
428.17
424.75
269+50.00
-L-

PROJECT REFERENCE NO.	SHEET NO.
R-2812	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 15 of 31

REVISIONS

8/17/99

-L-
Pls Sta 279+81.74
Θs = 5° 43' 46.5"
Ls = 200.00'
LT = 133.40'
ST = 66.73'

-L-
Pls Sta 287+13.10
Θs = 2° 17' 30.6"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

NAD 83

280

285

290

LEGEND

- DENOTES FILL IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES EXCAVATION IN WETLAND

SITE 3

④ PHILLIP BROWN

DITCH DATA
DA= 5.14 ac
SLOPE= 8.6%
Q2= 7.2 cfs
V2= 5.4 fps
D2= 0.29 ft
Q10= 11.51 cfs
V10= 6.8 fps
D10= 0.36 ft
STA. 280+50 LT

TS Sta. 285+79.76

SC Sta. 287+79.76

-L- STA 277+92

-L- STA 290+92

SEE SHEET 23

SEE SHEET 25

MATCH LINE

MATCH LINE

+70-LREV3-
130.00'

+90-LREV3-
123.00'

+55-LREV3-
110.00'

+92-LREV3-
110.00'

EST 50 TONS
CLASS 'I' RIP RAP
EST 75 SY EF

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

EXIST 10x6 RCBC

10' x 7' RCBC

30.0° SKEW

HEAD WALL

CONC. APRON

CONC. HW

CMP

CONC. PIPE

S 40° 47' 16.7" E

S 45° 42' 26.5" E

-LREV3

280+00

285+00

290+00

DI W/ FLAT GRATE

15" CSP

18" CSP

CB

PDE

CS Sta. 279+15.01

ST Sta. 281+50.01

DITCH DATA
DA= 3.25 ac
SLOPE= 7.49%
Q2= 9.10 cfs
V2= 5.6 cfs
D2= 0.35 ft
Q10= 14.56 cfs
V10= 6.5 fps
D10= 0.45 ft
STA 279+50 RT

-LREV3- CS Sta. 281+35.30

-LREV3- ST Sta. 283+35.30

NOT A STREAM
PER PD&EA

-LREV3- TS Sta. 287+73.23

-LREV3- SC Sta. 289+73.23

15" PLASTIC

8" CONC

12/17/2000
11:43:37 PM
road-permits-s24.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2812	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 16 of 31

REVISIONS
8.17.99

-L-
Pls Sta 279+81.74
Θs = 5° 43' 46.5"
Ls = 200.00'
LT = 133.40'
ST = 66.73'

-L-
Pls Sta 287+13.10
Θs = 2° 17' 30.6"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

NAD 83

280

285

290

LEGEND
- DENOTES FILL IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES EXCAVATION IN WETLAND

SITE 3

④ PHILLIP BROWN

DITCH DATA
DA= 5.14 ac
SLOPE= 8.6%
Q2= 7.2 cfs
V2= 5.4 fps
D2= 0.29' ft
Q10= 11.51 cfs
V10= 6.8 fps
D10= 0.36' ft
STA. 280+50 LT

DITCH DATA
DA= 3.25 ac
SLOPE= 7.49%
Q2= 9.10 cfs
V2= 5.6 cfs
D2= 0.35' ft
Q10= 14.56 cfs
V10= 6.5 fps
D10= 0.45' ft
STA 279+50 RT

TS Sta. 285+79.76

SC Sta. 287+79.76

CS Sta. 279+15.0

ST Sta. 281+50.0

-LREV3- CS Sta. 281+35.30

-LREV3- ST Sta. 283+35.30

-LREV3- TS Sta. 287+73.23

-LREV3- SC Sta. 289+73.23

NOT A STREAM PER PD&EA

-L- STA 277+92 SEE SHEET 23

-L- STA 290+92 SEE SHEET 25

MATCH LINE

MATCH LINE

+70-LREV3- 130.00'

+90-LREV3- 123.00'

+55-LREV3- 110.00'

+92-LREV3- 110.00'

EST. 50 TONS CLASS 'I' RIP RAP
EST. 75 SY GF

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

EXIST 10x6 RCBC

10'x 7' RCBC

30.0' CONC HEAD WALL

30.0' CONC CULV.

60.0' CMP PIPE

60.0' LONG HW

DI W/ FLAT GRATE

CB

18" CSP

15" CSP

15" PLASTIC

6' CONC

PDE

S 40° 47' 16.7" E

S 45° 42' 26.5" E

-L-

-LREV3-

285+00

290+00 LREV

280+00

12/17/2000
K:\Projects\hyd-permits_s24.dgn

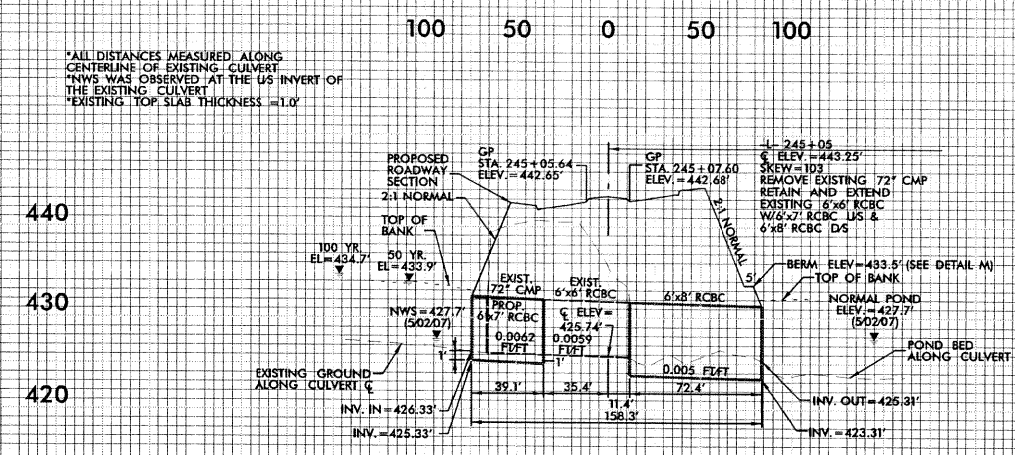
PROJECT REFERENCE NO.	SHEET NO.
R-2812	CSR-21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 17 of 31

SITE 1 R-2812



PROFILE ALONG ℄ OF CULVERT

5/28/99

1/18/2011
r_r2812_hyd_per_psh21_csr.dgn
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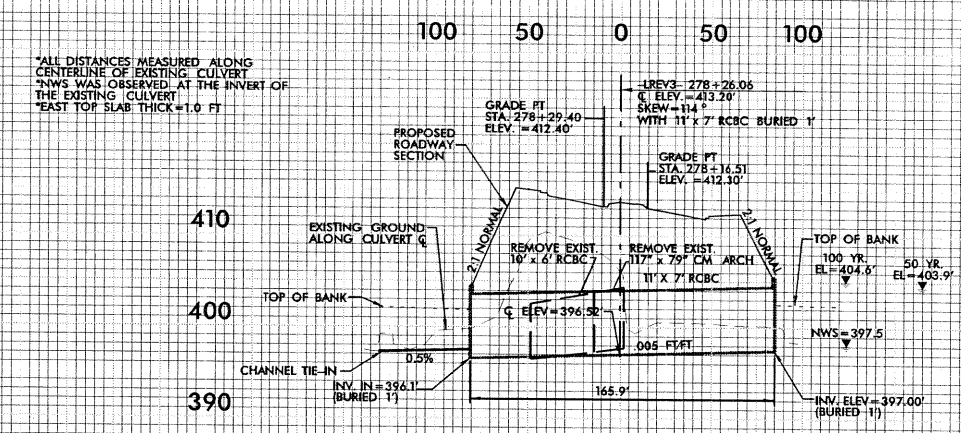
PROJECT REFERENCE NO.	SHEET NO.
R-2812	CSR-24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 18 of 31

SITE 3 R-2812



PROFILE ALONG ℄ OF CULVERT

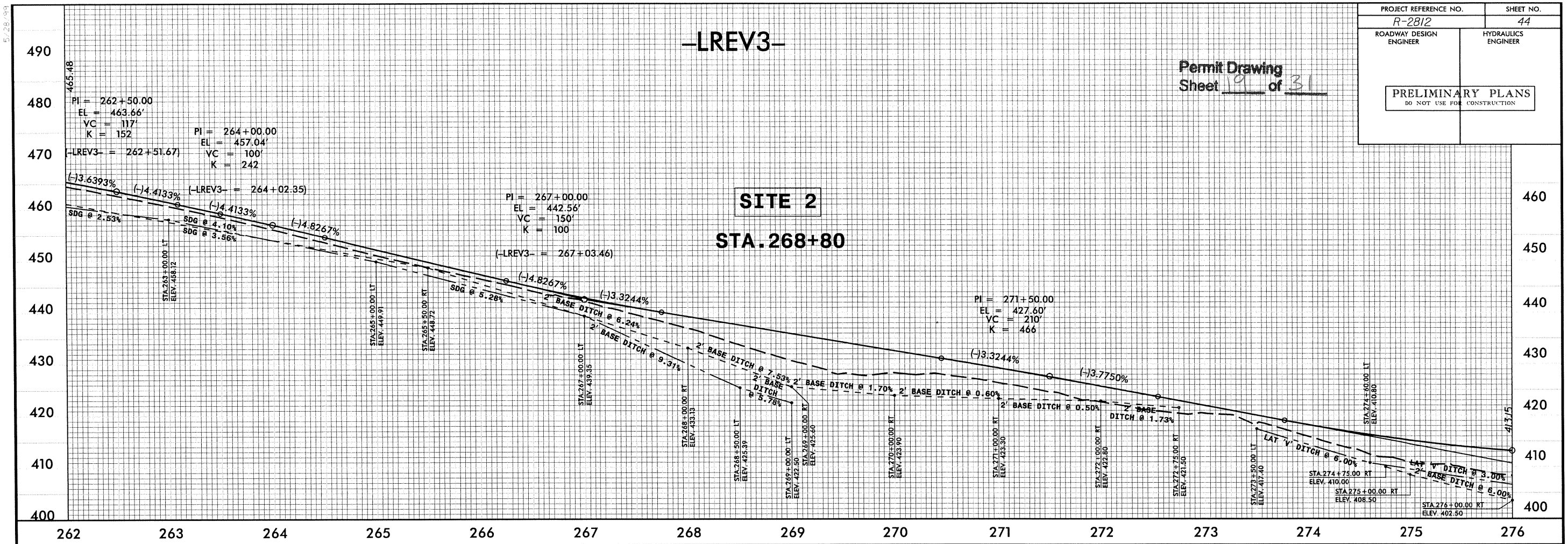
5/28/99

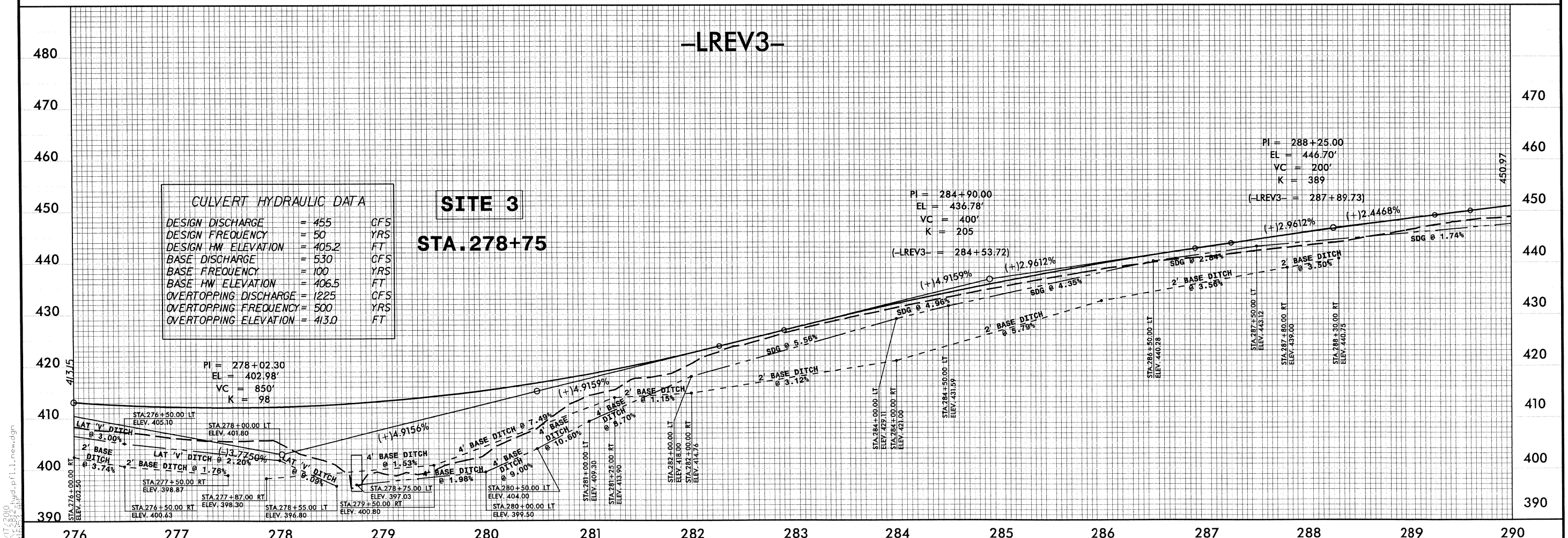
1/18/2011
r2812_hyd_per_psh24_csr.dgn
1:57:11 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2812	44
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

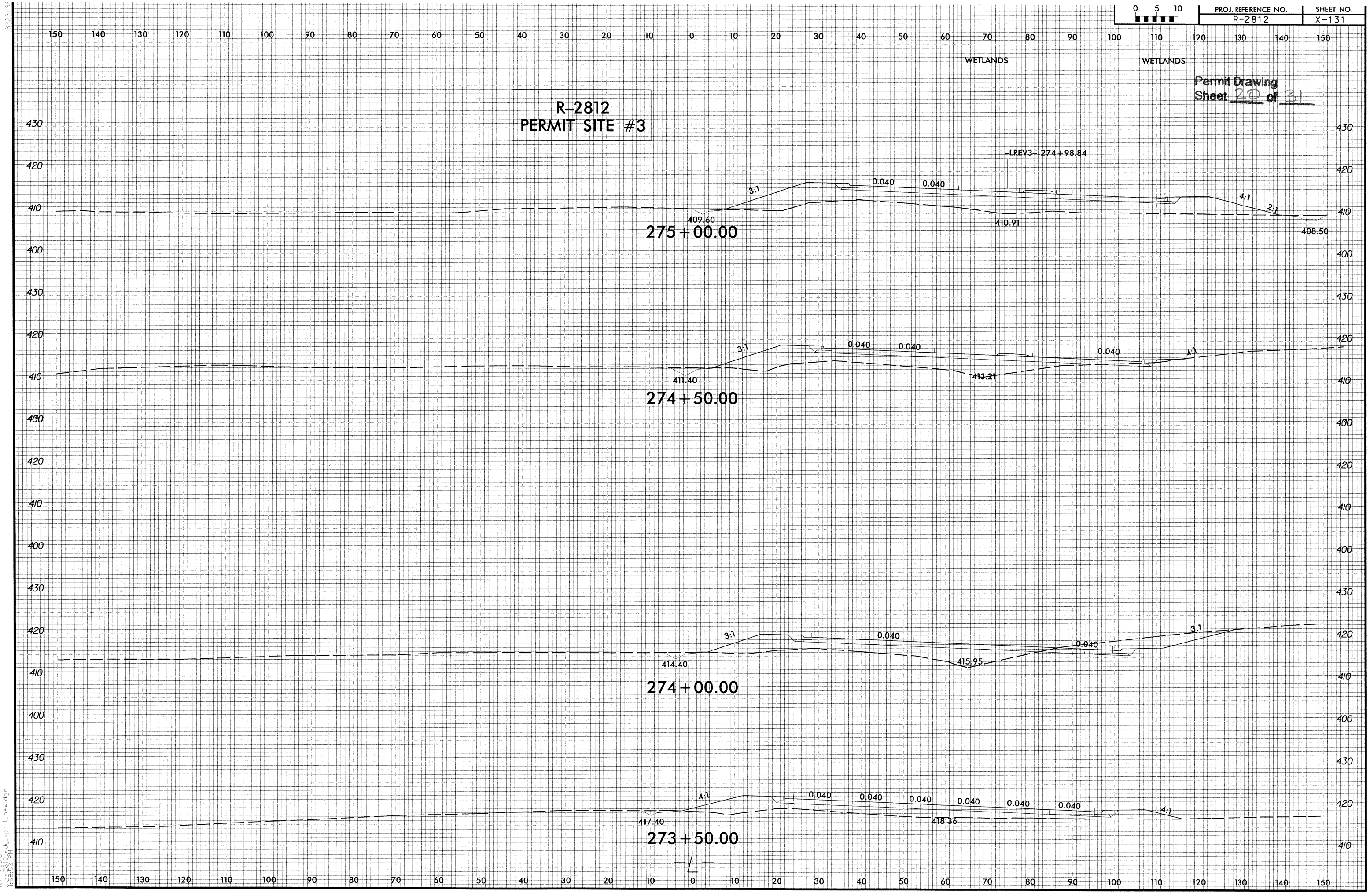
Permit Drawing
Sheet 19 of 31



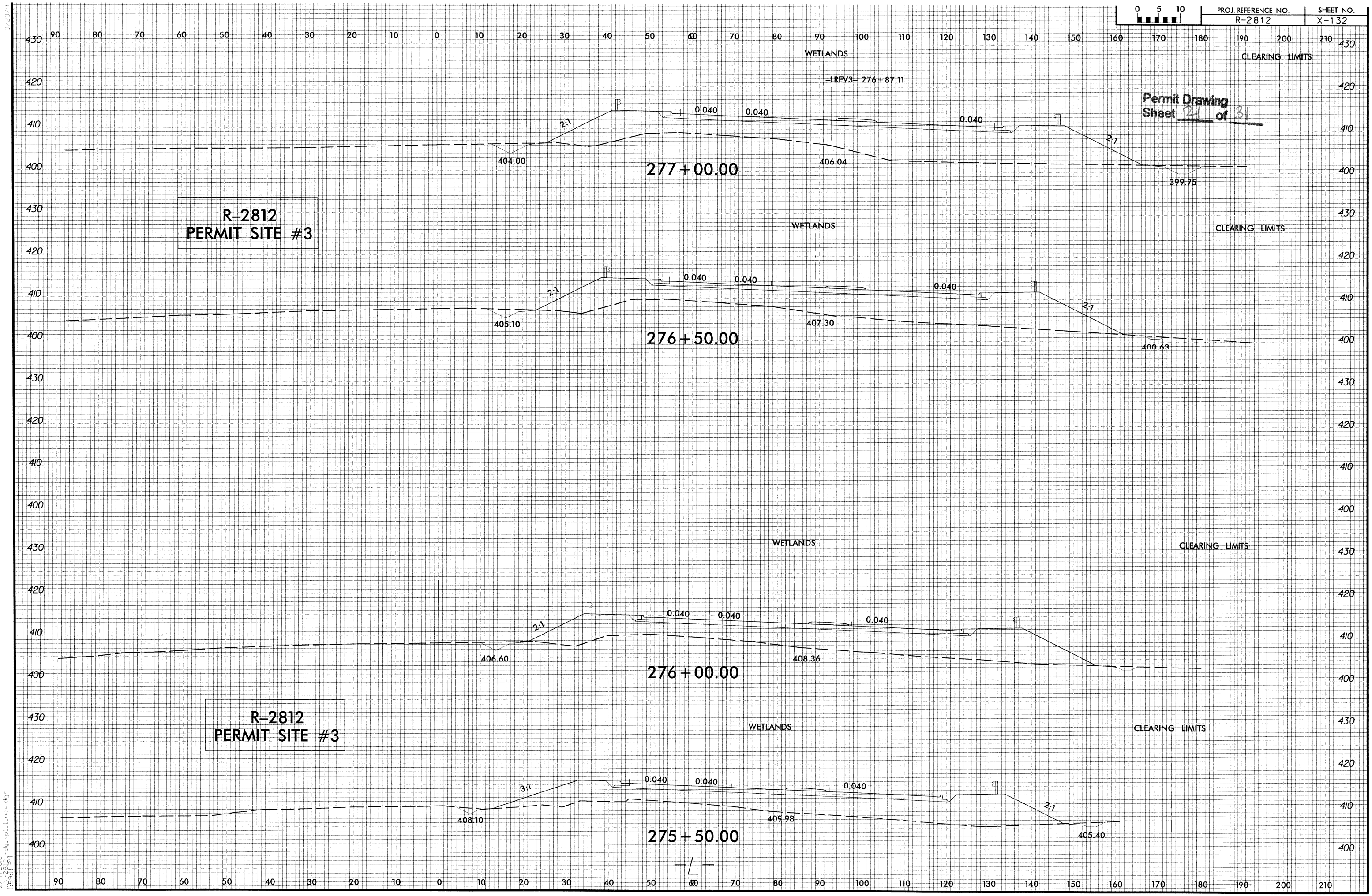


CULVERT HYDRAULIC DATA

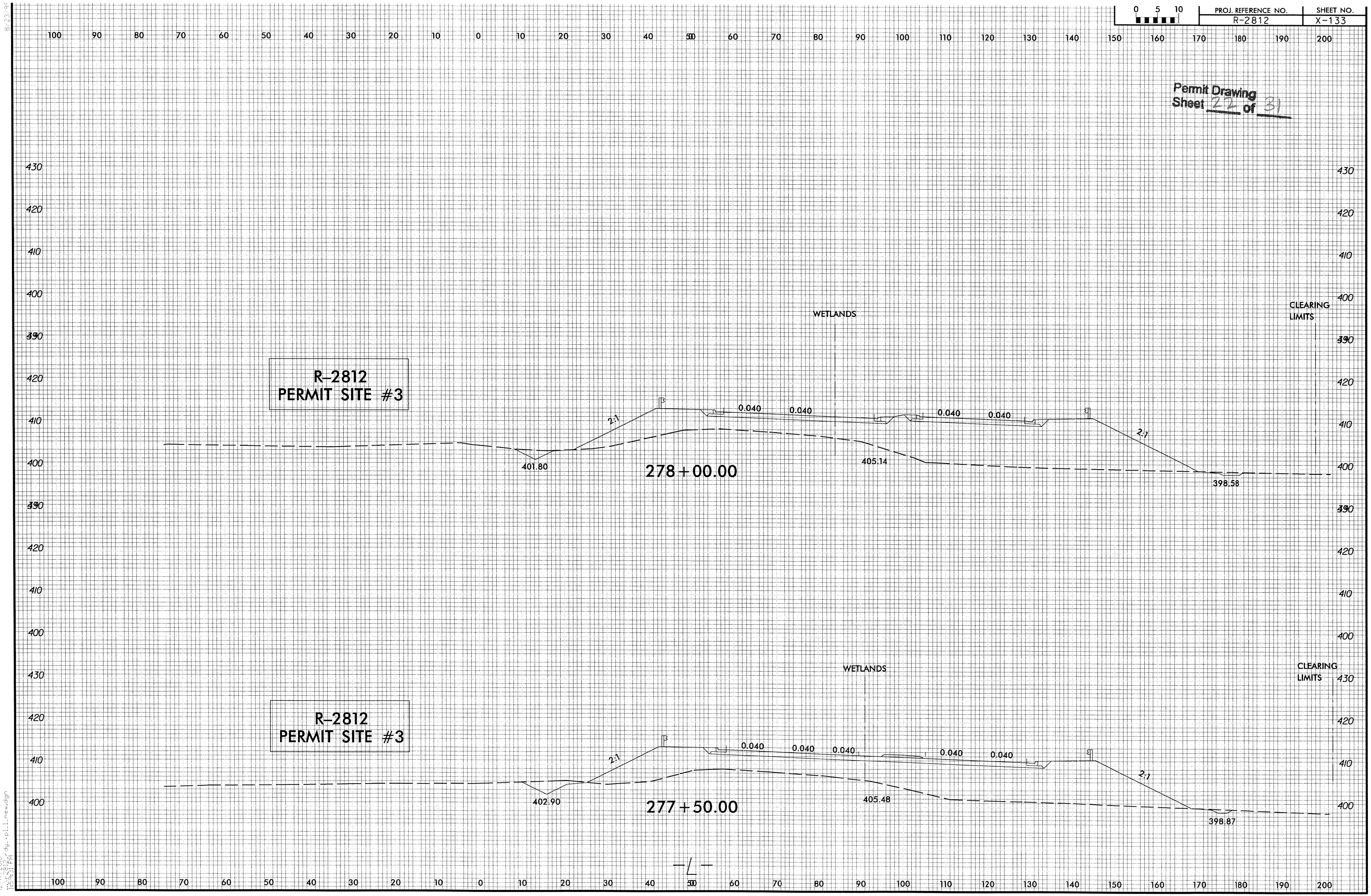
DESIGN DISCHARGE	= 455	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 405.2	FT
BASE DISCHARGE	= 530	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 406.5	FT
OVERTOPPING DISCHARGE	= 1225	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 413.0	FT



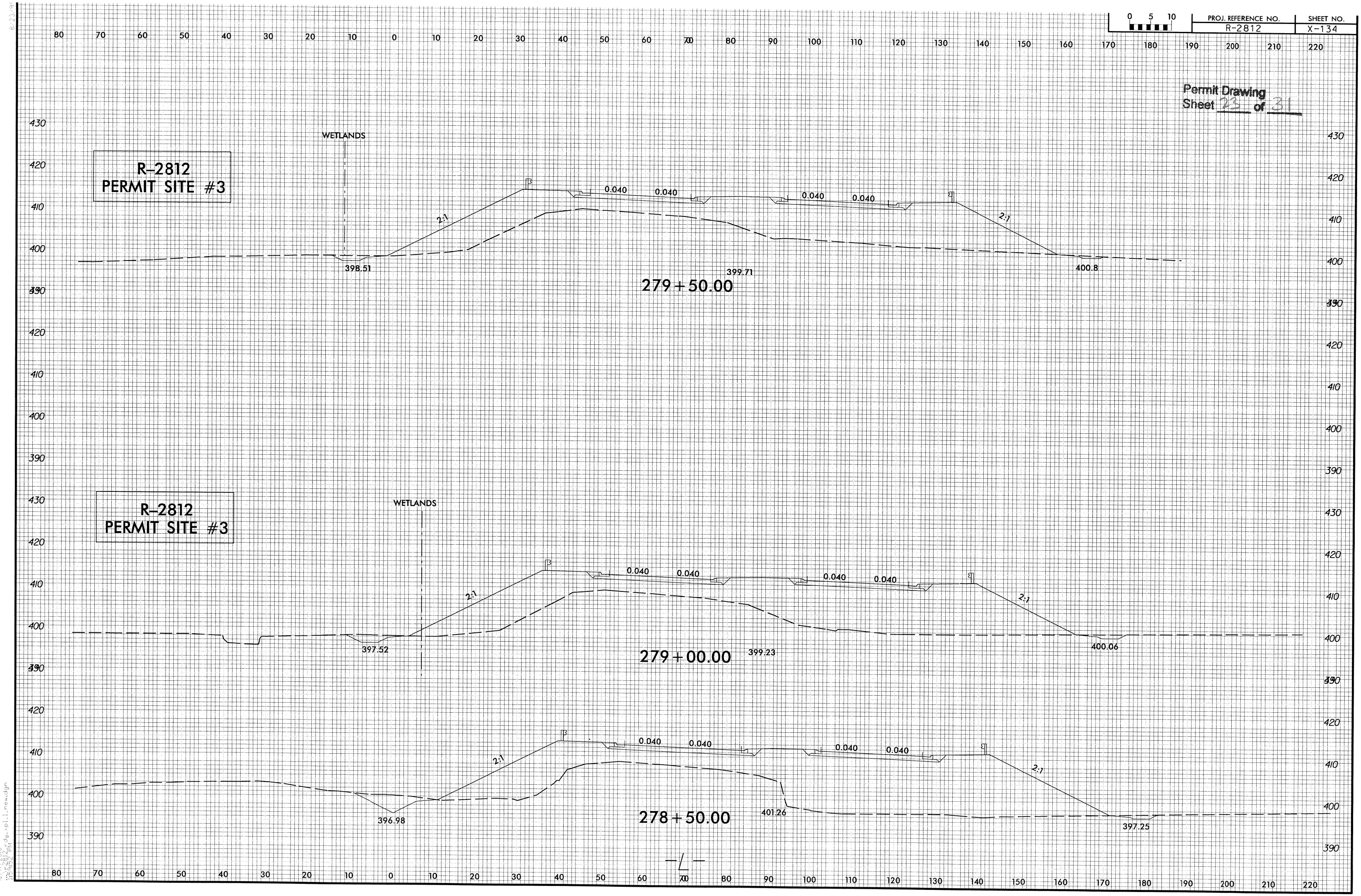
PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-131
Permit Drawing
Sheet 20 of 31
R-2812
PERMIT SITE #3
WETLANDS
WETLANDS
-LREV3- 274+98.84
3:1
0.040
0.040
4:1
2:1
409.60
410.91
408.50
275+00.00
3:1
0.040
0.040
0.040
4:1
411.40
413.21
274+50.00
3:1
0.040
0.040
3:1
414.40
415.95
274+00.00
4:1
0.040
0.040
0.040
0.040
0.040
0.040
4:1
417.40
418.36
273+50.00
-L-



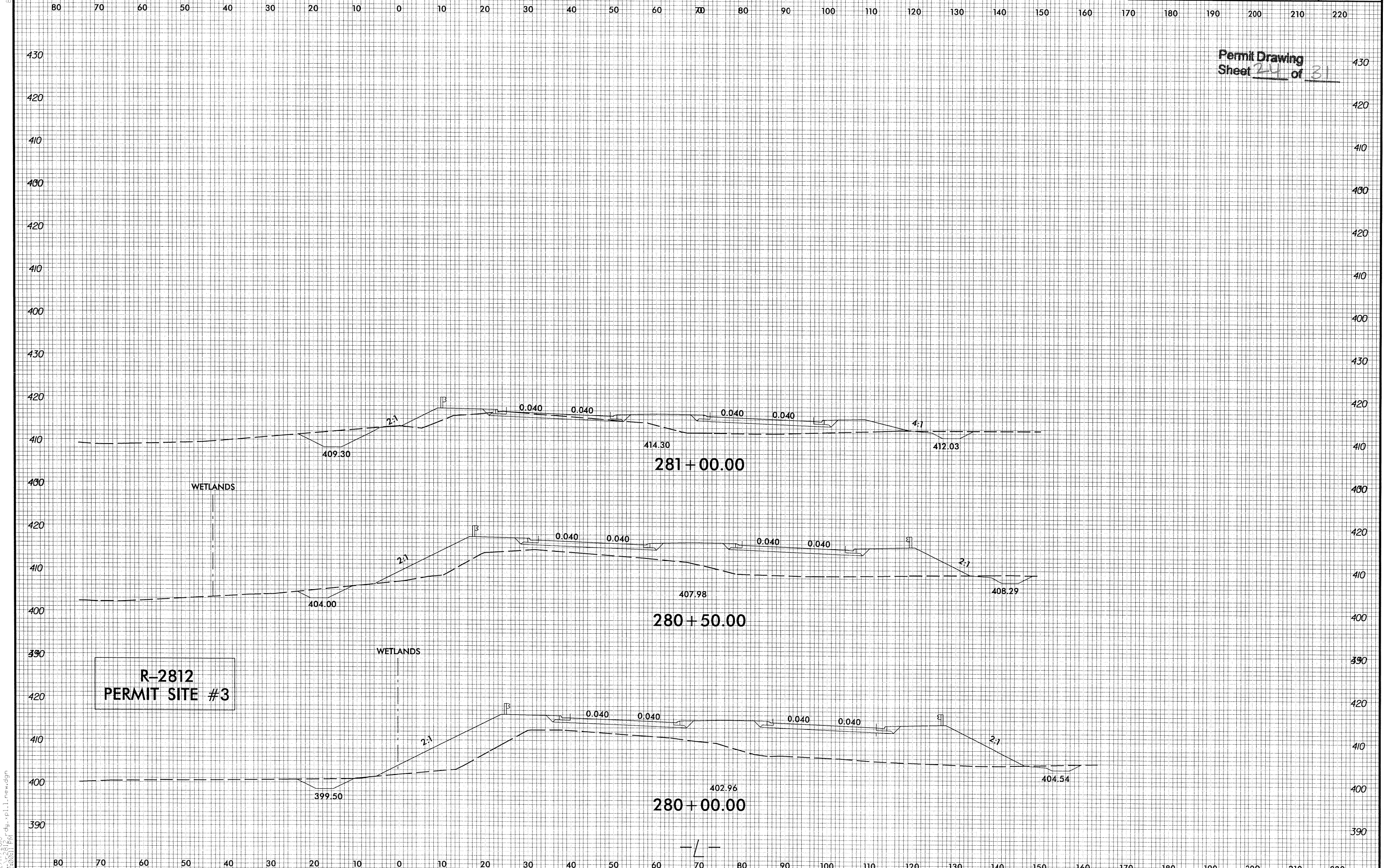
PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-132
Permit Drawing
Sheet 21 of 31
WETLANDS
CLEARING LIMITS
-LREV3- 276+87.11
0.040
2:1
404.00
406.04
399.75
277+00.00
R-2812
PERMIT SITE #3
405.10
407.30
400.63
276+50.00
406.60
408.36
276+00.00
3:1
408.10
409.98
405.40
275+50.00
-L-



PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-133
Permit Drawing
Sheet 22 of 31
R-2812
PERMIT SITE #3
WETLANDS
CLEARING LIMITS
0.040
2:1
401.80
405.14
398.58
278+00.00
R-2812
PERMIT SITE #3
WETLANDS
CLEARING LIMITS
0.040
2:1
402.90
405.48
398.87
277+50.00
-L-



PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-134
Permit Drawing
Sheet 23 of 31
R-2812
PERMIT SITE #3
WETLANDS
0.040
0.040
0.040
0.040
2:1
2:1
398.51
399.71
400.8
279+50.00
R-2812
PERMIT SITE #3
WETLANDS
0.040
0.040
0.040
0.040
2:1
2:1
397.52
399.23
400.06
279+00.00
0.040
0.040
0.040
0.040
2:1
2:1
396.98
401.26
397.25
278+50.00
-L-



PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-135
Permit Drawing
Sheet 24 of 31
0.040
2:1
4:1
409.30
414.30
412.03
281+00.00
WETLANDS
404.00
407.98
408.29
280+50.00
R-2812
PERMIT SITE #3
399.50
402.96
404.54
280+00.00
-L-

PROJECT REFERENCE NO.	SHEET NO.
R-2812	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

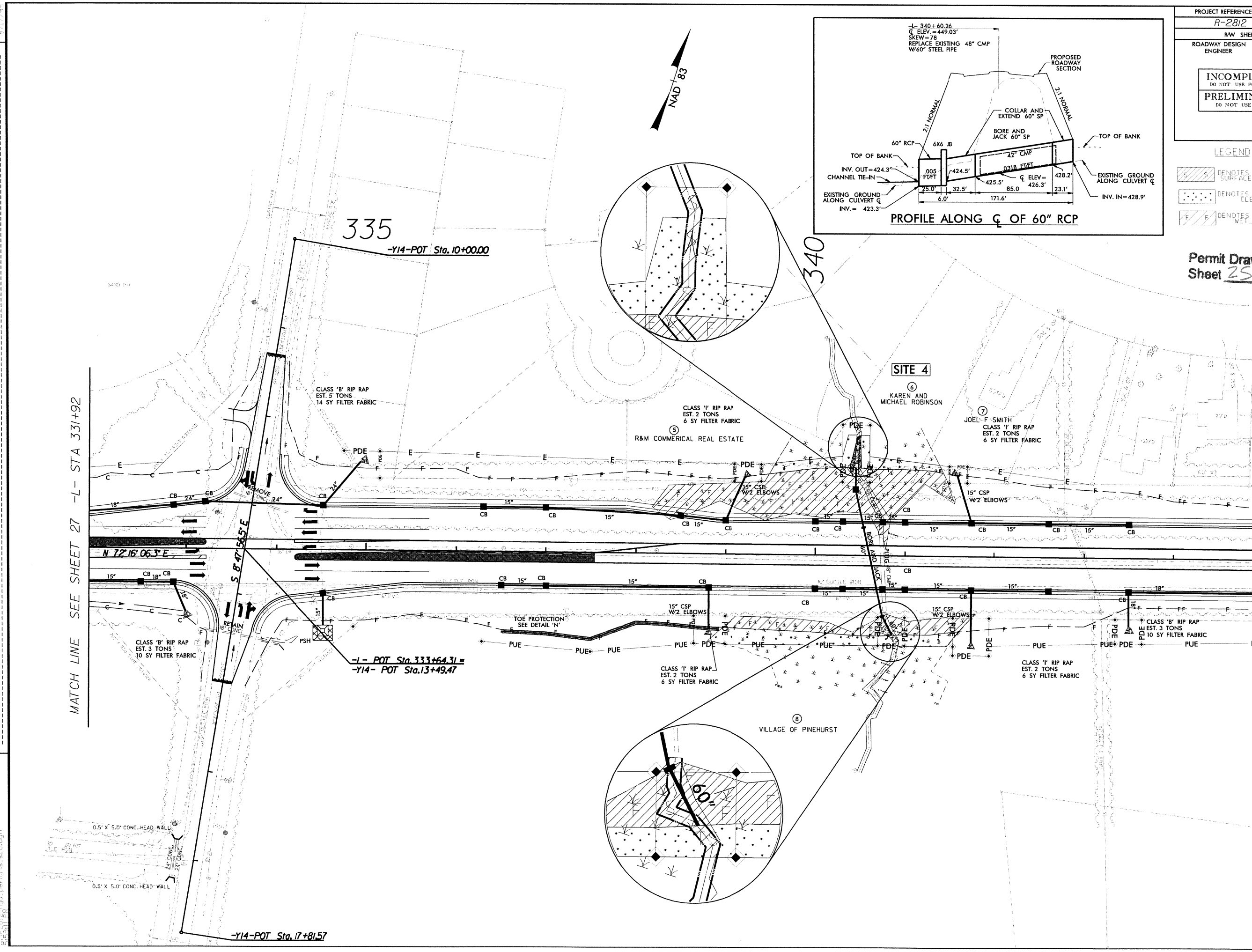
LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

Permit Drawing
Sheet 25 of 31



REVISIONS

8/17/99

12/15/2010
R-2812_hyd_permits_s28.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2812	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

LEGEND

- DENOTES FILL IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND

Permit Drawing Sheet 26 of 31

REVISIONS 8/17/99

NAD 83

335

-Y14-POT Sta. 10+00.00

340

-L- 340+60.26
℄ ELEV. = 449.03'
SKEW = 78
REPLACE EXISTING 48" CMP W/60" STEEL PIPE

PROPOSED ROADWAY SECTION

2:1 NORMAL

COLLAR AND EXTEND 60" SP

BORE AND JACK 60" SP

TOP OF BANK

60" RCP

6X6 JB

42" CMP

005 FT/FT

031B FT/FT

424.5'

425.5'

℄ ELEV. = 426.3'

428.2'

23.1'

INV. OUT = 424.3'
CHANNEL TIE-IN

EXISTING GROUND ALONG CULVERT ℄
INV. = 423.3'

EXISTING GROUND ALONG CULVERT ℄

INV. IN = 428.9'

25.0'
32.5'
85.0
6.0'
171.6'

PROFILE ALONG ℄ OF 60" RCP

SITE 4

⑥ KAREN AND MICHAEL ROBINSON

⑦ JOEL F SMITH

CLASS 'I' RIP RAP
EST. 2 TONS
6 SY FILTER FABRIC

⑤ R&M COMMERICAL REAL ESTATE

CLASS 'B' RIP RAP
EST. 5 TONS
14 SY FILTER FABRIC

REMOVE 18" CONC. 24"

RETAIN 18" CONC.

S 84°55'55" E

N 72°16'06.3" E

-L- STA 331+92

MATCH LINE SEE SHEET 27 -L- STA 331+92

MATCH LINE SEE SHEET 29 -L- STA 344+92

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

PSH

-L- POT Sta. 333+64.31 =
-Y14- POT Sta. 13+49.47

TOE PROTECTION SEE DETAIL 'N'

15" CSP W/2 ELBOWS

BORE AND JACK 60" SP

PLUG 18" CMP

CLASS 'I' RIP RAP
EST. 2 TONS
6 SY FILTER FABRIC

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

⑧ VILLAGE OF PINEHURST

60"

0.5' X 5.0' CONC. HEAD WALL

24" CONC.

24" CONC.

0.5' X 5.0' CONC. HEAD WALL

-Y14-POT Sta. 17+81.57

12/15/2000
mbeal
C:\projects\hyd-permits\sc28.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2812	46
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 21 of 31

-L-

PI = 319+00.00
EL = 518.70'
VC = 260'
K = 98

PI = 321+00.00
EL = 512.80'
VC = 120'
K = 114

PI = 324+00.00
EL = 500.80'
VC = 280'
K = 119

PI = 326+25.00
EL = 486.50'
VC = 170'
K = 133

PI = 329+50.00
EL = 470.00'
VC = 400'
K = 213

519.04

(-)0.3400%
(-)2.9500%
(-)2.9500%
(-)4.0000%
(-)4.0000%
(-)6.3556%
(-)6.3556%
(-)5.0769%
(-)5.0769%
(-)3.2000%

SPECIAL CUT DITCH @ 3.68%
SDG @ 4.78%

STA 329+50 RT
ELEV = 468.90

STA 331+00 RT
ELEV = 463.38

462.00

540 530 520 510 500 490 480 470 460 450

318 319 320 321 322 323 324 325 326 327 328 329 330 331 332

-L-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 368.20	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 280	CFS
DESIGN HW ELEVATION	= 439.37	FT
100 YEAR DISCHARGE	= 550	CFS
100 YEAR HW ELEVATION	= 456.34	FT
OVERTOPPING FREQUENCY	= 50	YRS
OVERTOPPING DISCHARGE	= 503	CFS
OVERTOPPING ELEVATION	= 448.99	FT

SITE 4

STA.340+60

PI = 332+75.00
EL = 459.60'
VC = 120'
K = 96

PI = 335+00.00
EL = 455.20'
VC = 100'
K = 225

PI = 337+25.00
EL = 451.80'
VC = 200'
K = 751

PI = 339+70.00
EL = 448.75'
VC = 200'
K = 129

PI = 342+50.00
EL = 449.60'
VC = 245'
K = 109

PI = 345+20.00
EL = 456.50'
VC = 250'
K = 160

462.00

(-)3.2000%
(-)1.9556%
(-)1.9556%
(-)1.5111%
(-)1.5111%
(-)1.2449%
(-)1.2449%
(+)0.3036%
(+)0.3036%
(+)2.5556%
(+)2.5556%
(+)4.1176%

SDG @ 4.76%

STA 333+00 RT
ELEV = 453.86

BORE AND JACK 60"
INV. IN = 428.90
INV. OUT = 423.30 (BURIED 1')

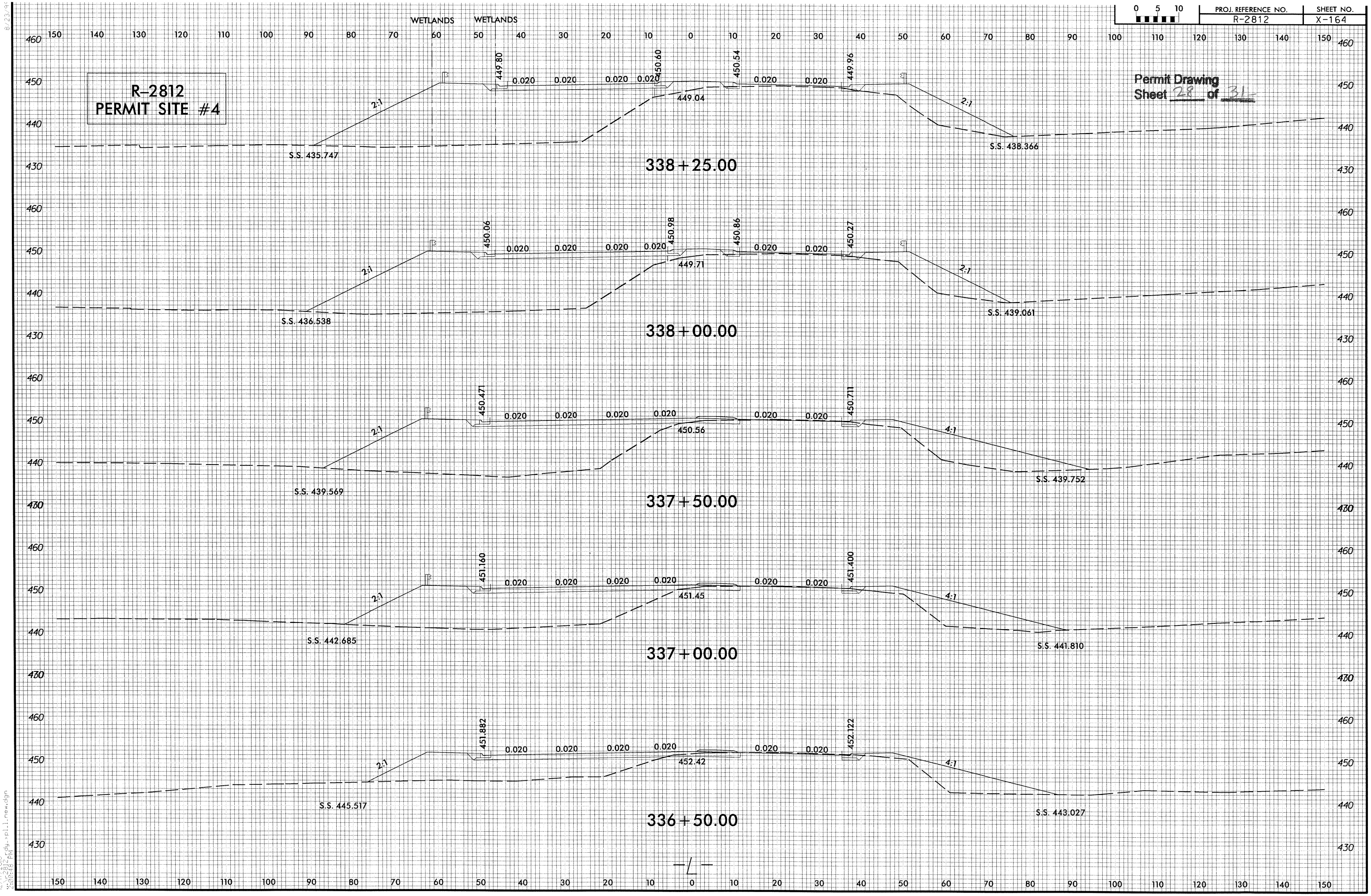
48" CS

459.86

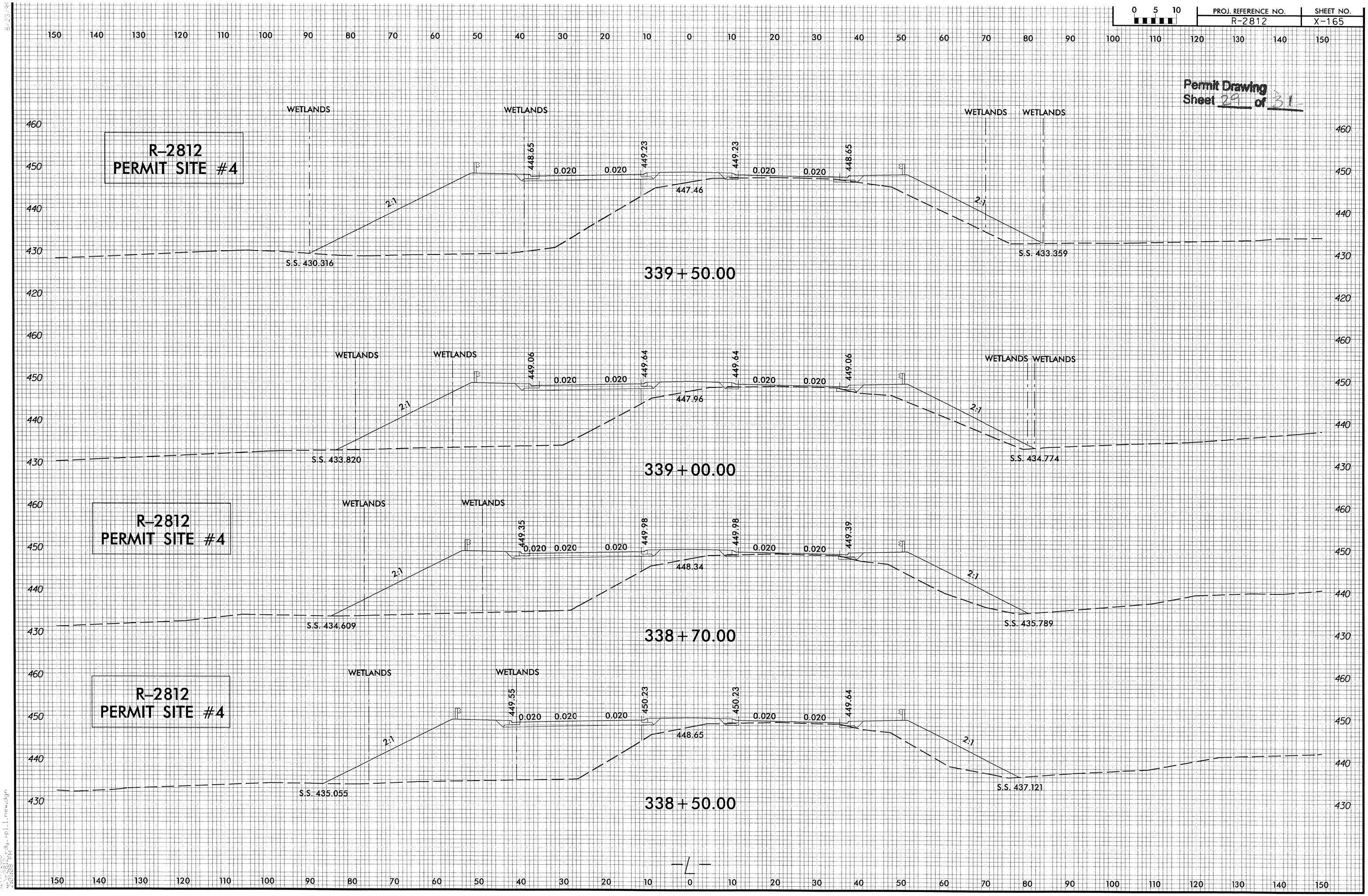
520 510 500 490 480 470 460 450 440 430

332 333 334 335 336 337 338 339 340 341 342 343 344 345 346

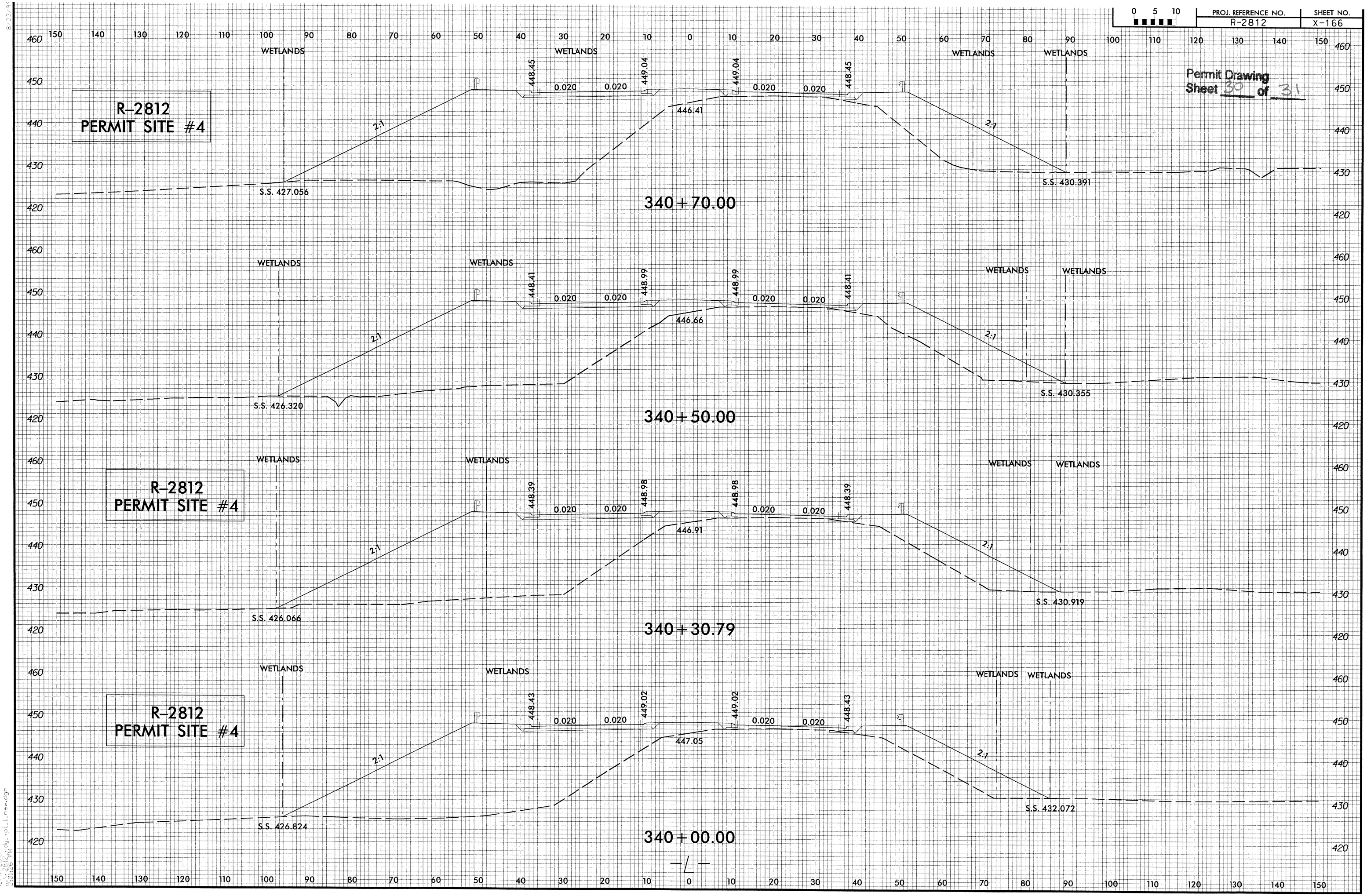
12/17/2020
10:25:08 AM
\\Cdot8\projects\Hydro\Hydro_Pkg1_of_1_1_new.dgn



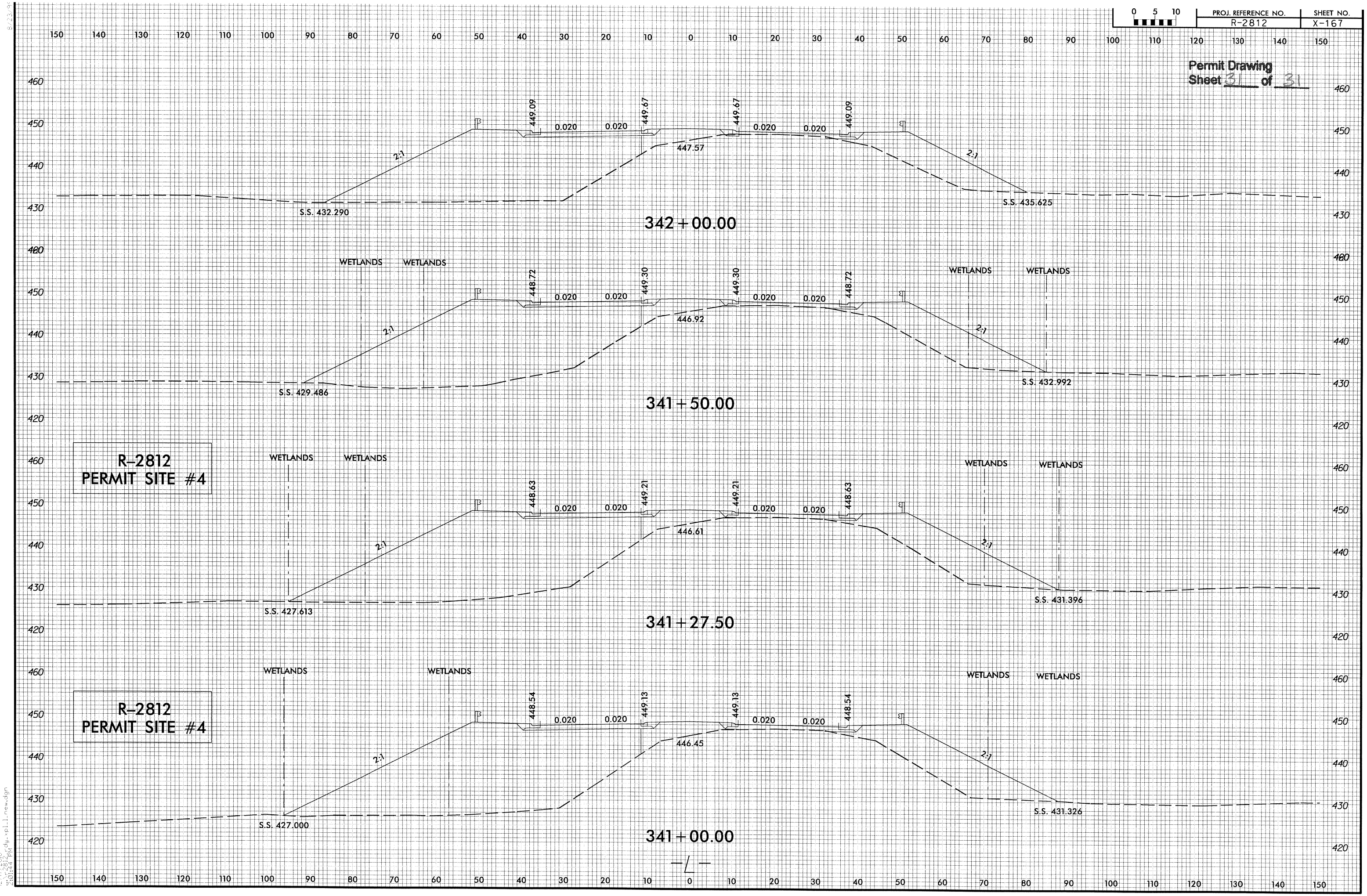
PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-164
0 5 10
WETLANDS
WETLANDS
R-2812
PERMIT SITE #4
Permit Drawing
Sheet 28 of 31
449.80
450.60
450.54
449.96
0.020
449.04
2:1
S.S. 435.747
S.S. 438.366
338+25.00
450.06
450.98
450.86
450.27
449.71
S.S. 436.538
S.S. 439.061
338+00.00
450.471
450.711
450.56
4:1
S.S. 439.569
S.S. 439.752
337+50.00
451.160
451.400
451.45
S.S. 442.685
S.S. 441.810
337+00.00
451.882
452.122
452.42
S.S. 445.517
S.S. 443.027
336+50.00
-L-



PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-165
Permit Drawing
Sheet 29 of 31
R-2812
PERMIT SITE #4
WETLANDS
448.65
449.23
0.020
447.46
2:1
S.S. 430.316
S.S. 433.359
339+50.00
449.06
449.64
447.96
S.S. 433.820
S.S. 434.774
339+00.00
449.35
449.98
448.34
S.S. 434.609
S.S. 435.789
338+70.00
449.55
450.23
448.65
S.S. 435.055
S.S. 437.121
338+50.00



PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-166
Permit Drawing
Sheet 30 of 31
R-2812
PERMIT SITE #4
WETLANDS
448.45
449.04
0.020
446.41
2:1
S.S. 427.056
S.S. 430.391
340+70.00
448.41
448.99
446.66
S.S. 426.320
S.S. 430.355
340+50.00
448.39
448.98
446.91
S.S. 426.066
S.S. 430.919
340+30.79
448.43
449.02
447.05
S.S. 426.824
S.S. 432.072
340+00.00



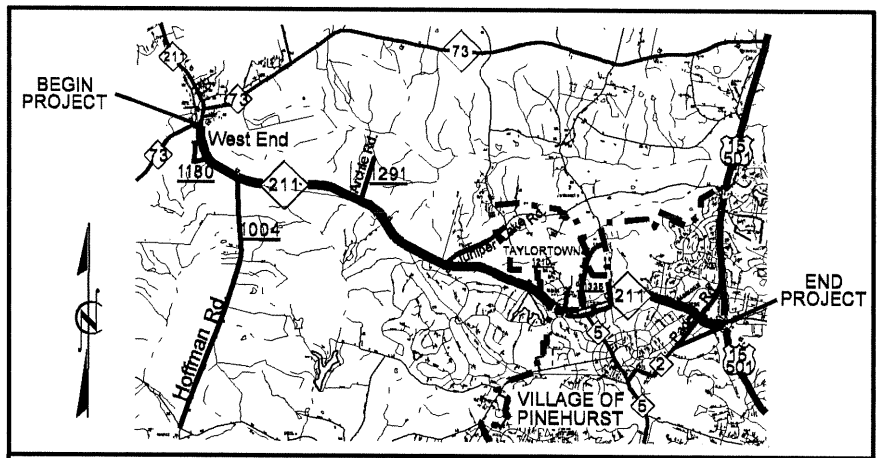
PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-167
Permit Drawing
Sheet 31 of 31
342+00.00
S.S. 432.290
S.S. 435.625
449.09
449.67
447.57
0.020
2:1
341+50.00
S.S. 429.486
S.S. 432.992
448.72
449.30
446.92
WETLANDS
R-2812
PERMIT SITE #4
341+27.50
S.S. 427.613
S.S. 431.396
448.63
449.21
446.61
341+00.00
S.S. 427.000
S.S. 431.326
448.54
449.13
446.45
-L-

09/08/55

TIP PROJECT: R-2812

CONTRACT: C202663

See Sheet 1-A For Index of Sheets



VICINITY MAP

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MOORE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2812	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34504.1.1	STP-211 (5)	P.E.
34504.2.2	STP-0211(25)	R/W, UTIL.
34504.3.2	STP-0211(26)	CONSTR.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

LOCATION: NC 211 FROM NC 73 IN WEST END TO THE TRAFFIC CIRCLE IN PINEHURST

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CURB & GUTTER SIGNALS, AND SIGNING

NAD 83

TO ABERDEEN

–LREV3– POT STA. 316+74.63 BK. =
–L– POT STA. 317+10.00 AH.

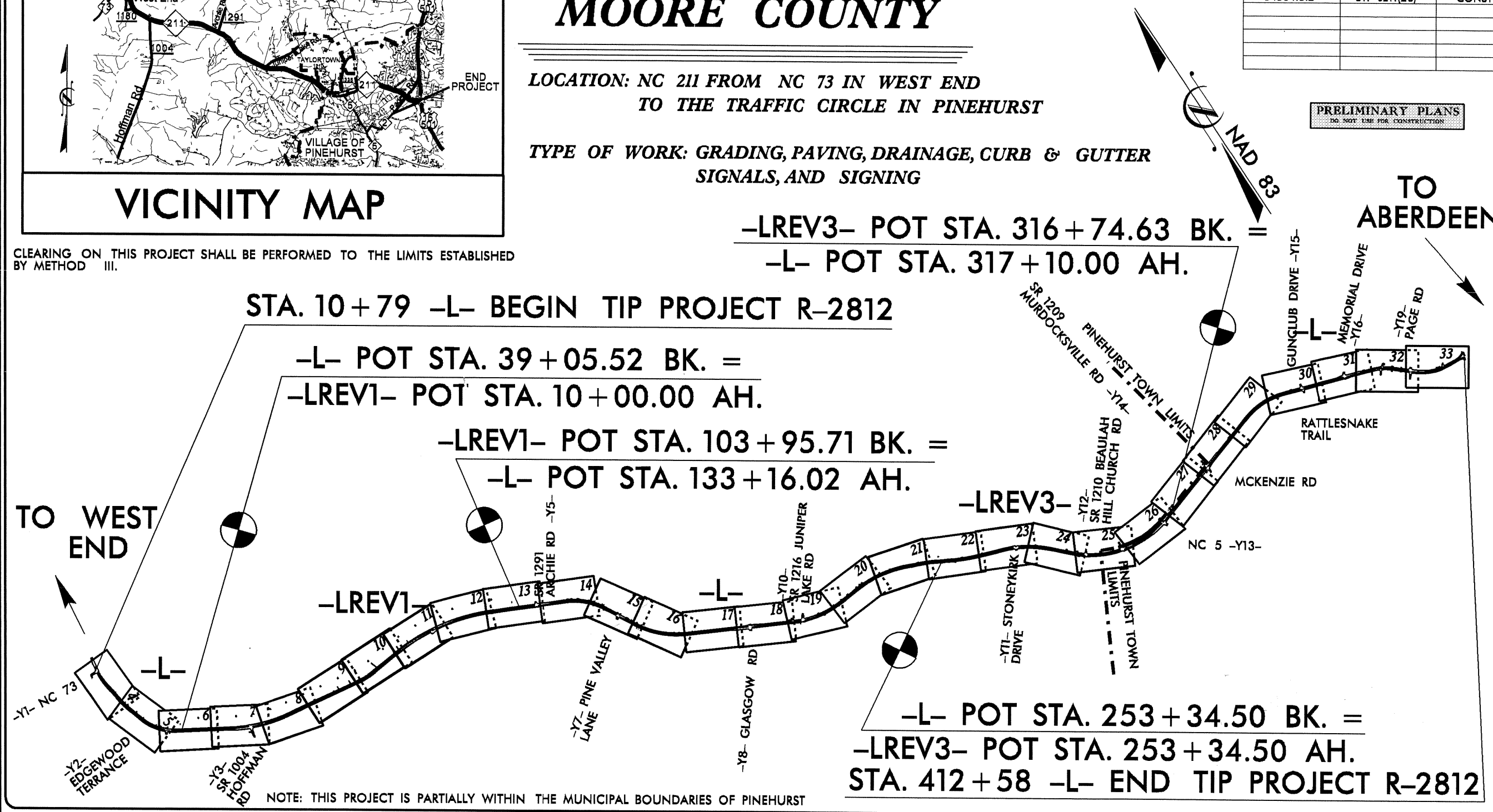
STA. 10+79 –L– BEGIN TIP PROJECT R-2812

–L– POT STA. 39+05.52 BK. =
–LREV1– POT STA. 10+00.00 AH.

–LREV1– POT STA. 103+95.71 BK. =
–L– POT STA. 133+16.02 AH.

–LREV3– POT STA. 253+34.50 BK. =
–LREV3– POT STA. 253+34.50 AH.

STA. 412+58 –L– END TIP PROJECT R-2812



NOTE: THIS PROJECT IS PARTIALLY WITHIN THE MUNICIPAL BOUNDARIES OF PINEHURST

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2004 = 15300
ADT 2025 = 20500
DHV = 9 %
D = 52 %
T = 5 % *
V = 50 MPH

* TTST 2 DUAL 3

PROJECT LENGTH

LENGTH ROADWAY F.A. PROJECT STP-211(5) = 7.610 MI.
TOTAL LENGTH STATE PROJECT 34504.1.1 = 7.610 MI.

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPT. 29, 2008

LETTING DATE: OCTOBER 18, 2011

JIMMY GOODNIGHT
PROJECT ENGINEER

TIM GOINS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER P.E.

18-JAN-2011 14:04
R:\Roadway\Proj\r-2812_rdy_tsh.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2812	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

NAD 83

-L-

Pis Sta 12+04.60
Es = 4°00'00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

PI Sta 13+71.13
Δ = 7°58'45.0" (LT)
D = 4°00'00.0"
L = 199.46'
T = 99.89'
R = 1,432.39'
SE = 0.07'

Pis Sta 15+37.40
Es = 4°00'00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

-L-

Pis Sta 21+24.19
Es = 3°00'00.0"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

PI Sta 22+49.21
Δ = 3°30'05.9" (LT)
D = 3°00'00.0"
L = 116.72'
T = 58.38'
R = 1,909.86'
SE = 0.06

Pis Sta 23+74.24
Es = 3°00'00.0"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

NC 211
9100 17000 750 1350 | 1250 1850 9600 17500
2000 3200
2004 ADT
2025 ADT
NC 73

15

20

BEGIN TIP PROJECT R-2812
-L- STA 7+50

TS Sta. 10+71.23
POT Sta. 10+00.00
BL-1
-L- STA. 11+03.83 =
-BL- POT 5+00.00 =
-BYI- POT 5+00.00
SC Sta. 12+71.23
CS Sta. 14+70.70
ST Sta. 16+70.70
TS Sta. 19+90.83
SC Sta. 21+90.83
MATCH LINE SEE SHEET 5
-L- STA. 30+00

FRED B. MONROE, JR. DB 1150 PG 36
STANLEY FURNITURE COMPANY, INC. DB 1095 PG 557
MC,B,MC,LLC DB 2373 PG 3
FRED B. MONROE, JR. DB 1150 PG 36
THE KERR LIVING TRUST DB 3481 PG 402
CLASSIC RELAY ANIMAL ASS. DWELLINGS TRUST AND DB 12008 PG 1853
ISBLK BUS (ABAND)
ISFBUS
U/G SEPTIC TANKS
U/G GAS TANKS
GAS PUMPS U/MTL CANOPY
ISFD
WD DECK
G
S
NC 211
S 8° 01' 58.8" W
S 8° 34' 56.1" W
S 8° 56' 44.3" E
-L- POS Sta. 11+25.76 =
-Y1- POT Sta. 10+00.00
STANLEY FURNITURE COMPANY DB 1095 PG 557
MICHAEL OIL CO. THIRD DB 1284 PG 327
POWER METER
R.R. POWER HUT
ABANDONED BREAKER BOX
R.R. SIGNAL
PROPOSED SIGNAL
-L- STA. 17+18.59 =
GPS R2812-1
PINC 11+25.19
ABERDEEN CAROLINA AND WESTERN RAILROAD
END CONSTR.
-Y1- STA 12+16 +/-
NC 73
MTL BUS
ISBK FIRESTATION
-Y1-POT Sta.13+67.99
BL-50
-BYI- POT 9+55.79
WEST END FIRE DEPARTMENT
DB 216 PG 350
DB 453 PG 709
DB 886 PG 152
DB 451 PG 702
DB 451 PG 704
GRASS
TREES
SOIL
BST
CONC
WOODS
DATUR
CHORD
SPECIAL CUT DITCH SEE DETAIL 'C'
LAT. 'V' DITCH SEE DETAIL 'D'
REMOVE EXISTING PIPE
REMOVE ROCK TO SHALE
USE EXIST. CATCH BASIN
USE EXIST. CBC
SEE DETAIL 'L'
F5 - SEE DETAIL 'K'

DETAIL K
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
10H
20H
2.0'
0.5' Min.
1.0' Max.
6' etc.
S = Ditch Slope
℄ Proposed Ditch

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
4H
D
All of Flatter
Front Ditch Slope
Min. D= 1Ft.
FROM STA. 14+50 -L- TO STA. 15+56 -L- LT.

DETAIL D
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
2H
D
2H
T/Ft.
Fill Slope
Min. D= 1Ft.
b= 5 Ft.
FROM STA. 20+44 -L- TO STA. 21+50 -L- LT.

DETAIL L
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
20H
10H
2'
0.5' Min.
1.0' Max.
6' etc.
S=Ditch Slope
℄ Proposed Ditch

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2812-1" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 541028.04 (ift) EASTING: 1830430.19 (ift)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9998490
THE NC LAMBERT GRID BEARING LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2812-1" TO -L- STATION (supplied by roadway) IS

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

18-JAN-2011 14:04
R:\Roadway\Proj\r2812_rdy_s04.dgn
jessicaperdue

PROJECT REFERENCE NO.	SHEET NO.
R-2812	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS
8/17/99

NAD 83

-L-
Pt Sta 21+24.19
Θs = 3°00'00.0"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

Pt Sta 22+49.21
Δ = 3°30'05.9" (LT)
D = 3°00'00.0"
L = 116.72'
T = 58.38'
R = 1,909.86'
SE = 0.06

Pt Sta 23+74.24
Θs = 3°00'00.0"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

-L-
Pt Sta 29+03.02
Θs = 4°25'00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

Pt Sta 33+47.78
Δ = 12°30'03.9" (LT)
D = 4°25'00.0"
L = 735.81'
T = 378.13'
R = 1,297.26'

Pt Sta 37+72.23
Θs = 4°25'00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

-L- POC Sta. 35+70.00=
-Y2- POT Sta. 10+00.00

MATCH LINE SEE SHEET 4 -L- STA 22+00

MATCH LINE SEE SHEET 6 -L- STA. 36+00

CHARLES D. POPE
DB 2785 PG 149

JOHN WESLEY WATKINS III
DB 3314 PG 90

RHETSON DEVELOPMENT LLC
DB 3365 PG 401
PC 7 PG 606

MCDONALD FAMILY FARMS, LLC
DB 3199 PG 190

PINE RIDGE PROPERTIES, INC
DB 3086 PG 151

HELEN W. GRAHAM
DB 2006 PG 276

DREXEL BRADLEY
DB 608 PG 464

TATE RENTAL PROPERTIES, LLC
DB 1108 PG 105
DB 1480 PG 359

NCDOT BY MAINTENANCE

ABERDEEN CAROLINA AND WESTERN RAILROAD

SHIRLEY GARRISON
WILL 96E-384
DB 570 PG 263

EVERETTE COLE
DB 28 PG 633
DB 330 PG 89

CS Sta. 23+07.55
ST Sta. 25+07.55
TS Sta. 27+69.65
SC Sta. 29+69.65

-L- STA. 32+05.82 =
GPS R2812-2
PINC 26+19.92

-Y2- PC Sta. 10+80.13
Δ = 93°48'06.0" (RT)
D = 71°37'11.0"
L = 130.98'
T = 85.49'
R = 80.00'
SE = 0.07

-Y2- POT Sta. 12+65.17
-BY2- POT 11+51.25
-Y2- PT Sta. 12+25.61
-Y2- PRC Sta. 10+94.62
END CONSTR. -Y2-10+92.5 +/-
BL-51

SR 1180 EDGEWOOD TERRACE DR
NC 211
SR 1180

DETAIL B
LATERAL BASE DITCH
(Not to Scale)
Min. D= 1Ft.
B= 2 Ft.
b= 5 Ft.
FROM STA.25+35 -L- TO STA.26+50 -L- LT.

DETAIL D
LATERAL 'V' DITCH
(Not to Scale)
Min. D= 1Ft.
b= 5 Ft.
FROM STA. 24+10 -L- TO STA. 25+35 -L- LT.

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)
Min. D= 1Ft.
FROM STA. 22+27 -L- TO STA. 24+10 -L- LT.

DETAIL H
STANDARD TAIL DITCH
(Not to Scale)
Min. D= 1Ft.
B= 2 Ft.
FROM STA. 25+35 -L- TO STA. 25+35 -L- LT.

DETAIL L
FALSE SUMP
(Not to Scale)
S=Ditch Slope
℄ Proposed Ditch

DETAIL K
FALSE SUMP
(Not to Scale)
S = Ditch Slope
℄ Proposed Ditch

18-JAN-2011 14:04
R:\Roadway\Proj\R-2812_rdy_s05.dgn
rstevens
$$$$USERNAME$$$$

REVISIONS
.

18-JAN-2011 14:04
R:\Roadway\Proj\r2812_rdy_s06.dgn
$$$$USERNAME$$$$

8/17/99

-L-

MATCH LINE SEE SHEET 5 -L- STA. 36+00

MATCH LINE SEE SHEET 7 -LREVI- STA. 19+00

Pt Sta 29+03.02
Δ = 4°25'00.0"
D = 4°25'00.0"
L = 200.00'
T = 133.37'
R = 1297.26'

Pt Sta 33+47.78
Δ = 32°30'03.9" (LT)
Ls = 200.00'
LT = 133.37'
ST = 66.70'

Pt Sta 37+23.23
Δ = 4°25'00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

CS Sta. 37+05.52

-LREVI- POT Sta. 59+05.52 BK. 5
-L- POT Sta. 40+00.00 AH.

-L- STA. 36+01.86 = -BL-76 PINC 30+30.99 = -BY2- POT 5+00.00

-L- STA. 38+85.53 = -BL-4 PINC 33+29.47

S 58°46'54"E

S 46°54'54"E

NC 211

RAMONA M. & TIMOTHY HARRIS DB 554 PG 89

BOBBY PUSSER DB MK4 PG 239

MARY CHARLES SISK, ET AL DB 1466 PG 181

ABERDEEN CAROLINA AND WESTERN RAILROAD

SCATTERED TREES

GREGORY RUSH DB 549 PG 729

J. HARRISON ATKINS DB 565 PG 945

TATE RENTAL PROPERTIES DB 625 PG 39

AGUSTIN LUGO DB 852 PG 14

MARY CHARLES SISK, ET AL DB 1466 PG 181

NATHANIEL & ROBBIE HAILEY DB 1959 PG 337

SUZANNE VON CANNON DB 737 PG 469

DETAIL A
LATERAL BASE DITCH
(Not to Scale)

Min. D= 1Ft.
Max. d= 1Ft.
B= 2 Ft.
D= 5 Ft.

When B is < 6.0'

Type of Liner= Class B Rip-Rap
FROM STA. 16+50 -LREVI- TO STA. 19+37 -LREVI- LT.

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)

Min. D= 1Ft.

FROM STA. 36+00 -L- TO STA. 39+50 -L- RT.

DETAIL G
STANDARD "V" TAIL DITCH
(Not to Scale)

Min. D= 1Ft.
Max. d= 1Ft.

FROM STA. 37+50 -L- TO STA. 37+50 -L- LT.

DETAIL K
FALSE SUMP
(Not to Scale)

0.5' Min.
1.0' Max.

DETAIL L
FALSE SUMP
(Not to Scale)

0.5' Min.
1.0' Max.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
R-2812	6

RW SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

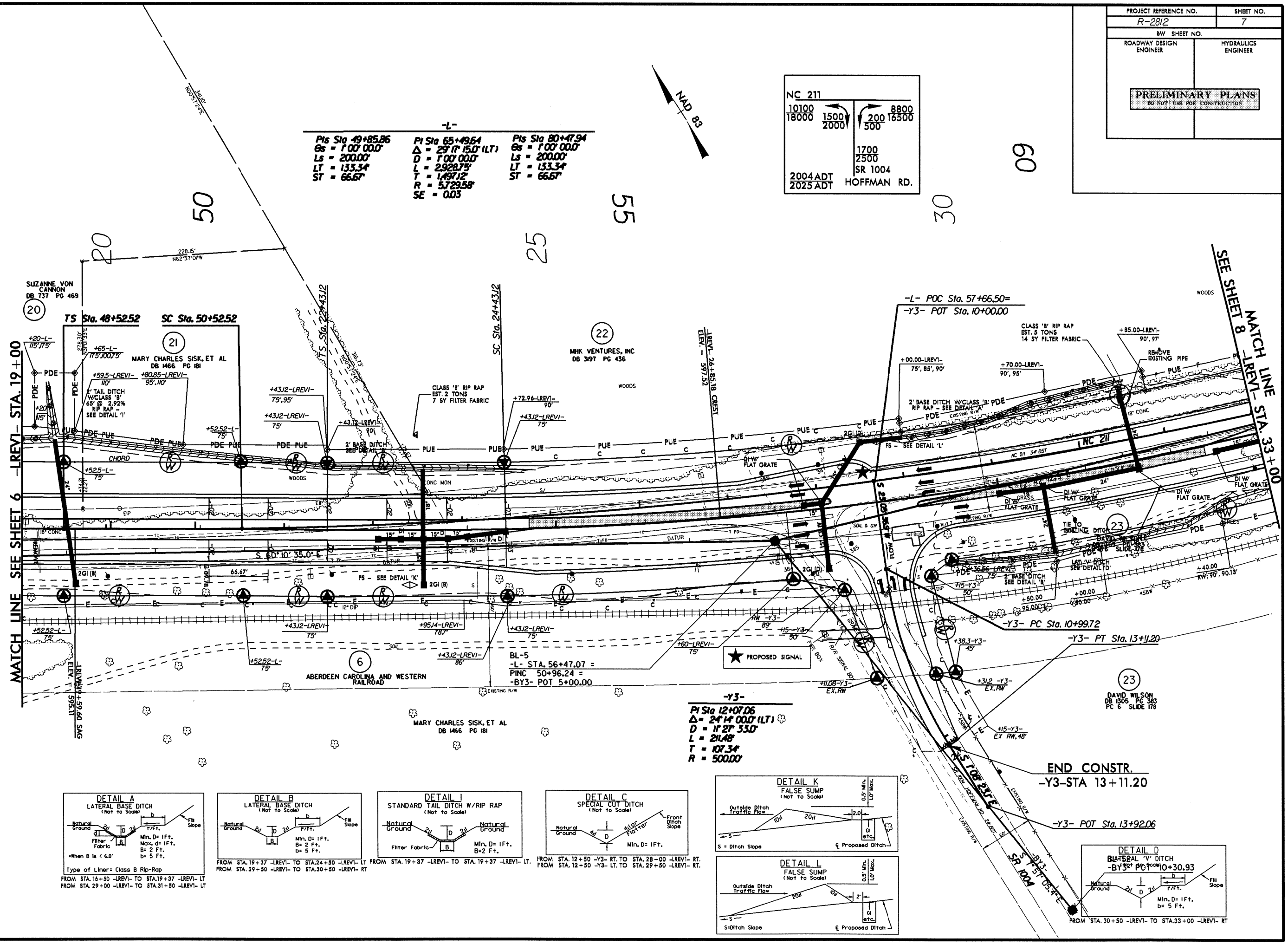
40

15

45

PROJECT REFERENCE NO.	SHEET NO.
R-2812	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

8/17/99

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REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2812	8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-
Pts Sta 49+85.86
Es = 1 00' 00.0"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

Pt Sta 65+49.64
Δ = 29° 11' 15.0" (LT)
D = 1° 00' 00.0"
L = 2,928.75'
T = 1,497.12'
R = 5,729.58'
SE = 0.03

Pts Sta 80+47.94
Es = 1 00' 00.0"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

NAD 83

35 65 40 70

MATCH LINE SEE SHEET 7 -L- STA. 62+00

MATCH LINE SEE SHEET 9 -LREVI- STA. 46+00

BL-6
-L- STA. 66+28.91 =
PINC 61+29.69

CS Sta. 38+32.98

ST Sta. 40+32.98

22
MHK VENTURES, INC
DB 3197 PG 436

WOODS

+32.98-LREVI-
90'

+32.98-LREVI-
75'

+50.00-LREVI-
135'

+62.50-LREVI-
90'

+60.00-LREVI-
90'

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

2' BASE TAIL DITCH
W/CLASS 'B' RR
17' @ 3.12%
SEE DETAIL 'H'

PUE

TREES

D.I.W/
FLAT GRATE

FS - SEE DETAIL 'L'

FS SEE DETAIL 'L'

FS - SEE DETAIL 'K'

SEE DETAIL 'K'

2GI (B)

GI (B)

45BW

GUY

POWER METER

BILLBOARD FLOOD LIGHT

EXISTING R/W

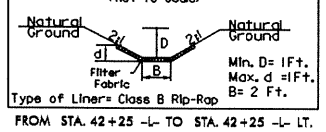
S 80° 38' 39.8" E

6
ABERDEEN CAROLINA AND WESTERN RAILROAD

23
DAVID WILSON
DB 1305 PG 383
PC 6 SLIDE 178

B

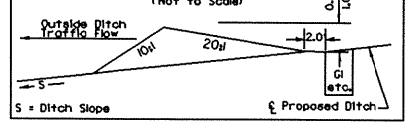
DETAIL H
STANDARD TAIL DITCH
(Not to Scale)



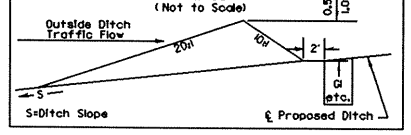
Type of Liner= Class B Rip-Rap

FROM STA. 42+25 -L- TO STA. 42+25 -L- LT.

DETAIL K
FALSE SUMP
(Not to Scale)



DETAIL L
FALSE SUMP
(Not to Scale)



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75

MATCH LINE SEE SHEET 8 -LREV1- STA. 46+00

Pls Sta 49+85.86
Δs = 1°00'00"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

Pls Sta 80+47.94
Δs = 1°00'00" (LT)
Ls = 200.00'
LT = 133.34'
ST = 66.67'

Pls Sta 63+66.64
Δ = 28°11'50" (LT)
D = 1°00'00"
L = 2824.15'
T = 1437.36'
R = 5729.58'
SE = 0.03'

DETAIL A
LATERAL BASE DITCH
(Not to Scale)
Natural Ground
Fiber Fabric
Min. D = 1Ft.
Max. d = 1Ft.
B= 2 Ft.
b= 5 Ft.
*When B is < 6.0'
Fill Slope

Type of Liner= Class B Rip-Rap
FROM STA 49+00 -LREV1- TO STA 49+50 -LREV1- RT
FROM STA. 55+00 -LREV1- TO STA.56+00 -LREV1- RT

DETAIL B
LATERAL BASE DITCH
(Not to Scale)
Natural Ground
Min. D= 1Ft.
B= 2 Ft.
b= 5 Ft.
Fill Slope

FROM STA. 49+50 -LREV1- TO STA.53+50 -LREV1- RT
FROM STA. 56+00 -LREV1- TO STA.58+00 -LREV1- RT

DETAIL L
FALSE SUMP
(Not to Scale)
Outside ditch Traffic Flow
S-Ditch Slope
℄ Proposed Ditch
20H
10H
2'
d etc.
0.5' Min
1.0' Max

DETAIL K
FALSE SUMP
(Not to Scale)
Outside ditch Traffic Flow
S = Ditch Slope
℄ Proposed Ditch
10H
20H
2.0'
d etc.
0.5' Min
1.0' Max

DETAIL X
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
Match Flat Grade
Front Ditch Slope
Max. d= 1Ft.
B= 2 Ft.

FROM STA. 53+50 -LREV1- TO STA.55+00 -LREV1- RT

DETAIL Z
LATERAL BASE DITCH
(Not to Scale)
Natural Ground
Min. D= 1Ft.
B= 4 Ft.
b= 5 Ft.
Fill Slope

FROM STA. 58+00 -LREV1- TO STA.60+00 -LREV1- LT

Pls Sta 59+99.45
Δs = 3°49'11.0"
LT = 133.36'
ST = 66.69'

Pl Sta 61+52.28
Δ = 6°34'39.2" (LT)
D = 3°49'11.0"
L = 172.20'
T = 86.19'
R = 1500.00'

-LREV1-

MATCH LINE SEE SHEET 10 -LREV1- STA. 58+50

PROJECT REFERENCE NO.	SHEET NO.
R-2812	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

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MATCH LINE SEE SHEET 9 -LREV1- STA. 58+50

MATCH LINE SEE SHEET 11 -LREV1- STA. 72+50

NAD 83

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT REFERENCE NO. R-2812
SHEET NO. 10
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER

DETAIL D
LATERAL 'V' DITCH
(Not to Scale)
FROM STA. 67+15 -LREV1- TO STA. 72+00 -LREV1- LT
FROM STA. 65+00 -LREV1- TO STA. 69+50 -LREV1- RT

DETAIL W
STANDARD TAIL DITCH
(Not to Scale)
FROM STA. 67+15 -LREV1- TO STA. 67+15 -LREV1- LT

DETAIL K
FALSE SUMP
(Not to Scale)
S = Ditch Slope
℄ Proposed Ditch

DETAIL L
FALSE SUMP
(Not to Scale)
S=Ditch Slope
℄ Proposed Ditch

DETAIL Z
LATERAL BASE DITCH
(Not to Scale)
FROM STA. 58+00 -LREV1- TO STA. 63+50 -LREV1- LT
FROM STA. 63+50 -LREV1- TO STA. 67+17 -LREV1- LT

DETAIL Y
SPECIAL CUT DITCH
(Not to Scale)
FROM STA. 60+00 -LREV1- TO STA. 63+50 -LREV1- RT

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2812	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-
Pts Sta 104+03.59
Gs = 1'00' 00.0"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

Pt Sta 105+17.34
Δ = 0°56' 29.7" (LT)
D = 1°00' 00.0"
L = 94.16'
T = 47.08'
R = 5729.58'
SE = 0.03

Pts Sta 106+31.08
Gs = 1'00' 00.0"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

Pts Sta 109+23.54
Gs = 2°23' 14.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

-L-
Pts Sta 109+23.54
Gs = 2°23' 14.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

Pt Sta 114+93.46
Δ = 25°41' 09.6" (RT)
D = 2°23' 14.4"
L = 992.16'
T = 503.27'
R = 2400.00'

Pts Sta 120+49.03
Gs = 2°23' 14.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

NAD 83

105 110 75 80 85

(30) E MCRAE DUNN
415 PG 633

(31) DOROTHY PHILLIPS
DB 2829 PG 356

(32) DONALD PARKER
DB 682 PG 444

(22) MHK VENTURES, INC
DB 3197 PG 436

(22) MHK VENTURES, INC
DB 3179 PG 213

BL-10
-L- STA. 114+70.73 =
PINC 109+30.04

TS Sta. 102+70.26
SC Sta. 104+70.26
CS Sta. 105+64.41
ST Sta. 107+64.41
TS Sta. 107+90.20
SC Sta. 109+90.20

ISFD
TREES
WOODS
CONC MON
EIP
SDG SEE DETAIL 'C'
TR-TO EXISTING DITCH
DI W/ FLAT GRATE
DI W/ FLAT GRATES
200' TAPER
24" RCP
18" RCP
15" RCP
LAT 'V' DITCH SEE DETAIL 'D'
2' BASE DITCH W/CLASS 'B' RIP RAP – SEE DETAIL 'A'
NC 211
N 89° 01' 29.2" E
N 89° 59' 31.5" E
0.78Ac
0.05Ac
0.48Ac
0.22Ac
0.08Ac
0.56Ac
0.20Ac
0.00Ac
0.40Ac
0.13Ac
0.15Ac
0.24Ac
0.07Ac

MATCH LINE SEE SHEET 10 -LREV1- STA. 72+50

MATCH LINE SEE SHEET 12 -LREV1- STA. 86+00

SC Sta. 73+40.10

+25-LREV1- 90', 110.00

+42-LREV1- 110', 130'

+30-LREV1- 130'

+42-LREV1- 75', 90'

+72-LREV1- 75', 90'

MCDONALD FAMILY FARMS, INC
DB 3199 PG 190

ANNE MINROE
DB 3181 PG 549

BL-9
-L- STA. 101+97.44 =
PINC 96+57.54

DETAIL A
LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 2d, d, D, 2d, b, B, Fill Slope, Filter Fabric, F/Ft.

Min. D = 1Ft.
Max. d = 1Ft.
B= 2 Ft.
b= 5 Ft.

*When B is < 6.0'

Type of Liner= Class B Rip-Rap

FROM STA. 79+00 -LREV1- TO STA.87+00 -LREV1- RT

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground, 4d or Flatter, D, 4d or Flatter, Front Ditch Slope

Min. D= 1Ft.

FROM STA. 74+50 -LREV1- TO STA.75+50 -LREV1- LT
FROM STA. 78+00 -LREV1- TO STA.79+00 -LREV1- rT

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

Natural Ground, 2d, D, 2d, b, F/Ft., Fill Slope

Min. D= 1Ft.
b= 5 Ft.

FROM STA. 73+50 -LREV1- TO STA.75+50 -LREV1- rT

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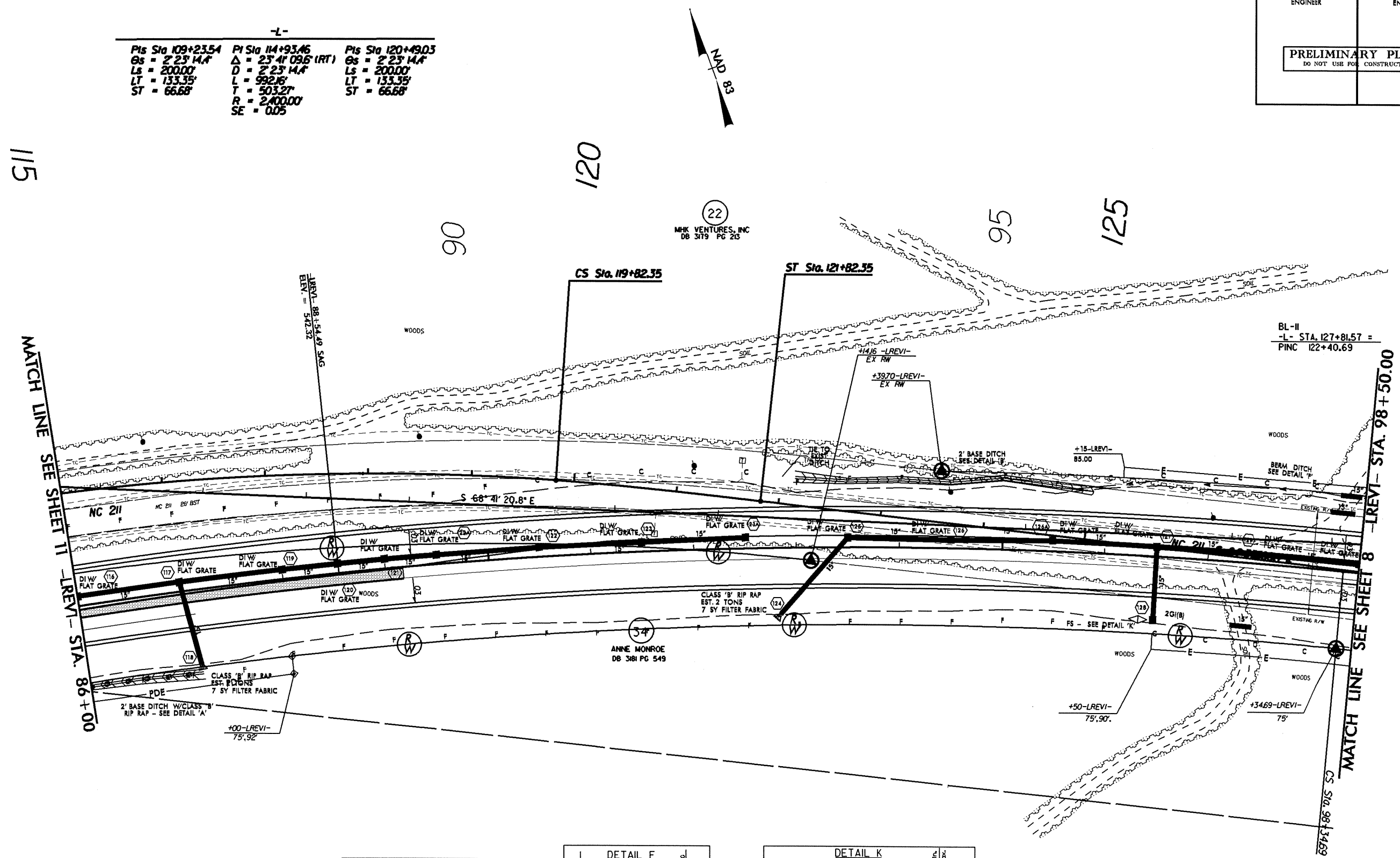
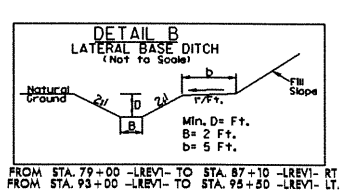
PROJECT REFERENCE NO.	SHEET NO.
R-2812	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

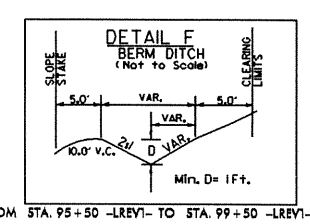
-L-

Pts Sta 109+23.54	Pt Sta 114+93.46	Pts Sta 120+49.03
Θs = 2°23' 14.4"	Δ = 23°41' 09.6" (RT)	Θs = 2°23' 14.4"
Ls = 200.00'	D = 2°23' 14.4"	Ls = 200.00'
LT = 133.35'	L = 992.16'	LT = 133.35'
ST = 66.68'	T = 503.27'	ST = 66.68'
	R = 2,400.00'	
	SE = 0.05	

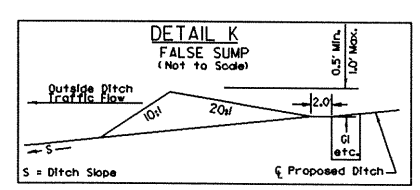




FROM STA. 79+00 -LREV1- TO STA. 87+10 -LREV1- RT
FROM STA. 93+00 -LREV1- TO STA. 95+50 -LREV1- LT.



FROM STA. 95+50 -LREV1- TO STA. 99+50 -LREV1- LT.



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MATCH LINE SEE SHEET 12 -LREVI- STA. 98+50

MATCH LINE SEE SHEET 14 -L- STA. 141+85

-LREVI-
Pis Sta 99+01.36
θs = 1°08'45.3"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

-LREVI- POT Sta. 103+95.71 BK. =
-L- POT Sta. 133+16.02 AH. =

-L- POT Sta. 133+16.02 =
-Y4- POT Sta. 12+70.99

-L- POT Sta. 140+66.12 =
-Y5- POT Sta. 13+59.19

-Y4-POT Sta. 10+00.00

-Y5-POT Sta. 10+00.00

BEG CONSTR. -Y5-12+64+/-

BL-78
-BY17- POT 5+00.00

BL-53
-BY4- POT 5+00.00

ST Sta. 100+34.69

PINC 127+87.31 =
-BY17- POT 8+65.03

BL-77
-L- STA. 133+27.84 =

BL-12
-L- STA. 140+89.83 =
PINC 135+51.36 =
-BY4- POT 9+87.90

-Y4-
-Y5-

ANNE MONROE
DB 1246 PG 383

ANNE MONROE
DB 381 PG 549

MHK VENTURES, INC
DB 397 PG 436

MHK VENTURES, INC
DB 379 PG 213

JON A. GILES
DB 704 PG 523

MOORE COUNTY
DB 175 PG 238

ABERDEEN CAROLINA AND WESTERN RAILROAD

SR 1291
ARCHIE RD.
2004 ADT
2025 ADT
1880
3000

NC 211
690
1400
9500
16900

1190
1600

DETAIL F
BERM DITCH
(Not to Scale)
SLOPE STAKE
10.0' V.C.
5.0'
VAR.
D
Min. D= 1Ft.
CLEARING LIMITS

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
Min. D= 1Ft.

DETAIL K
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
10d
20d
2.0'
0.5' Min.
1.0' Max.
℄ Proposed Ditch

DETAIL L
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
10d
20d
2'
0.5' Min.
1.0' Max.
℄ Proposed Ditch

FROM STA. 95+50 -LREVI- TO STA. 99+50 -LREVI- LT.
FROM STA. 95+50 -LREVI- TO STA. 99+50 -LREVI- LT.
FROM STA. 134+00 -L- TO STA. 139+90 -L- LT.

PROJECT REFERENCE NO. R-2812
SHEET NO. 13
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS
05/14/09 ADDED PUE ON PARCEL NOS. 37, 38, 39, 40, 41, 42, 43, & 44. ELIMINATED TCE ON PARCEL NOS. 37, 39, 40, 41, 42, & 43. REVISED TCE ON PARCEL NO. 44.

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MATCH LINE SEE SHEET 13 -L- STA 141+85

MATCH LINE SEE SHEET 14 -L- STA 155+85

-L-

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)

DETAIL L
FALSE SUMP
(Not to Scale)

PI's Sta 149+01.79
Δs = 5° 30' 00.0"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

PI's Sta 153+92.81
Δ = 27° 04' 01.0" (RT.)
D = 5° 30' 00.0"
L = 830.48'
T = 424.38'
R = 1,637.02'
SE = 0.04

PI's Sta 158+65.60
Δs = 5° 30' 00.0"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

PROJECT REFERENCE NO.	SHEET NO.
R-2812	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
R-2812	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

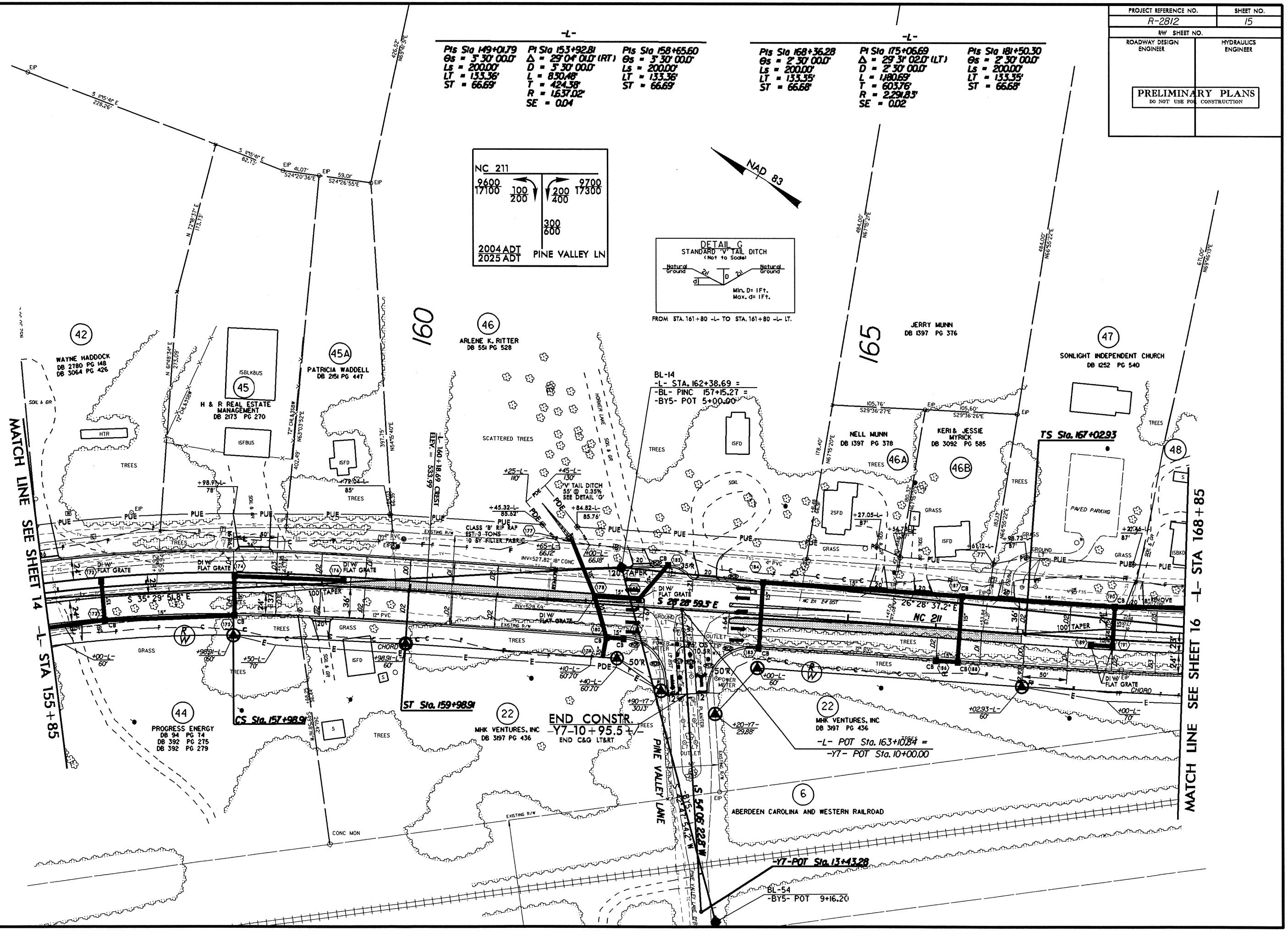
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-

Pls Sta 149+01.79	Pl Sta 153+92.81	Pls Sta 158+65.60
Θs = 3° 30' 00.0"	Δ = 29° 04' 01.0" (RT)	Θs = 3° 30' 00.0"
Ls = 200.00'	D = 3° 30' 00.0"	Ls = 200.00'
LT = 133.36'	L = 830.48'	LT = 133.36'
ST = 66.69'	T = 424.38'	ST = 66.69'
	R = 1,637.02'	
	SE = 0.04	

-L-

Pls Sta 168+36.28	Pl Sta 175+06.69	Pls Sta 181+50.30
Θs = 2° 30' 00.0"	Δ = 29° 31' 02.0" (LT)	Θs = 2° 30' 00.0"
Ls = 200.00'	D = 2° 30' 00.0"	Ls = 200.00'
LT = 133.35'	L = 1,180.69'	LT = 133.35'
ST = 66.68'	T = 603.76'	ST = 66.68'
	R = 2,291.83'	
	SE = 0.02	



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PROJECT REFERENCE NO.	SHEET NO.
R-2812	16
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS 8/17/99

NAD 83

-L-

Pis Sta 168+36.28	PI Sta 175+06.69	Pis Sta 181+50.30
θs = 2° 30' 00.0"	Δ = 29° 31' 02.0" (LT)	θs = 2° 30' 00.0"
Ls = 200.00'	D = 2° 30' 00.0"	Ls = 200.00'
LT = 133.35'	L = 1,180.69'	LT = 133.35'
ST = 66.68'	T = 603.76'	ST = 66.68'
	R = 2,291.83'	
	SE = 0.02	

104.99'
N29°13'22"W
93.41'
N28°21'40"W
115.00'
N28°21'40"W
670.79'
N28°39'28"W
N28°39'32"E

170

175

180

48
DONNIE WILLARD
DB 817 PG 438

50
MCDONALD FAMILY FARMS, LLC
DB 3199 PG 190

51
RETIREMENT ACCOUNTS INC.
DB 841 PG 277

50
MCDONALD FAMILY FARMS, LLC
DB 3199 PG 190

MATCH LINE SEE SHEET 15 -L- STA 168+85

MATCH LINE SEE SHEET 17 -L- STA 182+35

SC Sta. 169+02.93

BL-15
-L- STA. 171+07.90 =
PINC 165+85.20

+/- 173+55.19 SAG
ELEV. = 511.80

CS Sta. 180+83.62

+/- 181+36.37 CSGST
ELEV. = 518.34

GPS R2812-3
-L- STA. 179+57.31 =
PINC 174+34.42

NC 211

S 46°-09'-16.5" E

105.08'
S60°21'56"E

WOODS

TREES

ISBKD

GRASS

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

CLASS 'B' RIP RAP
EST. 5 TONS
14 SY FILTER FABRIC

24" CSP
W/2 ELBOWS

18" CSP
W/2 ELBOWS

REMOVE EXISTING PIPE

DI W/ FLAT GRATE

CB 24" CONC
INV=501.76

INV=504.50

2' BASE DITCH
SEE DETAIL 'B'

METER

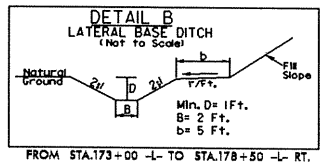
4" PVC

12" PVC

PINEWILD PROJECT LIMITED PARTNERSHIP
DB 729 PG 408

ABERDEEN CAROLINA AND WESTERN RAILROAD

DETAIL B
LATERAL BASE DITCH
(Not To Scale)



Min. D= 1Ft.
B= 2 Ft.
b= 5 Ft.

FROM STA.173+00 -L- TO STA.178+50 -L- RT.

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PROJECT REFERENCE NO.	SHEET NO.
R-2812	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

NAD 83

185

190

195

MATCH LINE SEE SHEET 16 -L- STA 182+35

ST Sta. 182+83.62

+35-L- 76'

+83.62-L- 60'

+83.62-L- 60'

WOODS

+30-L- 60'80'

+55-L- 60'80'

+30-L- 79.48'

+55-L- 80'

CLASS 'B' RIP RAP
EST. 5 TONS
14 SY FILTER FABRIC

PDE

PUE

NC 211

NC 211 24" BST

24" CMP

18" CONC

12" PVC

TREES

+83.62-L- 60'

+70-L- 60'65'80'

+00-L- 60'65'80'

-L- ELEV. = 526.36

-L- STA. 184+40 SAG

52

PINEWILD PROJECT LIMITED PARTNERSHIP
DB 729 PG 408

WOODS

GPS R2812-4
-L- STA. 191+37.71 =
PINC 186+16.26

50

MCDONALD FAMILY FARMS, LLC
DB 3199 PG 190

+00-L- 60'

-L- ELEV. = 526.76

-L- STA. 192+30.10 CREST

+30.00-L- 70'

2'6" CONC C&G

S 63°00'03"E

100' TAPER

REMOVE EXISTING PIPE

18" CONC

FIRST BAPTIST CHURCH OF PINEHURST, INC
DB 2597 PG 255

54

N 41°24'55" E 99.00'

S 63°17'31" E

+31.78-L- 60'

+25-L- 60'85'

CAROLINA POWER AND LIGHT R/W
PC 4 SLIDE 323

+30.00-L- 90'

+30-L- 60'90'

+65-L- 60'90'

+65.00-L- 90'

CLASS 'B' RIP RAP
EST. 5 TONS
14 SY FILTER FABRIC

+48.14-L- 75'

S 63°13'55.3" E

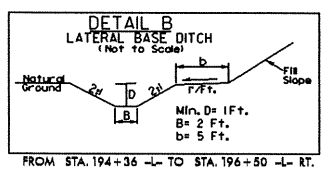
PDE BASE DITCH
SEE DETAIL 'B'

-L- ELEV. = 525.42

-L- STA. 194+87.23 SAG

MATCH LINE SEE SHEET 18 -L- STA 195+85

DETAIL B
LATERAL BASE DITCH
(Not to Scale)



Min. D= 1Ft.
B= 2 Ft.
b= 5 Ft.

FROM STA. 194+36 -L- TO STA. 196+50 -L- RT.

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MATCH LINE SEE SHEET 17 -L- STA 195+85

MATCH LINE SEE SHEET 19 -L- STA 209+85

NC 211
9700 / 17300
200 / 550
800 / 1050
10300 / 17800
1900 / 1800
2004 ADT
2025 ADT
GLASGOW RD

-Y8-POT Sta. 14+23.81

-Y8-10+90+/-
END CONSTR.
END C&G LT&RT
END SW LT
END SW LT R/W

-L- POT Sta. 198+86.16 =
-Y8- POT Sta. 10+00.00

-L- STA. 198+57.92 =
PINC 193+36.48

BL-55
-L- STA. 198+57.92 =
PINC 193+36.48

BL-18
-L- STA. 204+94.05 =
PINC 199+75.02

-L- STA. 205+22.07 CREST
ELEV. = 537.33

TS Sta. 207+46.79

S 26°57'47.2"W

S 63°00'00"E

S 65°24'08.2"E

S 58°04'07.8"E

S 00°00'45"W 381.85'

N27°24'27"E 315.00'
N27°24'17"E 312.46'
N27°24'33"E 311.65'
N27°23'48"E 309.21'
N27°22'31"E 306.78'
N27°22'56"E 303.53'
N27°24'13"E 301.89'
N25°01'58"E 296.52'
S26°01'09"W 301.08'

N63°32'07"W 50.01'
N63°32'09"W 50.01'
N63°32'07"W 50.01'
N63°32'09"W 50.01'
N63°32'07"W 50.01'
N63°32'09"W 50.01'
N63°32'07"W 50.01'
N63°32'09"W 50.01'
N63°32'07"W 50.01'
N63°32'09"W 50.01'
N63°32'08"W 49.96'
N63°32'07"W 50.01'
N63°32'09"W 50.01'
N63°32'07"W 50.01'
N63°32'09"W 44.71'
N63°32'07"W 52.07'
N63°32'08"W 56.21'
N63°32'54"W 3.80'
N69°36'25"W 51.55'
N69°36'25"W 55.20'

CAROLINA POWER AND LIGHT R/W
PC 4 SLIDE 323

CAROLINA POWER AND LIGHT
PC 4 SLIDE 323

PINEWILD PROJECT LIMITED PARTNERSHIP
DB 729 PG 408

JON A. GILES
DB 96 PG 321
PC 4 SLIDE 323

LEONARD SHAFFER
DB 3096 PG 49
PC 4 SLIDE 323

LEONARD SHAFFER
DB 3073 PG 568
PC 4 SLIDE 323

LEONARD SHAFFER
DB 3073 PG 566
PC 4 SLIDE 323

LEONARD SHAFFER
DB 3100 PG 63
PC 4 SLIDE 323

PHYLLIS D. SEXTON
DB 3073 PG 564
PC 4 SLIDE 323

PHYLLIS SEXTON
DB 3571 PG 124
PC 4 SLIDE 323

LEONARD SHAFFER
DB 3074 PG 49
PC 4 SLIDE 323

LEONARD SHAFFER
DB 3061 PG 271
PC 4 SLIDE 323

MCDONALD FAMILY FARMS, LLC
DB 3699 PG 190

FIRST BAPTIST CHURCH OF PINEHURST, INC
DB 2597 PG 251
DB 2597 PG 255

/LEWIS M. METTS /
DB 3467 PG 59

DETAIL B
LATERAL BASE DITCH
(Not to Scale)

DETAIL F
BERM DITCH
(Not to Scale)

FROM STA. 194+36 -L- TO STA. 196+50 -L- RT.

FROM STA. 199+60 -L- TO STA. 202+00 -L- RT.

NAD 83

200

205

PAVED PARKING

PAVED DR

ACCESS EASEMENT

TREES

GRASS

SOIL & GRAVEL

SOIL & GR

ISFBUS

POWER METER

CONC MON

72" CHL&SSBW

5' CONC SIDEWALK

6' CONC C&G

100' TAPER

REMOVE EXISTING PAVEMENT

TIE TO EXIST. PAVEMENT

4'-6" CONCRETE CHORD

DUAL USE

*NOTE: 6' DIP PLACED BY MAPPING 2-24-09

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
R-2812	18
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PROJECT REFERENCE NO.	SHEET NO.
R-2812	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

-Y10-
PI Sta 11+64.54
Δ = 9°44'35.1" (RT)
D = 11°27'33.0"
L = 85.02'
T = 42.61'
R = 500.00'

PI Sta 11+93.19
Δ = 3°10'02.5" (LT)
D = 28°38'52.4"
L = 108.62'
T = 55.69'
R = 200.00'

-L-
Pts Sta 210+80.13
Θs = 2°17'30.6"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

PI Sta 217+82.99
Δ = 28°33'17.9" (LT)
D = 2°17'30.6"
L = 1245.95'
T = 636.20'
R = 2500.00'

Pts Sta 224+59.41
Θs = 2°17'30.6"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

2004 ADT / 2025 ADT	ELLIS RD	SR 1216 JUNIPER LAKE RD
	200 / 300	1100 / 2500
10300 / 17800	50 / 50	150 / 250
10400 / 18000	450 / 1200	650 / 1300
10600 / 18100		

NC 211

NAD 83

MATCH LINE SEE SHEET 18 -L- STA 209+85

MATCH LINE SEE SHEET 20 -L- STA 222+85

ELLIS RD

SR 1216 JUNIPER LAKE RD

-Y9- Sta. 10+00.00

SC Sta. 211+45.79

PC Sta. 11+21.95

BEG CONSTR. -Y9-STA 11+57.5+/- BEG C&G RT

PT Sta. 12+06.95

BEG C&G 12.93 LT

-Y10- POT Sta. 10+00.00

BEG CONSTR. -Y10-STA 11+37.5+/- BEG C&G LTART

-Y10- PC Sta. 11+37.50

-Y10- PT Sta. 12+45.12

BL-56 -BY6- POT 5+00.00

BL-20 -L- STA. 221+05.58 = PINC 215+86.29

BL-19 -L- STA. 213+02.41 = -BL- PINC 207+85.56 -BY6- POT 10+70.97

-L- POS Sta. 210+14.31 = -Y9- POT Sta. 12+51.07

-L- POT Sta. 213+14.69 = -Y10- POT Sta. 13+02.84

JUNIPER LAKE BUSINESS PARK DB 3401 PG 303 PC 6 SLIDE 678

COMMERCIAL NET LEASE REALTY DB 3079 PG 324 PC 6 SLIDE 847

MONTGOMERY FARMS, LLC DB 550 PG 423

FRANCIS MASER DB 3044 PG 228

CARTER GRINE DB 2881 PG 285

CARTER GRINE DB 2881 PG 289

HOWARD HARRIS DB 2002E PG 431

JEFFREY ETHERIDGE DB 1304 PG 3

CHARLES DINKEL DB 1345 PG 228

PROGRESS ENERGY PC 4 SLIDE 323

FOUR SEASONS REALTY DB 968 PG 151 PC 4 SLIDE 324

LEONARD SHAFFER DB 3100 PG 63 PC 4 SLIDE 323

LEONARD SHAFFER DB 3300 PG 65 PC 4 SLIDE 323

LEONARD SHAFFER DB 3107 PG 210 PC 4 SLIDE 323

LEONARD SHAFFER DB 3107 PG 200 PC 4 SLIDE 323

LEONARD SHAFFER DB 3107 PG 216 PC 4 SLIDE 323

LEONARD SHAFFER DB 3100 PG 71 PC 4 SLIDE 323

LEONARD SHAFFER DB 3166 PG 406 PC 4 SLIDE 323

LEONARD SHAFFER DB 361 PG 379 PC 4 SLIDE 323

LEONARD SHAFFER DB 3096 PG 551 PC 4 SLIDE 324

LEONARD SHAFFER DB 3097 PG 240 PC 4 SLIDE 324

LEONARD SHAFFER DB 3097 PG 246 PC 4 SLIDE 324

LEONARD SHAFFER DB 3100 PG 75 PC 4 SLIDE 324

LEONARD SHAFFER DB 3100 PG 59 PC 4 SLIDE 324

TWO EXPOSED 1/4" TAN TELEPHONE CABLES AS OF 6/15/00

GAS PUMPS U/MTL CANOPY

ISBLKBUS

ISMTLBUS

WOODS

TREES

SOIL

GR

EIP

CONC MON

CB

DI

DI W/ FLAT GRATE

SPECIAL CUT DITCH SEE DETAIL 'C'

FS - SEE DETAIL 'L'

CLASS 'B' RIP RAP EST. 3 TONS 14 SY FILTER FABRIC

TYPE 350 E

ACCESS EASEMENT

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground | 4H | D | 4:1 or Flatter | Front Ditch Slope

Min. D= 1Ft.

DETAIL L
FALSE SUMP
(Not to Scale)

Outside Ditch Traffic Flow | 20ft | 6m | 2' | 0.5' Min. 1.0' Max. | S | Q etc.

S=Ditch Slope | ℄ Proposed Ditch

FROM STA. 213+70 -L- TO STA. 221+75 -L- LT.

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MATCH LINE SEE SHEET 19 -L- STA 222+85

-L-

Pts Sta 220+80.5
Gs = 2.17.30.6
Ls = 200.00'
LT = 133.34'
ST = 66.68'

Pt Sta 217+82.99
Δ = 28°33'17.9" (LT)
D = 2°17'30.6"
L = 1245.95'
T = 636.20'
R = 2500.00'

CS Sta. 223+92.74

ST Sta. 225+92.74

TS Sta. 228+21.09

SC Sta. 230+21.09

Pts Sta 224+59.41
Gs = 2.17.30.6
Ls = 200.00'
LT = 133.34'
ST = 66.68'

Pts Sta 229+54.43
Δ = 1°54'35.5"
D = 1°54'35.5"
L = 1297.13'
T = 648.64'
R = 3000.00'

Pts Sta 236+79.95
Δ = 24°46'23.6" (RT)
D = 1°54'35.5"
L = 1297.13'
T = 658.86'
R = 3000.00'

Pts Sta 241+94.89
Gs = 1.54.35.5
LS = 200.00'
LT = 133.34'
ST = 66.67'

NAD 83

FOUR SEASONS REALTY DB 968 PG 151 PC 4 SLIDE 324

JEFFREY ETHERIDGE DB 1504 PG 3

JANICE ARNETTE DB 564 PG 88

EDU-CARE DB 496 PG 183

JANICE ARNETTE DB 564 PG 115

DANIEL ADAMS DB 1789 PG 422

KENNETH KINTNER DB 1027 PG 52

JANET RHULE DB 2963 PG 500

LEONARD SHAFFER DB 3089 PG 235 PC 4 PG 324

D. P. MCKENZIE DB 29 PG

PROGRESS ENERGY PC 4 SLIDE 323

CAT-1

CLASS 'B' RIP RAP 1.5 TONS 1 SY FILTER FABRIC

2' BASE DITCH W/CLASS 'B' RIP RAP - SEE DETAIL 'A'

2' BASE DITCH SEE DETAIL 'B'

CLASS 'B' RIP RAP EST. 2 TONS 7 SY FILTER FABRIC

15" CSP W/2 ELBOWS

REMOVE EXISTING PIPE

REMOVE DI W/ FLAT GRATE

DI W/ FLAT GRATE

DI W/ CONC MON

SPECIAL CUT DITCH - SEE DETAIL 'C'

FS - SEE DETAIL 'I'

LATERAL 'V' DITCH SEE DETAIL 'D'

ACCESS EASEMENT

WOODS

PUE

PDE

DETAIL A
LATERAL BASE DITCH
(Not to Scale)

Type of Liner= Class B Rip-Rap
FROM STA. 232+50 -L- TO 234+65 -L- RT.

DETAIL B
LATERAL BASE DITCH
(Not to Scale)

FROM STA. 234+65 -L- TO STA. 236+25 -L- RT.

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)

FROM STA. 225+50 -L- TO STA. 233+00 -L- LT.

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

FROM STA. 235+60 -L- TO STA. 239+39 -L- LT.

DETAIL L
FALSE SUMP
(Not to Scale)

0.5' Min.
1.0' Max

230

235

PROJECT REFERENCE NO.	SHEET NO.
R-2812	20

RW SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCH LINE SEE SHEET 22 -L- STA 249+85

MATCH LINE SEE SHEET 20 -L- STA 235+85

D. P. MCKENZIE ESTATE DB 29 PG 461 (98)

SC Sta. 249+8173

TS Sta. 247+8173

ST Sta. 245+8122

CS Sta. 243+8122

TYPE 350

DRAIN POND

WOODS

EXISTING DITCH SPILLS OUT

CLASS 'I' RIP RAP EST. 2 TONS 6 SY FILTER FABRIC

CLASS 'I' RIP RAP EST. 2 TONS 7 SY FILTER FABRIC

SEE DETAIL 'B'

SEE DETAIL 'M'

EMBANKMENT FILL IN POND

DUAL USE

SURF ACE

FLAT GRATE

D.W. FLAT GRATE

TDE

PUE

PDE

CHORD

245

240

NAD 83

N 79° 31' 55.2" E

S 49° 02' 04.5" W

S 78° 07' 57.7" E

S 64° 22' 18.8" E

S 09° 41' 16" E

S 09° 38' 42" E

S 09° 05' 6" E

S 07° 59' 46" E

S 00° 41' 03" W

S 02° 25' 00" W

S. 90° 41' 09.6" E

13-312 PINC 7+24.13
ELEV=435.10'
REBAR & CAP SET

13-311 PINC 8+97.99
ELEV=434.60'
REBAR & CAP SET

13-310 PINC 10+51.18
ELEV=431.42'
REBAR & CAP SET

13-309 PINC 11+64.20
ELEV=429.07'
REBAR & CAP SET

13-308 PINC 12+84.25
ELEV=439.53'
REBAR & CAP SET

13-307 POT 14+66.17
ELEV=430.00'
REBAR & CAP SET

-T3- P01 5+00.00
ELEV=443.43'

BL-22 PINC 236+71.67=
-L- STA. 241+86.46

BND J.S.

"NOTE: 12" HDPE WATER LINE PLACED BY MAPPING 2-24-09"

JANET RHULE DB 2963 PG 500 (96)

-L-

PI Sta 256+79.95
Δ = 24° 46' 23.8" (RT)
D = 1° 54' 35.5"
L = 1297.13'
T = 658.86'
R = 3000.00'

PI Sta 249+84.62
Δ = 2° 30' 59.2" (RT)
D = 1° 54' 35.5"
L = 131.76'
T = 65.89'
R = 3000.00'

PIs Sta 243+84.89
Ds = 1° 54' 35.5"
LT = 133.34'
Ls = 200.00'
ST = 66.67'

PIs Sta 248+52.07
Ds = 1° 54' 35.5"
LT = 133.34'
Ls = 200.00'
ST = 66.67'

DETAIL H
STANDARD TAIL DITCH
(Not to Scale)

DETAIL B
LATERAL BASE DITCH
(Not to Scale)

DETAIL M
EMBANKMENT FILL IN POND
(Not to Scale)

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

FROM STA. 241+50 -L- TO STA. 241+50 -L- RT.

FROM STA.234+55 -L- TO STA.236+25 -L- RT.

FROM STA. 244+60 -L- TO STA. 243+65 -L- LT

FROM STA. 235+60 -L- TO STA. 239+39 -L- LT.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER

PROJECT REFERENCE NO.	SHEET NO.
R-2812	21

RW SHEET NO.

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-2812	22
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCH LINE SEE SHEET 23 -L- STA 263+88

MATCH LINE SEE SHEET 21 -L- STA 249+85

-L-
PI Sta 259+68.29
Δ = 10° 21' 55.5" (LT)
D = 1°08' 45.3"
L = 904.55'
T = 453.5'
R = 5,000.00'

-LREV3-
PI Sta 259+73.44
Δ = 7° 08' 21.4" (LT)
D = 1°08' 45.3"
L = 623.02'
T = 311.91'
R = 5,000.00'

PI Sta 255+94.86
Δ = 1°08' 45.3"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

PI Sta 263+51.22
Δ = 1°08' 45.3"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

PI Sta 251+17.17
Δs = 1°54' 35.5"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

PI Sta 254+68.12
Δs = 1°08' 45.3"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

-L-

DETAIL F
BERM DITCH
(Not to Scale)

DETAIL H
STANDARD TAIL DITCH
(Not to Scale)

DETAIL B
LATERAL BASE DITCH
(Not to Scale)

DETAIL J
BERM DITCH W/RIP RAP
(Not to Scale)

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)

FROM STA. 252+00 -L- TO STA. 254+00 -LREV3- RT
FROM STA. 258+50 -LREV3- TO STA. 265+50 -LREV3- RT
FROM STA. 259+00 -LREV3- TO STA. 265+00 -LREV3- LT

FROM STA. 254+00 -LREV3- TO STA. 256+83 -LREV3- LT.
FROM STA. 256+83 -LREV3- TO STA. 265+50 -LREV3- RT

FROM STA. 255+25 -LREV3- TO STA. 255+83 -LREV3- LT.

FROM STA. 254+00 -LREV3- TO STA. 256+50 -LREV3- RT
FROM STA. 256+50 -LREV3- TO STA. 265+50 -LREV3- RT

-LREV3- SC Sta. 256+61.53
-L- TS Sta. 254+61.53

-LREV3- TS Sta. 253+34.78 SC Sta. 255+34.78

-L- POT Sta. 253+34.50 BK ≡
-LREV3- POT Sta. 253+34.50 AH.

ST Sta. 252+50.49
CS Sta. 250+50.49

BL-24
-L- STA. 263+27.93 =
PINC 258+12.76

BL-23
-L- STA. 257+51.07 =
PINC 252+33.62

LREV3- 258+08.94 CREST
ELEV. = 473.32

NAD 83

260

255

250

JENNE GRAHAM
DB 3179 PG 430

HARRY GRAHAM
DB 336 PG 565

D. P. MCKENZIE ESTATE
DB 29 PG 461

PHYLLIS SEXTON
DB 3089 PG 232

PROGRESS ENERGY
PC 4 SLIDE 325

LEONARD SHAFFER
DB 342 PG 579
PC 4 SLIDE 325

LEONARD SHAFFER
DB 358 PG 415
PC 4 SLIDE 325

LEONARD SHAFFER
DB 342 PG 577
PC 4 SLIDE 325

LEONARD SHAFFER
DB 3400 PG 63
PC 4 SLIDE 325

LEONARD SHAFFER
DB 368 PG 169
PC 4 SLIDE 325

LEONARD SHAFFER
DB 368 PG 169
PC 4 SLIDE 325

LEONARD SHAFFER
DB 368 PG 43
PC 4 SLIDE 325

LEONARD SHAFFER
DB 351 PG 373
PC 4 SLIDE 325

LEONARD SHAFFER
DB 351 PG 375
PC 4 SLIDE 325

LEONARD SHAFFER
DB 351 PG 371
PC 4 SLIDE 325

THOMAS COLEMAN
DB 307 PG 264
PC 4 SLIDE 325

REVISIONS

8/17/99

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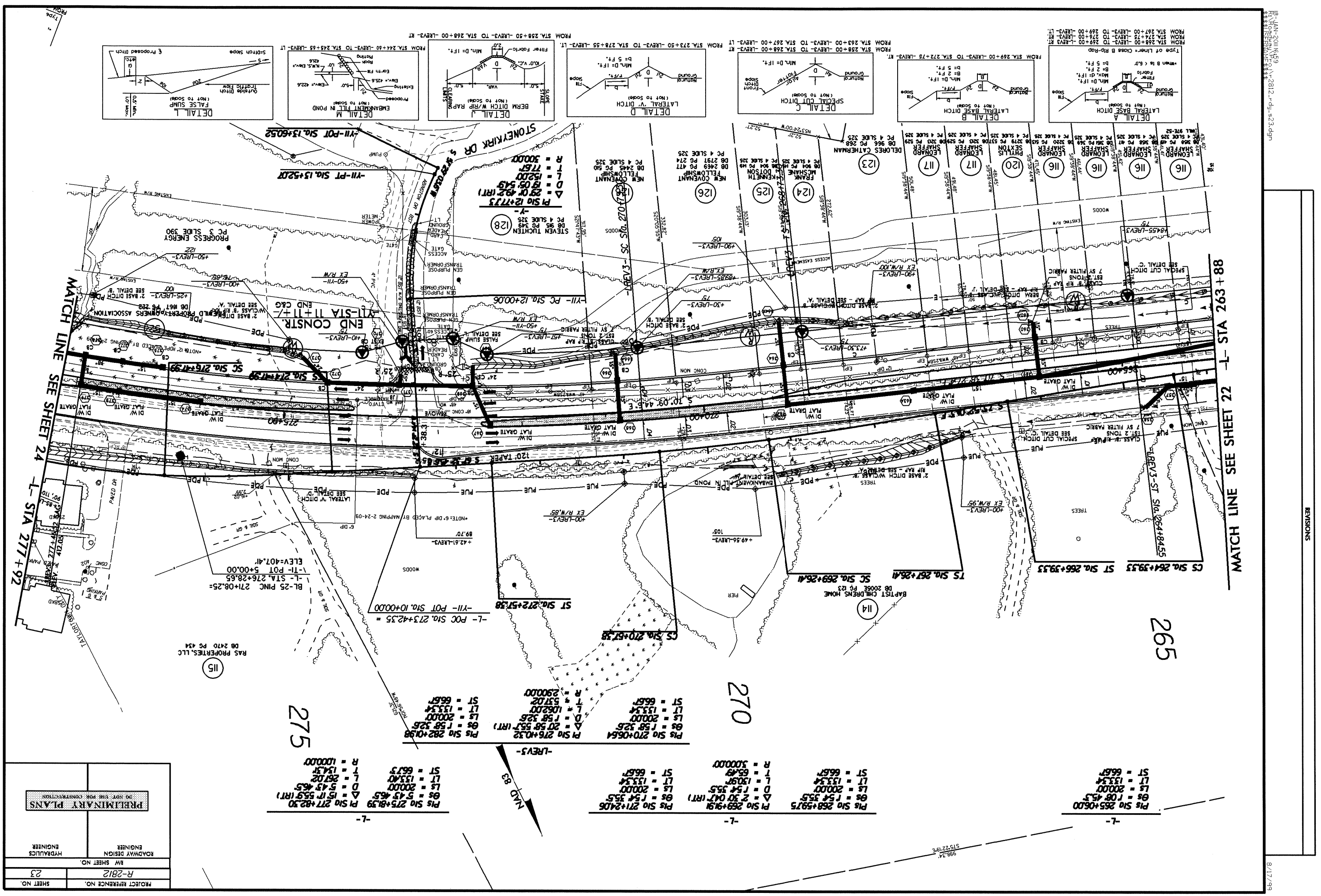

MATCH LINE SEE SHEET 24 -L- STA 277+92
MATCH LINE SEE SHEET 22 -L- STA 263+88
STONEYKIRK DR
END CONSTR.
-Y11-STA 11+11+/-
END C&G
-Y11-PT Sta. 13+52.07
-Y11-POT Sta. 13+60.52
-Y11-PC Sta. 12+00.06
-L- POC Sta. 273+42.35 =
-Y11- POT Sta. 10+00.00
-L- STA. 276+28.65
BL-25 PINC 271+08.25=
-Y11- POT 5+00.00
ELEV=407.41'
RAS PROPERTIES, LLC
DB 2470 PG 434
BAPTIST CHILDRENS HOME
DB 2006E PG 123
DELORES CATHERMAN
DB 966 PG 268
PC 4 SLIDE 325
STEVEN TUCHTEN
DB 915 PG 349
PC 4 SLIDE 325
PROGRESS ENERGY
PC 3 SLIDE 390
NAD 83
-LREV3-
-L-
Pls Sta 265+06.00
Θs = 1°08' 45.3"
Ls = 200.00'
LT = 133.34'
ST = 66.67'
Pls Sta 268+59.75
Θs = 1°54' 35.5"
Ls = 200.00'
LT = 133.34'
ST = 66.67'
Pl Sta 269+91.91
Δ = 2°30' 04.7" (RT)
D = 1°54' 35.5"
L = 130.97'
T = 65.49'
R = 3,000.00'
Pls Sta 271+24.06
Θs = 1°54' 35.5"
Ls = 200.00'
LT = 133.34'
ST = 66.67'
Pls Sta 270+06.64
Θs = 1°58' 32.6"
Ls = 200.00'
LT = 133.34'
ST = 66.67'
Pl Sta 276+10.32
Δ = 20°58' 55.7" (RT)
D = 1°58' 32.6"
L = 1,062.00'
T = 537.02'
R = 2,900.00'
Pls Sta 282+01.98
Θs = 1°58' 32.6"
Ls = 200.00'
LT = 133.34'
ST = 66.67'
Pls Sta 275+81.39
Θs = 5°43' 46.5"
Ls = 200.00'
LT = 133.40'
ST = 66.73'
Pl Sta 277+82.30
Δ = 15°17' 55.9" (RT)
D = 5°43' 46.5"
L = 267.02'
T = 134.31'
R = 1,000.00'
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
R/W SHEET NO.
R-2812
23
PROJECT REFERENCE NO.
SHEET NO.
REVISIONS
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2812	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99
REVISIONS

-L-
Pis Sta 279+81.74
Θs = 5°45'46.5"
Ls = 200.00'
LT = 133.40'
ST = 66.73'

-L-
Pis Sta 287+13.10
Θs = 2°17'30.6"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

NAD 83

280

285

290

660.73' N07°23'47"W

303.53' S42°05'59"W

CONC MON

ISLET S08°20'40"E

115 RAS PROPERTIES, LLC DB 2470 PG 434

130 PHILLIP BROWN DB 2478 PG 506

132 INTERSTATE HOLDINGS, LLC DB 3574 PG 357 PC 4 SLIDE 211

133 ALEX SPEIGHT DB 1229 PG 474 PC 4 SLIDE 211

134 FIRST HEALTH OF THE CAROLINAS DB 1148 PG 400 PC 4 SLIDE 211

135 LEACH INVESTMENT PROPERTIES, LLC DB 3737 PG PC 4 SLIDE

GEORGE P. BONVILLE DB 1148 PG 449 PC 4 SLIDE 211

MARK SMITH DB 1584 PG 421 PC 4 SLIDE 211

WESTGATE DR

BL-82 -BY18- POT 5+00.00

BL-81 PINC 282+17.59= -L- STA. 287+44.36 -BY18- POT 7+59.34

TS Sta. 285+79.76

SC Sta. 287+79.76

CS Sta. 279+15.00

ST Sta. 283+50.00

-LREV3- CS Sta. 281+35.30

-LREV3- ST Sta. 283+35.30

-LREV3- TS Sta. 287+23.23

-LREV3- SC Sta. 289+73.23

MATCH LINE SEE SHEET 23 -L- STA 277+92

MATCH LINE SEE SHEET 25 -L- STA 290+92

PROGRESS ENERGY PC 3 SLIDE 390

FINEWILD PROPERTY OWNERS ASSOCIATION DB 1867 PG 222

EDWARD ADAMS DB 2953 PG 589 PC 3 SLIDE 390

R-FORE DEVELOPERS, LLC DB 3286 PG 591 PC 3 SLIDE 390

WILLIAM SHEEHAN DB 2068 PG 402 PC 3 SLIDE 390

NOT A STREAM PER PD&EA

WOODS

ISMTLBUS

ISBKBUS

25FBUS

25SBKD

DO NOT DISTURB PARKING LOT 8" SANITARY SEWER

SPECIAL CUT DITCH SEE DETAIL 'C'

LIFT STATION

CLASS 'B' RIP RAP EST. 3 TONS

4' BASE SDG W/CLASS 'B' RIP RAP SEE DETAIL 'A'

4' BASE LATERAL DITCH W/CLASS 'B' RIP RAP SEE DETAIL 'A'

2' BASE LATERAL DITCH SEE DETAIL 'B'

2' BASE LATERAL DITCH W/CLASS 'B' RIP RAP SEE DETAIL 'A'

4' BASE LATERAL DITCH SEE DETAIL 'Z'

LATERAL 'V' DITCH SEE DETAIL 'D'

CLASS 'I' RIP RAP EST 75 SY

48" BLK WALL

8" SANITARY SEWER

EXISTING R/W

30'R

DETAIL A
LATERAL BASE DITCH
(Not to Scale)
Min. D= 1Ft.
Max. d= 1Ft.
B= 2 Ft.
b= 5 Ft.
*When B is < 6.0'
Type of Liner= Class B Rip-Rap
FROM STA. 282+00 -LREV3- TO 288+30 -LREV3- RT.

DETAIL B
LATERAL BASE DITCH
(Not to Scale)
Min. D= 1Ft.
B= 2 Ft.
b= 5 Ft.
FROM STA. 281+25 -LREV3- TO STA. 282+00 -LREV3- RT.

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)
Min. D= 1Ft.
FROM STA. 284+00 -LREV3- TO STA. 287+50 -LREV3- LT.
FROM STA. 287+50 -LREV3- TO STA. 292+00 -LREV3- LT.

DETAIL D
LATERAL 'V' DITCH
(Not to Scale)
Min. D= 1Ft.
b= 5 Ft.
FROM STA. 273+50 -LREV3- TO STA. 278+55 -LREV3- LT.

DETAIL 7
LATERAL BASE DITCH
(Not to Scale)
Min. D= 1Ft.
B= 4 Ft.
b= 5 Ft.
FROM STA. 277+87 -LREV3- TO STA. 279+50 -LREV3- LT

DETAIL U
SPECIAL CUT DITCH
(Not to Scale)
Min. D = 1Ft.
Max. d= 1Ft.
B= 4 Ft.
Type of Liner= Class B Rip-Rap
FROM STA. 282+00 -LREV3- TO STA.284+00 -LREV3- LT

DETAIL V
LATERAL BASE DITCH
(Not to Scale)
Min. D= 1Ft.
Max. d= 1Ft.
B= 4 Ft.
b= 5 Ft.
*When B is < 6.0'
Type of Liner= Class B Rip-Rap
FROM STA. 279+50 -LREV3- TO 281+25 -LREV3- RT.
FROM STA. 278+75 -LREV3- TO 282+00 -LREV3- LT.

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PROJECT REFERENCE NO.	SHEET NO.
R-2812	25
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

-WESTGATE-
PI Sta 11+83.02
Δ = 15° 15' 53.8" (RT)
D = 14° 19' 26.2"
L = 113.55'
T = 57.16'
R = 400.00'

-LREV3-
PI Sta 289+06.57
θs = 2° 18' 37.1"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

PI Sta 303+31.09
Δ = 57° 24' 13.0" (LT)
D = 2° 18' 37.1"
L = 2,484.67'
T = 1,357.86'
R = 2,480.00'

PI Sta 315+24.57
θs = 2° 18' 37.1"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

-L-
PI Sta 302+92.62
Δ = 62° 2' 35.9" (LT)
D = 2° 17' 30.6"
L = 2,720.91'
T = 1,512.86'
R = 2,500.00'

NAD 83

WESTGATE DR

TOP EL.=459.84'
MH
INV=450.54'

165.12'
N63°55'20"E
152.58'
N63°55'20"E

EIP

29.83'
N 68°19'09" W

ARC = 118.30'
RADIUS = 955.98'
CHORD BEARING = S 7°51'51" E

136

295

52.96'
N 76°26'04" W

N 13°58'26" E
102.69'

379.22'
N75°38'44"W

BUTLER INVESTMENTS
DB 554 PG 599

BL-57
-BY7- POT 5+00.00

SOIL

389.27'
N75°24'39"W

-Y12- POT Sta. 10+00

SR 1210 BEULAH HILL CHURCH RD

2004 ADT
2025 ADT

2200
3300

10700
18500

350
1550

1850
1750

12200
18700

NC 211

300

137

CAROLINA POWER AND LIGHT
DB 482 PG 299

POWER SUBSTATION

72" CMP, S 3.5% W

SR 1210 BEULAH HILL CHURCH RD
EXISTING R/W
EXISTING E/T

S 5° 08' 57.5" W
272.85'

BEG CONSTR.
-Y12-STA 11+75 +/-

BEG C&G
-Y12-STA 12+75 +/-

142

ITAC 143, LLC
DB 2884 PG 524

+50-Y12-
29.80'

+75-L-
85'

+50-Y12-
30.20'

+37.81-L-
75'

+30-L-
60'

50'R

POWER METER

+75-L-

MATCH LINE SEE SHEET 26 -L- STA 303+92

MATCH LINE SEE SHEET 24 -L- STA 290+92

-WESTGATE- POT Sta. 12+91.11

N 52°45'10" E

LINWOOD HIGGINS
DB 1345 PG 74
PC 4 SLIDE 211

135

SOIL

TOP EL.=451.86'
INV=445.86'
132.59'
N31°24'59" W

ISMTLBUS

RR SPIKE

BL-83
-BY19- POT 5+00.00

ISBKBUS

-WESTGATE- PT Sta. 12+39.41

BST+NOTE: PIPE STARTED 15" PLASTIC ENDED AS A 30" CONC.

-WESTGATE-PC Sta.11+25.86

END CONSTR.
-WESTGATE-STA.10+86 +/-
END C&G

ENT
LC
219
21

BST

SPECIAL CUT DITCH
SEE DETAIL 'C'

+05-L-
78.55'

+75-L-
81.68'

+00-L-
40.80'

261(D)

50'R

REMOVE DI

REMOVE CB

15" CMP

30" CSP

DI W/ FLAT GRATE

403

404

405

406

407

408

409

410

411

412

CB

TRAFFIC SIGNAL JB

TRAFFIC CONTROL LOOP

W/SIG L1

120' TAPER

CAT-1

12" DIP

PDE

+75-L-
15.85'
105'

+25-L-
75'
100'

CLASS 'B' RIP RAP
EST. 11 TONS
28 SY FILTER FABRIC

52

PROGRESS ENERGY
PC 3 SLIDE 390

N 22°25'15" E
28.28'

127.15'
S61°10'03" E

+14.4-L-
R/W

RIP RAP
@ CF TRANSITION

TIE TO EXISTING DITCH

72" WD

PUE

2' BASE SPECIAL CUT DITCH
W/CLASS B RIPRAP
SEE DETAIL 'T'

-L- POC Sta.292+44.78 =
-WESTGATE- POT Sta.10+00

TAYLORTOWN CITY LIMITS
PINEHURST CORPORATE LIMITS

-BL- S 59° 57' 27.2" E

+68.93-L-
60'

295+00

300+00

30" 4° PVC

100' TAPER

10" PVC

4" PVC

120' TAPER

-34.20 -L-
EX. R/W

+60.57-L-
EX.R/W

+75.52-L-
100'

BL-27
-BL- PINC 297+15.99=
-L- STA. 302+35.14
-BY7- POT 10+18.08

-L- POC Sta.302+21.59 =
-Y12- POT Sta.13+87.85

141

IRENE CORBIN
DB 1047 PG 368
MB 10 PG 11

141A

RICHARD STARNER
DB 547 PG 596
MB 10 PG 11

CONC
POOL

ISBKD

PROPOSED SIGNAL

BL-26 PINC 285+72.23=
-L- STA. 290+97.36
-BY19- POT 1+57.60

PINEWILD PROJECT
LIMITED PARTNERSHIP
DB 729 PG 409

+14.4-L-
R/W

+PL -L-
R/W, 100'

WOODS

JACK DAMRON
DB 953 PG 435
PC 3 SLIDE 390

ISBKD

OK

STEVEN GEORGILAS
DB 826 PG 486
PC 3 SLIDE 390

N 19°47'49" W
264.15'
S 80°05'03" E

PINEHURST CORPORATE LIMITS

DONALD THOMAS
DB 1466 PG 239
MB 10 PG 11

138

JERIANNE RANERI
DB 2003E PG 412
MB 10 PG 11

S 27°58'17" W
280.10'

139

JOHN RANDALL
DB 1005 PG 479
MB 10 PG 11

140

PAMELA C. BRADLEY
DB 3597 PG 41
MB 10 PG 11

S 20°50'03" W
184.74'

S 69°09'57" E
232.21'

S 22°10'33" W
305.43'

DETAIL 138A
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground
4H
D
dT
Filter Fabric
B
4H or Flatter
Front Ditch Slope

Min. D = 1Ft.
Max. d= 1Ft.
B= 2 Ft.

Type of Liner= Class B Rip-Rap
FROM STA. 295+50 -LREV3- TO STA. 303+50 -LREV3- LT

N 02°52'03" W
114.00'

N 28°24'36" W
229.07'

TERRY MERRITT
DB 670 PG 202
PC 4 SLIDE 389

BARTON WALKER
DB 738 PG 473
MB 10 PG 11

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*****DESIGNFILE*****

PROJECT REFERENCE NO.	SHEET NO.
R-2812	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

CENTRAL PARK AVE

4380 / 8000

1810 / 2670 | 1300 / 3190

NC 211

12200 / 18700 | 3410 / 5090 | 820 / 2770 | 9100 / 16900

5500 / 10000

2004 ADT
2025 ADT NC 5

-Y13-
PI Sta 12+69.75
Δ = 13° 42' 10.2" (LT)
D = 7° 09' 43.1"
L = 191.33'
T = 96.12'
R = 800.00'

PI Sta 15+04.21
Δ = 18° 54' 59.9" (LT)
D = 28° 38' 52.4"
L = 66.03'
T = 33.32'
R = 200.00'

-L-
Pts Sta 315+67.40
Gs = 2° 17' 30.6"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

305

310

315

NAD 83

SEE SHEET 25 -L- STA 303+92

MATCH LINE

SEE SHEET 27 -L- STA 317+92

-Y13- POT Sta. 10+00.00

BL-60
POT 5+00.00

CENTRAL PARK AVE

S 2° 48' 41" E

S 7° 29' 31" E

-LREV3- POT Sta. 316+44.63 BK =
-L- Sta. 317+00.00 AH.

-Y13- PC Sta. 1+73.63

BEG CONSTR.
-Y13-STA.13+00
BEG C&G (LT&RT)
BEGIN SIDEWALK
-Y13-STA.13+86

ST Sta. 317+00.72

CS Sta. 315+00.72

MATCH LINE SEE SHEET

S 65° 32' 56" E

N 74° 59' 47.31" E

N 70° 16' 43" E

-LREV3- Sta. 316+57.89
-Y13-PC Sta. 14+70.89
-Y13-PT Sta. 15+36.92

END CONSTR.
-Y13-STA.15+60 +/-
END SW (LT) -
END C&G (LT&RT)

-LREV3- CS Sta. 314+57.89

-LREV3- POS Sta. 314+82.33 =
-Y13- POT Sta. 14+35.86

-Y13- POT Sta. 18+33.92

BL-58
-BL- PINC 309+91.07=
-L- STA. 311+73.38
-BY8- POT 8+75.88

BL-28
-L- STA. 311+86.89 =
PINC 306+87.90

BL-59
-BY8- POT 14+23.99

148
OLMSTED VILLAGE WEST LIMITED PARTNERSHIP
DB 981 PG 411

149
OVB, LLC
DB 3264 PG 49

150
LENA GORDON
DB 2004E PG 197
MB 10 PG II

151
MOORE COUNTY
DB 1556 PG 98
MB 10 PG 12

142
ITAC 143, LLC
DB 2884 PG 524

FRANK A. MCNEILL
DB 1257 PG 187

RICHARD STARNER
DB 547 PG 596
MB 10 PG II

HAZEL ELMORE
DB 804 PG 270
MB 10 PG II

VINCENT & CHERYAL KORFMAN
DB 2410 PG 312
MB 10 PG II

VINCENT & CHERYAL KORFMAN
DB 2410 PG 312
MB 10 PG II

LOUIS DISTEFANO
DB 1338 PG 24
MB 10 PG II

JOSEPH PESEK
DB 3455 PG 142
MB 10 PG II

CHRISTOPHER MARTIN
DB 1837 PG 269
MB 10 PG II

WAYNE J. PENSENSTADLER
DB 1086 PG 454
MB 10 PG II

ACCESS EASEMENT
DB 1257 PG 187

PROPOSED SIGNAL

EXISTING DITCH SPILLS OUT

TAYLORTOWN CITY LIMITS
PINEHURST CORPORATE LIMITS

NC 211 36' BST

100' TAPER

120' TAPER

2' BASE SPECIAL CUT DITCH - SEE DETAIL 'X'

SPECIAL CUT DITCH SEE DETAIL 'C'

EXISTING CROSS PIPE IS NOT FUNCTIONAL - OUTLET END IS BURIED ON NORTH SIDE

CLASS 'B' RIP RAP EST. 2 TONS
7 SY FILTER FABRIC

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground | 4:1 | D | 4:1 or Flatter | Front Ditch Slope

Min. D= 1Ft.

FROM STA. 309+00 -LREV3- TO STA. 314+50 -LREV3- RT.

DETAIL X
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground | 4:1 | D | 4:1 or Flatter | Front Ditch Slope

Max. d= 1Ft.
B= 2 Ft.

FROM STA. 303+50 -LREV3- TO STA. 309+00 -LREV3- RT

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$$$$STEVENWHITE$$$$

REVISIONS

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8/17/99

MATCH LINE SEE SHEET 26 -L- STA 317+92

MATCH LINE SEE SHEET 28 -L- STA 331+92

GPS R2812-5
-L- STA. 320+12.94 =
PINC 315+30.18

320

325

330

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground
4:1
D
4:1 OR FLATTER
Min. D= 1Ft.
Front Ditch Slope

FROM STA. 329+50 -L- TO STA. 333+00 -L- RT.

DANIEL STRICKLAND, INC
DB 3436 PG 71
MB 10 PG 12
(152)

LOT 227
MB 10 PG 12

ROBERT HOLUB
DB 3309 PG 597
MB 10 PG 12
(153)

JOHN B. CLAYTON
DB 696 PG 341
MB 10 PG 12
(154)

ZAIJIE LI
DB 3228 PG 596
MB 10 PG 12
(155)

JENNIFER GOFF
DB 3606 PG 177
MB 10 PG 12
(156)

DORIS OWEN
DB 2007E PG 687
MB 10 PG 12
(157)

DAVID ROSEN
DB 3339 PG 50
MB 10 PG 12
(158)

LOC, L.L.C.
DB 1824 PG 38
DB 2756 PG 208
(159)

OLMSTEAD VILLAGE WEST LIMITED
DB 3354 PG 551
(160)

CAMELLIA PARKE 2, LLC
DB 3261 PG 106
(160A)

MARY ANN BERMAN
DB 994 PG 232
MB 10 PG 12

THOMAS EMBREY
DB 2814 PG 50
MB 10 PG 12

TAYLORTOWN-CITY LIMITS
PINEHURST CORPORATE LIMITS

BL-65
-BY10- POT 5+00.00

McDONALD RD

100' TAPER

TRAFFIC CONTROL LOOP

TRAFFIC SIGNAL JB

RIP RAP PROTECTION

SHRUBS & MULCH

GRASS

TREES

ISFD

ISBKD

SAND PIT

NAD 83

PROJECT REFERENCE NO.
R-2812

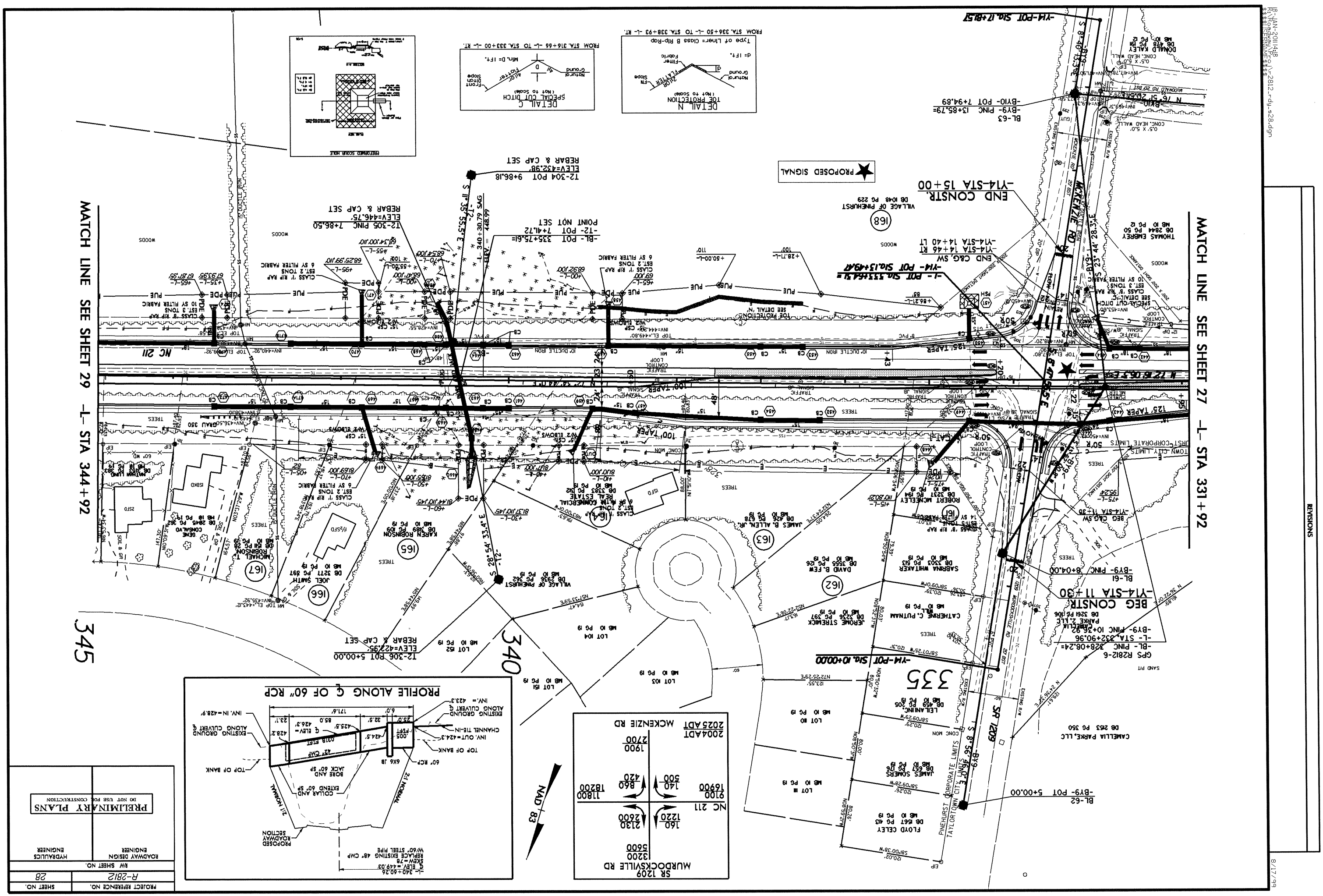
SHEET NO.
27

RW SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

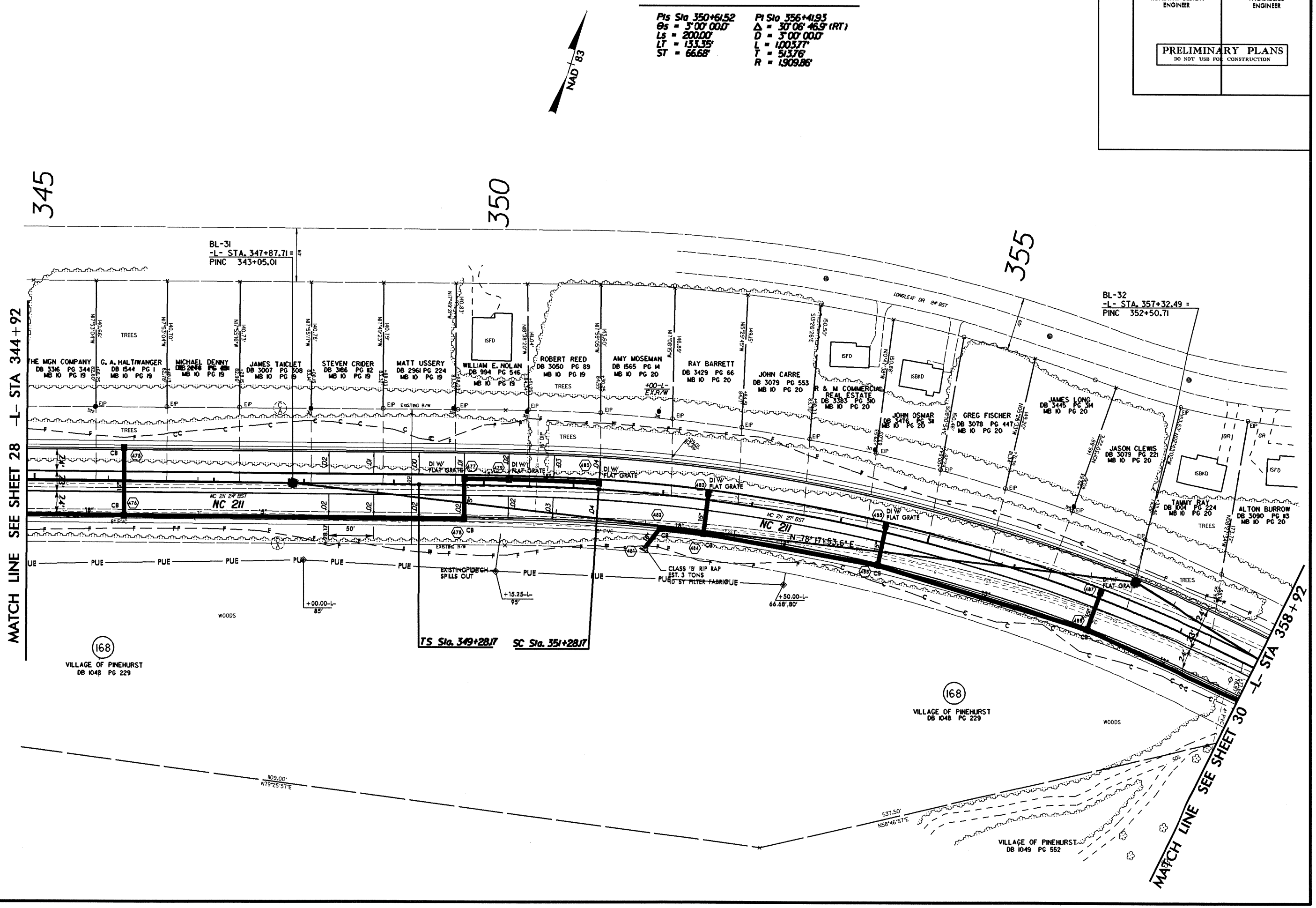

MATCH LINE SEE SHEET 27 -L- STA 331+92
MATCH LINE SEE SHEET 29 -L- STA 344+92
REVISIONS
PROPOSED SIGNAL
END CONSTR. -Y14-STA 15+00
BEG CONSTR. -Y14-STA 11+30
PROFILE ALONG ℄ OF 60" RCP
SR 1209 MURDOCKSVILLE RD
NC 211
MCKENZIE RD
NAD 83
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PROJECT REFERENCE NO.
SHEET NO.
R-2812
28
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER

PROJECT REFERENCE NO.	SHEET NO.
R-2812	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-

Pts Sta 350+61.52	Pt Sta 356+41.93
Θs = 3°00'00.0"	Δ = 30°06'46.9" (RT)
Ls = 200.00'	D = 3°00'00.0"
LT = 133.35'	L = 1,003.77'
ST = 66.68'	T = 513.76'
	R = 1,909.86'



REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2812	30

NW SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCH LINE SEE SHEET 31 -L- STA 371+92

MATCH LINE SEE SHEET 29 -L- STA 358+92

370

365

360

-L- Pts Sta 361+98.62
Gs = 3'00.00"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

GUNCLUB DR.	2350 / 3400	860 / 1450	3450 / 5000
NC 211	750 / 890	1650 / 2840	15300 / 20500
	11800 / 18200	1060 / 1100	2004ADT / 2025ADT RATTLESNAKE TR.

BL-33
-L- STA. 366+93.71 =
-BL- PINC 362+18.29=
-BYII- PINC 8+63.51

-L- POT Sta.357+41.04 =
-Y15- POT Sta.13+23.49
-Y15-PC Sta.14+57.32

-Y15-
PI Sta 15+09.29
Δ = 2°58'36.0" (RT)
D = 2°51'53.2"
L = 103.94'
T = 51.96'
R = 2000.00'

-Y15-PT- Sta. 15+61.23

-L- POT 13+46.74
-BYII-
S 10°10'13.4"W
RATTLESNAKE TR

BL-66
-BYII- POT 5+00.00

BEG C&G, SW
-Y15- STA 12+50

BEG CONSTR.
-Y15-STA 12+00

BEG C&G, SW
-Y15- STA 12+23

END CONSTR.
-Y15-STA 14+25
END C&G, SW(LT)

END C&G, SW(RT)
BST-Y15-STA 13+97

CS Sta. 361+3.93
ST Sta. 363+3.93

PROPOSED SIGNAL

100' TAPER

NC 211

GUNCLUB DR

RATTLESNAKE TR

NAD 83

PREFORMED SCOUR HOLE

SANDHILLS ALLIANCE CHURCH OF THE CHRISTIAN AND MISSIONARY ALLIANCE
DB 785 PG 350

VILLAGE OF PINEHURST
DB 1049 PG 552

MANOR CARE OF PINEHURST
DB 3351 PG 495

VILLAGE OF PINEHURST
DB 568 PG 79

RODNEY ROBINSON
DB 798 PG 235
MB 10 PG 57

KENNETH SCHOENBERG
DB 1340 PG 565
MB 10 PG 57

LOT 389 MB 10 PG 57

LOT 390 MB 10 PG 57

LOT 391 MB 10 PG 57

ELLEN HERTLEIN
DB 677 PG 254
MB 10 PG 20

BARBARA JOHNSON
DB 3307 PG 387
MB 10 PG 20

JEAN BARRETT
DB 955-288
MB 10 PG 20

R&M COMMERCIAL ESTATE
DB 3362 PG 140
MB 10 PG 20

PAUL WILLIAMS
DB 3368 PG 20

JAMES BAILES
DB 1490 PG 20
MB 10 PG 20

NANCY L. JOHANN
DB 3538 PG 413
MB 10 PG 20

ARTHUR MUSCCIO
DB 2078 PG 589
MB 10 PG 20

LEIA TATE
DB 3251 PG 297
MB 10 PG 20

BRADLEY FRUTH
DB 2884 PG 237
MB 10 PG 20

FAC HOLDINGS, LLC
DB 3489 PG 46
MB 10 PG 20

RONALD JACKSON
DB 3337 PG 330
MB 10 PG 20

RONALD SAFKO
DB 413 PG 374
MB 10 PG 20

CLAUDETTE JACQUET
DB 661 PG 397
MB 10 PG 20

LISA DEWEY
DB 2239 PG 80
MB 10 PG 20

BETTY TYSON
DB 2406 PG 494
MB 10 PG 20

LOT 209 MB 10 PG 20

LOT 222 MB 10 PG 20

LOT 223 MB 10 PG 20

LOT 232 MB 10 PG 20

LOT 233 MB 10 PG 20

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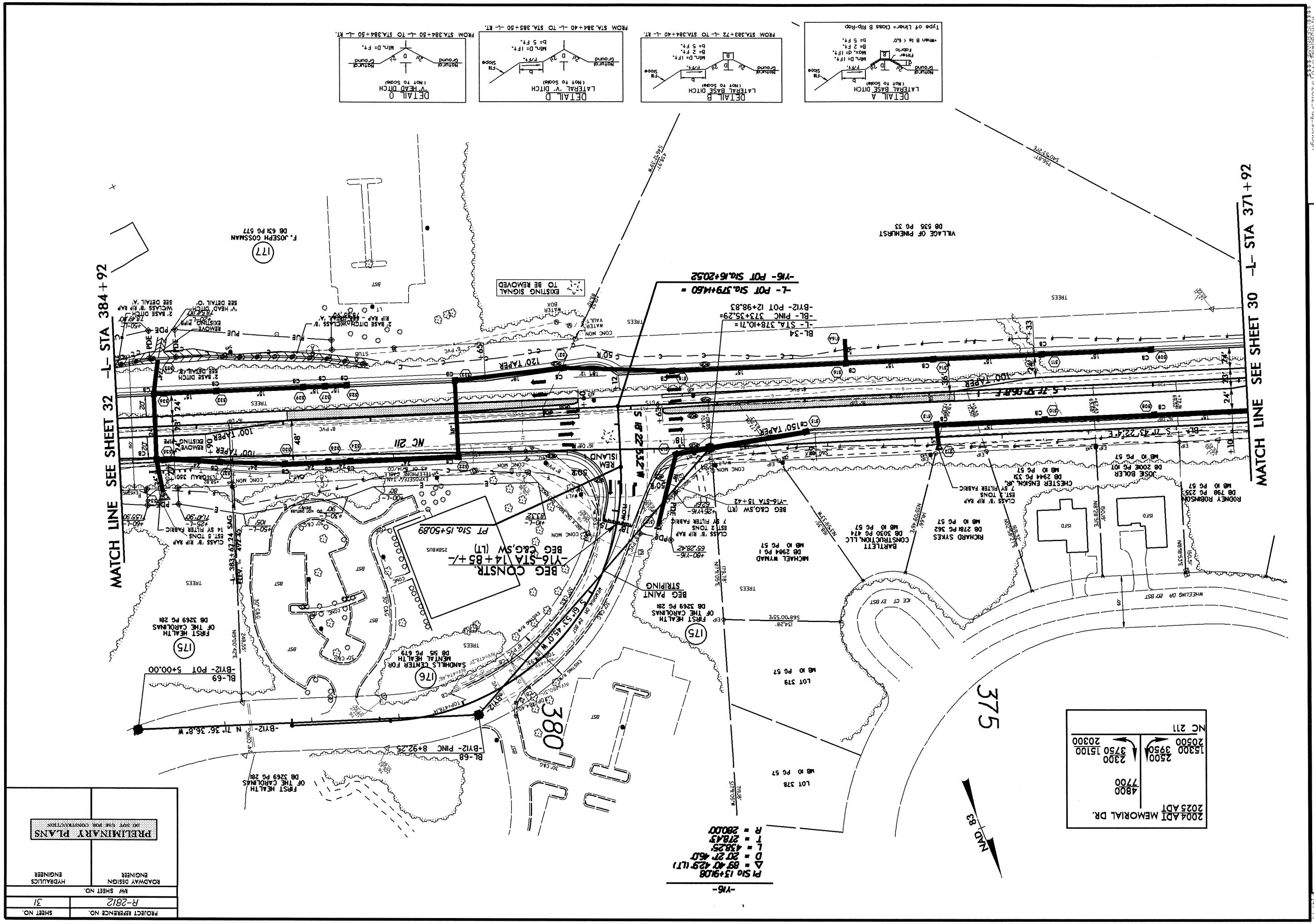

MATCH LINE SEE SHEET 32 -L- STA 384+92
MATCH LINE SEE SHEET 30 -L- STA 371+92
DETAIL A
LATERAL BASE DITCH
DETAIL B
LATERAL BASE DITCH
DETAIL D
LATERAL 'V' DITCH
DETAIL O
'V' HEAD DITCH
NC 211
BEG CONSTR. -Y16-STA 14+85+/- BEG C&G,SW (LT)
PT Sta. 15+50.89
BEG PAINT STRIPING
EXISTING SIGNAL TO BE REMOVED
VILLAGE OF PINEHURST DB 535 PG 33
F. JOSEPH GOSSMAN DB 631 PG 577
FIRST HEALTH OF THE CAROLINAS DB 3269 PG 281
SANDHILLS CENTER FOR MENTAL HEALTH DB 515 PG 679
MICHAEL WYMAD DB 2984 PG 1 MB 10 PG 57
BARTLETT CONSTRUCTION, LLC DB 3030 PG 474 MB 10 PG 57
RICHARD SYKES DB 2781 PG 362 MB 10 PG 57
CHESTER ENSIGN, JR. DB 2944 PG 33 MB 10 PG 57
JOSE BOLER DB 2006 PG 107 MB 10 PG 57
RODNEY ROBINSON DB 798 PG 235 MB 10 PG 57
LOT 379 MB 10 PG 57
LOT 378 MB 10 PG 57
-Y16- PI Sta 13+91.08
Δ = 89°40'42.9" (LT)
D = 20°27'46.0"
L = 438.25'
T = 278.43'
R = 280.00'
NAD 83
2004 ADT MEMORIAL DR.
2025 ADT
4800
7700
15300 2500 2300 3750 15100
20500 3950 20300
NC 211
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
R-2812
31

PROJECT REFERENCE NO.	SHEET NO.
R-2812	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PAGE RD
6200 / 11100
2160 / 2990 — 660 / 2020
NC 211
14700 / 19500 — 530 / 730 — 530 / 1180 — 14400 / 19000
3500 / 8000
2004 ADT / 2025 ADT
PAGE RD

DETAIL A
LATERAL BASE DITCH
(Not to Scale)
Natural Ground, Filter Fabric, FW Slope, 2V, D, 2H, R, b, d, V/Ft.
Min. D= 1Ft.
Max. d= 1Ft.
B= 2 Ft.
b= 5 Ft.
*When B is < 6.0'
Type of Liner= Class B Rip-Rap
FROM STA. 384+40 -L- TO 385+50 -L- RT.

NAD 83

385 — 390 — 395

-Y18-
PI Sta 11+53.85
Δ = 95° 44' 56.3" (RT)
D = 179° 02' 57.5"
L = 53.48'
T = 35.38'
R = 32.00'

PI Sta 12+65.33
Δ = 101° 08' 17.2" (LT)
D = 150° 46' 42.1"
L = 67.08'
T = 46.21'
R = 38.00'

-L-
Pls Sta 386+90.28
Gs = 4° 00' 00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

Pl Sta 389+44.93
Δ = 14° 57' 20.1" (RT)
D = 4° 00' 00.0"
L = 373.89'
T = 188.01'
R = 1432.39'

Pls Sta 391+97.50
Gs = 4° 00' 00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

-L- POC Sta. 389+62.78 =
-Y18- POT Sta.13+59.00

-L- POC Sta. 389+11.70 =
-Y17- POT Sta.10+00

-Y18- POT Sta. 10+00.00

-Y18- PT Sta. 12+86.20
BEGIN SIDEWALK (LT,RT)
CONC PARKING DECK
&
-Y18- PT Sta. 12+19.12

BEG CONSTR.
-Y18-STA 12+00
BEG C&G

BL-36A
-L- STA. 392+44.10 =
-BL- PINC 387+82.64=
-BY14- POT 5+00.00

BL-73A
-BY15- POT 5+00.00
-BY16- POT 5+00.00

-Y19- POT Sta.10+00

BEG CONSTR.
-Y19-STA 12+13 +/-
TIE TO EXIST C&G
BEGIN SIDEWALK

TS Sta. 397+16.82

SC Sta. 395+22.18/CREST
ELEV = 51.30

-L- STA 398+50

TS Sta. 385+56.91

SC Sta. 387+56.91

BL-35A
-L- STA. 388+57.93 =
-BL- PINC 383+87.93=
-BL3- POT 5+00.00

MATCH LINE SEE SHEET 31 -L- STA 384+92

MATCH LINE SEE SHEET 33 -L- STA 398+50

-Y17- PC Sta. 10+88.02

-Y17-PT Sta.11+78.21

END CONSTR.
-Y17- STA 11+78.21
END C&G

-Y17-
Pl Sta 11+33.89
Δ = 25° 50' 14.1" (RT)
D = 28° 38' 52.4"
L = 90.19'
T = 45.87'
R = 200.00'

-L- POT Sta. 397+01.48
-Y19- POT Sta.13+04.70

-Y19- POT Sta. 15+87.96

END C&G, SW
-Y19-STA 14+01

END CONSTR.
-Y19-STA 15+01+/-

-Y17- POT Sta. 12+87.04

-BY13- POT 9+83.56

-BY15- POT 12+00.30

-BY14- POT 10+04.07

-BY15- POT 14+27.46

PROPOSED SIGNAL

NC 211 (ASSUMING FULL MOVEMENT)
15100 / 20300 — 1950 / 2900 — 1550 / 2100 — 14700 / 19500
1000 / 5000
2004 ADT / 2025 ADT
DUNDEE RD

2SBK CHURCH
FIRST HEALTH OF THE CAROLINAS DB 3269 PG 281 (175)
3SBKBUS
2SBKBUS HOSPITAL
EMERGENCY CALL BOX
PINEHURST NEUROLOGY DB 907 PG 37 MB 3 SLIDE 46 (182)
W.J. BARNHARDT DB 1219 PG 550 MB 2A PG 72 (178)
F. JOSEPH GOSSMAN DB 631 PG 577 (177)
KELLY MCLEAN, JR. DB 3490 PG 217 MB 2A PG 72 (179)
MOORE MEMORIAL HOSPITAL HEALTHCARE CORPORATION DB 540 PG 172 MB 2A PG 72 (181)
MOORE REGIONAL HEALTHCARE CORPORATION DB 650 PG 210 MB 2A PG 72 (180)
FRANCIS SCAGNELLI DB 2612 PG 392 MB 10 PG 37 (183)
MICHAEL HOWERY DB 3487 PG 62 MB 2A PG 72
SHAWN KANE DB 3203 PG 415 MB 2A PG 72
JOHNSYE WHITE DB 1786 PG 268 MB 2A PG 72
EVELYN DEACON DB 1252 PG 534 MB 2A PG 72
MICHAEL PRITCHETT DB 3436 PG 301 MB 2A PG 72
MARGARET EHRHARDT DB 88E PG 508 MB 2A PG 72
ROBERT BOOKMEYER DB 547 PG 800 MB 2A PG 72
TERESA GILLESPIE DB 3301 PG 410 MB 2A PG 72

DUNDEE RD
McFARLAND RD
PAGE RD
DALRYMPLE RD

BL-70
BL-71
BL-75

REVISIONS
8/14/98

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PROJECT REFERENCE NO.	SHEET NO.
R-2812	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5/14/99

NAD 83

-L-
Pis Sta 398+50.19 Pi Sta 402+77.38 Pis Sta 406+89.96
θs = 4°00'00" Δ = 28°15'27" (LT) θs = 4°00'00"
Ls = 200.00' D = 4°00'00" Ls = 200.00'
LT = 133.37' L = 706.44' LT = 133.37'
ST = 66.70' T = 360.56' ST = 66.70'
R = 1,432.39'

BL-74
-BY16- POT 7+94.30

BL-80
-BY20- POT 5+00.00

ST Sta. 408+23.26

CS Sta. 406+23.26

MATCH LINE SEE SHEET 32 -L- STA 398+50

END TIP PROJECT R-2812
-L- STA 412+58

BL-37
-L- STA. 402+75 =
PINC 398+33.45

BL-38
-L- STA. 411+14.05 =
PINC 406+82.96

BL-79 PINC 401+69.97=
-L- STA. 406+04.10
-BY20- POT 6+92.27

DETAIL C

182 PINEHURST NEUROLOGY DB 907 PG 37 PC 3 SLIDE 46 SC Sta. 399+15.82

193 CLES PROPERTIES INC. DB 845 PG 45 PC 3 SLIDE 46

194 MOORE REGIONAL HOSPITAL INC. DB 1060 PG 629 PC 3 SLIDE 48

195 FIRST-CITIZENS BANK & TRUST CO. DB 2144 PG 96

196 MID SOUTH BANK AND TRUST CO. DB 423 PG 454 PC 3 SLIDE 67

197 MID SOUTH BANK AND TRUST CO. DB 528 PG 320 PC 3 SLIDE 67 400'R

198 OK PROPERTY MANAGEMENT, LLC DB 2511 PG 48 PC 3 SLIDE 369

FRANK MASER DB 985 PG 398 PC 5 SLIDE 518

FIRSTHEALTH OF THE CAROLINAS DB 1148 PG 294

183 FRANCIS SCAGNELLI DB 2612 PG 392 MB 10 PG 37

184 NO CLAIM CLETA GETTYS DB 2007E PG 269 MB 10 PG 37

185 NO CLAIM GOFFER'S NEST, LLC DB 3693 PG 256 MB 10 PG 37

186 NO CLAIM JOHN ROBERTS DB 2919 PG 380 MB 10 PG 37

187 NO CLAIM ELIZABETH SZALANKIEWICZ DB 3103 PG 82 MB 10 PG 37

188 NO CLAIM RAYMOND JOHN FORD DB 894 PG 239 MB 10 PG 37

189 NO CLAIM TERRY L. FEISTER DB 1536 PG 87 MB 10 PG 37 PLATE SLIDE 4-158

190 NO CLAIM CAROL L. KEYS DB 731 PG 522 MB 10 PG 37 PLATE SLIDE 4-158

191 NO CLAIM CAROL L. KEYS DB 731 PG 522 MB 10 PG 37

192 NO CLAIM VILLAGE OF PINEHURST DB 3448 PG 483 MB 10 PG 37

400 405 410

NC 211

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R-2812 SHEET 33

PROJECT REFERENCE NO.	SHEET NO.
R-2812	34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BEGIN GRADE
-L- STA. 12+50.00 ELEV. 603.14

-L-

PI = 12+75.00
EL = 603.22'
VC = 50'
K = 29

PI = 14+50.00
EL = 600.77'
VC = 100'
K = 27.3

PI = 16+60.00
EL = 598.60'
VC = 250'
K = 17.0

PI = 19+60.00
EL = 591.10'
VC = 300'
K = 10.2

PI = 22+50.00
EL = 592.40'
VC = 143'
K = 10.8

(+)0.3200% (-)1.4000% (-)0.4000% (-)1.0333% (-)12.5000% (-)12.5000% (+)0.4483% (+)0.4483% (-)10.8150%

600 @ 2.42%

STA. 14+90 LT
ELEV = 595.63

STA. 15+66.43
ELEV = 593.87

STA. 20+46 LT
ELEV = 577.55

CAT Y DITCH @ 9.19%

STA. 21+50 LT
ELEV = 587.29

STA. 22+21 LT
ELEV = 590.39

SPECIAL CUT DITCH @ 2.75%

591.09

598.43

PI = 24+50.00
EL = 590.68'
VC = 80'
K = 14.0

PI = 26+30.00
EL = 590.10'
VC = 270'
K = 9.9

PI = 28+00.00
EL = 594.20'
VC = 50'
K = 11.0

PI = 29+50.00
EL = 598.50'
VC = 180'
K = 10.8

PI = 32+50.00
EL = 602.10'
VC = 300'
K = 17.5

PI = 35+50.00
EL = 600.55'
VC = 150'
K = 18.1

PI = 37+40.00
EL = 598.00'
VC = 210'
K = 11.6

(+)0.8750% (-)0.3056% (-)0.3056% (-)2.4118% (+)12.8667% (+)12.8667% (-)11.2000% (+)1.5160% (-)0.5160% (-)1.3432% (-)1.3432% (+)0.5625%

STA. 24+10 LT
ELEV = 585.36

STA. 24+91 LT
ELEV = 589.40

STA. 25+00 LT
ELEV = 589.39

STA. 25+35 LT
ELEV = 590.19

STA. 25+74 LT
ELEV = 582.74

STA. 26+00 LT
ELEV = 585.10

STA. 26+50
ELEV = 587.37

STA. 36+00 RT
ELEV = 599.19

STA. 37+83 RT
ELEV = 591.87

CAT Y DITCH @ 11.25%

8' BASE DITCH @ 0.07%

8' BASE DITCH @ 0.50%

8' BASE DITCH @ 0.08%

8' BASE DITCH @ 1.64%

CAT Y DITCH @ 4.00%

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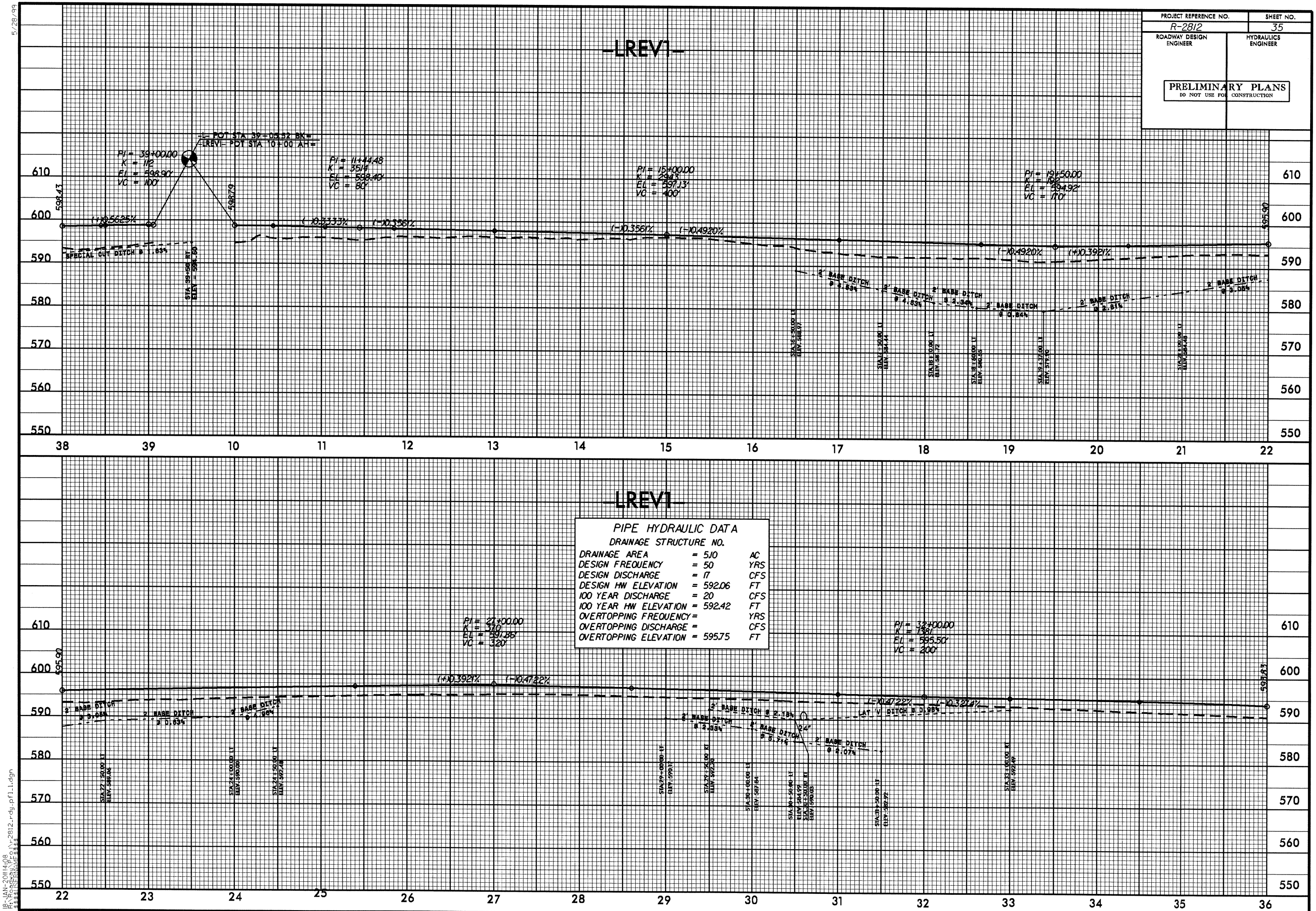
PROJECT REFERENCE NO.	SHEET NO.
R-2812	35
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 5.10	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 17	CFS
DESIGN HW ELEVATION	= 592.06	FT
100 YEAR DISCHARGE	= 20	CFS
100 YEAR HW ELEVATION	= 592.42	FT
OVERTOPPING FREQUENCY	=	YRS
OVERTOPPING DISCHARGE	=	CFS
OVERTOPPING ELEVATION	= 595.75	FT

5/28/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2812	36
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-LREV1-

PI = 51+00.00
K = 310
EL = 593.86'
VC = 500'

PI = 41+50.00
K = 171
EL = 585.13'
VC = 200'

593.83

578.55

(-)0.3214%

(-)1.9396%

(-)1.9396%

(-)0.0783%

2' BASE DITCH @ 1.08%

2' BASE DITCH @ 0.88%

STA 51+00.00 RT
ELEV. 590.19

STA 49+00.00 RT
ELEV. 580.42

STA 49+00.00 RT
ELEV. 568.29

-LREV1-

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 3.50	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 7.90	CFS
DESIGN HW ELEVATION	= 560.15	FT
100 YEAR DISCHARGE	= 8.90	CFS
100 YEAR HW ELEVATION	= 560.32	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 23	CFS
OVERTOPPING ELEVATION	= 565.03	FT

PI = 52+00.00
K = 716
EL = 577.08'
VC = 600'

578.55

(-)0.7673%

(-)1.5408%

2' BASE DITCH @ 1.08%

2' BASE DITCH @ 0.88%

2' BASE DITCH @ 1.41%

2' BASE DITCH @ 2.05%

2' BASE DITCH @ 2.05%

STA 52+00.00 RT
ELEV. 580.19

STA 53+00.00 RT
ELEV. 569.42

STA 55+00.00 RT
ELEV. 568.29

STA 56+00.00 RT
ELEV. 560.79

STA 57+00.00 RT
ELEV. 558.74

STA 58+00.00 RT
ELEV. 558.02

PI = 62+50.00
K = 433
EL = 560.90'
VC = 900'

562.75

(-)1.5408%

1+10.5393%

350 @ 0.64%

4' BASE DITCH @ 0.82%

STA 60+00.00 LT
ELEV. 556.68

STA 63+00.00 LT
ELEV. 558.50

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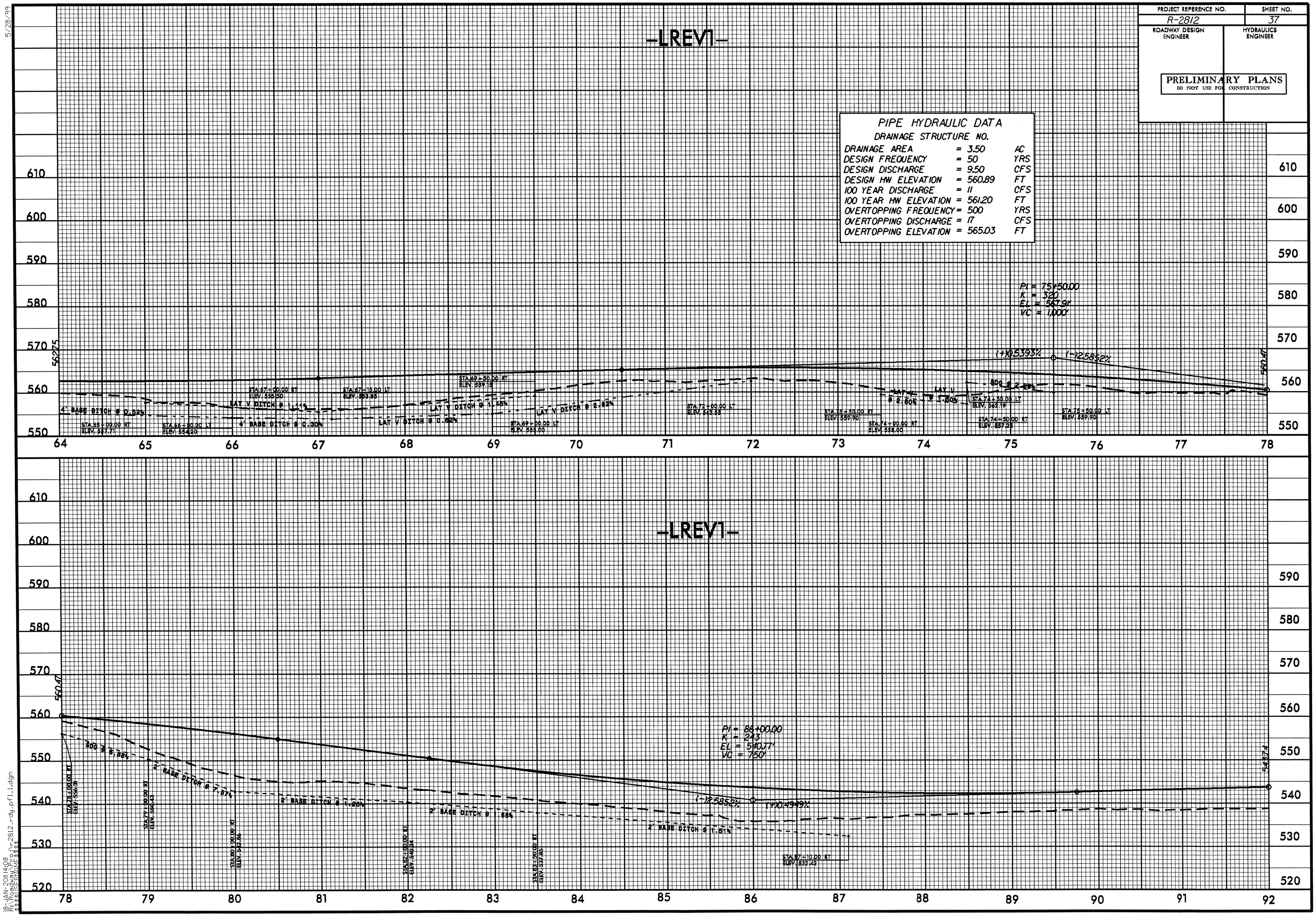
PROJECT REFERENCE NO.	SHEET NO.
R-2812	37
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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PROJECT REFERENCE NO.	SHEET NO.
R-2812	38

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-LREV1-

610
600
590
580
570
560
550
540
530
520

92 93 94 95 96 97 98 99 100 101 102 103 104 105 106

54574

PI = 99+00.00
K = 300
EL = 547.20'
VC = 300'

(+)0.4949%

(-)0.3650%

2' BASE DITCH @ 0.30%

STA 93+06.00 LT
ELEV. 540.75

STA 95+30.00 LT
ELEV. 541.50

(-)0.3650%

(-)2.1016%

PI = 103+24.59
EL = 545.55
VC = 400'
K = 230

-LREV1- STA 103+55.71 BK
-L- STA 133+16.02 AH

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PROJECT REFERENCE NO.	SHEET NO.
R-2812	39
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L- STA 133+16.02 A!!!-

PI = 132+45.00
EL = 545.55'
VC = 400'
K = 230

PI = 135+50.00
EL = 539.24'
VC = 200'
K = 215

(-)0.3647%

(-)2.1016%

538.71

(-)2.1016%

(-)1.1733%

SPECIAL CUT DITCH
@ 4.77%

STA 135+00 LT
ELEV = 534.84

STA 135+70 LT
ELEV = 533.00

570
560
550
540
530
520

133 134 135 136

-L-

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 5.97	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 13	CFS
DESIGN HW ELEVATION	= 531.81	FT
100 YEAR DISCHARGE	= 15	CFS
100 YEAR HW ELEVATION	= 531.99	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 38	CFS
OVERTOPPING ELEVATION	= 535.93	FT

PI = 137+75.00
EL = 536.60'
VC = 100'
K = 130

PI = 140+70.00
EL = 535.41'
VC = 160'
K = 227

PI = 144+50.00
EL = 536.55'
VC = 400'
K = 212

PI = 148+25.00
EL = 530.60'
VC = 150'
K = 2938

538.71

(-)1.1733%

(-)0.4034%

SPECIAL CUT DITCH
@ 0.90%

STA 139+41 LT
ELEV = 529.3'

24" RCP
INV. IN = 529.92
INV. OUT = 525.77

STA 139+90 LT
ELEV = 530.17

SPECIAL CUT DITCH
@ 1.76%

(-)0.4034%

(+)0.3000%

(+)0.3000%

(-)1.5867%

STA 144+50 RT
ELEV = 533.63

(-)1.5867%

SPECIAL CUT DITCH @1.62%

(-)1.6377%

527.73

STA 149+88 RT
ELEV = 528.46

610
600
590
580
570
560
550
540
530
520

136 137 138 139 140 141 142 143 144 145 146 147 148 149 150

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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2812	40
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 1.59	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 4.30	CFS
DESIGN HW ELEVATION	= 530.44	FT
100 YEAR DISCHARGE	= 4.90	CFS
100 YEAR HW ELEVATION	= 530.56	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 11	CFS
OVERTOPPING ELEVATION	= 532.90	FT

PI = 152+28.00
EL = 524.00'
VC = 450'
K = 143

PI = 157+00.00
EL = 531.10'
VC = 300'
K = 1107

PI = 160+00.00
EL = 534.80'
VC = 300'
K = 157

PI = 162+50.00
EL = 532.40'
VC = 200'
K = 460

527.73

531.61

(-)1.5677%

(+)1.5042%

(+)1.2333%

(+)1.2333%

(-)0.9600%

(-)0.9600%

(-)0.5250%

15"

-L-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 2.94	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 8	CFS
DESIGN HW ELEVATION	= 510.85	FT
100 YEAR DISCHARGE	= 9.10	CFS
100 YEAR HW ELEVATION	= 510.99	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 33	CFS
OVERTOPPING ELEVATION	= 514.02	FT

PI = 164+50.00
EL = 531.35'
VC = 60'
K = 144

PI = 167+10.00
EL = 528.90'
VC = 320'
K = 119

PI = 172+20.00
EL = 510.35'
VC = 420'
K = 96

PI = 176+00.00
EL = 513.50'
VC = 160'
K = 180

PI = 177+80.00
EL = 516.59'
VC = 200'
K = 193

531.61

516.56

(-)0.5250%

(-)0.9423%

(-)0.9423%

(-)4.4373%

(-)3.6872%

(+)0.8269%

(+)1.7167%

(+)1.7167%

(+)0.6784%

2' BASE DITCH @ 0.80%

24"

STA 173+66 RT
ELEV = 509.18

STA 173+35 RT
ELEV = 509.29

2' BASE DITCH @ 1.83%

STA 177+15 RT
ELEV = 515.15

2' BASE DITCH @ 0.80%

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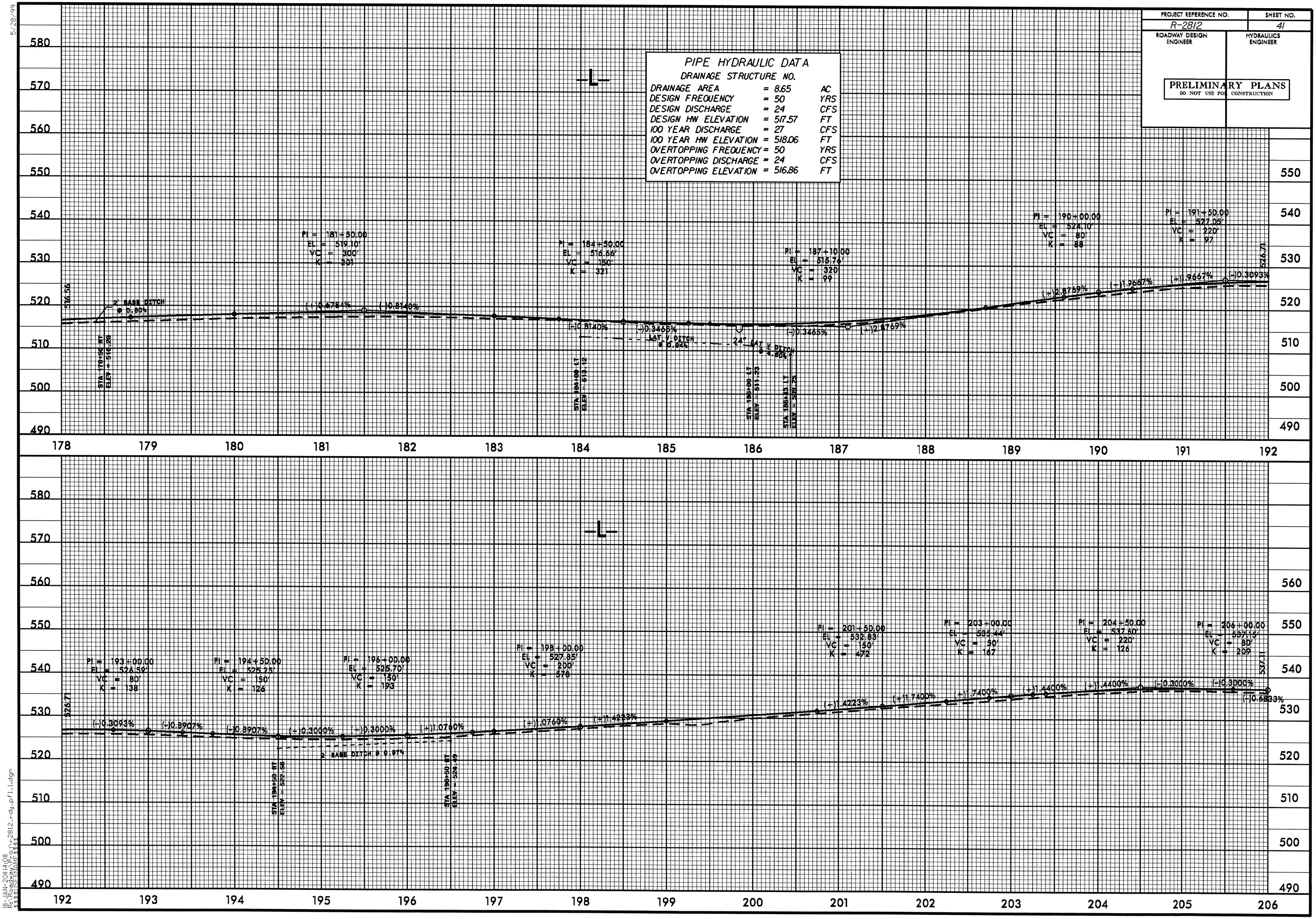
PROJECT REFERENCE NO.	SHEET NO.
R-2812	41
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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PROJECT REFERENCE NO.	SHEET NO.
R-2812	42
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 2.46	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 6.70	CFS
DESIGN HW ELEVATION	= 533.37	FT
100 YEAR DISCHARGE	= 7.60	CFS
100 YEAR HW ELEVATION	= 533.50	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 17	CFS
OVERTOPPING ELEVATION	= 536.07	FT

-L-

PI = 206+00.00
EL = 537.15'
VC = 80'
K = 209

PI = 209+00.00
EL = 535.10'
VC = 300'
K = 1636

PI = 212+00.00
EL = 533.60'
VC = 300'
K = 1482

PI = 215+20.00
EL = 530.65'
VC = 500'
K = 714

PI = 219+50.00
EL = 512.92'
VC = 100'
K = 98

537.11

(-)0.3000%
(-)0.6833%
(-)0.6833%
(-)0.5000%
(-)0.5000%
(-)0.7024%
(-)0.7024%
(-)5.0697%
(-)5.0697%
(-)4.0500%

18"

SPECIAL CUT DITCH @ 0.87%
SPECIAL CUT DITCH @ 4.98%
SPECIAL CUT DITCH @ 4.73%

STA 213+70 LT
ELEV = 529.49

STA 216+00 LT
ELEV = 526.50

STA 217+50 LT
ELEV = 519.91

511.50

580 570 560 550 540 530 520 510 500 490

206 207 208 209 210 211 212 213 214 215 216 217 218 219 220

-L-

PI = 220+50.00
EL = 509.87'
VC = 100'
K = 336

PI = 223+00.00
EL = 499.00'
VC = 250'
K = 155

PI = 228+50.00
EL = 483.95'
VC = 250'
K = 404

PI = 234+00.00
EL = 465.50'
VC = 100'
K = 274

511.90

(-)4.0500%
(-)4.3480%
(-)4.3480%
(-)2.7364%
(-)2.7364%
(-)3.3545%
(-)3.3545%
(-)3.7200%

SPECIAL CUT DITCH @ 4.73%
SPECIAL CUT DITCH
SPECIAL CUT DITCH @ 2.77%
SPECIAL CUT DITCH @ 4.98%
SPECIAL CUT DITCH @ 4.73%
SPECIAL CUT DITCH @ 4.98%
BASE DITCH @ 6.67%

STA 221+50 LT
ELEV = 501.00

STA 221+75 LT
ELEV = 500.49

STA 225+50 LT
ELEV = 488.53

STA 229+00 LT
ELEV = 479.92

STA 230+50 LT
ELEV = 475.68

STA 232+10 LT
ELEV = 470.13

STA 232+50 RT
ELEV = 469.28

STA 233+00 LT
ELEV = 466.50

465.45

540 530 520 510 500 490 480 470 460 450

220 221 222 223 224 225 226 227 228 229 230 231 232 233 234

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PROJECT REFERENCE NO.	SHEET NO.
R-2812	43
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

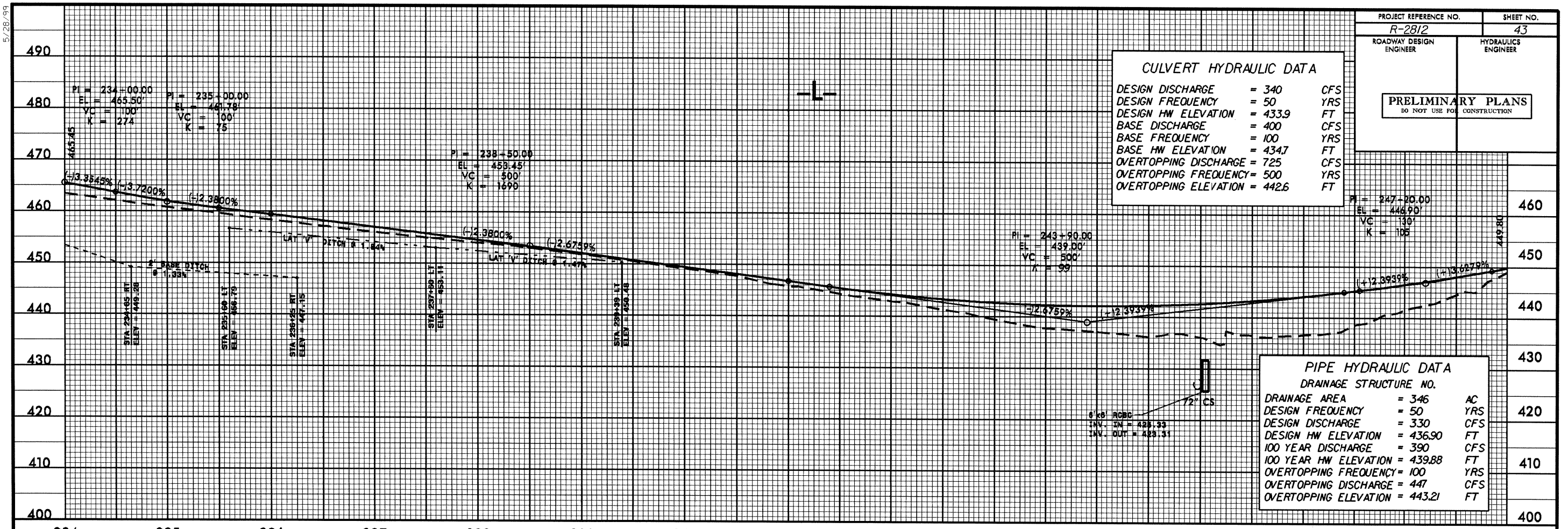
CULVERT HYDRAULIC DATA

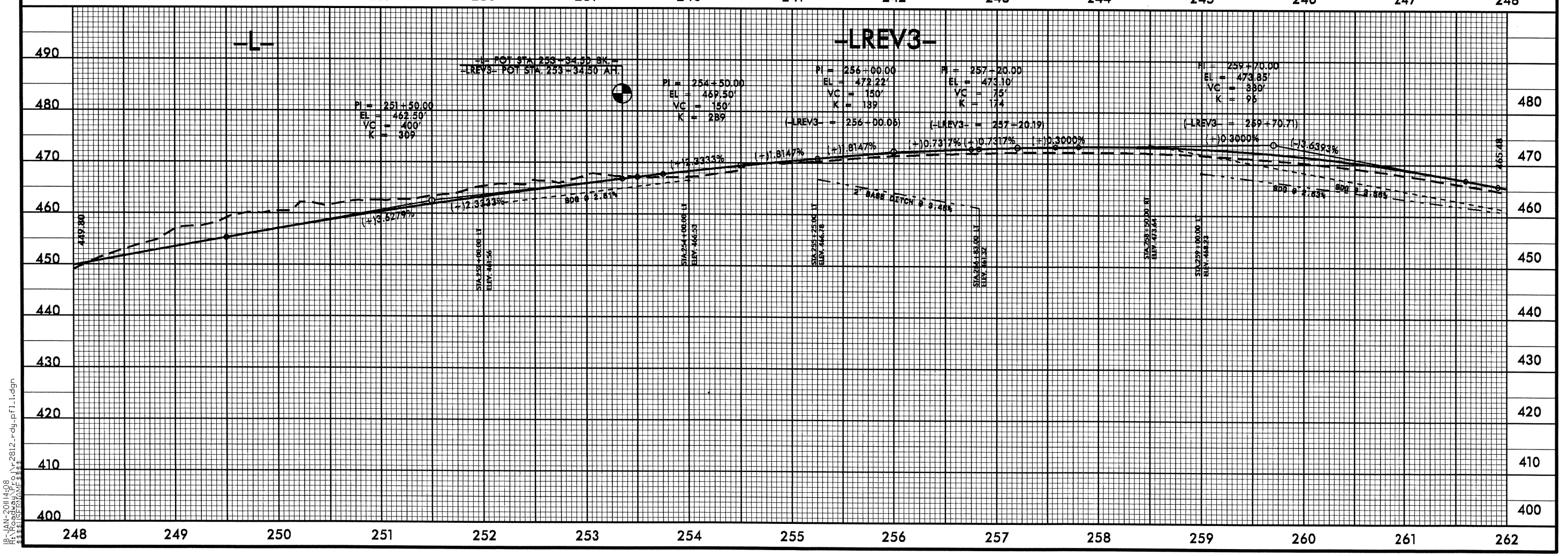
DESIGN DISCHARGE	= 340	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 433.9	FT
BASE DISCHARGE	= 400	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 434.7	FT
OVERTOPPING DISCHARGE	= 725	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 442.6	FT

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 346	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 330	CFS
DESIGN HW ELEVATION	= 436.90	FT
100 YEAR DISCHARGE	= 390	CFS
100 YEAR HW ELEVATION	= 439.88	FT
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 447	CFS
OVERTOPPING ELEVATION	= 443.21	FT





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PROJECT REFERENCE NO.	SHEET NO.
B-2812	44
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-LREV3-

PI = 262+50.00
EL = 463.66'
VC = 117'
K = 152
(-LREV3- = 262+51.67)

PI = 264+00.00
EL = 457.04'
VC = 100'
K = 242
(-LREV3- = 264+02.35)

PI = 267+00.00
EL = 442.56'
VC = 150'
K = 100
(-LREV3- = 267+03.46)

PI = 271+50.00
EL = 427.50'
VC = 210'
K = 466

(-)3.6393%
(-)4.4139%
(-)4.4133%
(-)4.8267%
(-)4.8267%
(-)13.3244%
(-)13.3244%
(-)3.7750%
(+)4.9159%
(+)12.9612%
(+)2.4466%

465.48
413.15
450.97

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 455	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 405.2	FT
BASE DISCHARGE	= 530	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 406.5	FT
OVERTOPPING DISCHARGE	= 1225	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 413.0	FT

PI = 278+02.30
EL = 402.98'
VC = 850'
K = 98

PI = 284+90.00
EL = 436.78'
VC = 400'
K = 205
(-LREV8- = 284+53.72)

PI = 288+25.00
EL = 446.70'
VC = 200'
K = 389
(-LREV3- = 287+89.73)

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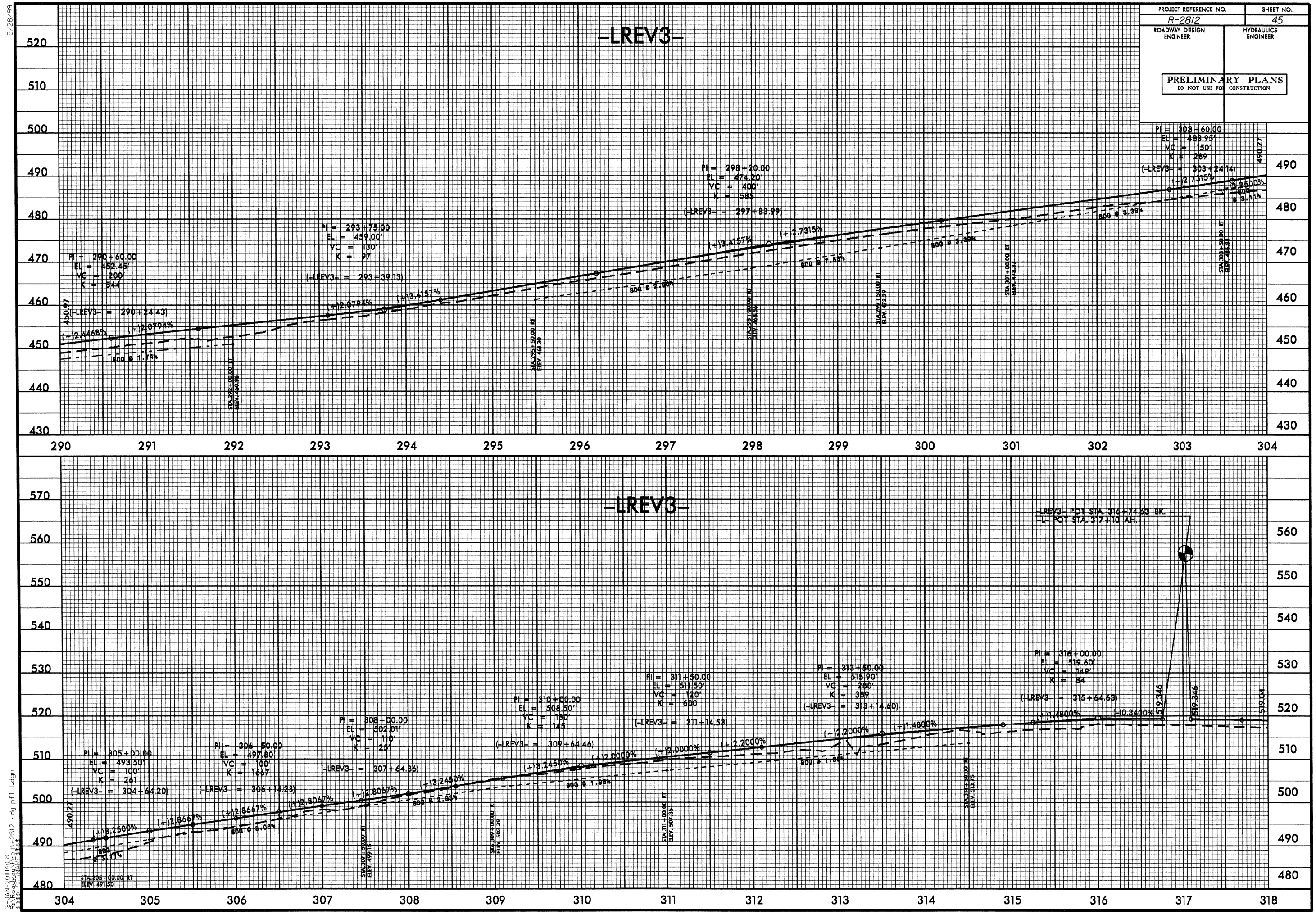
PROJECT REFERENCE NO.	SHEET NO.
R-2812	45
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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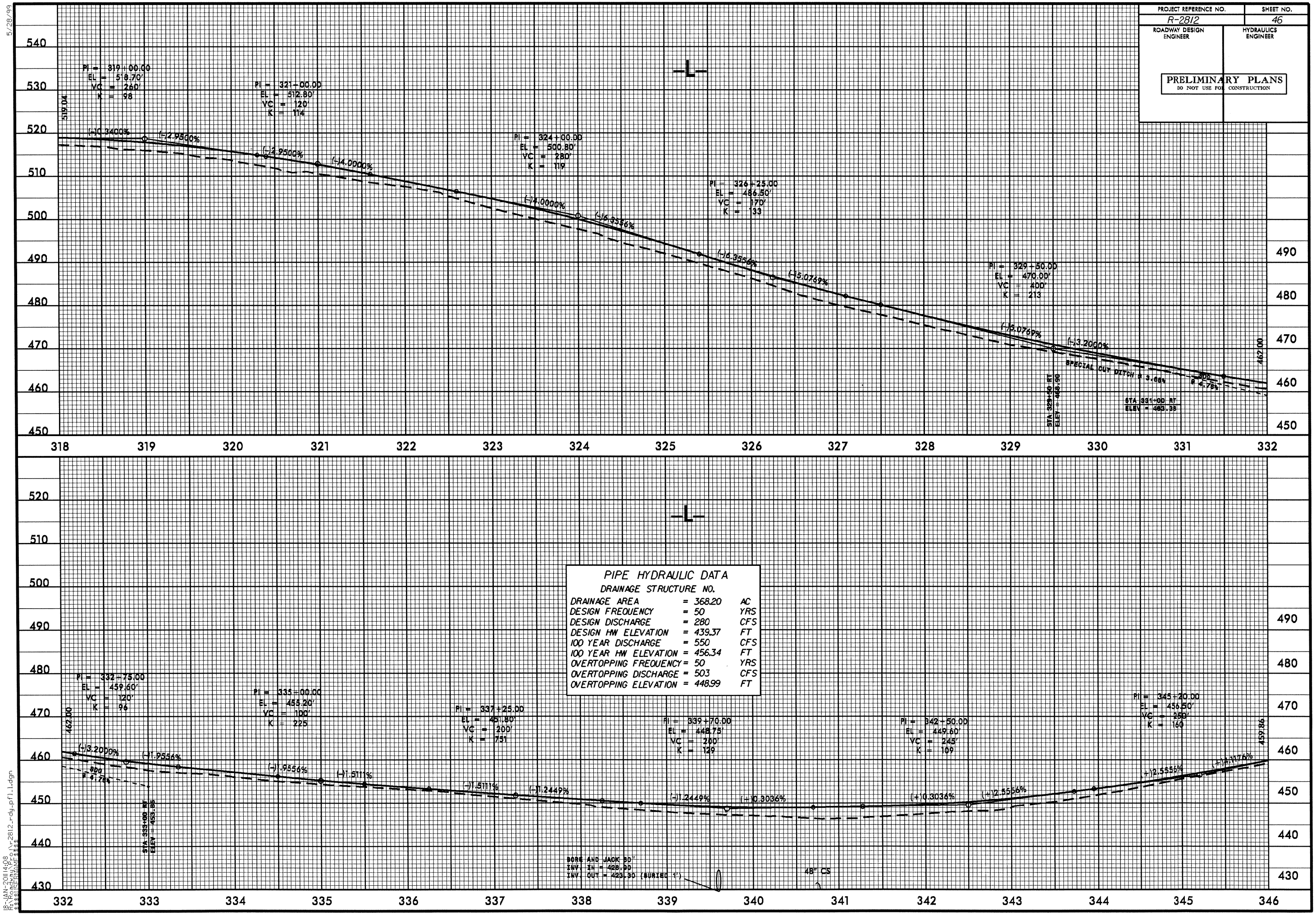
PROJECT REFERENCE NO.	SHEET NO.
R-2812	46
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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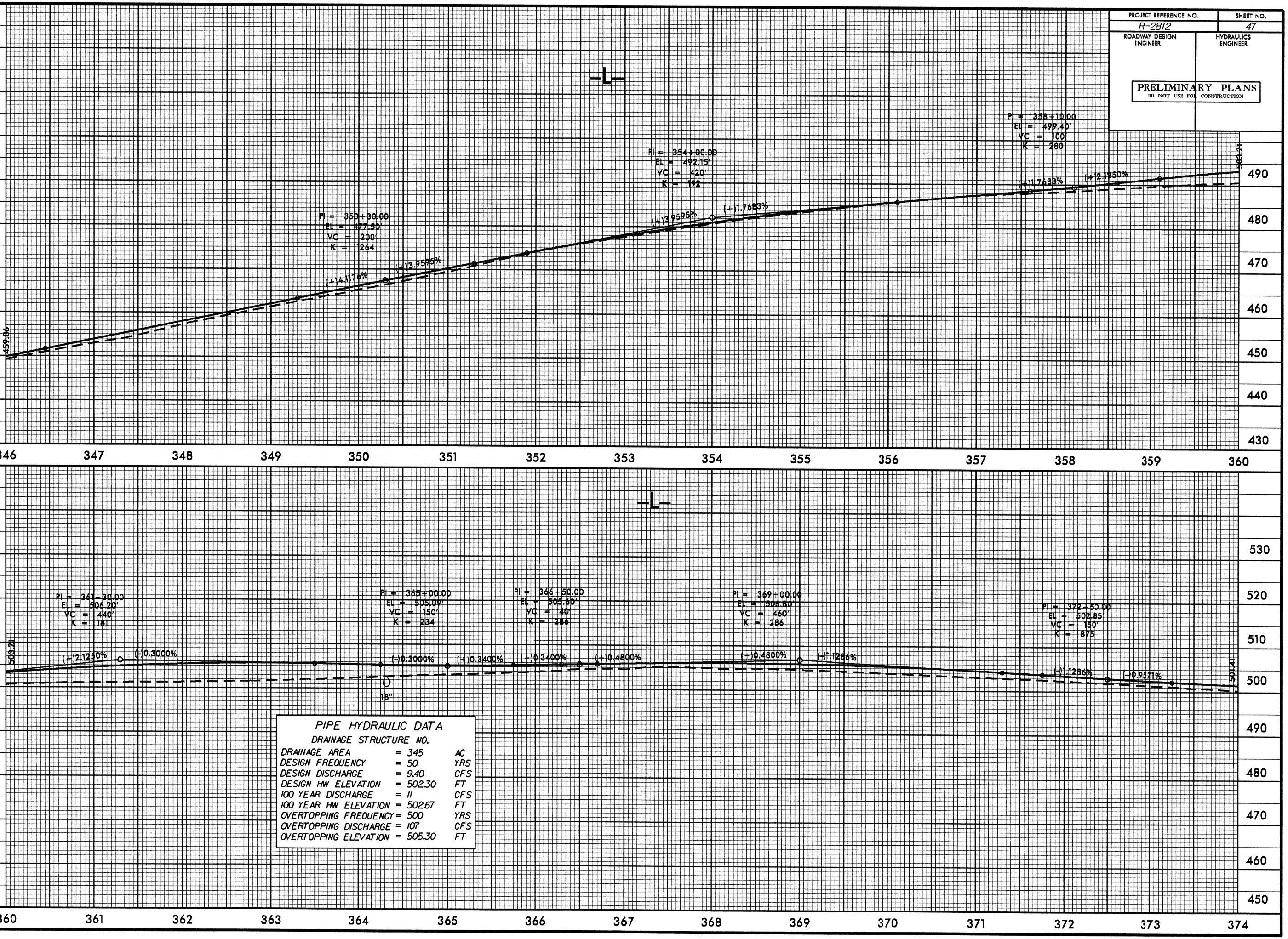
PROJECT REFERENCE NO.	SHEET NO.
R-2812	47
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 345	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 9.40	CFS
DESIGN HW ELEVATION	= 502.30	FT
100 YEAR DISCHARGE	= 11	CFS
100 YEAR HW ELEVATION	= 502.67	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 107	CFS
OVERTOPPING ELEVATION	= 505.30	FT

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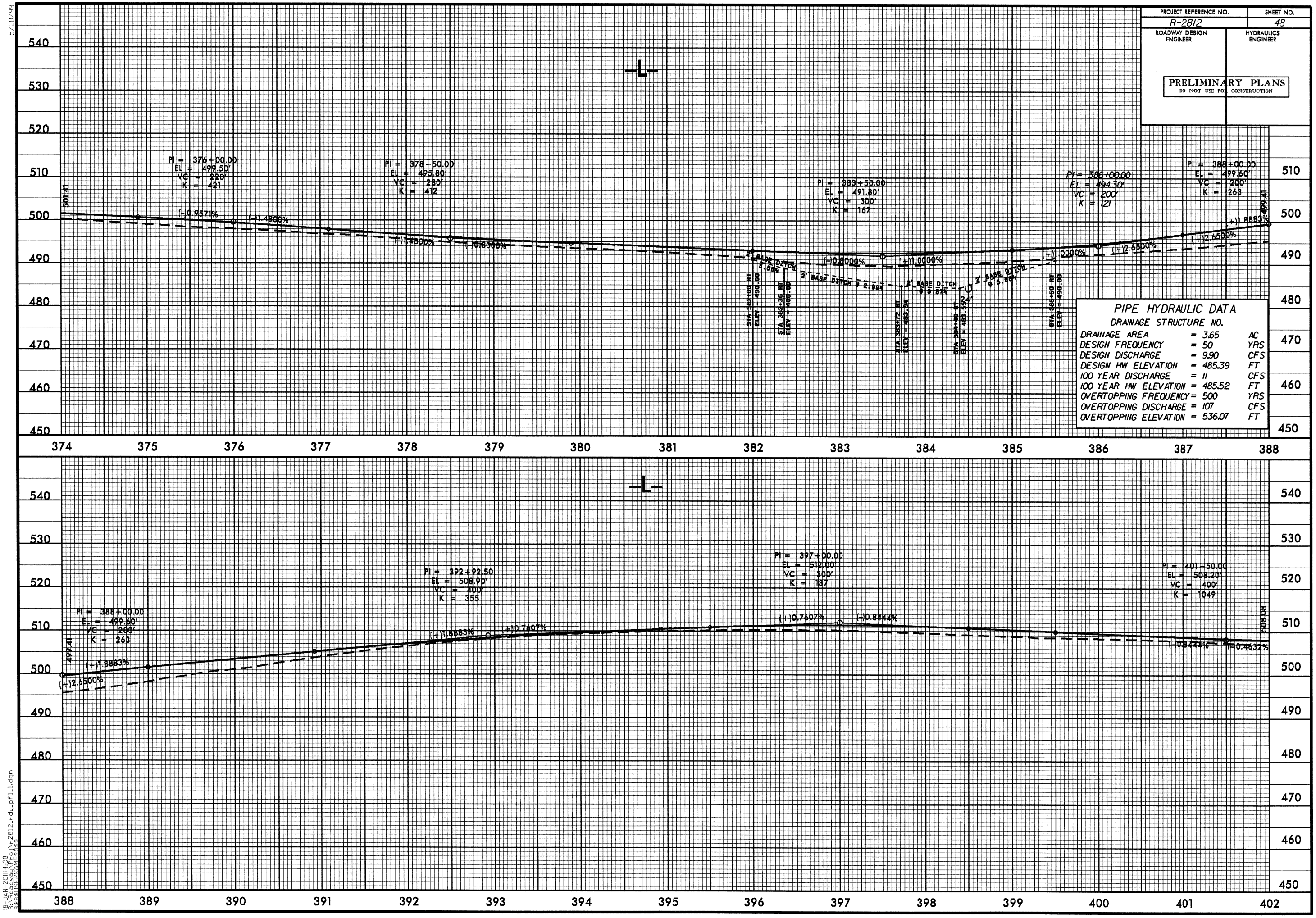
PROJECT REFERENCE NO.	SHEET NO.
R-2812	48
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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PROJECT REFERENCE NO.	SHEET NO.
R-2812	49
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-

END GRADE
-L- STA. 409+23.26 ELEV. 504.17

PI = 406+25.00
EL = 506.00'
VC = 150'
K = 445

PI = 407+50.00
EL = 505.00'
VC = 50'
K = 156

508.08

(-)0.4632%

(-)0.4632%

(-)0.8000%

(-)0.3000%

(-)0.4792%

STA. 409+00 LT
ELEV = 501.38

STA. 411+50 LT
ELEV = 499.27

SPECIAL CUT DITCH @ 0.48%

SPECIAL CUT DITCH @ 0.20%

TO PIPE
ELEV = 498.19

540
530
520
510
500
490
480
470
460
450

402 403 404 405 406 407 408 409 410 411

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PROJECT REFERENCE NO.	SHEET NO.
R-2812	50
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y1-

-Y2-

-Y3-

-Y2- BEGIN GRADE
STA 10+35.53 EL 602.70

-Y2- END GRADE
STA 10+92.50 EL 602.31

PI = 10+50.00
EL = 603.71'
VC = 20'
K = 1

PI = 10+70.00
EL = 602.04'
VC = 20'
K = 2

-Y3- BEGIN GRADE
STA 10+35.50 EL 598.16

-Y3- END GRADE
STA 13+11.20 EL 597.42

PI = 12+50.00
EL = 597.63'
VC = 25'
K = 67

602.70
602.31
(-)0.2003%
(-)0.2786%
(-)0.3420%

-Y4-

-Y5-

-Y7-

610 600 590 580 570 560 550
540 530 520 510 500
10 11 12 13

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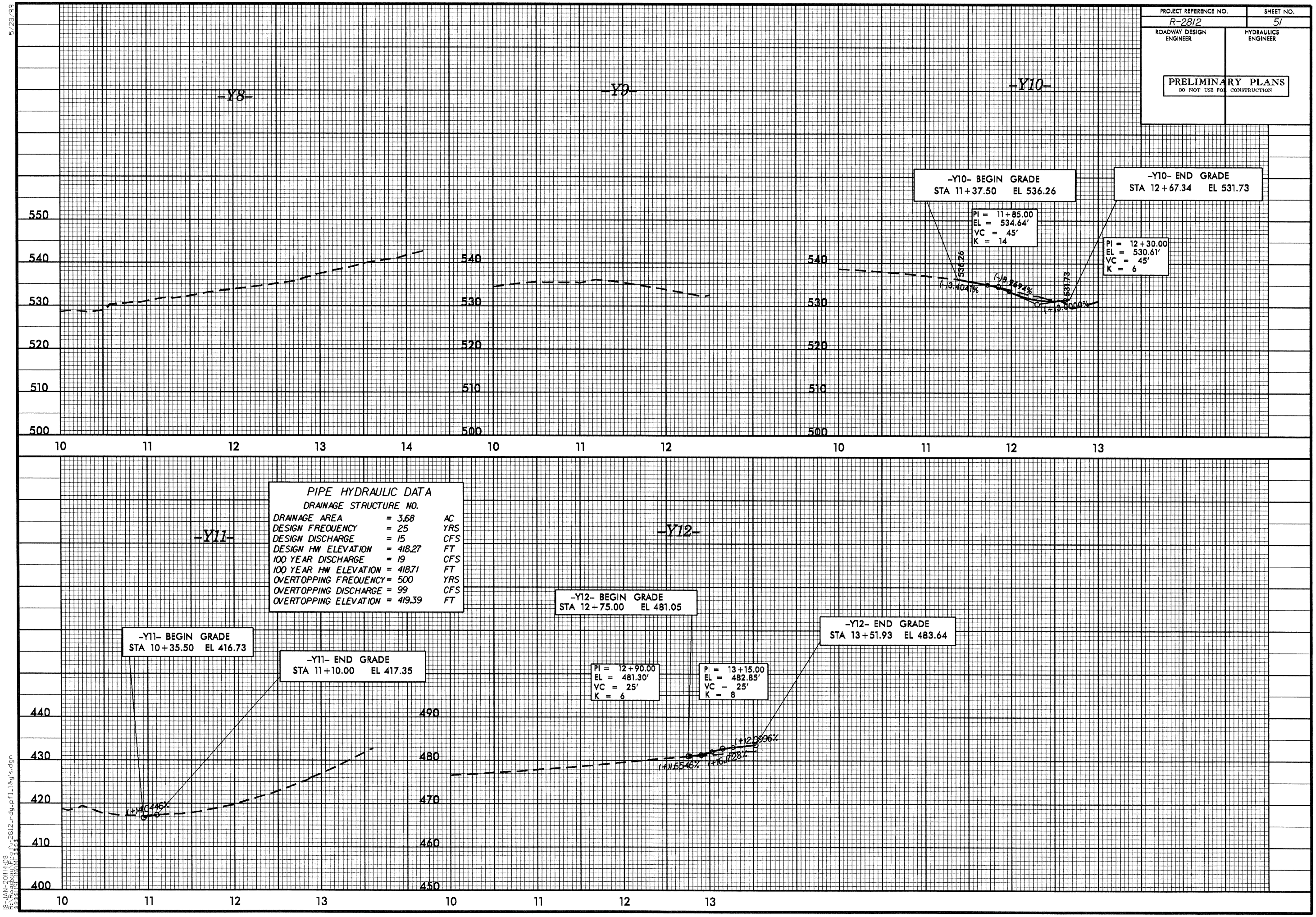
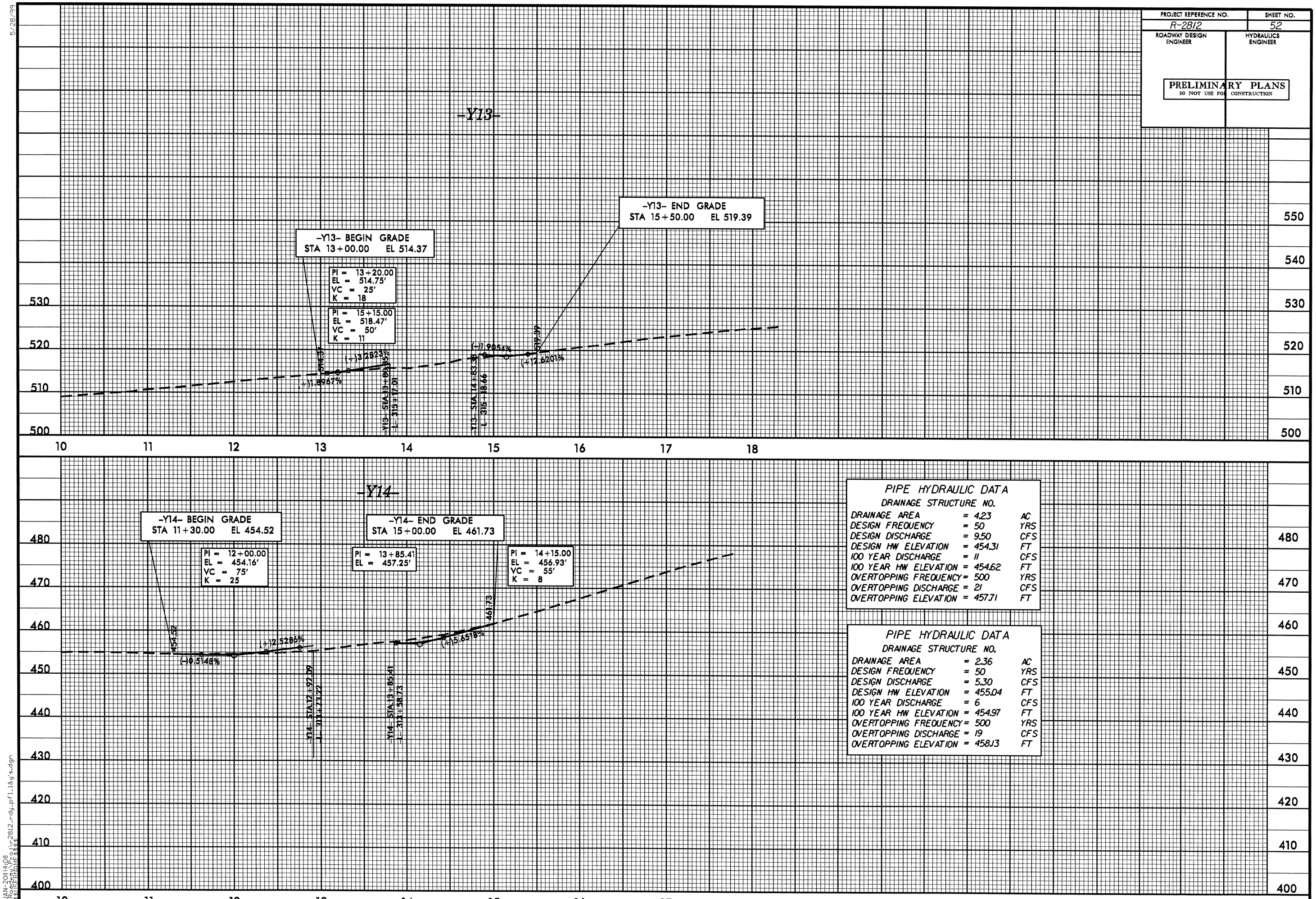


PROJECT REFERENCE NO.
R-2812
SHEET NO.
51
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
-Y8-
-Y9-
-Y10-
-Y10- BEGIN GRADE
STA 11+37.50 EL 536.26
-Y10- END GRADE
STA 12+67.34 EL 531.73
PI = 11+85.00
EL = 534.64'
VC = 45'
K = 14
PI = 12+30.00
EL = 530.61'
VC = 45'
K = 6
536.26
531.73
(-)3.4041%
(-)8.9694%
(-)3.0000%
550
540
530
520
510
500
10
11
12
13
14
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.
DRAINAGE AREA = 3.68 AC
DESIGN FREQUENCY = 25 YRS
DESIGN DISCHARGE = 15 CFS
DESIGN HW ELEVATION = 418.27 FT
100 YEAR DISCHARGE = 19 CFS
100 YEAR HW ELEVATION = 418.71 FT
OVERTOPPING FREQUENCY = 500 YRS
OVERTOPPING DISCHARGE = 99 CFS
OVERTOPPING ELEVATION = 419.39 FT
-Y11-
-Y12-
-Y11- BEGIN GRADE
STA 10+35.50 EL 416.73
-Y11- END GRADE
STA 11+10.00 EL 417.35
-Y12- BEGIN GRADE
STA 12+75.00 EL 481.05
-Y12- END GRADE
STA 13+51.93 EL 483.64
PI = 12+90.00
EL = 481.30'
VC = 25'
K = 6
PI = 13+15.00
EL = 482.85'
VC = 25'
K = 8
(+)4.0446%
(+)1.6546%
(+)6.1728%
(+)2.0896%
440
430
420
410
400
490
480
470
460
450

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2812	52
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 4.23	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 9.50	CFS
DESIGN HW ELEVATION	= 454.31	FT
100 YEAR DISCHARGE	= 11	CFS
100 YEAR HW ELEVATION	= 454.62	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 21	CFS
OVERTOPPING ELEVATION	= 457.71	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 2.36	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 5.30	CFS
DESIGN HW ELEVATION	= 455.04	FT
100 YEAR DISCHARGE	= 6	CFS
100 YEAR HW ELEVATION	= 454.97	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 19	CFS
OVERTOPPING ELEVATION	= 458.13	FT

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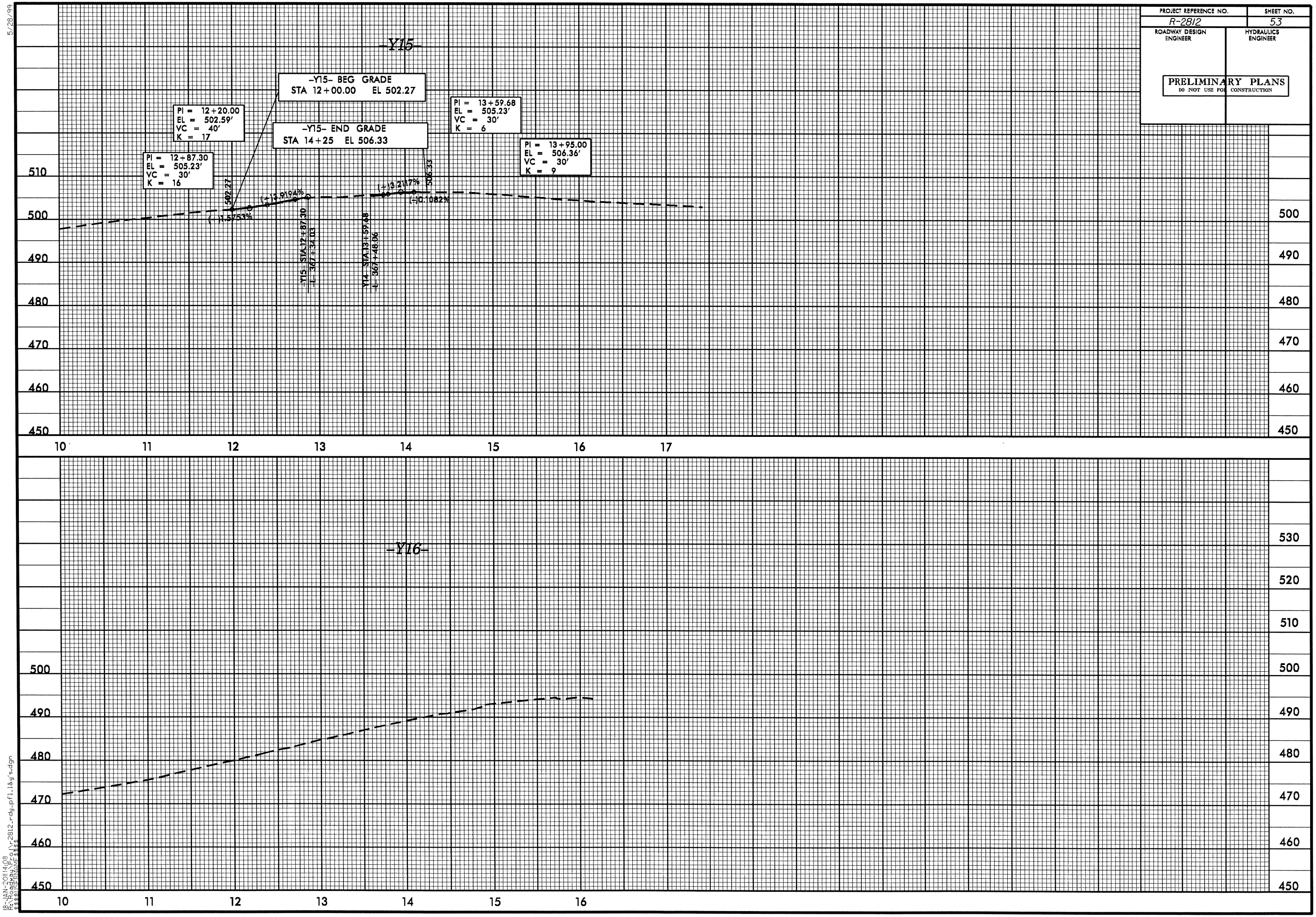
8136 CONNIE SAYLES

PROJECT REFERENCE NO.	SHEET NO.
R-2812	53
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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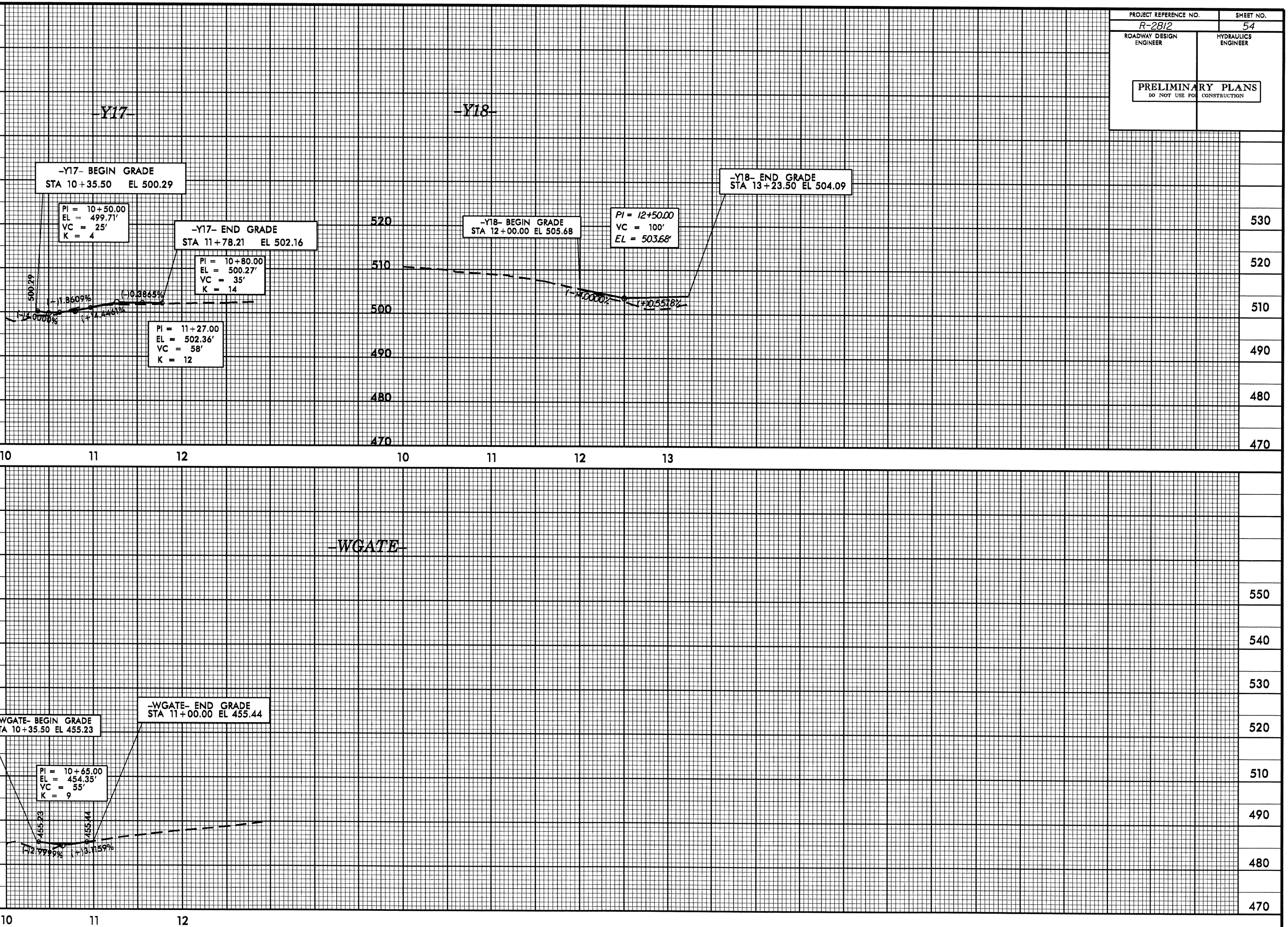
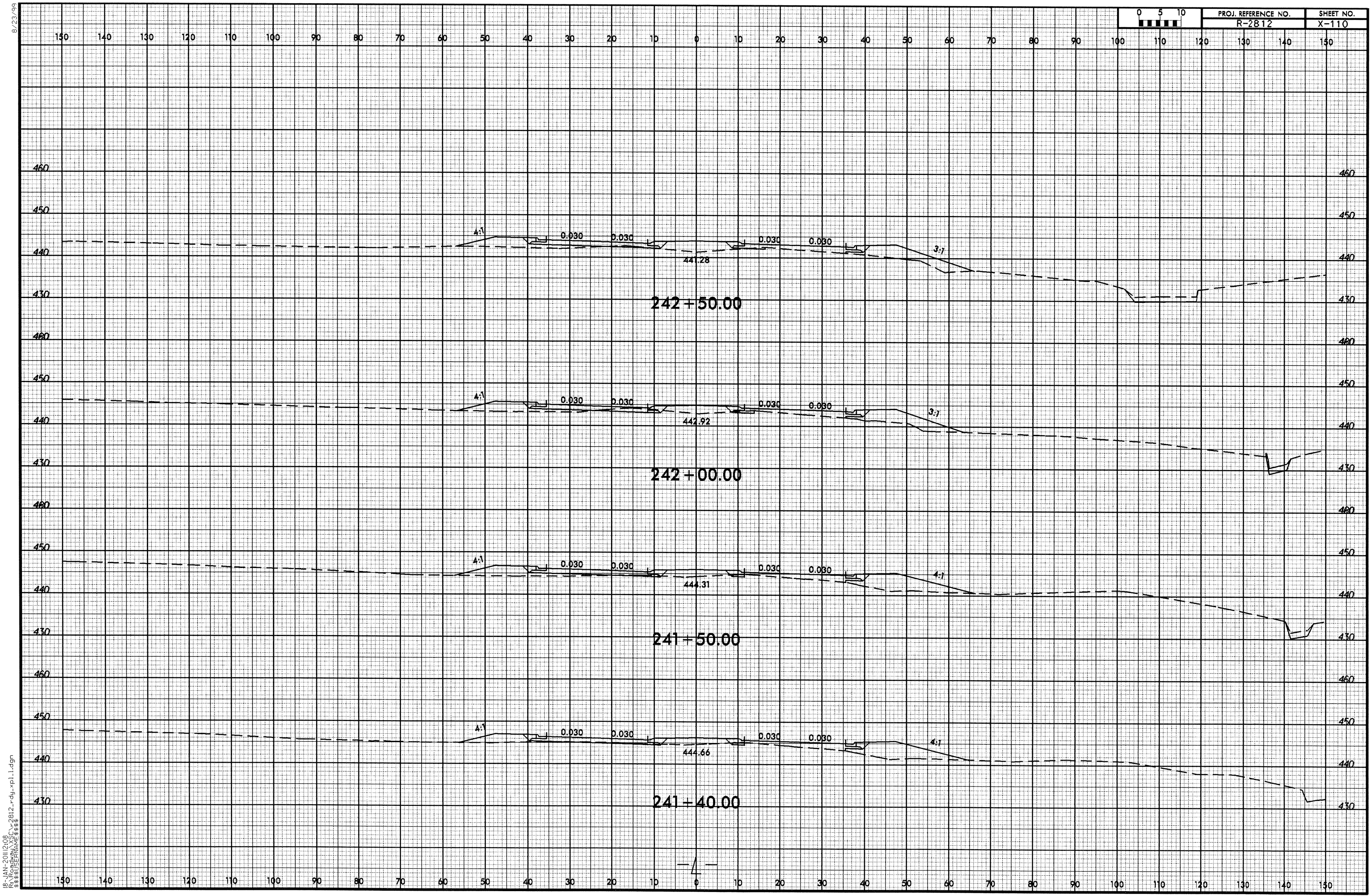


PROJECT REFERENCE NO.
R-2812
SHEET NO.
54
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
-Y17-
-Y18-
-Y17- BEGIN GRADE
STA 10+35.50 EL 500.29
PI = 10+50.00
EL = 499.71'
VC = 25'
K = 4
-Y17- END GRADE
STA 11+78.21 EL 502.16
PI = 10+80.00
EL = 500.27'
VC = 35'
K = 14
PI = 11+27.00
EL = 502.36'
VC = 58'
K = 12
500.29
(-)1.8609%
(-)0.3865%
(-)4.0000%
(+)4.4461%
-Y18- BEGIN GRADE
STA 12+00.00 EL 505.68
PI = 12+50.00
VC = 100'
EL = 503.68'
-Y18- END GRADE
STA 13+23.50 EL 504.09
(-)4.0000%
(+)0.5578%
-WGATE-
-WGATE- BEGIN GRADE
STA 10+35.50 EL 455.23
-WGATE- END GRADE
STA 11+00.00 EL 455.44
PI = 10+65.00
EL = 454.35'
VC = 55'
K = 9
455.23
455.44
(-)2.9999%
(+)3.1159%



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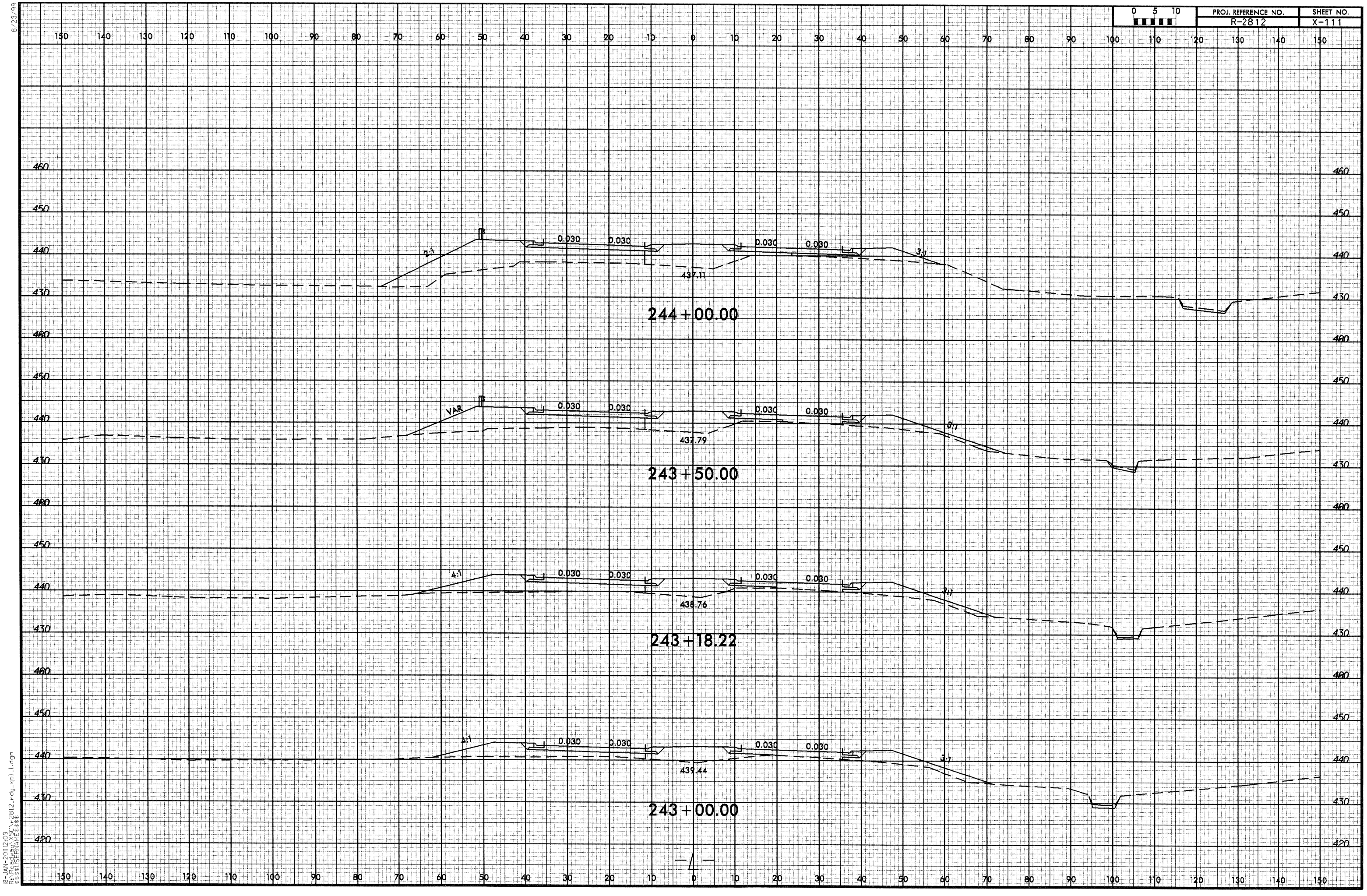

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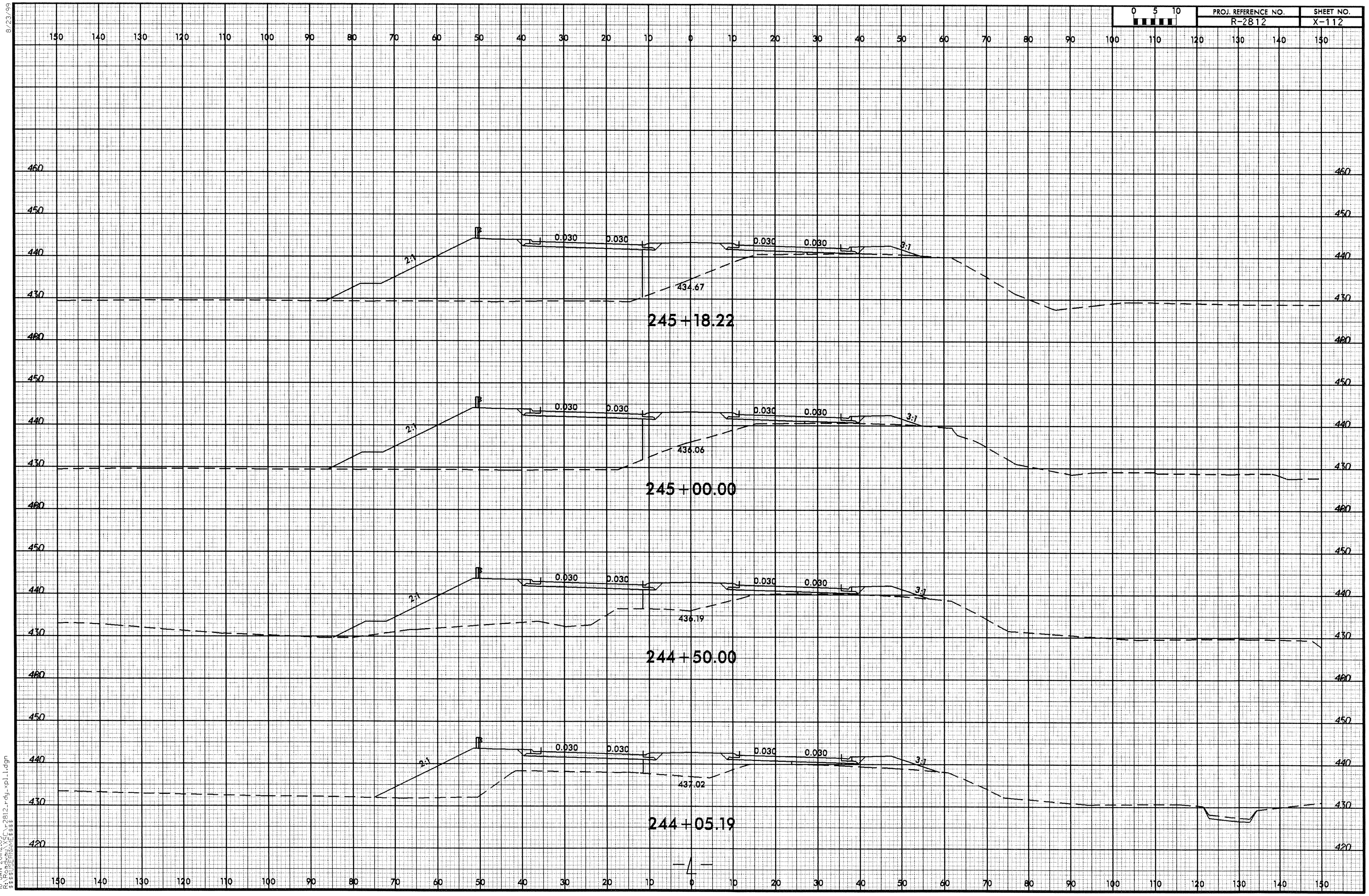

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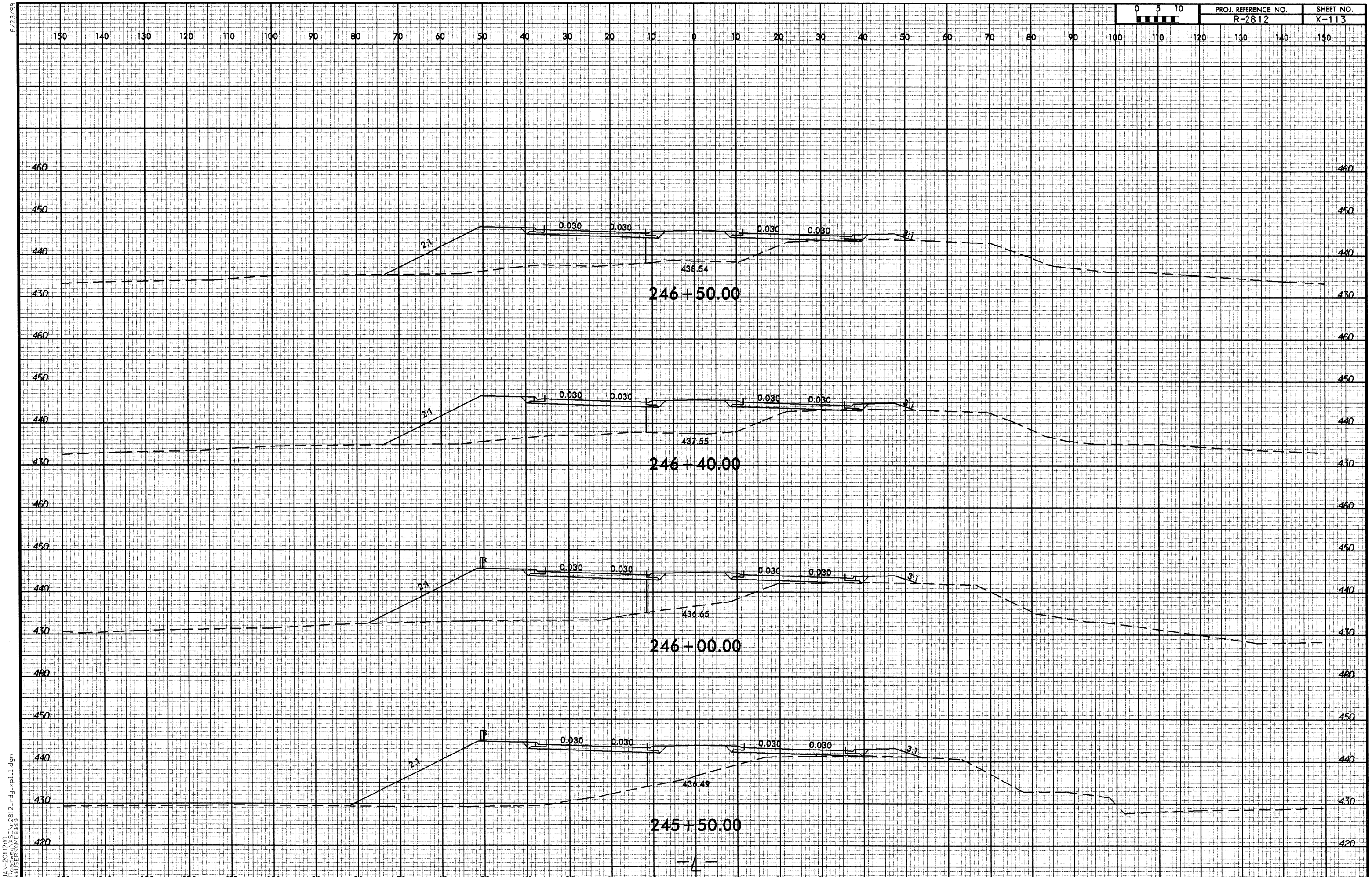

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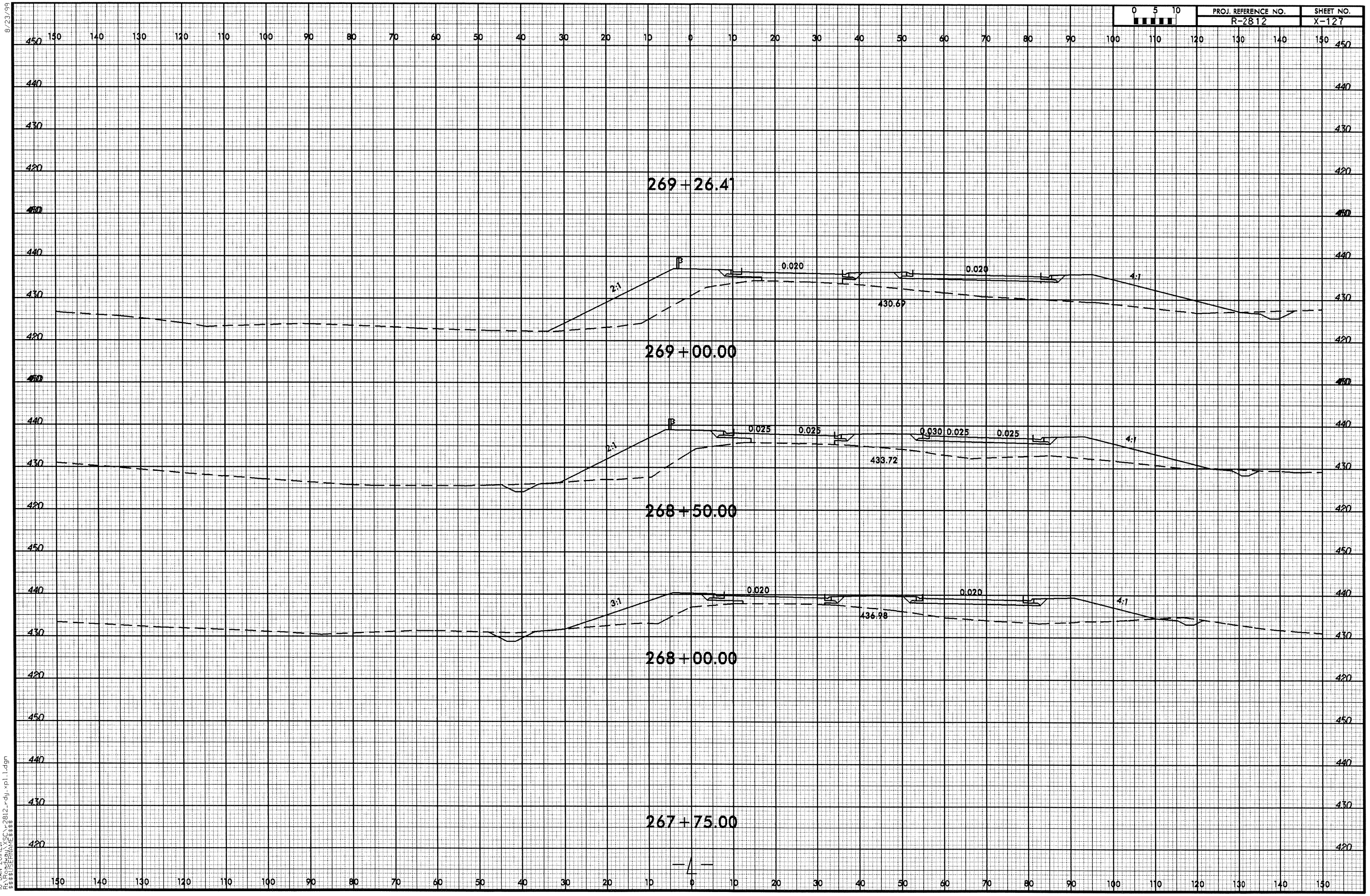

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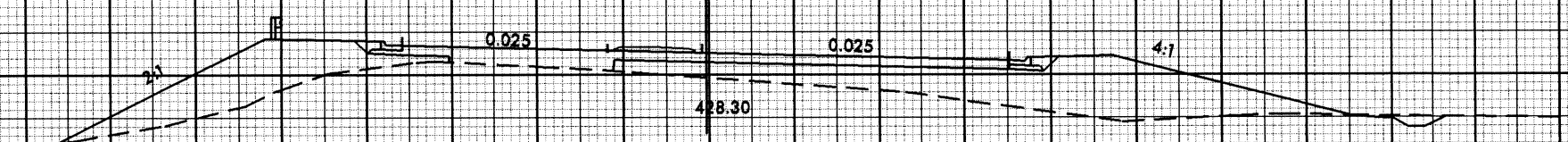
	R-2812	X-128

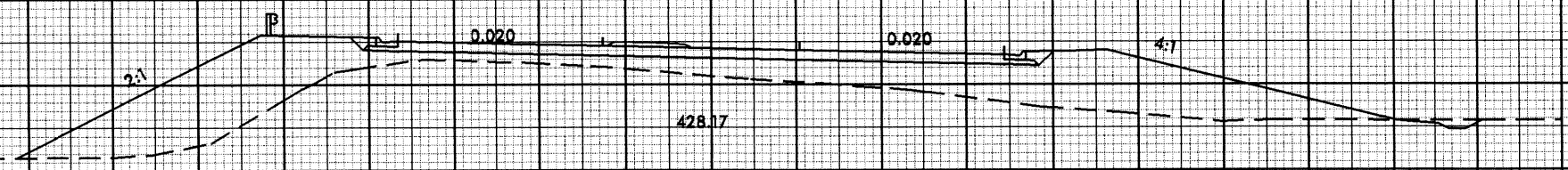
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

450 440 430 420 410

270+45.00



270+00.00



269+50.00

269+49.68

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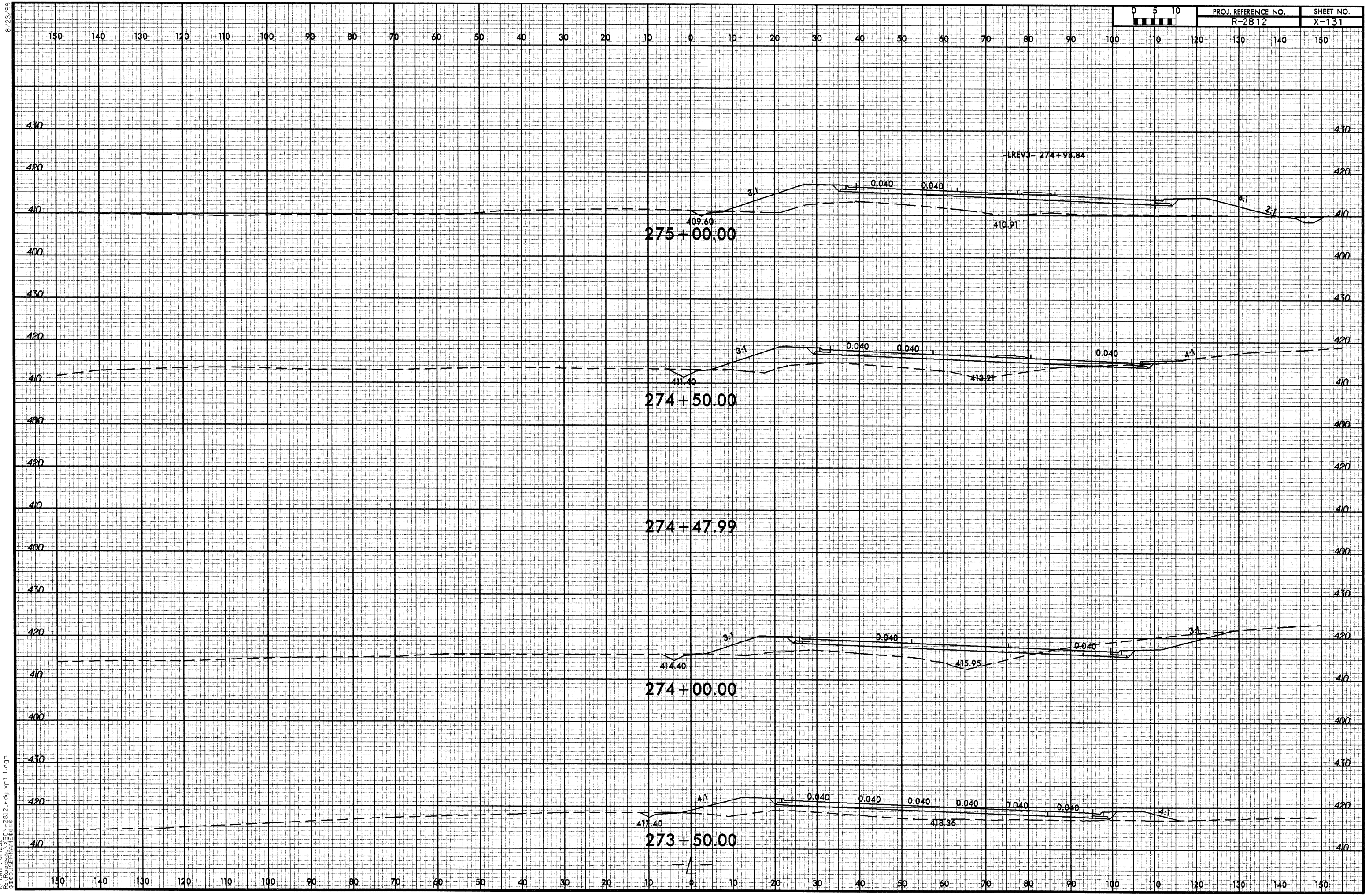

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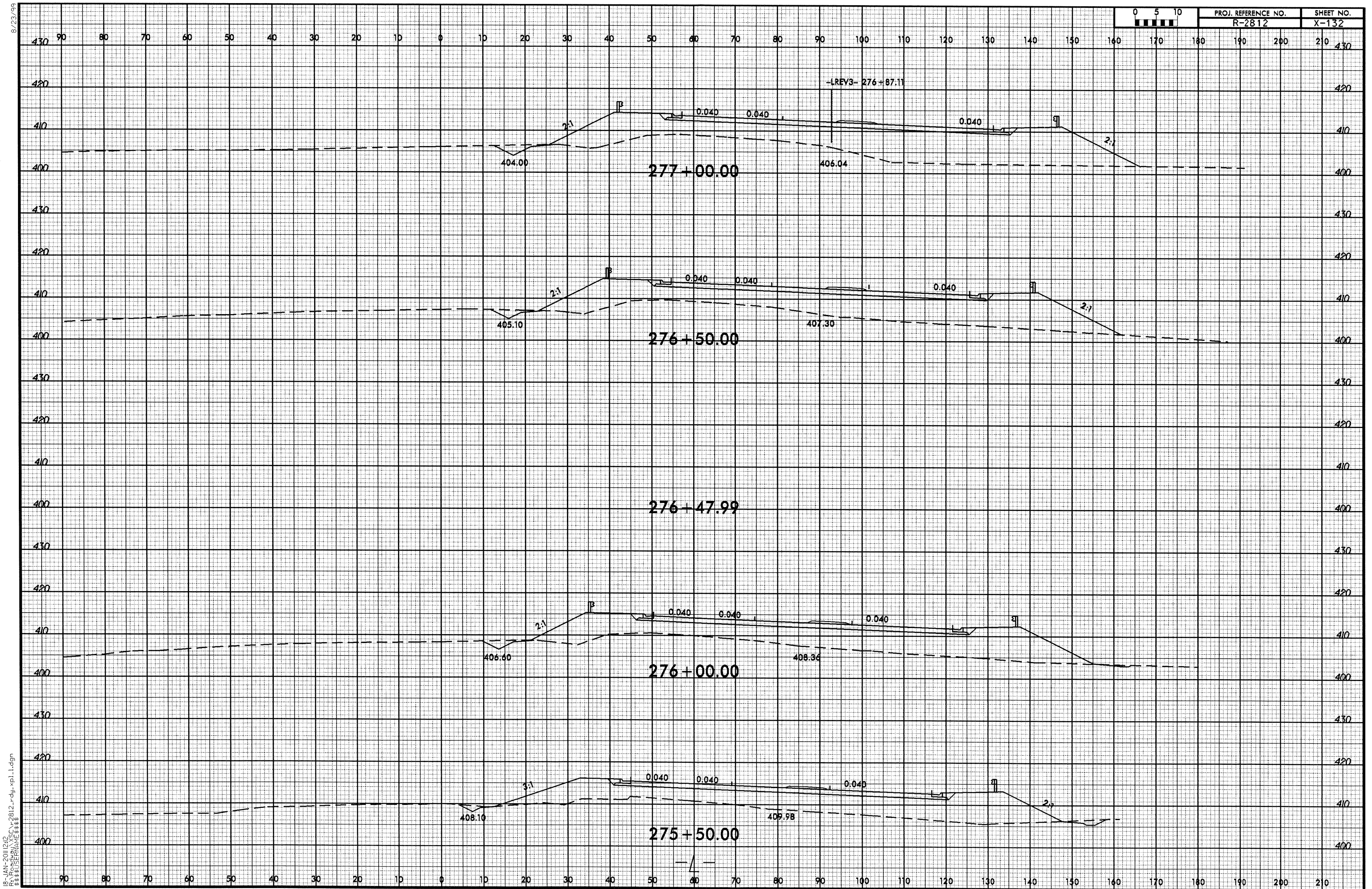

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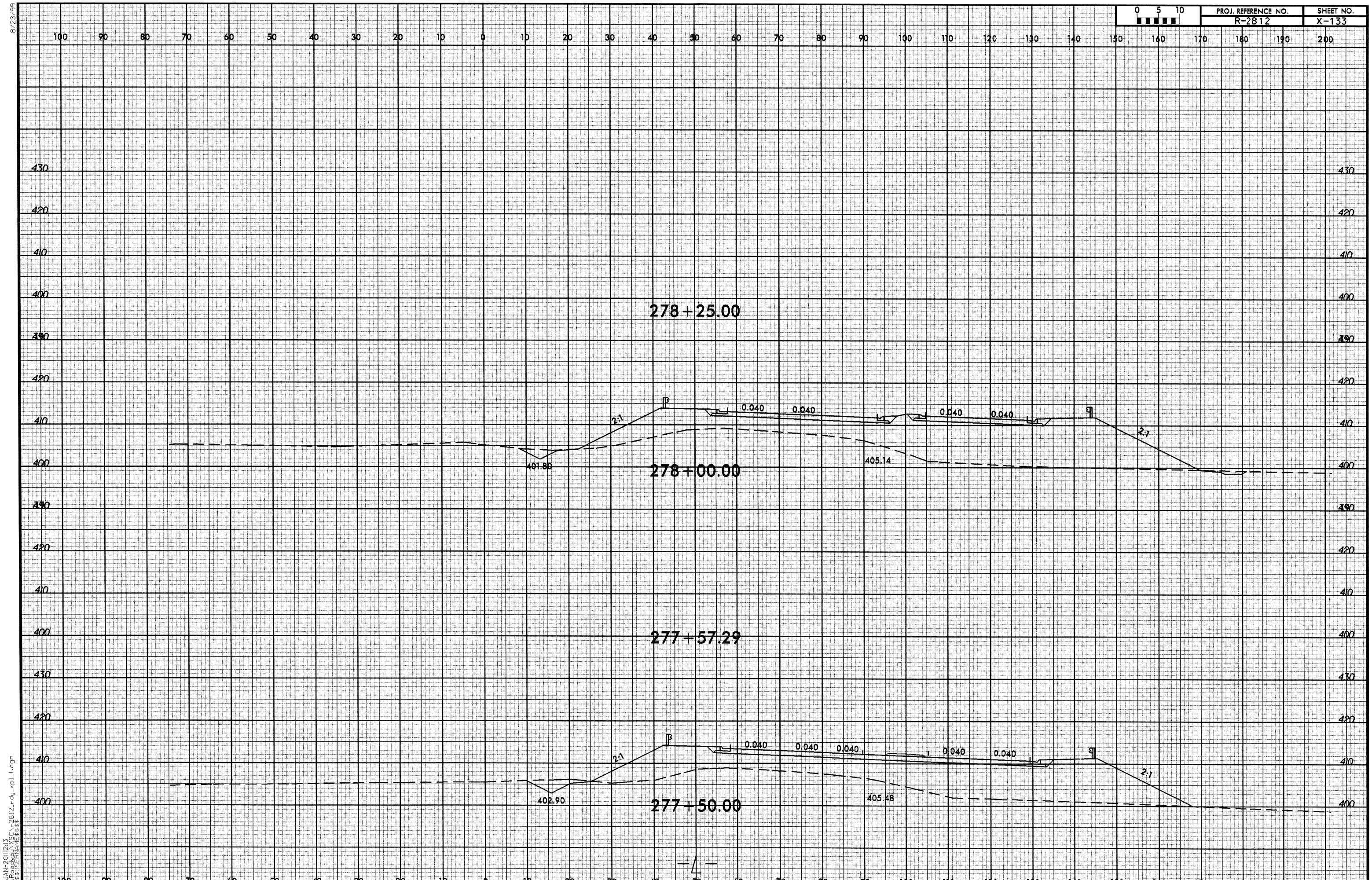

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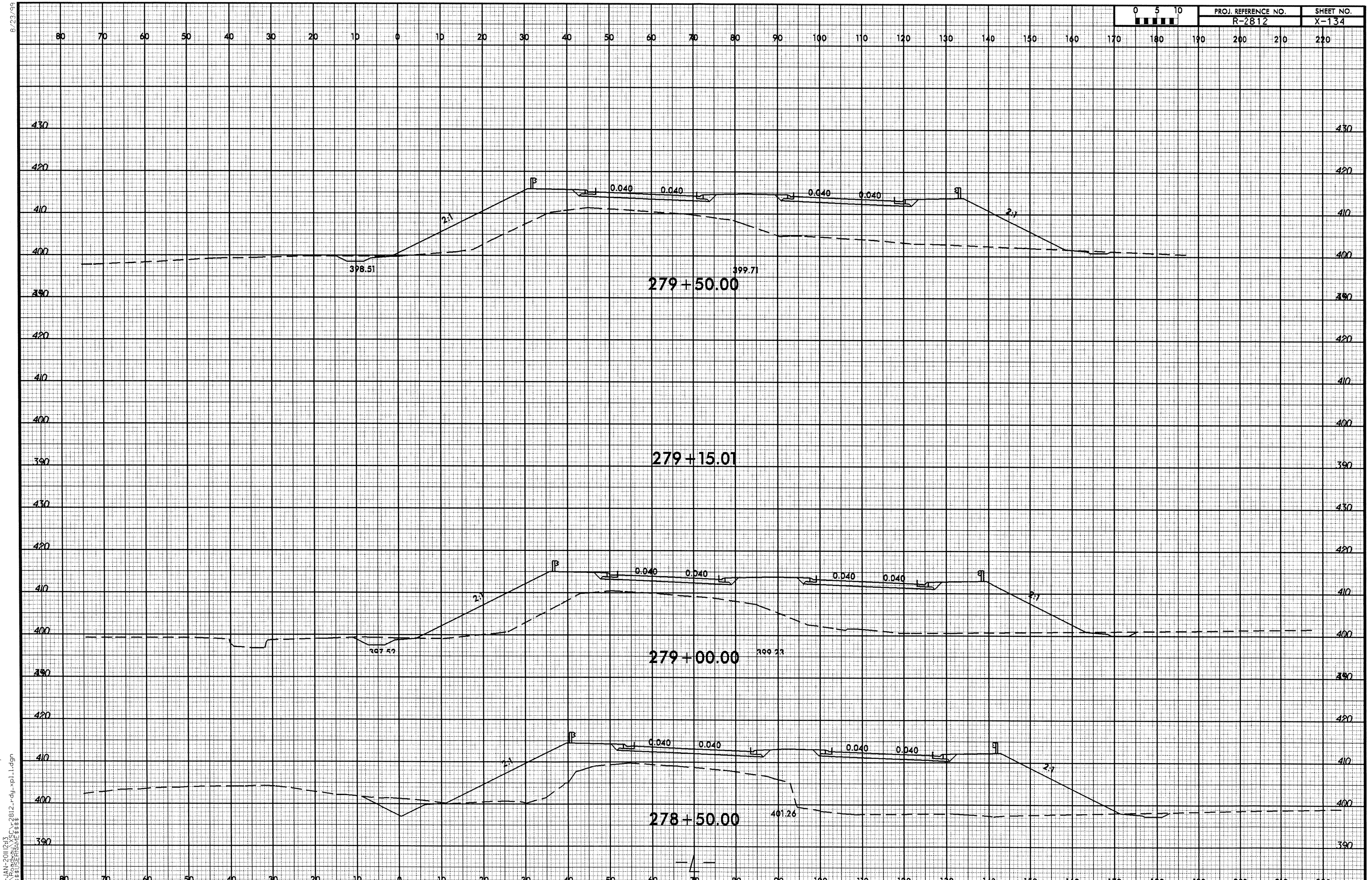

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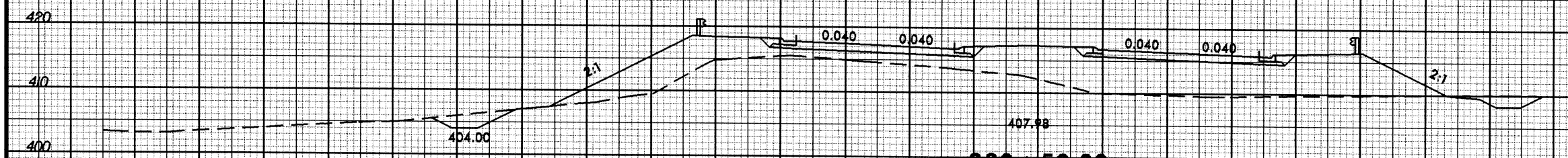
281+15.01

281+00.00



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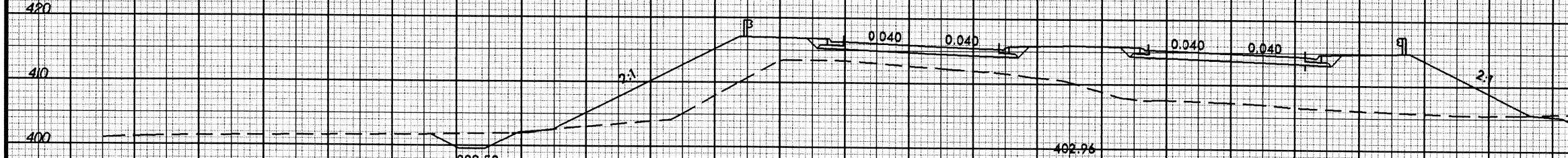

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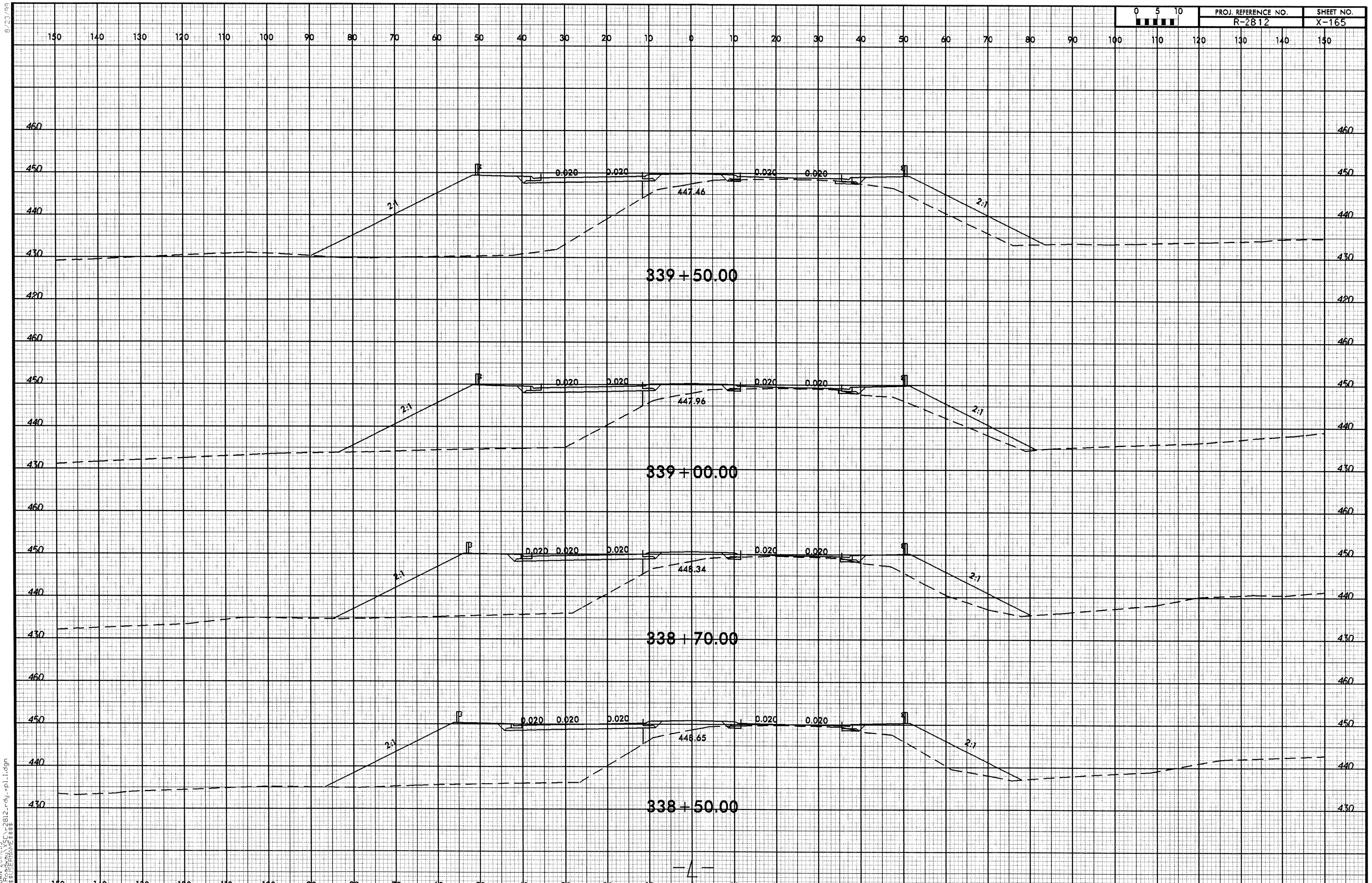

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PROJ. REFERENCE NO.
R-2812
SHEET NO.
X-165
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447.96
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448.34
338+50.00
448.65
0.020
2:1

18-JAN-2011 12:15
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8/23/99

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
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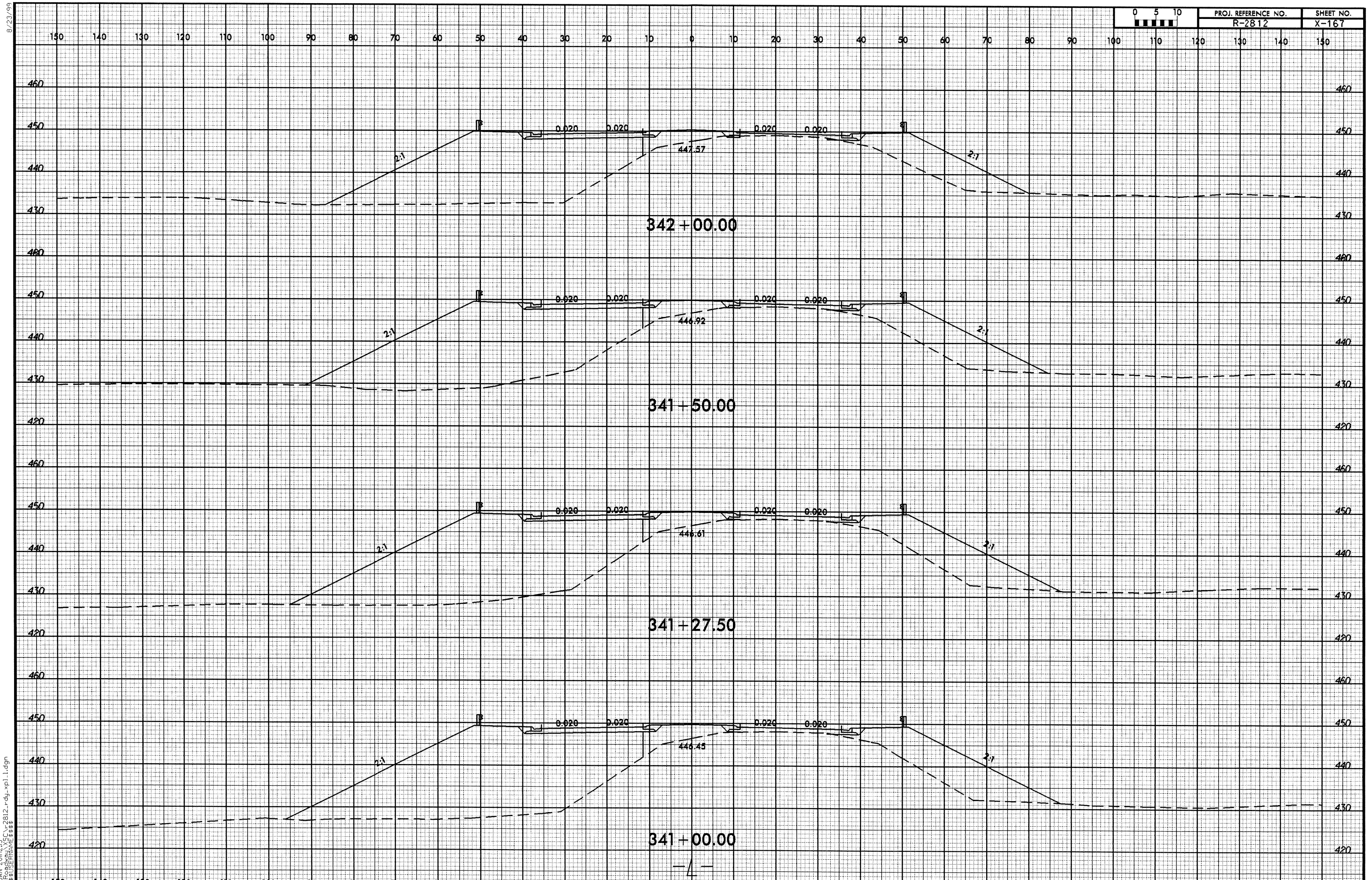

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