STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	20343	1	1

JOB # 25
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

S-NHU-2-094(126)932

FHWA Limited Involvement
Barnes County
I-94 Business Loop
Wolski Plaza Road
Milling, Widening, Hot Bituminous Pavement,
Roadway Realignment, Turn Lanes, Lighting and Incidentals

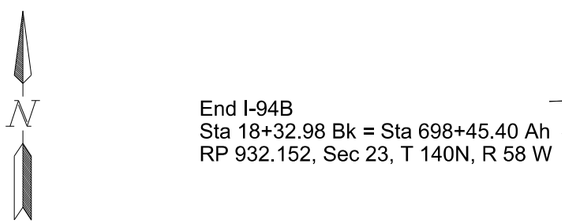
DESIGN DATA I-94 Business Loop				
Traffic	Average Daily			Max. Hr.
Current	Pass: 2142	Trucks: 277	Total: 2419	25
Forecast	Pass: 2950	Trucks: 400	Total: 3350	34
Clear Zone Distance: 22' & 29' on curve		Design Speed: 55 MPH		
Minimum Sight Dist. for Stopping: 495		Bridges:		
Sight Dist. for No Passing Zone: N/A				
Pavement Design Life 20 (years)				
Design Accumulated One-way ESALs: 565,489				

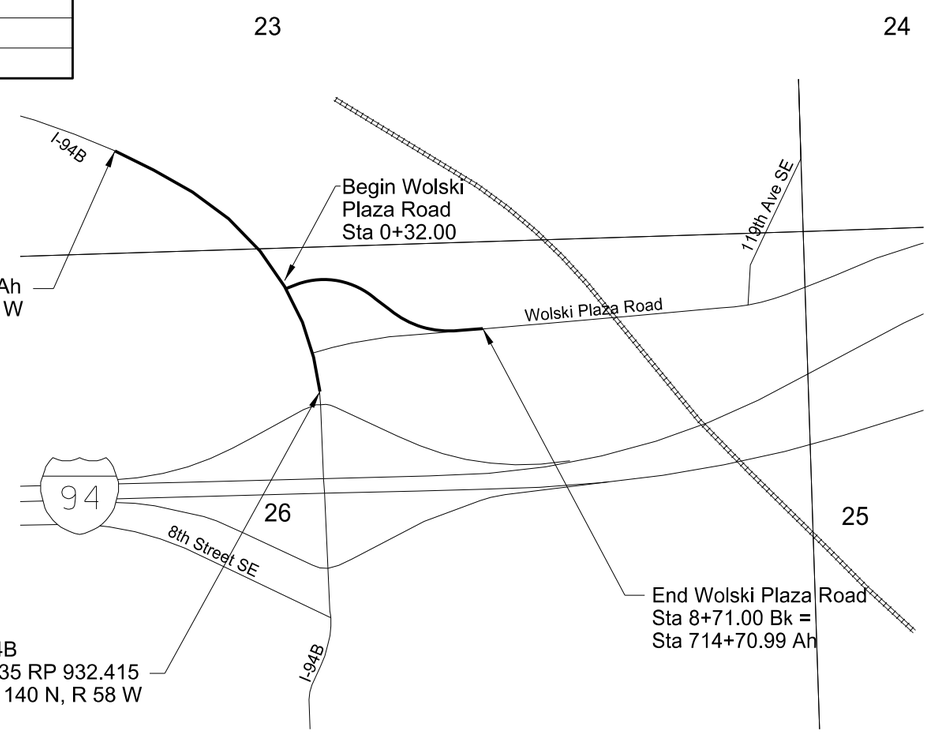
DESIGN DATA Wolski Plaza Road				
Traffic	Average Daily			Max. Hr.
Current	Pass: 225	Trucks: 5	Total: 230	3
Forecast	Pass: 392	Trucks: 8	Total: 400	4
Clear Zone Distance: N/A		Design Speed: 25 MPH		
Minimum Sight Dist. for Stopping: 155		Bridges:		
Sight Dist. for No Passing Zone: N/A				
Pavement Design Life 20 (years)				
Design Accumulated One-way ESALs: 125,347				

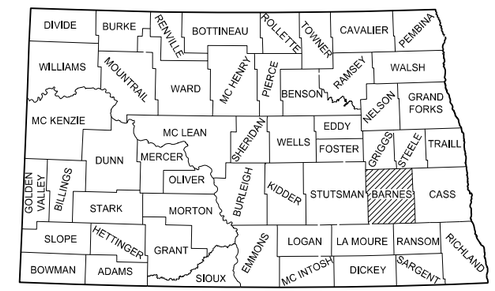
GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota Department of Transportation October 2008; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
S - NHU - 2 - 094(126)932		
Major Rehabilitation		
I-94 Business Loop	0.263	0.263
Wolski Plaza Road	0.159	0.159
Total	0.422	0.422







STATE COUNTY MAP

DESIGNERS

Andrew Krog, EIT

Jon Atkins, PE

David A. Roedel, PE

APPROVED DATE 19 September 2013

Robert Fode /s/
OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 19 September 2013

David A. Roedel, PE /s/
Moore Engineering, Inc.

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moore engineering, inc.

TABLE OF CONTENTS

Section No.	Sheet No.	Description
1	1	Title Sheet
2	1	Table of Contents
4	1	Scope of Work – I-94 Business Loop
4	2	Scope of Work – Wolski Plaza Road
6	1-3	Notes
6	4	Environmental Commitments
8	1	Quantities
10	1-3	Basis of Estimate
11	1-2	Earthwork Values
20	1	Milling and Paving Transitions
20	2-3	Superelevation Tables
30	1-5	Typical Sections
40	1-2	Pavement Removals
60	1-3	Plan and Profile
75	1-2	Wetlands, Erosion Control and Seeding Layouts
90	1-3	Paving Layouts
100	1	Traffic Control Devices List
100	2	Work Zone Traffic Control Sheet
110	1-6	Signing
120	1-3	Marking
140	1-3	Lighting
200	1-27	Cross Sections

Special Provisions

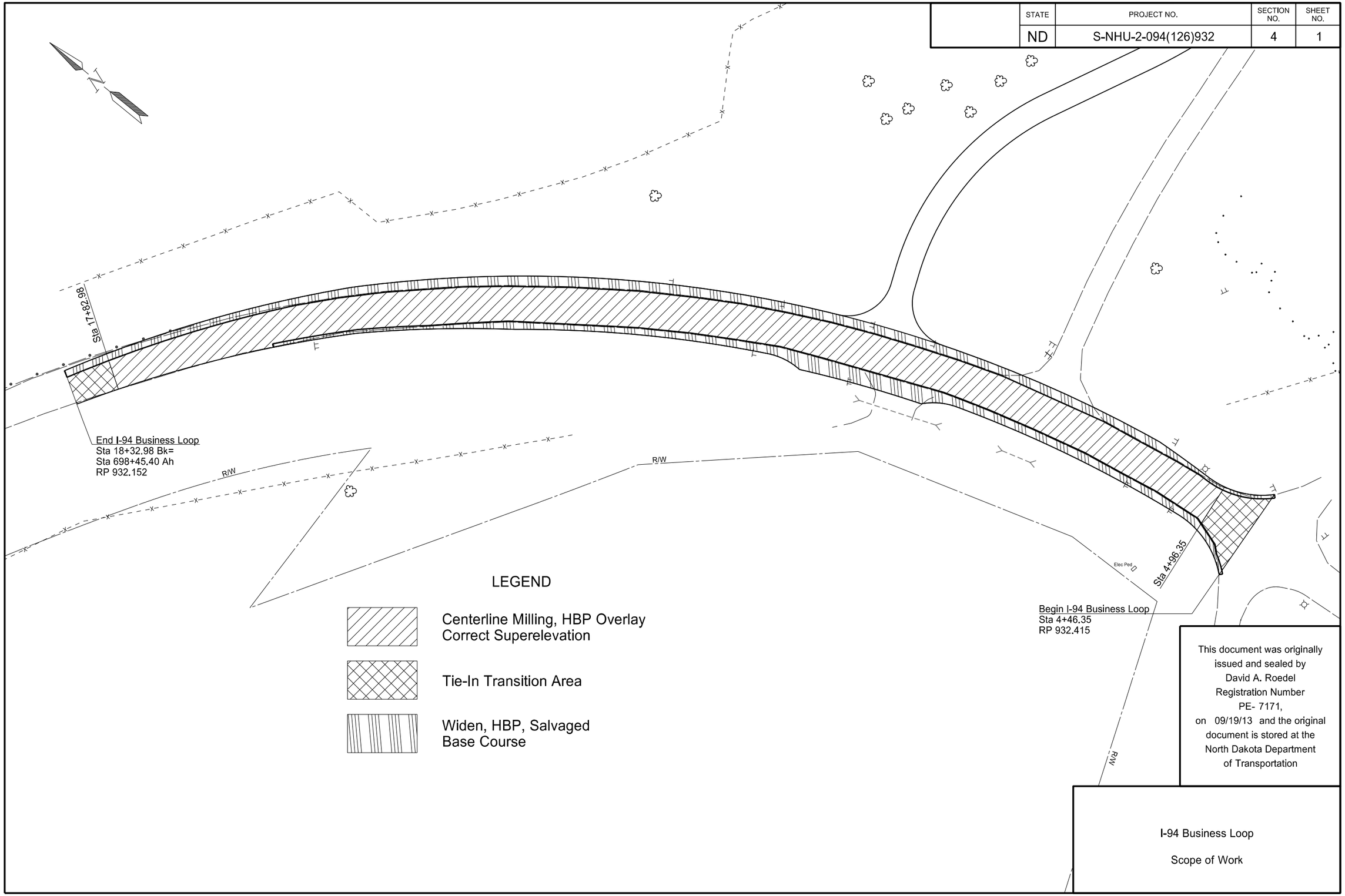
SP 1010(08) Temporary Erosion and Sediment Best Management Practices
SP 1101(08) Split Sampling and Testing Requirements for Aggregate Base
SP 1275(08) Weather Limitations For Hot Bituminous Mix

LIST OF STANDARD DRAWINGS

Standard No.	Description
D-20-1, 2, 3	NDDOT Abbreviations
D-20-10	NDDOT Utility Company Abbreviations
D-20-20, 21	Linestyles
D-20-30, 31, 32	Symbols
D-203-6	Standard 90° Flared Intersection
D-203-7	Recovery Approaches at T-Intersections
D-704-2	Traffic Control for Coring of Hot Bituminous Pavement
D-704-5	Construction Sign Detail
D-704-7	Breakaway Systems for Construction Zone Signs Perforated Tube
D-704-8	Breakaway Systems for Construction Zone Signs
D-704-9, 10, 11,	Construction Sign Details
D-704-13	Barricade Details and Channelizing Devices
D-704-14	Construction Sign and Barricade Assembly Details
D-704-15, 19, 24	Construction Sign and Barricade Location Details
D-704-50	Portable Sign Support Assembly
D-704-56	Mobile Operation (Grinding Shoulder Rumble Strips)
D-706-1	Type C Field Laboratory
D-708-2	Erosion and Siltation Controls
D-708-7	Erosion Control Fiber Roll Staking Details
D-754-3	Break-Away Base and Foundation Details Stub Post
D-754-4	Multi-Directional Break-Away Base
D-754-5	Foundation Data for Steel Supports
D-754-6	Hinge Plate Details-Perforated Fuse Plate Details
D-754-7	Mounting, Post Cap and Panel Details
D-754-8	Attachment Brackets for Standard Steel Pipe (Galv.) Posts and Aluminum Tubular Posts
D-754-9	Letter and Arrow Details for Variable Length Signs
D-754-21	Reflectorized Delineators
D-754-23	Assembly Details
D-754-24, 25	Mounting Details Perforated Tube
D-754-26, 27, 28, 41	Sign Punching, Stringer and Support Location Details Regulatory, Warning and Guide Signs
D- 754-48	Sign Punching, Stringer and Support Location Details for Variable Length Signs
D-754-55	Sign Punching, Stringer and Support Location Details-Route Marker Signs
D-754-57	Sign Punching, Stringer and Support Location Details – Route Marker Signs
D-754-79	Chevron Installation Details
D-762-1	Pavement Marking Message Details
D-762-4	Pavement Marking
D-762-6	Short-Term Pavement Marking

Table of Contents

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	4	1



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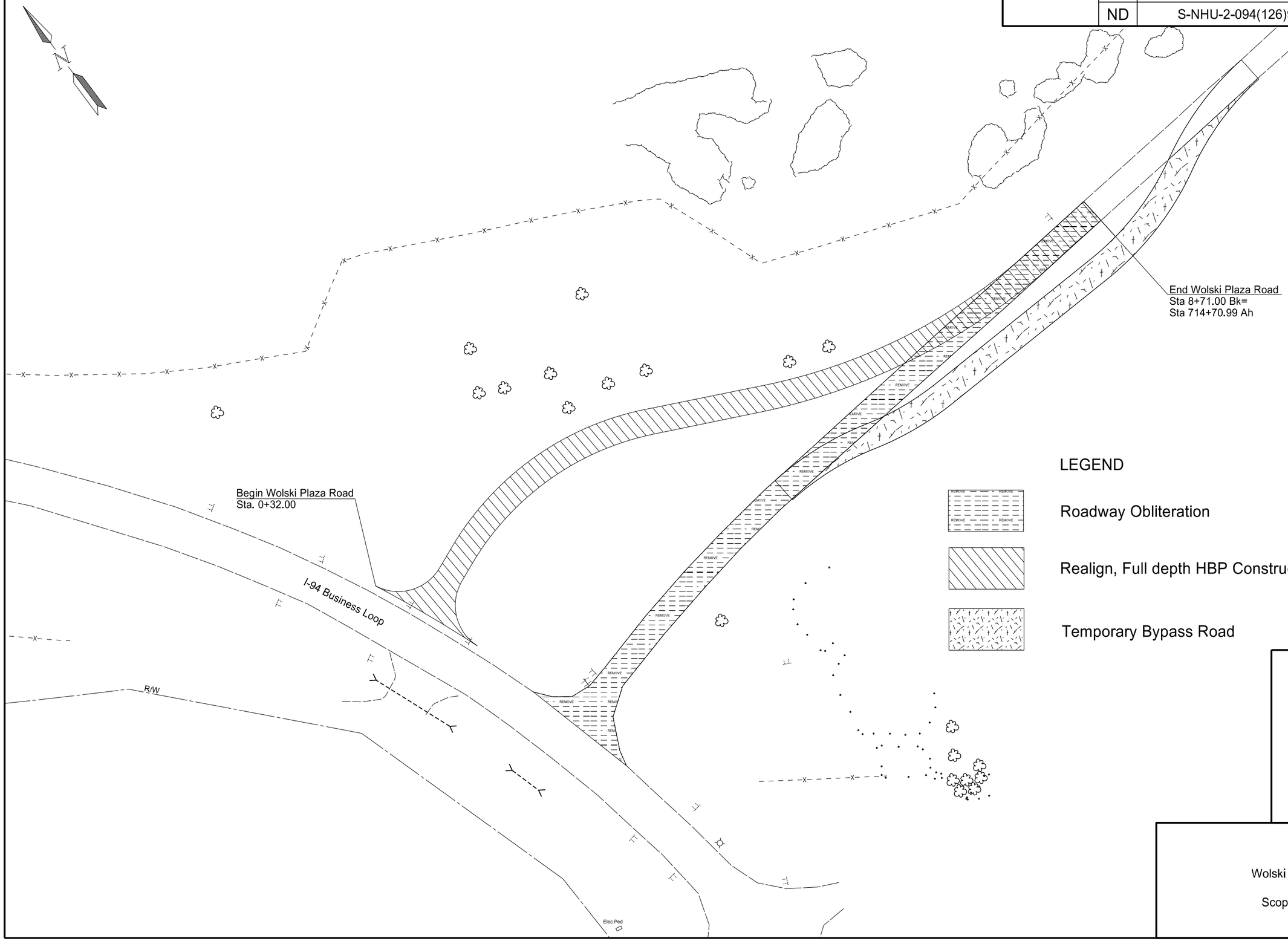
I-94 Business Loop

Scope of Work

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	4	2



LEGEND

Roadway Obliteration

Realign, Full depth HBP Construction

Temporary Bypass Road

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Wolski Plaza Road

Scope of Work

NOTES

GENERAL NOTES

100-P01 PROTECTION OF EXISTING FACILITIES: The contractor shall exercise care in his construction operations to ensure that no damage is done to the existing facilities and other site improvements that are to remain in place. All cost to repair any damage shall be at the contractor's expense.

100-P02 WORK SCHEDULE: In order to minimize interference with traffic operations, a detailed schedule shall be agreed to prior to beginning work between the engineer, the city, and the contractor and subcontractors, if any.

100-P03 TIED PROJECT: This project is tied to Project S-NHU-2-094(123)931. The traffic control devices will be shared for the projects but only measured once.

100-P04 COORDINATION OF PROJECTS: Other project under construction during the 2014 construction season in the vicinity of this project is TCP-2-990(049)053.

107-P01 HAUL ROAD RESTRICTIONS: All roads shall not be used as haul roads unless the contractor obtains written approval from the local government agency or agencies and the engineer. The engineer will determine what government agency or agencies are appropriate.

200-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

202-P01 REMOVAL OF PAVEMENT: Where the new pavement will abut existing pavement, a full-depth vertical saw cut shall be made along the entire length of the butt joint. The material to be removed shall then be removed without disturbing the material that is designated to remain. The new pavement shall be placed so as to match the existing pavement and so as to provide a satisfactory surface profile. The areas to be sawed are shown on the removal plan sheets. Sawing shall be paid as "Saw Bituminous Surfacing-Full Depth." The removal of bituminous surfacing and aggregate base shall be included in the price bid for “Removal of Bituminous Surfacing.”

202-P02 REMOVAL OF CULVERTS-ALL TYPES AND SIZES: All culverts that are removed as part of this project shall become the property of the Contractor and either salvaged or disposed of in accordance with Section 202.02 A.

203-P01 ROADWAY OBLITERATION: “Roadway Obliteration” shall be performed in accordance with NDDOT Standard Specification 203.02.A.2 and shall include removal of roadway surface material, structures, and appurtenances, filling in of all ditches, and rough grading. Placing of topsoil and seeding shall be paid as “Topsoil” and “Seeding-Type B-CL II and Seeding-Type B-CL VI”

203-P02 TOPSOIL: The existing topsoil within the reconstruction area on this project shall be salvaged. Removal of topsoil is based upon a 6" depth. The topsoil shall be removed to its full depth and stockpiled. Upon completion of the reconstruction/widening area, the topsoil shall be spread evenly over the areas to be seeded. Placed topsoil depth shall be a minimum of 6”.

230-P01 SUBGRADE PREPARATION TYPE A: Compaction and density control shall be in accordance with Section 203.02.G of the Standard Specifications. Subgrade preparation shall be performed to a depth of 6-inches in all locations.

410-P01 HOT BITUMINOUS PAVEMENT: The 5” Superpave FAA 45 shall be paver laid in one, 2” lift with PG 58-28 Asphalt Cement and two, 1.5” top lifts with PG 64-28 Asphalt Cement for I-94B. The 5” Superpave FAA 45 shall be paver laid in one, 2” lift with PG 58-28 Asphalt Cement and two, 1.5” top lifts with PG 64-28 Asphalt Cement for Wolski Plaza Road. The Superpave FAA 45 shall have the following aggregate and mix design properties:

Test	Criteria	Reference
Course Aggregate Angularity	85% min	NDDOT Field Sampling/Testing Manual
Fine Aggregate Angularity	45% min	AASHTO T 304
Gyratory Effort, # Gyrations	N_{ini}=7, N_{des}=75, N_{max}=115,	AASHTO R 35
Voids Filled with Asphalt	65%-75%	AASHTO M 323, T 166
%G_{mm}@ N_{ini}	89.0% max	AASHTO M 323, T 166

410-P02 CONTRACTOR MIX DESIGN: The final mix design shall be a Contractor-developed mix design as per NDDOT Standard Specification 410.04. The mix design shall be submitted to the Department 10 working days before production starts.

410-P03 HBP LEVELING COURSE: 400 tons of hot bituminous pavement has been included in the quantity for Superpave FAA 45 and 24 tons of PG 58-28 asphalt cement to be used for correction of the existing

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NOTES

superelevation to .057'/'. The engineer will determine the location and length of the leveling needed at the time of placement. Placement shall occur 24 hours prior to mainline paving. A paver laid mat shall be placed using a set grade control to obtain a smooth transition and ride. The hot bituminous pavement shall be compacted in accordance with section 408.04.I.2 (ordinary compaction) of the standard specification. The hot bituminous pavement shall be laid in with the maximum depth of lift not to exceed 2 1/2 inches at the greatest depth.

410-P04 HOT BITUMINOUS PAVEMENT SEAMS: Contractor shall pave the overlay in a manner so that the two outside paving seams will offset the existing pavement seams by a minimum of 2 ft.

411-P01 TEMPORARY ASPHALT WEDGES: The Contractor shall place temporary asphalt or milled material wedges at the milled taper location to allow for a smooth passage of vehicles. All costs for labor, materials, and equipment to install and remove the wedges shall be included in the unit price bid for "Milling Pavement Surface."

411-P02 MILLINGS: The milled bituminous material shall become the property of the NDDOT. The milled material shall be hauled and stockpiled at the NDDOT Maintenance Yard at Valley City. No additional payment will be made to the contractor for milled material stockpiled at the NDDOT Maintenance Yard. All costs for this work shall be included in the price bid for "Milling Pavement Surface".

704-016 TRAFFIC CONTROL-SUPERVISOR: A traffic control supervisor shall be provided on this project.

704-252 TRAFFIC CONTROL FOR UNEVEN PAVEMENT: The contractor has the option of making the paving lanes even at the end of each day's paving operation or signing for the uneven pavement and providing the following devices: Install "Uneven Lanes" signs (Sign No. W8-11-48) and a supplemental plate (Sign No. W20-52-54), identifying the distance, on the right shoulder (both directions) in advance of the beginning of the uneven pavement and at major intersections. A major intersection shall be defined as a CMC, state, U.S. highway, or Interstate ramp. Install "Do Not Pass" signs (Sign No. R4-1-48) on the right shoulder (both directions) between the uneven lanes sign and the beginning of the uneven pavement and at major intersections. Install tubular markers spaced at two times the posted speed limit on the centerline where uneven pavement exists.

These traffic control devices shall be left in place until the lanes are even. These signs and tubular markers are included in the "Traffic Control Devices List" and will be measured and paid for at the contract unit price for each device. No extra compensation will be allowed for relocation due to work progression.

704-255 TRAFFIC CONTROL FOR SHOULDER DROP-OFF: The contractor has the option of paving the adjacent shoulder with the driving lane or providing a slough and signing for the shoulder drop off as follows: Install "Shoulder Drop Off" signs (Sign No. W8-9a-48) and supplemental plate (Sign No. W20-52-54), identifying the distance, in advance of the beginning of the shoulder drop off, each mile thereafter, and at major intersections. A major intersection shall be defined as a CMC, State, U.S. highway, or Interstate ramp. If the contractor is unable to make the driving lane and shoulder even at the end of the day, he will sign the shoulder drop off as specified above. The sloughs shall be a 2:1 slope. No slough will be required for drop-offs of 1 ½" or less in depth.

These traffic control signs shall be in place until the shoulder is even. These signs are included in the "Traffic Control Devices List" and will be measured and paid for at the contract unit price for each device. No extra compensation will be allowed for relocation due to work progress.

704-P01 TRAFFIC CONTROL: The contractor shall provide one lane for traffic at all times on I-94B. The Traffic Control Devices List has been developed using the following layouts on the Standard Drawings and plan sheets for traffic control:

D-704-2: For coring operations.
D-704-5: Construction Sign Detail.
D-704-7,8,9,10,11: As applicable.
D-704-13: Barricade Details and Channelizing Devices
D-704-14: Construction Sign and Assembly Details
D-704-15, 19, 24: Construction Sign and Location Details
D-704-24: Layout Type T for shoulder preparation, topsoil, seeding and mulching.
D-704-50: Portable Sign Support Assembly.
D-704-56: Mobile Operations (Grinding Shoulder Rumble Strips)

704-P02 TRAFFIC CONTROL: Stackable vertical panels shall be used for the temporary traffic control layout D-704-15 Type B for temporary bypass.

706-P01 FIELD LABORATORY TYPE-C: The contractor shall supply a telephone with service and a copy machine with reduction capabilities for the Field Laboratory. The copy machine shall not use thermal-type paper. The payment for these items will be included in the price bid for "Field Laboratory - Type C."

708-P01 MULCHING: All excavation and embankment areas shall be stabilized with mulch after the completion of

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NOTES

the Type B-Class II permanent seeding operation. Temporary seeding shall be Type B–Class VI. Additional mulching may be required to meet the requirements of the NDPDES Construction General Permit.

710-P01 DRAINAGE: Adequate drainage shall be maintained throughout the process of construction of the Wolski Plaza Road and the temporary bypass. No direct payment shall be made to maintain drainage but shall be included in the bid item price for “Temporary Bypass” and “Roadway Obliteration.”

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ENVIRONMENTAL COMMITMENTS

ENVIRONMENTAL COMMITMENTS: The North Dakota Department of Transportation and the Federal Highway Administration have made several environmental commitments to various agencies and the public to secure approval of this project. The environmental commitments are as follows:

Example if No Environmental Commitments Exist:
Based on the NEPA documentation, no additional permits or environmental commitments have been identified beyond what is covered by the NDDOT's Standard Specification of Road and Bridge Construction.

Wetland Number	Cowardin Classification	Wetland Type	Wetland Size (acres)	Wetland Feature	USACE Jurisdictional Wetlands	Impacts to Wetlands	
						Temp.	Perm.
NO WETLANDS PRESENT							
TOTALS:			0.00			0.00	0.00

*A wetland Jurisdictional Determination was issued by the USACE on 09/26/2012; NWO-2012-2312-BIS.

Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
103	0100	CONTRACT BOND	L SUM	0.58
201	0330	CLEARING & GRUBBING	LSUM	1
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	457
202	0153	SAW BITUMINOUS SURFACING-FULL DEPTH	LF	2,622
202	0169	REMOVAL OF END SECTIONS-ALL TYPES & SIZES	EA	4
202	0170	REMOVAL OF CULVERTS-ALL TYPES & SIZES	LF	125
203	0101	COMMON EXCAVATION-TYPE A	CY	1,214
203	0109	TOPSOIL	CY	4,463
203	0140	BORROW-EXCAVATION	CY	11,047
203	0180	ROADWAY OBLITERATION	LF	783
216	0100	WATER	MGAL	160
230	0300	SUBGRADE PREPARATION-TYPE A	STA	22.50
302	0100	SALVAGED BASE COURSE	TON	3,835
401	0100	MC70 OR 250 LIQUID ASPHALT	GAL	1,977
401	0160	BLOTTER MATERIAL CL 44	TON	60
410	0215	SUPERPAVE FAA 45	TON	3,000
410	0445	PG 58-28 ASPHALT CEMENT	TON	62
410	0460	PG 64-28 ASPHALT CEMENT	TON	119
410	0910	CORED SAMPLE	EA	26
411	0105	MILLING PAVEMENT SURFACE	SY	1,849
420	0109	SS1H OR CSS1H EMULSIFIED ASPHALT	GAL	1,661
702	0100	MOBILIZATION	LSUM	0.58
704	0100	FLAGGING	MHR	120
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,706
704	1052	TYPE III BARRICADE	EA	13
704	1060	DELINEATOR DRUMS	EA	10
704	1067	TUBULAR MARKERS	EA	84
704	1080	STACKABLE VERTICAL PANELS	EA	30
704	1185	PILOT CAR	HR	40
706	0300	FIELD LABORATORY-TYPE C	EA	0.58
708	1322	SILT FENCE UNSUPPORTED	LF	2,305
708	1332	REMOVAL SILT FENCE UNSUPPORTED	LF	2,305
708	1430	FIBER ROLLS 12IN	LF	2,040
708	1431	REMOVAL FIBER ROLLS 12IN	LF	2,040
708	2240	SEEDING-TYPE B-CL II	ACRE	5.0
708	2290	SEEDING-TYPE B-CL VI	ACRE	5.0
708	5500	MULCHING	ACRE	10.0
709	0701	GEOTEXTILE FABRIC-TYPE R1	SY	7,907
710	0200	TEMPORARY BYPASS	LSUM	1
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFLECTIVE SHEETING	SF	133.1
754	0162	REMOVE & RESET DELINEATORS	EA	7
754	0206	GALV. STEEL POST-TELESCOPING PERFORATED TUBE	LF	262.7
754	0492	STUB POST 4IN	EA	2
754	0592	RESET SIGN PANEL	EA	1
754	0593	RESET SIGN SUPPORT	EA	2
754	1100	CLASS AE CONCRETE-SIGN FOUNDATIONS	CY	0.78
762	0103	PVMT MK PAINTED - MESSAGE	SF	160
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	2,018
762	1104	PVMT MK PAINTED 4IN LINE	LF	10,277
762	1108	PVMT MK PAINTED 8IN LINE	LF	1,070
762	1124	PVMT MK PAINTED 24IN LINE	LF	44
762	1500	OBLITERATION OF PVMT MK	SF	10
770	0020	CONCRETE FOUNDATION-HIGHWAY LIGHTING	EA	7
770	0100	PULL BOX	EA	1
770	0330	2IN DIAMETER RIGID CONDUIT	LF	1,190
770	0505	UNDERGROUND CONDUCTOR NO6-TYPE RHW	LF	3,570
770	1676	LT STD 6FT MA 40FT MT HT BREAKAWAY	EA	6
770	4220	LED LUMINAIRE - 150 WATT	EA	8
770	4523	REVISE HIGHWAY LIGHTING FEEDPOINT	EA	1
770	4540	RELOCATE LIGHT STANDARD	EA	1
770	4570	REMOVE STREET LIGHT LUMINAIRE	EA	2
770	4582	REMOVE CONCRETE FOUNDATION	EA	1

Quantities

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	10	1

BASIS OF ESTIMATE

Widening Areas On I-94B

Description	Unit	4+46.35 to 5+83.00		5+83.00 to 13+23.00		13+23.00 to 15+03.00		15+03.00 to 16+00.00		16+00.00 to 18+32.98		Totals		
		Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right & Left Combined
AREA*	**SF**	**763.15**	**1,119.17**	**8,105.22**	**7,990.04**	**1,979.62**	**950.22**	**861.83**	**199.56**	**1,881.24**	**0.00**	**13,591.06**	**10,258.99**	**23,850.05**
Superpave FAA 45 @ 2.0 Tons/CY	Tons	10.5	15	106	105	26	13	11.5	3	25	0	179	136	315
Salvaged Base Course @ 1.875 Tons/CY	Tons	115.5	146.5	971	961	237	147.5	110	52	247.5	0	1681	1307	2988
PG 58-28 Asphalt Cement	Tons	0.6	0.9	6.4	6.3	1.6	0.8	0.7	0.2	1.5	0	10.8	8.2	19
Geotextile Fabric-Type R1	SY	186	226	1449	1436	353	239	168	94	382	0	2538	1995	4533
MC 70 or 250 Liquid Asphalt	Gal	46.5	56.5	362	359	88	60	42	23.5	95.5	0	634	499	1133
Blotter Material CL 44	Tons	1.4	1.7	10.9	10.8	2.6	1.8	1.3	0.7	2.9	0	19.1	15	34.1

I-94B 3" Overlay - Superpave FAA 45, PG 64-28 Asphalt Cement

Description	Unit	4+46.35 to 5+83.00		5+83.00 to 13+23.00		13+23.00 to 15+03.00		15+03.00 to 16+00.00		16+00.00 to 18+32.98		Totals		
AREA*	**SF**	**8,764.08**		**46,138.23**		**10,107.80**		**4,722.44**		**10,311.95**		**80,044.50**		
Superpave FAA 45 @ 2.0 Tons/CY	Tons	165		868		190.5		89		195.5		1508		
PG 64-28 Asphalt Cement	Tons	9.9		52.1		11.4		5.4		11.7		90.5		
		Lift 1	Lift 2	Lift 1	Lift 2	Lift 1	Lift 2	Lift 1	Lift 2	Lift 1	Lift 2	Lift 1	Lift 2	Combined
SS1h or CSS1h Emulsified Asphalt	Gal	51	50	270	264.5	59.5	58	28	27	61.5	60	470	459.5	929.5

Wolski Plaza Road

Description	Unit	0+32.00 to 8+71.00	
		2" Bottom	**3" Top**
AREA*	**SF**	**24,211.02**	
Superpave FAA 45 @ 2.0 Tons/CY	Tons	313	464
PG 58-28 Asphalt Cement	Tons	18.8	
PG 64-28 Asphalt Cement	Tons	27.8	
Salvaged Base Course @ 1.875 Tons/CY	Tons	847	
Geotextile Fabric-Type R1	SY	3374	
		Lift 1	Lift 2
SS1h or CSS1h Emulsified Asphalt	Gal	150	144
MC 70 or 250 Liquid Asphalt	Gal	844	
Blotter Material CL 44	Tons	25.5	

*Areas were measured at the top of pavement. All quantities have been calculated based on the area at the top of the pavement plus any applicable slough at 4:1.

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BASIS OF ESTIMATE

Removals						
Description	Unit	+46.35 Rt to 6+49.00 R	7+70.5 Rt to 18+32.98 Rt	4+46.35 Lt to 16+00.0 Lt	4+46.35 Rt to 18+32.98 Rt	Wolski Plaza Road @ Sta 8+71
Removal of Bituminous	SY	44	258	155		
Saw Bituminous Surfacing	LF			1161	1434	27

Asphalt Leveling Course Superpave FAA 45, PG 58-28 Asphalt Cement		
Description	Unit	I-94 Business Loop 4+46.35 to 18+32.98
AREA	SF	56,194.45
Superpave FAA 45 @ 2.0 Tons/CY	Tons	400
PG 58-28 Asphalt Cement	Tons	24
SS1h or CSS1h Emulsified Asphalt 0.07 Gal/SY	Gal	437

Salvaged Base Course
@ 1.875 Tons per CY

SS1H or CSS1H or MS1 Emulsified Asphalt
@ .05 Gal per SY per Lift on new pavement
(I-94 Business Loop – 2 Lifts)
(Wolski Plaza Road – 2 Lifts)
@ .07 Gal per SY per Lift on existing pavement – 1 Lift
(I-94 Business Loop – 1 Lift under leveling course)

PG 64-28 Asphalt Cement
@ 6% of Superpave FAA 45

PG 58-28 Asphalt Cement
@ 6% of Superpave FAA 45

Superpave FAA 45
@ 2.00 TON/CY

Subgrade Preparation-Type A
@ 6IN depth

I-94 Business Loop
Sta 4+46.35 to Sta 18+32.98 = 1386.63 ft
1386.63ft = 14 Stations
Wolski Plaza Road
Sta 0+32.00 to Sta 8+71.00 = 839 ft
839 ft = 8.5 Stations
14 + 8.5 = 22.5 Stations Total

Milling Pavement Surface
I-94 Business Loop
Sta 4+46.35 to Sta 18+32.98 = 1386.63 ft
1386.63 ft x 12 ft max width = 16,639.56 SF
16,639.56 SF/ 9 SF/SY = 1849 SY

Cored Sample – Bituminous Pavement
I-94B
Sta 4+46.35 to Sta 18+32.98 = 1386.63 ft
1386.63 ft. = 1 Length of 2000 ft. at 3 Lifts = 3 Sub-Lots
3 Sub-lots x 2 Lanes = 6 Sub-lots
2 Cores per Sub-Lot = 12 Cores
Add 1 Core Per Mile for the District = 13 Cores total
Wolski Plaza Road
Sta 0+32.00 to Sta 8+71.00 = 839 ft
839 ft. = 1 length of 2000 ft. at 3 lifts = 3 Sub-Lots
3 Sub-lots X 2 Lanes = 6 Sub-lots
2 Cores per Sub-Lot = 12 Cores
Add 1 Core per mile for the District = 13 Cores
26 Cores Total

Temporary Pavement Marking
Skipped Short Term 4IN Line – Type NR @ 1320 LF per Mile (10' Line 30' Space)
I-94B
Sta 4+46.35 to Sta 18+32.98 = 1386.63 ft
1386.63 ft x 0.25 ft/ft = 347 LF / application
Applications = Centerline Milling + Leveling Course + Surfacing Lift one + Surfacing Lift two = 4
4 x 347 = 1388 LF
Wolski Plaza Road
Sta 0+32.00 to Sta 8+71.00 = 839 ft
839ft x 0.25ft/ft = 210 LF / application
Applications = 3 Surfacing Lifts = 3
3 x 210 = 630 LF

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BASIS OF ESTIMATE

Permanent Pavement Marking

Solid Epoxy Pvmt Mk 4IN Line @10,560ft per Mile (White Edge Line- See Section 120 Sheets)
Solid Epoxy Pvmt Mk 4IN Line @ 10,560ft per Mile (Double Yellow Barrier Line- See Section 120 Sheets)
Solid Epoxy Pvmt Mk 8IN Line @ Turn Lanes (See Section 120 Sheets)

Water

25MGal/Mile for dust palliative
20 Gal/Ton for Salvaged Base Course
10 Gal/CY for Embankment
Dust Palliative
0.422 Miles x 25 MGal/Mile = 11 MGal
Salvaged Base Course
3835 Tons x 20 Gal/Ton = 77 MGal
Embankment
7191 CY x 10 Gal/CY = 72 MGal
160 MGal Total

Topsoil

Topsoil shall be placed to a 6” depth
Removal quantities based on a 6” depth
I-94 Business Loop
1393 CY
Wolski Plaza Road
2324 CY

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	11	1

EARTHWORK VALUES

I-94B

Baseline Station	End Areas (SF)		Volume (CY)		Mass Ordinate
	Exca	Fill	Exca	Fill	
4+46.35	16.5	10.6	0.0	0.0	0.0
4+50.00	30.1	0.8	3.1	1.0	2.1
5+00.00	14.1	60.3	40.9	70.7	-27.7
5+50.00	14.5	79.0	26.5	161.3	-162.5
6+00.00	13.8	98.8	26.2	205.9	-342.2
6+50.00	14.1	80.5	25.8	207.6	-524.0
7+00.00	22.4	25.8	33.8	123.0	-613.2
7+50.00	21.7	34.6	40.9	69.9	-642.2
8+00.00	19.3	55.0	38.0	103.7	-707.9
8+50.00	51.8	28.9	65.9	97.2	-739.2
9+00.00	54.0	3.9	98.0	38.0	-679.2
9+50.00	17.0	85.5	65.8	103.5	-716.9
10+00.00	21.3	75.6	35.4	186.4	-867.9
10+50.00	17.3	77.8	35.7	177.5	-1009.7
11+00.00	17.2	89.1	31.9	193.2	-1171.0
11+50.00	16.8	98.8	31.4	217.5	-1357.1
12+00.00	16.0	114.3	30.3	246.6	-1573.4
12+50.00	14.3	149.5	28.1	305.3	-1850.6
13+00.00	14.3	174.3	26.5	374.8	-2198.9
13+50.00	13.8	212.6	26.0	447.7	-2620.6
14+00.00	18.9	143.7	30.3	412.3	-3002.6
14+50.00	19.3	124.4	35.3	310.2	-3277.5
15+00.00	23.3	72.4	39.4	227.8	-3465.9
15+50.00	25.5	44.4	45.2	135.2	-3555.9
16+00.00	28.3	20.5	49.9	75.1	-3581.1
16+50.00	15.2	30.5	40.3	59.0	-3599.8
17+00.00	15.2	49.6	28.1	92.7	-3664.4
17+50.00	18.3	42.0	31.0	106.1	-3739.5
18+00.00	27.8	12.3	42.7	62.9	-3759.7
18+22.78	22.4	8.8	21.2	11.1	-3749.6
18+28.28	23.0	8.7	4.6	2.2	-3747.2
18+32.98	24.0	8.5	4.1	1.9	-3745.0
			Volume (CY)		
			Exca.	Fill	Mass Ordinate
Totals			**1082.3**	**4827.3**	

Note:
SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	11	2

EARTHWORK VALUES

Wolski Plaza Road

Baseline Station	End Areas (SF) Exca	End Areas (SF) Fill	Volume (CY) Exca	Volume (CY) Fill	Mass Ordinate
0+32.00	0.5	227.3	0.0	0.0	0.0
0+50.00	1.0	277.3	0.5	210.3	-209.8
1+00.00	1.7	242.5	2.6	601.6	-808.8
1+50.00	1.3	271.6	2.8	595.0	-1401.0
2+00.00	1.1	251.0	2.2	604.9	-2003.7
2+50.00	1.8	282.0	2.7	616.9	-2617.9
3+00.00	1.4	423.0	3.0	816.0	-3430.8
3+50.00	8.1	363.0	8.8	909.7	-4331.7
3+51.52	8.3	359.3	0.5	25.4	-4356.7
4+00.00	26.6	274.7	31.3	711.5	-5036.9
4+50.00	20.1	225.0	43.2	578.4	-5572.0
4+72.77	22.5	270.4	18.0	261.1	-5815.1
4+75.00	365.6	274.3	16.1	28.1	-5827.1
5+00.00	0.0	211.9	0.0	281.4	-6108.5
5+50.00	0.0	139.2	0.0	406.4	-6514.9
6+00.00	0.0	104.5	0.0	282.0	-6796.9
6+50.00	0.0	70.6	0.0	202.6	-6999.5
7+00.00	0.0	30.0	0.0	116.4	-7115.9
7+50.00	0.0	23.4	0.0	61.8	-7177.7
7+91.74	0.0	24.8	0.0	46.6	-7224.3
8+00.00	0.0	25.0	0.0	9.5	-7233.8
8+50.00	0.0	19.6	0.0	51.6	-7285.4
8+71.00	0.0	14	0.0	16.3	-7301.8
			Volume (CY)		
			Exca.	**Fill**	**Mass Ordinate**
Totals			**131.7**	**7433.5**	

Existing Wolski Road Removal

Baseline Station	End Areas (SF) Exca	End Areas (SF) Fill	Volume (CY) Exca	Volume (CY) Fill	Mass Ordinate
0+32.00	0.3	0.0	0.2	0.0	0.1
0+50.00	240.8	0.0	80.3	0.0	80.4
0+60.00	229.1	0.0	87.0	0.0	167.4
0+65.00	238.8	0.0	43.3	0.0	210.7
1+00.00	289.3	0.0	342.3	0.0	553.0
1+50.00	298.9	0.0	544.6	0.0	1097.6
2+00.00	333.3	0.0	585.4	0.0	1683.0
2+50.00	366.7	0.0	648.1	0.0	2331.1
3+00.00	467.1	0.0	772.0	0.0	3103.1
3+50.00	533.5	0.0	926.5	0.0	4029.6
3+51.52	535.4	0.0	30.2	0.0	4059.8
4+00.00	525.1	0.0	952.0	0.0	5011.8
4+50.00	377.7	0.0	835.9	0.0	5847.7
4+72.77	330.5	0.0	298.6	0.0	6146.3
4+75.00	365.6	0.0	28.8	0.0	6175.1
5+00.00	357.4	0.0	334.7	0.0	6509.8
5+30.00	317.4	0.0	374.9	0.0	6884.7
5+50.00	274.6	0.0	219.3	0.0	7104.0
6+00.00	187.2	0.0	427.6	0.0	7531.6
6+50.00	106.4	0.0	271.8	0.0	7803.4
6+90.00	65.7	0.0	127.4	0.0	7930.8
7+00.00	56.8	0.0	22.7	0.0	7953.5
7+50.00	34.6	0.0	84.6	0.0	8038.1
7+91.74	39.1	0.0	57.0	0.0	8095.1
8+00.00	39.2	0.0	12.0	0.0	8107.1
8+50.00	31.1	0.0	65.1	0.0	8172.2
8+71.00	30.1	0.0	23.8	0.0	8196.0
			Volume (CY)		
			Exca.	**Fill**	**Mass Ordinate**
Totals			**8196.1**	**0**	

Note:
SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

Wolski Plaza Road removal quantities are for informational purposes only. Payment for the removal of these items and other associated items shall be included in the price bid for item 203 0180 Roadway Obliteration (LF).

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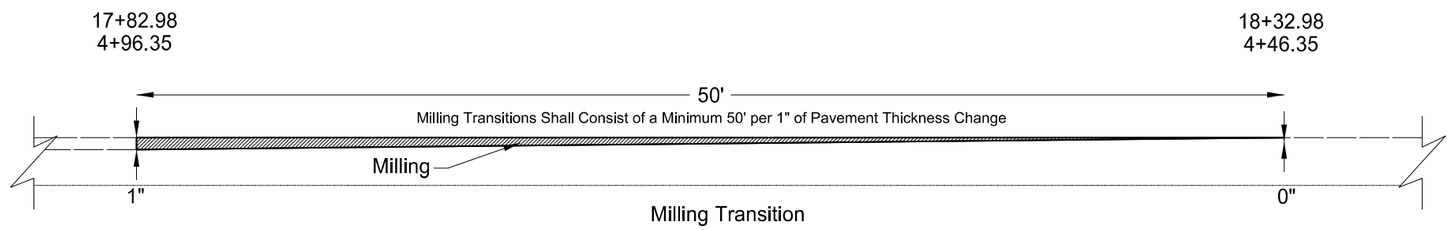
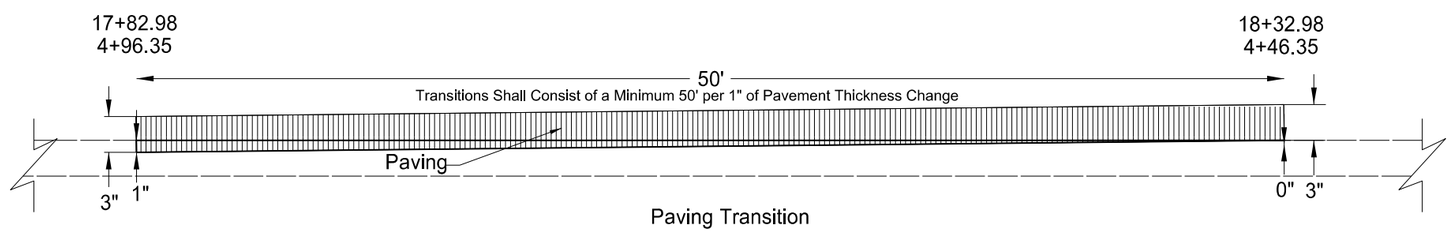
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	20	1



Milling Transition



Paving Transition

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I-94 Business Loop

Milling Transition

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	20	2

Superelevation Table

Curve C1

P.I. Station 11+67.74 N 467,376.9417 E 2,602,294.9353

Delta = 57° 52' 17" (LT)

Degree = 3° 59' 57"

Tangent = 792.0597

Length = 1,447.0962

Radius = 1,432.7000

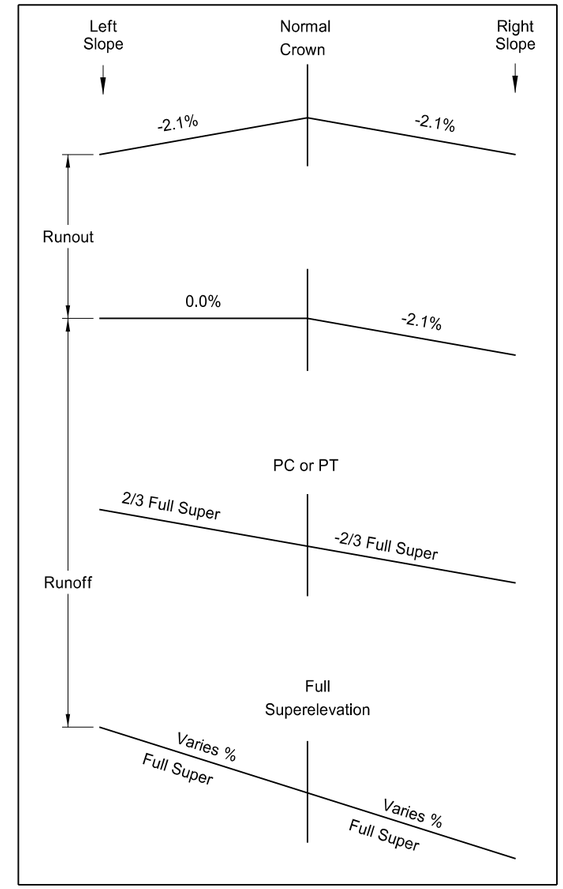
External = 204.3669

P.C. Station 3+75.68 N 466,585.1650 E 2,602,316.1061

P.T. Station 18+22.78 N 467,780.0956 E 2,601,613.1541

Curve C-1				
Station	Left Shoulder Slope	Left Slope	Right Slope	Right Shoulder Slope
PC +127' Sta 5+03.00	-6.14% Existing	-6.14% Existing	3.70% Existing	3.70% Existing
PC +181' Sta 5+31.00	Transition	Transition	Transition	2.10%
PC +178' Sta 5+54.00	-5.70%	-5.70%	5.70%	2.10%
PT -66' Sta 17+57.00	-5.70%	-5.70%	5.70%	2.10%
PT -119' Sta 17+75.78	Transition	Transition	Transition	2.10%
PT +0' Sta 18+22.78	-8.25% Existing	-8.25% Existing	4.85% Existing	4.85% Existing

Note: Calculations based on AASHTO method five.
A design speed of 55 mph and maximum superelevation of 6% were used.



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I-94 Business Loop

Superelevation Table

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	20	3

Superelevation Tables

Curve C5

P.I. Station	2+33.69 N	467,189.6237 E	2,602,421.3546
Delta =	48° 02' 15" (RT)		
Degree =	19° 05' 55"		
Tangent =	133.6863		
Length =	251.5238		
Radius =	300.0000		
External =	28.4388		
P.C. Station	1+00.00 N	467,138.0587 E	2,602,298.0134
P.T. Station	3+51.52 N	467,132.3880 E	2,602,542.1689

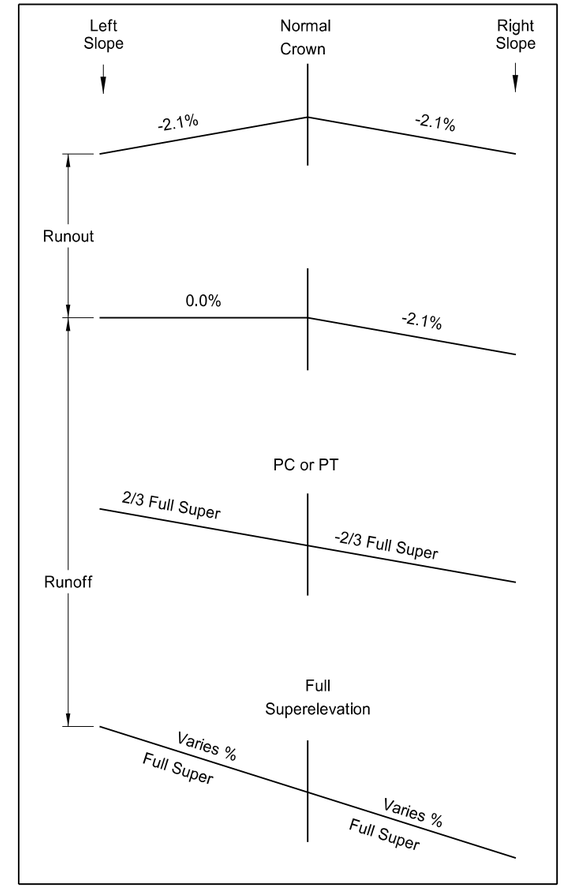
Curve C-5		
Station	Left Slope	Right Slope
PC -68' Sta 0+32	-1.00%	1.00%
PC +29' Sta 1+29	5.00%	-5.00%
PT -29' Sta 3+23	5.00%	-5.00%
PT +67.48' Sta 4+19	0.00%	0.00%

Curve C6

P.I. Station	6+36.12 N	467,010.5432 E	2,602,799.3610
Delta =	30° 27' 35" (LT)		
Degree =	9° 32' 57"		
Tangent =	163.3524		
Length =	318.9738		
Radius =	600.0000		
External =	21.8392		
P.C. Station	4+72.77 N	467,080.4801 E	2,602,651.7370
P.T. Station	7+91.74 N	467,025.0941 E	2,602,962.0640

Curve C-6		
Station	Left Slope	Right Slope
PC -53.77' Sta 4+19	0.00%	0.00%
PC +22' Sta 4+95	-3.80%	3.80%
PT -22' Sta 7+70	-3.80%	3.80%
PT +43' Sta 8+35	-2.10%	0.00%
PT +79' Sta 8+71	-2.10% Existing	-2.10% Existing

Note: Calculations based on AASHTO method five.
A design speed of 25 mph and maximum superelevation of 6% were used.



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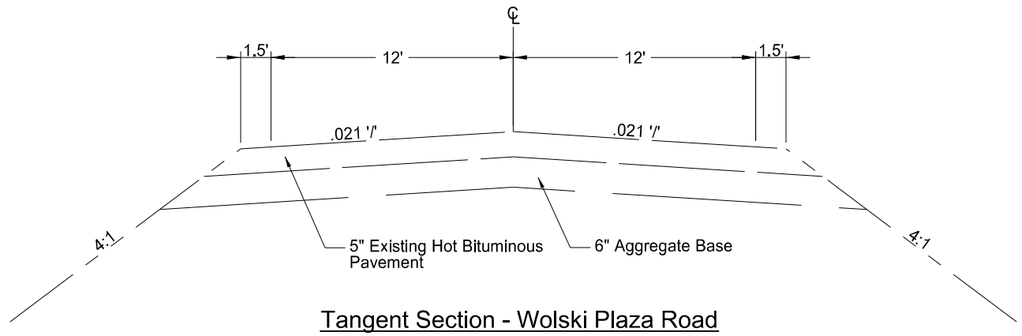
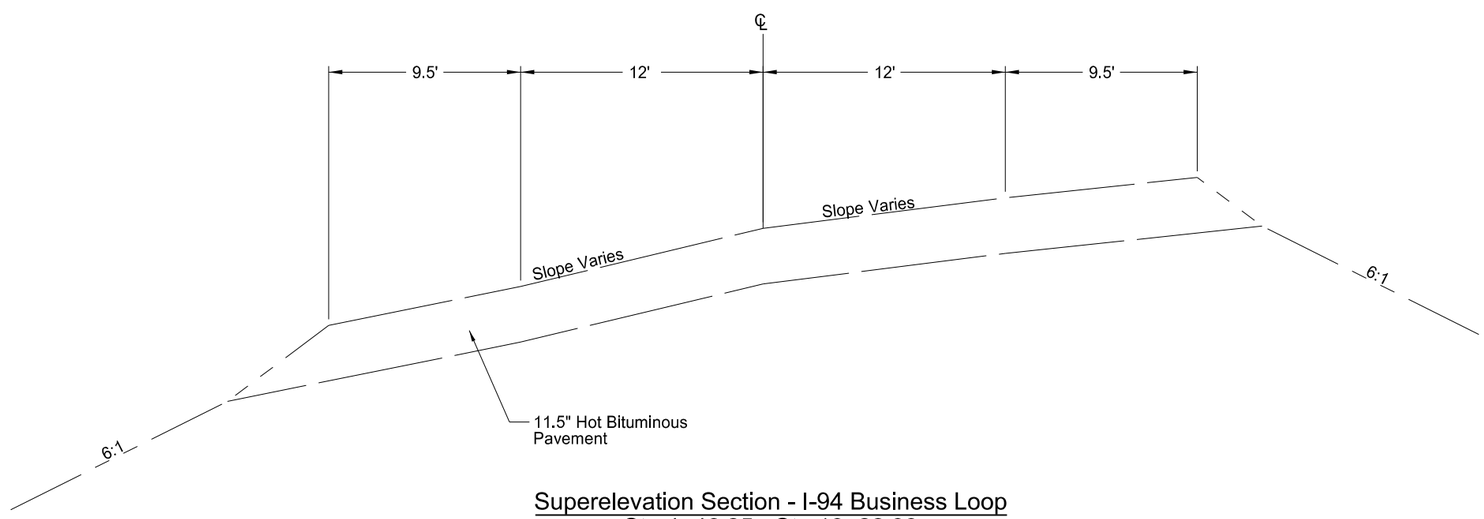
Wolski Plaza Road

Superelevation Table

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	30	1



Tangent Section - Wolski Plaza Road
Sta 0+32.00 - Sta 714+70.99
Not to Scale



Superelevation Section - I-94 Business Loop
Sta 4+46.35 - Sta 18+32.98
Not to Scale

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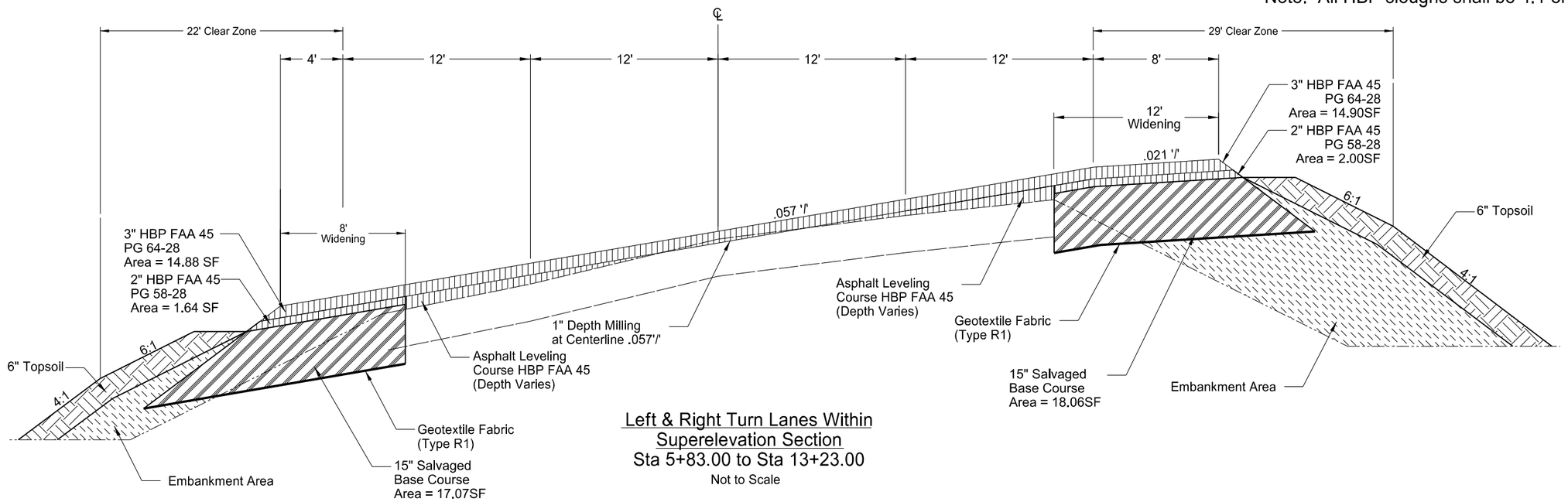
Existing

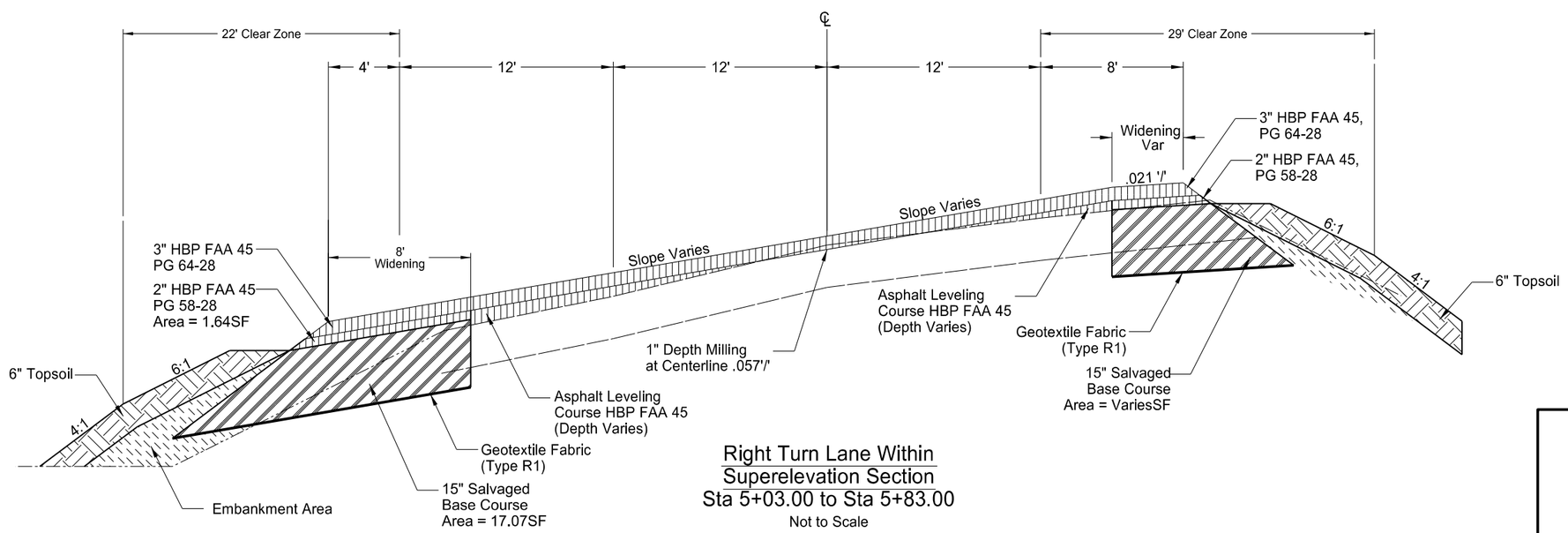
Typical Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	30	2

Note: All HBP sloughs shall be 4:1 or flatter.



Left & Right Turn Lanes Within
Superelevation Section
Sta 5+83.00 to Sta 13+23.00
Not to Scale



Right Turn Lane Within
Superelevation Section
Sta 5+03.00 to Sta 5+83.00
Not to Scale

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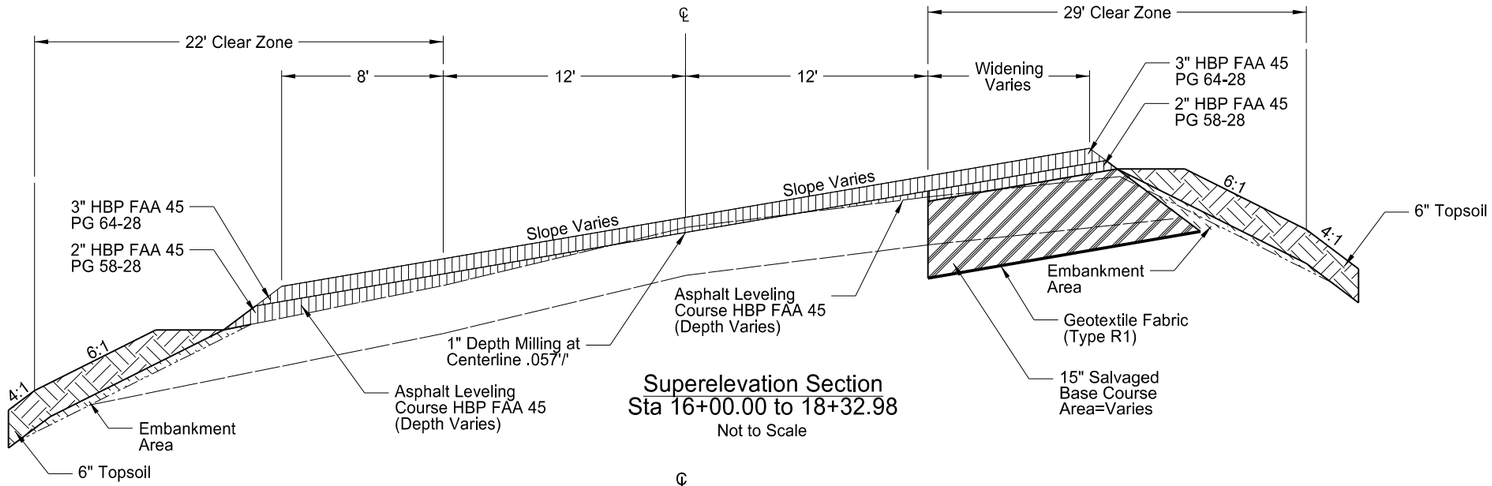
Proposed I-94 Business Loop

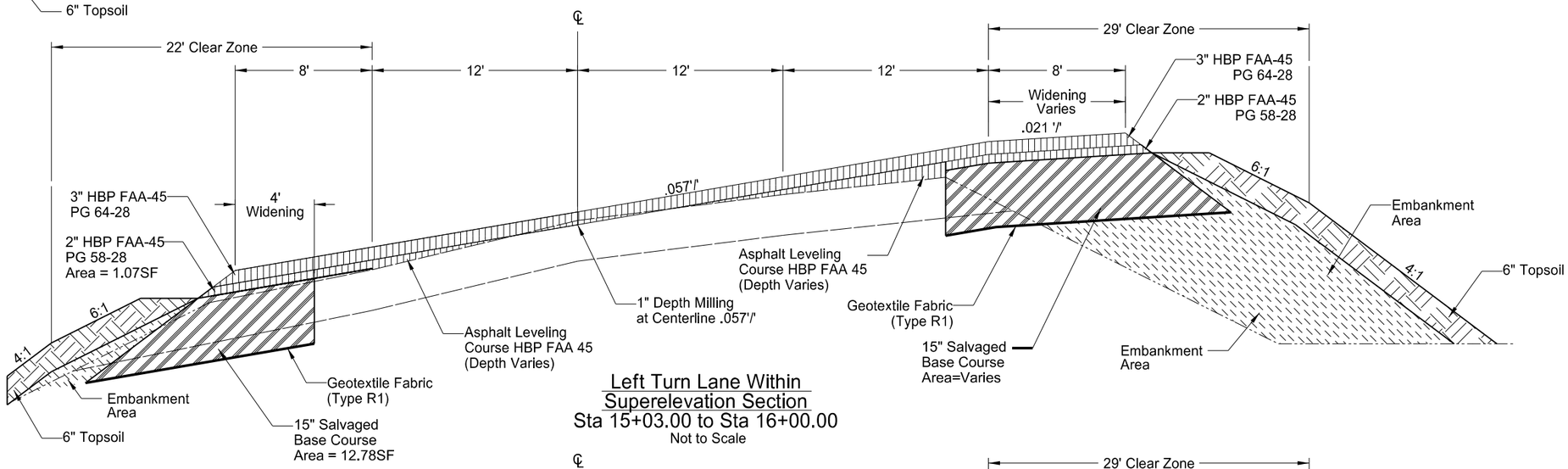
Typical Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	30	3

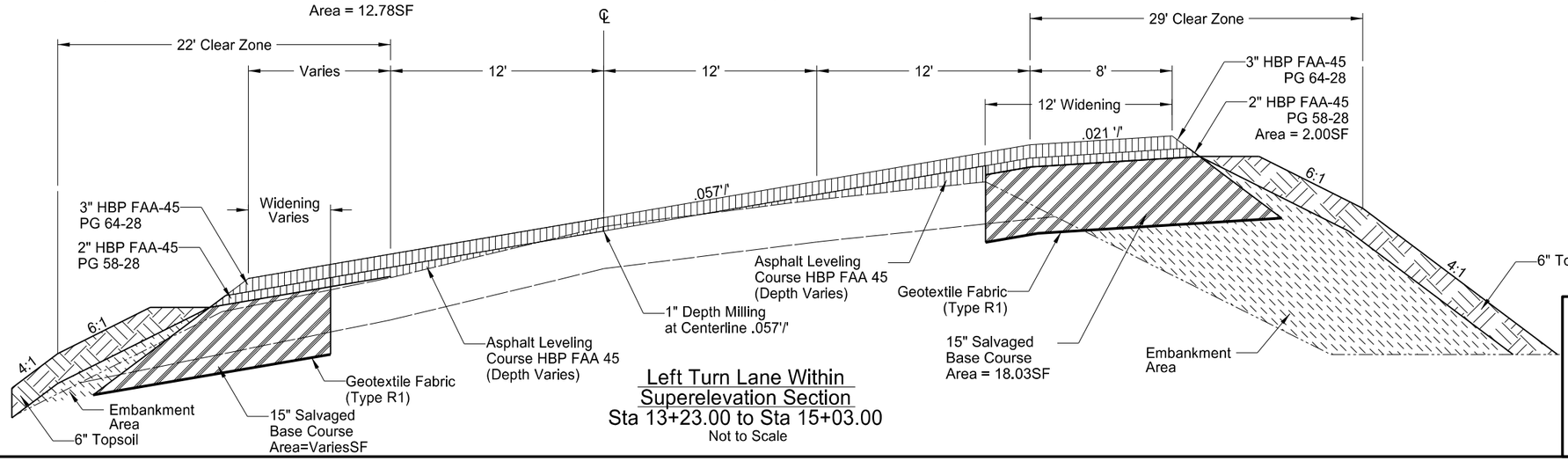
Note: All HBP sloughs shall be 4:1 or flatter.



Superelevation Section
Sta 16+00.00 to 18+32.98
Not to Scale



Left Turn Lane Within
Superelevation Section
Sta 15+03.00 to Sta 16+00.00
Not to Scale



Left Turn Lane Within
Superelevation Section
Sta 13+23.00 to Sta 15+03.00
Not to Scale

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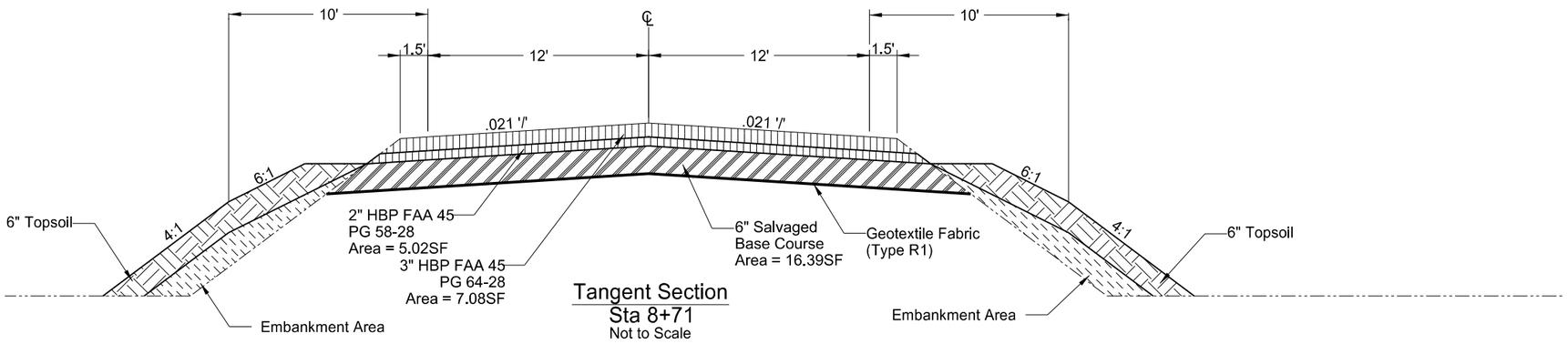
Proposed I-94 Business Loop

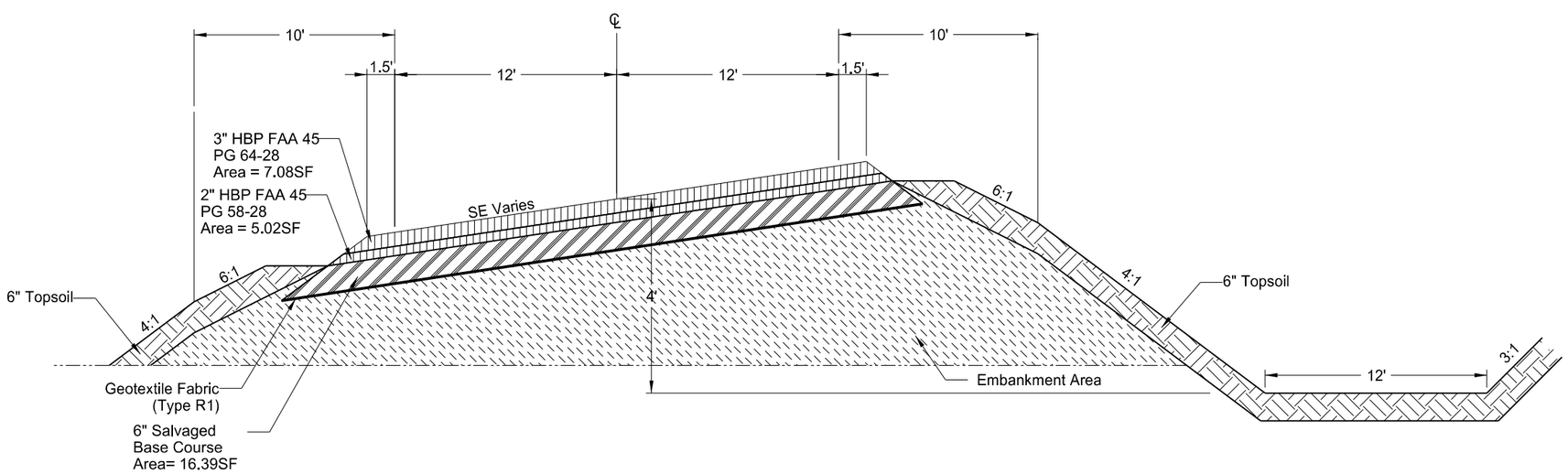
Typical Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	30	4

Note: All HBP sloughs shall be 4:1 or flatter.



Tangent Section
Sta 8+71
Not to Scale



Superelevation Section
Sta 0+32 to Sta 8+71
Not to Scale

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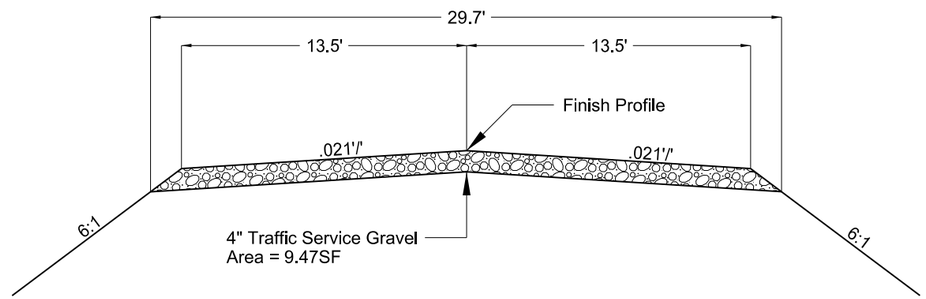
Proposed Wolski Plaza Road

Typical Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	30	5



Temporary Bypass Detail
Not to Scale

*TEMPORARY BYPASS ESTIMATED QUANTITIES		
DESCRIPTION	UNIT	QUANTITY
Embankment	CY	719
Traffic Surface Gravel at 1.875 Ton/CY	TON	400
Water for Embankment at 10 Gal/CY Water for Traffic Surface Gravel at 20 Gal/Ton Water for Dust Palliative As Needed	MGAL	25

* Note:
The estimated quantities for items to be included in the temporary bypass will not be bid seperately, but will be included in the price bid for "Temporary Bypass". Payment shall be considered full compensation for placement and removal of all included items and quantities.

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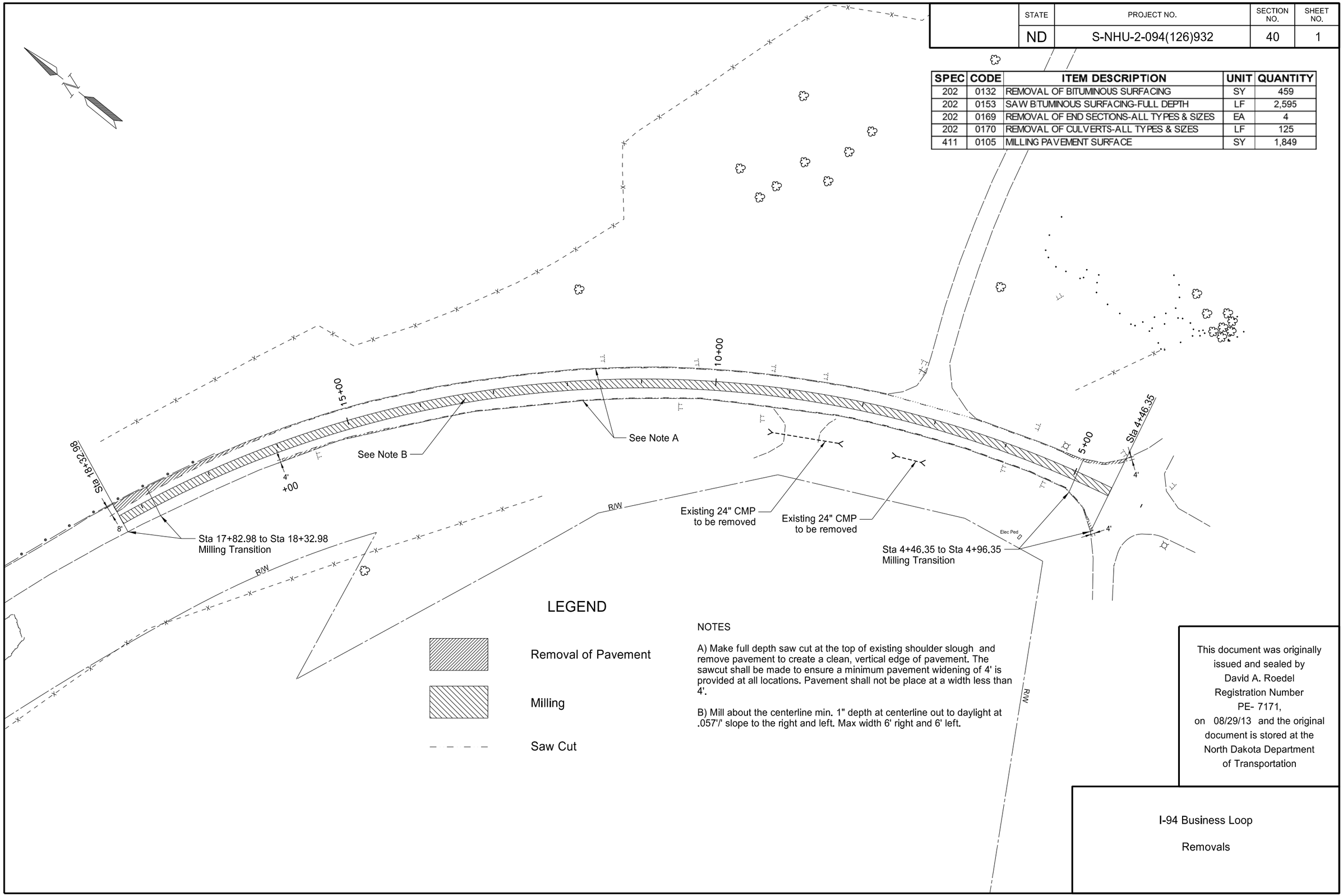
Temporary Bypass

Typical Section

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	40	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	459
202	0153	SAW BTUMINOUS SURFACING-FULL DEPTH	LF	2,595
202	0169	REMOVAL OF END SECTIONS-ALL TYPES & SIZES	EA	4
202	0170	REMOVAL OF CULVERTS-ALL TYPES & SIZES	LF	125
411	0105	MILLING PAVEMENT SURFACE	SY	1,849



NOTES

A) Make full depth saw cut at the top of existing shoulder slough and remove pavement to create a clean, vertical edge of pavement. The sawcut shall be made to ensure a minimum pavement widening of 4' is provided at all locations. Pavement shall not be place at a width less than 4'.

B) Mill about the centerline min. 1" depth at centerline out to daylight at .057'/' slope to the right and left. Max width 6' right and 6' left.

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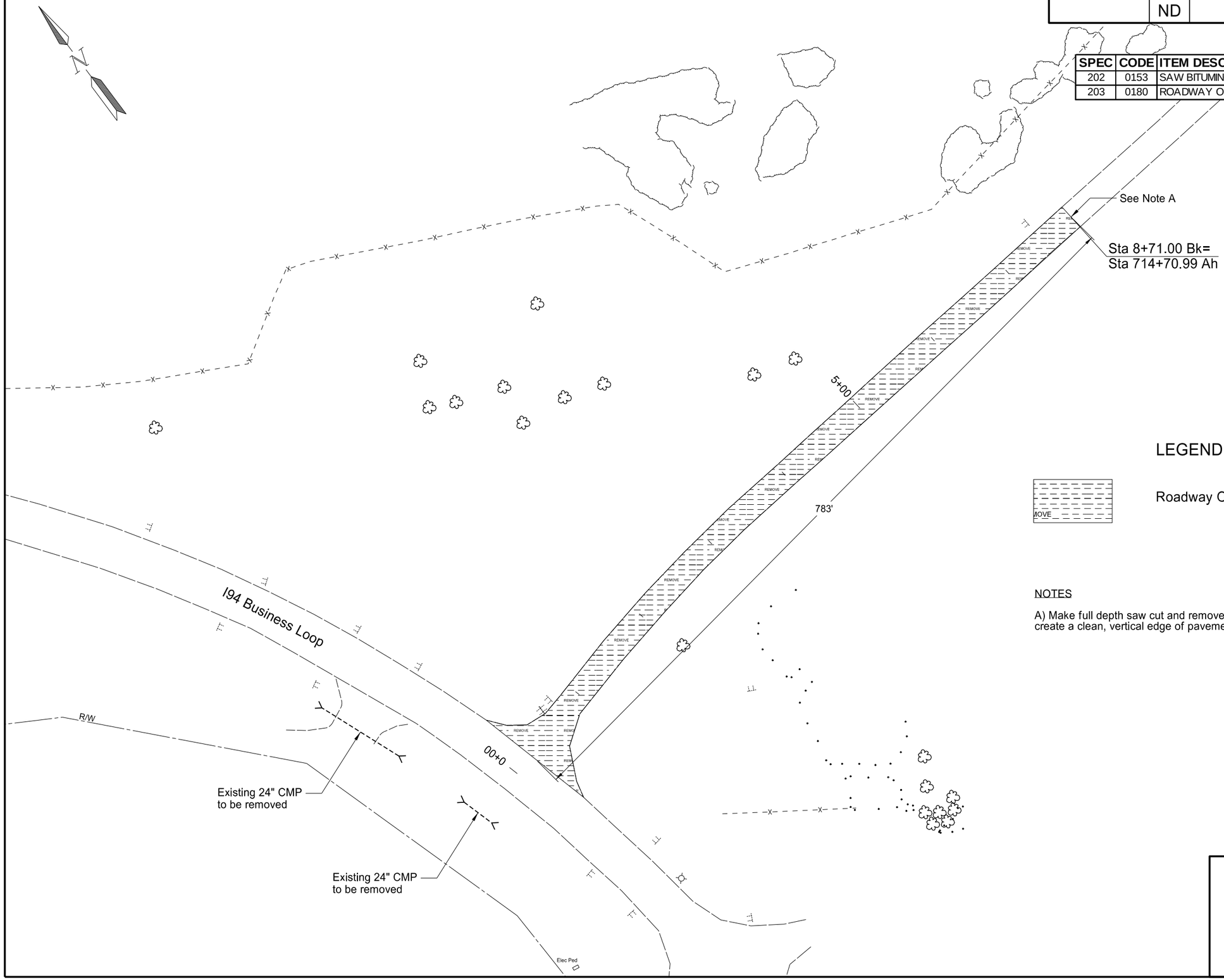
I-94 Business Loop

Removals

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	40	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0153	SAW BITUMINOUS SURFACING-FULL DEPTH	LF	27
203	0180	ROADWAY OBLITERATION	LF	783



LEGEND

Roadway Obliteration

NOTES

A) Make full depth saw cut and remove pavement to create a clean, vertical edge of pavement.

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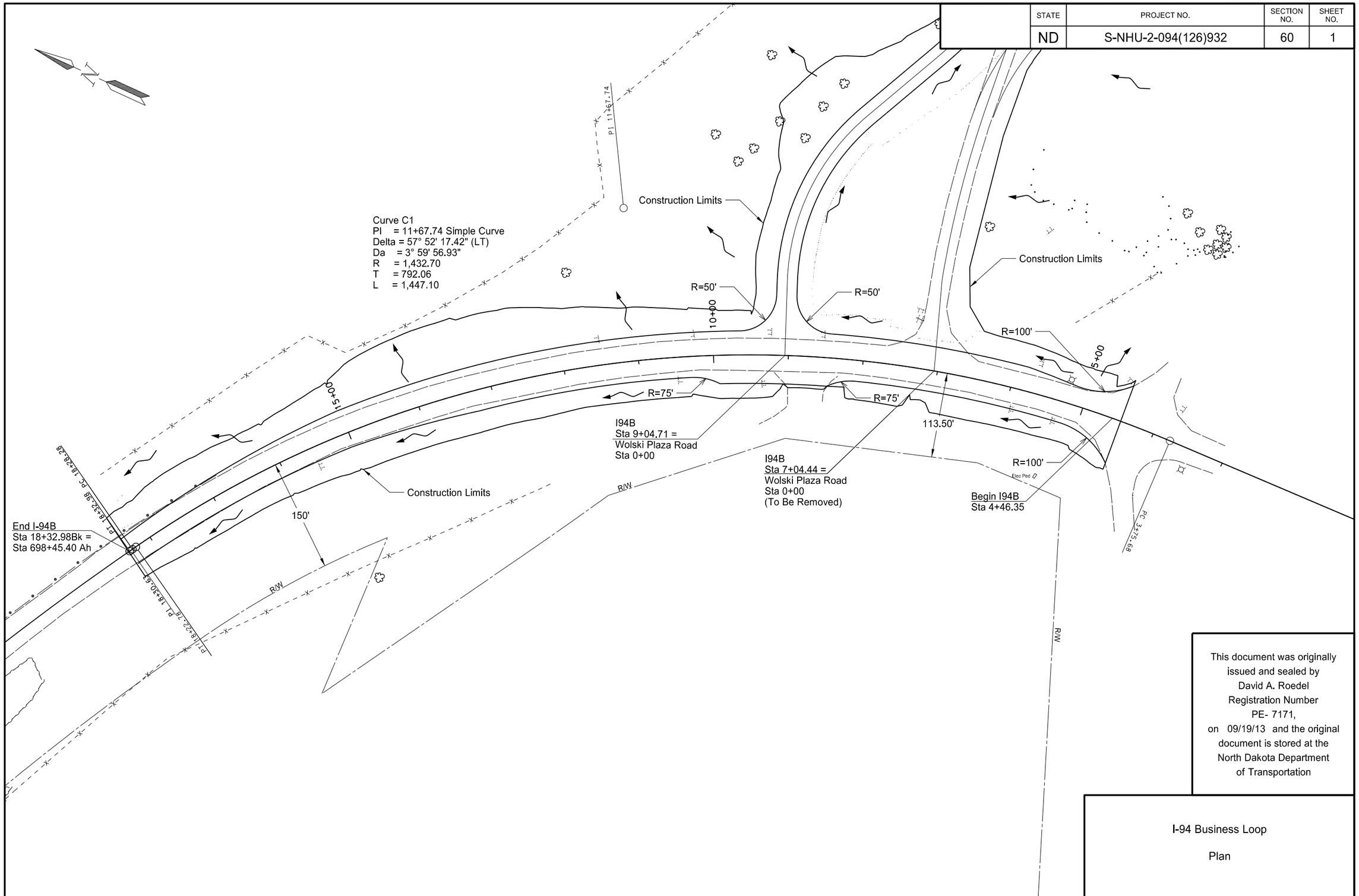
Wolski Plaza Road

Removals

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	60	1



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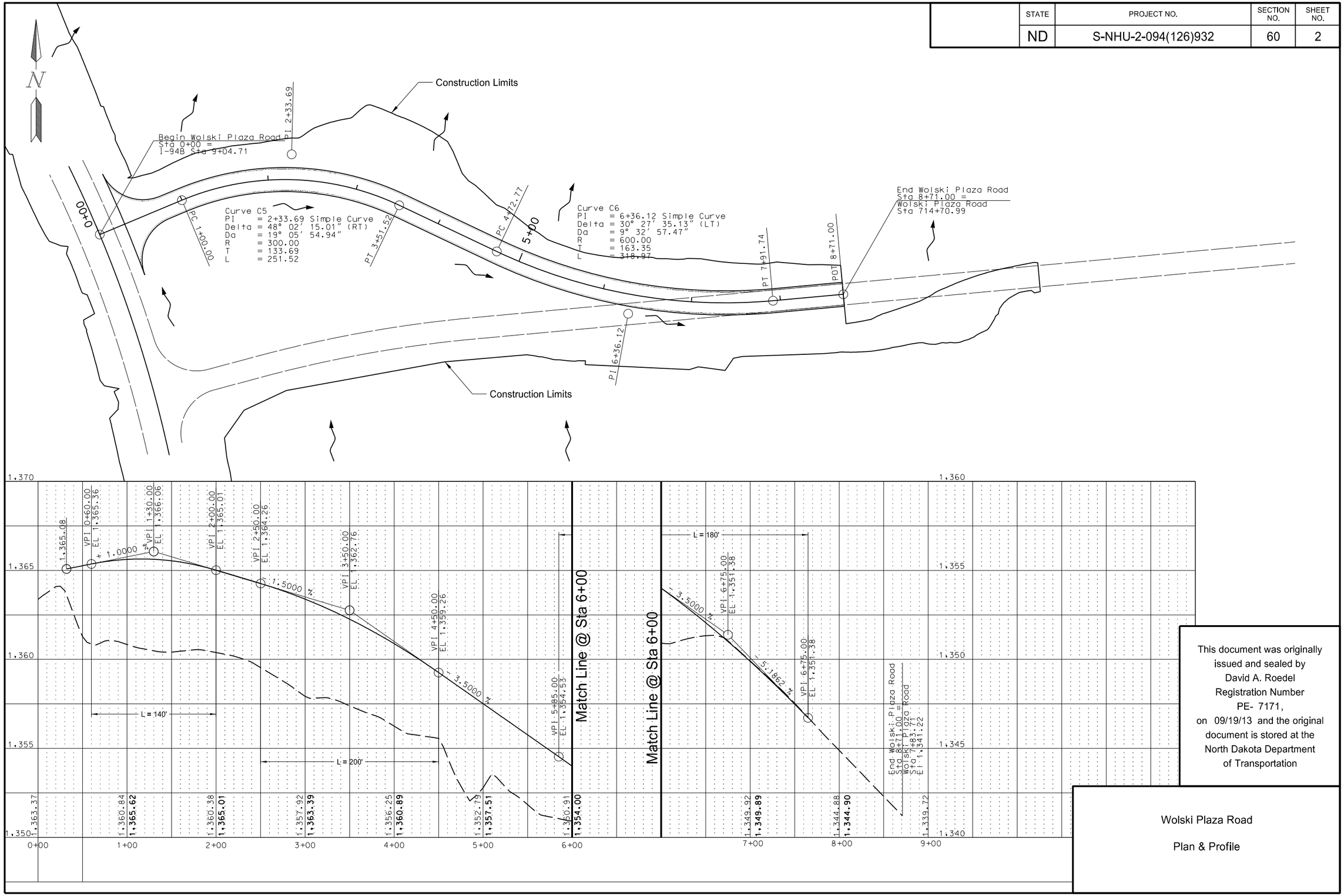
I-94 Business Loop

Plan

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	60	2



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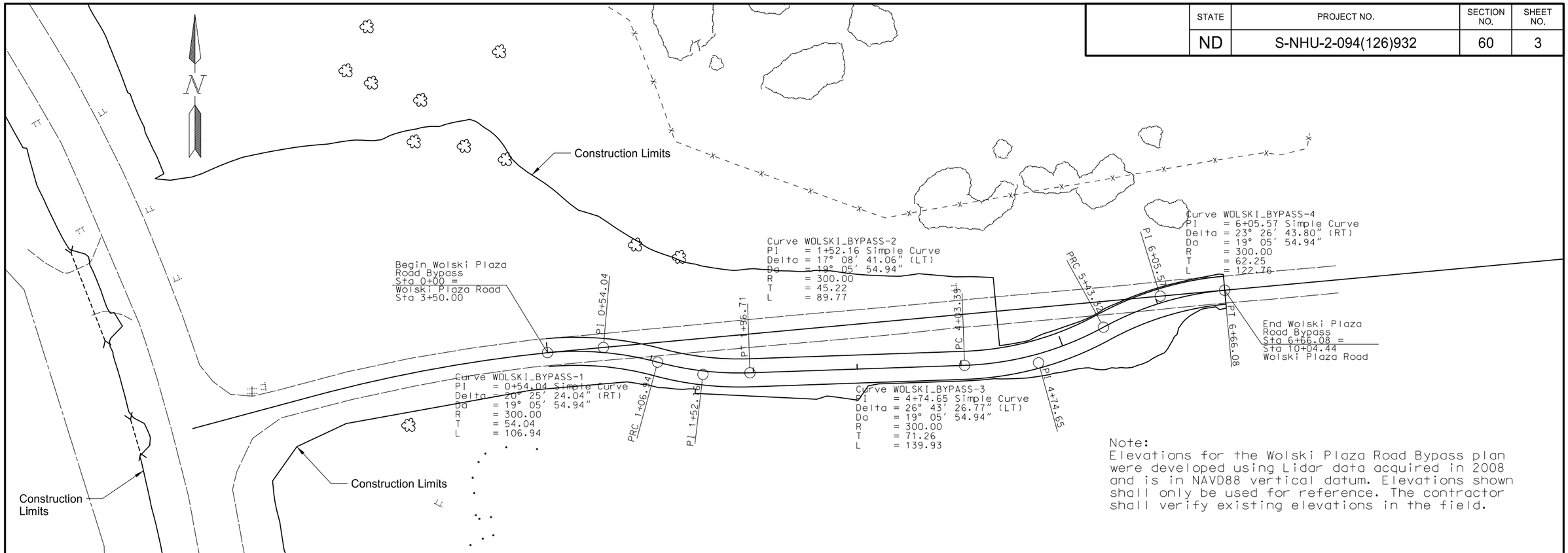
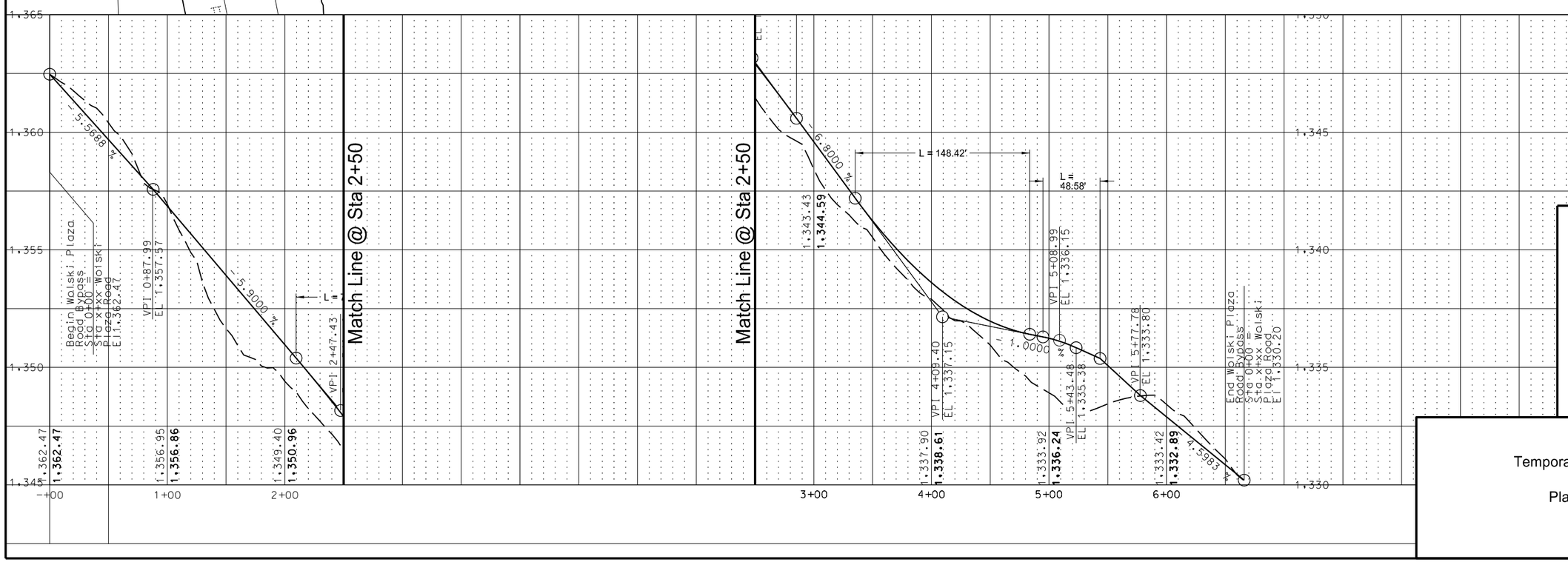
Wolski Plaza Road

Plan & Profile

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	60	3



Note:
Elevations for the Wolski Plaza Road Bypass plan were developed using Lidar data acquired in 2008 and is in NAVD88 vertical datum. Elevations shown shall only be used for reference. The contractor shall verify existing elevations in the field.



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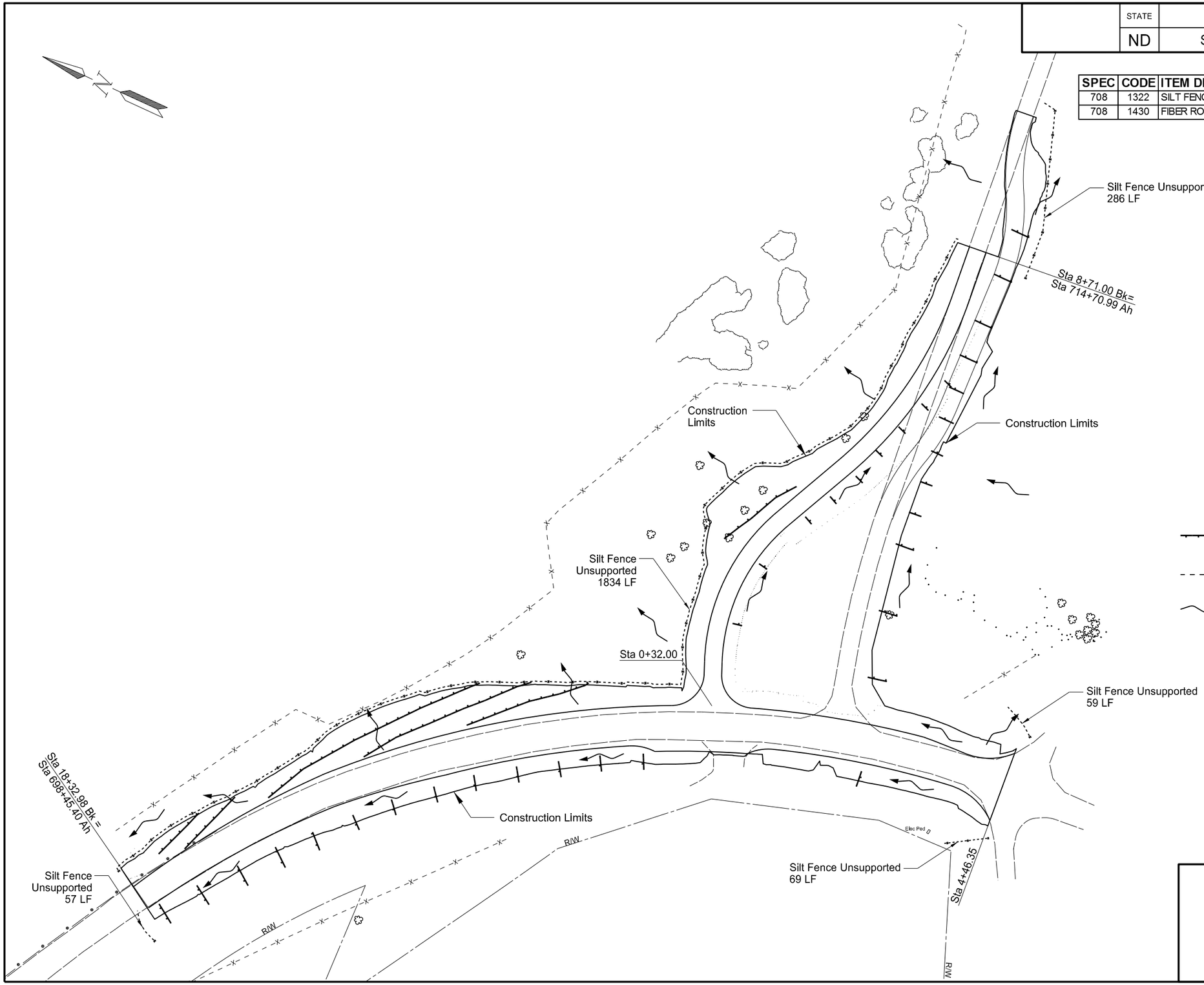
Temporary Bypass Road

Plan & Profile

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	75	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
708	1322	SILT FENCE UNSUPPORTED	LF	2,305
708	1430	FIBER ROLLS 12IN	LF	2,040



LEGEND

Fiber Rolls 12IN

Silt Fence Unsupported

Flow Direction

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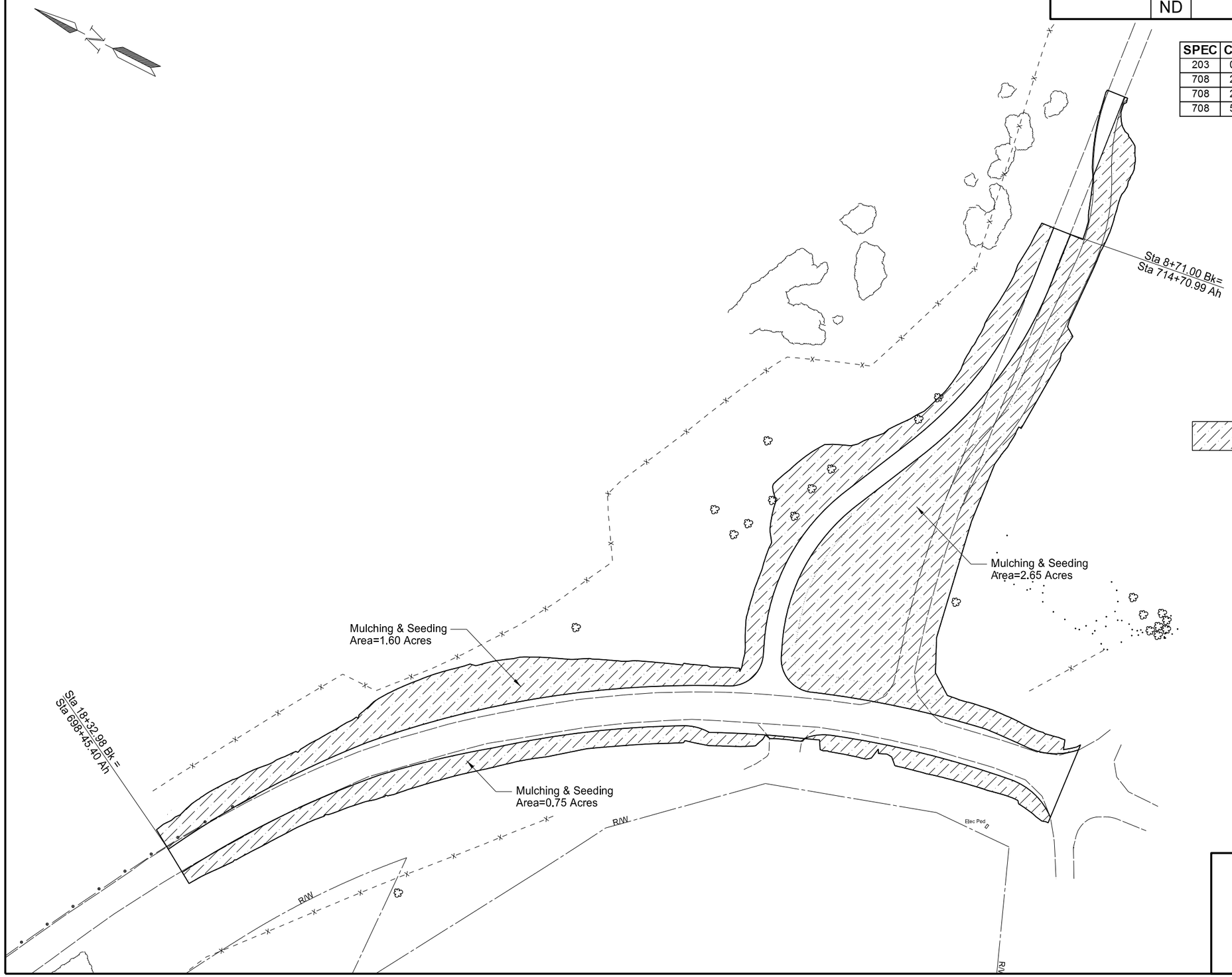
I-94 Business Loop/Wolski Road

Erosion Control

9/19/2013 9:42:47 AM andrew.krog U:\PROJECTS\16734\Consultant\dgn\075WL_001_EROSION.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	75	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
203	0109	TOPSOIL	CY	4,463
708	2240	SEEDING-TYPE B-CL II	ACRE	5.0
708	2290	SEEDING-TYPE B-CL VI	ACRE	5.0
708	5500	MULCHING	ACRE	10.0



LEGEND

Mulching & Seeding

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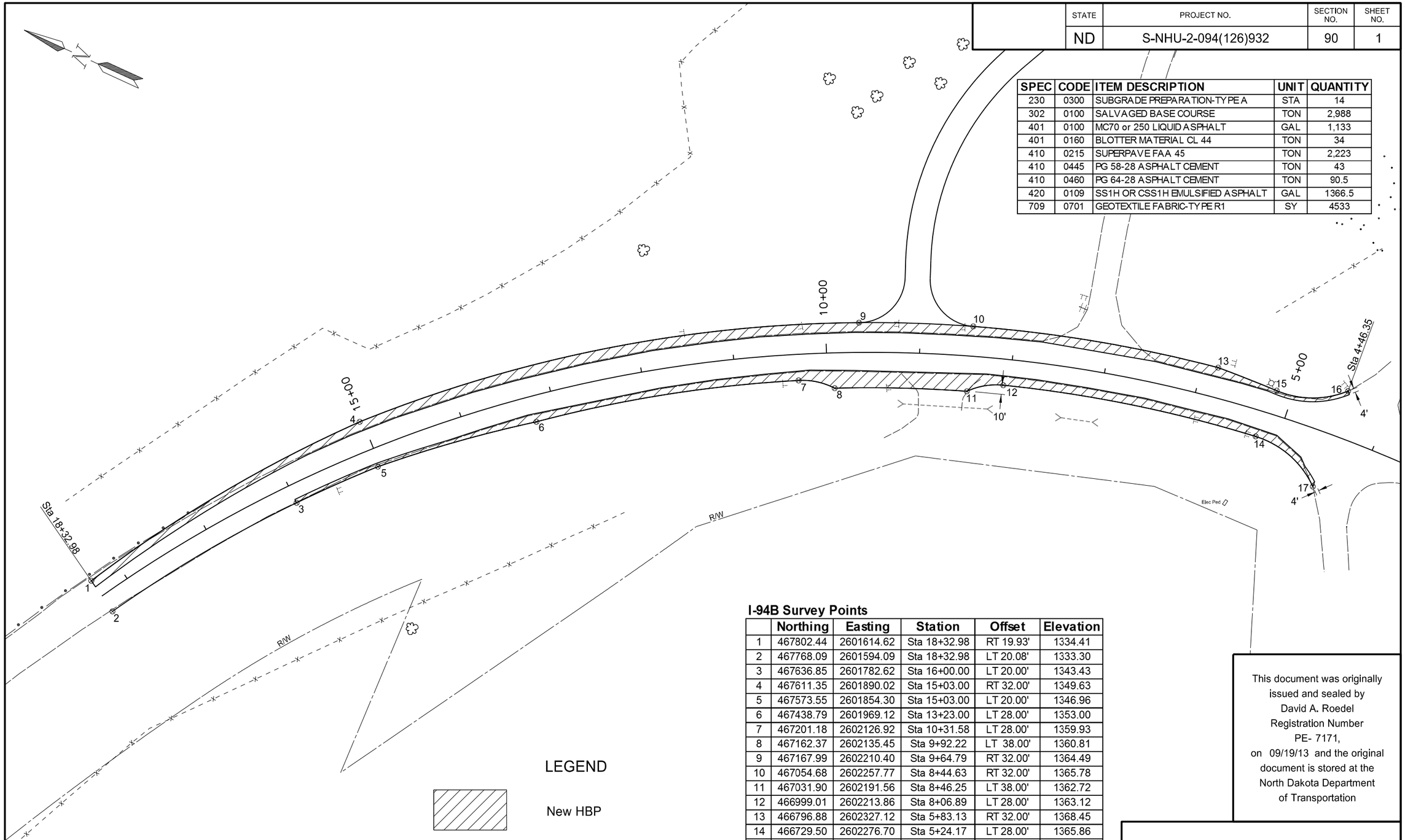
I-94 Business Loop/Wolski Road

Seeding & Mulching

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	90	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
230	0300	SUBGRADE PREPARATION-TYPE A	STA	14
302	0100	SALVAGED BASE COURSE	TON	2,988
401	0100	MC70 or 250 LIQUID ASPHALT	GAL	1,133
401	0160	BLOTTER MATERIAL CL 44	TON	34
410	0215	SUPERPAVE FAA 45	TON	2,223
410	0445	PG 58-28 ASPHALT CEMENT	TON	43
410	0460	PG 64-28 ASPHALT CEMENT	TON	90.5
420	0109	SS1H OR CSS1H EMULSIFIED ASPHALT	GAL	1366.5
709	0701	GEOTEXTILE FABRIC-TYPE R1	SY	4533



LEGEND

New HBP

I-94B Survey Points

	Northing	Easting	Station	Offset	Elevation
1	467802.44	2601614.62	Sta 18+32.98	RT 19.93'	1334.41
2	467768.09	2601594.09	Sta 18+32.98	LT 20.08'	1333.30
3	467636.85	2601782.62	Sta 16+00.00	LT 20.00'	1343.43
4	467611.35	2601890.02	Sta 15+03.00	RT 32.00'	1349.63
5	467573.55	2601854.30	Sta 15+03.00	LT 20.00'	1346.96
6	467438.79	2601969.12	Sta 13+23.00	LT 28.00'	1353.00
7	467201.18	2602126.92	Sta 10+31.58	LT 28.00'	1359.93
8	467162.37	2602135.45	Sta 9+92.22	LT 38.00'	1360.81
9	467167.99	2602210.40	Sta 9+64.79	RT 32.00'	1364.49
10	467054.68	2602257.77	Sta 8+44.63	RT 32.00'	1365.78
11	467031.90	2602191.56	Sta 8+46.25	LT 38.00'	1362.72
12	466999.01	2602213.86	Sta 8+06.89	LT 28.00'	1363.12
13	466796.88	2602327.12	Sta 5+83.13	RT 32.00'	1368.45
14	466729.50	2602276.70	Sta 5+24.17	LT 28.00'	1365.86
15	466729.42	2602330.80	Sta 5+17.19	RT 25.66'	1369.02
16	466659.54	2602362.43	Sta 4+46.35	RT 50.10'	1369.52
17	466651.23	2602253.31	Sta 4+46.35	LT 59.34'	1366.56

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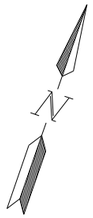
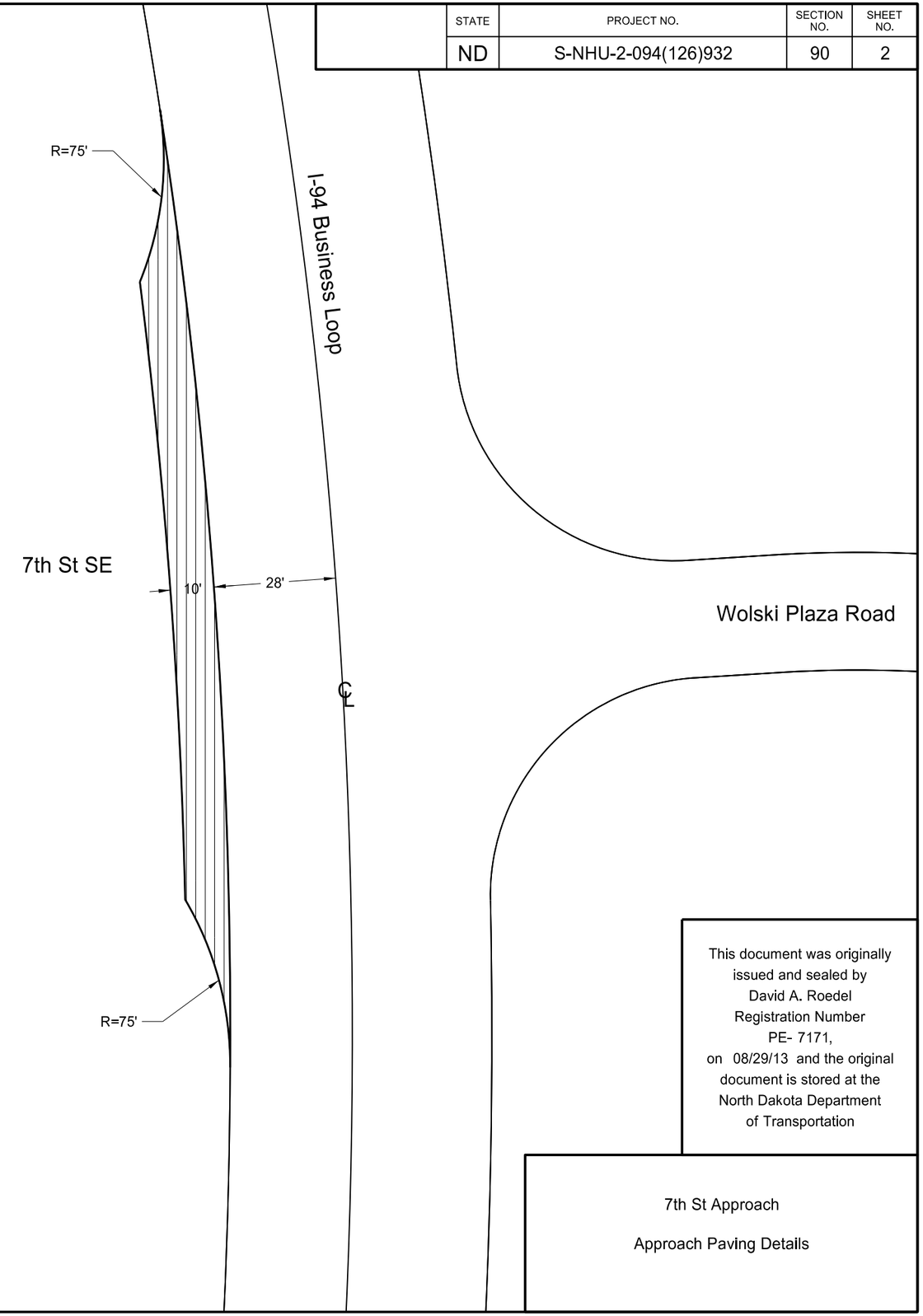
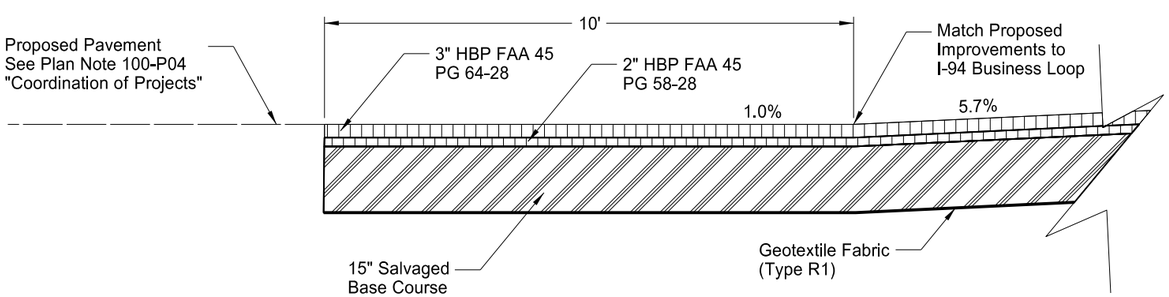
I-94B

Widening Areas

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	90	2







7th St Approach Paving Detail

Note:
1. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.

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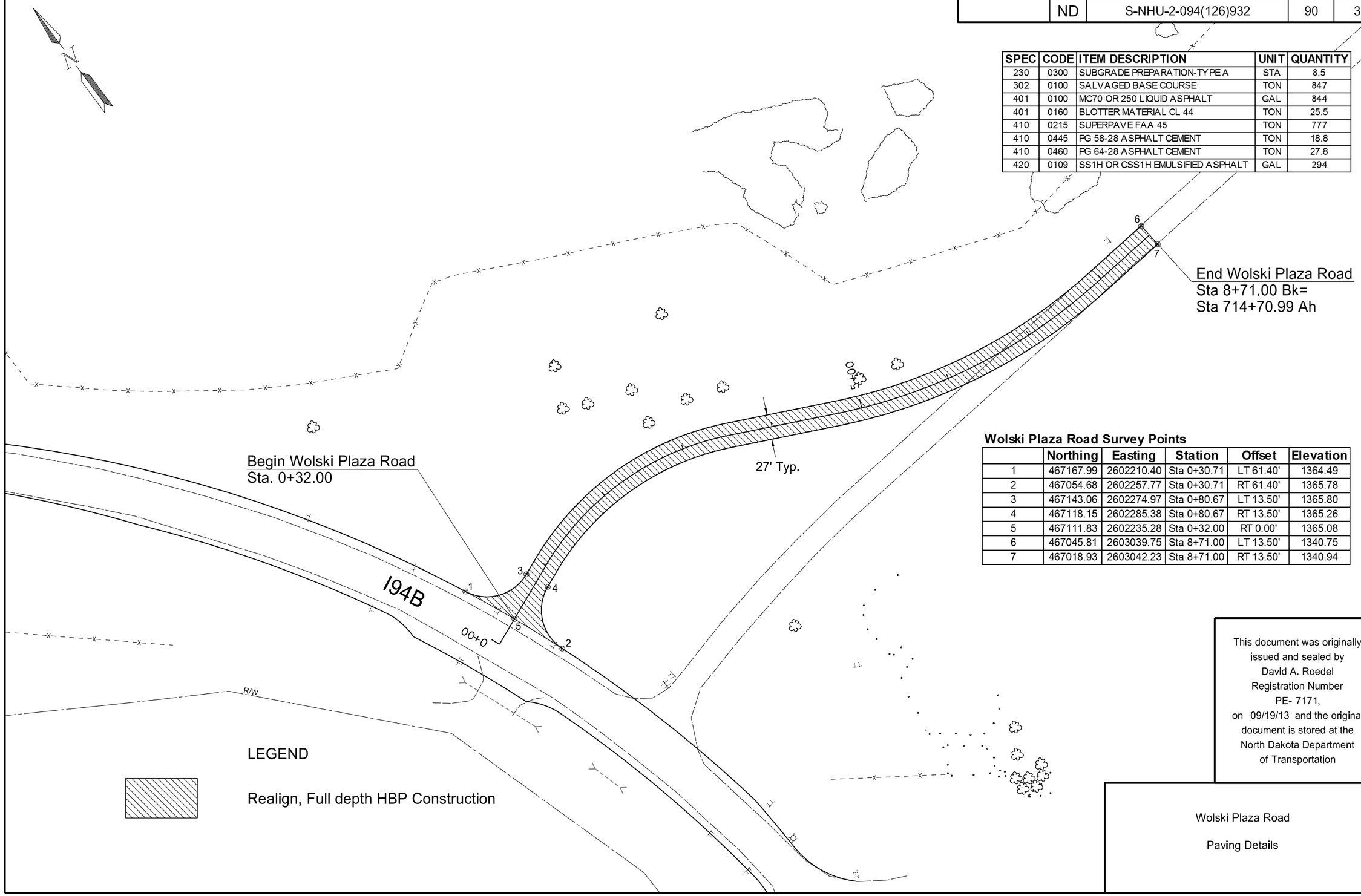
7th St Approach

Approach Paving Details

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	90	3

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
230	0300	SUBGRADE PREPARATION-TYPE A	STA	8.5
302	0100	SALVAGED BASE COURSE	TON	847
401	0100	MC70 OR 250 LIQUID ASPHALT	GAL	844
401	0160	BLOTTER MATERIAL CL 44	TON	25.5
410	0215	SUPERPAVE FAA 45	TON	777
410	0445	PG 58-28 ASPHALT CEMENT	TON	18.8
410	0460	PG 64-28 ASPHALT CEMENT	TON	27.8
420	0109	SS1H OR CSS1H EMULSIFIED ASPHALT	GAL	294



Wolski Plaza Road Survey Points

	Northing	Easting	Station	Offset	Elevation
1	467167.99	2602210.40	Sta 0+30.71	LT 61.40'	1364.49
2	467054.68	2602257.77	Sta 0+30.71	RT 61.40'	1365.78
3	467143.06	2602274.97	Sta 0+80.67	LT 13.50'	1365.80
4	467118.15	2602285.38	Sta 0+80.67	RT 13.50'	1365.26
5	467111.83	2602235.28	Sta 0+32.00	RT 0.00'	1365.08
6	467045.81	2603039.75	Sta 8+71.00	LT 13.50'	1340.75
7	467018.93	2603042.23	Sta 8+71.00	RT 13.50'	1340.94

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Wolski Plaza Road

Paving Details

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)				6	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES				34	
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)				26	
G20-2-48	**48"x24"**	**END ROAD WORK**	**3**		**3**	**19**	**57**
G20-4-36	**36"x18"**	**PILOT CAR FOLLOW ME (Mounted to back of pilot car)**	**1**		**1**	**18**	**18**
G20-10-108	**108"x48"**	**CONTRACTOR SIGN**	**2**		**2**	**64**	**128**
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS				37	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW				30	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**3**		**3**	**59**	**177**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)				10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)				10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)				10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)				7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)				7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)				7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)				7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)				7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT				15	
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT				23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT(Mounted on route marker post)				7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)				7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)				7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)				7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)				7	
R1-1-48	48"x48"	STOP				32	
R1-1a-18	**18"x18"**	**STOP and SLOW PADDLE Back to Back**	**3**		**3**	**5**	**15**
R1-2-60	60"x60"	YIELD				29	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**7**		**7**	**39**	**273**
R2-1a-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**2**		**2**	**10**	**20**
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT				35	
R4-1-48	**48"x60"**	**DO NOT PASS**	**3**		**3**	**39**	**117**
R4-7-48	48"x60"	KEEP RIGHT SYMBOL				39	
R5-1-48	48"x48"	DO NOT ENTER				35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT				13	
R7-1-12	12"x18"	NO PARKING				11	
R10-6-24	24"x36"	STOP HERE ON RED				16	
R11-2-48	**48"x30"**	**ROAD CLOSED**	**4**		**4**	**28**	**112**
R11-2a-48	48"x30"	STREET CLOSED				28	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY				31	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY				31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC				31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW				35	
W1-4-48	**48"x48"**	**RIGHT or LEFT REVERSE CURVE ARROW**	**4**		**4**	**35**	**140**
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW				35	
W1-6-48	**48"x24"**	**LARGE ARROW**	**2**		**2**	**26**	**52**
W3-1-48	48"x48"	STOP AHEAD SYMBOL				35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL				35	
W3-4-48	48"x48"	BE PREPARED TO STOP				35	
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**		**2**	**35**	**70**
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL				35	
W5-1-48	48"x48"	ROAD NARROWS				35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE				35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW				35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL				35	
W8-1-48	48"x48"	BUMP				35	
W8-3-48	48"x48"	PAVEMENT ENDS				35	
W8-7-48	48"x48"	LOOSE GRAVEL				35	
W8-9a-48	**48"x48"**	**SHOULDER DROP-OFF**	**3**		**3**	**35**	**105**
W8-11-48	**48"x48"**	**UNEVEN LANES**	**3**		**3**	**35**	**105**
W8-12-48	48"x48"	NO CENTER STRIPE				35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY				35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT.				35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT.				35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY				35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL				35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL				35	
W13-1-24	24"x24"	__ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)				11	
W13-4-48	48"x60"	RAMP ARROW				39	
W14-3-48	48"x36"	NO PASSING ZONE				23	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**4**		**4**	**35**	**140**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT				35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT.				35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT.				35	
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or __ FT.				35	
W20-7a-48	**48"x48"**	**FLAGGING SYMBOL**	**3**		**3**	**35**	**105**
W20-7k-24	24"x18"	__ FEET (Mounted on warning sign post)				10	
W20-8-48	48"x48"	STREET CLOSED				35	
W20-51-48	48"x48"	EQUIPMENT WORKING				35	
W20-52-54	**54"x12"**	**NEXT __ MILES (Mounted on warning sign post)**	**6**		**6**	**12**	**72**
W21-1a-48	48"x48"	WORKERS SYMBOL				35	
W21-2-48	48"x48"	FRESH OIL				35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT				35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5-48	48"x48"	SHOULDER WORK				35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED				35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.				35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD				35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT.				35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY				35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK				35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)				11	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1706**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. 1		TOTAL QUANTITY
704-0100	**FLAGGING**	MHR	**120**		**120**
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH			
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH			
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH			
704-1050	TYPE I BARRICADES	EACH			
704-1051	TYPE II BARRICADES	EACH			
704-1052	**TYPE III BARRICADES**	EACH	**13**		**13**
704-1060	**DELINEATOR DRUMS**	EACH	**10**		**10**
704-1065	TRAFFIC CONES	EACH			
704-1067	**TUBULAR MARKERS**	EACH	**84**		**84**
704-1070	DELINEATOR	EACH			
704-1072	FLEXIBLE DELINEATORS	EACH			
704-1080	**STACKABLE VERTICAL PANELS**	EACH	**30**		**30**
704-1081	VERTICAL PANELS - BACK TO BACK	EACH			
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH			
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH			
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH			
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH			
704-1095	TYPE B FLASHERS	EACH			
704-1185	**PILOT CAR**	HR	**40**		**40**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF			
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH			
762-0200	RAISED PAVEMENT MARKERS	EACH			
762-0420	SHORT TERM 4IN LINE - TYPE R	LF			
762-0430	**SHORT TERM 4IN LINE - TYPE NR**	LF	**2018**		**2018**
762-1500	**OBLITERATION OF PVMT MK**	SF	**10**		**10**
772-2110	FLASHING BEACON - POST MOUNTED	EACH			

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-19.06 of the Design Manual.
http://www.dot.nd.gov/

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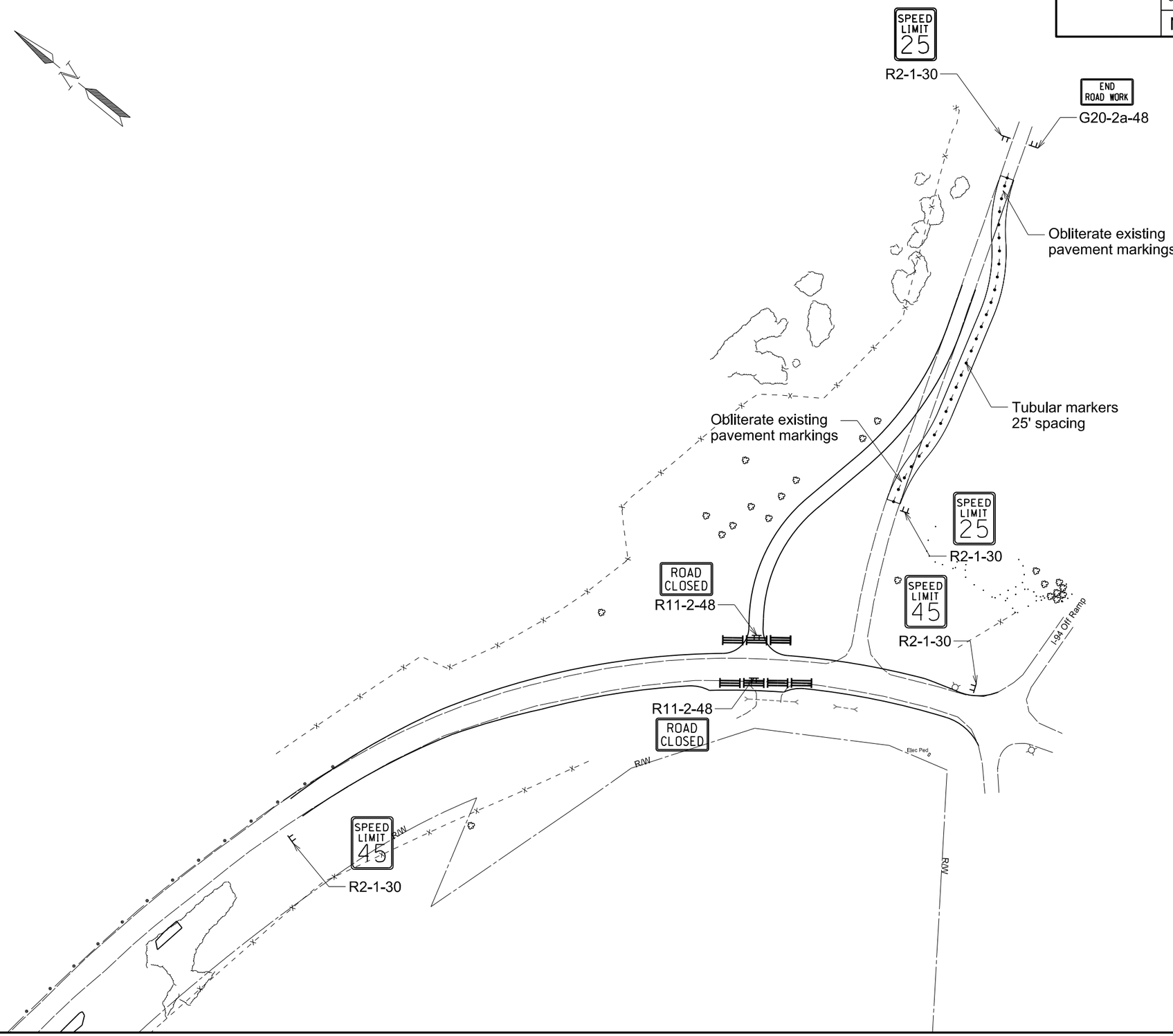
Traffic Control Devices List

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	100	2



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Work Zone Traffic Control

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	S-NHU-2-094(126)932	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs 3A SF	Flat Sheet For Signs 2 SF	Sign Support Length 1st LF	Sign Support Length 2nd LF	Sign Support Length 3rd LF	Sign Support Length 4th LF	Support Size	Max Post Len LF	Sleeve Length 1st LF	Sleeve Length 2nd LF	Sleeve Length 3rd LF	Sleeve Length 4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
I-94B																						
05+32 Lt		399	6.2		12.4				2.25 x 2.25 12 ga	12.7						1	4	2.5 x 2.5 12 ga				
05+35 Lt		17	16.0		11.9	12.2			2.5 x 2.5 10 ga	13.9						2	4	3 x 3 7 ga			2	
05+94 Lt		387	16.4		13.1				2.5 x 2.5 10 ga	13.7	4.4				2.19 x 2.19 10 ga	1	4	3 x 3 7 ga			1	
06+75 Rt		391	6.2		12.3				2.25 x 2.25 12 ga	12.7						1	4	2.5 x 2.5 12 ga				
08+54 Lt		3	13.3		13.6				2.5 x 2.5 10 ga	14.6	4.7				2.19 x 2.19 10 ga	1	4	3 x 3 7 ga			1	
09+35 Rt	SA A		14.7		11.0				2.5 x 2.5 12 ga	12.9						1	4	3 x 3 7 ga				
10+76 Rt		11	12.0		12.2	12.5			2.25 x 2.25 12 ga	12.7						2	4	2.5 x 2.5 12 ga				
11+50 Rt		67	5.0		11.5				2.25 x 2.25 12 ga	14.1						1	4	2.5 x 2.5 12 ga				
Sub Total			89.8	0.0		**Total**	122.7									**Total**	40		0	0	4	
Wolski Plaza Rd.																						
00+73 Lt		3	13.3		12.6	12.6			2.5 x 2.5 12 ga	13.8						2	4	3 x 3 7 ga			2	
01+83 Lt		10	7.5		12.7				2.5 x 2.5 12 ga	13.3						1	4	3 x 3 7 ga				
01+85 Lt		10	7.5		12.7				2.5 x 2.5 12 ga	13.3						1	4	3 x 3 7 ga				
02+67 Lt		10	7.5		12.7				2.5 x 2.5 12 ga	13.3						1	4	3 x 3 7 ga				
02+69 Lt		10	7.5		12.7				2.5 x 2.5 12 ga	13.3						1	4	3 x 3 7 ga				
Sub Total			43.3	0.0		**Total**	76.0									**Total**	24		0	0	2	
Grand Total			133.1	0.0		**Total**	198.7									**Total**	64		0	0	6	

Sta/RP	Sign/ Assembly No.	Flat Sheet For Signs 3A SF	Flat Sheet For Signs 2 SF	Panel For Signs 3A SF	Panel For Signs 2 SF	Overlay Panel 3A SF	Overlay Panel 2 SF	Galv Steel Post Standard Pipe 1st LF	Galv Steel Post Standard Pipe 2nd LF	Size	Galv Steel Post W-Shape Posts 1st LF	Galv Steel Post W-Shape Posts 2nd LF	Galv Steel Post W-Shape Posts 3rd LF	Max Post Len LF	Post Space FT	Revise Fuse Joint EA	Std Pipe Fdn Dia FT	Std Pipe Fdn Dep FT	Std Pipe Fdn Vol CY	W-Shape Pile LF	Remove Sign Fdns Conc Fdn EA	Remove Sign Fdns W-Shape Pile EA	Reset Sign Panel EA	Reset Sign Support EA	Stub Post EA	Multi Dir Base EA	Comments
Pipe Support																											
10+49 Lt										4					4.0	4	1.3	7.5	0.4		2		1	2	2		
Sub Total		0.0	0.0	0.0	0.0	0.0	0.0	**Total**	0.0		**Total**	0.0							0.4	0	2	0	1	2	2	0	
Grand Total		0.0	0.0	0.0	0.0	0.0	0.0	**Total**	0.0		**Total**	0.0							0.4	0	2	0	1	2	2	0	

Basis of Estimate
Sign Support Lengths

The sign support lengths have been calculated using the following vertical clearances:

Rural Roadway - 60"

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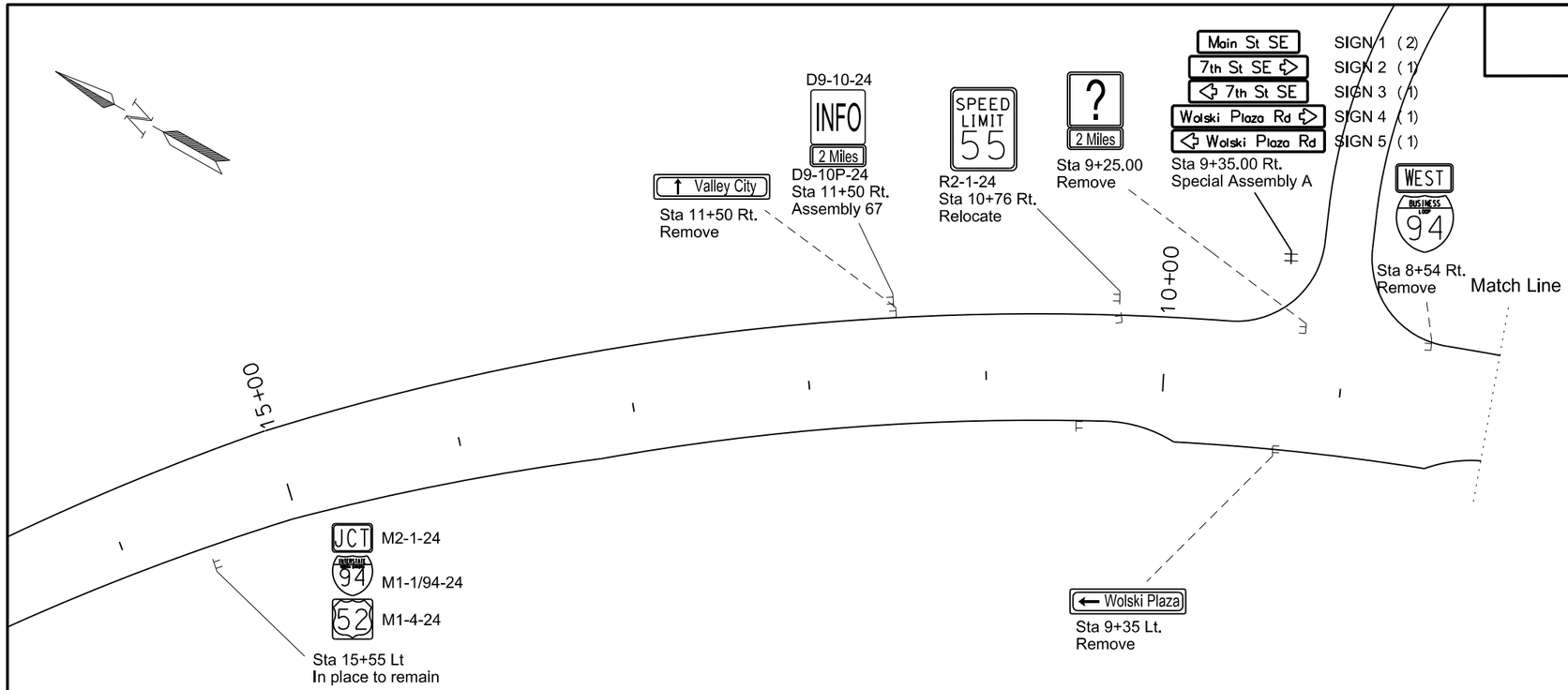
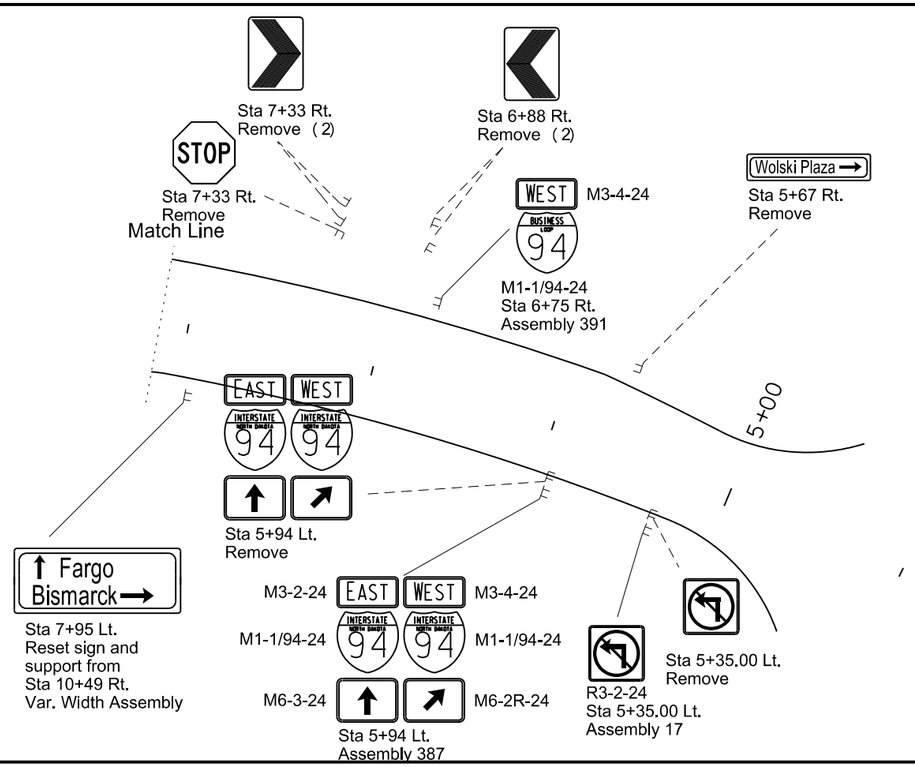
Sign Summary
Perforated Tube

Sign Summary
Round Steel Pipe and W-Shape

I-94B
Wolski Plaza Road

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	110	2





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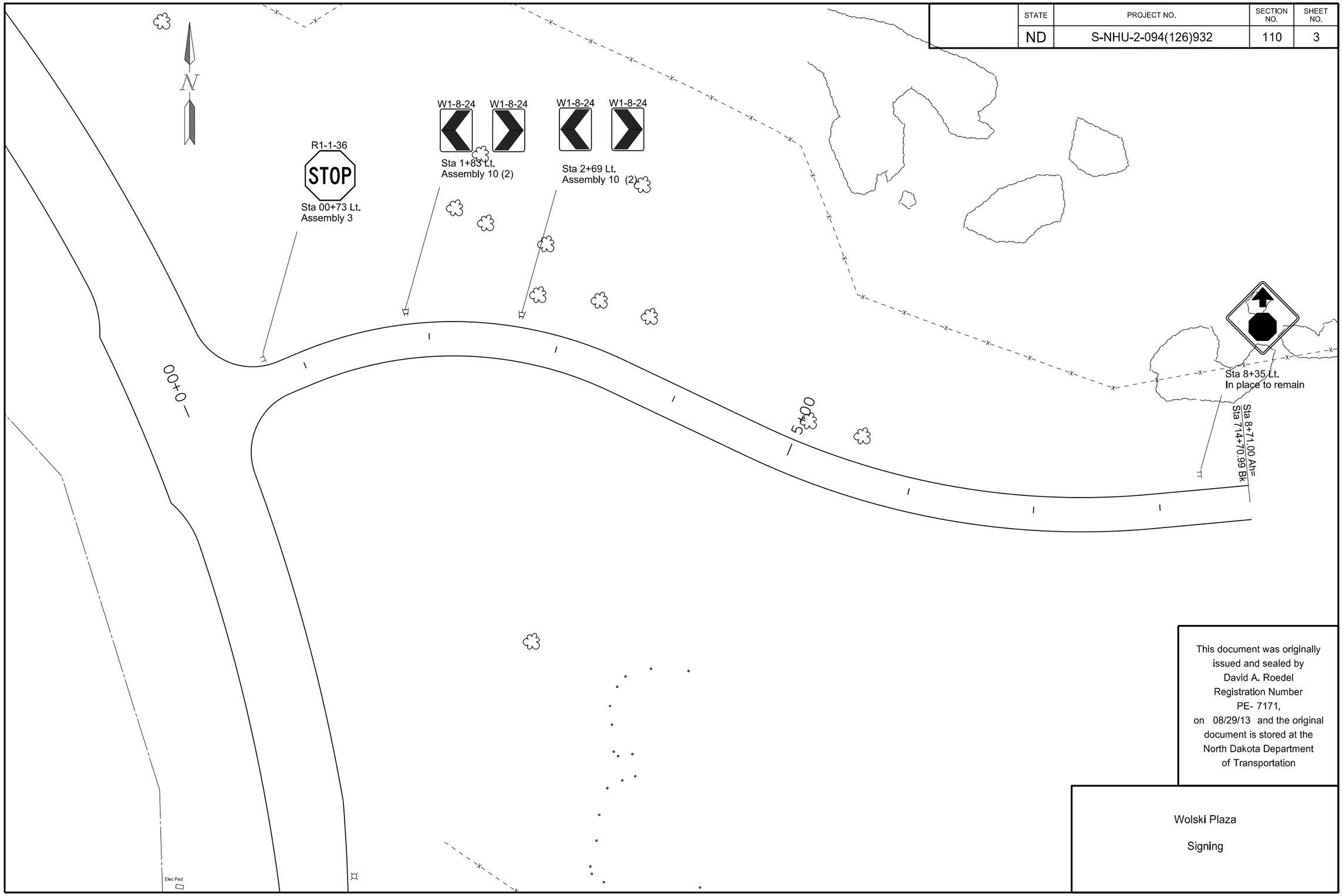
I-94 Business Loop

Signing

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	110	3



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Wolski Plaza

Signing

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	110	4

SIGN NUMBER	Sign 1
WIDTH x HEIGHT	3' x 0'-8"
BORDER WIDTH	0.38" (inset 0")
CORNER RADIUS	1"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: XI Reflective
	COLOR: White

STATION(S): 9+35 RT — AREA: 2.0 Sq.Ft.

Dimensions are in inches.tenths
Letter locations are panel edge to lower left corner

SYMBOL	X	Y	WID	HT	ANGLE

LETTER	POSITION (X)	LENGTH	SERIES/SIZE
M	4.3	28.2	4D
a	8.0		3D
i	10.6		
n	12		
	14.4		
S	17.4		
t	20.6		
	22.4		
S	25.4		
E	29.3		

SIGN NUMBER	Sign 2
WIDTH x HEIGHT	4'-6" x 0'-8"
BORDER WIDTH	0.38" (inset 0")
CORNER RADIUS	1"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: XI Reflective
	COLOR: White

STATION(S): 9+35 RT — AREA: 3.0 Sq.Ft.

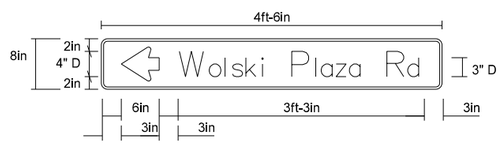
Dimensions are in inches.tenths
Letter locations are panel edge to lower left corner

SYMBOL	X	Y	WID	HT	ANGLE
Standard Arrow	45.0	4	6"	4"	0

LETTER	POSITION (X)	LENGTH	SERIES/SIZE
W	3.2	39	4D
o	7.9		3D
l	10.4		
s	11.6		
k	13.7		
i	16.2		
	17.9		
P	20.9		
l	25.0		
a	25.9		
z	28.2		
a	30.8		
	33.4		
R	36.4		
d	39.8		

SIGN NUMBER	Sign 3
WIDTH x HEIGHT	4'-6" x 0'-8"
BORDER WIDTH	0.38" (inset 0")
CORNER RADIUS	1"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: XI Reflective
	COLOR: White

STATION(S): 9+35 RT — AREA: 3.0 Sq.Ft.



Dimensions are in inches.tenths
Letter locations are panel edge to lower left corner

SYMBOL	X	Y	WID	HT	ANGLE
Standard Arrow	3.2	4	6"	4"	180

LETTER	POSITION (X)	LENGTH	SERIES/SIZE
W	12.4	39	4D
o	17.1		3D
l	19.6		
s	20.5		
k	22.9		
i	25.7		
	27.2		
P	30.2		
l	34		
a	34.9		
z	37.4		
a	39.3		
	42.2		
R	45.2		
d	48.6		

SIGN NUMBER	Sign 4
WIDTH x HEIGHT	3'-6" x 0'-8"
BORDER WIDTH	0.38" (inset 0")
CORNER RADIUS	1"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: XI Reflective
	COLOR: White

STATION(S): 9+35 RT — AREA: 2.33 Sq.Ft.

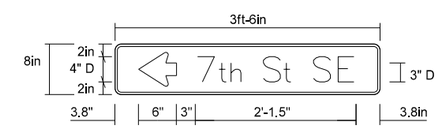
Dimensions are in inches.tenths
Letter locations are panel edge to lower left corner

SYMBOL	X	Y	WID	HT	ANGLE
Standard Arrow	32.3	4	6"	4"	0

LETTER	POSITION (X)	LENGTH	SERIES/SIZE
7	4.1	25.5	4D
t	7.5		3D
h	9.4		
	11.4		
S	14.4		
t	17.6		
	19.5		
S	22.5		
E	26.4		

SIGN NUMBER	Sign 5
WIDTH x HEIGHT	3'-6" x 0'-8"
BORDER WIDTH	0.38" (inset 0")
CORNER RADIUS	1"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: XI Reflective
	COLOR: White

STATION(S): 9+35 RT — AREA: 2.33 Sq.Ft.



Dimensions are in inches.tenths
Letter locations are panel edge to lower left corner

SYMBOL	X	Y	WID	HT	ANGLE
Standard Arrow	3.8	4	6"	4"	180

LETTER	POSITION (X)	LENGTH	SERIES/SIZE
7	13.1	25.5	4D
t	16.5		3D
h	18.4		
	20.5		
S	23.5		
t	26.7		
	28.5		
S	31.5		
E	35.4		

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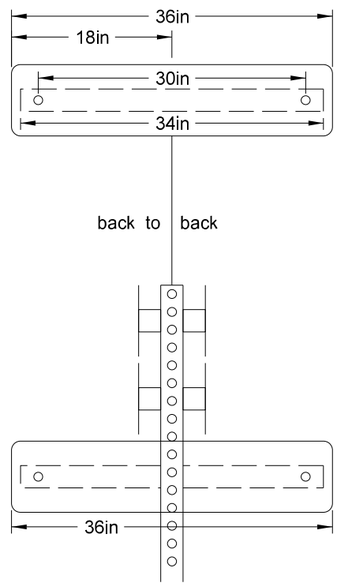
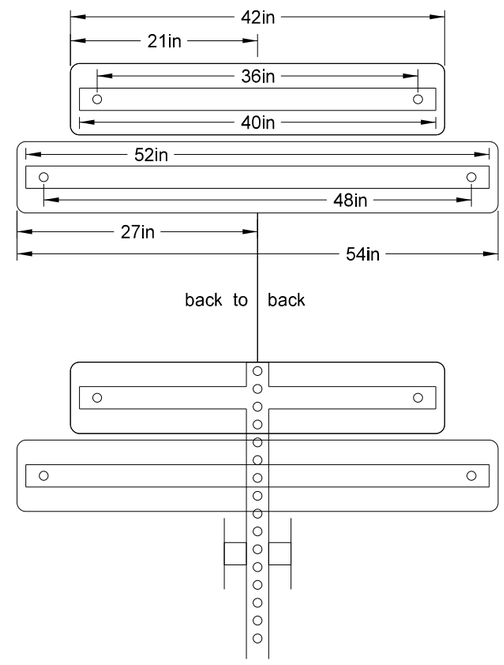
Sign Details

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	110	5



Front View



Side View

Special Assembly A
Sta 9+35 Rt.
Area: 14.7 SF

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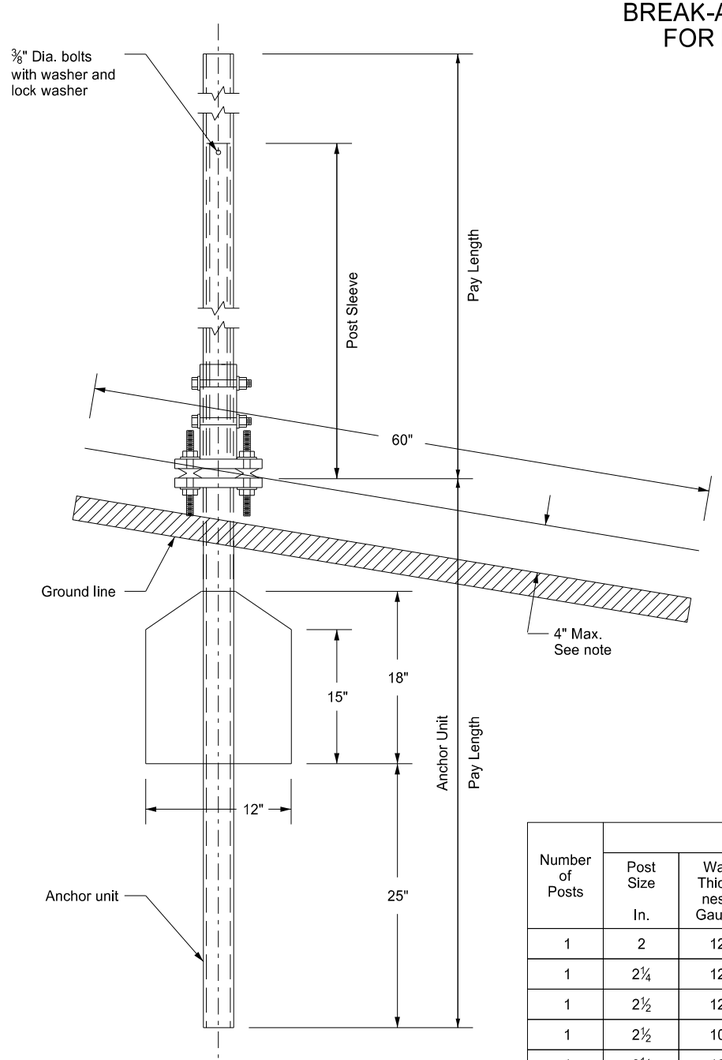
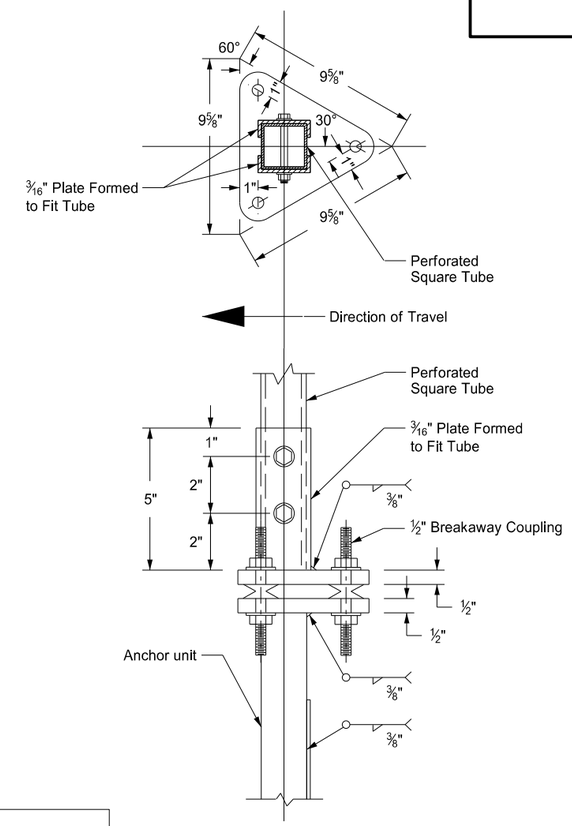
Special Assembly Details

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	110	6

BREAK-AWAY COUPLER SYSTEM FOR PERFORATED TUBES





BASE PLATE WITH BREAKAWAY COUPLER

NOTES:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
2. Anchor unit shall be the same size as the post and shall have the same specification as the post.
3. When used in concrete sidewalk, anchor shall be the same except the anchor plate shall be omitted.
4. Four post signs shall have over 8' between the first and fourth post.
5. In lieu of the breakaway base system on standard D-754-24 the breakaway coupling system may be used. The breakaway coupler system shall be manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements as specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.
6. Base plates and formed plates shall be fabricated from steel meeting the requirements of AASHTO M-183 and M232.

Number of Posts	Telescoping Perforated Tube					
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size In.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			B	2½
1	2½	10			Yes	2½
1	2¼	12	2	12	Yes	2¼ & 2 Sleeve
1	2½	12	2¼	12	Yes	2½ & 2¼ Sleeve
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	2½
2	2½	10			Yes	2½
2	2¼	12	2	12	Yes	2¼ & 2 Sleeve
2	2½	12	2¼	12	Yes	2½ & 2¼ Sleeve
3 & 4	2½	12			Yes	2½
3 & 4	2½	10			Yes	2½
3 & 4	2½	12	2¼	12	Yes	2½ & 2¼ Sleeve
3 & 4	2¼	12	2	12	Yes	2¼ & 2 Sleeve
3 & 4	2½	10	2 3/16	10	Yes	2½ & 2 3/16 Sleeve

B - The 2½" 12 gauge posts do not need breakaway bases when placed in standard soils. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.

Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.4	Cross Sect. area In.2	Section Modules In.3
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.785

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans. The 2½" size 10 gauge is shown as 2.51" size on the plans.

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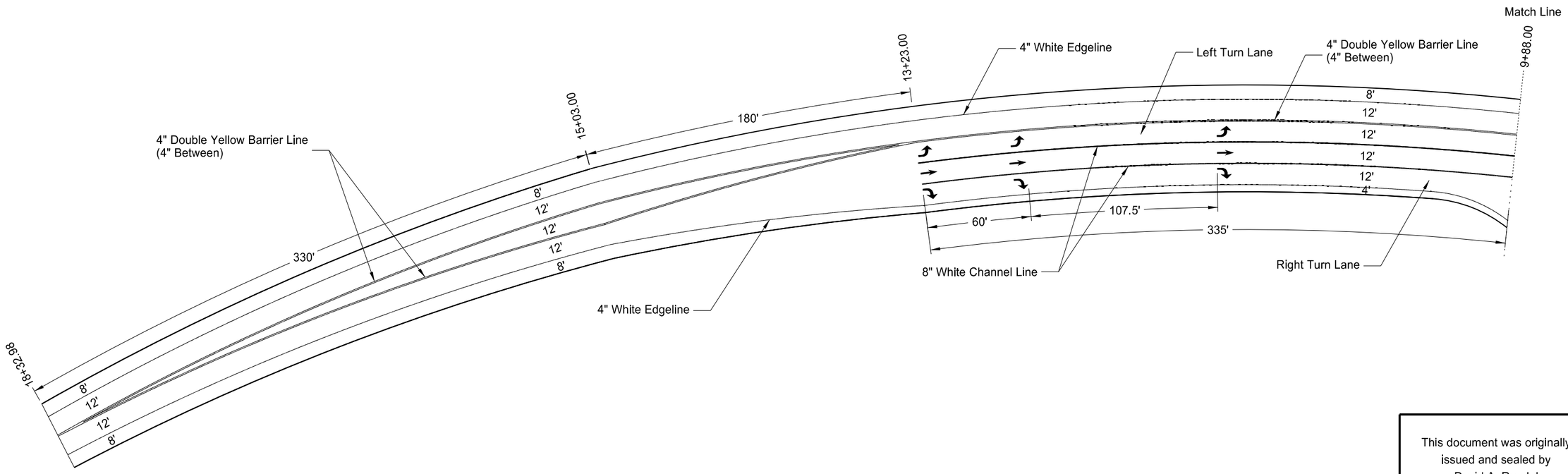
Perforated Tube Details

Break-Away Coupler System

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	120	1

SPEC	CODE	BID ITEM	QUANTITY	UNIT
762	0112	EPOXY PVMT MK PAINTED-MESSAGE		
		6 Turn Arrows - White 16SF-EA	96	SF
		3 Straight Arrows-White 12SF-EA	36	SF
762	1104	PVMT MK PAINTED 4IN LINE		
		4" Double Barrier - Yellow	2671	LF
		4" Edgeline - White	1695	LF
762	1108	PVMT MK PAINTED 8IN LINE		
		8" Channel Line - White	670	LF



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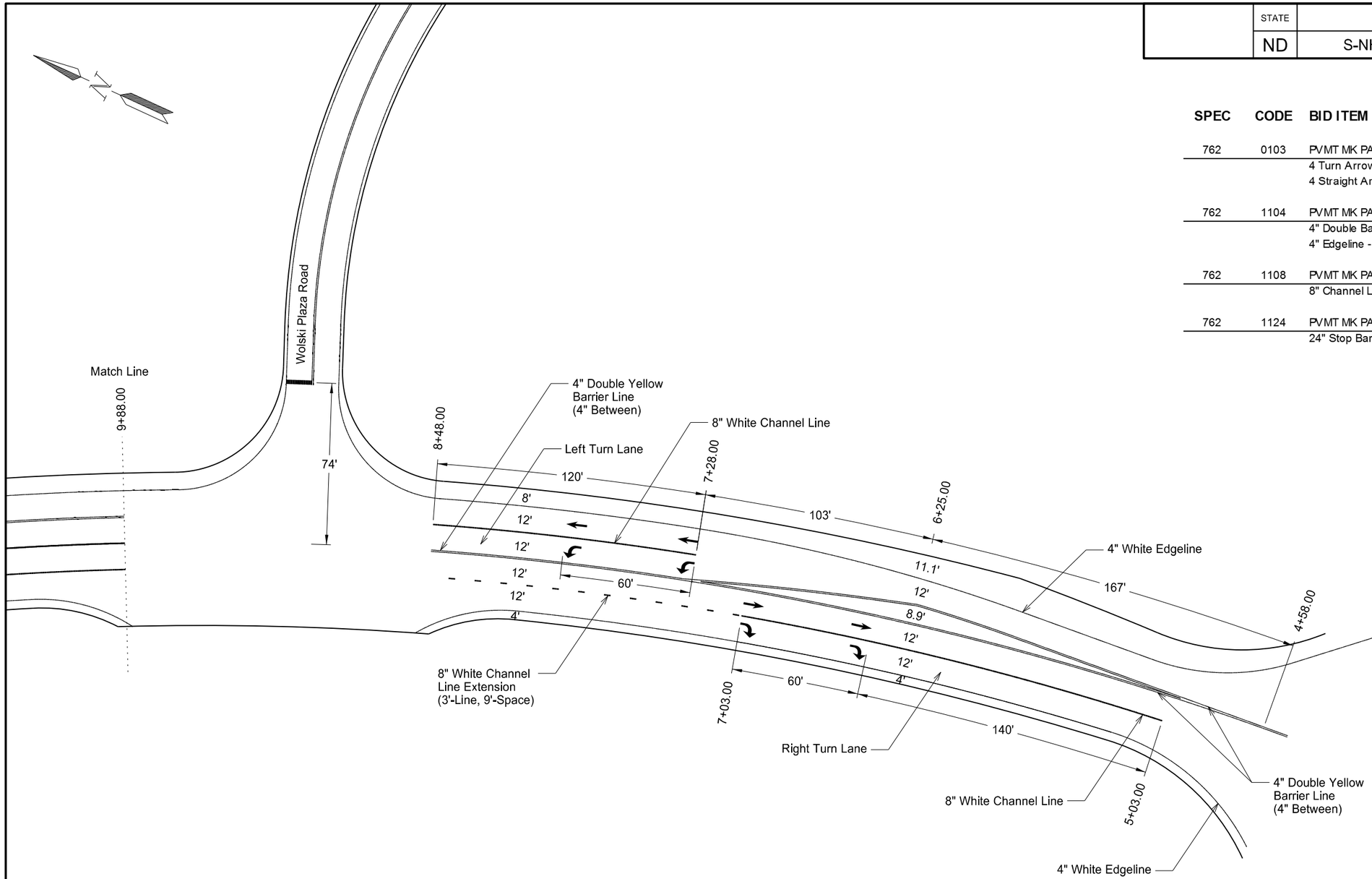
I-94 Business Loop

Pavement Marking

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	120	2



SPEC	CODE	BID ITEM	QUANTITY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE		
		4 Turn Arrows - White 16SF-EA	64	SF
		4 Straight Arrows 12SF-EA	48	SF
762	1104	PVMT MK PAINTED 4IN LINE		
		4" Double Barrier - Yellow	1493	LF
		4" Edgeline - White	1226	LF
762	1108	PVMT MK PAINTED 8IN LINE		
		8" Channel Line - White	356	LF
762	1124	PVMT MK PAINTED 24IN LINE		
		24" Stop Bar - White	32	LF

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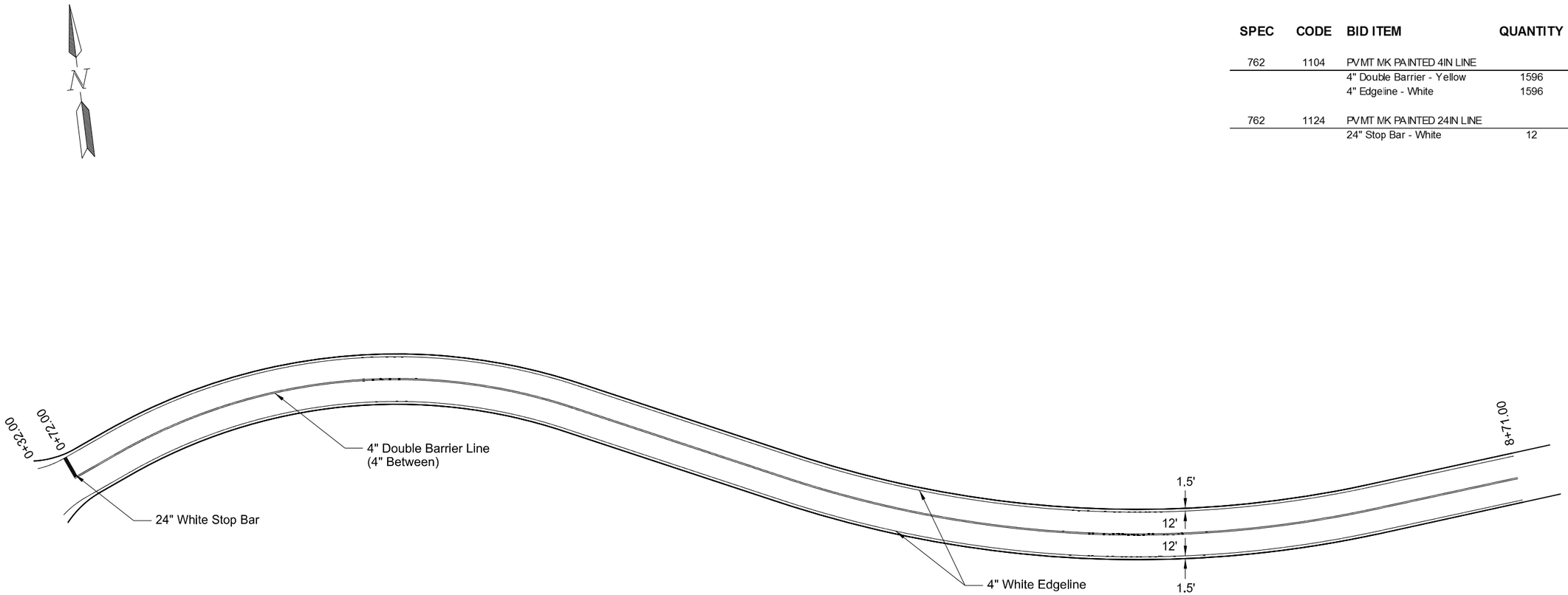
I-94 Business Loop

Pavement Marking

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	120	3

SPEC	CODE	BID ITEM	QUANTITY	UNIT
762	1104	PVMT MK PAINTED 4IN LINE		
		4" Double Barrier - Yellow	1596	LF
		4" Edgeline - White	1596	LF
762	1124	PVMT MK PAINTED 24IN LINE		
		24" Stop Bar - White	12	LF



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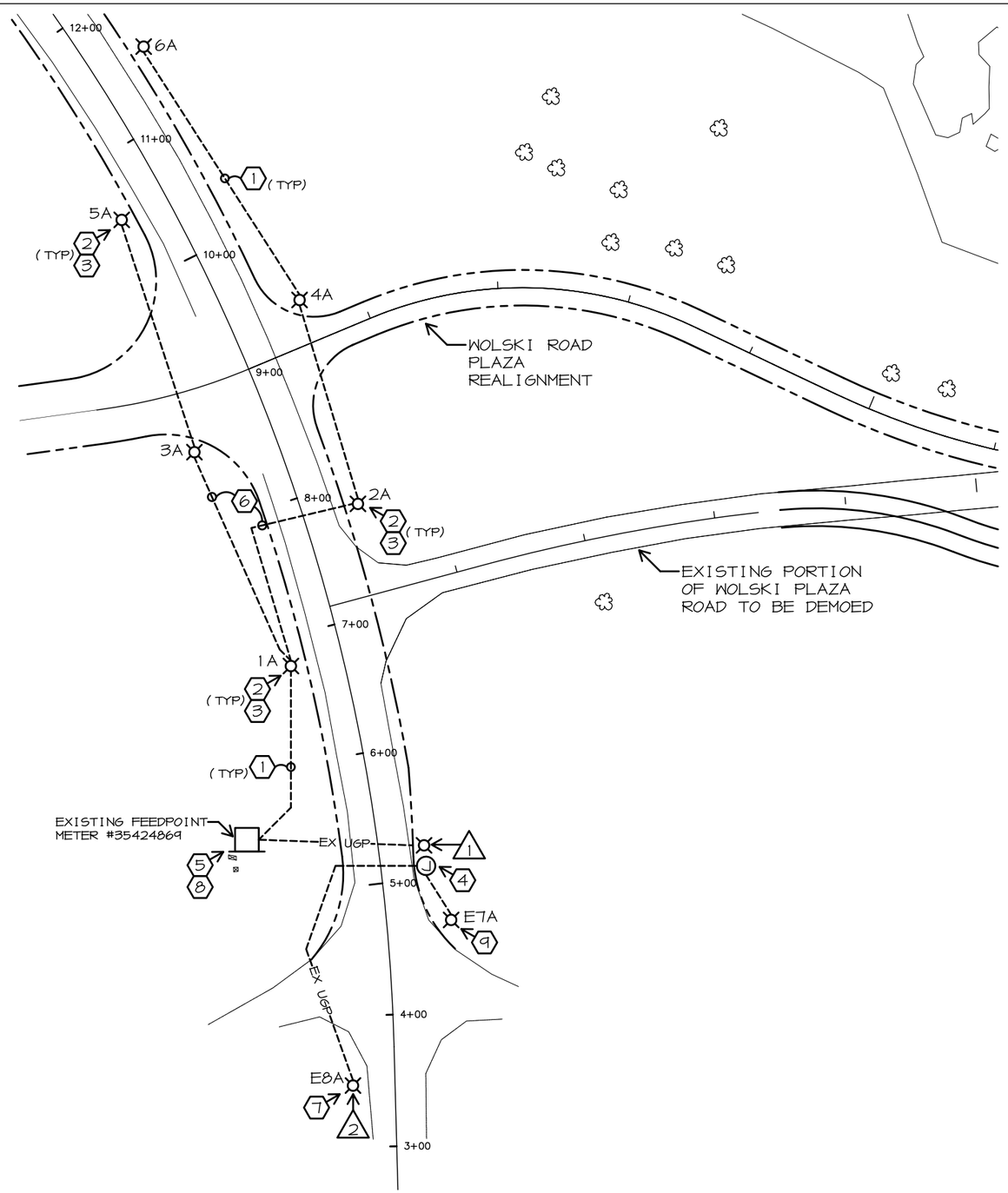
Wolski Plaza Road

Pavement Marking

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-094(126)932	140	1



NORTH

1 / E1 LIGHTING LAYOUT
SCALE: 1" = 100'

DEMO NOTES:

1. DISCONNECT AND REMOVE 250W HPS LIGHT FIXTURE, REMOVE 40' POLE. TURN POLE AND FIXTURE OVER TO OWNER AND STORE AS DIRECTED BY OWNER AT CITY SHOP LOCATION DESIGNATED BY OWNER. REMOVE AND SALVAGE EXISTING CIRCUIT CONDUCTORS FOR REUSE. REMOVE CONCRETE BASE. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR DISPOSAL OF CONCRETE BASE.

2. DISCONNECT AND REMOVE THE EXISTING 250W HPS FIXTURE FROM POLE. TURN OVER TO OWNER. POLE TO REMAIN IN PLACE AND TO RECEIVE NEW LED FIXTURE.

SPEC	CODE	ITEM DESCRIPTION	QUANTITY
770	0020	CONCRETE FOUNDATION - HIGHWAY LIGHTING	7 EA
770	0100	PULL BOX	1 EA
770	0330	2IN DIAMETER RIGID CONDUIT	1190 LF
770	0505	UNDERGROUND CONDUCTOR N06 - TYPE RHW	3570 LF
770	1676	LT STD 6FT MA 40FT MTG HT BREAKAWAY	6 EA
770	4220	LED LUMINAIRE 150 WATT	8 EA
770	4523	REVISE HIGHWAY LIGHTING FEEDPOINT	1 EA
770	4540	RELOCATE LIGHT STANDARD	1 EA
770	4570	REMOVE STREET LIGHTING LUMINAIRE	2 EA
770	4582	REMOVE CONCRETE FOUNDATION	1 EA

FIXTURE NUMBER	STATION & OFFSET
1A	6+82 - 41'LT
2A	7+88 - 44'RT
3A	8+57 - 63LT
4A	9+44 - 57'RT
5A	10+55 - 38'LT
6A	11+59 - 40'RT
7A	3+44 - 40'LT
8A	4+69 - 50'RT

NOTE: PROVIDE DIRECTIONAL BORING METHODS FOR RACEWAY INSTALLATION UNDER ALL HARD SURFACES. CONTRACTOR OPTION TO PROVIDE TRENCHED RACEWAY PATH OR DIRECTIONAL BORING METHODS IN GREEN SPACE AREA.

This document was originally issued and sealed by Kevin Kroke, Registration No. PE-4966, on August 29, 2013, and the original document is stored at Moore Engineering, Inc., West Fargo, N.D.

194-B

LIGHTING

LKA ENGINEERS, INC.
402 North 5th Ave.Ste. 2 Ave. Fargo, ND 58102
Ph.: 701-232-5351 Fax: 701-237-0845

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S–NHU–094(126)932	140	2

PLAN NOTES:

1. ELECTRICAL CONTRACTOR TO PROVIDE 30" DEEP TRENCH OR DIRECTIONAL BORING METHODS WHERE REQUIRED, BACKFILL & COMPACTION. ELECTRICAL CONTRACTOR SHALL ALSO FURNISH & INSTALL 2" INNERDUCT RACEWAY, 2#6 AWG USE Cu. & #6 Grd. (TYPICAL). ROUTE ALL TRENCHES PARALLEL TO ADJACENT ROADWAY EDGE AT AN APPROXIMATE DISTANCE OF 36" FROM CLOSEST OUTSIDE EDGE.

2. ELECTRICAL CONTRACTOR SHALL PROVIDE LIGHTING UNIT BASE, 24" DIAMETER SONO-TUBE, CONDUITS, CONDUCTORS, GROUND ROD, CONCRETE, ANCHOR BOLTS, REINFORCING IRON (CAGE), ETC. PER DETAILS SHOWN ON SECTION 140, SHEET 3. DRILLING OF HOLE FOR CONCRETE BASES SHALL ALSO BE PROVIDED BY ELECTRICAL CONTRACTOR CENTER OF CONCRETE LIGHT BASE SHALL BE 3'-0" FROM BACKSIDE OF STREET CURB, OR AS STAKED BY FIELD ENGINEER. TOP OF BASE SHALL BE 3" ABOVE TOP OF ADJACENT CURB. TYPICAL FOR ALL CONCRETE BASES.

3. ALL STREET LIGHT LOCATIONS SHALL BE FIELD VERIFIED WITH FIELD ENGINEER PRIOR TO ACTUAL ROUGH-IN.

4. PROVIDE AN IN GROUND JUNCTION POINT PER DETAIL 3/E3, IN PLACE AT REMOVED CONCRETE BASE FOR A SPLICE POINT FOR SALVAGED CIRCUIT CONDUCTORS. FROM J-POINT, PROVIDE 2" INNERDUCT, 2#6 RHW PHASE CONDUCTORS +#6 RHW GROUND TO NEW BASE FOR RELOCATED POLE 7A.

5. EXISTING FEEDPOINT IN PLACE AND TO REMAIN. ENCLOSURE CONTAINS A 100A, 24 CIRCUIT, 120/240V LOADCENTER. PROVIDE (1) NEW 60/2 CIRCUIT BREAKER IN LOADCENTER. PROVIDE (1) NEW 60/2 MERCURY TYPE 2 POLE CONTACTOR EQUAL TO DURAKOOL (260N0120) 60A, 2 POLE, 120 VOLT, MOUNTED TO ENCLOSURE BACK PLATE. SET, WIRE, AND CONNECT NEW BREAKER AND CONTACTOR TO EXISTING PHOTOCELL CONTROL TO CONTROL NEW LIGHTING CIRCUIT.

6. CONTRACTOR SHALL USE DIRECTIONAL BORING METHODS TO INSTALL CONDUIT UNDER EXISTING HARD SURFACES TO REMAIN. (TYPICAL) CONTRACTOR OPTION TO PROVIDE OPEN TRENCH IN GREEN SPACES.

7. EXISTING FIXTURE ON POLE TO BE REPLACED AND TO REMAIN CONNECTED TO EXISTING FEEDPOINT. PROVIDE NEW LED FIXTURE AT POLE.

8. THE NEW DISTRIBUTION CIRCUIT SHALL COMMENCE AT THE EXISTING FEEDPOINT AND CONTINUE AS SHOWN ON THE SITE PLAN. CIRCUITS SHALL BE OF THE MULTIPLE TYPE CONSISTING OF TWO FEEDER CONDUCTORS AND ONE CONTINUOUS GROUND CONDUCTOR.

   ALL WIRING WITHIN THE LIGHTING STANDARDS BETWEEN DISTRIBUTION CONDUCTORS AND LUMINARIES SHALL BE #10 A.W.G. STRANDED COPPER, 600V, TYPE THHN/THWN.

   THE CIRCUIT CONDUCTOR AT EACH BASE SHALL BE EVENLY CUT AT A LENGTH OF 24" ABOVE THE BASE SURFACE. THE SPLICED CONDUCTOR SHALL BE COILED IN A NEAT, WORKMANLIKE MANNER, IN THE BASE OF THE POLE FOR EASE OF REMOVAL BY MAINTAINANCE PERSONNEL. ALL CONNECTIONS WITHIN STANDARD BASES, EXCEPT GROUND CONDUCTOR, SHALL BE WATER TIGHT AND SUITABLE FOR CONTINUOUS SUBMERSION IN WATER. ALL OTHER CONDUCTOR SPLICES SHALL BE UL LISTED WITH POWER GEL SEALANT TYPE CONNECTIONS MEETING ALL CODES FOR DESIRED APPLICATIONS.

   FROM THE FUSE HOLDERS IN EACH STANDARD BASE CONNECT CONDUCTOR TO THE LUMINAIRE WITH SUFFICIENT SLACK FOR REMOVAL OF FUSE HOLDER BEYOND HANDHOLE OR TRANSFORMER BASE OPENING. INSTALL 10 AMP FUSES IN EACH FUSE HOLDER FOR LUMINAIRE. PROVIDE 4" LONG HEAT SHRINK EQUAL TO 3M (600V AC) ON EACH END OF EACH FUSE HOLDER.

   STUB CONDUITS 3" ABOVE TOP OF CONCRETE BASE AND SEAL AROUND CONDUCTORS WITH DUCT SEAL.

9. RELOCATE DEMOED 40' POLE AS STAKED BY FIELD ENGINEER. PROVIDE NEW CONCRETE BASE. EXTEND EXISTING CIRCUIT TO NEW BASE, PROVIDE NEW LED FIXTURE AT POLE, REINSTALL POLE, AND RECONNECT AS EXISTING.

ELECTRICAL SYMBOLS LEGEND

SYM.:	DESCRIPTION:	SYM.:	DESCRIPTION:
A LU#1	NEW LIGHT STANDARD, CONCRETE BASE & LED LUMINAIRE	X	NOTE IDENTIFICATION
	GROUND ROD	EC	ELECTRICAL CONTRACTOR
	FUSEHOLDER & FUSE	EX, EXTG	EXISTING
	2" PVC CONDUCTORS		CIRCUIT BREAKER
J	QUAZITE IN-GROUND J-POINT	LU #1,A	LIGHTING UNIT NUMBER, TYPE
			FEED POINT
			EXISTING LIGHTING UNIT

LIGHTING FIXTURE/POLE SCHEDULE

TYPE	MFG.	SERIES	VOLT.	LAMP	BLST	FIN.	MTG	REMARKS
A	HOLOPHANE HUBBELL STREETWORKS	LANEVIEW NAVION	(240V) AUTO SENSING	60 CHIP 4K 4 SQUARE	144W, 700MA 206W, 760MA	STANDARD	6' DAVIT ARM/FXT	LED ROADWAY FIXTURE. TYPE 3 DIST. INTEGRAL 10KV SURGE PROTECTION MODULE. 5 YR WARRANTY. SEE NOTE #1.

NOTE #1 – PROVIDE STEEL LIGHTING STANDARD, 40' HEIGHT, WITH SINGLE 6-FOOT DAVIT ARM, TRANSFORMER TYPE BREAKAWAY BASE AS APPROVED BY NDDOT STANDARDS.

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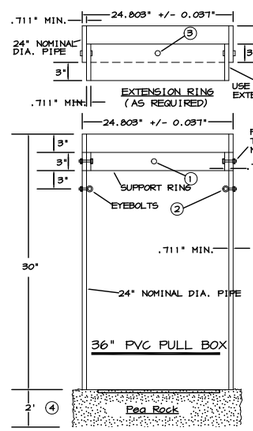
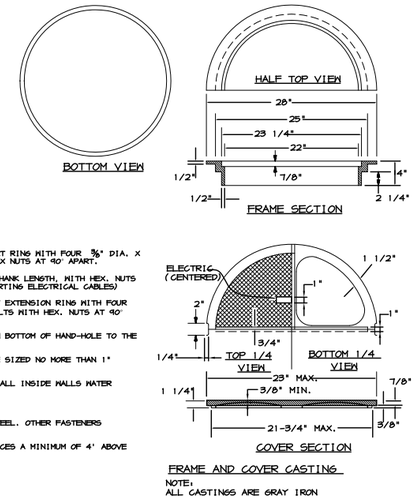
194–B

LIGHTING

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-094(126)932	140	3





① ATTACH SPLIT 24" NOM. DIA. P.V.C. COVER. SUPPORT RING WITH FOUR ⅜" DIA. X 2" LONG. STAINLESS STEEL HEX HEAD BOLTS WITH HEX NUTS AT 90° APART.

② TWO TYPE 2 SHOULDER EYEBOLTS, ⅜" DIA. X 1½" SHANK LENGTH, WITH HEX. NUTS AT 180° APART (FOR LIFTING HAND-HOLES AND SUPPORTING ELECTRICAL CABLES)

③ ATTACH SPLIT 24" NOM. DIA. P.V.C. COVER SUPPORT EXTENSION RING WITH FOUR ⅜" DIA. X 2" LONG HEX. HEAD STAINLESS STEEL BOLTS WITH HEX. NUTS AT 90° APART. BOLT ASSEMBLY TOGETHER.

④ PLACE COMPACTED 2'-0" AGGREGATE DRAIN BED BELOW BOTTOM OF HAND-HOLE TO THE SATISFACTION OF THE ENGINEER.

⑤ CONDUIT HOLES LOCATED IN THE BARREL SECTION ARE SIZED NO MORE THAN 1" LARGER THAN THE CONDUIT USED.

⑥ AFTER HAND-HOLE AND CONDUIT INSTALLATION, SEAL ALL INSIDE WALLS WATER TIGHT TO THE SATISFACTION OF THE ENGINEER.

⑦ THE P.V.C. PIPE COMPLIES WITH ASTM F679T-1.

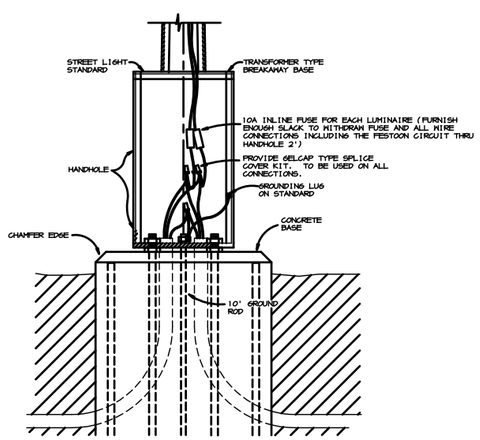
⑧ HEX. HEAD BOLTS AND NUTS ARE TO BE STAINLESS STEEL. OTHER FASTENERS TO BE GALVANIZED AS PER AASHTO M-232

⑨ PROVIDE ENOUGH SLACK TO PULL CONDUCTOR AND SPLICES A MINIMUM OF 4' ABOVE FINISHED ELEVATION.

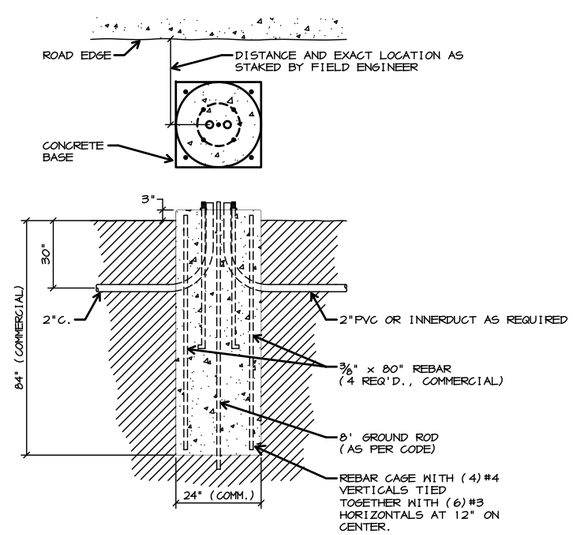
FRAME AND COVER CASTING

NOTE:
ALL CASTINGS ARE GRAY IRON

3/E3 PULL BOX, METAL FRAME AND COVER DETAIL
SCALE: NONE



2/E3 LIGHT FIXTURE BASE
SCALE: NONE



NOTE:
1" x 36" ANCHOR BOLTS (OR AS RECOMMENDED BY MANUFACTURER)

3/E3 STREET LIGHTING CONCRETE BASE
SCALE: NONE

LIGHT BASE NOTES:

① CONCRETE SHALL BE CLASS AE PORTLAND CEMENT. (4000 LB)

② CENTER OF CONCRETE BASE SHALL AS STAKED BY FIELD ENGINEER. CONCRETE BASE SHALL BE 3" ABOVE TOP GRADE (VERIFY WITH ENGINEER).

③ FOUNDATIONS MAY BE CONSTRUCTED IN AUGURED HOLES UNLESS THE NATURAL SOILS WILL NOT STAND OPEN. IN WHICH CASE FORMING WILL BE REQUIRED.

④ LOCATE HANDHOLE 180 DEG. FROM STREET SIDE WHERE APPLICABLE.

⑤ THE GROUND ROD SHALL BE PLACED INSIDE THE BASE WITH THE TOP EXTENDING 3" ABOVE THE TOP OF CONCRETE.

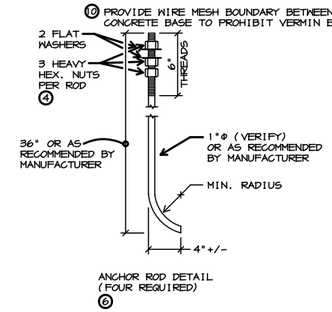
⑥ ANCHOR BOLTS AS RECOMMENDED BY MFG & PER SPECIFICATIONS. GALVANIZE TOP 1'-0" OF ANCHOR ROD & NUTS.

⑦ PVC CONDUIT AS PER SPEC. SHALL BE PROTECTED 4"+/- ABOVE THE FOUNDATION BEFORE THE CONCRETE IS PLACED & SHALL BE THE SIZE & NUMBER SHOWN IN THE PLAN OR AS SPECIFIED.

⑧ A TEMPLATE SHALL BE PROVIDED FOR ANCHOR ROD PLACEMENT & SHALL BE LEFT IN PLACE UNTIL CONCRETE HAS SET.

⑨ VERIFY EXACT BASE REQUIREMENTS WITH POLE MANUFACTURER.

⑩ PROVIDE WIRE MESH BOUNDARY BETWEEN POLE BASE FLANGE AND CONCRETE BASE TO PROHIBIT VERMIN ENTRY.



ANCHOR ROD DETAIL
(FOUR REQUIRED)
⑥

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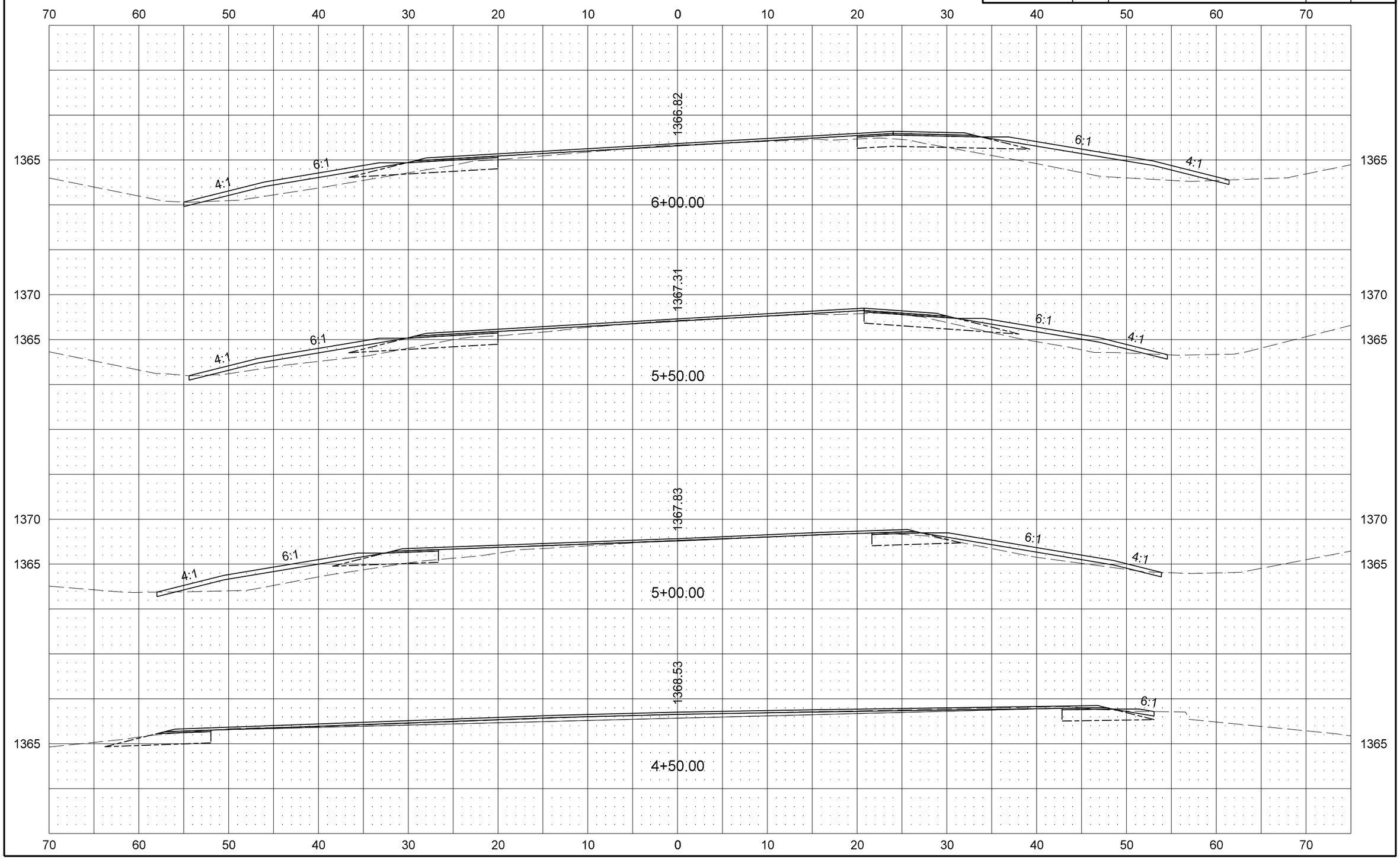
194-B

LIGHTING

LKA ENGINEERS, INC.
2828 North University Drive, Fargo, ND 58102
Ph: 701.232.5757 Fax: 701.277.6445

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)932	200	1

I94-B Business Loop



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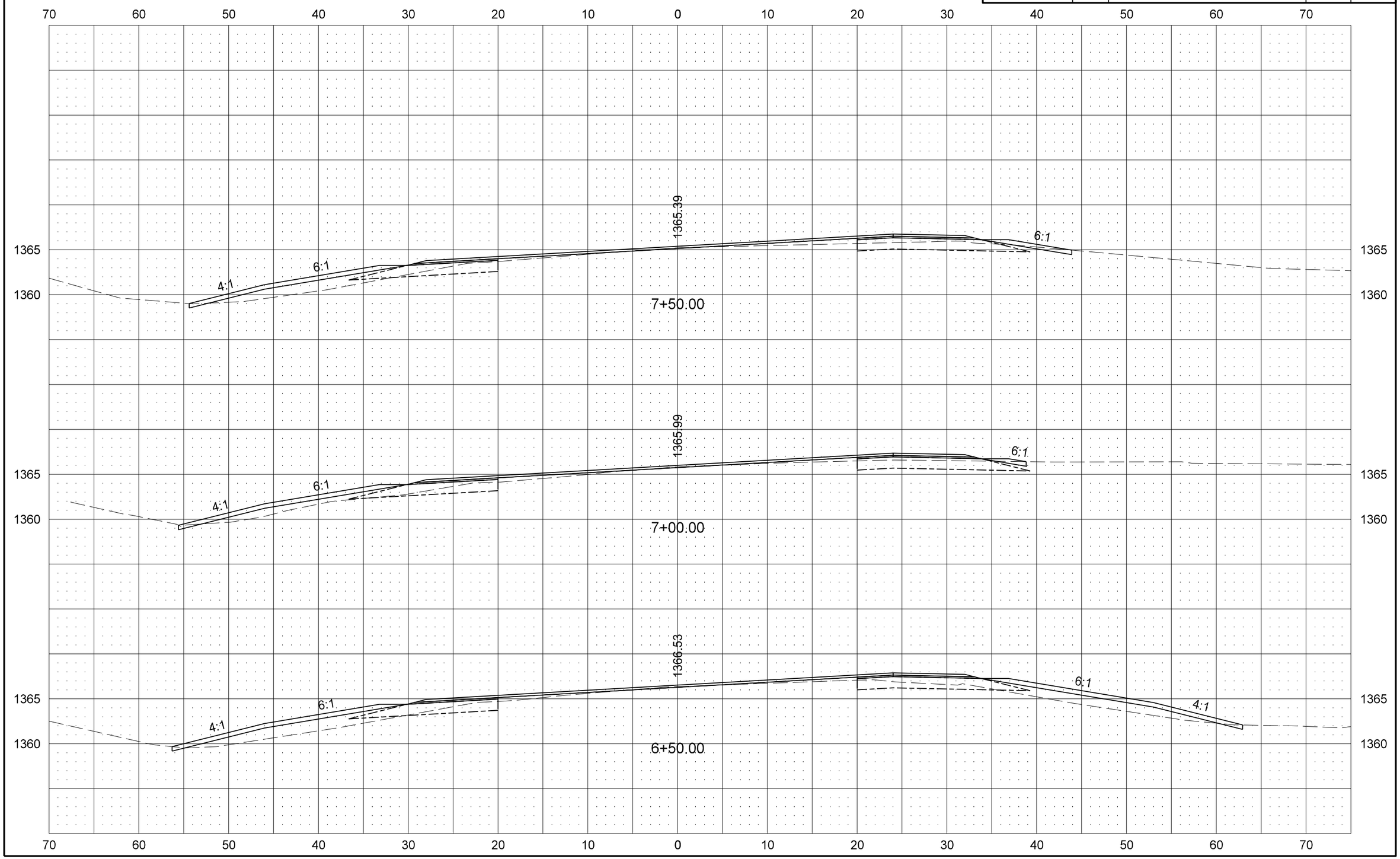

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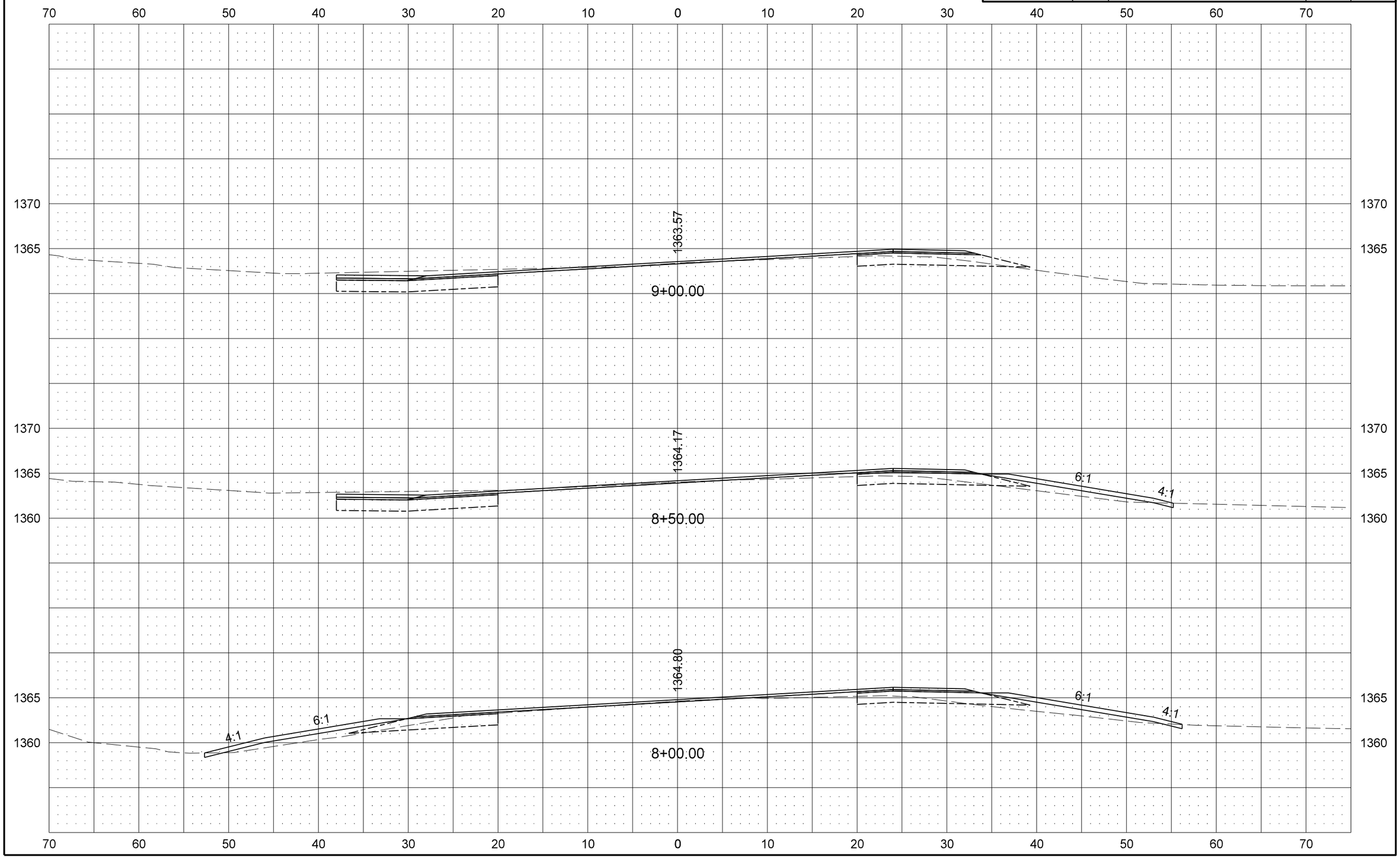

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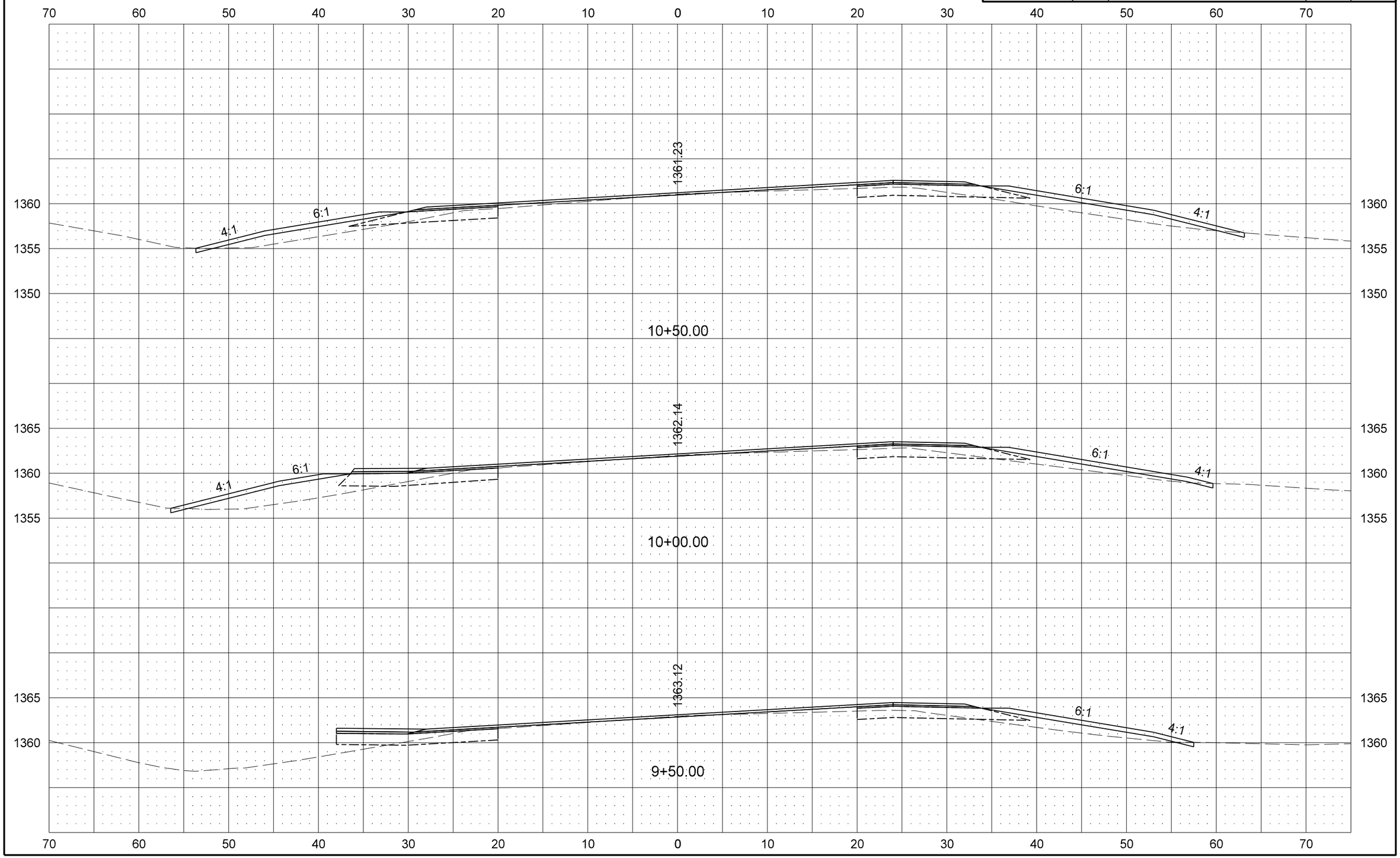

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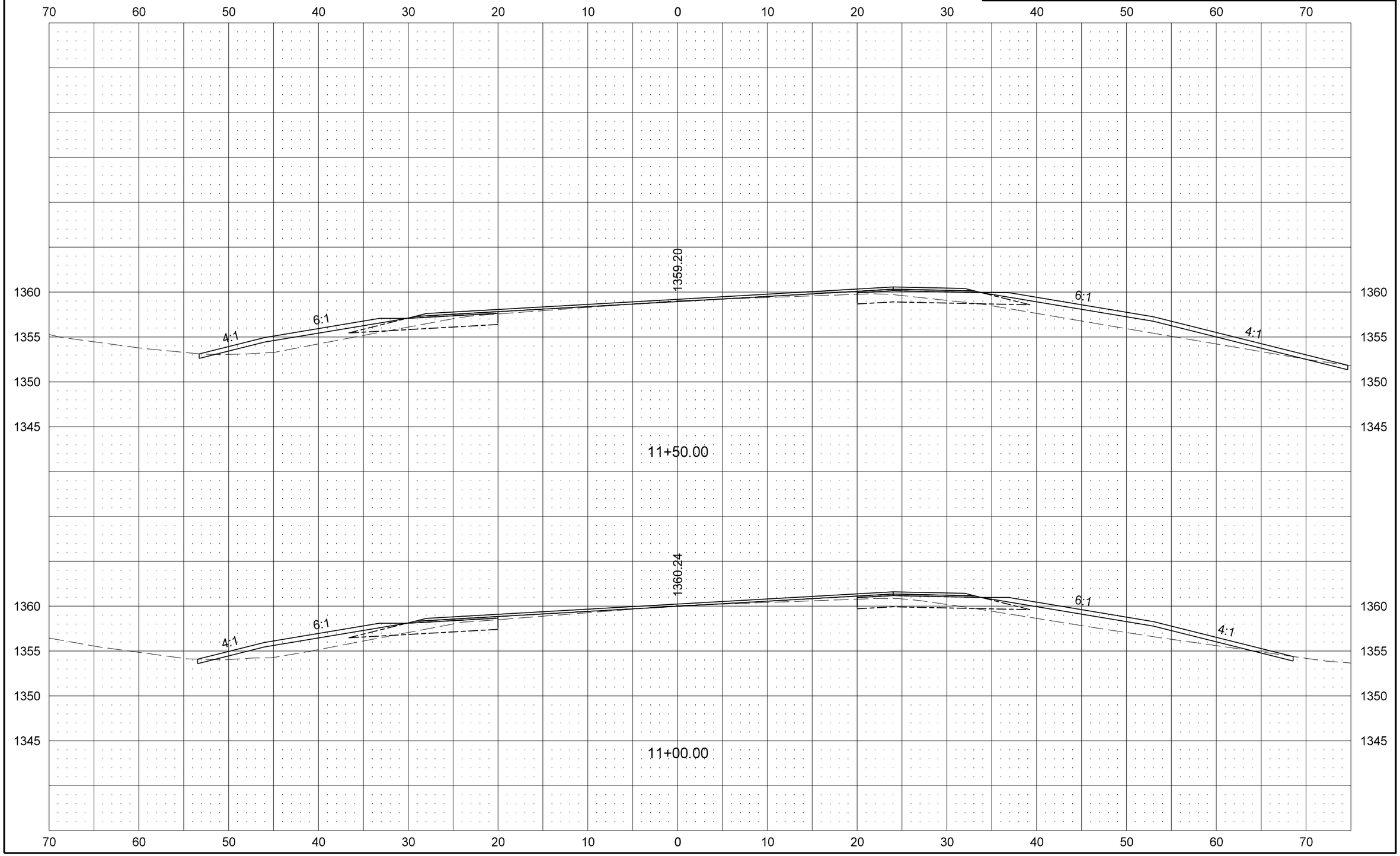

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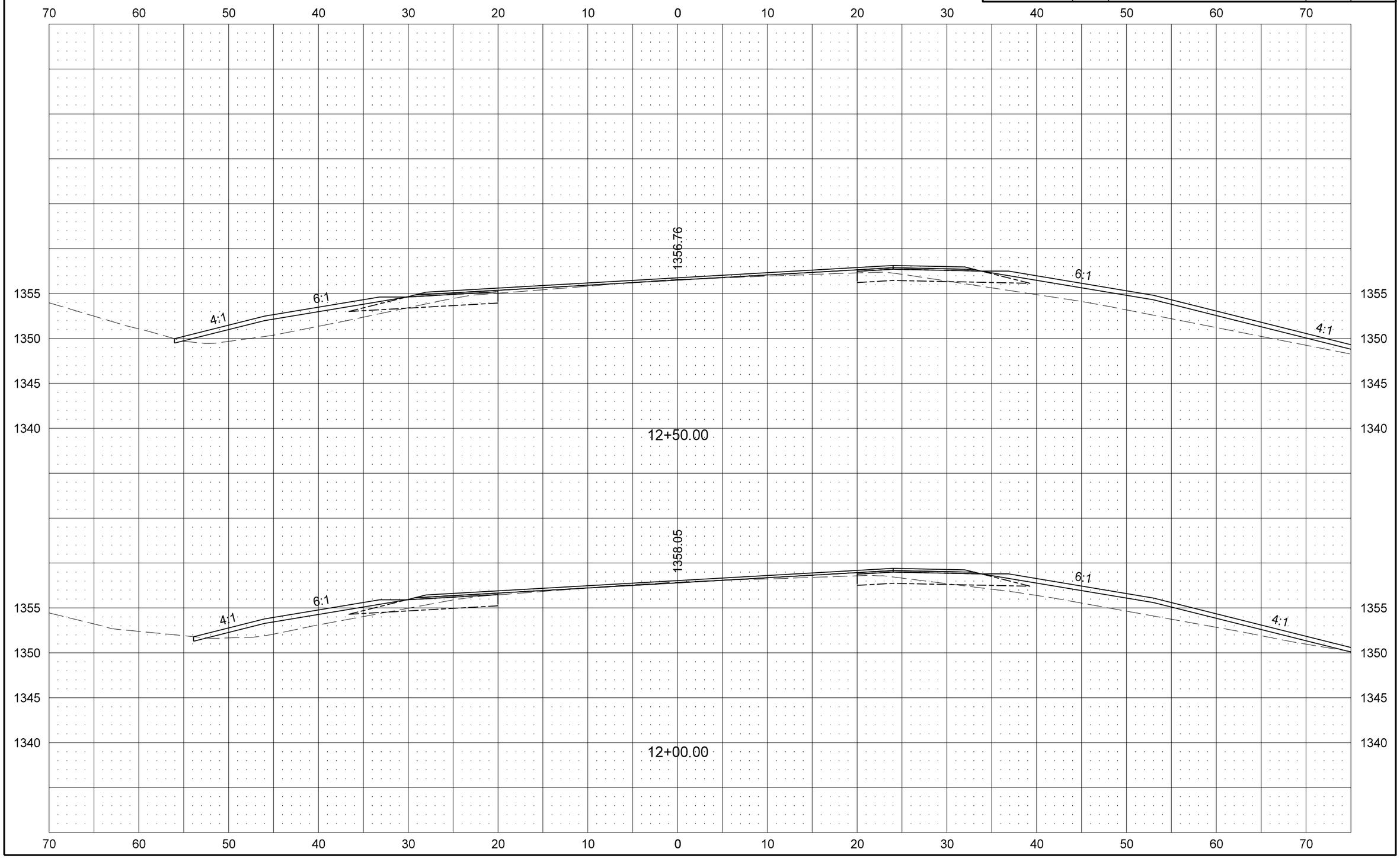

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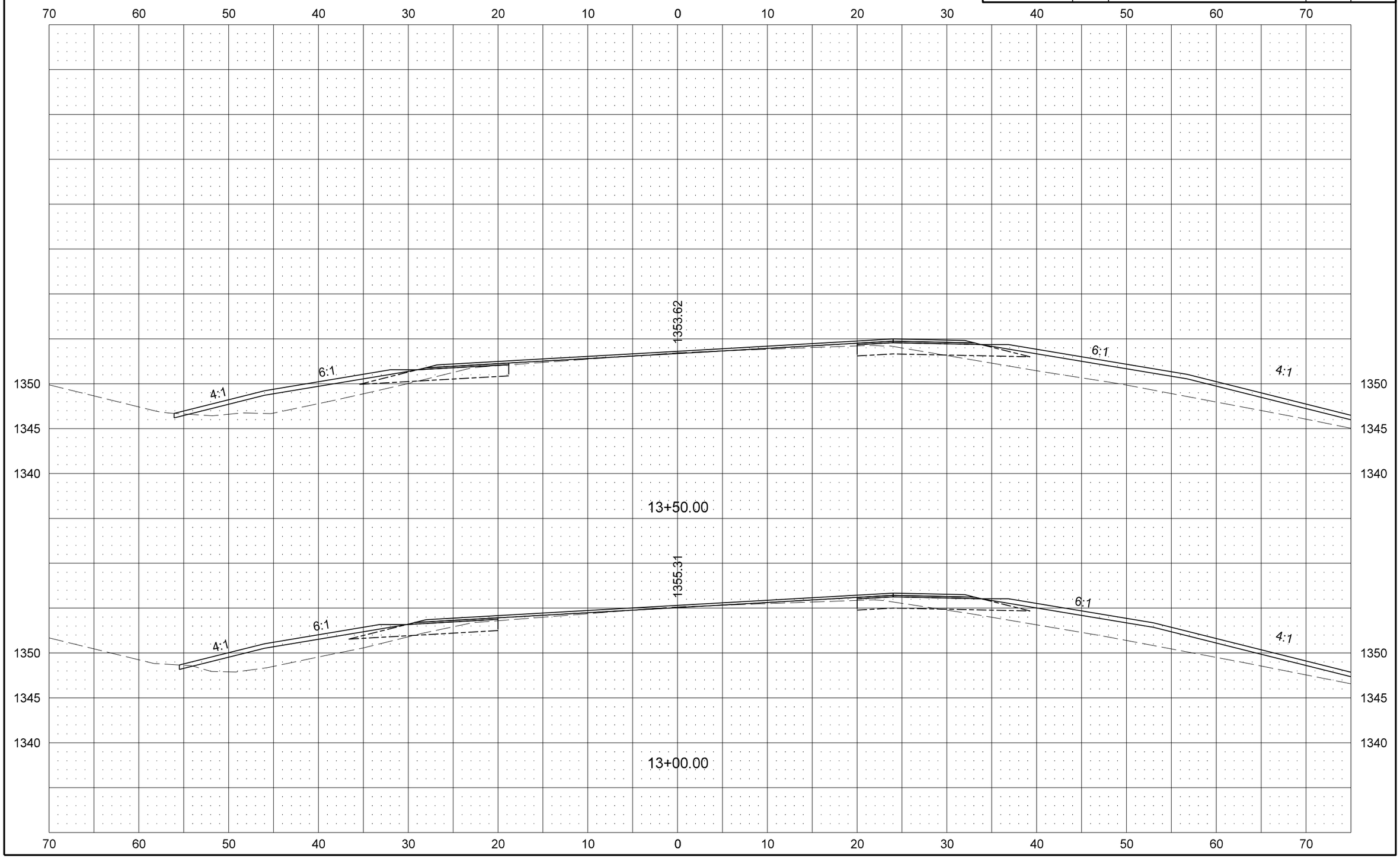

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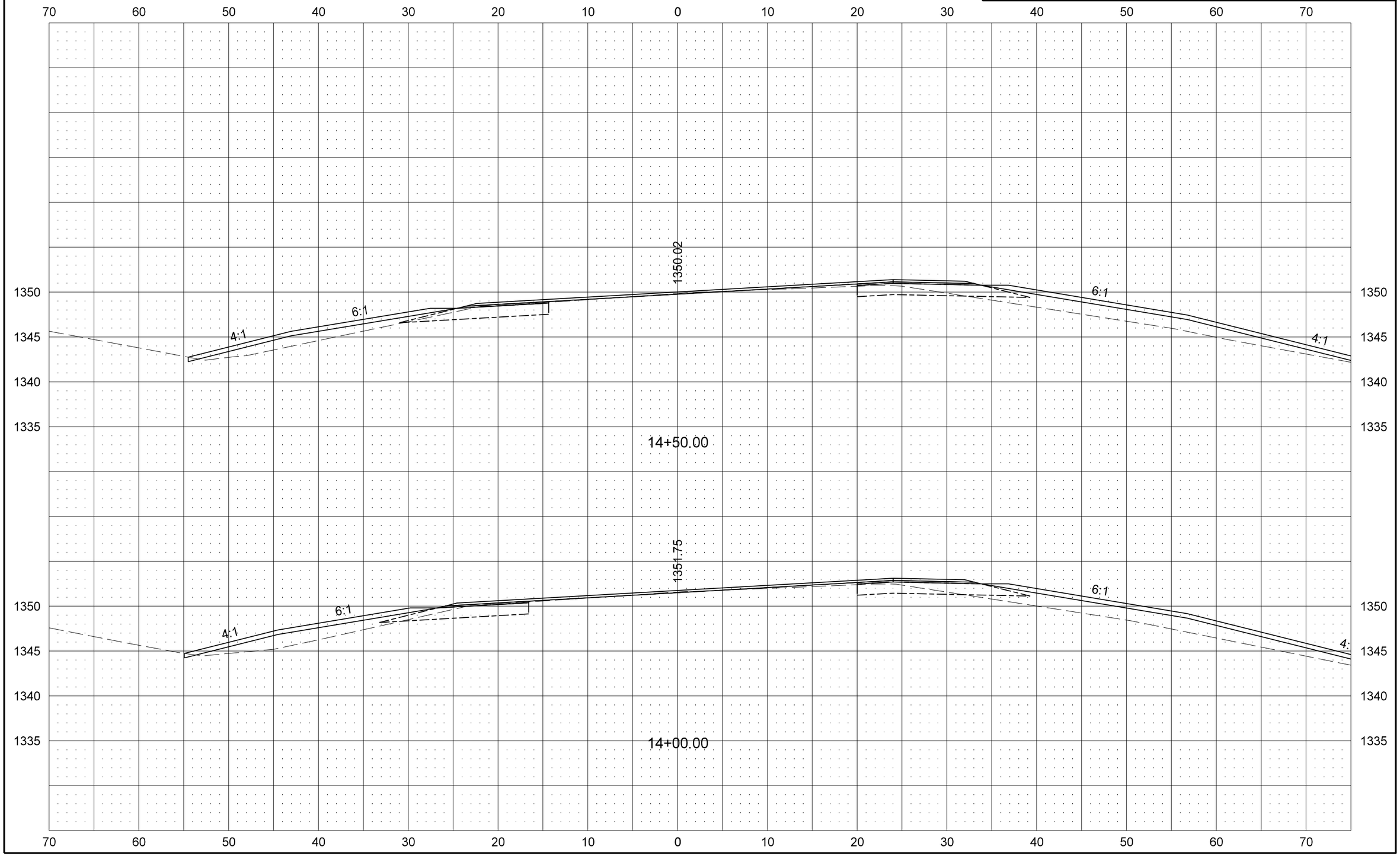

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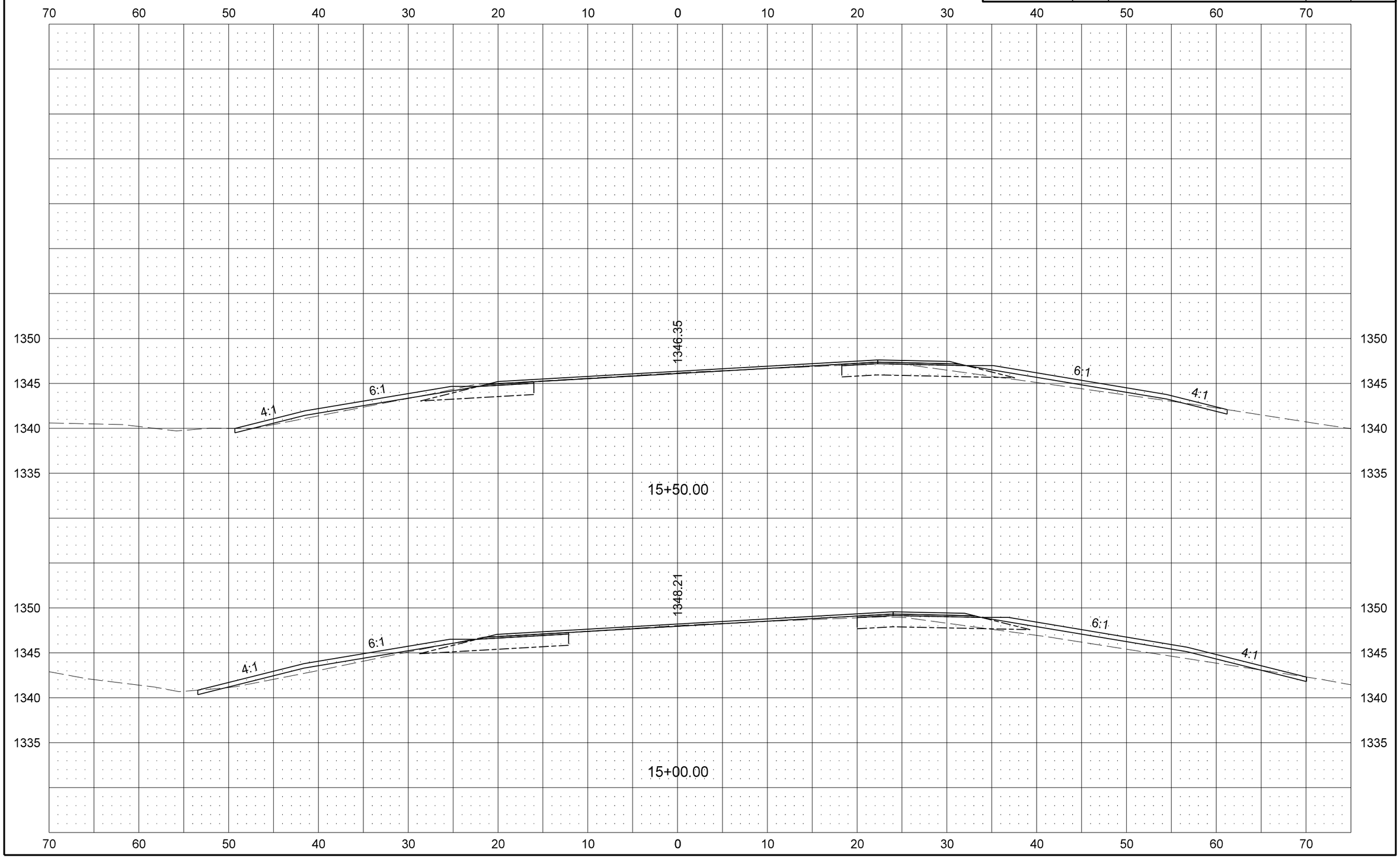

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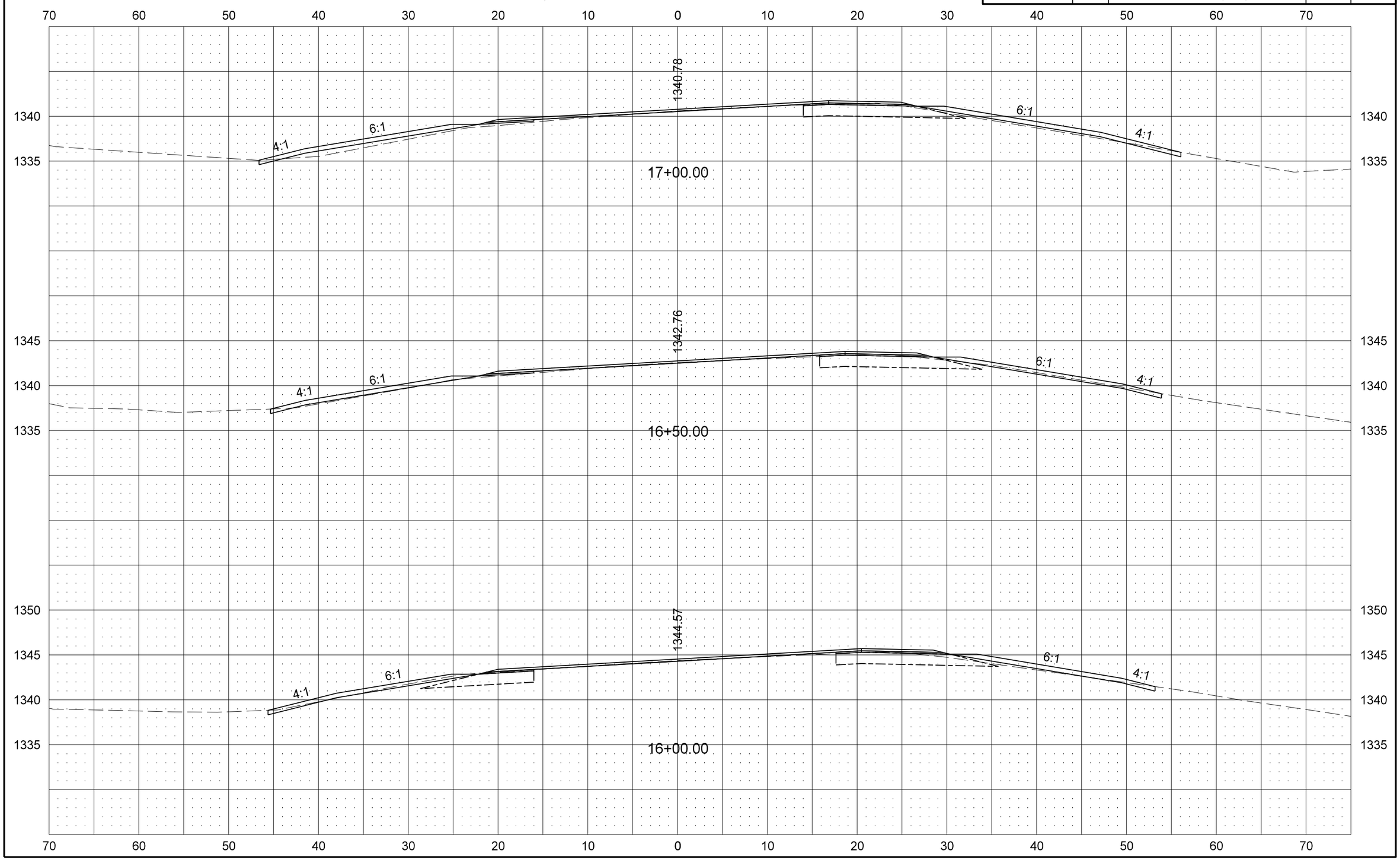

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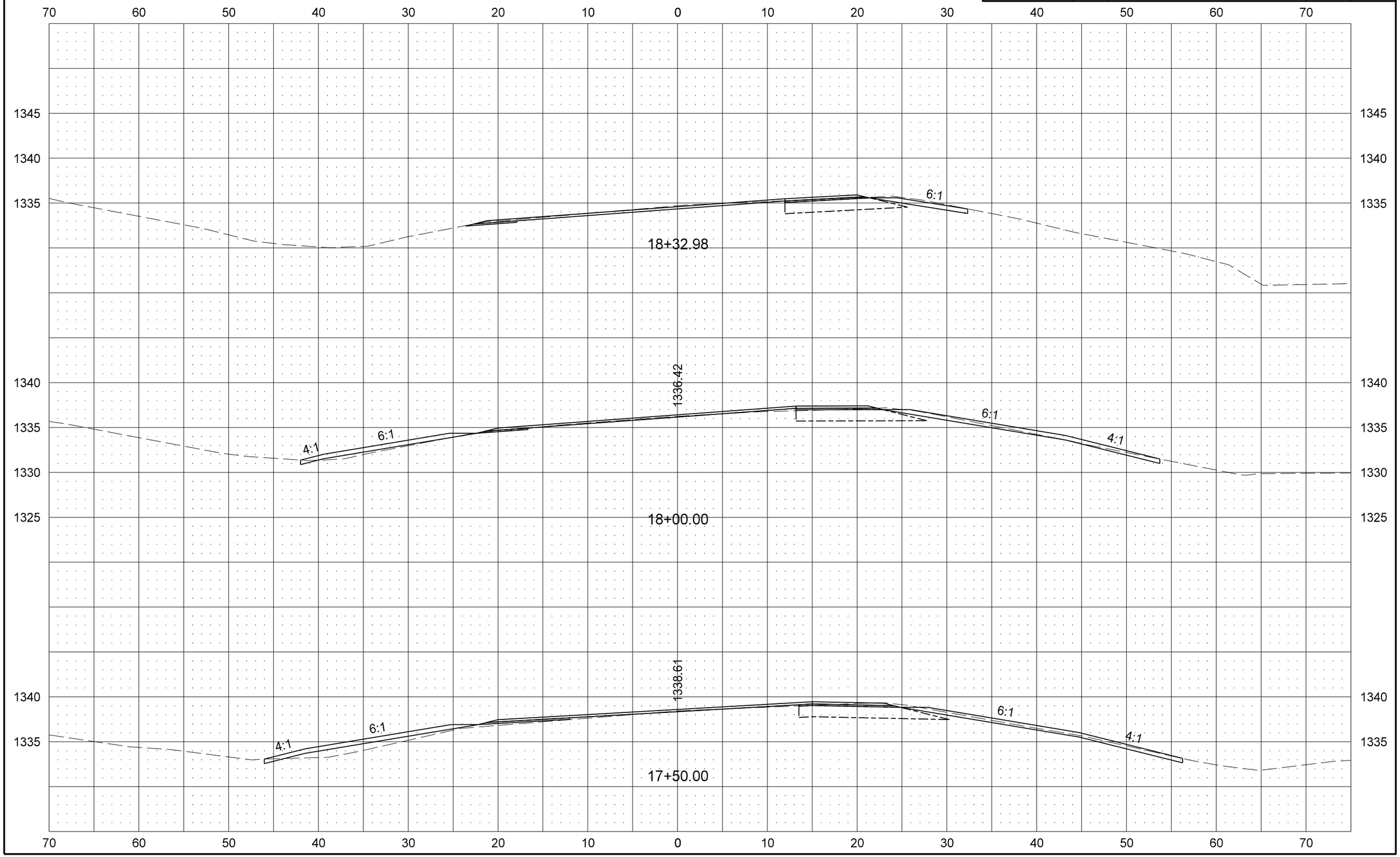
I94-B Business Loop



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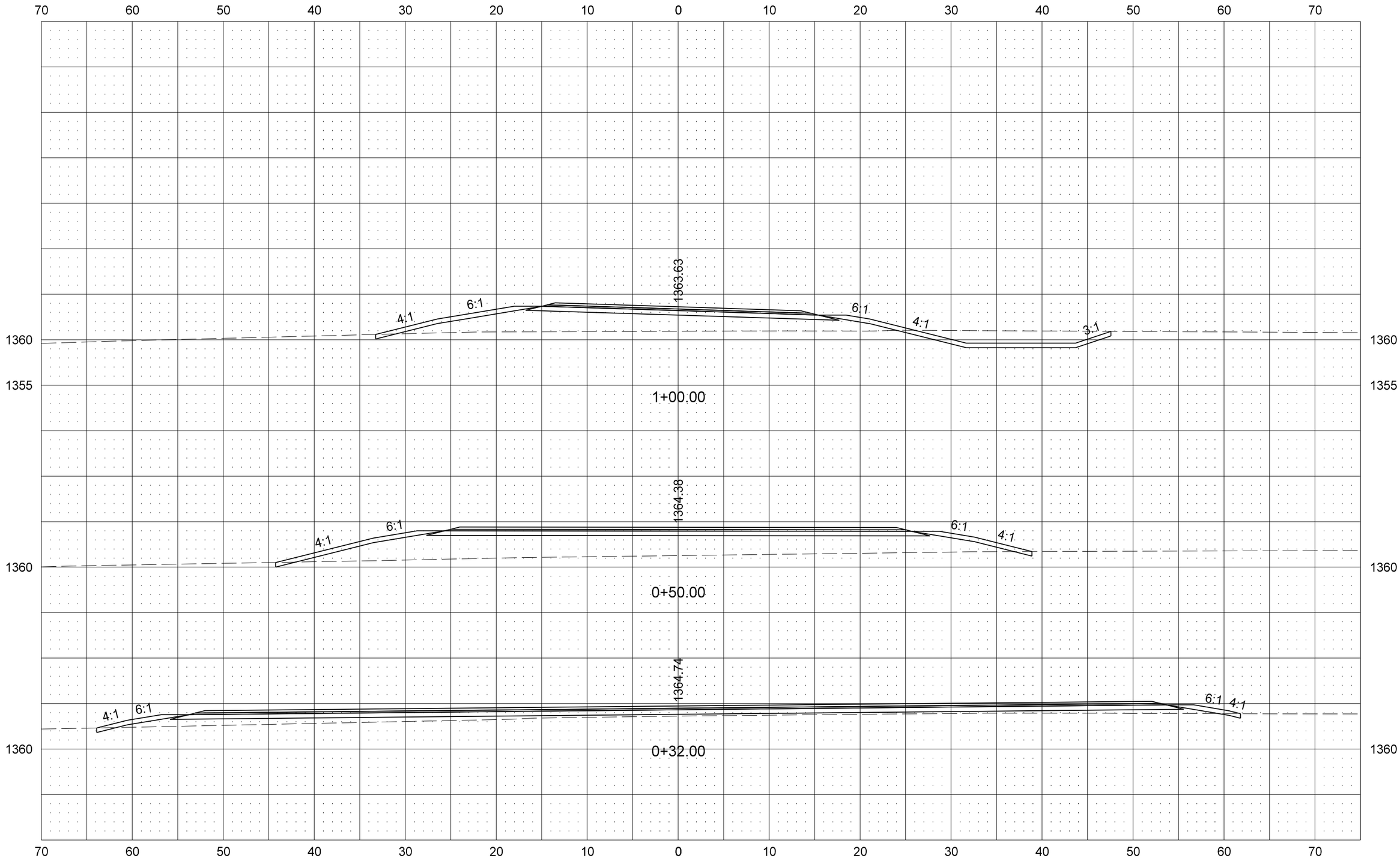
Wolski Plaza Road



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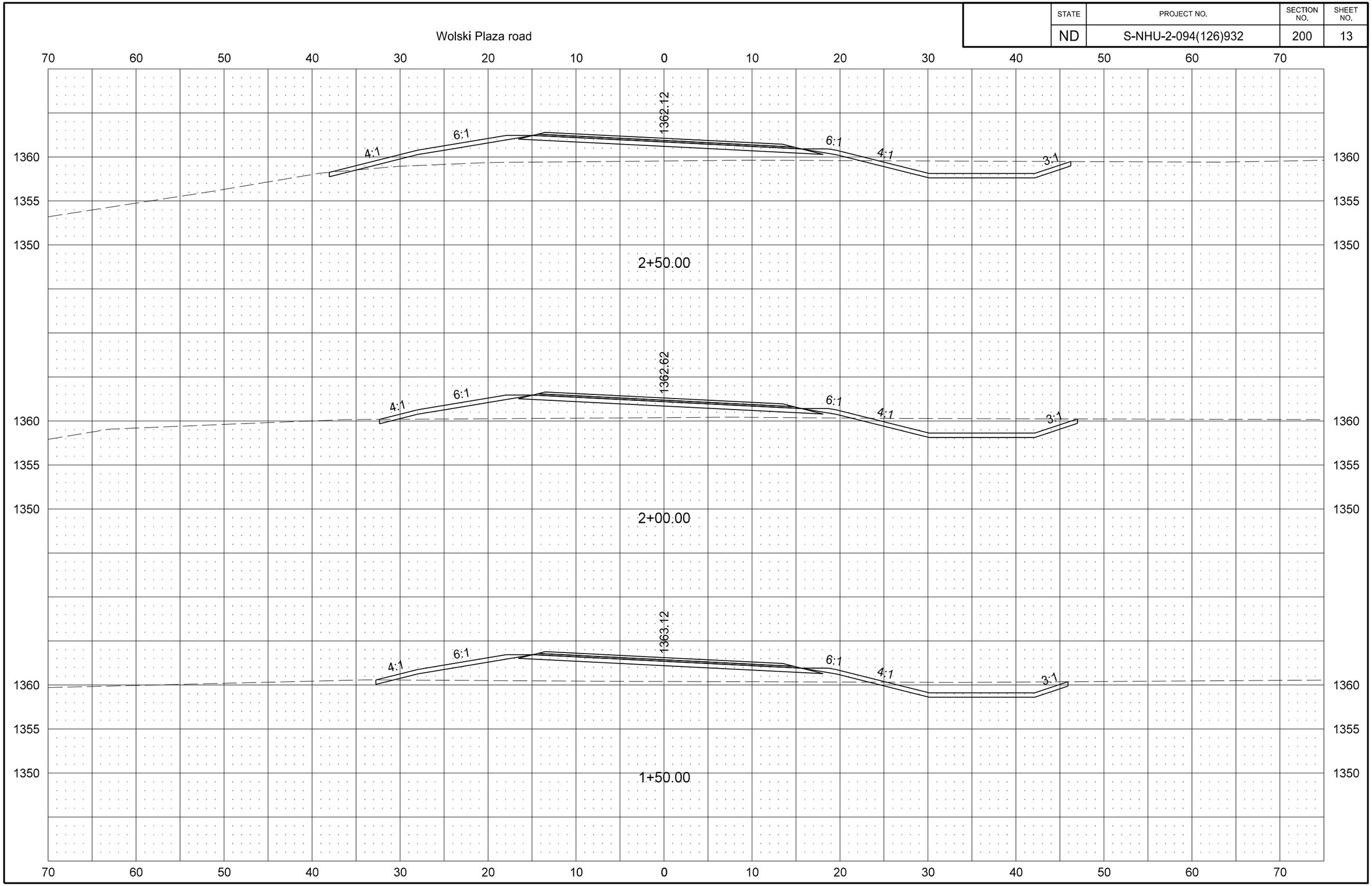

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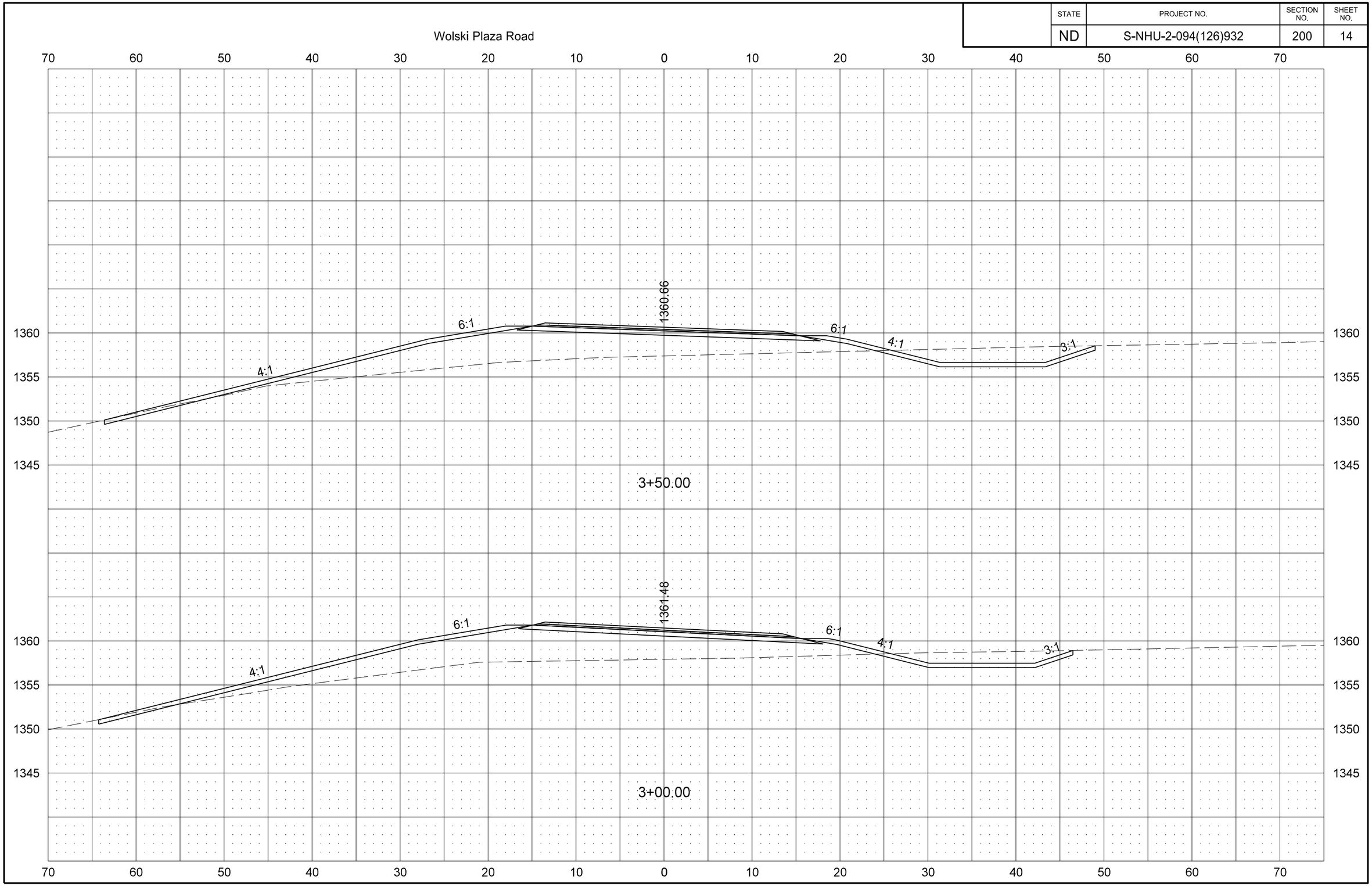

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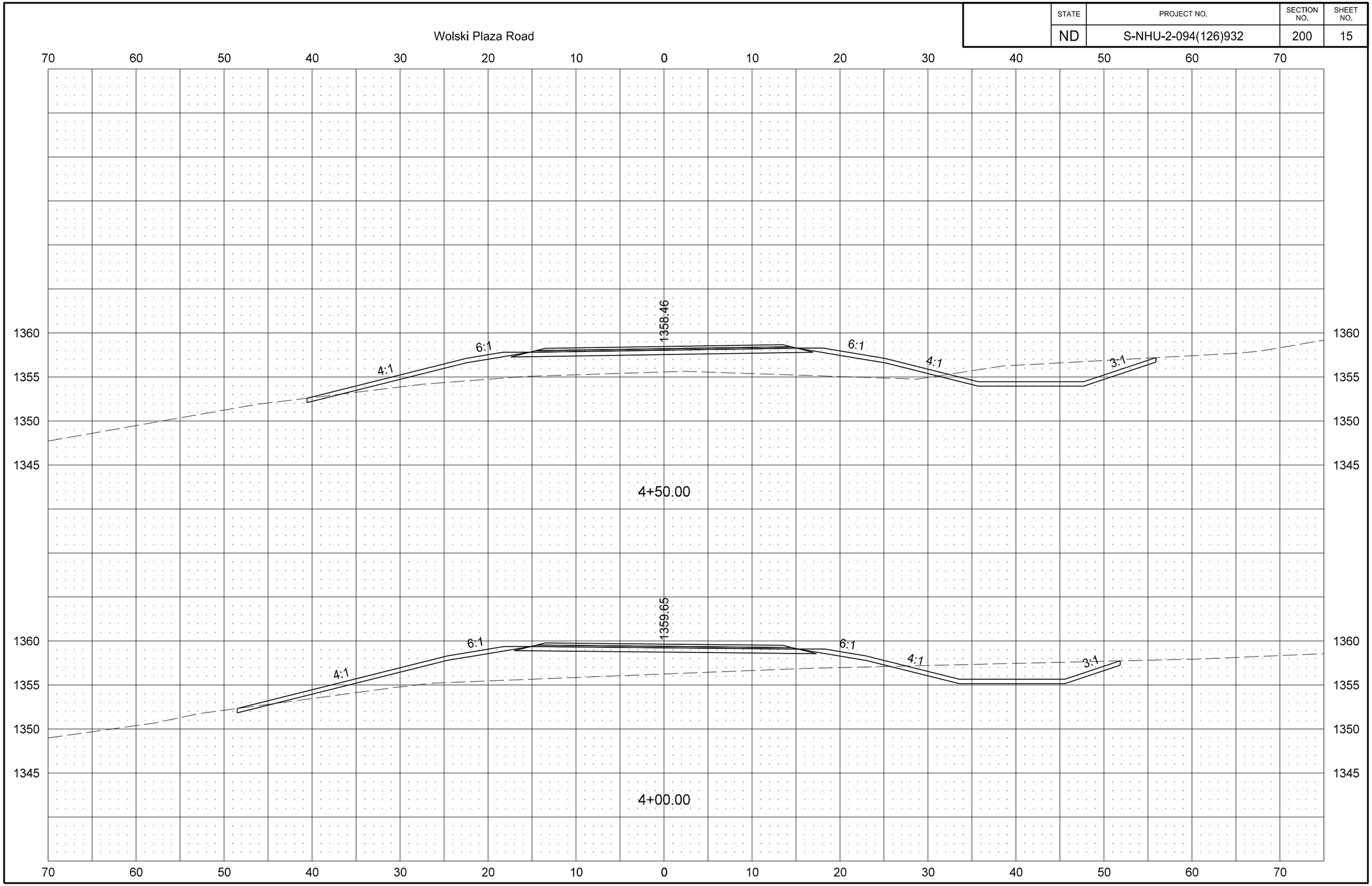

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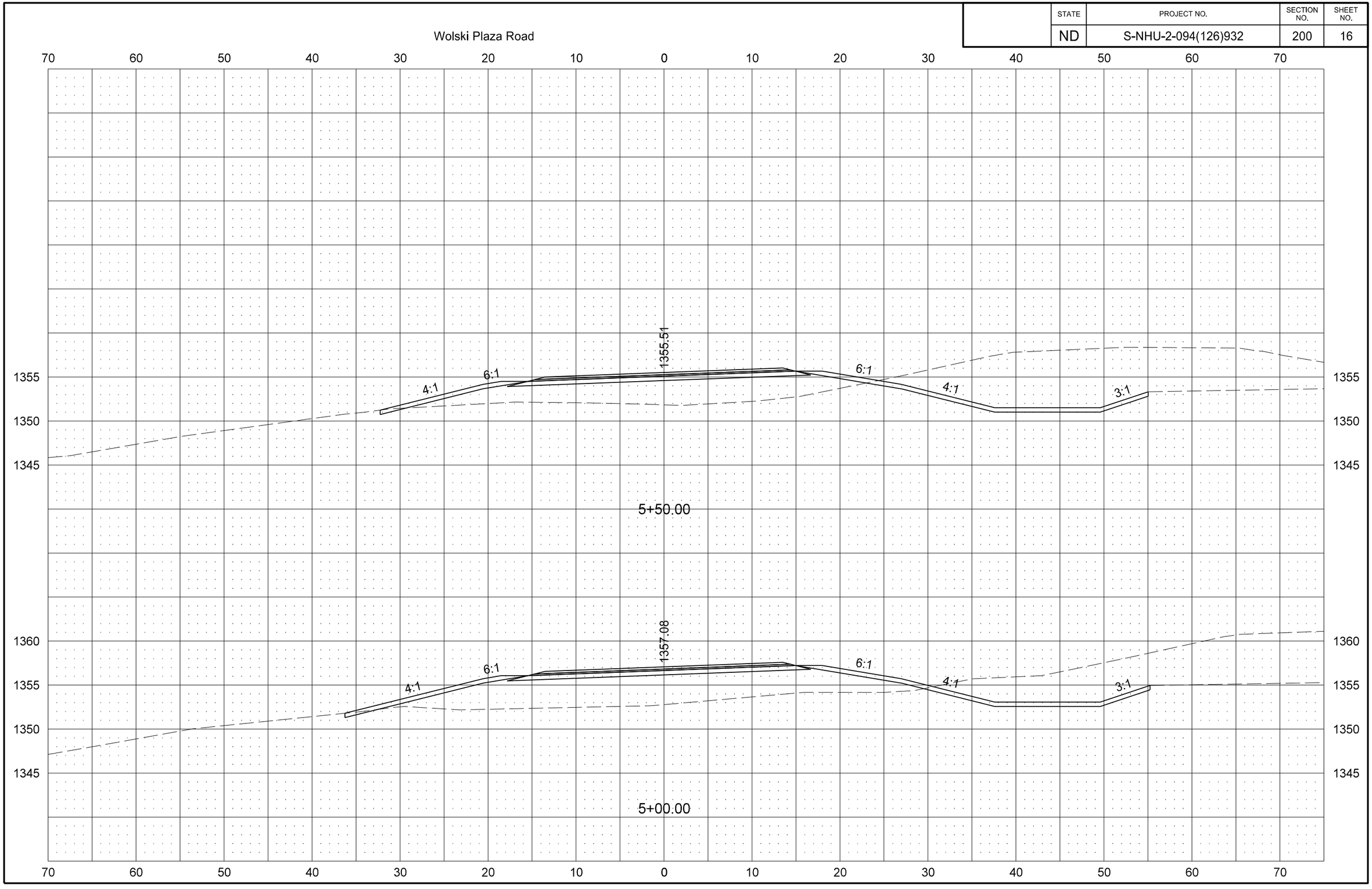

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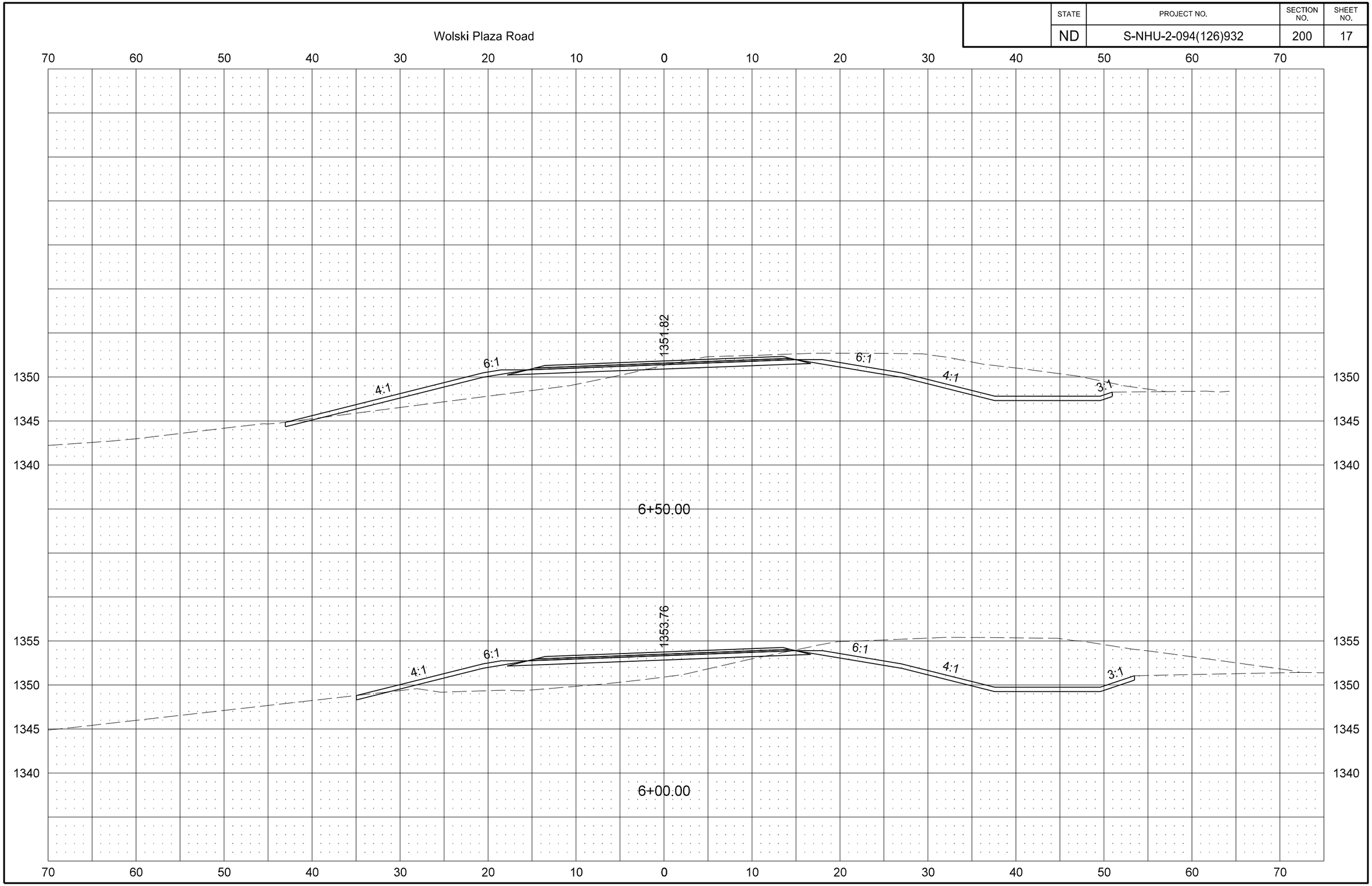

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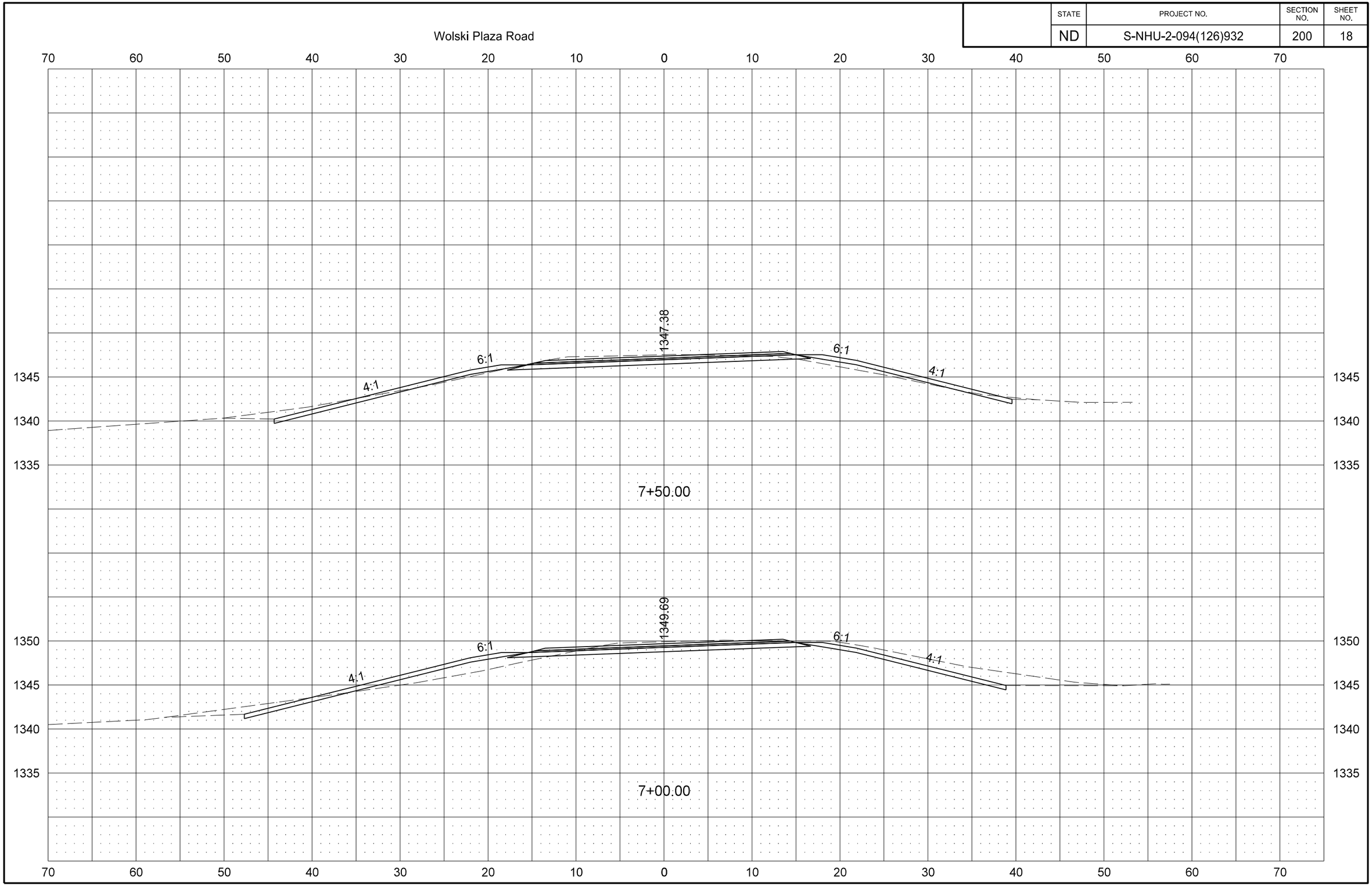

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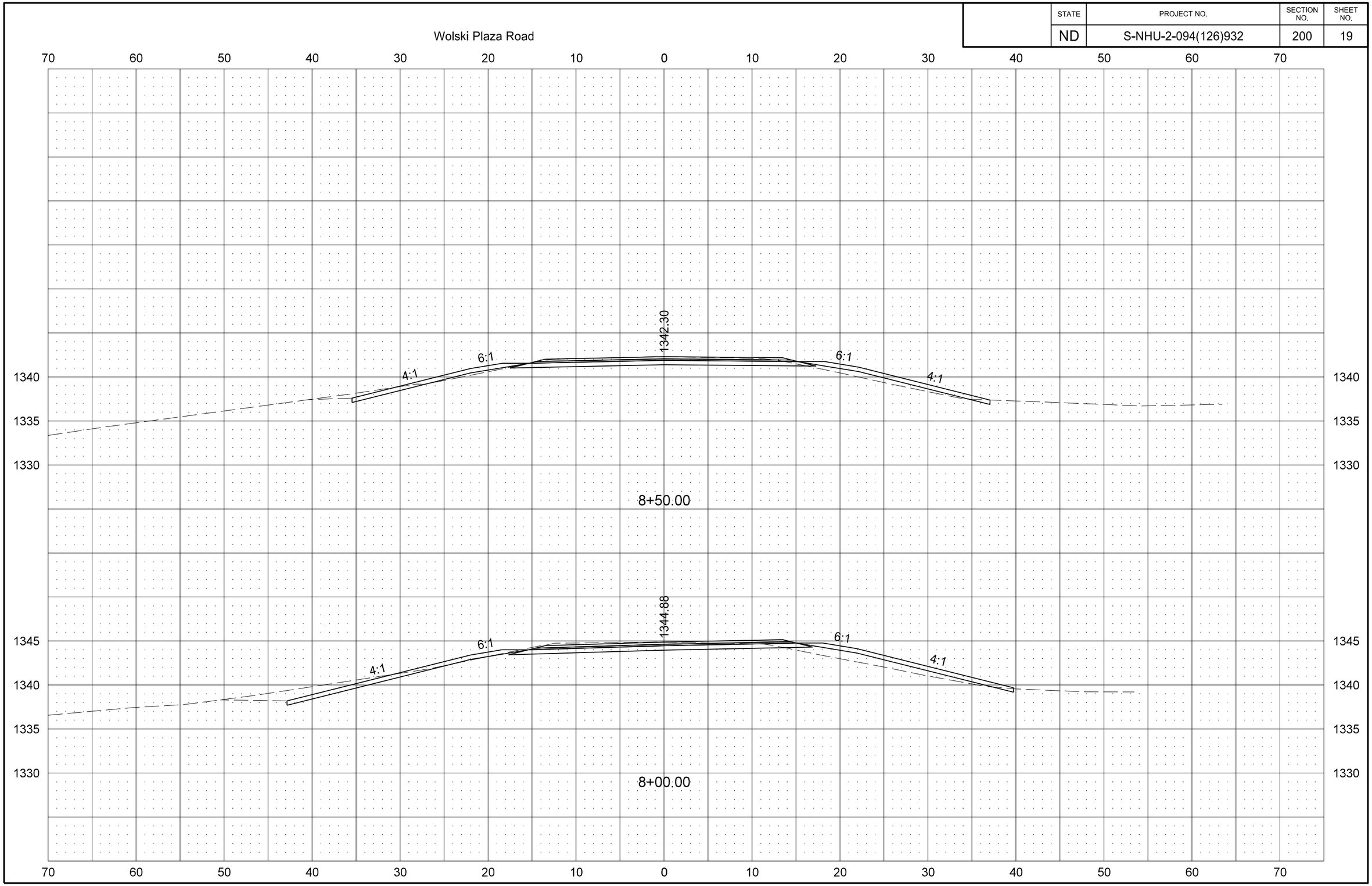

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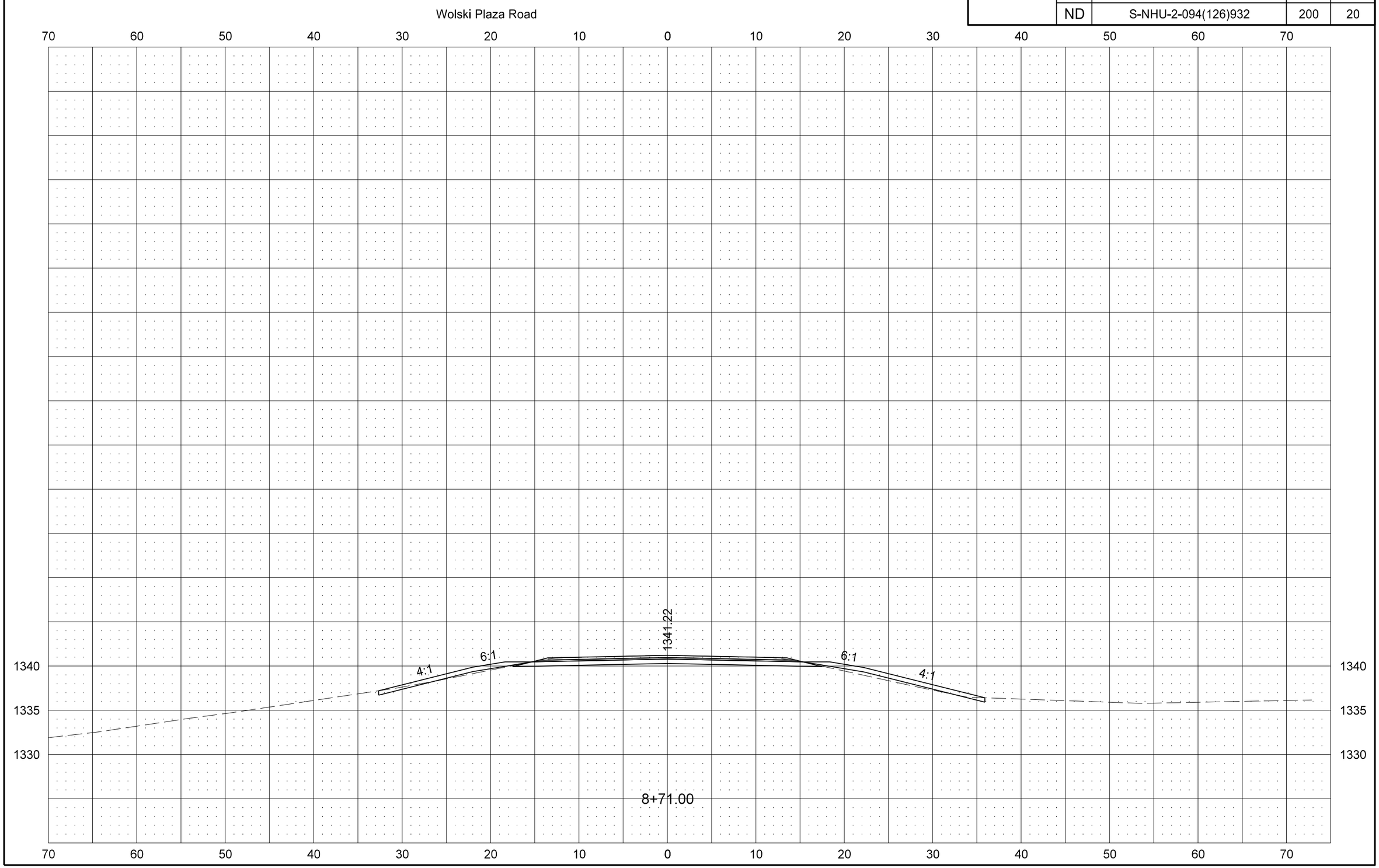

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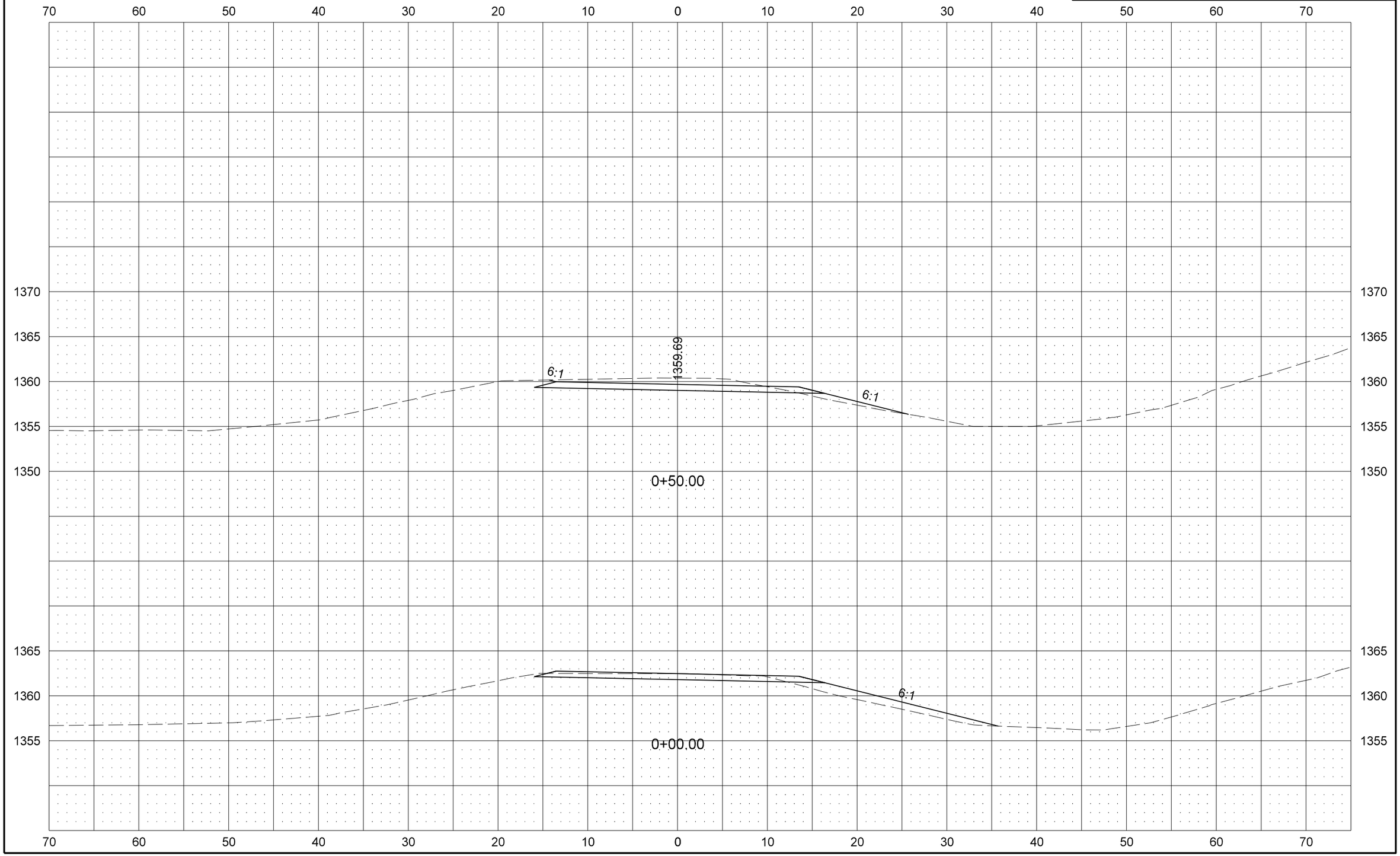
Wolski Plaza Road Bypass



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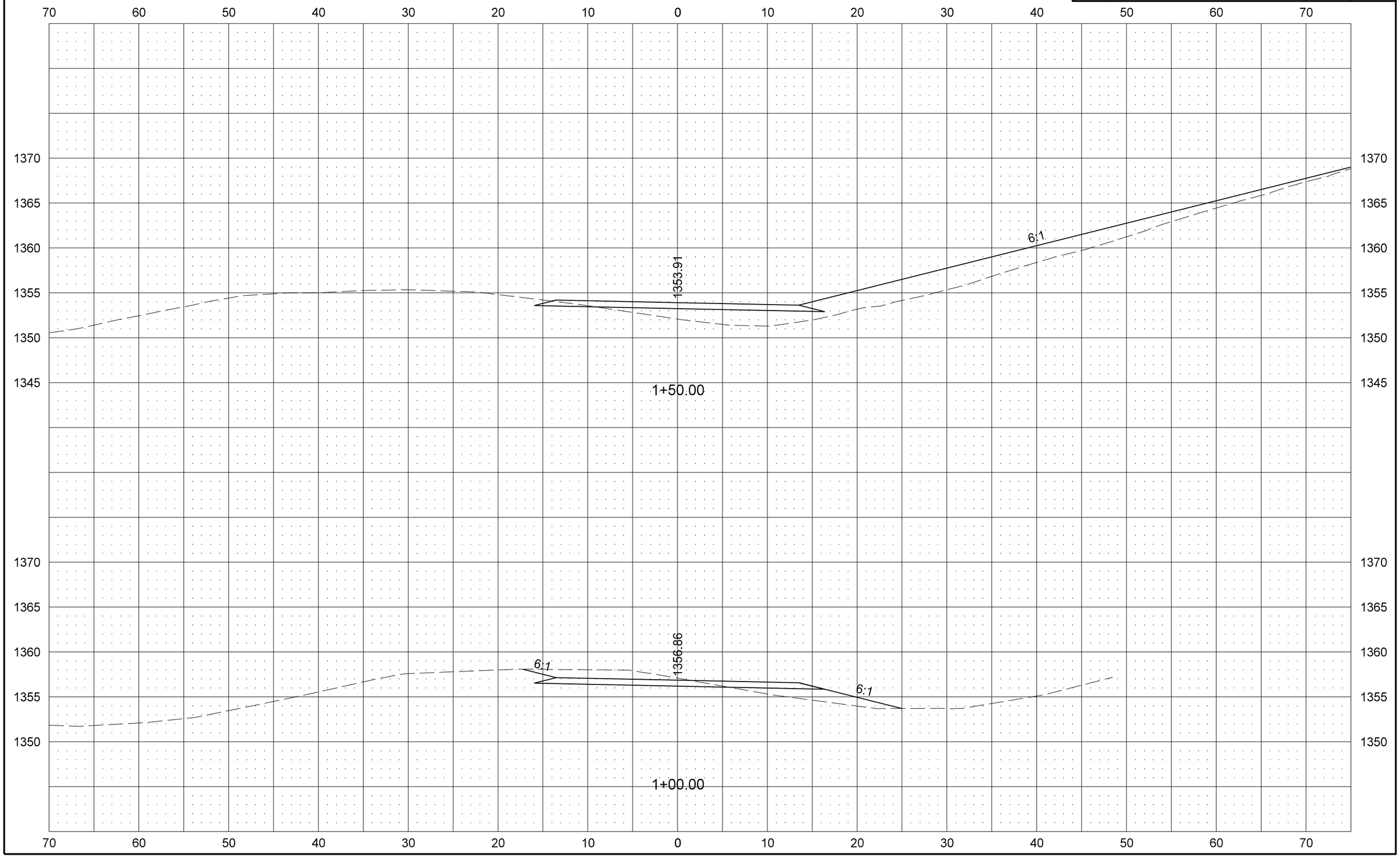
Wolski Plaza Road Bypass



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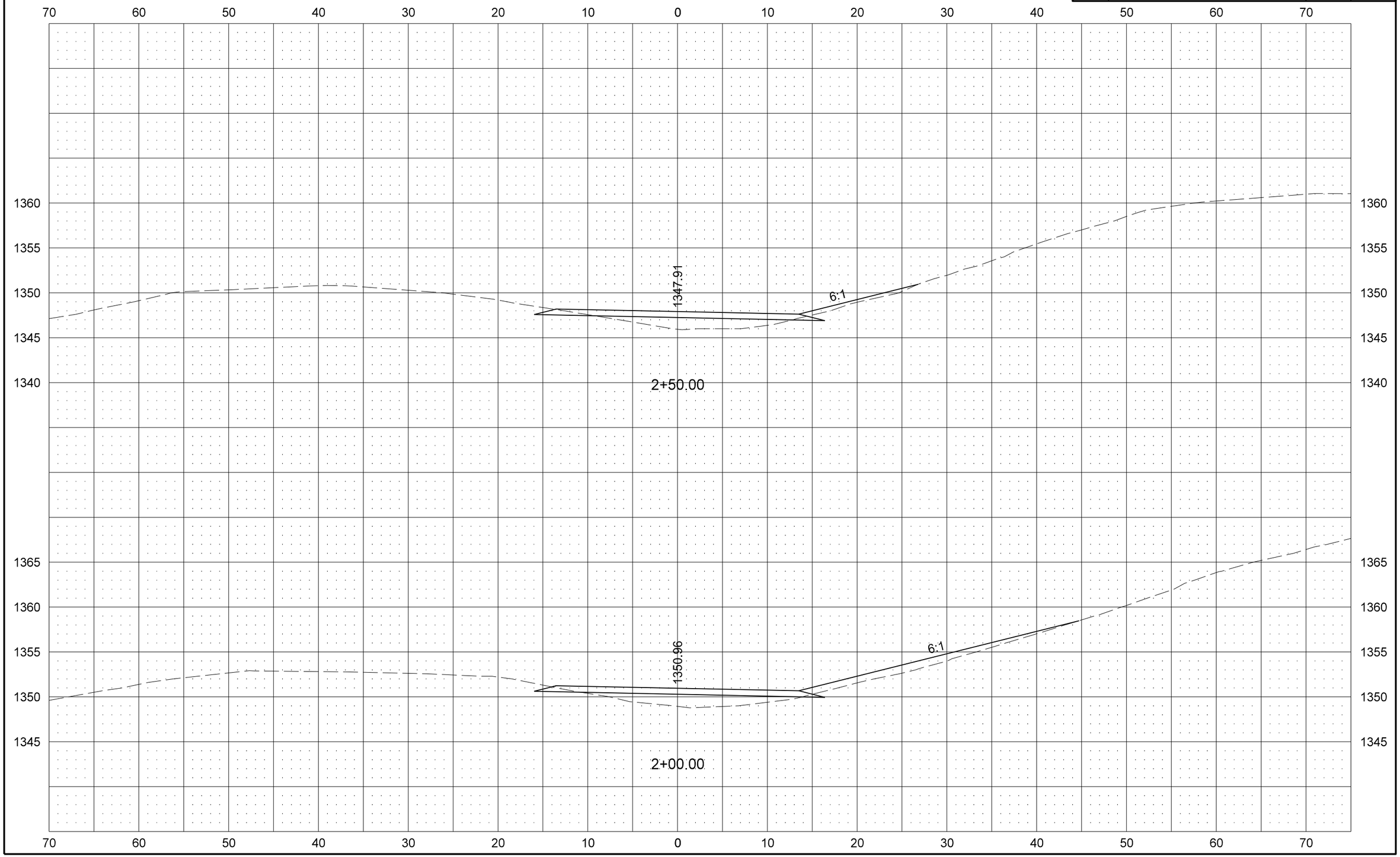
Wolski Plaza Road Bypass



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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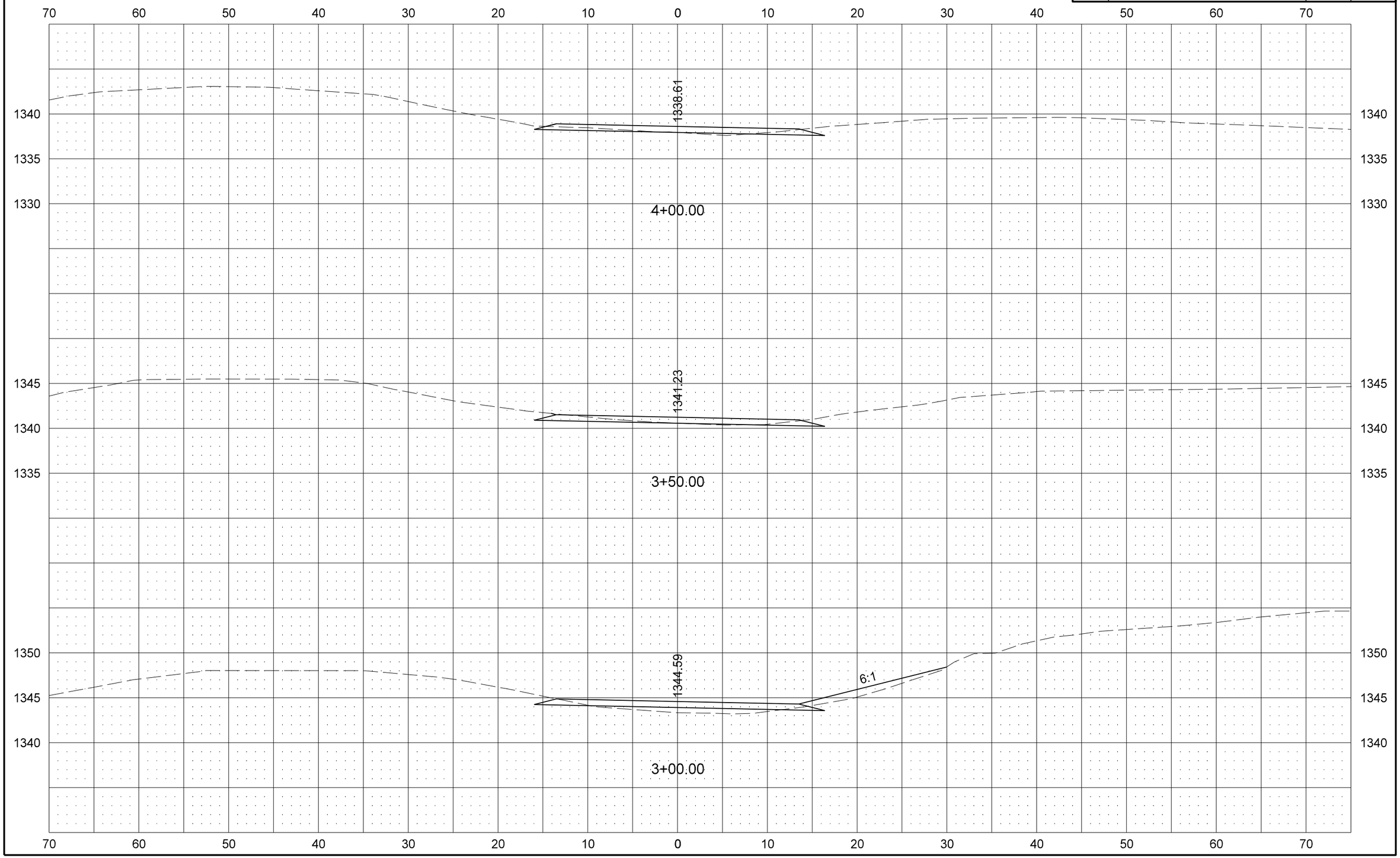
Wolski Plaza Road Bypass



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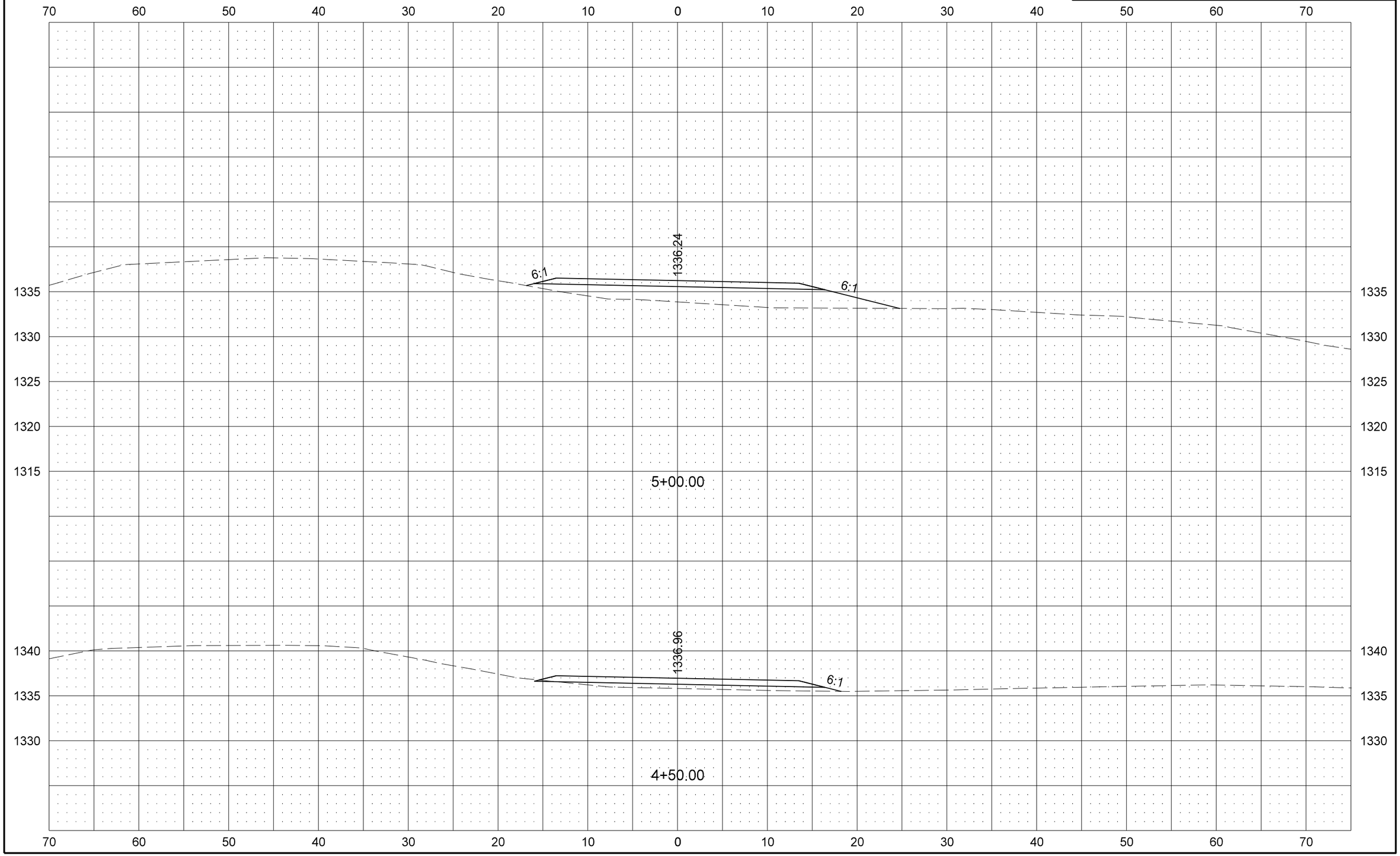
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)952	200	25

Wolski Plaza Road Bypass



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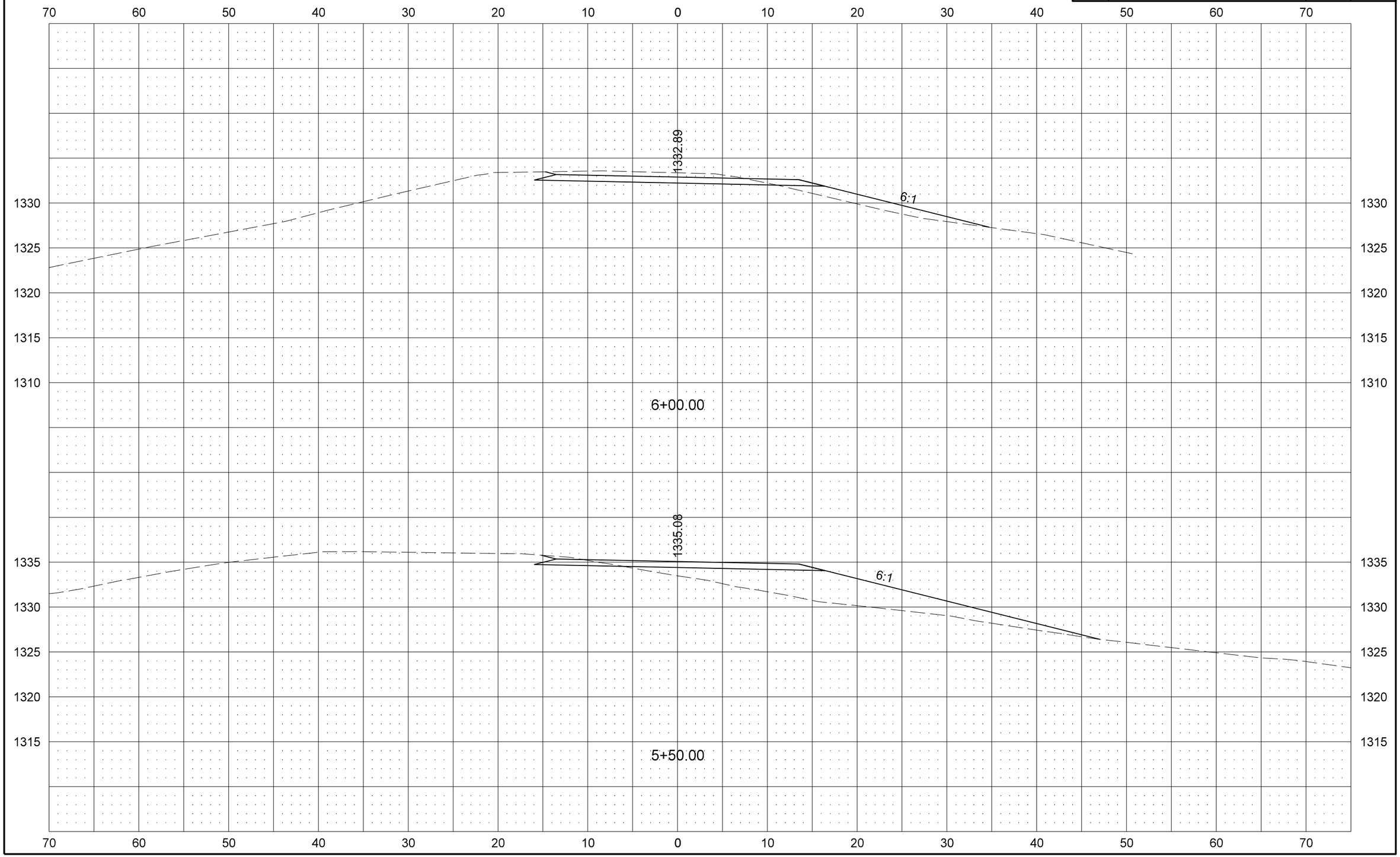
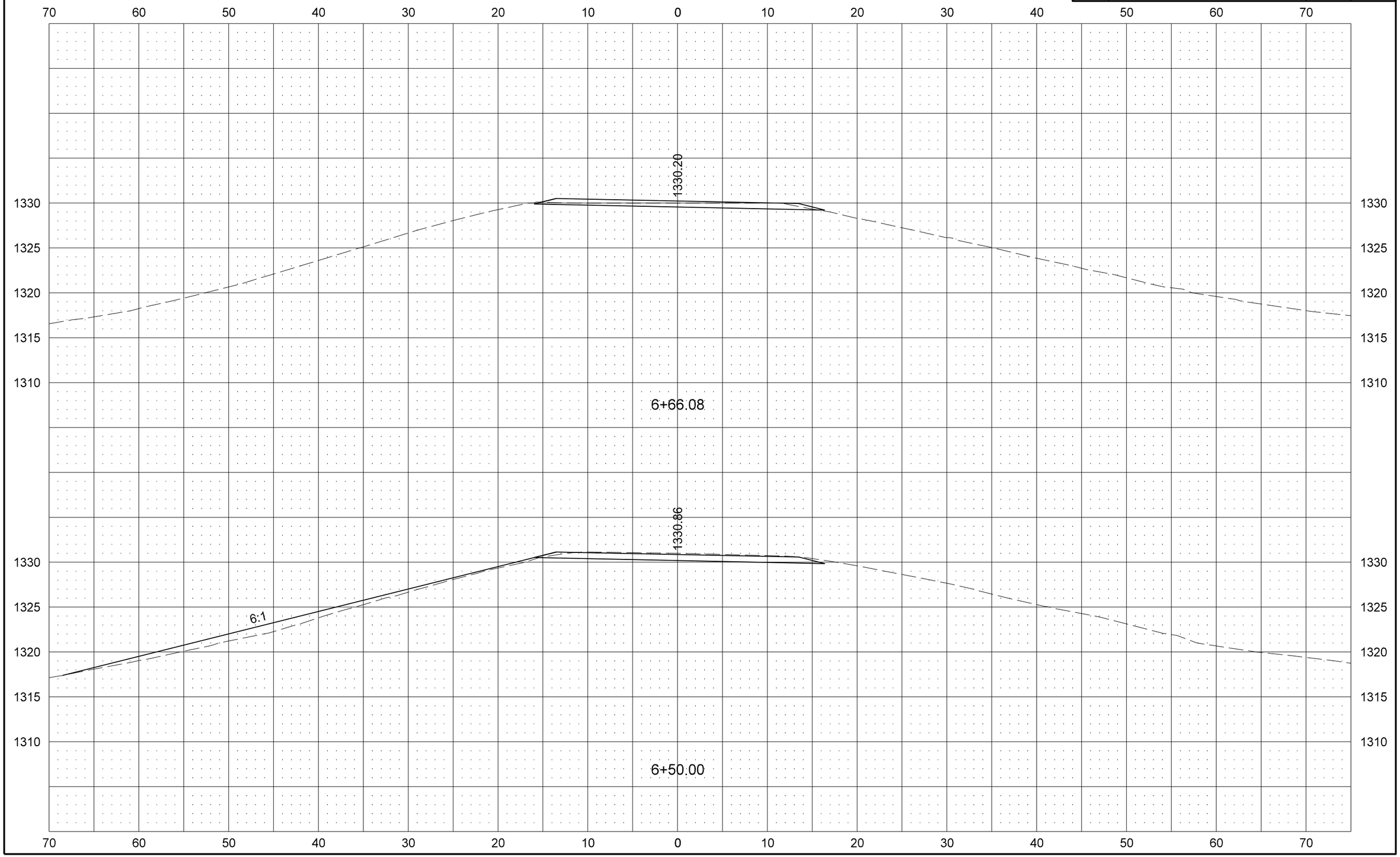
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)952	200	26

Wolski Plaza Road Bypass



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-2-094(126)952	200	27

Wolski Plaza road Bypass



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