DESIGN DATA				
Traffic	Average Daily			
Current 2016	Pass: 350	Trucks: 90	Total: 440	
Forecast 2036	Pass: 430	Trucks: 110	Total: 540	
Clear Zone Distance: NA		Design Speed: 55 mph		
Minimum Sight Dist. for Stopping: 495'		Bridges: HL-93		
Sight Dist. for No Passing Zone: 900'				
Pavement Design Life: NA				
Design Accumulated One-way Flexible ESALs: NA				

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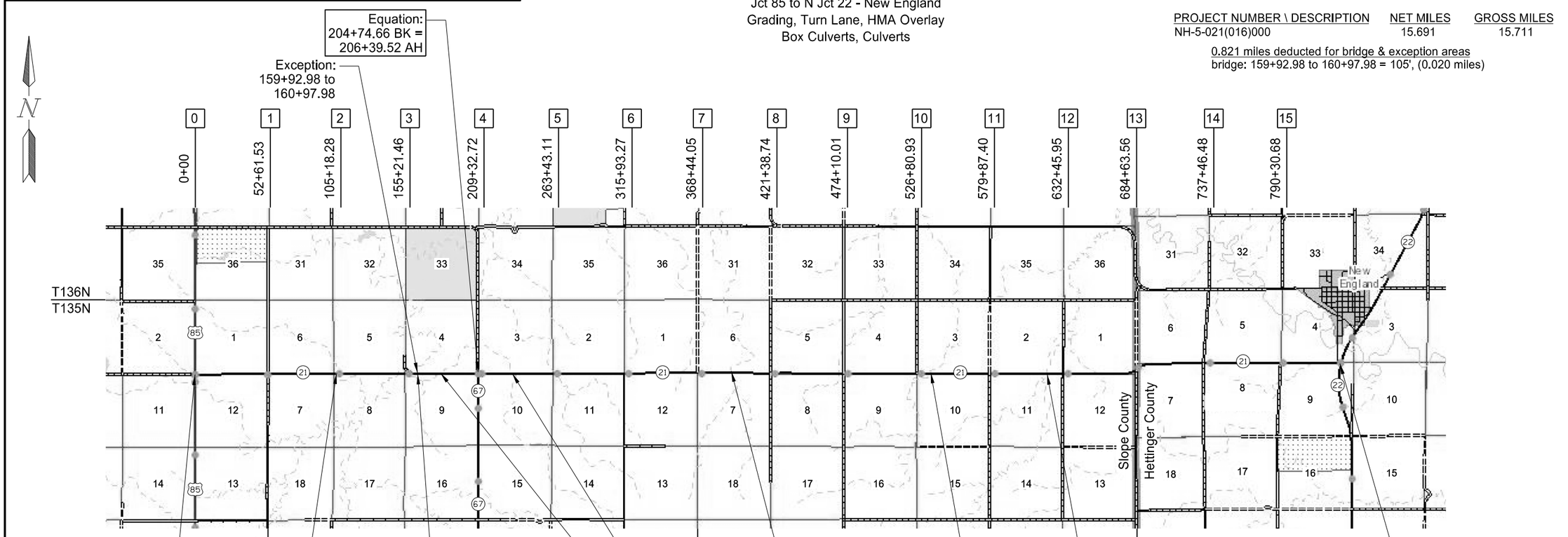
JOB # 27
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

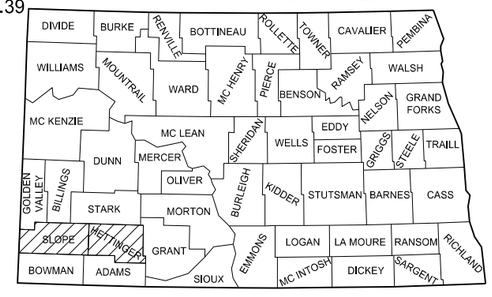
NH-5-021(016)000
Slope County & Hettinger County
Jct 85 to N Jct 22 - New England
Grading, Turn Lane, HMA Overlay
Box Culverts, Culverts

GOVERNING SPECIFICATIONS:
2020 Standard Specifications adopted by the North Dakota Department of Transportation and the Supplemental Specifications effective on the date the project is advertised.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-5-021(016)000	15.691	15.711

0.821 miles deducted for bridge & exception areas
bridge: 159+92.98 to 160+97.98 = 105', (0.020 miles)





STATE COUNTY MAP

DESIGNER
Kory Kleinknecht, Rick Archer
DESIGNER
Thomas Fakler
DESIGNER
Jon Iserman

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Approval Name	Date Signed
Kirk Hoff /s/	9/10/2020

Ulteig Engineers, Inc.

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61(20)	Temporary Water Diversion
PSP 10(20)	Permits and Environmental Considerations
SSP 1	Temporary Erosion and Sediment Best Management Practices
SSP 2	Federal Migratory Bird Treaty Act
SSP 4	Longitudinal Joint Density

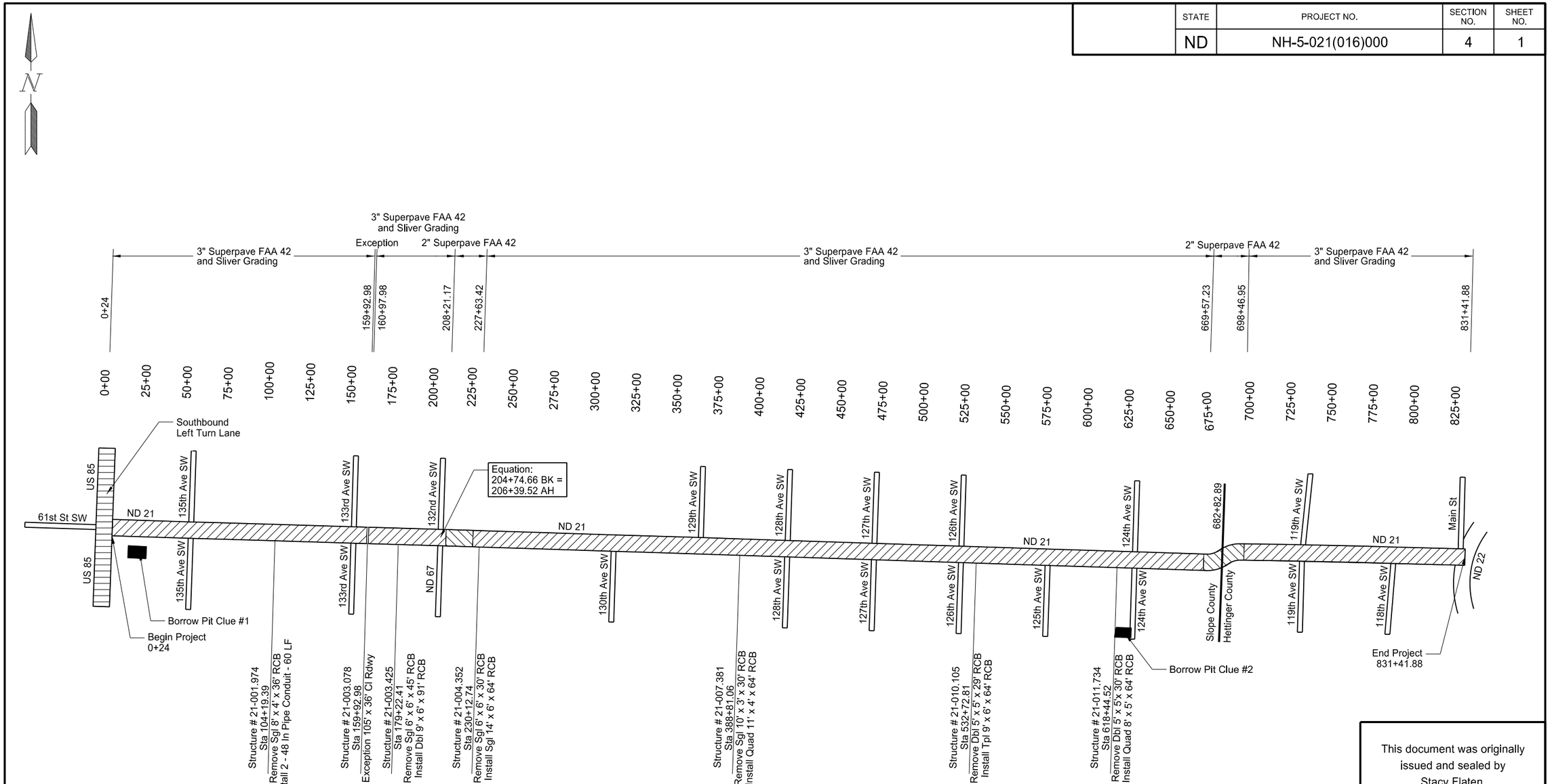
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Scope of Work

ND 21
Jct 85 to N Jct 22 - New England

0+24 to 831+41.88

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NOTES

100-P01 LIMITED ACCESS: Take care to ensure that no trees or bushes are removed outside the limits of construction.

105-200 UTILITY COORDINATION: A utility coordination meeting is required.

105-P01 UTILITIES: Notify all utility owners of the project schedule as specified in Section 105.03, “Cooperation with Utility Owners”.

Coordinate and perform construction activities in a manner that accommodates the utility coordination requirements included in the Utility Coordination Table.

Protect utilities not listed in the Utility Coordination Table in their existing locations.

Approx. Sta. From		Approx. Sta. To	Approx. Qty	Max Cut (LF)	Comments	Utility	Offset
2643+85	to	2643+85	11	2.1	Conflict with Electric Line	SLOPE ELEC	Lt
2644+26	to	2644+27	13	2.1	Conflict with Fiber Optic Line	CONS TEL	Lt
0+90	to	0+90	1		Conflict with Lighted Power Pole	SLOPE ELEC	Lt
127+05	to	127+19	81	3.0	Protect in Place Water Line	SW PL PRJ	Rt
289+63	to	290+71	109	2.1	Protect in Place Fiber Optic Line	MID-CONT CABLE	Rt
394+86	to	394+87	6	2.3	Conflict with Fiber Optic Line	CONS TEL	Rt
416+93	to	416+93	33	2.2	Conflict with Electric Line	SLOPE ELEC	Lt
416+99	to	417+04	30	2.2	Conflict with Fiber Optic Line	CONS TEL	Lt
522+03	to	522+03	1	2.8	Conflict with Box	CONS TEL	Rt
522+04	to	522+07	32	2.8	Conflict with Fiber Optic Line	CONS TEL	Rt
530+71 or 4008+00	to	539+81 or 4010+78	910	7.7	Conflict with Fiber Optic Line	MID-CONT CABLE	Rt
532+05 or 4005+30	to	532+44 or 4005+68	39	2.0	Protect in Place Water Line	SW PL PRJ	Rt
534+37 or 4007+57	to	535+38 or 4008+51	101	3.4	Protect in Place Water Line	SW PL PRJ	Rt
618+23 or 5005+73	to	618+79 or 5006+30	56	4.4	Conflict with Fiber Optic Line	MID-CONT CABLE	Rt
641+07	to	641+77	71	3.0	Conflict with Fiber Optic Line	MID-CONT CABLE	Rt
641+64	to	641+74	26	2.5	Conflict with Fiber Optic Line	CONS TEL	Rt
641+65	to	641+65	1	1.8	Conflict with Box	CONS TEL	Rt
641+65	to	641+74	26	2.5	Conflict with Fiber Optic Line	CONS TEL	Rt
641+73	to	641+74	31	2.7	Conflict with Fiber Optic Line	CONS TEL	Lt
641+74	to	641+75	31	2.7	Conflict with Fiber Optic Line	CONS TEL	Lt
642+19	to	642+50	31	2.2	Protect in Place Fiber Optic Line	MID-CONT CABLE	Rt
715+87	to	717+87	202	1.9	Protect in Place Fiber Optic Line	MID-CONT CABLE	Rt
720+74	to	721+53	80	0.8	Protect in Place Fiber Optic Line	MID-CONT CABLE	Rt
720+79	to	720+82	34	3.1	Conflict with Fiber Optic Line	CONS TEL	Rt
731+48	to	731+48	19	1.8	Conflict with Fiber Optic Line	CONS TEL	Rt
731+52	to	731+54	29	3.1	Conflict with Fiber Optic Line	CONS TEL	Lt
731+57	to	731+57	19	1.9	Conflict with Electric Line	SLOPE ELEC	Rt
731+57	to	731+57	28	3.3	Conflict with Electric Line	SLOPE ELEC	Lt
731+66	to	731+96	30	0.7	Protect in Place Fiber Optic Line	CONS TEL	Lt
731+84	to	731+88	20	2.0	Protect in Place Water Line	SW PL PRJ	Rt
731+85	to	731+85	29	3.7	Protect in Place Water Line	SW PL PRJ	Lt
748+18	to	751+81	363	1.4	Conflict with Fiber Optic Line	CONS TEL	Lt
757+19	to	759+81	263	2.2	Conflict with Fiber Optic Line	CONS TEL	Lt
786+49	to	787+23	81	2.2	Conflict with Fiber Optic Line	CONS TEL	Lt
787+18	to	787+19	21	0.7	Protect in Place Fiber Optic Line	CONS TEL	Rt
787+20	to	787+21	26	1.8	Conflict with Fiber Optic Line	CONS TEL	Lt
787+23	to	787+86	70	1.8	Conflict with Fiber Optic Line	CONS TEL	Lt
810+83	to	812+49	187	4.0	Conflict with Fiber Optic Line	CONS TEL	Lt
810+98	to	817+31	634	3.9	Conflict with Fiber Optic Line	MID-CONT CABLE	Rt
812+39	to	812+42	26	3.8	Conflict with Fiber Optic Line	CONS TEL	Rt
812+48	to	812+50	30	3.5	Conflict with Fiber Optic Line	CONS TEL	Lt
812+50	to	813+77	150	3.8	Conflict with Fiber Optic Line	CONS TEL	Lt
812+50	to	813+77	147	3.8	Conflict with Fiber Optic Line	CONS TEL	Lt
812+50	to	812+50	1	0.8	Conflict with Box	CONS TEL	Lt
813+95	to	813+97	35	3.3	Protect in Place Water Line	Pvt WL (Keane Hanson)	Rt
813+95	to	813+98	35	3.3	Conflict with Electric Line	SLOPE ELEC	Rt
821+57	to	821+99	43	1.1	Conflict with Fiber Optic Line	CONS TEL	Lt
822+03	to	822+19	17	0.5	Protect in Place Fiber Optic Line	MID-CONT CABLE	Rt
828+31	to	828+38	19	0.9	Protect in Place Fiber Optic Line	CONS TEL	Lt
828+31	to	828+40	70	1.9	Conflict with Fiber Optic Line	CONS TEL	Lt
828+32	to	828+32	1	2.5	Conflict with Power Pole	SLOPE ELEC	Lt
828+33	to	828+57	24	1.9	Conflict with Fiber Optic Line	CONS TEL	Lt
828+86	to	829+14	28	0.9	Protect in Place Fiber Optic Line	CONS TEL	Lt
830+57	to	830+57	1		Conflict with Lighted Power Pole	SLOPE ELEC	Lt

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NOTES

105-P02 UTILITIES: Mid-Continent Cable's pothole depths of their fiber optic line are located in Section 10 of the plans.

105-P03 UTILITIES: The Contractor will provide Consolidated Telephone a 14 day notice before the work will begin of moving their lines near US 85. At all other locations on the project, the Contractor will provide Consolidated Telephone a minimum of a 3 days notice before the work will begin for moving their lines at each location. Consolidated Telephone will need 3 days to complete the work of moving their line at each location.

107-P01 MAINTAINING TRAFFIC –DROP-OFFS: If, at the end of the work-day, drop-offs greater than 2 inches and less than 18 inches or slopes steeper than 4:1 exist between the edge of a traffic lane and the outside edge of the proposed roadway, perform one of the following actions:

- Construct a traversable wedge in the area of the drop-off or steep slope; or
- Close the lane adjacent to the drop-off or steep slope and provide 24-hour flagging or pilot car operations.

When constructing a wedge, construct a wedge composed of aggregate or earthen materials with a 4:1 or flatter slope along the entire length of the area. Compact materials using Type B compaction, as specified in 203.04 E.4, "Compaction Control Type B".

Install stackable vertical panels that meet the requirements of Section 704.03 H, "Stackable Vertical Panels", along the edge of the driving lane closest to the wedge. The Engineer will measure stackable vertical panels as specified in Section 704.05, "Method of Measurement" and will pay for panels as specified in Section 704.06, "Basis of Payment".

The Engineer will not measure material used to construct the wedge. Include the cost of materials, equipment, labor, and incidentals required for this operation in the price bid for "Salvaged Base Course".

If a 4:1 or flatter wedge is not installed, provide 24 hour flagging or pilot car operations and associated traffic control at no additional cost to the Department.

The requirements of Section 704.04 O, "Traffic Control for Uneven Pavement" apply to drop-offs created by milling or the placement of hot mix asphalt.

108-100 WEEKLY PLANNING & REPORTING MEETING: A weekly planning and reporting meeting is required.

202-P01 REMOVAL OF BITUMINOUS SURFACING: The removal of bituminous surfacing includes the removal of aggregate.

203-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

203-380 AVERAGE HAUL: The average haul shown on the plans does not include the dead haul from the borrow areas to the point of entry into the mass.

203-P01 COMPACTION AND DENSITY CONTROL: Compact material for sliver grading as specified in Section 203.04 E.4, Compaction Control, Type B. Compact material for filling at the centerline pipe locations as specified in Section 203.04 E.2, Compaction Control, Type A. Include all costs in the unit price bid for "Common Excavation-Type B".

203-P02 COMMON EXCAVATION-SUBCUT: Incorporate Common Excavation-Subcut material into sliver grading. Include all costs for subcut, hauling, placing, drying, and compacting material in the unit price bid for "Common Excavation-Subcut." Engineer will measure Common Excavation-Subcut at plan quantity.

203-P03 EXCAVATION AND FILL ELEVATIONS: All cross section elevations and offsets are given at the top of the aggregate sluff rather than the top of asphalt sluff.

203-P04 TEMPORARY BYPASSES: Use embankment material to construct temporary widenings at the pipe removal and installation locations. When temporary widening is no longer required, incorporate material into sliver grading. Include all cost for hauling, placing, and compacting of this material for both uses in the unit price bid for "Common Excavation-Type B and "Borrow-Excavation". Payment will be made one time for the double use of this material.

Earthwork for temporary bypasses to be considered incidental to "Common Excavation-Type B" and "Borrow-Excavation" and will not be measured in the field. Areas affected by the temporary bypasses are to be restored to existing conditions.

Excavate the existing channel embankment necessary to place temporary pipe at the elevations shown in the plans. Excavate to maintain adequate drainage through the pipe while in use. Include all costs to excavate the existing channel in the price bid for "Pipe Conduit _IN-Approach"

Remove the temporary bypasses when no longer required. Establish the sites to existing conditions.

The existing field approach at 532+00 – 125' Rt will be reestablished after the temporary bypass is removed. The rocks used at this approach shall be salvaged and replaced when the bypass is removed.

203-P05 BORROW PIT CLUES: Furnish borrow needed to complete construction. The locations listed in Section 180 are listed as borrow pit clues. Obtain Certificate of Approval on all borrow sites in accordance with Section 107.05 of the Standard Specifications.

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261-P01 TEMPORARY EROSION CONTROL WITHIN WETLANDS: Fiber Rolls and Silt Fence have been provided for placement at the back-side of earthen berm at the perimeter of the work area at wetlands. If there is no standing water within the adjacent wetland, immediate temporary seeding and mulching of the earthen berm may replace the fiber roll. If seed/mulch is not immediately applied, fiber rolls or silt fence are required. Fiber rolls will still be required at the weirs within the berm. Fiber rolls cannot be placed inside a wetland. Silt fence shall be used in wetlands. Temporary seed mix and mulch for this use will be paid for as “Temporary Cover Crop” and “Straw Mulch”.

261-P02 PERMANENT FIBER ROLLS: If fiber rolls are to remain on the project, use fiber rolls that are composed of netting that meets either of the following:

- Plastic or natural fiber photodegradable netting that has a life expectancy between 12 to 24 months.
- 100 percent biodegradable jute netting that has a life expectancy between 6 to 12 months.

302-P01 SALVAGED BASE COURSE: 2183 CY of RAP milled bituminous material located in the SE quadrant of US 85 and ND 21. Use this material and removal of bituminous surfacing material to produce salvaged base course. The pile of milled bituminous material has been sitting for several years, additional work may be needed to get the material out of the pile and processed. Do not use the SE quadrant of US 85 and ND 21 for staging or for stockpiling of materials.

704-200 PRECAST CONCRETE MEDIAN BARRIERS – STATE FURNISHED: Obtain 115 barriers from NDDOT Belfield Maintenance Yard (898 8th St NE). Return barriers to NDDOT Belfield Maintenance Yard.

Install any missing markers on the barriers before traffic use. Include the cost of the markers in the contract unit price for “Precast Concrete Median Barrier – State Furnished”.

Some 4 inch x 4 inch boards are available at the return location. Provide any additional 4 inch x 4 inch boards necessary to stack barriers. The boards will become property of the Department. Include the cost for boards in the contract unit price for “Precast Concrete Median Barrier – State Furnished”.

704-500 PORTABLE RUMBLE STRIPS (PRS): Use PRS made of rubber or engineered polymers.

Install PRS as part of the temporary traffic control when the following signs are also part of the required traffic control set up:

- "Be Prepared to Stop" (W3-4); and
- "Flagger" symbol (W20-7)

Install PRS that meet the following criteria:

- Have no adhesives or fasteners required for placement;
- Have a manufacture's speed rating that meets or exceeds the posted speed limit; and
- Each strip in the array must weigh a minimum of 100 pounds.

Use individual PRS constructed in one of the following manners:

- A single piece;
- Inter locking segments; or
- Two pieces hinged at the midpoint.

An installed array of PRS consists of a minimum of 3 individual strips.

Move rumble strips with the flagging operation. Do not place rumble strips on horizontal curves.

The Engineer will count and measure each array as one unit. Include the cost of providing, installing, maintaining, and relocating PRS in the unit price bid for "Portable Rumble Strips".

704-P01 TRAFFIC CONTROL FOR BITUMINOUS PAVEMENT: Provide traffic control consisting of a temporary road closure, flagging, pilot car, and shoulder closures.

Traffic control device quantities are based on a 6 mile limitation, 3 temporary bypasses, and the list below. Provide additional devices at no additional cost to the Department.

1. Standard D-704-2: For coring of hot bituminous pavement.
2. Standard D-704-15, layout A: To be used any time conditions exist.
3. Standard D-704-15, layout B: For temporary bypass for box culvert installations.
4. Standard D-704-19, layout F: For lane closure using flaggers
5. Standard D-704-20, layout G as the basis of the Terminal Signing

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6. Standard D-704-22, layouts K and L: For construction trucks hauling material.
7. Standard D-704-24, layouts R and S: For shoulder work.
8. Standard D-704-26, layouts BB, CC, EE, and GG: For paving operations.
9. Standard D-704-26, layout JJ: For centerline pipe replacement.
10. Standard D-704-27: For mobile operation of pavement marking.
11. Standard D-704-30: For windrow marking of material on roadway.
12. Standard D-704-56: For installation of rumble strips.

When installing layout G from Standard D-704-20, move sign W3-5-48 and the sign assembly containing signs R2-1-48 and R2-1a-24 with the work area as it progresses through the construction zone. Place the R2-1-48 assembly a minimum of 500 feet in advance of flagging signs.

Place flaggers and traffic control devices as shown on Standard D-704-15, layout A at the following intersections when the lane closure spans across them:
1. US 85
2. ND 67
3. ND 22

704-P02 TEMPORARY WIDENING AT CENTERLINE PIPE REMOVAL AND INSTALLATION AND PATCHING AREAS: Provide Traffic Service Aggregate to maintain traffic during construction. Supply aggregate that meets the requirements of Salvaged Base Course. After returning traffic to normal flow, remove Traffic Service Aggregate from temporary roadway widening, salvage it, and use as a substitute for Salvaged Base Course.

Include all costs for material and labor required to supply and place Traffic Service Aggregate, salvage it after no longer in use as a temporary driving surface, and reuse it as Salvaged Base Course, in the unit bid price for “Salvaged Base Course”.

The Contractor shall maintain traffic speeds of 55 mph at all centerline pipe removal and installation areas and patching areas.

704-P03 WEIGHT LIMIT: The existing “Weight Limit 40 Tons” signs at 4+83 Rt and 827+42 Lt shall remain in place, or be installed as temporary signs, and left up until the final lift of HMA has been placed.

714-P01 REMOVAL OF CONCRETE: Include the cost of removing the concrete headwalls located at the ends of the pipes at 260+00 and 260+27 in the unit price bid for “Removal of Pipe All Types and Sizes”.

714-P02 TEMPORARY PIPES: Include all costs for installing and removing the temporary pipes in the temporary bypasses in the unit bid prices “Pipe Conduit_IN-Approach” and “Removal of Pipe All Types and Sizes”.

752-P01 TEMPORARY FENCE: Temporary fence will be placed prior to removing the existing fence. The Contractor will supply equipment to provide similar fence and gates for the temporary fence that is similar to the surrounding area as approved by the Engineer.

754-P01 STOP SIGNS – REFLECTIVE STRIPS: Install 2 inch wide red reflective strips on the side of the support that faces the same direction as the stop sign. Begin the strip at the bottom of the sign face and stop the strip 2 feet above the sign support base.

Use reflective material that meets the requirements of Section 894.02 E, “Type XI Retroreflective Sheeting".

Install the strips to all new STOP signs at stations:
- Sta 0+64 Lt
- Sta 206+71 Rt
- 830+88 Rt

Include the cost of furnishing and installing retroreflective strips in the contract unit price for “Steel Galvanized Posts – Telescoping Perforated Tube”

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ENVIRONMENTAL NOTES

ENVIRONMENTAL NOTES (EN): The North Dakota Department of Transportation and the Federal Highway Administration have made environmental commitments to secure approval of this project. The following environmental notes are requirements to comply with these commitments:

EN-1 SPAWNING RESTRICTION: Do not work within the Cannonball River from April 15 to June 1.

EN-2 AVOIDANCE AREAS: The Project Engineer will contact Jeani Borchert of the Environmental and Transportation Services Division to coordinate any meetings needed to identify the limits of the avoidance area. The site is at 32SL354 (approximate Sta. 259+55 to Sta. 272+55). This avoidance area within the right-of-way must not be disturbed and will be fenced prior to commencement of any construction. Provide the fence and fence posts, install the fence in the location designated in the plans, maintain the fence, and remove the fence upon completion of the project. A quantity of 2080 LF of Temporary Safety Fence has been included for this purpose. All costs to provide, place, maintain, and remove the fence shall be included in the price bid for “Temporary Safety Fence.”

EN-3 AQUATIC NUISANCE SPECIES (ANS): Equipment that was last used outside of North Dakota or within a Class I infested waterbody (identified on the North Dakota Game and Fish Department (NDGFD) website) requires an inspection by NDGFD. Notify the NDGFD at least 10 business days prior to pumps, watercraft, or any equipment entering a public water to allow the NDGFD sufficient time to inspect any and all such equipment for ANS. Contact the NDGFD ANS Coordinator, Jessica Howell by e-mail jmhowell@nd.gov for equipment inspections. Supply one of the following to the engineer as proof of compliance prior to work taking place in the water: (1) the NDGFD inspection report, (2) documented NDGFD correspondence (email or signed letter). If an inspection is not required, no follow up documentation is required.

EN-4 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.

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Estimated Quantities

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SPEC	CODE	ITEM DESCRIPTION	UNIT					TOTAL
103	100	CONTRACT BOND	L SUM	1				1
201	330	CLEARING & GRUBBING	L SUM	1				1
202	104	REMOVAL OF STRUCTURE	EA	6				6
202	135	REMOVAL OF BITUMINOUS SURFACING	TON	6019				6019
202	169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	6				6
202	174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	5694				5694
202	312	REMOVE EXISTING FENCE	LF	1587				1587
203	102	COMMON EXCAVATION-TYPE B	CY	110748				110748
203	109	TOPSOIL	CY	103555				103555
203	138	COMMON EXCAVATION-SUBCUT	CY	249				249
203	140	BORROW-EXCAVATION	CY	15413				15413
210	50	BOX CULVERT EXCAVATION	EA	5				5
210	210	FOUNDATION FILL	CY	6430				6430
210	405	FOUNDATION PREPARATION-BOX CULVERT	EA	5				5
216	100	WATER	M GAL	2433				2433
251	200	SEEDING CLASS II	ACRE	152				152
251	1000	WETLAND SEED	ACRE	0.45				0.45
251	2000	TEMPORARY COVER CROP	ACRE	152				152
253	101	STRAW MULCH	ACRE	287				287
255	101	ECB TYPE 1	SY	78448				78448
255	102	ECB TYPE 2	SY	3643				3643
255	201	TRM TYPE 1	SY	146				146
256	100	RIPRAP GRADE I	CY	398				398
256	200	RIPRAP GRADE II	CY	400				400
260	200	SILT FENCE SUPPORTED	LF	3331				3331
260	201	REMOVE SILT FENCE SUPPORTED	LF	3331				3331
261	112	FIBER ROLLS 12IN	LF	75738				75738
261	113	REMOVE FIBER ROLLS 12IN	LF	13993				13993
261	120	FIBER ROLLS 20IN	LF	870				870
261	121	REMOVE FIBER ROLLS 20IN	LF	870				870
262	100	FLOTATION SILT CURTAIN	LF	200				200
262	101	REMOVE FLOTATION SILT CURTAIN	LF	200				200
302	50	TRAFFIC SERVICE AGGREGATE	TON	5933				5933
302	100	SALVAGED BASE COURSE	TON	51428				51428
401	50	TACK COAT	GAL	24379				24379
401	60	PRIME COAT	GAL	24308				24308
401	160	BLOTTER MATERIAL CL 44	TON	729				729
411	100	MILLING PAVEMENT SURFACE	TON	107				107
430	42	SUPERPAVE FAA 42	TON	49440				49440
430	400	HMA INTELLIGENT COMPACTION	L SUM	1				1
430	1000	CORED SAMPLE	EA	517				517
430	5803	PG 58S-28 ASPHALT CEMENT	TON	2923				2923
602	1131	CLASS AE-3 CONCRETE-BOX CULVERT	CY	174.5				174.5
606	906	9FT X 6FT PRECAST RCB CULVERT	LF	64				64
606	1406	14FT X 6FT PRECAST RCB CULVERT	LF	64				64
606	2805	DBL 8FT X 5FT PRECAST RCB CULVERT	LF	128				128
606	2906	DBL 9FT X 6FT PRECAST RCB CULVERT	LF	64				64

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Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT					TOTAL
606	3104	DBL 11FT X 4FT PRECAST RCB CULVERT	LF	128				128
606	5406	14FT X 6FT PRECAST RCB END SECTION	EA	2				2
606	6805	DBL 8FT X 5FT PRECAST RCB END SECTION	EA	2				2
606	6906	DBL 9FT X 6FT PRECAST RCB END SECTION	EA	2				2
606	7104	DBL 11FT X 4FT PRECAST RCB END SECTION	EA	2				2
612	114	REINFORCING STEEL-GRADE 60-BOX CULVERT	LBS	26762				26762
618	120	TREATED TIMBER STRUCTURE	L SUM	1				1
702	100	MOBILIZATION	L SUM	1				1
704	100	FLAGGING	MHR	4000				4000
704	1000	TRAFFIC CONTROL SIGNS	UNIT	6253				6253
704	1041	ATTENUATION DEVICE-TYPE B-55	EA	3				3
704	1048	PORTABLE RUMBLE STRIPS	EA	4				4
704	1052	TYPE III BARRICADE	EA	20				20
704	1060	DELINEATOR DRUMS	EA	74				74
704	1067	TUBULAR MARKERS	EA	108				108
704	1080	STACKABLE VERTICAL PANELS	EA	200				200
704	1185	PILOT CAR	HR	2000				2000
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	3133				3133
704	3510	PRECAST CONCRETE MED BARRIER-STATE FURNISHED	EA	115				115
706	400	FIELD OFFICE	EA	1				1
706	500	AGGREGATE LABORATORY	EA	1				1
706	550	BITUMINOUS LABORATORY	EA	1				1
706	600	CONTRACTOR'S LABORATORY	EA	1				1
709	100	GEOSYNTHETIC MATERIAL TYPE G	SY	1470				1470
709	151	GEOSYNTHETIC MATERIAL TYPE R1	SY	18745				18745
709	155	GEOSYNTHETIC MATERIAL TYPE RR	SY	1557				1557
714	820	PIPE CONC REINF 30IN CL III	LF	24				24
714	4099	PIPE CONDUIT 18IN-APPROACH	LF	1000				1000
714	4105	PIPE CONDUIT 24IN	LF	756				756
714	4106	PIPE CONDUIT 24IN-APPROACH	LF	645				645
714	4110	PIPE CONDUIT 30IN	LF	350				350
714	4115	PIPE CONDUIT 36IN	LF	994				994
714	4116	PIPE CONDUIT 36IN-APPROACH	LF	244				244
714	4120	PIPE CONDUIT 42IN	LF	330				330
714	4122	PIPE CONDUIT 42IN-APPROACH	LF	506				506
714	4125	PIPE CONDUIT 48IN	LF	312				312
714	4130	PIPE CONDUIT 54IN	LF	110				110
714	4132	PIPE CONDUIT 54IN-APPROACH	LF	270				270
714	4142	PIPE CONDUIT 66IN-APPROACH	LF	216				216
714	4145	PIPE CONDUIT 72IN	LF	552				552
714	4152	PIPE CONDUIT 78IN-APPROACH	LF	396				396
714	5015	PIPE CORR STEEL .064IN 18IN	LF	59				59
714	5035	PIPE CORR STEEL .064IN 24IN	LF	32				32
714	5810	END SECT CORR STEEL .064IN 18IN	EA	2				2
714	6501	END SECT-TRAVERSABLE METAL 18IN	EA	4				4
714	6506	END SECT-TRAVERSABLE METAL 24IN	EA	2				2
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	2				2

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Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT					TOTAL
720	110	RIGHT OF WAY MARKERS	EA	107				107
720	125	ALIGNMENT MONUMENTS	EA	3				3
720	130	IRON PIN R/W MONUMENTS	EA	39				39
720	135	IRON PIN REFERENCE MONUMENTS	EA	71				71
752	110	FENCE BARBED WIRE 3 STRAND-STEEL POST	LF	411				411
752	300	FENCE BARBED WIRE 4 STRAND-WOOD POST	LF	149				149
752	320	FENCE BARBED WIRE 4 STRAND-STEEL POST	LF	1042				1042
752	905	TEMPORARY FENCE	LF	930				930
752	911	TEMPORARY SAFETY FENCE	LF	2080				2080
752	993	FENCE TERMINAL	EA	10				10
752	2100	VEHICLE GATE	EA	1				1
752	2120	REMOVE VEHICLE GATE	EA	2				2
752	3150	CORNER ASSEMBLY BARBED WIRE-WOOD POST	EA	5				5
752	4140	DOUBLE BRACE ASSEMBLY BARBED WIRE-WOOD POST	EA	2				2
754	110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	142				142
754	112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	163				163
754	206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	1206				1206
754	561	REFERENCE MARKER-TYPE A	EA	9				9
754	562	REFERENCE MARKER-TYPE B	EA	6				6
754	592	RESET SIGN PANEL	EA	40				40
754	805	OBJECT MARKERS - CULVERTS	EA	106				106
760	5	RUMBLE STRIPS - ASPHALT SHOULDER	MILE	32.04				32.04
760	7	RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	15.69				15.69
760	10	RUMBLE STRIPS - INTERSECTION	SET	3				3
762	103	PVMT MK PAINTED-MESSAGE	SF	48				48
762	430	SHORT TERM 4IN LINE-TYPE NR	LF	154689				154689
762	1104	PVMT MK PAINTED 4IN LINE	LF	230234				230234
762	1108	PVMT MK PAINTED 8IN LINE	LF	874				874
762	1124	PVMT MK PAINTED 24IN LINE	LF	36				36
764	131	W-BEAM GUARDRAIL	LF	113				113
764	151	REMOVE W-BEAM GUARDRAIL & POSTS	LF	363				363
764	1050	RESET W-BEAM GUARDRAIL	LF	221				221
764	1059	RESET W-BEAM GUARDRAIL END TERMINAL	EA	4				4
764	2081	REMOVE END TREATMENT & TRANSITION	EA	4				4
766	100	MAILBOX-ALL TYPES	EA	8				8
900	1000	TEMPORARY STREAM DIVERSION	EA	5				5
930	8230	SHORING	EA	4				4
990	400	PIPE CLEANOUT	EA	3				3

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BASIS OF ESTIMATE

Pavemen

Milling Pavement Surface @ 2 Ton/CY
Salvaged Base Course @ 1.875 Ton/CY
Traffic Service Aggregate @ 1.875 Ton/CY
Prime Coat @ 0.25 Gal/SY
Blotter Material CL44 @ 15 lbs/SY
Tack Coat @ 0.05 Gal/SY
Superpave FAA 42 @ 2 Ton/CY
PG 58S-28 Asphalt Cement @ 5.9%

Water

25 MGal/Mile for Dust Palliative
20 Gal/Ton for Aggregates
10 Gal/CY for Embankment

Mailboxes

Station	Type	Work
363+23 - LT	Single	Replace
395+12 - LT	Single	Replace
522+86 - RT	Single	Replace
628+95 - RT	Single	Replace
641+86 - LT	Single	Replace
788+35 - LT	Single	Replace
812+26 - LT	Single	Replace
814+43 - LT	Single	Replace

Rumble Strips

Centerline: ND 21 0+24 to 159+93 = 15,969'
ND 21 160+98 to 204+74.66 BK = 4,377'
ND 21 206+39.52 AH to 831+42 = 62,503'
Total 82,849' = 15.69 miles

Shoulders: ND 21 0+24 to 159+93 = 15,969'
ND 21 160+98 to 204+74.66 BK = 4,377'
ND 21 206+39.52 AH to 831+42 = 62,503'
US 85 2640+44 to 2657+76 = 1,732'
Total 84,581' = 16.02 miles x 2 sides = 32.04 miles

Rumble Strips, Intersection

760 0010 Rumble Strips – Intersection = 1 SET on ND 21 (ND 21 & US 85 intersection)
1 SET on ND 21 (ND 21 & ND 22 intersection)
1 SET on ND 67 (ND 67 & ND 21 intersection)

HMA Cored Samples							
Specification Section	A	B		C	Quantity (A x B x C)	Quantity (1 per mile)	Unit
	Distance (Ft)/1000	Lanes	Joints	Lifts			
430.04 I.2.b(1), "General"							
ND 21	78,217 / 1,000 = 78	2	N/A	2	312	N/A	EA
ND 21 (2" overlay)	4,632 / 1,000 = 5	2	N/A	1	10	N/A	EA
US 85 Lt	1,731 / 1,000 = 2	1	N/A	3	6	N/A	EA
US 85 Rt	1,163 / 1,000 = 1	1	N/A	3	3	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)							
ND 21	78,217 / 1,000 = 78	N/A	1	2	156	N/A	EA
ND 21 (2" overlay)	4,632 / 1,000 = 5	N/A	1	1	5	N/A	EA
US 85 Lt	1,731 / 1,000 = 2	N/A	1	3	6	N/A	EA
US 85 Rt	1,163 / 1,000 = 1	N/A	1	3	3	N/A	EA
430.04 I.2.b(2), "Pavement Thickness Determination Cores"					N/A	16	EA
				Totals	501	16	EA

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US 85 LT side widening	US 85 RT side rumble strips	US 85 centerline widening	ND 21 3" overlay		ND 21 Centerline Pipe 5" new pavement		ND 21 2" overlay		ND21 widening near bridge		ND21 guardrail near bridge		ND21, ND 67, Main St milling & paving transitions		ND21, US 85 approaches
													Sheet 20-1		Sheet 20-2, 20-3
2640+44.69 to 2657+76.06	2640+44.69 to 2641+69.45	2639+44.69 to 2644+17	1+74	26+13	26+13	27+20	208+71.17	227+13.42	158+92.98	159+92.98	157+57.42	159+92.98	0+24	1+74	
	2647+37.95 to 2657+76.06	2646+17 to 2658+76.06	27+20	48+72	48+72	49+18	670+07.23	697+96.95	160+97.98	161+97.98	160+97.98	163+33.53	208+21.17	208+71.17	
			49+18	87+66	87+66	88+49							227+13.42	227+63.42	
			88+49	103+72	103+72	104+65							669+57.23	670+07.23	
			104+65	115+68	115+68	116+32							697+96.95	698+46.95	
			116+32	147+91	147+91	148+52							829+91.88	830+35	
			148+52	153+66	153+66	154+41							831+03	831+41.88	
			154+41	158+22.98	158+22.98	158+92.98							1446+96.61	1448+46.61	
			162+67.98	178+09.65	161+97.98	162+67.98							0+99.1	2+49.1	
			180+35.04	191+32	178+09.65	180+35.04									
			192+10	199+82	191+32	192+10									
			200+78	204+74.66 Bk	199+82	200+78									
			206+39.52 Ah	208+21.17	229+17.66	231+07.82									
			227+63.42	229+17.66	236+58	237+28									
			231+07.82	236+58	259+48	260+79									
			237+28	259+48	282+27	283+03									
			260+79	282+27	289+92	290+28									
			283+03	289+92	304+77	305+47									
			290+28	304+77	353+75	354+56									
			305+47	353+75	366+74	367+05									
			354+56	366+74	387+71.81	389+90.31									
			367+05	387+71.81	399+25	399+99									
			389+90.31	399+25	413+69	414+43									
			399+99	413+69	441+68	442+42									
			414+43	441+68	446+52	447+26									
			442+42	446+52	460+69	461+37									
			447+26	460+69	467+34	467+98									
			461+37	467+34	492+50	493+00									
			467+98	492+50	516+18	516+97									
			493+00	516+18	531+70.93	533+74.69									
			516+97	531+70.93	548+39	549+10									
			533+74.69	548+39	617+40.60	619+48.44									
			549+10	617+40.60	652+37	653+15									
			619+48.44	652+37	709+18	709+72									
			653+15	669+57.23	731+45	732+50									
			698+46.95	709+18	750+49	750+81									
			709+72	731+45	758+77	759+37									
			732+50	750+49	787+06	788+13									
			750+81	758+77	812+47	813+28									
			759+37	787+06	821+89	822+39									
			788+13	812+47	830+35	831+03									
			813+28	821+89											
			822+39	829+91.88											
	Length (ft) = 1,731.37	Length (ft) = 1,162.87	Length (ft) = 1,731.37		Length (ft) = 73937.4		Length (ft) = 3646.65		Length (ft) = 4631.97		Length (ft) = 200.00		Length (ft) = 471.11		Length (ft) = 732.00		

Material	Unit	Total Quantity	Total Quantity	Width (ft)	Total	Width (ft)	Total Quantity	Width (ft)	Total	Width (ft)	Total	Total Quantity	Total Quantity	Total Quantity	Total Quantity	Totals
Salvaged Base Course @ 1.875 Ton/CY	Ton	2970.70	1915.24			8.2	26442.89	31.6	9119.16			566.75	312.17		10101	51,428
Prime Coat @ 0.25 Gal/SY	Gal	634.80	405.02			8.2	16841.30	31.6	3200.95			202.44	212.89		2810	24,308
Blotter Material CL 44 @ 15 lbs/SY	Ton	19.04	12.15			8.2	505.24	31.6	96.03			6.07	6.39		84	729
Tack Coat @ 0.05 Gal/SY (1st Lift)	Gal	125.42	79.97	2	32.06	22	9276.41	29.8	634.11	36.0	943.55	38.47		187	667	11,984
Tack Coat @ 0.05 Gal/SY (2nd Lift)	Gal	123.08	78.40			29.1	12192.82									12,395
Superpave FAA 42 @ 2 Ton/CY	Ton	891.99	565.91	2	42.75	28	39816.66	28	3357.62	34.6	2017.48	213.70	89.05	337	2107	49,440
PG 58S-28 Asphalt Cement @ 5.9%	Ton	52.63	33.39	2	2.52	28	2349.18	28	198.10	34.6	119.03	12.61	5.25	23	127	2,923

Total Salvageable Material from Project					
RAP Stockpile (SE quadrant US 85 and ND21)	Millings	Removal of Bituminous Surfacing		Salvaged Base Course Created	Salvaged Base Course Required
		Removal of HMA	Removal of Aggregate		
(Ton)	(Ton)	(Ton)	(Ton)	Total (Ton)	(Ton)
A	B	C	D	E=A+B+C+D	F
4366	107	3713	2306	10492	51428

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Basis of Estimate

ND 21
Jct 85 to N Jct 22 - New England

Pavement Quantities

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	10	3

Mid-Continent Cable Fiber Optic Line			
Station	Offset		Depth (IN)
289+12	69	Rt	44
289+43	69	Rt	52
289+70	70	Rt	46
289+96	70	Rt	48
290+27	69	Rt	48
290+55	69	Rt	48
290+85	69	Rt	48
291+10	70	Rt	44
366+06	70	Rt	46
366+46	70	Rt	46
366+92	69	Rt	50
367+27	71	Rt	48
367+65	71	Rt	46
383+43	68	Rt	46
383+76	68	Rt	48
384+16	68	Rt	48
384+54	68	Rt	48
384+94	68	Rt	46
385+33	67	Rt	46
385+72	67	Rt	48
386+12	67	Rt	48
386+53	67	Rt	48
386+91	67	Rt	46
387+31	67	Rt	48
387+84	67	Rt	48
388+20	68	Rt	54
388+48	67	Rt	54
388+75	69	Rt	52
389+24	70	Rt	52
389+57	70	Rt	50
390+02	68	Rt	50
390+36	69	Rt	44
390+80	69	Rt	48
391+22	68	Rt	48
391+57	67	Rt	48
391+95	68	Rt	48
392+34	68	Rt	50
392+60	69	Rt	50
392+83	68	Rt	56
393+16	68	Rt	48
393+52	69	Rt	48
393+89	70	Rt	48
394+24	71	Rt	48
394+55	71	Rt	48
394+85	72	Rt	48
395+21	74	Rt	48
395+54	74	Rt	48
395+97	74	Rt	48
526+43	65	Rt	42
526+94	66	Rt	42
527+49	66	Rt	42
528+06	66	Rt	42
528+59	65	Rt	42
529+12	65	Rt	44
529+65	65	Rt	44
530+20	65	Rt	44
530+71	64	Rt	44
531+23	64	Rt	42

Mid-Continent Cable Fiber Optic Line			
Station	Offset		Depth (IN)
531+77	64	Rt	44
532+26	64	Rt	48
532+58	64	Rt	34
532+80	63	Rt	40
533+29	63	Rt	44
533+78	63	Rt	48
534+38	64	Rt	44
534+91	65	Rt	42
535+42	64	Rt	36
535+96	65	Rt	48
536+48	66	Rt	44
537+00	67	Rt	48
613+95	74	Rt	50
614+45	73	Rt	50
614+95	73	Rt	50
615+46	72	Rt	48
615+96	72	Rt	44
616+47	73	Rt	48
616+98	74	Rt	48
617+48	73	Rt	48
617+97	73	Rt	48
618+45	72	Rt	56
618+80	71	Rt	42
619+20	72	Rt	42
619+65	73	Rt	56
620+15	73	Rt	48
620+65	73	Rt	48
621+17	74	Rt	42
621+66	73	Rt	40
622+17	73	Rt	42
622+67	74	Rt	44
623+16	74	Rt	48
623+67	75	Rt	44
624+17	75	Rt	42
624+66	74	Rt	42
625+14	75	Rt	42
625+63	74	Rt	42
626+13	74	Rt	42
626+66	74	Rt	46
627+20	74	Rt	40
627+73	73	Rt	44
640+17	33	Rt	48
640+65	39	Rt	50
641+12	41	Rt	50
641+58	41	Rt	60
641+99	45	Rt	76
642+32	48	Rt	60
642+79	52	Rt	50
643+27	59	Rt	48
643+79	63	Rt	48
714+68	57	Rt	48
715+12	55	Rt	42
715+62	54	Rt	42
716+14	52	Rt	42
716+63	46	Rt	42
717+10	39	Rt	36
717+39	36	Rt	60
717+72	33	Rt	48

Mid-Continent Cable Fiber Optic Line			
Station	Offset		Depth (IN)
718+19	31	Rt	48
718+70	29	Rt	48
719+24	30	Rt	44
719+74	29	Rt	44
720+23	29	Rt	48
720+74	31	Rt	40
720+93	35	Rt	96
721+10	37	Rt	60
721+52	40	Rt	48
722+01	52	Rt	46
722+44	65	Rt	42
722+94	67	Rt	42
723+45	68	Rt	42
807+86	60	Rt	54
808+29	60	Rt	50
808+88	60	Rt	48
809+39	59	Rt	60
809+89	59	Rt	60
810+39	58	Rt	56
810+92	59	Rt	50
811+42	60	Rt	50
811+94	60	Rt	50
812+18	59	Rt	96
812+50	59	Rt	60
813+02	58	Rt	50
813+50	58	Rt	48
813+96	60	Rt	60
814+50	59	Rt	50
814+98	59	Rt	50
815+48	59	Rt	48
815+99	59	Rt	48
820+55	63	Rt	48
820+98	62	Rt	48
821+49	63	Rt	42
821+90	62	Rt	48
822+11	63	Rt	56
822+36	62	Rt	48
822+81	61	Rt	48
823+24	59	Rt	48
826+94	59	Rt	54
827+43	59	Rt	54
828+02	60	Rt	54
828+69	60	Rt	54
829+97	65	Rt	48
830+32	64	Rt	62
830+32	64	Rt	38
830+54	62	Rt	86
830+79	61	Rt	110
831+18	59	Rt	196

Centerline Barrier Stripe Locations					
Station	to	Station	Direction	Length (LF)	Total Length (LF)
0+35	to	1+69	DBL	134	268
29+90	to	37+20	EB	730	730
38+52	to	46+14	WB	762	762
46+90	to	52+70	EB	580	580
55+88	to	60+80	WB	492	492
60+80	to	61+69	DBL	89	178
61+69	to	67+85	EB	616	616
69+73	to	76+11	WB	638	638
87+90	to	91+60	EB	370	370
96+88	to	100+52	WB	364	364
181+90	to	186+90	EB	500	500
190+72	to	195+83	WB	511	511
199+56	to	204+51	EB	495	495
206+64	to	211+59	DBL	495	990
211+59	to	216+39	EB	480	480
216+39	to	216+60	DBL	21	42
216+60	to	225+55	WB	895	895
279+15	to	282+70	EB	355	355
288+14	to	291+70	WB	356	356
295+65	to	300+70	EB	505	505
304+45	to	309+64	WB	519	519
316+30	to	324+21	EB	791	791
324+21	to	324+65	DBL	44	88
324+65	to	332+90	WB	825	825
333+10	to	339+35	EB	625	625
341+91	to	347+61	WB	570	570
354+80	to	362+00	EB	720	720
363+75	to	366+95	WB	320	320
366+95	to	370+88	DBL	393	786
370+88	to	372+80	EB	192	192
375+92	to	381+60	WB	568	568
411+90	to	418+50	EB	660	660
420+89	to	427+07	WB	618	618
436+90	to	439+35	EB	245	245
445+85	to	448+30	WB	245	245
456+50	to	460+20	EB	370	370
465+44	to	466+30	WB	86	86
466+30	to	469+15	DBL	285	570
469+15	to	470+40	EB	125	125
475+29	to	479+33	WB	404	404
493+85	to	498+45	EB	460	460
502+84	to	507+35	WB	451	451
531+00	to	532+60	EB	160	160
539+99	to	541+60	WB	161	161
565+30	to	573+64	EB	834	834
573+64	to	579+80	DBL	616	1232
579+80	to	588+65	WB	885	885
625+00	to	633+70	EB	870	870
633+70	to	637+05	DBL	335	670
637+05	to	645+92	WB	887	887
654+40	to	663+26	EB	886	886

Permanent Pavement Marking			
Location - Type	Basis	Quantity	
Centerline – Pvmt MK 4 IN Line 0+24 to 204+75 Bk 206+40 Ah to 831+42			
	Centerline Skips	20,040	LF
	Barrier Stripe	31,523	LF
Edge Lines – Pvmt MK 4 IN Line 0+24 to 204+75 Bk 206+40 Ah to 831+42	10,560 LF/mile	165,906	LF
	Total	**217,469**	**LF**

Short Term 4IN Line-Type NR			
Location - Type	Basis	Quantity	
Centerline – Top of 1st Lift	Centerline Skips	20,040	LF
	Barrier Stripe	31,523	LF
Centerline – Top of 2nd Lift	Centerline Skips	20,040	LF
	Barrier Stripe	31,523	LF
Top of Fogged Centerline Rumble Strip	Centerline Skips	20,040	LF
	Barrier Stripe	31,523	LF
	Total	**154,689**	**LF**

Centerline Barrier Stripe Locations					
Station	to	Station	Direction	Length (LF)	Total Length (LF)
663+26	to	666+10	DBL	284	568
666+10	to	674+91	WB	881	881
698+90	to	704+80	EB	590	590
707+74	to	713+80	WB	606	606
758+05	to	765+15	EB	710	710
766+99	to	774+06	WB	707	707
787+10	to	788+45	EB	135	135
796+05	to	797+37	WB	132	132
830+13	to	831+35	DBL	122	244
			Total (LF)		**31,523**

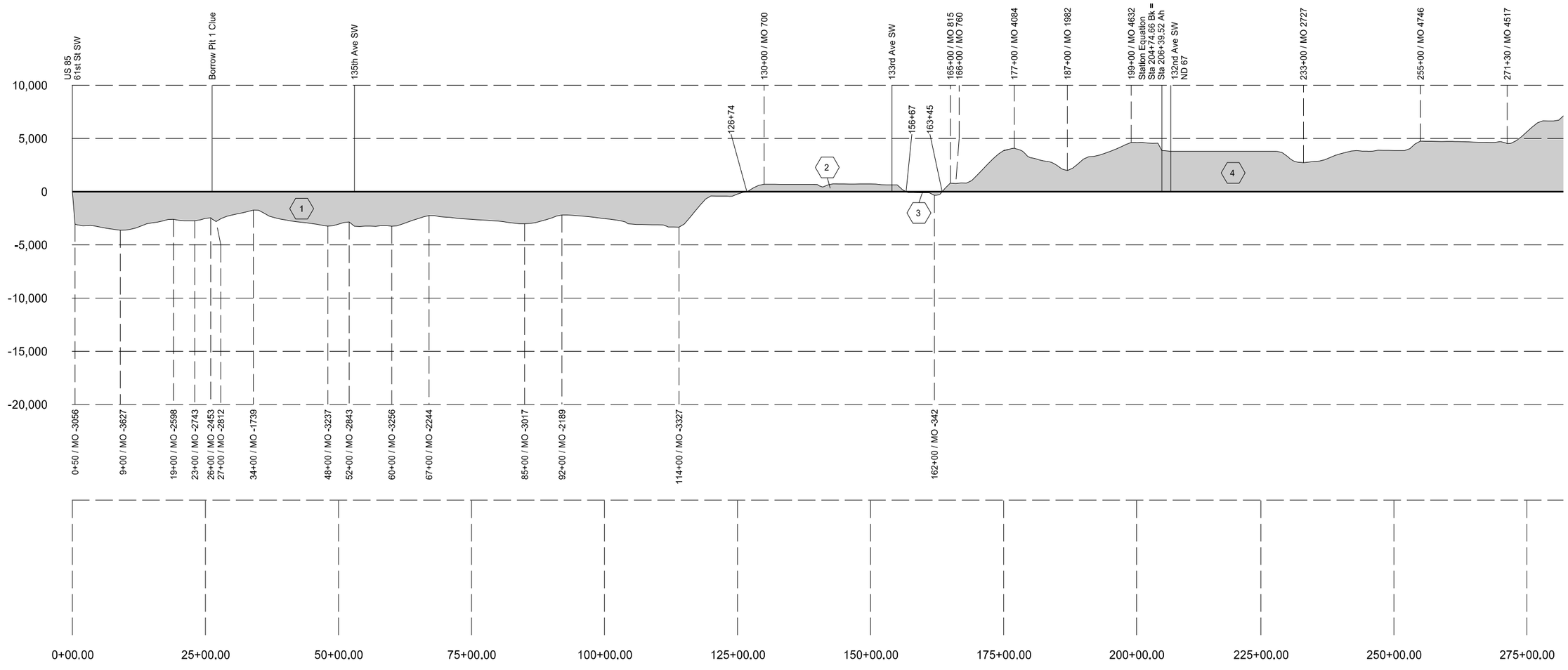
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Basis of Estimate

ND 21
Jct 85 to N Jct 22 - New England

Utility Data and Pavement Markings

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	11	1



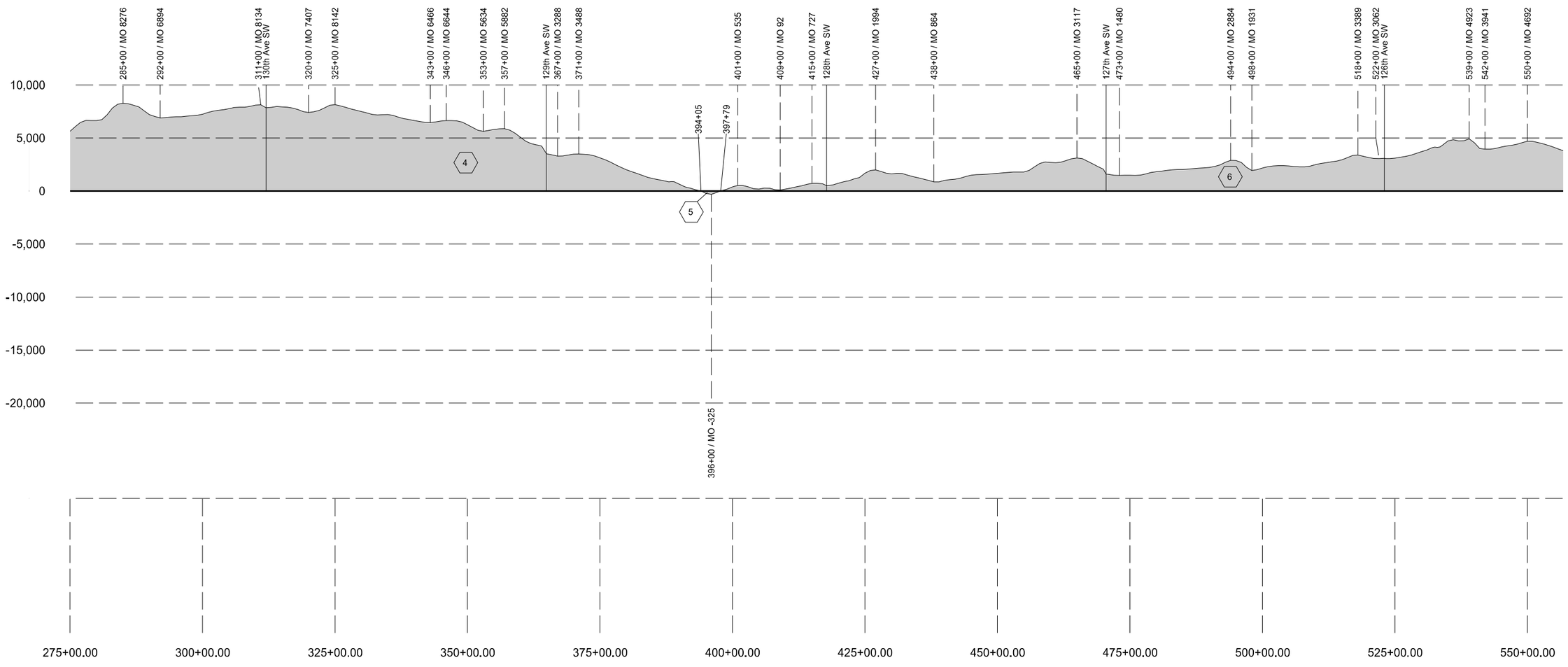
Balance #	Exc Hauled	Haul	Average Haul Distance	Common Excavation	Embankment	Adjusted Embankment
		CY*Sta	Sta	CY	CY	CY
		J	K	L	M	N=M*1.25
1	8145.65	330817	40.6	14,880	11,952	14,940
2	999.569	18771	18.8	1,257	811	1,013
3	344.1885	962	2.8	282	584	730
4	15595.239	1086265	69.7	37,594	29,853	37,316
5	325.0445	669	2.1	556	566	708
6	12498.2745	497548	39.8	40,161	31,938	39,923
7	5805.0115	1692230	291.5	16,267	25,424	31,780
Total=	43,713	3,627,262	83.0	110,997	101,128	126,410

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Mass Diagram

ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	11	2



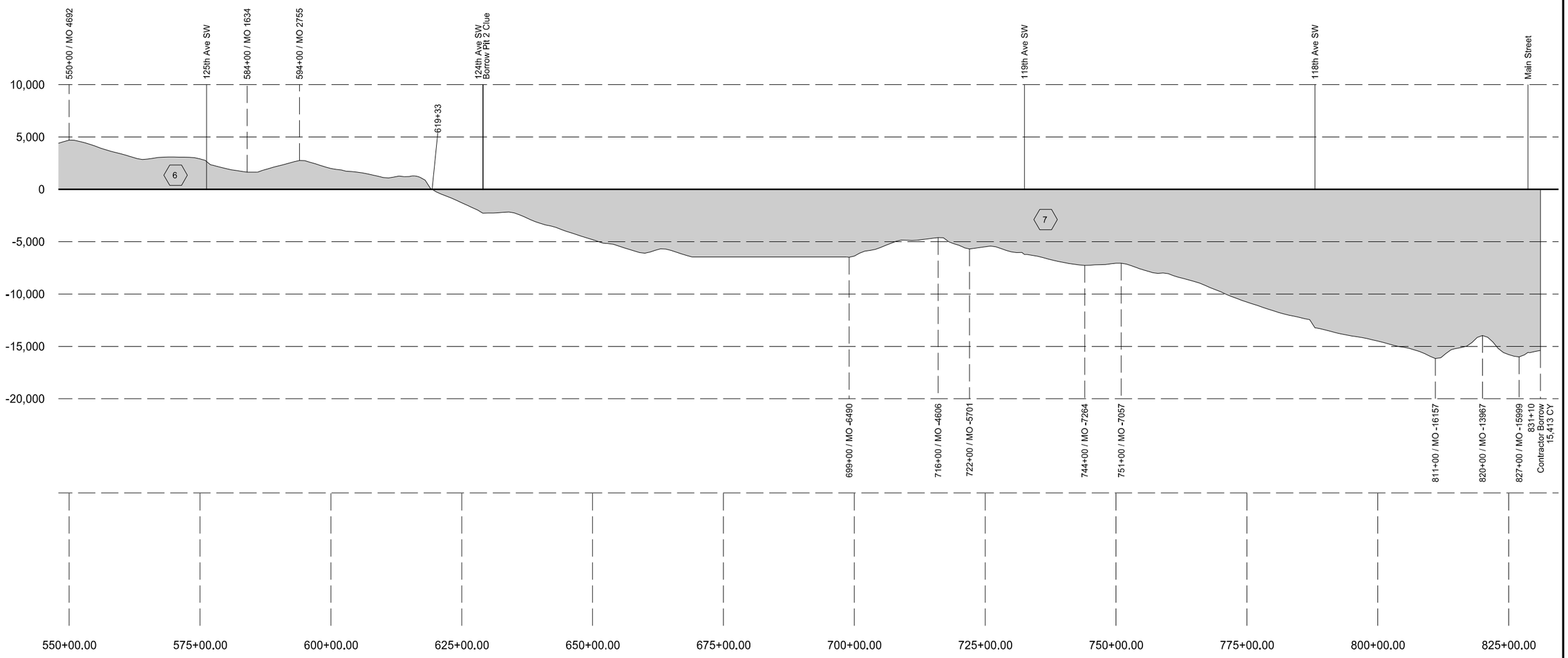
Balance #	Exc Hauled	Haul	Average Haul Distance	Common Excavation	Embankment	Adjusted Embankment
		CY*Sta	Sta	CY	CY	CY
		J	K	L	M	N=M*1.25
1	8145.65	330817	40.6	14,880	11,952	14,940
2	999.569	18771	18.8	1,257	811	1,013
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Total=	43,713	3,627,262	83.0	110,997	101,128	126,410

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Mass Diagram

ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	11	3



Balance #	Exc Hauled	Haul	Average Haul Distance	Common Excavation	Embankment	Adjusted Embankment
		CY*Sta	Sta	CY	CY	CY
		J	K	L	M	N=M*1.25
1	8145.65	330817	40.6	14,880	11,952	14,940
2	999.569	18771	18.8	1,257	811	1,013
3	344.1885	962	2.8	282	584	730
4	15595.239	1086265	69.7	37,594	29,853	37,316
5	325.0445	669	2.1	556	566	708
6	12498.2745	497548	39.8	40,161	31,938	39,923
7	5805.0115	1692230	291.5	16,267	25,424	31,780
Total=	43,713	3,627,262	83.0	110,997	101,128	126,410

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Mass Diagram

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	11	4

Earthwork Summary						
Location	Common Excavation-Type B (Pay Item)	Common Excavation-Subcut (Pay Item)	Embankment Volume	Common Compacted Volume	Borrow-Excavation (Pay Item)	Topsoil (Pay Item)
	CY	CY	CY	CY	CY	CY
	J	K	L	M=L * 1.25	N=M-J-K	P
ND 21	108,953	249	94,582	118,227	9,025	103,555
US 85	1332	-	3284	4,105	2,773	-
61st St SW	8	-	233	291	283	-
135th Ave SW - South	0	-	343	429	429	-
135th Ave SW - North	35	-	0	0	-35	-
133rd Ave SW - South	8	-	52	65	57	-
133rd Ave SW - North	0	-	140	175	175	-
ND 67	0	-	252	315	315	-
132nd Ave SW - North	0	-	207	259	259	-
132nd Ave SW - North - 2	0	-	105	131	131	-
130th Ave SW - South	0	-	168	210	210	-
129th Ave SW - North	10	-	175	219	209	-
128th Ave SW - South	19	-	38	48	29	-
128th Ave SW - North	9	-	105	131	122	-
127th Ave SW - South	18	-	52	65	47	-
127th Ave SW - North	0	-	292	365	365	-
126th Ave SW - South	39	-	12	15	-24	-
126th Ave SW - North	15	-	35	44	29	-
125th Ave SW - South	18	-	25	31	13	-
124th Ave SW - South	16	-	113	141	125	-
124th Ave SW - North	4	-	74	93	89	-
119th Ave SW - South	0	-	220	275	275	-
119th Ave SW - North	69	-	0	0	-69	-
118th Ave SW - South	0	-	610	762	762	-
Main Street	195	-	11	14	-181	-
Totals=	**110,748**	**249**	**101,128**	**126,410**	**15,413**	**103,555**

Earthwork Summary - Temporary Bypasses*				
Location	Common Excavation-Type B	Embankment Volume	Common Compacted Volume	Borrow-Excavation
	CY	CY	CY	CY
	J	L	M=L * 1.25	N=M-J
Bypass 1	54	3,202	4,003	3,949
Bypass 2	68	6,066	7,583	7,515
Bypass 4	1,216	3,192	3,990	2,774
Bypass 5	17	4,325	5,406	5,389
Totals=	**1,355**	**16,785**	**20,981**	**19,626**

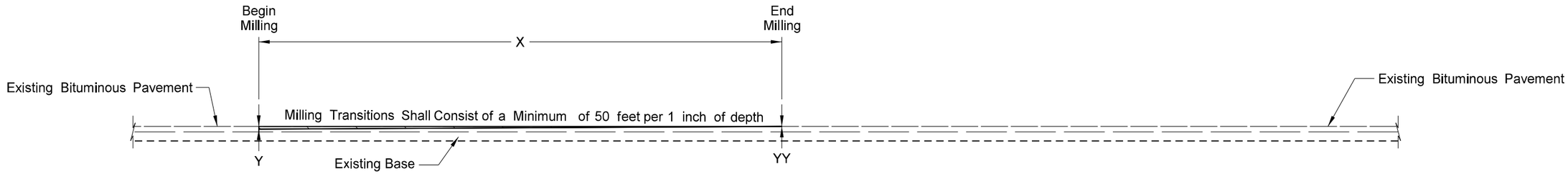
Common Excavation - Subcut			
Location	Average Area	Length	Volume
	SF	LF	CY
From Sta. 158+22.98 to Sta. 159+92.98	18.39	170	116
From Sta. 160+97.98 to Sta. 162+67.98	21.18	170	133
Total=			**249**

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Earthwork Summary

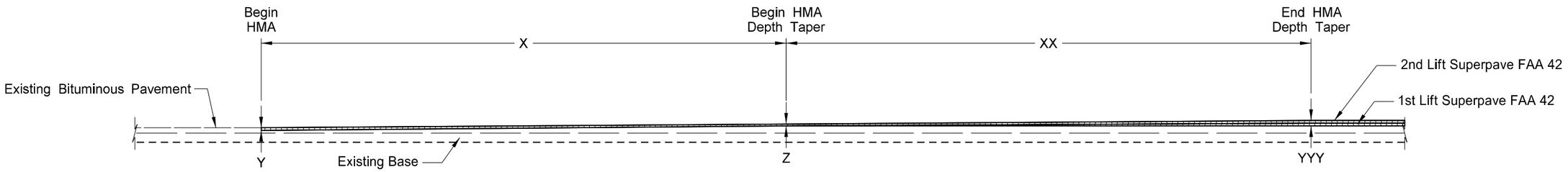
ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	20	1



Proposed Milling Transition

*Drawing is not to scale



Proposed Pavement Transition

*Drawing is not to scale

Milling and Paving Transitions

Location	X	Begin Milling/Begin HMA Station	Y	YY	End Milling Station	XX	Begin HMA Depth Taper	Z	YYY	End HMA Depth Taper	Tack (Gal)	HMA (Ton)	AC (Ton)
ND 21 - Begin Project	75'	0+24	1.5"	0"	0+99	75'	0+99	1.5"	3"	1+74	51	84	5
ND 21 - W of 2" Superpave FAA 42						50'	208+71.17	2"	3"	208+21.17	9	25	2
ND 21 - E of 2" Superpave FAA 42						50'	227+13.42	2"	3"	227+63.42	10	26	2
ND 21 - W of 2" Superpave FAA 42						50'	670+07.23	2"	3"	669+57.23	9	25	2
ND 21 - E of 2" Superpave FAA 42						50'	697+96.95	2"	3"	698+46.95	9	25	2
ND 21 - End Project**	38.88'	831+41.88	1.5"	0.7"	831+03	43.12'	830+35	2.1"	3"	829+91.88	32	57	4
ND 67 - Tie in at ND 21	75'	1446+96.61	1.5"	0"	1447+71.61	75'	1447+71.61	1.5"	3"	1448+46.61	35	49	3
Main St - Tie in at ND 21	75'	2+49.1	1.5"	0"	1+74.1	75'	1+74.1	1.5"	3"	0+99.1	32	46	3

*Note: Milling quantities found in Section 40

**Removal of Bituminous Surfacing 830+35 to 831+03 (for pipe removal) quantities found in Section 40

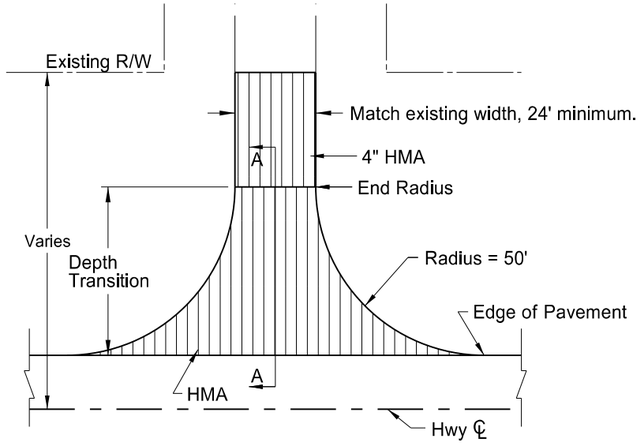
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Details

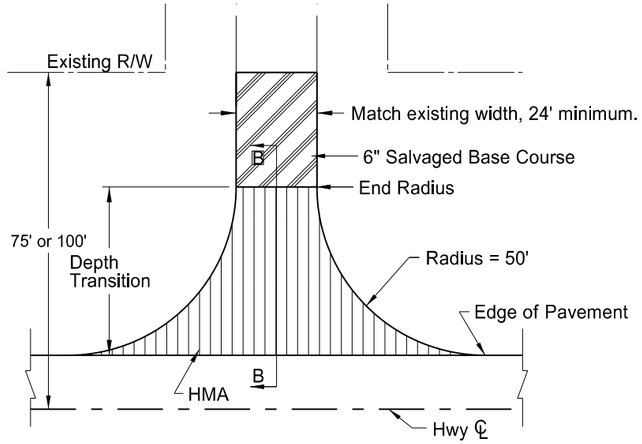
ND 21
Jct 85 to N Jct 22 - New England

Milling and Paving End Transitions

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	20	2



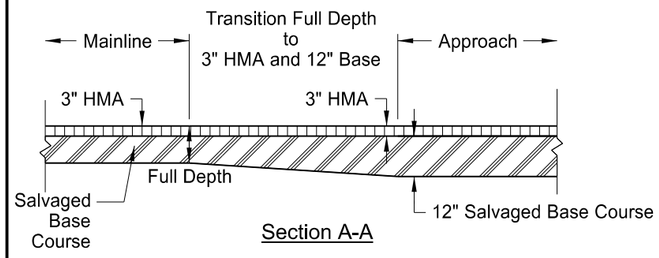
(1) Paved Section Line, County Road, or Street Approach



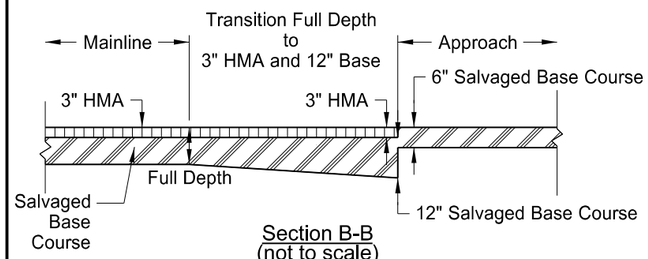
(2) Gravel Section Line, County Road, or Street Approach

Approach Type				
(1)	(2)	(3)	(4)	
206+40 RT	52+87 RT	3+43 RT	26+25 RT*	364+81 RT
828+70 LT	52+88 LT	111+55 LT	26+26 LT*	373+94 RT
	151+88 RT	126+46 RT	38+65 RT	373+97 LT
	155+97 LT	363+10 LT	56+06 LT	395+03 RT
	206+41 LT	394+98 LT	98+97 LT	423+84 RT
	311+98 RT	641+98 RT	98+97 RT	449+21 LT
	364+83 LT	717+38 RT	120+05 LT	496+91 LT
	417+68 LT	720+94 RT	123+49 RT	496+95 RT
	417+71 RT	805+19 RT	140+40 RT	540+00 RT
	470+46 LT	812+17 RT	155+97 RT	540+07 LT
	470+46 RT	814+58 LT	165+16 LT	561+48 RT
	523+05 RT		165+16 RT	576+23 LT
	523+45 LT		199+86 RT*	585+87 RT
	576+23 RT		243+88 LT	585+88 LT
	629+09 RT		245+13 RT	602+83 LT
	629+12 LT		271+31 LT	602+86 RT
	732+36 RT*		286+14 LT	641+97 LT
	732+47 LT*		311+96 LT	717+40 LT
	787+99 RT*		338+36 RT	788+22 LT
	US 85 2645+14 LT			

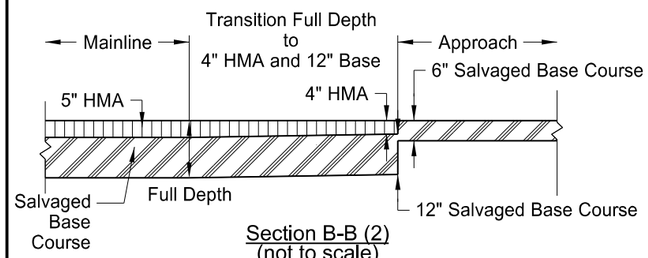
*Note - use Section B-B (2)



Section A-A



Section B-B
(not to scale)



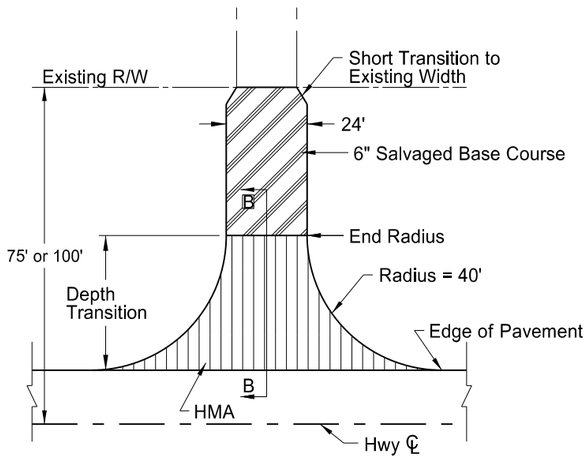
Section B-B (2)
(not to scale)

*Use on Approaches:
26+25 Rt, 26+26 Lt
199+86 Rt, 732+36 Rt
732+47 Lt, 787+99 Rt

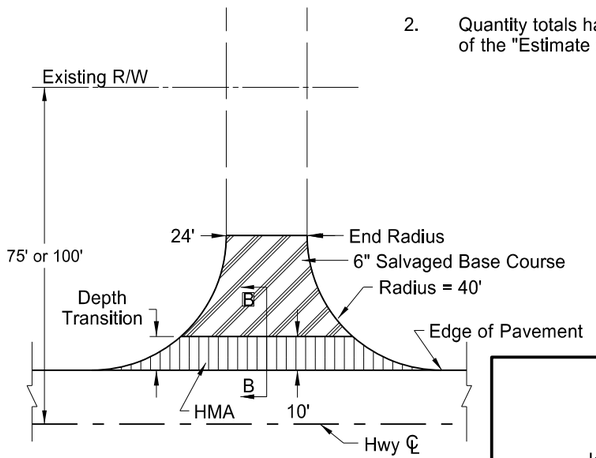
Basis of Estimate				(1)		(2)		(3)		(4)		Totals
Spec	Code	Item	Unit	Paved Section Line		Gravel Section Line		Gravel Private Drive		Field Drive		
		Number of Locations	#	2		20		11		38		
				Total	Average	Total	Average	Total	Average	Total	Average	
302	0100	Salvaged Base Course @ 1.875 Ton/CY	TON	151	75.5	4226	211.3	1824	165.8	3884	102.2	10085
401	0050	Tack Coat @ 0.05 Gal/SY	GAL	126	63.0	261	13.1	110	10.0	152	4.0	649
401	0060	Prime Coat @ 0.25 Gal/SY	GAL	41	20.5	1381	69.1	552	50.2	836	22.0	2810
401	0160	Blotter Material CL 44 @ 15 lbs/SY	TON	1	0.5	41	2.1	17	1.5	25	0.7	84
430	0042	Superpave FAA 42 @ 2 Ton/CY	TON	222	111.0	946	47.3	353	32.1	550	14.5	2071
430	5803	PG 58S-28 Asphalt Cement @ 5.9%	TON	13	6.5	56	2.8	21	1.9	32	0.8	122

Notes:

1. Actual HMA paving and salvaged base course locations may vary in the field, as approved by the Engineer.
2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.



(3) Gravel Private Drive Approach



(4) Field Drive Approach

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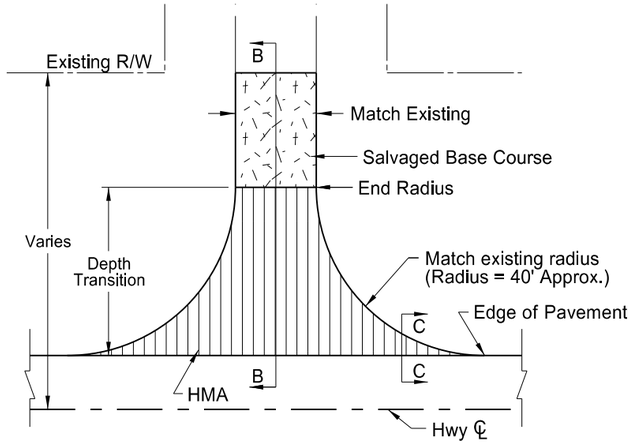
Details

ND 21
Jct 85 to N Jct 22 - New England

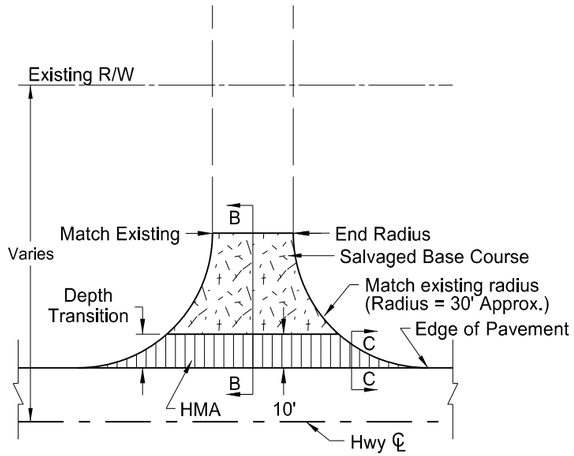
Approach Paving Details for
Regrading Rural Approaches (Approach Grading)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	20	3

Approach Type	
(5)	(6)
682+26 RT	219+18 RT
	670+48 LT
	682+30 LT



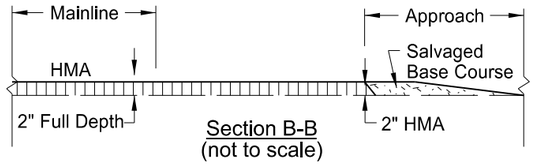
(5) Gravel Section Line, County Road, or Street Approach



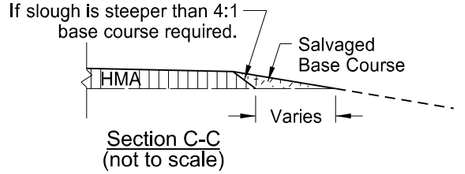
(6) Field Drive Approach

Notes:

1. Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.
3. Aggregate base course has been provided in the quantities to fill in around the radii. This material will be required when sloughs are steeper than 4:1 (see section C-C)



Section B-B
(not to scale)



Section C-C
(not to scale)

Basis of Estimate				(5)		(6)		Totals
Spec	Code	Item	Unit	Gravel Section Line		Field Drive		
		Number of Locations	#	1		3		
				Total	Average	Total	Average	
302	0100	Salvaged Base Course @ 1.875 Ton/CY	TON	8	8.0	8	2.7	16
401	0050	Tack Coat @ 0.05 Gal/SY	GAL	9	9.0	9	3.0	18
430	0042	Superpave FAA 42 @ 2 Ton/CY	TON	18	18.0	18	6.0	36
430	5803	PG 58S-28 Asphalt Cement @ 5.9%	TON	2	2.0	3	1.0	5

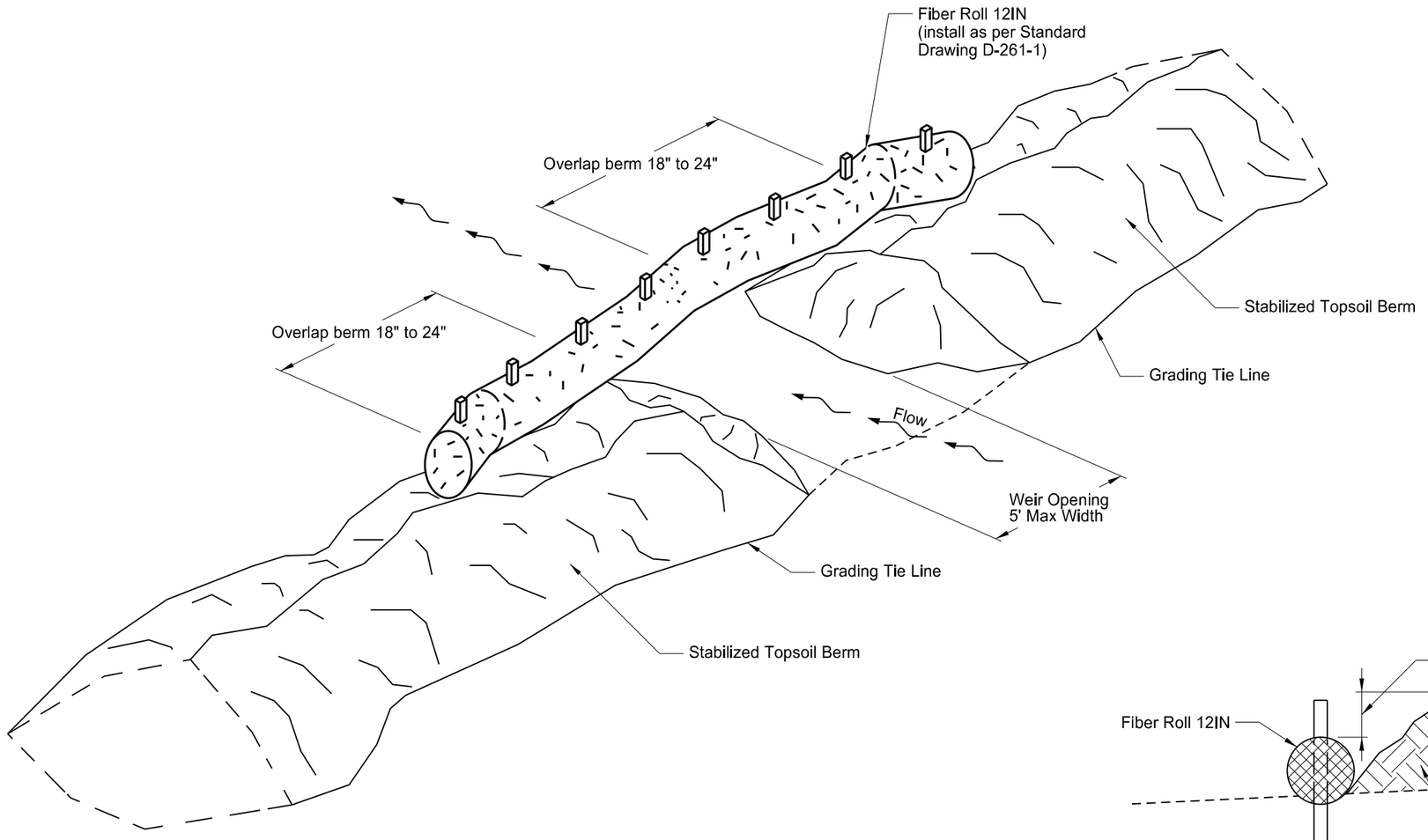
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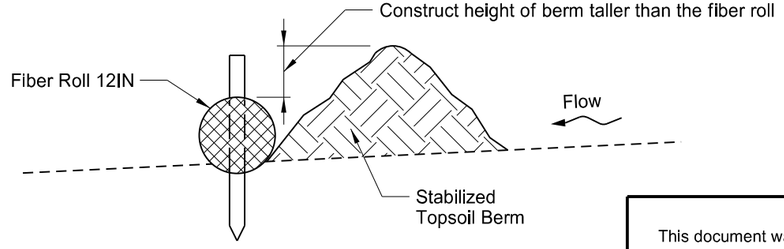
Details

ND 21
Jct 85 to N Jct 22 - New England

Approach Paving Details for
Existing Rural Approaches (No Approach Grading)

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	20	4





Topsoil Berm Detail

Notes:

1. Windrow the existing topsoil from the foreslope to create a berm at the grading tie line.
2. Stabilize berms in accordance with the Construction General Permit.
3. Place weirs intermittently throughout the length of the berm to allow stormwater to drain through the berm.
4. Avoid placing weirs adjacent to waterbodies.
5. Install fiber rolls as the weirs are created in the topsoil berm.
6. Include costs to create, stabilize, maintain, and dismantle the berm in the unit price bid for "Topsoil".
7. Include costs for fiber rolls in the unit price bid for "Fiber Rolls 12IN".
8. 400 LF of "Fiber Rolls 12IN" have been provided

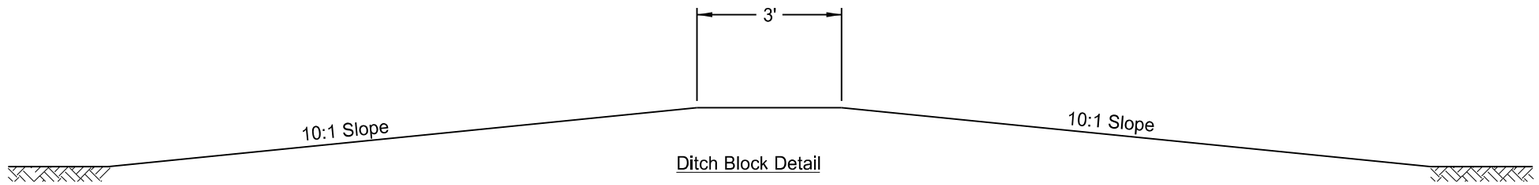
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Details

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Temporary Topsoil Berm and Weir

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	20	5



Ditch Block Detail

Location	Top Elevation
Sta. 236+70.50 Lt.	2779.7
Sta. 282+38.63 Lt.	2826.4
Sta. 517+95.00 Rt.	2670.6

Note: Ditch block construction is included in the unit price bid for "Common Excavation-Type B"

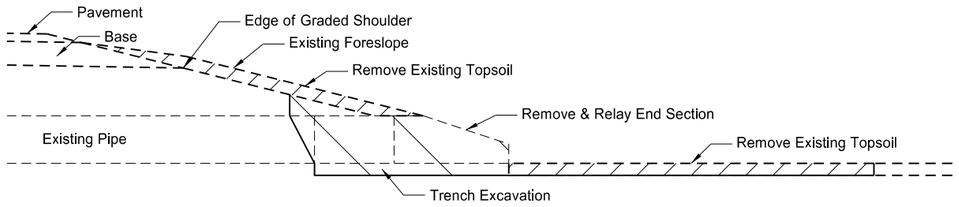
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Details

ND 21
Jct 85 to N Jct 22 - New England

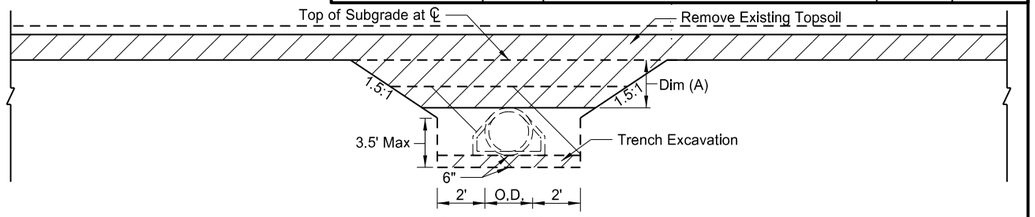
Ditch Block Detail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	20	6



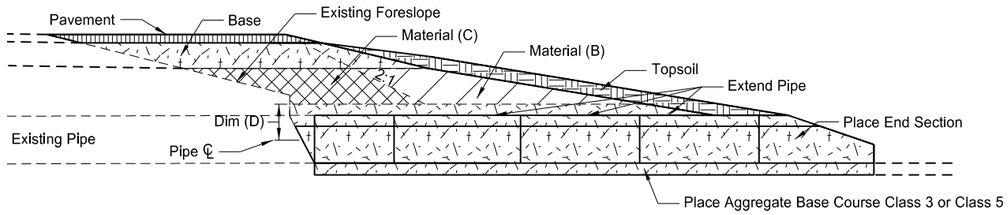
Removal Section

Cross Section View



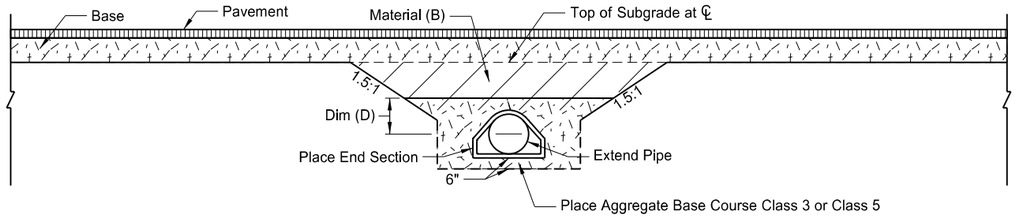
Removal Detail

Side View



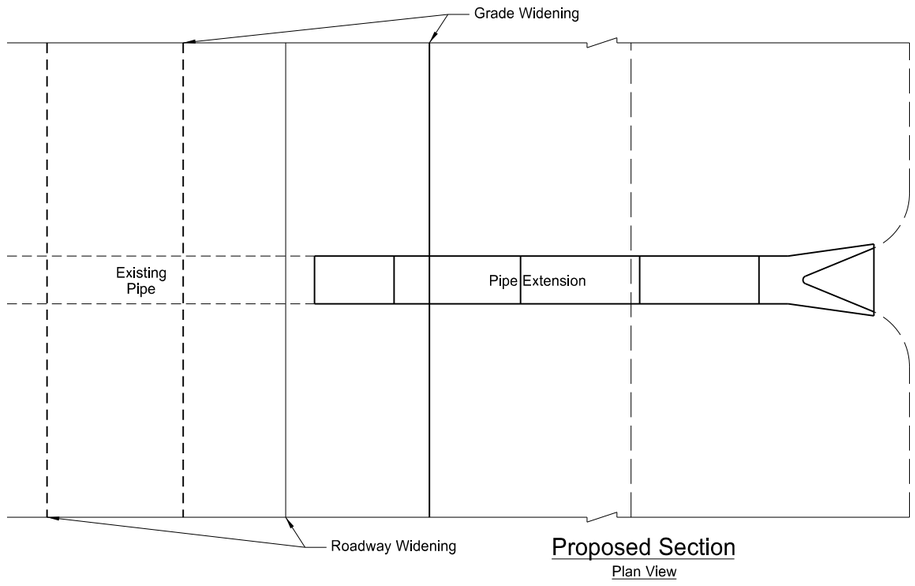
Proposed Section

Cross Section View



Backfill Detail

Side View (Topsoil not shown)



Proposed Section

Plan View

Pay Items
1) Pipe*
2) Remove & Relay End Section
3) Borrow Excavation or Common Excavation
4) Topsoil
5) Seeding
6) Mulching

*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate Base Course Class 3 or Class 5

Pipe Materials	Dim (A)>4 Feet		Backfill Dimension
	Material (B)	Material (C)	Dim (D)
Concrete	Embankment	Embankment	0.5 O.D.

Location:
US 85 2645+94

NOTES:
1. Embankment may be either Borrow Excavation or Common Excavation

2. Aggregate may be either Class 3 or Class 5 Aggregate Base Course.

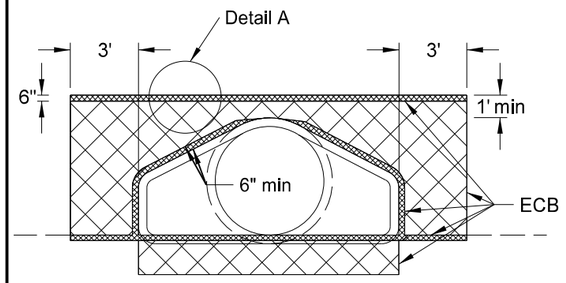
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Details

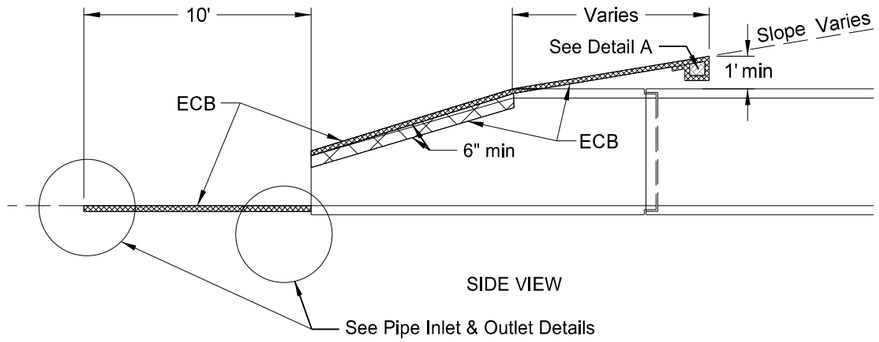
ND 21
Jct 85 to N Jct 22 - New England

Mainline Widening CL Pipe Extension Detail

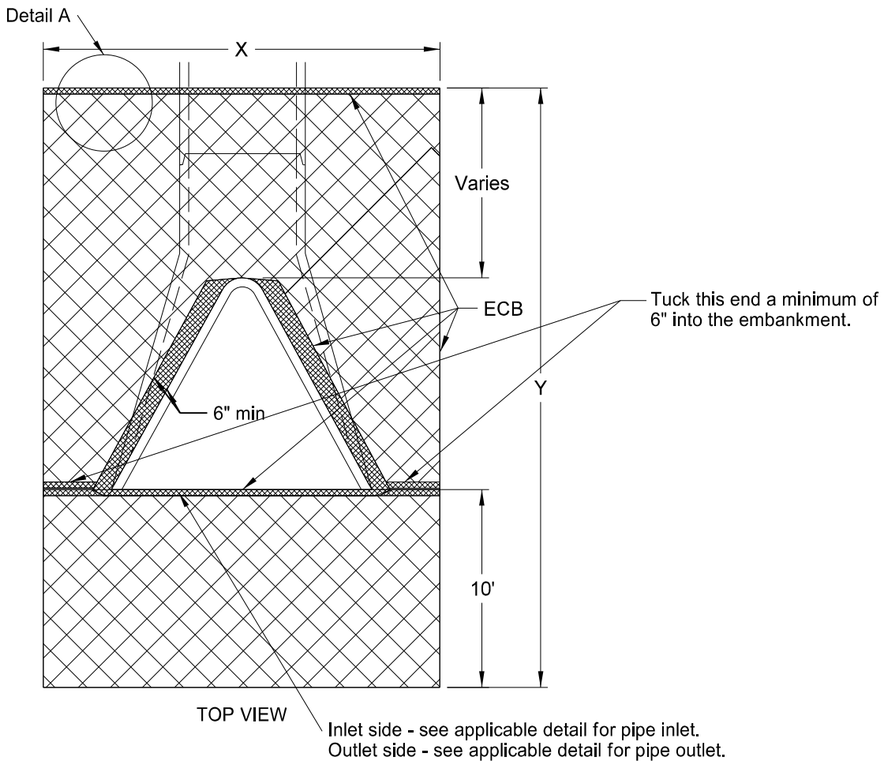
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	20	7



FRONT VIEW

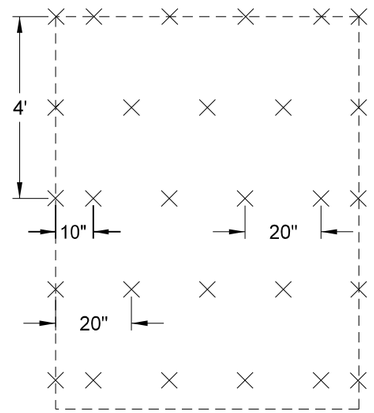


SIDE VIEW



TOP VIEW

NOTE: Tuck the ECB a minimum of 6" into the embankment (against the flared end section) around the opening of the flared end section.

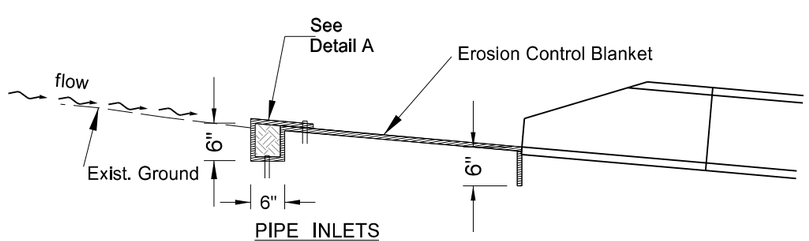


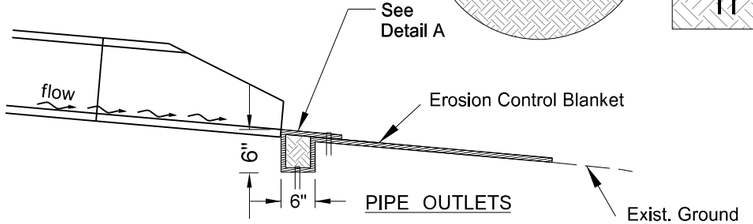
STAPLE PATTERN

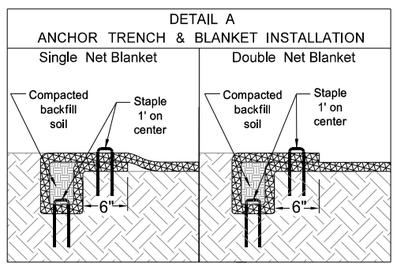
APPROACH CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
15	9.0	20.0	176.0	20
18	9.5	20.7	190.7	22
21	9.5	21.0	190.9	22
24	10.5	21.6	214.1	24
27	11.0	22.0	226.3	25
30	11.6	22.5	241.5	27
36	12.7	23.3	268.8	30
42	13.3	23.3	279.7	31
48	13.8	24.0	293.2	33
54	14.5	23.4	300.6	34
60	15.0	23.0	307.5	35
66	15.6	24.0	325.6	37
72	16.2	24.5	340.6	38
Note: Quantities based on 8:1 slope.				

CENTERLINE CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
24	10.5	17.6	172.1	20
27	11.0	18.0	182.3	21
30	11.6	18.5	195.1	22
36	12.7	19.2	216.7	24
42	13.3	19.2	225.2	25
48	13.8	20.0	238.0	27
54	14.5	19.5	244.7	28
60	15.0	19.0	248.3	28
66	15.6	20.0	264.5	30
72	16.2	20.5	276.8	31
Note: Quantities based on 4:1 slope.				

Note: Pipe locations and quantities listed on next sheet







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Details

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Erosion Control at Culvert Flared End Sections

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Erosion Control Blanket (ECB)					
Location to be Protected	Culvert Type Appr/CL	Pipe Diam. (inch)	No.	Unit Quantity (SY)	Total Quantiy
Station					ECB Type 2 (SY)
3+46 Rt	Appr	24	2	24	48
26+80	CL	24	2	20	40
26+87	CL	24	2	20	40
48+91	CL	24	2	20	40
48+99	CL	24	2	20	40
56+04 Lt	Appr	18	2	22	44
88+03	CL	24	1	20	20
88+12	CL	24	1	20	20
98+99 Rt	Appr	18	2	22	44
98+99 Lt	Appr	18	2	22	44
104+12	CL	48	2	27	54
104+25	CL	48	2	27	54
116+00	CL	30	2	22	44
120+01 Lt	Appr	24	2	24	48
126+36 Rt	Appr	18	2	22	44
140+42 Rt	Appr	24	4	24	96
148+22	CL	36	2	24	48
154+04	CL	36	2	24	48
165+16 Rt	Appr	18	2	22	44
191+71	CL	24	2	20	40
200+40	CL	42	2	25	50
236+93	CL	24	2	20	40
243+87 Lt	Appr	24	2	24	48
245+13 Rt	Appr	24	2	24	48
259+99	CL	72	2	31	62
260+14	CL	72	2	31	62
260+29	CL	72	2	31	62
271+28 Lt	Appr	24	2	24	48
282+65	CL	24	2	20	40
290+11	CL	42	2	25	50
305+12	CL	36	1	24	24
311+96 Lt	Appr	24	2	24	48
354+16	CL	30	2	22	44
364+81 Lt	Appr	18	2	22	44
366+90	CL	36	1	24	24
394+99 Lt	Appr	18	2	22	44
395+05 Rt	Appr	18	2	22	44
399+62	CL	24	2	20	40
414+06	CL	24	2	20	40
423+84 Rt	Appr	24	2	24	48
446+89	CL	48	1	27	27
461+03	CL	24	2	20	40
467+60	CL	42	2	25	50
467+72	CL	42	2	25	50
470+42 Lt	Appr	18	2	22	44
492+75	CL	42	2	25	50
516+58	CL	48	1	27	27

Erosion Control Blanket (ECB)					
Location to be Protected	Culvert Type Appr/CL	Pipe Diam. (inch)	No.	Unit Quantity (SY)	Total Quantiy
Station					ECB Type 2 (SY)
523+06 Rt	Appr	18	2	22	44
540+00 Rt	Appr	18	2	22	44
540+08 Lt	Appr	18	2	22	44
548+74	CL	24	2	20	40
561+48 Rt	Appr	24	2	24	48
585+89 Lt	Appr	18	2	22	44
585+89 Rt	Appr	18	2	22	44
602+84 Lt	Appr	24	2	24	48
602+86 Rt	Appr	24	2	24	48
629+02 Rt	Appr	18	2	22	44
629+06 Lt	Appr	18	2	22	44
641+97 Rt	Appr	18	2	22	44
641+98 Lt	Appr	18	2	22	44
652+75	CL	36	2	24	48
709+40	CL	36	1	24	24
709+50	CL	36	1	24	24
717+36 Rt	Appr	18	2	22	44
717+40 Lt	Appr	24	2	24	48
720+95 Rt	Appr	18	2	22	44
731+70	CL	36	2	24	48
731+80	CL	36	2	24	48
750+65	CL	36	2	24	48
759+07	CL	36	1	24	24
787+31	CL	30	1	22	22
787+40	CL	30	1	22	22
805+23 Rt	Appr	18	2	22	44
812+18 Rt	Appr	36	8	30	240
812+87	CL	48	1	27	27
822+14	CL	54	2	28	56
830+69	CL	36	2	24	48
2645+19 Lt	Appr	42	2	31	62
2645+94	CL	30	2	22	44
Total=					3643

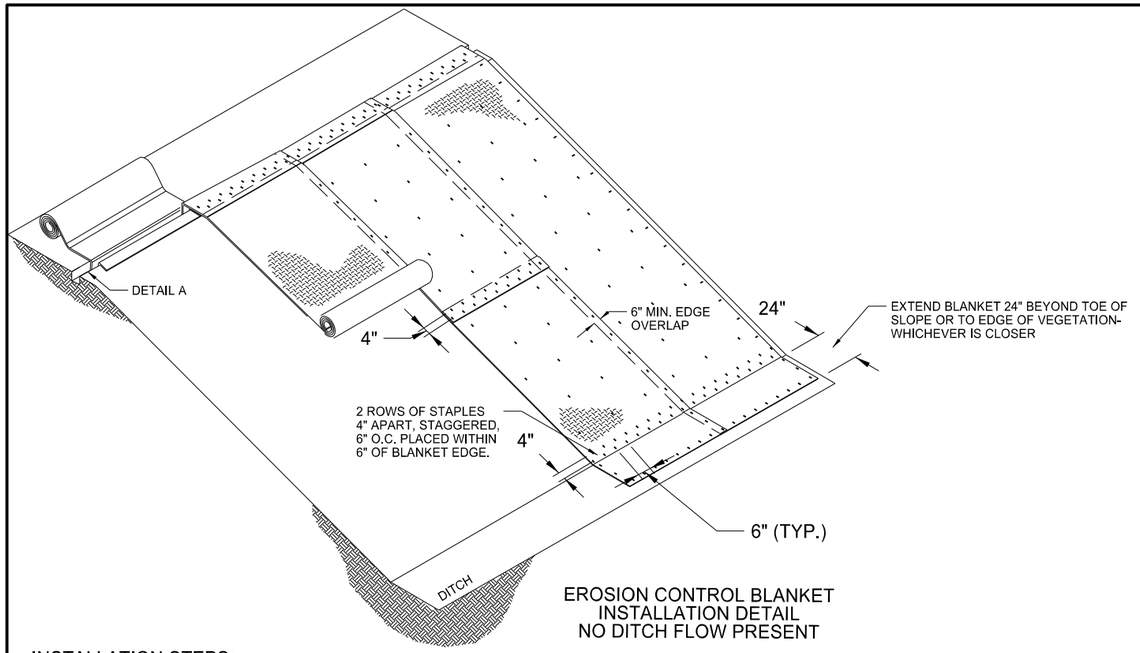
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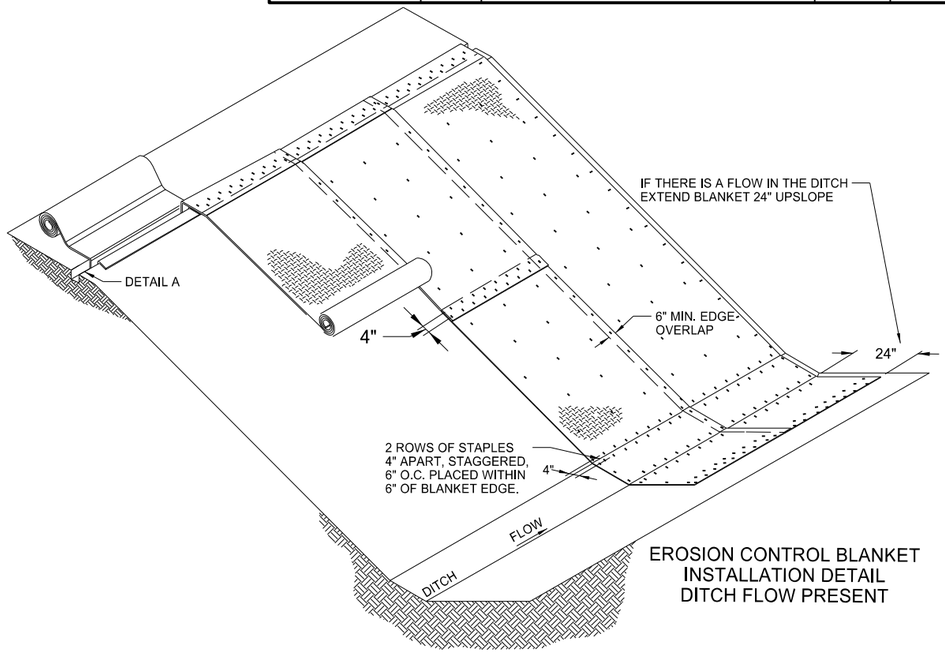
ND 21
Jct 85 to N Jct 22 - New England

Erosion Control at Culvert Flared End Sections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	20	9



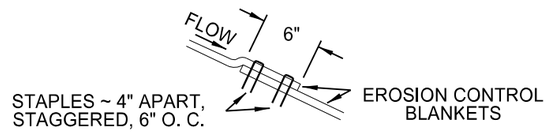
EROSION CONTROL BLANKET
INSTALLATION DETAIL
NO DITCH FLOW PRESENT



EROSION CONTROL BLANKET
INSTALLATION DETAIL
DITCH FLOW PRESENT

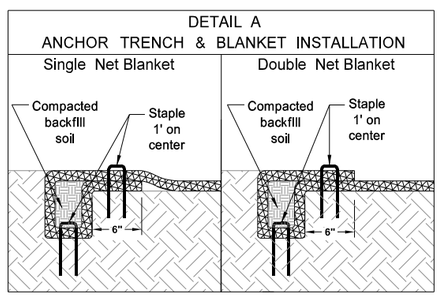
INSTALLATION STEPS:

1. Prepare smooth slope per spec. section 255
2. Amend soil and seed, as specified.
3. Dig anchor trench. Set aside native soil removed from trench.
4. Secure blanket in anchor trench, staking or stapling blanket as shown.
5. Replace native soil previously removed from trench.
6. Staple blanket as shown so there are no gaps between the blanket and the soil. Staple while unrolling blanket to minimize walking on blanket.
7. Install splices a minimum 24 inches prior to toe of slope.

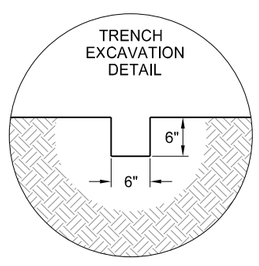


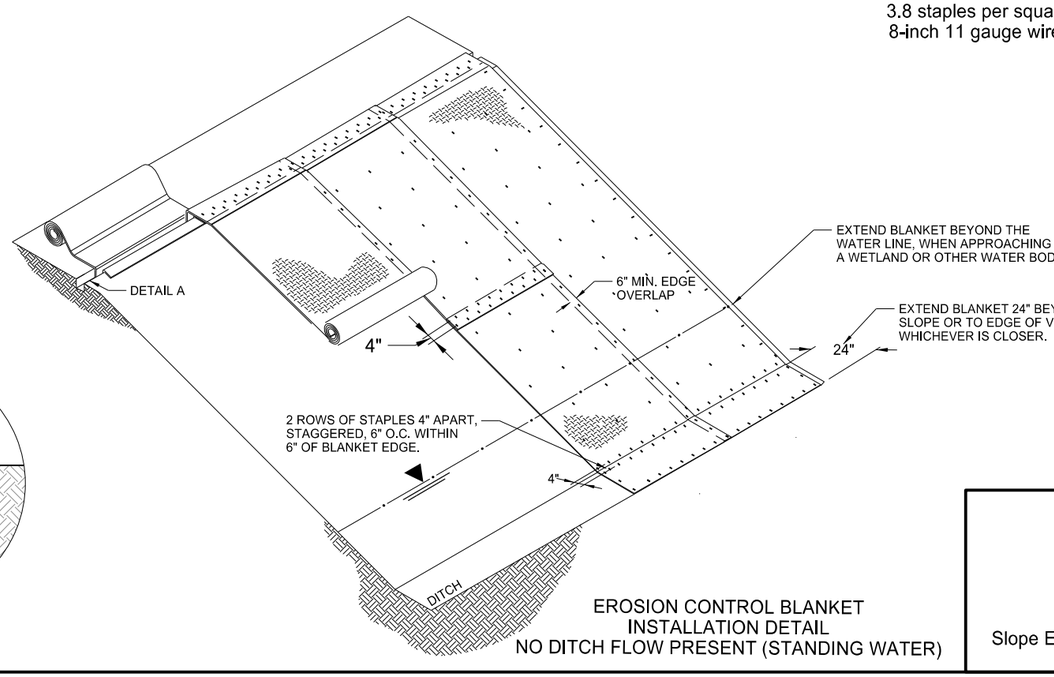
STAPLES ~ 4" APART, STAGGERED, 6" O. C.

EROSION CONTROL BLANKETS

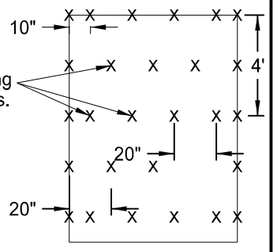


NOTE:
Install Single Net Blanket with netting on top of installed blanket.





EROSION CONTROL BLANKET
INSTALLATION DETAIL
NO DITCH FLOW PRESENT (STANDING WATER)



3.8 staples per square yard using 8-inch 11 gauge wire "u" staples.

STAPLE PATTERN

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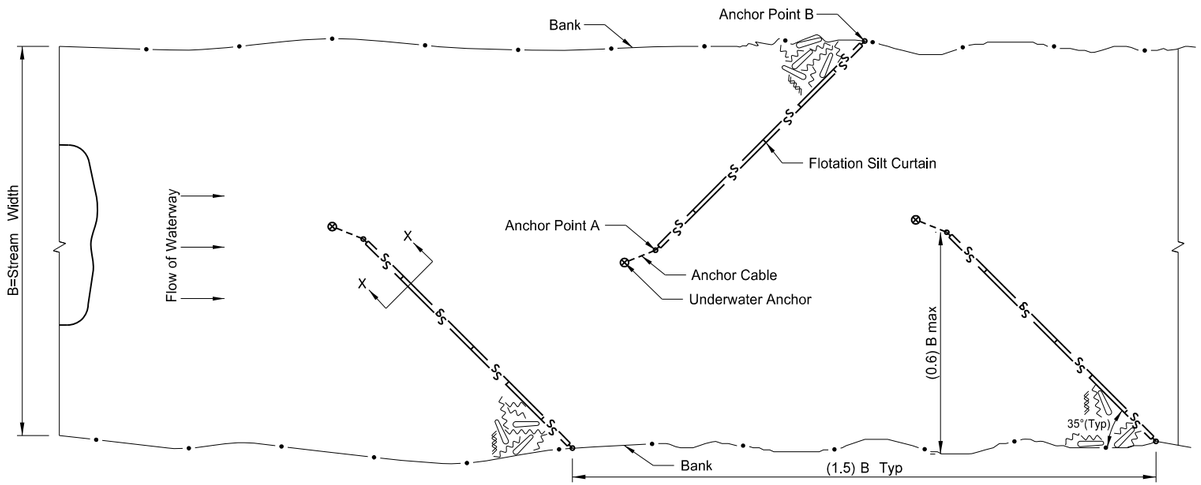
Details

ND 21
Jct 85 to N Jct 22 - New England

Slope Erosion Control Blanket Installation Details

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	20	10

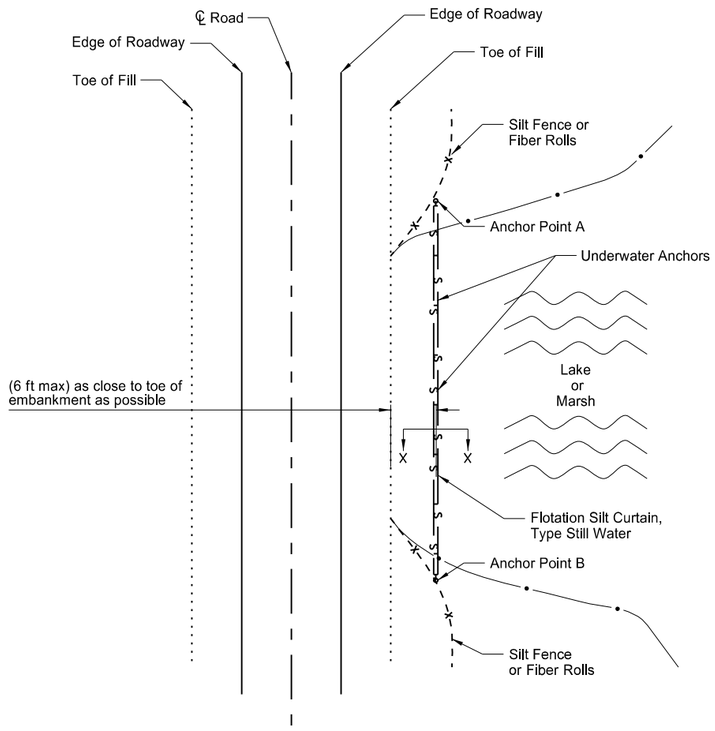
TYPICAL INSTALLATIONS
May vary with conditions



PLAN VIEW

FLOTATION SILT CURTAIN - TYPE HERRING BONE PATTERN

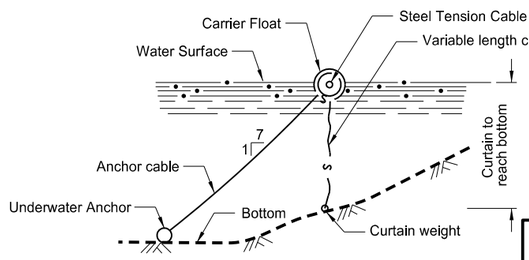
DESIGN GUIDELINES:
When temporary work encroaches more than ⅓ width of the stream
Or where stream width doesn't allow use of Type Moving Water



PLAN VIEW

FLOTATION SILT CURTAIN - TYPE STILL WATER

Extend silt curtain onto shore and anchor there also.



SECTION X-X
FLOTATION SILT CURTAINS

Note:
Maximum water velocity for moving water = 5 ft/sec

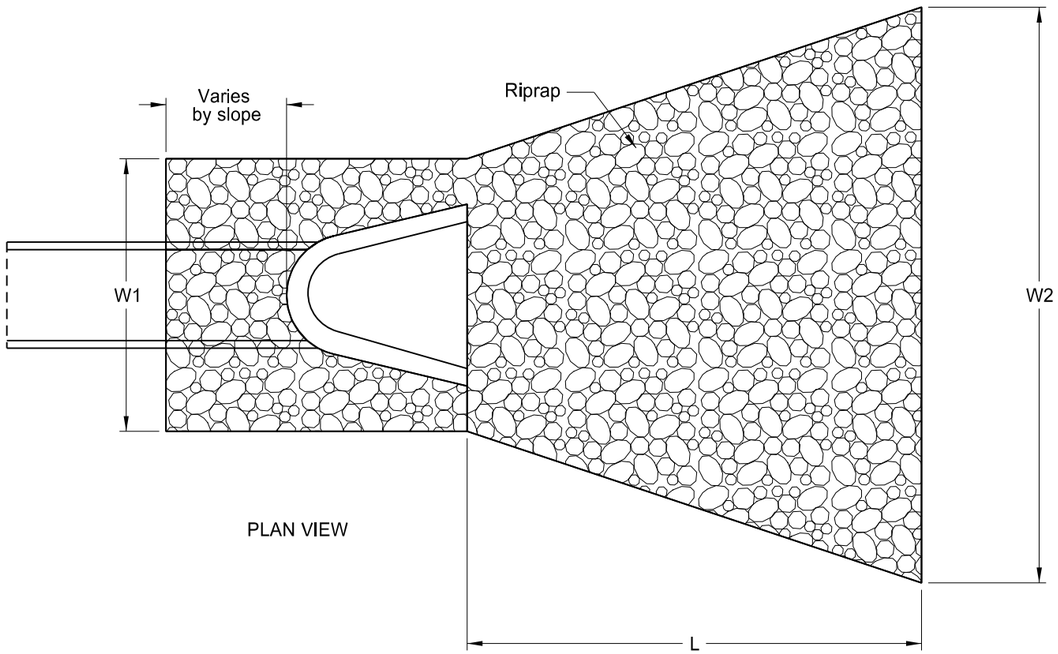
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Details

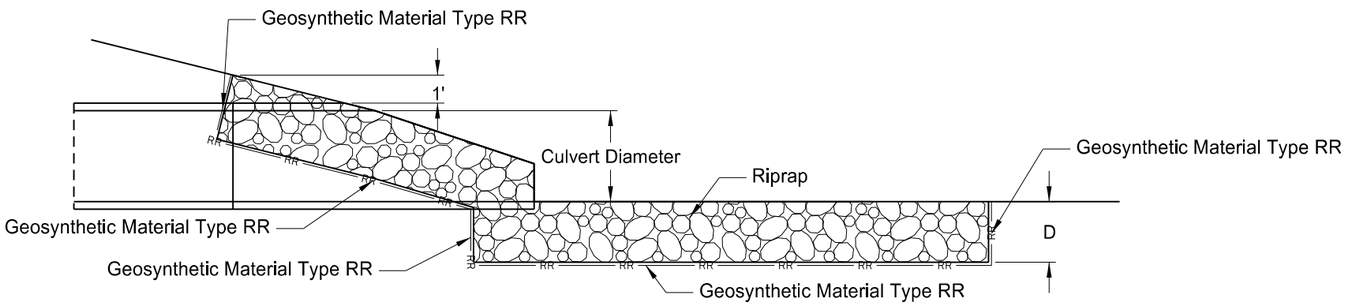
ND 21
Jct 85 to N Jct 22 - New England

Temporary Erosion Control - Flotation Silt Curtain

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	20	11



PLAN VIEW



PROFILE VIEW

Riprap Dimensions & Quantities

End Sections with Riprap			Culvert Diameter	Riprap Required for Smooth Pipe Alternatives	Riprap Required for Rough Pipe Alternatives	L	W1	W2	RR Depth D	Geosynthetic Material Type RR	Riprap Grade I
Alignment	Station	Offset	(IN)			(LF)	(LF)	(LF)	(IN)	(SY)	(CY)
SCL21	88+03	35.0' Rt	24	Yes	No	10	15	21.7	20	54.5	22.8
	88+12										
SCL21	305+12	34.0' Rt	36	Yes	No	18	9	21	24	64.5	31.0
SCL21	366+90	40.0' Lt	36	Yes	No	18	9	21	24	64.5	31.0
SCL21	446+89	34.0' Lt	48	Yes	No	24	12	28	27	106.8	60.6
SCL21	516+58	34.0' Lt	48	Yes	No	24	12	28	27	106.8	60.6
SCL21	709+40	34.0' Rt	36	Yes	No	15	19	29	20	92.6	41.6
	709+50										
SCL21	759+07	34.0' Rt	36	Yes	No	18	9	21	24	64.5	31.0
SCL21	787+31	34.0' Rt	30	Yes	No	17.5	16.5	28.2	30	95.6	58.2
	787+40										
SCL21	812+87	34.0' Rt	48	Yes	No	24	12	28	27	106.8	60.6
									Total	**756.6**	**397.4**

Notes:
1. Geosynthetic Material Type RR and Riprap Grade I quantities included in this table will only be paid if the Smooth Pipe Alternative is selected at listed locations.

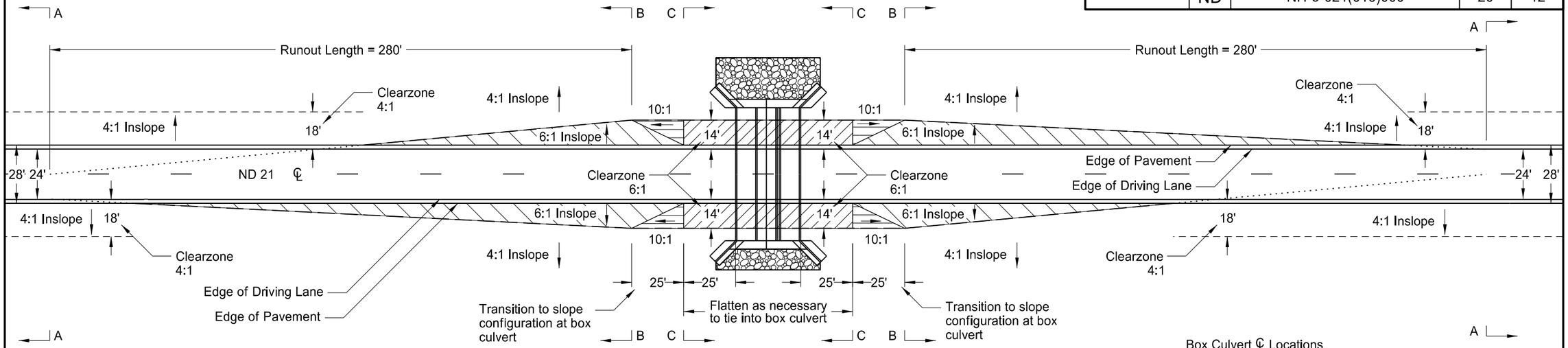
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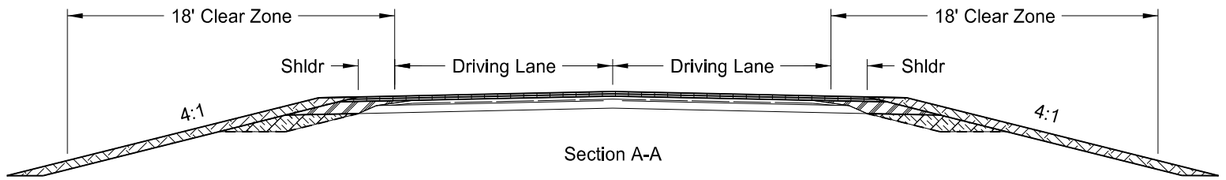
ND 21
Jct 85 to N Jct 22 - New England

Riprap at Pipe Outlets

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	20	12

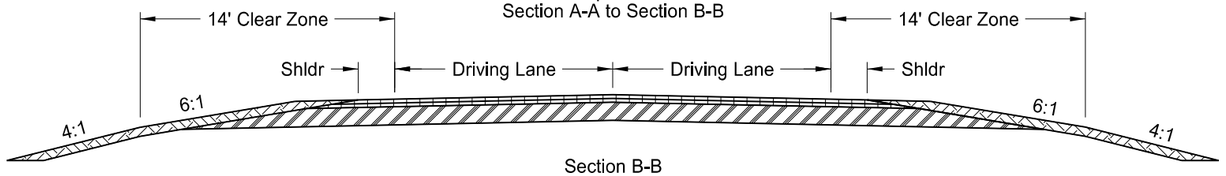


Box Culvert ℄ Locations
Sta. 179+22.41
Sta. 230+12.74
Sta. 388+81.06
Sta. 532+72.81
Sta. 618+44.52



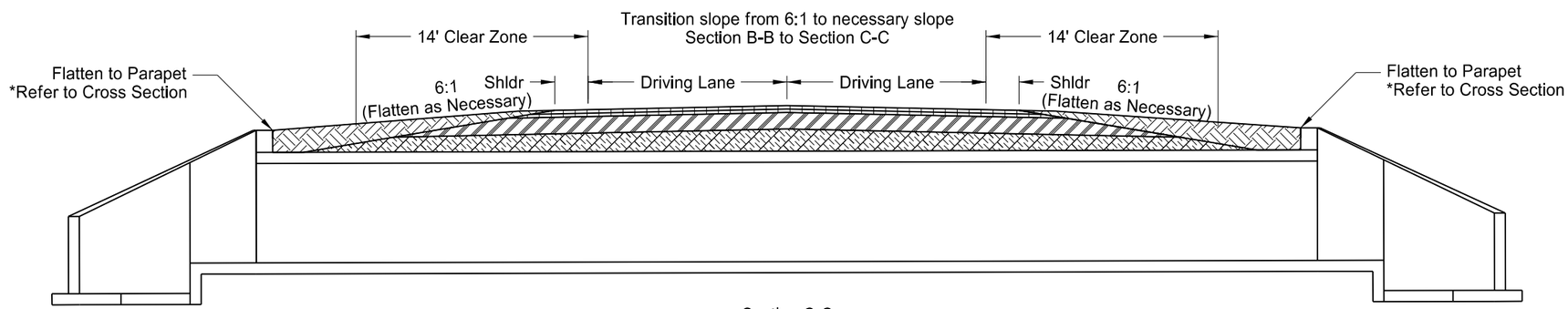
Section A-A

Transition slope from 4:1 to 6:1
Section A-A to Section B-B



Section B-B

Transition slope from 6:1 to necessary slope
Section B-B to Section C-C



Section C-C

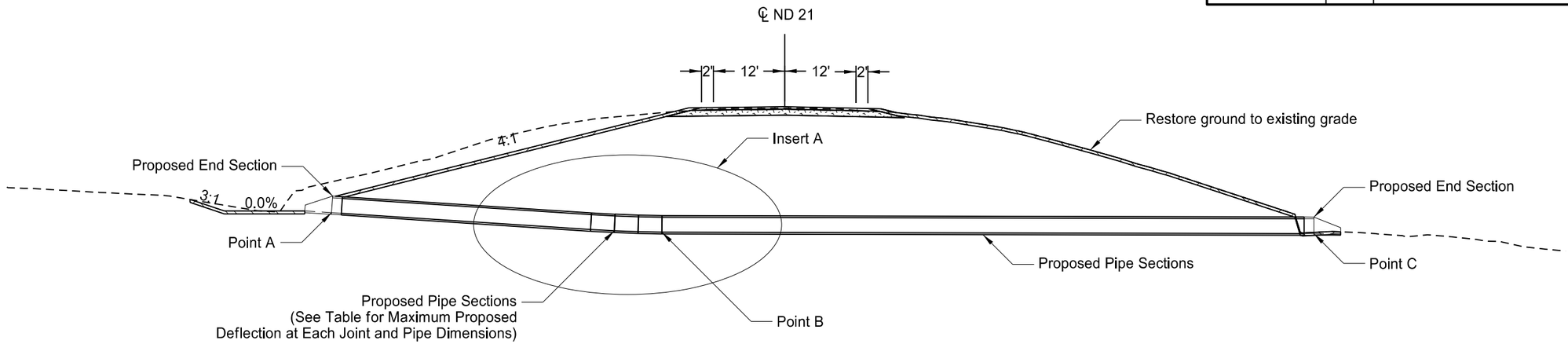
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Details

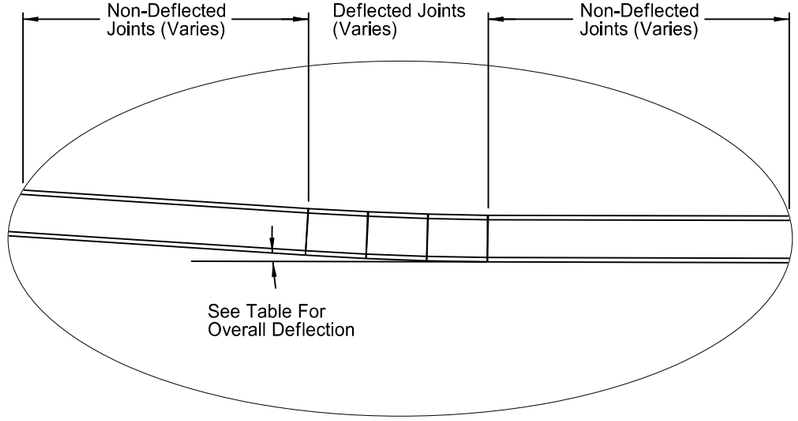
ND 21
Jct 85 to N Jct 22 - New England

Slope Flattening Detail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	20	13



Broken-Back Culvert Typical Section



Inset A

Begin Station	Offset	End station	Offset	Pipe Diameter (Inches)	Pipe Material	Overall Vertical Deflection (Degrees)	Proposed # of Joints to Deflect	Proposed Max Deflection Per Joint (Deg./Joint)
116+00.00	76' Lt	116+00.00	89' Rt	30	RCP	3.6	4	1

	Point A	Point B	Point C
Length (Feet)	0	56	166
Elevation	2729.53	2726.25	2726.00

Notes:

1. Install new pipe sections up to the maximum deflection angle per joint to obtain the required invert elevation.
2. Proposed number of joints to deflect is based on 4' pipe segment lengths.
3. Drawing not to scale.

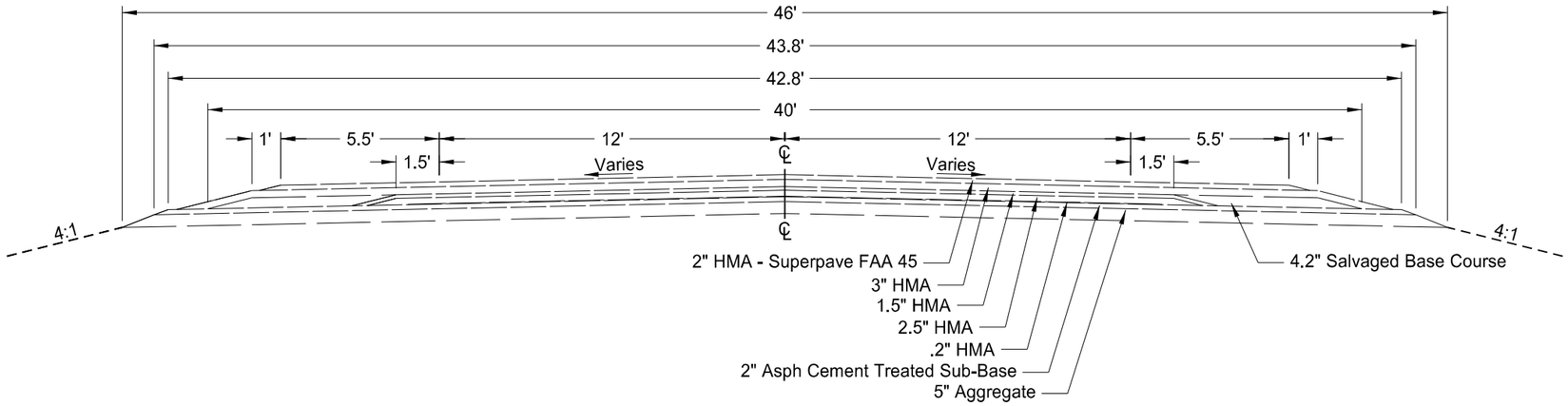
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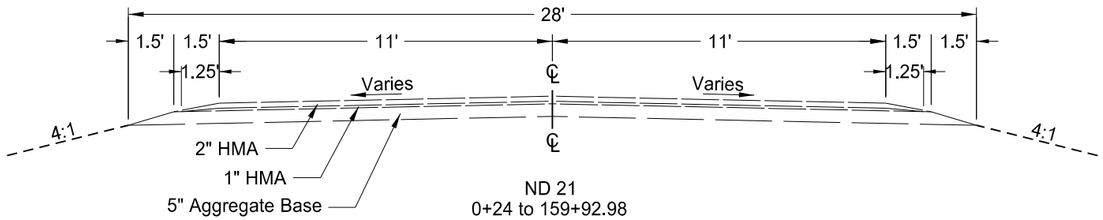
ND 21
Jct 85 to N Jct 22 - New England

Broken-Back Culvert Detail

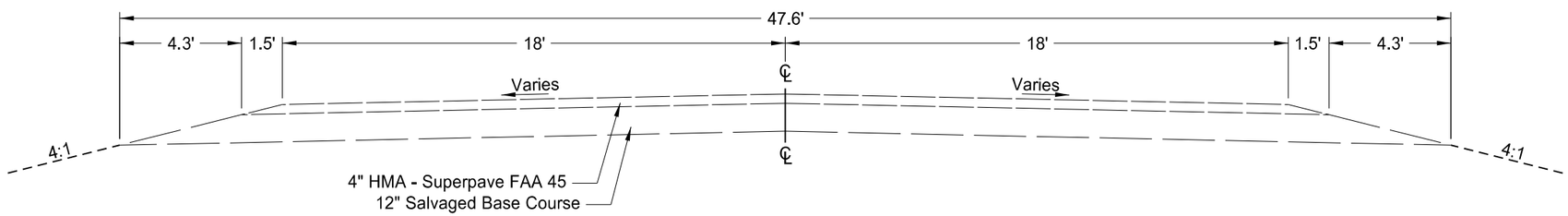
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	30	1



US 85
2639+44.69 to 2658+76.06



ND 21
0+24 to 159+92.98
160+97.98 to 204+74.66 Bk
206+39.52 Ah to 208+21.17
227+63.42 to 669+57.23
698+46.95 to 831+41.88



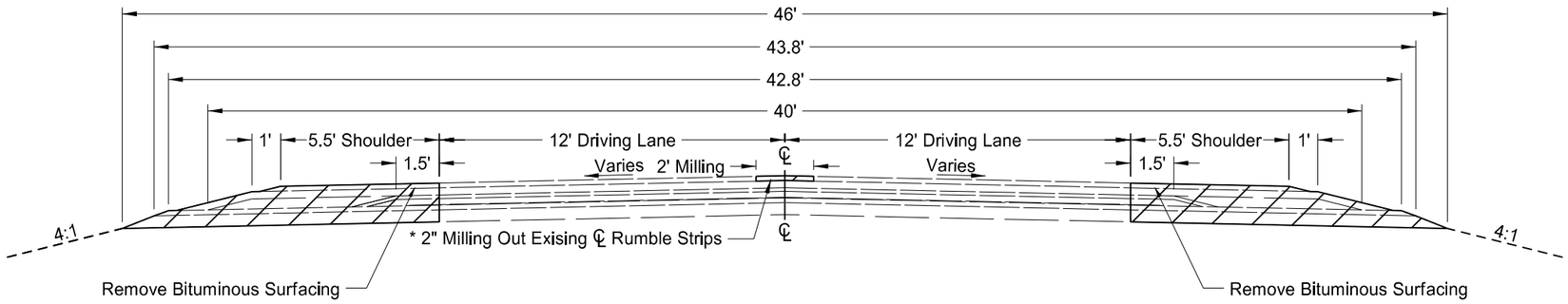
ND 21
208+21.17 to 227+63.42
669+57.23 to 698+46.95

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Existing Typical Sections

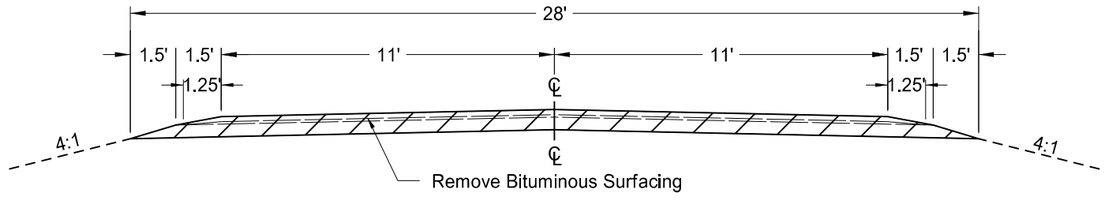
ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	30	2



*Mill Out Existing ℄ Rumble Strips
2639+44.69 to 2644+17
2646+17 to 2658+76.06

US 85
2640+44.69 to 2657+76.06



ND 21
Centerline Pipe, Box Culvert Locations, and Patching Area near Bridge #21-003.078

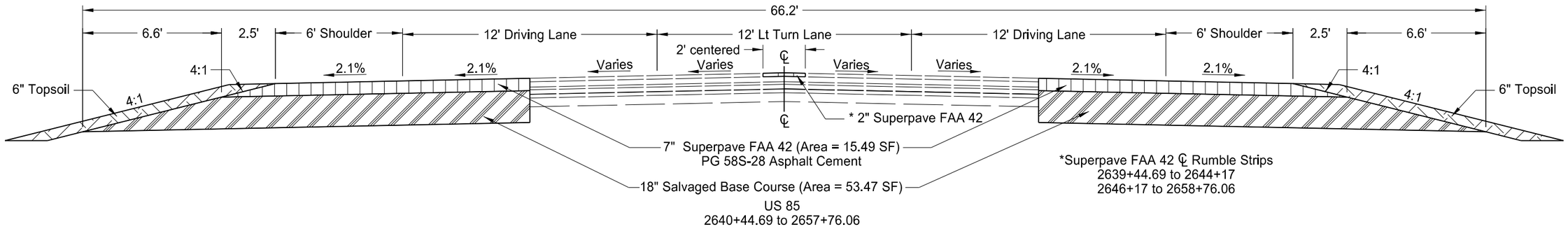
26+13 to 27+20	178+09.65 to 180+35.04	304+77 to 305+47	460+69 to 461+37	709+18 to 709+72
48+72 to 49+18	191+32 to 192+10	353+75 to 354+56	467+34 to 467+98	731+45 to 732+50
87+66 to 88+49	199+82 to 200+78	366+74 to 367+05	492+50 to 493+00	750+49 to 750+81
103+72 to 104+65	229+17.66 to 231+07.82	387+71.81 to 389+90.31	516+18 to 516+97	758+77 to 759+37
115+68 to 116+32	236+58 to 237+28	399+25 to 399+99	531+70.93 to 533+74.69	787+06 to 788+13
147+91 to 148+52	259+48 to 260+79	413+69 to 414+43	548+39 to 549+10	812+47 to 813+28
153+66 to 154+41	282+27 to 283+03	441+68 to 442+42	617+40.6 to 619+48.44	821+89 to 822+39
158+22.98 to 159+92.98	289+92 to 290+28	446+52 to 447+26	652+37 to 653+15	830+35 to 831+03
160+97.98 to 162+67.98				

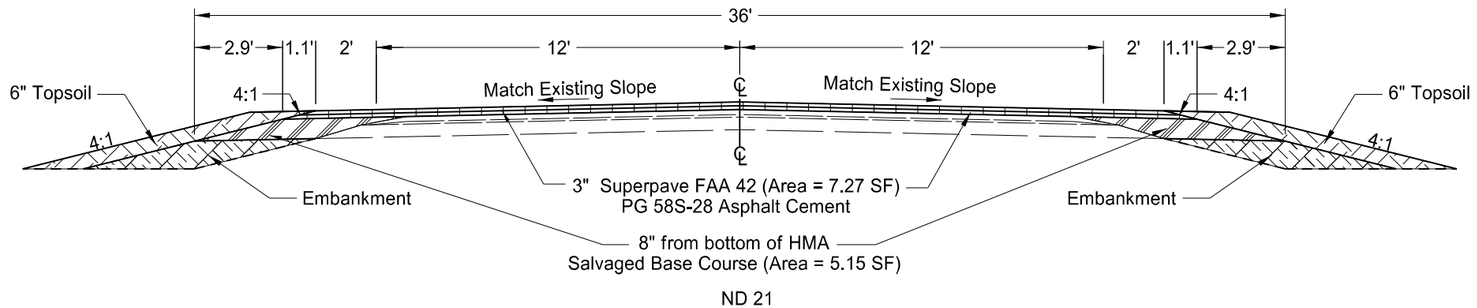
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Removal Typical Sections

ND 21
Jct 85 to N Jct 22 - New England

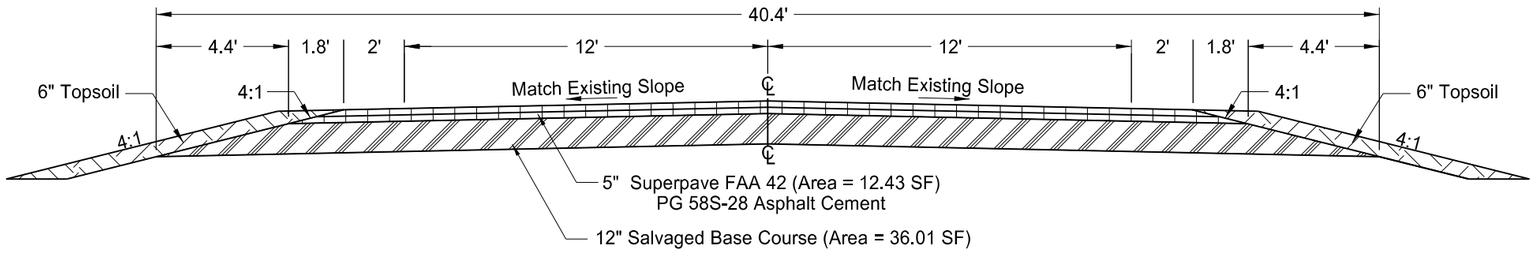
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	30	3





ND 21

1+74 to 26+13	180+35.04 to 191+32	290+28 to 304+77	461+37 to 467+34	709+72 to 731+45
27+20 to 48+72	192+10 to 199+82	305+47 to 353+75	467+98 to 492+50	732+50 to 750+49
49+18 to 87+66	200+78 to 204+74.66 Bk	354+56 to 366+74	493+00 to 516+18	750+81 to 758+77
88+49 to 103+72	206+39.52 Ah to 208+21.17	367+05 to 387+71.81	516+97 to 531+70.93	759+37 to 787+06
104+65 to 115+68	227+63.42 to 229+17.66	389+90.31 to 399+25	533+74.69 to 548+39	788+13 to 812+47
116+32 to 147+91	231+07.82 to 236+58	399+99 to 413+69	549+10 to 617+40.6	813+28 to 821+89
148+52 to 153+66	237+28 to 259+48	414+43 to 441+68	619+48.44 to 652+37	822+39 to 830+35
154+41 to 158+22.98	260+79 to 282+27	442+42 to 446+52	653+15 to 669+57.23	
162+67.98 to 178+09.65	283+03 to 289+92	447+26 to 460+69	698+46.95 to 709+18	



ND 21
Centerline Pipe, Box Culvert Locations, and Patching Area near Bridge 21-003.078

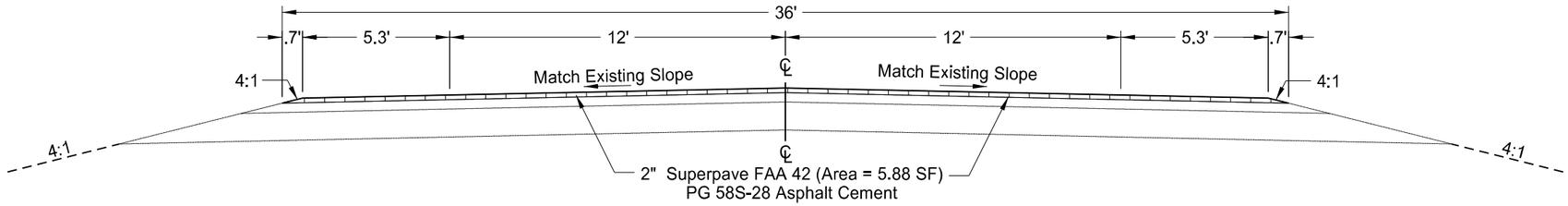
26+13 to 27+20	178+09.65 to 180+35.04	304+77 to 305+47	460+69 to 461+37	709+18 to 709+72
48+72 to 49+18	191+32 to 192+10	353+75 to 354+56	467+34 to 467+98	731+45 to 732+50
87+66 to 88+49	199+82 to 200+78	366+74 to 367+05	492+50 to 493+00	750+49 to 750+81
103+72 to 104+65	229+17.66 to 231+07.82	387+71.81 to 389+90.31	516+18 to 516+97	758+77 to 759+37
115+68 to 116+32	236+58 to 237+28	399+25 to 399+99	531+70.93 to 533+74.69	787+06 to 788+13
147+91 to 148+52	259+48 to 260+79	413+69 to 414+43	548+39 to 549+10	812+47 to 813+28
153+66 to 154+41	282+27 to 283+03	441+68 to 442+42	617+40.6 to 619+48.44	821+89 to 822+39
158+22.98 to 159+92.98	289+92 to 290+28	446+52 to 447+26	652+37 to 653+15	830+35 to 831+03
160+97.98 to 162+67.98				

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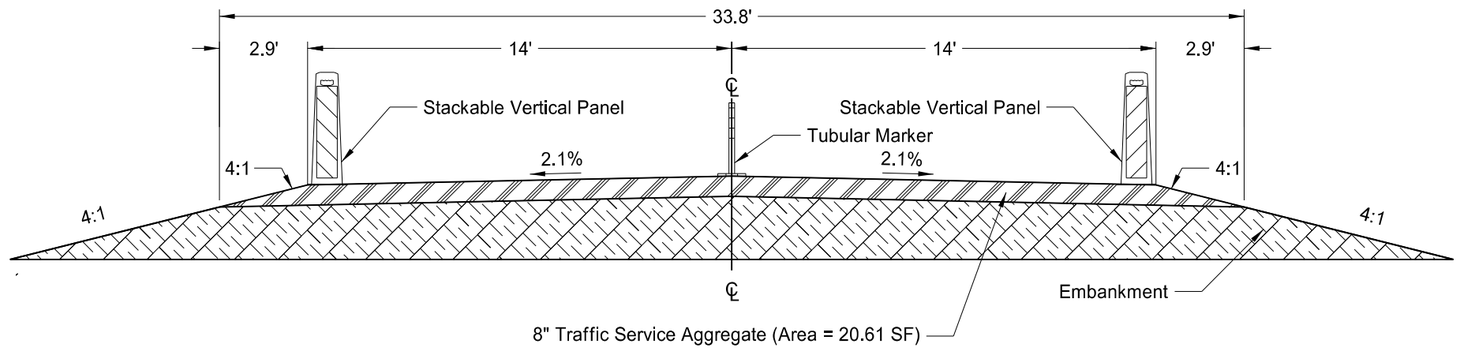
Proposed Typical Sections

ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	30	4

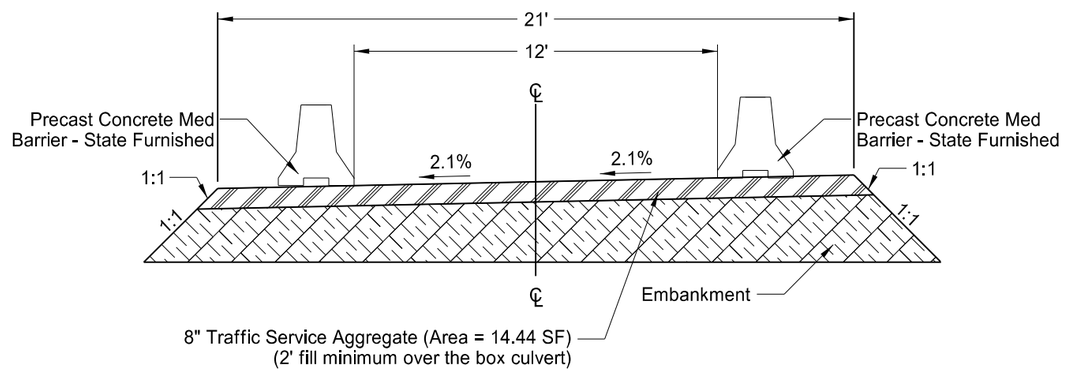


ND 21
208+21.17 to 227+63.42
669+57.23 to 698+46.95



ND 21
Tempoary Bypass
Box Culvert Replacement Locations

179+22.41 (Structure # 21-003.425)
230+12.74 (Structure # 21-004.352)
532+72.81 (Structure # 21-010.105)
618+44.52 (Structure # 21-011.734)



ND 21
Box Culvert Replacement Locations

388+81.06 (Structure # 21-007.381)

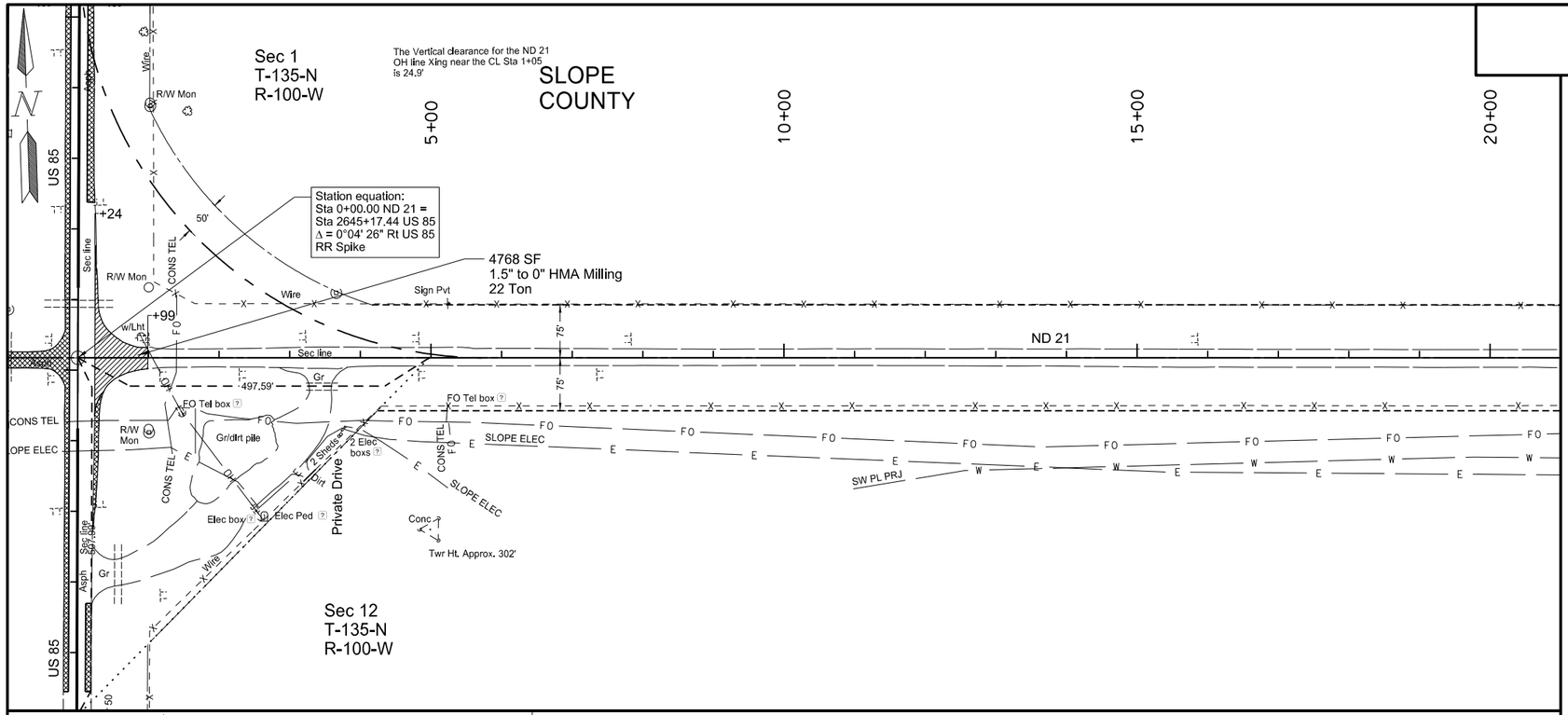
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Proposed Typical Sections

ND 21
Jct 85 to N Jct 22 - New England

Overlay Locations
Box Culvert Replacement Locations

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	1



SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		26+13 to 27+20	97	TON
411	0100	MILLING PAVEMENT SURFACE		
		0+24 to 0+99	22	TON

LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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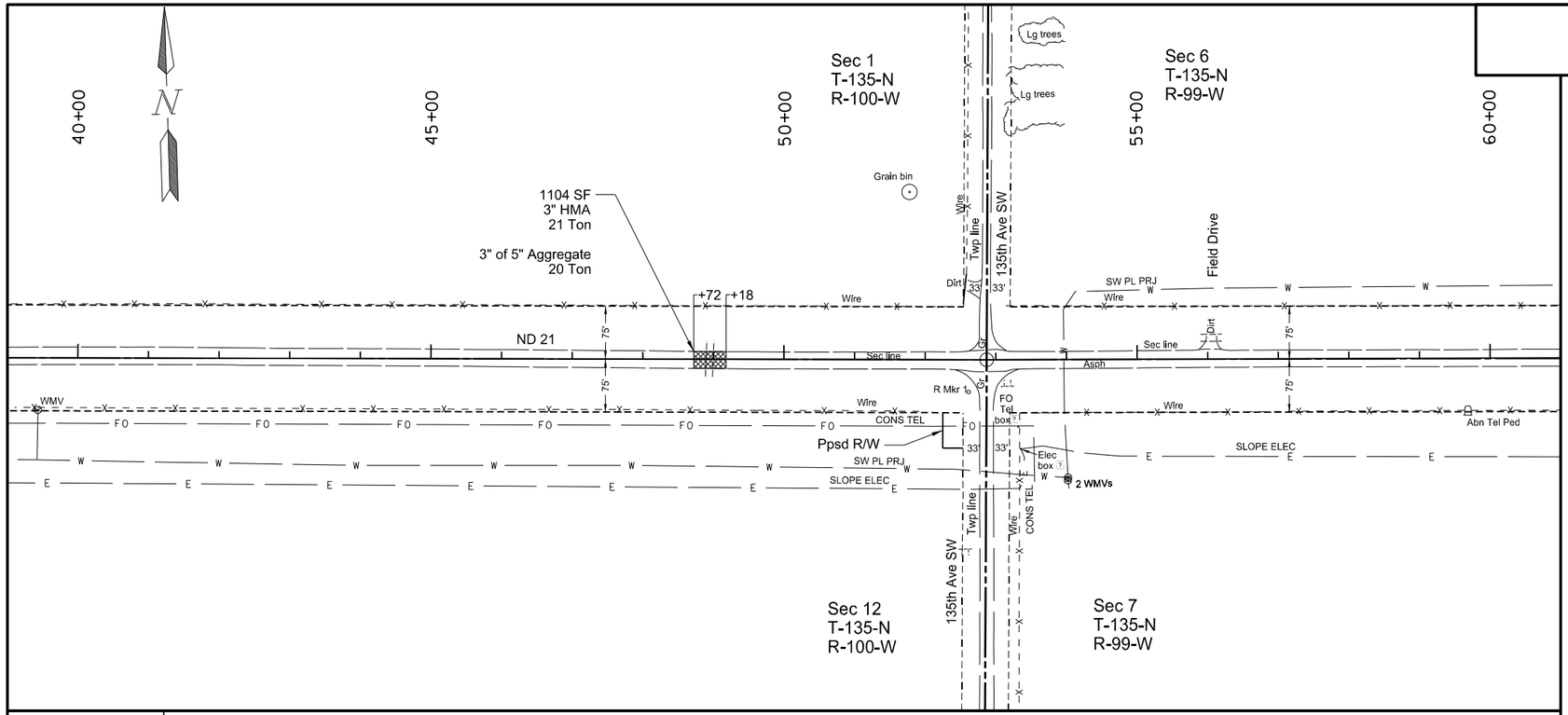
Removals

ND 21
Jct 85 to N Jct 22 - New England

0+24 to 40+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	2

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		48+72 to 49+18	41	TON



LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
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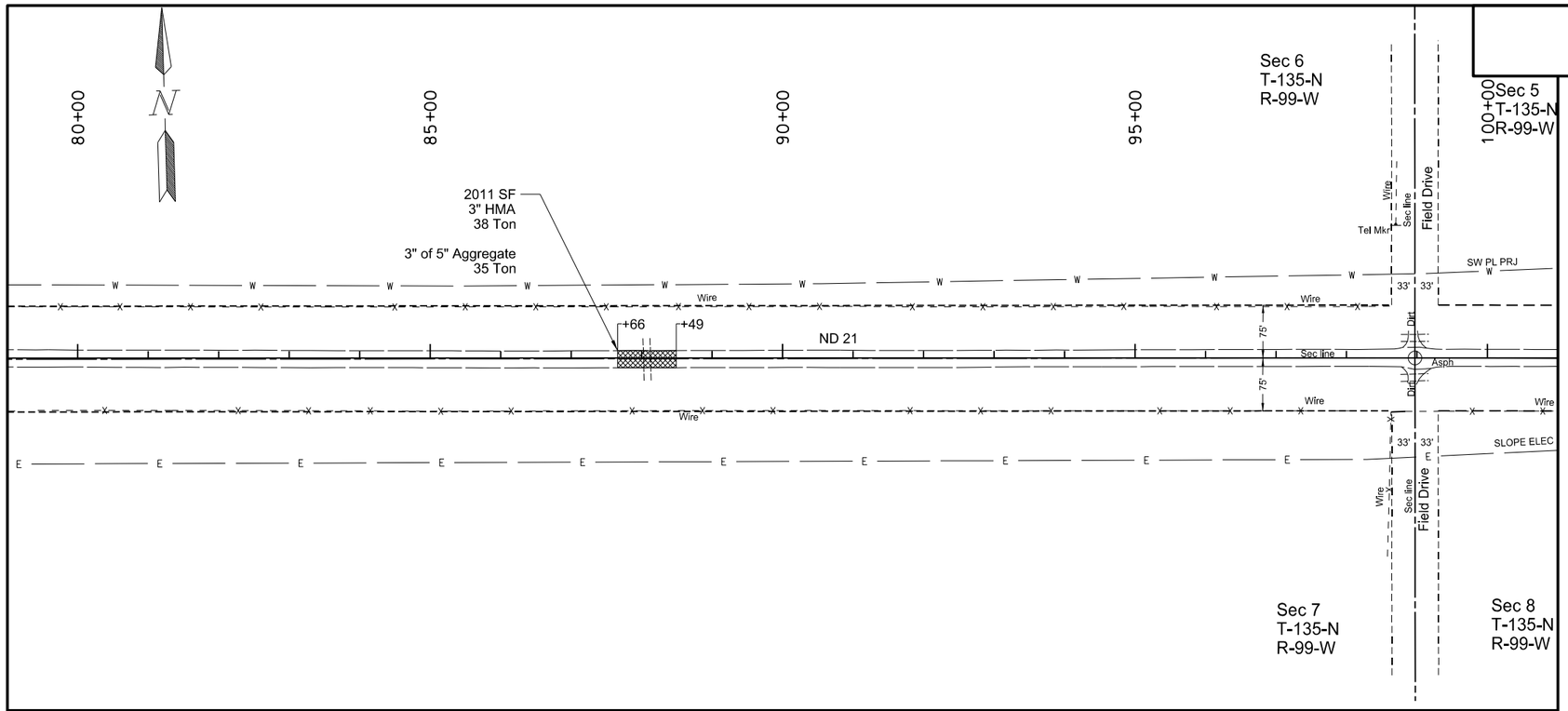
Removals

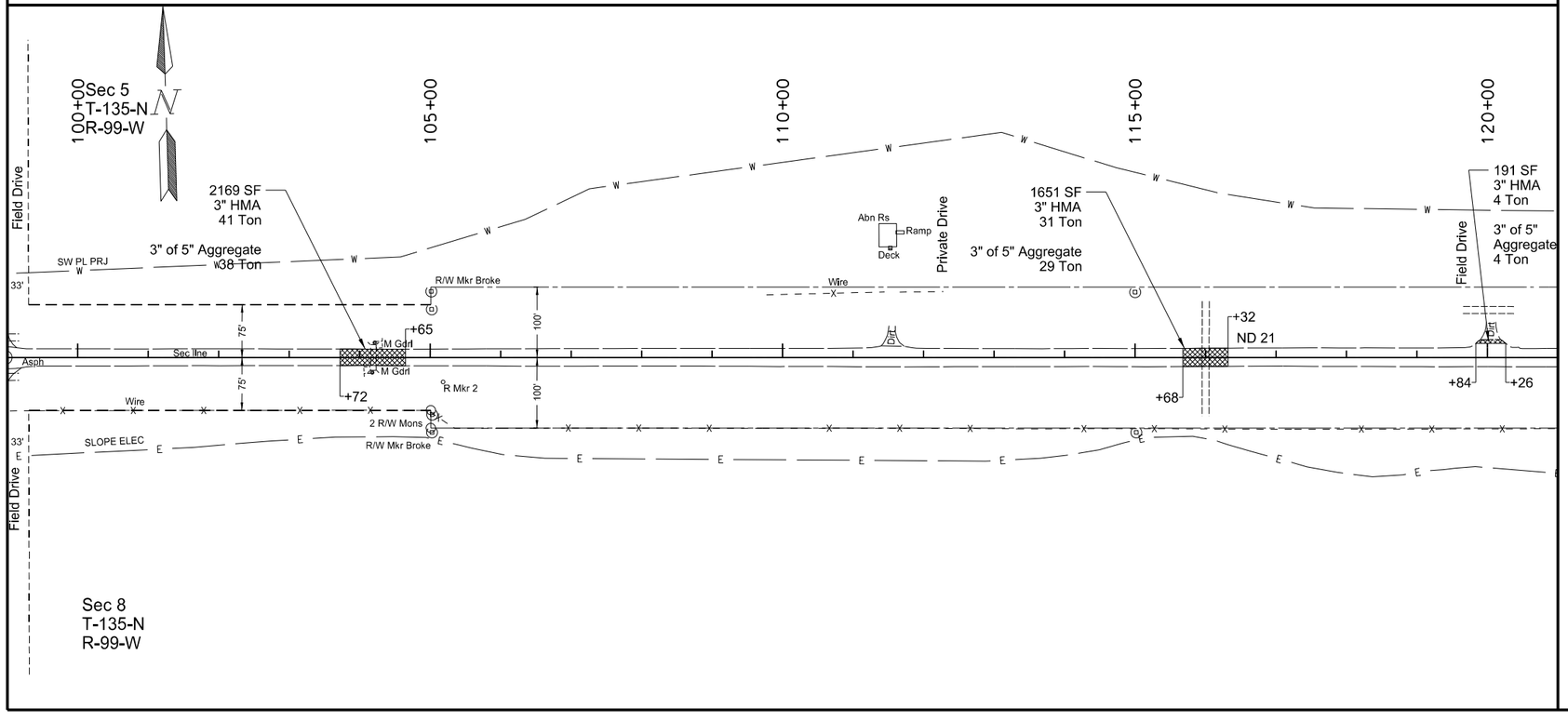
ND 21
Jct 85 to N Jct 22 - New England

40+00 to 80+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	3





SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		87+66 to 88+49	73	TON
		103+72 to 104+65	79	TON
		115+68 to 116+32	60	TON

LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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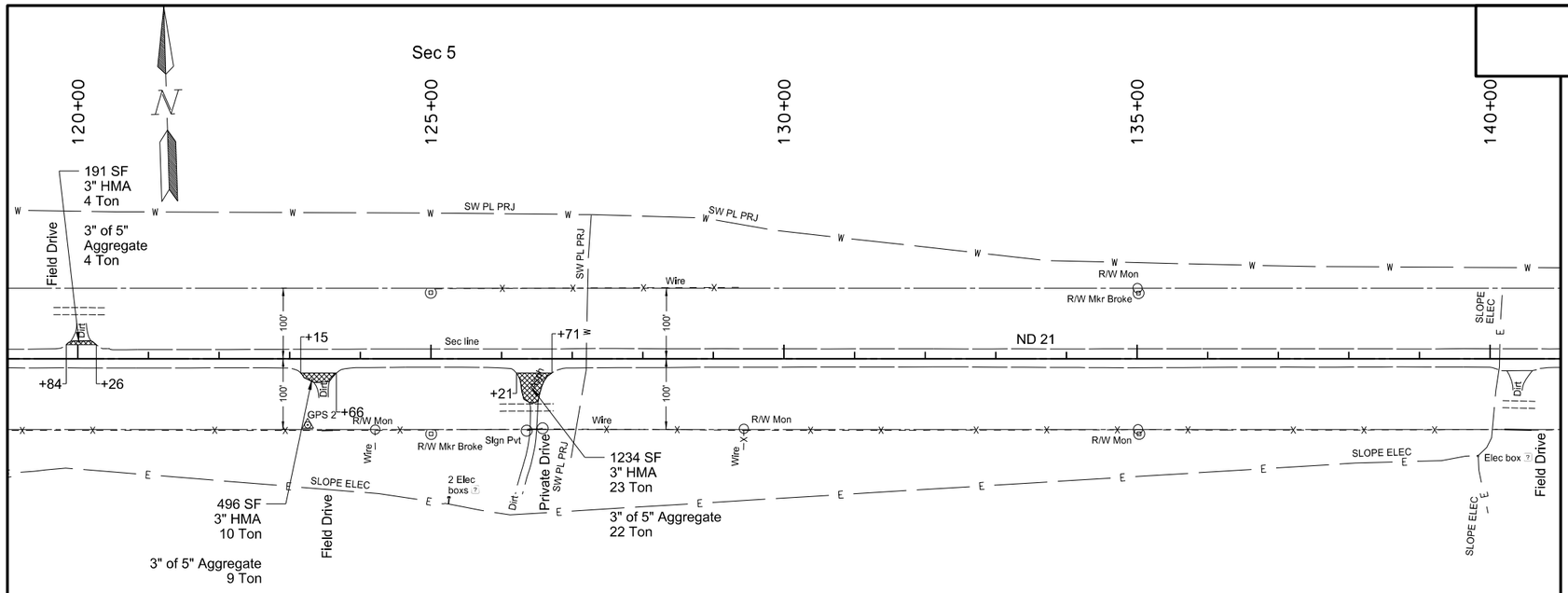
Removals

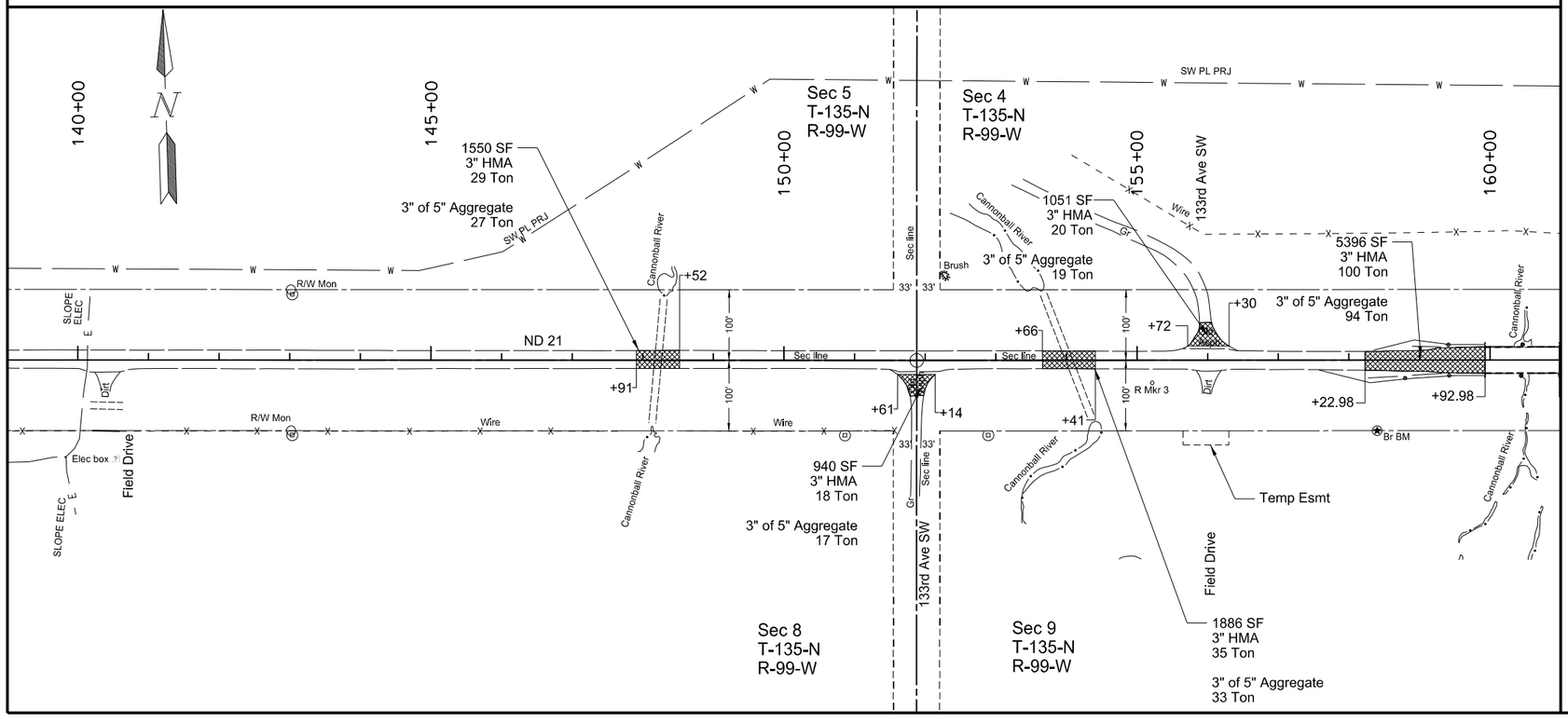
ND 21
Jct 85 to N Jct 22 - New England

80+00 to 120+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	4

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		119+84 to 120+26 Lt	8	TON
		123+15 to 123+66 Rt	19	TON
		126+21 to 126+71 Rt	45	TON
		147+91 to 148+52	56	TON
		151+61 to 152+14 Rt	35	TON
		153+66 to 154+41	68	TON
		155+72 to 156+30 Lt	39	TON
		158+22.98 to 159+92.98	194	TON





LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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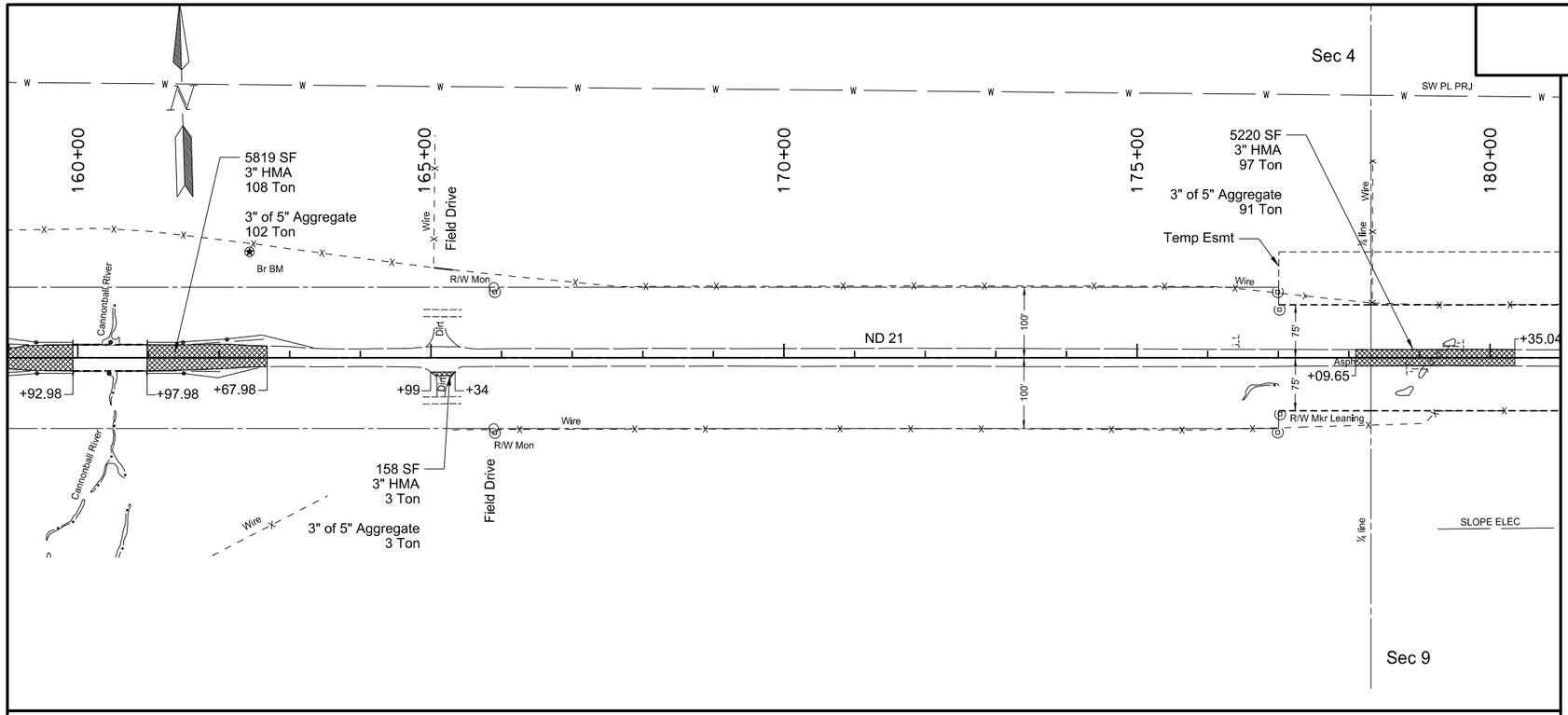
Removals

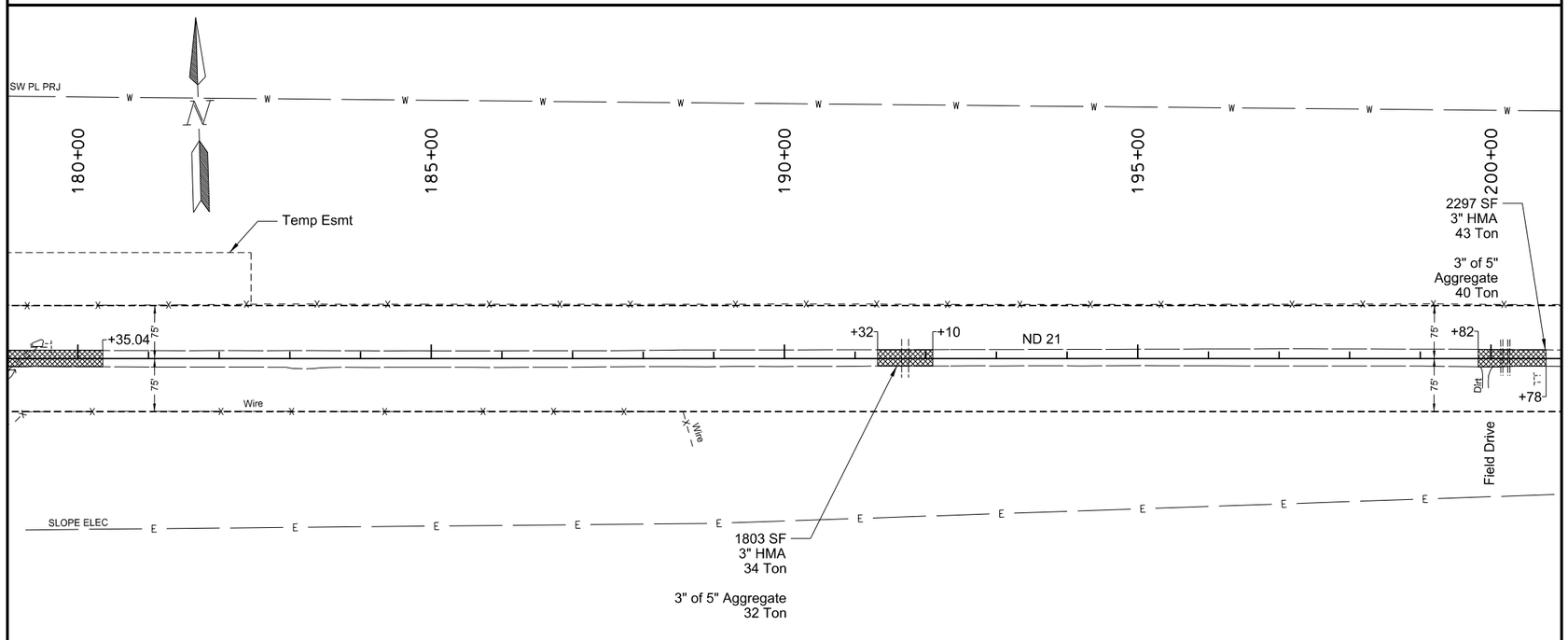
ND 21
Jct 85 to N Jct 22 - New England

120+00 to 159+92.98

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	5





SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		160+97.98 to 162+67.98	210	TON
		164+99 to 165+34 Rt	6	TON
		178+09.65 to 180+35.04	188	TON
		191+32 to 192+10	66	TON

LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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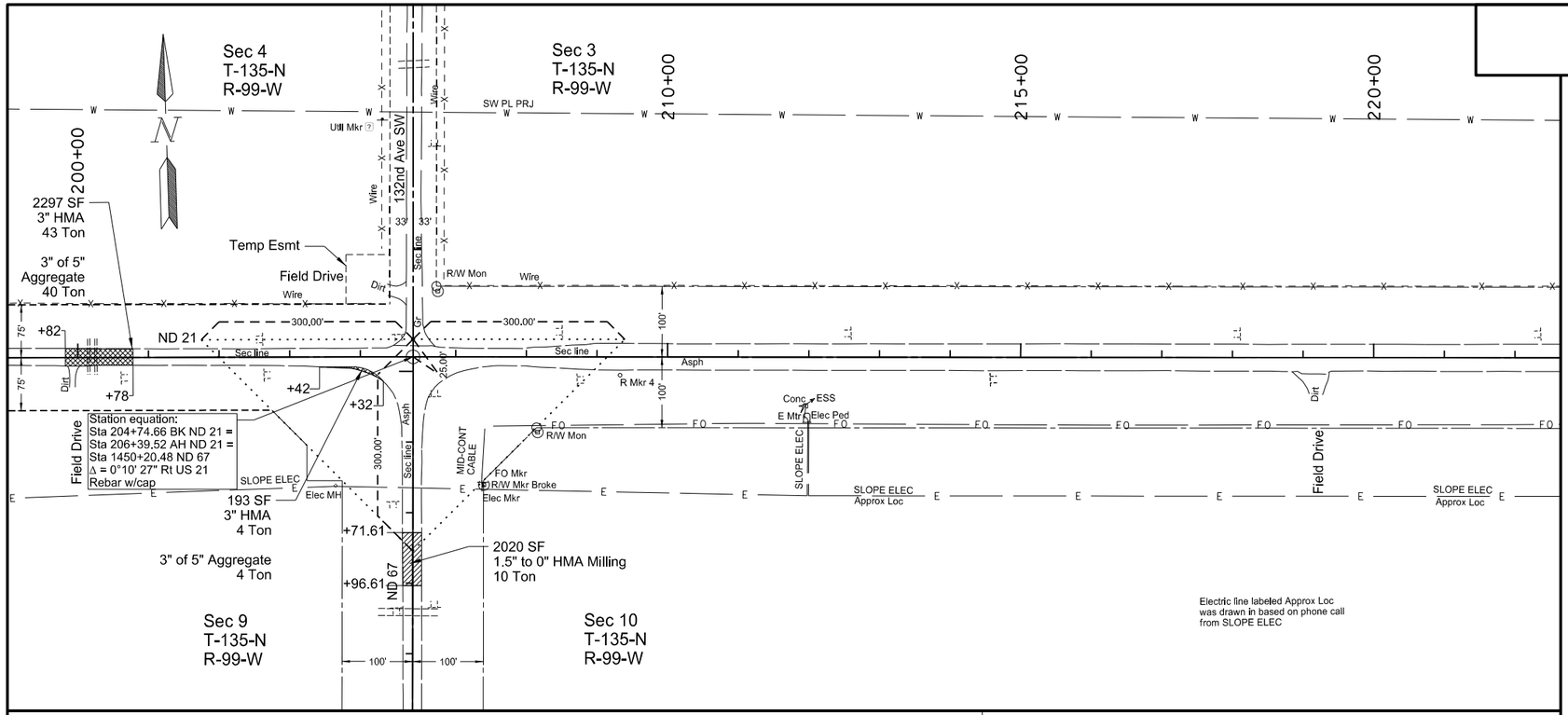
Removals

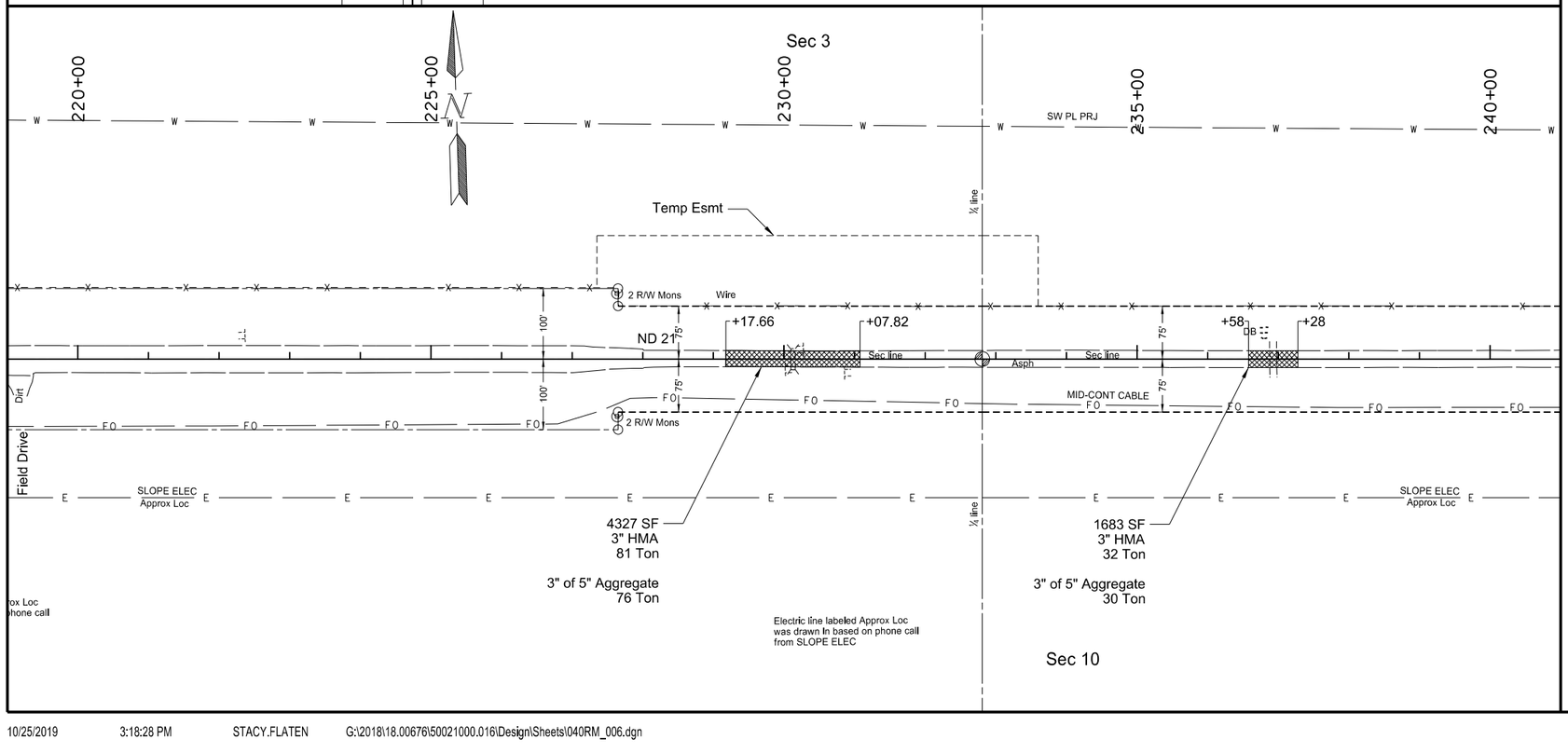
ND 21
Jct 85 to N Jct 22 - New England

160+97.98 to 200+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	6

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		199+82 to 200+78	83	TON
		203+42 to 204+32 Rt	8	TON
		229+17.66 to 231+07.82	157	TON
		236+58 to 237+28	62	TON
411	0100	MILLING PAVEMENT SURFACE		
		ND 67 1446+96.61 to 1447+71.61	10	TON





LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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Removals

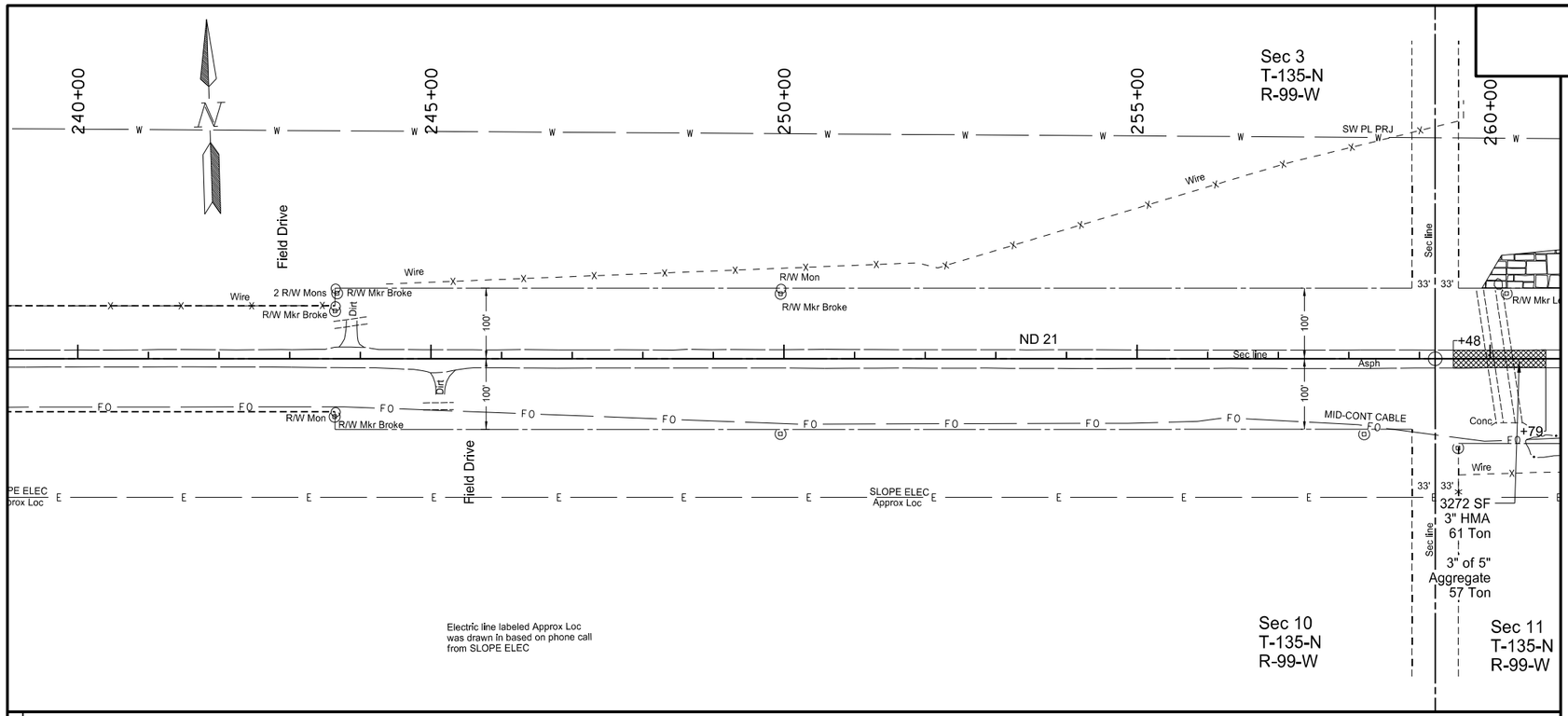
ND 21
Jct 85 to N Jct 22 - New England

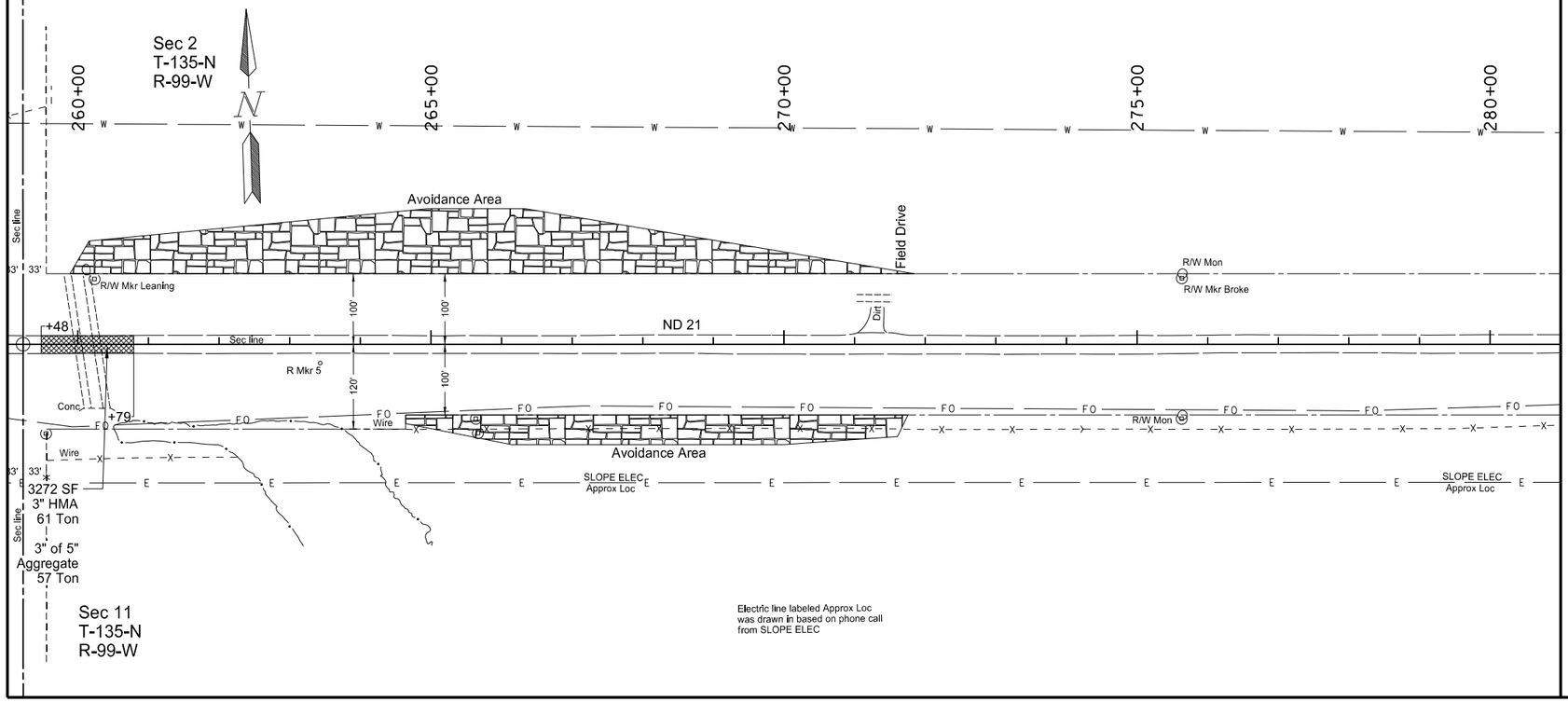
200+00 to 240+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	7

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		259+48 To 260+79	118	TON





LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

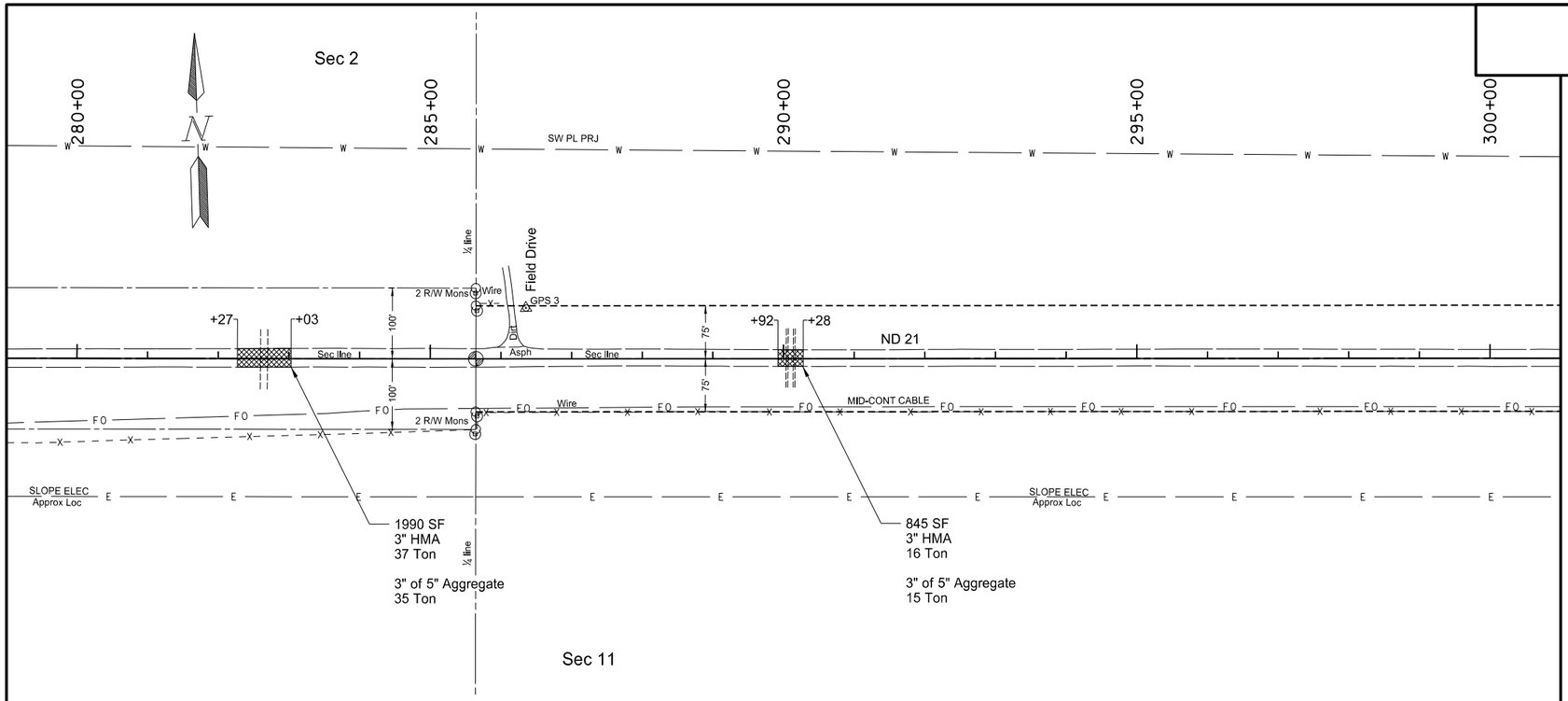
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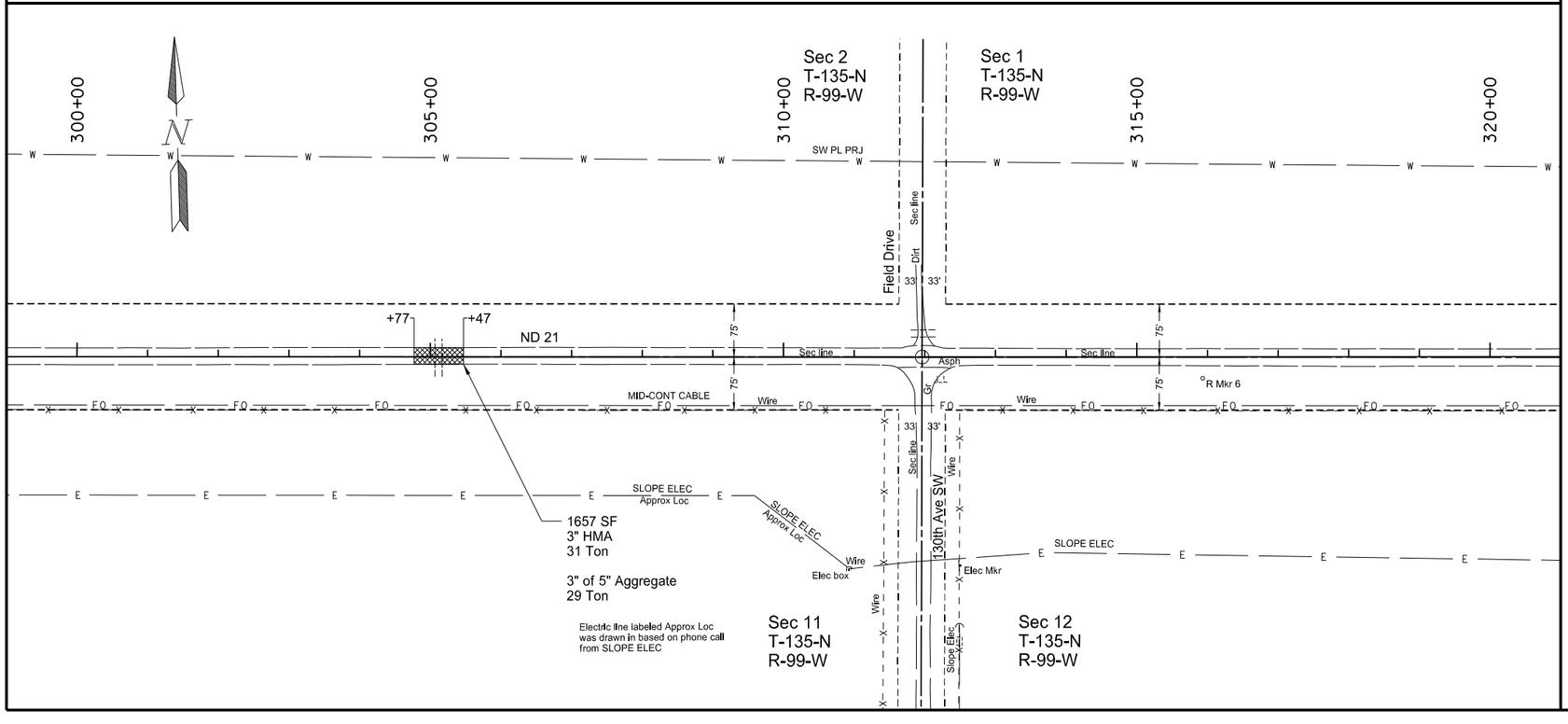
Removals

ND 21
Jct 85 to N Jct 22 - New England

240+00 to 280+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	8





SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		282+27 to 283+03	72	TON
		289+92 to 290+28	31	TON
		304+77 to 305+47	60	TON

LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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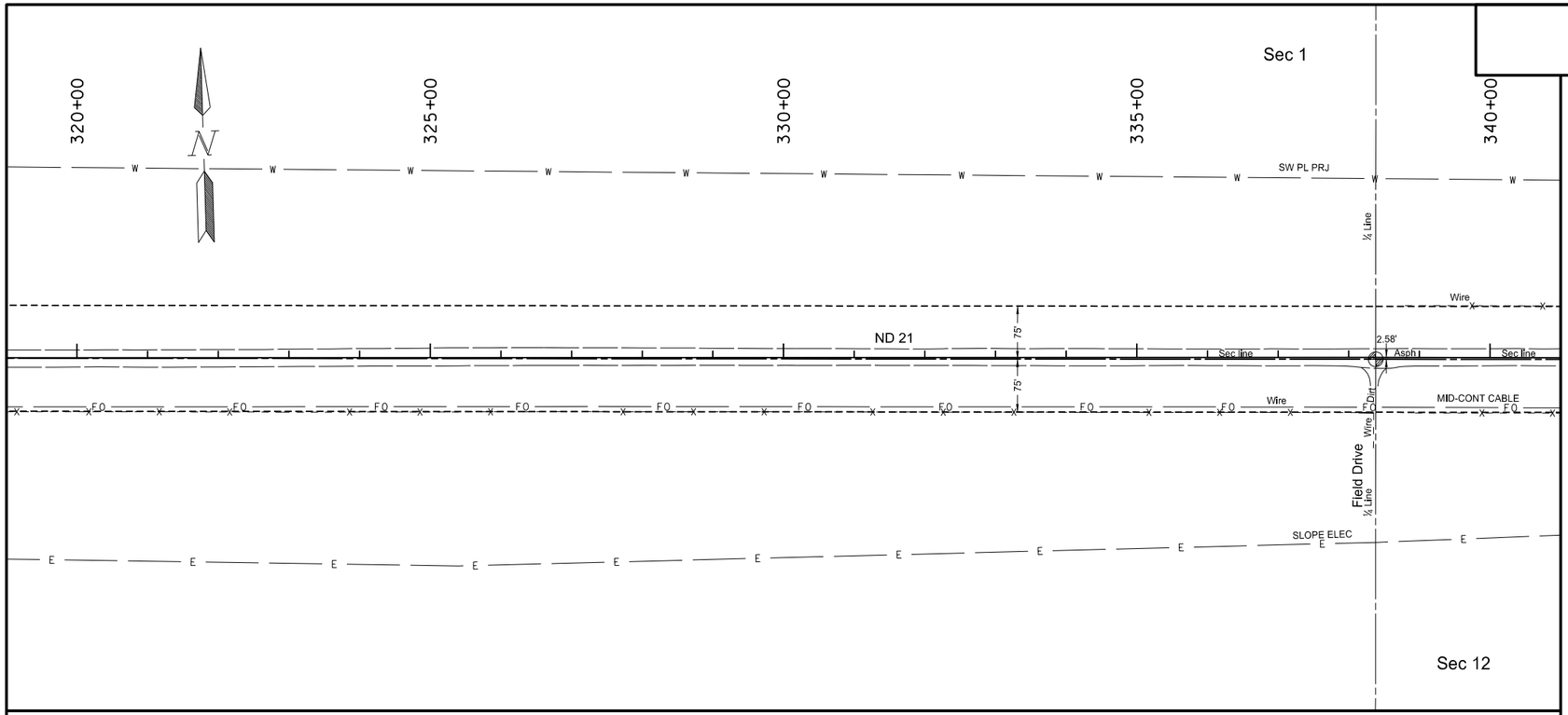
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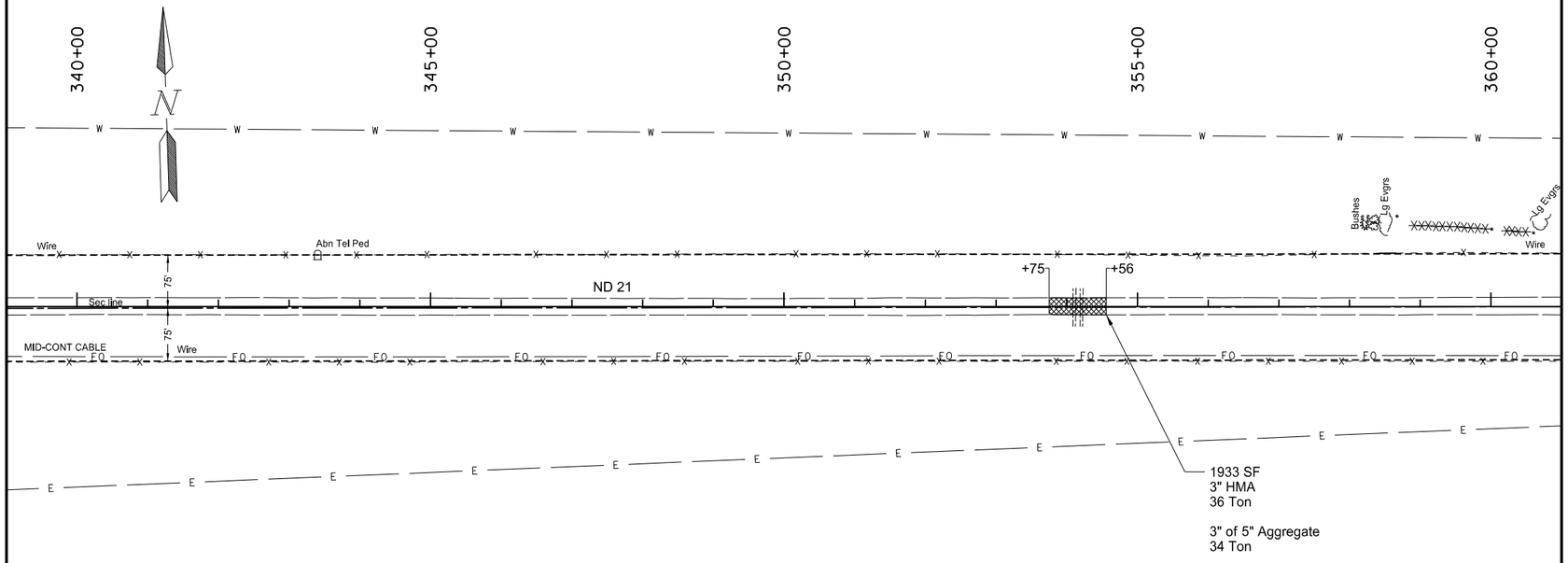
ND 21
Jct 85 to N Jct 22 - New England

280+00 to 320+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	9

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		353+75 to 354+56	70	TON





LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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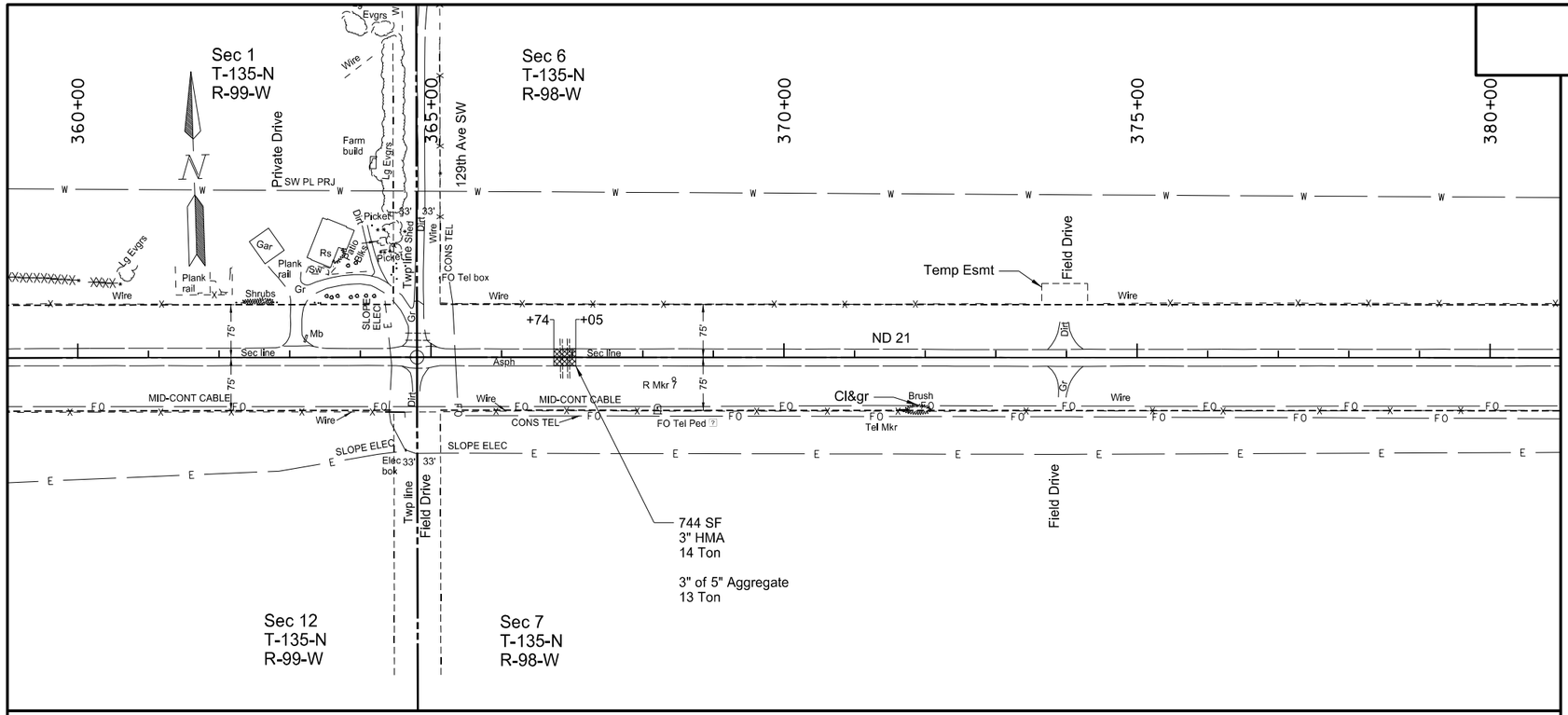
Removals

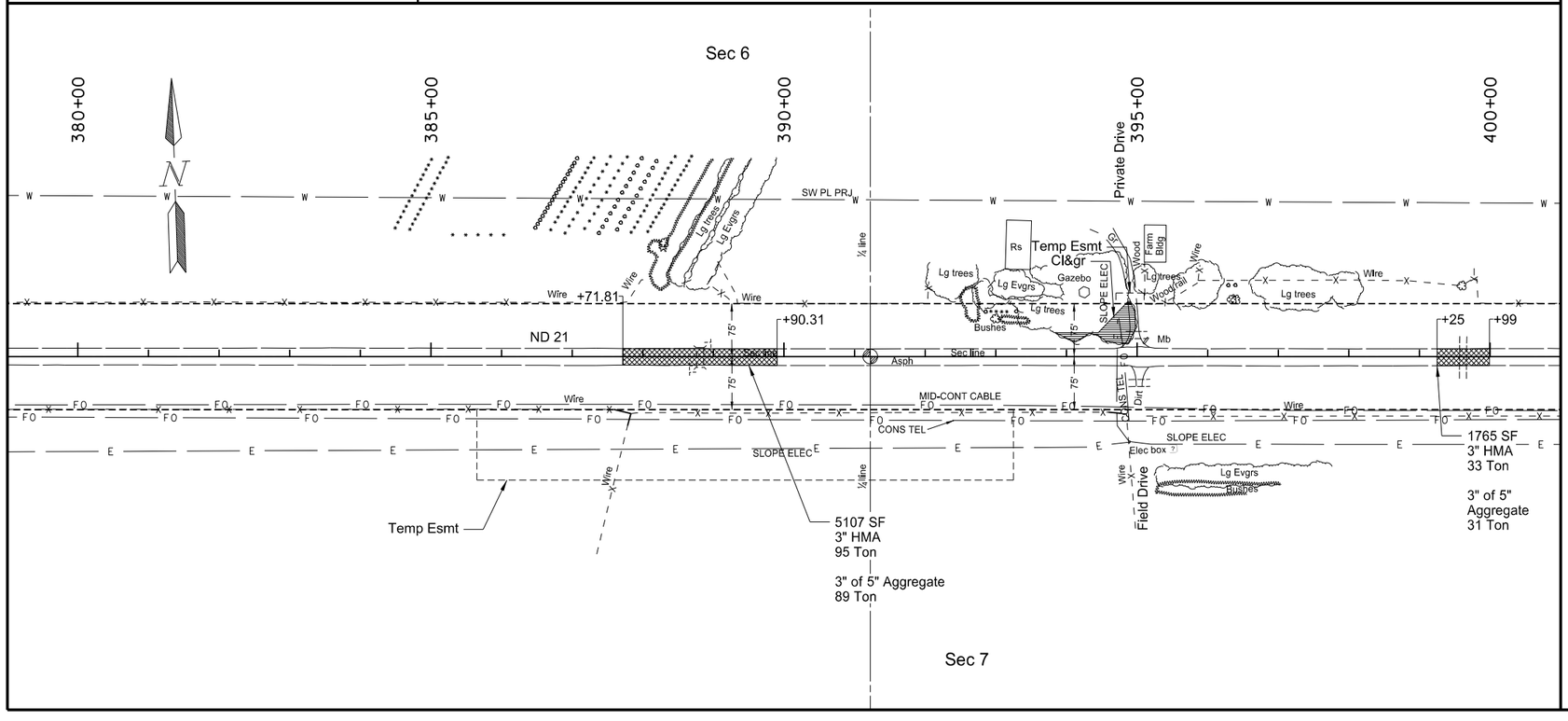
ND 21
Jct 85 to N Jct 22 - New England

320+00 to 360+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	10

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		366+74 to 367+05	27	TON
		387+71.81 to 389+90.31	184	TON
		399+25 to 399+99	64	TON





LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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Removals

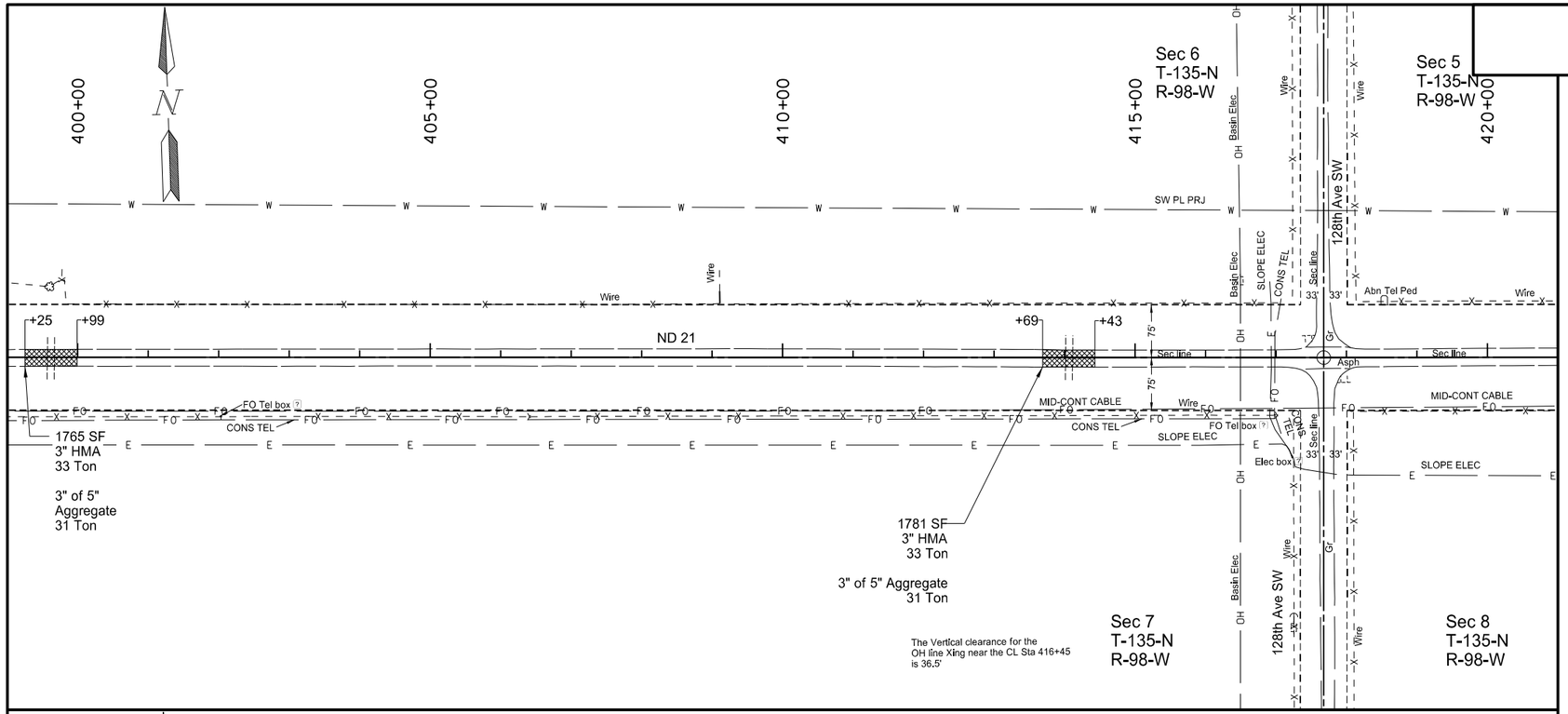
ND 21
Jct 85 to N Jct 22 - New England

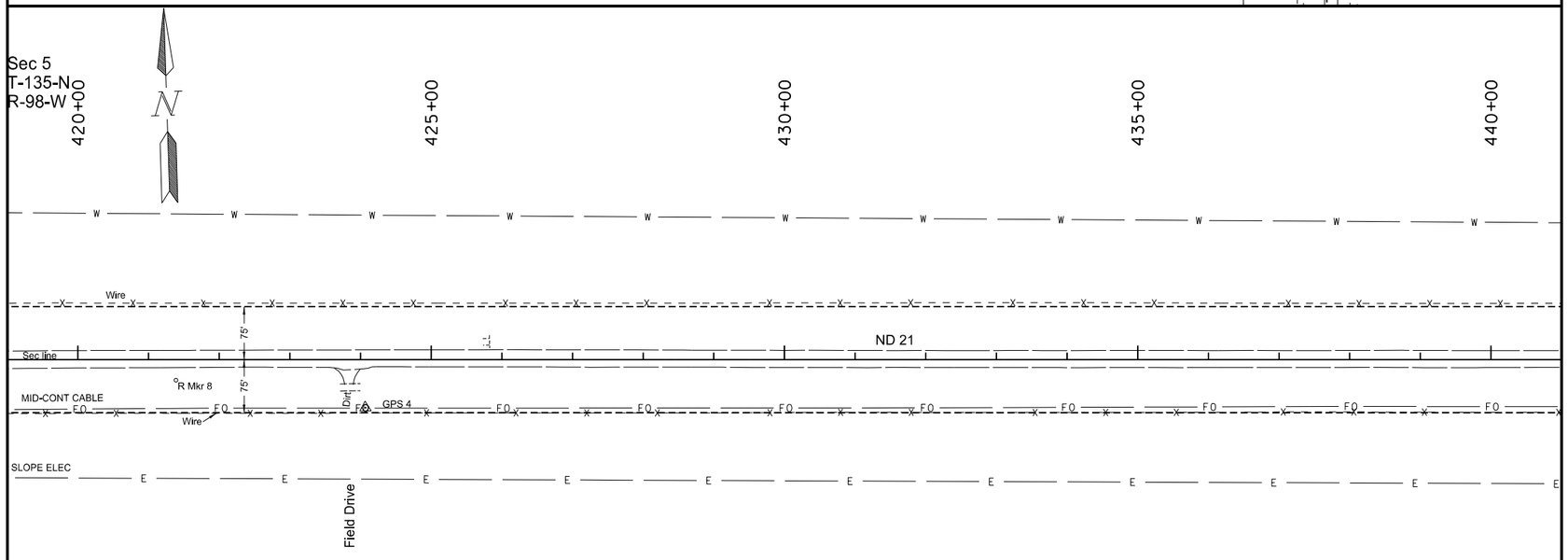
360+00 to 400+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	11

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		413+69 to 414+43	64	TON





LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

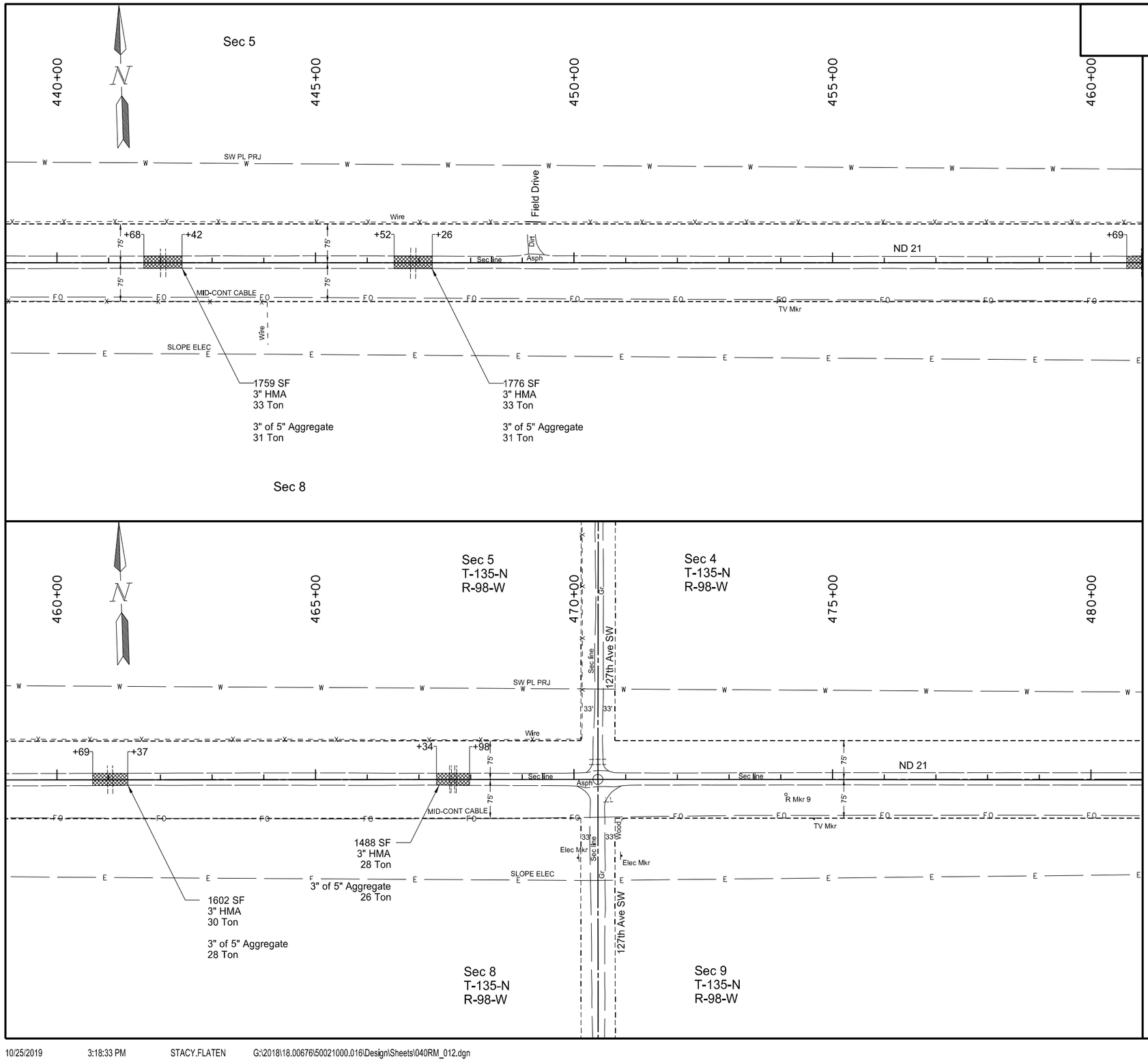
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Removals

ND 21
Jct 85 to N Jct 22 - New England

400+00 to 440+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	12



SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		441+68 to 442+42	64	TON
		446+52 to 447+26	64	TON
		460+69 to 461+37	58	TON
		467+34 to 467+98	54	TON

LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

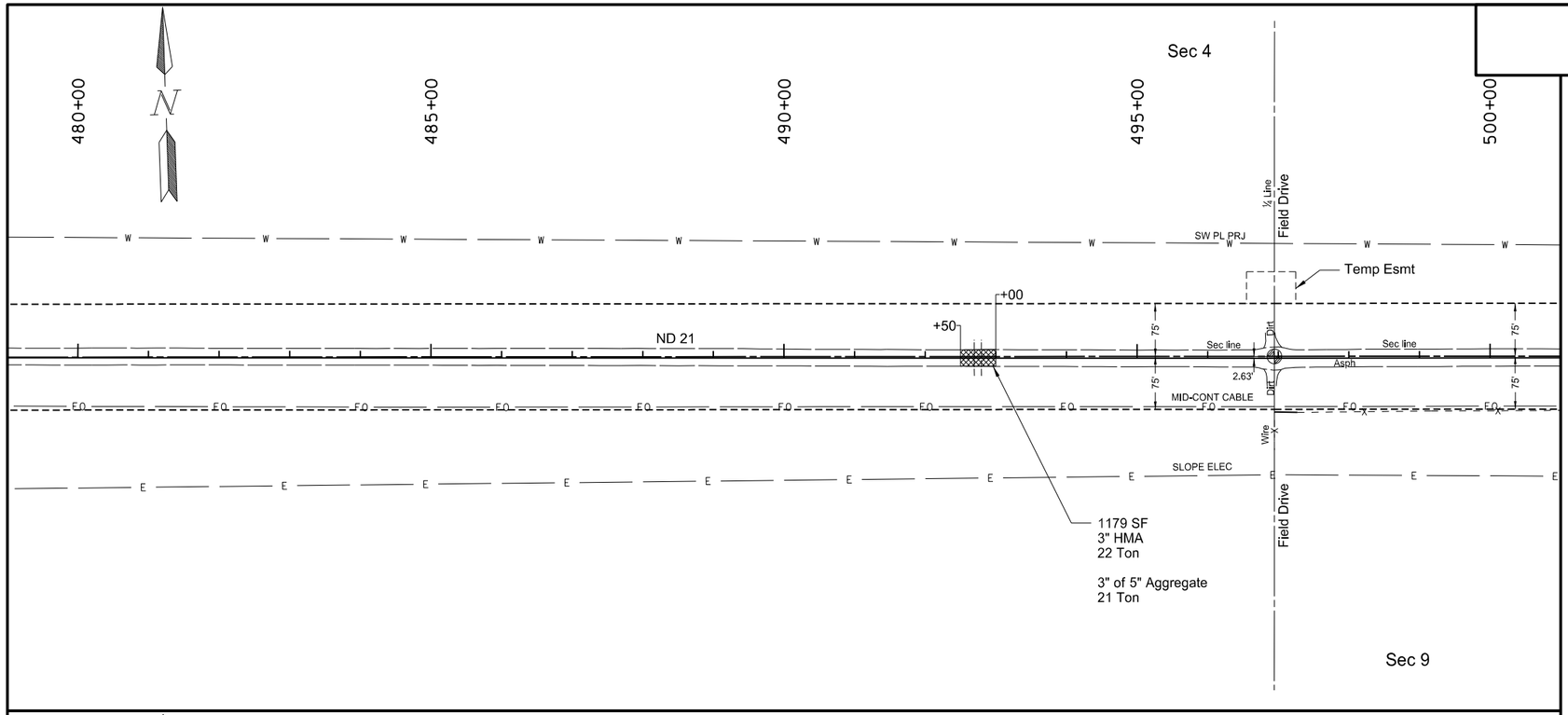
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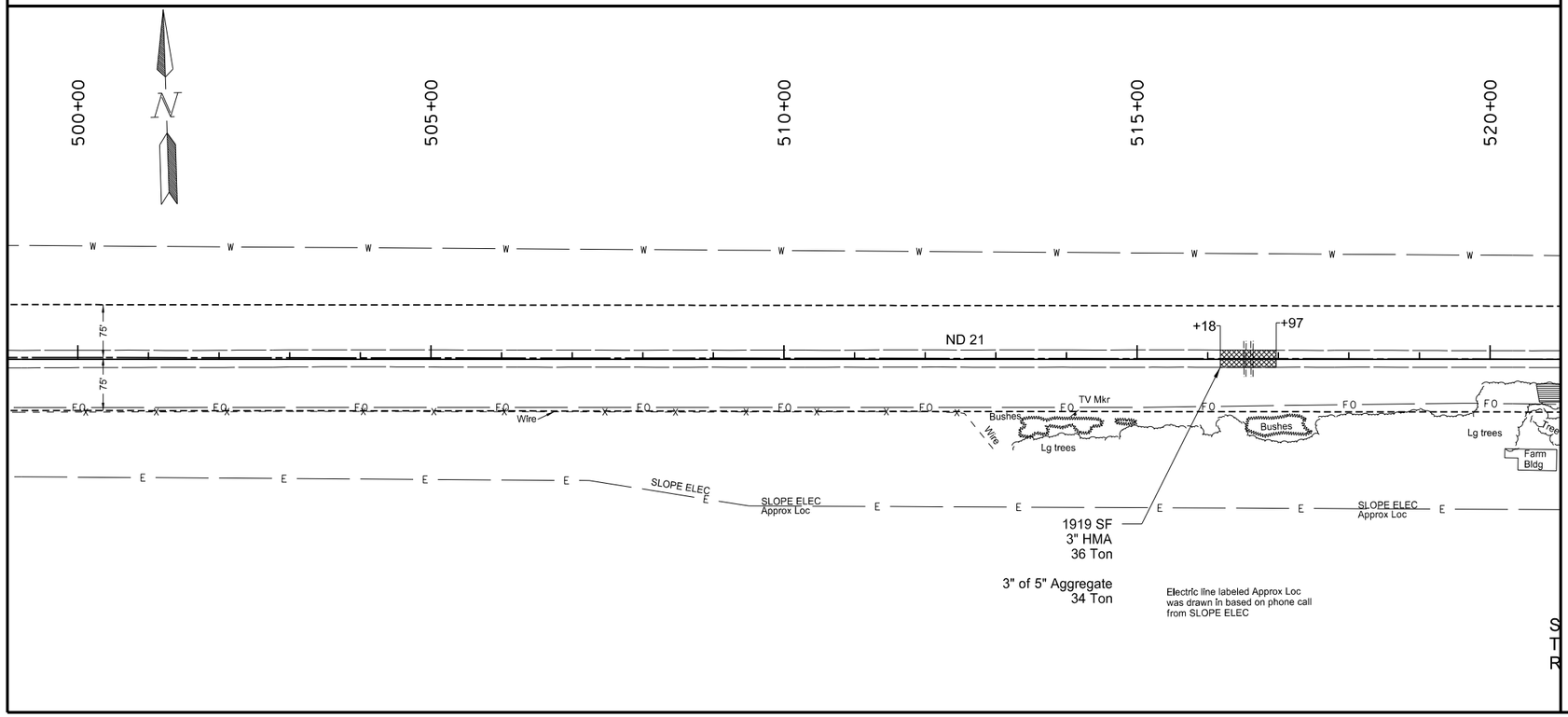
Removals

ND 21
Jct 85 to N Jct 22 - New England

440+00 to 480+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	13





SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		492+50 to 493+00	43	TON
		516+18 to 516+97	70	TON

LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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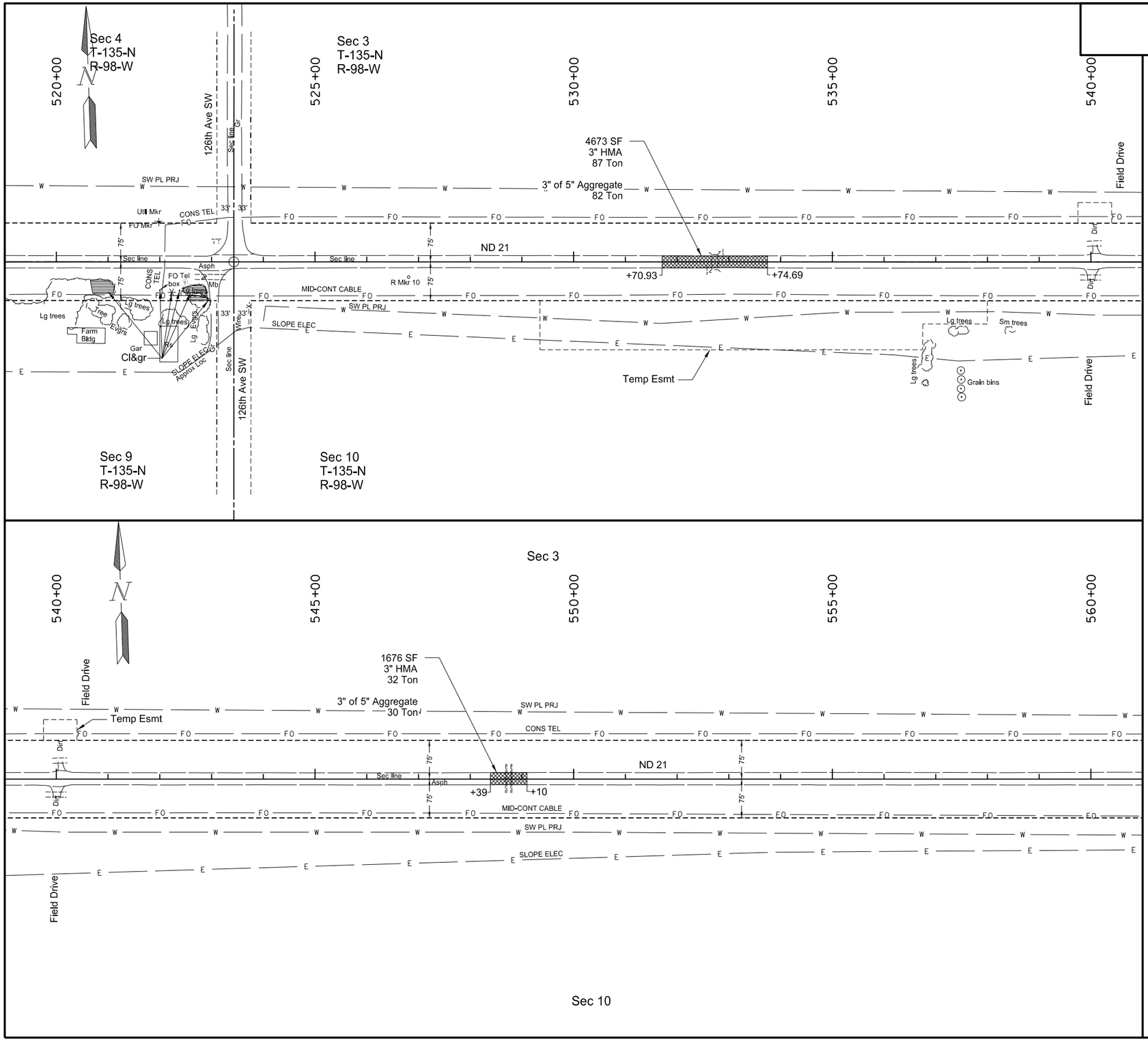
Removals

ND 21
Jct 85 to N Jct 22 - New England

480+00 to 520+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	14

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		531+70.93 to 533+74.69	169	TON
		548+39 to 549+10	62	TON



LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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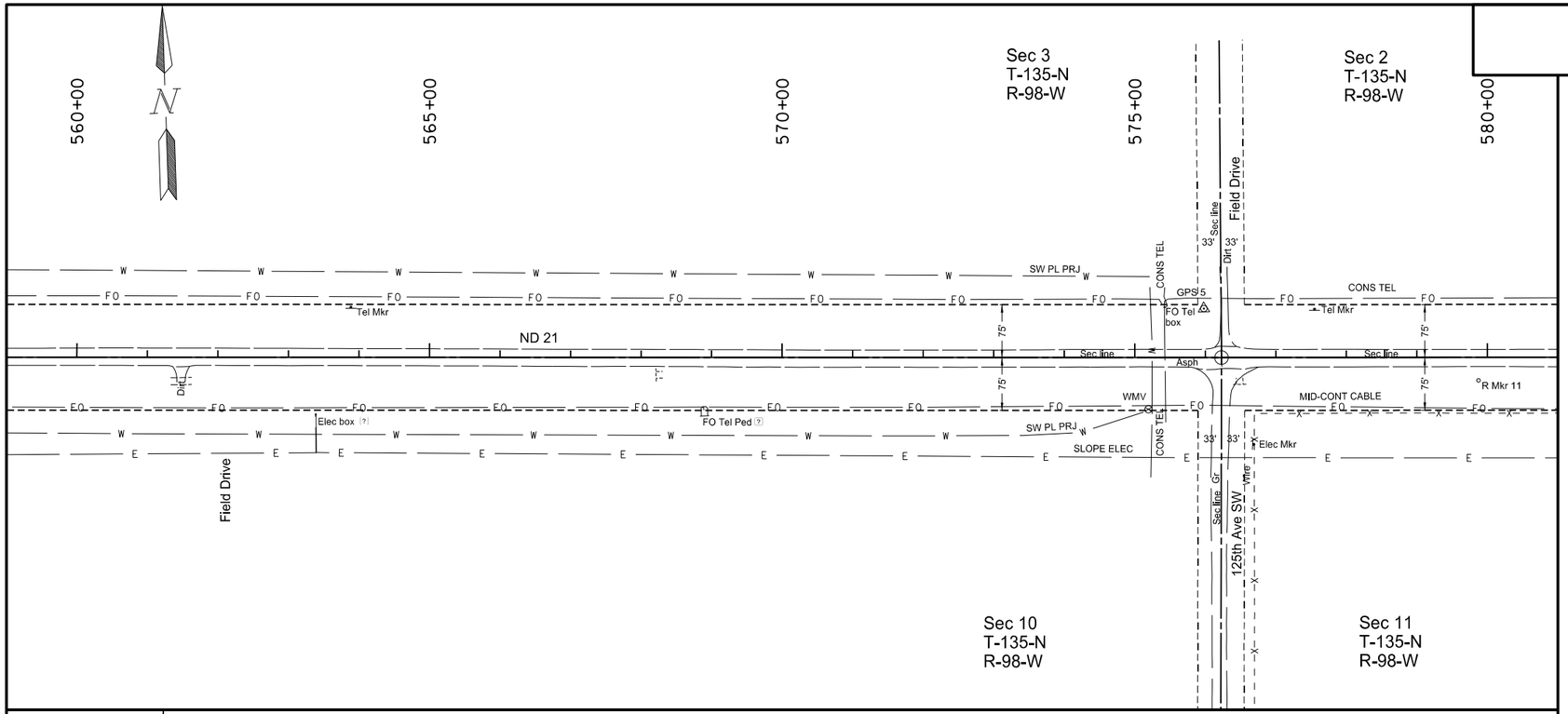
Removals

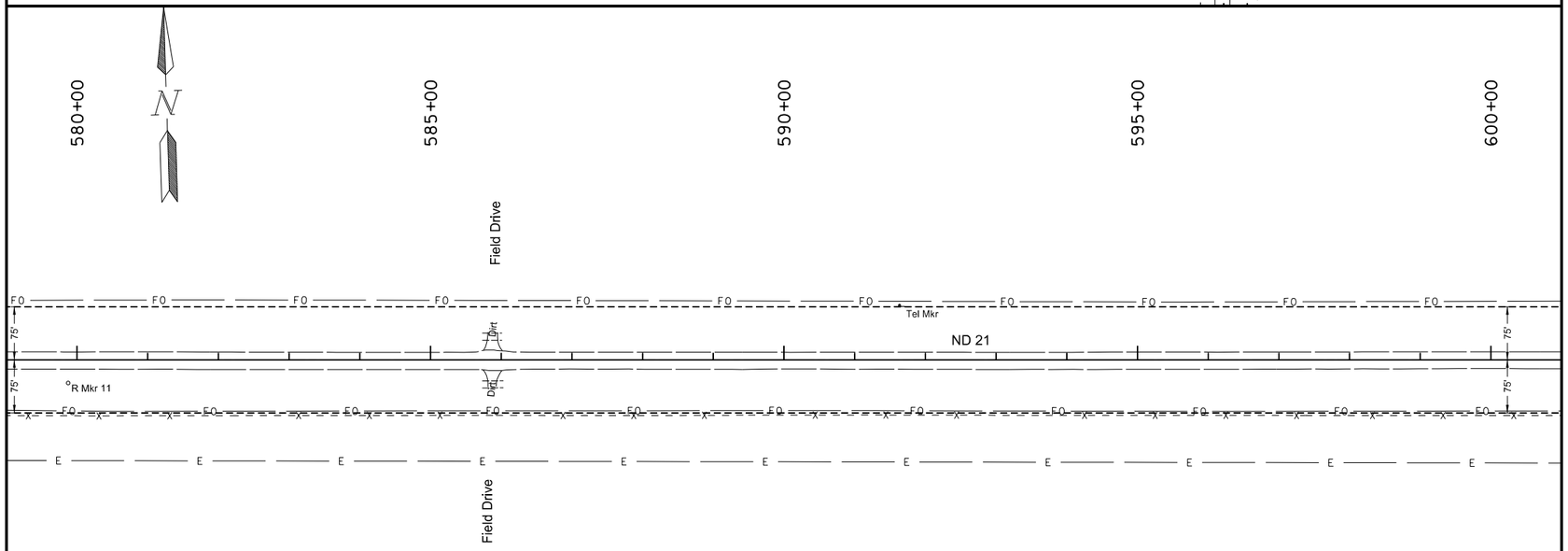
ND 21
Jct 85 to N Jct 22 - New England

520+00 to 560+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	15





LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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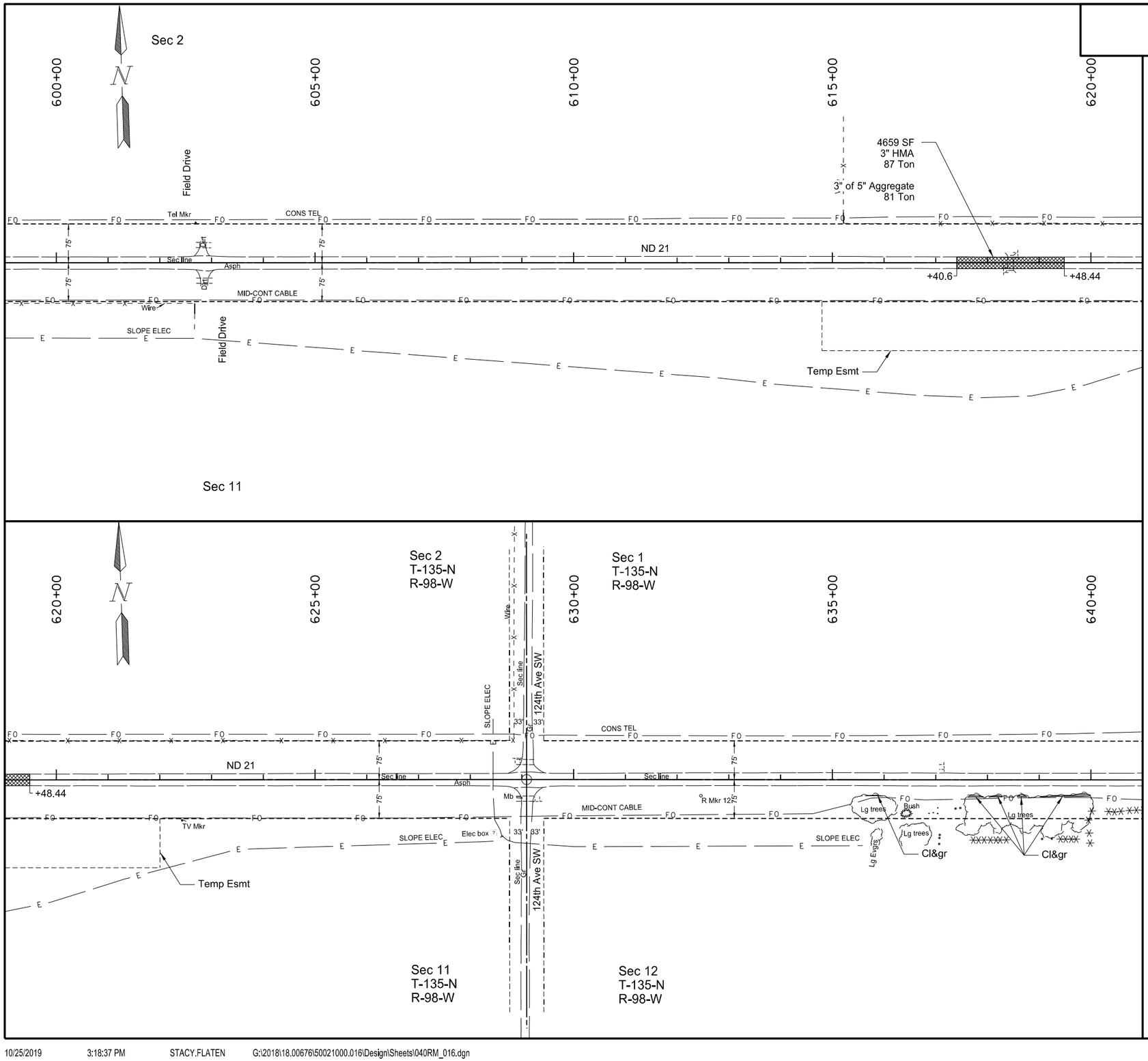
Removals

ND 21
Jct 85 to N Jct 22 - New England

560+00 to 600+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	16

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		617+40.6 to 619+48.44	168	TON



LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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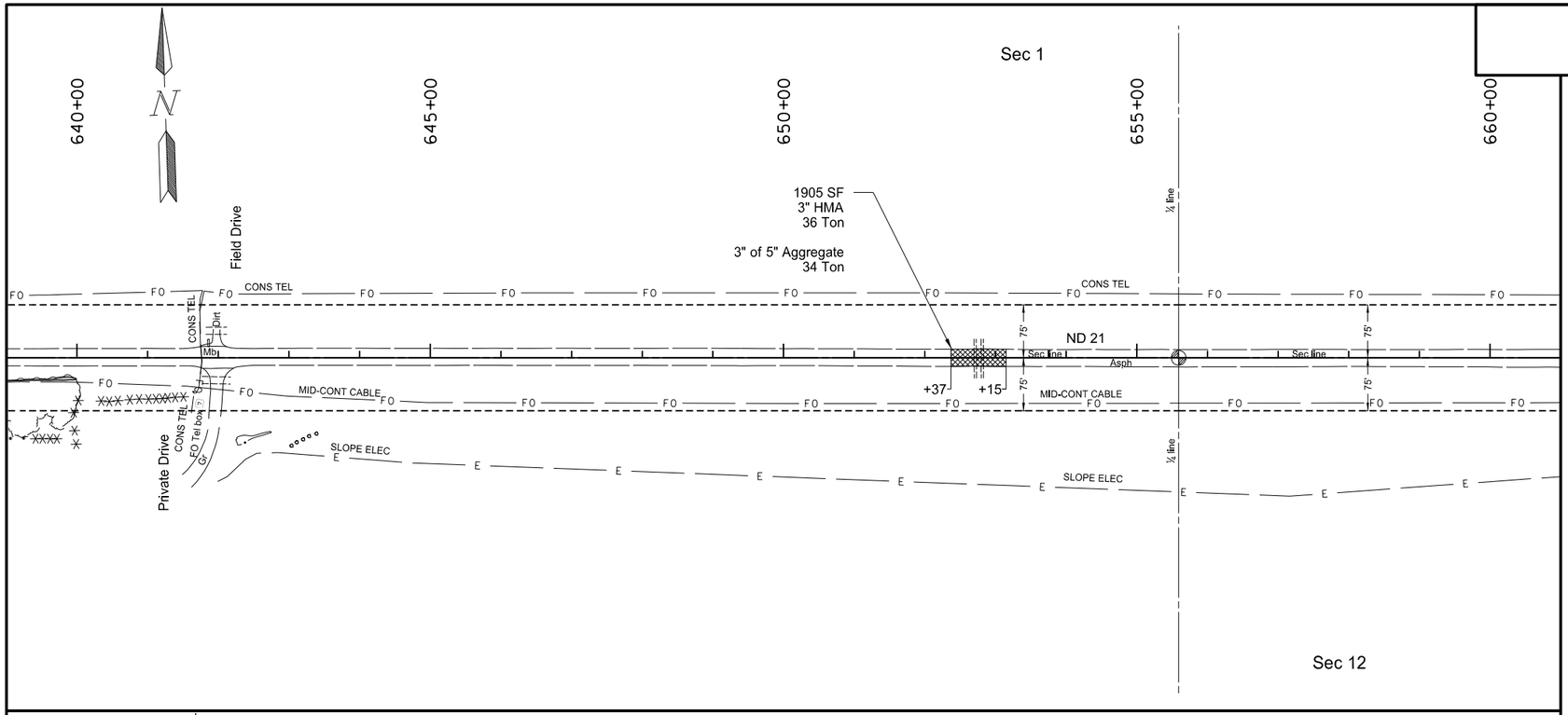
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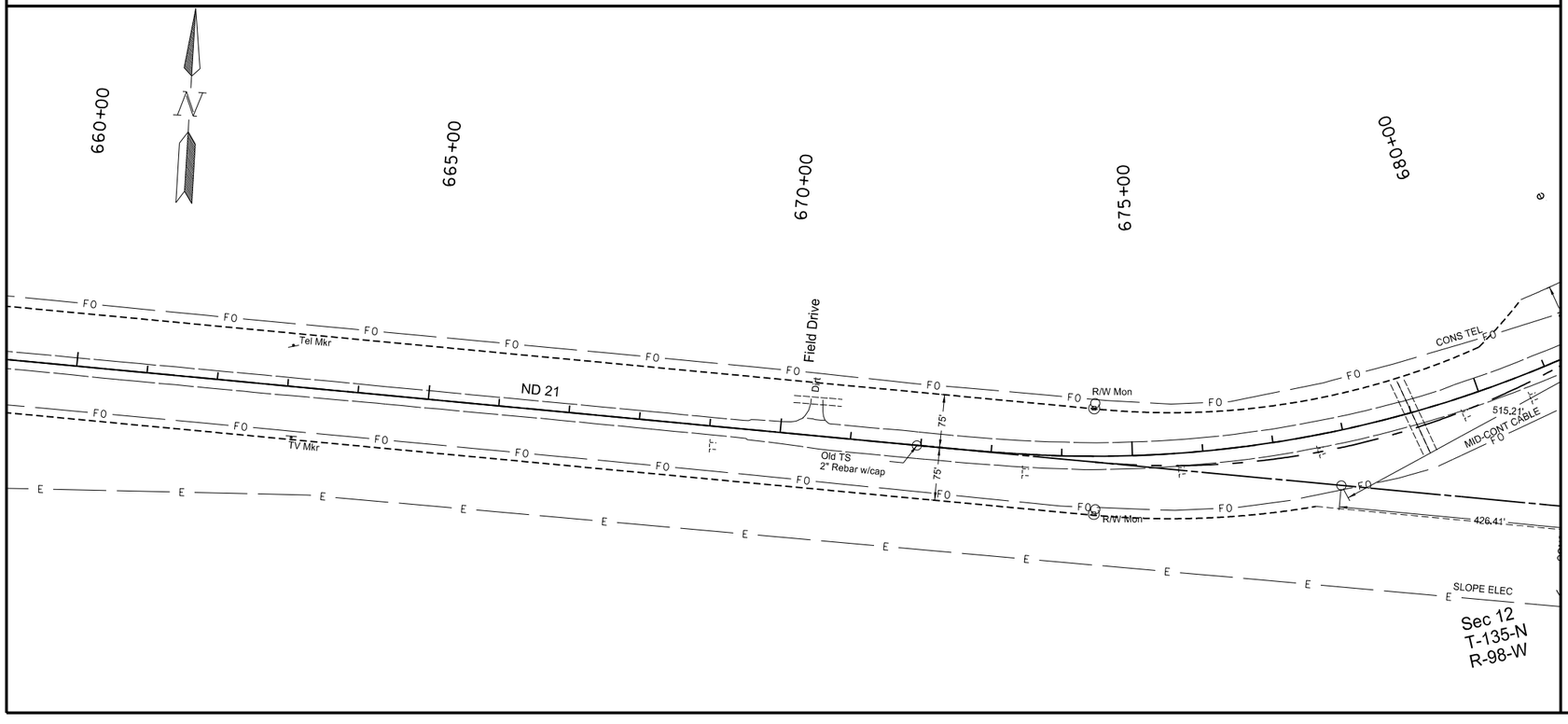
ND 21
Jct 85 to N Jct 22 - New England

600+00 to 640+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	17

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		652+37 to 653+15	70	TON





LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
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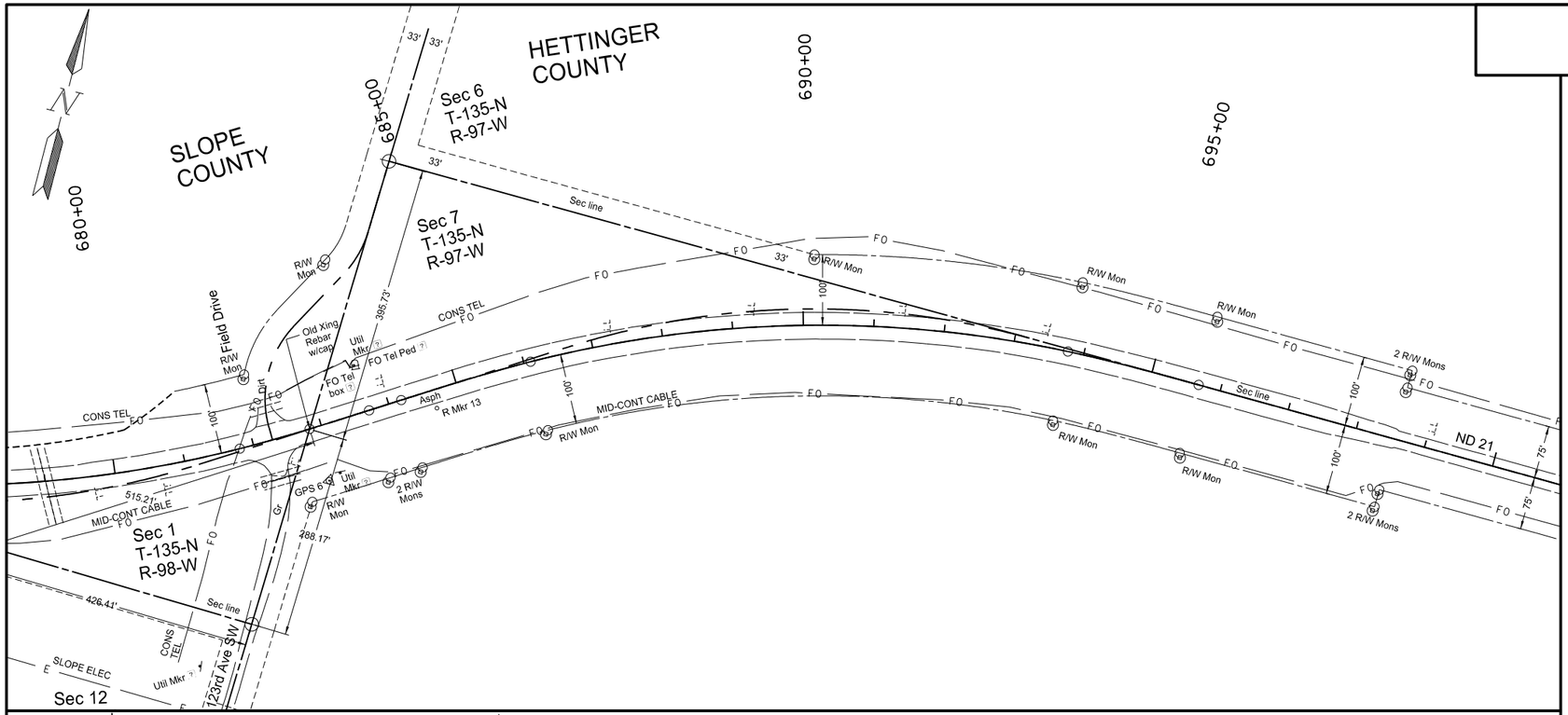
Removals

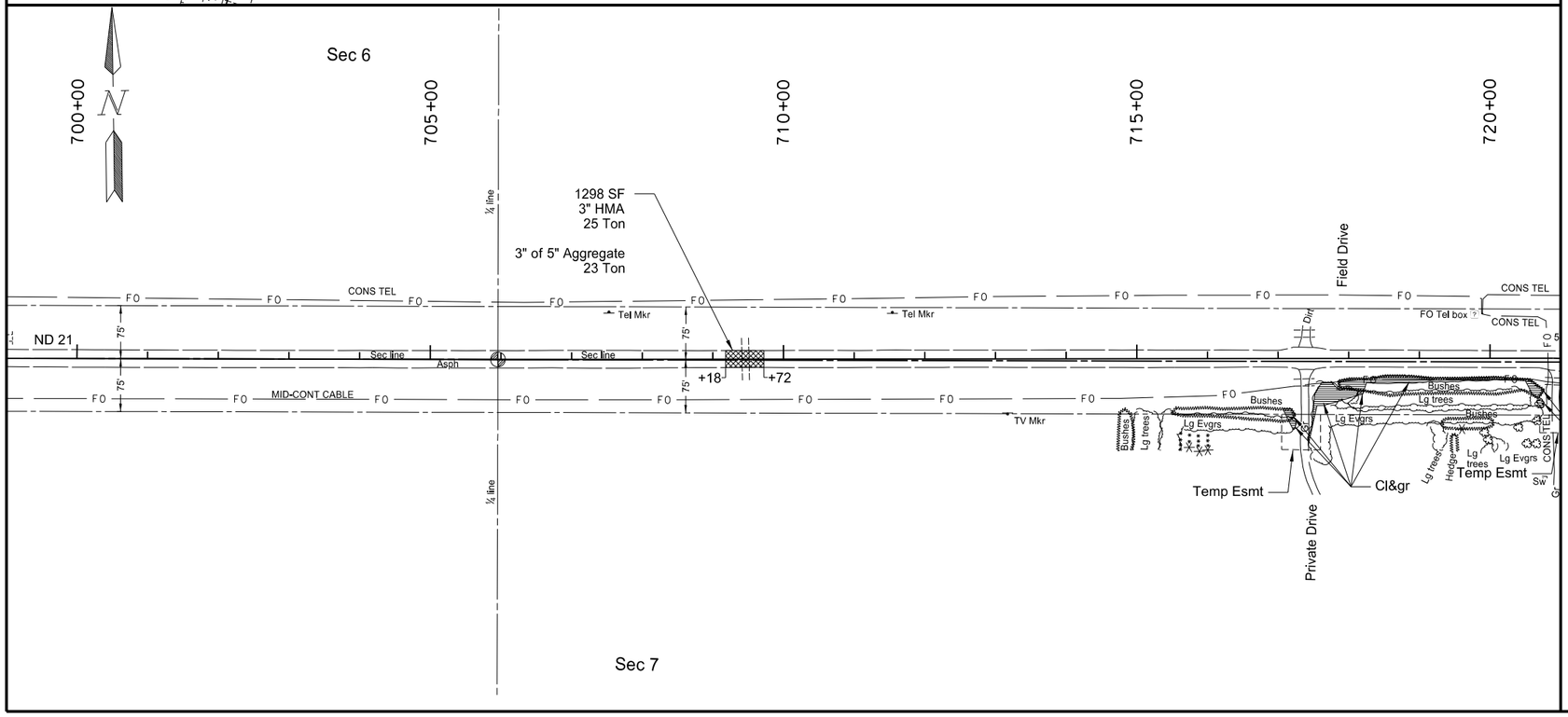
ND 21
Jct 85 to N Jct 22 - New England

640+00 to 680+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	18

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		709+18 to 709+72	48	TON





LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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Removals

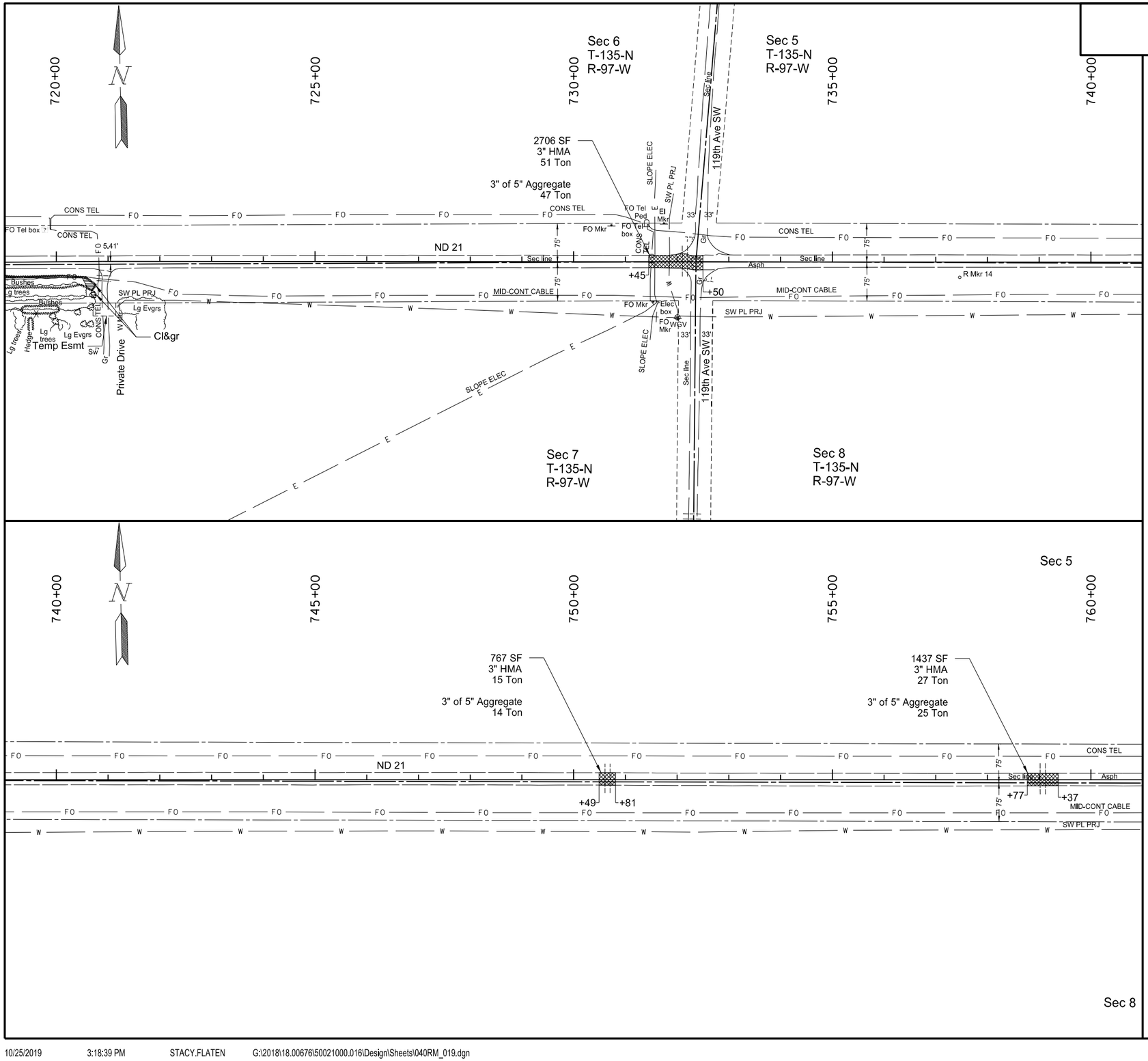
ND 21
Jct 85 to N Jct 22 - New England

680+00 to 720+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	19

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		731+45 to 732+50	98	TON
		750+49 to 750+81	29	TON
		758+77 to 759+37	52	TON



LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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Removals

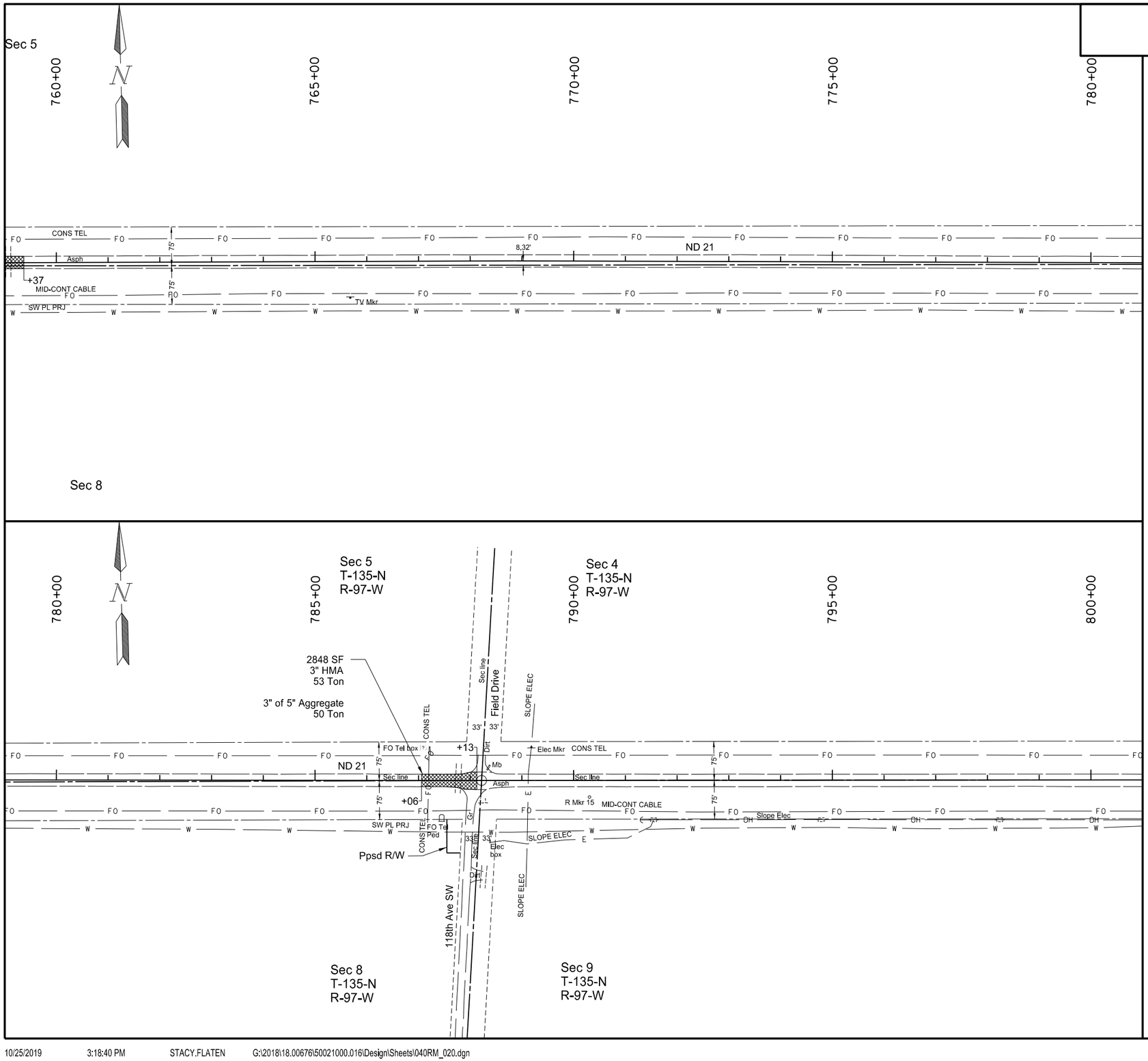
ND 21
Jct 85 to N Jct 22 - New England

720+00 to 760+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	20

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		787+06 to 788+13	103	TON



LEGEND

- Removal of Bituminous Surfacing
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- Clearing & Grubbing

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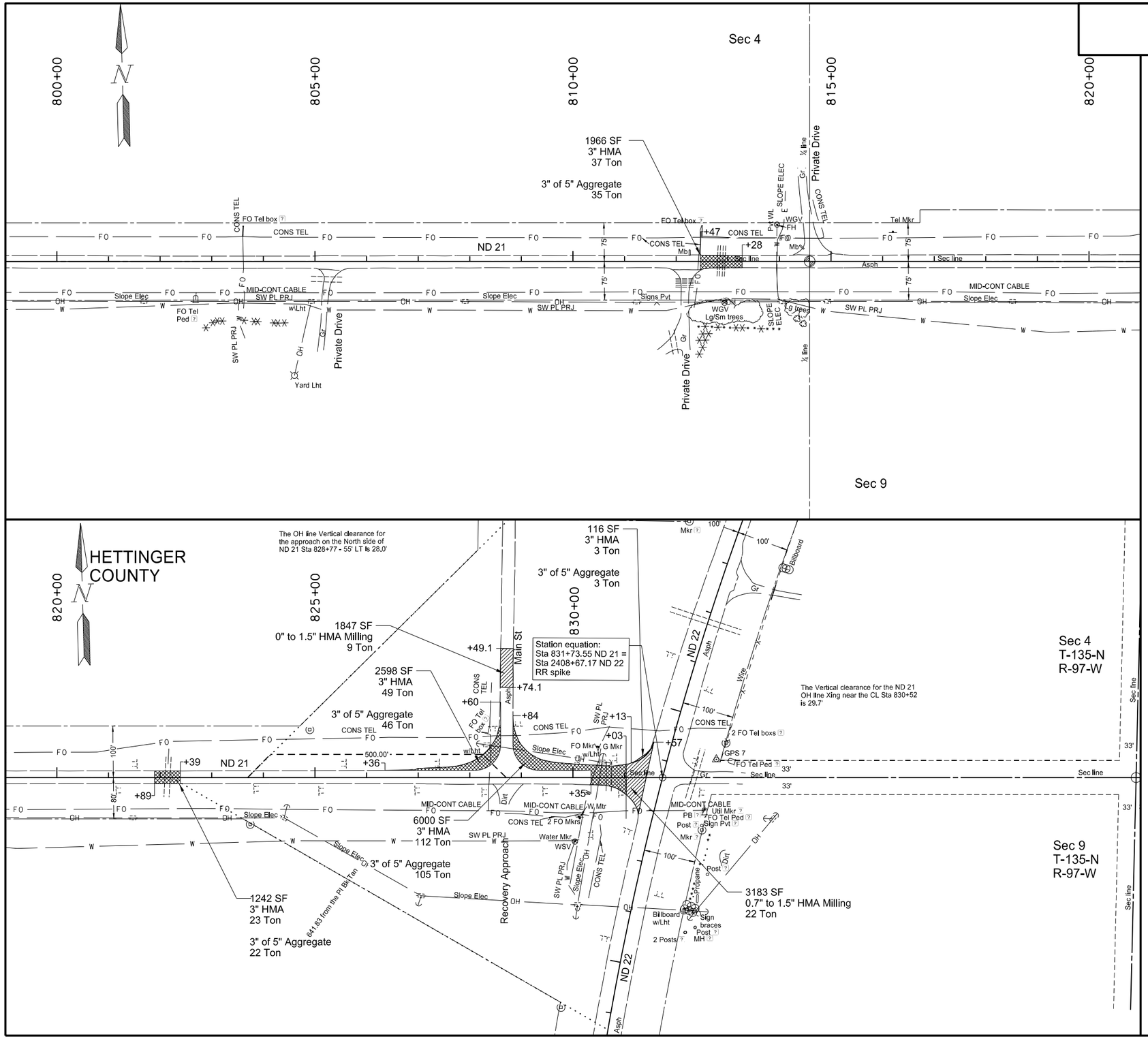
Removals

ND 21
Jct 85 to N Jct 22 - New England

760+00 to 800+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	40	21

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		812+47 to 813+28	72	TON
		821+89 to 822+39	45	TON
		826+36 to 828+60 Lt	95	TON
		828+84 to 831+03 Lt	217	TON
		831+13 to 831+57 Lt	6	TON
411	0100	MILLING PAVEMENT SURFACE		
		Main St 1+74.1 to 2+49.1	9	TON
		831+03 to 831+41.88	22	TON



LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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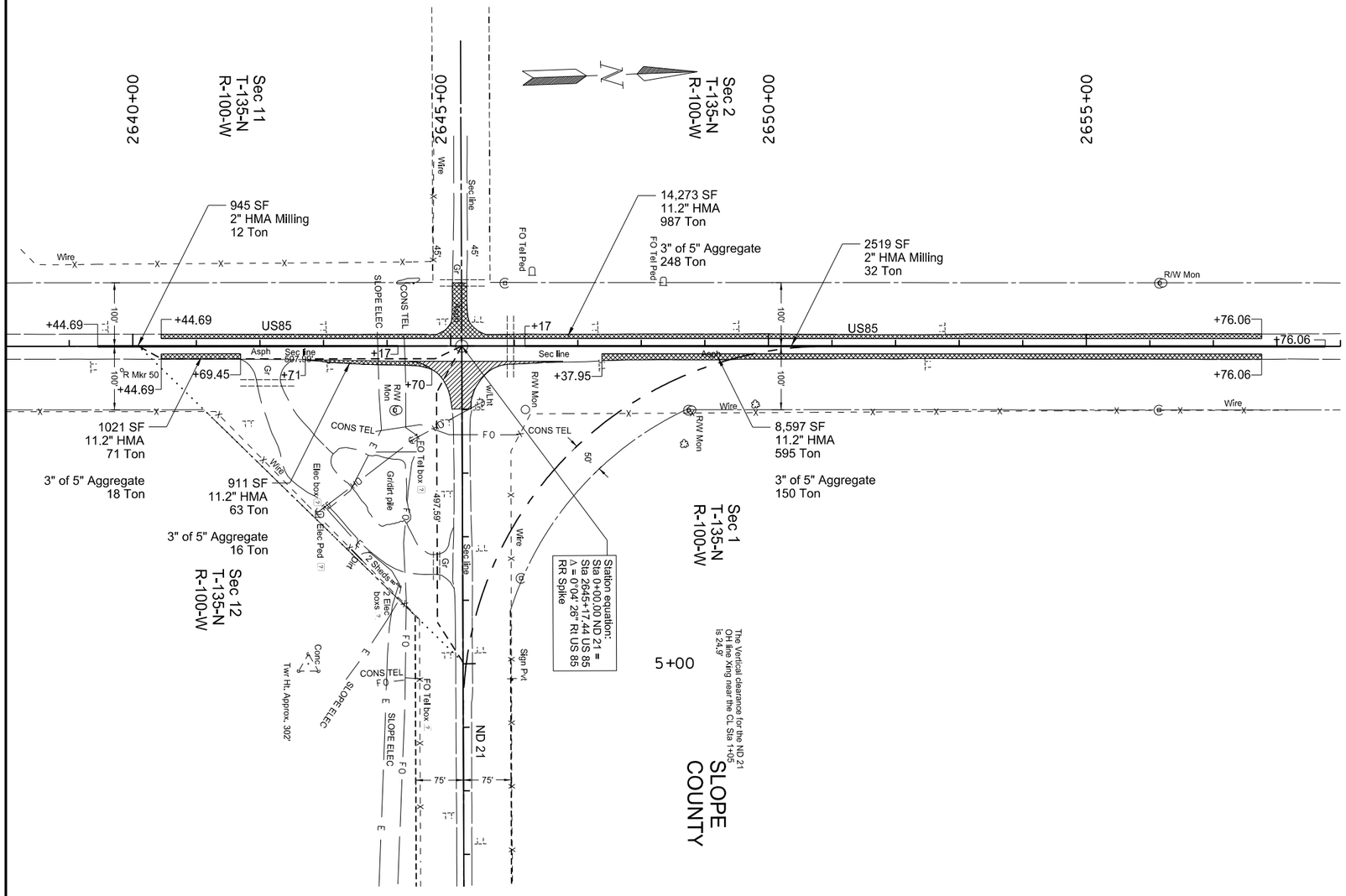
Removals

ND 21
Jct 85 to N Jct 22 - New England

800+00 to 831+41.88

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	40	22

SPEC	CODE	BID ITEM	QTY	UNIT
202	0135	REMOVAL OF BITUMINOUS SURFACING		
		2640+44.69 to 2657+76.06 Lt	1235	TON
		2640+44.69 to 2641+69.45 Rt	89	TON
		2642+71 to 2644+70 Rt	79	TON
		2647+37.95 to 2657+76.06 Rt	745	TON
411	0100	MILLING PAVEMENT SURFACE		
		2639+44.69 to 2644+17	12	TON
		2646+17 to 2658+76.06	32	TON



LEGEND

- Removal of Bituminous Surfacing
- Milling Pavement Surface
- Clearing & Grubbing

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Removals

ND 21
Jct 85 to N Jct 22 - New England

US 85
2639+44.69 to 2658+76.06

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	50	1

HYDRAULIC DATA FOR PROJECT NH-5-021(016)000, PCN 18244 (A)

CULVERT STATION	EXISTING PIPE	PROPOSED PIPE SIZE	DRAINAGE AREA	25-YEAR DATA				100-YEAR DATA	
				DESIGN DISCHARGE	DESIGN HEADWATER	DESIGN VELOCITY	DESIGN STAGE	100-YEAR DISCHARGE	100-YEAR STAGE
			(ACRES)	(CFS)	(FT)	(FPS)	(NAVD 88)	(CFS)	(NAVD 88)
26+80.00	15" RCP	24IN x 54FT RCP	5.4	23.0	1.62	8.9	2791.81	37.0	2792.37
26+87.00	15" RCP	24IN x 54FT RCP	5.4	23.0	1.62	8.9	2791.81	37.0	2792.37
48+91.00	15" RCP	24IN x 48FT RCP	25.0	30.4	2.36	6.5	2811.27	48.8	2812.62
48+99.00	15" RCP	24IN x 48FT RCP	25.0	30.4	2.36	6.5	2811.27	48.8	2812.62
88+03.00	24" CSP	24IN x 64FT RCP (C)	36.7	45.1	3.34	11.2	2750.07	71.9	2752.18
88+12.00	24" CSP	24IN x 64FT RCP (C)	36.7	45.1	3.34	11.2	2750.07	71.9	2752.18
104+12.00	8'x4' RCB	48IN x 60FT RCP	1537.2	146.9	4.25	8.5	2734.48	232.0	2736.27
104+25.00	8'x4' RCB	48IN x 60FT RCP	1537.2	146.9	4.25	8.5	2734.48	232.0	2736.27
116+00.00	30" RCP	30IN x 166FT RCP	14.4	28.5	3.00	9.3	2732.53	46.2	2734.67
148+21.65	30" RCP	36IN x 182FT RCP	22.0	10.2	1.71	3.5	2703.23	17.0	2703.77
154+03.92	30" RCP	36IN x 186FT RCP (D)	101.4	24.6	4.12	6.5	2704.22	41.1	2707.62
191+71.00	15" RCP	24IN x 73FT RCP	13.3	1.7	0.74	2.4	2735.28	2.7	2735.48
200+40.00	21" RCP	36IN x 55FT RCP	71.0	34.6	2.95	9.9	2747.22	55.6	2748.71
236+93.00	15" RCP	24IN x 56FT RCP	4.4	16.7	2.46	9.3	2780.17	26.3	2781.80
282+65.00	24" RCP	24IN x 67FT RCP	5.3	9.3	1.76	5.3	2825.77	15.2	2826.44
290+11.00	21" RCP	42IN x 86FT RCP	84.5	66.3	4.24	9.1	2819.55	106.7	2822.50
305+12.00	21" RCP	36IN x 61FT RCP (C)	19.7	40.6	3.32	10.7	2850.18	65.4	2852.22
354+16.00	27" RCP	30IN x 66FT RCP	135.4	40.3	4.73	9.0	2817.15	65.1	2819.87
366+90.00	21" RCP	36IN x 78FT RCP (C)	105.5	53.4	5.11	10.6	2812.56	85.5	2816.09
399+62.00	15" RCP	24IN x 61FT RCP	116.5	24.1	4.04	8.3	2782.91	39.0	2785.23
414+06.00	15" RCP	24IN x 63FT RCP	5.1	14.6	2.99	8.2	2790.56	22.9	2791.79
446+89.00	21" RCP	48IN x 64FT RCP (C)	116.2	67.8	3.82	9.9	2734.72	109.0	2736.55
461+03.00	15" RCP	24IN x 54FT RCP	13.4	22.2	3.56	7.9	2721.46	35.8	2723.22
467+60.00	27" RCP	42IN x 62FT RCP	376.7	134.3	4.68	9.5	2711.78	215.6	2713.70
467+72.00	27" RCP	42IN x 62FT RCP	376.7	134.3	4.68	9.5	2711.78	215.6	2713.70
492+75.00	21" RCP	36IN x 48FT RCP	109.4	60.5	5.03	9.6	2691.69	97.1	2692.66
516+58.00	21" RCP	48IN x 64FT RCP (C)	122.2	89.0	5.23	10.8	2672.01	143.2	2673.97
548+74.00	15" RCP	24IN x 50FT RCP	167.8	24.1	4.25	9.1	2667.00	38.6	2667.77
652+75.00	21" RCP	30IN x 58FT RCP	346.0	43.7	5.00	9.5	2658.20	70.6	2659.80
709+40.00	18" CSP	36IN x 59FT RCP (C)	22.7	75.1	3.12	11.5	2689.98	122.3	2691.77
709+50.00	18" CSP	36IN x 59FT RCP (C)	22.7	75.1	3.12	11.5	2689.98	122.3	2691.77
731+70.00	18" CSP	36IN x 62FT RCP	47.3	59.9	2.67	9.9	2675.10	97.4	2676.31
731+80.00	18" CSP	36IN x 62FT RCP	47.3	59.9	2.67	9.9	2675.10	97.4	2676.31
750+65.00	18" CSP	30IN x 48FT RCP	31.2	39.2	4.18	9.1	2655.68	63.1	2656.25
759+07.00	18" CSP	36IN x 59FT RCP (C)	17.5	30.7	2.71	11.4	2657.57	49.9	2658.81
787+31.00	18" CSP	30IN x 59FT RCP (C)	28.9	67.2	3.50	11.8	2625.97	108.3	2627.24
787+40.00	18" CSP	30IN x 59FT RCP (C)	28.9	67.2	3.50	11.8	2625.97	108.3	2627.24
812+87.00	36" CSP	48IN x 64FT RCP (C)	54.3	81.1	4.33	11.7	2582.88	131.6	2585.52
822+14.00	84" RCP	54IN x 110FT RCP	993.3	128.3	6.11	9.9	2577.11	205.1	2581.08
830+69.00	24" RCP	36IN x 66FT RCP	36.5	52.5	4.48	8.8	2585.54	84.1	2587.37

(A) Hydraulic data provided is for smooth-walled type conduits

(C) Culverts requiring riprap

(D) Culverts requiring embedment based on 2017 Nationwide Permit Regional Conditions

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Hydraulic Data

ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	50	2

HYDRAULIC DATA FOR PROJECT NH-5-021(016)000, PCN 18244 (B)

CULVERT STATION	EXISTING PIPE	PROPOSED PIPE SIZE	DRAINAGE AREA	25-YEAR DATA				100-YEAR DATA	
				DESIGN DISCHARGE	DESIGN HEADWATER	DESIGN VELOCITY	DESIGN STAGE	100-YEAR DISCHARGE	100-YEAR STAGE
			(ACRES)	(CFS)	(FT)	(FPS)	(NAVD 88)	(CFS)	(NAVD 88)
26+80.00	15" RCP	30IN x 51FT CSP	5.4	23.0	1.59	6.0	2791.78	37.0	2792.33
26+87.00	15" RCP	30IN x 51FT CSP	5.4	23.0	1.59	6.0	2791.78	37.0	2792.33
48+91.00	15" RCP	30IN x 45FT CSP	25.0	30.4	2.19	5.8	2811.10	48.8	2811.93
48+99.00	15" RCP	30IN x 45FT CSP	25.0	30.4	2.19	5.8	2811.10	48.8	2811.93
88+03.00	24" CSP	30IN x 59FT CSP	36.7	45.1	2.46	7.5	2749.19	71.9	2750.46
88+12.00	24" CSP	30IN x 59FT CSP	36.7	45.1	2.46	7.5	2749.19	71.9	2750.46
104+12.00	8'x4' RCB	54IN x 60FT CSP	1537.2	146.9	4.07	7.8	2734.30	232.0	2735.77
104+25.00	8'x4' RCB	54IN x 60FT CSP	1537.2	146.9	4.07	7.8	2734.30	232.0	2735.77
116+00.00	30" RCP	30IN x 167FT CSP	14.4	28.5	2.98	7.4	2732.51	46.2	2737.62
148+21.65	30" RCP	54IN x 176FT CSP	22.0	10.2	1.72	2.7	2703.24	17.0	2703.73
154+03.92	30" RCP	42IN x 183FT CSP (D)	101.4	24.6	3.44	6.1	2703.54	41.1	2705.46
191+71.00	15" RCP	36IN x 66FT CSP	13.3	1.7	0.75	1.9	2735.29	2.7	2735.48
200+40.00	21" RCP	42IN x 60FT CSP	71.0	34.6	2.63	6.7	2746.90	55.6	2748.10
236+93.00	15" RCP	30IN x 52FT CSP	4.4	16.7	2.01	6.3	2779.72	26.3	2780.66
259+99.00	84" RCP	72IN x 184FT CSP	1707.3	470.3	6.46	9.5	2777.46	752.5	2779.80
260+14.00	84" RCP	72IN x 184FT CSP	1707.3	470.3	6.46	9.5	2777.46	752.5	2779.80
260+29.00	84" RCP	72IN x 184FT CSP	1707.3	470.3	6.46	9.5	2777.46	752.5	2779.80
282+65.00	24" RCP	30IN x 64FT CSP	5.3	9.3	1.74	5.0	2825.75	15.2	2826.31
290+11.00	21" RCP	48IN x 83FT CSP	84.5	66.3	4.07	8.2	2819.38	106.7	2821.60
305+12.00	21" RCP	42IN x 60FT CSP	19.7	40.6	2.91	7.5	2849.77	65.4	2851.15
354+16.00	27" RCP	36IN x 63FT CSP	135.4	40.3	4.02	7.8	2816.44	65.1	2819.25
366+90.00	21" RCP	42IN x 75FT CSP	105.5	53.4	4.58	8.0	2812.03	85.5	2814.32
399+62.00	15" RCP	30IN x 58FT CSP	116.5	24.1	3.29	6.9	2782.16	39.0	2784.43
414+06.00	15" RCP	30IN x 60FT CSP	5.1	14.6	2.83	5.7	2790.40	22.9	2791.02
446+89.00	21" RCP	54IN x 60FT CSP	116.2	67.8	3.78	7.9	2734.68	109.0	2736.00
461+03.00	15" RCP	30IN x 51FT CSP	13.4	22.2	3.01	6.7	2720.91	35.8	2722.74
467+60.00	27" RCP	48IN x 60FT CSP	376.7	134.3	4.45	8.2	2711.55	215.6	2713.45
467+72.00	27" RCP	48IN x 60FT CSP	376.7	134.3	4.45	8.2	2711.55	215.6	2713.45
492+75.00	21" RCP	42IN x 60FT CSP	109.4	60.5	4.56	8.5	2691.22	97.1	2692.59
516+58.00	21" RCP	54IN x 60FT CSP	122.2	89.0	5.01	8.7	2671.79	143.2	2673.69
548+74.00	15" RCP	30IN x 47FT CSP	167.8	24.1	3.35	6.9	2666.10	38.6	2667.65
652+75.00	21" RCP	36IN x 60FT CSP	346.0	43.7	4.29	8.1	2657.49	70.6	2659.70
709+40.00	18" CSP	36IN x 60FT CSP	22.7	75.1	3.08	8.3	2689.94	122.3	2691.74
709+50.00	18" CSP	36IN x 60FT CSP	22.7	75.1	3.08	8.3	2689.94	122.3	2691.74
731+70.00	18" CSP	36IN x 60FT CSP	47.3	59.9	2.63	6.9	2675.06	97.4	2676.33
731+80.00	18" CSP	36IN x 60FT CSP	47.3	59.9	2.63	6.9	2675.06	97.4	2676.33
750+65.00	18" CSP	36IN x 60FT CSP	31.2	39.2	3.51	7.7	2655.01	63.1	2656.18
759+07.00	18" CSP	36IN x 60FT CSP	17.5	30.7	2.66	8.2	2657.52	49.9	2658.79
787+31.00	18" CSP	30IN x 52FT CSP	28.9	67.2	3.48	8.5	2625.95	108.3	2627.24
787+40.00	18" CSP	30IN x 52FT CSP	28.9	67.2	3.48	8.5	2625.95	108.3	2627.24
812+87.00	36" CSP	54IN x 60FT CSP	54.3	81.1	3.90	8.7	2582.45	131.6	2584.31
822+14.00	84" RCP	60IN x 109FT CSP	993.3	128.3	6.01	9.5	2577.01	205.1	2580.40
830+69.00	24" RCP	42IN x 60FT CSP	36.5	52.5	4.13	8.0	2585.19	84.1	2587.24

(B) Hydraulic data provided is for corrugated steel pipe conduits

(D) Culverts requiring embedment based on 2017 Nationwide Permit Regional Conditions

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Hydraulic Data

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	51	1

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material Type R1 (Pay Item)	(*) End Sections		Applicable Backfill
													Begin	End	
				IN	Bid Item	LF		In	Type		In	SY	EA	EA	
3+02.08	41' Rt	3+23.08	41' Rt	24	Pipe Corr. Steel - Approach (Extension)	21	Corrugated Steel Pipe	24	Z, A, P	2	0.064		*TES (6:1)		Specification 714.04 A
3+67.99	41' Rt	3+78.99	41' Rt	24	Pipe Corr. Steel - Approach (Extension)	11	Corrugated Steel Pipe	24	Z, A, P	2	0.064			*TES (6:1)	Specification 714.04 A
26+80.00	25' Lt	26+80.00	29' Rt	24	Pipe Conduit	54	Reinforced Concrete Pipe - Class III (barrel length = 52 LF)	24				327	TES (4:1)	TES (4:1)	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 51 LF)	30	P	2	0.064				
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	24							
26+87.00	25' Lt	26+87.00	29' Rt	24	Pipe Conduit	54	Reinforced Concrete Pipe - Class III (barrel length = 52 LF)	24					TES (4:1)	TES (4:1)	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 51 LF)	30	P	2	0.064				
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	24							
48+91.00	24' Lt	48+91.00	24' Rt	24	Pipe Conduit	48	Reinforced Concrete Pipe - Class III (barrel length = 46 LF)	24				277	TES (4:1)	TES (4:1)	Standard D-714-26M
							Corrugated Steel Pipe (barrel length = 45 LF)	30	P	2	0.064				
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	24							
48+99.00	24' Lt	48+99.00	24' Rt	24	Pipe Conduit	48	Reinforced Concrete Pipe - Class III (barrel length = 46 LF)	24					TES (4:1)	TES (4:1)	
							Corrugated Steel Pipe (barrel length = 45 LF)	30	P	2	0.064				
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	24							
55+79.92	54' Lt	56+27.92	54' Lt	18	Pipe Conduit - Approach	48	Reinforced Concrete Pipe - Class III (barrel length = 46 LF)	18					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
88+03.00	29' Lt	88+03.00	35' Rt	24	Pipe Conduit	64	Reinforced Concrete Pipe - Class III (barrel length = 60 LF)	24				425	TES (4:1)	FES	Standard D-714-26M
							Corrugated Steel Pipe (barrel length = 59 LF)	30	P	2	0.064				
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	24							
88+12.00	29' Lt	88+12.00	35' Rt	24	Pipe Conduit	64	Reinforced Concrete Pipe - Class III (barrel length = 60 LF)	24					TES (4:1)	FES	
							Corrugated Steel Pipe (barrel length = 59 LF)	30	P	2	0.064				
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	24							
98+69.91	40' Rt	99+27.96	40' Rt	18	Pipe Conduit - Approach	58	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	18					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
98+68.45	35' Lt	99+30.40	35' Lt	18	Pipe Conduit - Approach	62	Reinforced Concrete Pipe - Class III (barrel length = 60 LF)	18					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
104+12.00	30' Lt	104+12.00	30' Rt	48	Pipe Conduit	60	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	48				477	FES	FES	Standard D-714-26M
							Corrugated Steel Pipe	54	P	2, 3, 5	0.079, 0.064, 0.064				
							Spiral Rib Steel Pipe	48	P	3/4, 1	0.064				
104+25.00	30' Lt	104+25.00	30' Rt	48	Pipe Conduit	60	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	48					FES	FES	
							Corrugated Steel Pipe	54	P	2, 3, 5	0.079, 0.064, 0.064				
							Spiral Rib Steel Pipe	48	P	3/4, 1	0.064				

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Coatings: **Z** = Zinc, **A** = Aluminum, **P** = Polymeric (over Zinc or Aluminum)

Corrugations: **2** = 2-2/3"x1/2", **3** = 3"x1", **5** = 5"x1"

Spiral Ribs: **3/4** = 3/4"x3/4"@7-1/2", **1** = 3/4"x1"@11-1/2"

(*) End sections are measured and paid for separately for pipe extensions.
FES = Flared End Section
TES = Traversable End Section

Allowable Pipe List

ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	51	2

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material Type R1 (Pay Item)	(*) End Sections		Applicable Backfill
													Begin	End	
				IN	Bid Item	LF		In	Type		In	SY	EA	EA	
116+00.00	76' Lt	116+00.00	89' Rt	30	Pipe Conduit	166	Reinforced Concrete Pipe - Class IV (barrel length = 162 LF)	30				1489	FES	FES	Standard D-714-25
							Corrugated Steel Pipe (barrel length = 167)	30	P	2	0.064				
							Spiral Rib Steel Pipe	30	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	30							
119+65.52	68' Lt	120+36.52	67' Lt	24	Pipe Conduit - Approach	71	Reinforced Concrete Pipe - Class III (barrel length = 66 LF)	24					FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	24	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	24	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
126+73.98	69' Rt	126+85.98	69' Rt	18	Pipe Corr. Steel - Approach (Extension)	12	Corrugated Steel Pipe	18	Z, A, P	2	0.064			*FES	Specification 714.04 A
140+12.88	65' Rt	140+70.88	65' Rt	24	Pipe Conduit - Approach	58	Reinforced Concrete Pipe - Class III (barrel length = 54 LF)	24					FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	24	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	24	A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
140+12.88	73' Rt	140+70.88	73' Rt	24	Pipe Conduit - Approach	58	Reinforced Concrete Pipe - Class III (barrel length = 54 LF)	24					FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	24	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	24	A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
148+29.91	90' Lt	148+13.24	91' Rt	36	Pipe Conduit	182	Reinforced Concrete Pipe - Class III (barrel length = 176 LF)	36				1495	FES	FES	Standard D-714-25
							Corrugated Steel Pipe (barrel length = 176 LF)	54	P	2, 3, 5	0.079, 0.064, 0.064				
							Spiral Rib Steel Pipe	36	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	36							
153+68.62	91' Lt	154+35.65	82' Rt	36	Pipe Conduit	186	Reinforced Concrete Pipe - Class IV (barrel length = 180 LF)	36				1605	FES	FES	Standard D-714-25
							Corrugated Steel Pipe (barrel length = 183 LF)	42	P	2	0.064				
							Spiral Rib Steel Pipe	36	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	36							
164+91.59	63' Rt	165+40.59	63' Rt	18	Pipe Conduit - Approach	49	Reinforced Concrete Pipe - Class III (barrel length = 42 LF)	18					FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
191+71.00	36' Lt	191+71.00	37' Rt	24	Pipe Conduit	73	Reinforced Concrete Pipe - Class III (barrel length = 68 LF)	24				454	FES	FES	Standard D-714-25
							Corrugated Steel Pipe (barrel length = 66 LF)	36	P	2	0.064				
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	24							
200+40.00	30' Lt	200+40.00	30' Rt	42	Pipe Conduit	60	Reinforced Concrete Pipe - Class III (barrel length = 52 LF)	36				353	TES (4:1)	TES (4:1)	Standard D-714-26
							Corrugated Steel Pipe	42	P	2	0.064		FES	FES	
							Spiral Rib Steel Pipe	36	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	36							
236+93.00	26' Lt	236+93.00	30' Rt	24	Pipe Conduit	56	Reinforced Concrete Pipe - Class III (barrel length = 52 LF)	24				296	TES (4:1)	FES	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 52 LF)	30	P	2	0.064			TES (4:1)	
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064			FES	
							Polypropylene Pipe (AASHTO M330, Type S)	24							

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Corrugations; **2** = 2-2/3"x1/2"
3 = 3"x1"
5 = 5"x1"

Spiral Ribs; **3/4** = 3/4"x3/4"@7-1/2"
1 = 3/4"x1"@11-1/2"

(*) End sections are measured and paid for separately for pipe extensions.
FES = Flared End Section
TES = Traversable End Section

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Allowable Pipe List

ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	51	3

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material Type R1 (Pay Item)	(*) End Sections		Applicable Backfill
													Begin	End	
				IN	Bid Item	LF		In	Type		In	SY	EA	EA	
243+65.04	48' Lt	244+09.58	54' Lt	24	Pipe Conduit - Approach	45	Reinforced Concrete Pipe - Class III (barrel length = 42 LF)	24					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	24	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	24	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
244+93.43	63' Rt	245+32.43	63' Rt	24	Pipe Conduit - Approach	39	Reinforced Concrete Pipe - Class III (barrel length = 34 LF)	24					FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	24	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	24	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
259+85.29	92' Lt	260+12.48	90' Rt	72	Pipe Conduit	184	Corrugated Steel Pipe	72	P	2, 3, 5	0.138, 0.064, 0.064	3034	FES	FES	Standard D-714-25M
260+00.29	92' Lt	260+27.48	90' Rt	72	Pipe Conduit	184	Corrugated Steel Pipe	72	P	2, 3, 5	0.138, 0.064, 0.064		FES	FES	
260+15.29	92' Lt	260+42.48	90' Rt	72	Pipe Conduit	184	Corrugated Steel Pipe	72	P	2, 3, 5	0.138, 0.064, 0.064		FES	FES	
271+05.81	65' Lt	271+49.81	65' Lt	24	Pipe Conduit - Approach	44	Reinforced Concrete Pipe - Class III (barrel length = 38 LF)	24					FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	24	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	24	A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
282+65.00	34' Lt	282+65.00	33' Rt	24	Pipe Conduit	67	Reinforced Concrete Pipe - Class III (barrel length = 62 LF)	24				394	FES	FES	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 64 LF)	30	P	2	0.064				
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	24							
290+11.00	42' Lt	290+11.00	43' Rt	42	Pipe Conduit	86	Reinforced Concrete Pipe - Class III (barrel length = 80 LF)	42				430	FES	FES	Standard D-714-25
							Corrugated Steel Pipe (barrel length = 83 LF)	48	P	2, 3, 5	0.064				
							Spiral Rib Steel Pipe	42	P	3/4, 1	0.064				
305+12.00	26' Lt	305+12.00	34' Rt	36	Pipe Conduit	61	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	36				356	TES (4:1)	FES	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 60 LF)	42	P	2	0.064		FES	FES	
							Spiral Rib Steel Pipe (barrel length = 64 LF, 30' LT & 34' Rt)	36	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S) (barrel length = 64 LF, 30' Lt & 34' Rt)	36							
311+71.34	64' Lt	312+20.40	64' Lt	24	Pipe Conduit - Approach	49	Reinforced Concrete Pipe - Class III (barrel length = 44 LF)	24					FES	FES	Specification 714.04 A
							Corrugated Steel Pipe (barrel length = 45 LF)	30	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	24	A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
354+16.00	33' Lt	354+16.00	32' Rt	30	Pipe Conduit	66	Reinforced Concrete Pipe - Class III (barrel length = 62 LF)	30				396	FES	FES	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 63 LF)	36	P	2	0.064				
							Spiral Rib Steel Pipe	30	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	30							
364+47.22	63' Lt	365+15.11	63' Lt	18	Pipe Conduit - Approach	68	Reinforced Concrete Pipe - Class III (barrel length = 60 LF)	18					FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							

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Corrugations: **2** = 2-2/3"x1/2", **3** = 3"x1", **5** = 5"x1"

Spiral Ribs: **3/4** = 3/4"x3/4"@7-1/2", **1** = 3/4"x1"@11-1/2"

(*) End sections are measured and paid for separately for pipe extensions.
FES = Flared End Section
TES = Traversable End Section

Allowable Pipe List

ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	51	4

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material Type R1 (Pay Item)	(*) End Sections		Applicable Backfill
													Begin	End	
				IN	Bid Item	LF		In	Type		In	SY	EA	EA	
366+90.00	40' Lt	366+90.00	38' Rt	36	Pipe Conduit	78	Reinforced Concrete Pipe - Class III (barrel length = 72 LF)	36				333	FES	FES	Standard D-714-25
							Corrugated Steel Pipe (barrel length = 75 LF)	42	P	2	0.064				
							Spiral Rib Steel Pipe	36	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	36							
394+83.12	63' Rt	395+27.12	63' Rt	18	Pipe Conduit - Approach	44	Reinforced Concrete Pipe - Class III (barrel length = 36 LF)	18					FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
394+77.49	58' Lt	395+21.49	58' Lt	18	Pipe Conduit - Approach	44	Reinforced Concrete Pipe - Class III (barrel length = 42 LF)	18					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
399+62.00	31' Lt	399+62.00	30' Rt	24	Pipe Conduit	61	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	24				344	FES	FES	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 58 LF)	30	P	2	0.064		TES (4:1)	TES (4:1)	
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064		FES	FES	
							Polypropylene Pipe (AASHTO M330, Type S)	24							
414+06.00	33' Lt	414+06.00	30' Rt	24	Pipe Conduit	63	Reinforced Concrete Pipe - Class III (barrel length = 58 LF)	24				362	FES	FES	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 60 LF)	30	P	2	0.064		FES	TES (4:1)	
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064		FES	FES	
							Polypropylene Pipe (AASHTO M330, Type S)	24							
423+55.06	46' Rt	424+13.06	46' Rt	24	Pipe Conduit - Approach	58	Reinforced Concrete Pipe - Class III (barrel length = 52 LF)	24					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	24	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	24	A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
446+89.00	34' Lt	446+89.00	30' Rt	48	Pipe Conduit	64	Reinforced Concrete Pipe - Class III (barrel length = 60 LF)	48							
							Corrugated Steel Pipe (barrel length = 60 LF)	54	P	2, 3, 5	0.079, 0.064, 0.064	412	FES	FES	Standard D-714-26
							Spiral Rib Steel Pipe	48	P	3/4, 1	0.064				
461+03.00	27' Lt	461+03.00	27' Rt	24	Pipe Conduit	54	Reinforced Concrete Pipe - Class III (barrel length = 52 LF)	24							
							Corrugated Steel Pipe (barrel length = 51 LF)	30	P	2	0.064	285	TES (4:1)	TES (4:1)	Standard D-714-26
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	24							
467+60.00	31' Lt	467+60.00	31' Rt	42	Pipe Conduit	62	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	42							
							Corrugated Steel Pipe (barrel length = 60 LF)	48	P	2, 3, 5	0.064		FES	FES	
							Spiral Rib Steel Pipe	42	P	3/4, 1	0.064	463			Standard D-714-26M
467+72.00	31' Lt	467+72.00	31' Rt	42	Pipe Conduit	62	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	42							
							Corrugated Steel Pipe (barrel length = 60 LF)	48	P	2, 3, 5	0.064		FES	FES	
							Spiral Rib Steel Pipe	42	P	3/4, 1	0.064				
470+06.70	50' Lt	470+77.61	50' Lt	18	Pipe Conduit - Approach	71	Reinforced Concrete Pipe - Class III (barrel length = 68 LF)	18							
							Corrugated Steel Pipe	18	Z, A, P	2	0.064		TES (6:1)	TES (6:1)	Specification 714.04 A
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
492+75.00	30' Lt	492+75.00	30' Rt	42	Pipe Conduit	60	Reinforced Concrete Pipe - Class III (barrel length = 46 LF)	36					TES (4:1)	TES (4:1)	
							Corrugated Steel Pipe	42	P	2	0.064	350			Standard D-714-26
							Spiral Rib Steel Pipe	36	P	3/4, 1	0.064		FES	FES	
							Polypropylene Pipe (AASHTO M330, Type S)	36							

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Corrugations; **2** = 2-2/3"x1/2", **3** = 3"x1", **5** = 5"x1"

Spiral Ribs; **3/4** = 3/4"x3/4"@7-1/2", **1** = 3/4"x1"@11-1/2"

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Allowable Pipe List

ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	51	5

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material Type R1 (Pay Item)	(*) End Sections		Applicable Backfill
													Begin	End	
				IN	Bid Item	LF		In	Type		In	SY	EA	EA	
516+58.00	34' Lt	516+58.00	30' Rt	48	Pipe Conduit	64	Reinforced Concrete Pipe - Class III (barrel length = 60 LF)	48				412	FES	FES	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 60 LF)	54	P	2, 3, 5	0.079, 0.064, 0.064				
							Spiral Rib Steel Pipe	48	P	3/4, 1	0.064				
522+72.44	46' Rt	523+39.44	46' Rt	18	Pipe Conduit - Approach	67	Reinforced Concrete Pipe - Class III (barrel length = 64 LF)	18					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
539+80.77	63' Lt	540+35.77	63' Lt	18	Pipe Conduit - Approach	55	Reinforced Concrete Pipe - Class III (barrel length = 46 LF)	18					FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
539+72.29	54' Rt	540+29.29	54' Rt	18	Pipe Conduit - Approach	57	Reinforced Concrete Pipe - Class III (barrel length = 54 LF)	18					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
548+74.00	26' Lt	548+74.00	24' Rt	24	Pipe Conduit	50	Reinforced Concrete Pipe - Class III (barrel length = 48 LF)	24				259	TES (4:1)	TES (4:1)	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 47 LF)	30	P	2	0.064				
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	24							
561+18.75	33' Rt	561+77.75	33' Rt	24	Pipe Conduit - Approach	59	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	24					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	24	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	24	A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
585+67.32	63' Lt	586+10.32	63' Lt	18	Pipe Conduit - Approach	43	Reinforced Concrete Pipe - Class III (barrel length = 34 LF)	18					FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
585+63.00	45' Rt	586+15.00	45' Rt	18	Pipe Conduit - Approach	52	Reinforced Concrete Pipe - Class III (barrel length = 50 LF)	18					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
602+61.72	45' Rt	603+10.72	45' Rt	24	Pipe Conduit - Approach	49	Reinforced Concrete Pipe - Class III (barrel length = 46 LF)	24					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	24	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	24	A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
602+58.79	45' Lt	603+09.79	45' Lt	24	Pipe Conduit - Approach	51	Reinforced Concrete Pipe - Class III (barrel length = 46 LF)	24					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	24	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	24	A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							

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Allowable Pipe List

ND 21
Jct 85 to N Jct 22 - New England

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Corrugations: **2** = 2-2/3"x1/2", **3** = 3"x1", **5** = 5"x1"

Spiral Ribs: **3/4** = 3/4"x3/4"@7-1/2", **1** = 3/4"x1"@11-1/2"

(*) End sections are measured and paid for separately for pipe extensions.
FES = Flared End Section
TES = Traversable End Section

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	51	6

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material Type R1 (Pay Item)	(*) End Sections		Applicable Backfill
													Begin	End	
				IN	Bid Item	LF		In	Type		In	SY	EA	EA	
628+66.11	58' Rt	629+37.19	58' Rt	18	Pipe Conduit - Approach	71	Reinforced Concrete Pipe - Class III (barrel length = 68 LF)	18					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
628+71.01	52' Lt	629+39.93	52' Lt	18	Pipe Conduit - Approach	69	Reinforced Concrete Pipe - Class III (barrel length = 66 LF)	18					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
641+75.04	55' Lt	642+21.04	55' Lt	18	Pipe Conduit - Approach	46	Reinforced Concrete Pipe - Class III (barrel length = 44 LF)	18					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
641+65.37	31' Rt	641+76.37	31' Rt	18	Pipe Corr. Steel - Approach (Extension)	11	Corrugated Steel Pipe	18	Z, A, P	2	0.064		*TES (6:1)		Specification 714.04 A
642+17.51	32' Rt	642+44.51	33' Rt	18	Pipe Corr. Steel - Approach (Extension)	27	Corrugated Steel Pipe	18	Z, A, P	2	0.064			*TES (6:1)	Specification 714.04 A
652+75.00	30' Lt	652+75.00	30' Rt	36	Pipe Conduit	60	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	30				342	TES (4:1)	TES (4:1)	Standard D-714-26
							Corrugated Steel Pipe	36	P	2	0.064		FES	FES	
							Spiral Rib Steel Pipe	30	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	30							
709+40.00	24' Lt	709+40.00	34' Rt	36	Pipe Conduit	59	Reinforced Concrete Pipe - Class III (barrel length = 54 LF)	36				410	TES (4:1)	FES	Standard D-714-26M
							Corrugated Steel Pipe (round barrel length = 60 LF)	36	P	2	0.064		FES	FES	
							Spiral Rib Steel Pipe (barrel length = 64 LF, 30' Lt & 34' Rt)	36	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S) (barrel length = 64 LF, 30' Lt & 34' Rt)	36							
709+50.00	24' Lt	709+50.00	34' Rt	36	Pipe Conduit	59	Reinforced Concrete Pipe - Class III (barrel length = 54 LF)	36					TES (4:1)	FES	
							Corrugated Steel Pipe (round barrel length = 60 LF)	36	P	2	0.064		FES	FES	
							Spiral Rib Steel Pipe (barrel length = 64 LF, 30' Lt & 34' Rt)	36	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S) (barrel length = 64 LF, 30' Lt & 34' Rt)	36							
717+07.57	35' Lt	717+71.57	35' Lt	24	Pipe Conduit - Approach	64	Reinforced Concrete Pipe - Class III (barrel length = 62 LF)	24					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe (barrel length = 59 LF)	30	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	24	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
717+12.26	60' Rt	717+60.26	60' Rt	18	Pipe Conduit - Approach	48	Reinforced Concrete Pipe - Class III (barrel length = 46 LF)	18					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
720+70.53	56' Rt	721+19.00	56' Rt	18	Pipe Conduit - Approach	48	Reinforced Concrete Pipe - Class III (barrel length = 46 LF)	18					TES (6:1)	TES (6:1)	Specification 714.04 A
							Corrugated Steel Pipe	18	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	18	Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							

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Corrugations: **2** = 2-2/3"x1/2", **3** = 3"x1", **5** = 5"x1"

Spiral Ribs: **3/4** = 3/4"x3/4"@7-1/2", **1** = 3/4"x1"@11-1/2"

(*) End sections are measured and paid for separately for pipe extensions.
FES = Flared End Section
TES = Traversable End Section

Allowable Pipe List

ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	51	7

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material Type R1 (Pay Item)	(*) End Sections		Applicable Backfill
													Begin	End	
				IN	Bid Item	LF		In	Type		In	SY	EA	EA	
731+70.00	32' Lt	731+70.00	30' Rt	36	Pipe Conduit	62	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	36				431	FES	FES	Standard D-714-26M
							Corrugated Steel Pipe (barrel length = 60 LF)	36	P	2	0.064				
							Spiral Rib Steel Pipe	36	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	36							
731+80.00	32' Lt	731+80.00	30' Rt	36	Pipe Conduit	62	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	36					FES	FES	
							Corrugated Steel Pipe (barrel length = 60 LF)	36	P	2	0.064				
							Spiral Rib Steel Pipe	36	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	36							
750+65.00	30' Lt	750+65.00	30' Rt	36	Pipe Conduit	60	Reinforced Concrete Pipe - Class III (barrel length = 46 LF)	30				260	TES (4:1)	TES (4:1)	Standard D-714-26
							Corrugated Steel Pipe	36	P	2	0.064		FES	FES	
							Spiral Rib Steel Pipe (barrel length = 48 LF)	30	P	3/4, 1	0.064		TES (4:1)	TES (4:1)	
							Polypropylene Pipe (AASHTO M330, Type S) (barrel length = 48 LF)	30							
759+07.00	24' Lt	759+07.00	34' Rt	36	Pipe Conduit	59	Reinforced Concrete Pipe - Class III (barrel length = 54 LF)	36				339	TES (4:1)	FES	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 60 LF)	36	P	2	0.064		FES		
							Spiral Rib Steel Pipe (barrel length = 64 LF, 30' Lt & 34' Rt)	36	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S) (barrel length = 64 LF, 30' Lt & 34' Rt)	36							
787+31.00	25' Lt	787+31.00	34' Rt	30	Pipe Conduit	59	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	30				386	TES (4:1)	FES	Standard D-714-26M
							Corrugated Steel Pipe (barrel length = 52 LF)	30	P	2	0.064			TES (4:1)	
							Spiral Rib Steel Pipe	30	P	3/4, 1	0.064			FES	
							Polypropylene Pipe (AASHTO M330, Type S)	30							
787+40.00	25' Lt	787+40.00	34' Rt	30	Pipe Conduit	59	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	30					TES (4:1)	FES	
							Corrugated Steel Pipe (barrel length = 52 LF)	30	P	2	0.064			TES (4:1)	
							Spiral Rib Steel Pipe	30	P	3/4, 1	0.064			FES	
							Polypropylene Pipe (AASHTO M330, Type S)	30							
804+89.34	34' Rt	804+92.34	34' Rt	18	Pipe Corr. Steel - Approach (Extension)	3	Corrugated Steel Pipe	18	Z, A, P	2	0.064		*TES (6:1)		Specification 714.04 A
805+53.60	36' Rt	805+59.60	36' Rt	18	Pipe Corr. Steel - Approach (Extension)	6	Corrugated Steel Pipe	18	Z, A, P	2	0.064			*TES (6:1)	Specification 714.04 A
811+88.12	40' Rt	812+48.62	40' Rt	36	Pipe Conduit - Approach	61	Reinforced Concrete Pipe - Class III (barrel length = 58 LF)	36					TES (6:1)	TES (6:1)	Specification 714.04 A
811+88.12	46' Rt	812+48.62	46' Rt	36	Pipe Conduit - Approach	61	Reinforced Concrete Pipe - Class III (barrel length = 58 LF)	36					TES (6:1)	TES (6:1)	Specification 714.04 A
811+88.12	52' Rt	812+48.62	52' Rt	36	Pipe Conduit - Approach	61	Reinforced Concrete Pipe - Class III (barrel length = 58 LF)	36					TES (6:1)	TES (6:1)	Specification 714.04 A
811+88.12	58' Rt	812+48.62	58' Rt	36	Pipe Conduit - Approach	61	Reinforced Concrete Pipe - Class III (barrel length = 58 LF)	36					TES (6:1)	TES (6:1)	Specification 714.04 A
812+87.00	30' Lt	812+87.00	34' Rt	48	Pipe Conduit	64	Reinforced Concrete Pipe - Class III (barrel length = 60 LF)	48				415	FES	FES	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 60 LF)	54	P	2, 3, 5	0.079, 0.064, 0.064				
							Spiral Rib Steel Pipe	48	P	3/4, 1	0.064				
822+16.77	56' Lt	822+11.35	53' Rt	54	Pipe Conduit	110	Reinforced Concrete Pipe - Class III (barrel length = 104 LF)	54				749	FES	FES	Standard D-714-25
							Corrugated Steel Pipe (barrel length = 109 LF)	60	P	2, 3, 5	0.109, 0.064, 0.064				
							Spiral Rib Steel Pipe	54	P	3/4, 1	0.079, 0.064				
830+69.00	35' Lt	830+69.00	31' Rt	36	Pipe Conduit	66	Reinforced Concrete Pipe - Class III (barrel length = 60 LF)	36				385	FES	FES	Standard D-714-26
							Corrugated Steel Pipe (barrel length = 60 LF)	42	P	2	0.064				
							Spiral Rib Steel Pipe	36	P	3/4, 1	0.064				
							Polypropylene Pipe (AASHTO M330, Type S)	36							

Coatings: **Z** = Zinc, **A** = Aluminum, **P** = Polymeric (over Zinc or Aluminum)

Corrugations: **2** = 2-2/3"x1/2", **3** = 3"x1", **5** = 5"x1"

Spiral Ribs: **3/4** = 3/4"x3/4"@7-1/2", **1** = 3/4"x1"@11-1/2"

(*) End sections are measured and paid for separately for pipe extensions.
FES = Flared End Section
TES = Traversable End Section

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Allowable Pipe List

ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	51	8

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material Type R1 (Pay Item)	(*) End Sections		Applicable Backfill
													Begin	End	
				IN	Bid Item	LF		In	Type		In	SY	EA	EA	
2644+87.82	99' Lt	2645+49.69	99' Lt	42	Pipe Conduit - Approach	62	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	42					FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	42	A, P	2, 3, 5	0.064				
							Spiral Rib Steel Pipe	42	A, P	3/4, 1	0.064				
2645+94.00	64' Lt	2645+94.00	48' Lt	30	Pipe Conc. Reinf. CL III (Extension)	14	Reinforced Concrete Pipe - Class III (barrel length = 14 LF)	30					*Remove & Relay		Section 20 Sheet 6
2645+94.00	50' Rt	2645+94.00	62' Rt	30	Pipe Conc. Reinf. CL III (Extension)	10	Reinforced Concrete Pipe - Class III (barrel length = 10 LF)	30						*Remove & Relay	Section 20 Sheet 6

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Allowable Pipe List

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	51	9

Pipe Conduit - Approach to be used on Bypass locations

*Refer to Sheets 100-8 thru 100-13

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material Type R1 (Pay Item)	(*) End Sections		Applicable Backfill
													Begin	End	
				IN	Bid Item	LF		In	Type		In	SY	EA	EA	
1006+51.56 Bypass 1	27' Rt	1006+56.60 Bypass 1	27' Lt	54	Pipe Conduit - Approach	54	Corrugated Steel Pipe	54	Z, A, P	2, 3, 5	0.079, 0.064, 0.064				Specification 714.04 A
1006+57.80 Bypass 1	27' Rt	1006+62.42 Bypass 1	27' Lt	54	Pipe Conduit - Approach	54	Corrugated Steel Pipe	54	Z, A, P	2, 3, 5	0.079, 0.064, 0.064				Specification 714.04 A
1006+64.05 Bypass 1	27' Rt	1006+68.23 Bypass 1	27' Lt	54	Pipe Conduit - Approach	54	Corrugated Steel Pipe	54	Z, A, P	2, 3, 5	0.079, 0.064, 0.064				Specification 714.04 A
1006+70.29 Bypass 1	27' Rt	1006+74.04 Bypass 1	27' Lt	54	Pipe Conduit - Approach	54	Corrugated Steel Pipe	54	Z, A, P	2, 3, 5	0.079, 0.064, 0.064				Specification 714.04 A
1006+76.52 Bypass 1	27' Rt	1006+79.84 Bypass 1	27' Lt	54	Pipe Conduit - Approach	54	Corrugated Steel Pipe	54	Z, A, P	2, 3, 5	0.079, 0.064, 0.064				Specification 714.04 A
2005+22.80 Bypass 2	41' Lt	2005+83.05 Bypass 2	38' Rt	78	Pipe Conduit - Approach	99	Corrugated Steel Pipe	78	Z, A, P	2, 3, 5	0.168, 0.064, 0.064				Specification 714.04 A
2005+32.41 Bypass 2	40' Lt	2005+93.71 Bypass 2	37' Rt	78	Pipe Conduit - Approach	99	Corrugated Steel Pipe	78	Z, A, P	2, 3, 5	0.168, 0.064, 0.064				Specification 714.04 A
2005+42.13 Bypass 2	40' Lt	2006+04.21 Bypass 2	37' Rt	78	Pipe Conduit - Approach	99	Corrugated Steel Pipe	78	Z, A, P	2, 3, 5	0.168, 0.064, 0.064				Specification 714.04 A
2005+51.96 Bypass 2	40' Lt	2006+14.56 Bypass 2	37' Rt	78	Pipe Conduit - Approach	99	Corrugated Steel Pipe	78	Z, A, P	2, 3, 5	0.168, 0.064, 0.064				Specification 714.04 A
4005+25.50 Bypass 4	30' Rt	4005+61.47 Bypass 4	35' Lt	42	Pipe Conduit - Approach	74	Corrugated Steel Pipe	42	Z, A, P	2	0.064				Specification 714.04 A
4005+31.00 Bypass 4	30' Rt	4005+67.43 Bypass 4	34' Lt	42	Pipe Conduit - Approach	74	Corrugated Steel Pipe	42	Z, A, P	2	0.064				Specification 714.04 A
4005+36.52 Bypass 4	30' Rt	4005+73.45 Bypass 4	34' Lt	42	Pipe Conduit - Approach	74	Corrugated Steel Pipe	42	Z, A, P	2	0.064				Specification 714.04 A
4005+42.07 Bypass 4	30' Rt	4005+79.49 Bypass 4	34' Lt	42	Pipe Conduit - Approach	74	Corrugated Steel Pipe	42	Z, A, P	2	0.064				Specification 714.04 A
4005+47.64 Bypass 4	30' Rt	4005+85.56 Bypass 4	34' Lt	42	Pipe Conduit - Approach	74	Corrugated Steel Pipe	42	Z, A, P	2	0.064				Specification 714.04 A
4005+53.24 Bypass 4	29' Rt	4005+91.65 Bypass 4	34' Lt	42	Pipe Conduit - Approach	74	Corrugated Steel Pipe	42	Z, A, P	2	0.064				Specification 714.04 A
5005+71.69 Bypass 5	27' Rt	5005+76.99 Bypass 5	27' Lt	66	Pipe Conduit - Approach	54	Corrugated Steel Pipe	66	Z, A, P	2, 3, 5	0.138, 0.064, 0.064				Specification 714.04 A
5005+78.69 Bypass 5	27' Rt	5005+84.02 Bypass 5	27' Lt	66	Pipe Conduit - Approach	54	Corrugated Steel Pipe	66	Z, A, P	2, 3, 5	0.138, 0.064, 0.064				Specification 714.04 A
5005+85.72 Bypass 5	27' Rt	5005+91.06 Bypass 5	27' Lt	66	Pipe Conduit - Approach	54	Corrugated Steel Pipe	66	Z, A, P	2, 3, 5	0.138, 0.064, 0.064				Specification 714.04 A
5005+92.76 Bypass 5	27' Rt	5005+98.09 Bypass 5	27' Lt	66	Pipe Conduit - Approach	54	Corrugated Steel Pipe	66	Z, A, P	2, 3, 5	0.138, 0.064, 0.064				Specification 714.04 A

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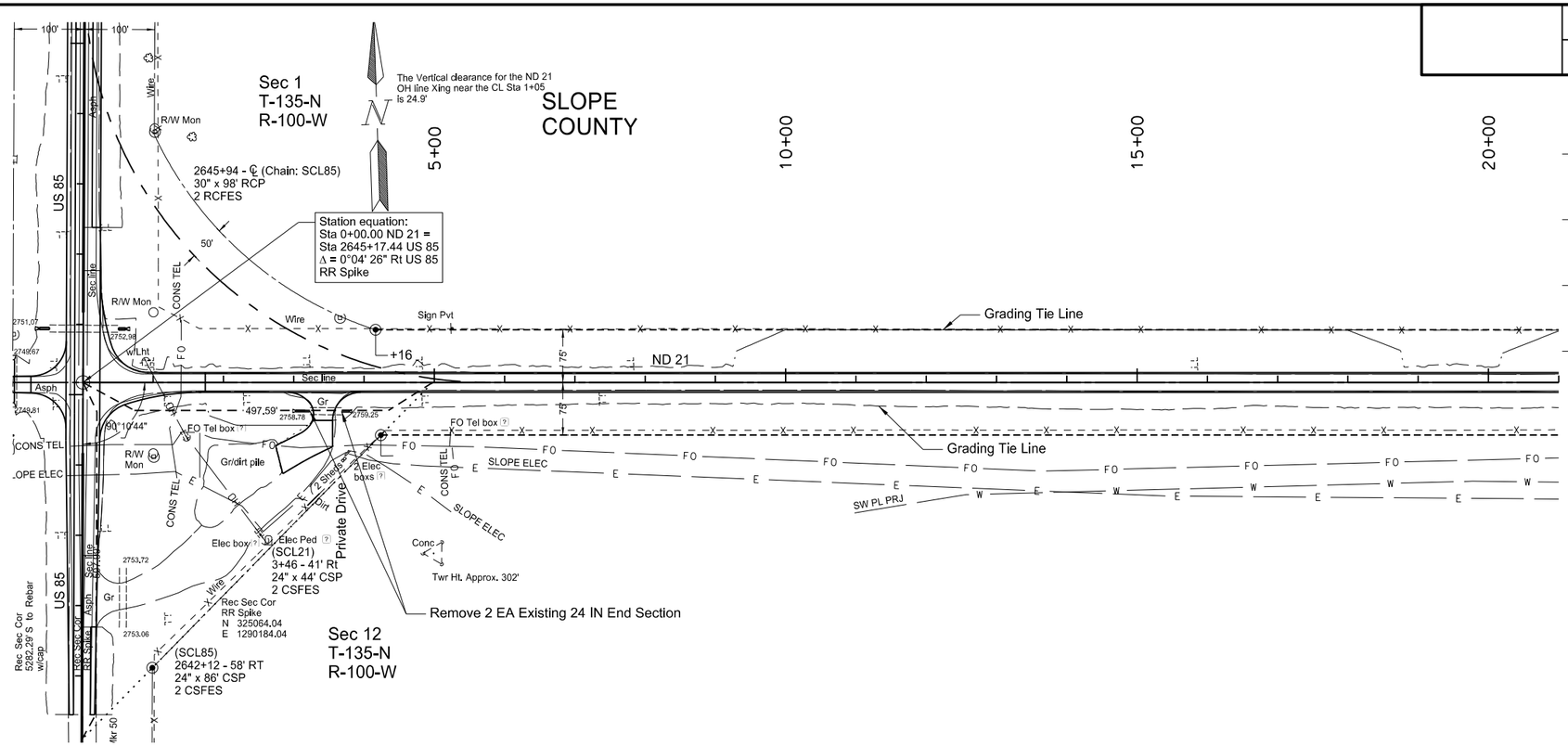
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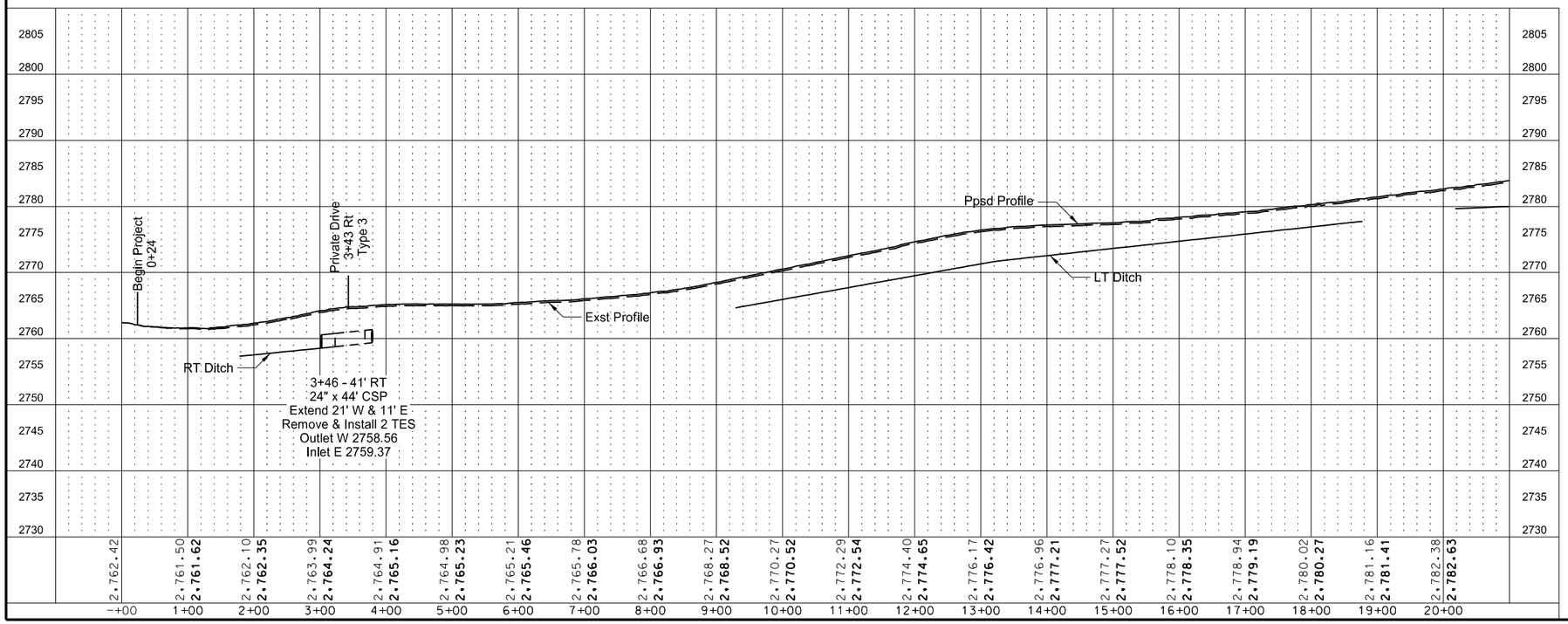
Allowable Pipe List

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	1

SPEC	CODE	BID ITEM	QTY	UNIT
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES		
		3+23 Rt	1	EA
		3+68 Rt	1	EA
714	5035	PIPE CORR STEEL .064IN 24IN		
		3+02 - 41' Rt to 3+23 - 41' Rt	21	LF
		3+68 - 41' Rt to 3+79 - 41' Rt	11	LF
714	6506	END SECT-TRAVERSABLE METAL 24IN		
		3+02 Rt	1	EA
		3+79 Rt	1	EA
990	0400	PIPE CLEANOUT		
		3+46 Rt	1	EA





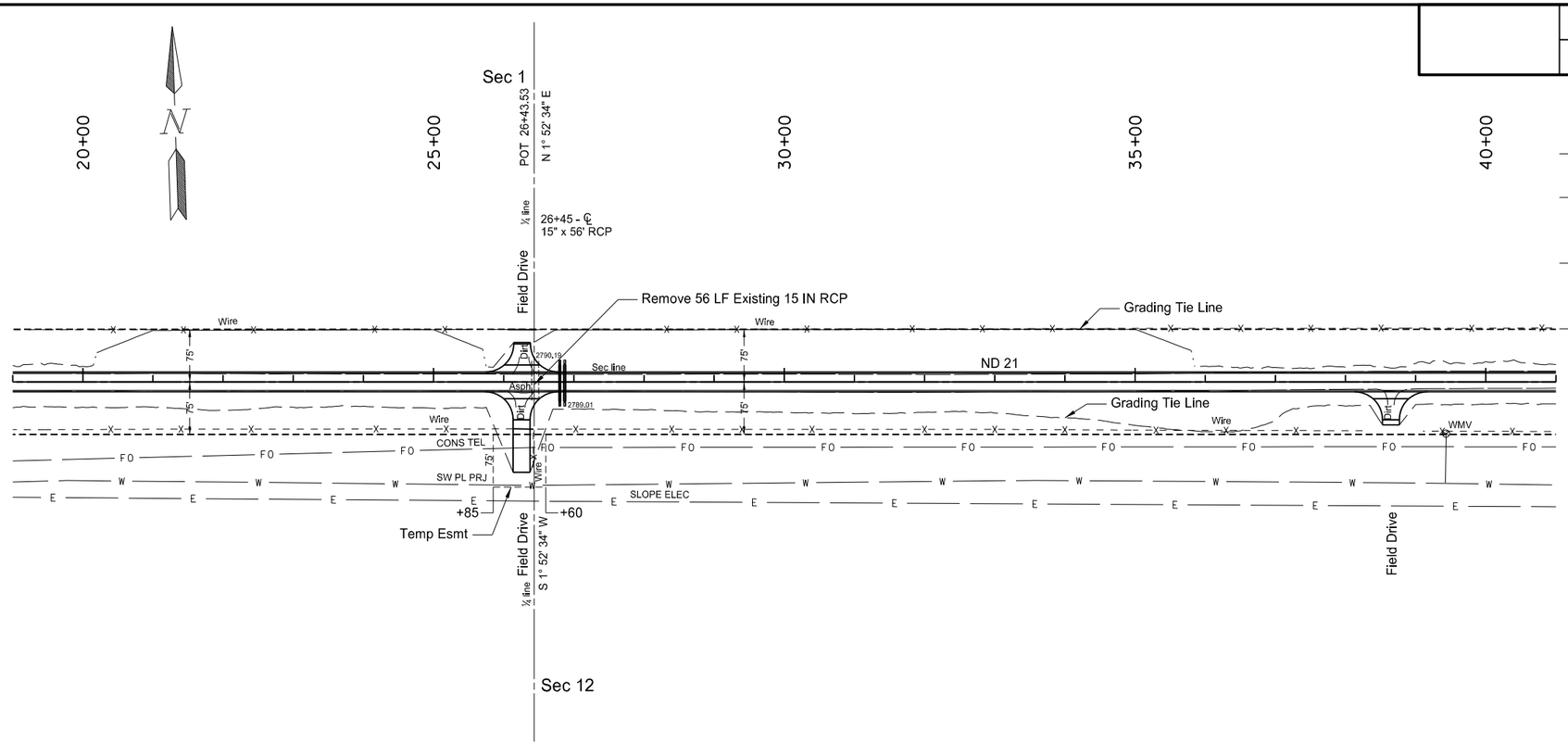
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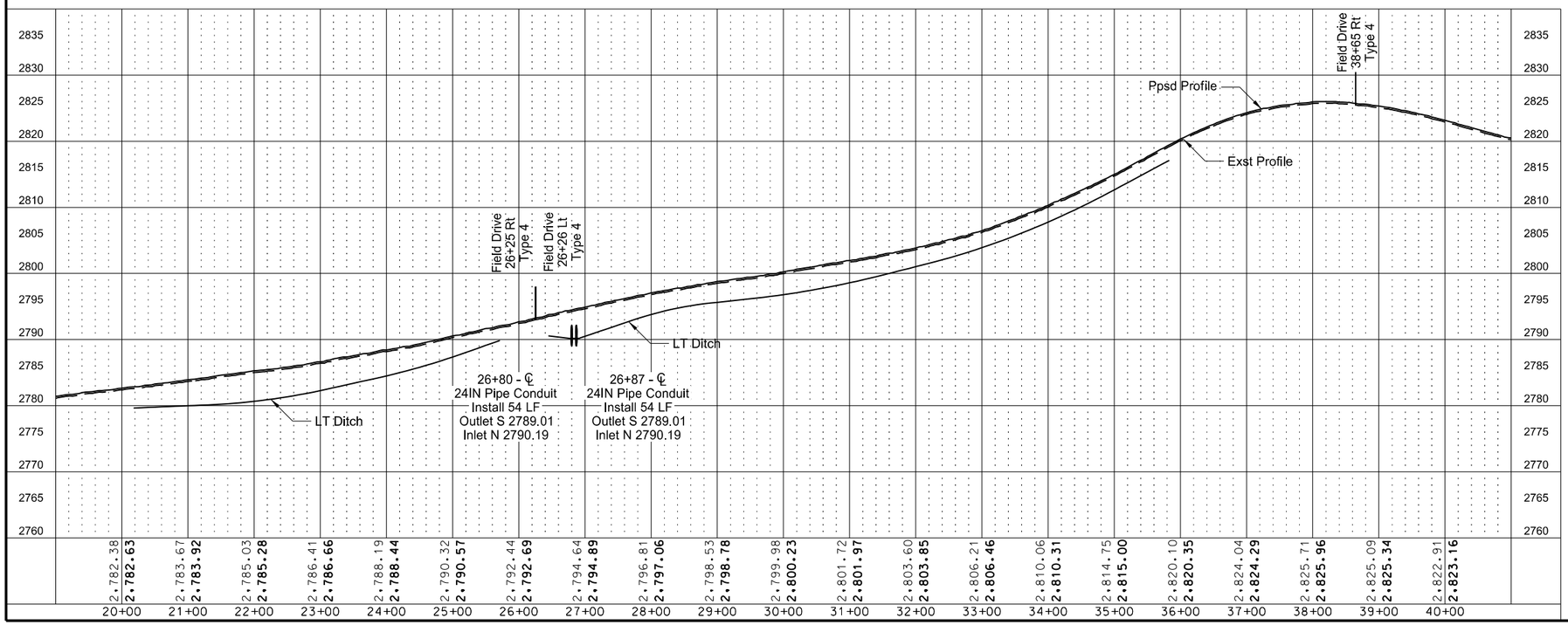
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

0+24 to 20+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	2





SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		26+45 - 30' Lt to 26+45 - 26' Rt	56	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		26+80 - 25' Lt to 26+80 - 29' Rt 26+87 - 25' Lt to 26+87 - 29' Rt	327	SY
714	4105	PIPE CONDUIT 24IN		
		26+80 - 25' Lt to 26+80 - 29' Rt	54	LF
		26+87 - 25' Lt to 26+87 - 29' Rt	54	LF
754	0805	OBJECT MARKERS - CULVERTS		
		26+80 Lt & Rt	2	EA
		26+87 Lt & Rt	2	EA

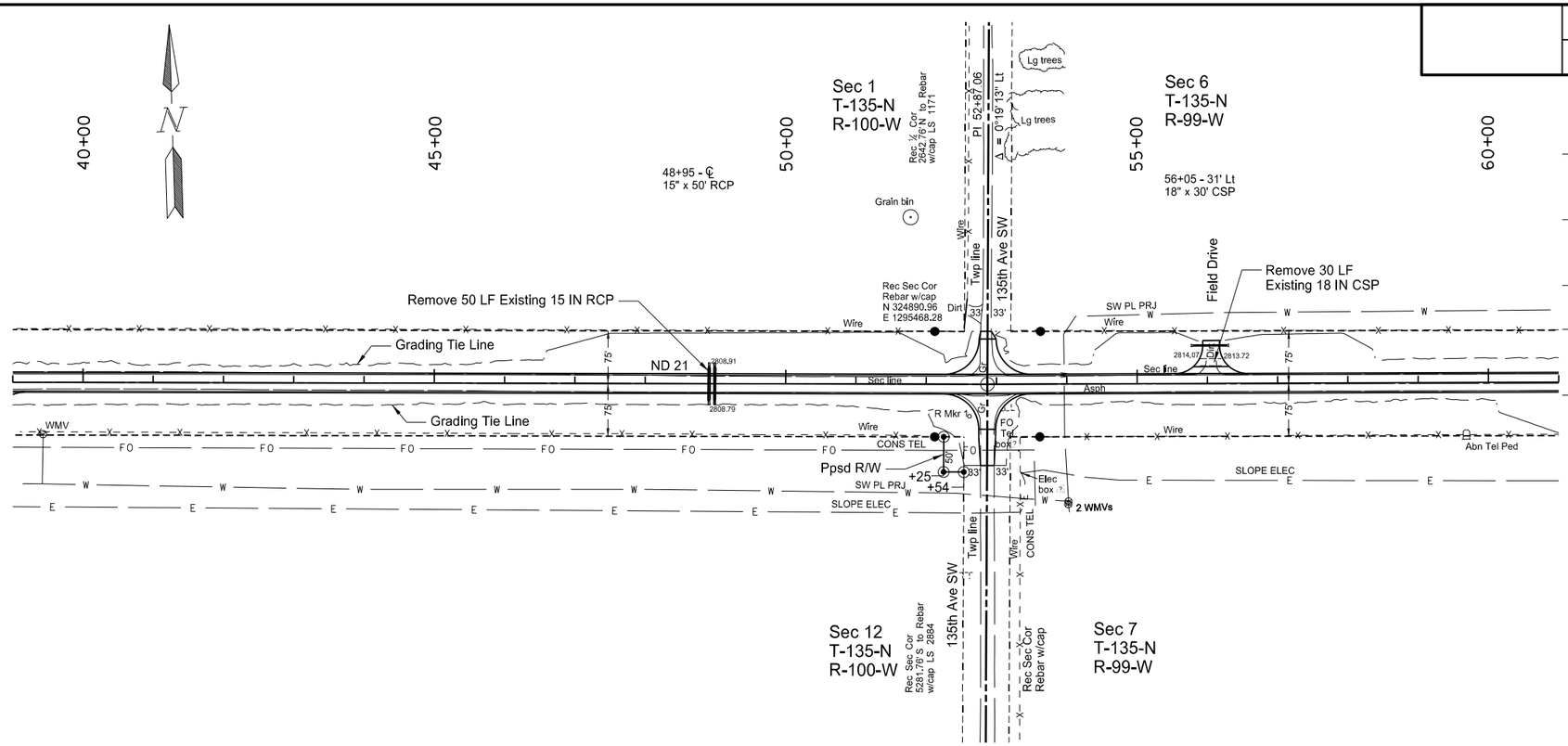
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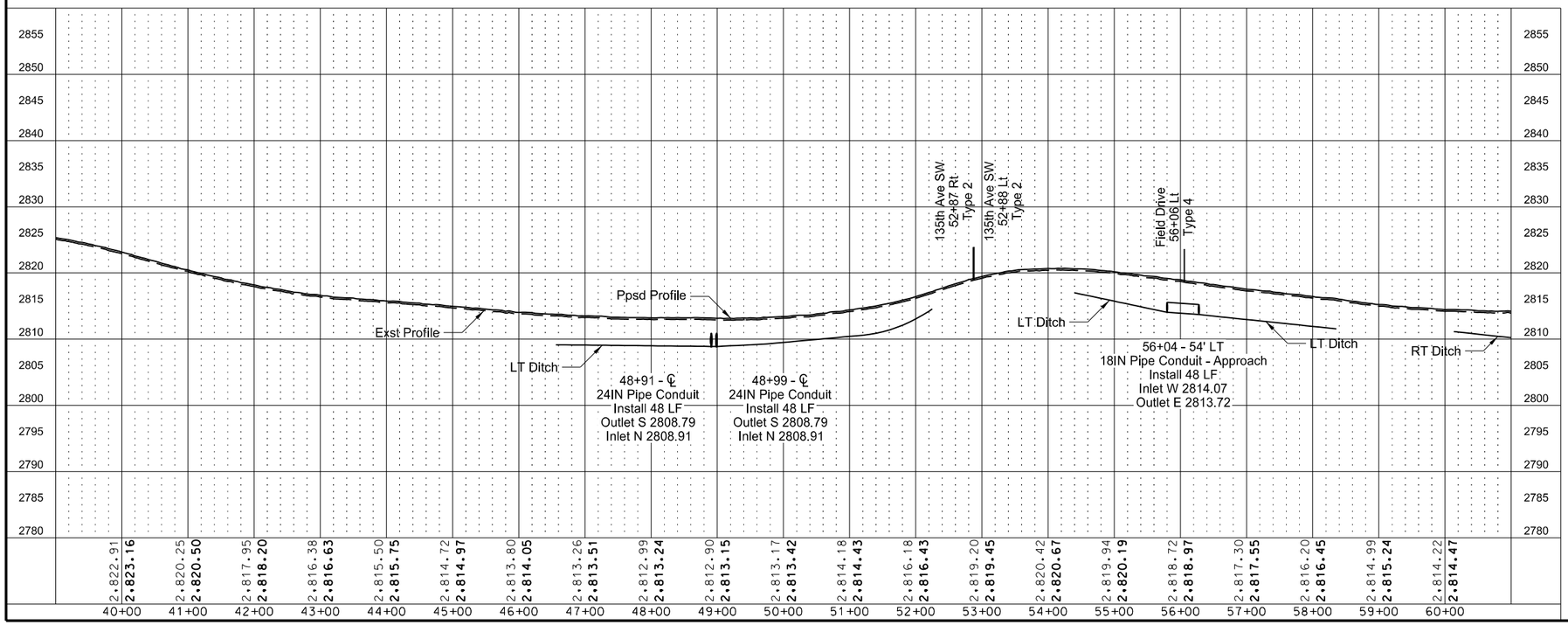
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

20+00 to 40+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	3





SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		48+95 - 25' Lt to 48+95 - 25' Rt	50	LF
		55+90 - 30' Lt to 56+20 - 30' Lt	30	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		48+91 - 24' Lt to 48+91 - 24' Rt 48+99 - 24' Lt to 48+99 - 24' Rt	277	SY
714	4099	PIPE CONDUIT 18IN-APPROACH		
		55+80 - 54' Lt to 56+28- 54' Lt	48	LF
714	4105	PIPE CONDUIT 24IN		
		48+91 - 24' Lt to 48+91 - 24' Rt	48	LF
		48+99 - 24' Lt to 48+99 - 24' Rt	48	LF
754	0805	OBJECT MARKERS - CULVERTS		
		48+91 Lt & Rt	2	EA
		48+99 Lt & Rt	2	EA

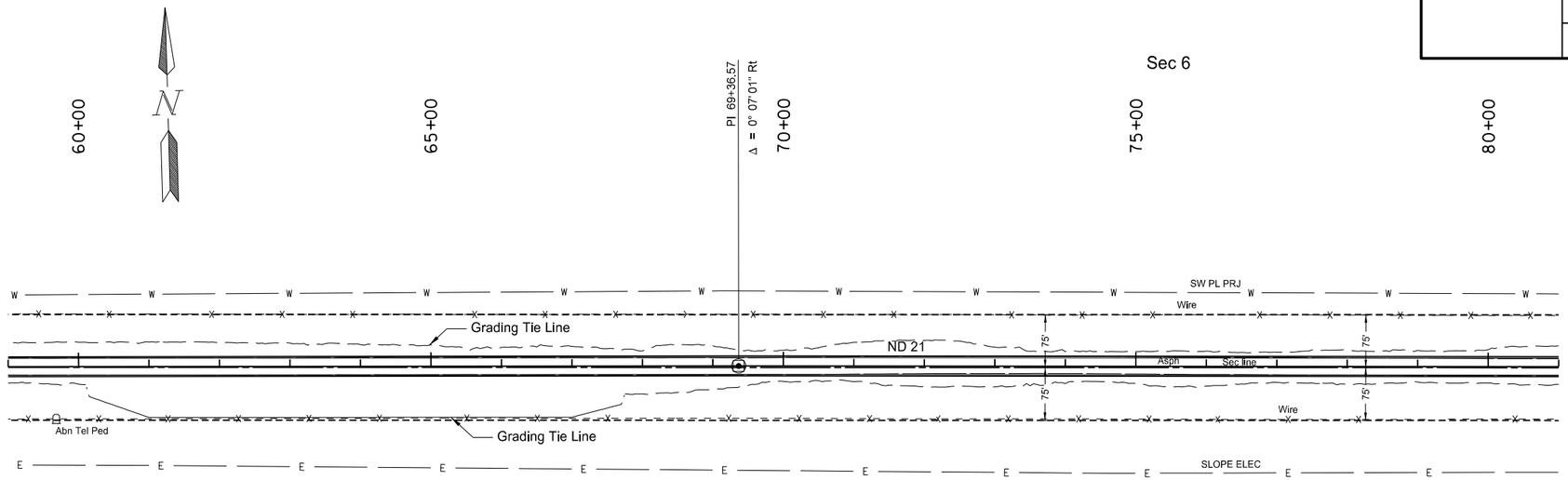
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Plan & Profile

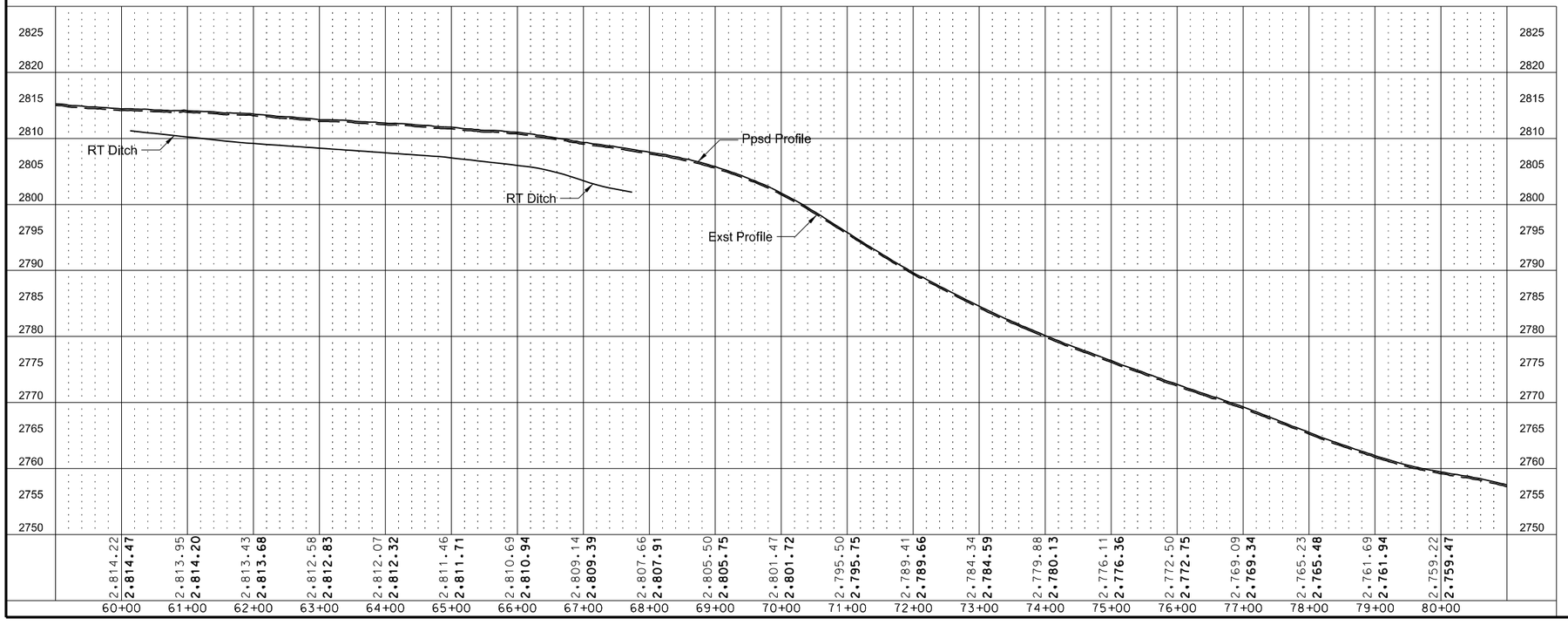
ND 21
Jct 85 to N Jct 22 - New England

40+00 to 60+00

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	4



Sec 7



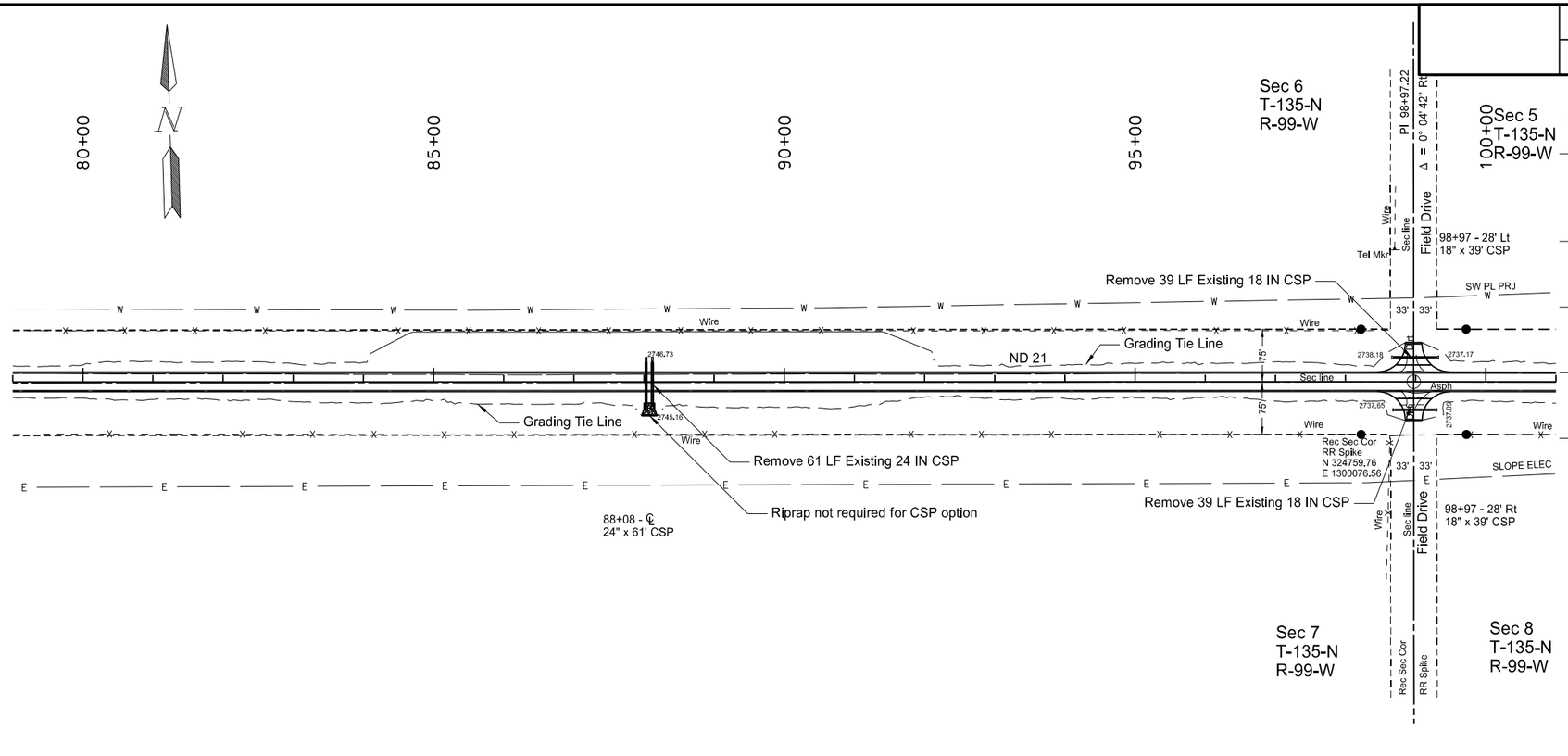
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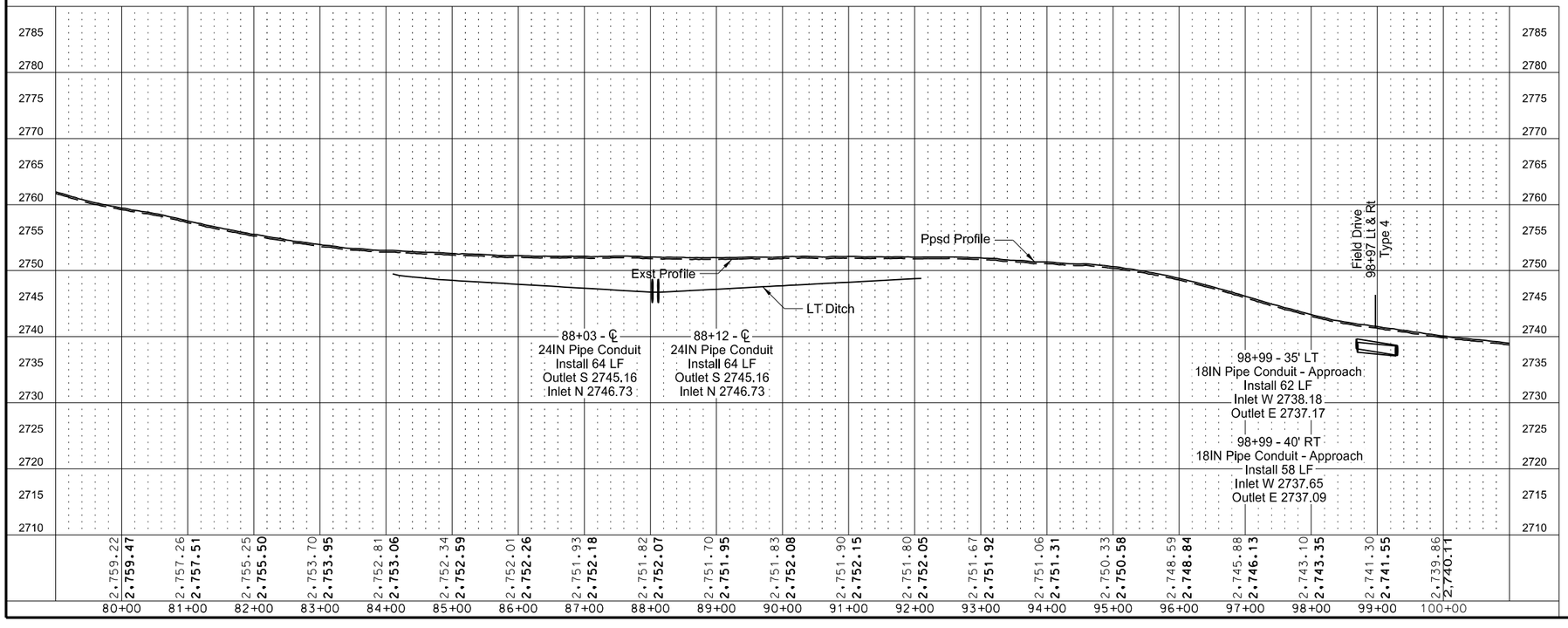
ND 21
Jct 85 to N Jct 22 - New England

60+00 to 80+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	5



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		88+08 - 30' Lt to 88+08 - 32' Rt	61	LF
		98+77 - 28' Lt to 99+17 - 28' Lt	39	LF
		98+77 - 28' Rt to 99+17 - 28' Rt	39	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		88+03 - 29' Lt to 88+03 - 35 Rt 88+12 - 29' Lt to 88+12 - 35 Rt	425	SY
714	4099	PIPE CONDUIT 18IN-APPROACH		
		98+70 - 40' Rt to 99+28 - 40' Rt	58	LF
		98+68 - 35' Lt to 99+30 - 35' Lt	62	LF
714	4105	PIPE CONDUIT 24IN		
		88+03 - 29' Lt to 88+03 - 35 Rt	64	LF
		88+12 - 29' Lt to 88+12 - 35 Rt	64	LF
754	0805	OBJECT MARKERS - CULVERTS		
		88+03 Lt & Rt	2	EA
		88+12 Lt & Rt	2	EA



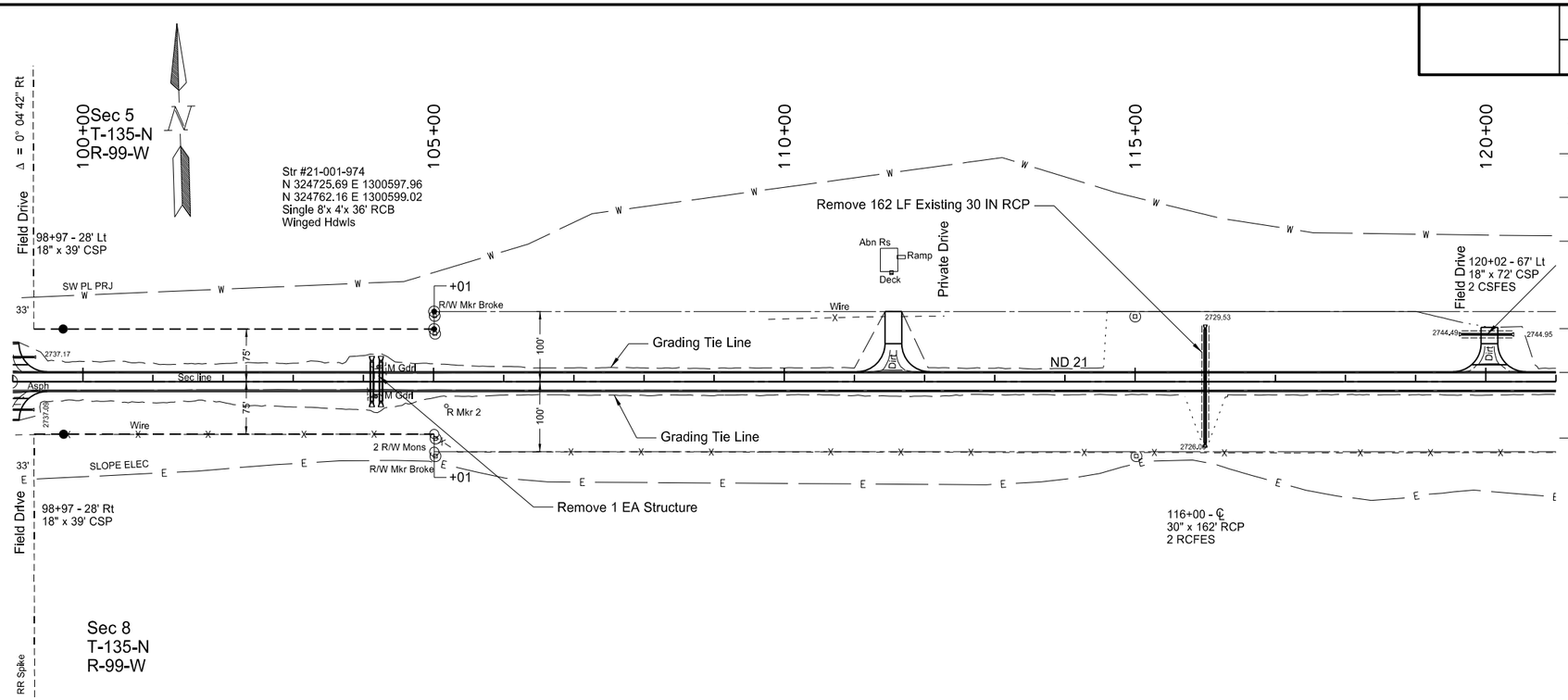
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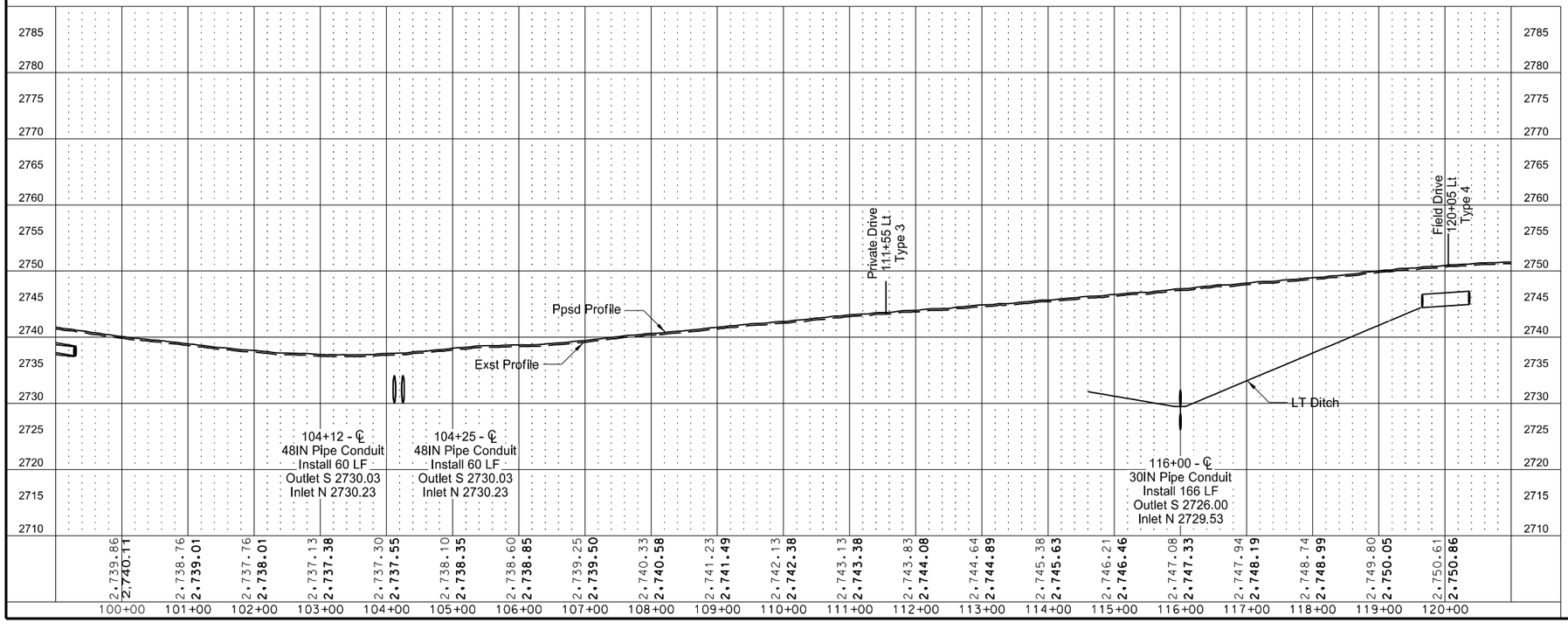
ND 21
Jct 85 to N Jct 22 - New England

80+00 to 100+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	6



SPEC	CODE	BID ITEM	QTY	UNIT
202	0104	REMOVAL OF STRUCTURE		
		104+19	1	EA
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		116+00 - 80' Lt to 116+00 - 83' Rt	162	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		104+12 - 30' Lt to 104+12 - 30' Rt 104+25 - 30' Lt to 104+25 - 30' Rt	477	SY
		116+00 - 76' Lt to 116+00 - 89' Rt	1489	SY
714	4110	PIPE CONDUIT 30IN		
		116+00 - 76' Lt to 116+00 - 89' Rt	166	LF
714	4125	PIPE CONDUIT 48IN		
		104+12 - 30' Lt to 104+12 - 30' Rt	60	LF
		104+25 - 30' Lt to 104+25 - 30' Rt	60	LF
754	0805	OBJECT MARKERS - CULVERTS		
		104+12 Lt & Rt	2	EA
		104+25 Lt & Rt	2	EA
		116+00 Lt & Rt	2	EA



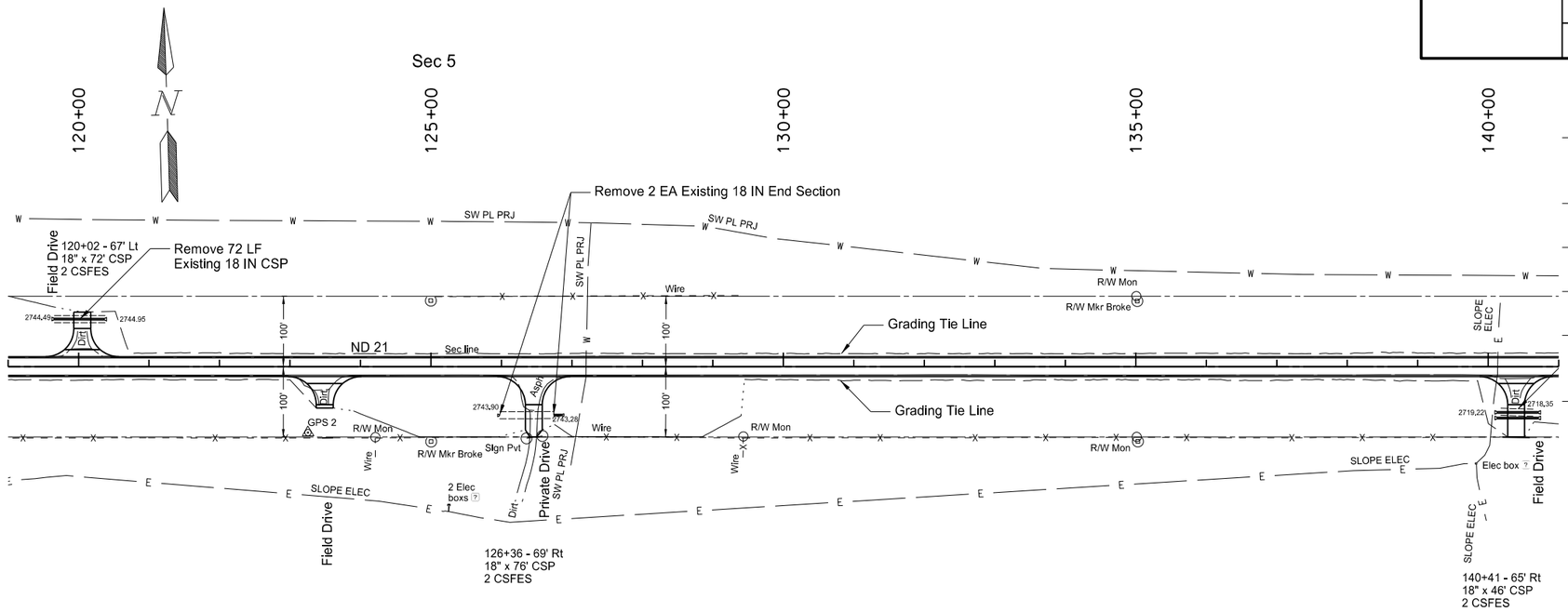
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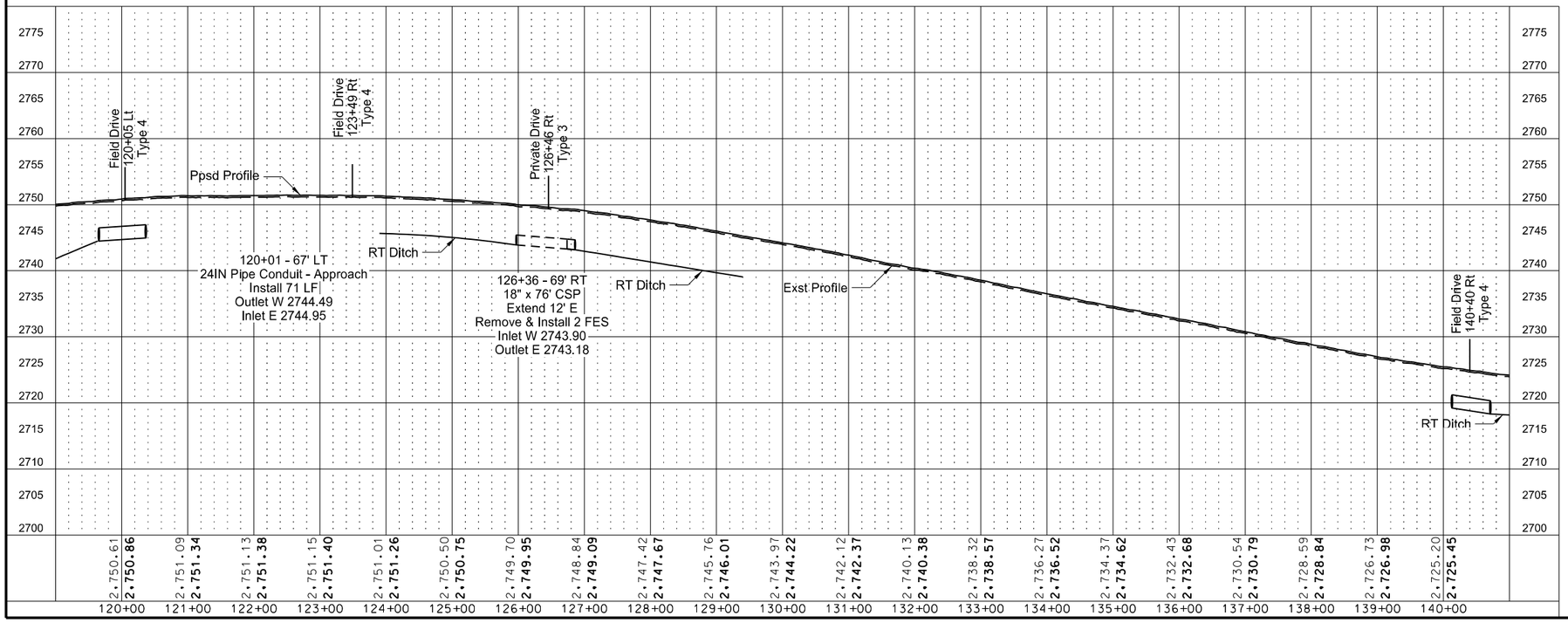
ND 21
Jct 85 to N Jct 22 - New England

100+00 to 120+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	7



Sec 8



SPEC	CODE	BID ITEM	QTY	UNIT
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES		
		125+97 Rt	1	EA
		126+74 Rt	1	EA
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		119+65 - 67' Lt to 120+38 - 67' Lt	72	LF
714	4106	PIPE CONDUIT 24IN-APPROACH		
		119+66 - 68' Lt to 120+37 - 67' Lt	71	LF
714	5015	PIPE CORR STEEL .064IN 18IN		
		126+74 - 69' Rt to 126+86 - 69' Rt	12	LF
714	5810	END SECT CORR STEEL .064IN 18IN		
		125+97 - 69' Rt	1	EA
		126+86 - 69' Rt	1	EA
990	0400	PIPE CLEANOUT		
		126+36 Rt	1	EA

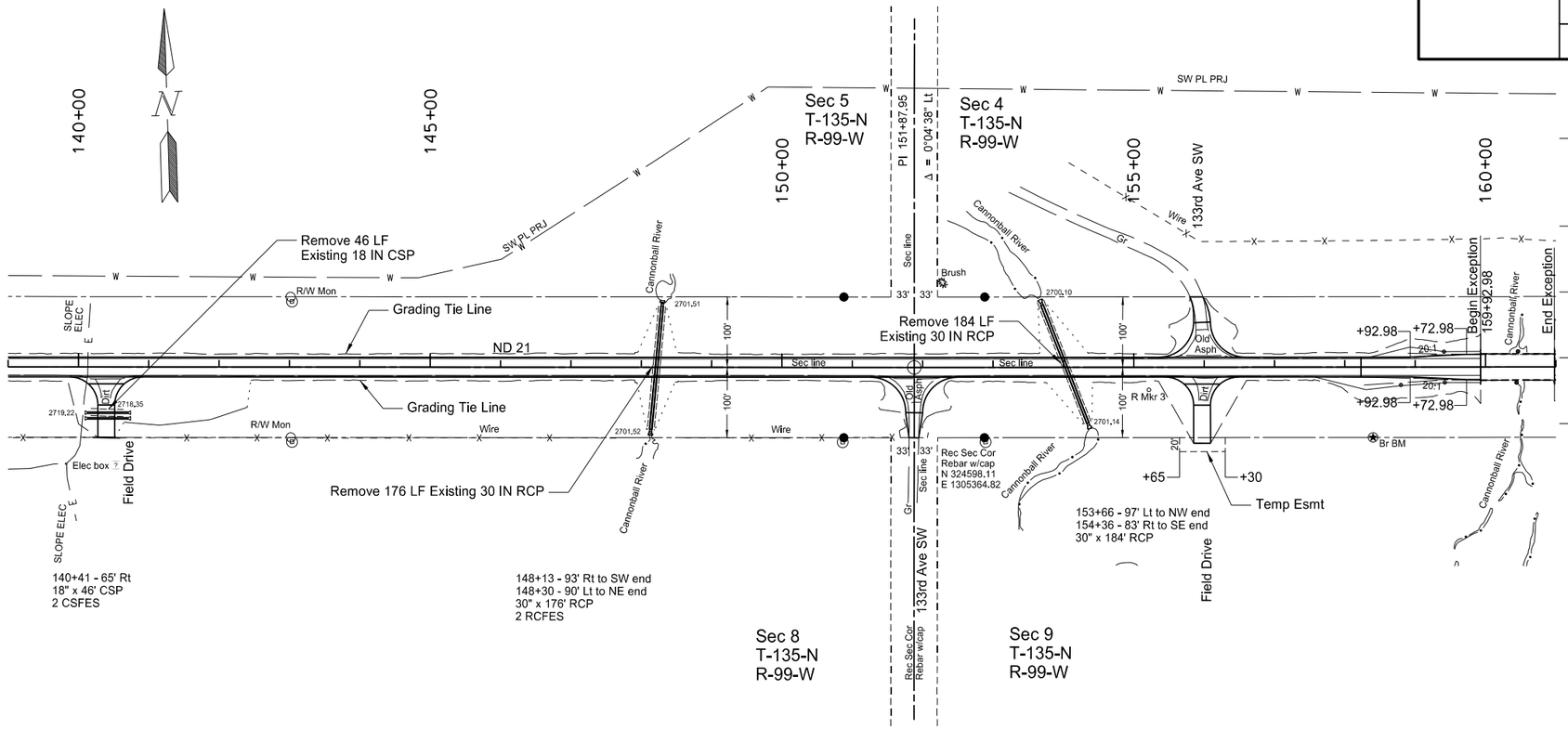
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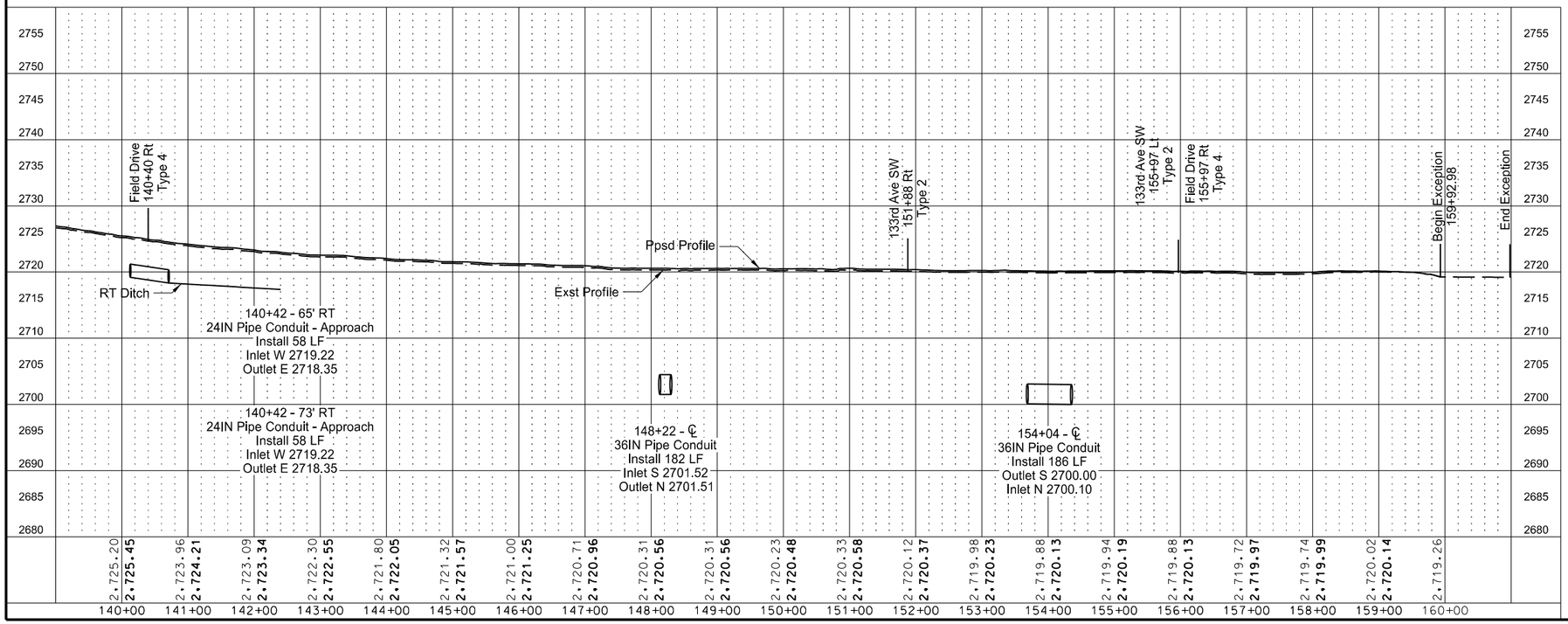
ND 21
Jct 85 to N Jct 22 - New England

120+00 to 140+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	8



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		140+17 - 64' Rt to 140+64 - 65' Rt	46	LF
		148+13 - 89' Rt to 148+30 - 87' Lt	176	LF
		153+68 - 94' Lt to 154+35 - 80' Rt	184	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		148+30 - 90' Lt to 148+13 - 91' Rt	1495	SY
		153+69 - 91' Lt to 154+36 - 82' Rt	1605	SY
714	4106	PIPE CONDUIT 24IN-APPROACH		
		140+13 - 65' Rt to 140+71 - 65' Rt	58	LF
		140+13 - 73' Rt to 140+71 - 73' Rt	58	LF
714	4115	PIPE CONDUIT 36IN		
		148+30 - 90' Lt to 148+13 - 91' Rt	182	LF
		153+69 - 91' Lt to 154+36 - 82' Rt	186	LF
754	0805	OBJECT MARKERS - CULVERTS		
		148+13 Rt	1	EA
		148+30 Lt	1	EA
		153+69 Lt	1	EA
		154+36 Rt	1	EA



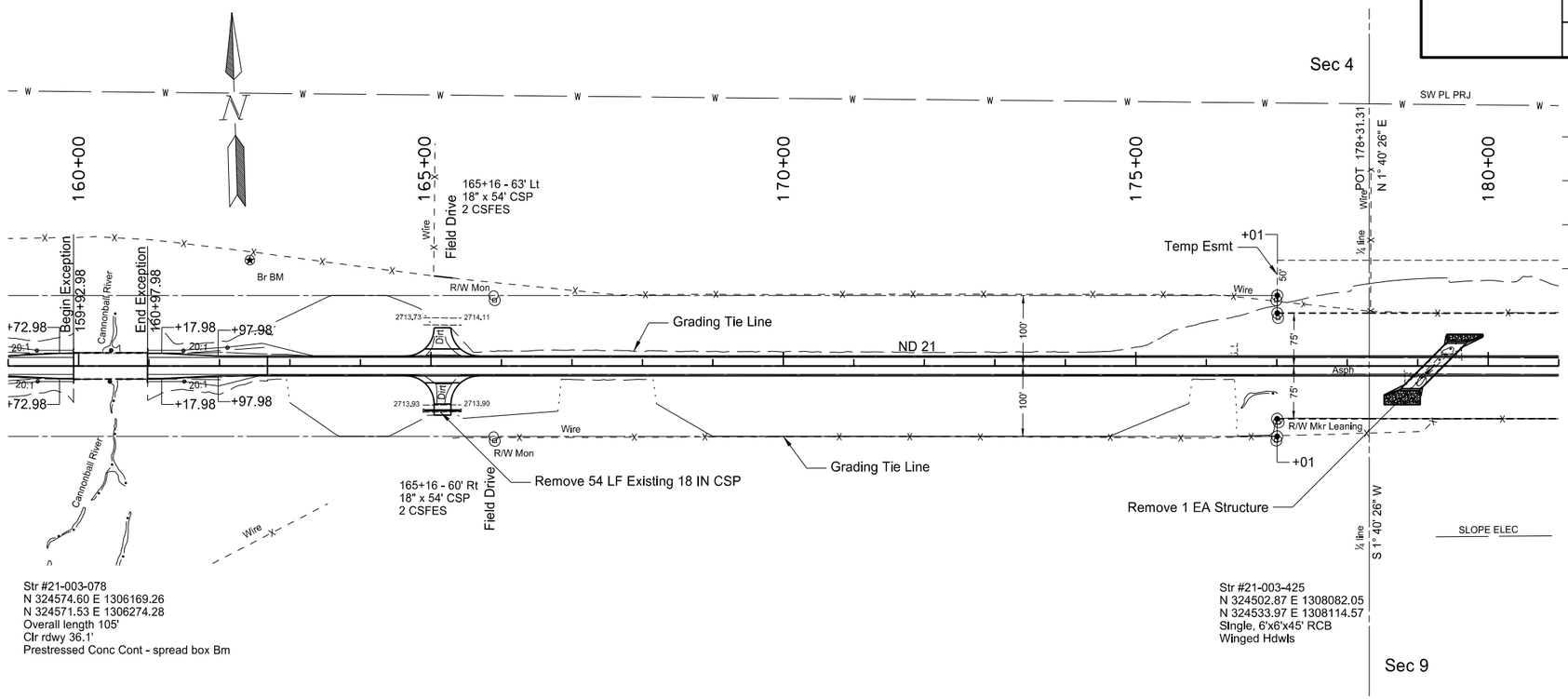
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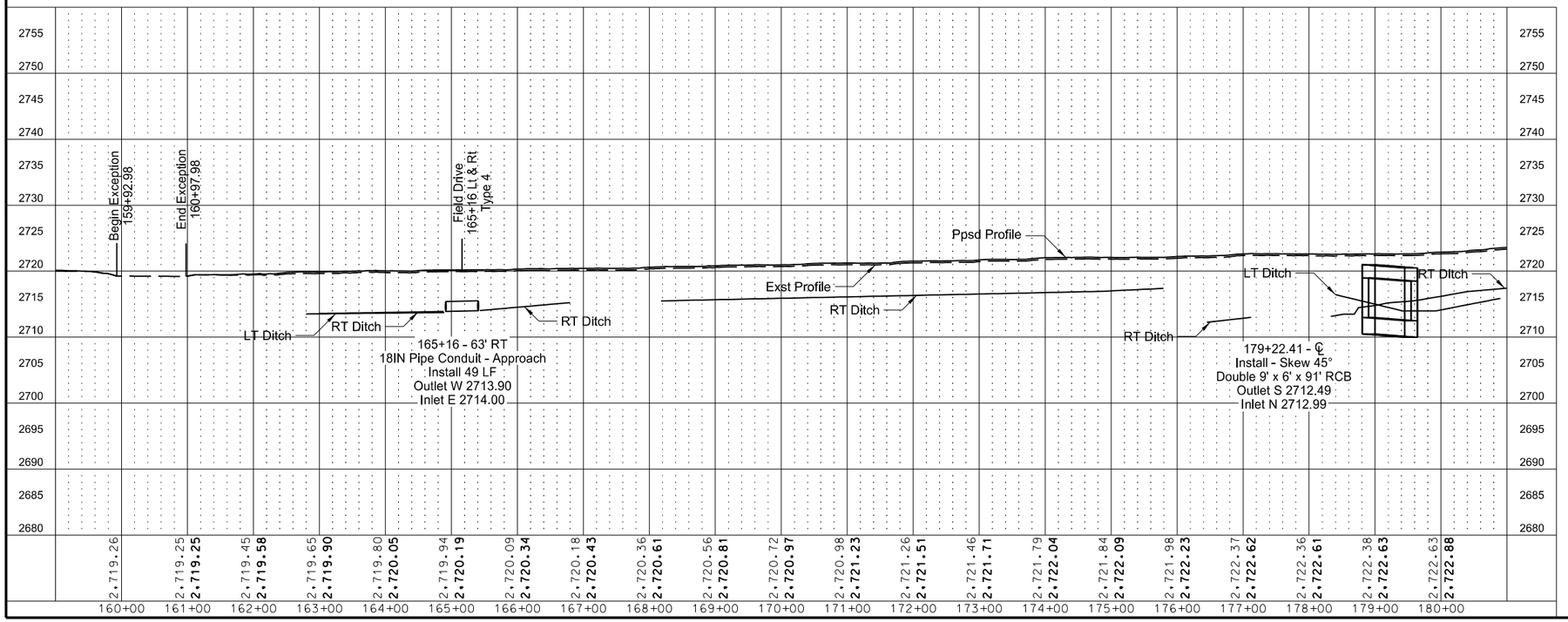
ND 21
Jct 85 to N Jct 22 - New England

140+00 to 159+92.98

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	9



SPEC	CODE	BID ITEM	QTY	UNIT
202	0104	REMOVAL OF STRUCTURE		
		179+22 (see section 170)	1	EA
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		164+88 - 60' Rt to 165+43 - 60' Rt	54	LF
714	4099	PIPE CONDUIT 18IN-APPROACH		
		164+92 - 63' Rt to 165+41 - 63' Rt	49	LF
754	0805	OBJECT MARKERS - CULVERTS		
		178+90 Rt	2	EA
		179+55 Lt	2	EA



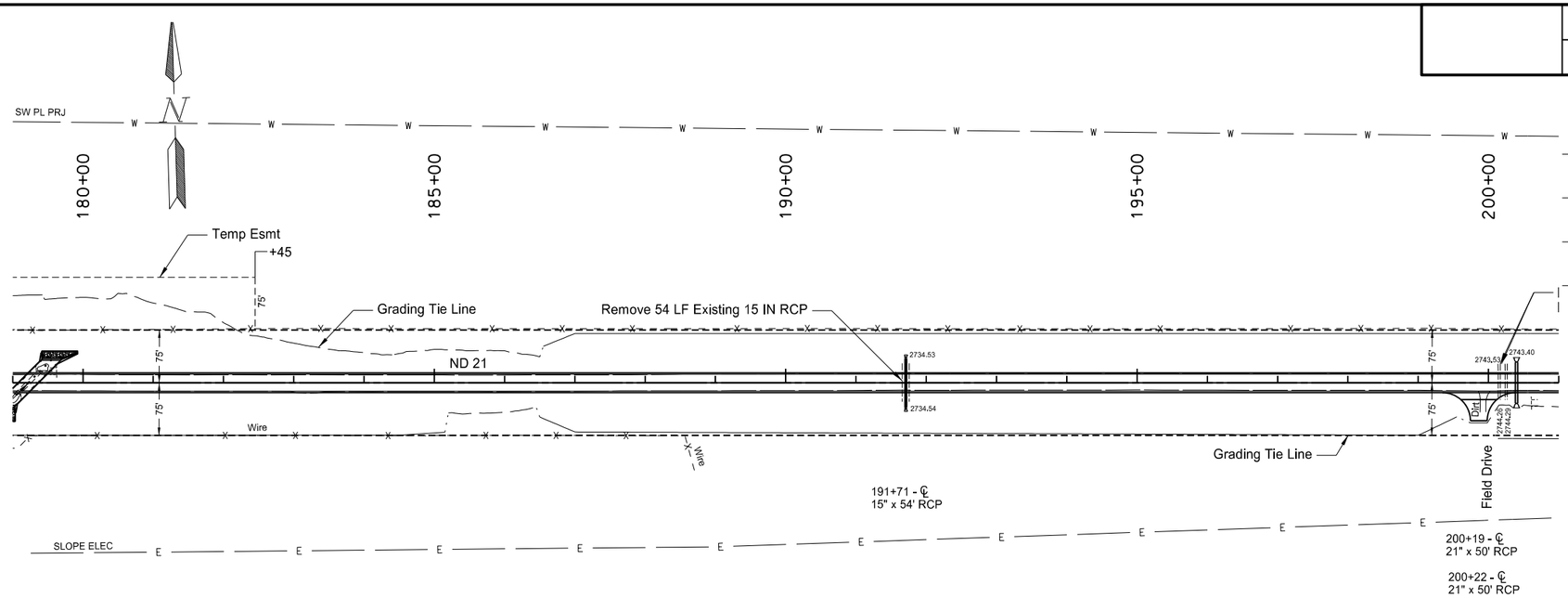
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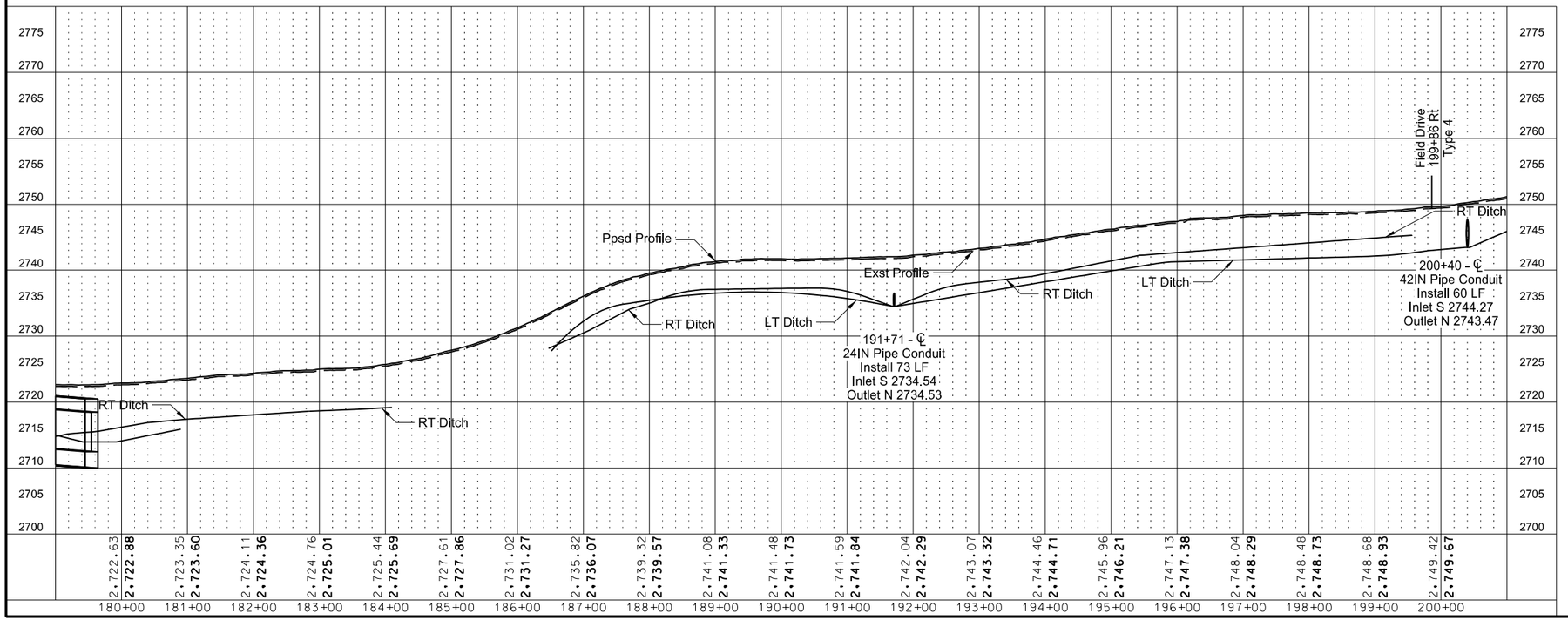
ND 21
Jct 85 to N Jct 22 - New England

160+97.98 to 180+00

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	10



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		191+71 - 28' Lt to 191+71 - 27' Rt	54	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		191+71 - 36' Lt to 191+71 - 37' Rt	454	SY
714	4105	PIPE CONDUIT 24IN		
		191+71 - 36' Lt to 191+71 - 37' Rt	73	LF
754	0805	OBJECT MARKERS - CULVERTS		
		191+71 Lt & Rt	2	EA



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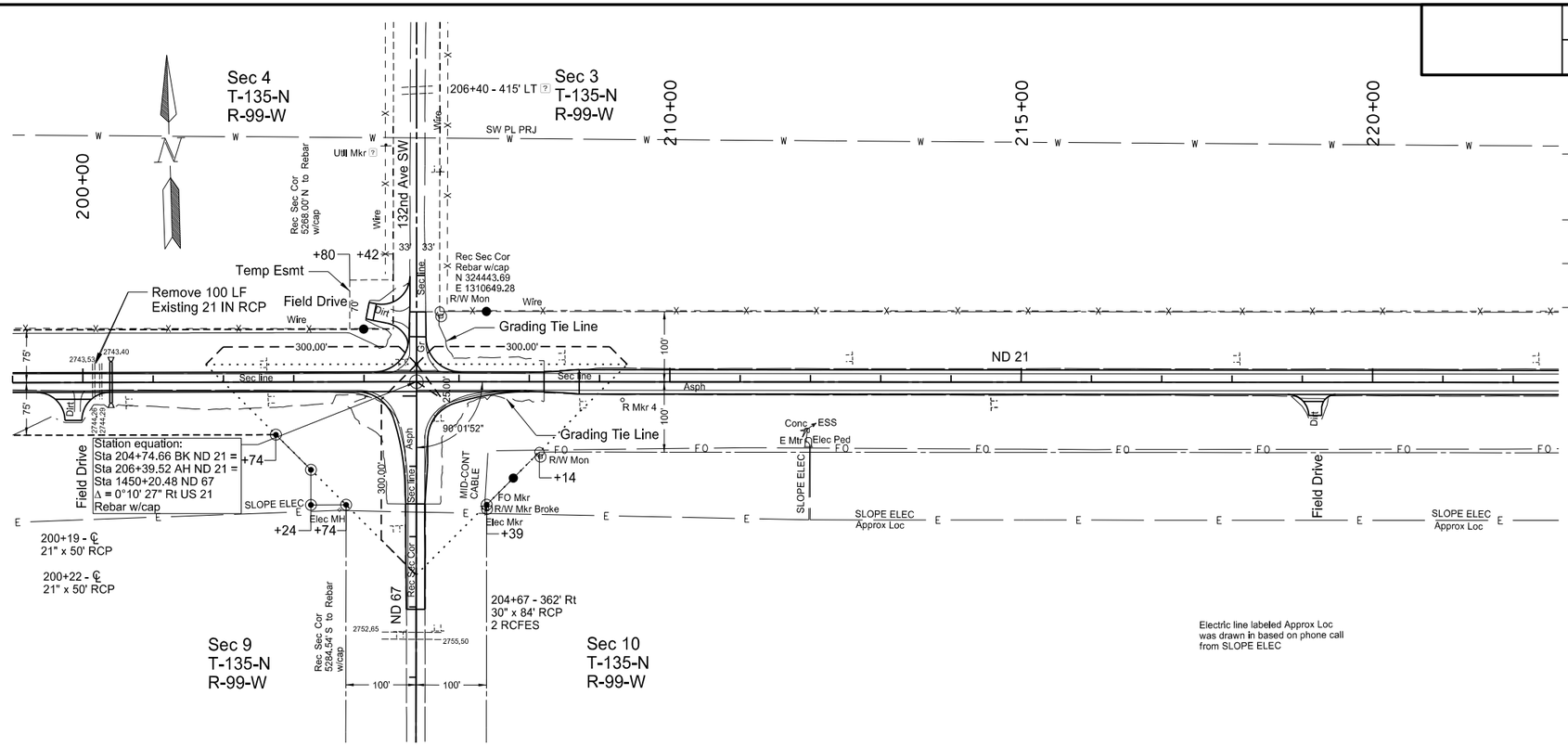
Plan & Profile

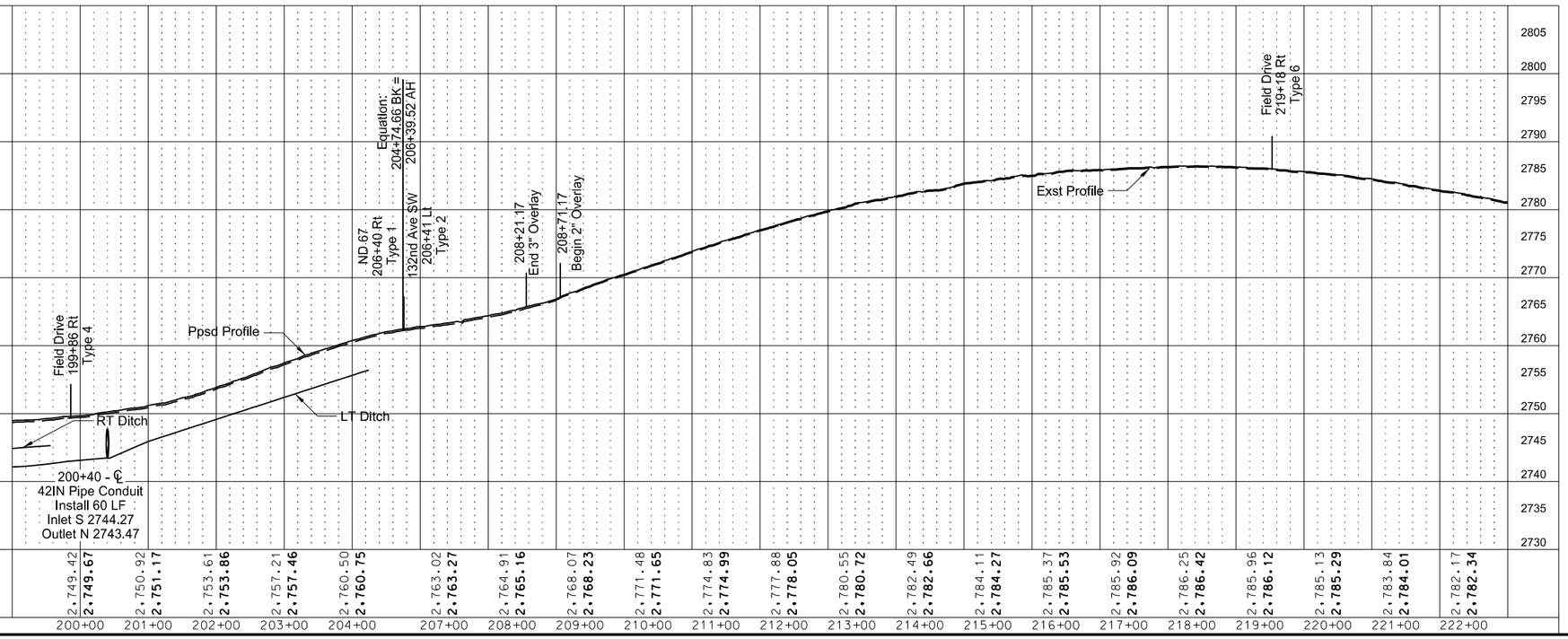
ND 21
Jct 85 to N Jct 22 - New England

180+00 to 200+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	11

SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		200+19 - 27' Lt to 200+19 - 24' Rt	50	LF
		200+22 - 27' Lt to 200+22 - 24' Rt	50	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		200+40 - 30' Lt to 200+40 - 30' Rt	353	SY
714	4120	PIPE CONDUIT 42IN		
		200+40 - 30' Lt to 200+40 - 30' Rt	60	LF
754	0805	OBJECT MARKERS - CULVERTS		
		200+40 Lt & Rt	2	EA





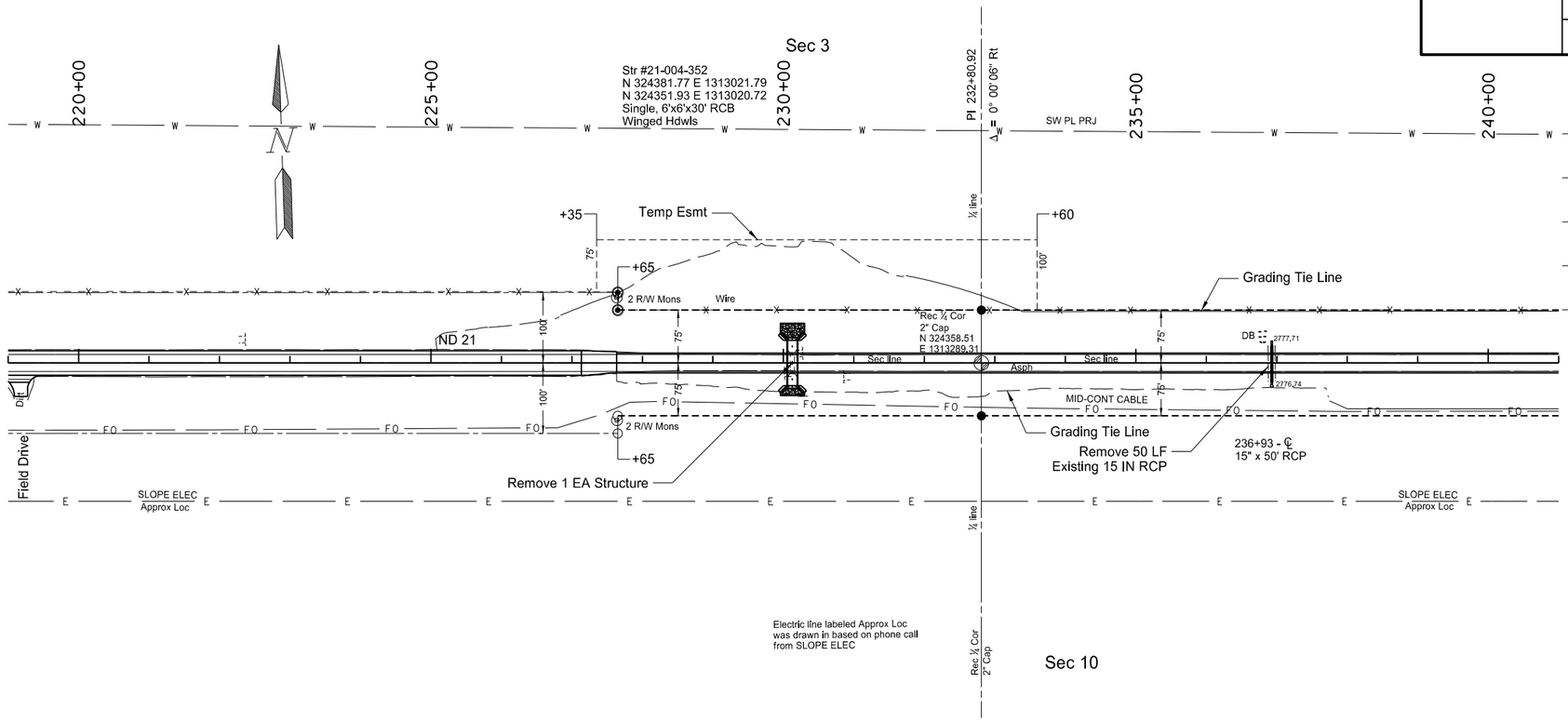
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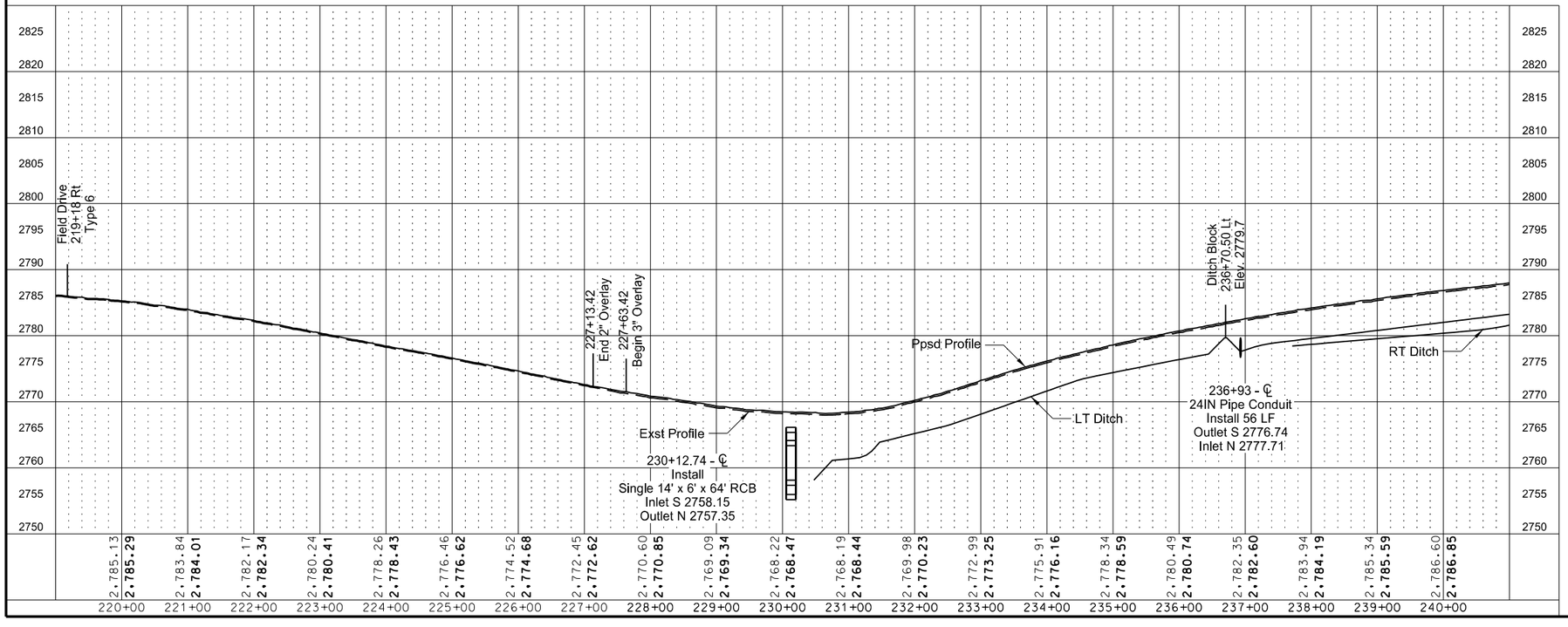
ND 21
Jct 85 to N Jct 22 - New England

200+00 to 209+71.17

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	12



SPEC	CODE	BID ITEM	QTY	UNIT
202	0104	REMOVAL OF STRUCTURE		
		230+13 (see section 170)	1	EA
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		236+93 - 25' Lt to 236+93 - 26' Rt	50	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		236+93 - 26' Lt to 236+93 - 30' Rt	296	SY
714	4105	PIPE CONDUIT 24IN		
		236+93 - 26' Lt to 236+93 - 30' Rt	56	LF
754	0805	OBJECT MARKERS - CULVERTS		
		230+13 Lt & Rt	4	EA
		236+93 Lt & Rt	2	EA



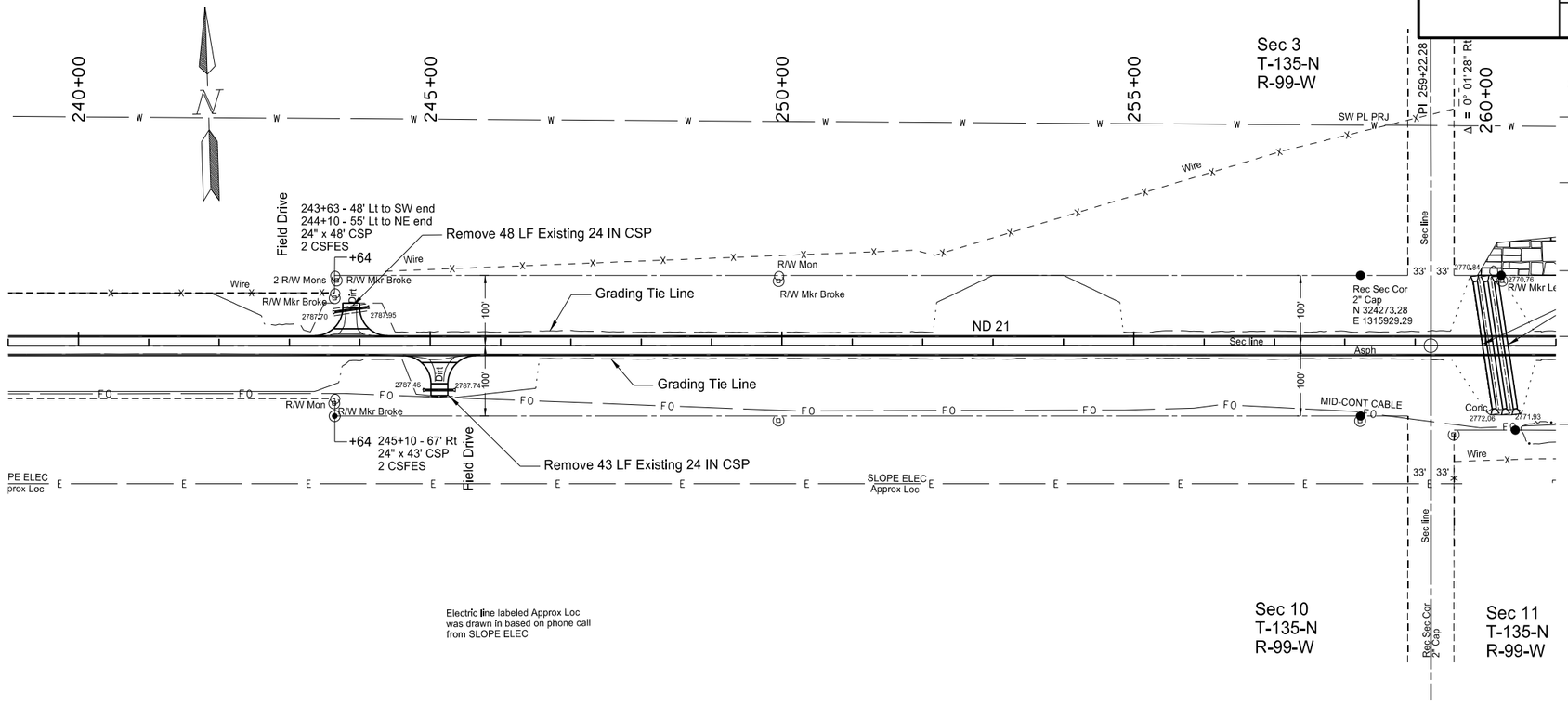
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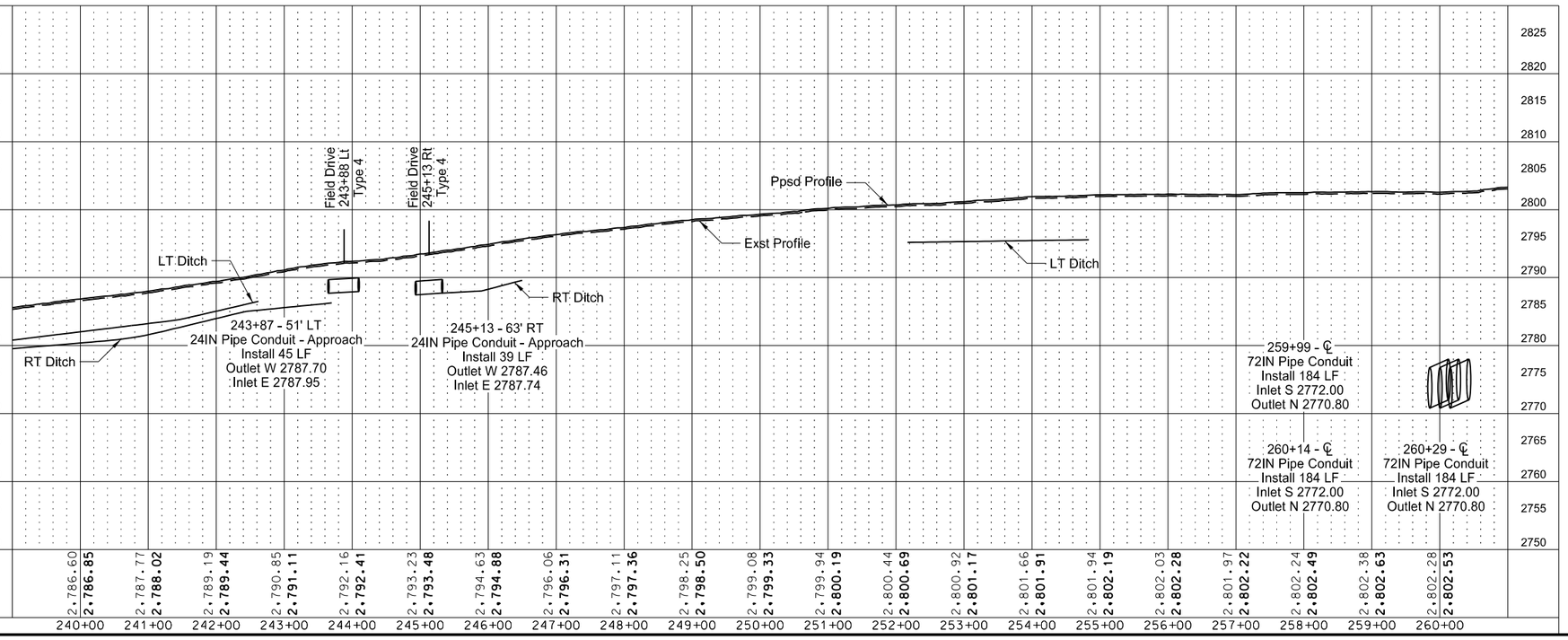
ND 21
Jct 85 to N Jct 22 - New England

226+13.42 to 240+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	13



Electric line labeled Approx Loc was drawn in based on phone call from SLOPE ELEC



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		243+63 - 48' Lt to 244+10 - 55' Lt	48	LF
		244+89 - 67' Rt to 245+32 - 67' Rt	43	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		259+85 - 92' Lt to 260+12 - 90' Rt		
		260+00 - 92' Lt to 260+27 - 90' Rt	3034	SY
		260+15 - 92' Lt to 260+42 - 90' Rt		
714	4106	PIPE CONDUIT 24IN-APPROACH		
		243+65 - 48' Lt to 244+10 - 54' Lt	45	LF
		244+93 - 63' Rt to 245+32 - 63' Rt	39	LF
714	4145	PIPE CONDUIT 72IN		
		259+85 - 92' Lt to 260+12 - 90' Rt	184	LF
		260+00 - 92' Lt to 260+27 - 90' Rt	184	LF
		260+15 - 92' Lt to 260+42 - 90' Rt	184	LF
754	0805	OBJECT MARKERS - CULVERTS		
		259+85 Lt	1	EA
		260+15 Lt	1	EA
		260+12 Rt	1	EA
		260+42 Rt	1	EA

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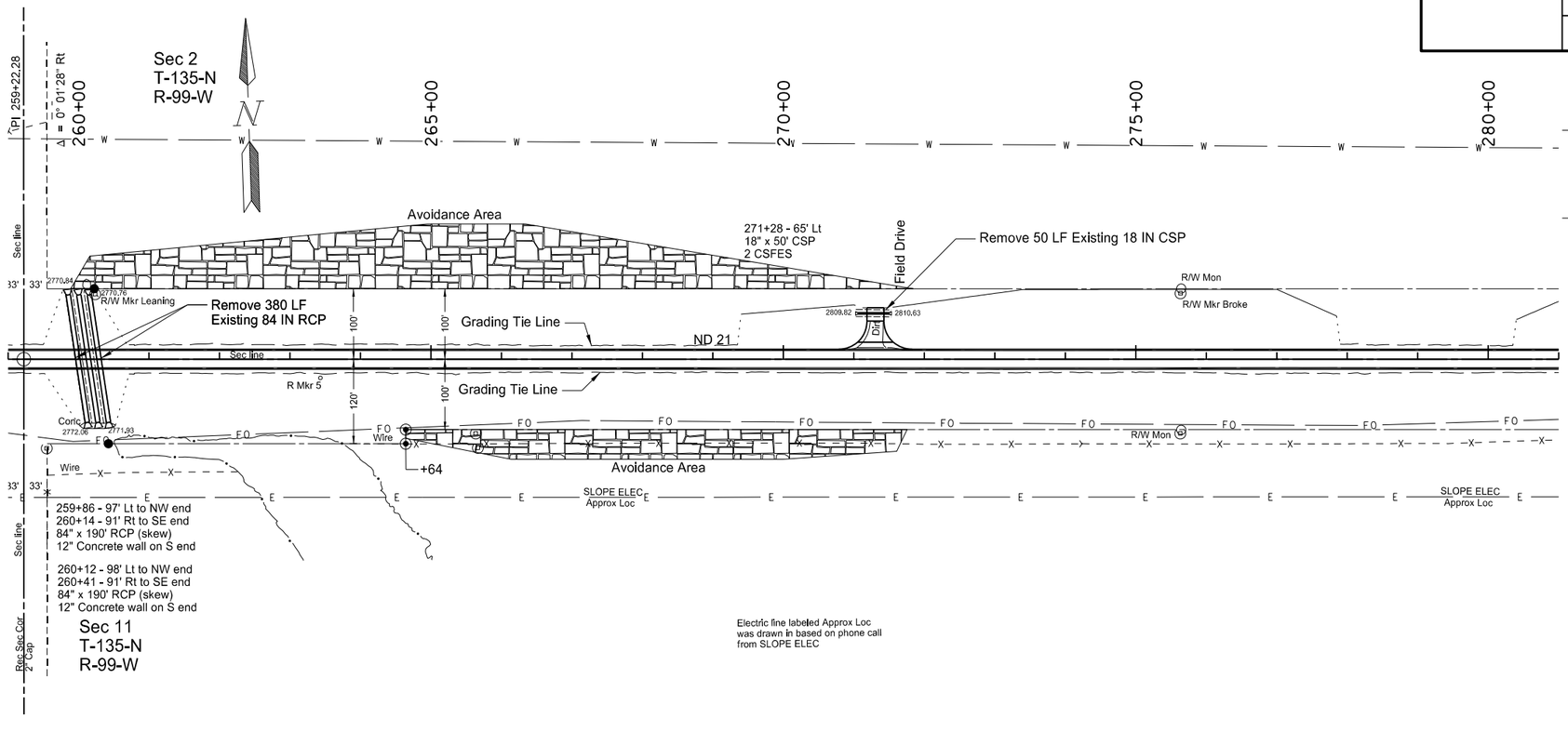
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

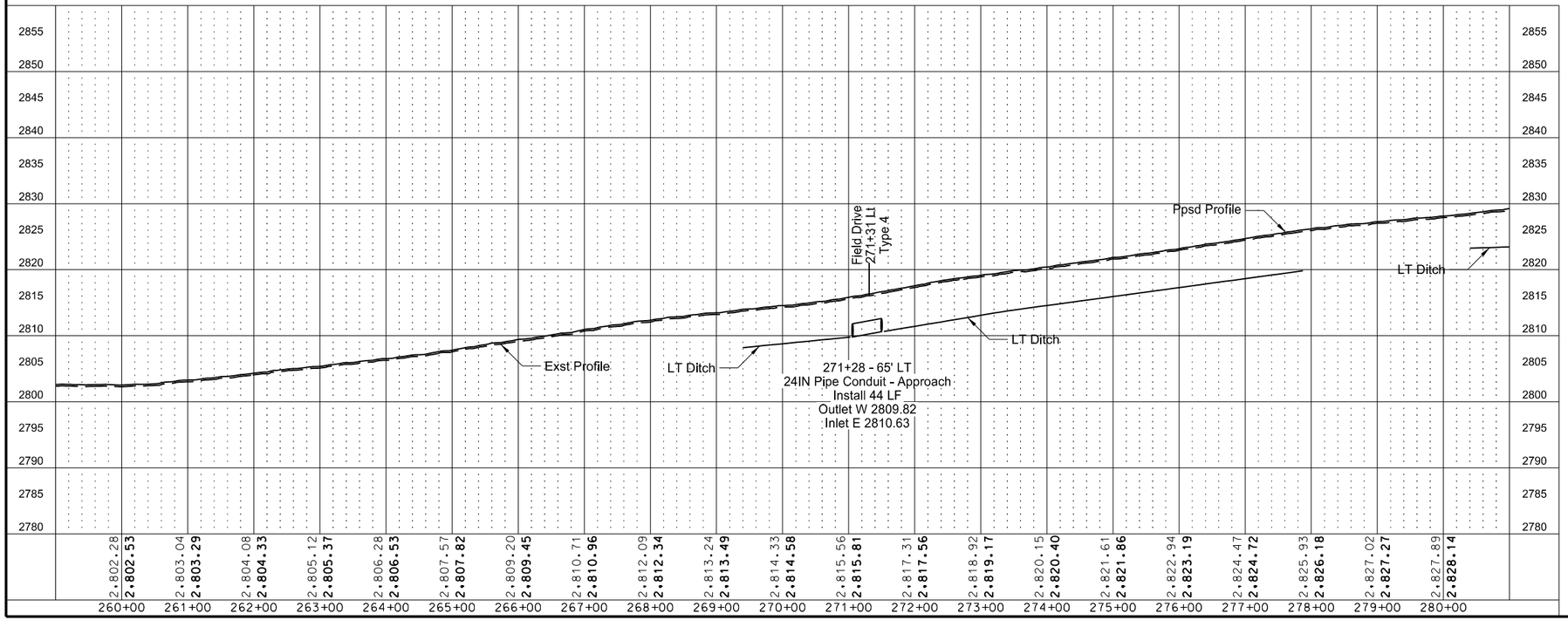
240+00 to 260+00

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	14

SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		259+86 - 97' Lt to 260+14 - 91' Rt	190	LF
		260+12 - 97' Lt to 260+41 - 91' Rt	190	LF
		271+03 - 66' Lt to 271+53 - 65' Lt	50	LF
714	4106	PIPE CONDUIT 24IN-APPROACH		
		271+06 - 65' Lt to 271+50 - 65' Lt	44	LF



Electric line labeled Approx Loc was drawn in based on phone call from SLOPE ELEC



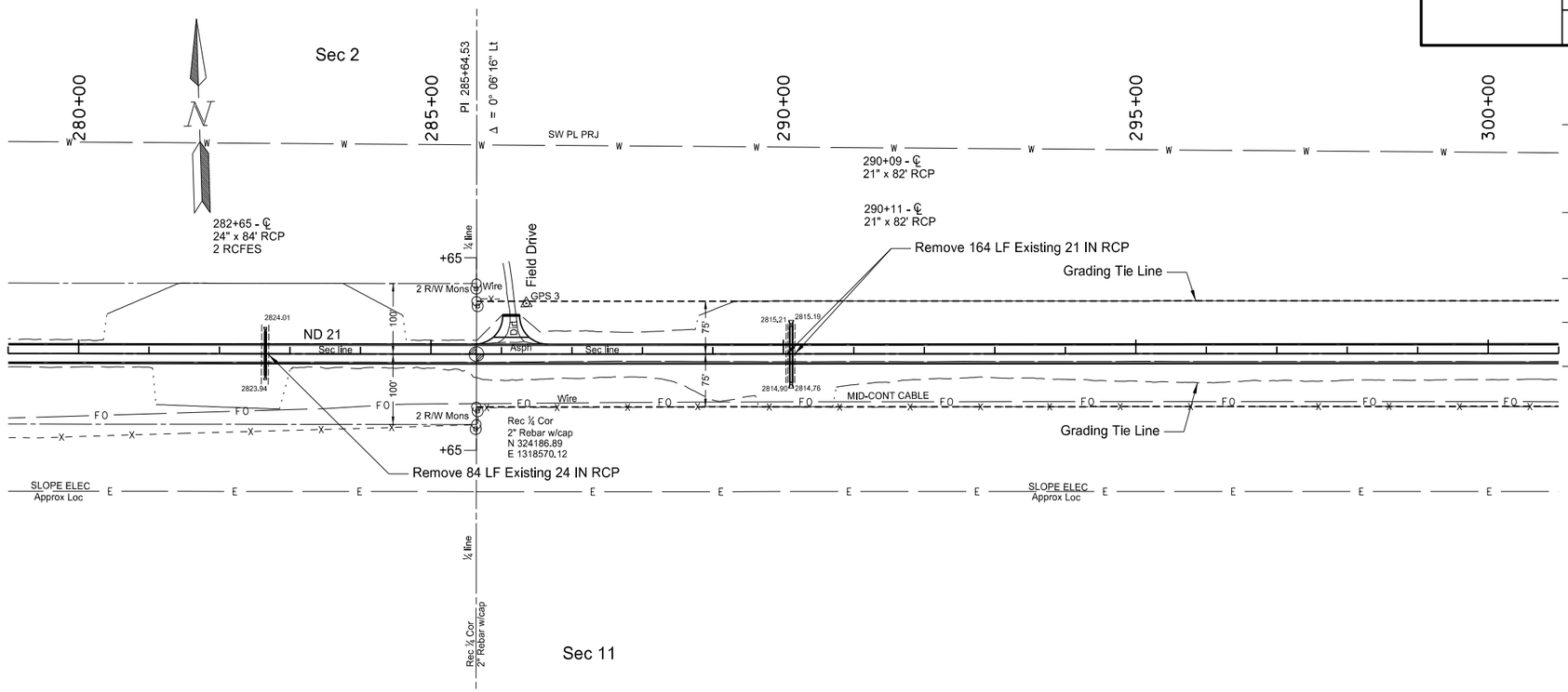
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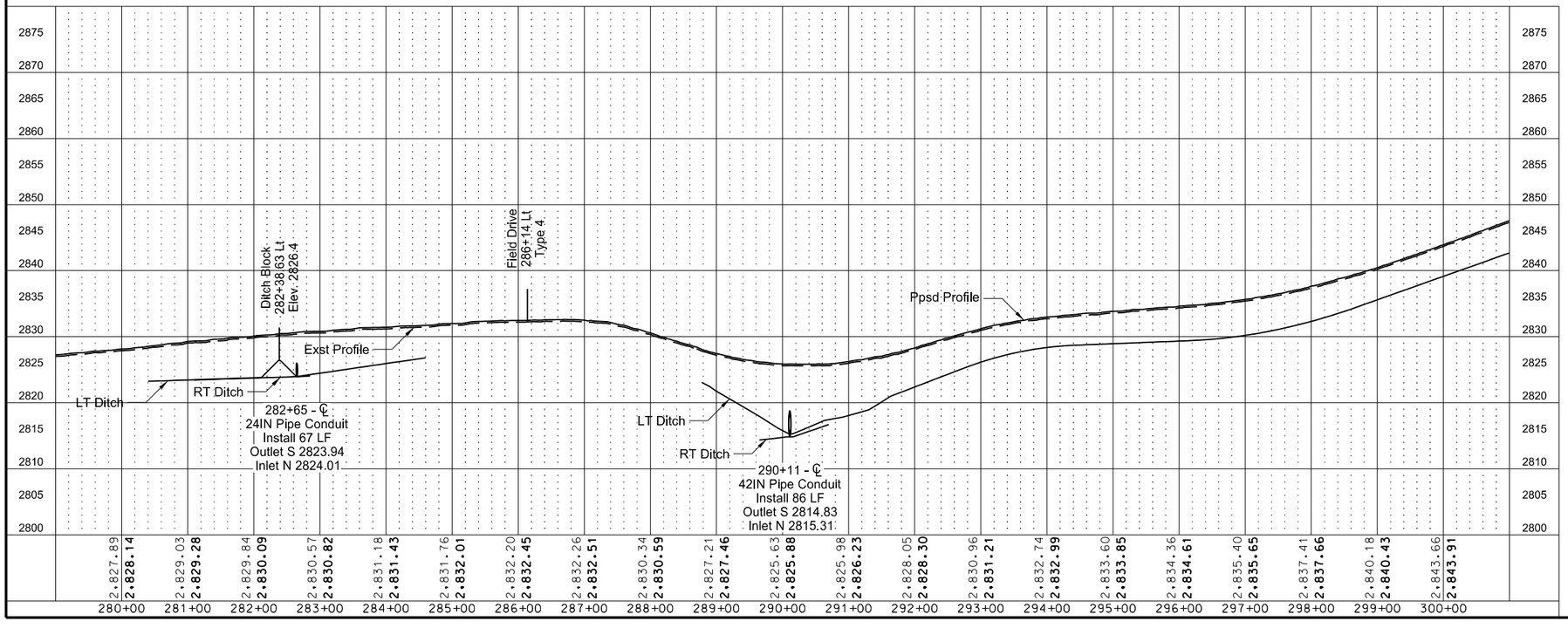
ND 21
Jct 85 to N Jct 22 - New England

260+00 to 280+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	15



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		282+65 - 42' Lt to 282+65 - 44' Rt	84	LF
		290+09 - 43' Lt to 290+09 - 41' Rt	82	LF
		290+11 - 43' Lt to 290+11 - 41' Rt	82	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		282+65 - 34' Lt to 282+65 - 33' Rt	394	SY
		290+11 - 42' Lt to 290+11 - 43' Rt	430	SY
714	4105	PIPE CONDUIT 24IN		
		282+65 - 34' Lt to 282+65 - 33' Rt	67	LF
714	4120	PIPE CONDUIT 42IN		
		290+11 - 42' Lt to 290+11 - 43' Rt	86	LF
754	0805	OBJECT MARKERS - CULVERTS		
		282+65 Lt & Rt	2	EA
		290+11 Lt & Rt	2	EA



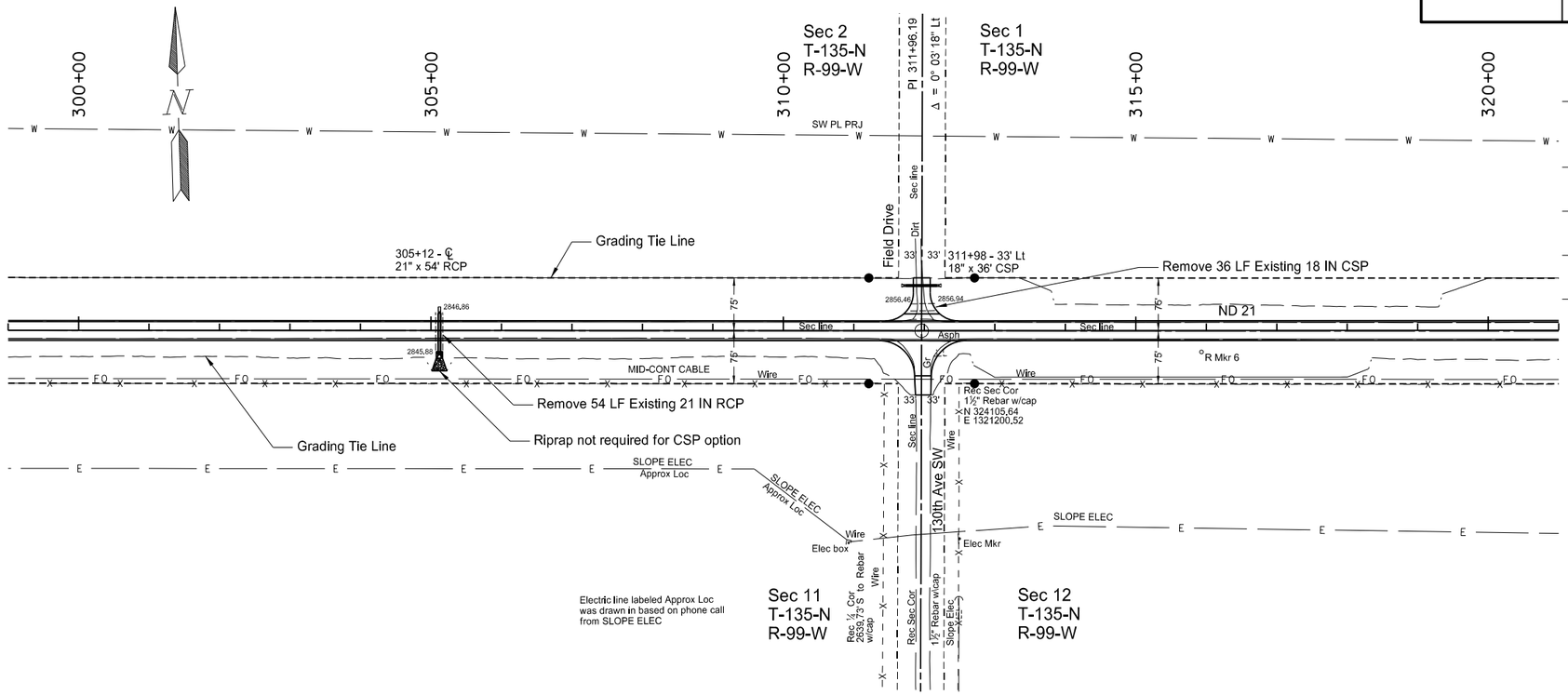
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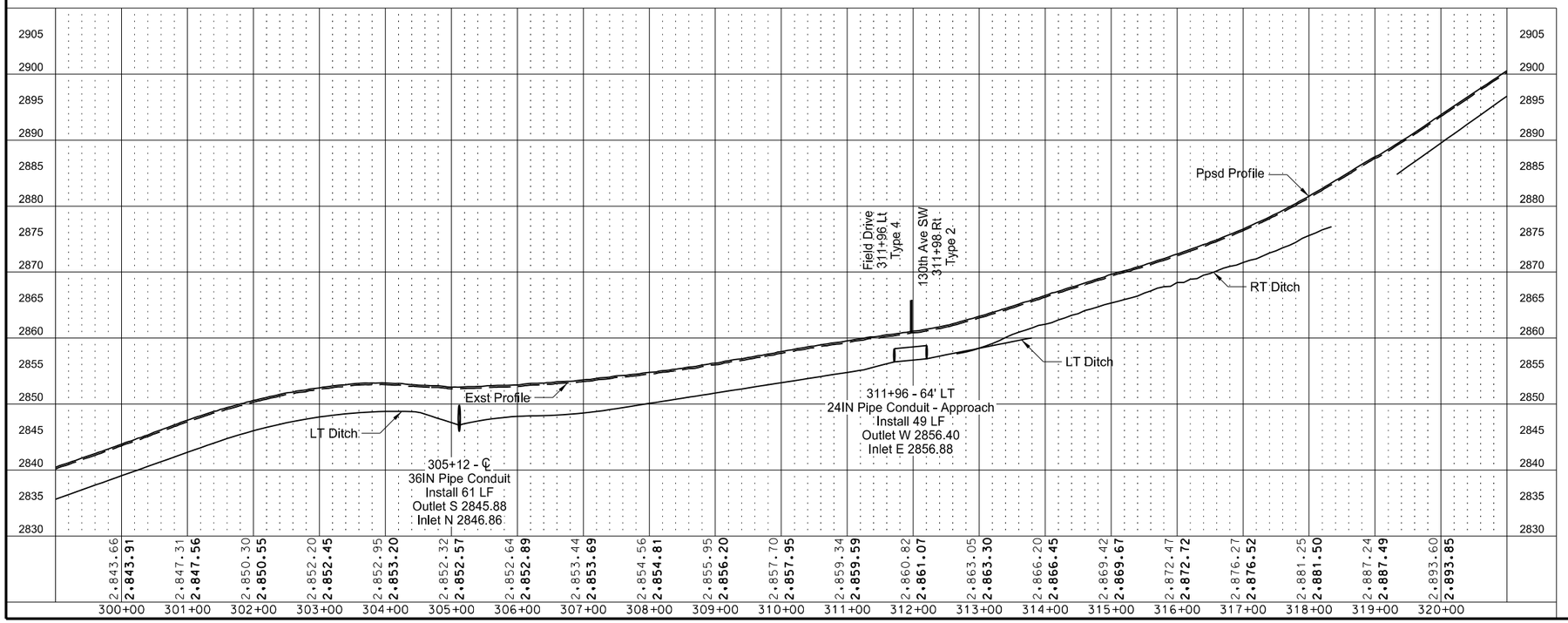
ND 21
Jct 85 to N Jct 22 - New England

280+00 to 300+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	16



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		305+12 - 26' Lt to 305+12 - 28' Rt	54	LF
		311+80 - 33' Lt to 312+16 - 34' Lt	36	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		305+12 - 26' Lt to 305+12 - 34' Rt	356	SY
714	4106	PIPE CONDUIT 24IN-APPROACH		
		311+71 - 64' Lt to 312+20 - 64' Lt	49	LF
714	4115	PIPE CONDUIT 36IN		
		305+12 - 26' Lt to 305+12 - 34' Rt	61	LF
754	0805	OBJECT MARKERS - CULVERTS		
		305+12 Lt & Rt	2	EA



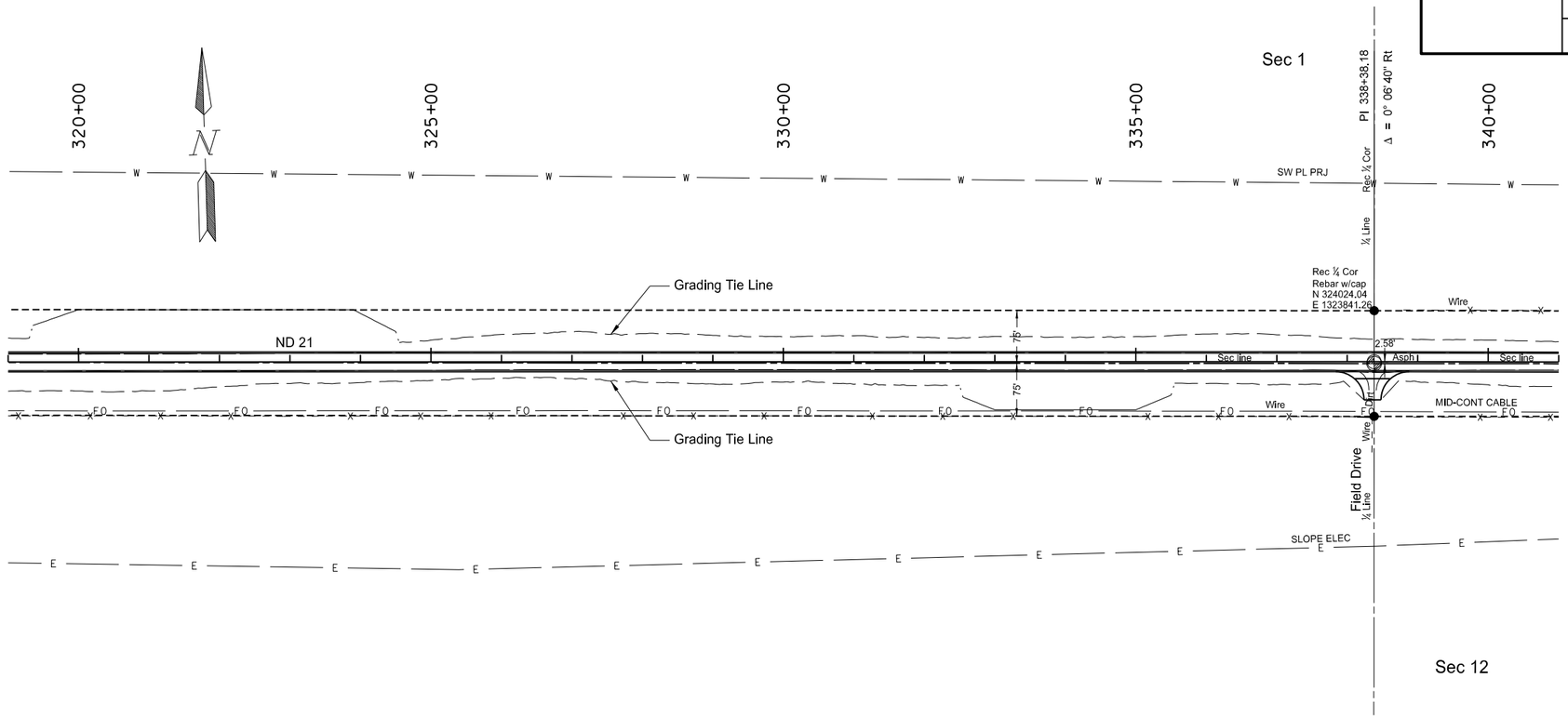
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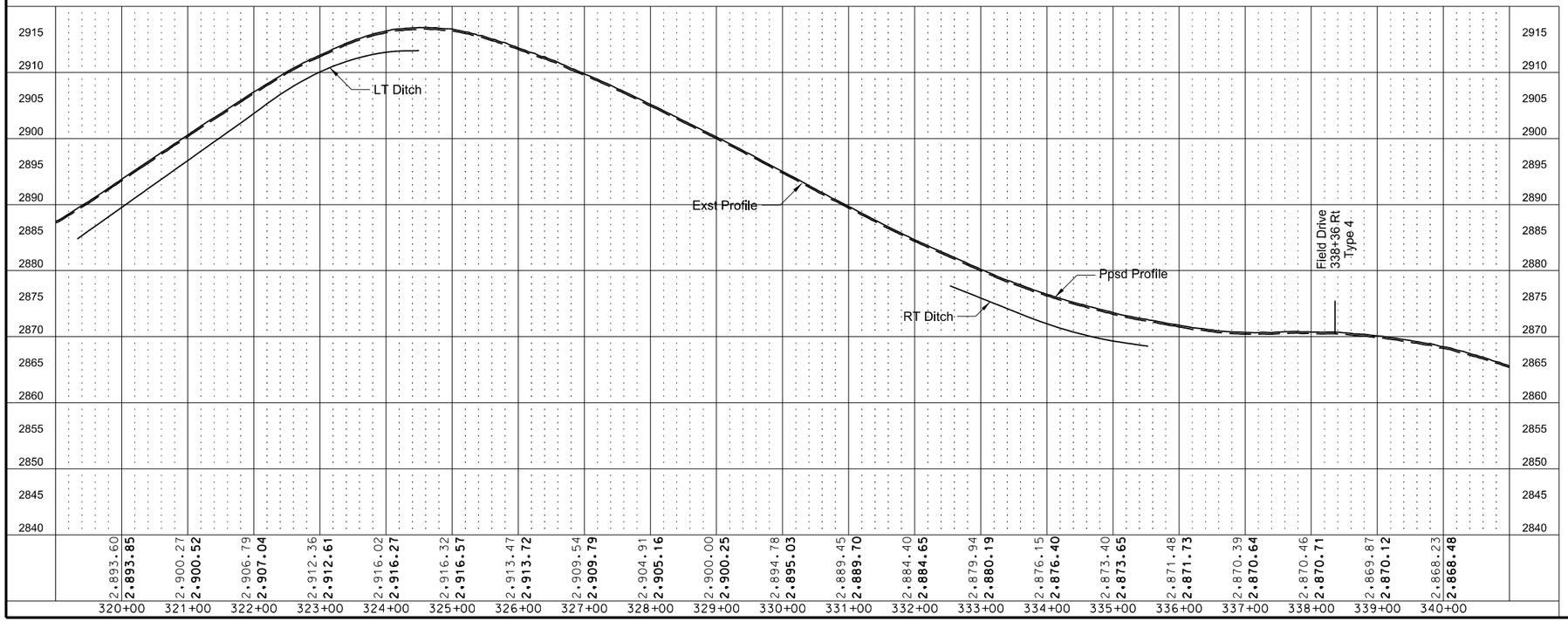
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

300+00 to 320+00

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	17





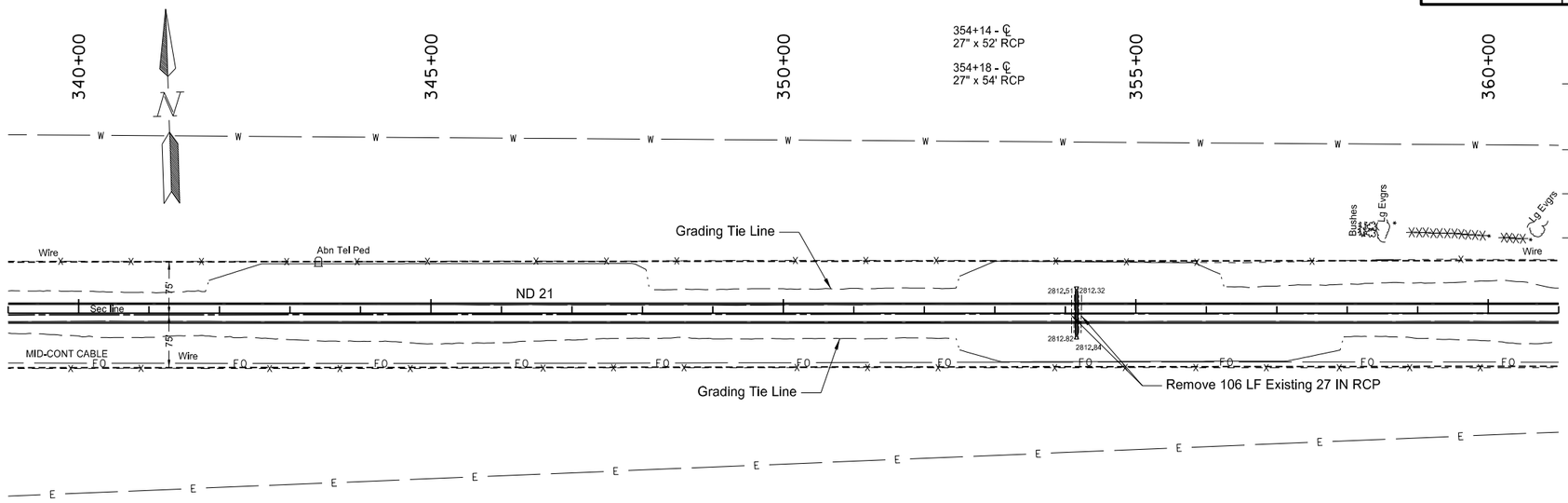
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Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

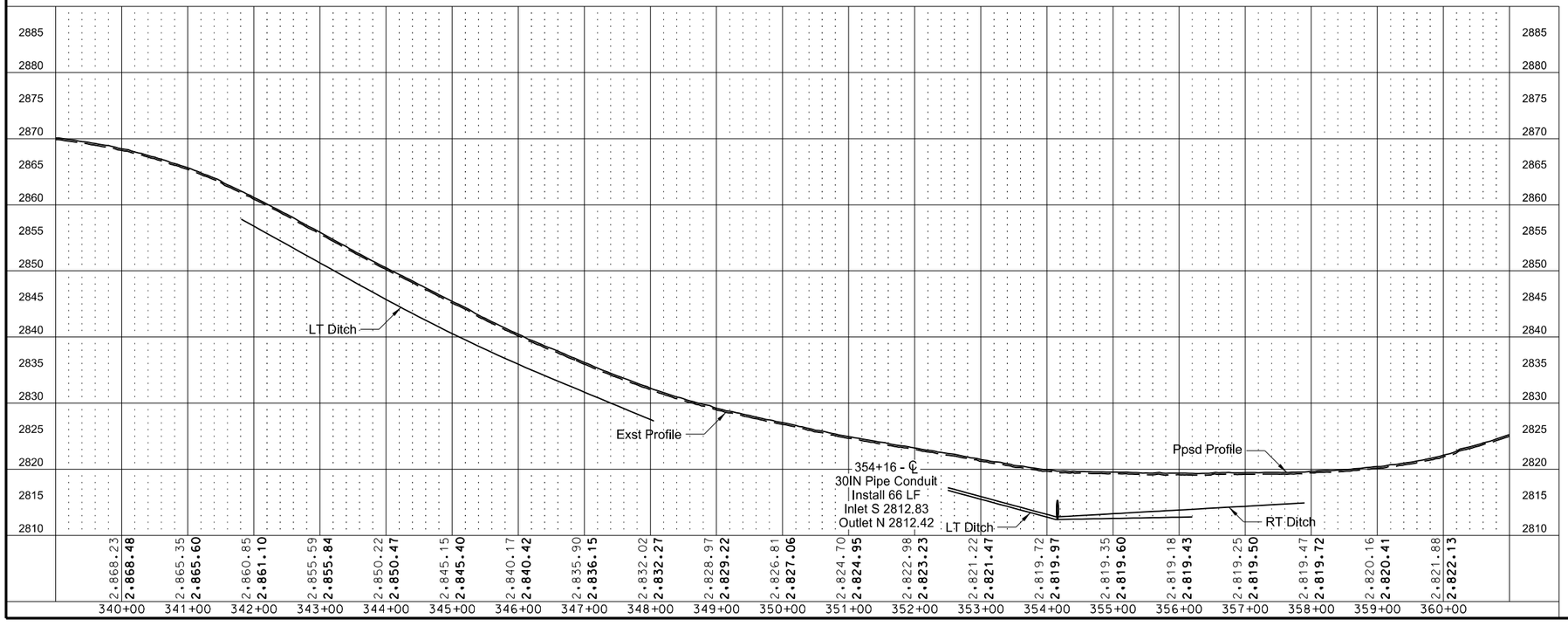
320+00 to 340+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	18



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		354+14 - 25' Lt to 354+14 - 28' Rt	52	LF
		354+18 - 26' Lt to 354+18 - 28' Rt	54	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		354+16 - 33' Lt to 354+16 - 32' Rt	396	SY
714	4110	PIPE CONDUIT 30IN		
		354+16 - 33' Lt to 354+16 - 32' Rt	66	LF
754	0805	OBJECT MARKERS - CULVERTS		
		354+16 Lt & Rt	2	EA

Sec 12



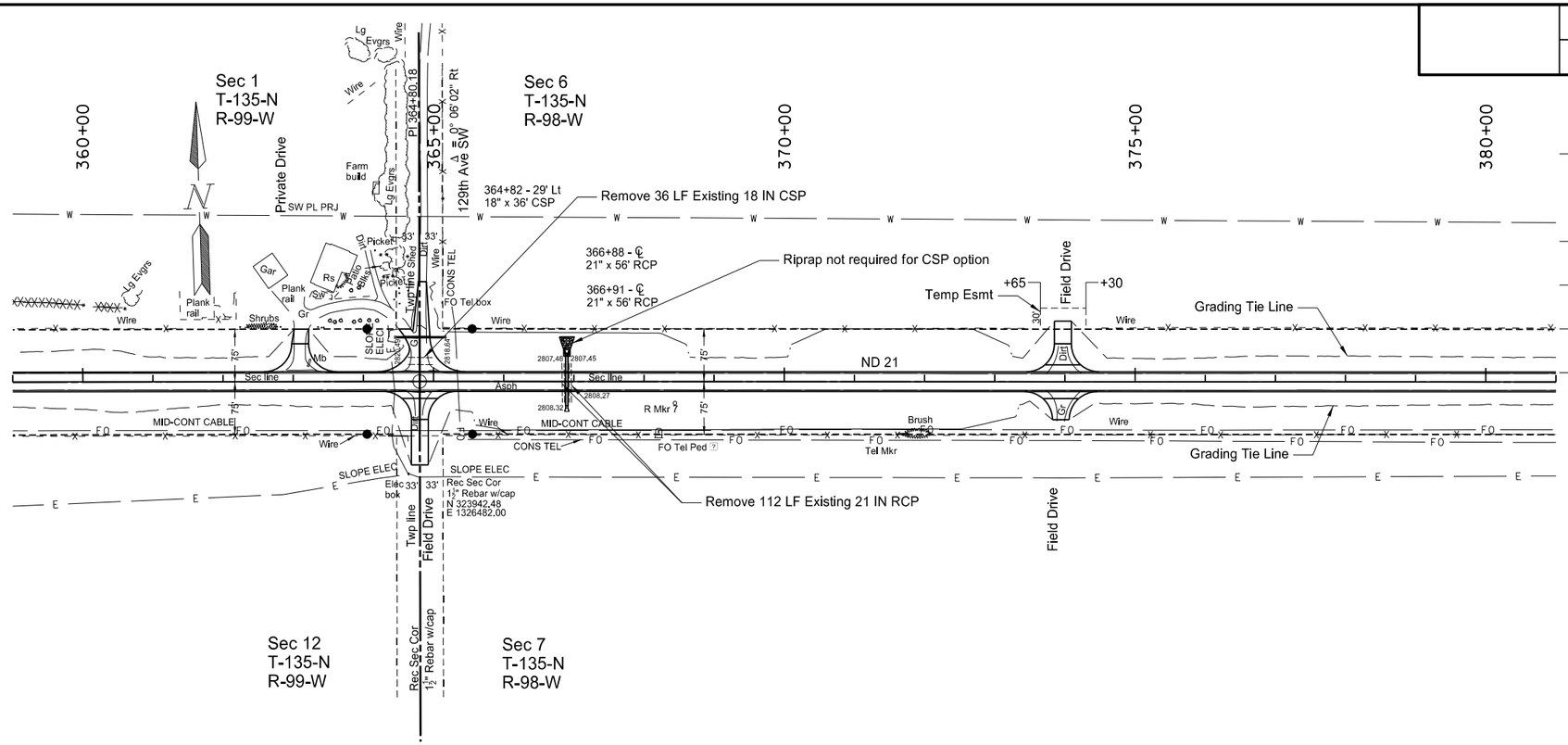
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Plan & Profile

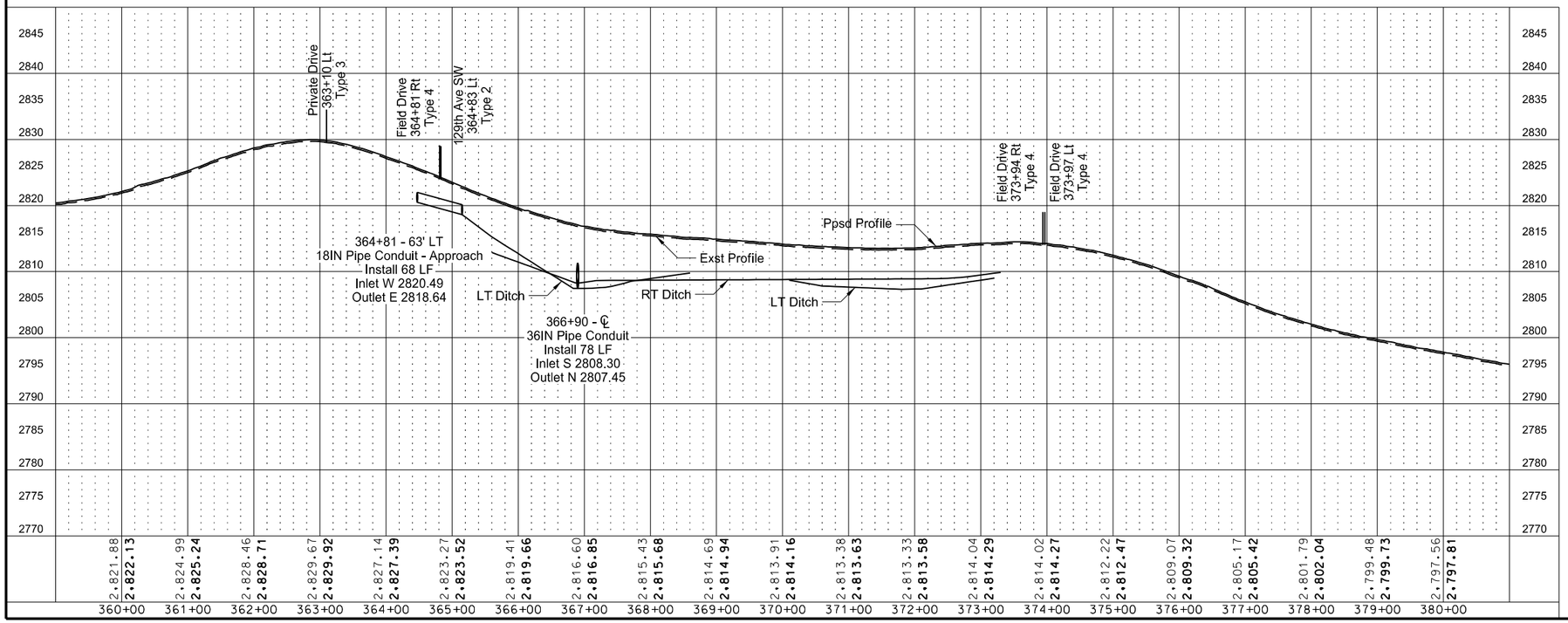
ND 21
Jct 85 to N Jct 22 - New England

340+00 to 360+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	19



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		364+64 - 29' Lt to 365+00 - 29' Lt	36	LF
		366+88 - 26' Lt to 366+88 - 30' Rt	56	LF
		366+91 - 26' Lt to 366+91 - 30' Rt	56	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		366+90 - 40' Lt to 366+90 - 38' Rt	333	SY
714	4099	PIPE CONDUIT 18IN-APPROACH		
		364+47 - 63' Lt to 365+15 - 63' Lt	68	LF
714	4115	PIPE CONDUIT 36IN		
		366+90 - 40' Lt to 366+90 - 38' Rt	78	LF
754	0805	OBJECT MARKERS - CULVERTS		
		366+90 Lt & Rt	2	EA



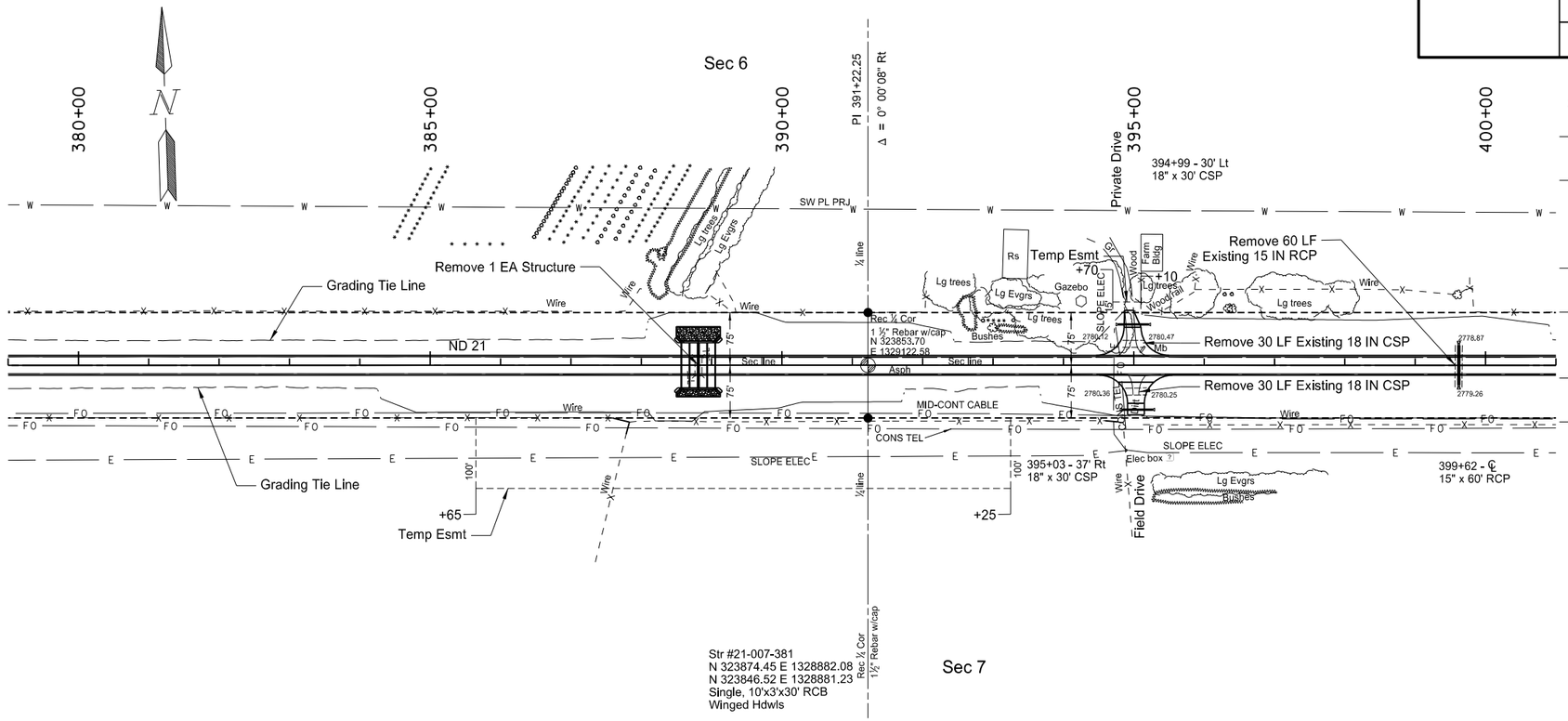
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Plan & Profile

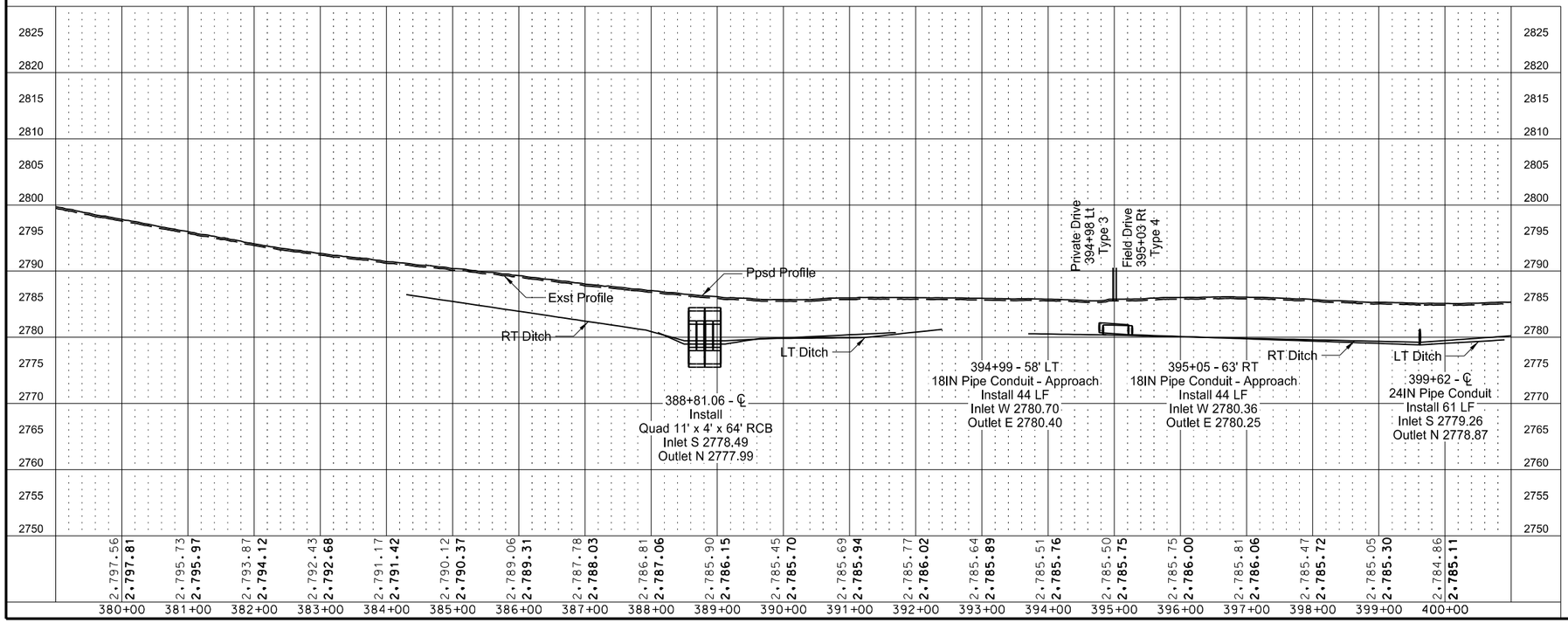
ND 21
Jct 85 to N Jct 22 - New England

360+00 to 380+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	20



SPEC	CODE	BID ITEM	QTY	UNIT
202	0104	REMOVAL OF STRUCTURE		
		388+81 (see section 170)	1	EA
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		394+84 - 30' Lt to 395+15 - 30' Lt	30	LF
		394+88 - 38' Rt to 395+19 - 37' Rt	30	LF
		399+62 - 29' Lt to 399+62 - 32' Rt	60	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		399+62 - 31' Lt to 399+62 - 30' Rt	344	SY
714	4099	PIPE CONDUIT 18IN-APPROACH		
		394+77 - 58' Lt to 395+21 - 58' Lt	44	LF
		394+83 - 63' Rt to 395+27 - 63' Rt	44	LF
714	4105	PIPE CONDUIT 24IN		
		399+62 - 31' Lt to 399+62 - 30' Rt	61	LF
754	0805	OBJECT MARKERS - CULVERTS		
		388+81 Lt & Rt	4	EA
		399+62 Lt & Rt	2	EA



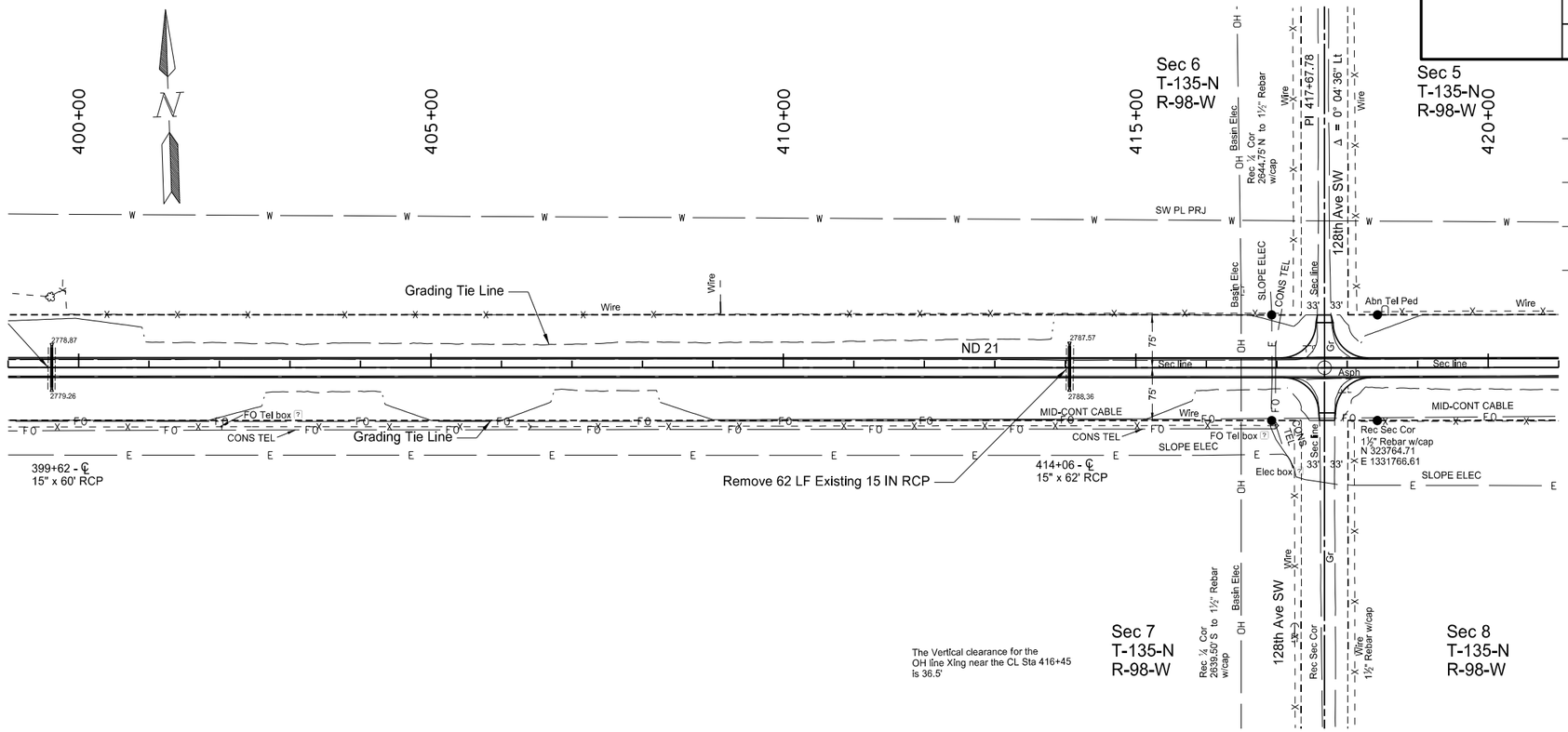
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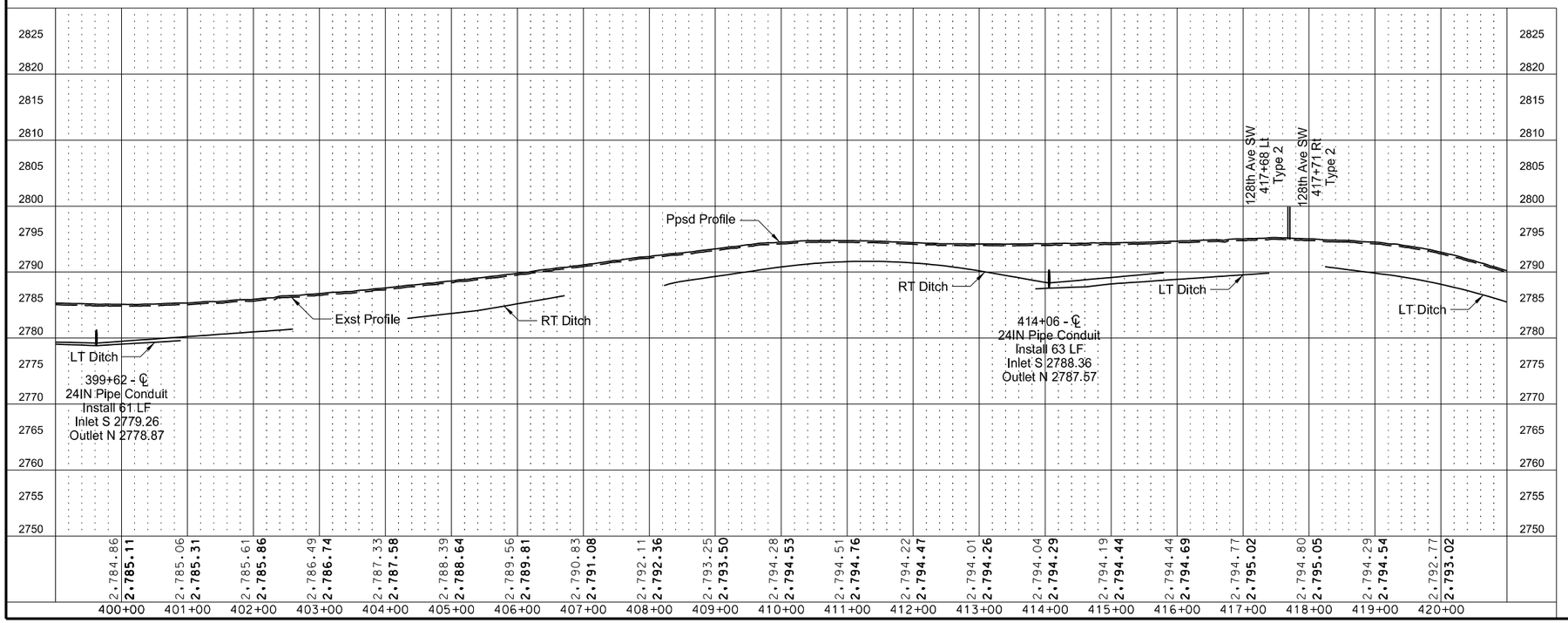
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

380+00 to 400+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	21





SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		414+06 - 32' Lt to 414+06 - 32' Rt	62	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		414+06 - 33' Lt to 414+06 - 30' Rt	362	SY
714	4105	PIPE CONDUIT 24IN		
		414+06 - 33' Lt to 414+06 - 30' Rt	63	LF
754	0805	OBJECT MARKERS - CULVERTS		
		414+06 Lt & Rt	2	EA

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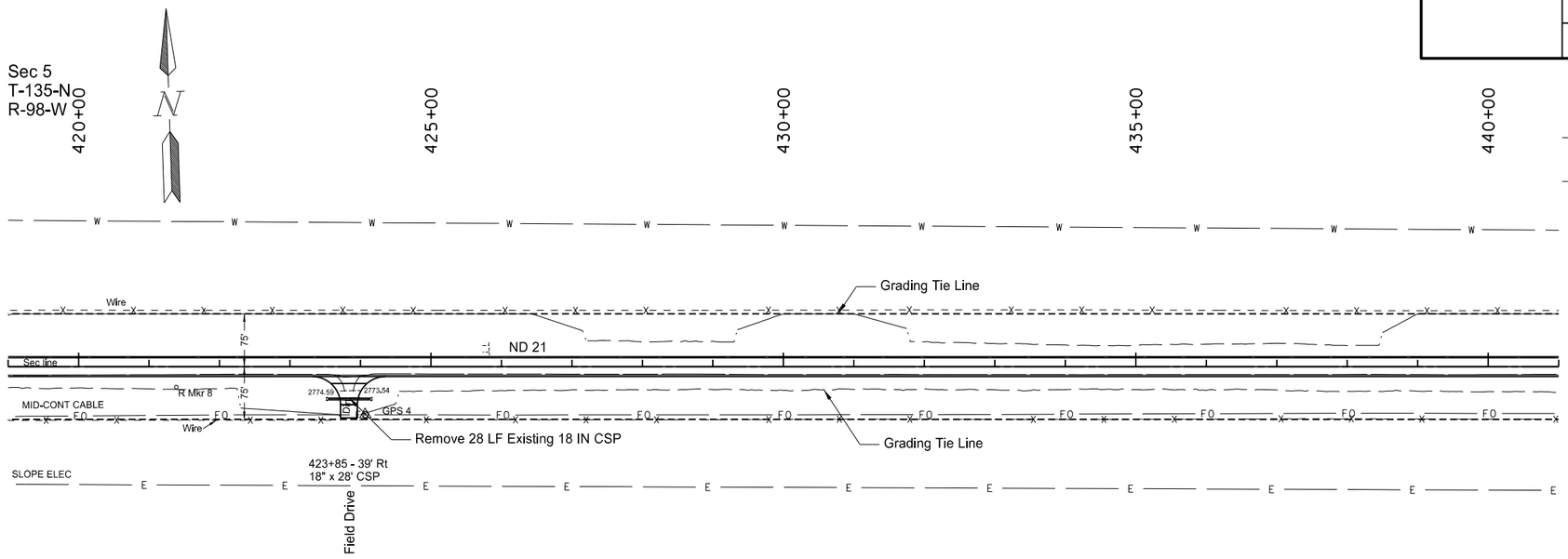
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

400+00 to 420+00

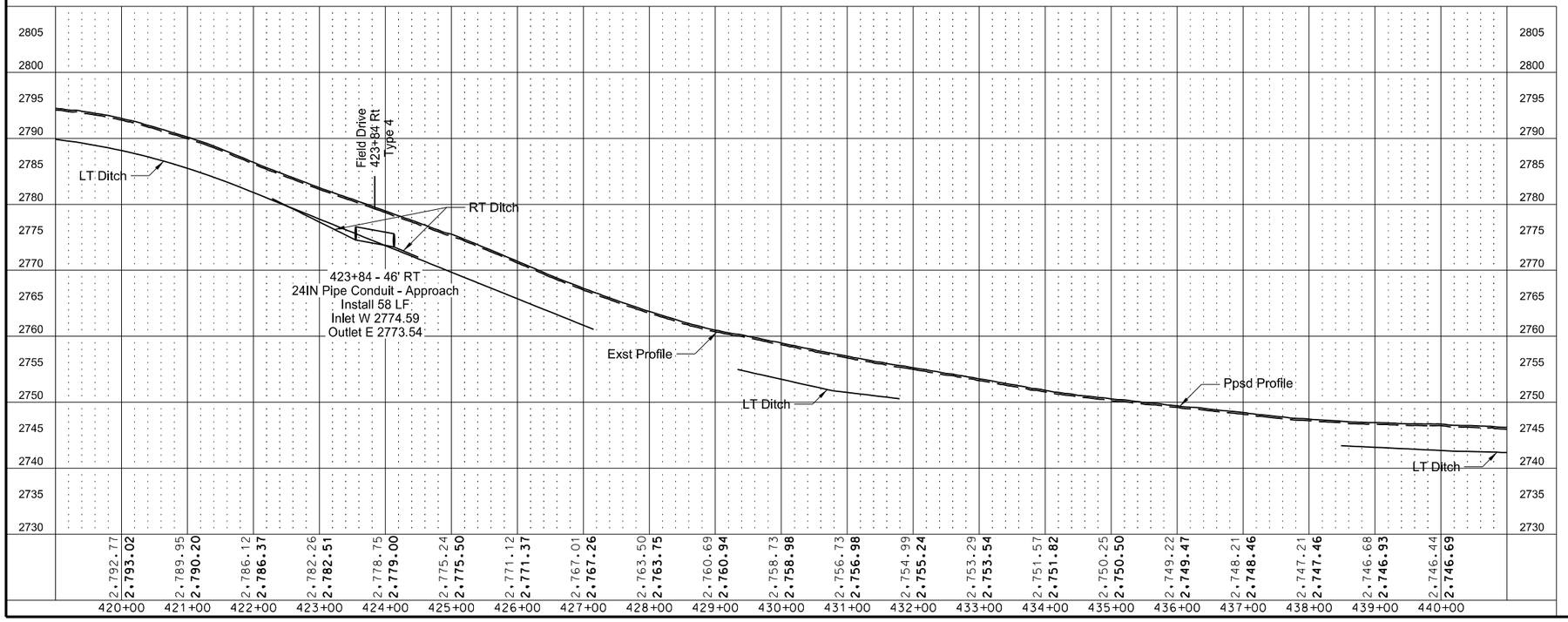
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	22

Sec 5
T-135-N
R-98-W



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		423+71 - 39' Rt to 424+00 - 39' Rt	28	LF
714	4106	PIPE CONDUIT 24IN-APPROACH		
		423+55 - 46' Rt to 424+13 - 46' Rt	58	LF

Sec 8
T-135-N
R-98-W



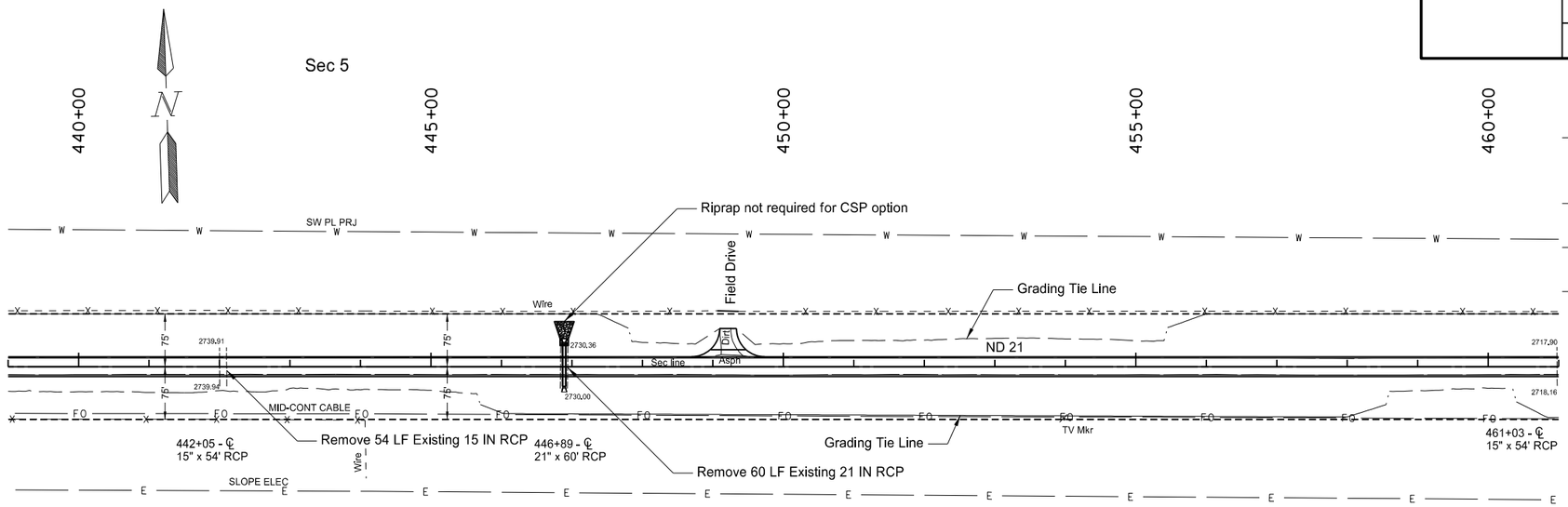
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Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

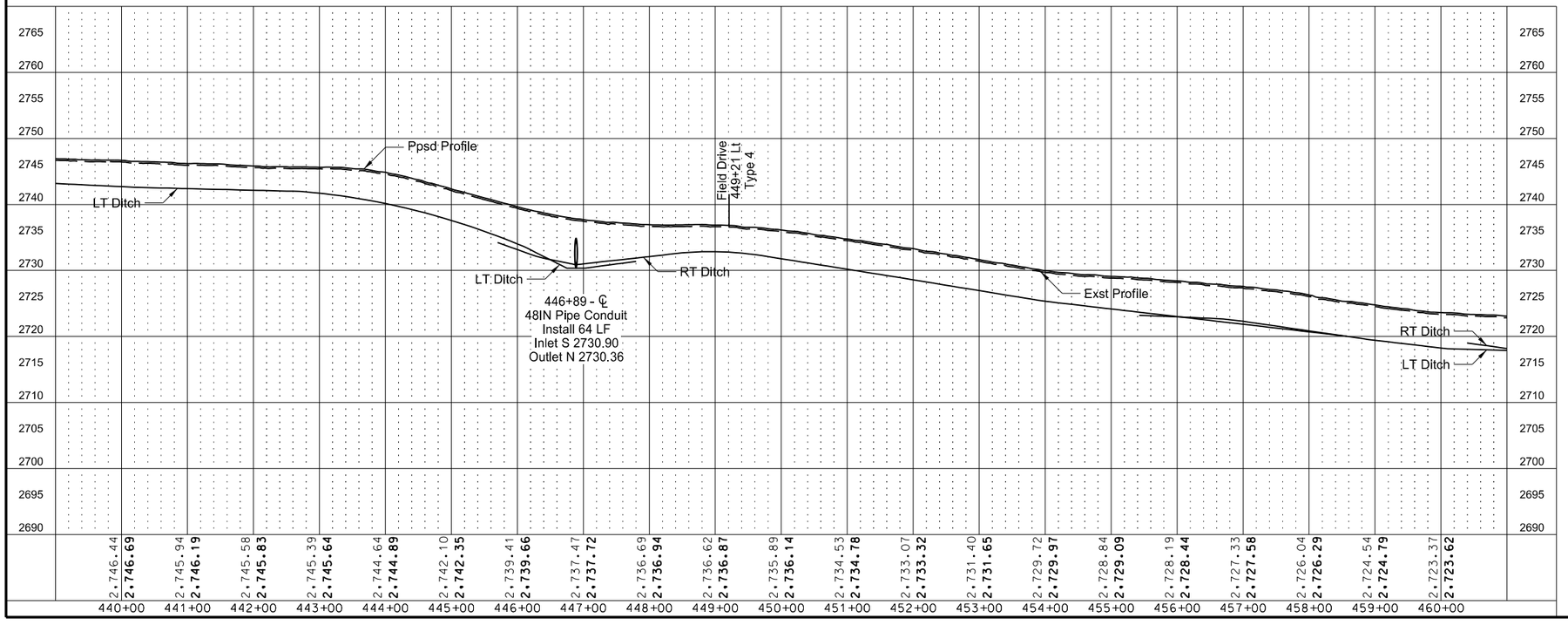
420+00 to 440+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	23



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		442+05 - 27' Lt to 442+05 - 28' Rt	54	LF
		446+89 - 31' Lt to 446+89 - 31' Rt	60	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		446+89 - 34' Lt to 446+89 - 30' Rt	412	SY
714	4125	PIPE CONDUIT 48IN		
		446+89 - 34' Lt to 446+89 - 30' Rt	64	LF
754	0805	OBJECT MARKERS - CULVERTS		
		446+89 Lt & Rt	2	EA

Sec 8



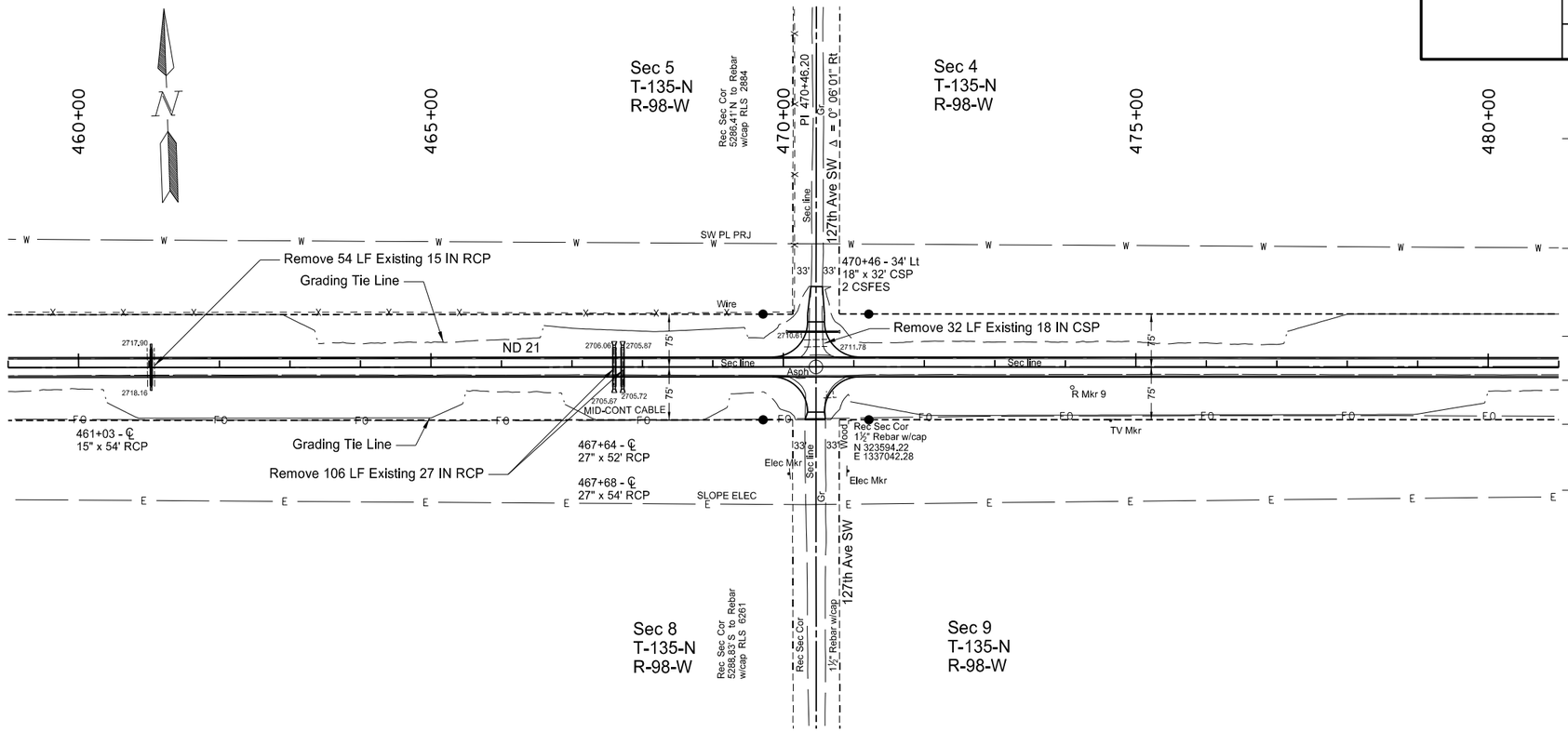
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Plan & Profile

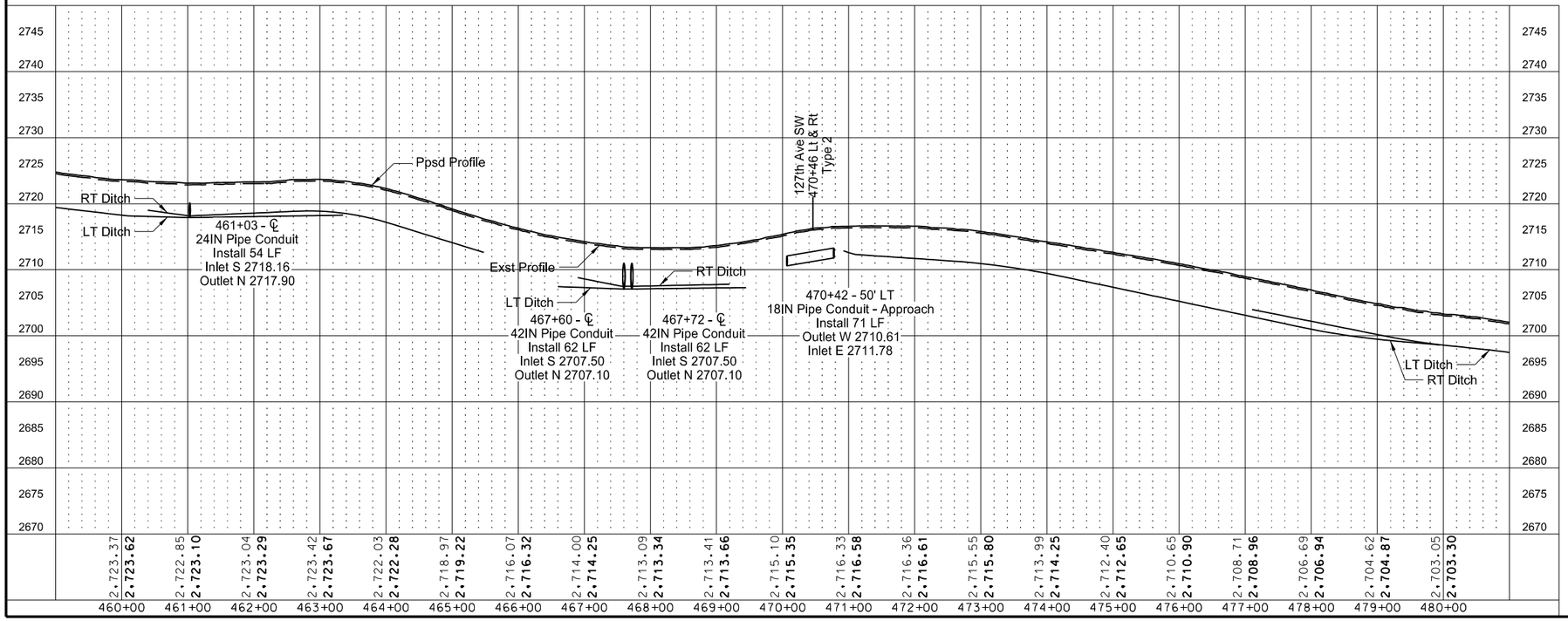
ND 21
Jct 85 to N Jct 22 - New England

440+00 to 460+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	24



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		461+03 - 28' Lt to 461+03 - 27' Rt	54	LF
		467+64 - 27' Lt to 467+64 - 26' Rt	52	LF
		467+68 - 28' Lt to 467+68 - 26' Rt	54	LF
		470+29 - 33' Lt to 470+62 - 34' Lt	32	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		461+03 - 27' Lt to 461+03 - 27' Rt	285	SY
		467+60 - 31' Lt to 467+60 - 31' Rt	463	SY
		467+72 - 31' Lt to 467+72 - 31' Rt		
714	4099	PIPE CONDUIT 18IN-APPROACH		
		470+07 - 50' Lt to 470+78 - 50' Lt	71	LF
714	4105	PIPE CONDUIT 24IN		
		461+03 - 27' Lt to 461+03 - 27' Rt	54	LF
714	4120	PIPE CONDUIT 42IN		
		467+60 - 31' Lt to 467+60 - 31' Rt	62	LF
		467+72 - 31' Lt to 467+72 - 31' Rt	62	LF
754	0805	OBJECT MARKERS - CULVERTS		
		461+03 Lt & Rt	2	EA
		467+60 Lt & Rt	2	EA
		467+72 Lt & Rt	2	EA



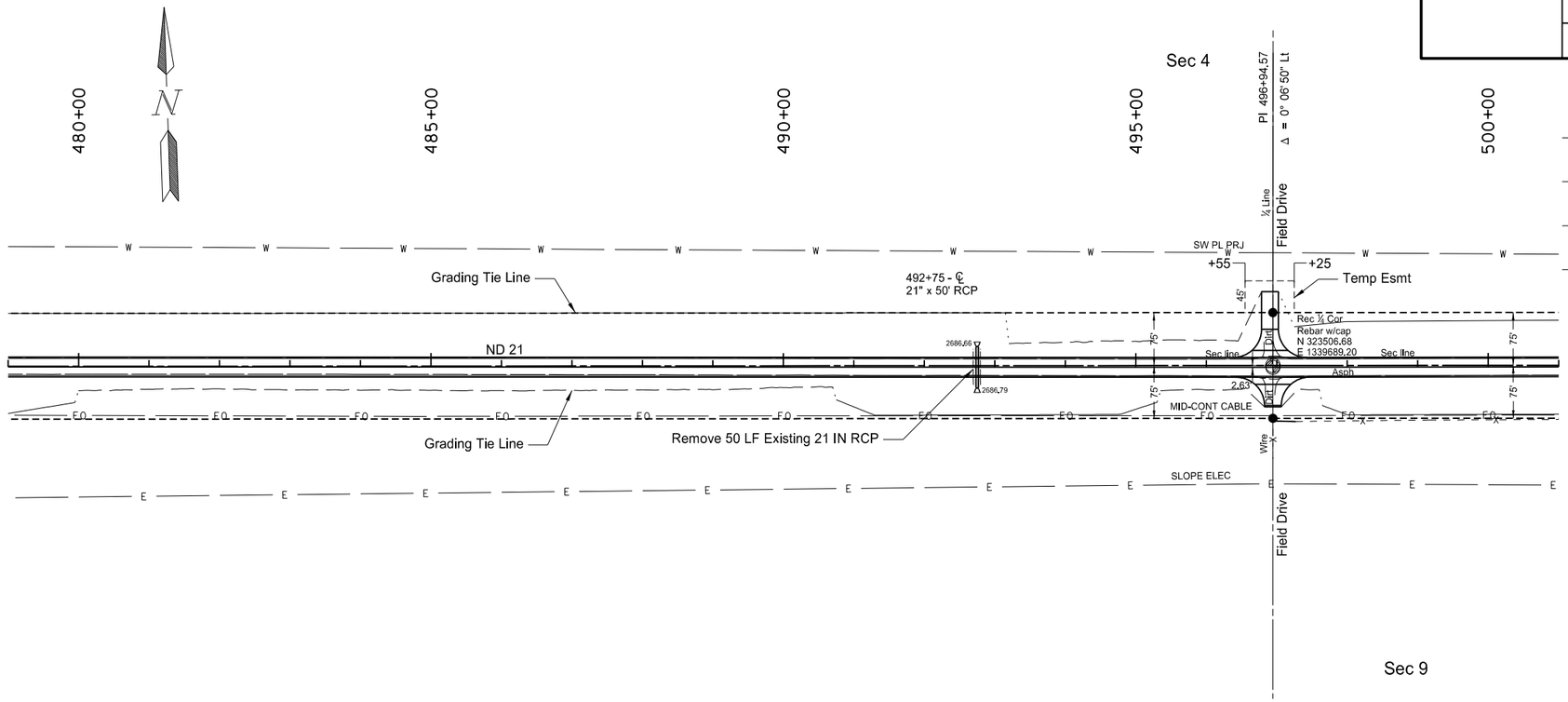
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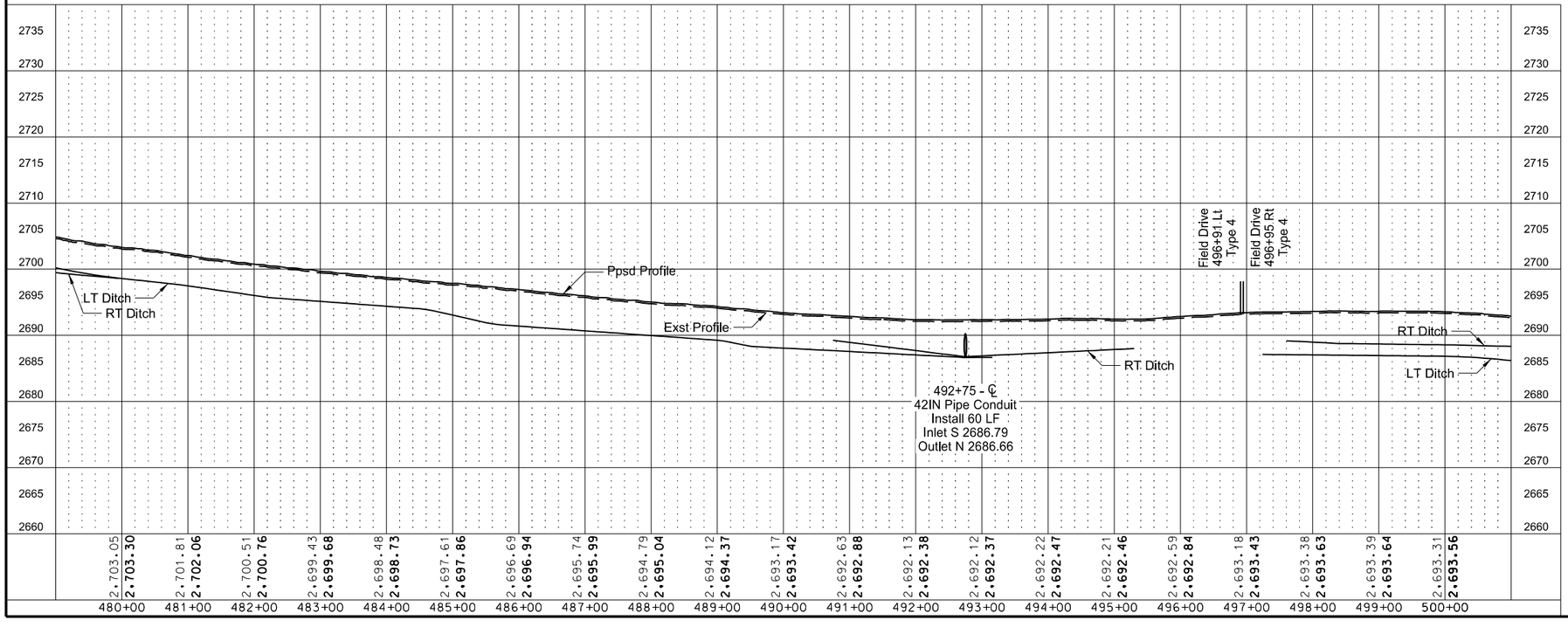
ND 21
Jct 85 to N Jct 22 - New England

460+00 to 480+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	25



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		492+75 - 26' Lt to 492+75 25' Rt	50	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		492+75 - 30' Lt to 492+75 - 30' Rt	350	SY
714	4120	PIPE CONDUIT 42IN		
		492+75 - 30' Lt to 492+75 - 30' Rt	60	LF
754	0805	OBJECT MARKERS - CULVERTS		
		492+75 Lt & Rt	2	EA



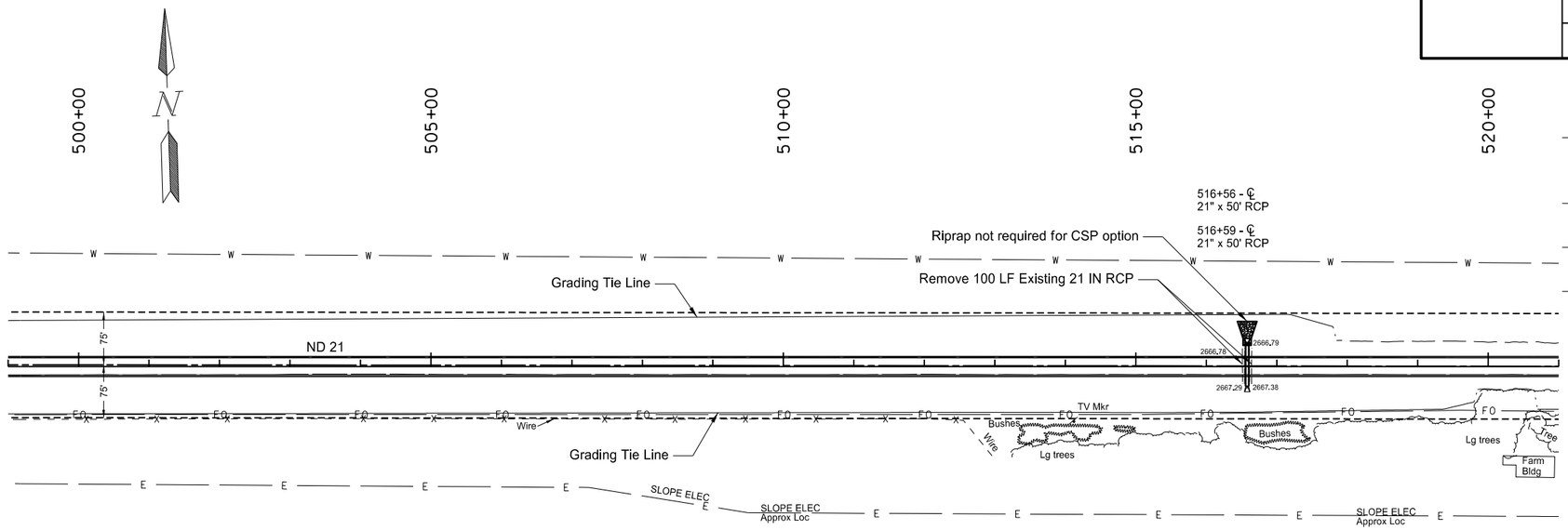
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Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

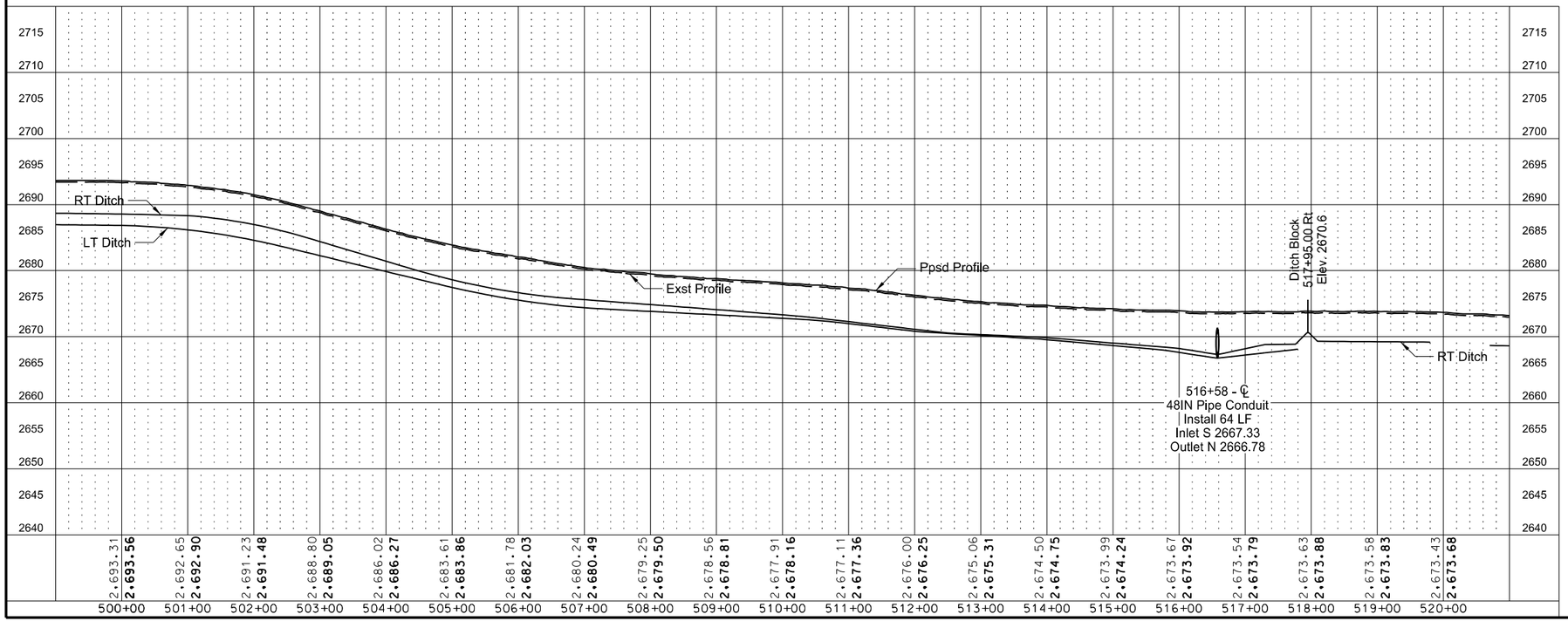
480+00 to 500+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	26



Electric line labeled Approx Loc was drawn in based on phone call from SLOPE ELEC

SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		516+56 - 26' Lt to 516+56 - 25' Rt	50	LF
		516+59 - 26' Lt to 516+59 - 25' Rt	50	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		516+58 - 34' Lt to 516+58 - 30' Rt	412	SY
714	4125	PIPE CONDUIT 48IN		
		516+58 - 34' Lt to 516+58 - 30' Rt	64	LF
754	0805	OBJECT MARKERS - CULVERTS		
		516+58 Lt & Rt	2	EA



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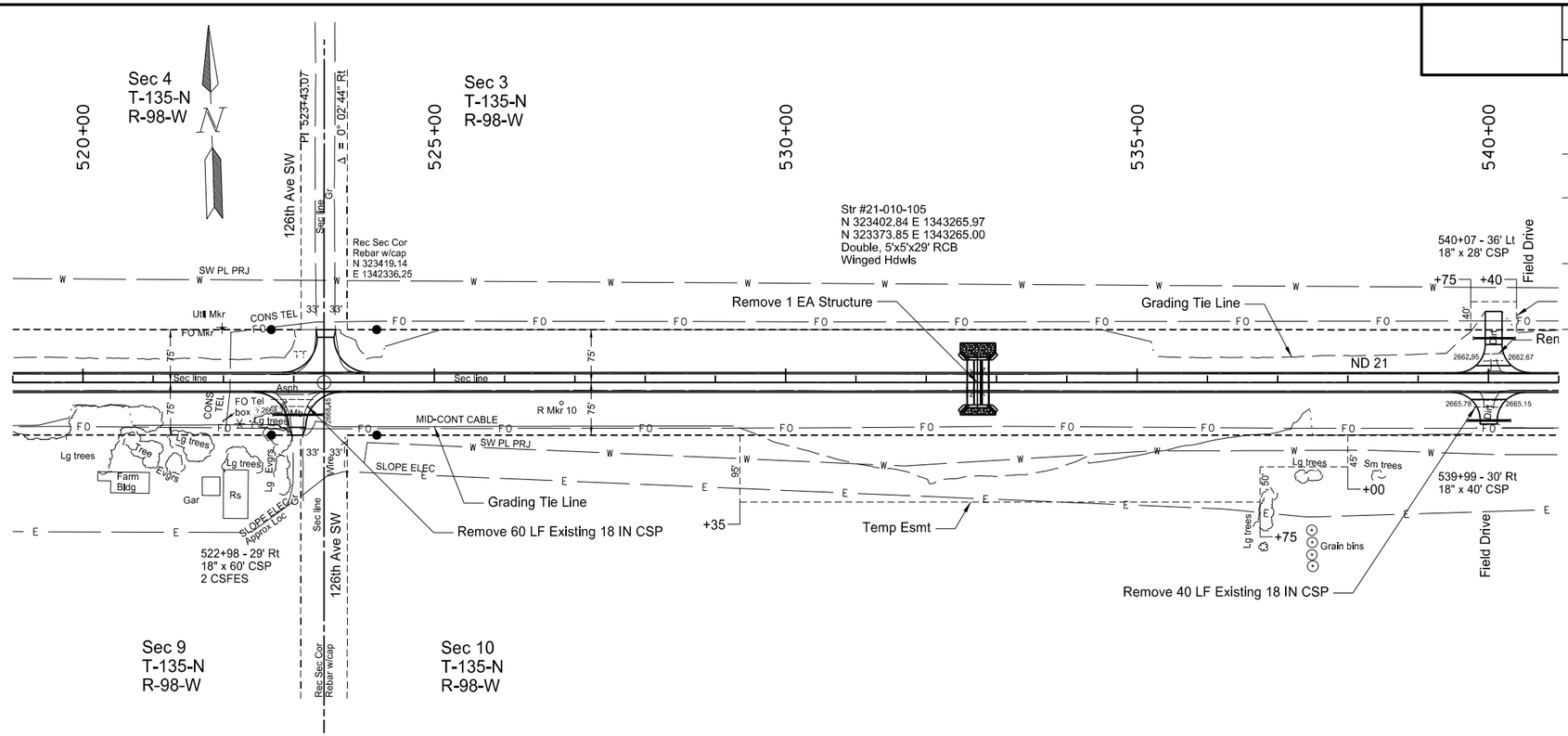
Plan & Profile

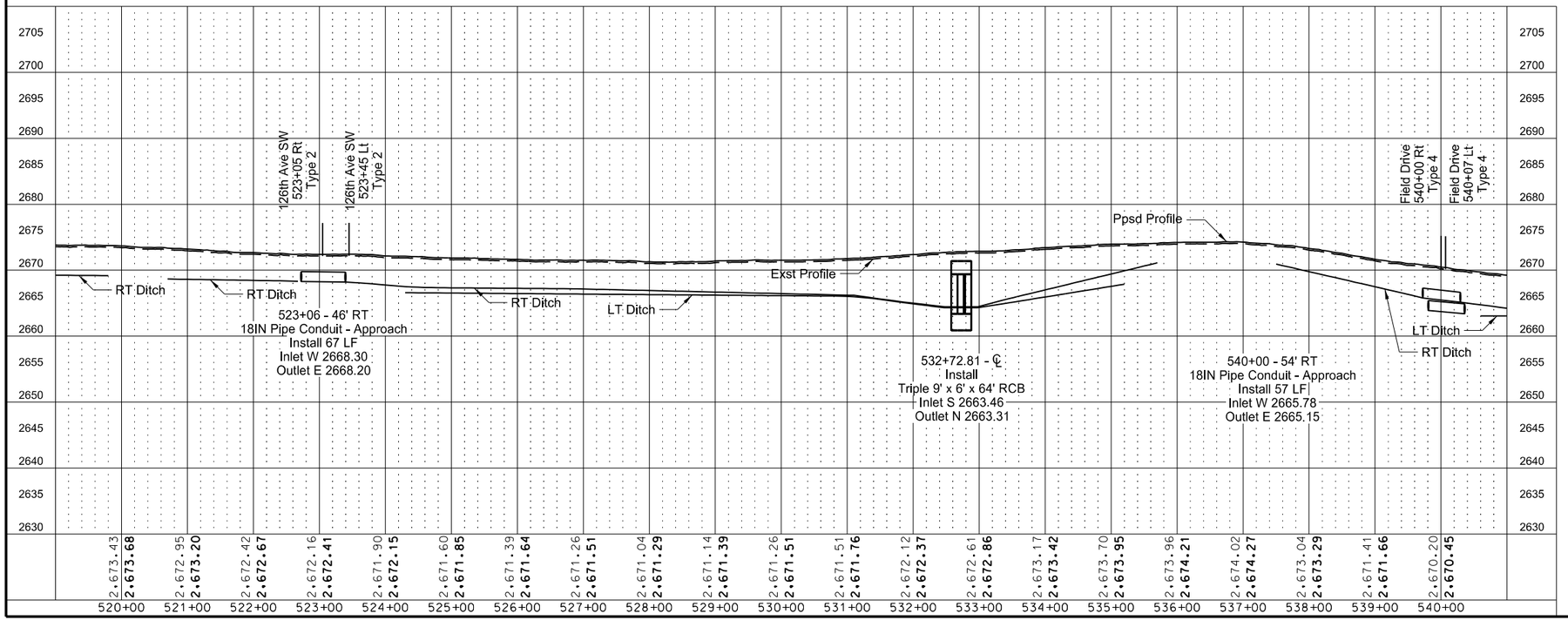
ND 21
Jct 85 to N Jct 22 - New England

500+00 to 520+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	27

SPEC	CODE	BID ITEM	QTY	UNIT
202	0104	REMOVAL OF STRUCTURE		
		532+73 (see section 170)	1	EA
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		522+67 - 29' Rt to 523+28 - 30' Rt	60	LF
		539+78 - 30' Rt to 540+20 - 30' Rt	40	LF
714	4099	PIPE CONDUIT 18IN-APPROACH		
		522+72 - 46' Rt to 523+39 - 46' Rt	67	LF
		539+72 - 54' Rt to 540+29 - 54' Rt	57	LF
754	0805	OBJECT MARKERS - CULVERTS		
		532+73 Lt & Rt	4	EA





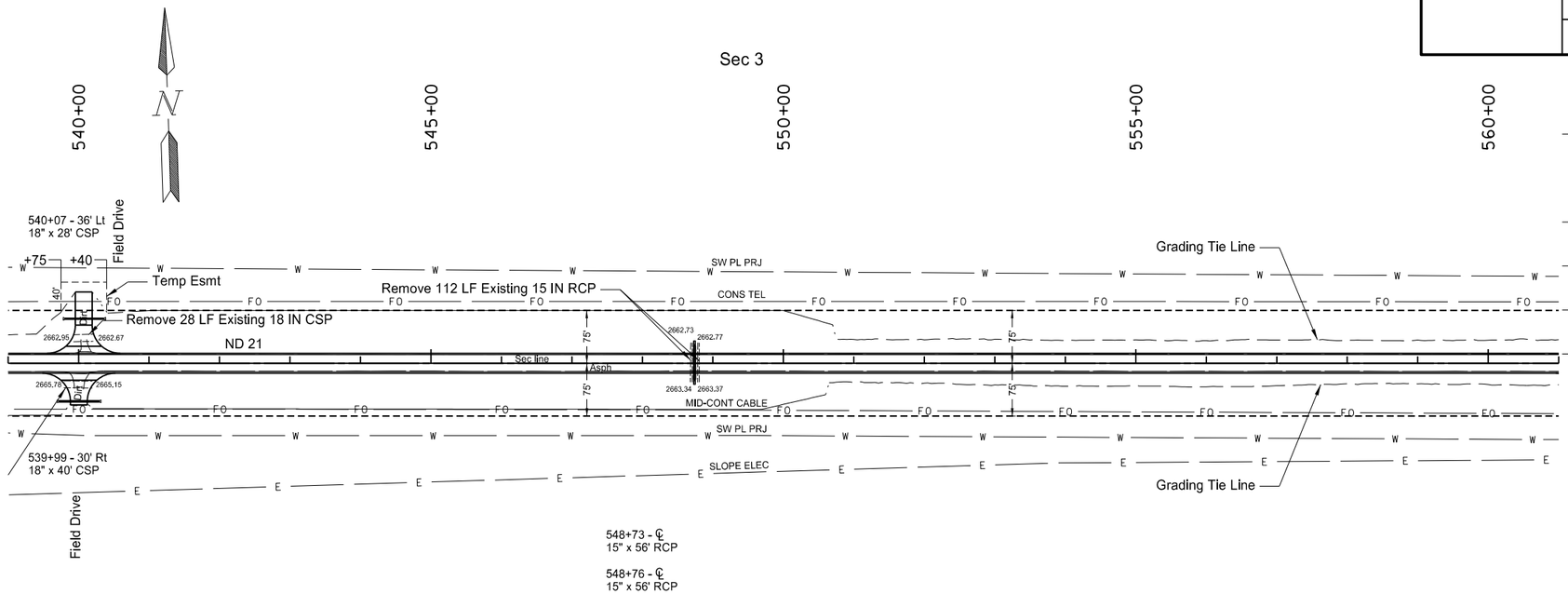
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Plan & Profile

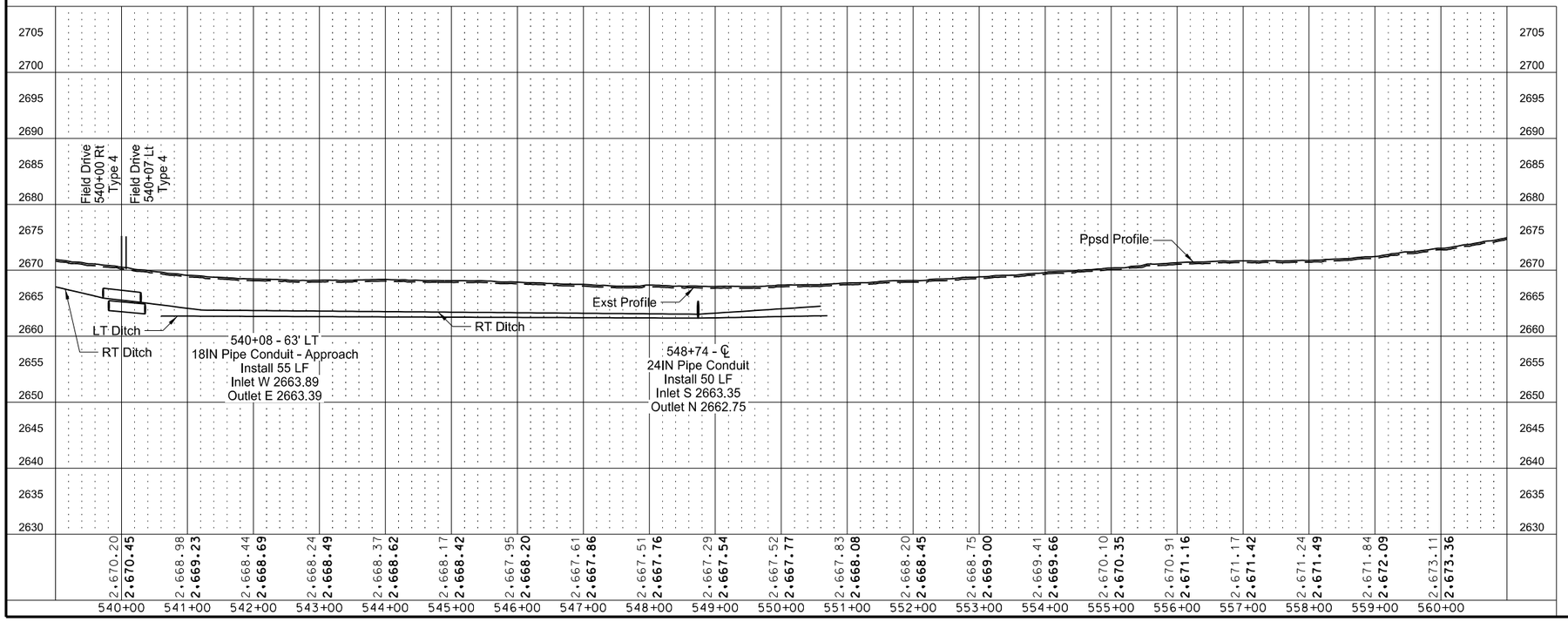
ND 21
Jct 85 to N Jct 22 - New England

520+00 to 540+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	28



Sec 10



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		539+92 - 35' Lt to 540+21 - 36' Lt	28	LF
		548+73 - 29' Lt to 548+73 - 27' Rt	56	LF
		548+76 - 29' Lt to 548+76 - 27' Rt	56	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		548+74 - 26' Lt to 548+74 - 24' Rt	259	SY
714	4099	PIPE CONDUIT 18IN-APPROACH		
		539+81 - 63' Lt to 540+36 - 63' Lt	55	LF
714	4105	PIPE CONDUIT 24IN		
		548+74 - 26' Lt to 548+74 - 24' Rt	50	LF
754	0805	OBJECT MARKERS - CULVERTS		
		548+74 Lt & Rt	2	EA

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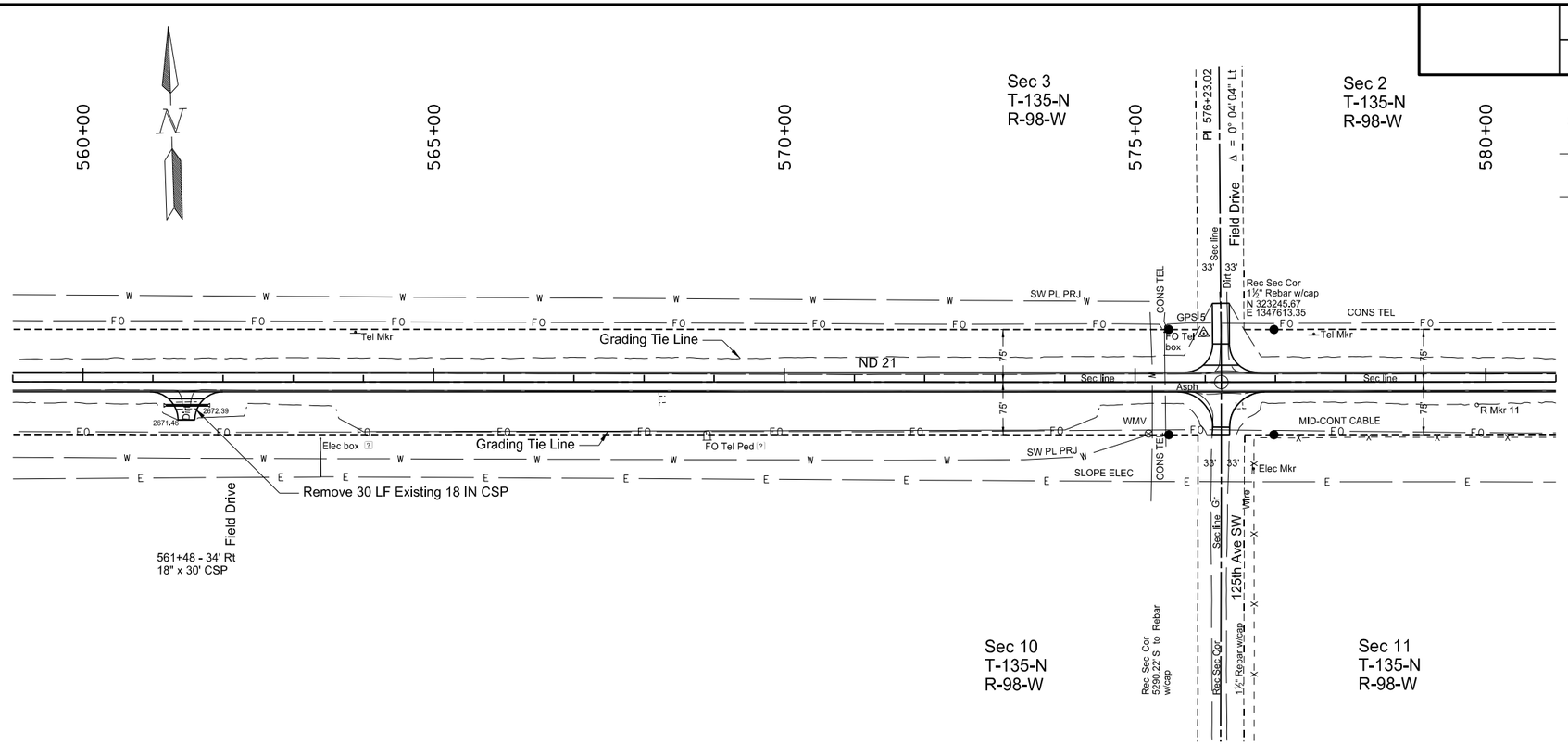
Plan & Profile

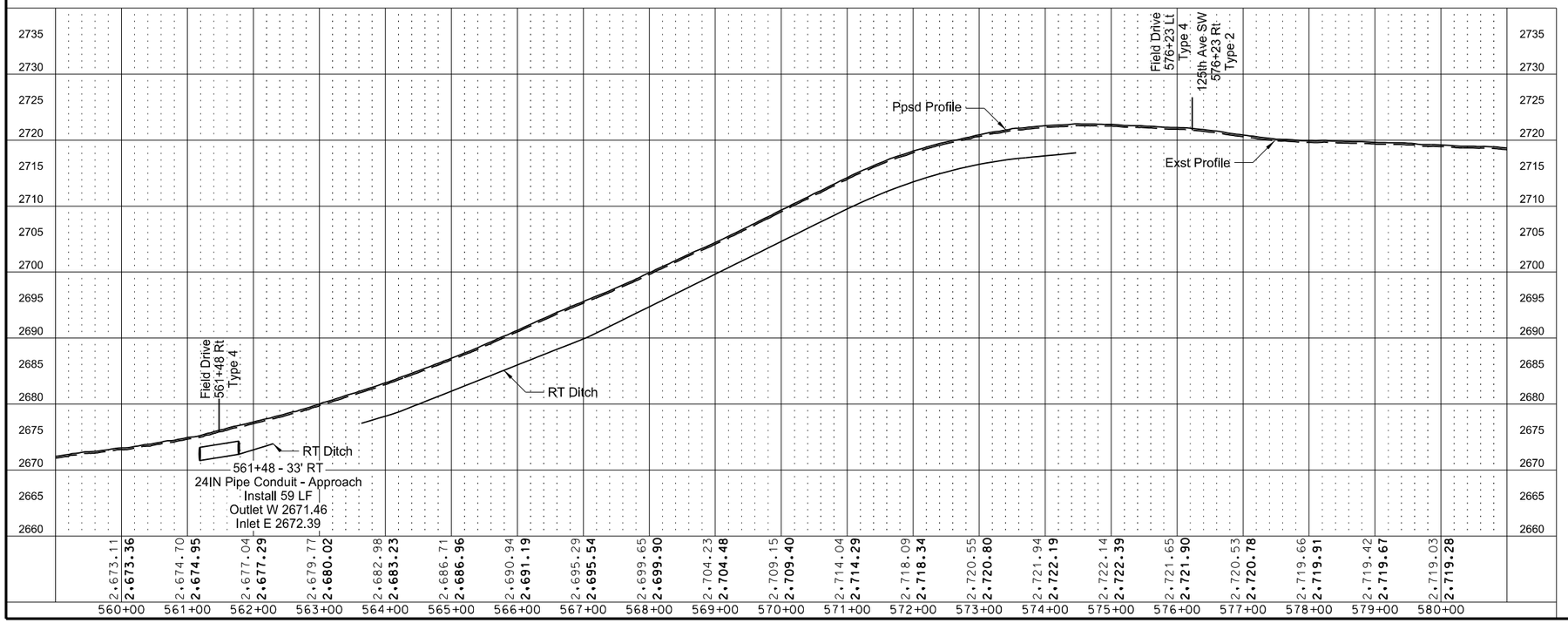
ND 21
Jct 85 to N Jct 22 - New England

540+00 to 560+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	29

SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		561+33 - 34' Rt to 561+63 - 33' Rt	30	LF
714	4106	PIPE CONDUIT 24IN-APPROACH		
		561+19 - 33' Rt to 561+78 - 33' Rt	59	LF





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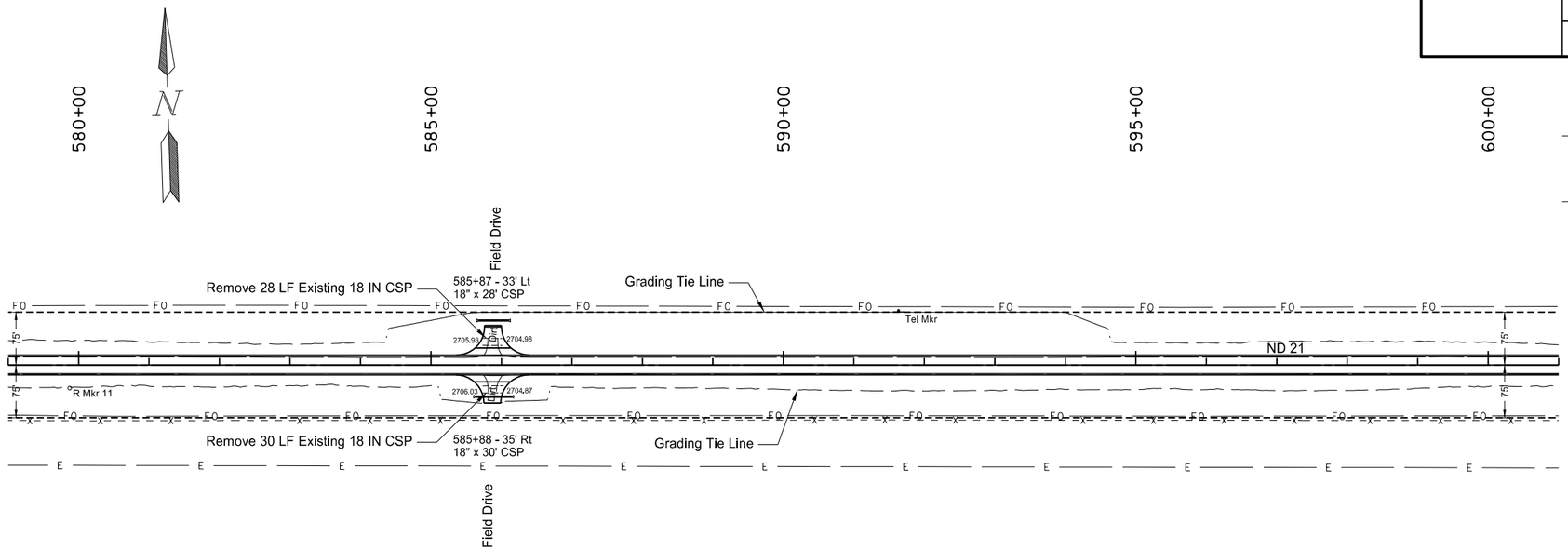
Plan & Profile

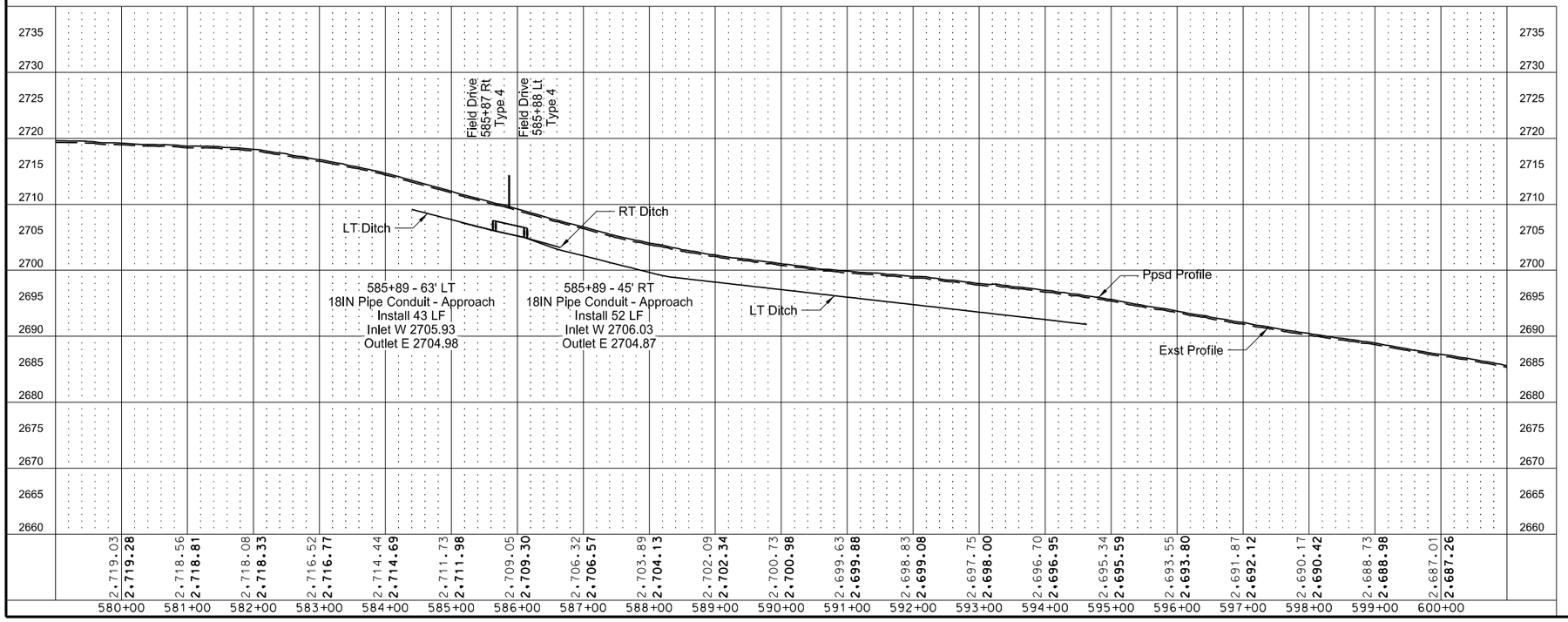
ND 21
Jct 85 to N Jct 22 - New England

560+00 to 580+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	30

SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		585+73 - 33' Lt to 586+01 - 33' Lt	28	LF
		585+73 - 35' Rt to 586+03 - 35' Rt	30	LF
714	4099	PIPE CONDUIT 18IN-APPROACH		
		585+67 - 63' Lt to 586+10 - 63' Lt	43	LF
		585+63 - 45' Rt to 586+15 - 45' Rt	52	LF





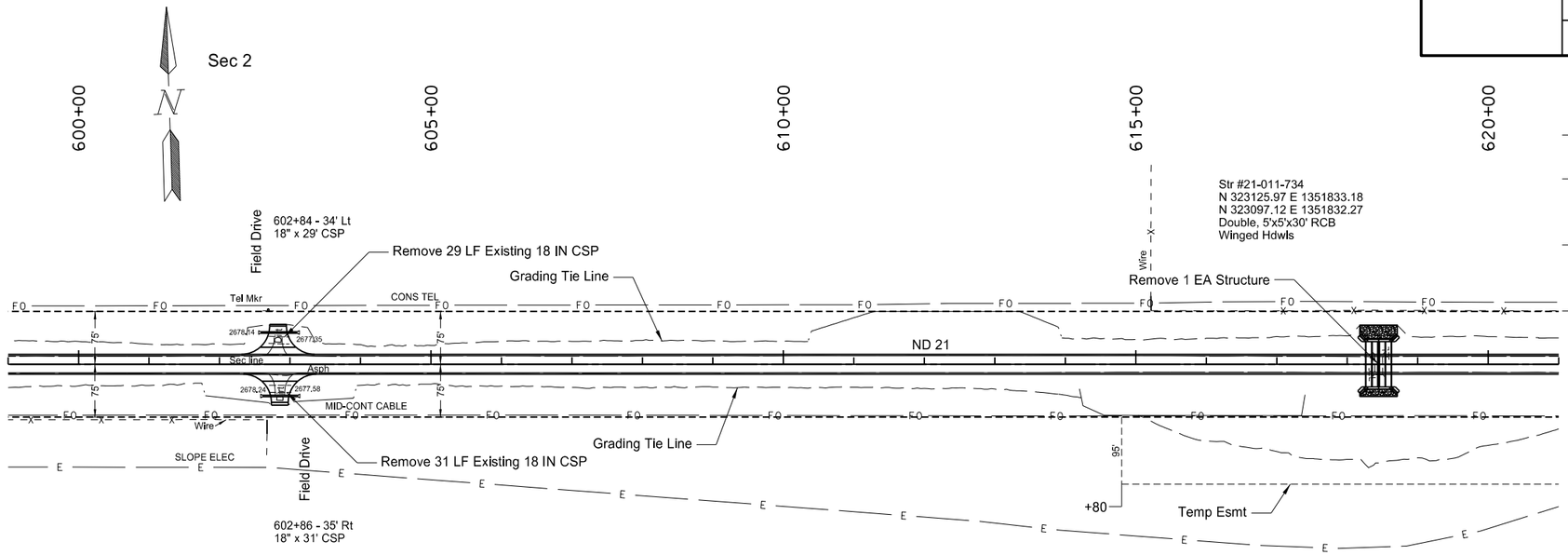
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Plan & Profile

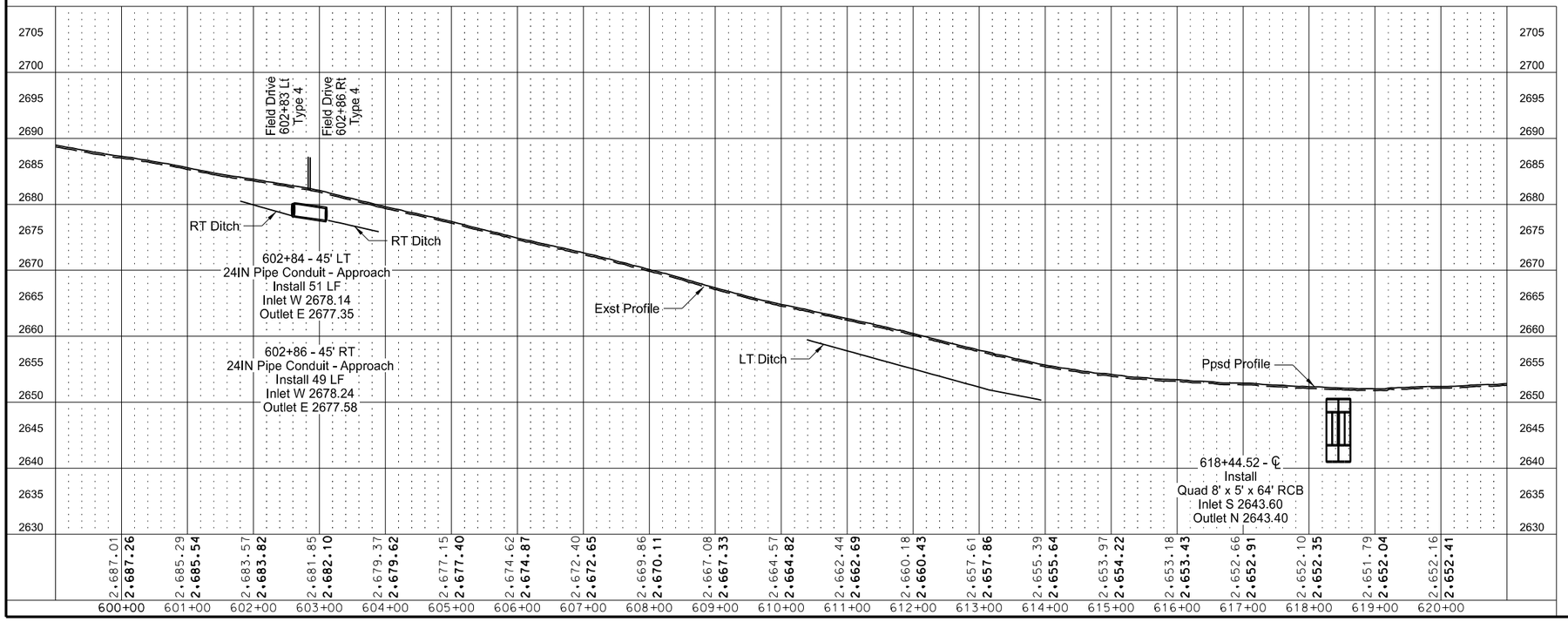
ND 21
Jct 85 to N Jct 22 - New England

580+00 to 600+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	31



Sec 11



SPEC	CODE	BID ITEM	QTY	UNIT
202	0104	REMOVAL OF STRUCTURE		
		618+45 (see section 170)	1	EA
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		602+69 - 34' Lt to 602+99 - 34' Lt	29	LF
		602+70 - 35' Rt to 603+02 - 35' Rt	31	LF
714	4106	PIPE CONDUIT 24IN-APPROACH		
		602+62 - 45' Rt to 603+11 - 45' Rt	49	LF
		602+59 - 45' Lt to 603+10 - 45' Lt	51	LF
754	0805	OBJECT MARKERS - CULVERTS		
		618+45 Lt & Rt	4	EA

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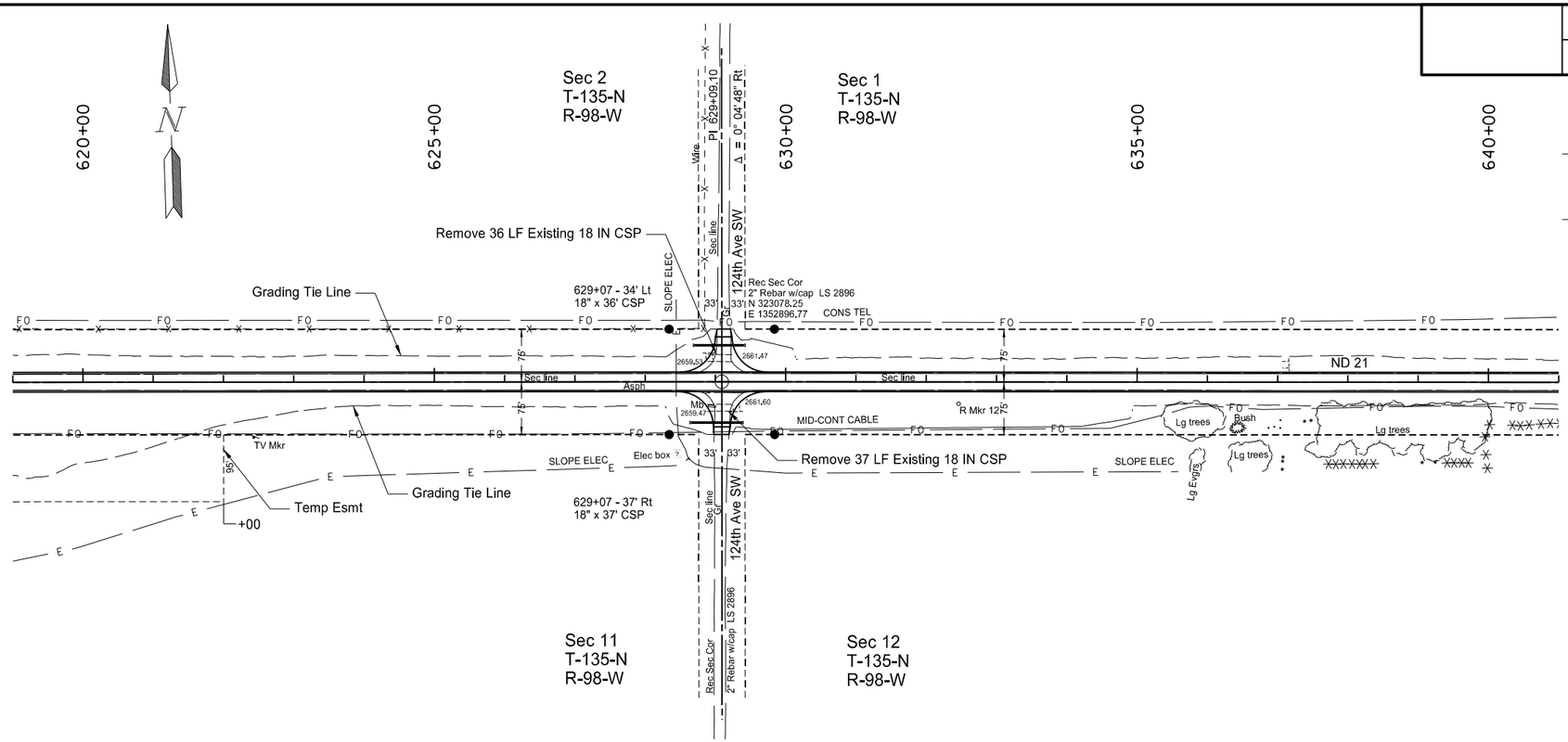
Plan & Profile

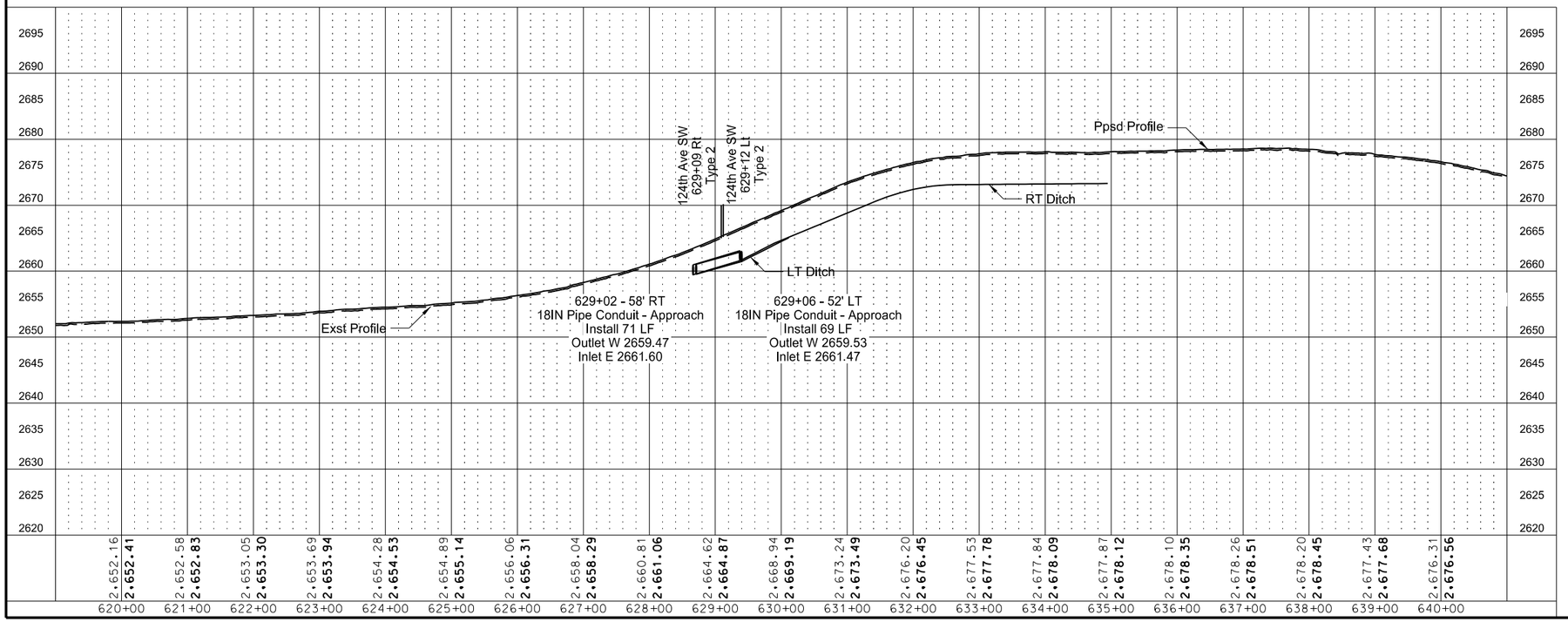
ND 21
Jct 85 to N Jct 22 - New England

600+00 to 620+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	32

SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		628+89 - 34' Lt to 629+25 - 34' Lt	36	LF
		628+88 - 37' Rt to 629+26 - 37' Rt	37	LF
714	4099	PIPE CONDUIT 18IN-APPROACH		
		628+66 - 58' Rt to 629+37 - 58' Rt	71	LF
		628+71 - 52' Lt to 629+40 - 52' Lt	69	LF





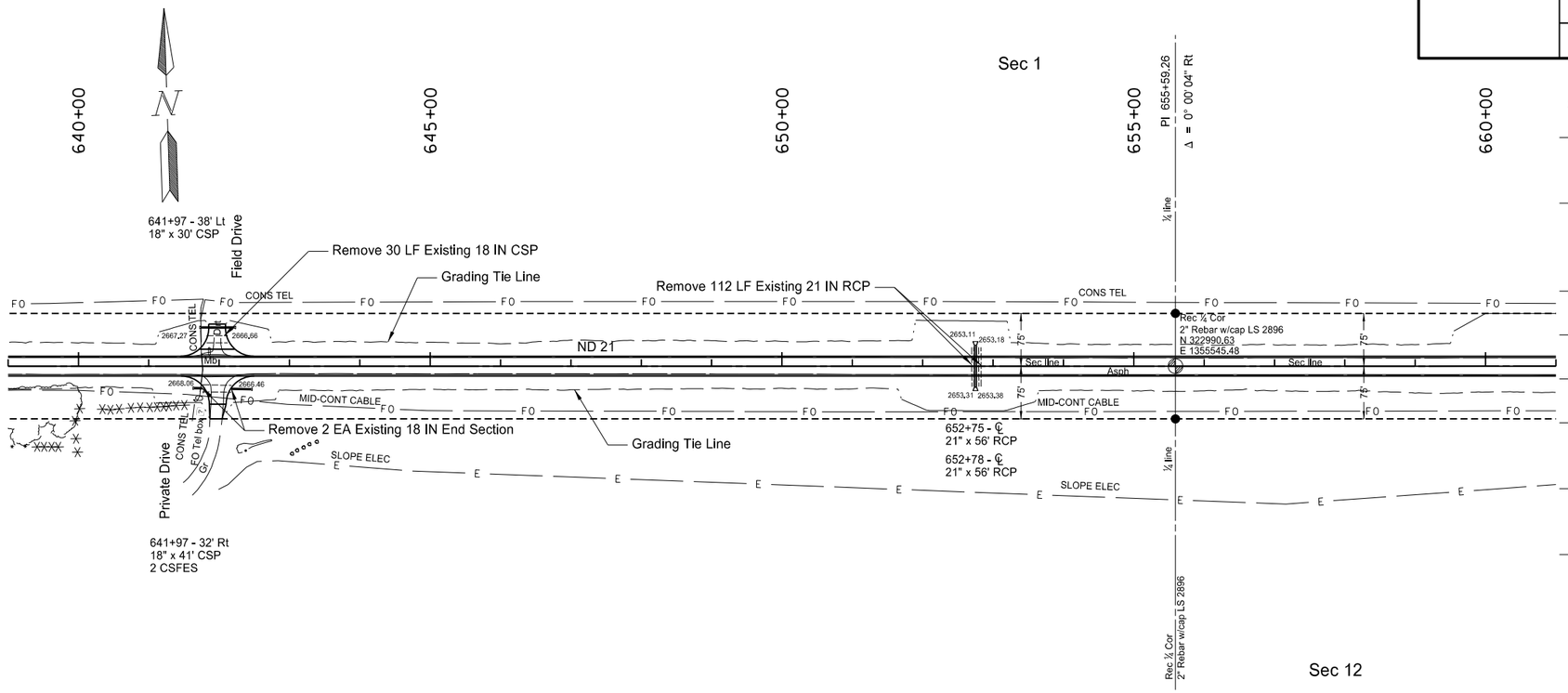
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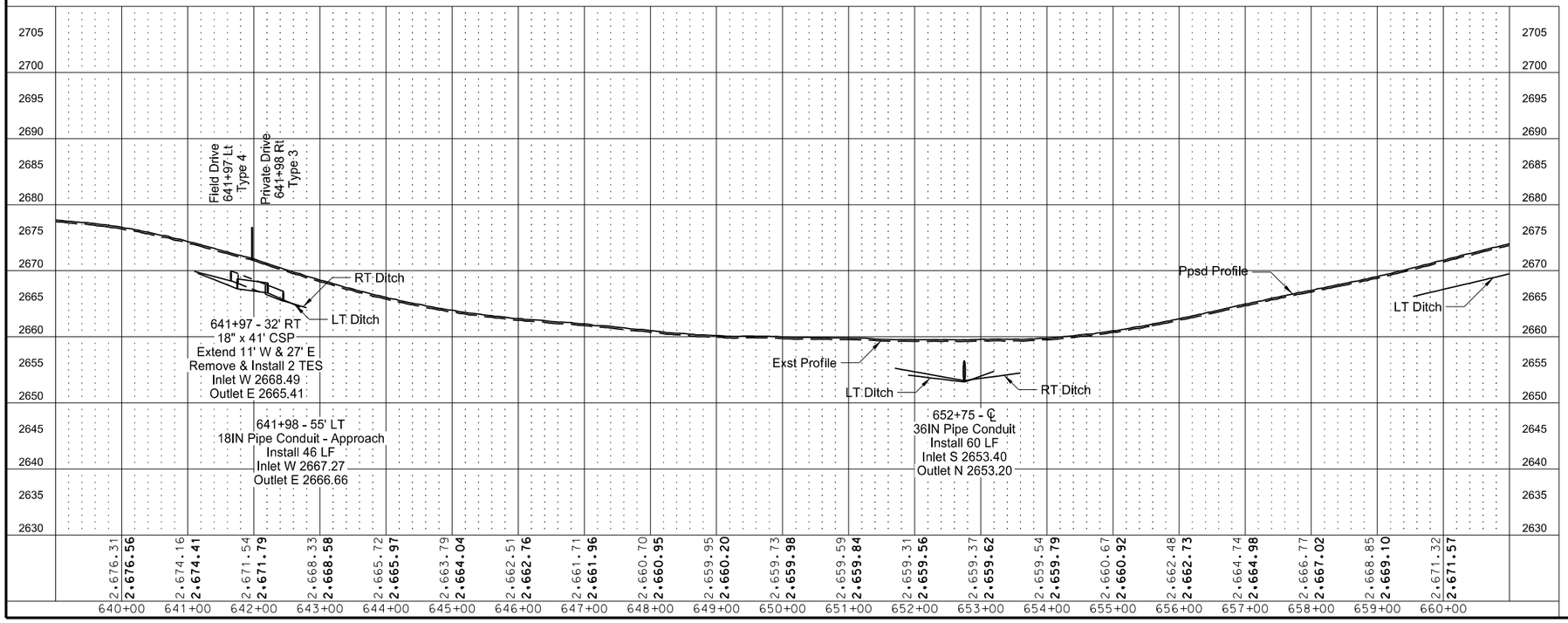
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

620+00 to 640+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	33





SPEC	CODE	BID ITEM	QTY	UNIT
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES		
		641+76 Rt	1	EA
		642+18 Rt	1	EA
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		641+82 - 38' Lt to 642+12 - 38' Lt	30	LF
		652+75 - 27' Lt to 652+75 - 29' Rt	56	LF
		652+78 - 27' Lt to 652+78 - 29' Rt	56	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		652+75 - 30' Lt to 652+75 - 30' Rt	342	SY
714	4099	PIPE CONDUIT 18IN-APPROACH		
		641+75 - 55' Lt to 642+21 - 55' Lt	46	LF
714	4115	PIPE CONDUIT 36IN		
		652+75 - 30' Lt to 652+75 - 30' Rt	60	LF
714	5015	PIPE CORR STEEL .064IN 18IN		
		641+65 - 31' Rt to 641+76 - 31' Rt	11	LF
		642+18 - 32' Rt to 642+45 - 33' Rt	27	LF
714	6501	END SECT-TRAVERSABLE METAL 18IN		
		641+65 Rt	1	EA
		642+45 Rt	1	EA
754	0805	OBJECT MARKERS - CULVERTS		
		652+75 Lt & Rt	2	EA

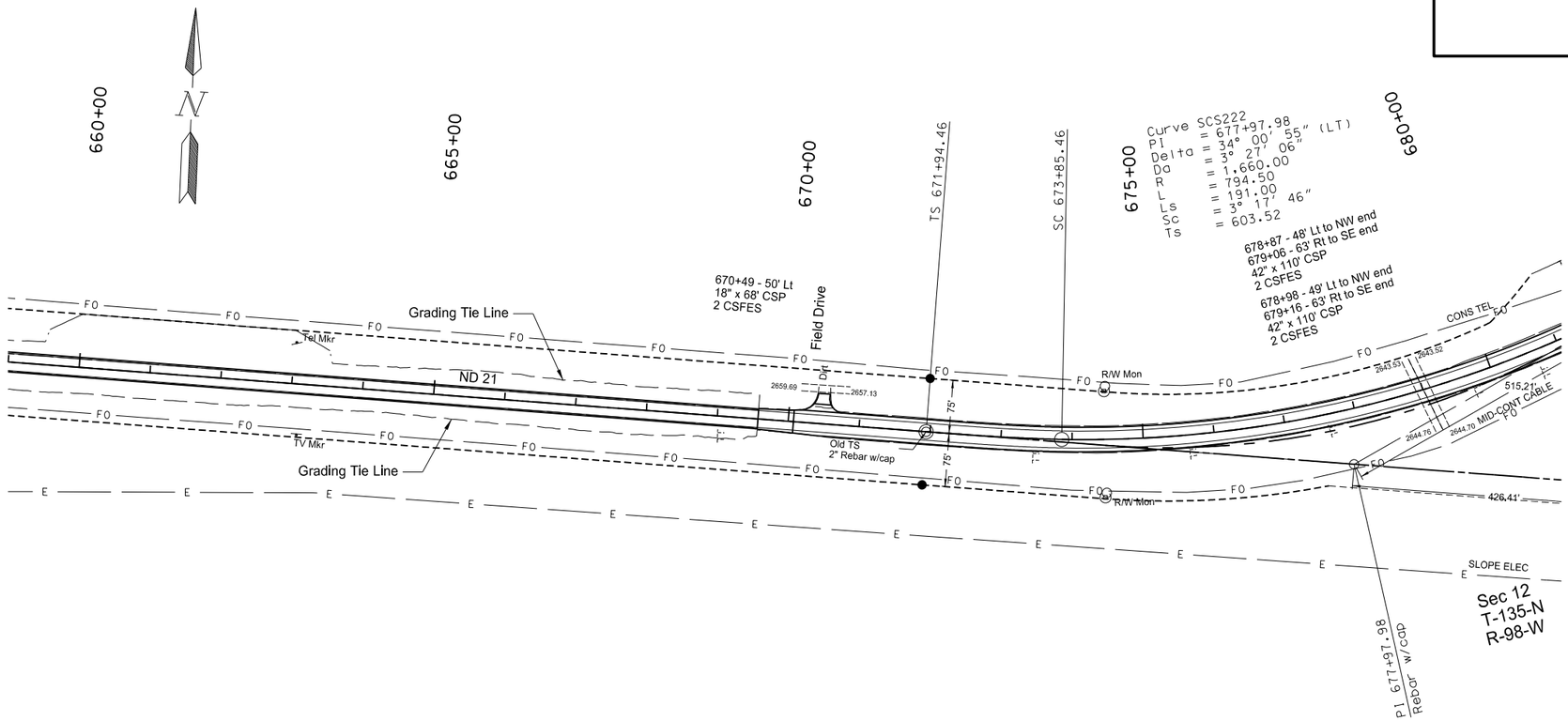
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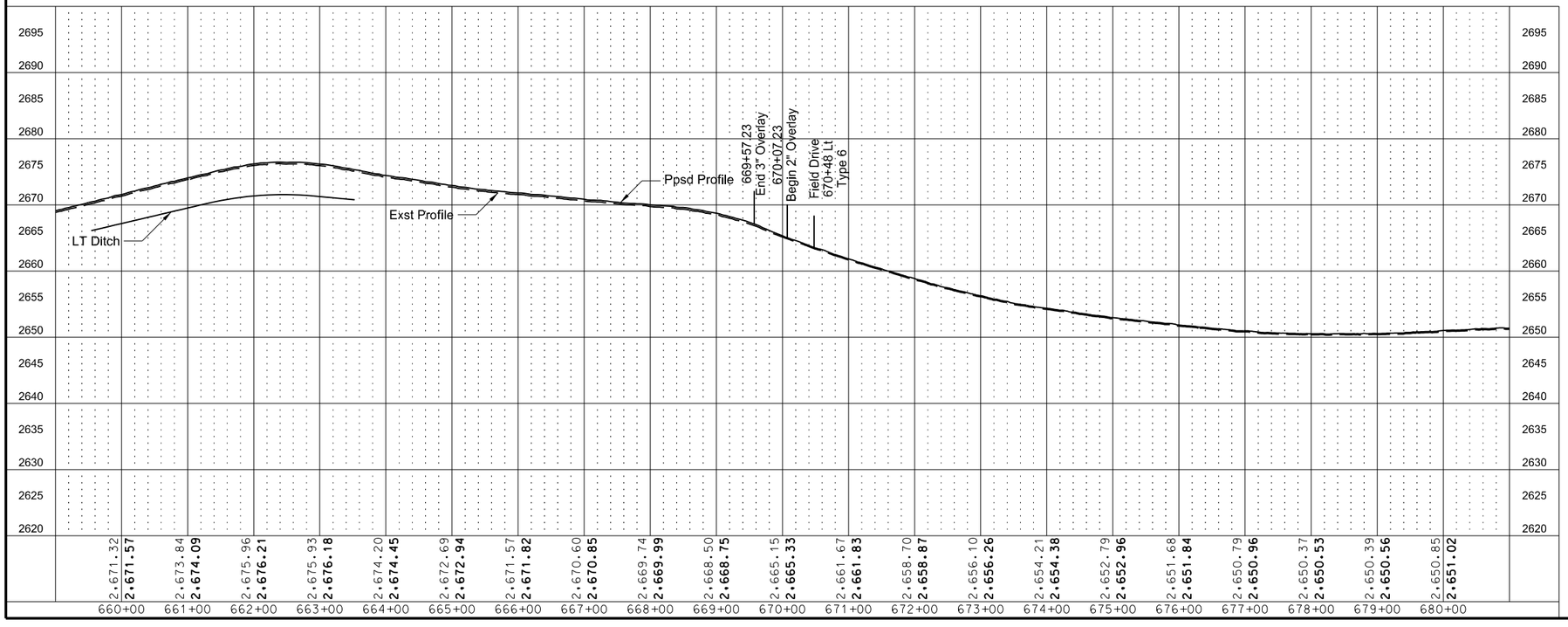
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

640+00 to 660+00

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	34





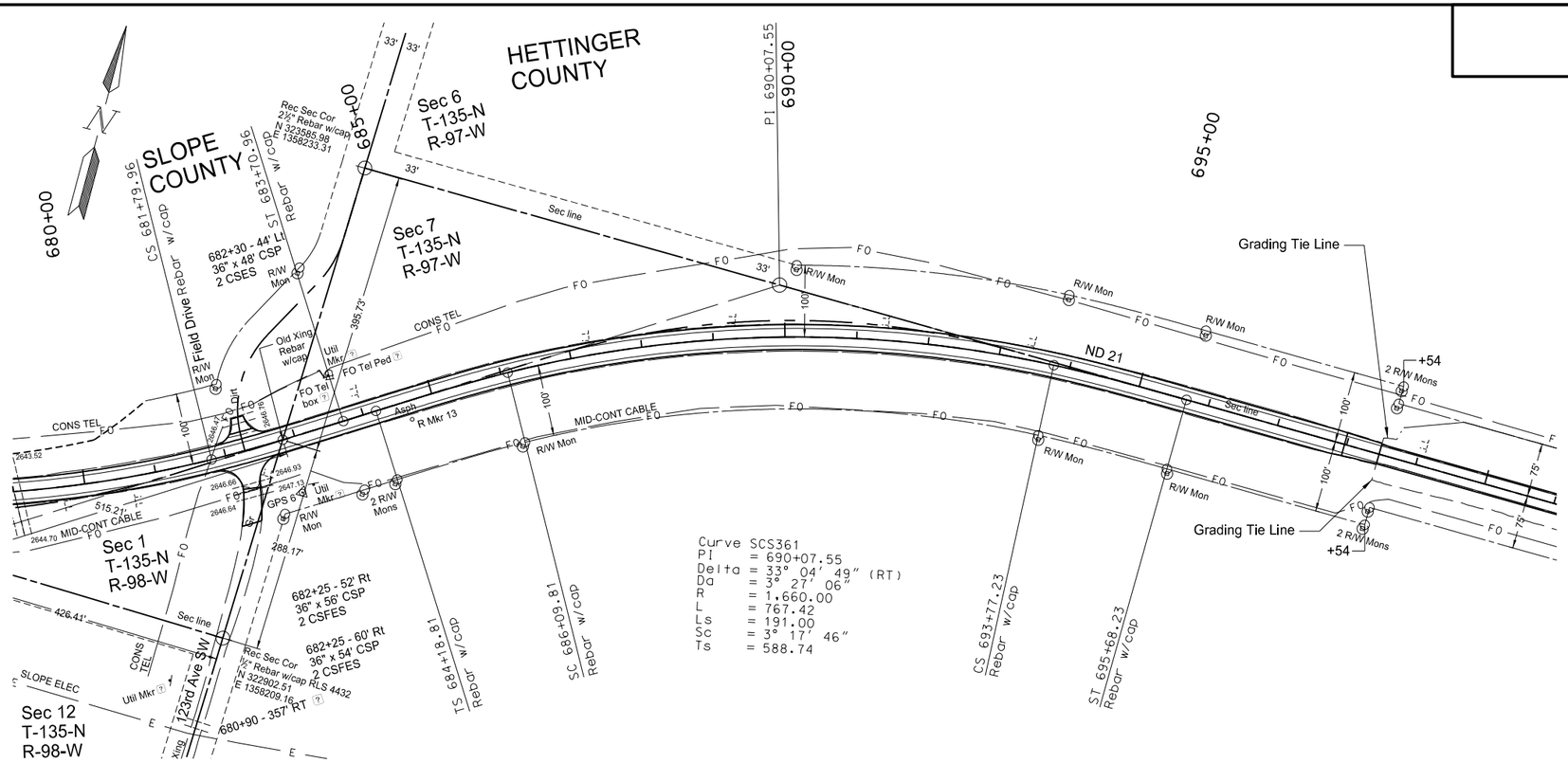
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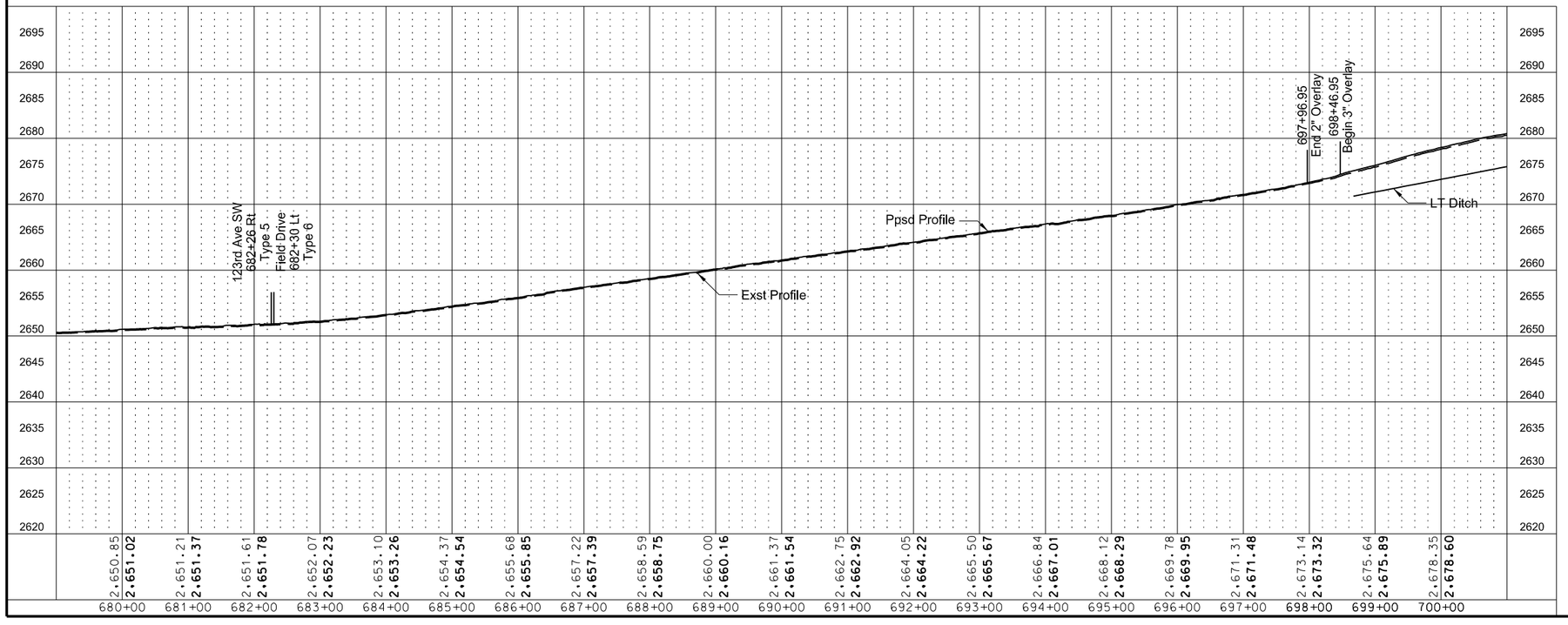
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

660+00 to 671+07.23

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	35





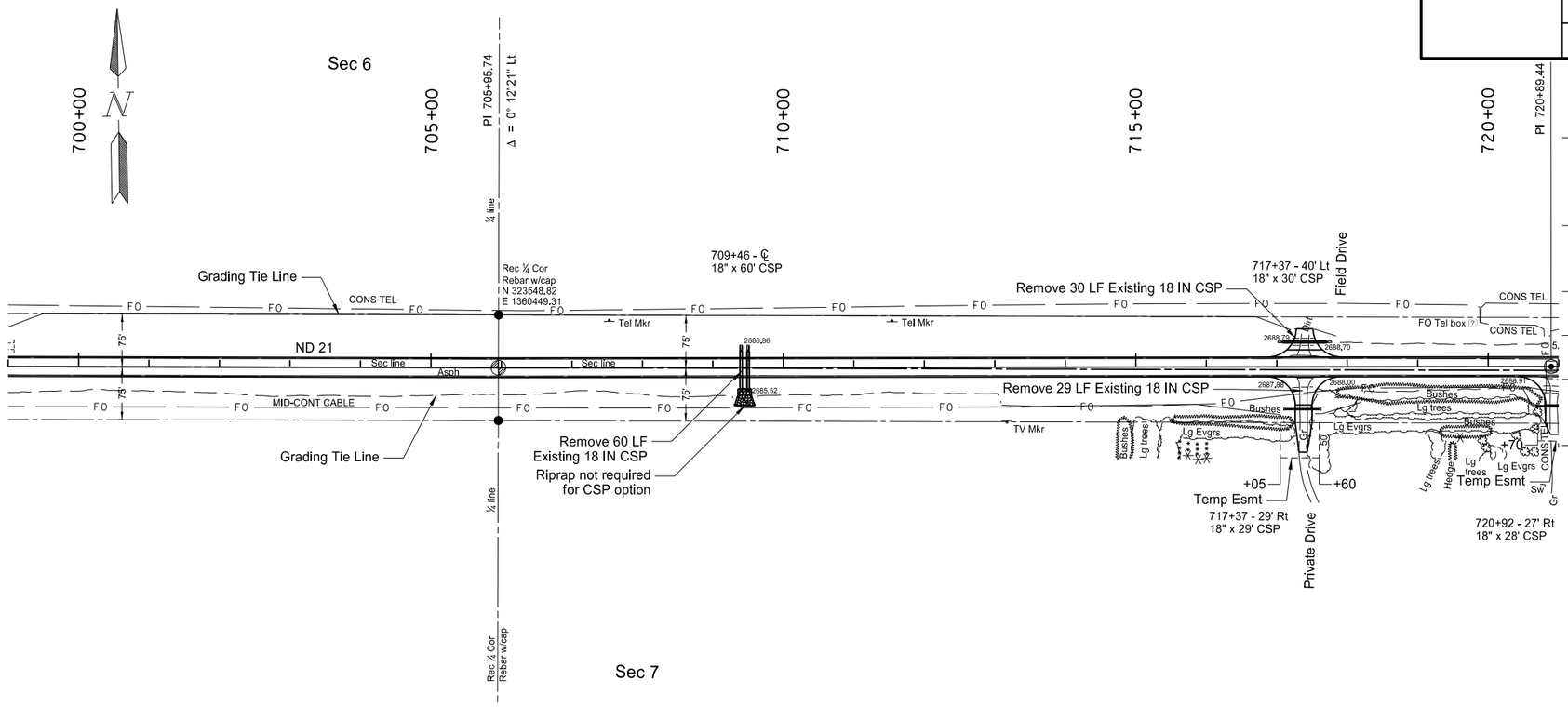
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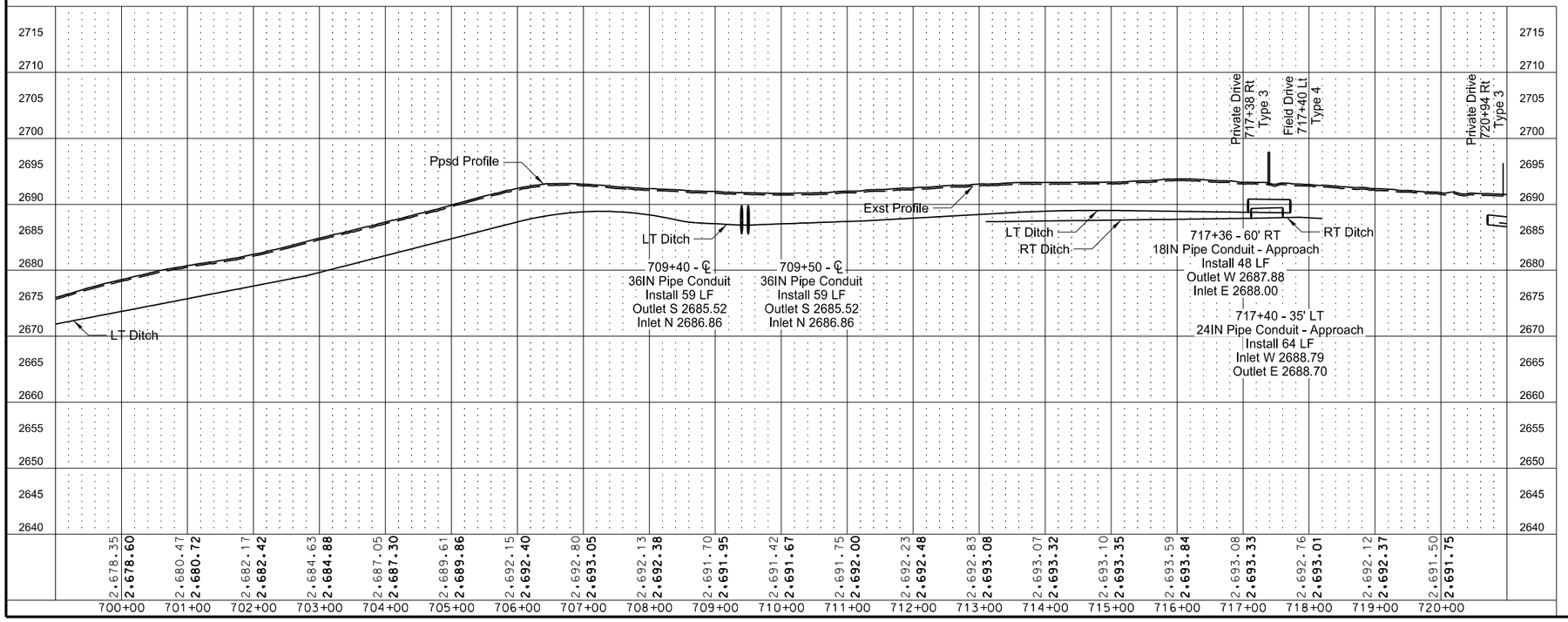
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

696+96.95 to 700+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	36





SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		709+46 - 31' Lt to 709+46 - 30' Lt	60	LF
		717+22 - 35' Lt to 717+52 - 35' Lt	30	LF
		717+22 - 34' Rt to 717+52 - 33' Rt	29	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		709+40 - 24' Lt to 709+40 - 34' Rt 709+50 - 24' Lt to 709+50 - 34' Rt	410	SY
714	4099	PIPE CONDUIT 18IN-APPROACH		
		717+12 - 60' Rt to 717+60 - 60' Rt	48	LF
714	4106	PIPE CONDUIT 24IN-APPROACH		
		717+08 - 35' Lt to 717+72 - 35' Lt	64	LF
714	4115	PIPE CONDUIT 36IN		
		709+40 - 24' Lt to 709+40 - 34' Rt	59	LF
		709+50 - 24' Lt to 709+50 - 34' Rt	59	LF
754	0805	OBJECT MARKERS - CULVERTS		
		709+40 Lt & Rt	2	EA
		709+50 Lt & Rt	2	EA

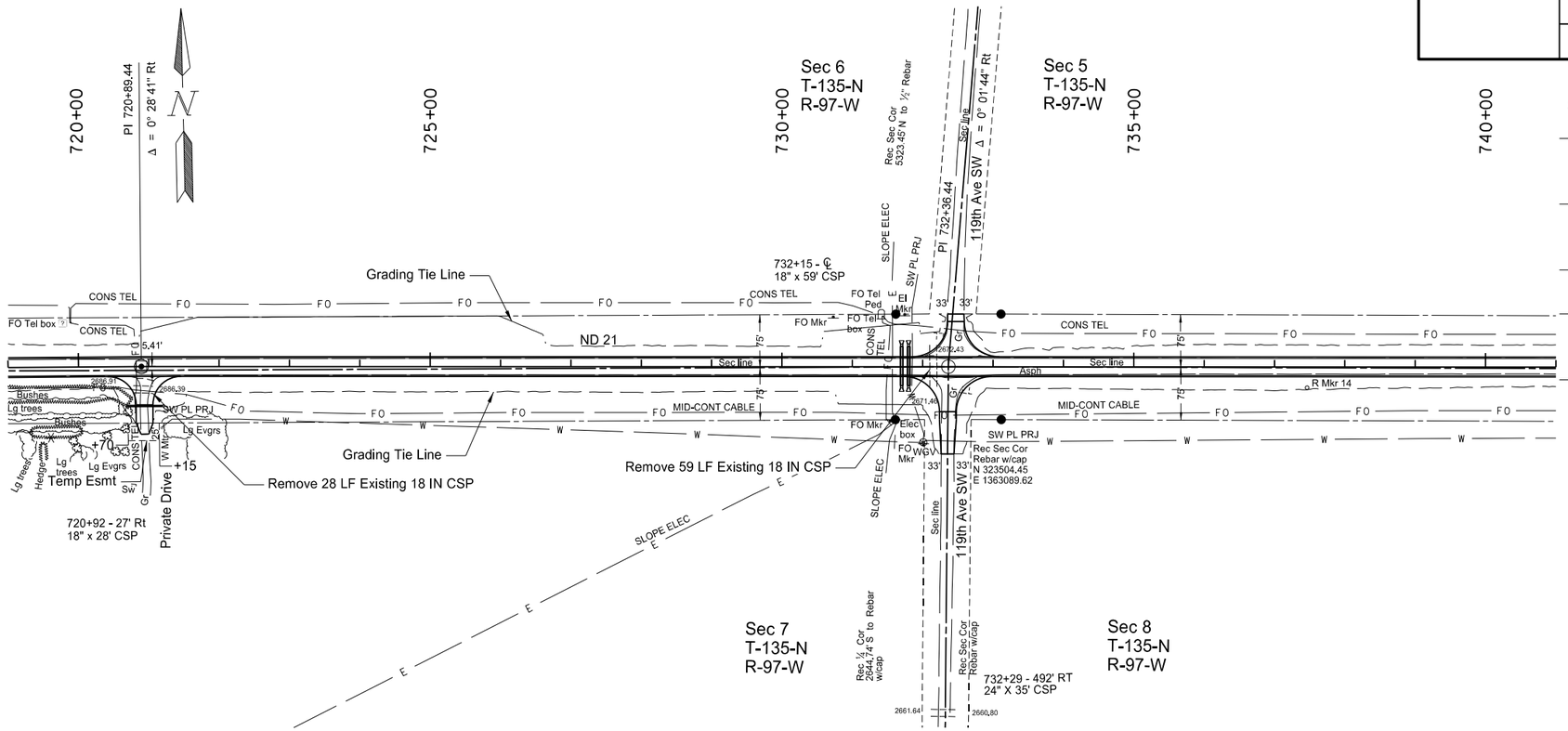
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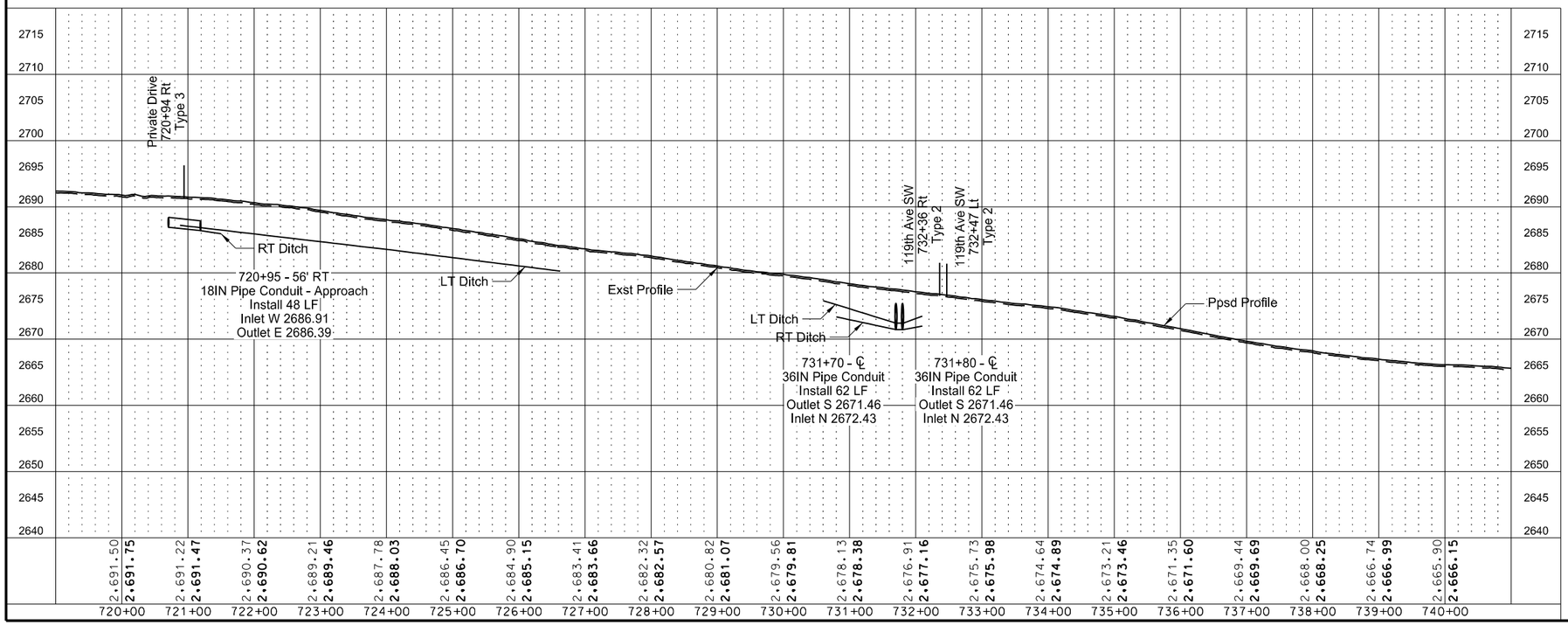
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

700+00 to 720+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	37





SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		720+78 - 32' Rt to 721+06 - 33' Rt	28	LF
		732+15 - 31' Lt to 732+15 - 29' Rt	59	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		731+70 - 32' Lt to 731+70 - 30' Rt 731+80 - 32' Lt to 731+80 - 30' Rt	431	SY
714	4099	PIPE CONDUIT 18IN-APPROACH		
		720+71 - 56' Rt to 721+19 - 56' Rt	48	LF
714	4115	PIPE CONDUIT 36IN		
		731+70 - 32' Lt to 731+70 - 30' Rt	62	LF
		731+80 - 32' Lt to 731+80 - 30' Rt	62	LF
754	0805	OBJECT MARKERS - CULVERTS		
		731+70 Lt & Rt	2	EA
		731+80 Lt & Rt	2	EA

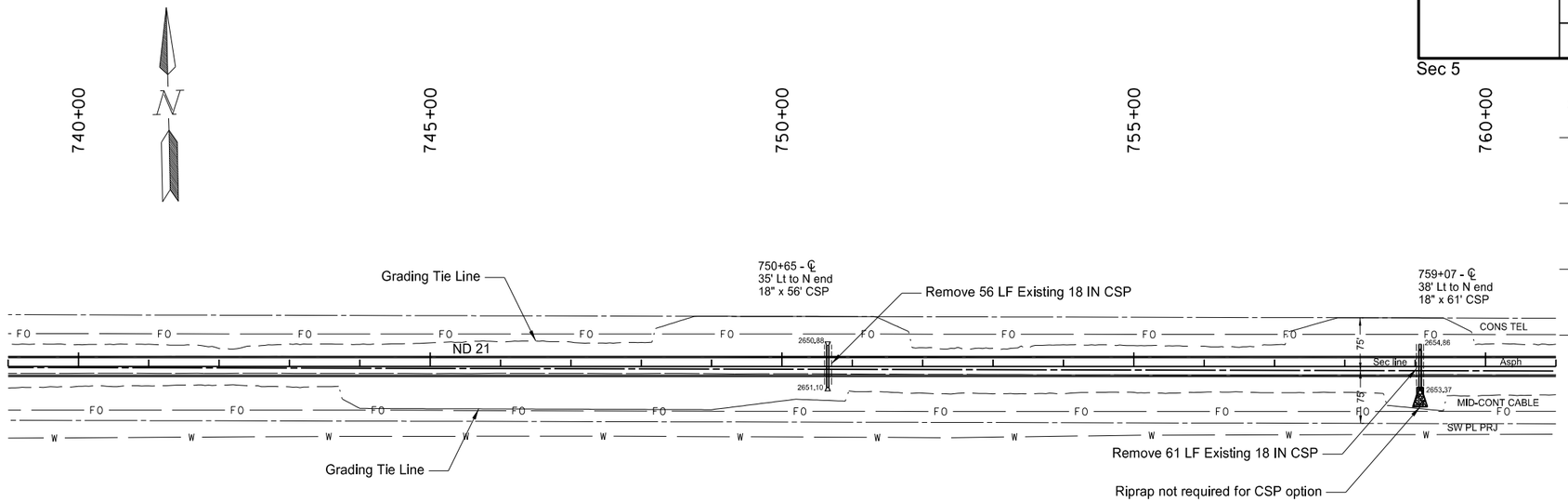
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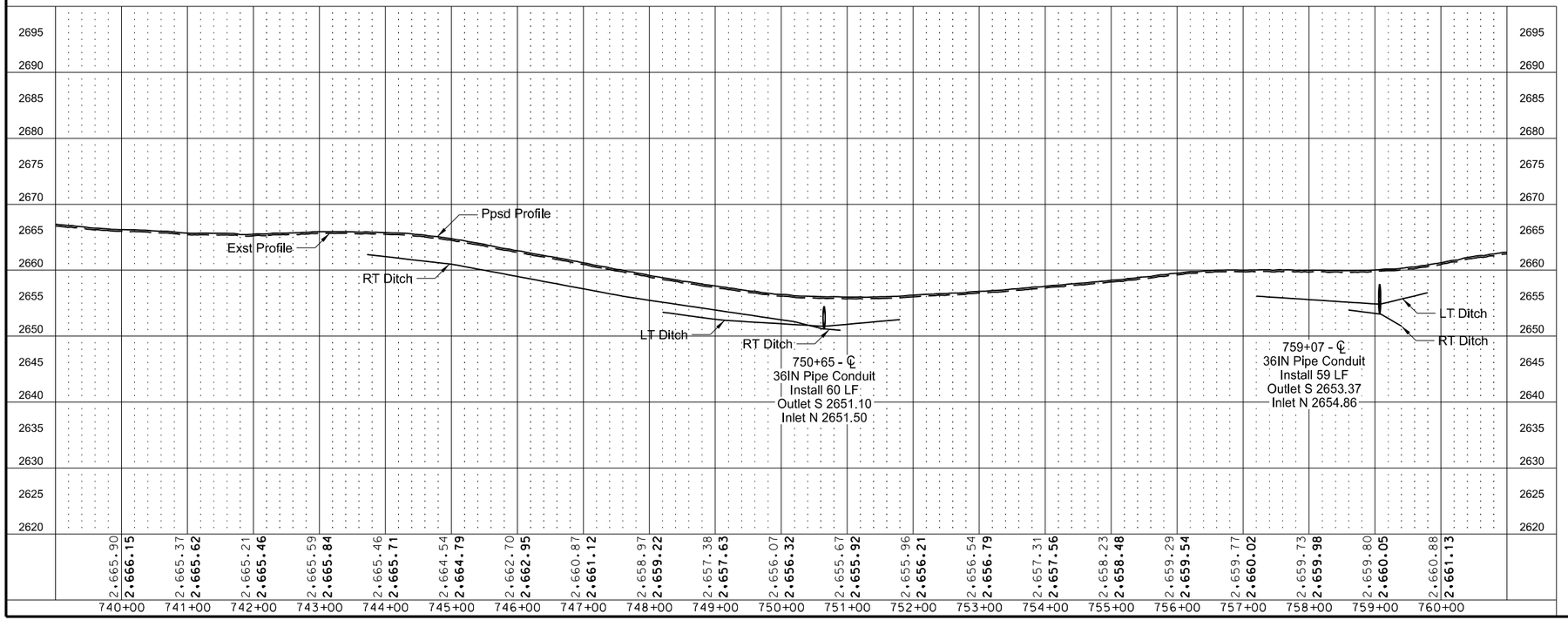
ND 21
Jct 85 to N Jct 22 - New England

720+00 to 740+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	38



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		750+65 - 31' Lt to 750+65 - 26' Rt	56	LF
		759+07 - 32' Lt to 759+07 - 29' Rt	61	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		750+65 - 30' Lt to 750+65 - 30' Rt	260	SY
		759+07 - 24' Lt to 759+07 - 34' Rt	339	SY
714	4115	PIPE CONDUIT 36IN		
		750+65 - 30' Lt to 750+65 - 30' Rt	60	LF
		759+07 - 24' Lt to 759+07 - 34' Rt	59	LF
754	0805	OBJECT MARKERS - CULVERTS		
		750+65 Lt & Rt	2	EA
		759+07 Lt & Rt	2	EA



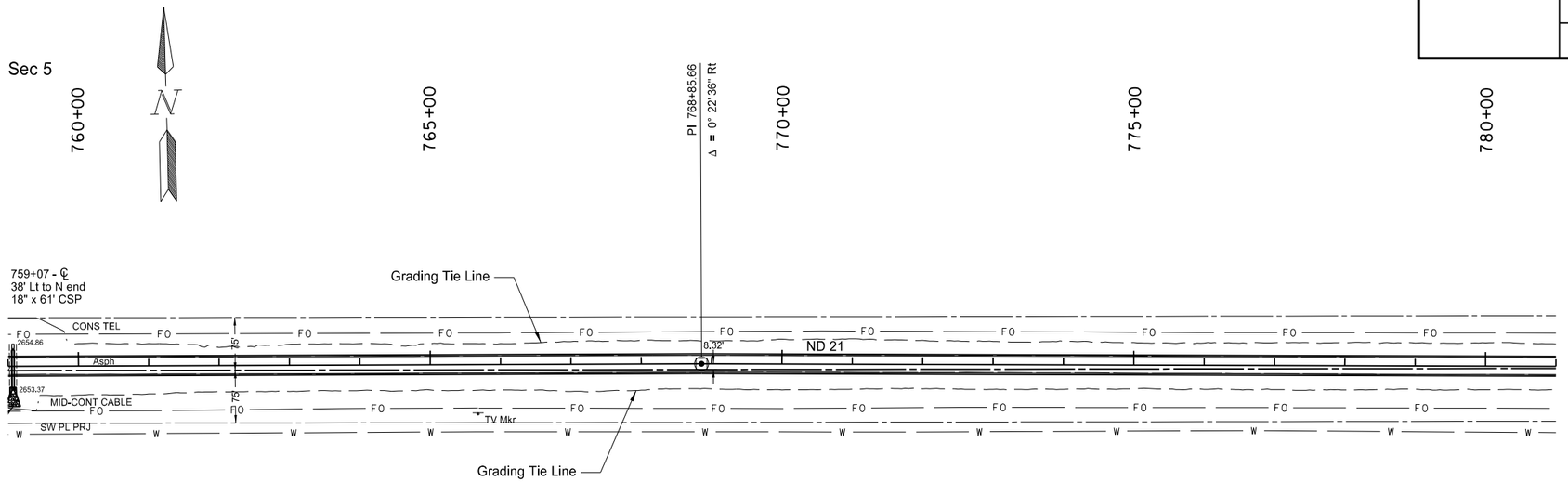
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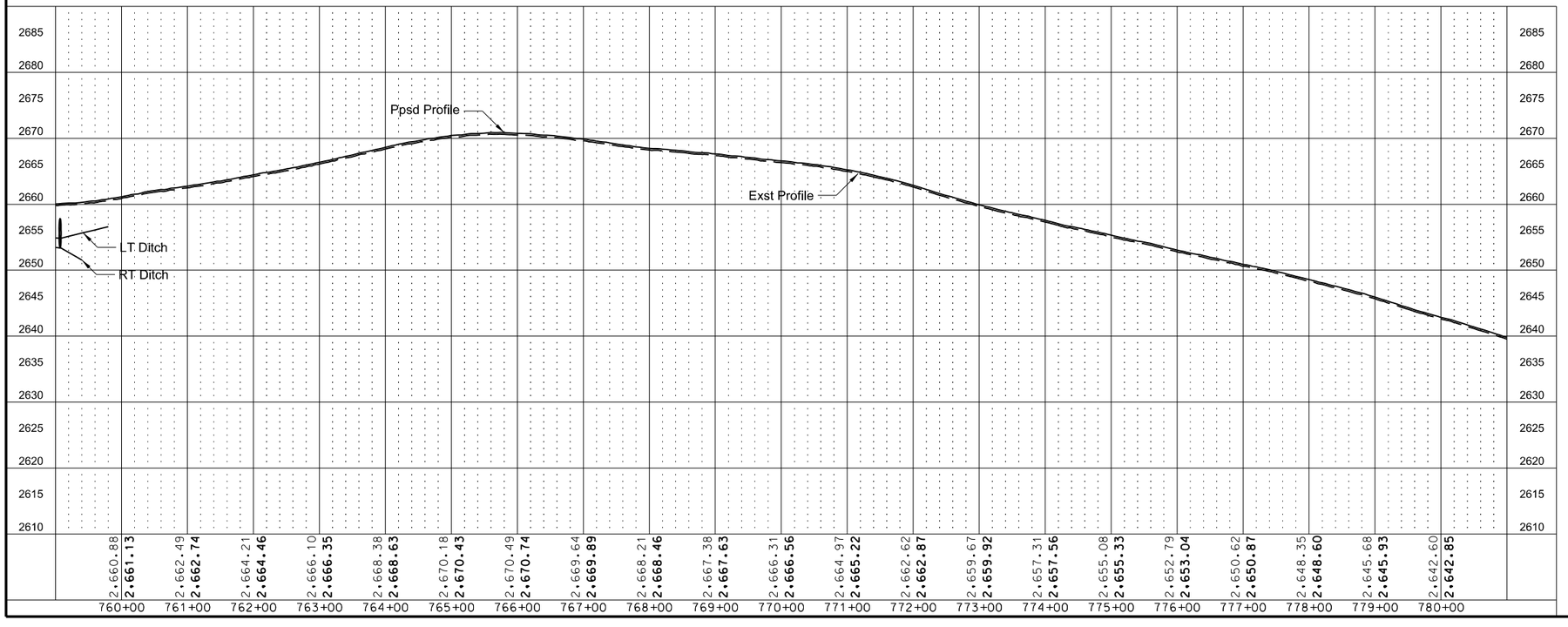
ND 21
Jct 85 to N Jct 22 - New England

740+00 to 760+00

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	39



Sec 8



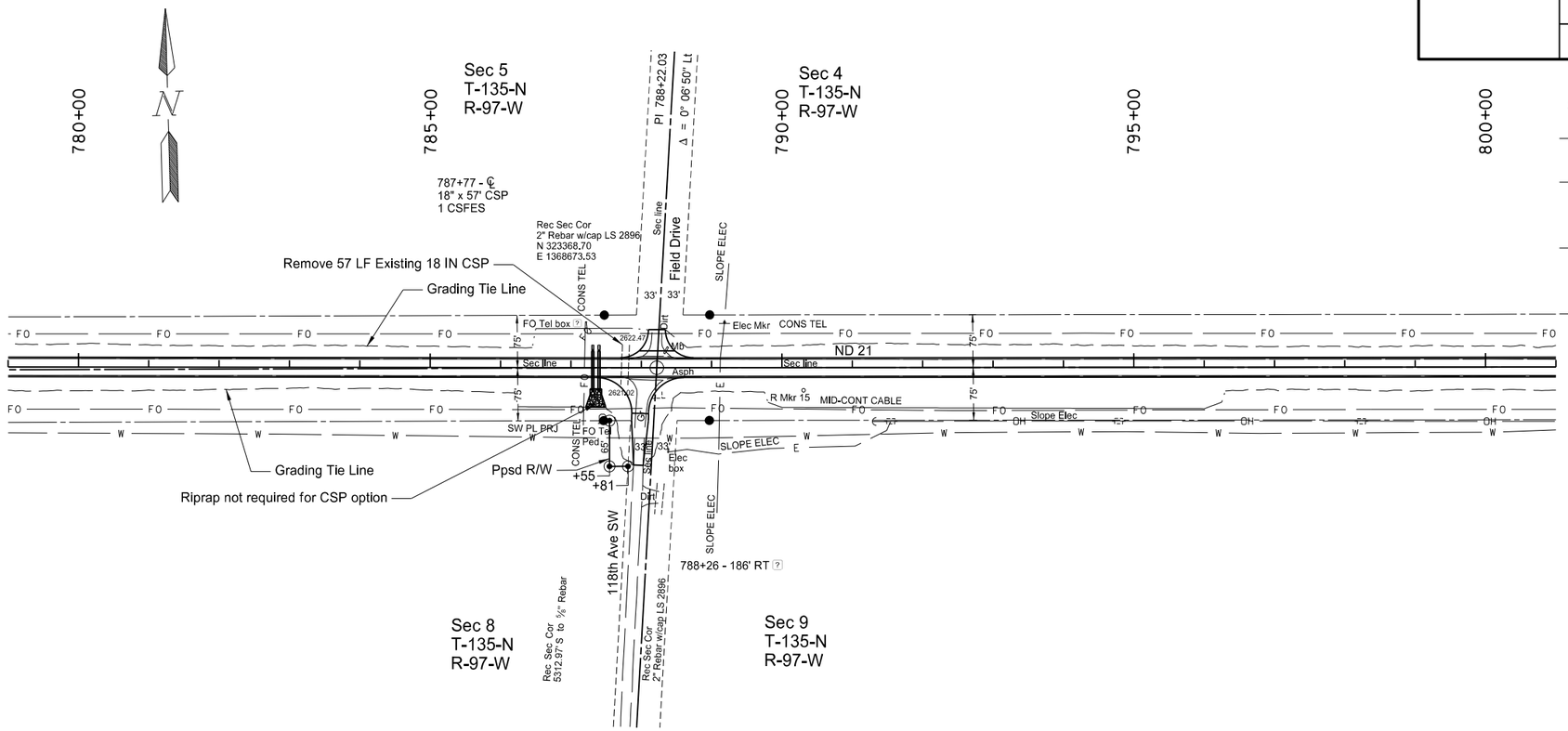
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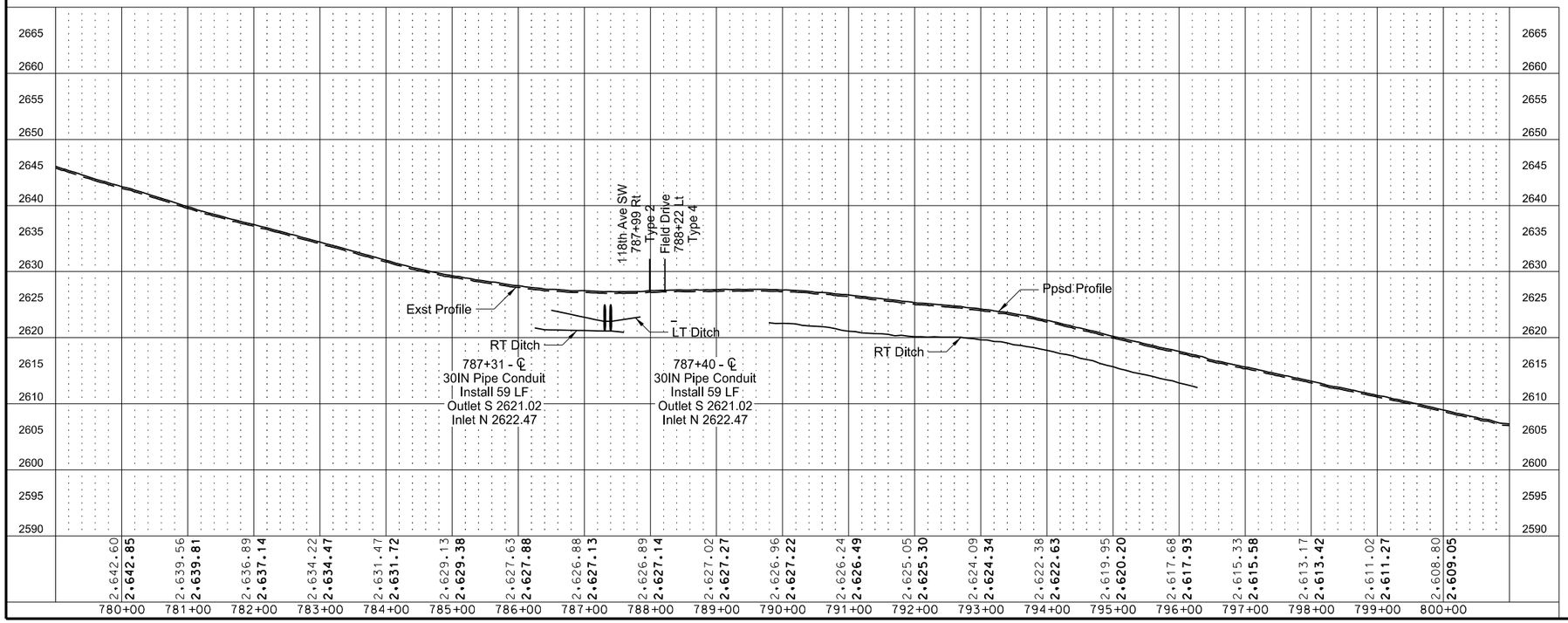
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

760+00 to 780+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	40





SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		787+77 - 33' Lt to 787+77 - 25' Rt	57	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		787+31 - 25' Lt to 787+31 - 34' Rt 787+40 - 25' Lt to 787+40 - 34' Rt	386	SY
714	4110	PIPE CONDUIT 30IN		
		787+31 - 25' Lt to 787+31 - 34' Rt	59	LF
		787+40 - 25' Lt to 787+40 - 34' Rt	59	LF
754	0805	OBJECT MARKERS - CULVERTS		
		787+31 Lt & Rt	2	EA
		787+40 Lt & Rt	2	EA

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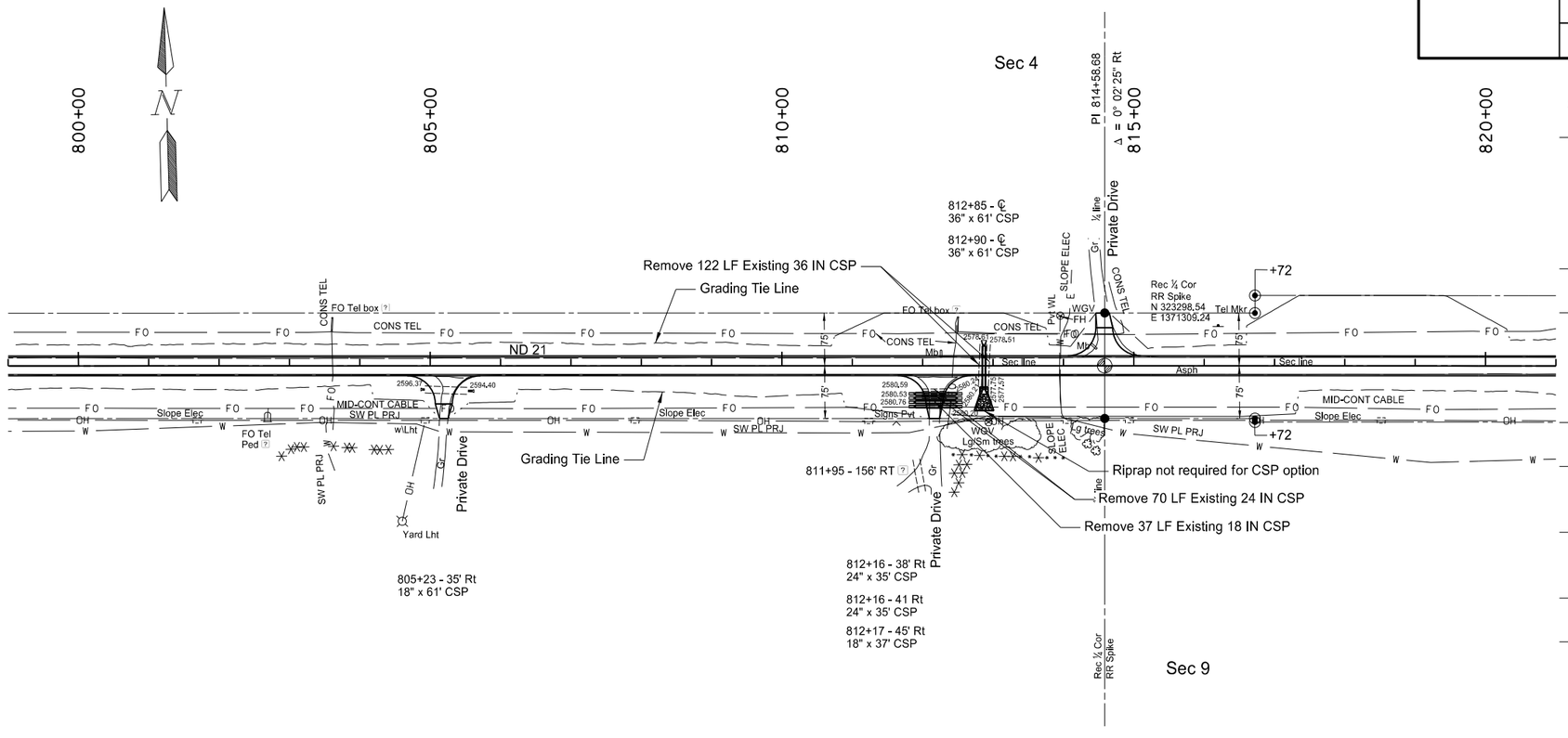
Plan & Profile

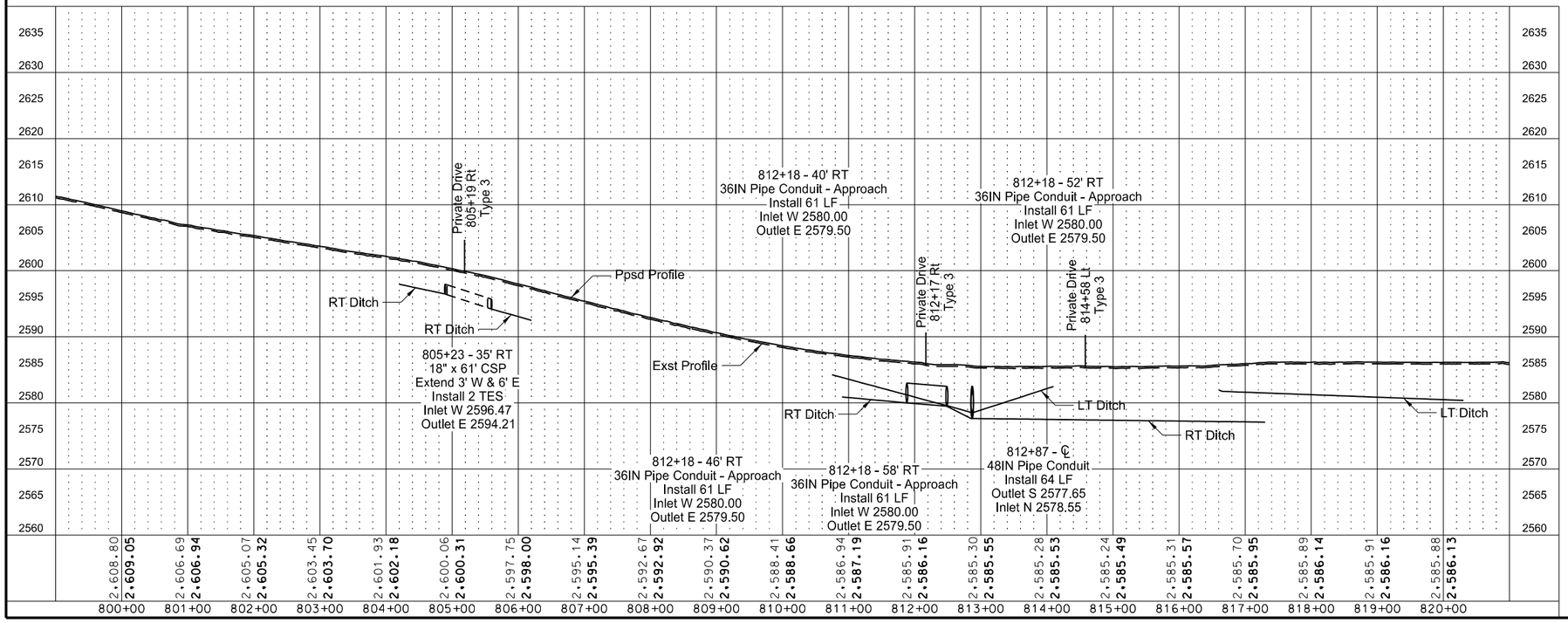
ND 21
Jct 85 to N Jct 22 - New England

780+00 to 800+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	41





SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		811+99 - 38' Rt to 812+34 - 38' Rt	35	LF
		811+99 - 41' Rt to 812+34 - 41' Rt	35	LF
		811+99 - 45' Rt to 812+36 - 45' Rt	37	LF
		812+85 - 31' Lt to 812+85 - 30' Rt	61	LF
		812+90 - 31' Lt to 812+90 - 30' Rt	61	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		812+87 - 30' Lt to 812+87 - 34' Rt	415	SY
714	4116	PIPE CONDUIT 36IN-APPROACH		
		811+88 - 40' Rt to 812+49 - 40' Rt	61	LF
		811+88 - 46' Rt to 812+49 - 46' Rt	61	LF
		811+88 - 52' Rt to 812+49 - 52' Rt	61	LF
		811+88 - 58' Rt to 812+49 - 58' Rt	61	LF
714	4125	PIPE CONDUIT 48IN		
		812+87 - 30' Lt to 812+87 - 34' Rt	64	LF
714	5015	PIPE CORR STEEL .064IN 18IN		
		804+89 - 34' Rt to 804+92 - 34' Rt	3	LF
		805+54 - 36' Rt to 805+60 - 36' Rt	6	LF
714	6501	END SECT-TRAVERSABLE METAL 18IN		
		804+89 Rt	1	EA
		805+60 Rt	1	EA
754	0805	OBJECT MARKERS - CULVERTS		
		812+87 Lt & Rt	2	EA
990	0400	PIPE CLEANOUT		
		805+23 Rt	1	EA

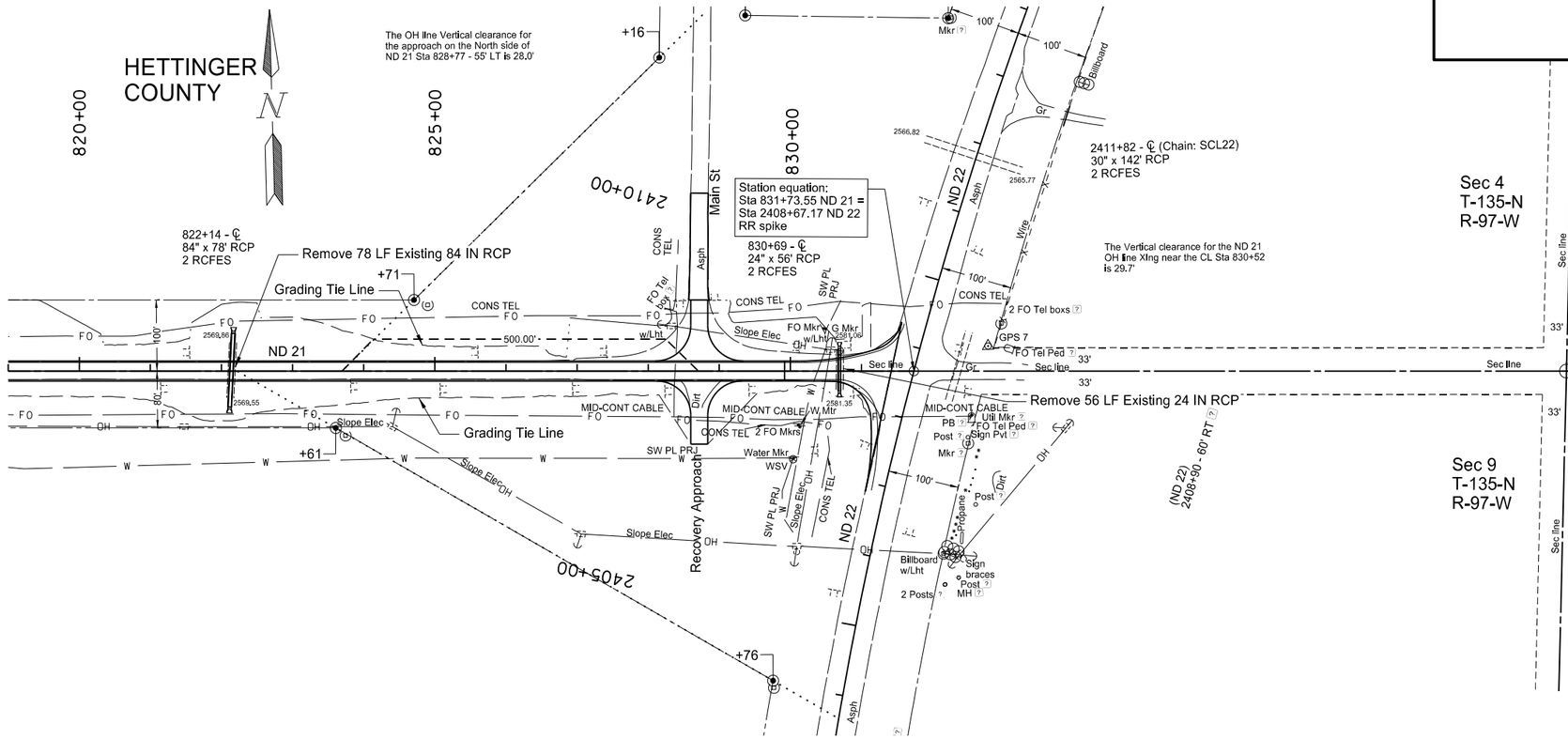
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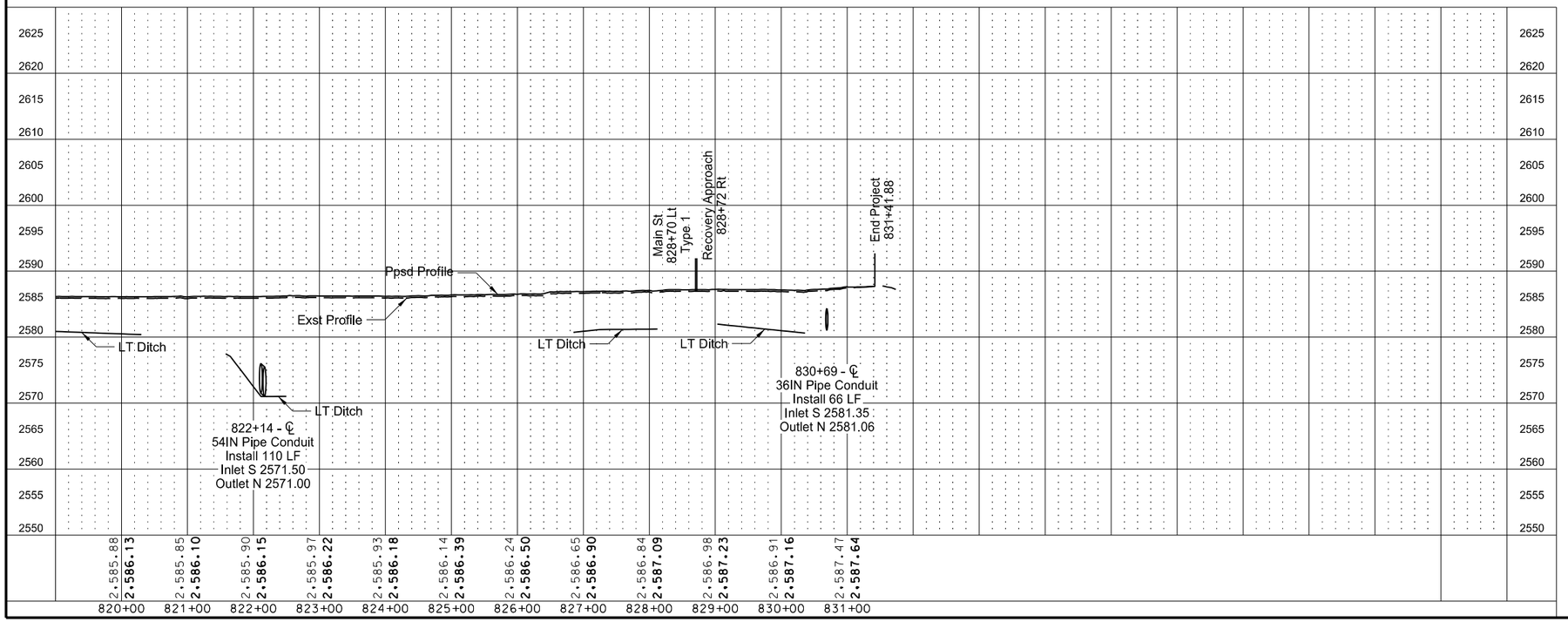
ND 21
Jct 85 to N Jct 22 - New England

800+00 to 820+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	42



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		822+14 - 40' Lt to 822+14 - 38' Rt	78	LF
		830+69 - 31' Lt to 830+69 - 26' Rt	56	LF
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		822+17 - 56' Lt to 822+11 - 53' Rt	749	SY
		830+69 - 35' Lt to 830+69 - 31' Rt	385	SY
714	4115	PIPE CONDUIT 36IN		
		830+69 - 35' Lt to 830+69 - 31' Rt	66	LF
714	4130	PIPE CONDUIT 54IN		
		822+17 - 56' Lt to 822+11 - 53' Rt	110	LF
754	0805	OBJECT MARKERS - CULVERTS		
		822+11 Rt	1	EA
		822+17 Lt	1	EA
		830+69 Lt & Rt	2	EA



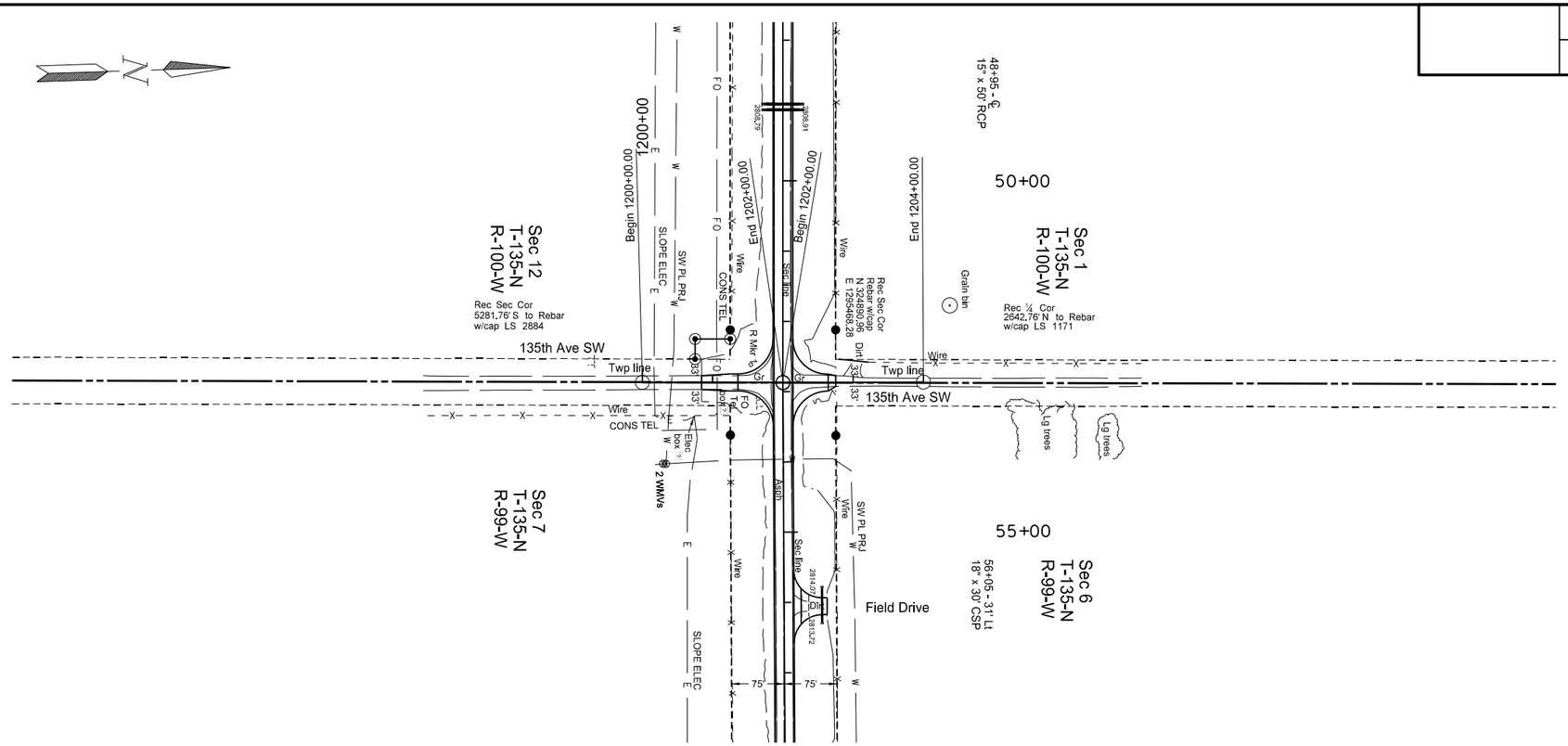
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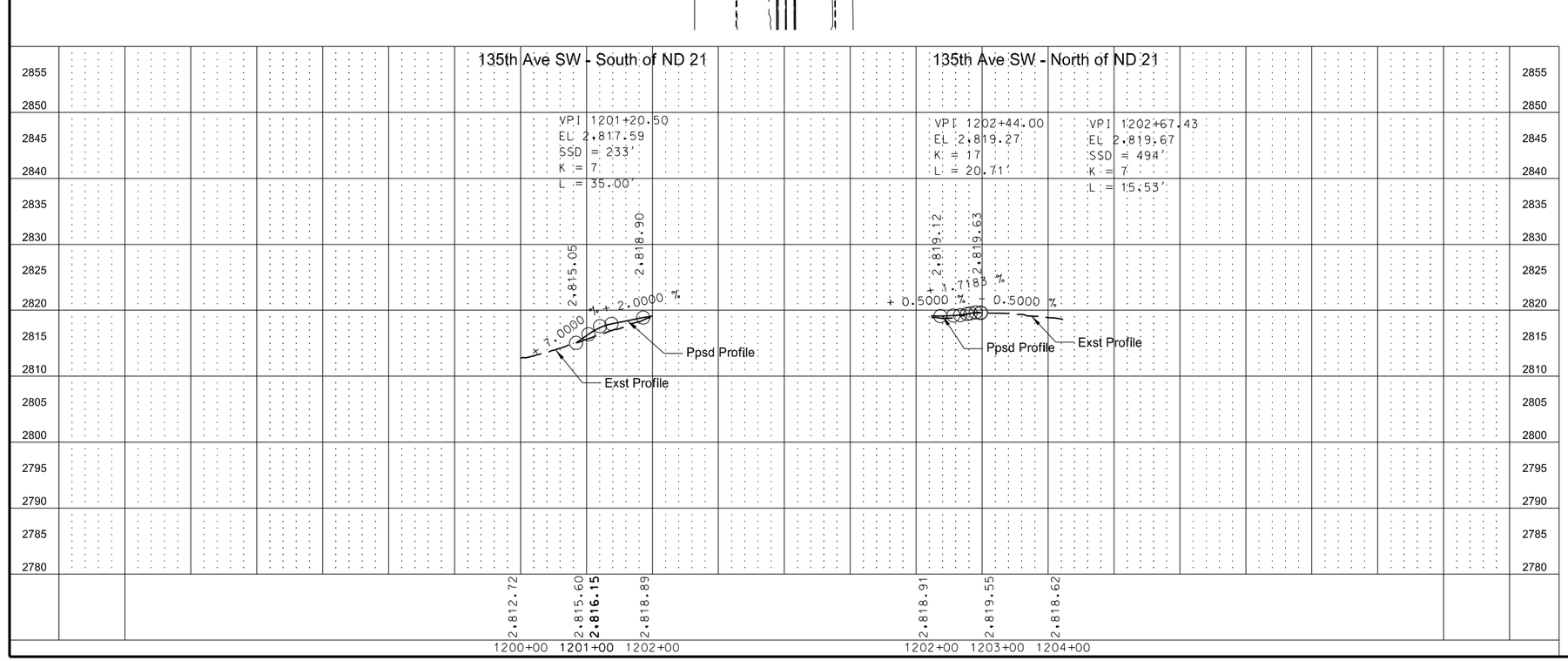
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

820+00 to 831+41.88

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	43





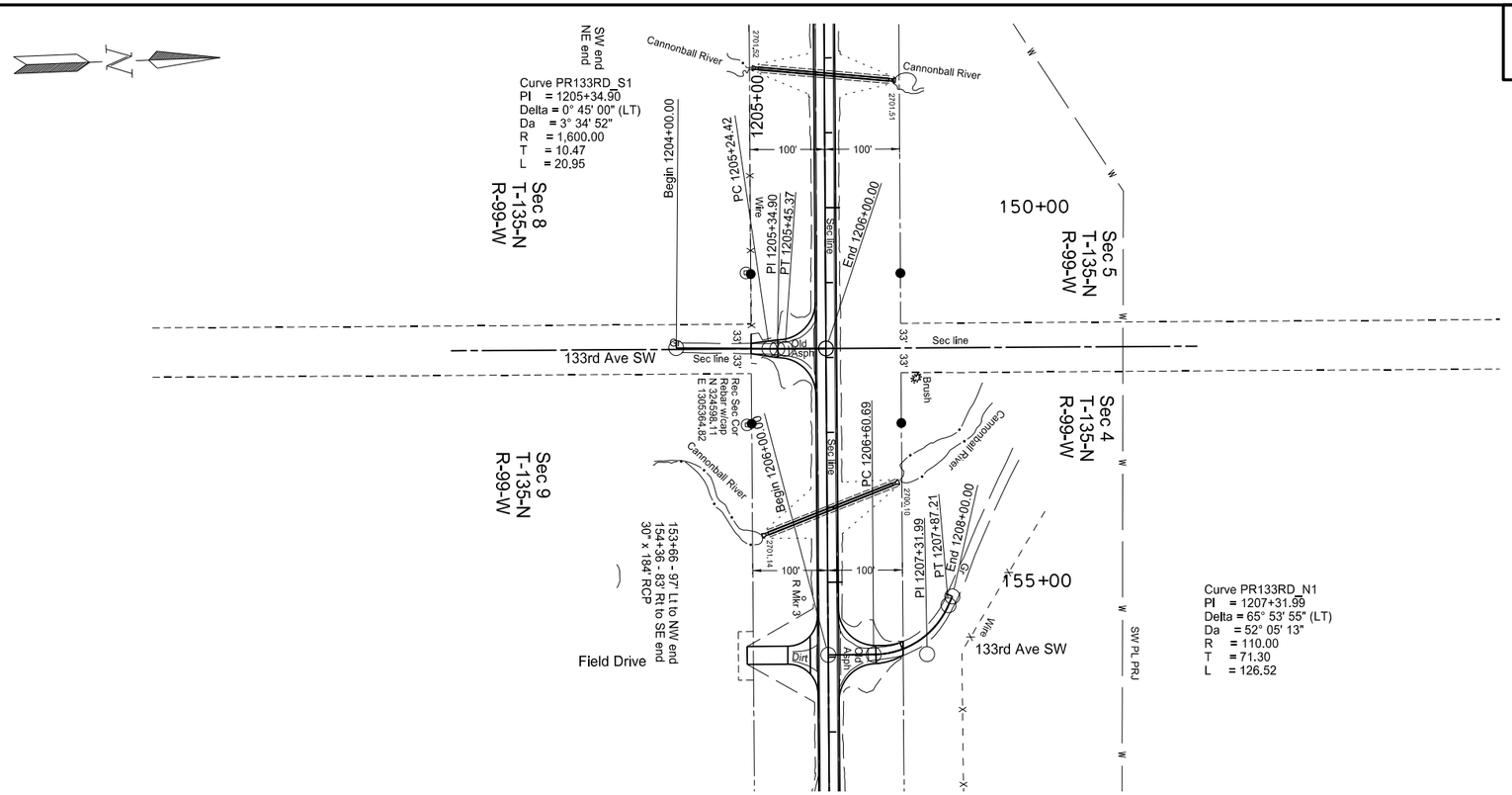
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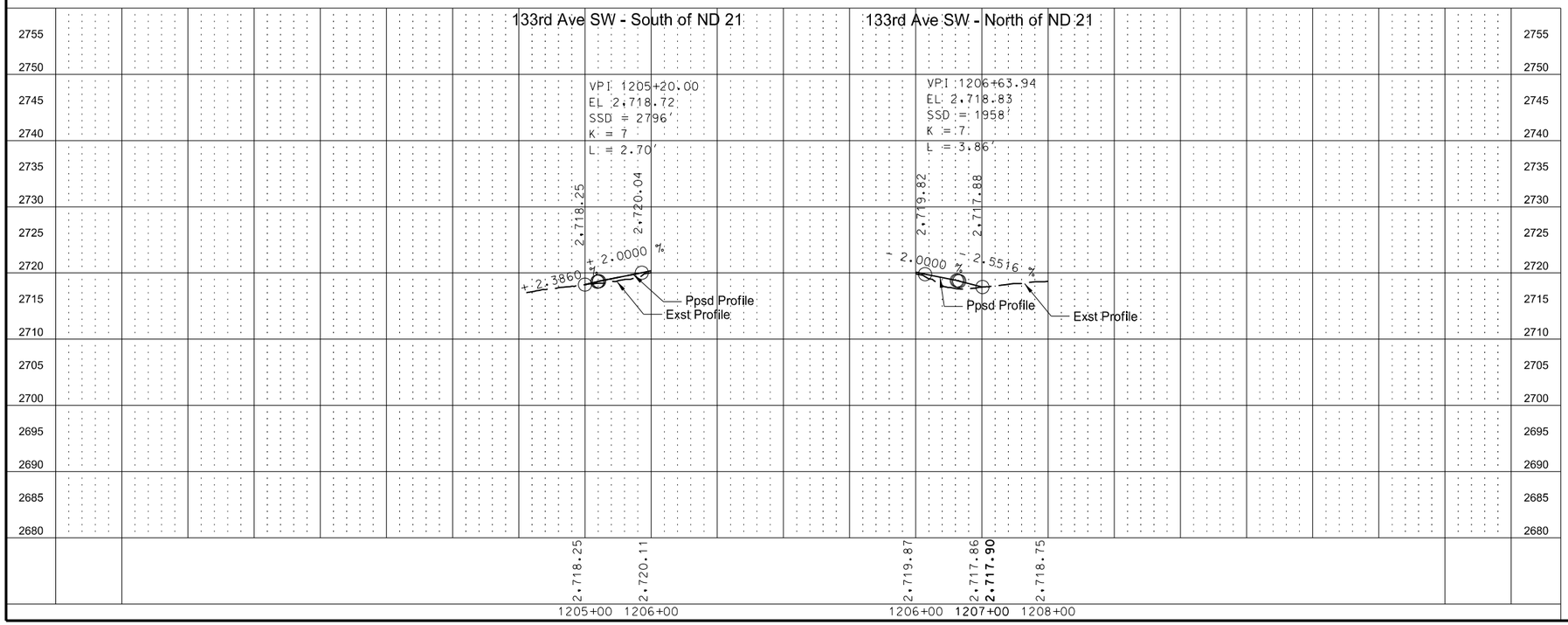
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

135th Ave SW

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	44





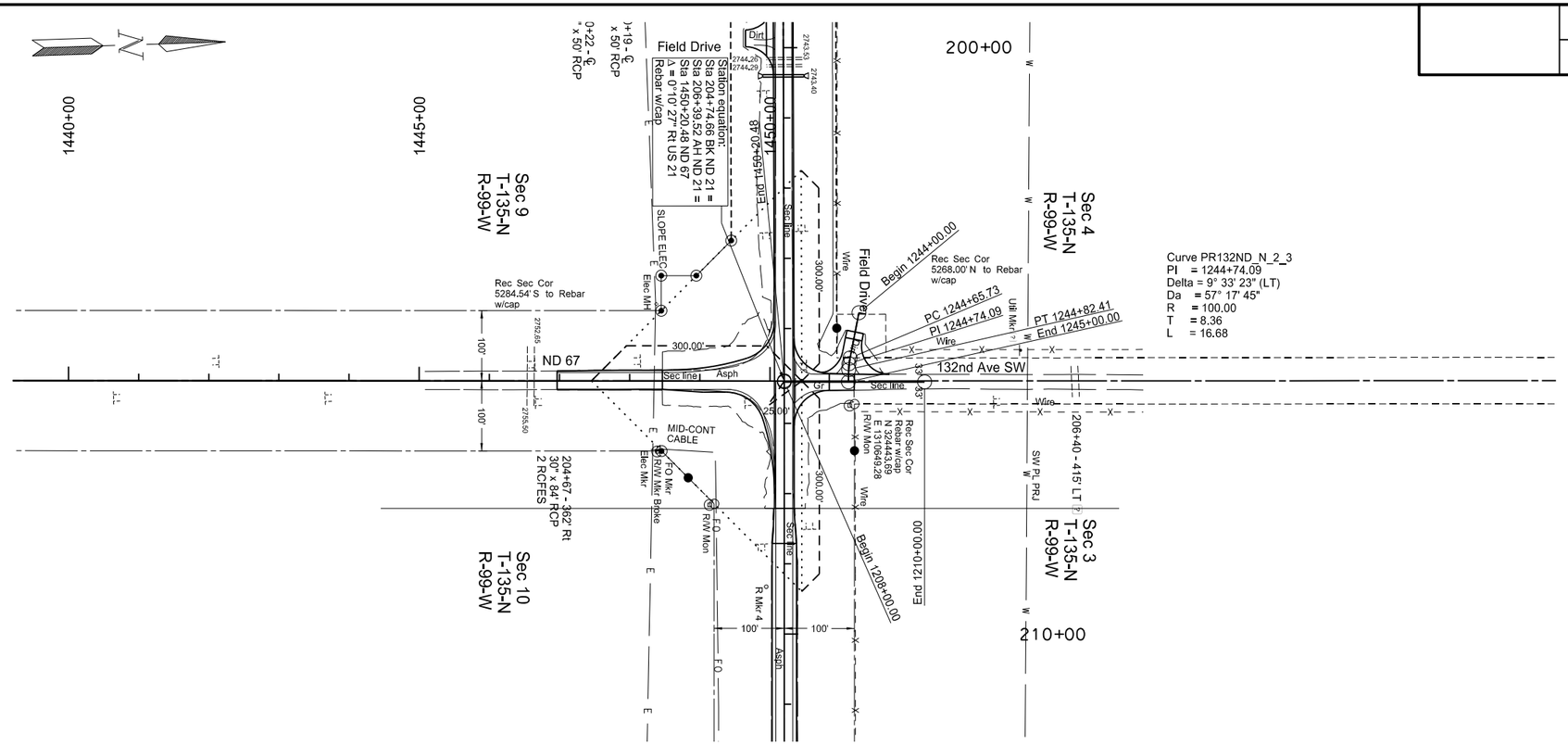
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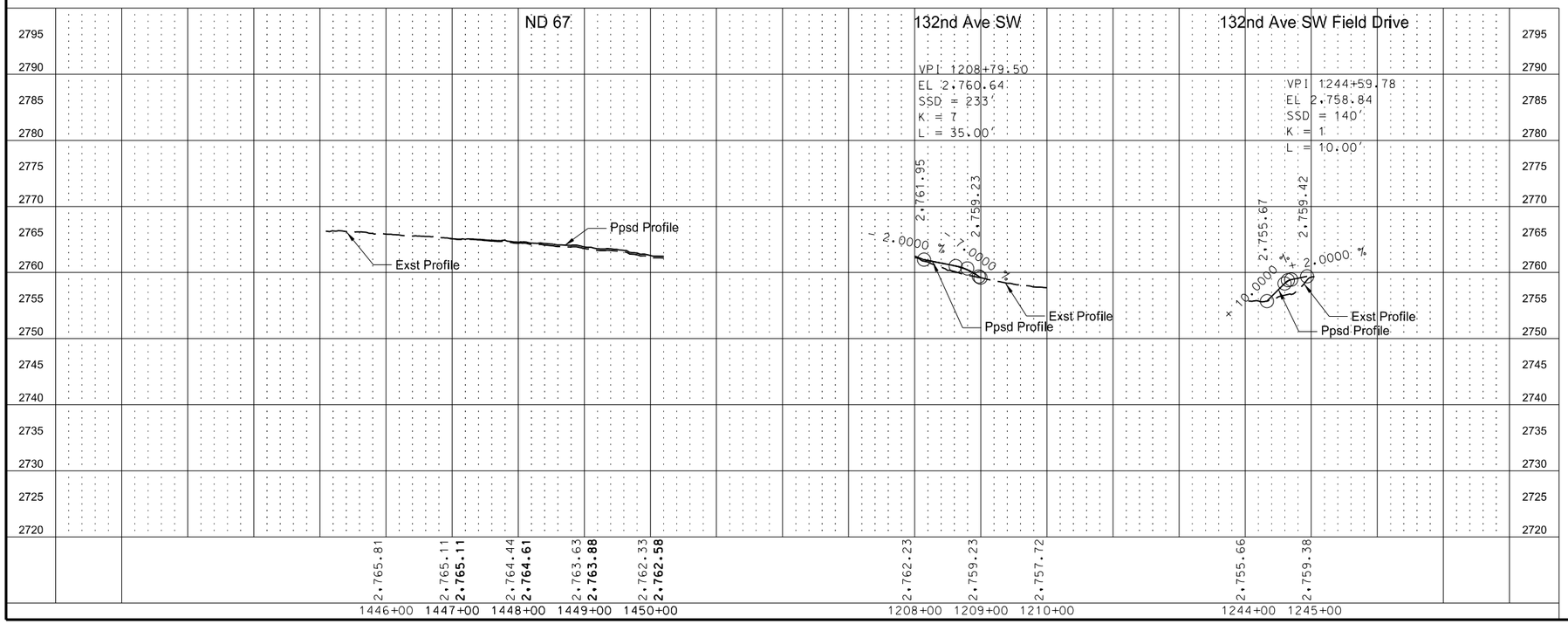
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

133rd Ave SW

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	45





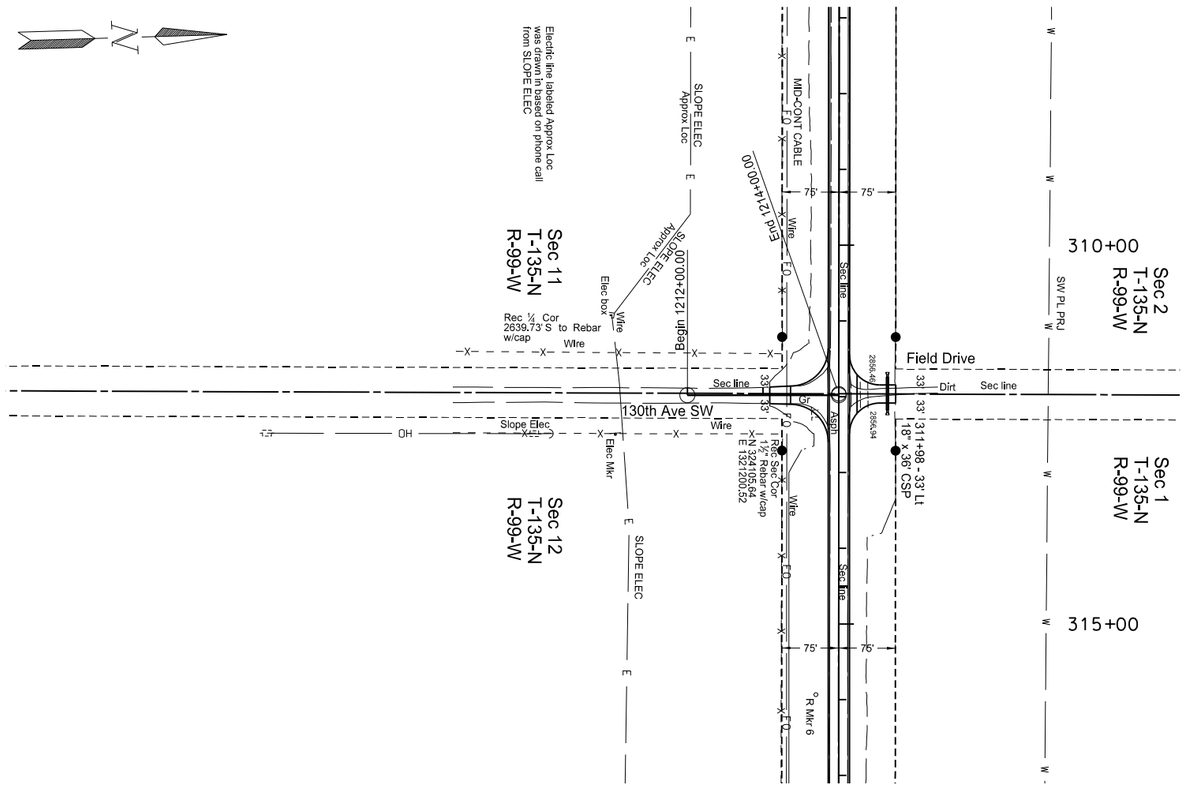
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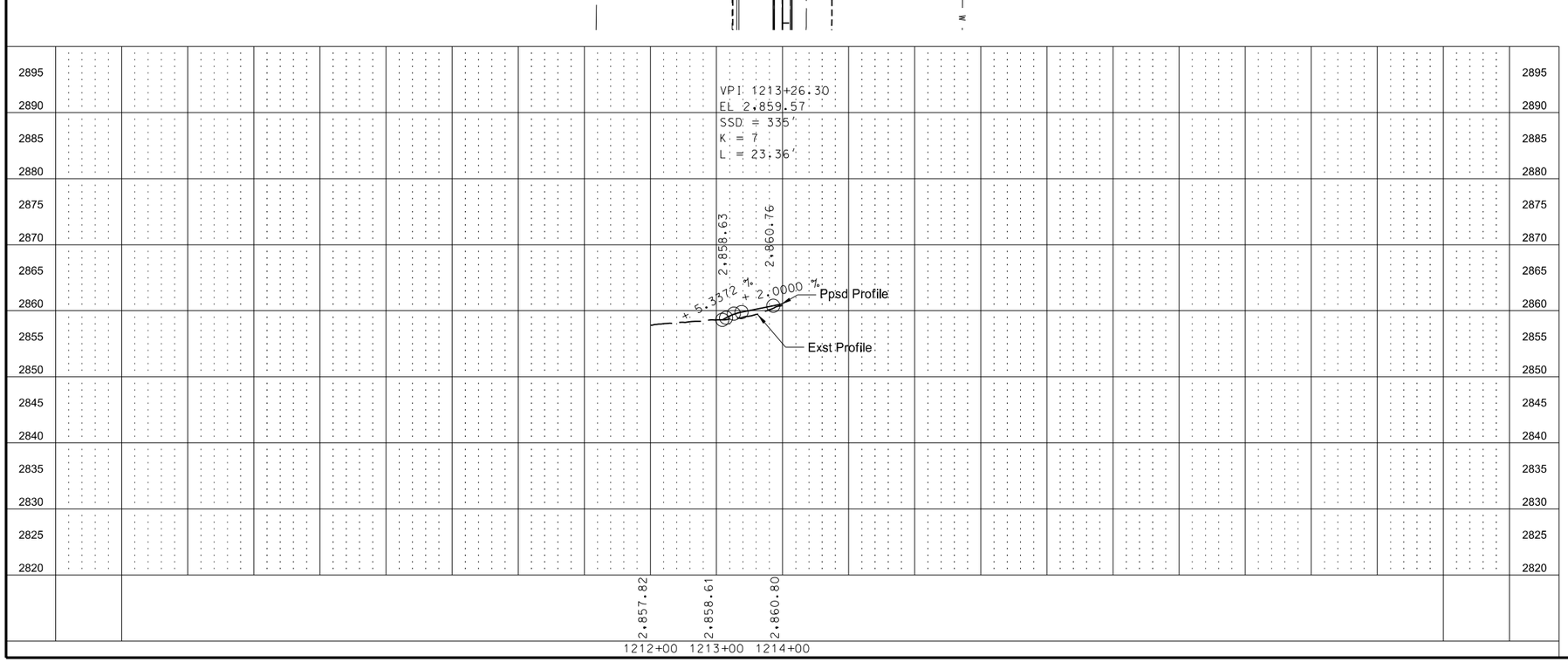
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

ND 67
132nd Ave SW

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	46





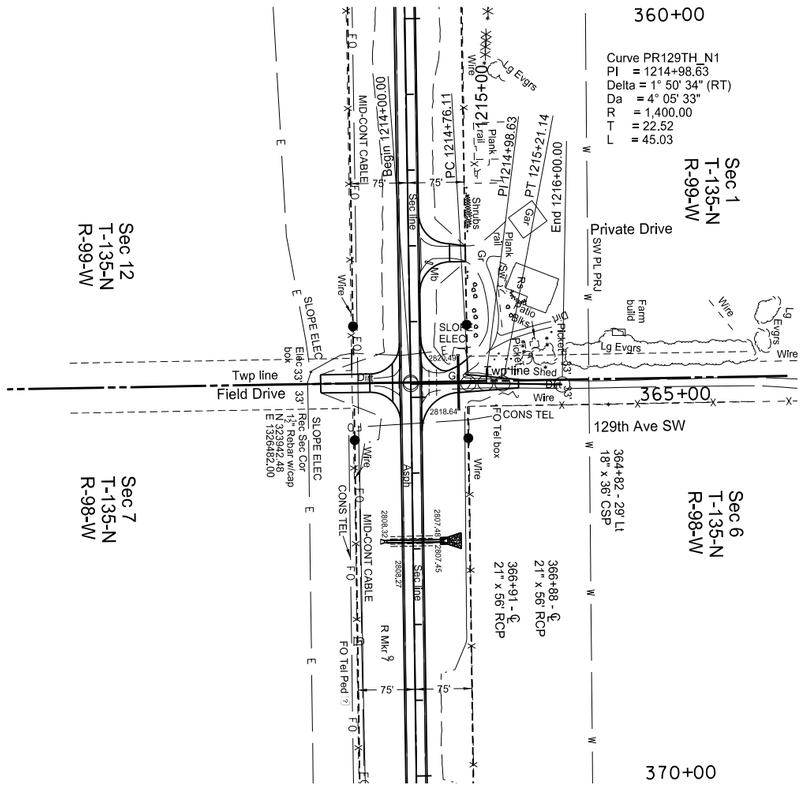
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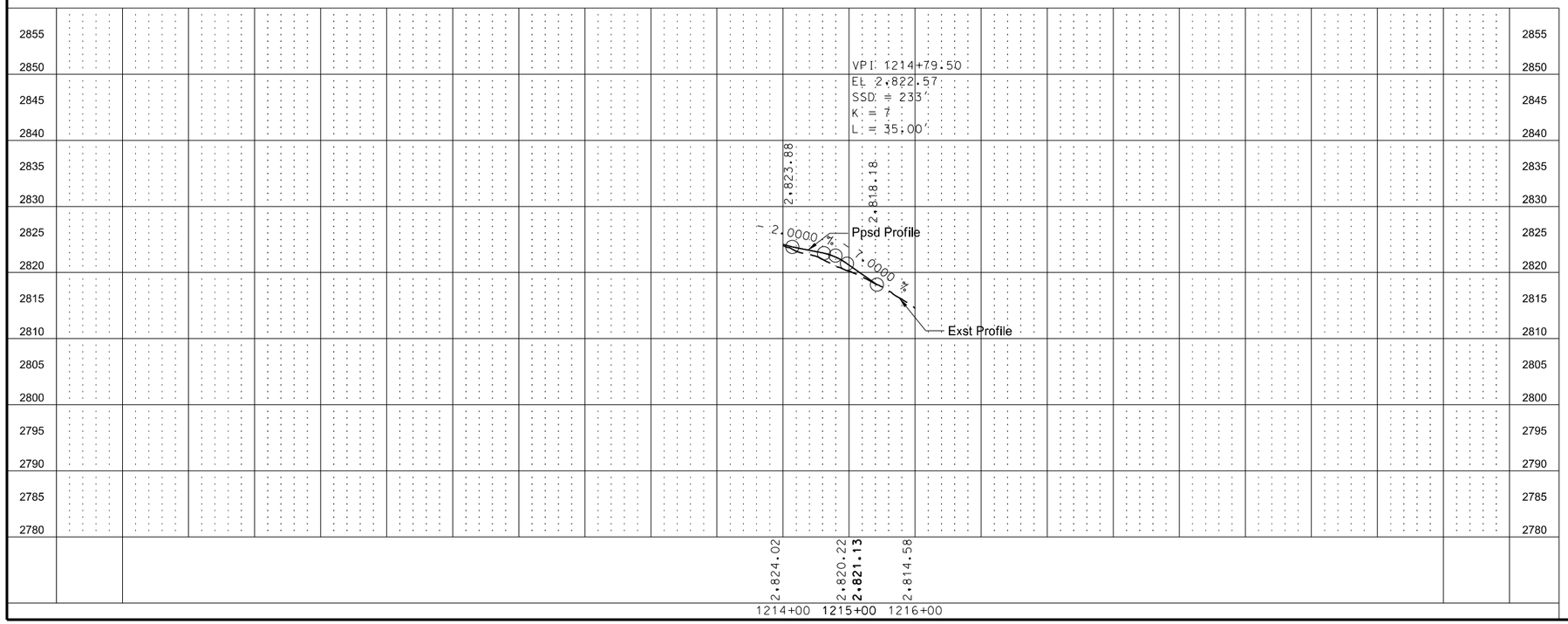
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

130th Ave SW South

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	47





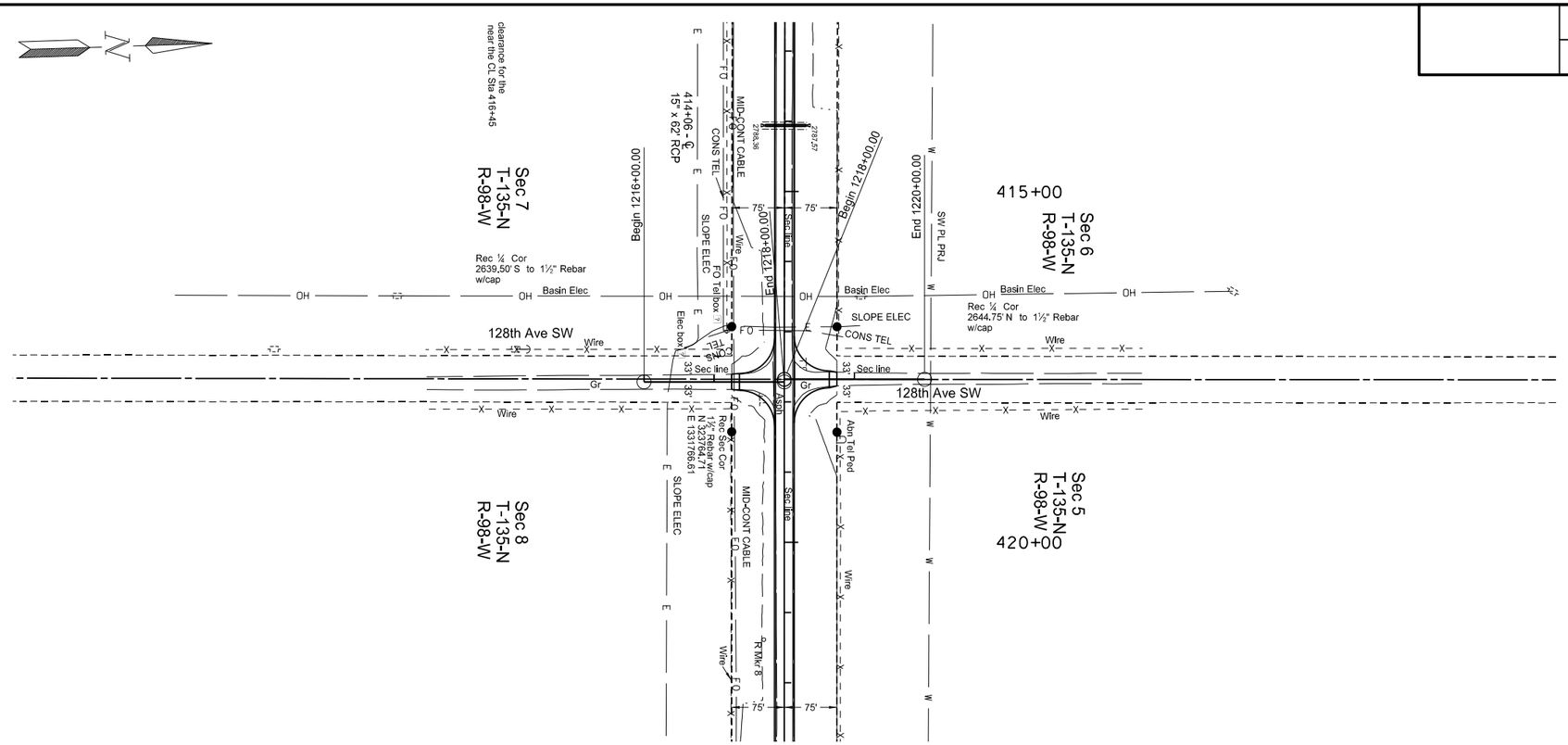
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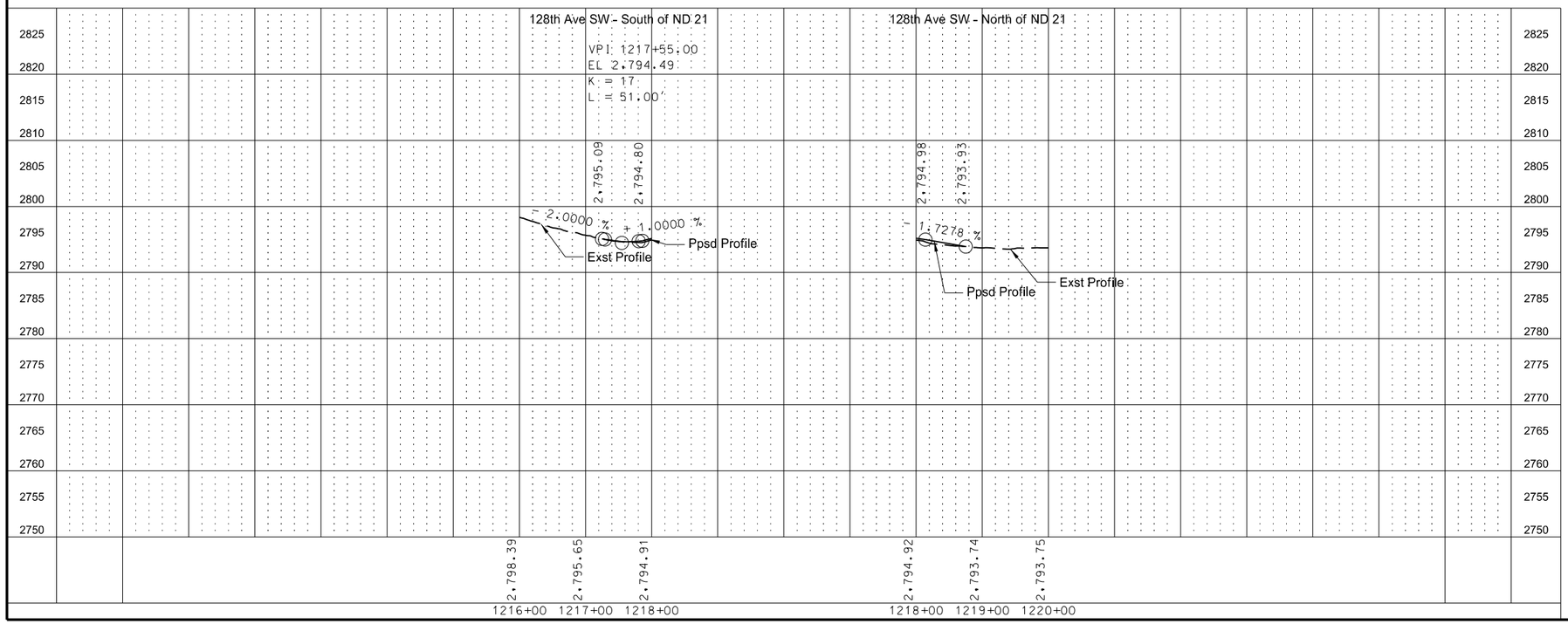
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

129th Ave SW North

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	48





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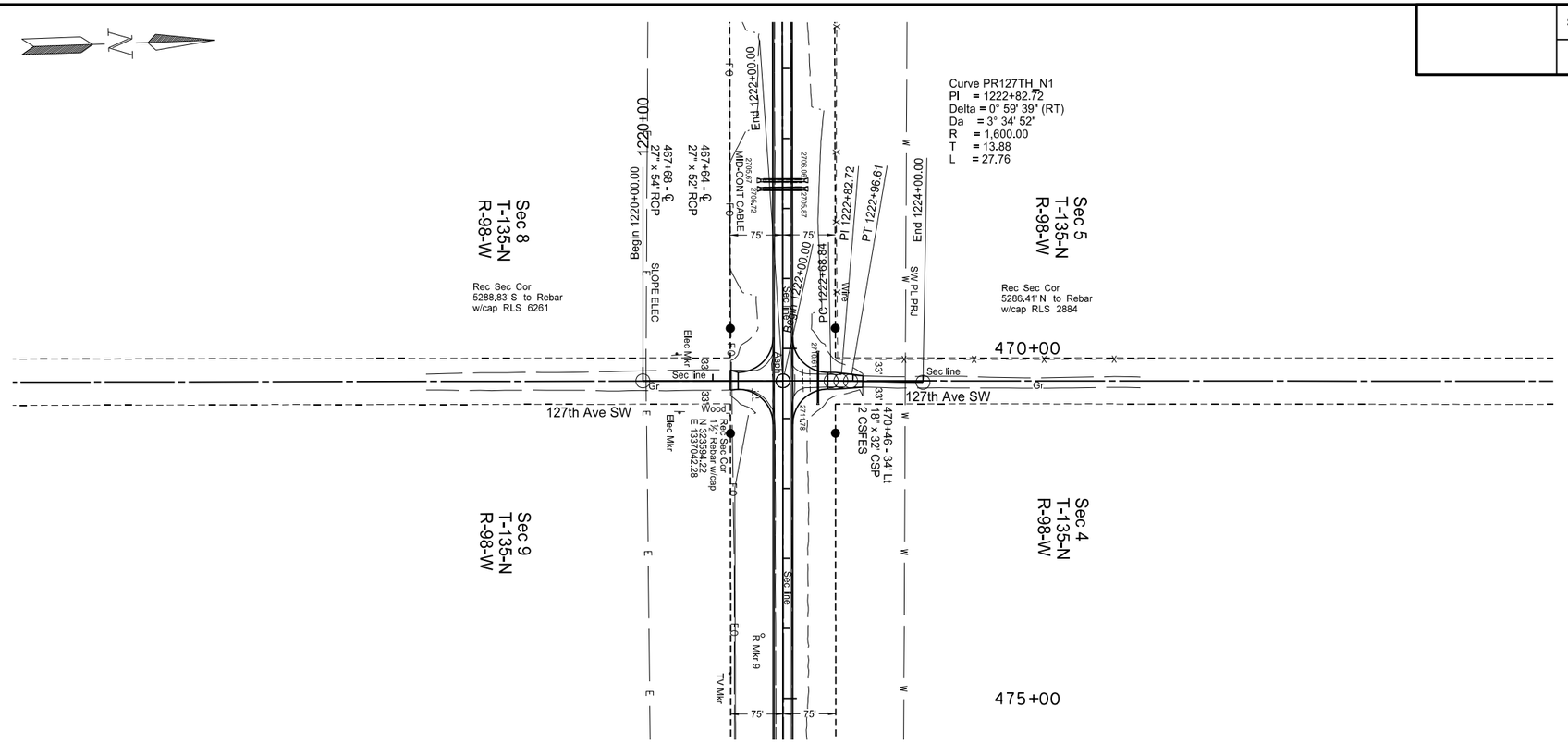
Plan & Profile

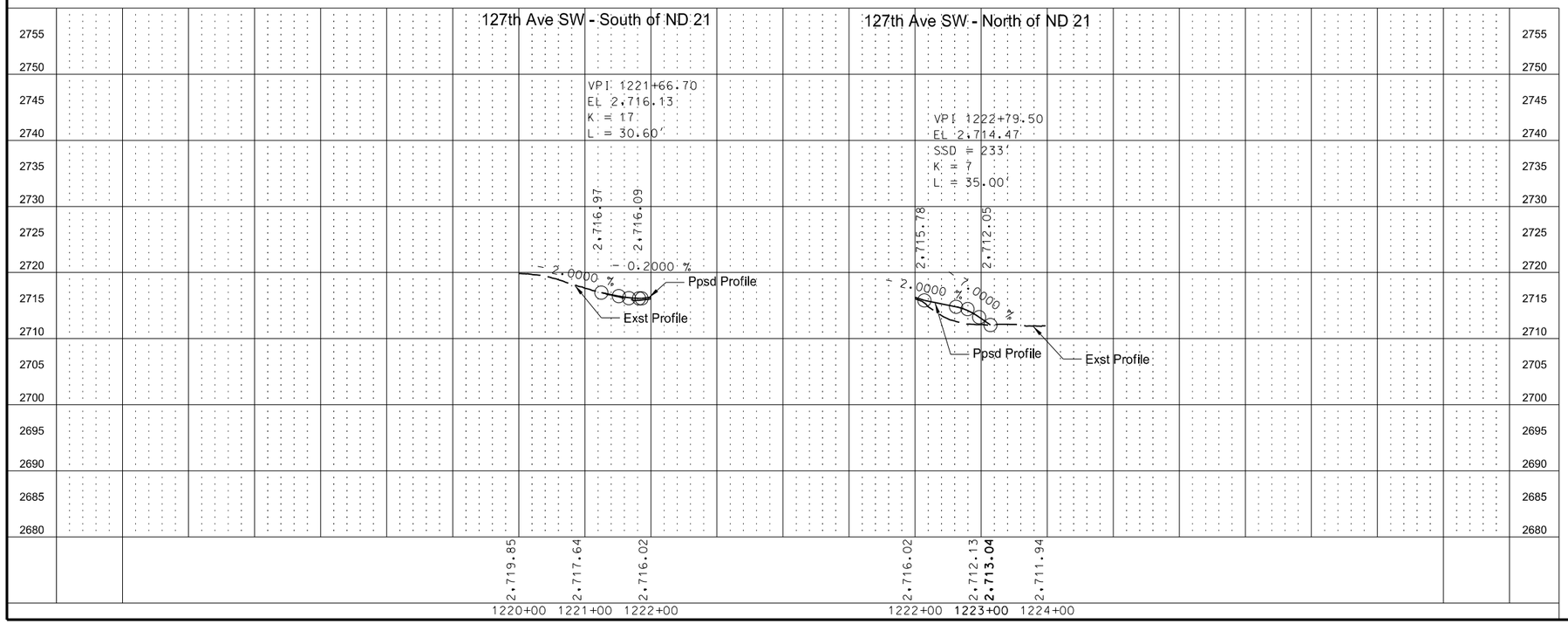
ND 21
Jct 85 to N Jct 22 - New England

128th Ave SW

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	49





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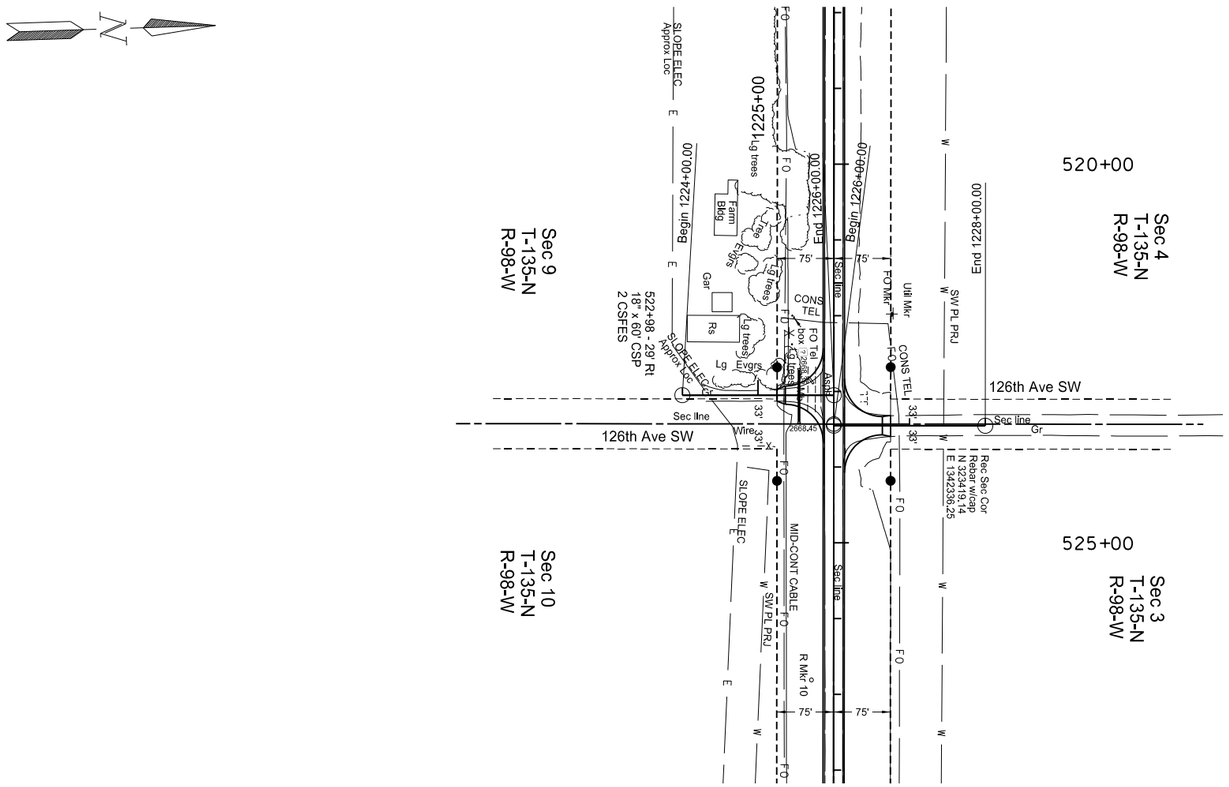
Plan & Profile

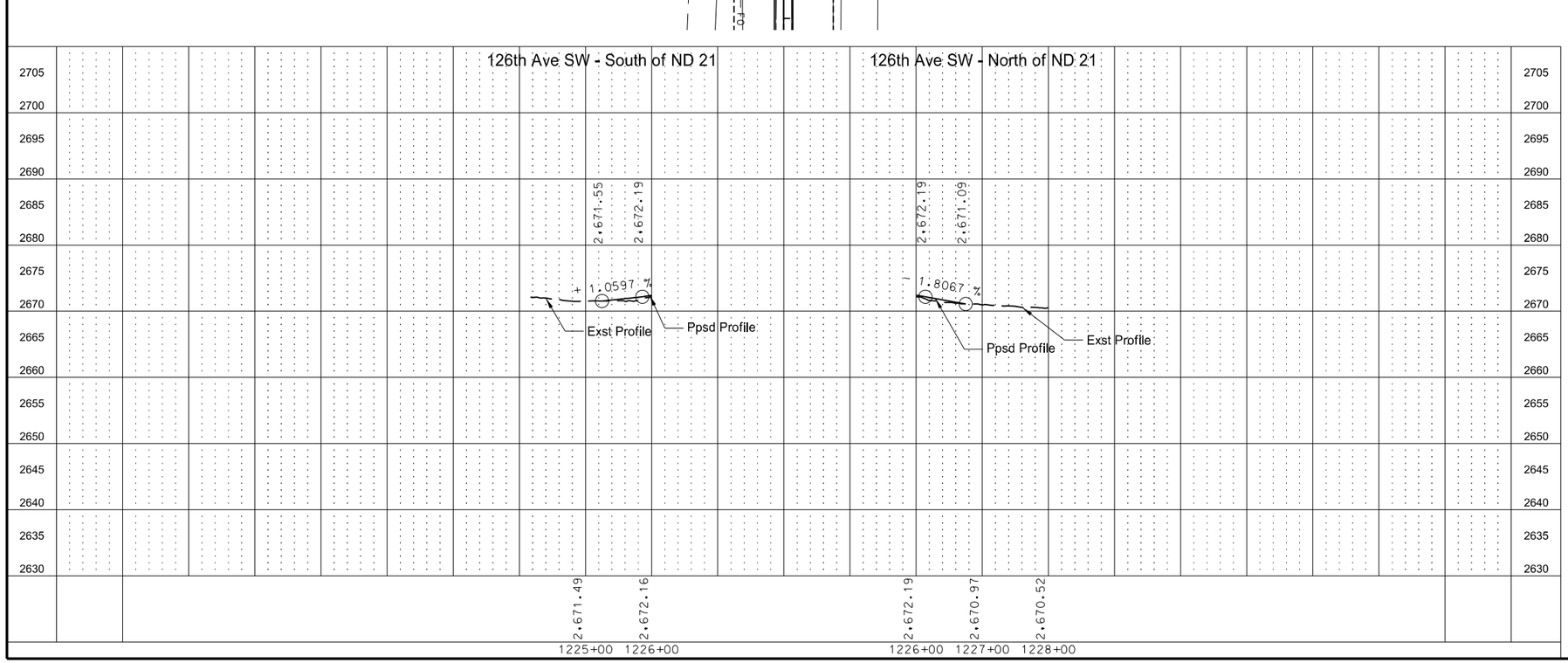
ND 21
Jct 85 to N Jct 22 - New England

127th Ave SW

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	50





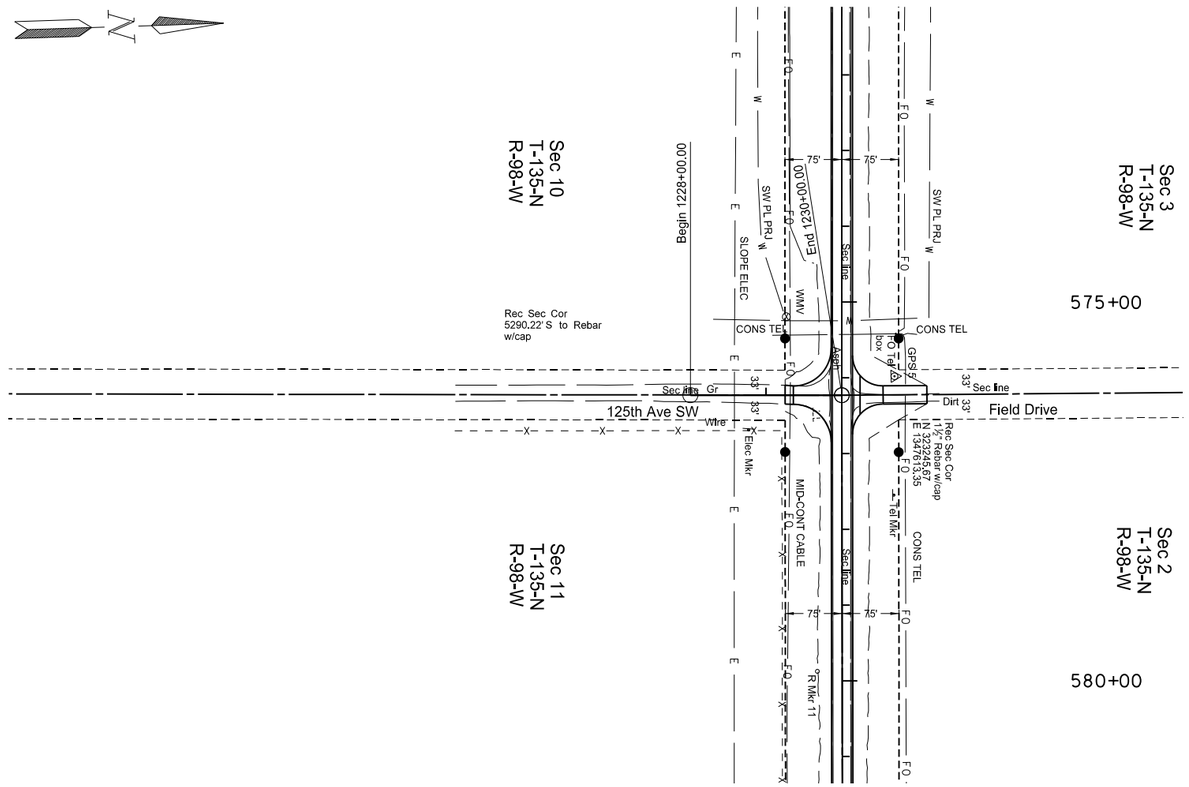
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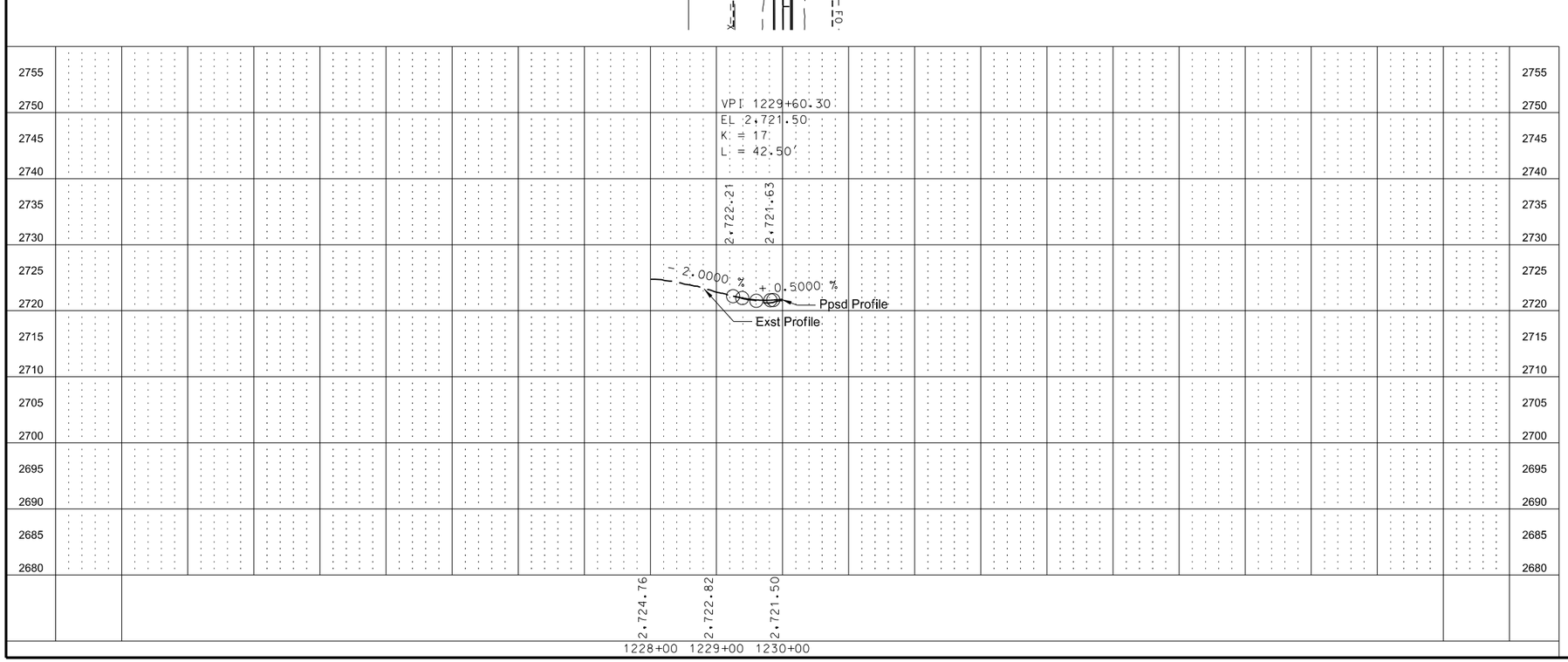
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

126th Ave SW

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	51





125th Ave SW

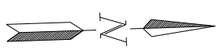
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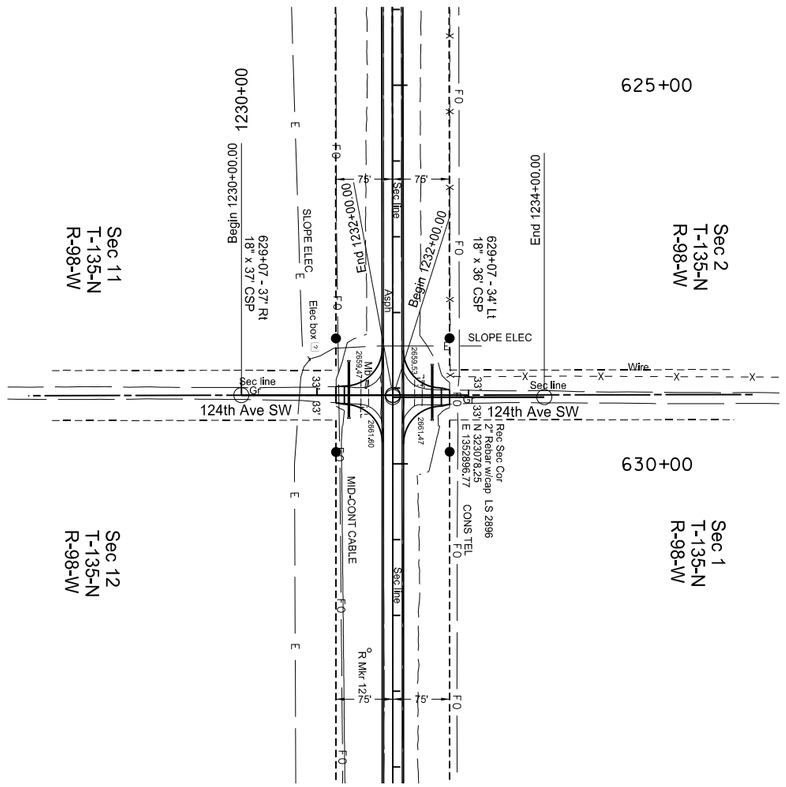
Plan & Profile

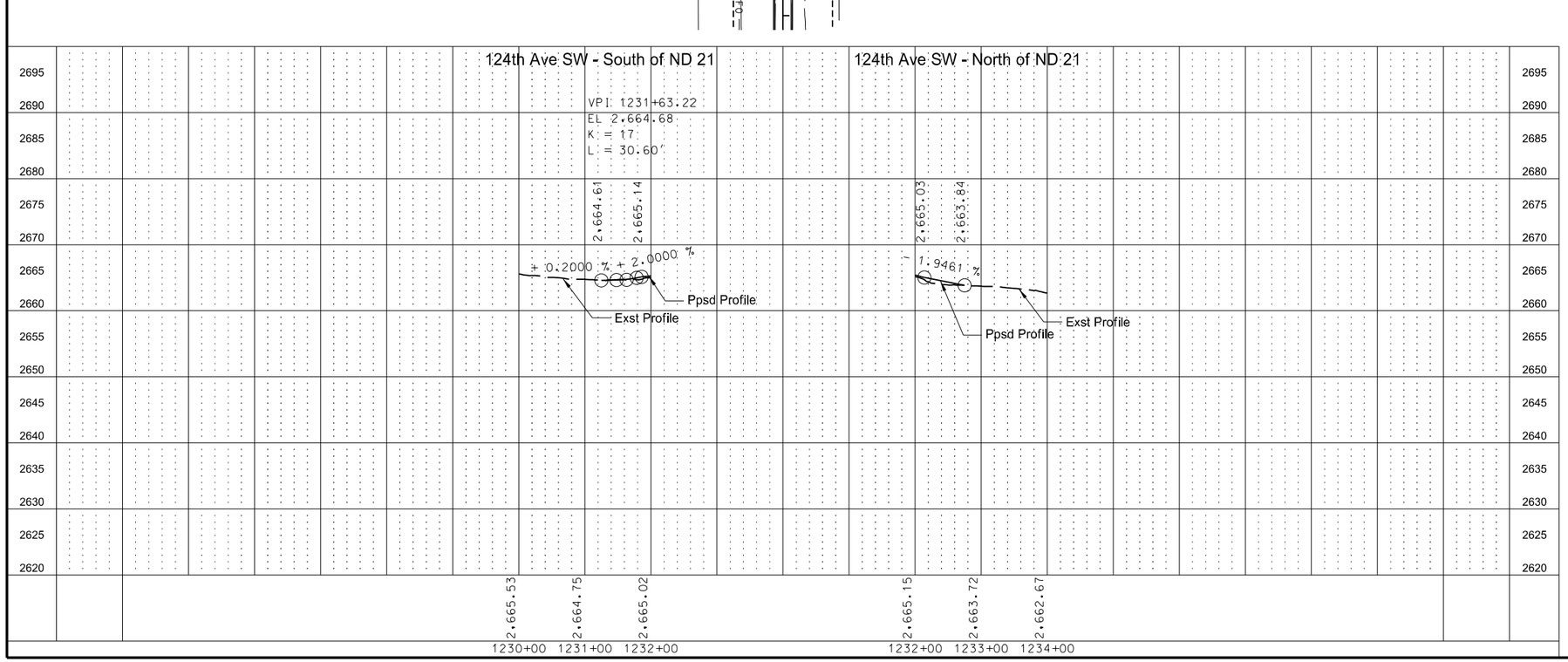
ND 21
Jct 85 to N Jct 22 - New England

125th Ave SW South

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	52







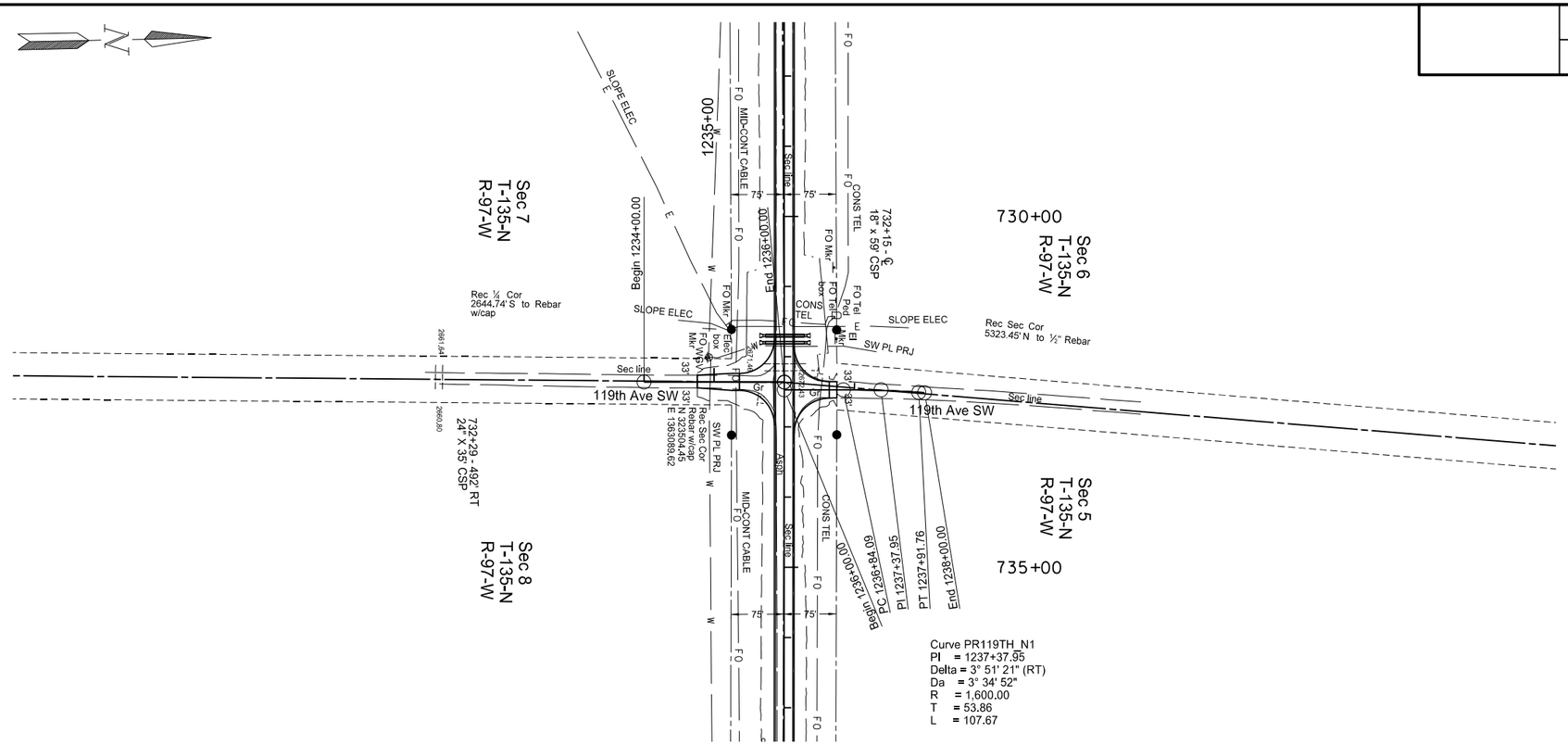
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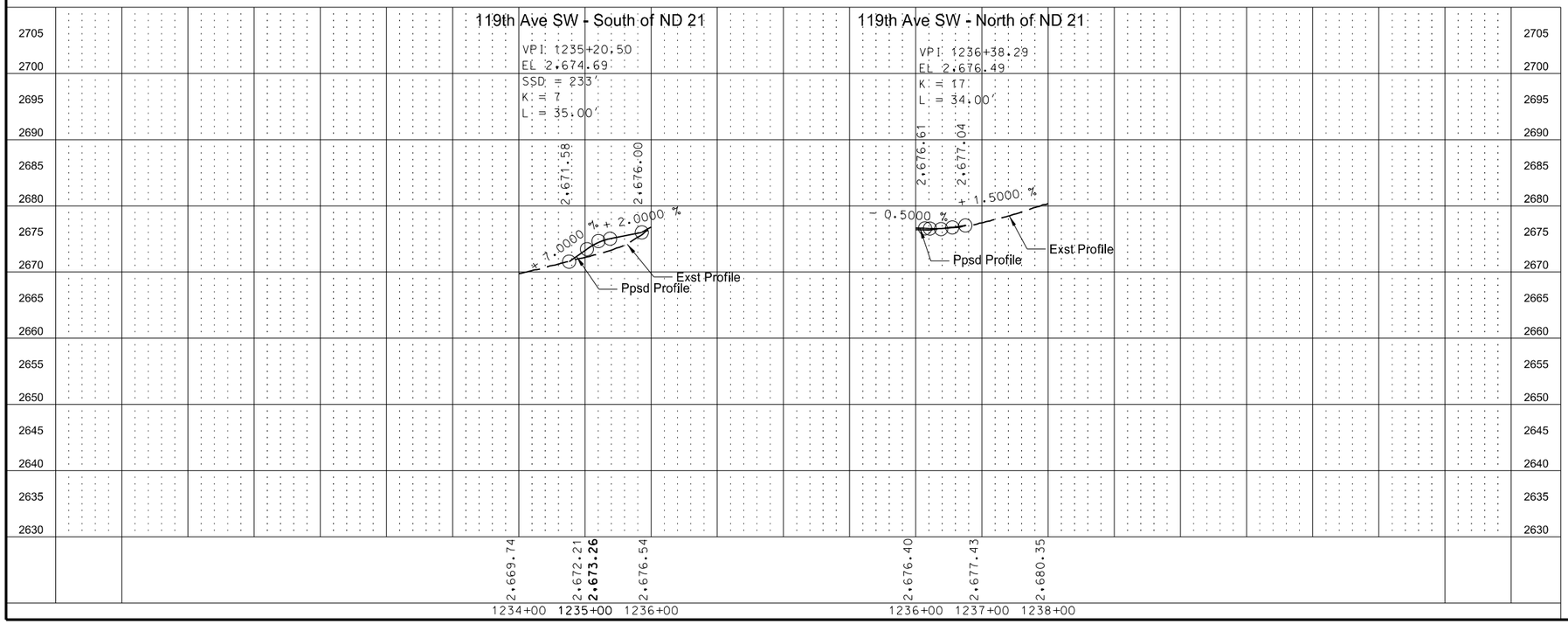
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

124th Ave SW

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	53





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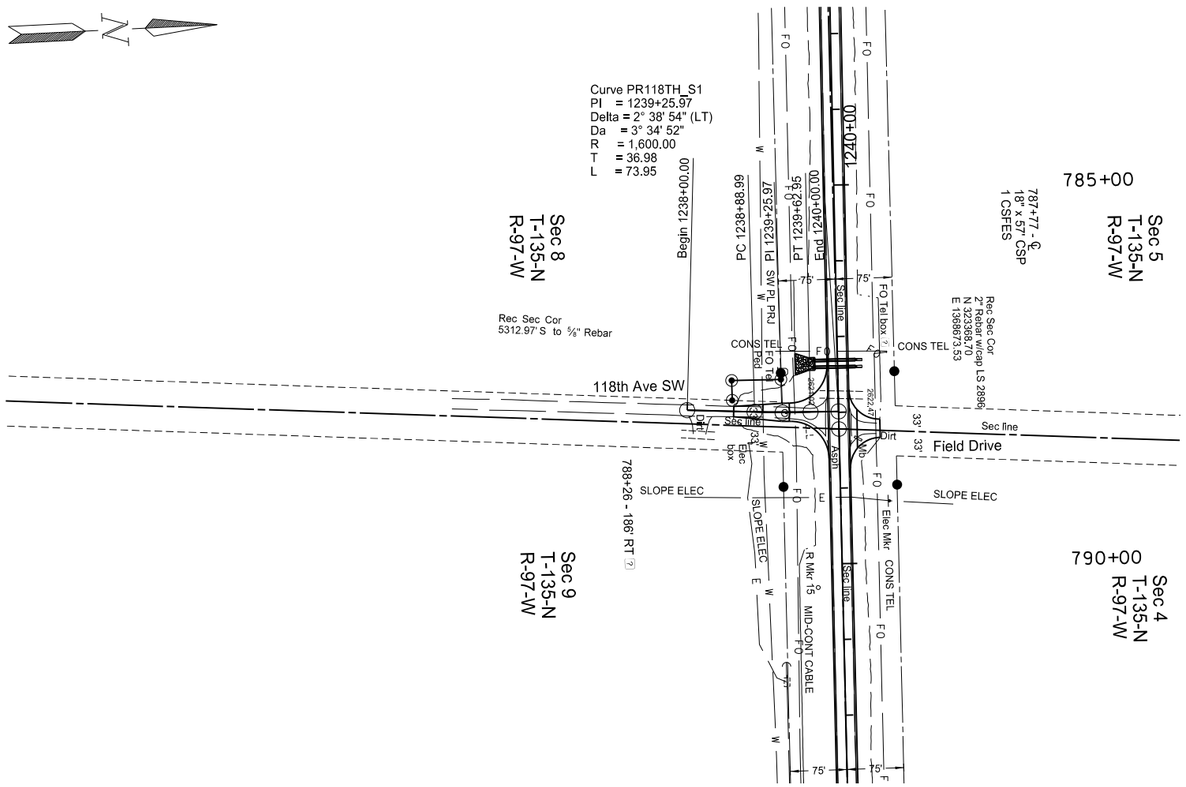
Plan & Profile

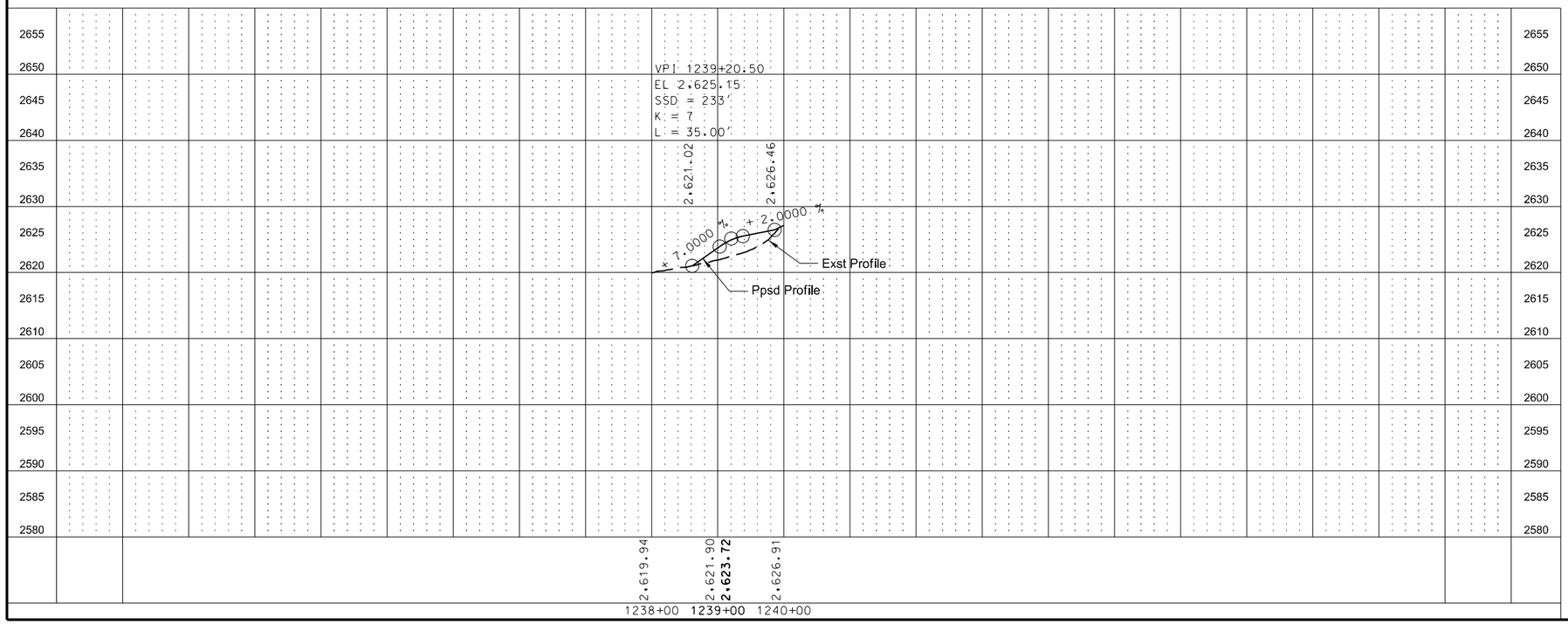
ND 21
Jct 85 to N Jct 22 - New England

119th Ave SW

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	54





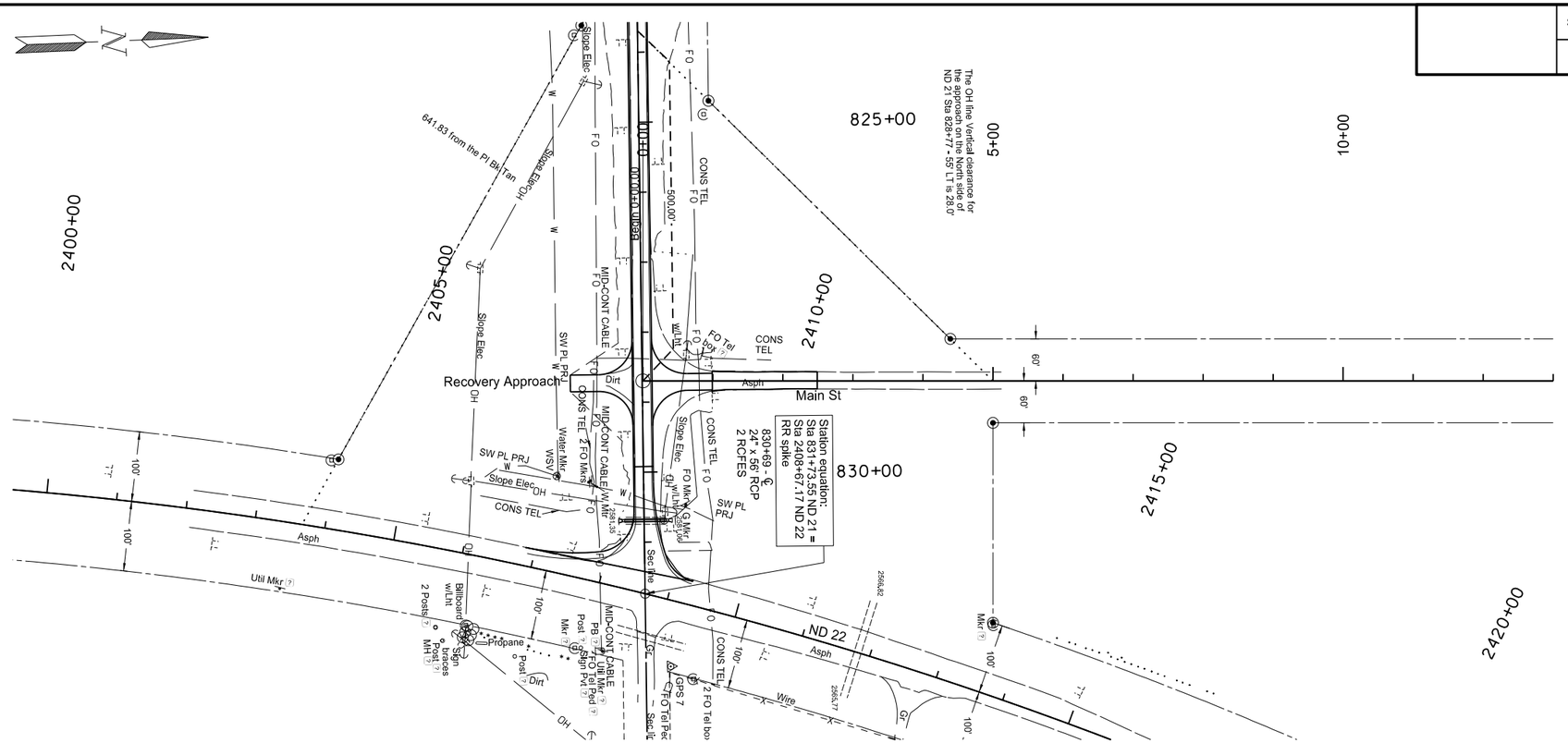
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Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

118th Ave SW South

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	55



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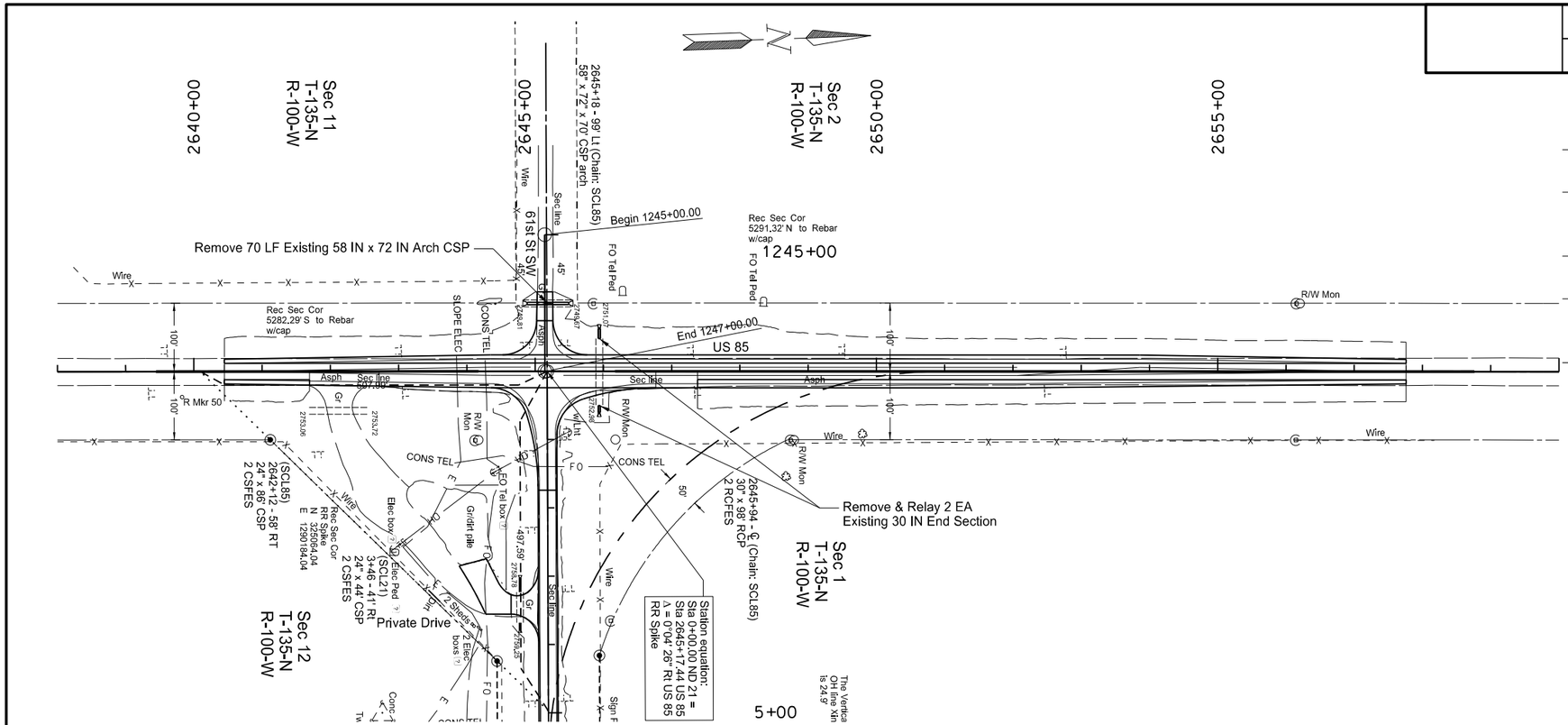
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

Main St

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	60	56

SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		2644+83 - 99' Lt to 2645+54 - 99' Lt	70	LF
714	0820	PIPE CONC REINF 30IN CL III		
		2645+94 - 64' Lt to 2645+94 - 48' Lt	14	LF
		2645+94 - 50' Rt to 2645+94 - 62' Rt	10	LF
714	4122	PIPE CONDUIT 42IN-APPROACH		
		2644+88 - 99' Lt to 2645+50 - 99' Lt	62	LF
714	9660	REMOVE&RELAY END SECTION-ALL TYPES&SIZES		
		2645+94 Lt	1	EA
		2645+94 Rt	1	EA
754	0805	OBJECT MARKERS - CULVERTS		
		2645+94 Lt	1	EA
		2645+94 Rt	1	EA



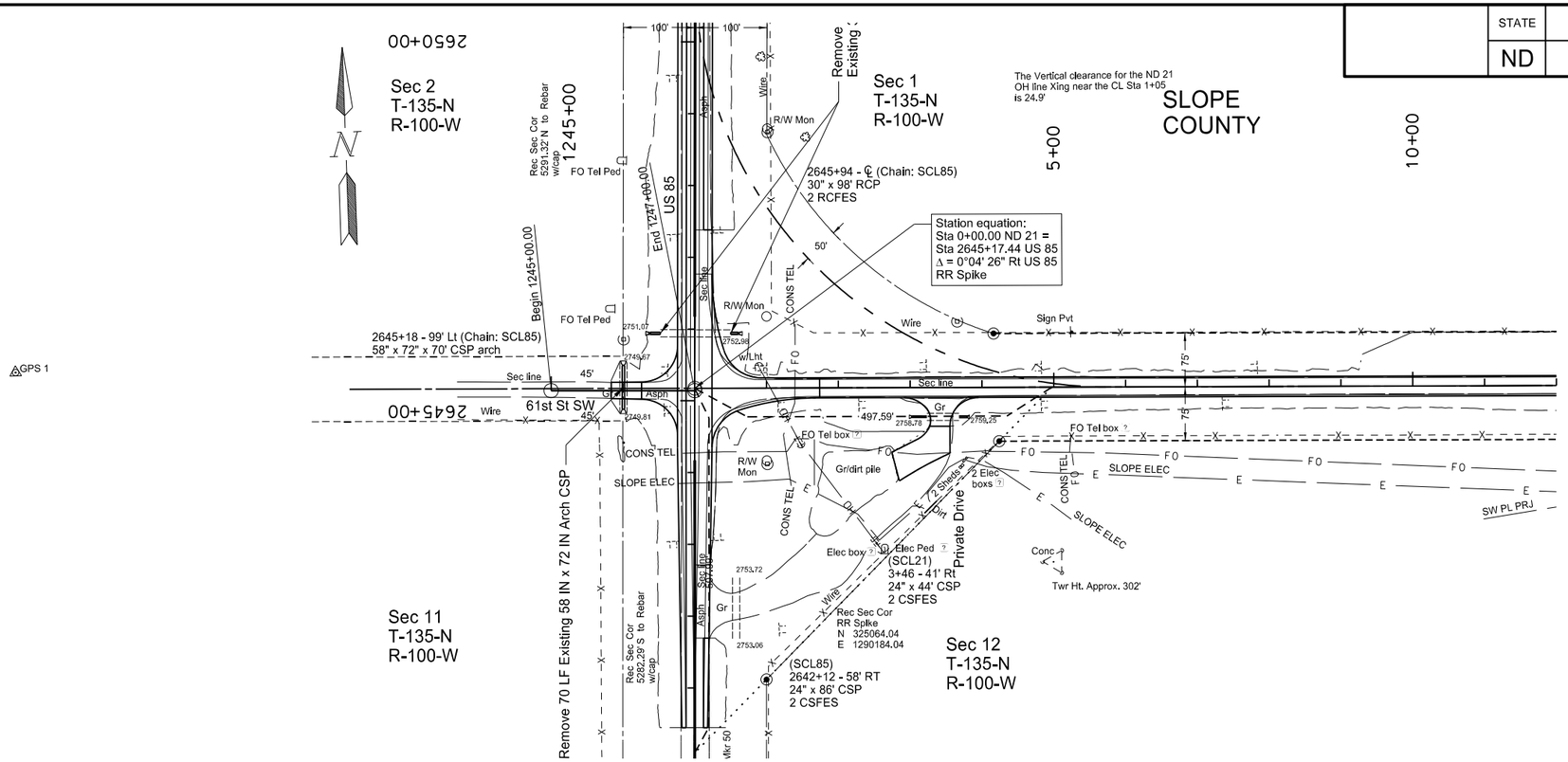
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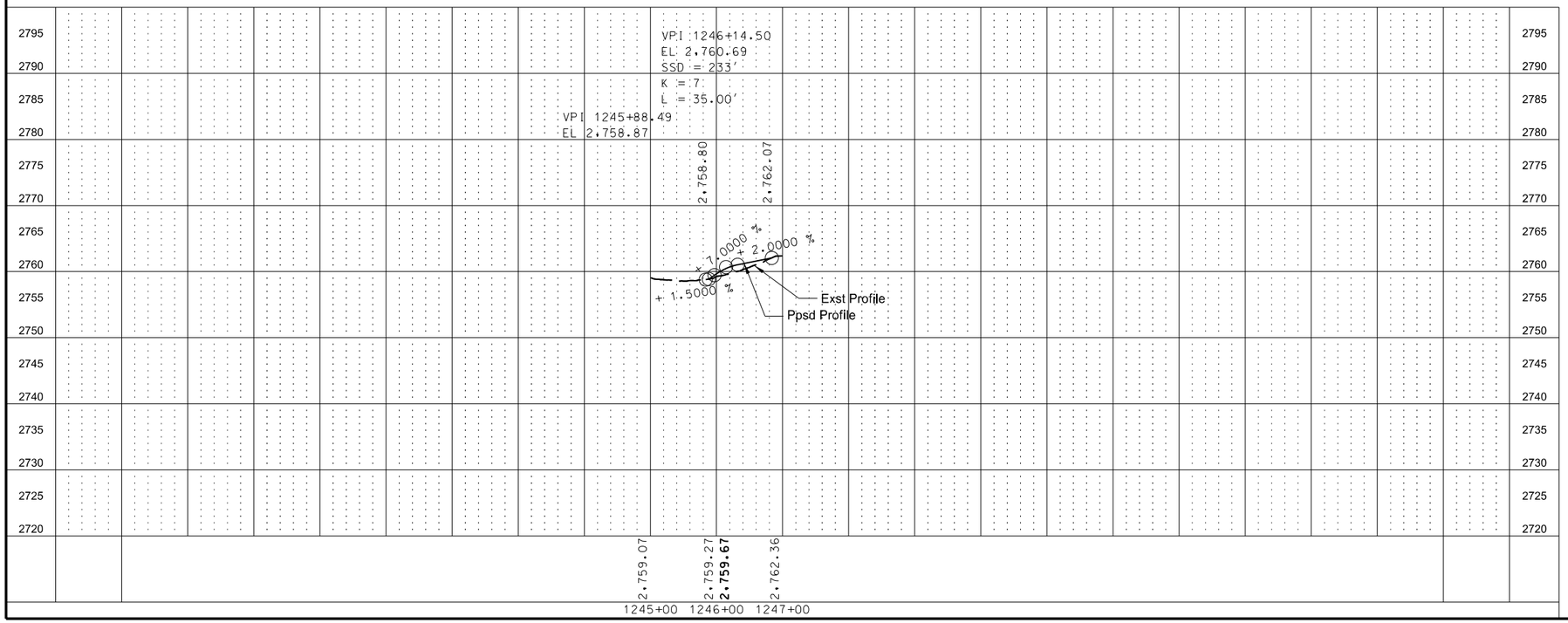
Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

US 85
2639+44.69 to 2658+76.06

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	60	57





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Plan & Profile

ND 21
Jct 85 to N Jct 22 - New England

61st St SW

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	75	1

Wetland Impact Table

Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands	Wetland Impacts Acre(s)			Wetland Mitigation									
								Mitigation Required		USACE/11990 Bank		11990 Bank		Onsite			
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)	Constructed Site #	Constructed Size Acre(s)
1a	Sec 5 T 135N R 99W	Riverine	Natural	No	0.000	0.000	0.000	N	N								
1b	Sec 5&8 T 135N R 99W	Riverine	Natural	No	0.006	0.003	0.000	Y	N			Vollrath 15/21 11990	0.003				
1c	Sec 8 T 135N R 99W	Riverine	Natural	Yes	0.001	0.000	0.000	N	N								
1d	Sec 8 T 135N R 99W	Riverine	Natural	Yes	0.000	0.000	0.000	N	N								
3a	Sec 4&9 T 135N R 99W	Riverine	Natural	Yes	0.067	0.053	0.000	Y	Y					Site 1 (1:1)	0.053	Site 1	0.233
3b	Sec 4 T 135N R 99W	Riverine	Natural	Yes	0.161	0.042	0.000	Y	Y					Site 1 (1:1)	0.042	Site 2	0.012
3c	Sec 9 T 135N R 99W	Riverine	Created	Yes	0.040	0.028	0.000	N	Y					Site 1 (1:1)	0.028		
3d	Sec 9 T 135N R 99W	Riverine	Created	Yes	0.040	0.018	0.000	N	Y					Site 1 (1:1)	0.018		
4a	Sec 3 T 135N R 99W	Riverine	Natural	Yes	0.349	0.043	0.000	Y	Y					Site 3 (2:1) Site 2 (2:1)	0.076 0.010		
4b	Sec 10 T 135N R 99W	Riverine	Natural	Yes	0.145	0.047	0.000	Y	Y					Site 1 (2:1) Site 2 (2:1)	0.092 0.002		
5a	Sec 2&3 T 135N R 99W	Riverine	Natural	Yes	0.000	0.000	0.000	N	N								
5b	Sec 10&11 T 135N R 99W	Riverine	Created	Yes	0.063	0.004	0.000	N	Y					Site 7 (2:1)	0.008		
5c	Sec 11 T 135N R 99W	Riverine	Natural	Yes	0.000	0.000	0.000	N	N								
6	Sec 11 T 135N R 99W	Basin	Created	No	0.004	0.008	0.000	N	N								
7	Sec 11 T 135N R 98W	Basin	Created	No	0.078	0.004	0.000	N	N							Site 3	0.077
8	Sec 2 T 135N R 98W	Riverine	Natural	Yes	0.005	0.020	0.000	Y	Y					Site 4 (2:1) Site 5 (2:1)	0.030 0.010		
8a	Sec 2 T 135N R 98W	Riverine	Natural	Yes	0.000	0.000	0.000	N	N								
9	Sec 5 T 135N R 97W	Ditch	Created	No	0.054	0.008	0.000	N	N								
10a	Sec 2&11 T 135N R 100W	Riverine	Natural	Yes	0.004	0.003	0.000	Y	Y					Site 6 (2:1)	0.006		
10b	Sec 2 T 135N R 100W	Riverine	Natural	Yes	0.005	0.005	0.000	Y	Y					Site 6 (2:1)	0.010		
11a	Sec 7 T 135N R 98W	Riverine	Natural	Yes	0.000	0.000	0.000	N	N							Site 4	0.041
11b	Sec 7 T 135N R 98W	Riverine	Natural	Yes	0.000	0.000	0.000	N	N								
11c	Sec 7 T 135N R 98W	Riverine	Natural	Yes	0.000	0.000	0.000	N	N								
11d	Sec 7 T 135N R 98W	Riverine	Natural	Yes	0.000	0.000	0.000	N	N								
12	Sec 6 T 135N R 98W	Riverine	Natural	Yes	0.000	0.000	0.000	N	N							Site 5	0.014

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Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	2

Wetland Impact Table

Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands	Wetland Impacts Acre(s)			Wetland Mitigation									
								Mitigation Required		USACE/11990 Bank		11990 Bank		Onsite			
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)	Constructed Site #	Constructed Size Acre(s)
13	Sec 10 T 135N R 98W	Riverine	Natural	Yes	0.072	0.000	0.000	N	N							Site 6	0.016
14	Sec 3 T 135N R 98W	Riverine	Natural	Yes	0.000	0.000	0.000	N	N							Site 7	0.015
15	Sec 11 T 135N R 98W	Basin	Natural	Yes	0.014	0.000	0.000	N	N								
16	Sec 2 T 135N R 98W	Basin	Natural	Yes	0.000	0.000	0.000	N	N								
17	Sec 11 T 135N R 98W	Riverine	Natural	Yes	0.044	0.000	0.000	N	N							Site 8	0.031
18a	Sec 12 T 135N R 100W	Riverine	Natural	Yes	0.000	0.000	0.000	N	N								
18b	Sec 12 T 135N R 100W	Riverine	Natural	Yes	0.004	0.000	0.000	N	N								
					1.156	0.286	0.000				0.000		0.003		0.385		0.439

Other Waters Impact Table

Number	Location	Type	Size		Feature	USACE Jurisdictional[1]	Imacts to Other Waters						Other Water Mitigation Mitigation Required		
							Acre(s)			Linear Feet					
			Acre(s)	Linear Feet			Temp	Perm. (Fill/Drain)	Perm. (Cut)	Temp	Perm (Fill/Drain)	Perm (Cut)	EO 11990	USACE	USFWS
OW 2a	Sec 8 T 135N R 99W	Cannonball River	0.02	23	Natural	Yes	0.002	0.000	0.000	4	0	0	N	N	N
OW 2b	Sec 5 T 135N R 99W	Cannonball River	0.01	17	Natural	Yes	0.001	0.000	0.000	6	0	0	N	N	N
OW 2c	Sec 4 T 135N R 99W	Cannonball River	0.01	14	Natural	Yes	0.000	0.000	0.000	1	0	0	N	N	N
OW 2d	Sec 9 T 135N R 99W	Cannonball River	0.02	30	Natural	Yes	0.004	0.000	0.000	15	0	0	N	N	N
OW 2e	Sec 4&9 T 135N R 99W	Cannonball River	0.37	312	Natural	Yes	0.000	0.000	0.000	0	0	0	N	N	N
OW 2f	Sec 9 T 135N R 99W	Cannonball River	0.01	46	Natural	Yes	0.000	0.000	0.000	0	0	0	N	N	N
		Totals	0.44	442			0.007	0.000	0.000	26	0	0			

[1] A wetland Juisdictional Determination was issued by the USACE on 12/15/2016; NWO-2012-2769-BIS

Impact Summary Table

Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres/Lf)
Natural/JD (Fill/Drain)	0.213	Temporary JD	1.014
Natural/ Non-JD (Fill/Drain)	0.003	Non-JD Temporary	0.142
Created/JD (Fill/Drain)	0.050	Permanent JD > 0.10	0.263
Created /Non-JD (Fill/Drain)	0.020	Permanent OW	0 ac / 0 ft.
Total	0.286	Temporary OW	0.007 ac / 26 ft.
JD Natural (Cut)	0.000		
JD Created (Cut)	0.000		
Non-JD Natural (Cut)	0.000		
Non-JD Created (Cut)	0.000		
Total	0.000		

Mitigation Summary Table

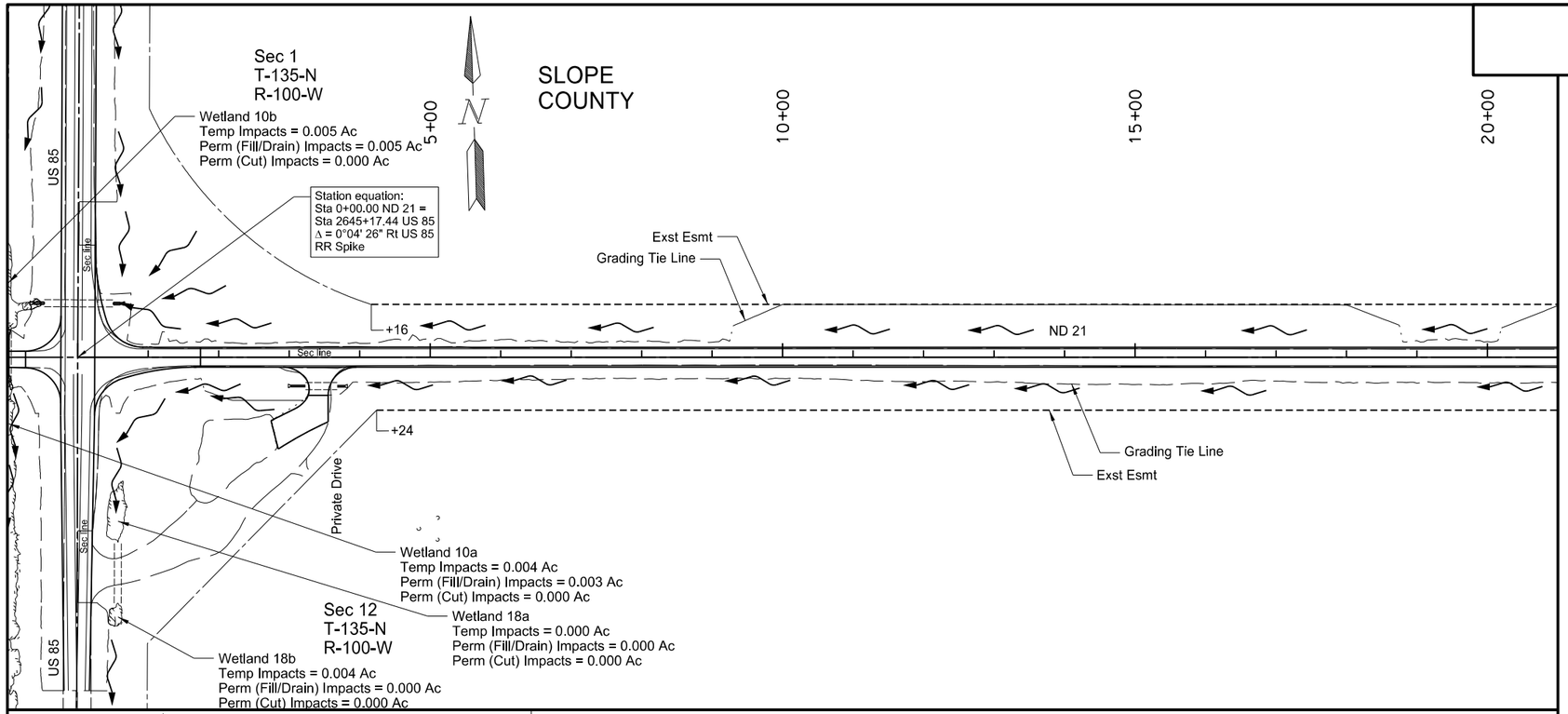
	Location	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only					
EO 11990 Only	Vollrath 15/21 11990		0.003		
USACE/11990		0.439			
USFWS					
	Total	0.439	0.003	0	0

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Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	3



Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

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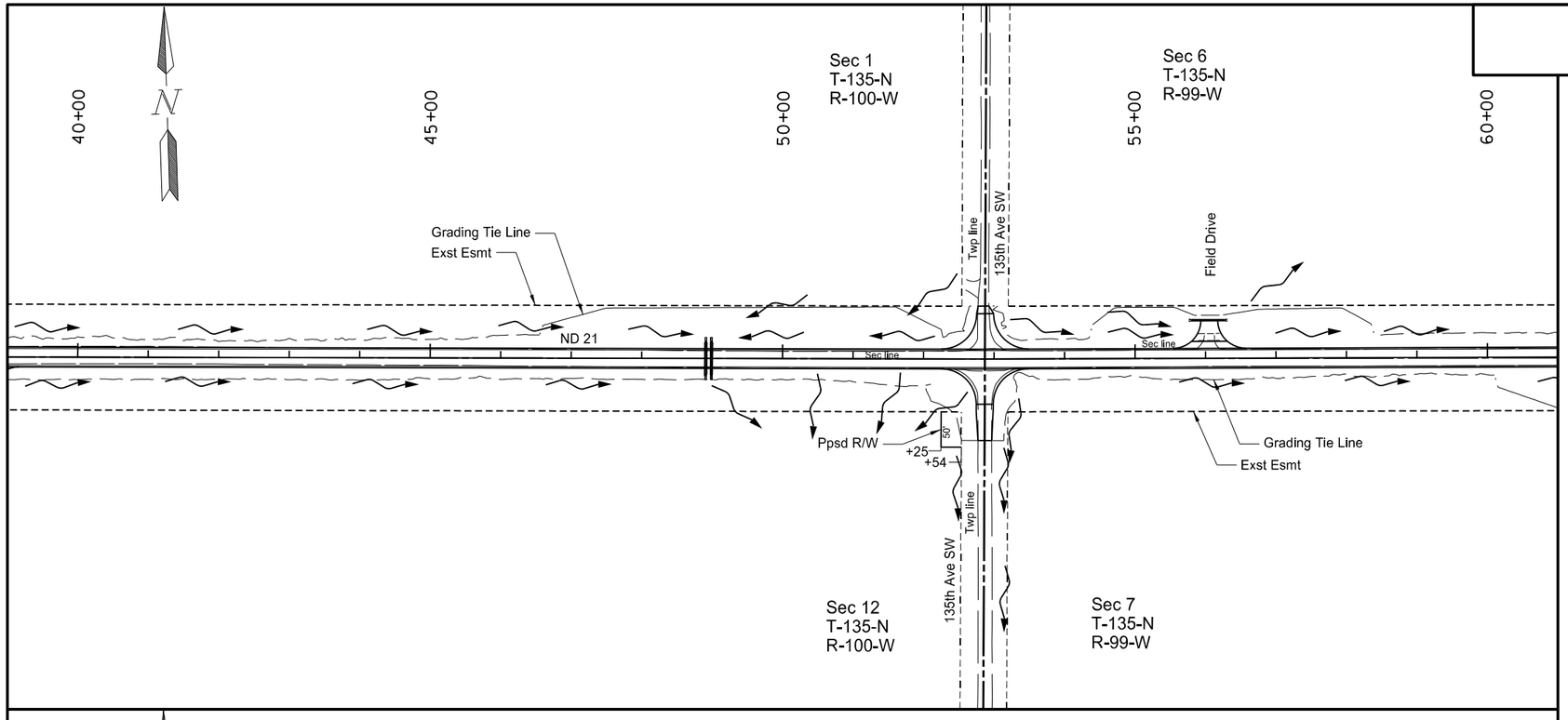
Wetland Impacts

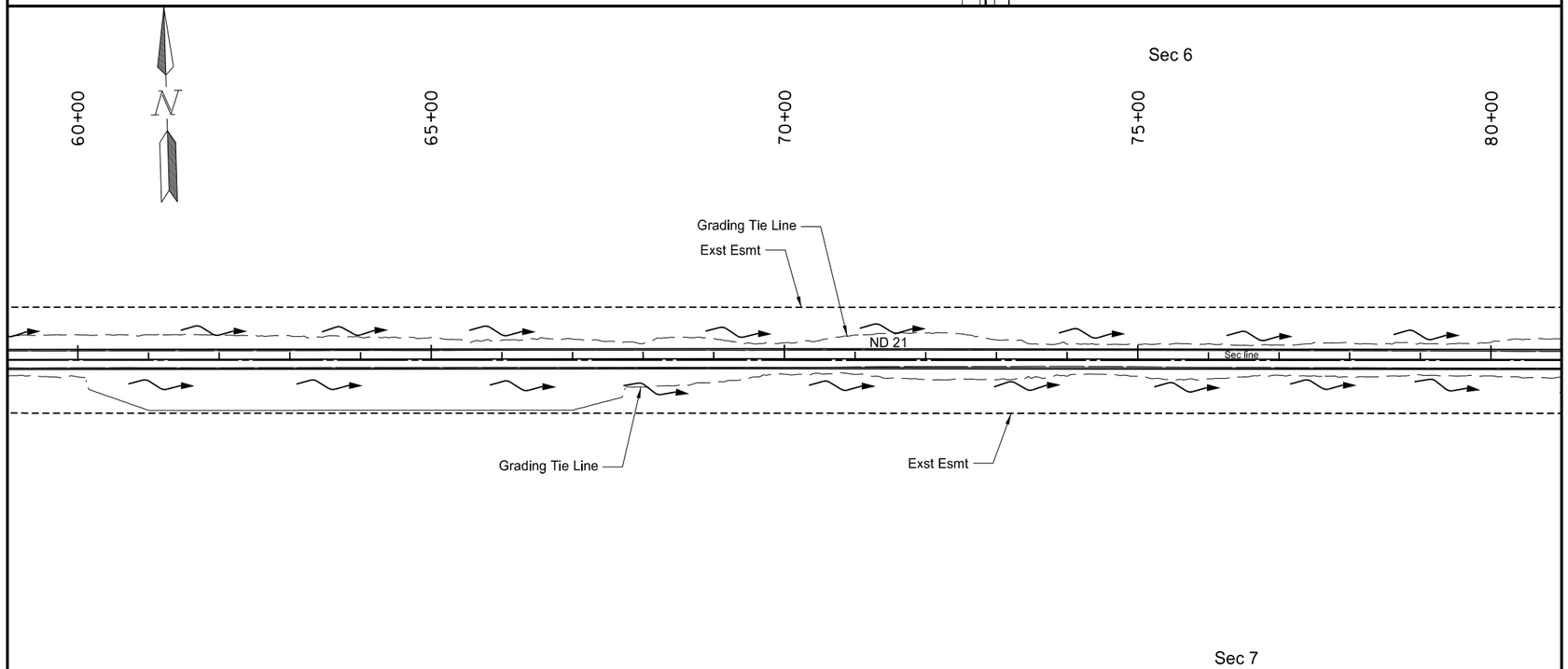
ND 21
Jct 85 to N Jct 22 - New England

0+24 to 40+00

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	75	4





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

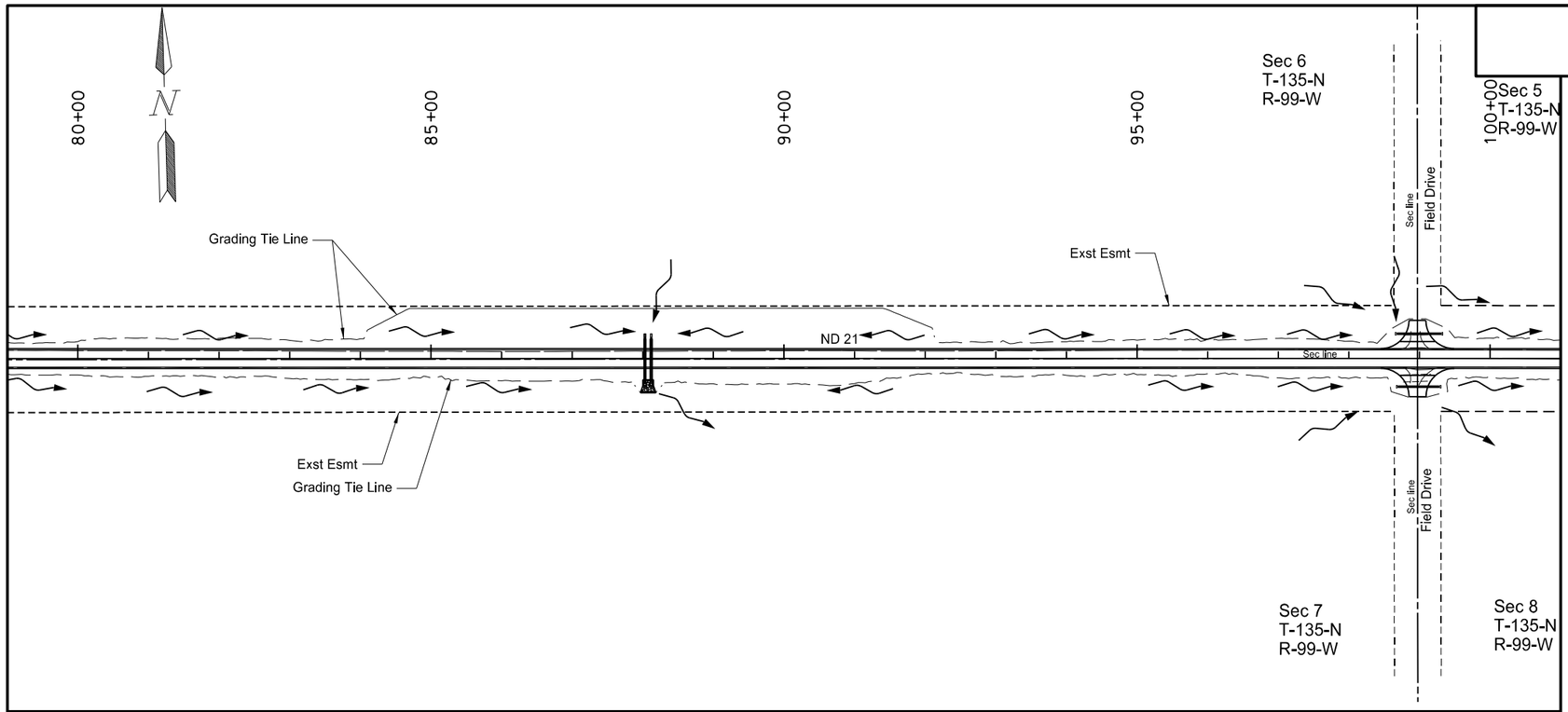
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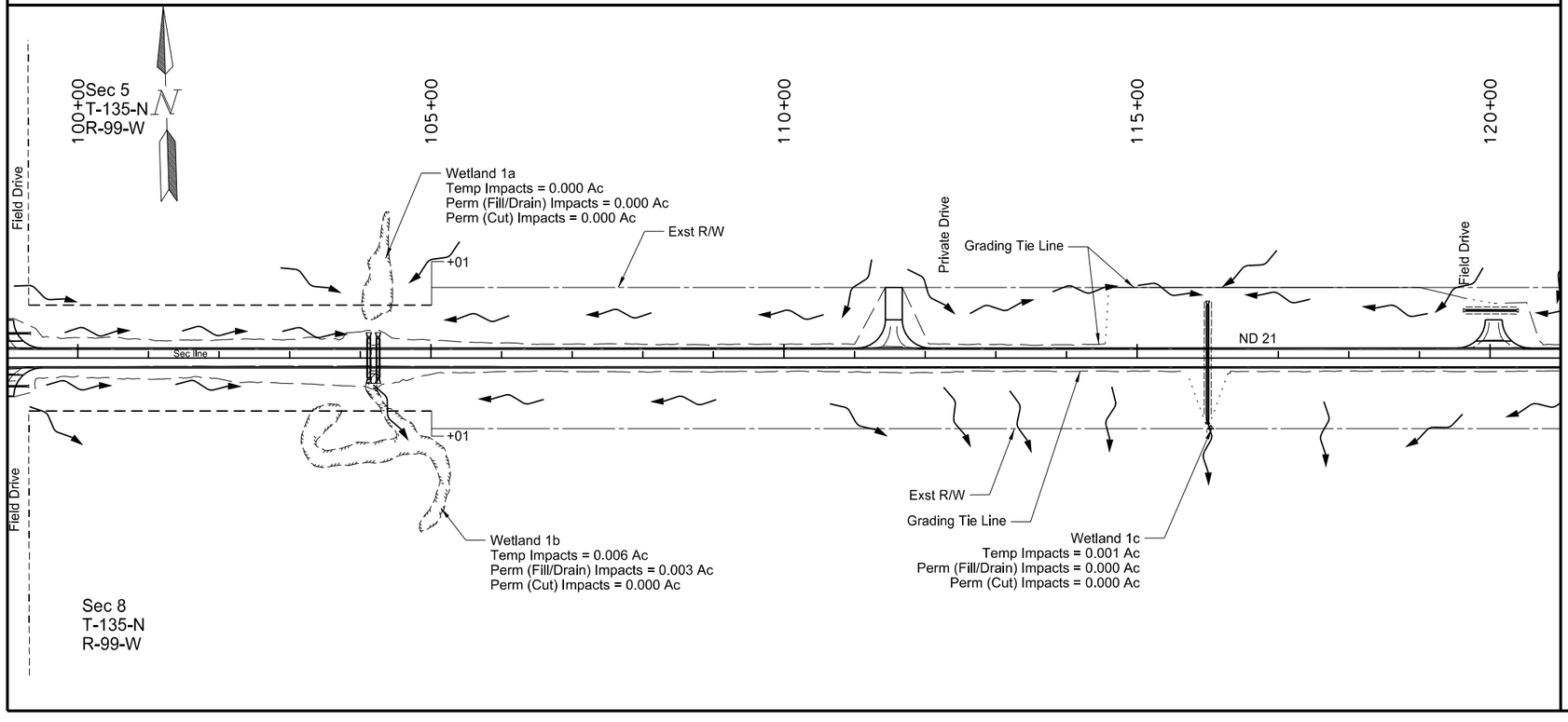
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

40+00 to 80+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	5





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

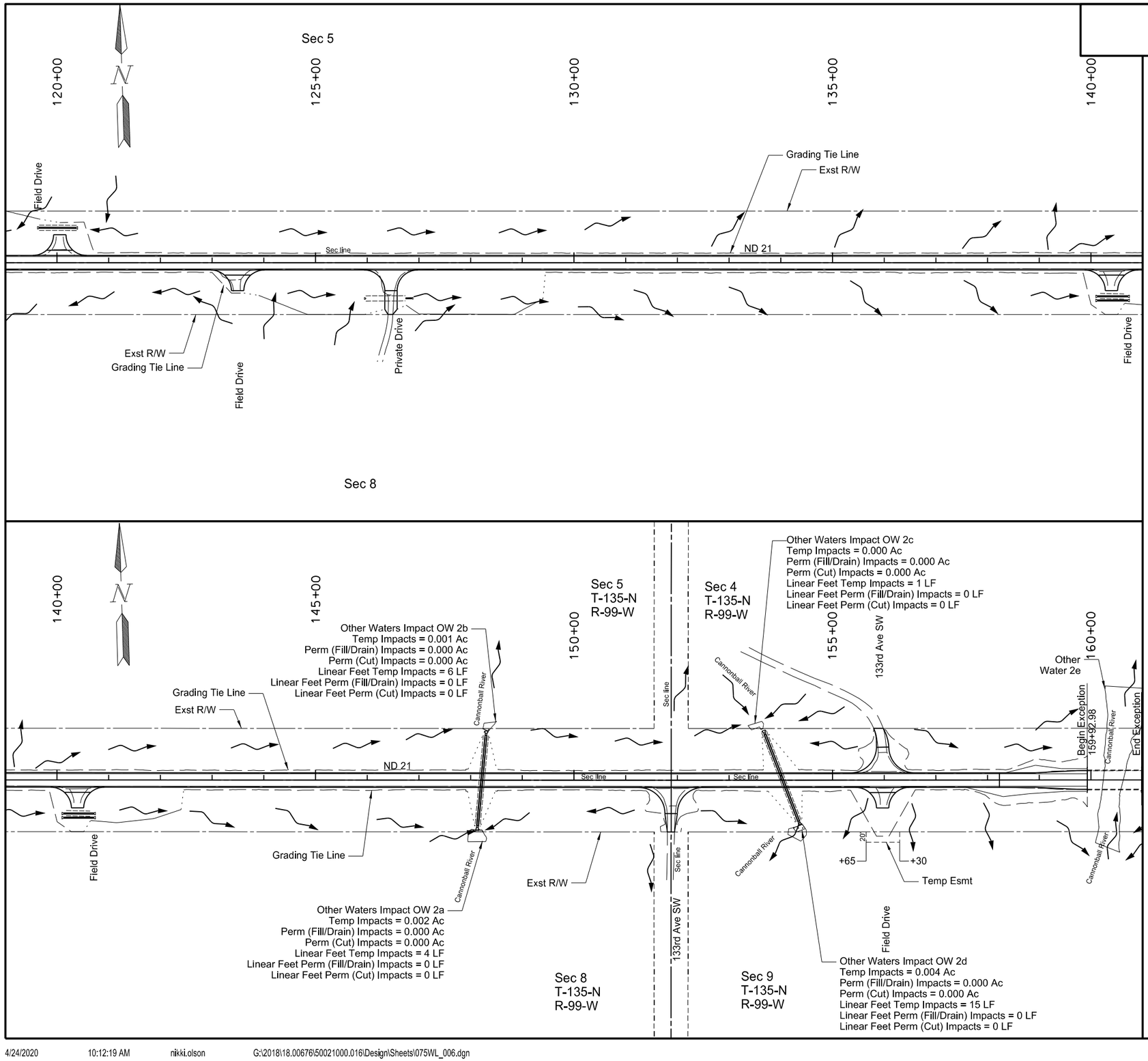
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Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

80+00 to 120+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	6



Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

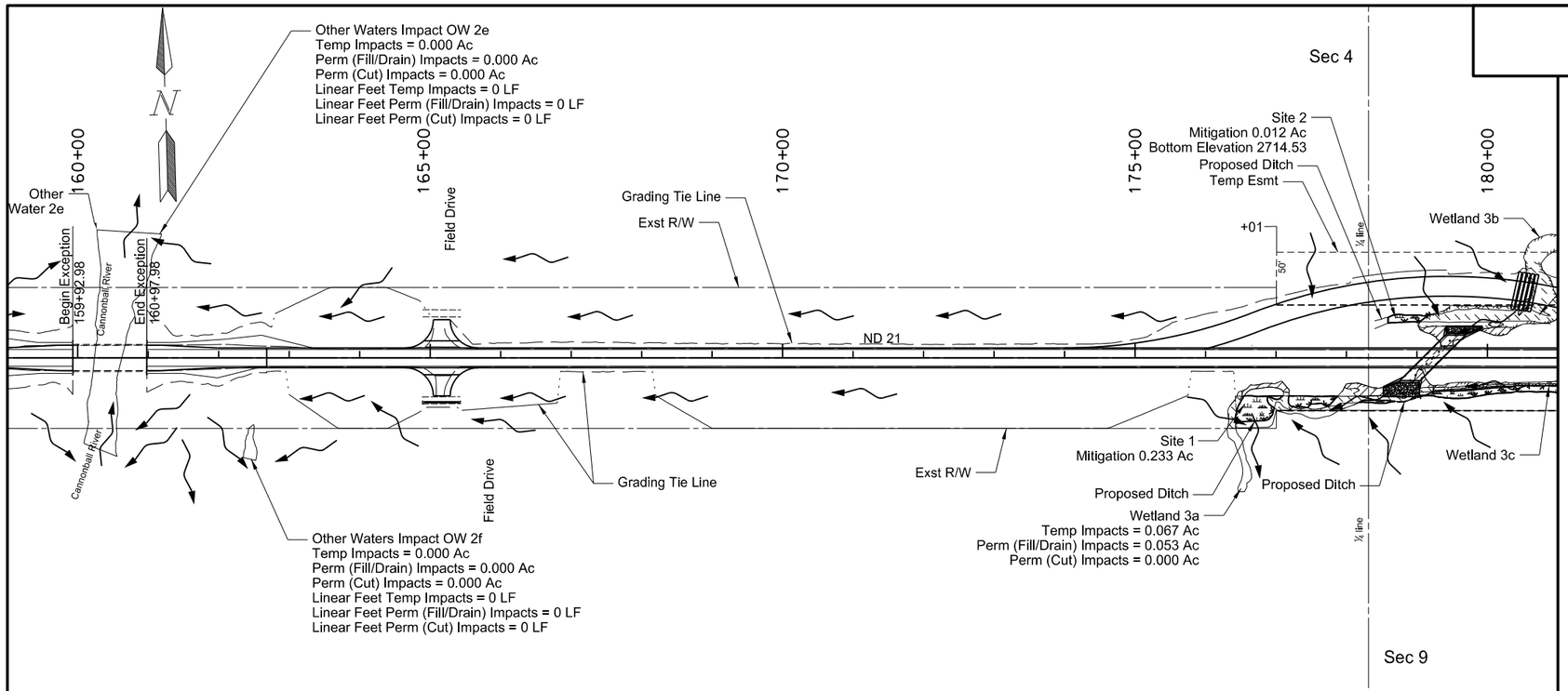
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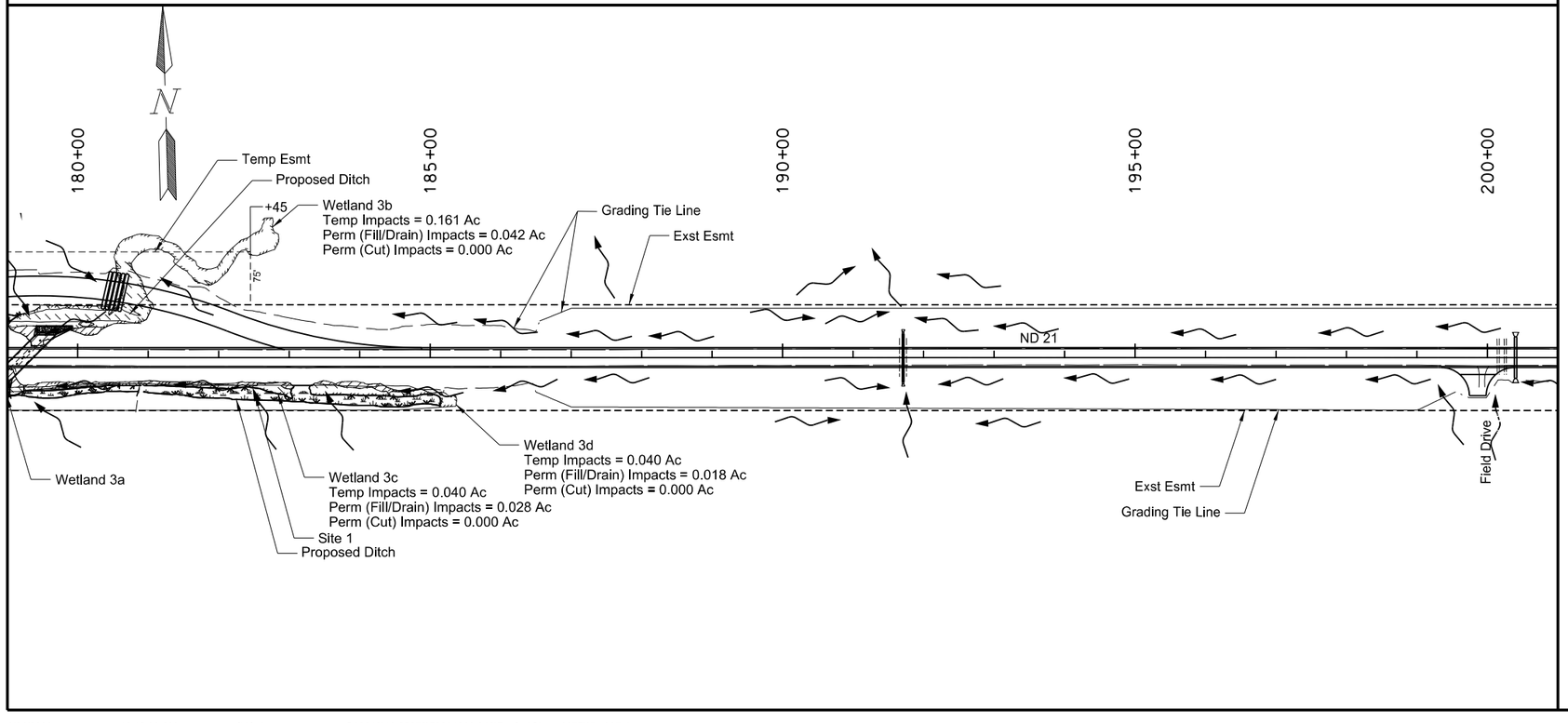
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

120+00 to 159+92.98

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	7





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

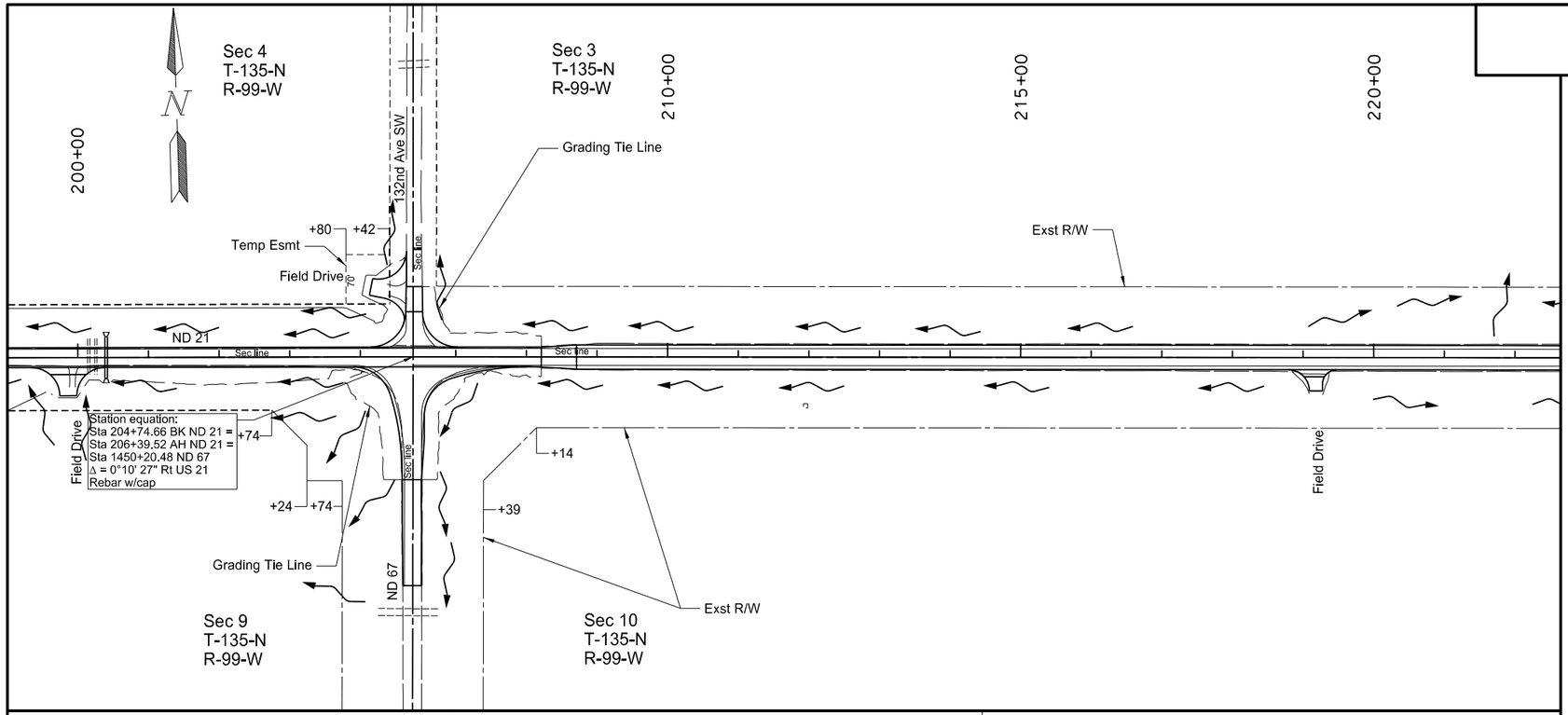
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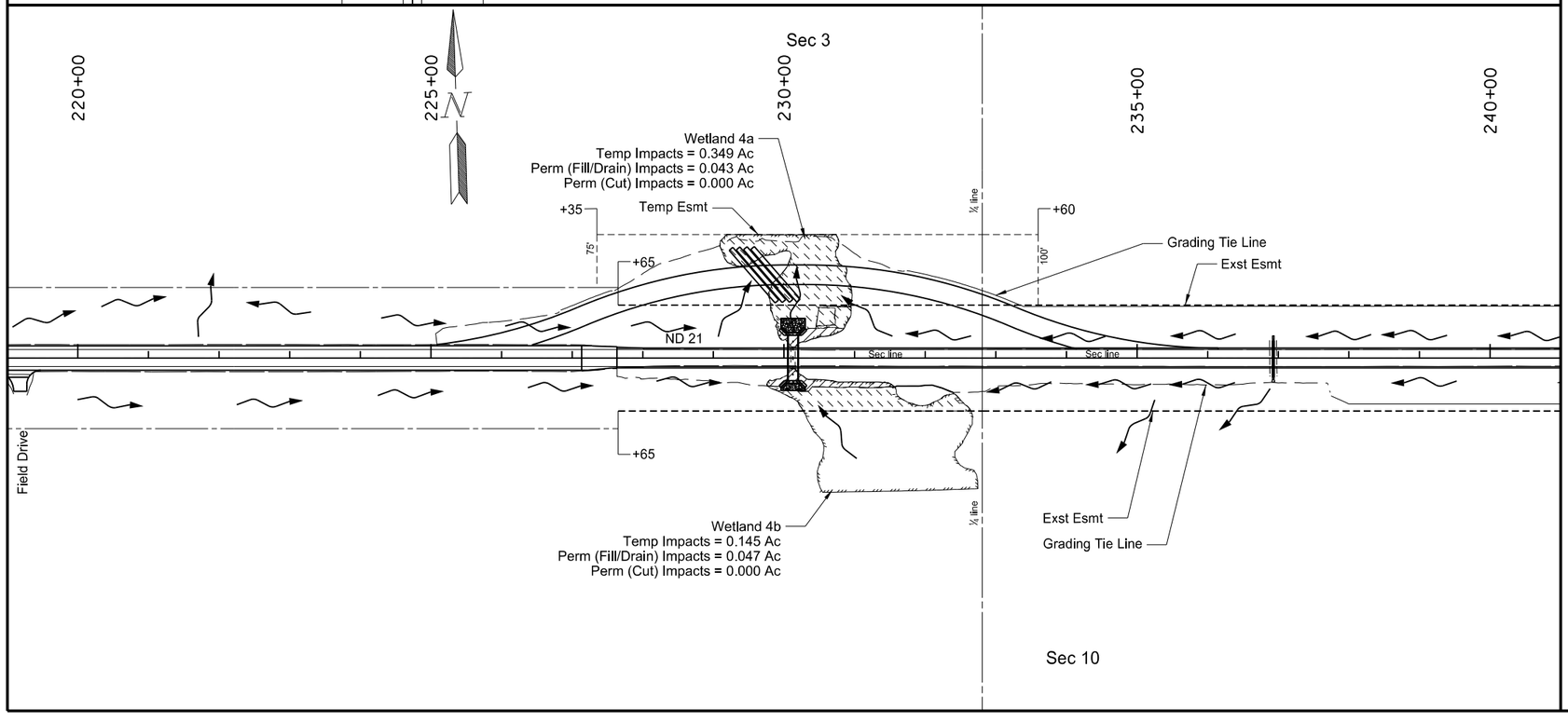
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

160+97.98 to 200+00

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	75	8





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

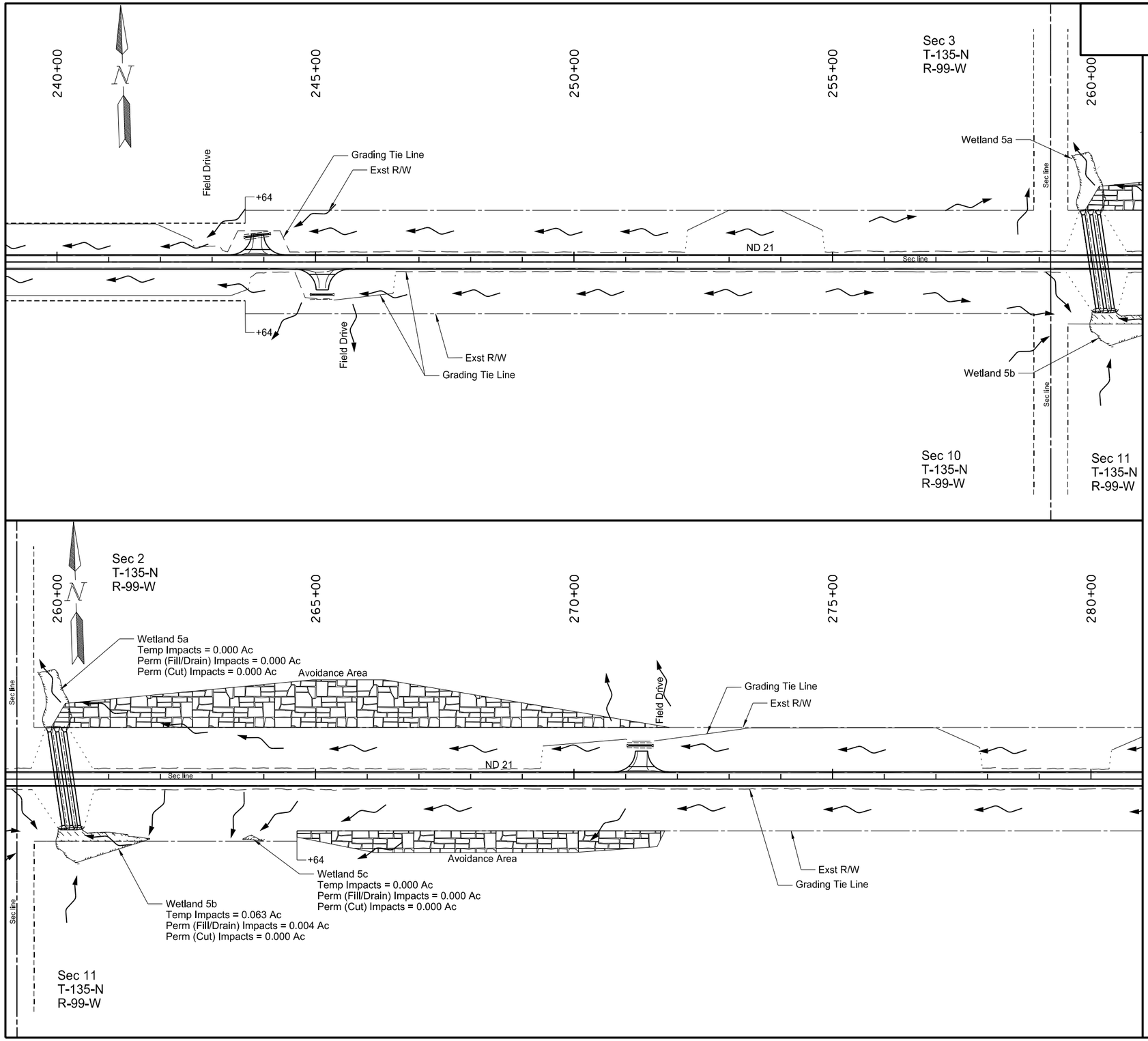
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Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

200+00 to 240+00
226+13.42 to 240+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	9



Legend

- Permanent Impact (Fill/Drain)
- Avoidance Area
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

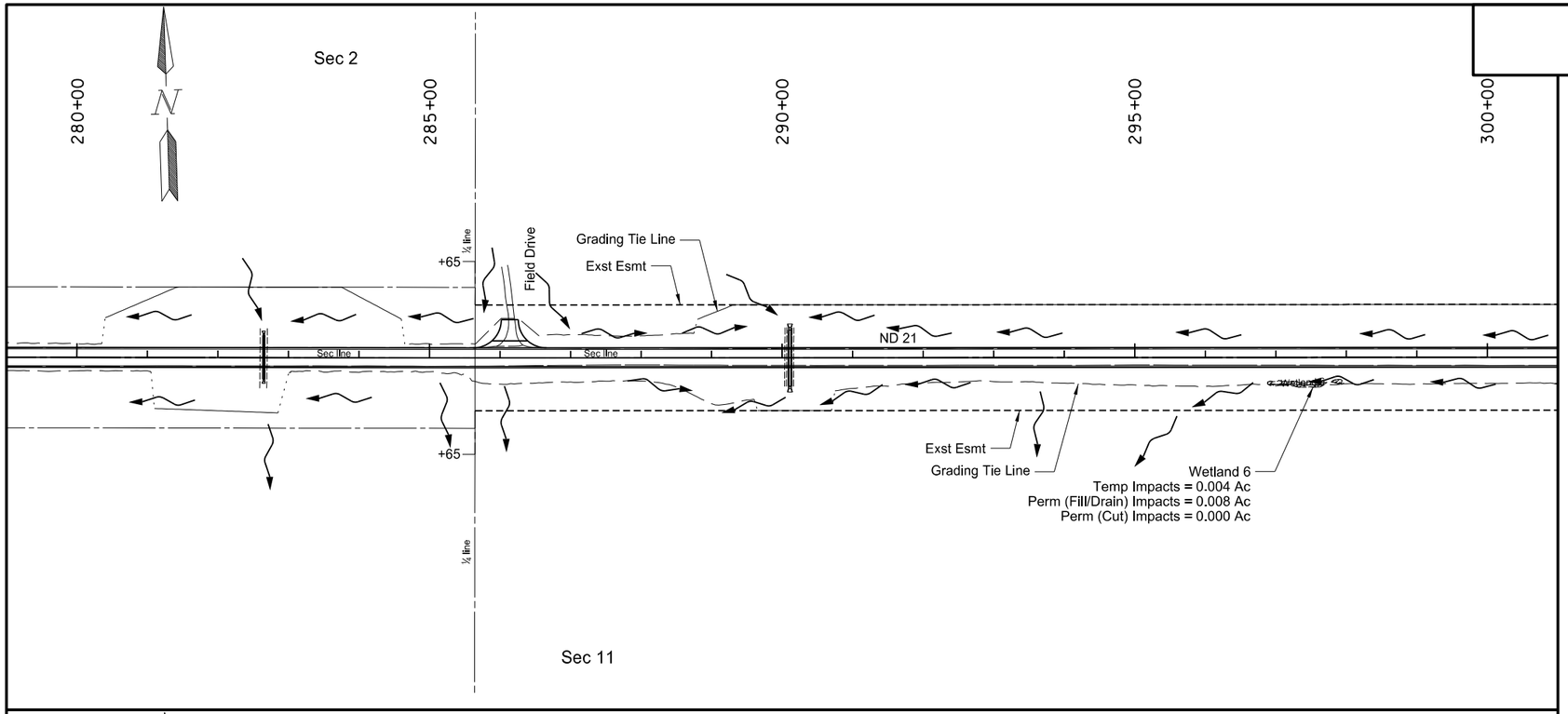
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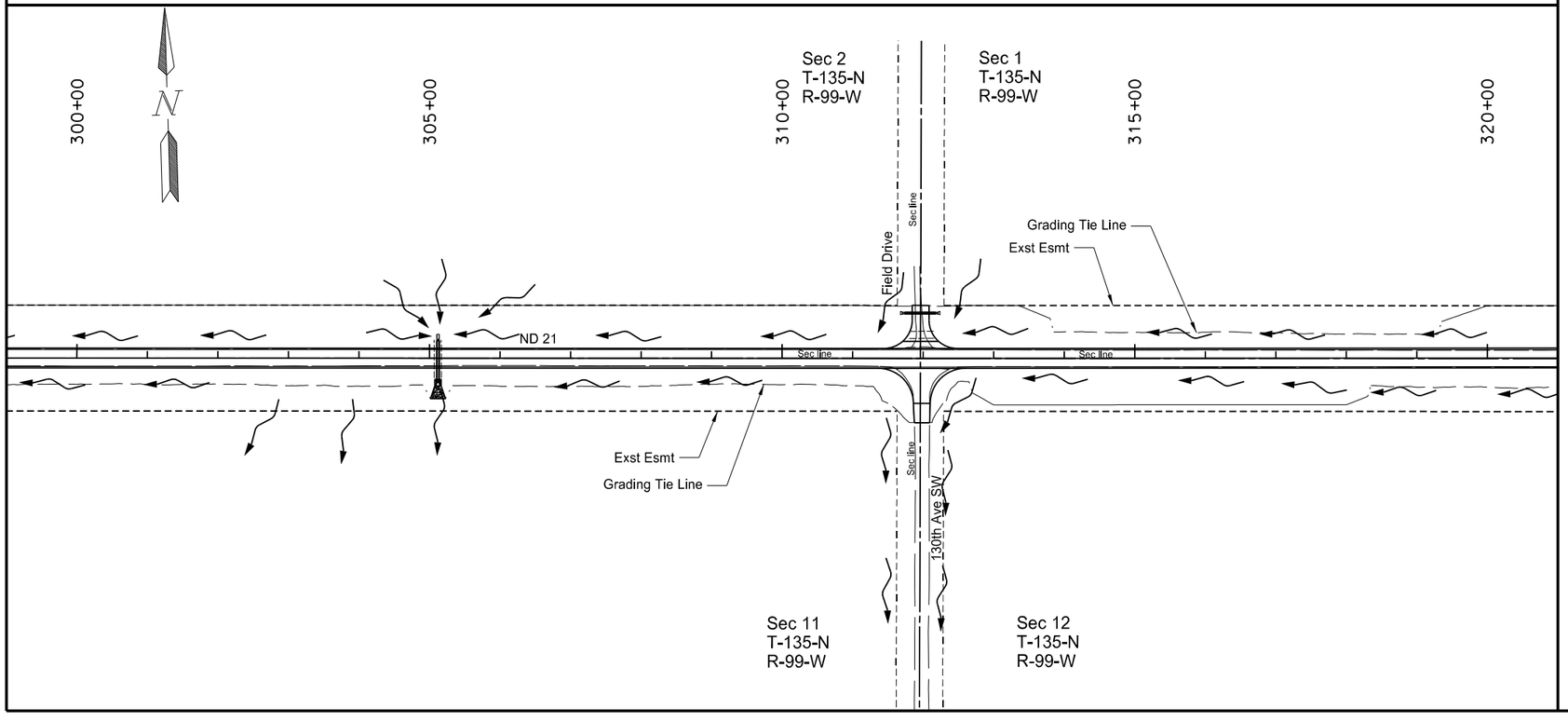
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

240+00 to 280+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	10





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

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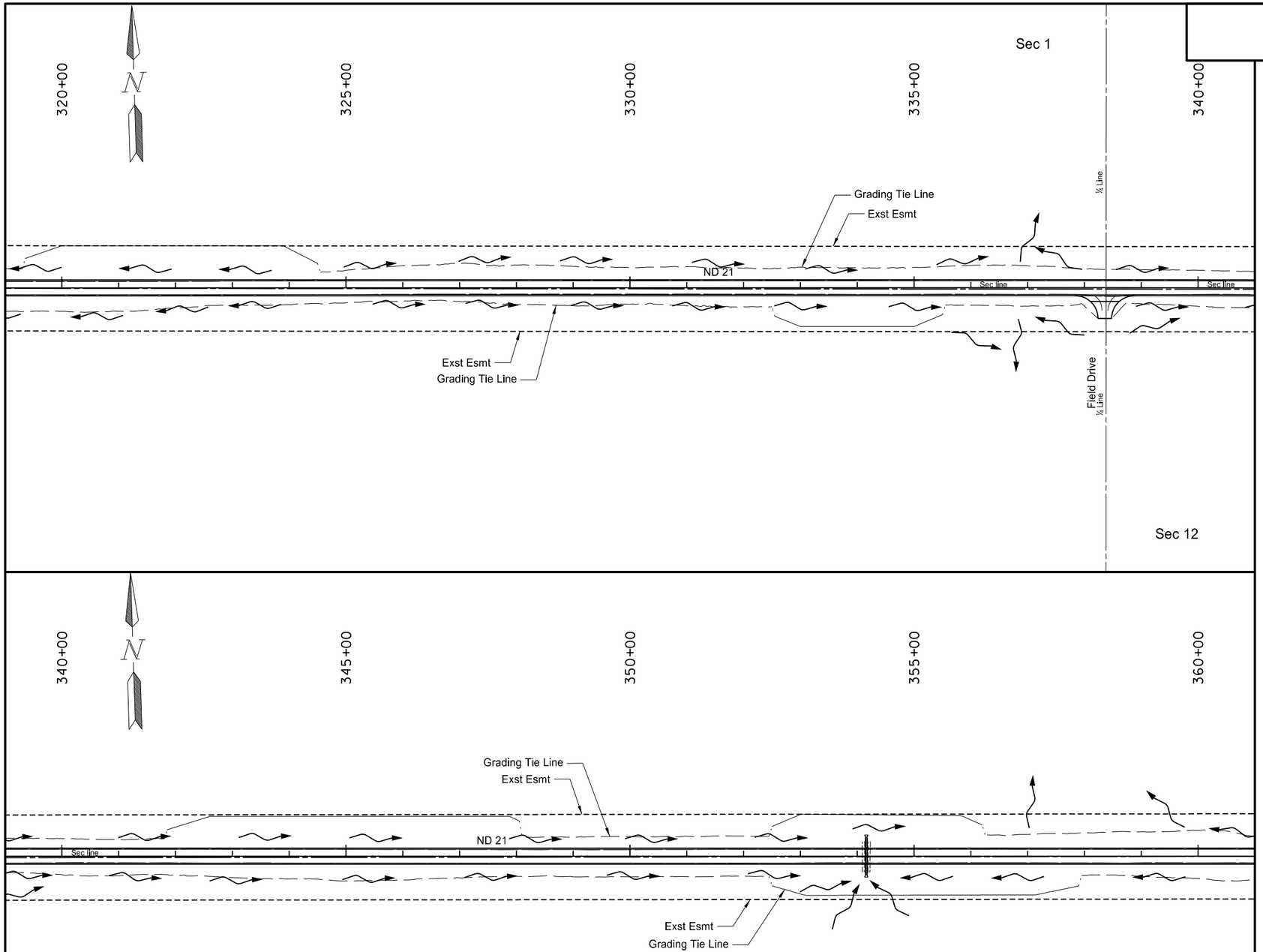
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

280+00 to 320+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	11



Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

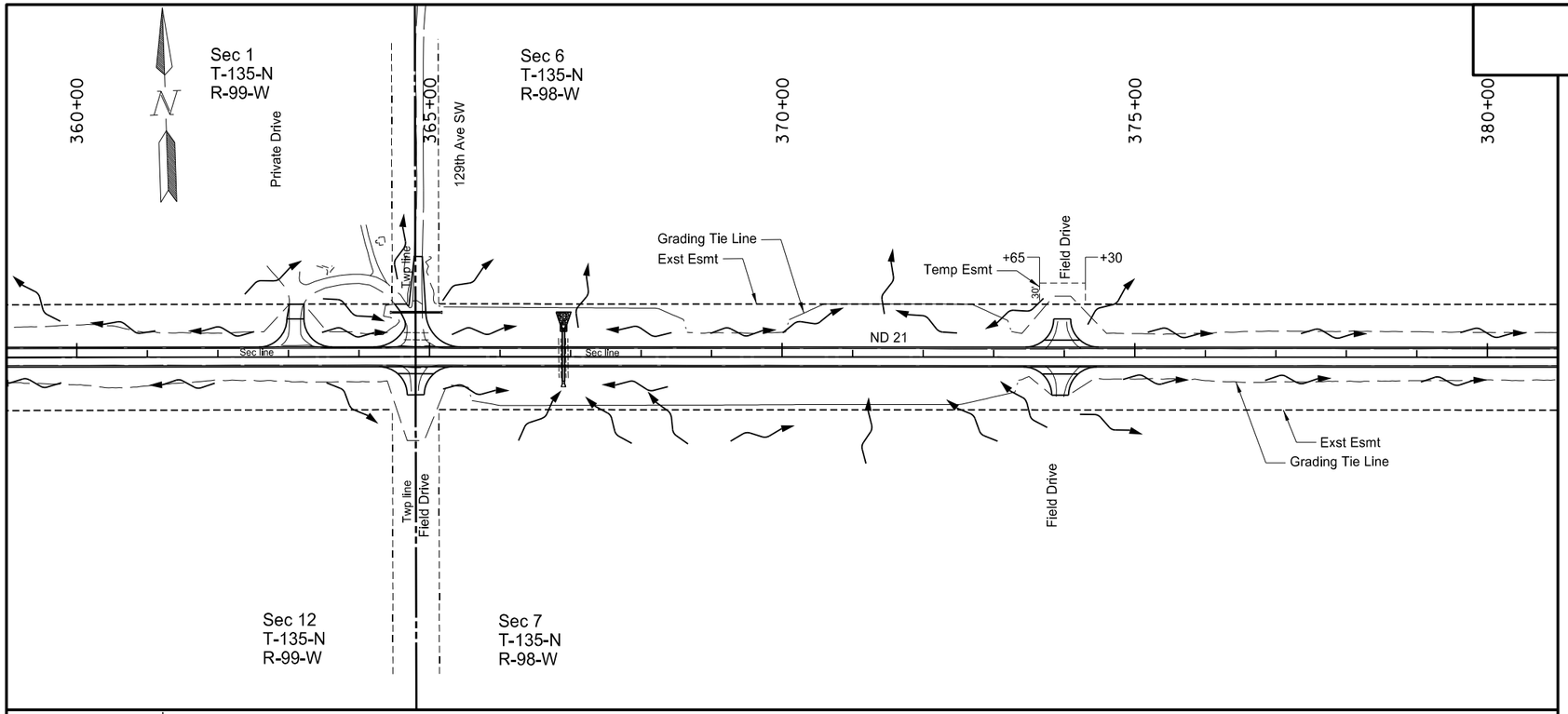
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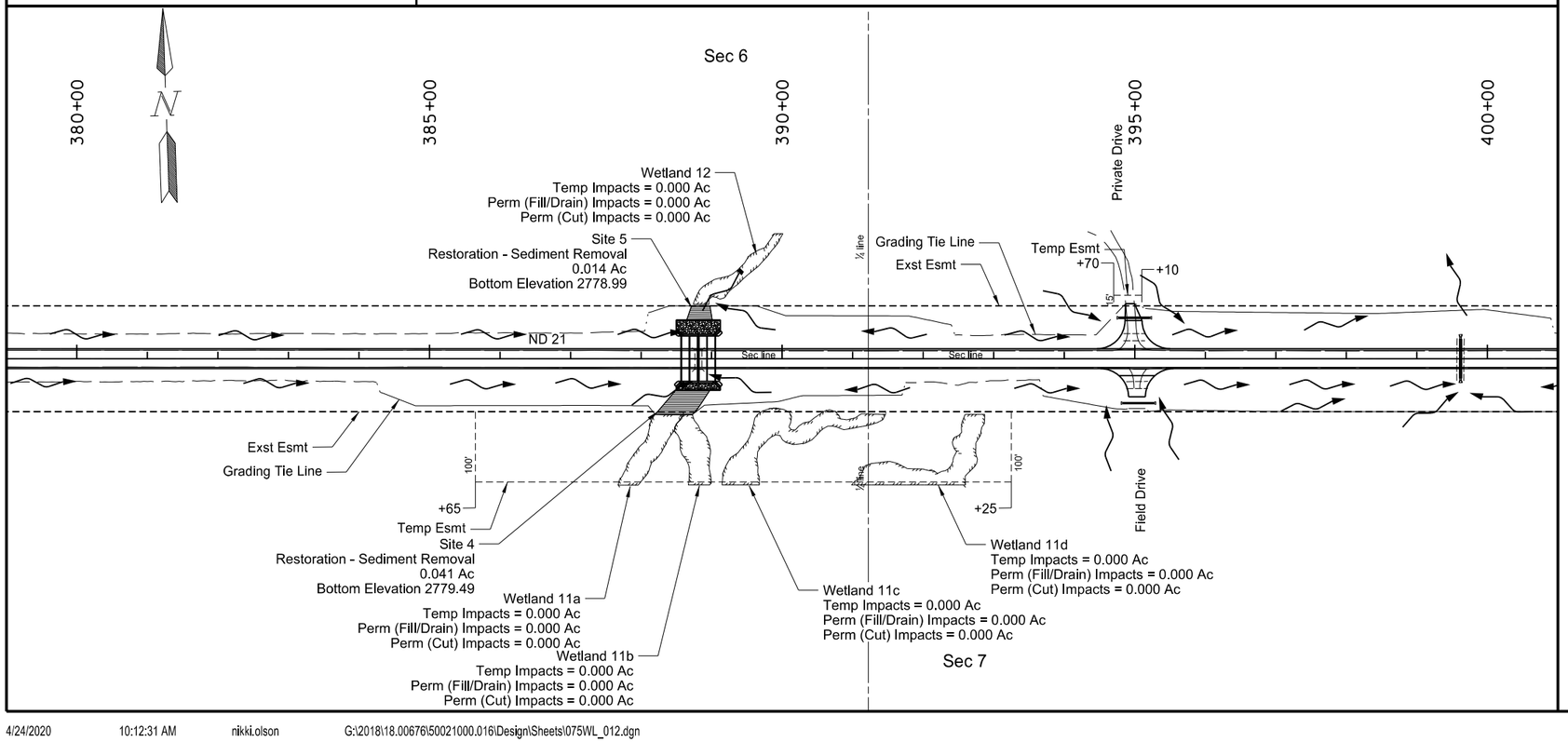
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

320+00 to 360+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	12





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

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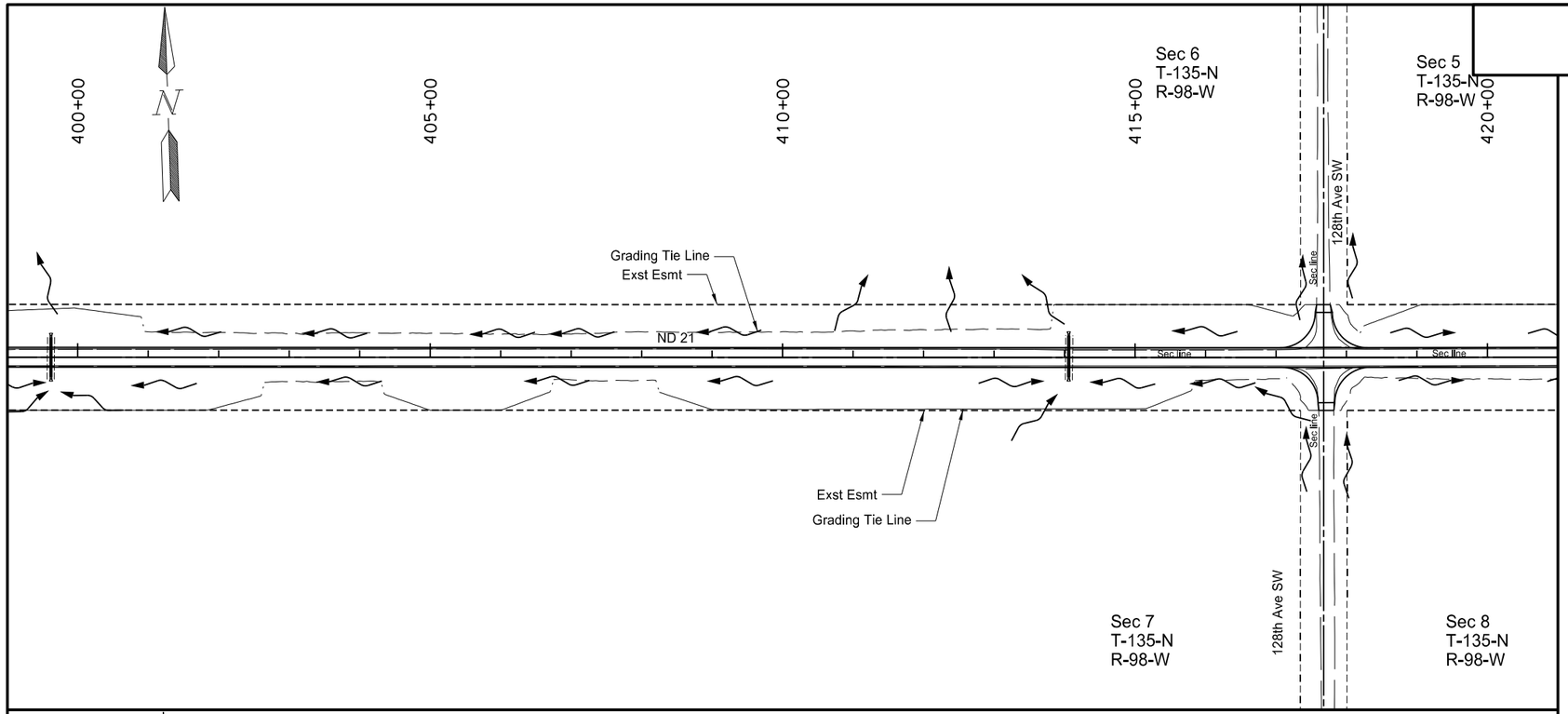
Wetland Impacts

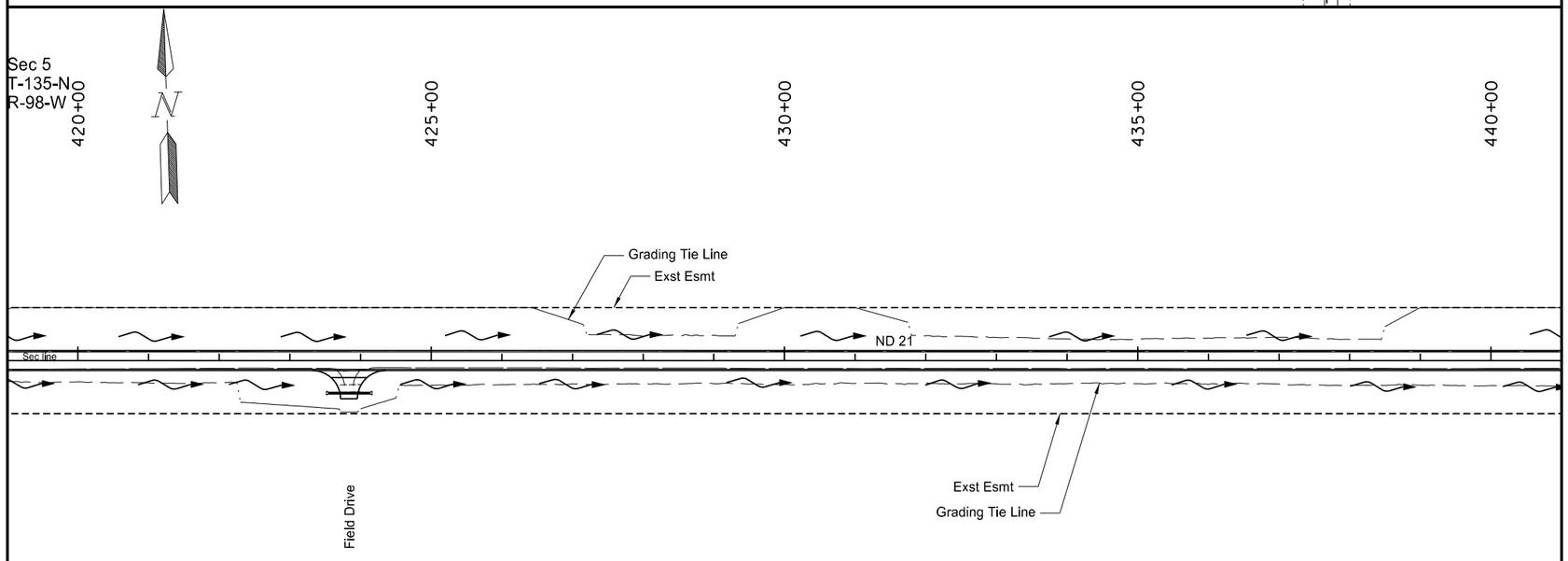
ND 21
Jct 85 to N Jct 22 - New England

360+00 to 400+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	13





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

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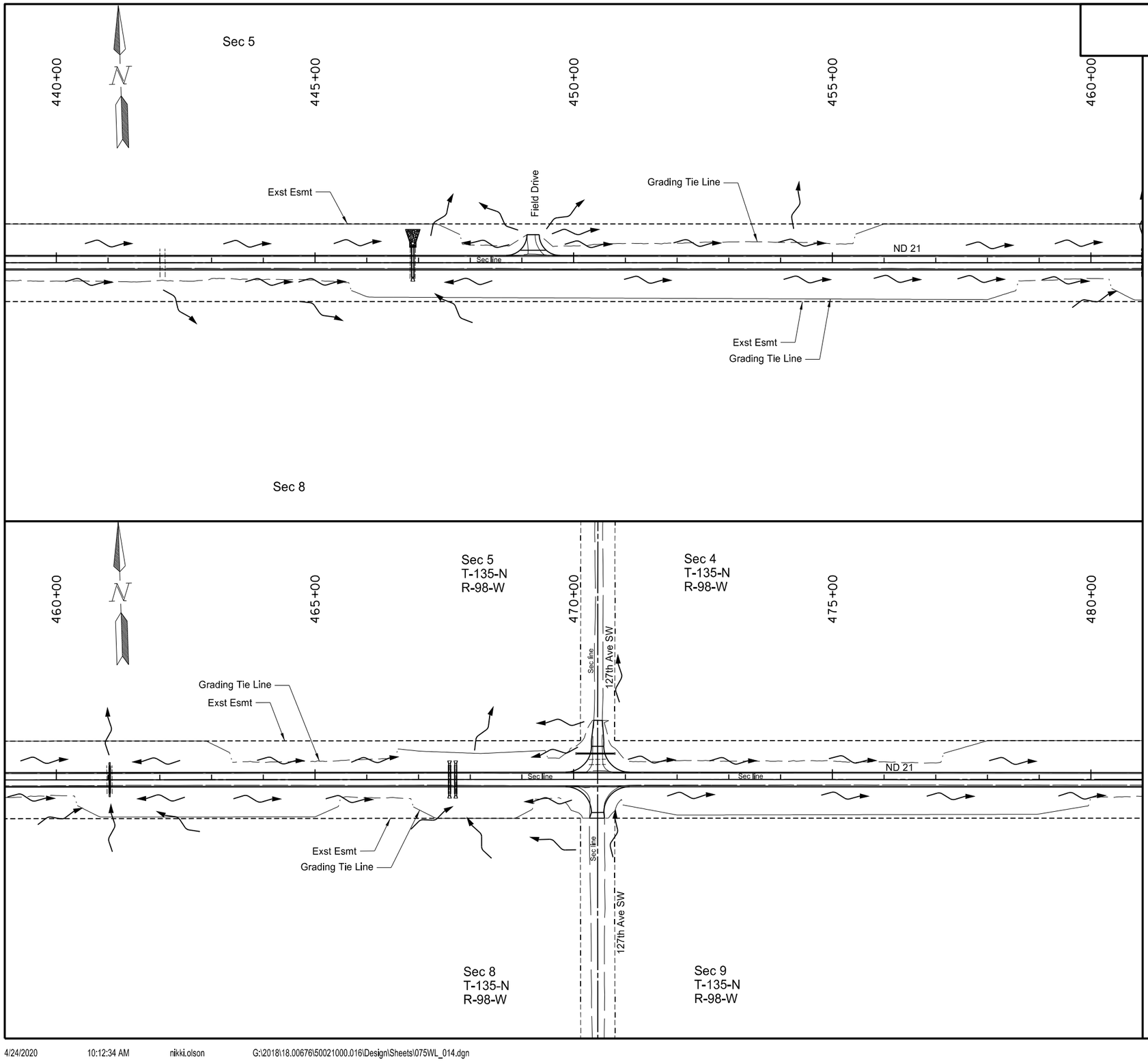
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

400+00 to 440+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	14



Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

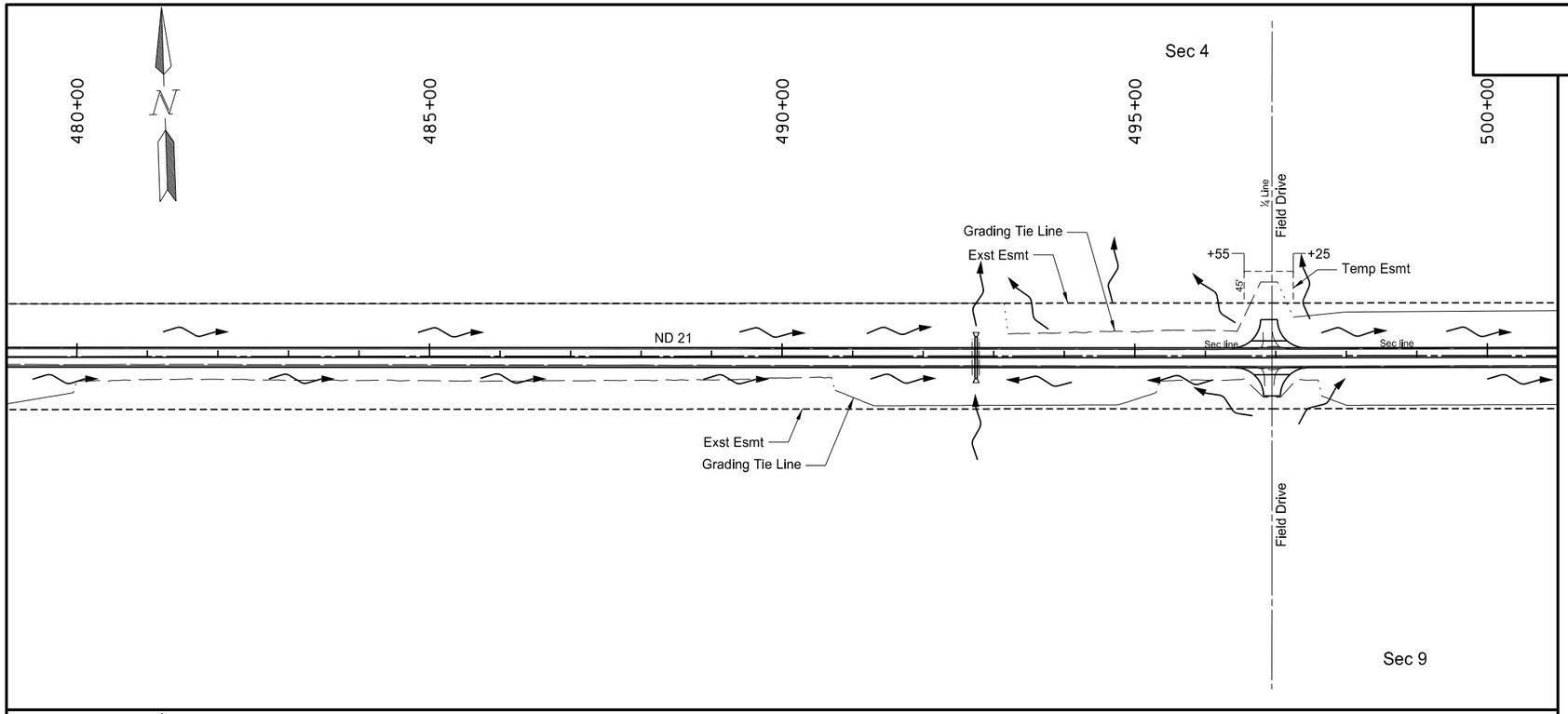
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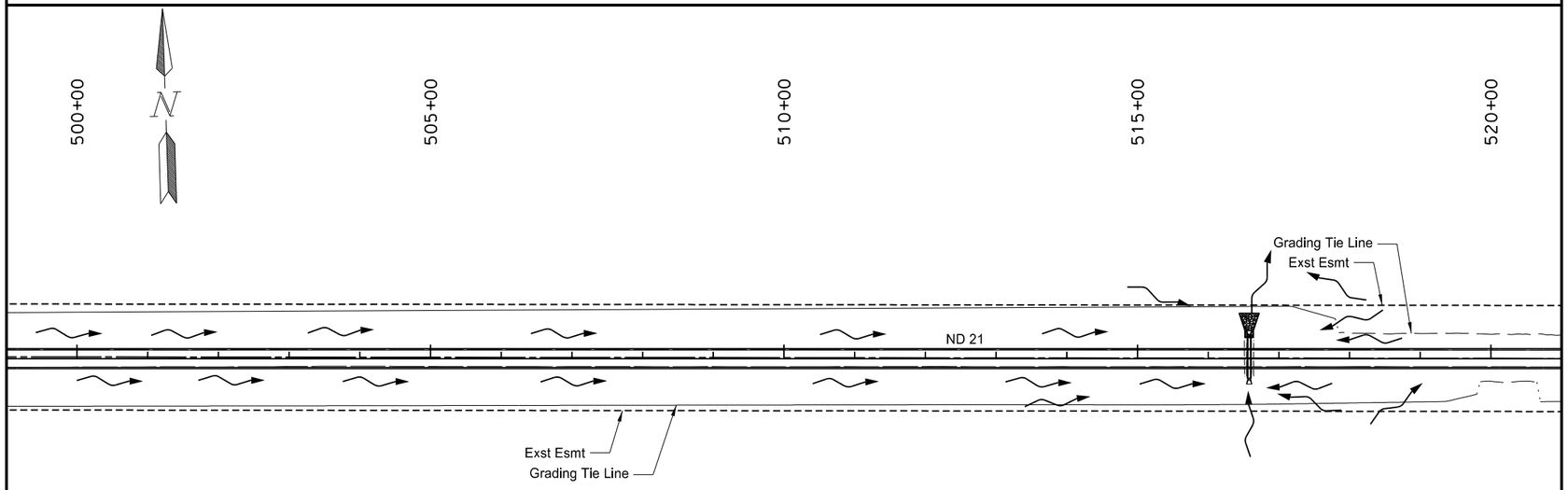
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

440+00 to 480+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	15





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
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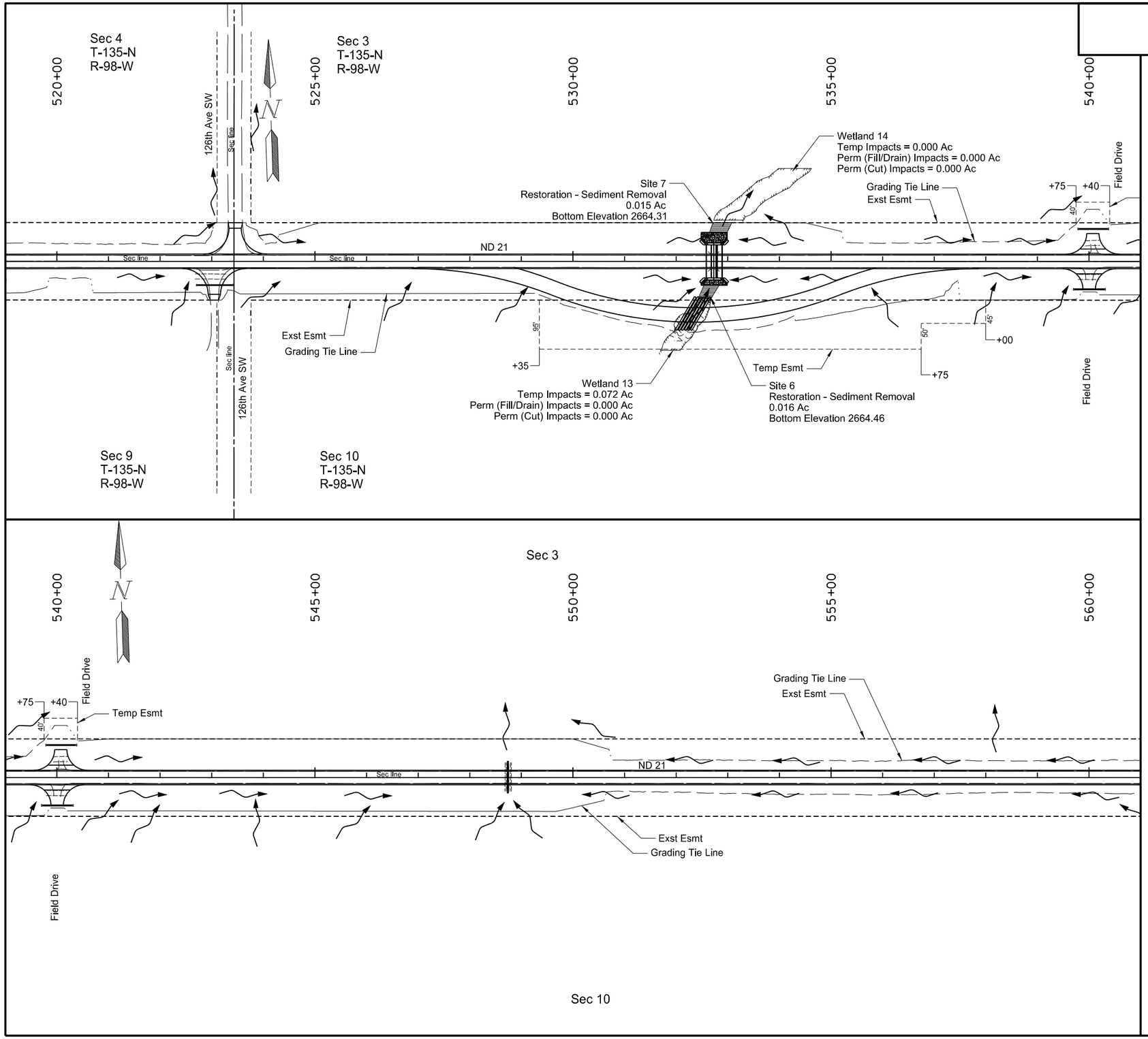
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

480+00 to 520+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	16



Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
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- Existing Other Water Wetland
- Flow Direction

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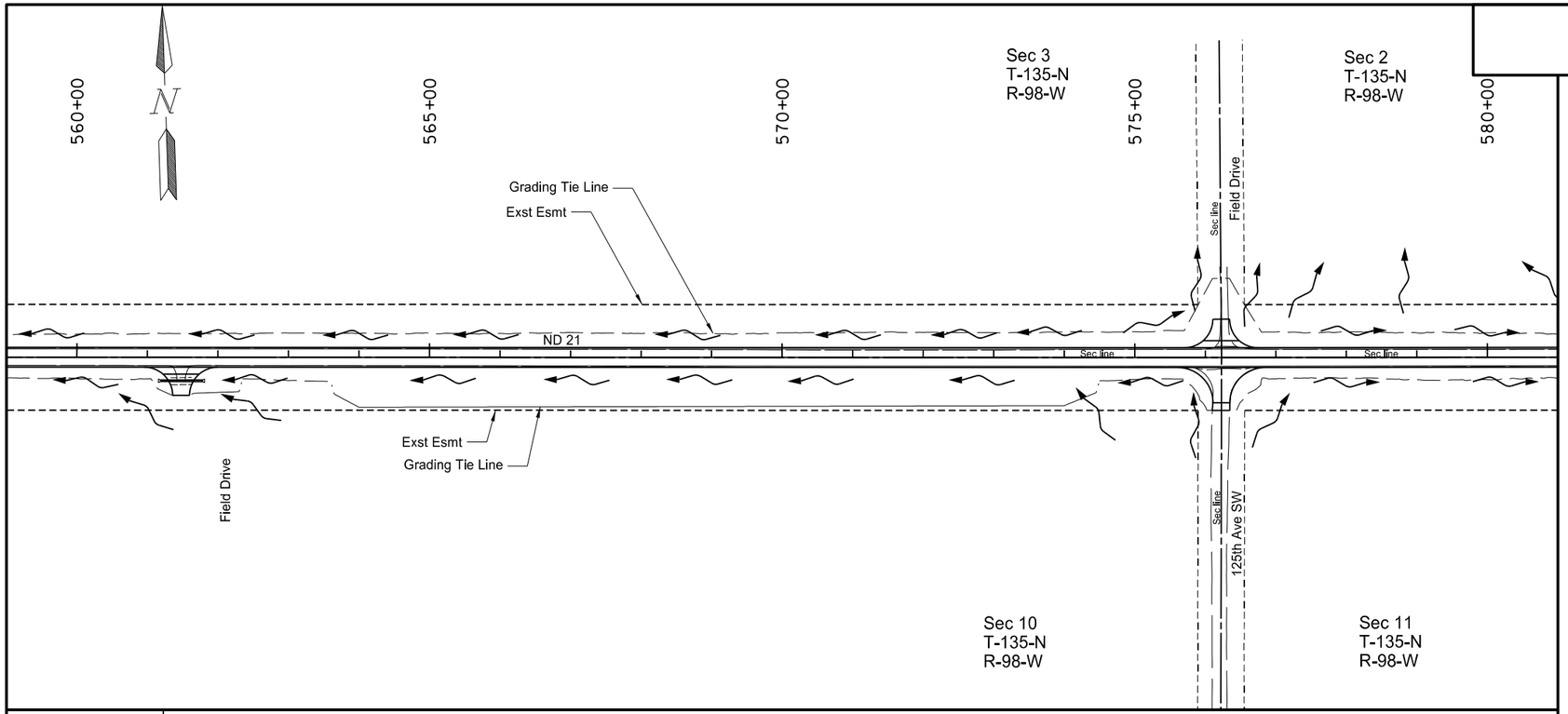
Wetland Impacts

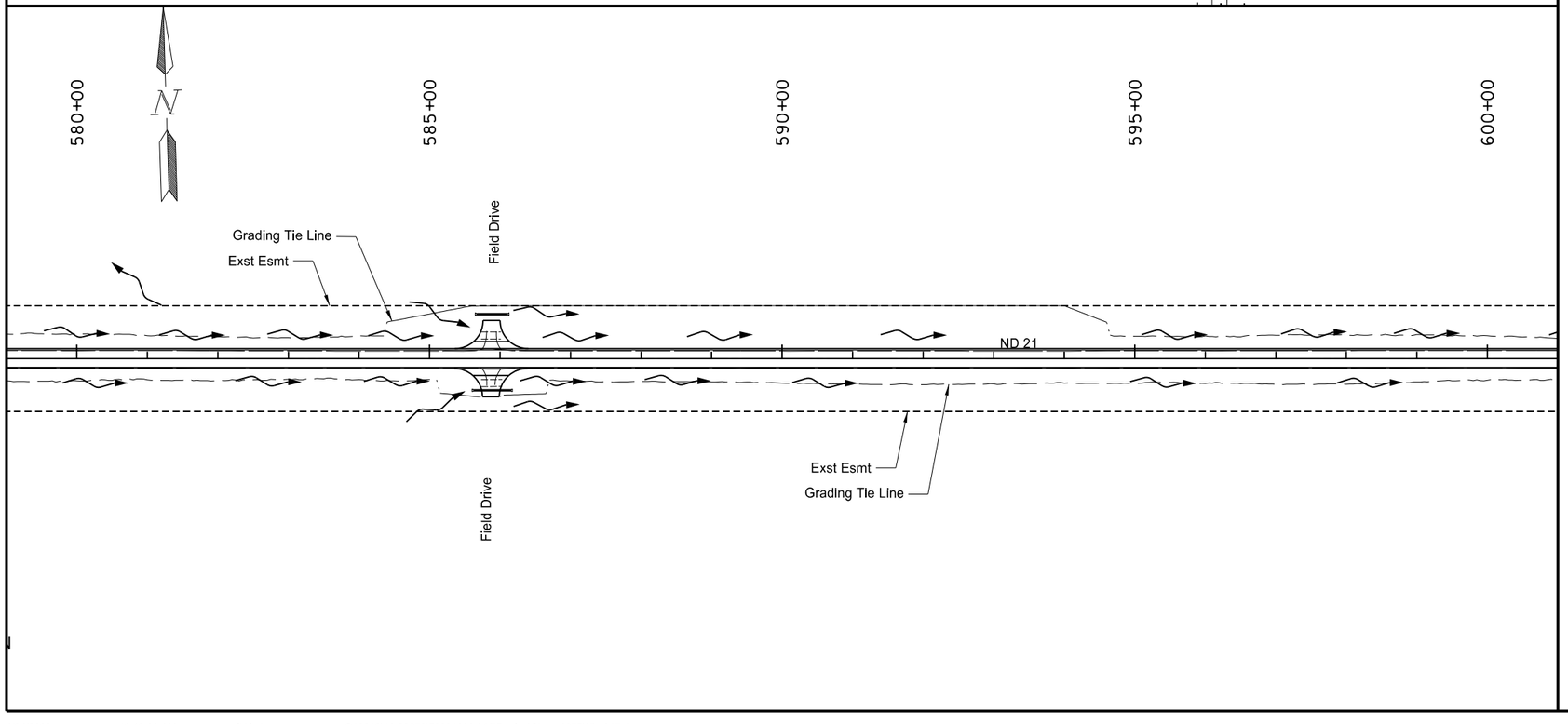
ND 21
Jct 85 to N Jct 22 - New England

520+00 to 560+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	17





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
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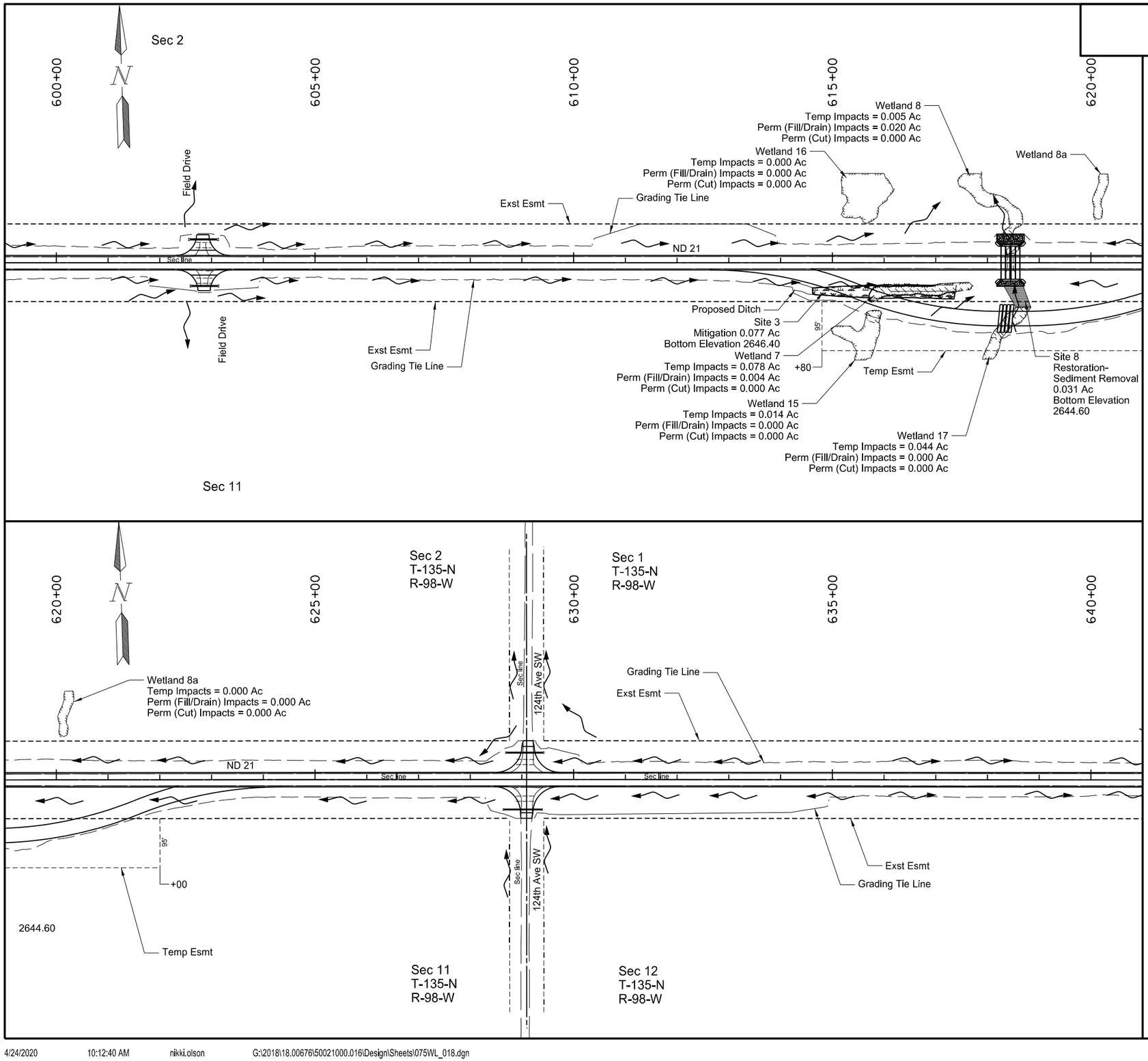
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

560+00 to 600+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	18



Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

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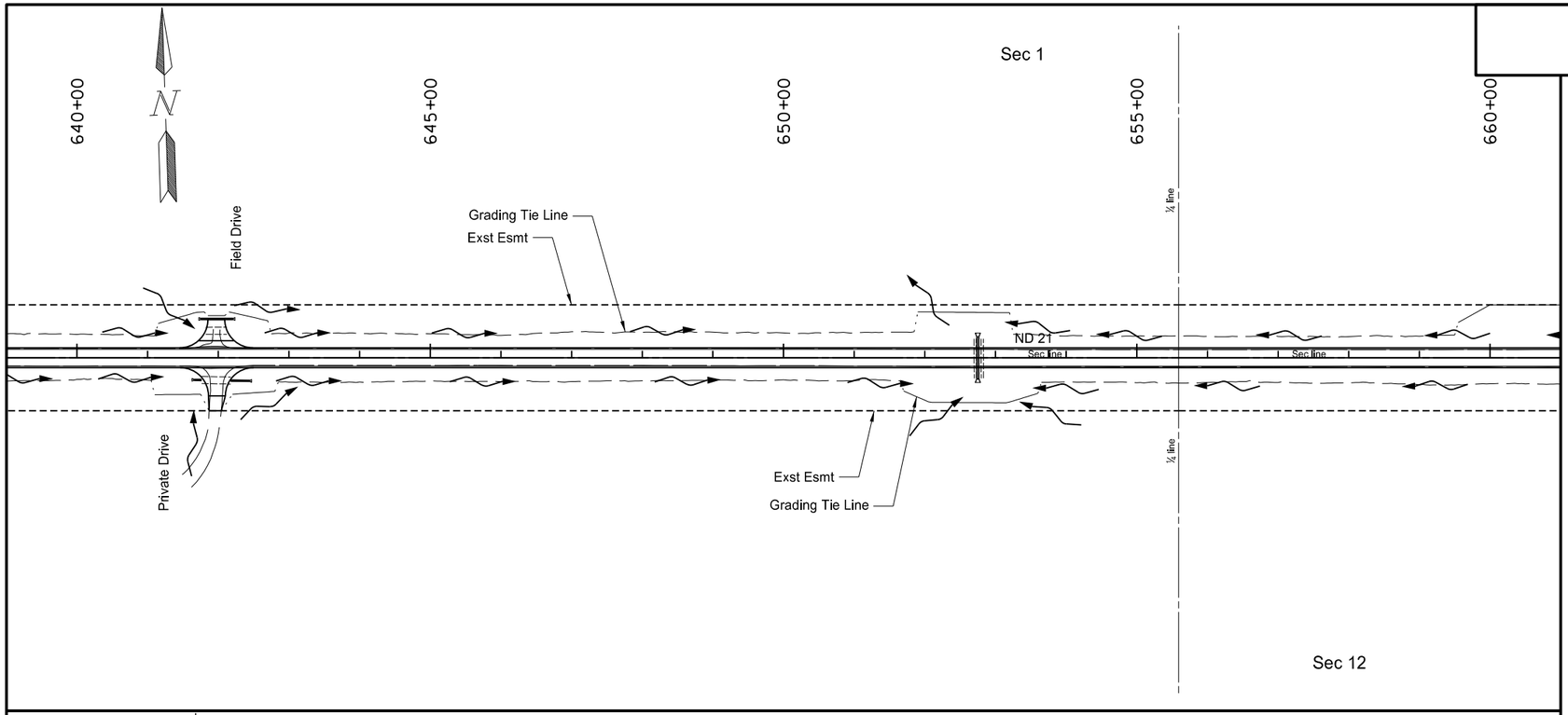
Wetland Impacts

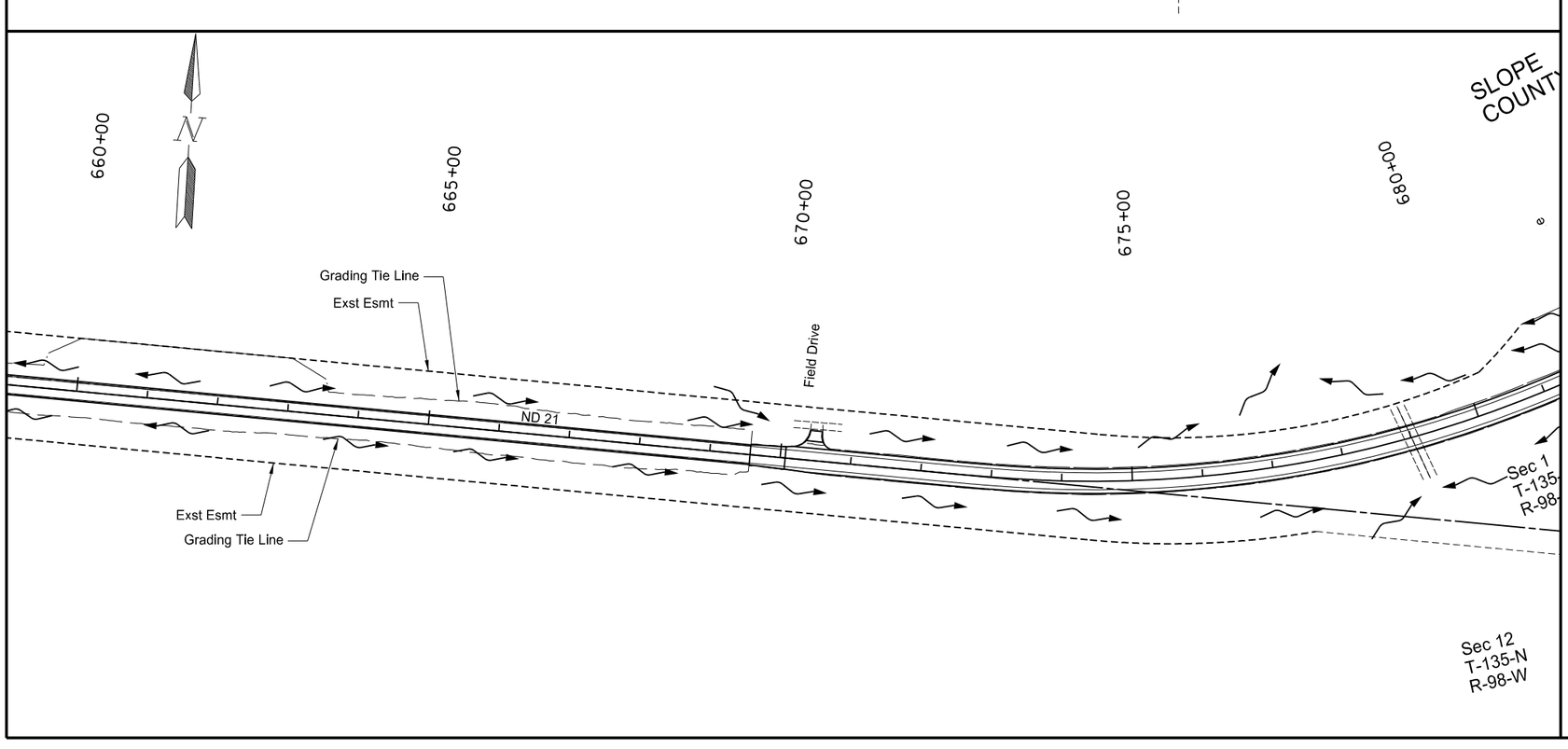
ND 21
Jct 85 to N Jct 22 - New England

600+00 to 640+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	19





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

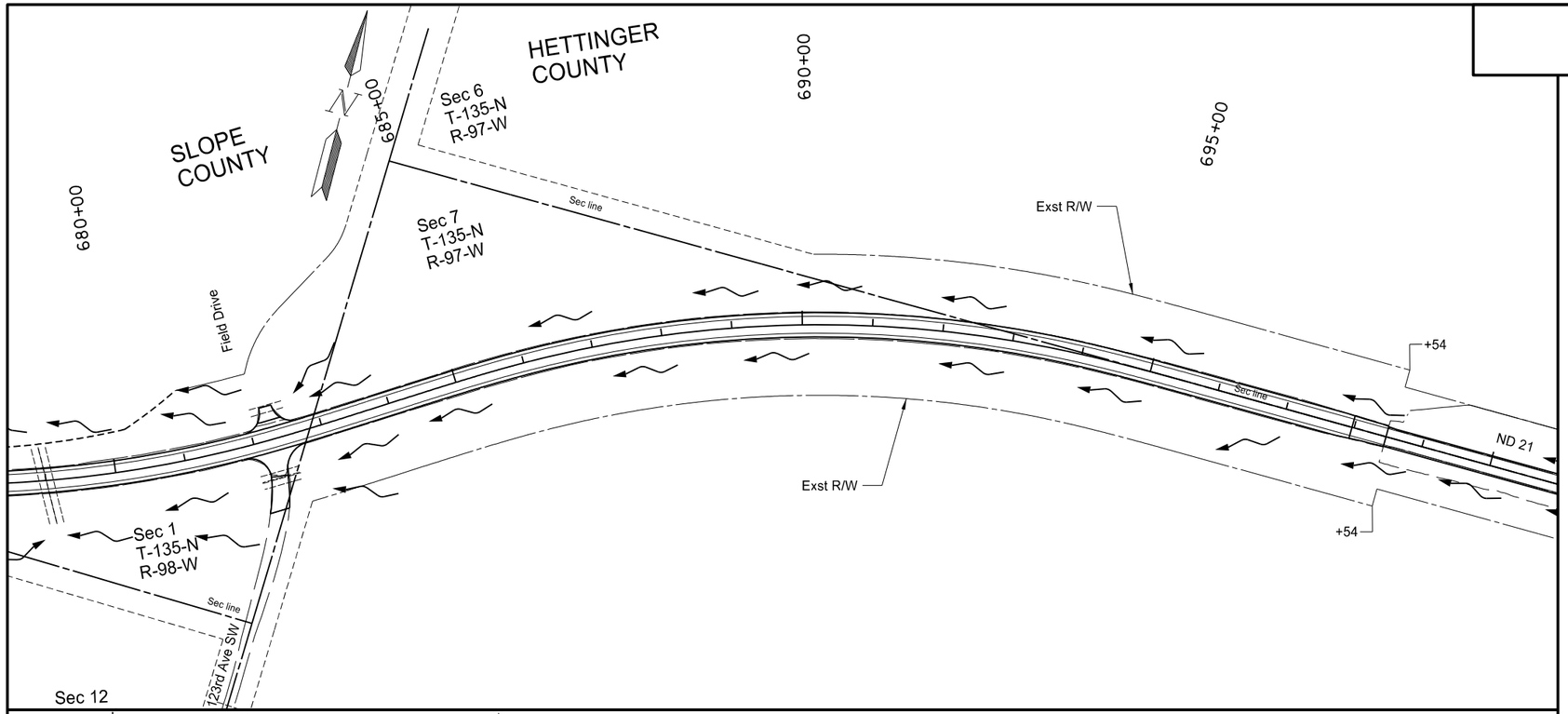
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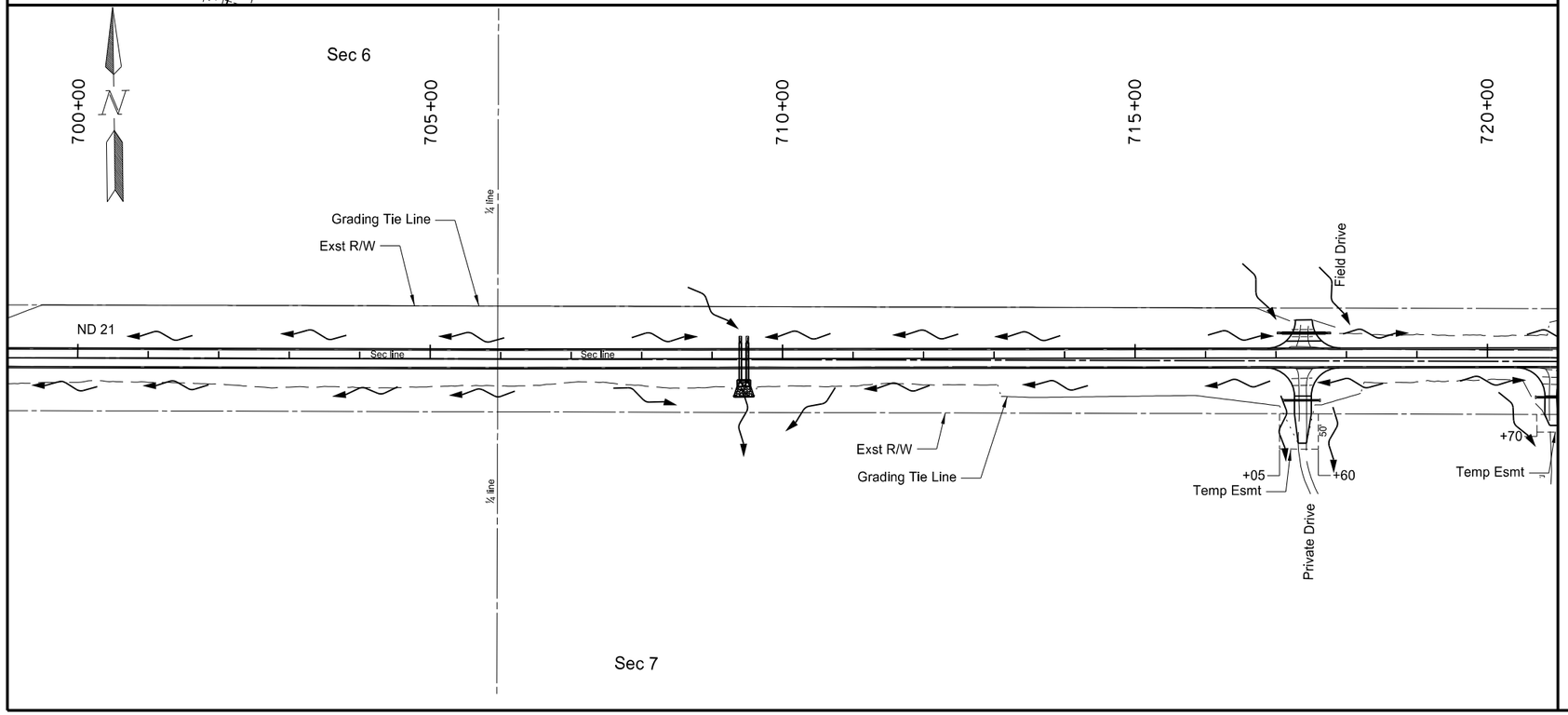
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

640+00 to 680+00

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	75	20





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

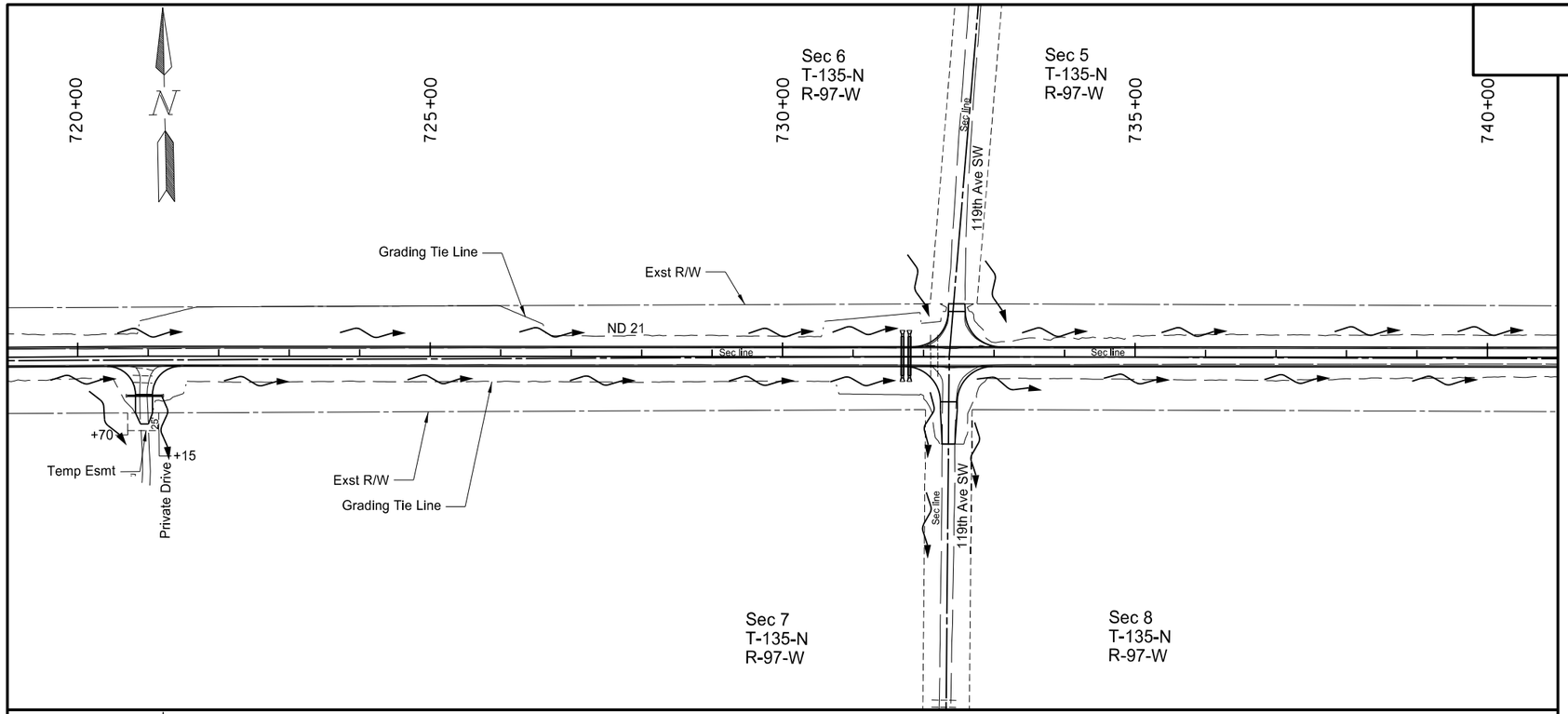
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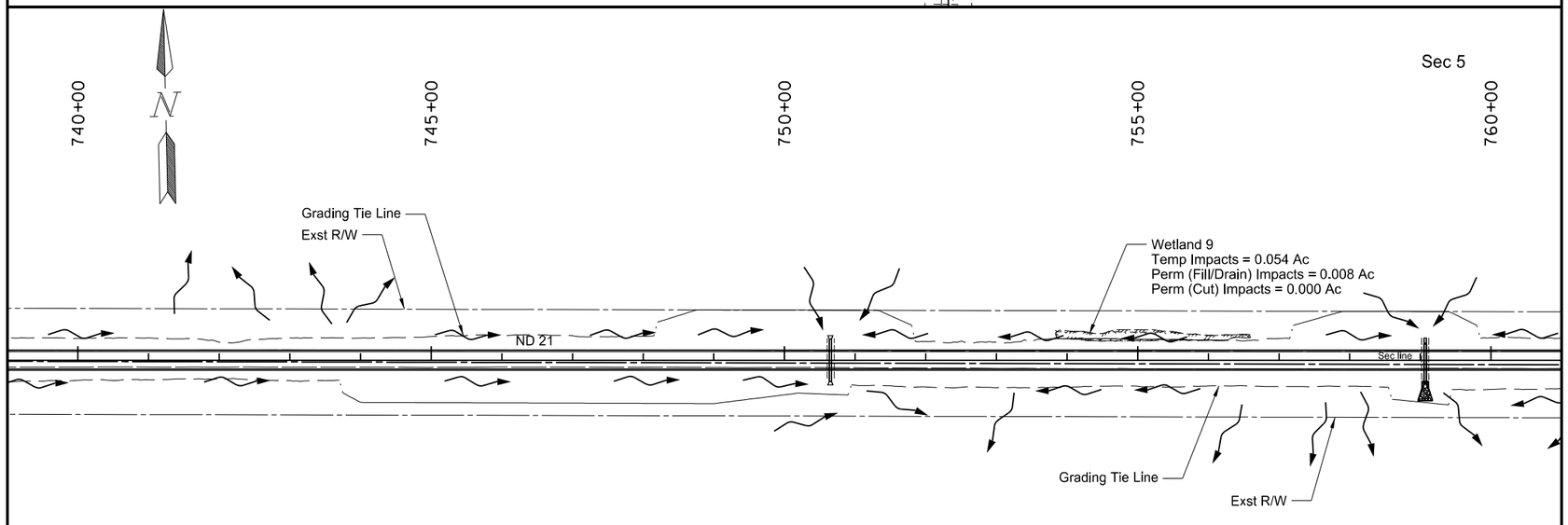
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

680+00 to 720+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	21





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

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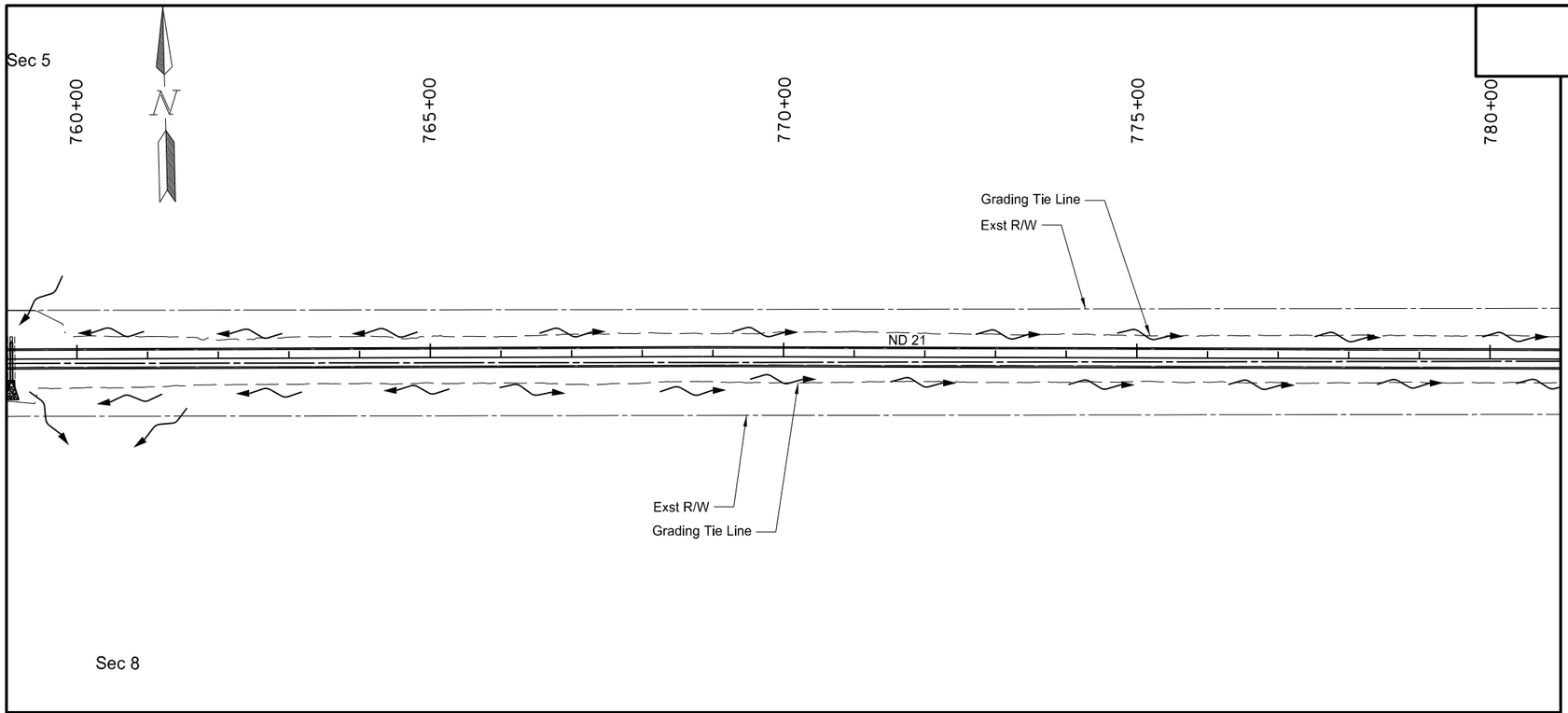
Wetland Impacts

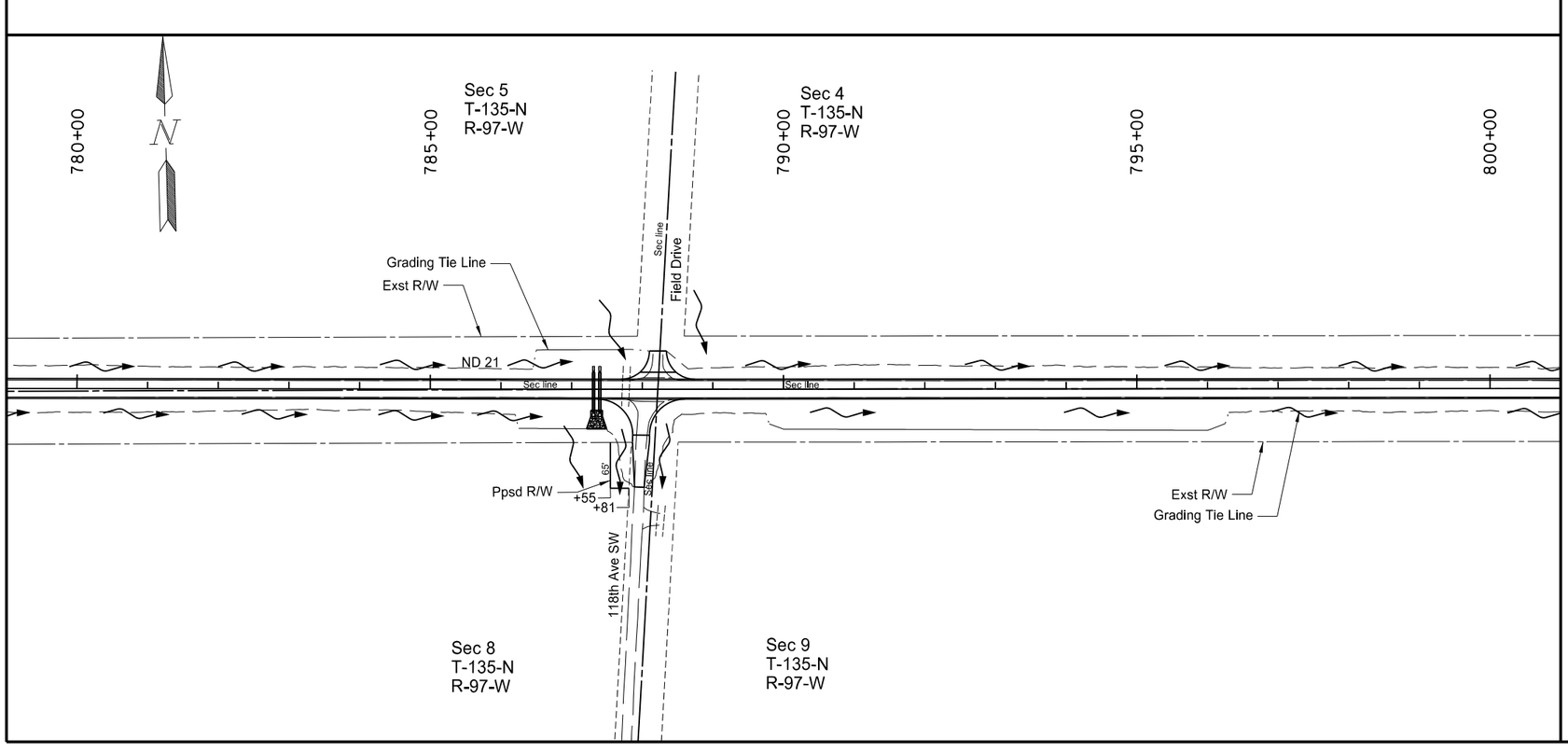
ND 21
Jct 85 to N Jct 22 - New England

720+00 to 760+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	75	22





Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

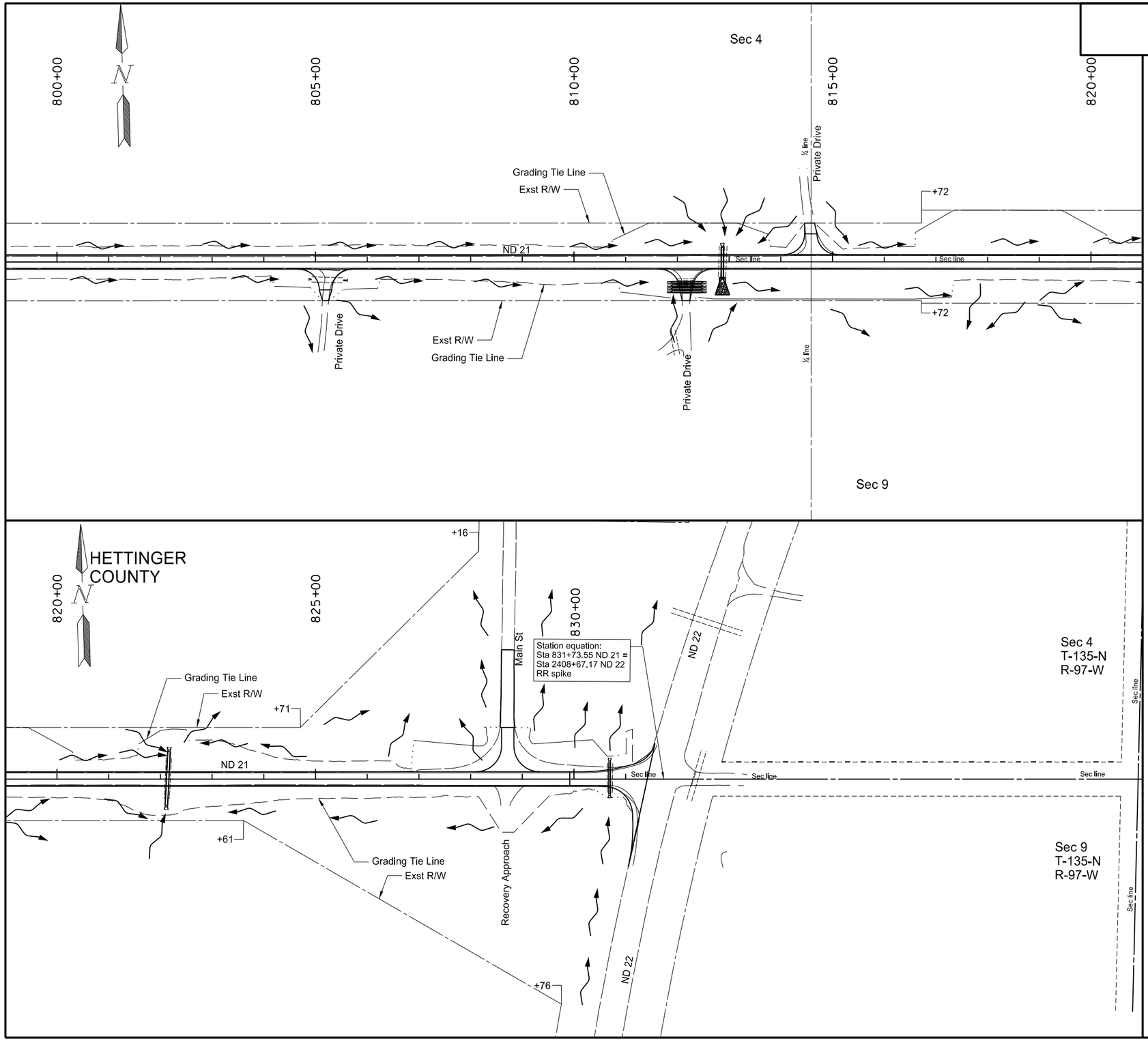
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Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

760+00 to 800+00

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	75	23



Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

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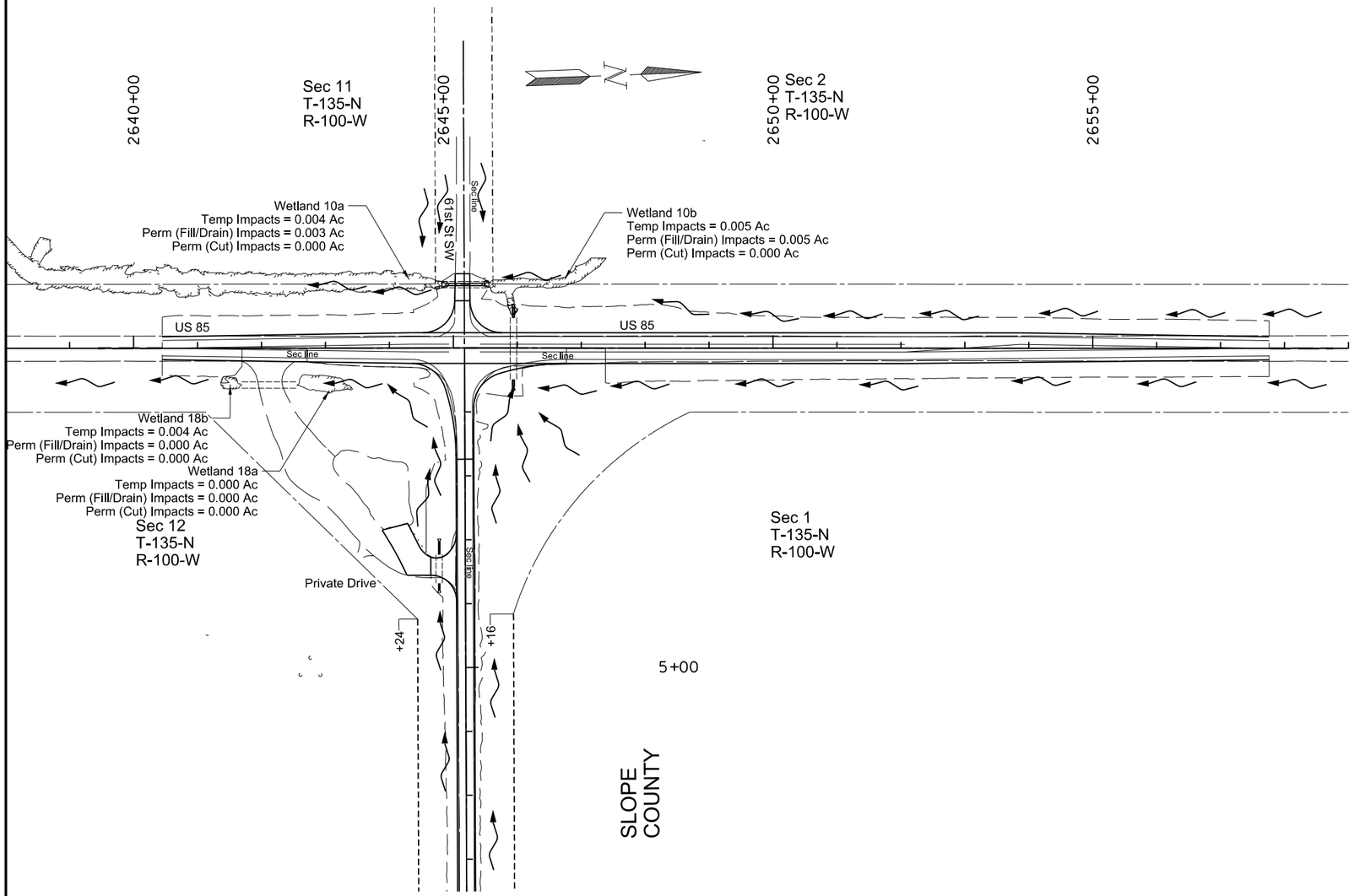
Wetland Impacts

ND 21
Jct 85 to N Jct 22 - New England

800+00 to 831+41.88

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	75	24



Legend

- Permanent Impact (Fill/Drain)
- Permanent Impact (Cut)
- Other Water Permanent Impact
- Other Water Temporary Impact
- Temporary Impact
- Wetland Mitigation
- Restoration - Sediment Removal
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Existing Delineated Wetland
- Existing Other Water Wetland
- Flow Direction

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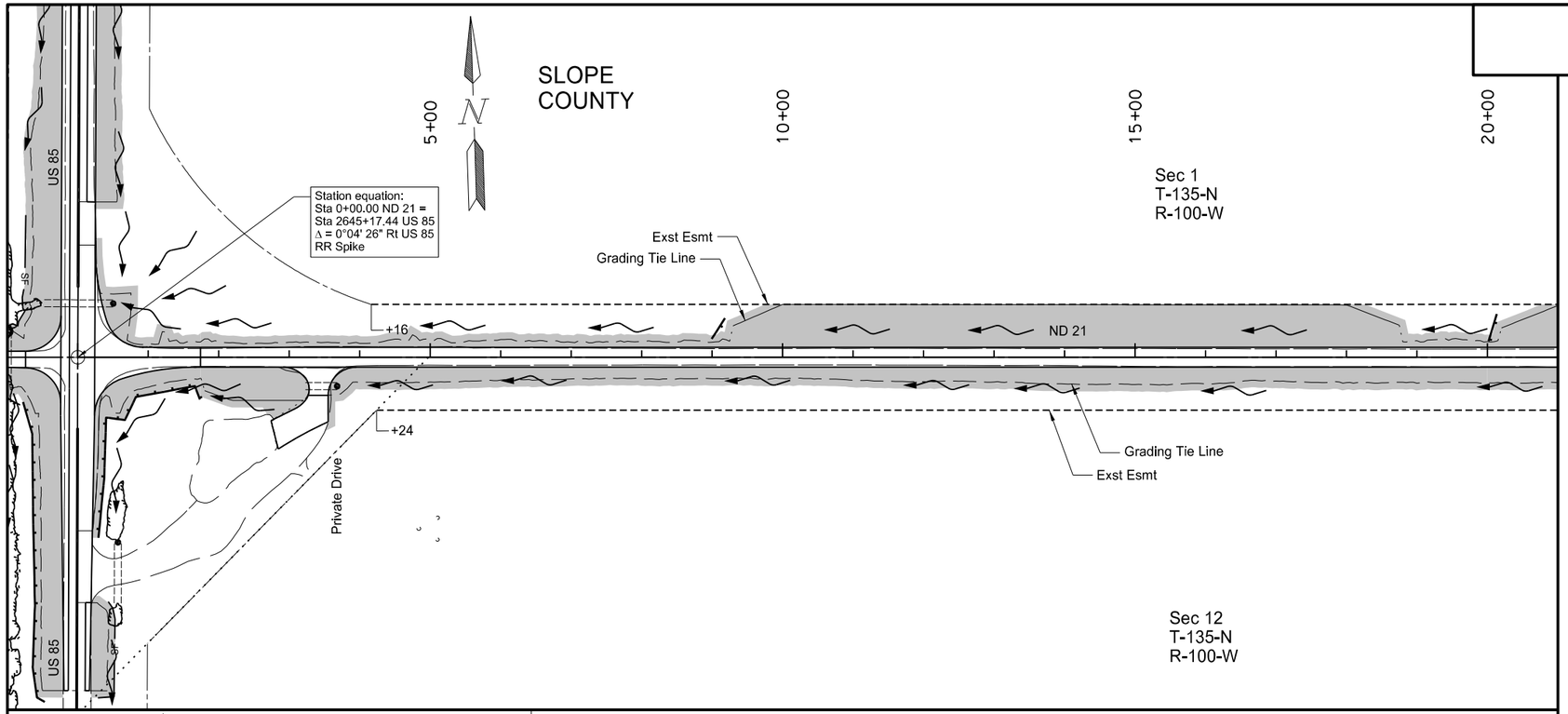
Wetland Impacts

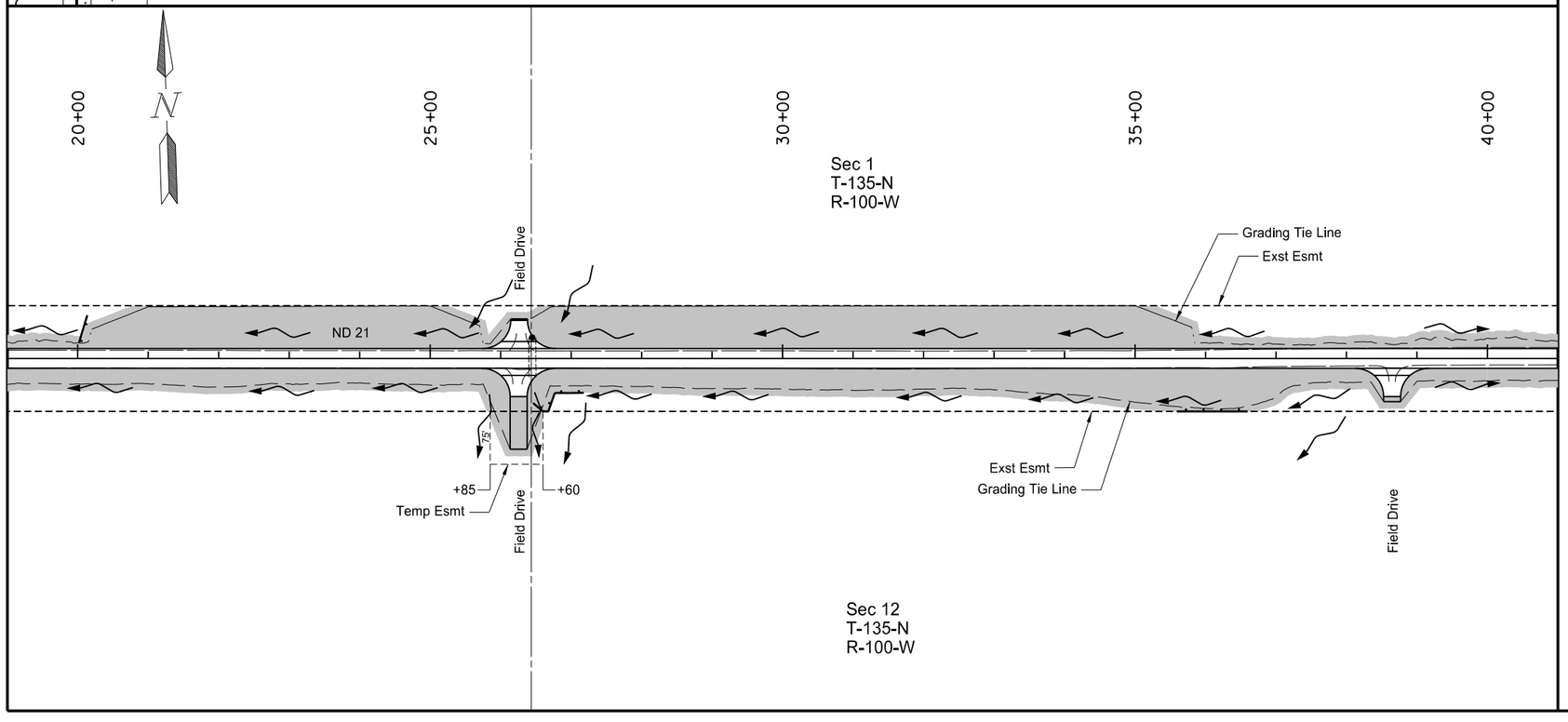
ND 21
Jct 85 to N Jct 22 - New England

US 85
2639+44.69 to 2658+76.06

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	1

SLOPE
COUNTY





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		1+74 Tto 40+00	7.21	ACRE
253	0101	STRAW MULCH		
		1+74 Tto 40+00	7.21	ACRE

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

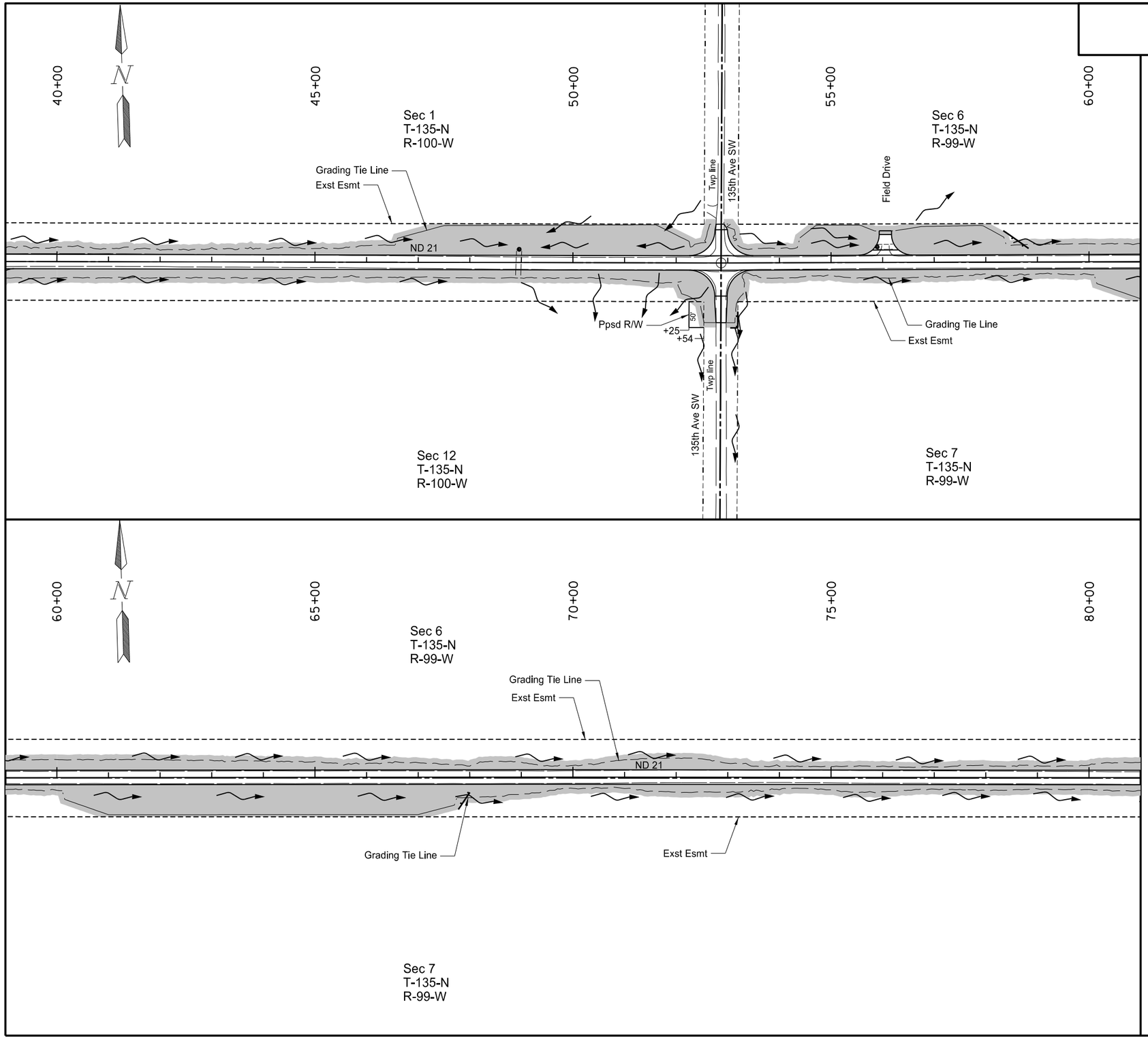
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Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

0+24 to 40+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	2



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		40+00 to 80+00	5.96	ACRE
253	0101	STRAW MULCH		
		40+00 to 80+00	5.96	ACRE

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

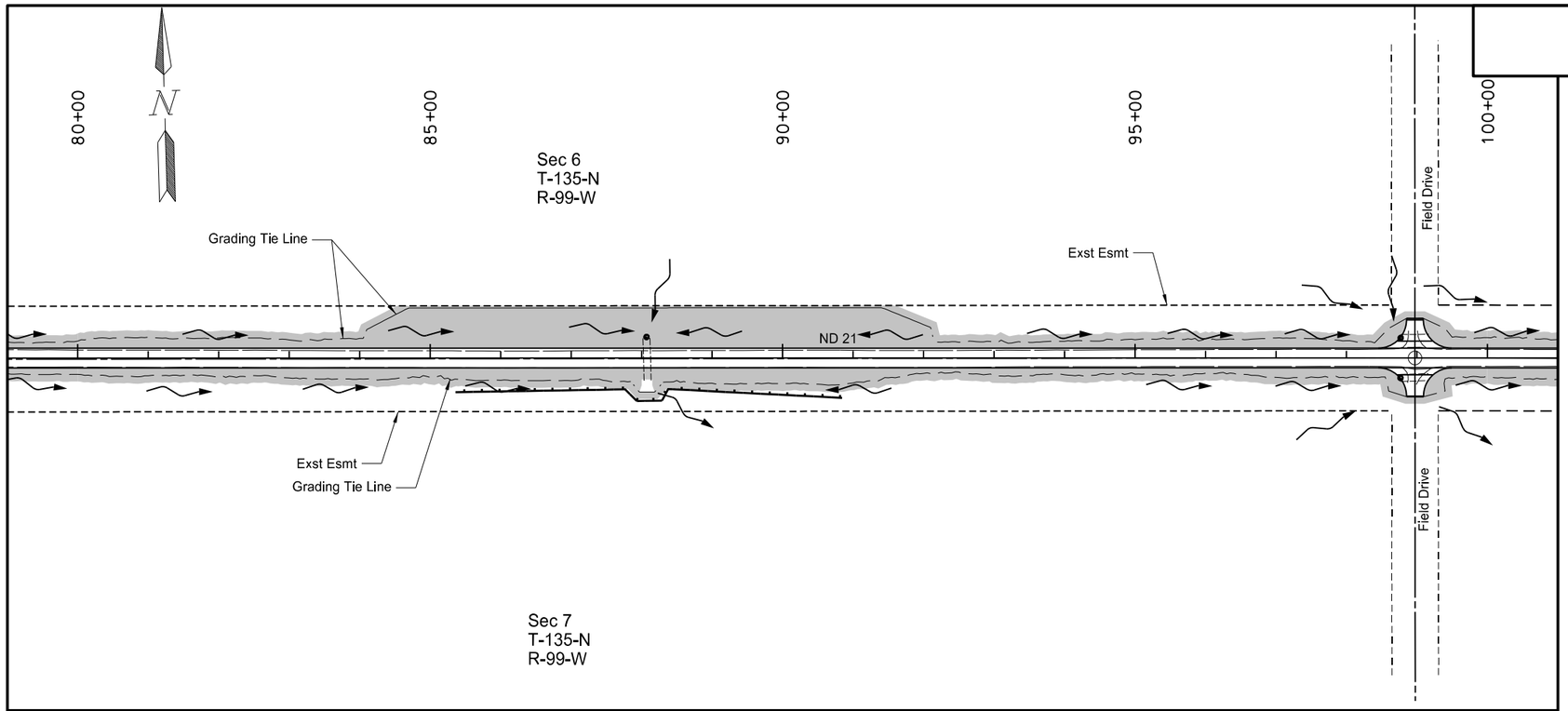
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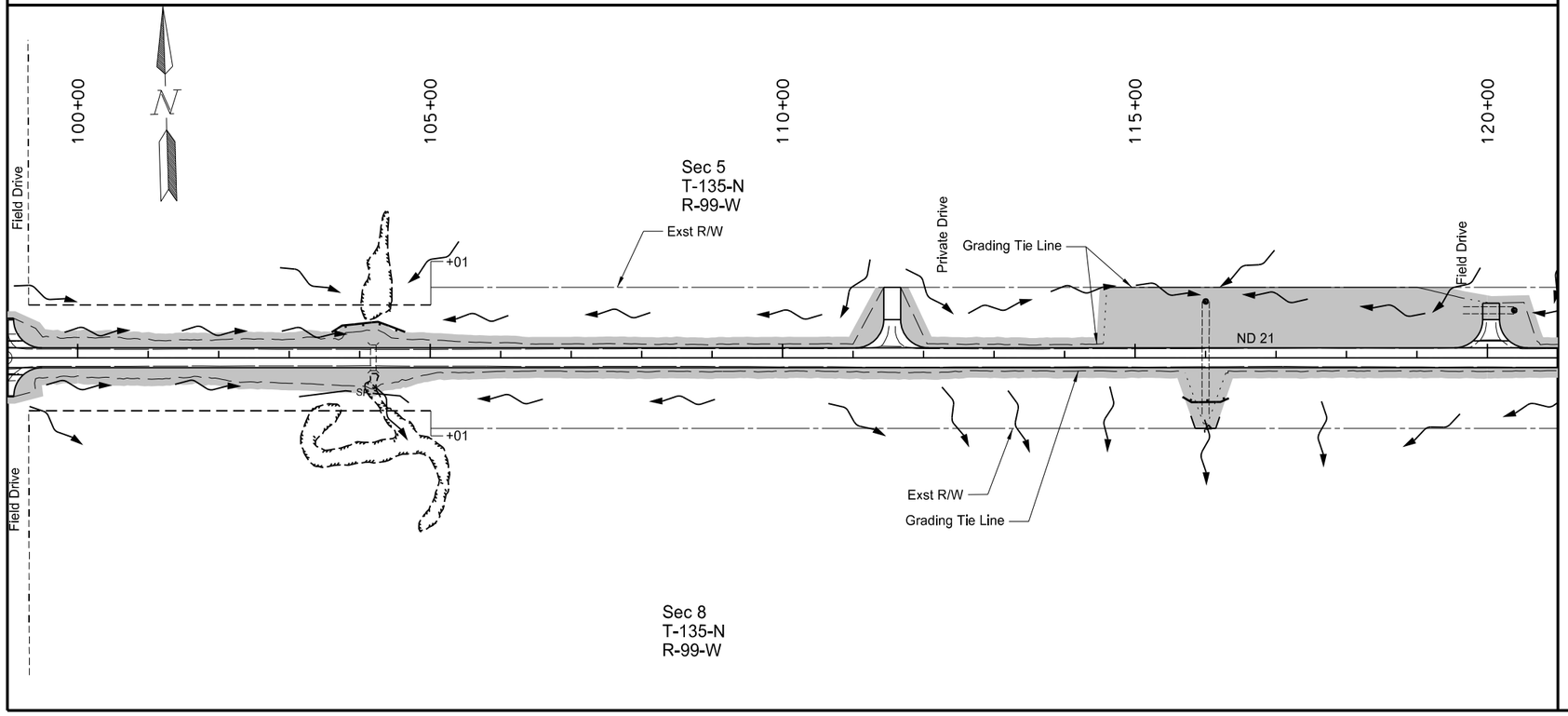
Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

40+00 to 80+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	3





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		80+00 to 120+00	5.57	ACRE
253	0101	STRAW MULCH		
		80+00 to 120+00	5.57	ACRE
260	0200	SILT FENCE SUPPORTED		
		103+14 - 55' Rt to 104+70 - 64' Rt	160	LF
		115+79 - 82' Rt to 116+20 - 84' Rt	65	LF
260	0201	REMOVE SILT FIENCE SUPPORTED		
		103+14 - 55' Rt to 104+70 - 64' Rt	160	LF
		115+79 - 82' Rt to 116+20 - 84' Rt	65	LF

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

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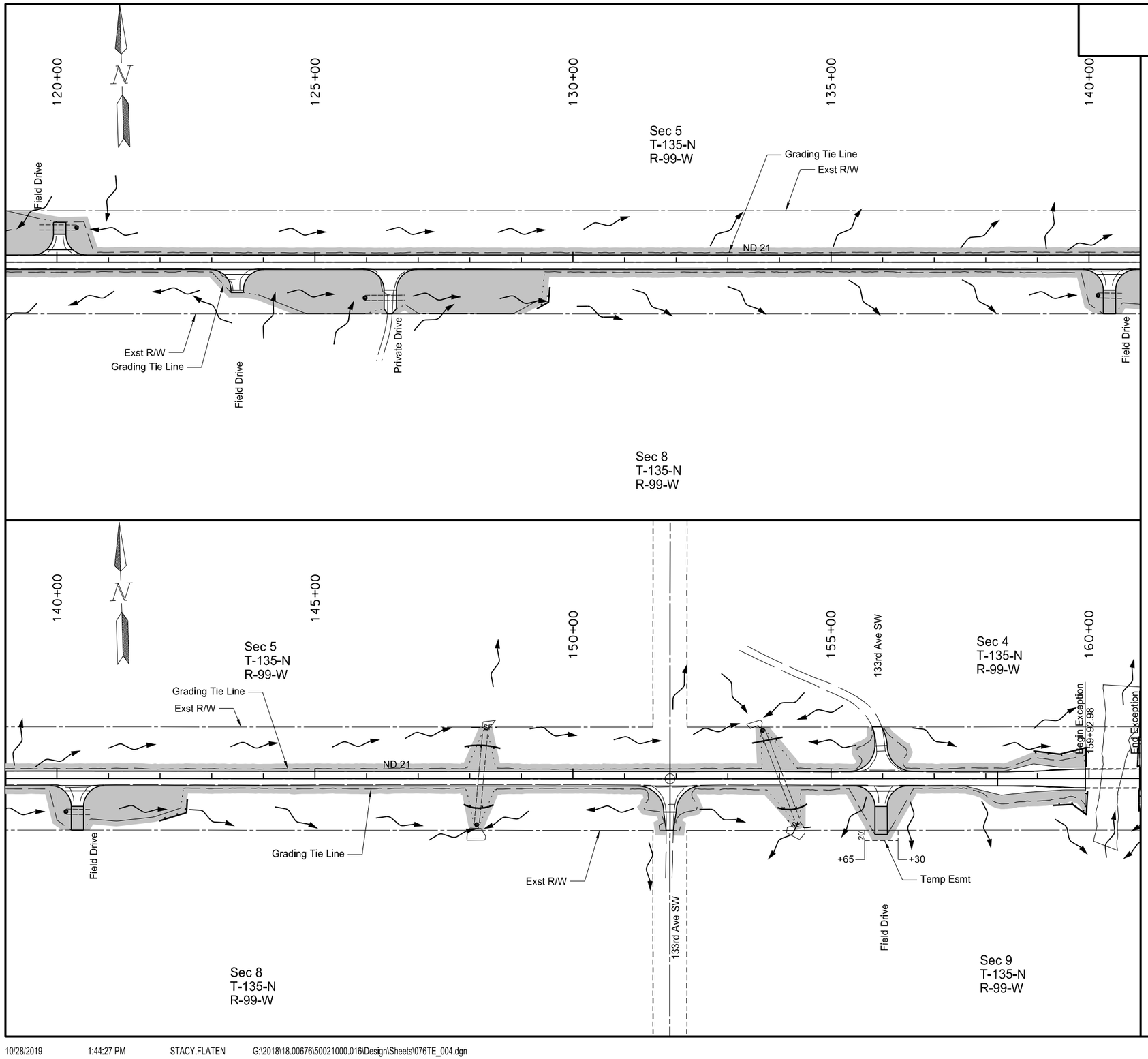
Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

80+00 to 120+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	4



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		120+00 to 159+92.98	4.74	ACRE
253	0101	STRAW MULCH		
		120+00 to 159+92.98	4.74	ACRE
260	0200	SILT FENCE SUPPORTED		
		148+03 - 100' Lt to 148+53 - 100' Lt	50	LF
		154+15 - 80' Rt to 154+62 - 93' Rt	51	LF
260	0201	REMOVE SILT FIENCE SUPPORTED		
		148+03 - 100' Lt to 148+53 - 100' Lt	50	LF
		154+15 - 80' Rt to 154+62 - 93' Rt	51	LF

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

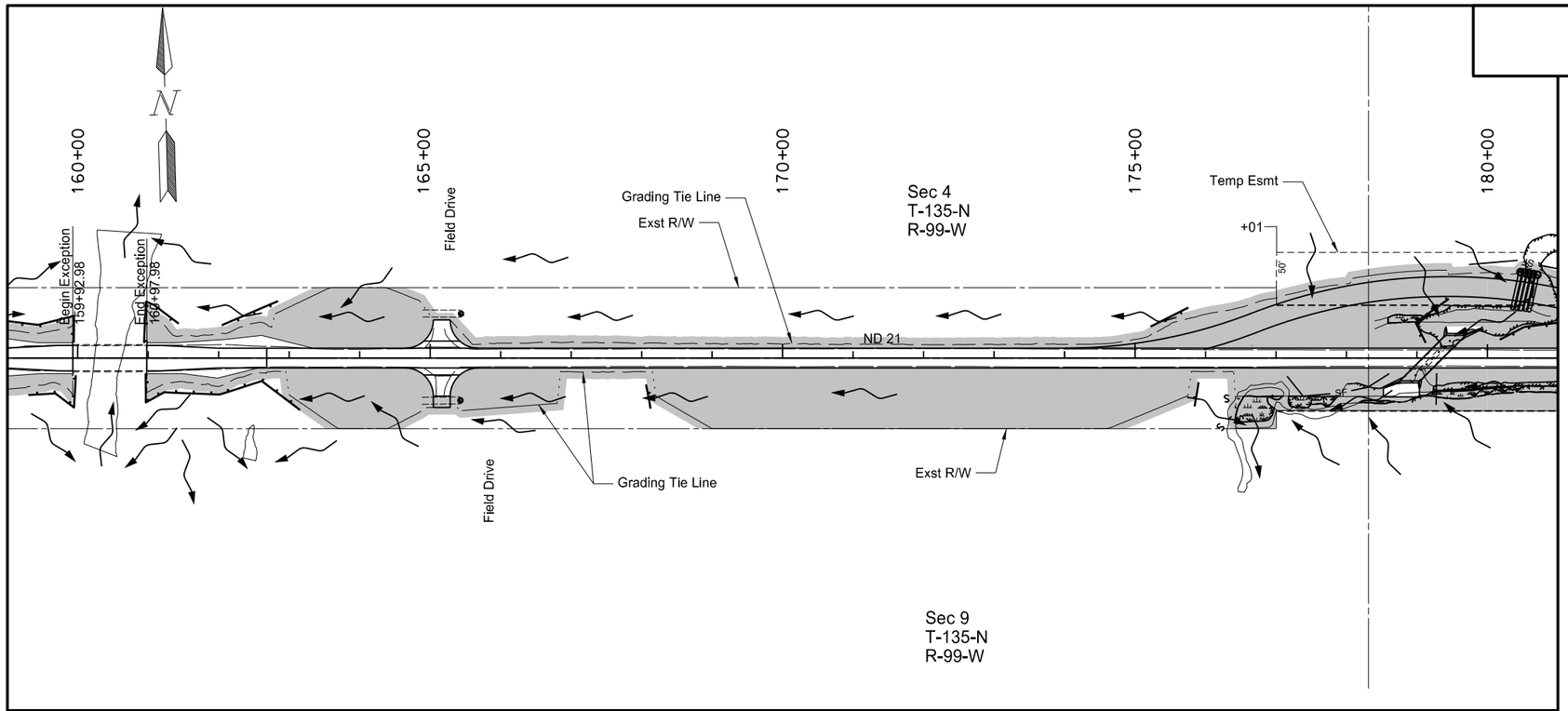
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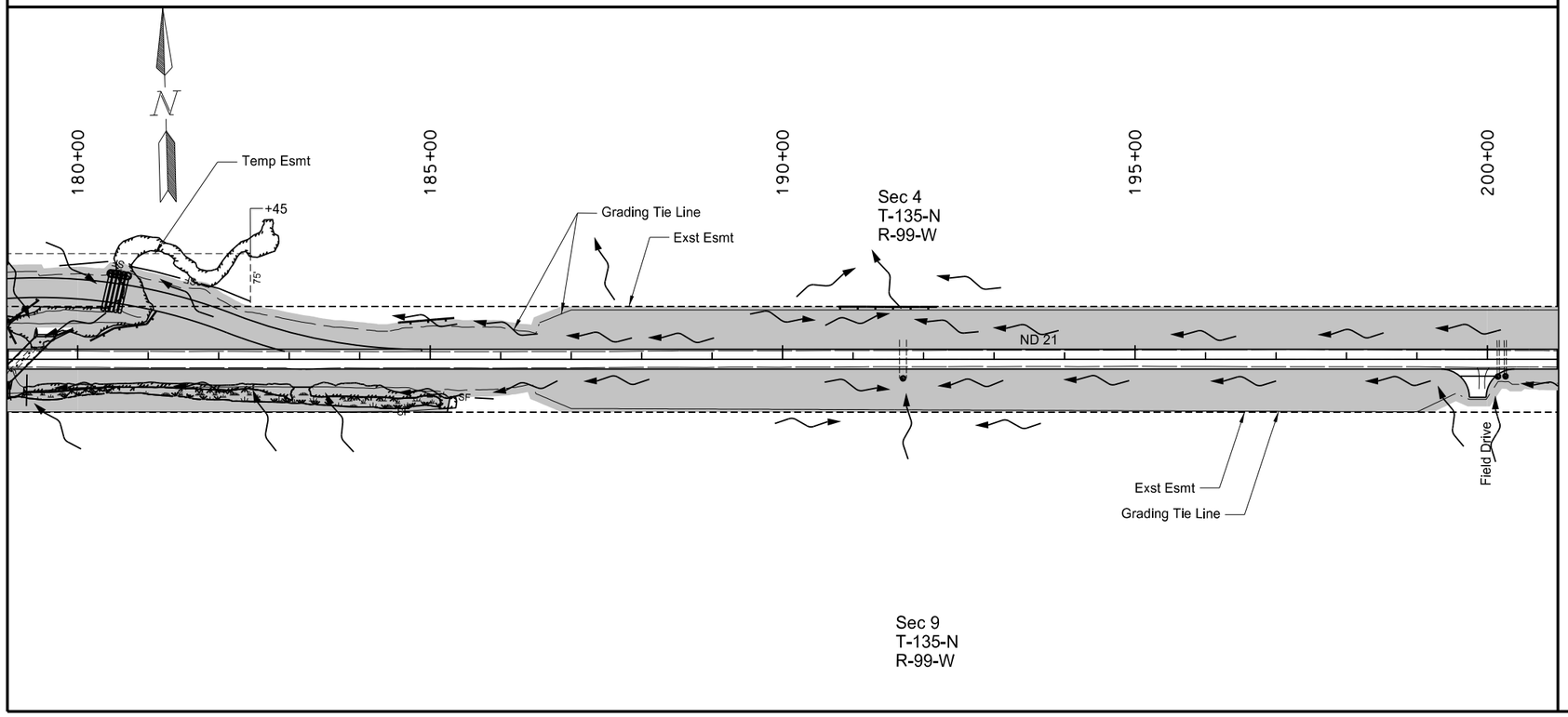
Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

120+00 to 159+92.98

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	5





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		160+97.98 to 200+00	10.19	ACRE
253	0101	STRAW MULCH		
		160+97.98 to 200+00	10.19	ACRE
262	0100	FLOTATION SILT CURTAIN		
		176+19 - 100' Rt to 176+37 - 82' Rt	25	LF
		176+24 - 68' Rt to 176+49 - 91' Rt	25	LF
		176+42 - 64' Rt to 176+50 - 88' Rt	25	LF
262	0101	REMOVE FLOTATION SILT CURTAIN		
		176+19 - 100' Rt to 176+37 - 82' Rt	25	LF
		176+24 - 68' Rt to 176+49 - 91' Rt	25	LF
		176+42 - 64' Rt to 176+50 - 88' Rt	25	LF
260	0200	SILT FENCE SUPPORTED		
		177+16 - 25' Rt to 178+61 - 22' Rt	165	LF
		179+27 - 66' Rt to 179+28 - 21' Rt	45	LF
		179+74 - 133' Lt to 182+45 - 82' Lt	280	LF
		183+71 - 75' Rt to 185+90 - 56' Rt	237	LF
260	0201	REMOVE SILT FIENCE SUPPORTED		
		177+16 - 25' Rt to 178+61 - 22' Rt	165	LF
		179+27 - 66' Rt to 179+28 - 21' Rt	45	LF
		179+74 - 133' Lt to 182+45 - 82' Lt	280	LF
		183+71 - 75' Rt to 185+90 - 56' Rt	237	LF

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

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Temporary Erosion Control

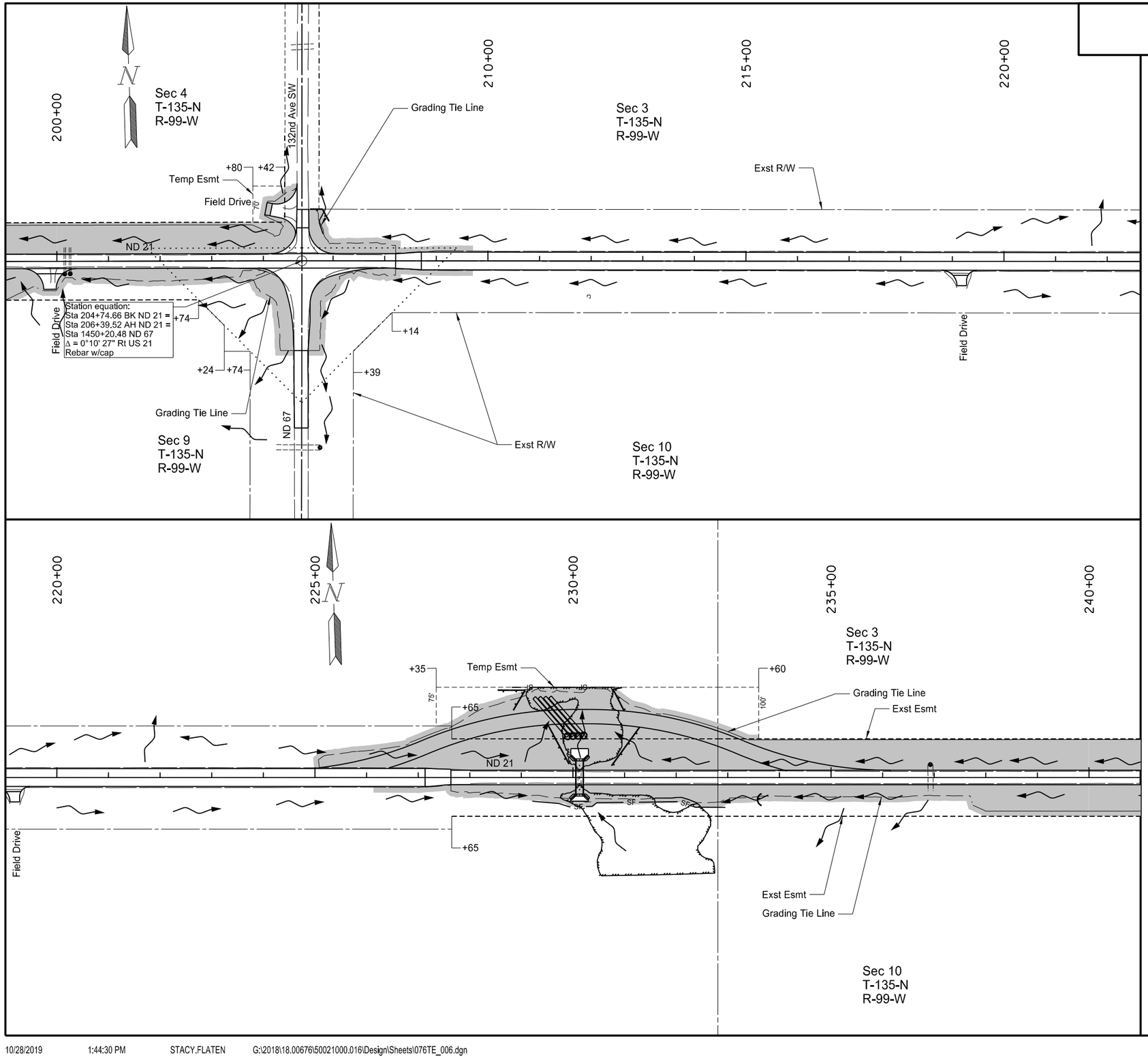
ND 21
Jct 85 to N Jct 22 - New England

160+97.98 to 200+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	6

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		200+00 to 240+00	5.62	ACRE
253	0101	STRAW MULCH		
		200+00 to 240+00	5.62	ACRE
260	0200	SILT FENCE SUPPORTED		
		228+81 - 175' Lt to 230+81 - 175' Lt	200	LF
		229+21 - 46' Rt to 232+95 - 58' Rt	380	LF
260	0201	REMOVE SILT FIENCE SUPPORTED		
		228+81 - 175' Lt to 230+81 - 175' Lt	200	LF
		229+21 - 46' Rt to 232+95 - 58' Rt	380	LF

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data



Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
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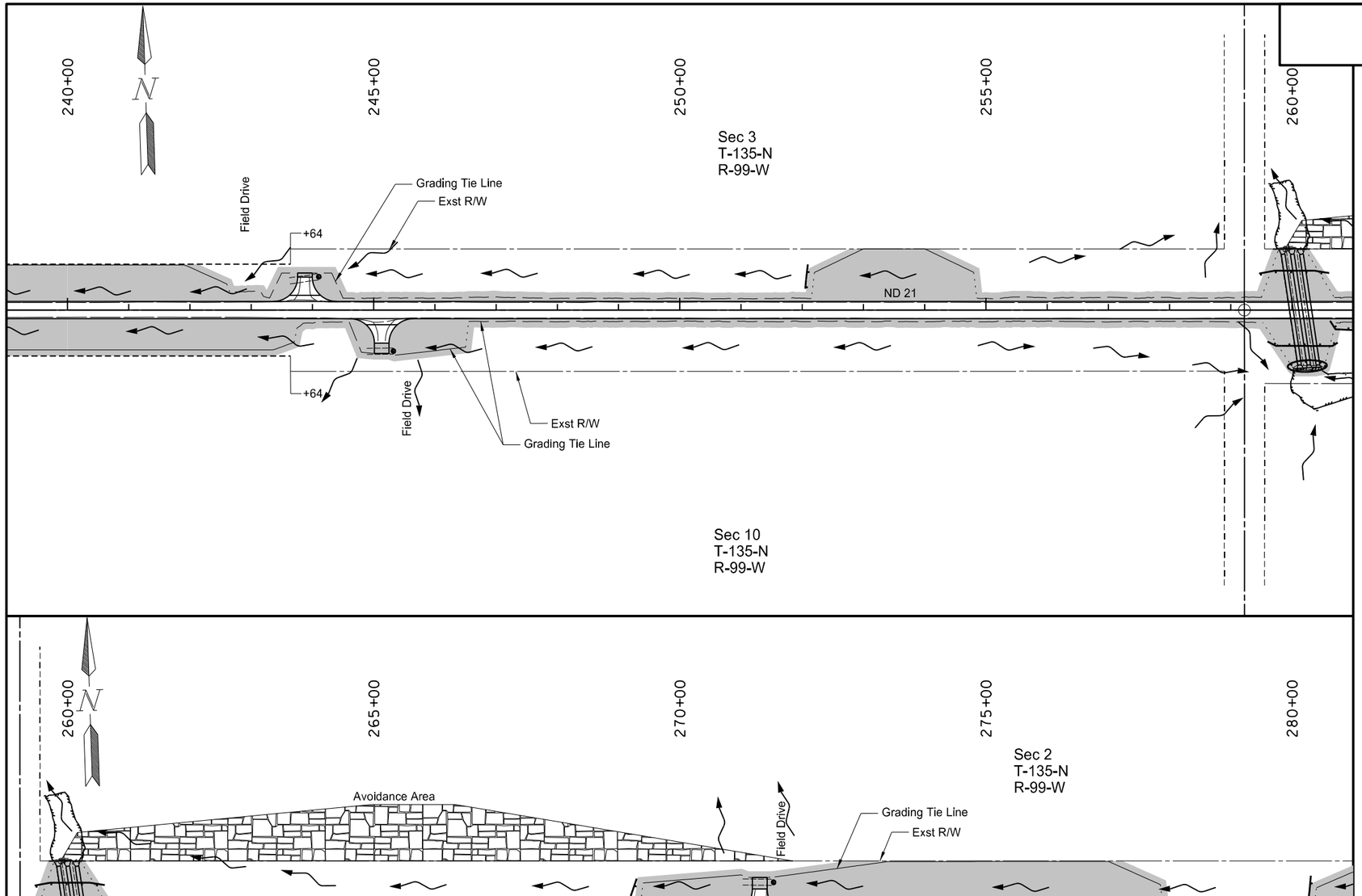
Temporary Erosion Control

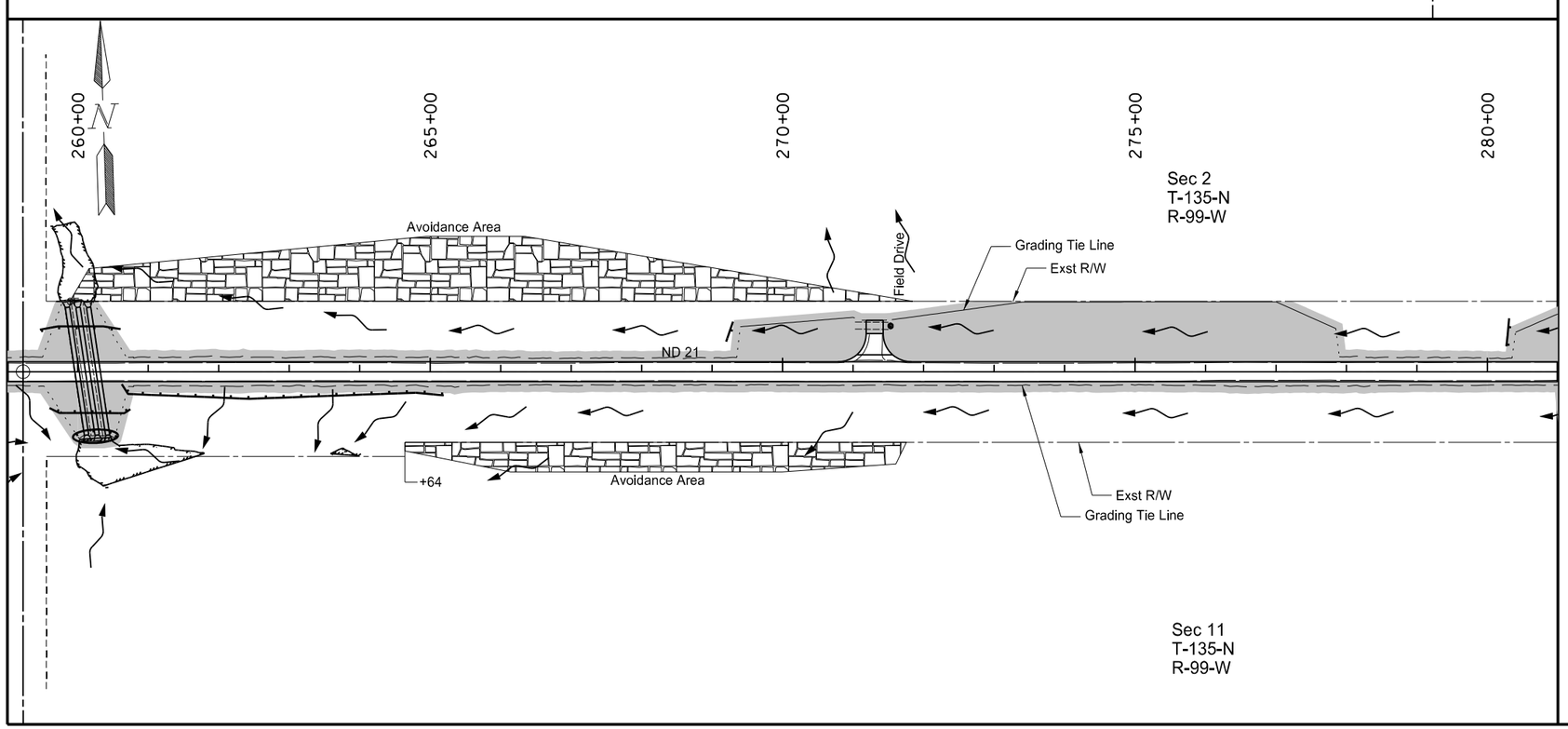
ND 21
Jct 85 to N Jct 22 - New England

200+00 to 240+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	7





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		240+00 to 280+00	5.71	ACRE
253	0101	STRAW MULCH		
		240+00 to 280+00	5.71	ACRE
260	0200	SILT FENCE SUPPORTED		
		259+69 - 100' Lt to 260+29 - 100' Lt	60	LF
260	0201	REMOVE SILT FIENCE SUPPORTED		
		259+69 - 100' Lt to 260+29 - 100' Lt	60	LF

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

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Temporary Erosion Control

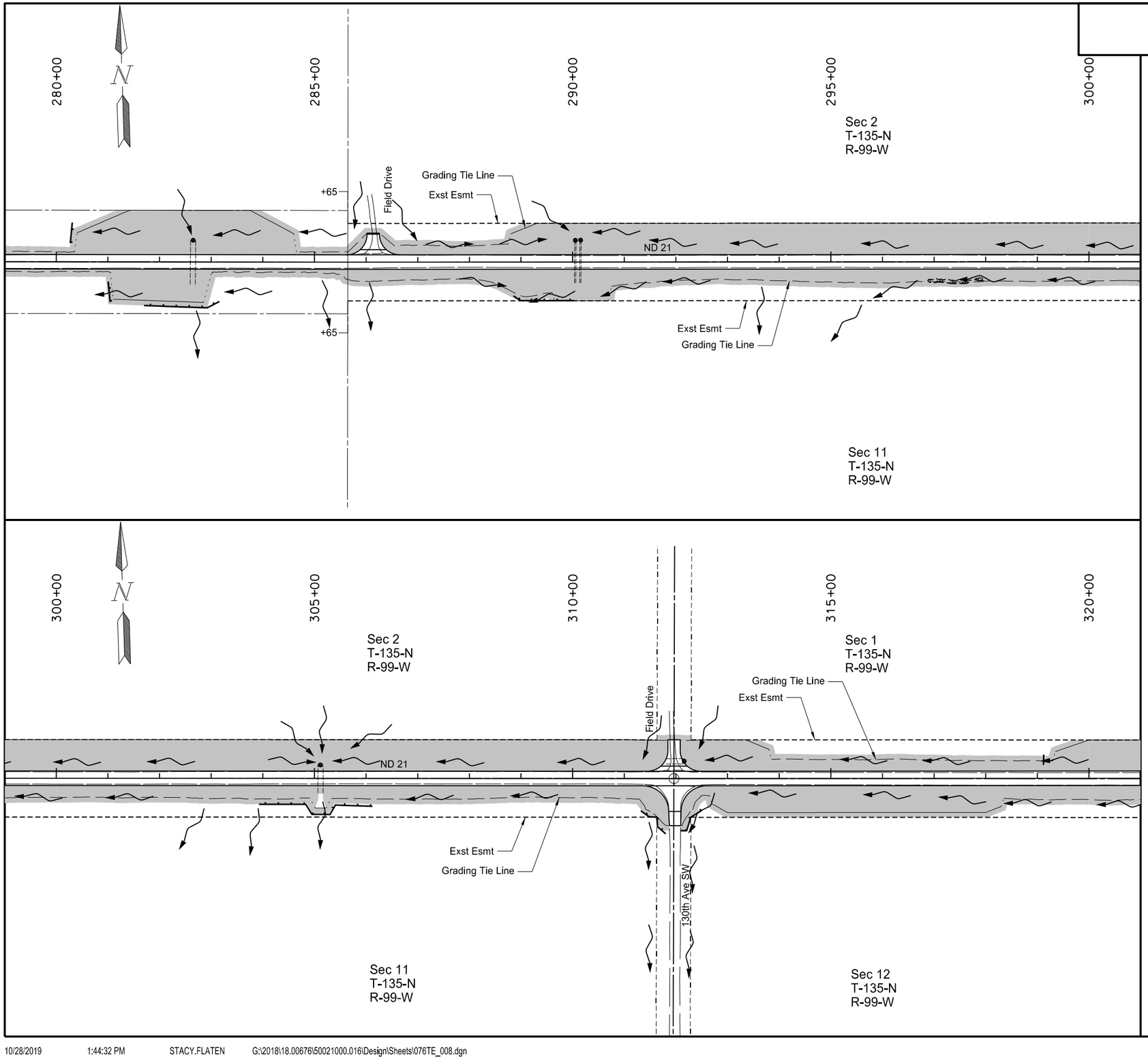
ND 21
Jct 85 to N Jct 22 - New England

240+00 to 280+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	8

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		280+00 to 320+00	8.67	ACRE
253	0101	STRAW MULCH		
		280+00 to 320+00	8.67	ACRE

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data



Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

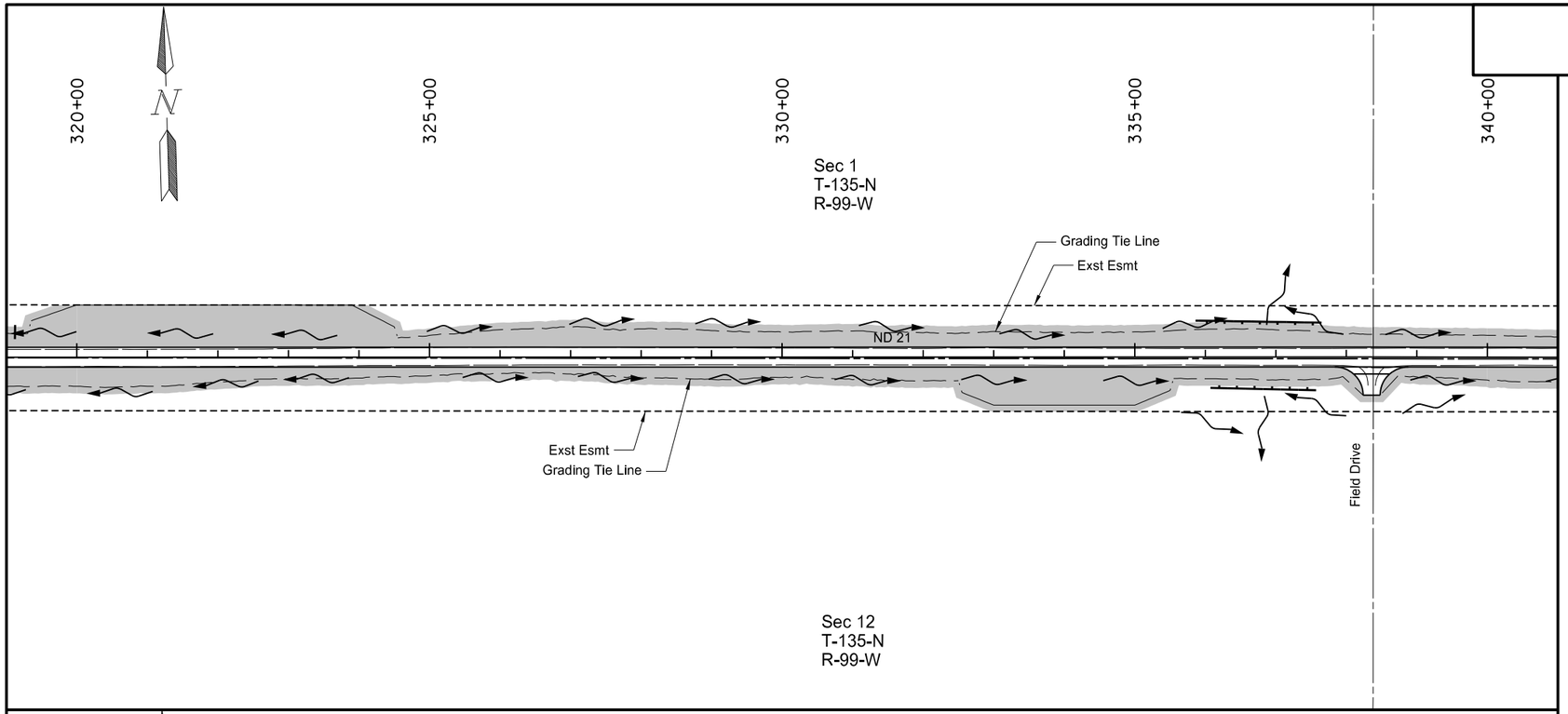
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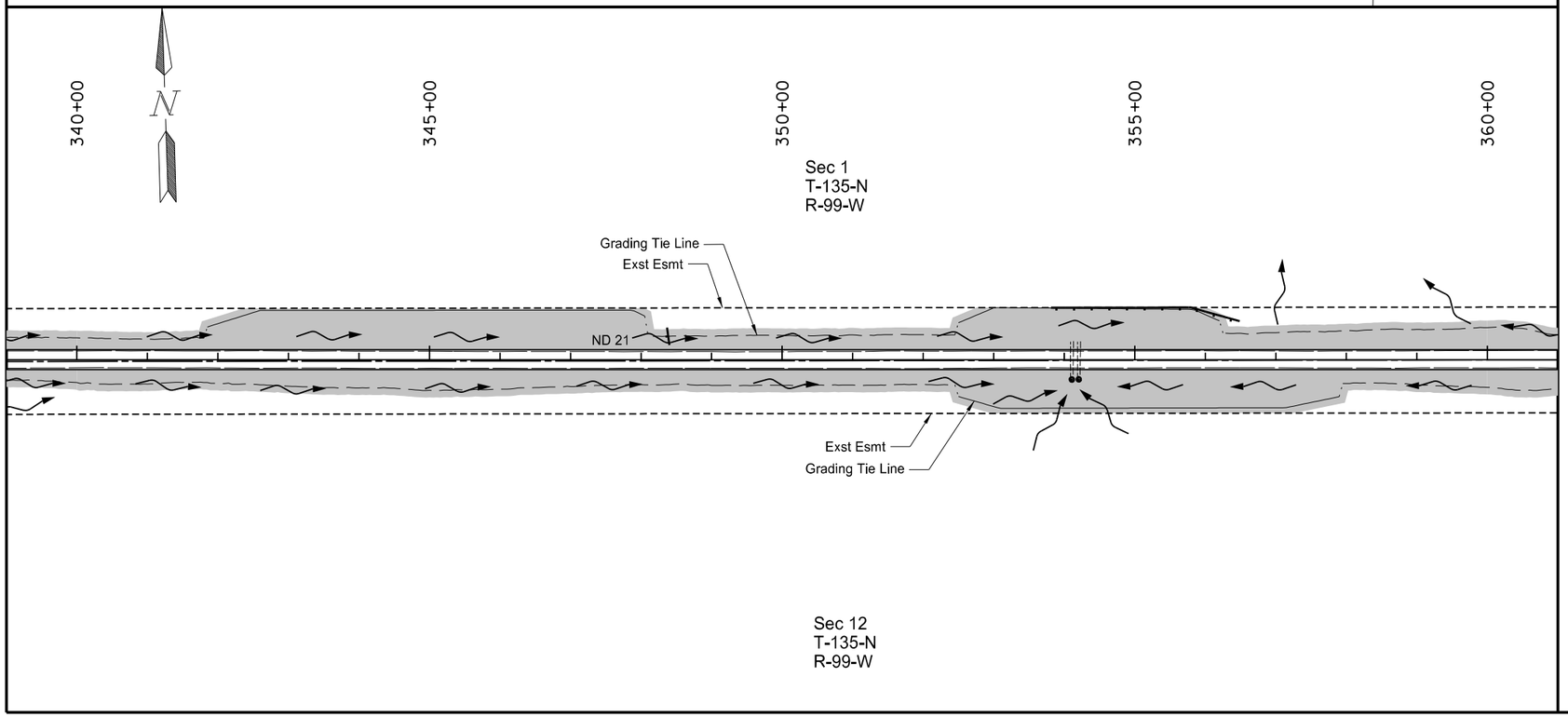
Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

280+00 to 320+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	9





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		320+00 to 360+00	7.18	ACRE
253	0101	STRAW MULCH		
		320+00 to 360+00	7.18	ACRE

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

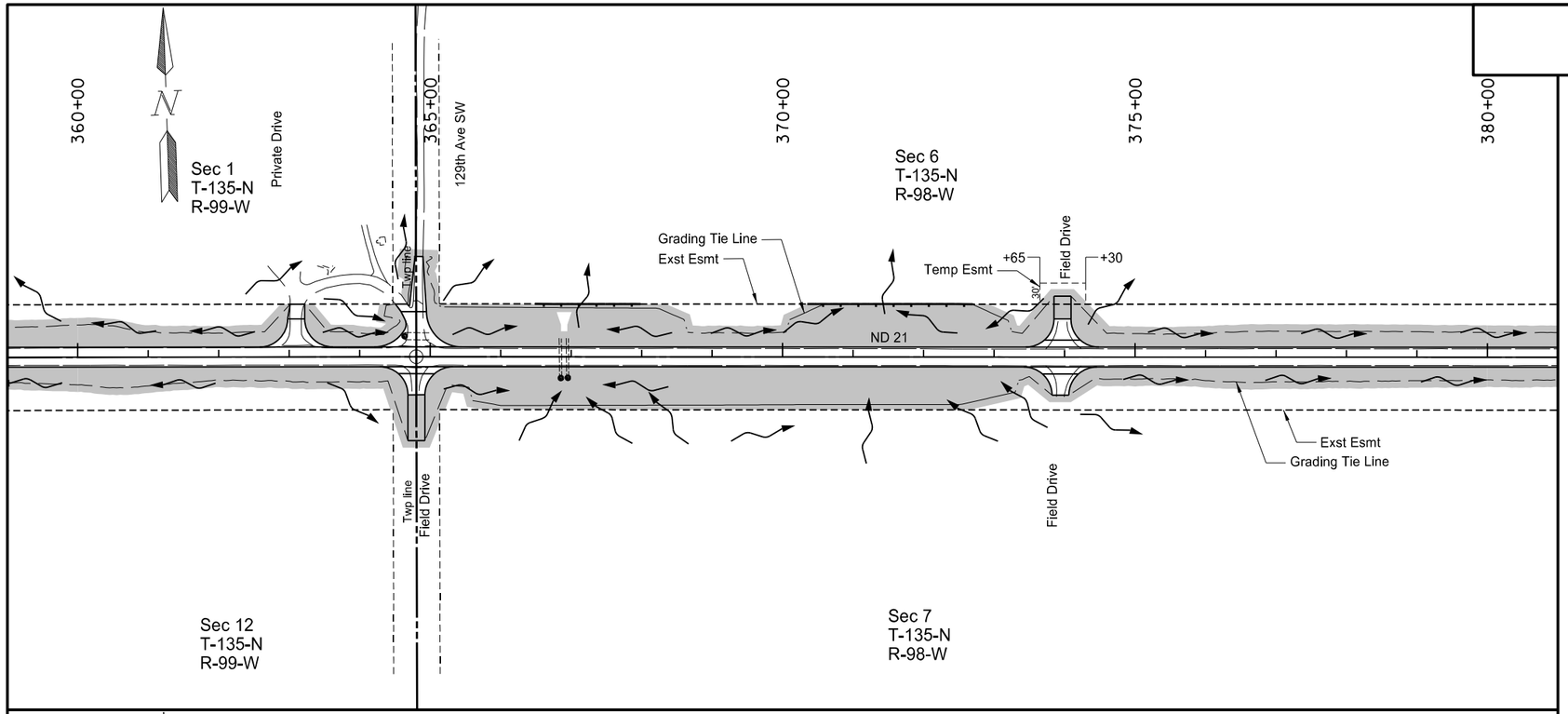
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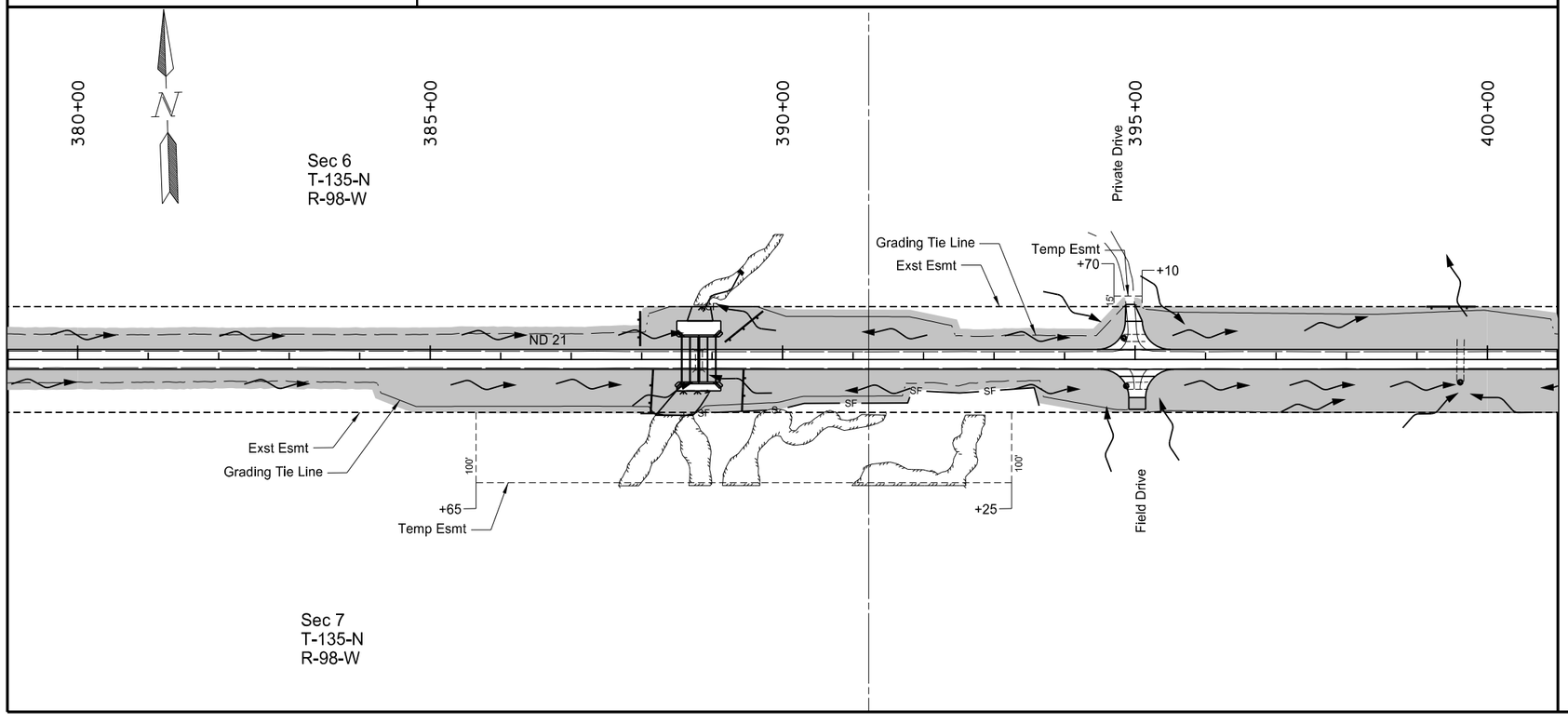
Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

320+00 to 360+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	10





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		360+00 to 400+00	8.27	ACRE
253	0101	STRAW MULCH		
		360+00 to 400+00	8.27	ACRE
260	0200	SILT FENCE SUPPORTED		
		387+98 - 75' Rt to 393+65 - 71' Rt	605	LF
		388+57 - 75' Lt to 389+57 - 75' Lt	100	LF
260	0201	REMOVE SILT FIENCE SUPPORTED		
		387+98 - 75' Rt to 393+65 - 71' Rt	605	LF
		388+57 - 75' Lt to 389+57 - 75' Lt	100	LF

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

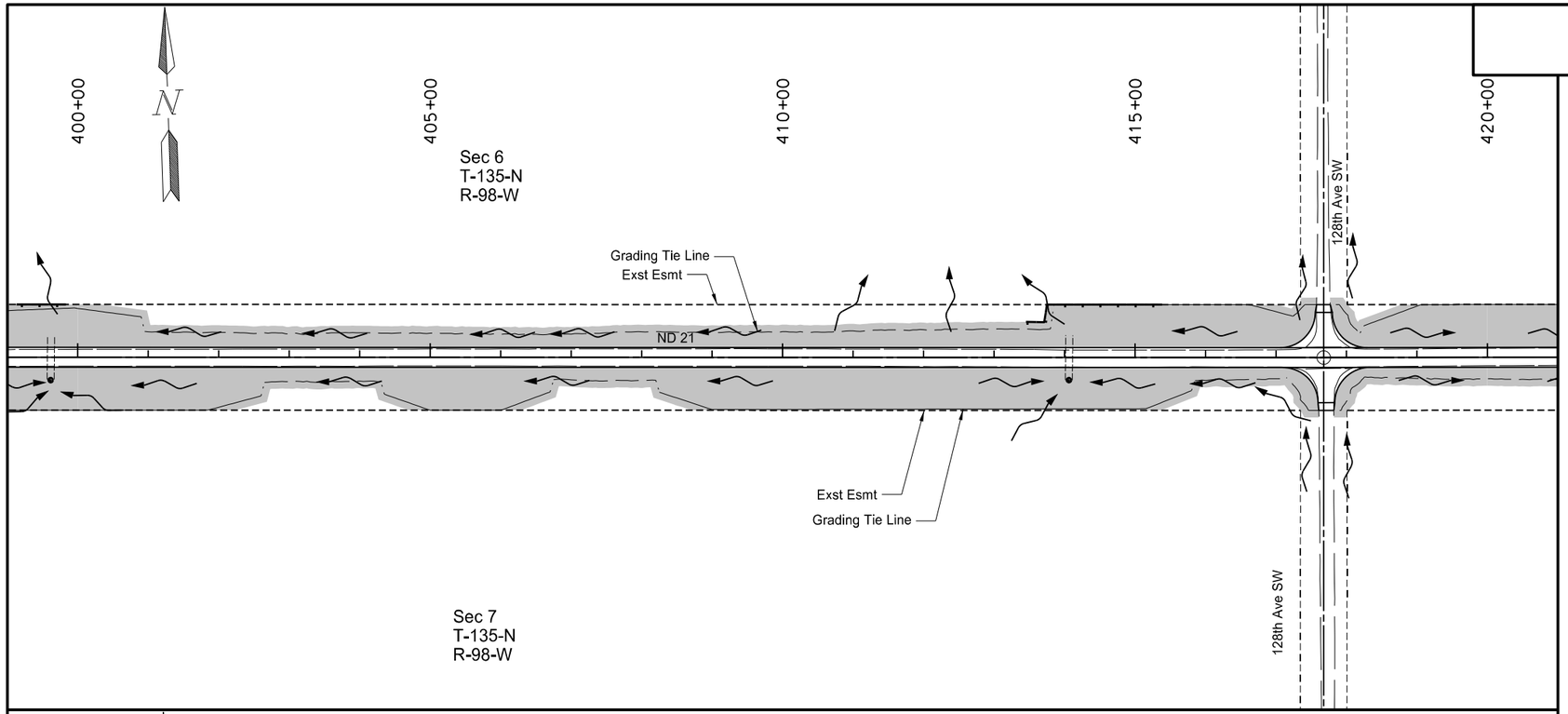
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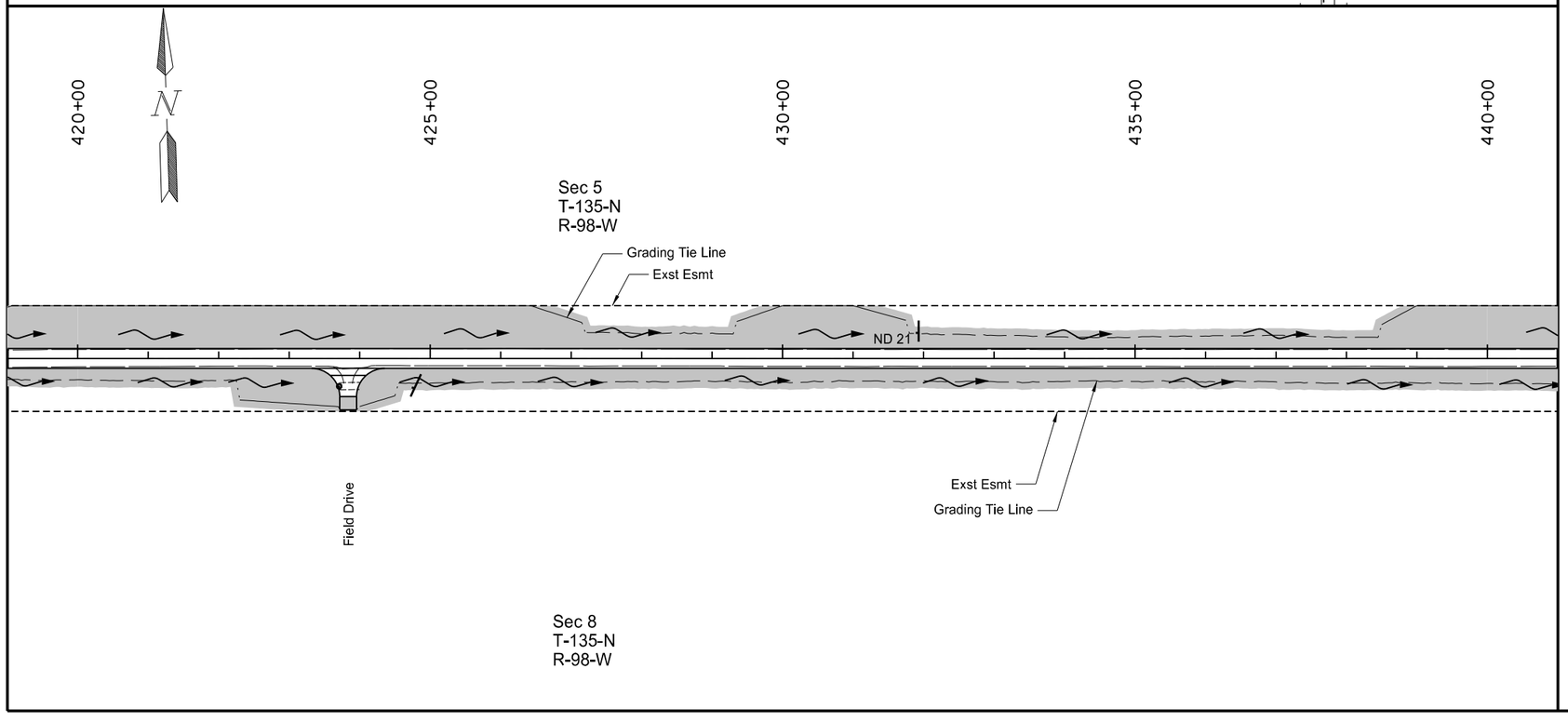
Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

360+00 to 400+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	11





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		400+00 to 440+00	7.70	ACRE
253	0101	STRAW MULCH		
		400+00 to 440+00	7.70	ACRE

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

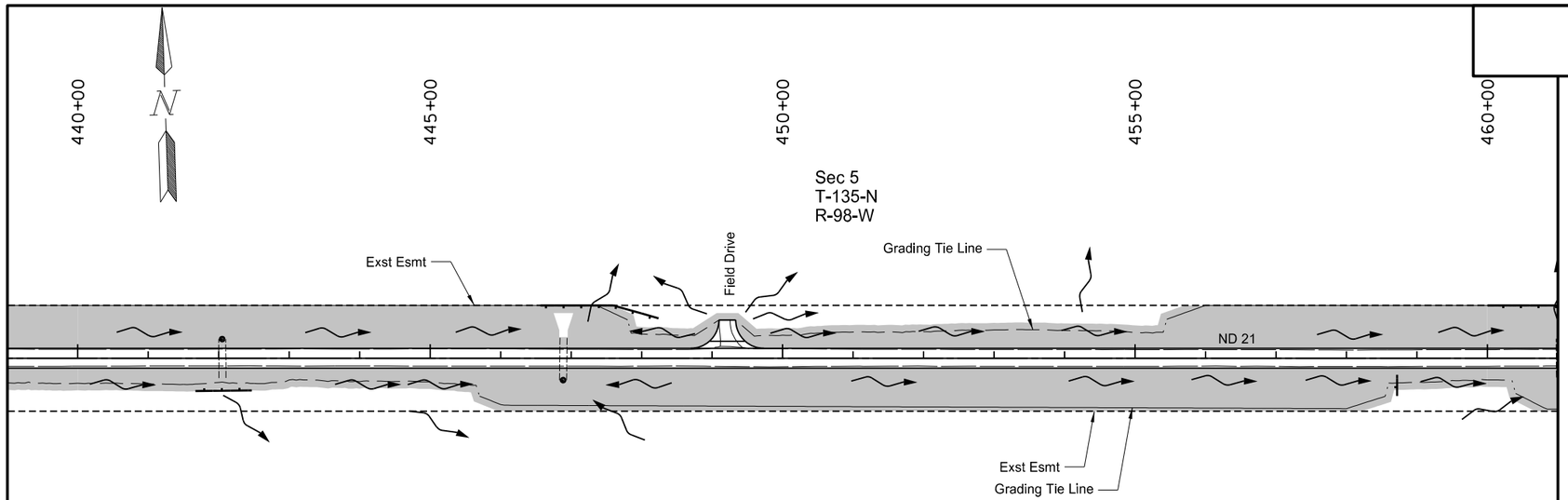
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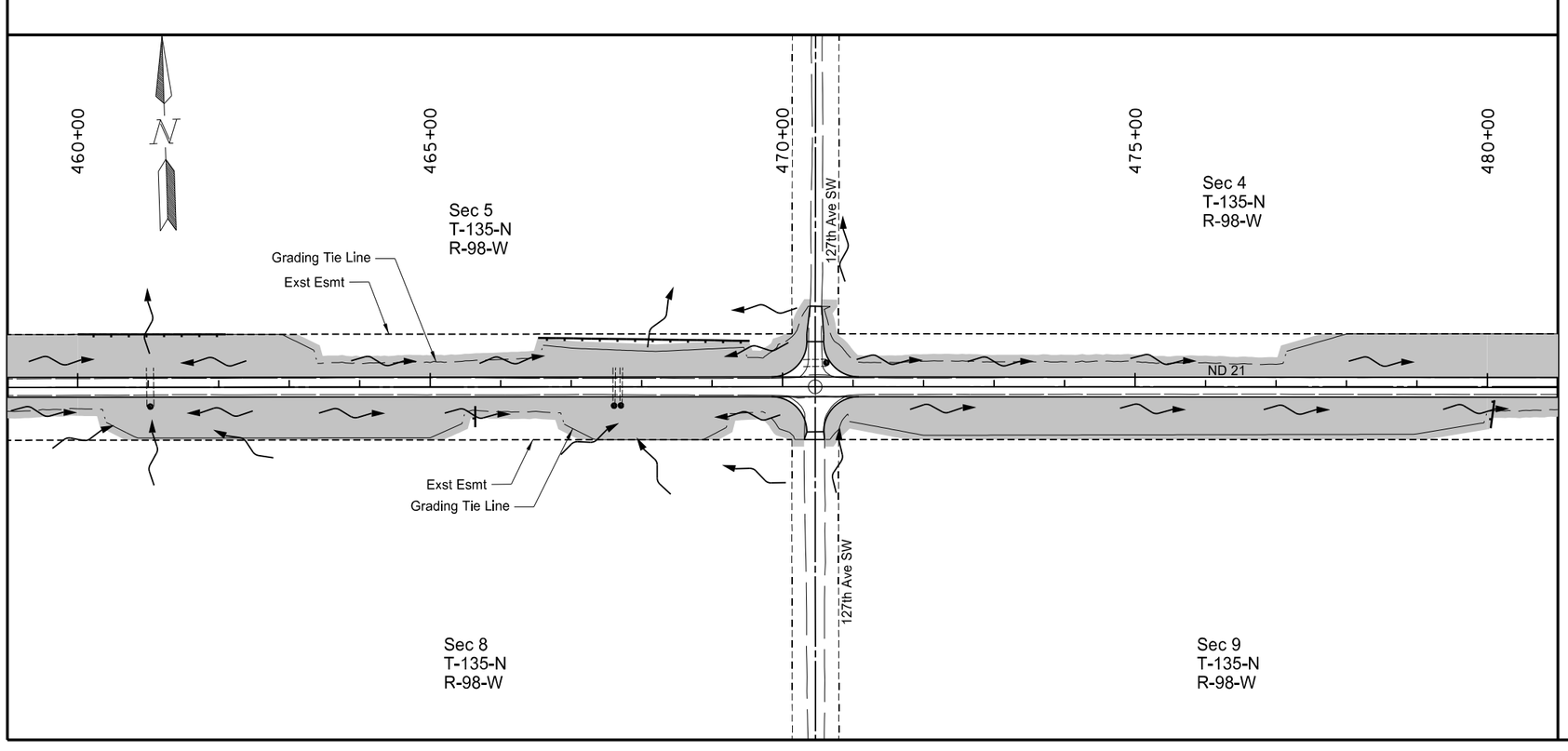
Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

400+00 to 440+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	12





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		440+00 to 480+00	9.18	ACRE
253	0101	STRAW MULCH		
		440+00 to 480+00	9.18	ACRE

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

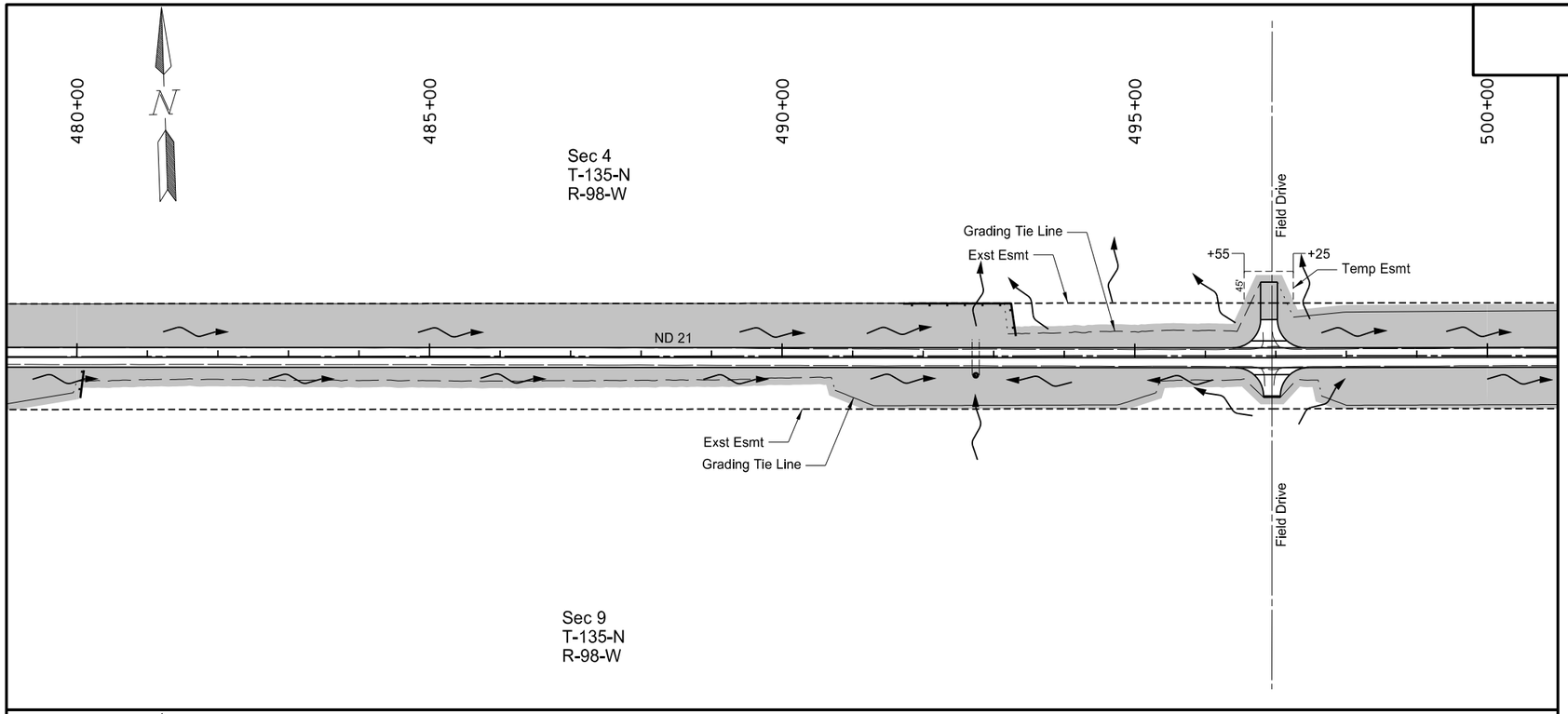
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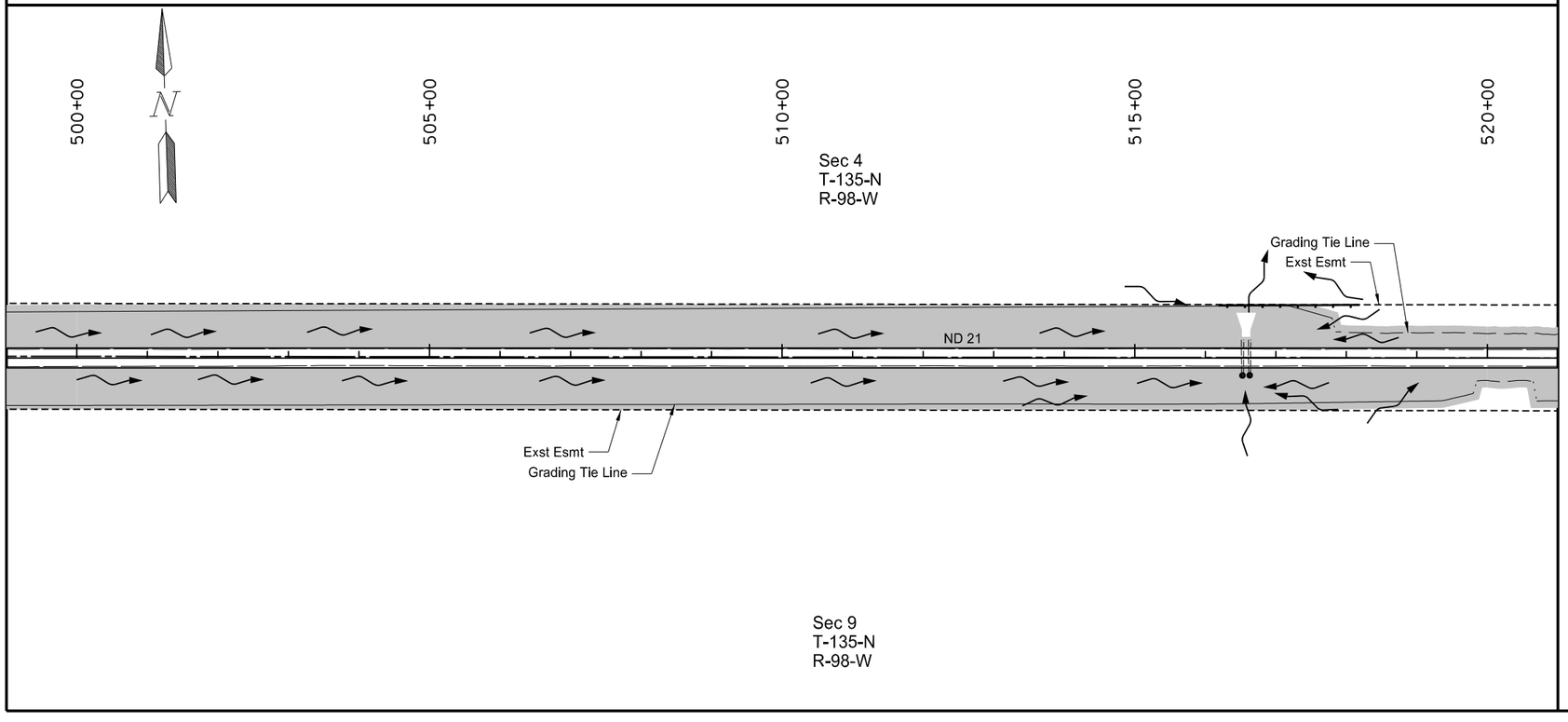
Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

440+00 to 480+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	13





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		480+00 to 520+00	9.83	ACRE
253	0101	STRAW MULCH		
		480+00 to 520+00	9.83	ACRE

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

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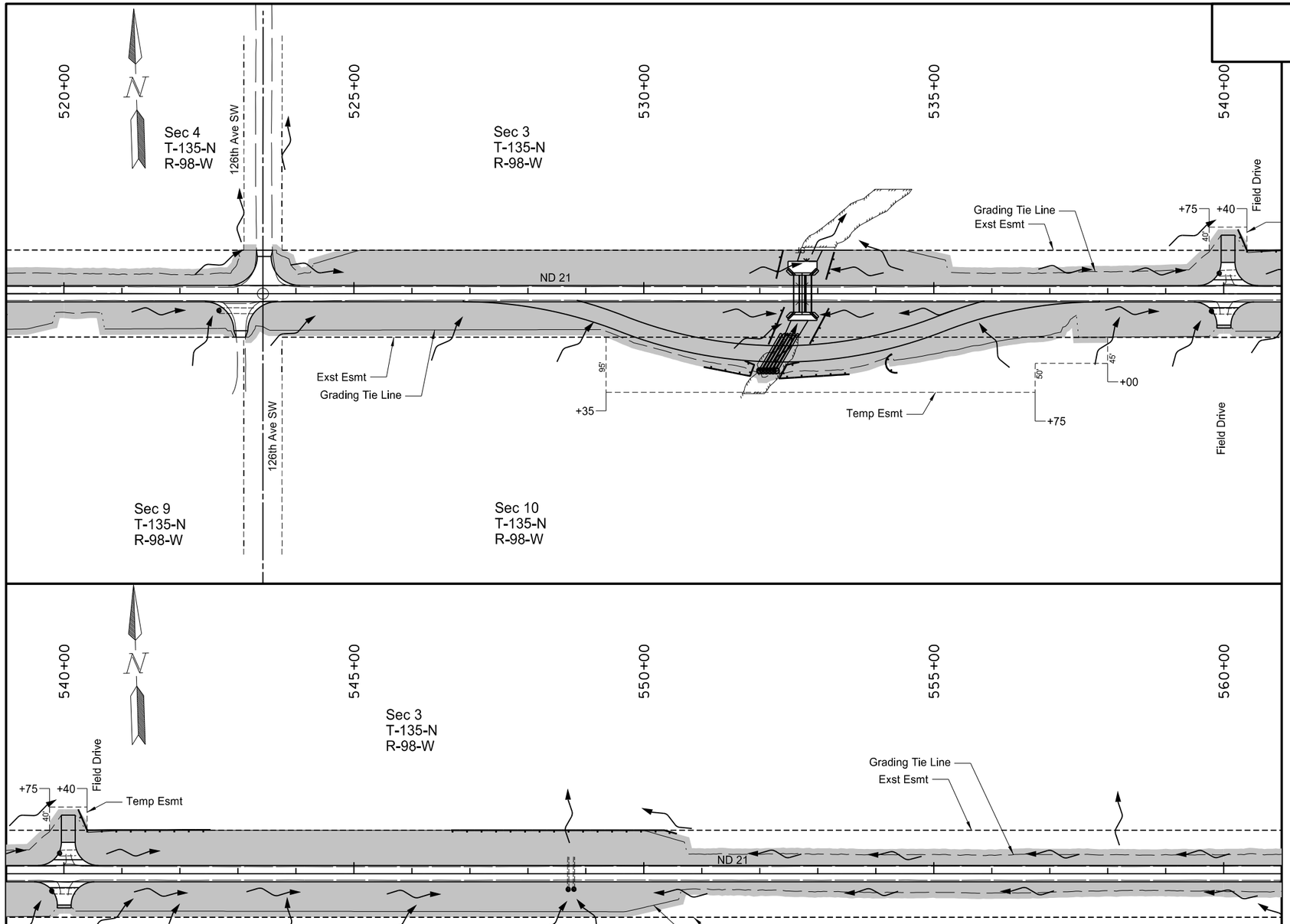
Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

480+00 to 520+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	14



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		520+00 to 560+00	9.74	ACRE
253	0101	STRAW MULCH		
		520+00 to 560+00	9.74	ACRE
260	0200	SILT FENCE SUPPORTED		
		532+50 - 75' Lt to 533+60 - 75' Lt	110	LF
260	0201	REMOVE SILT FIENCE SUPPORTED		
		532+50 - 75' Lt to 533+60 - 75' Lt	110	LF

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

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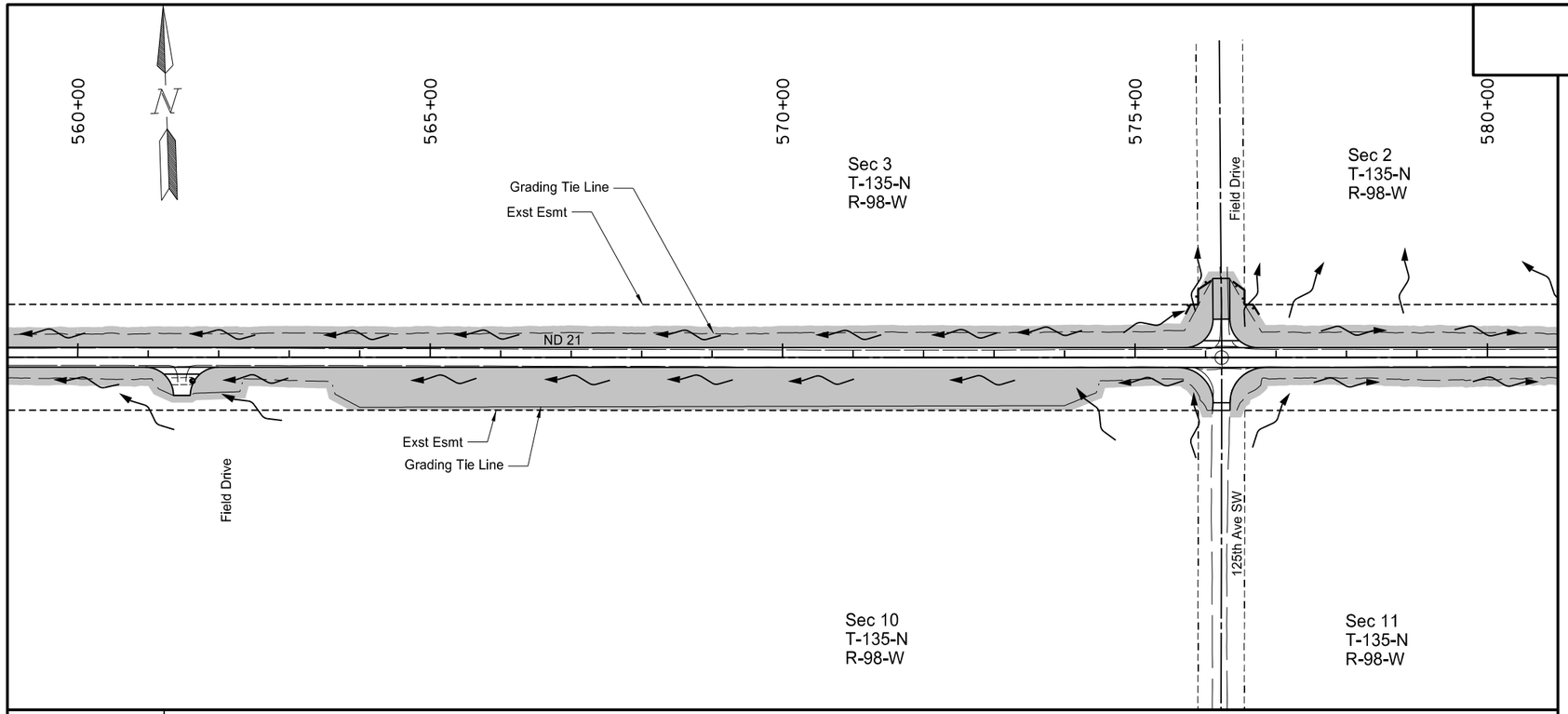
Temporary Erosion Control

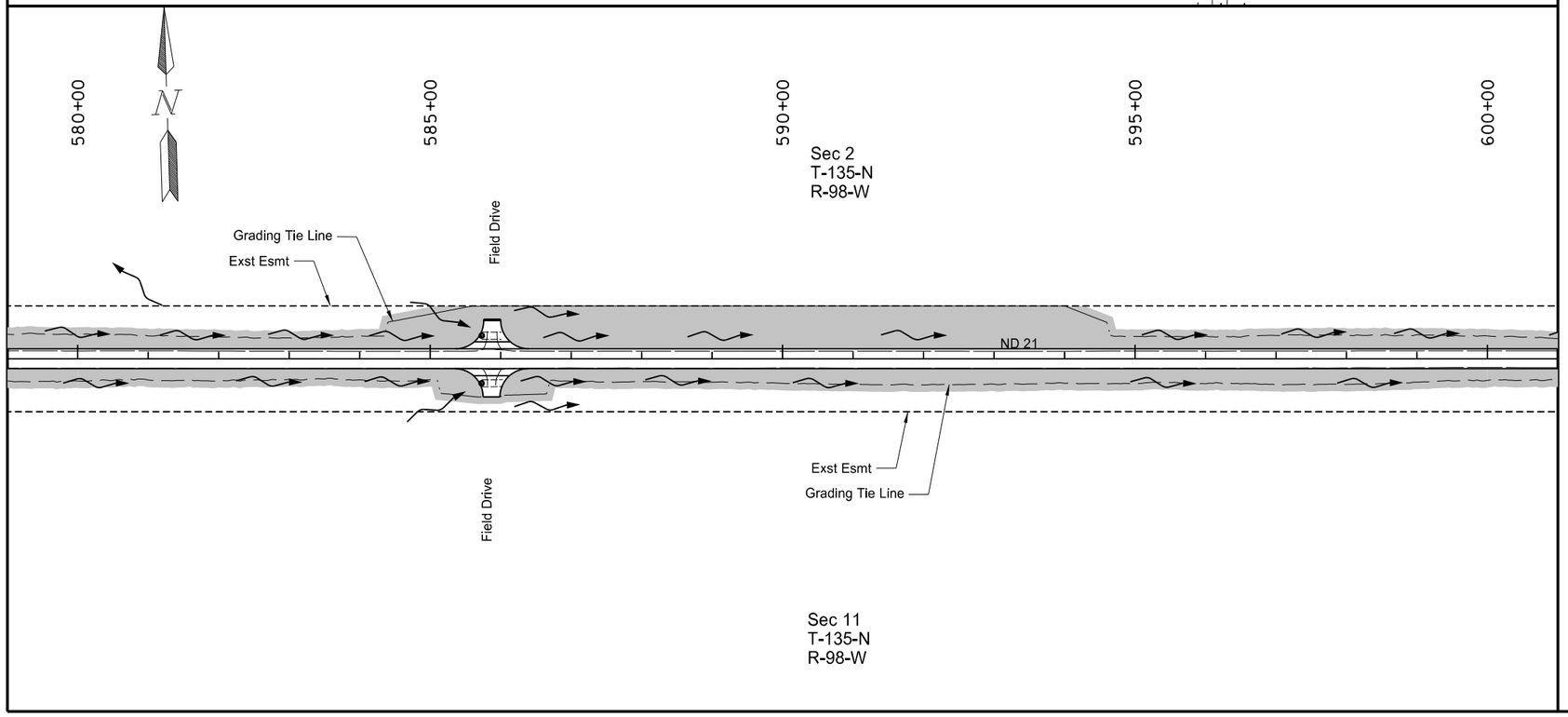
ND 21
Jct 85 to N Jct 22 - New England

520+00 to 560+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	15





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		560+00 to 600+00	7.03	ACRE
253	0101	STRAW MULCH		
		560+00 to 600+00	7.03	ACRE

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

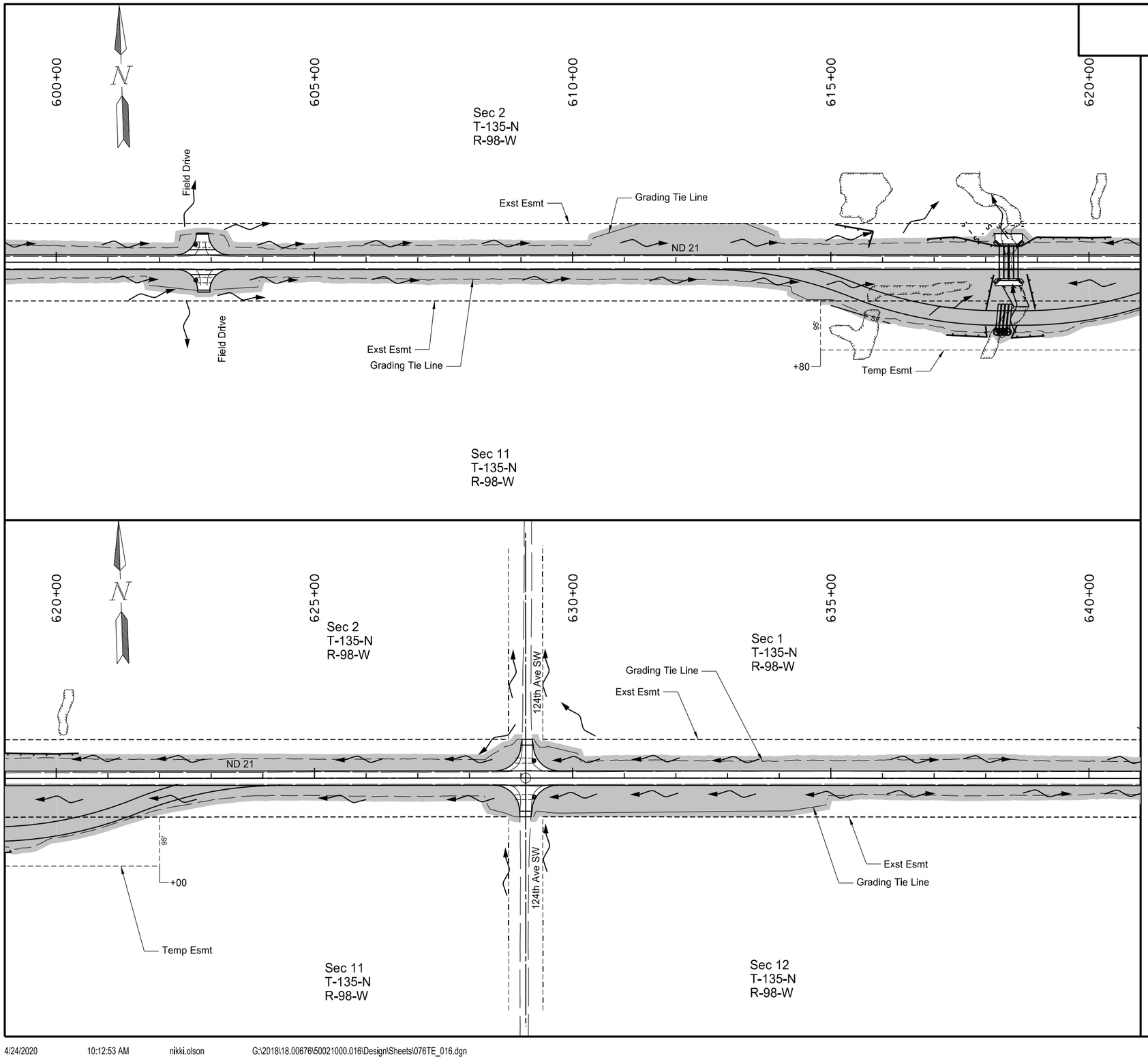
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Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

560+00 to 600+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	16



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		600+00 to 640+00	7.64	ACRE
253	0101	STRAW MULCH		
		600+00 to 640+00	7.64	ACRE
262	0100	FLOTATION SILT CURTAIN		
		617+58 - 75' Lt to 617+73 - 55' Lt	25	LF
		617+76 - 40' Lt to 617+96 - 56' Lt	25	LF
		618+03 - 73' Lt to 618+18 - 53' Lt	25	LF
		618+25 - 73' Lt to 618+43 - 55' Lt	25	LF
		618+49 - 70' Lt to 618+73 - 75' Lt	25	LF
262	0101	REMOVE FLOTATION SILT CURTAIN		
		617+58 - 75' Lt to 617+73 - 55' Lt	25	LF
		617+76 - 40' Lt to 617+96 - 56' Lt	25	LF
		618+03 - 73' Lt to 618+18 - 53' Lt	25	LF
		618+25 - 73' Lt to 618+43 - 55' Lt	25	LF
		618+49 - 70' Lt to 618+73 - 75' Lt	25	LF
260	0200	SILT FENCE SUPPORTED		
		615+00 - 84' Rt to 616+15 - 119' Rt	120	LF
260	0201	REMOVE SILT FIENCE SUPPORTED		
		615+00 - 84' Rt to 616+15 - 119' Rt	120	LF

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

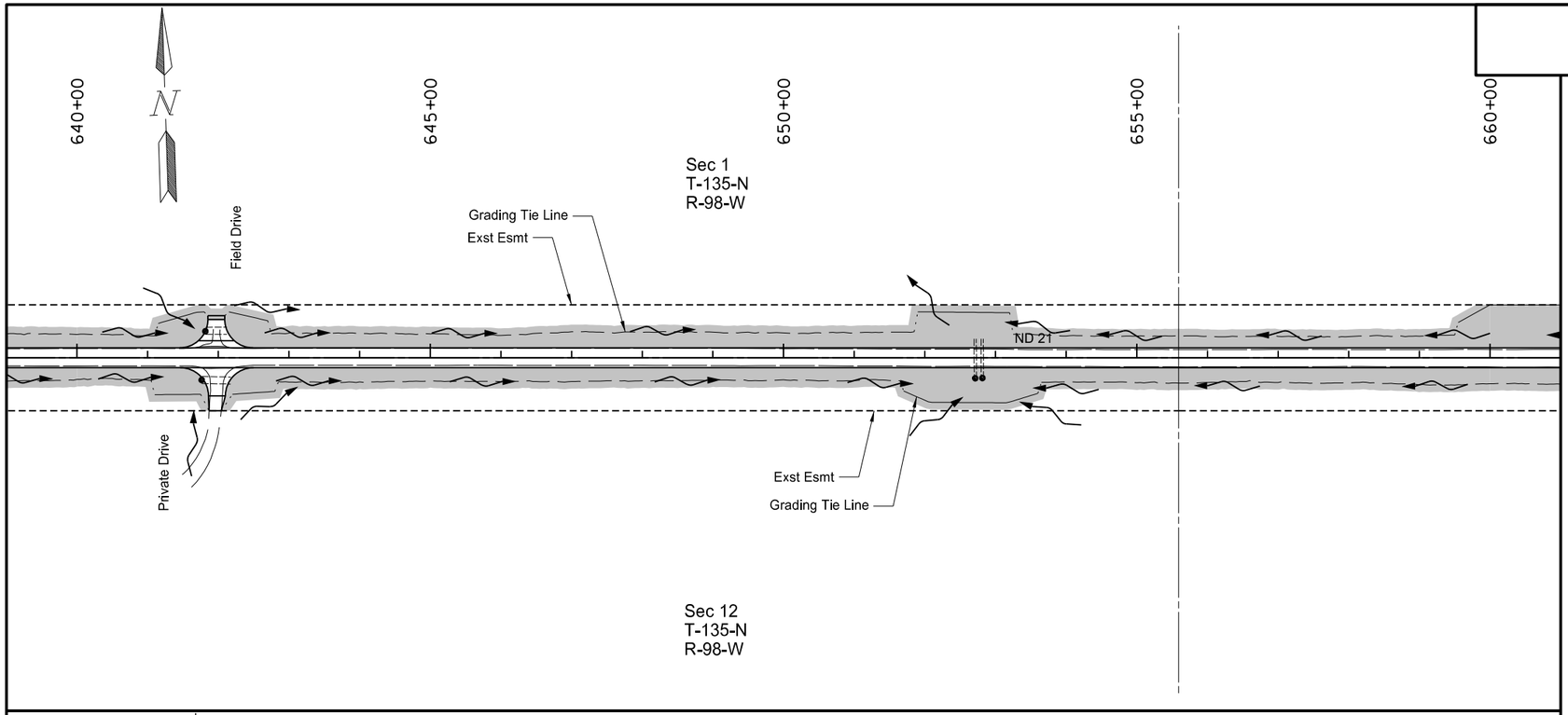
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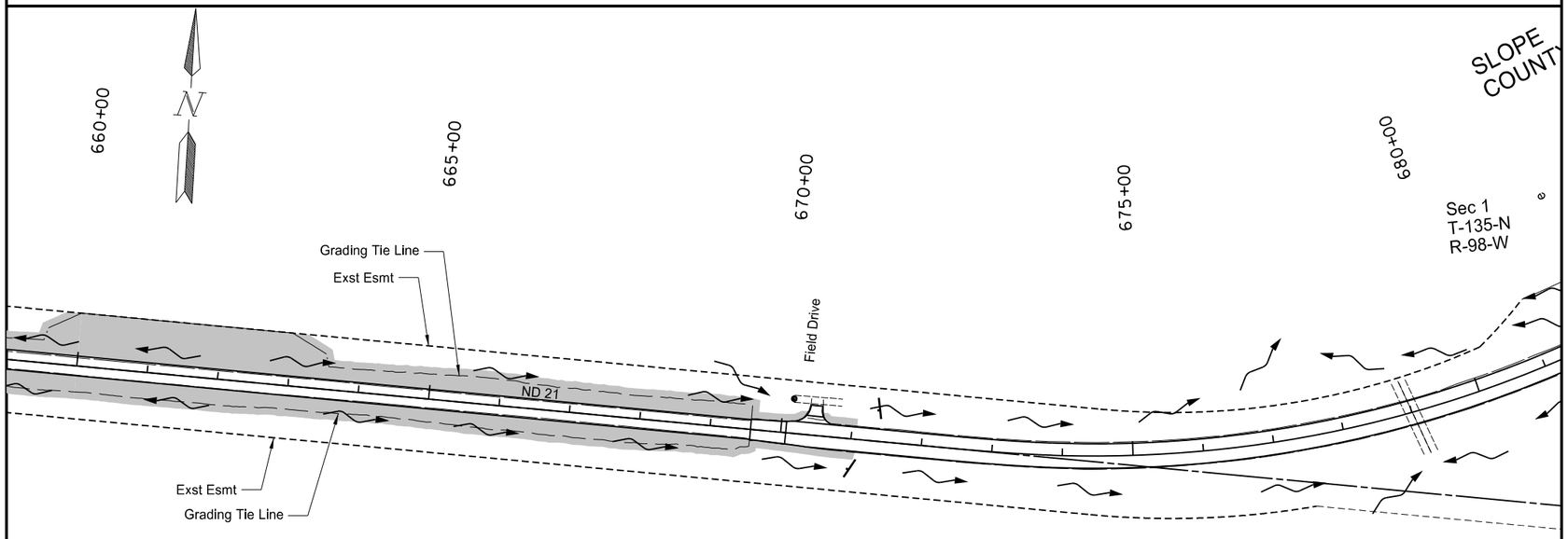
Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

600+00 to 640+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	17





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		640+00 to 671+07.23	4.73	ACRE
253	0101	STRAW MULCH		
		640+00 to 671+07.23	4.73	ACRE

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

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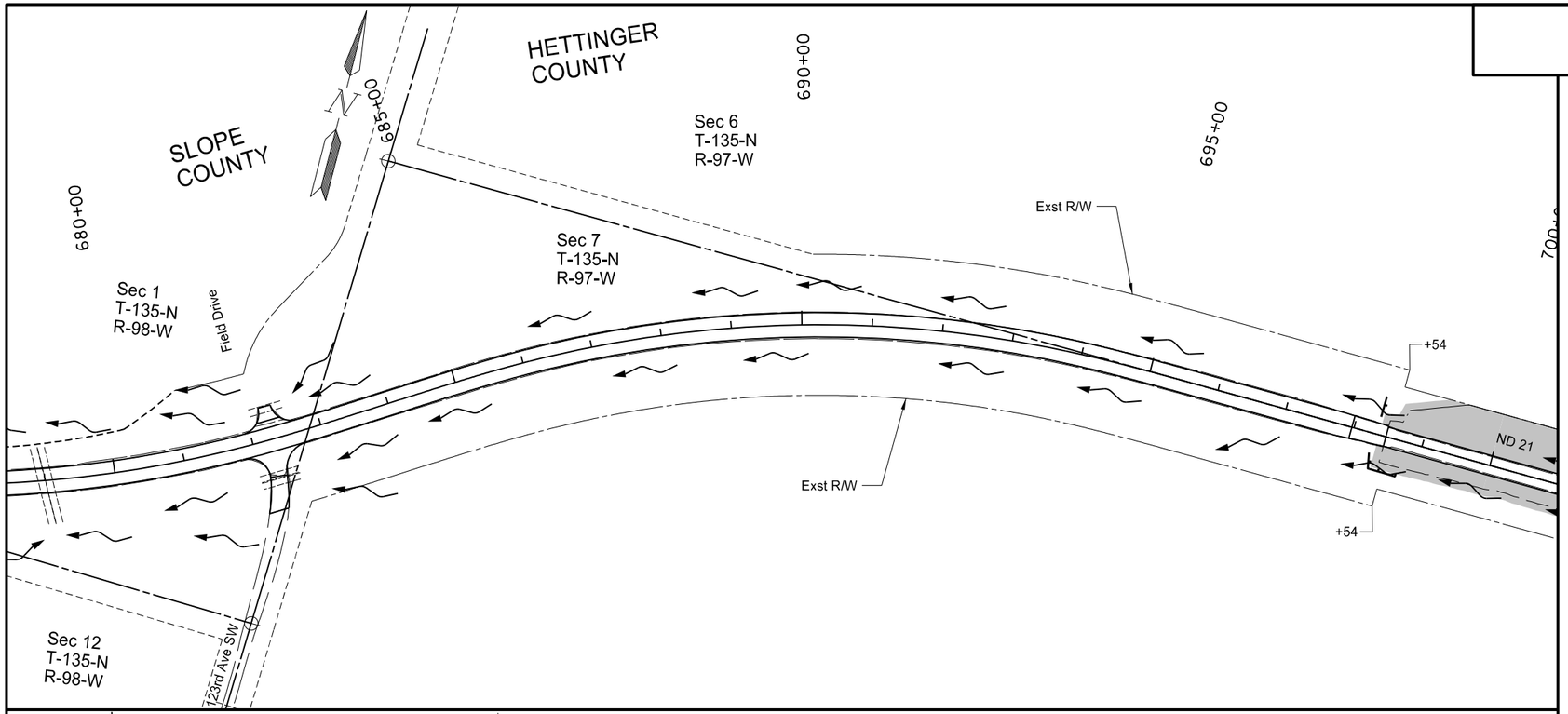
ND 21
Jct 85 to N Jct 22 - New England

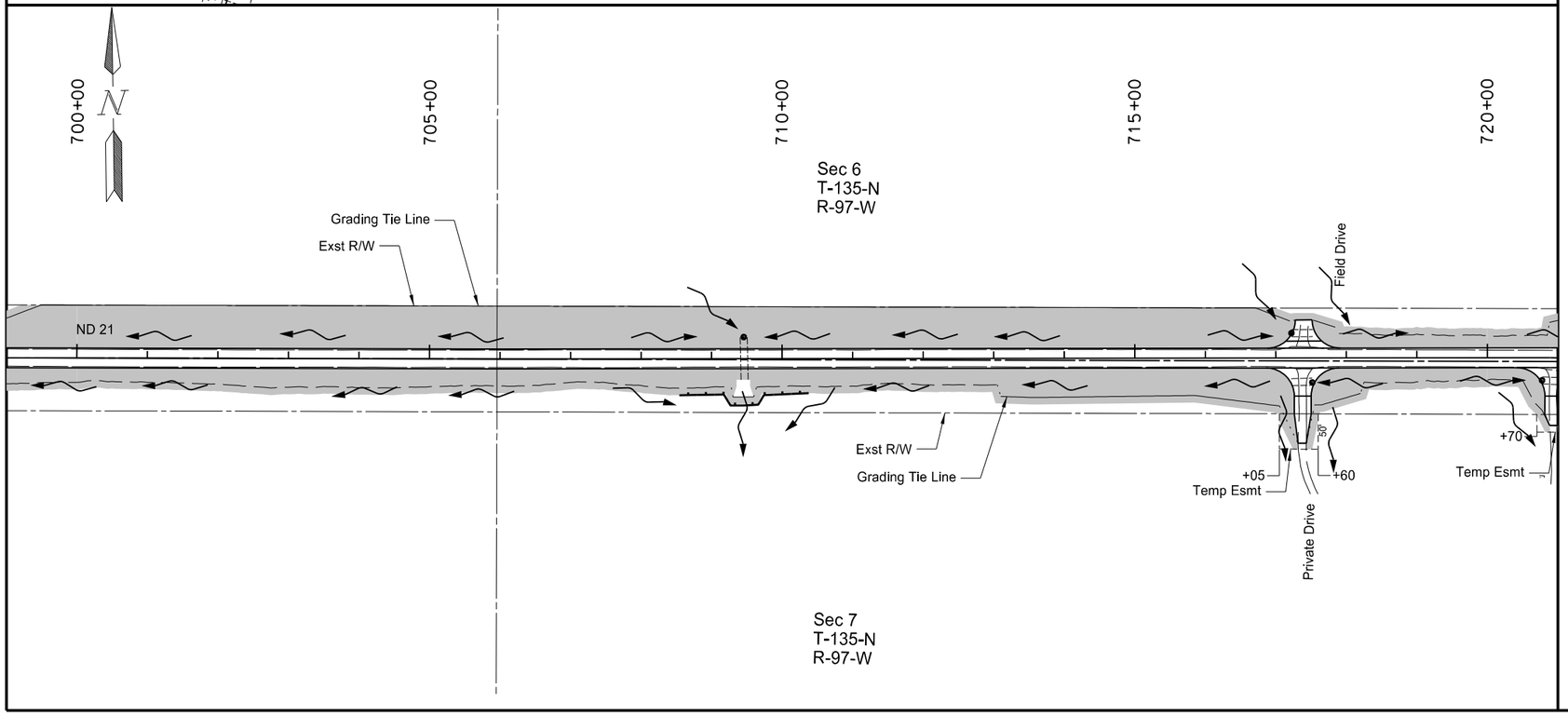
640+00 to 680+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	18

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		696+96.95 to 720+00	4.60	ACRE
253	0101	STRAW MULCH		
		696+96.95 to 720+00	4.60	ACRE

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data





Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

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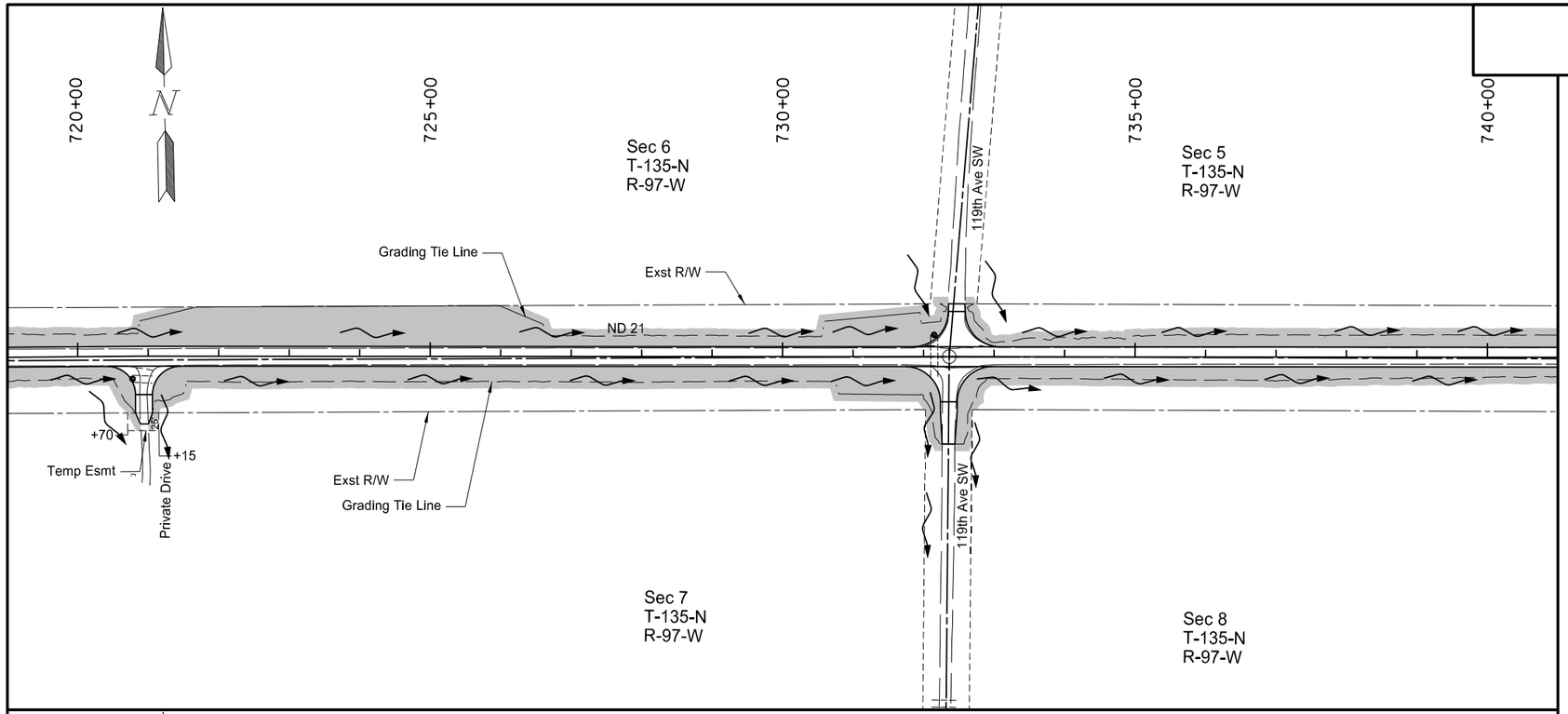
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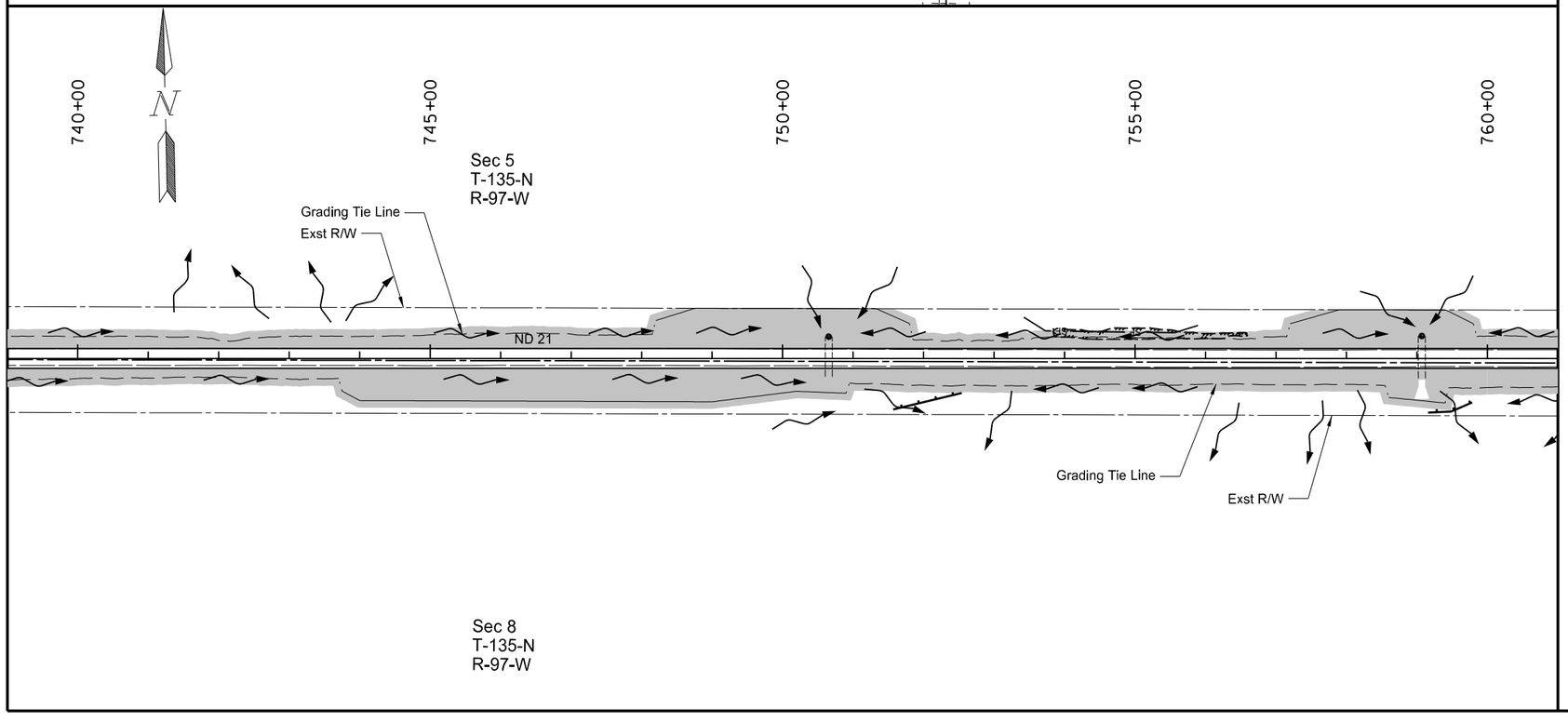
ND 21
Jct 85 to N Jct 22 - New England

680+00 to 720+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	19





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		720+00 to 760+00	6.71	ACRE
253	0101	STRAW MULCH		
		720+00 to 760+00	6.71	ACRE
260	0200	SILT FENCE SUPPORTED		
		753+42 - 59' Lt to 755+89 - 47' Lt	254	LF
260	0201	REMOVE SILT FIENCE SUPPORTED		
		753+42 - 59' Lt to 755+89 - 47' Lt	254	LF

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

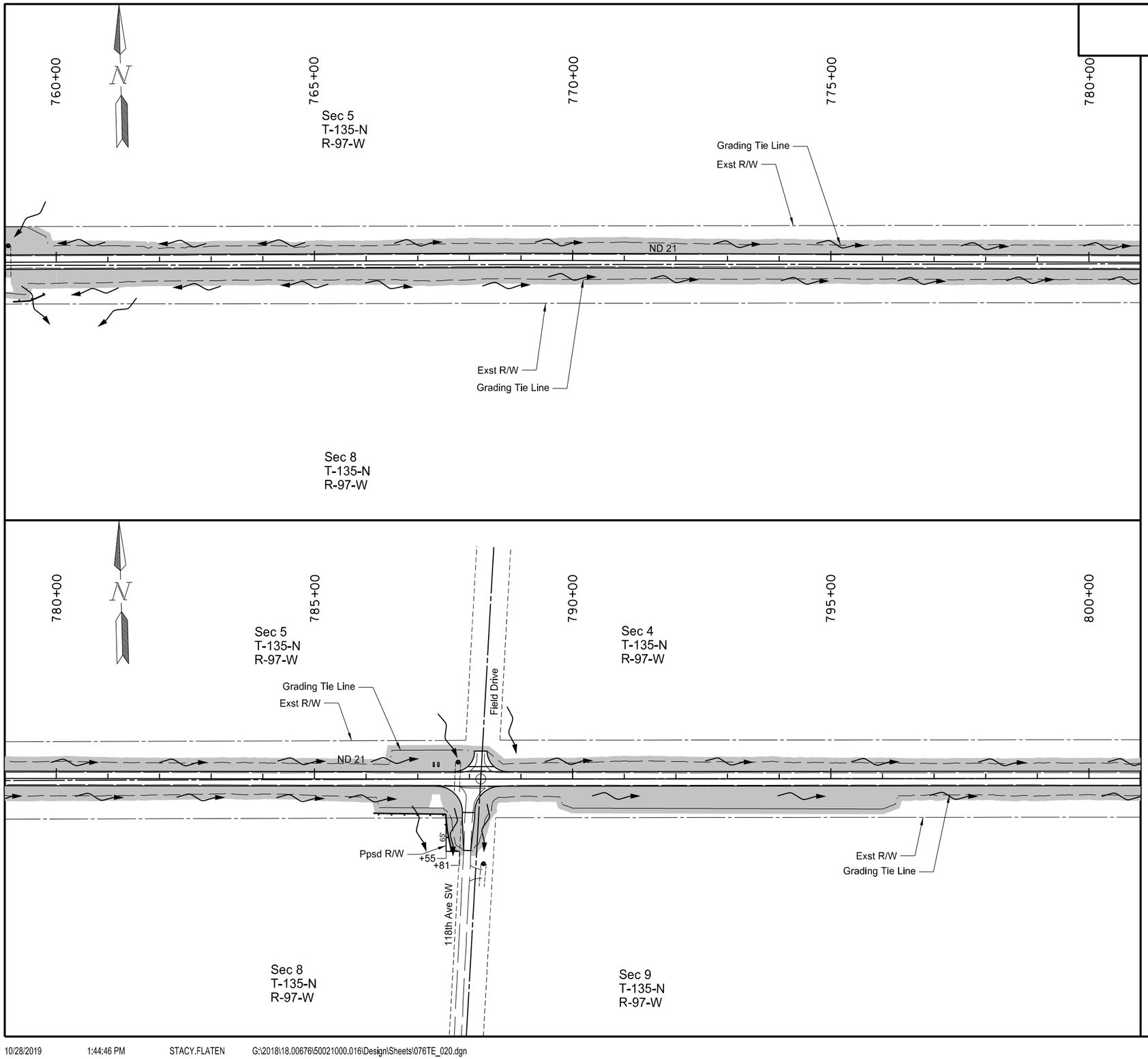
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Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

720+00 to 760+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	20



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		760+00 to 800+00	5.92	ACRE
253	0101	STRAW MULCH		
		760+00 to 800+00	5.92	ACRE

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data

Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

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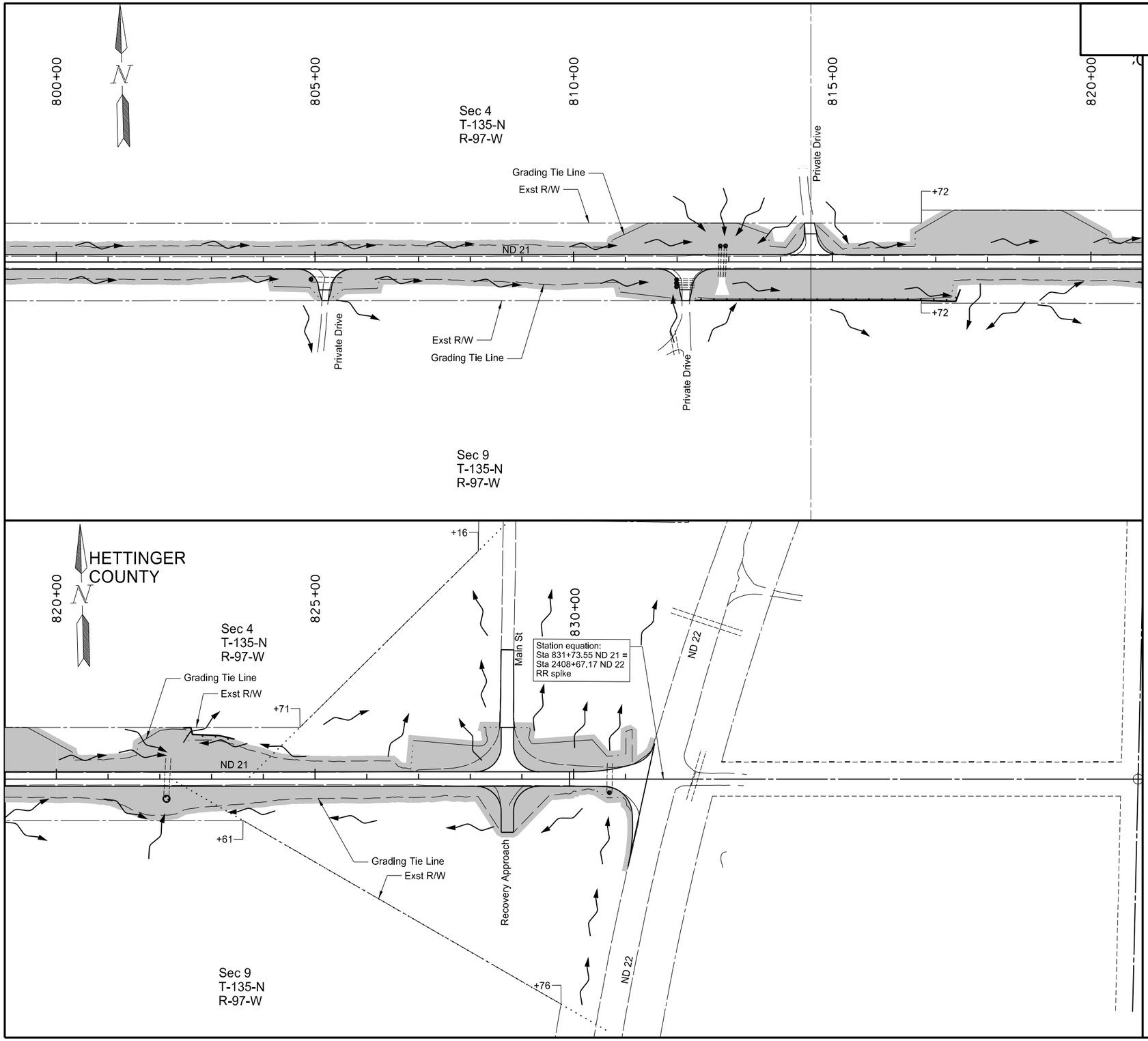
ND 21
Jct 85 to N Jct 22 - New England

760+00 to 800+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	21

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		800+00 to 831+41.88	6.30	ACRE
253	0101	STRAW MULCH		
		800+00 to 831+41.88	6.30	ACRE

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data



Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

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Temporary Erosion Control

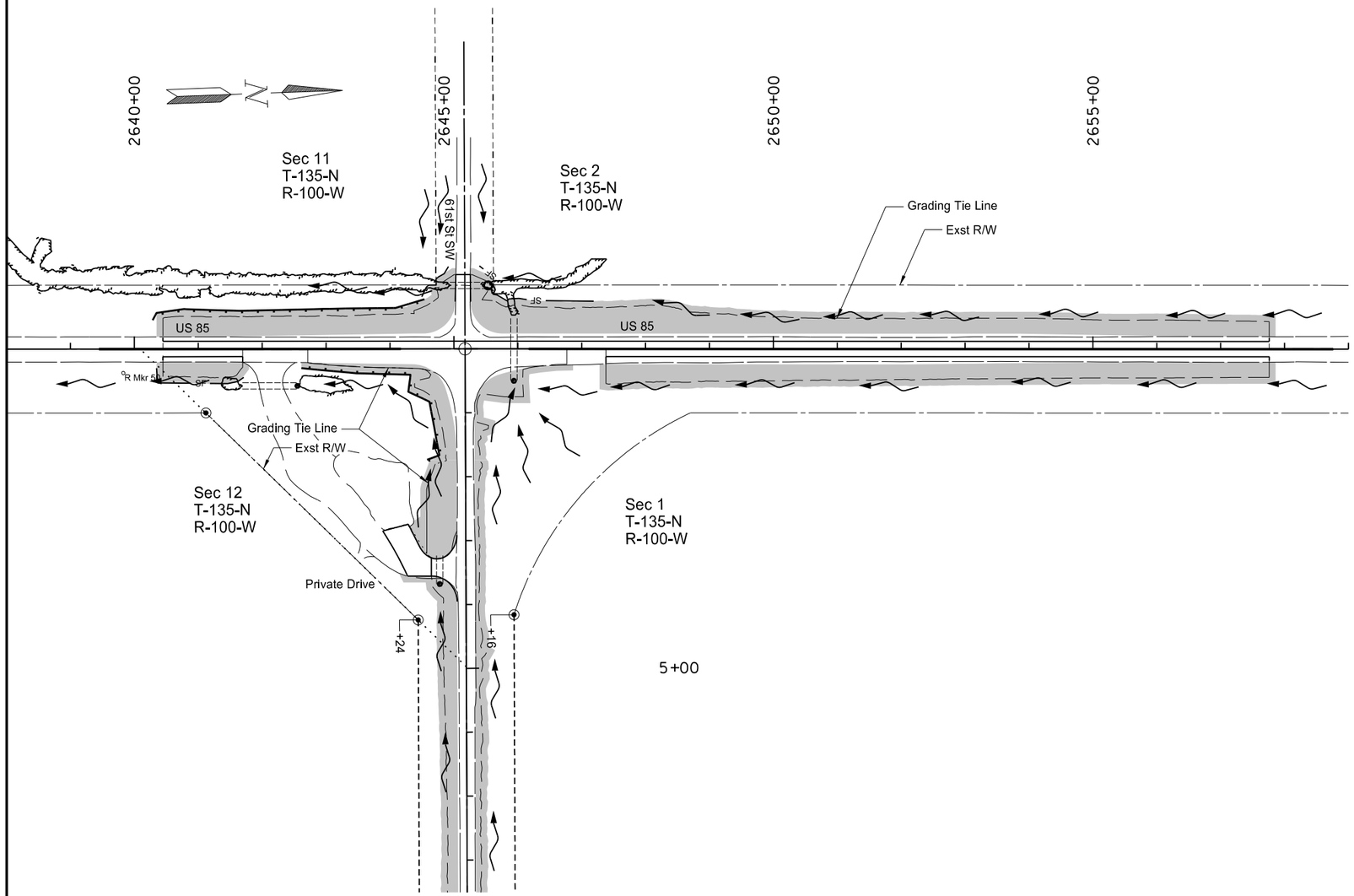
ND 21
Jct 85 to N Jct 22 - New England

800+00 to 831+41.88

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	76	22

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		2640+34 to 2657+86	2.94	ACRE
253	0101	STRAW MULCH		
		2640+34 to 2657+86	2.94	ACRE
260	0200	SILT FENCE SUPPORTED		
		2640+35 - 30' Rt to 2641+71 - 44' Rt	160	LF
		2644+50 - 82' Lt to 2644+92 - 129' Lt	71	LF
		2645+40 - 130' Lt to 2647+19 - 75' Lt	218	LF
260	0201	REMOVE SILT FIENCE SUPPORTED		
		2640+35 - 30' Rt to 2641+71 - 44' Rt	160	LF
		2644+50 - 82' Lt to 2644+92 - 129' Lt	71	LF
		2645+40 - 130' Lt to 2647+19 - 75' Lt	218	LF

*NOTE:See Section 76, Sheet 23-24 for Fiber Roll data



Legend

- Temporary Cover Crop/ Straw Mulch
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- SF — Silt Fence
- 12" Fiber Roll
- Culvert Protection(12" or 20")
- S — Flotation Silt Curtain

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Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

US 85
2639+44.69 to 2658+76.06

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	23

TEMPORARY EROSION CONTROL - CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls - Highway 21

Station	to	Station	Offset	Length (LF)
03+65	to	03+71	RT	20
08+99	to	09+18	LT	35
20+02	to	20+13	LT	40
26+42	to	26+48	LT	20
26+46	to	27+18	RT	95
35+60	to	36+60	RT	100
48+92	to	48+99	LT	20
53+04	to	53+19	RT	46
55+86	to	55+93	LT	20
58+34	to	58+83	LT	60
67+78	to	68+00	RT	40
85+36	to	90+84	RT	565
88+04	to	88+10	LT	20
98+73	to	98+80	RT	20
98+74	to	98+80	LT	20
103+60	to	104+64	LT	110
115+67	to	116+33	RT	69
115+97	to	116+04	LT	20
120+35	to	120+41	LT	20
125+94	to	126+00	RT	20
129+30	to	129+55	RT	56
140+14	to	140+21	RT	20
141+98	to	142+53	RT	82
147+88	to	148+46	RT	60
147+90	to	148+59	LT	70
148+10	to	148+17	RT	20
153+47	to	154+06	LT	60
153+65	to	153+71	LT	20
153+96	to	154+54	RT	60
158+92	to	159+95	LT	143
159+30	to	159+97	RT	117
160+94	to	161+43	LT	115
160+96	to	163+15	RT	280
162+05	to	162+84	LT	87
165+40	to	165+46	RT	20
165+41	to	165+47	LT	20
168+06	to	168+13	RT	35
175+22	to	175+76	LT	60
175+85	to	175+90	RT	35
178+98	to	179+45	LT	90
			TOTAL	**2810**

12" Fiber Rolls - Highway 21

Station	to	Station	Offset	Length (LF)
180+18	to	181+12	LT	108
184+55	to	185+34	LT	80
190+79	to	192+19	LT	140
191+68	to	191+74	RT	20
200+12	to	200+18	RT	20
200+23	to	200+29	RT	20
206+55	to	206+92	LT	51
206+72	to	206+78	RT	20
228+54	to	229+07	LT	99
229+52	to	229+93	LT	85
230+75	to	231+29	LT	92
230+78	to	230+98	LT	63
233+66	to	233+66	RT	30
236+89	to	236+96	LT	20
244+07	to	244+14	LT	20
245+29	to	245+35	RT	20
252+05	to	252+09	LT	40
259+46	to	260+61	LT	115
259+60	to	260+75	RT	118
260+62	to	265+19	RT	465
269+20	to	269+30	LT	30
271+50	to	271+56	LT	20
280+27	to	280+31	LT	40
281+00	to	281+04	RT	40
281+70	to	283+16	RT	149
282+62	to	282+68	LT	20
288+85	to	290+03	RT	120
290+02	to	290+08	LT	20
290+12	to	290+19	LT	20
303+93	to	306+12	RT	241
305+08	to	305+15	LT	20
311+32	to	311+80	RT	74
312+09	to	312+50	RT	65
312+13	to	312+19	LT	20
319+12	to	319+12	LT	20
335+86	to	337+65	LT	179
336+07	to	337+57	RT	150
348+37	to	348+40	LT	25
353+81	to	356+49	LT	270
354+08	to	354+14	RT	20
			TOTAL	**3169**

12" Fiber Rolls - Highway 21

Station	to	Station	Offset	Length (LF)
354+17	to	354+24	RT	20
364+61	to	364+67	LT	20
366+49	to	367+99	LT	150
366+82	to	366+89	RT	20
366+92	to	366+98	RT	20
370+35	to	372+70	LT	235
387+98	to	387+98	LT	50
388+13	to	388+16	RT	60
389+18	to	389+73	LT	70
389+42	to	389+45	RT	60
394+81	to	394+87	LT	20
394+84	to	394+91	RT	20
399+13	to	399+83	LT	70
399+58	to	399+65	RT	20
413+45	to	415+38	LT	215
414+03	to	414+09	RT	20
423+68	to	423+74	RT	20
424+72	to	424+87	RT	35
431+93	to	431+93	LT	30
441+67	to	442+47	RT	80
442+02	to	442+08	LT	20
446+57	to	448+24	LT	170
446+85	to	446+92	RT	20
458+72	to	458+72	RT	30
460+00	to	462+10	LT	210
461+00	to	461+06	RT	20
465+64	to	465+64	RT	30
466+53	to	469+53	LT	300
467+58	to	467+64	RT	20
467+67	to	467+74	RT	20
470+59	to	470+65	LT	20
480+05	to	480+10	RT	40
491+72	to	493+32	LT	200
492+71	to	492+78	RT	20
516+19	to	518+19	LT	200
516+50	to	516+56	RT	20
516+60	to	516+66	RT	20
522+64	to	522+71	RT	20
531+03	to	531+90	RT	120
			TOTAL	**2735**

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		3+65 to 179+45	2810	LF
		180+18 to 354+14	3169	LF
		354+17 to 531+90	2735	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		3+65 to 179+45	2810	LF
		180+18 to 354+14	3169	LF
		354+17 to 531+90	2735	LF

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Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	76	24

TEMPORARY EROSION CONTROL - CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls - Highway 21

Station	to	Station	Offset	Length (LF)
532+15	to	532+42	RT	70
532+28	to	532+40	LT	50
532+34	to	533+55	RT	170
532+86	to	533+19	RT	70
533+14	to	533+28	LT	50
534+28	to	534+37	RT	50
539+76	to	539+82	RT	20
539+89	to	539+96	LT	20
540+24	to	542+53	LT	252
546+68	to	550+57	LT	390
548+66	to	548+73	RT	20
548+76	to	548+83	RT	20
561+60	to	561+66	RT	20
575+71	to	576+08	LT	70
576+39	to	576+76	LT	70
585+70	to	585+76	RT	20
585+70	to	585+76	LT	20
602+66	to	602+73	LT	20
602+67	to	602+73	RT	20
615+08	to	615+82	LT	109
616+87	to	620+44	LT	363
617+24	to	618+02	RT	100
618+01	to	618+15	RT	70
618+50	to	619+13	RT	90
618+80	to	618+96	RT	70
629+22	to	629+28	LT	20
629+22	to	629+29	RT	20
641+73	to	641+80	RT	20
641+78	to	641+85	LT	20
652+68	to	652+74	RT	20
652+78	to	652+85	RT	20
670+12	to	670+18	LT	20
670+95	to	671+09	RT	30
671+34	to	671+40	LT	30
698+30	to	698+75	RT	63
698+33	to	698+33	LT	30
708+54	to	710+38	RT	200
709+42	to	709+49	LT	20
717+19	to	717+25	LT	20
717+49	to	717+55	RT	20
			TOTAL	**2777**

12" Fiber Rolls - Highway 21

Station	to	Station	Offset	Length (LF)
720+74	to	720+81	RT	20
732+12	to	732+18	LT	20
750+62	to	750+69	LT	20
751+57	to	752+54	RT	100
759+04	to	759+10	LT	20
759+16	to	759+78	RT	65
786+14	to	787+77	RT	223
787+75	to	787+81	LT	20
788+24	to	788+31	RT	20
804+89	to	804+96	RT	20
811+96	to	812+02	RT	20
811+96	to	812+02	RT	20
811+96	to	812+02	RT	20
812+33	to	817+48	RT	530
812+80	to	812+87	LT	20
812+91	to	812+97	LT	20
822+45	to	823+44	LT	110
830+66	to	830+72	RT	20
			TOTAL	**1288**

12" Fiber Rolls - Highway 85

Station	to	Station	Offset	Length (LF)
2640+29	to	2644+54	LT	434
2642+55	to	2642+55	RT	20
2642+61	to	2644+77	RT	340
2645+94	to	2645+94	RT	20
			TOTAL	**814**

20" Fiber Rolls - Highway 21

Station	to	Station	Offset	Length (LF)
180+42	to	180+52	LT	30
180+48	to	180+58	LT	30
180+54	to	180+64	LT	30
180+60	to	180+70	LT	30
180+66	to	180+76	LT	30
229+83	to	229+96	LT	40
229+93	to	230+06	LT	40
230+04	to	230+17	LT	40
230+14	to	230+27	LT	40
260+57	to	260+57	RT	140
531+95	to	532+01	RT	30
532+01	to	532+08	RT	30
532+08	to	532+14	RT	30
532+14	to	532+20	RT	30
532+20	to	532+27	RT	30
532+27	to	532+33	RT	30
618+15	to	618+24	RT	40
618+24	to	618+32	RT	40
618+32	to	618+41	RT	40
618+41	to	618+49	RT	40
822+07	to	822+19	RT	40
			TOTAL	**830**

20" Fiber Rolls - Highway 85

Station	to	Station	Offset	Length (LF)
2645+53	to	2645+54	LT	40
			TOTAL	**40**

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		532+15 to 717+55	2777	LF
		720+74 to 830+72	1288	LF
		2640+29 to 2645+94 (Hwy 85)	814	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		532+15 to 717+55	2777	LF
		720+74 to 830+72	1288	LF
		2640+29 to 2645+94 (Hwy 85)	814	LF
261	0120	FIBER ROLLS 20IN		
		180+42 to 822+19	830	LF
		2645+53 to 2645+54 (Hwy 85)	40	LF
261	0121	REMOVE FIBER ROLLS 20IN		
		180+42 to 822+19	830	LF
		2645+53 to 2645+54 (Hwy 85)	40	LF

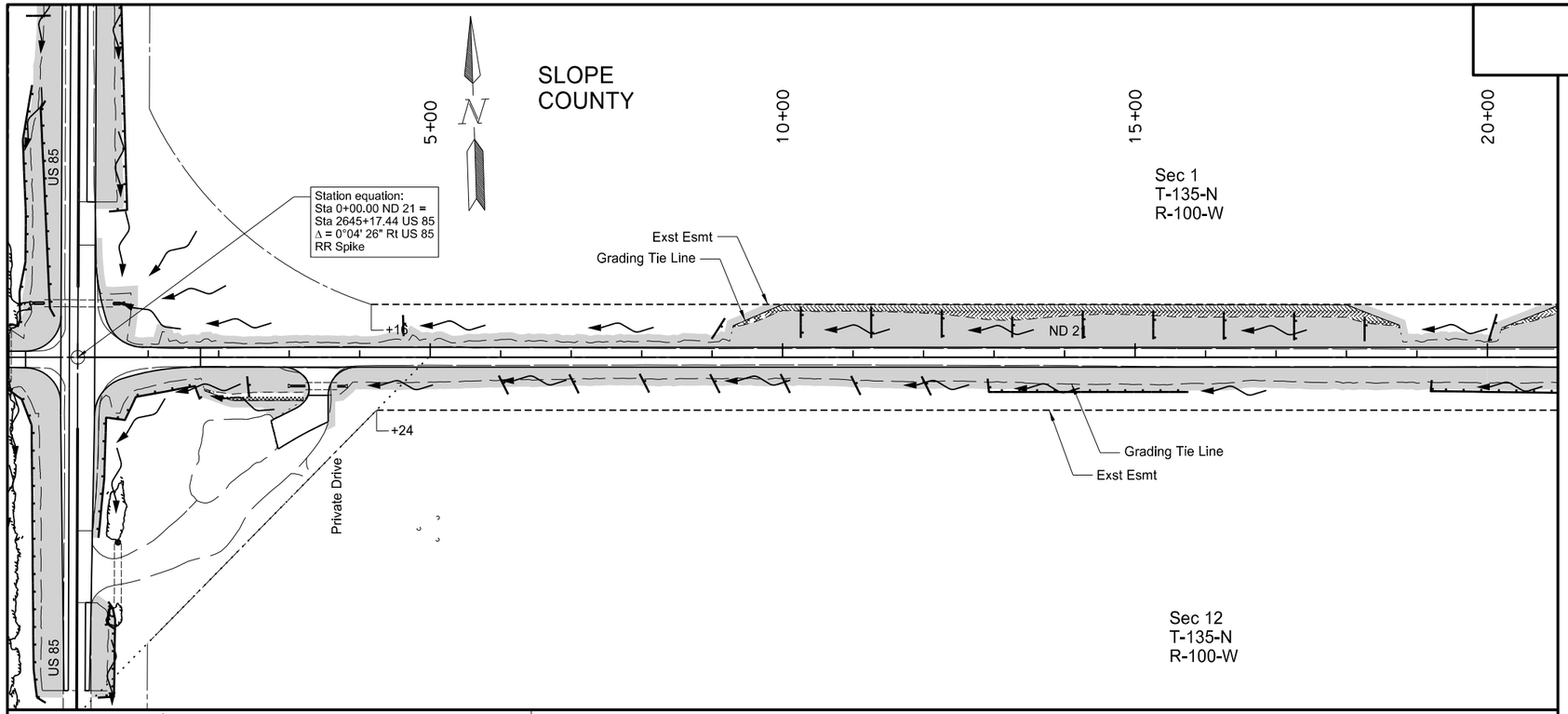
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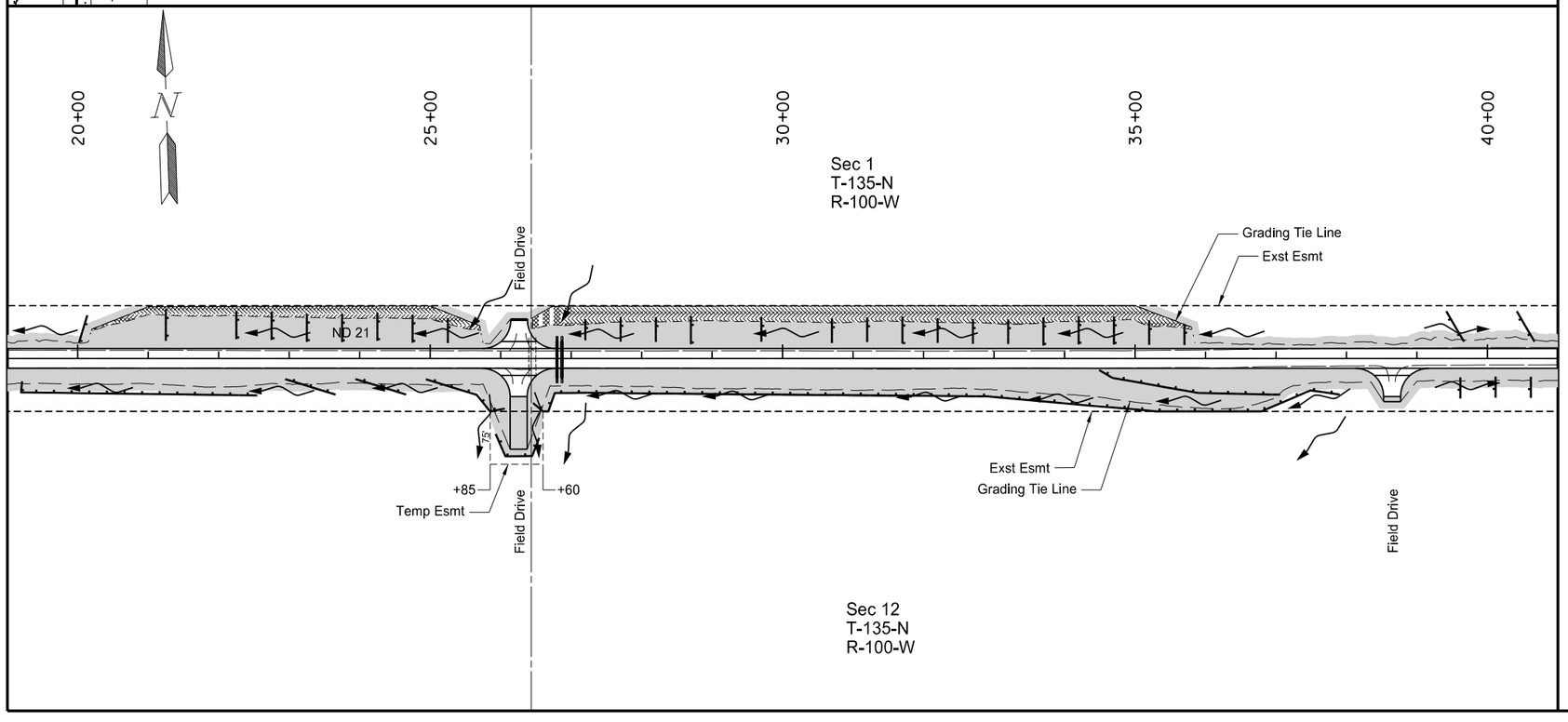
Temporary Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	1

SLOPE
COUNTY





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		1+74 Tto 40+00	7.2	ACRE
253	0101	STRAW MULCH		
		1+74 Tto 40+00	6.21	ACRE
255	0101	ECB TYPE 1		
		1+74 Tto 40+00	4776	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

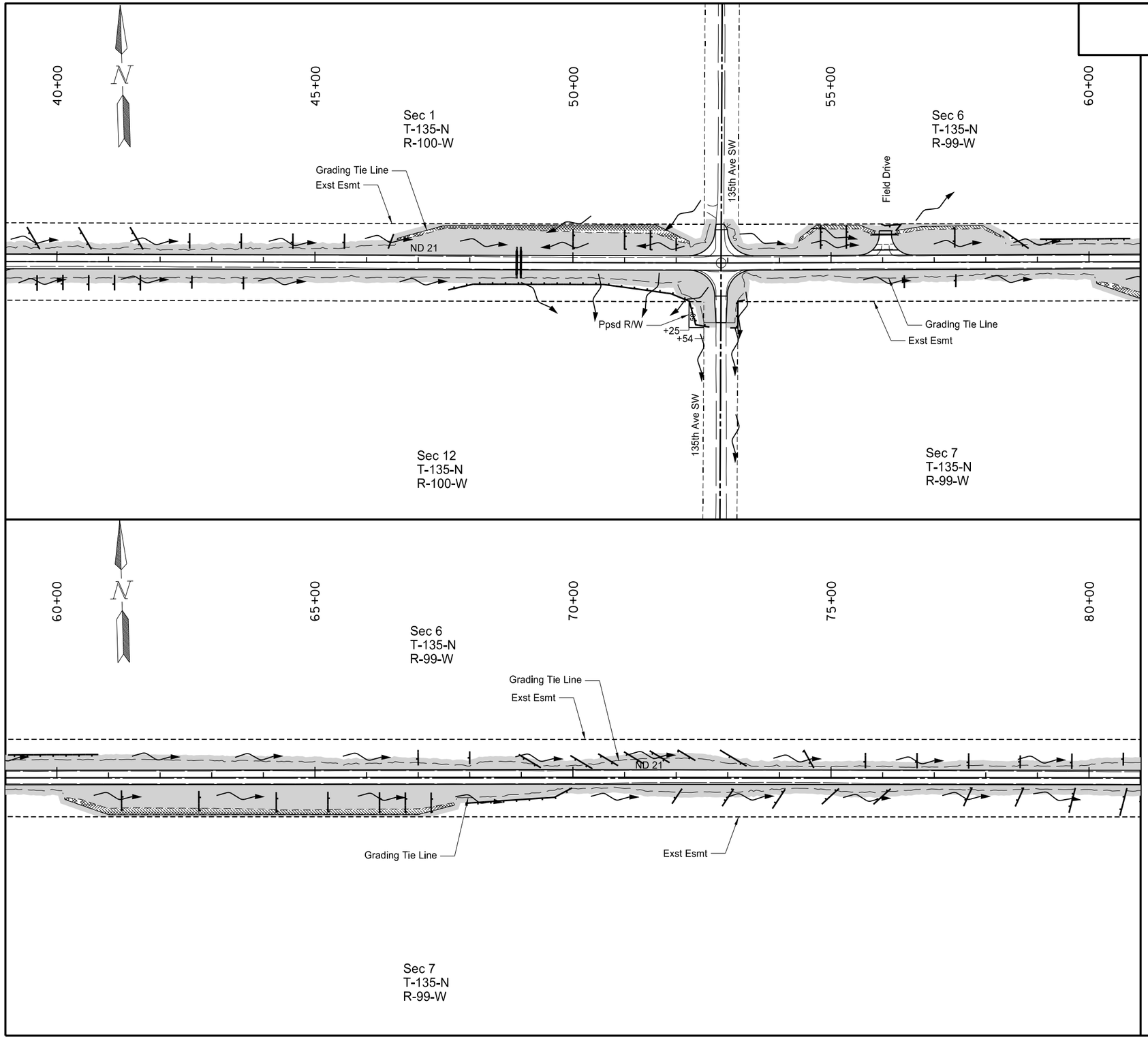
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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

0+24 to 40+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	2



SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		40+00 to 80+00	5.97	ACRE
253	0101	STRAW MULCH		
		40+00 to 80+00	5.59	ACRE
255	0101	ECB TYPE 1		
		40+00 to 80+00	1820	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

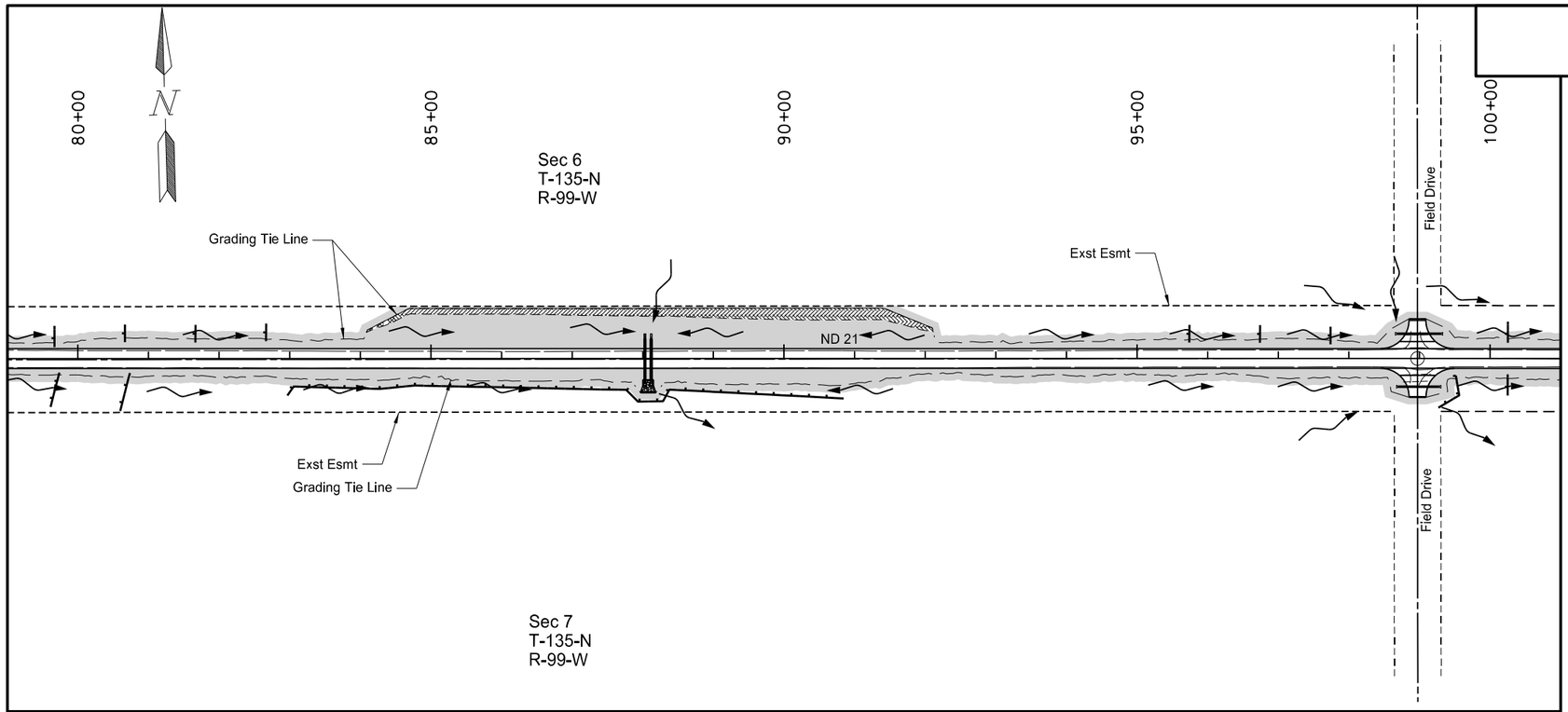
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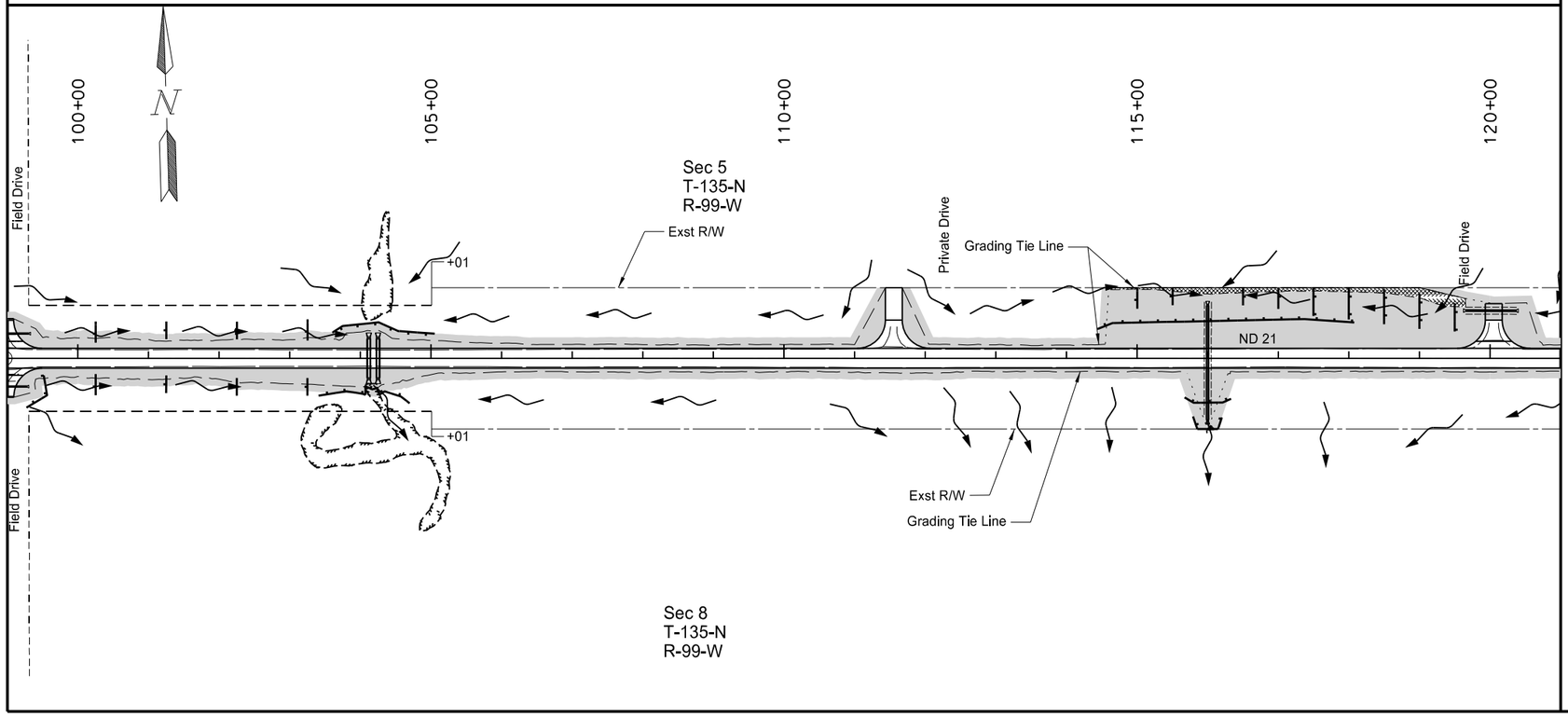
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

40+00 to 80+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	3





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		80+00 to 120+00	5.58	ACRE
253	0101	STRAW MULCH		
		80+00 to 120+00	5.28	ACRE
255	0101	ECB TYPE 1		
		80+00 to 120+00	1432	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

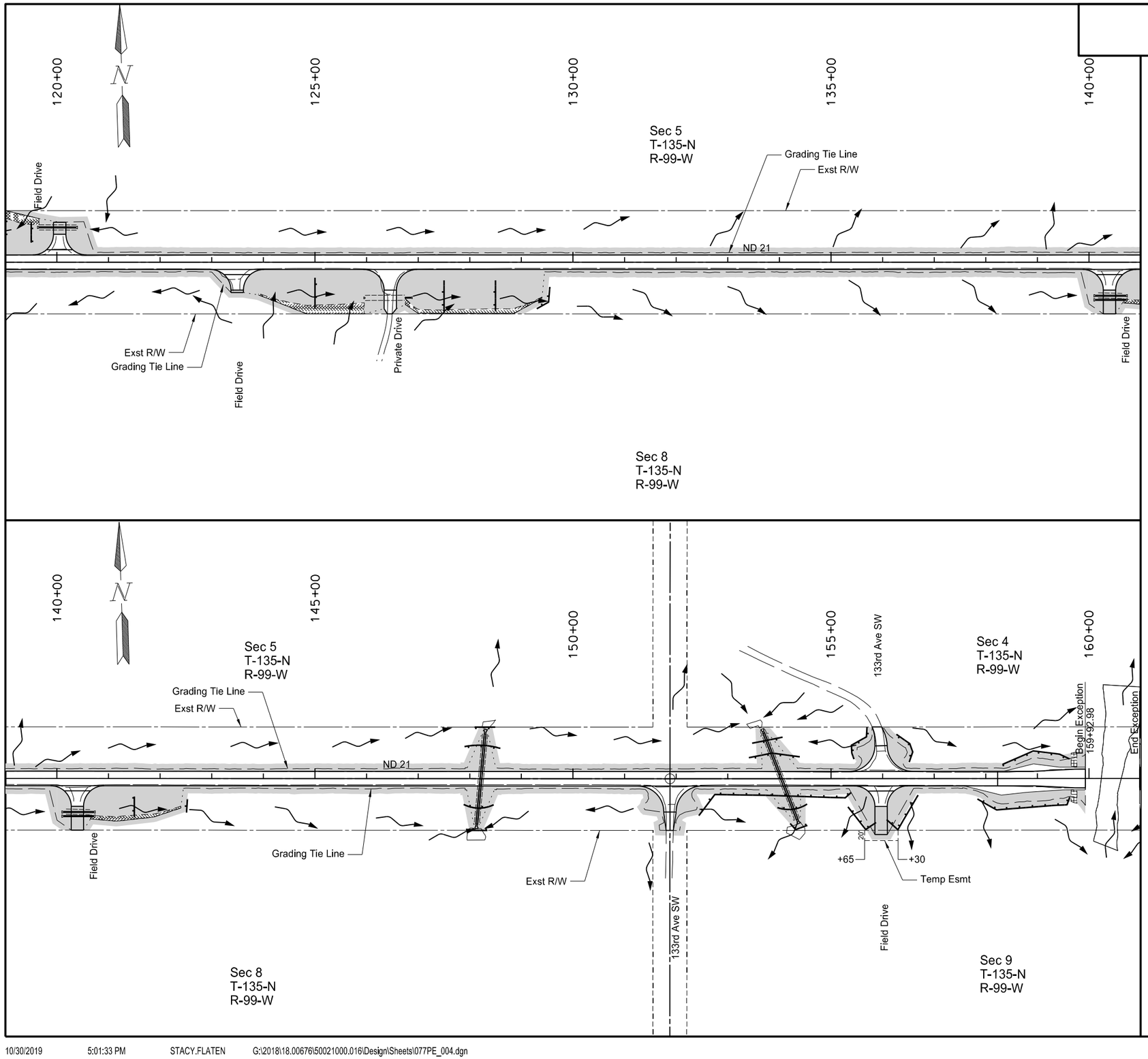
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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

80+00 to 120+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	4



SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		120+00 to 159+92.98	4.73	ACRE
253	0101	STRAW MULCH		
		120+00 to 159+92.98	4.58	ACRE
255	0101	ECB TYPE 1		
		120+00 to 159+92.98	667	SY
255	0201	TRM TYPE 1(Std Dwg D-255-1)		
		120+00 to 159+92.98	65	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Turf Reinforcement Mat
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

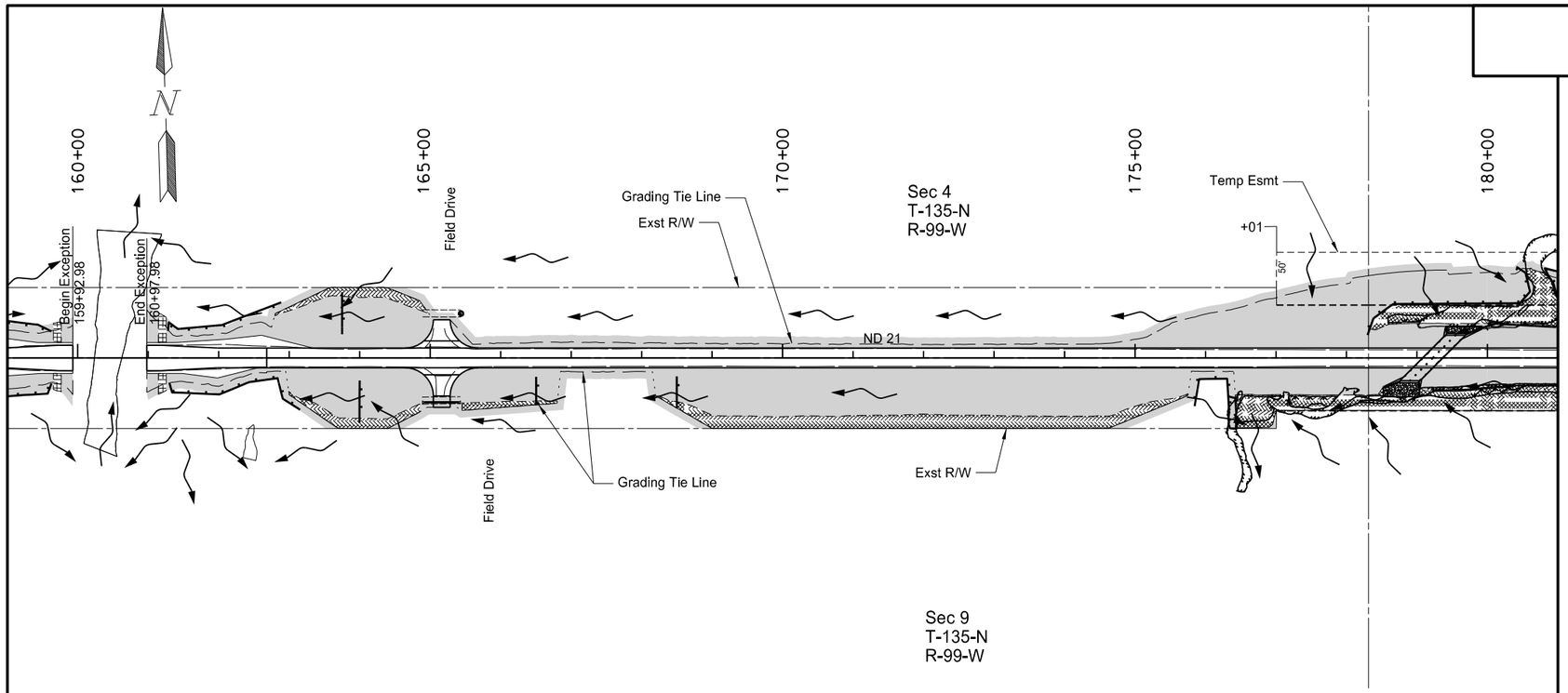
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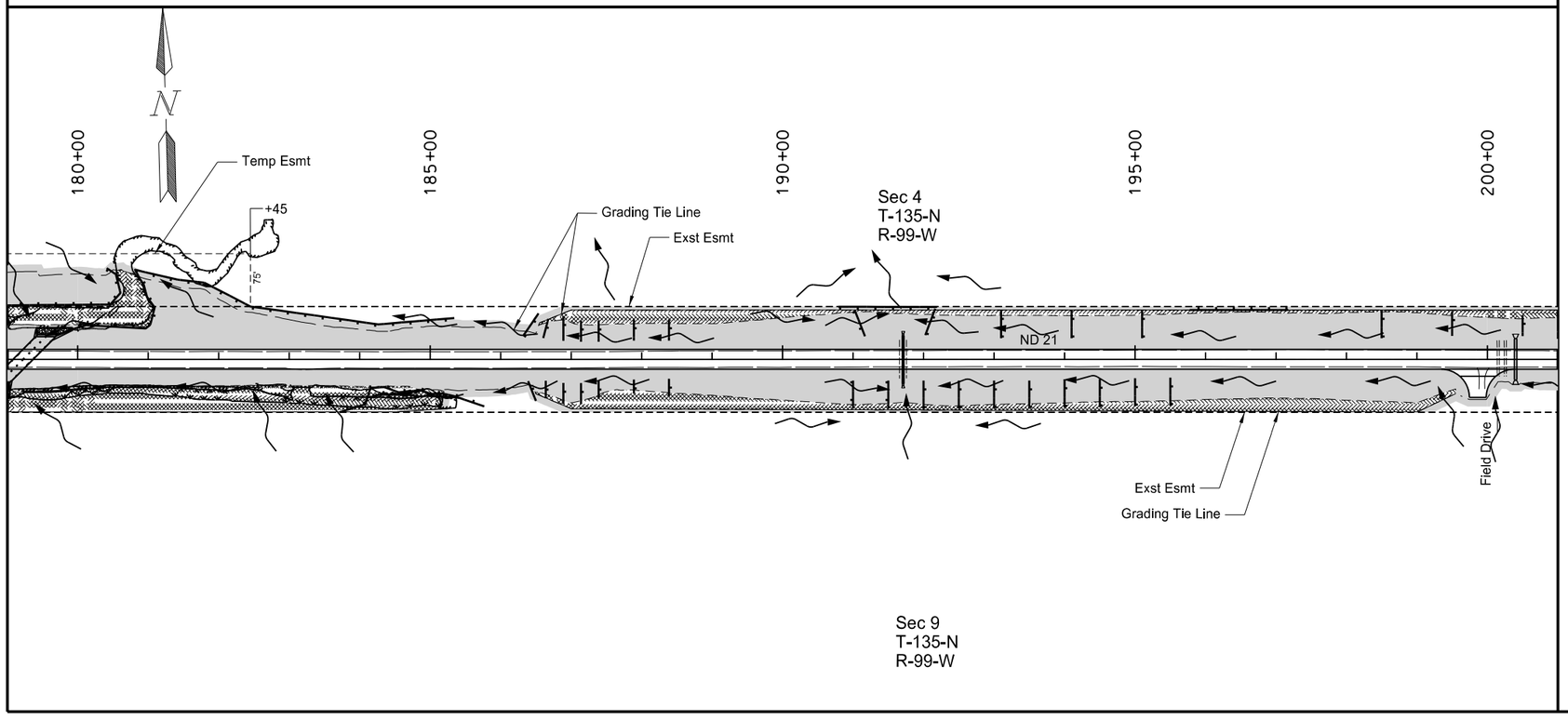
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

120+00 to 159+92.98

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	5





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		160+97.98 to 200+00	9.95	ACRE
251	1000	WETLAND SEED		
		160+97.98 to 200+00	0.25	ACRE
253	0101	STRAW MULCH		
		160+97.98 to 200+00	8.22	ACRE
255	0101	ECB TYPE 1		
		160+97.98 to 200+00	9451	SY
255	0201	TRM TYPE 1(Std Dwg D-255-1)		
		160+97.98 to 200+00	81	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Turf Reinforcement Mat
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

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Permanent Erosion Control

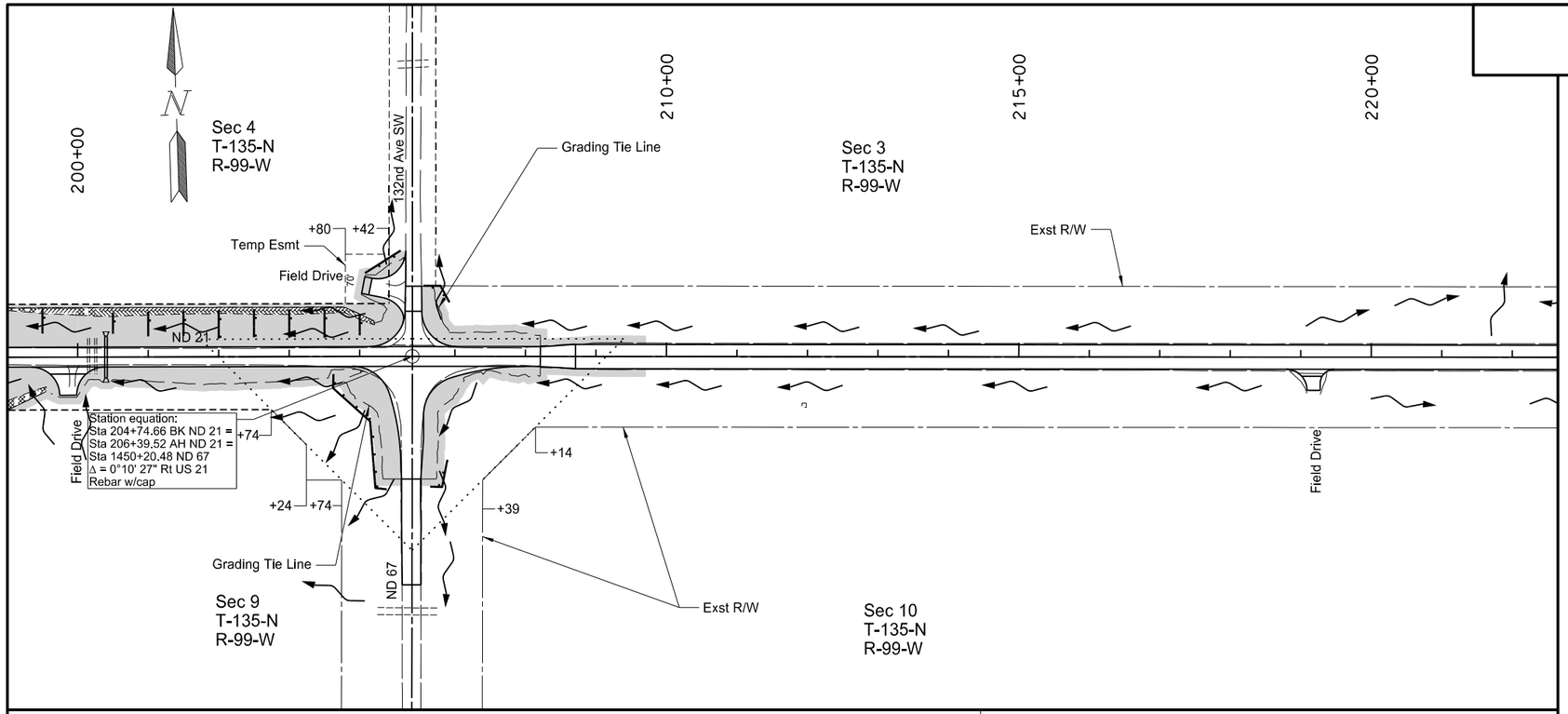
ND 21
Jct 85 to N Jct 22 - New England

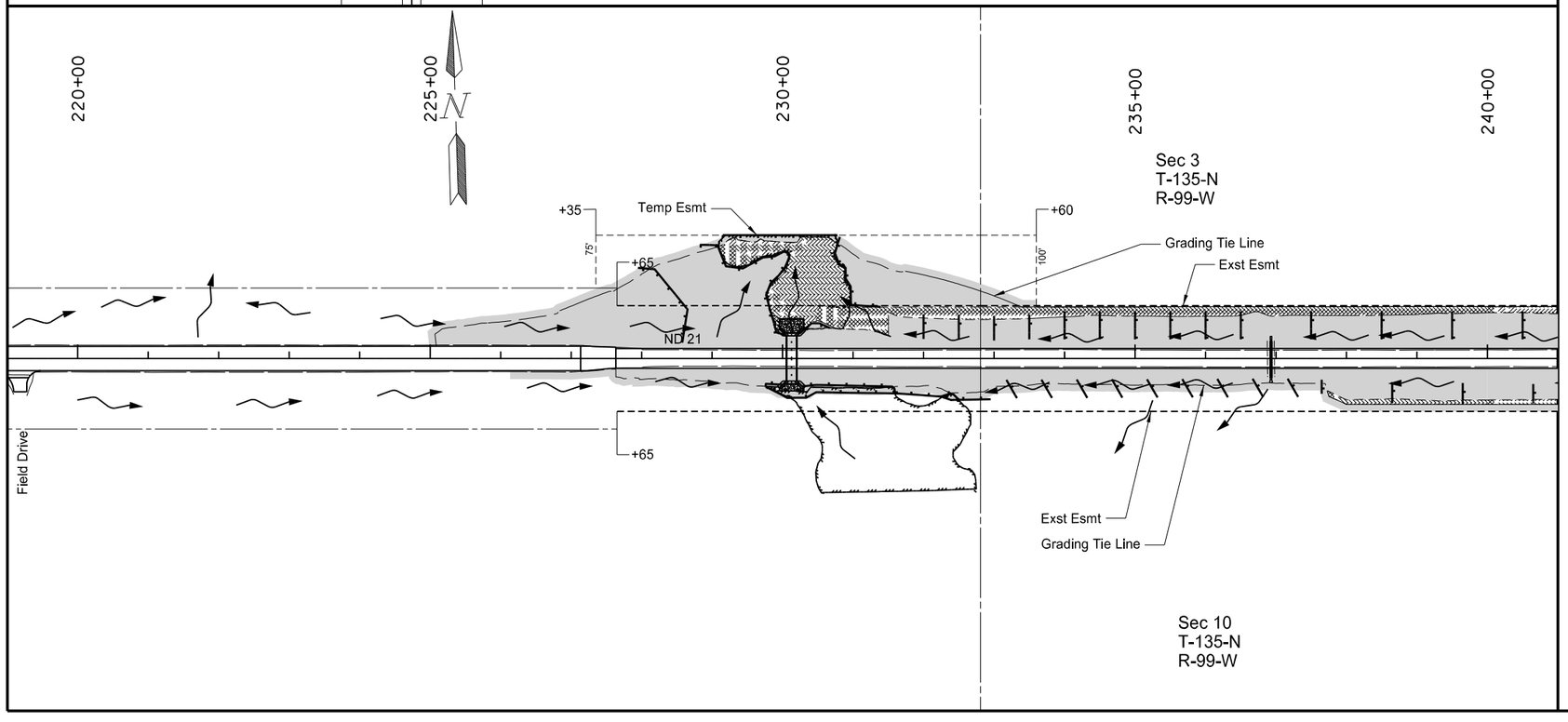
160+97.98 to 200+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	6

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		200+00 to 240+00	5.63	ACRE
253	0101	STRAW MULCH		
		200+00 to 240+00	4.88	ACRE
255	0101	ECB TYPE 1		
		200+00 to 240+00	3600	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data





Legend

- Seeding Class II / Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

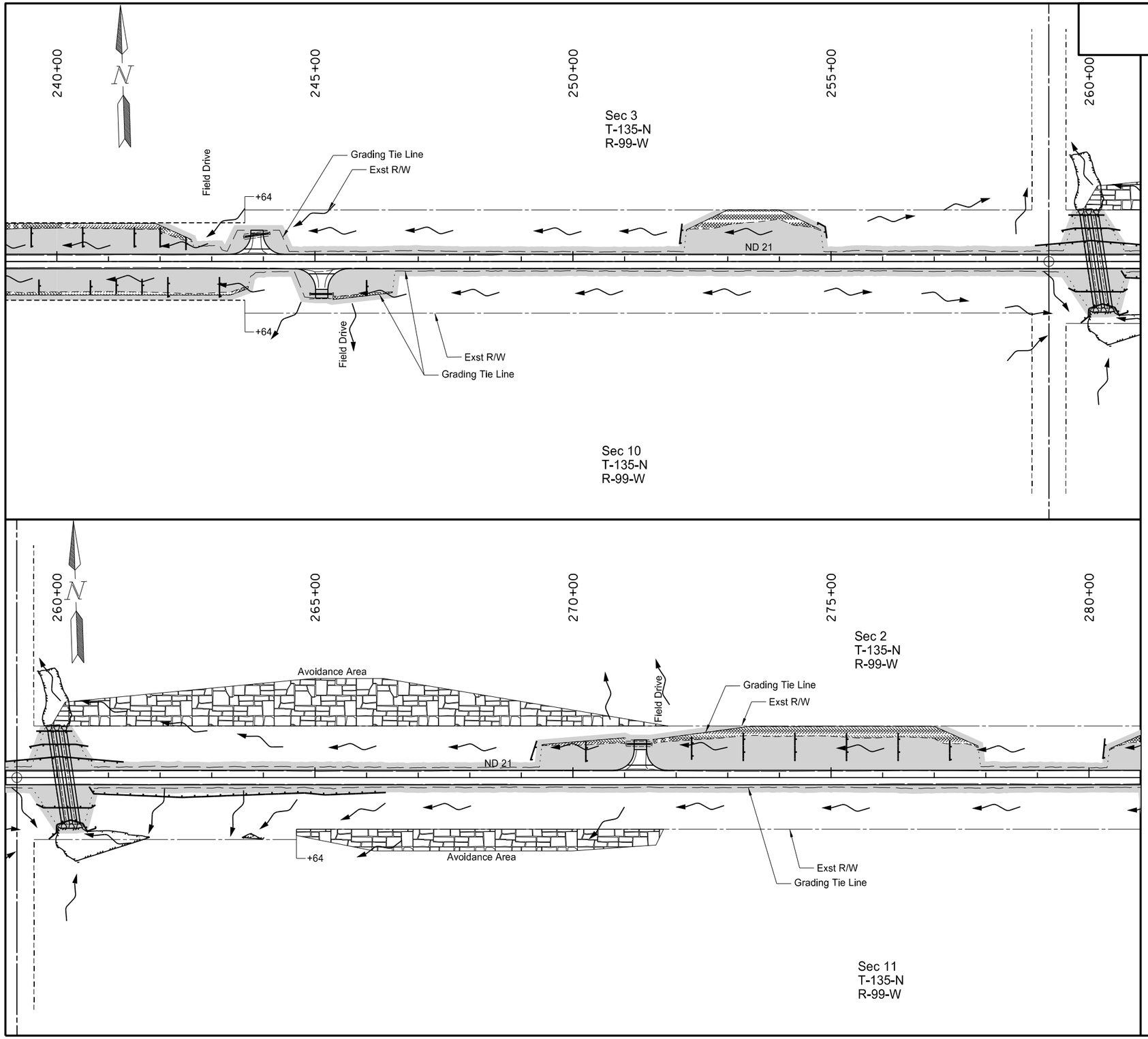
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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

200+00 to 240+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	7



SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		240+00 to 280+00	5.74	ACRE
253	0101	STRAW MULCH		
		240+00 to 280+00	5.24	ACRE
255	0101	ECB TYPE 1		
		240+00 to 280+00	2375	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II / Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

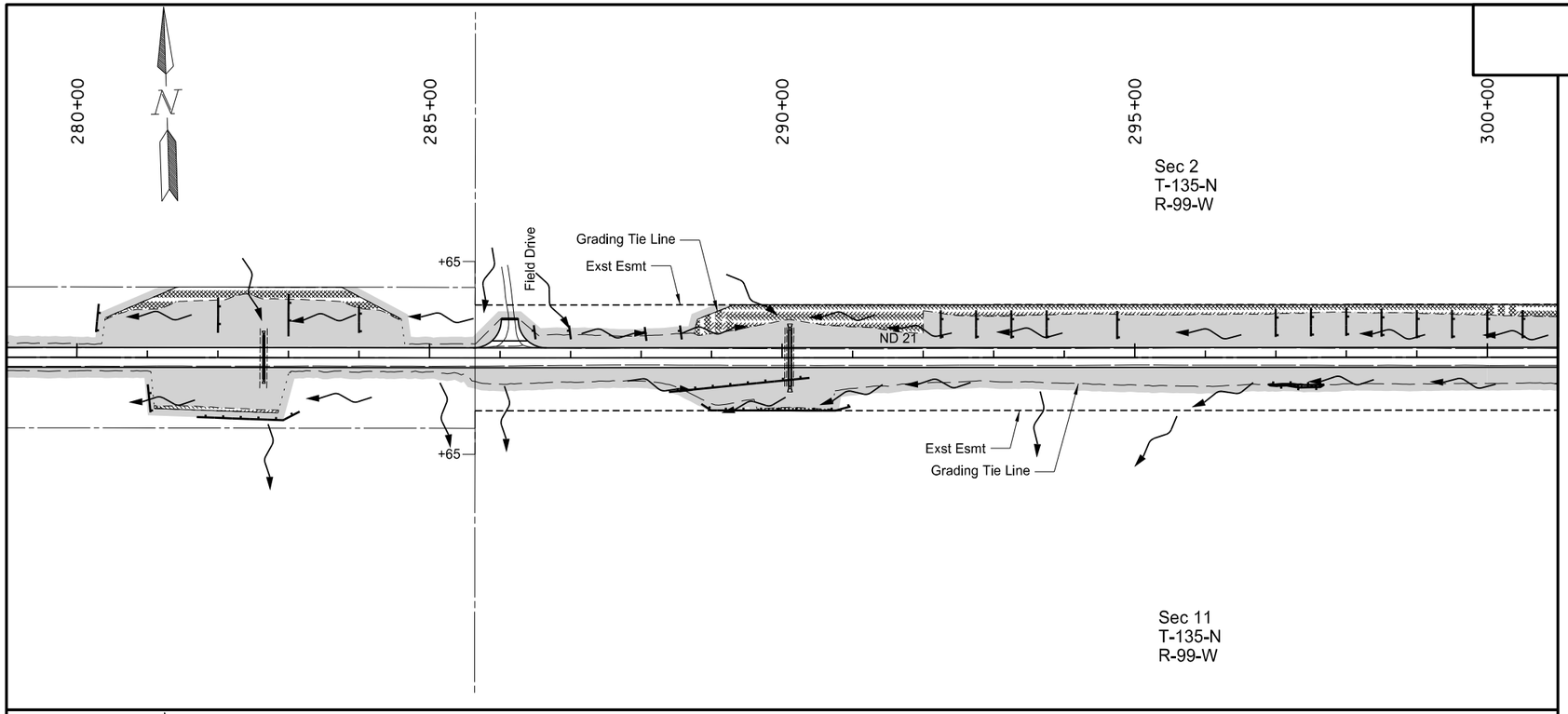
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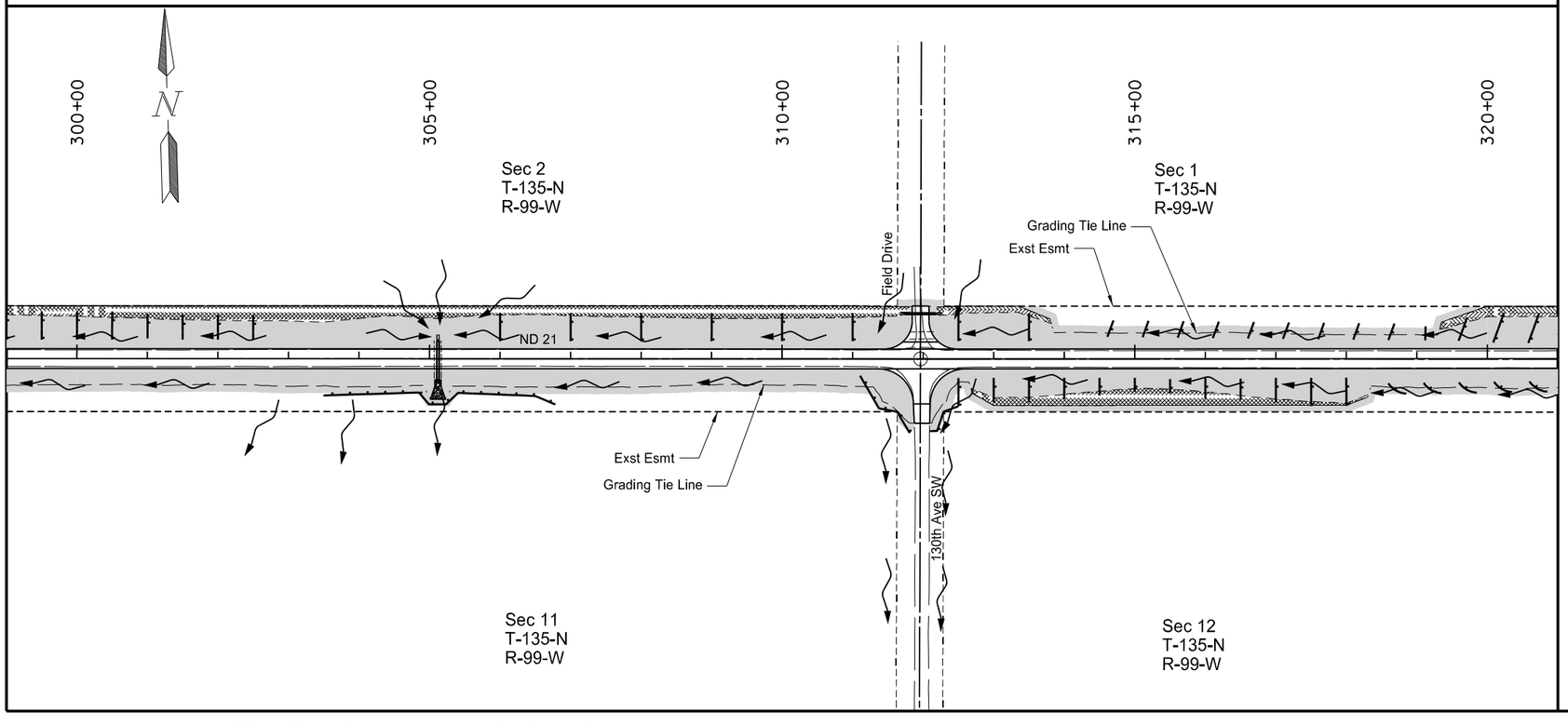
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

240+00 to 280+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	8





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		280+00 to 320+00	8.67	ACRE
253	0101	STRAW MULCH		
		280+00 to 320+00	7.34	ACRE
255	0101	ECB TYPE 1		
		280+00 to 320+00	6412	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

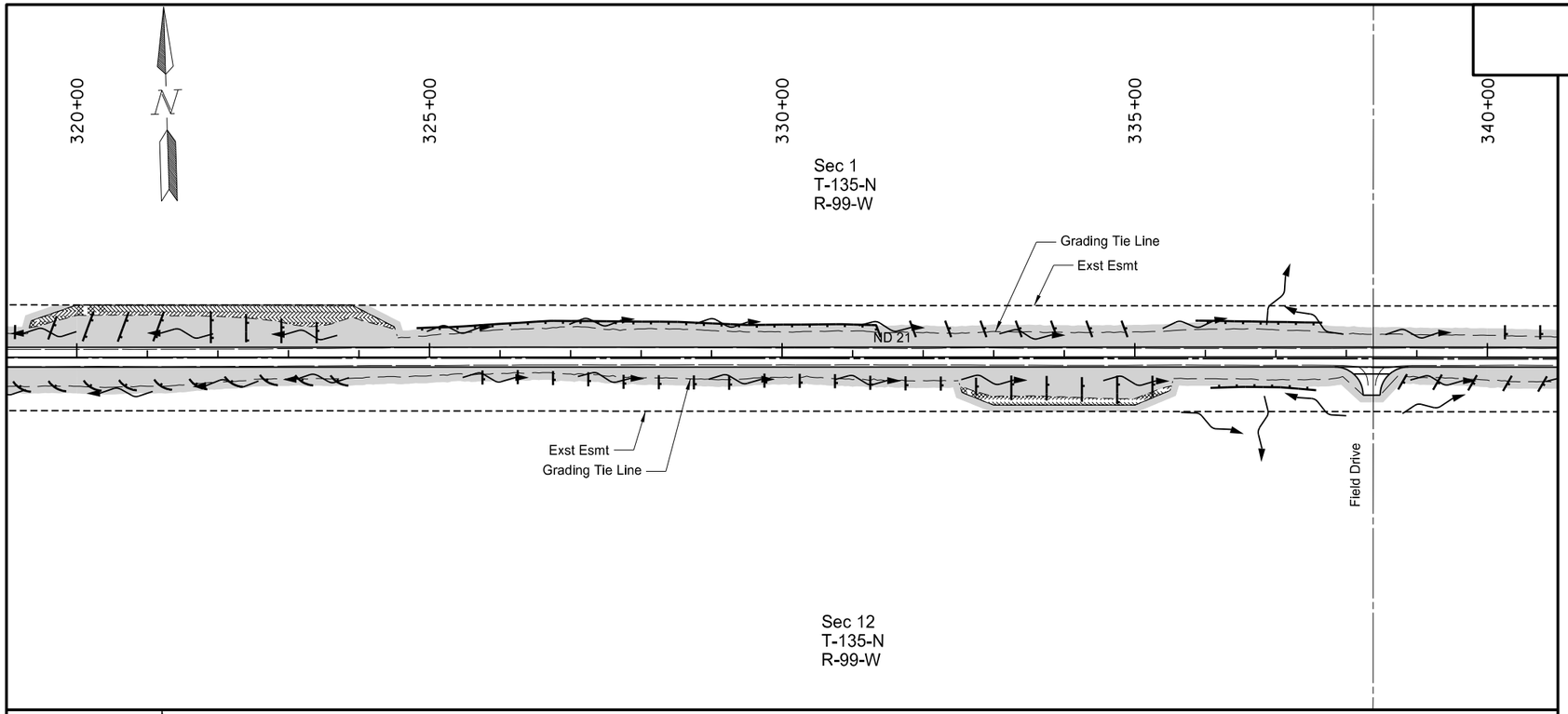
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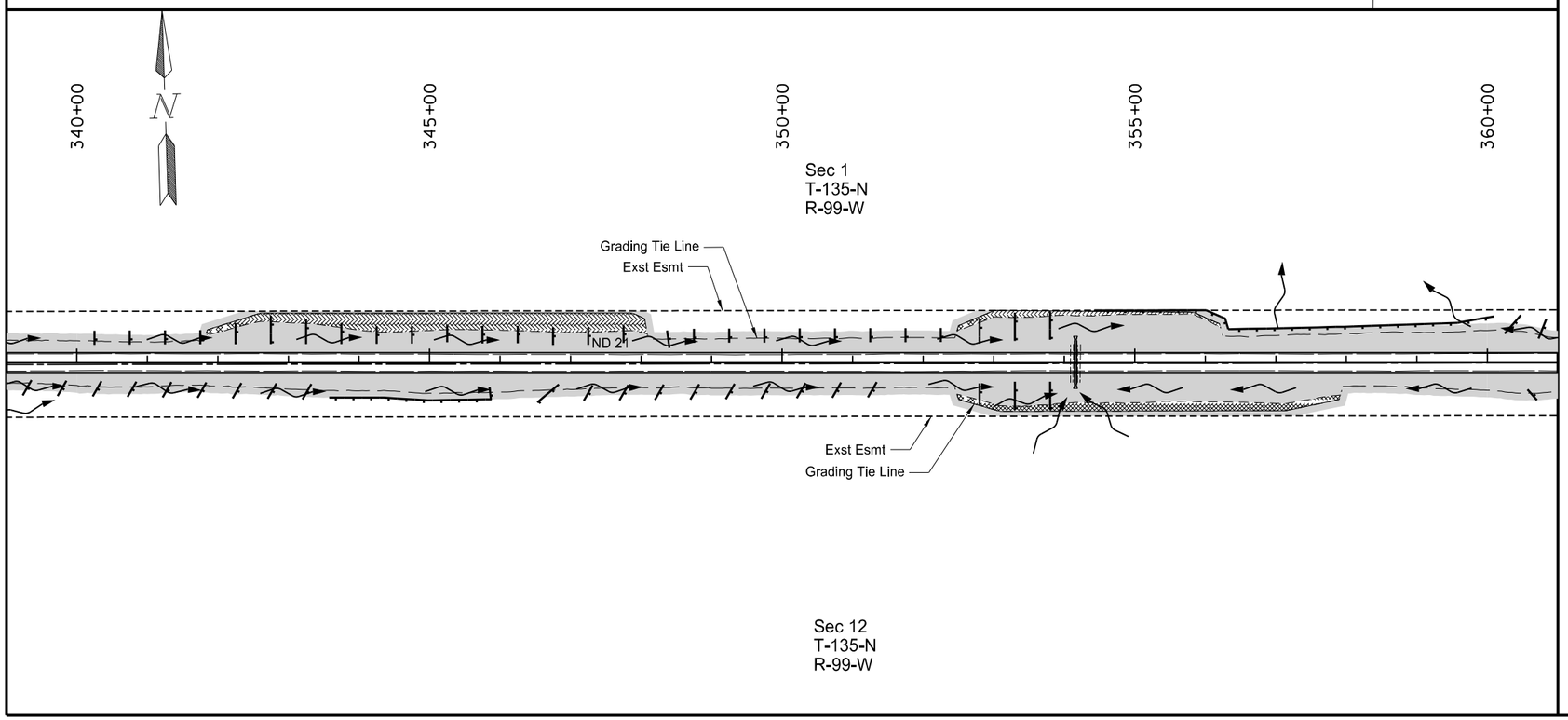
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

280+00 to 320+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	9





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		320+00 to 360+00	7.2	ACRE
253	0101	STRAW MULCH		
		320+00 to 360+00	6.45	ACRE
255	0101	ECB TYPE 1		
		320+00 to 360+00	3583	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

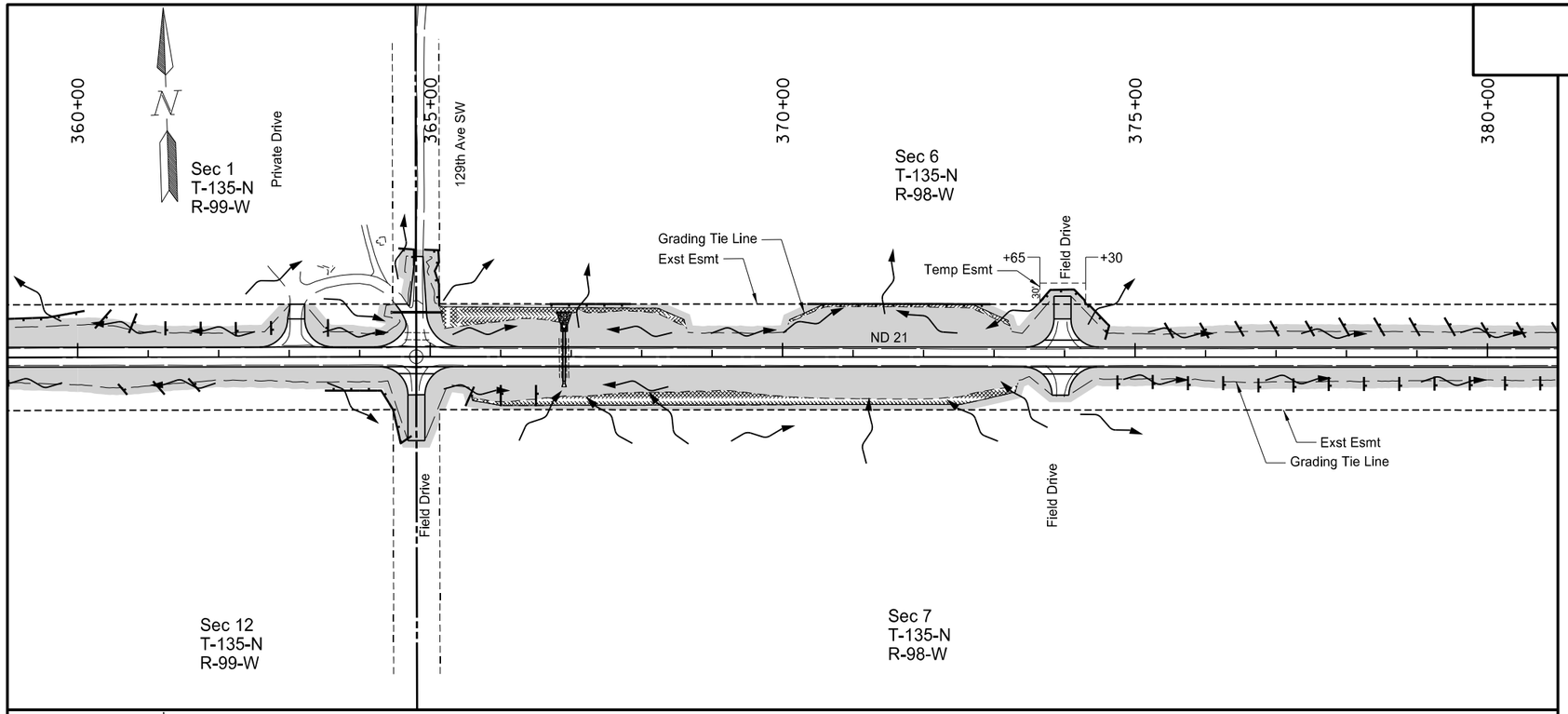
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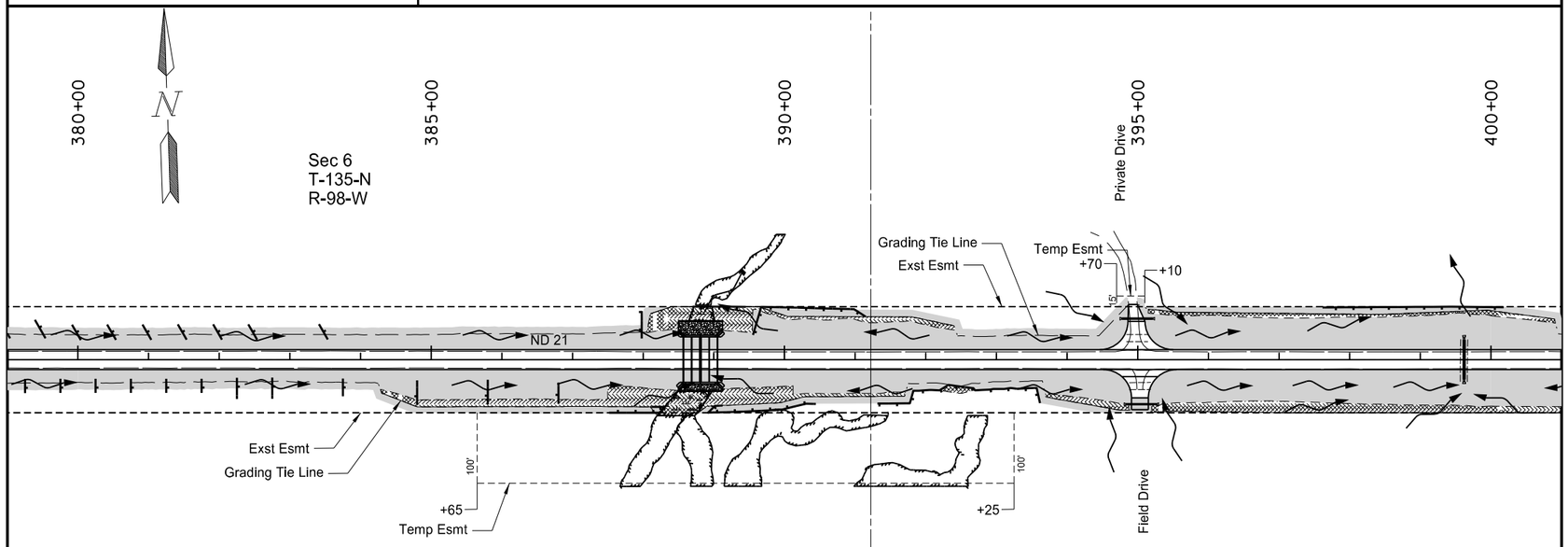
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

320+00 to 360+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	10





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		360+00 to 400+00	8.22	ACRE
251	1000	WETLAND SEED		
		360+00 to 400+00	0.06	ACRE
253	0101	STRAW MULCH		
		360+00 to 400+00	7.32	ACRE
255	0101	ECB TYPE 1		
		360+00 to 400+00	4612	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

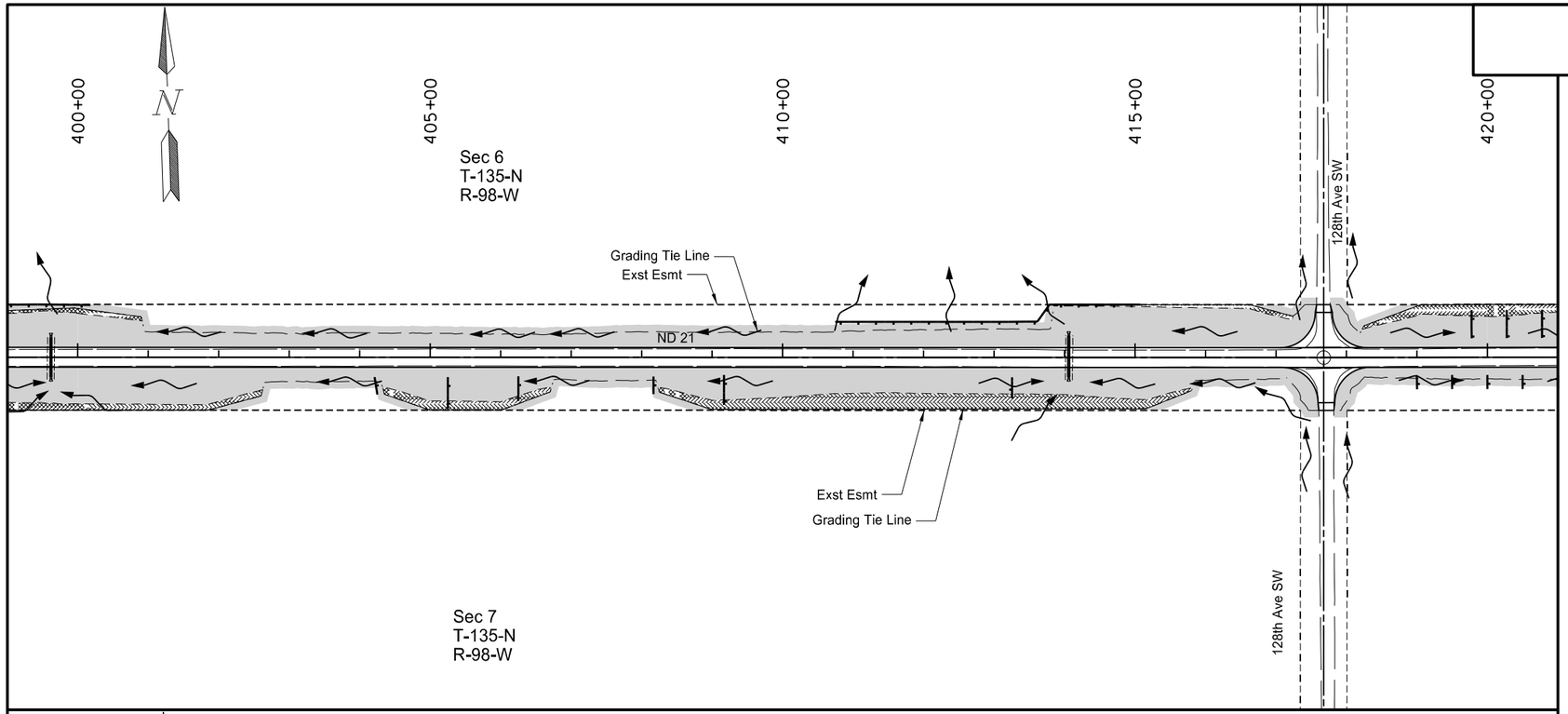
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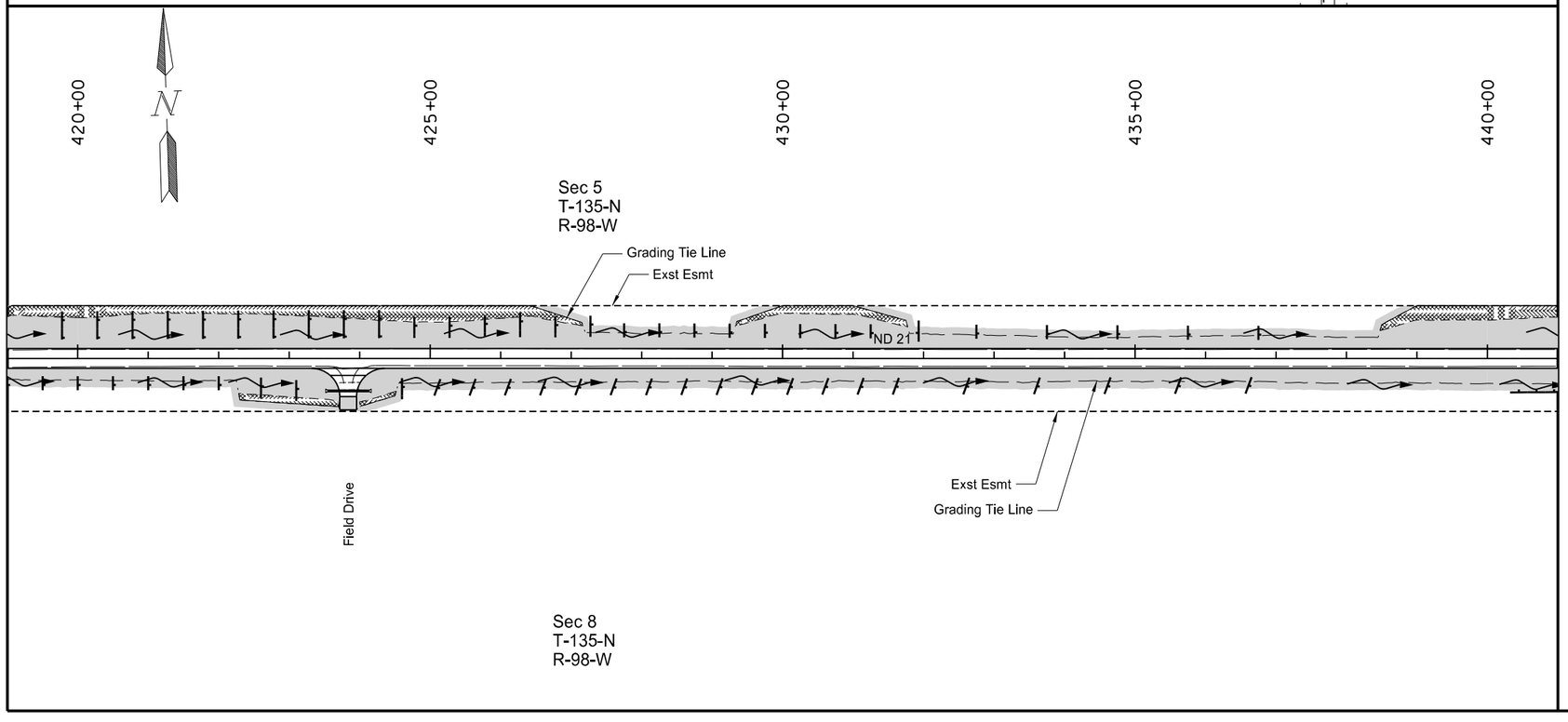
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

360+00 to 400+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	11





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		400+00 to 440+00	7.72	ACRE
253	0101	STRAW MULCH		
		400+00 to 440+00	6.79	ACRE
255	0101	ECB TYPE 1		
		400+00 to 440+00	4473	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

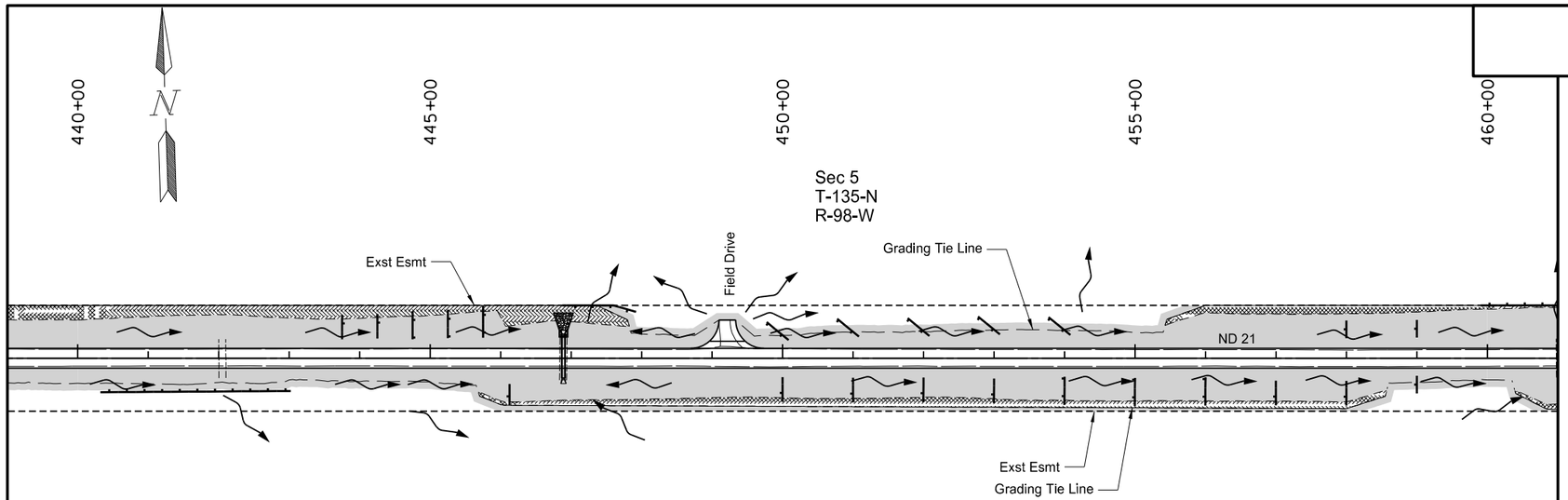
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Permanent Erosion Control

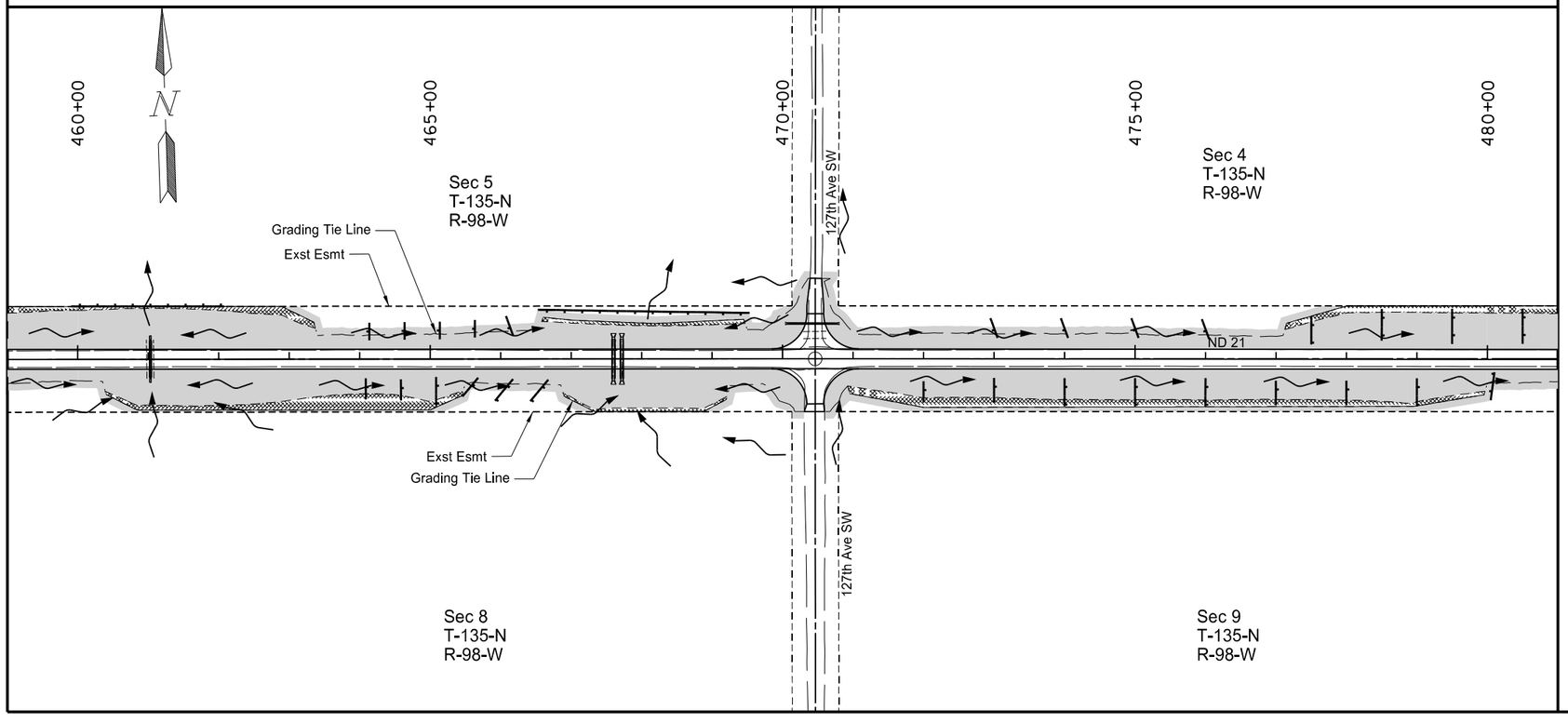
ND 21
Jct 85 to N Jct 22 - New England

400+00 to 440+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	12



Sec 8
T-135-N
R-98-W



SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		440+00 to 480+00	9.19	ACRE
253	0101	STRAW MULCH		
		440+00 to 480+00	7.95	ACRE
255	0101	ECB TYPE 1		
		440+00 to 480+00	5958	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

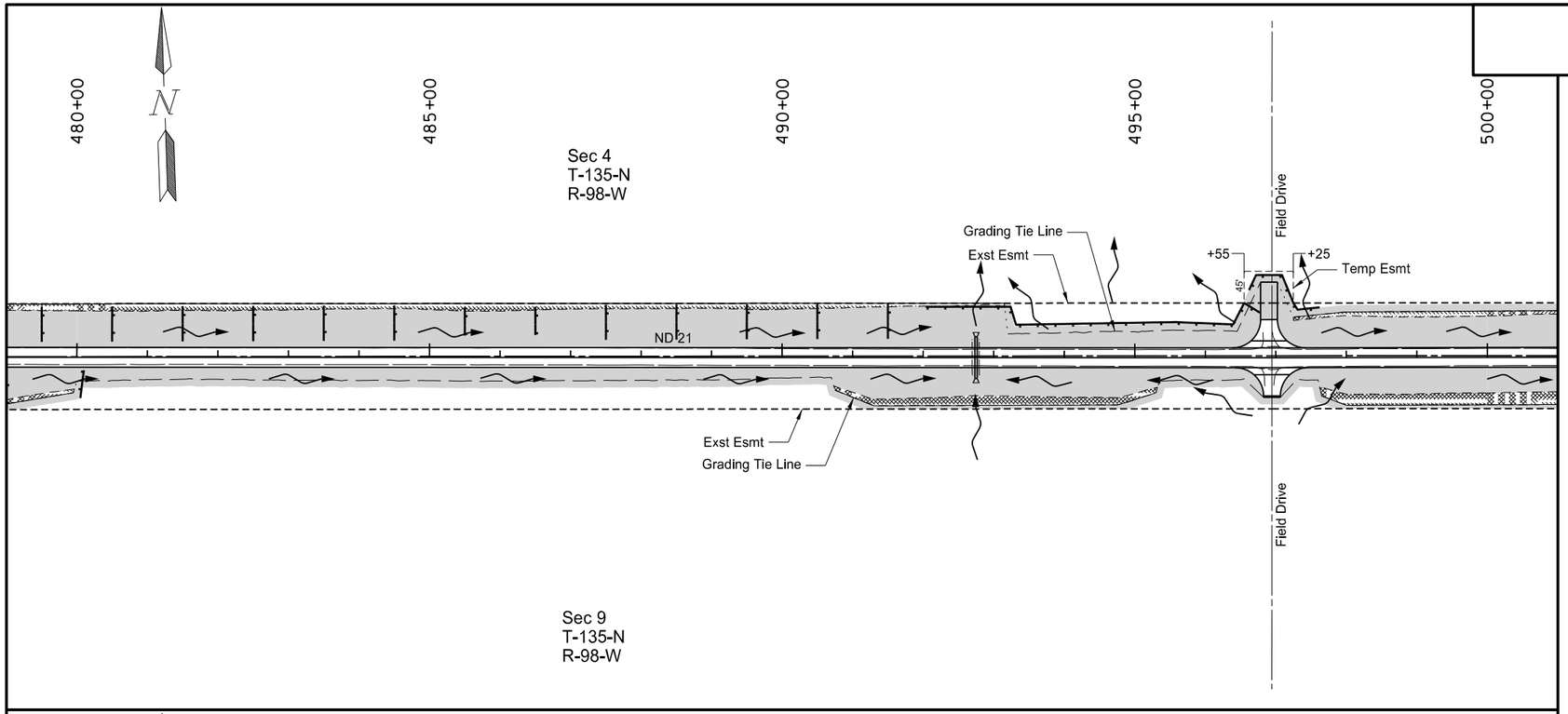
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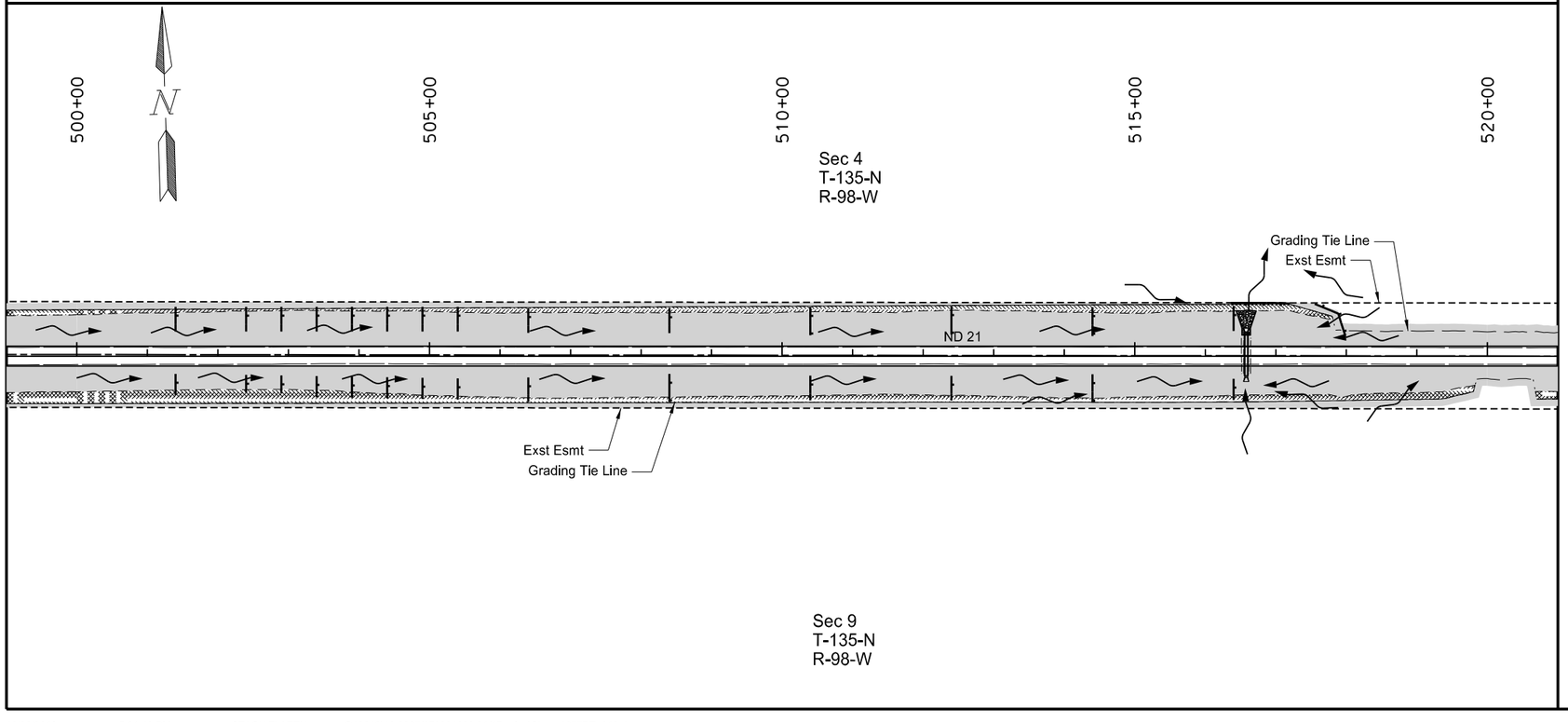
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

440+00 to 480+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	13





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		480+00 to 520+00	9.83	ACRE
253	0101	STRAW MULCH		
		480+00 to 520+00	8.56	ACRE
255	0101	ECB TYPE 1		
		480+00 to 520+00	6137	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II / Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

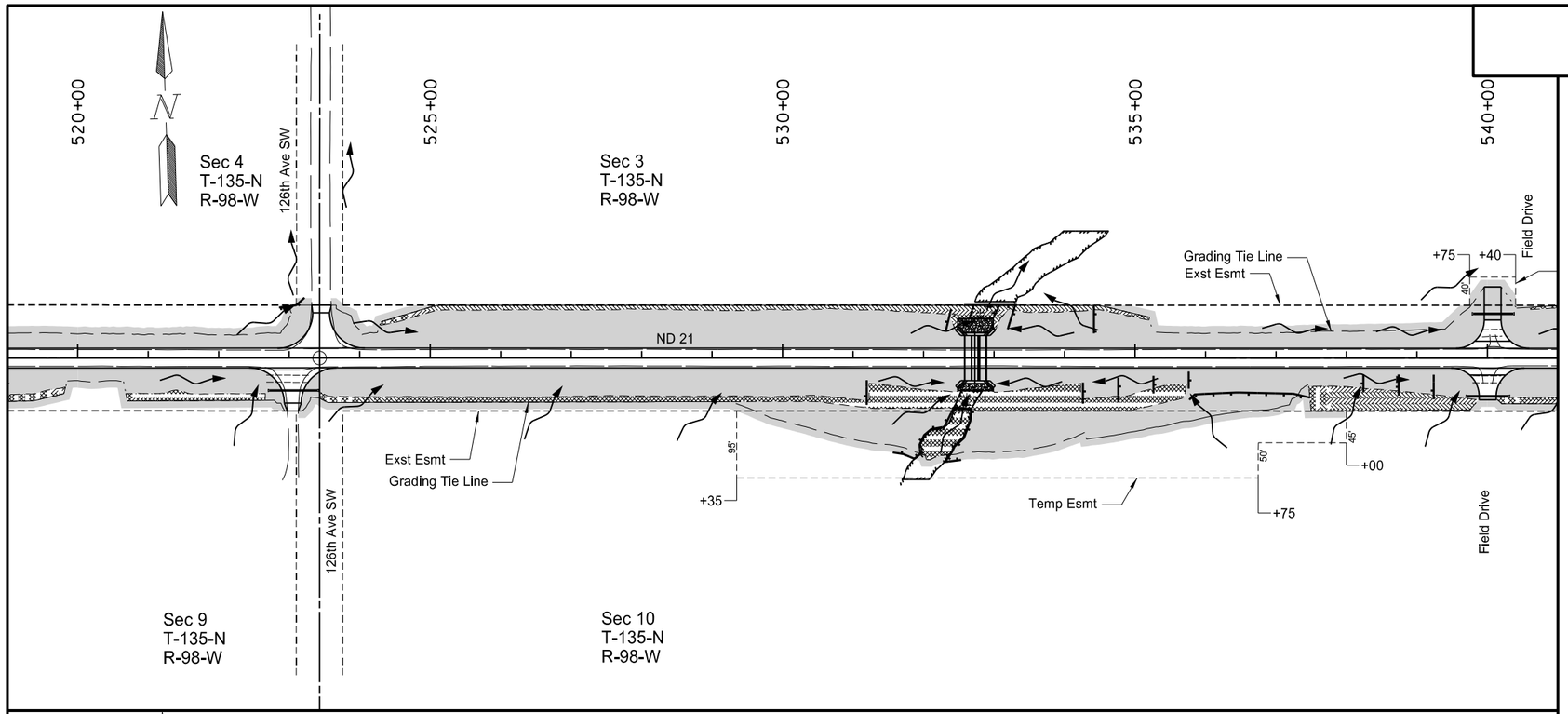
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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

480+00 to 520+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	14



SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		520+00 to 560+00	9.72	ACRE
251	1000	WETLAND SEED		
		520+00 to 560+00	0.03	ACRE
253	0101	STRAW MULCH		
		520+00 to 560+00	8.58	ACRE
255	0101	ECB TYPE 1		
		520+00 to 560+00	5638	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II / Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

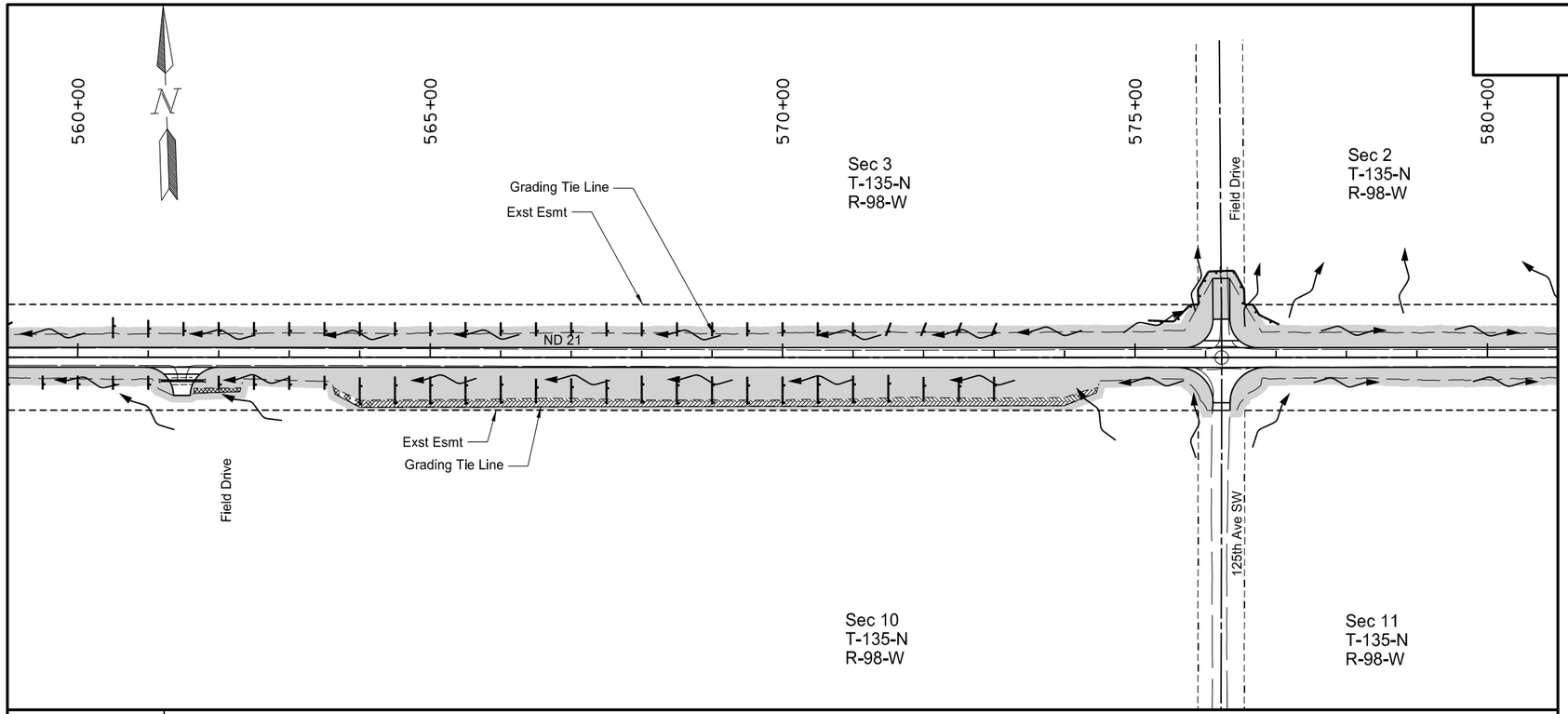
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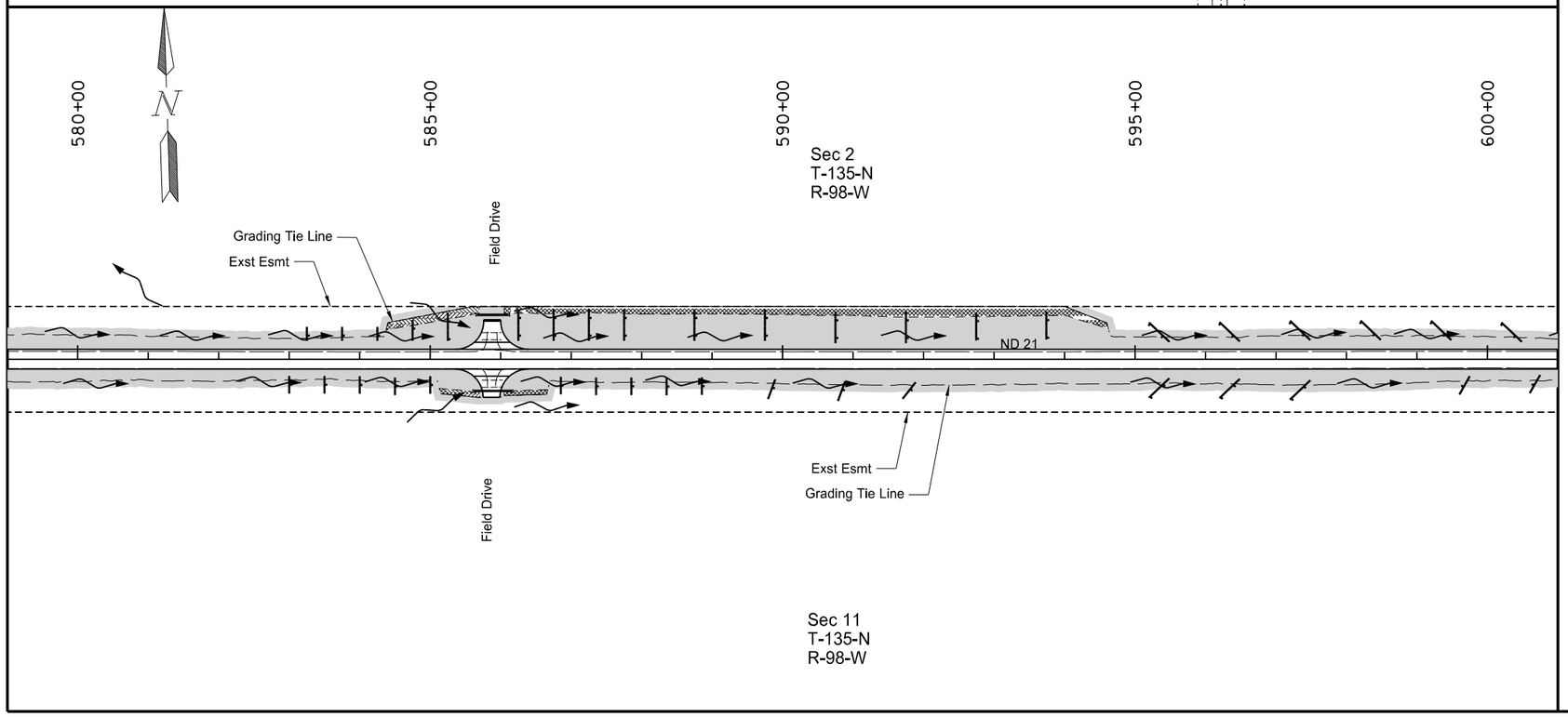
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

520+00 to 560+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	15





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		560+00 to 600+00	7.05	ACRE
253	0101	STRAW MULCH		
		560+00 to 600+00	6.49	ACRE
255	0101	ECB TYPE 1		
		560+00 to 600+00	2680	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

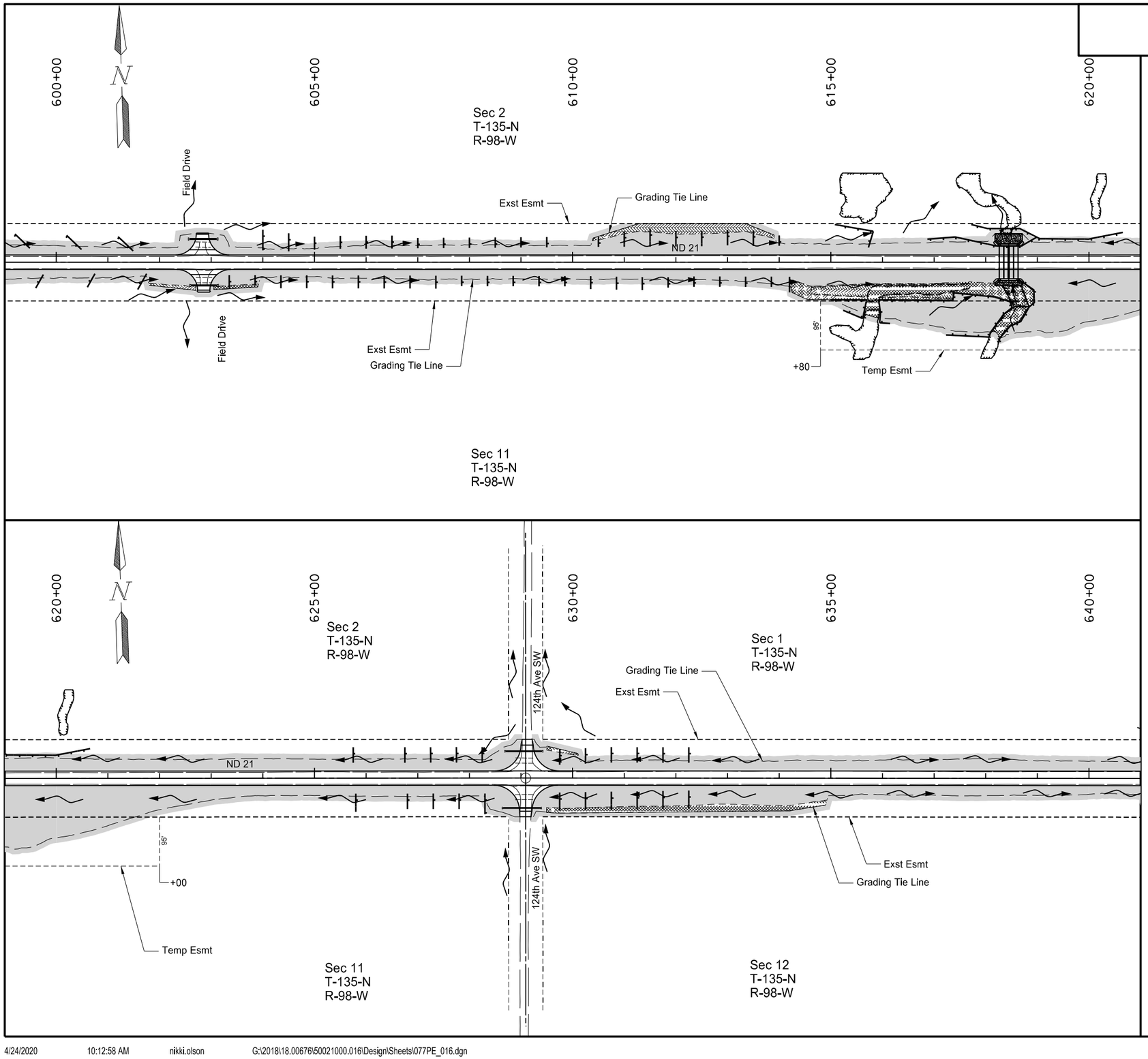
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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

560+00 to 600+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	16



SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		600+00 to 640+00	7.55	ACRE
251	1000	WETLAND SEED		
		600+00 to 640+00	0.11	ACRE
253	0101	STRAW MULCH		
		600+00 to 640+00	6.99	ACRE
255	0101	ECB TYPE 1		
		600+00 to 640+00	3231	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II / Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

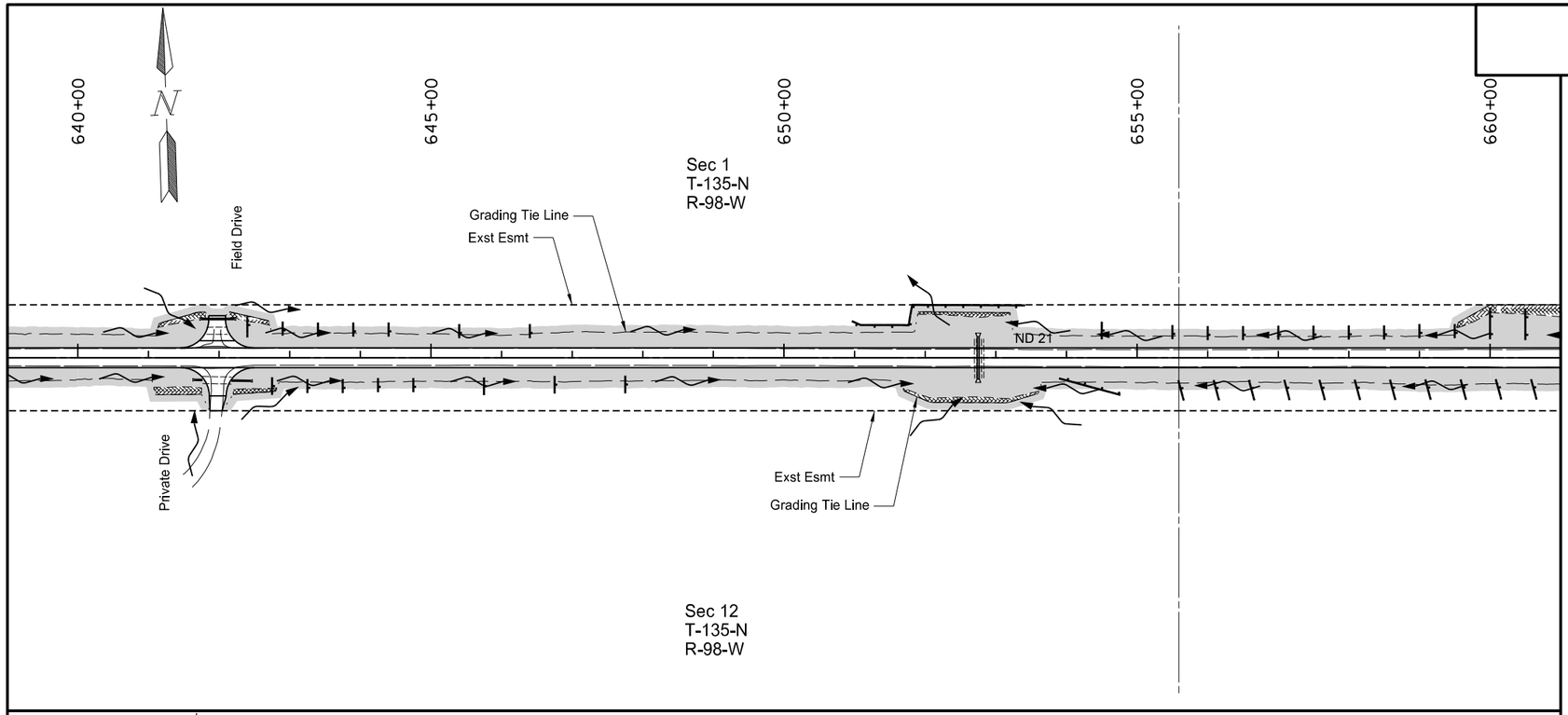
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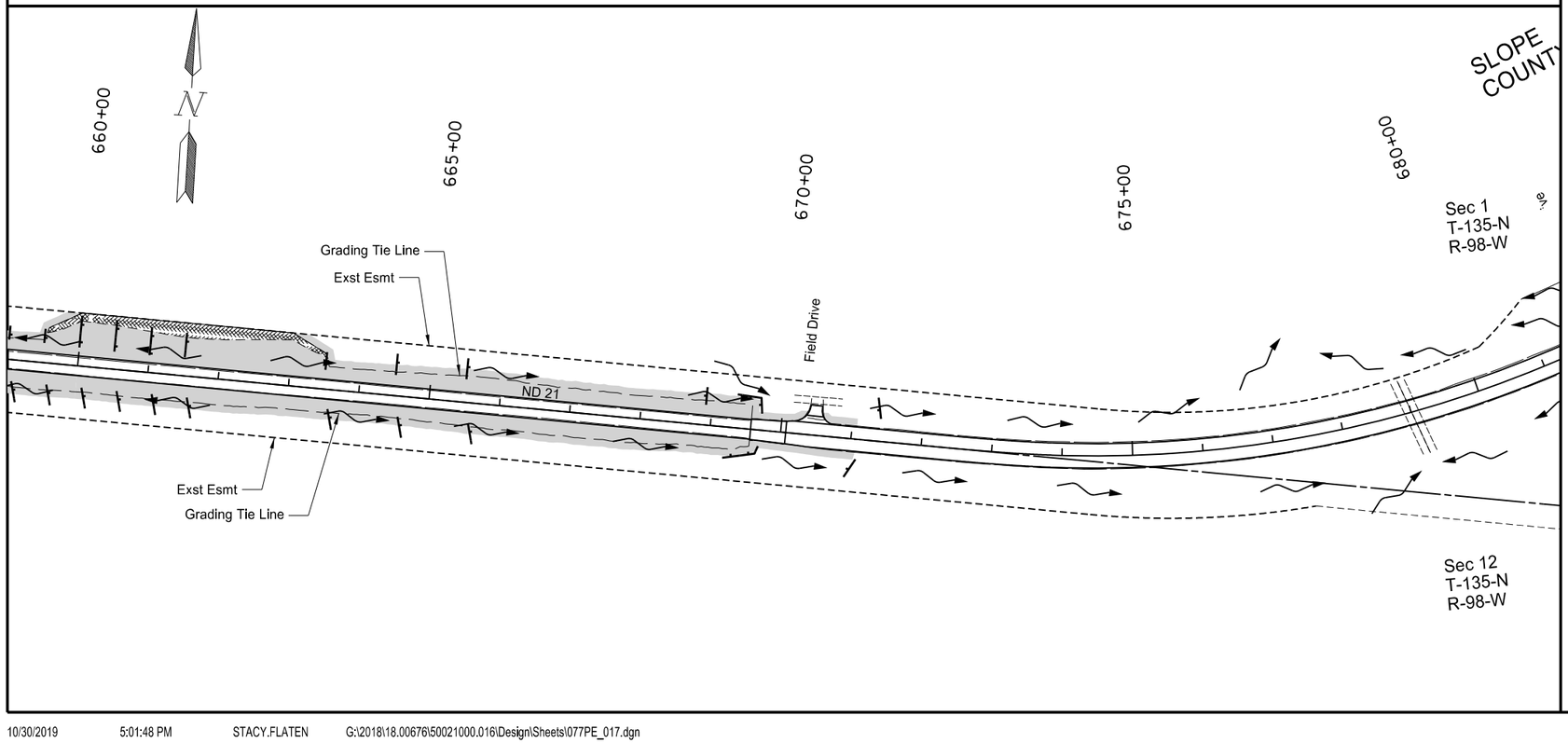
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

600+00 to 640+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	17





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		640+00 to 671+07.23	4.74	ACRE
253	0101	STRAW MULCH		
		640+00 to 671+07.23	4.52	ACRE
255	0101	ECB TYPE 1		
		640+00 to 671+07.23	1035	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

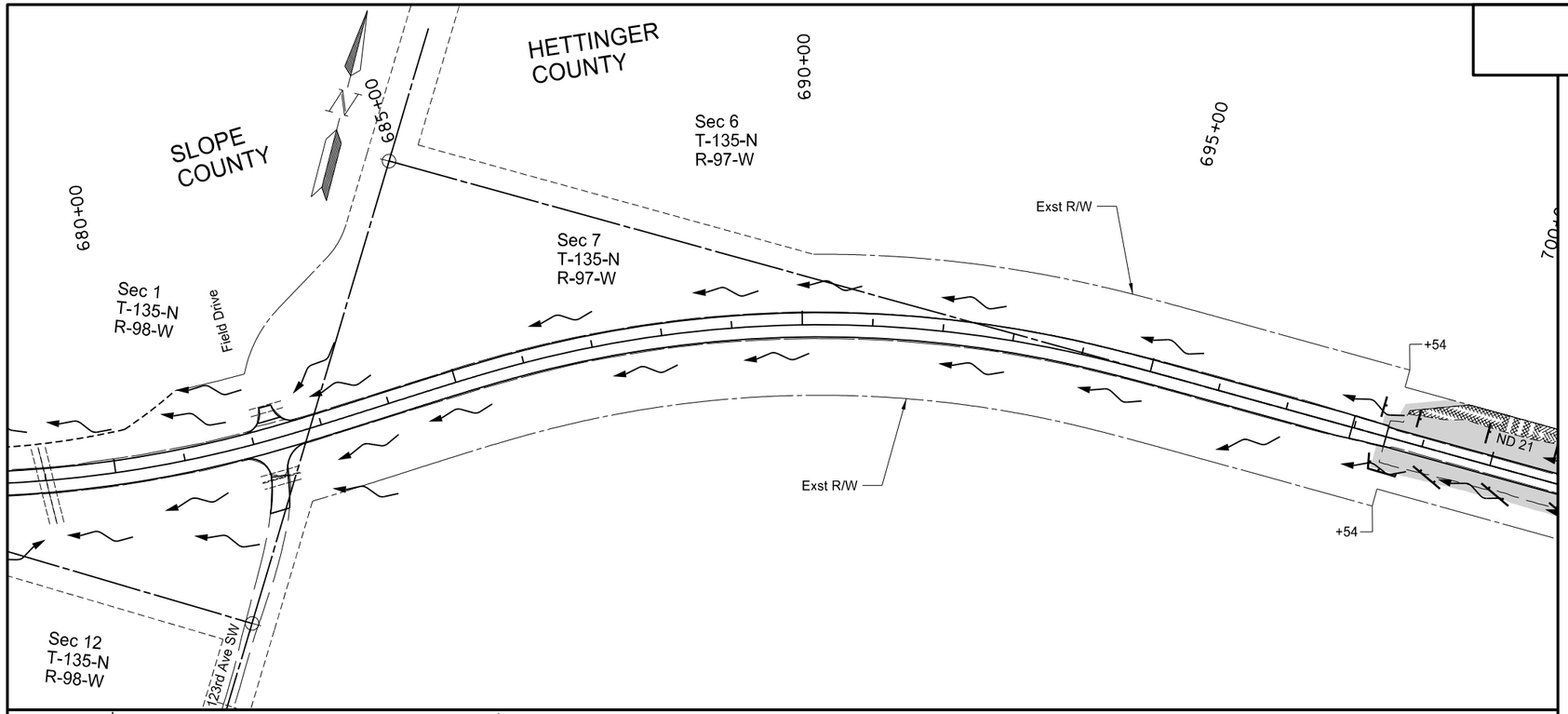
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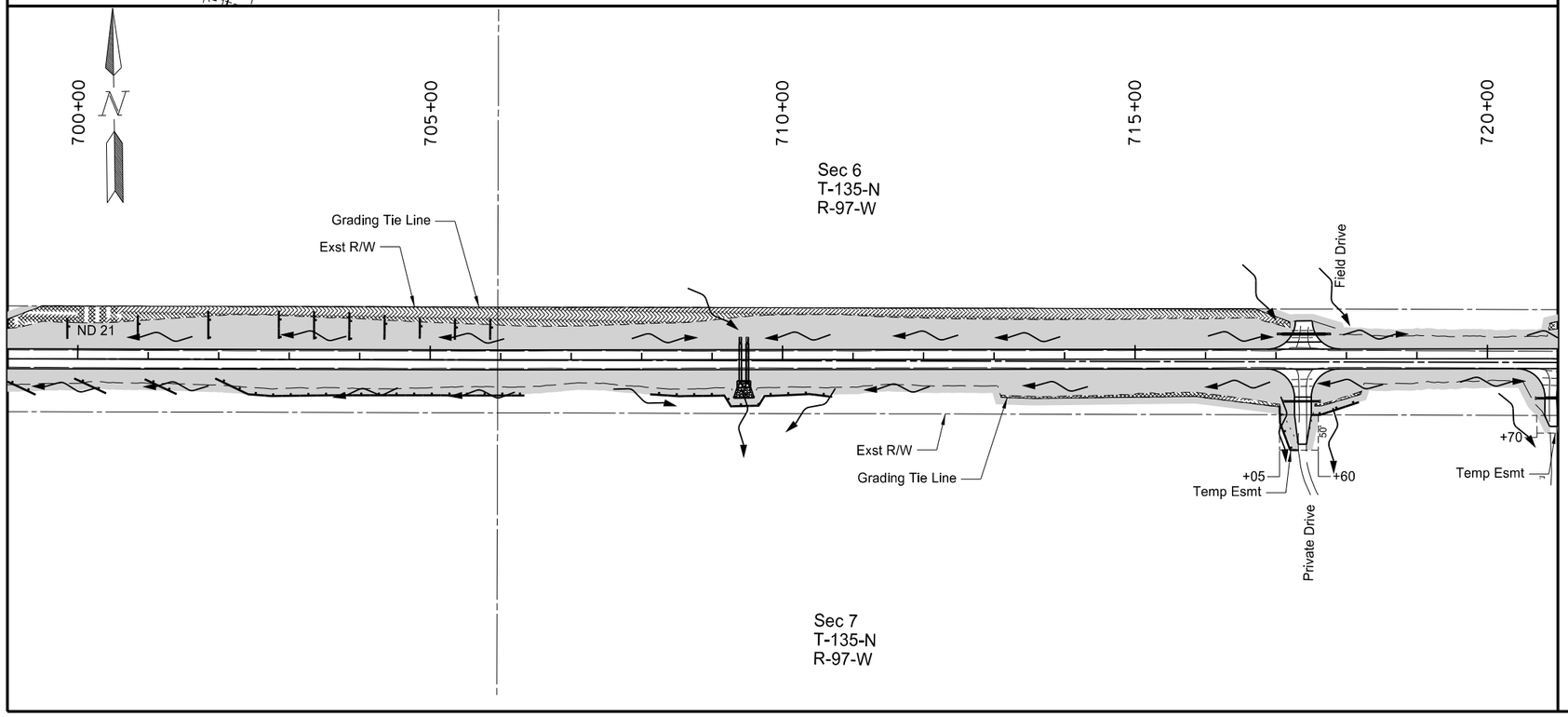
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

640+00 to 680+00

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	77	18





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		696+96.95 to 720+00	4.62	ACRE
253	0101	STRAW MULCH		
		696+96.95 to 720+00	3.85	ACRE
255	0101	ECB TYPE 1		
		696+96.95 to 720+00	3717	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

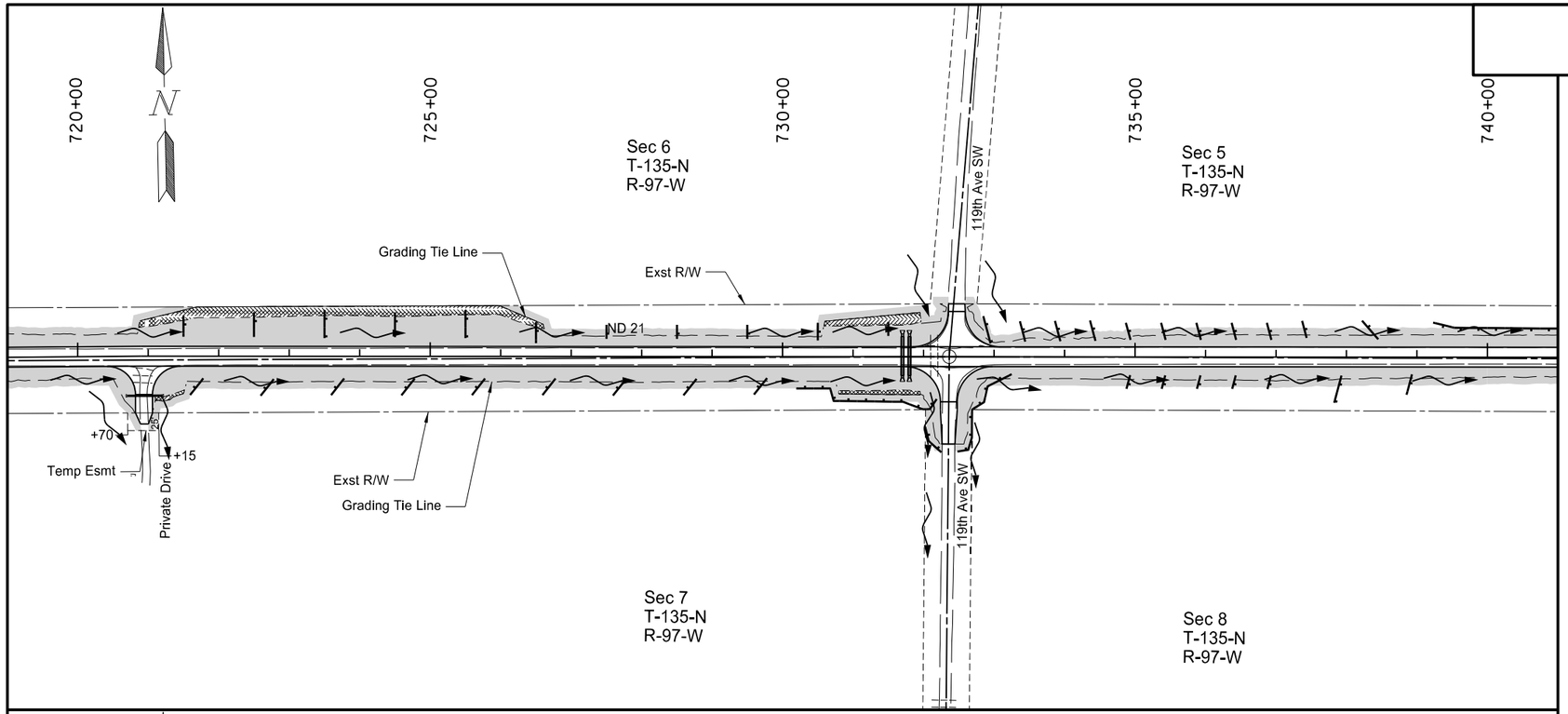
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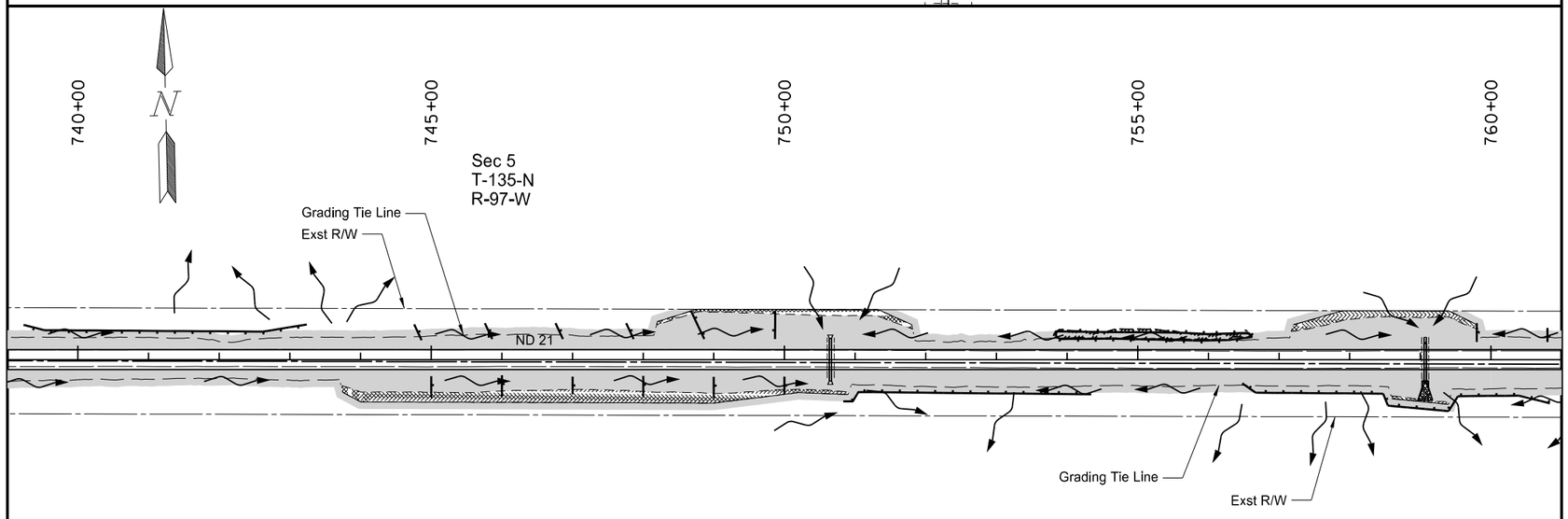
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

680+00 to 720+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	19





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		720+00 to 760+00	6.72	ACRE
253	0101	STRAW MULCH		
		720+00 to 760+00	6.14	ACRE
255	0101	ECB TYPE 1		
		720+00 to 760+00	2767	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

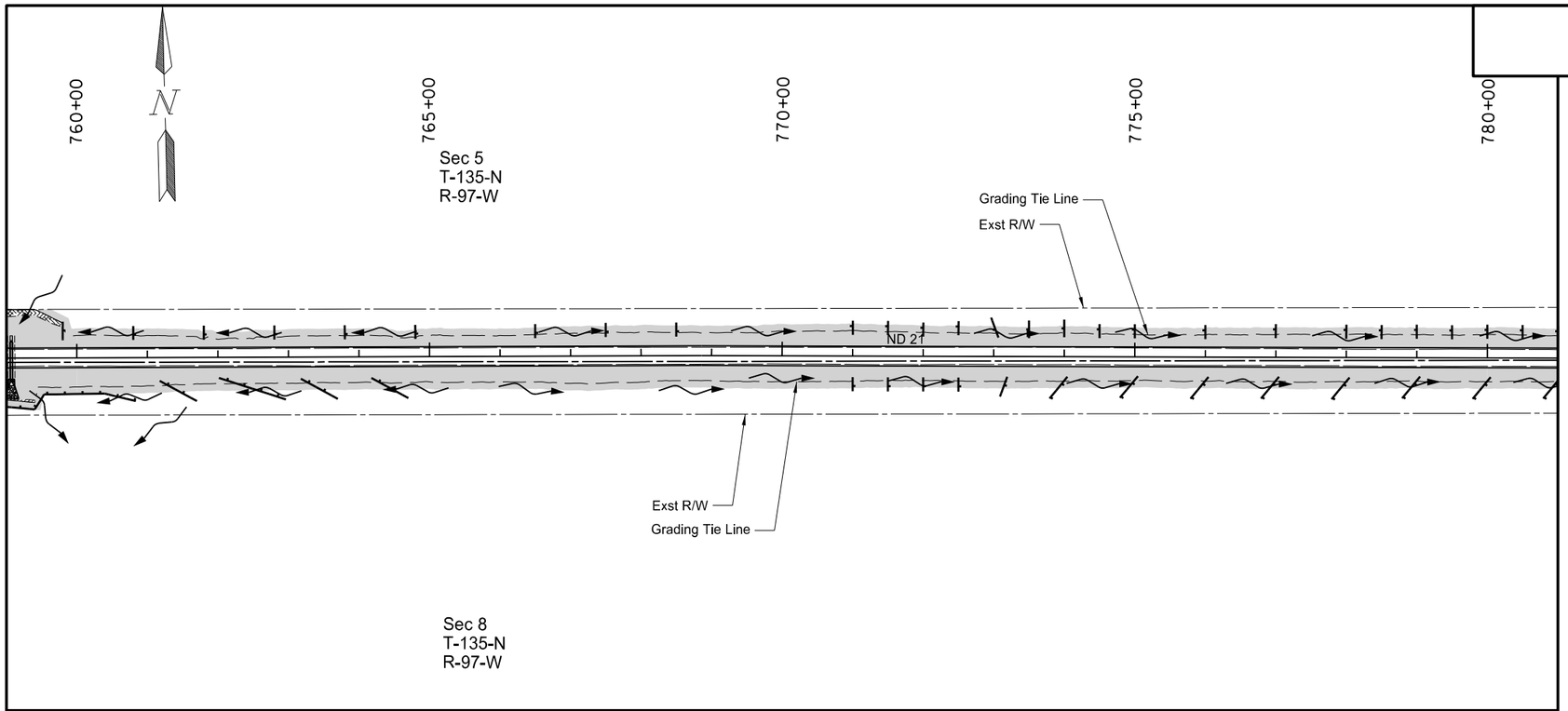
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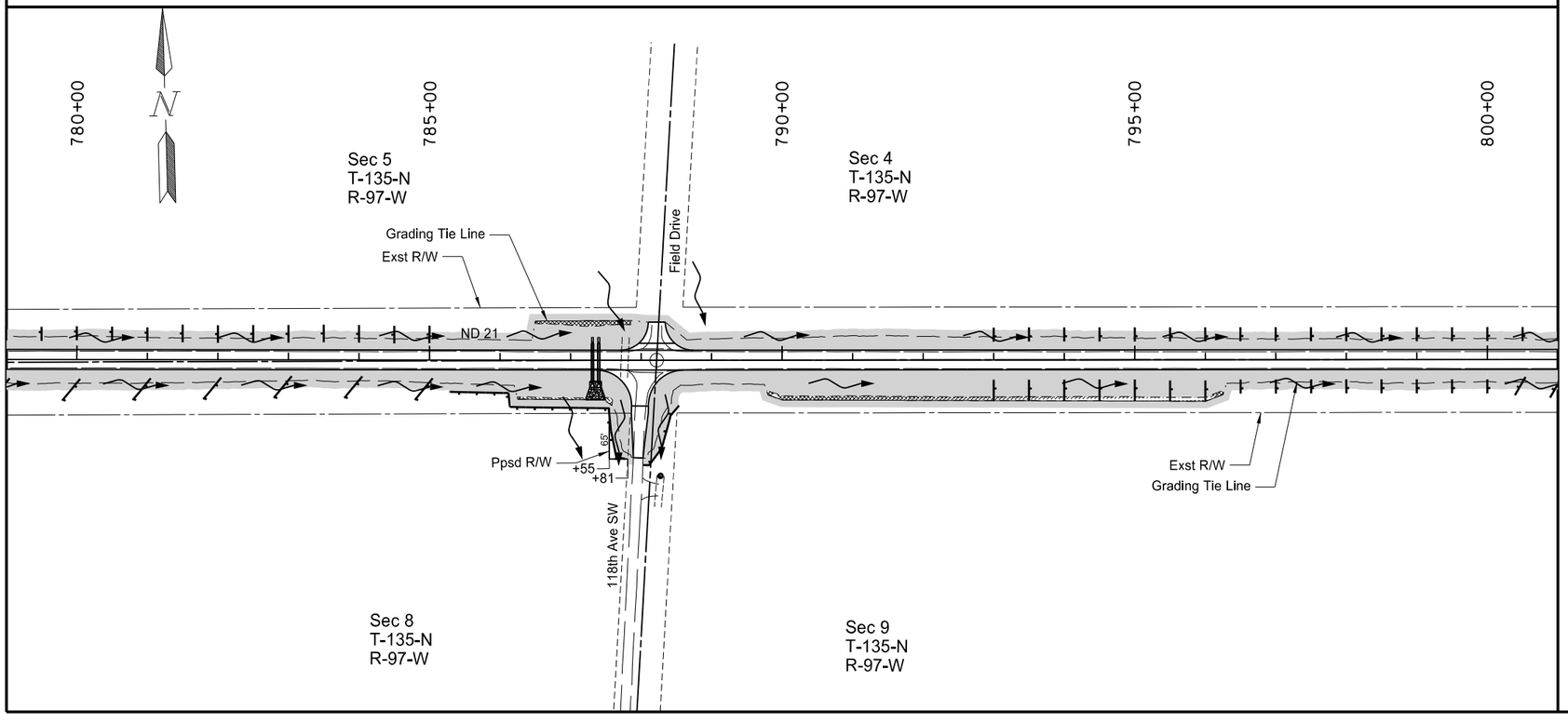
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

720+00 to 760+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	20





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		760+00 to 800+00	5.94	ACRE
253	0101	STRAW MULCH		
		760+00 to 800+00	5.82	ACRE
255	0101	ECB TYPE 1		
		760+00 to 800+00	533	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data

Legend

- Seeding Class II Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

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Permanent Erosion Control

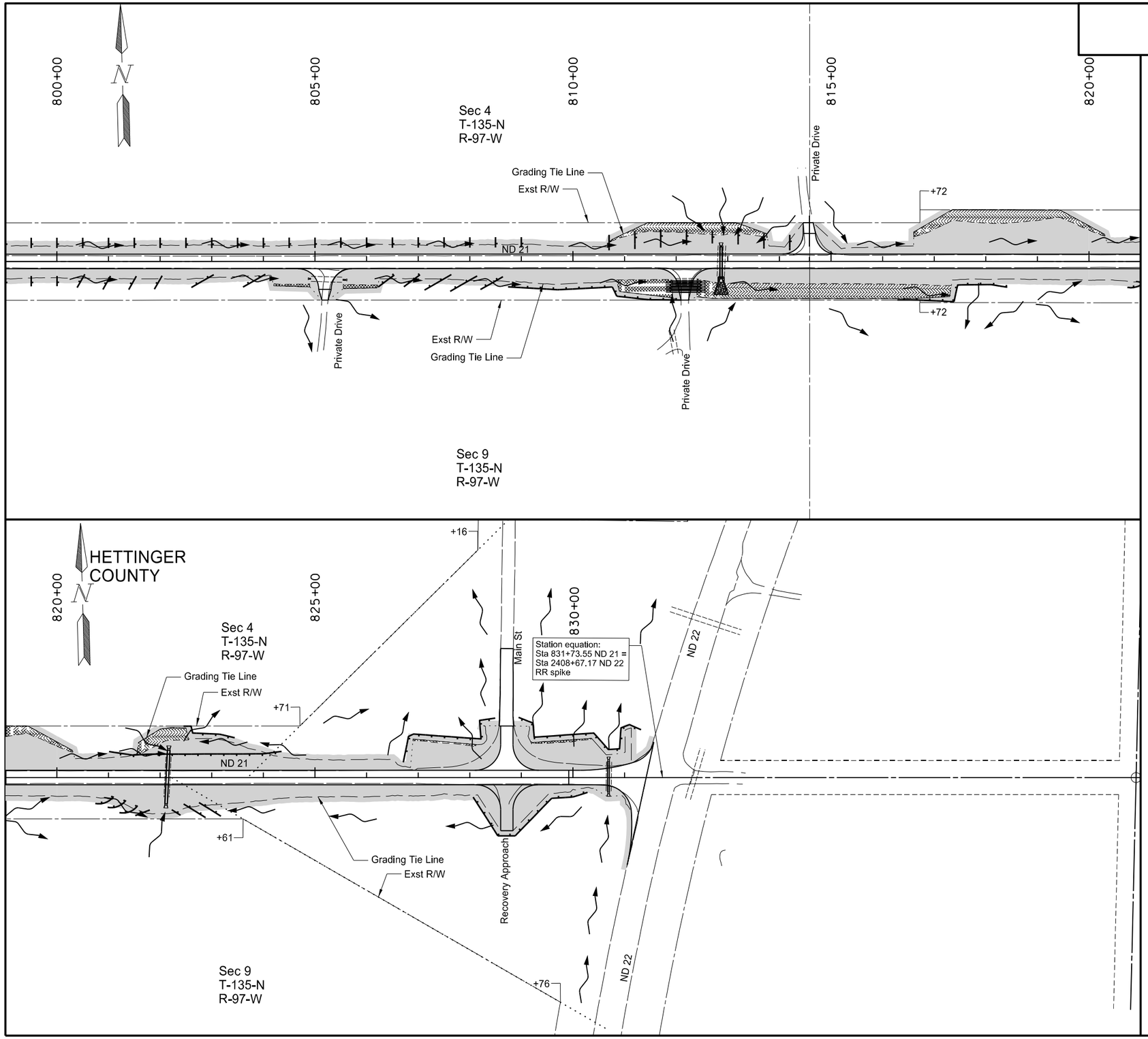
ND 21
Jct 85 to N Jct 22 - New England

760+00 to 800+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	21

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		800+00 to 831+41.88	6.32	ACRE
253	0101	STRAW MULCH		
		800+00 to 831+41.88	5.58	ACRE
255	0101	ECB TYPE 1		
		800+00 to 831+41.88	3551	SY

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data



Legend

- Seeding Class II / Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

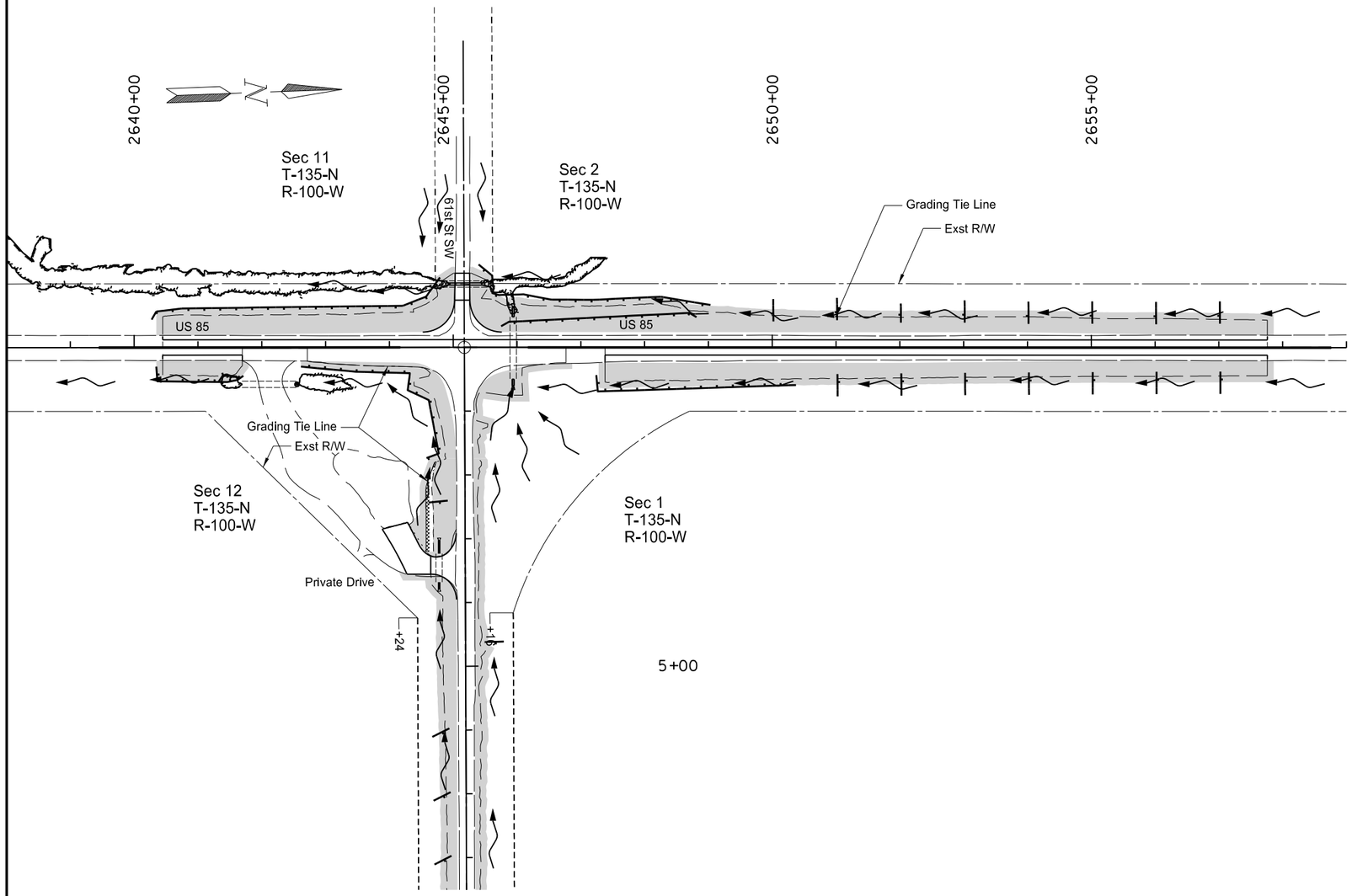
800+00 to 831+41.88

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	77	22

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		2640+44.69 to 2657+76.06	2.93	ACRE
253	0101	STRAW MULCH		
		2640+44.69 to 2657+76.06	2.93	ACRE

*NOTE:See Section 77, Sheet 23-33 for Fiber Roll data



Legend

- Seeding Class II / Straw Mulch
- Erosion Control Blanket
- Riprap
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Delineated Wetland
- 12" Fiber Roll

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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

US 85
2639+44.69 to 2658+76.06

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	23

PERMANENT EROSION CONTROL - DITCH CHECKS, CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
02+40	to	02+43	RT	30
04+62	to	04+62	LT	30
05+97	to	06+11	RT	30
06+97	to	07+11	RT	30
07+97	to	08+11	RT	30
08+97	to	09+11	RT	30
08+99	to	09+18	LT	35
09+97	to	10+11	RT	30
10+26	to	10+26	LT	45
10+97	to	11+11	RT	30
11+26	to	11+26	LT	45
11+97	to	12+11	RT	30
12+26	to	12+26	LT	40
12+91	to	15+76	RT	302
13+26	to	13+26	LT	30
14+26	to	14+26	LT	40
15+26	to	15+26	LT	40
16+26	to	16+26	LT	40
17+26	to	17+26	LT	40
18+26	to	18+26	LT	35
19+20	to	22+55	RT	351
20+02	to	20+13	LT	40
21+25	to	21+25	LT	45
22+25	to	22+25	LT	40
22+75	to	22+75	LT	40
22+94	to	23+66	RT	75
23+25	to	23+25	LT	40
23+75	to	23+75	LT	40
23+94	to	24+66	RT	75
24+25	to	24+25	LT	40
24+75	to	24+75	LT	40
24+94	to	26+06	RT	127
25+25	to	25+25	LT	35
25+93	to	26+55	RT	100
26+46	to	37+91	RT	1175
27+20	to	27+20	LT	30
27+70	to	27+70	LT	35
28+20	to	28+20	LT	35
			TOTAL	**3325**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
28+70	to	28+70	LT	40
29+70	to	29+70	LT	35
30+70	to	30+70	LT	35
31+20	to	31+20	LT	35
31+70	to	31+70	LT	38
32+20	to	32+20	LT	35
32+70	to	32+70	LT	35
33+20	to	33+20	LT	35
33+70	to	33+70	LT	40
34+20	to	34+20	LT	40
34+49	to	37+06	RT	262
34+70	to	34+70	LT	40
35+20	to	35+20	LT	35
35+70	to	35+70	LT	30
39+42	to	39+67	LT	50
39+62	to	39+62	RT	30
40+12	to	40+12	RT	30
40+42	to	40+67	LT	50
40+62	to	40+62	RT	30
41+12	to	41+12	RT	30
41+42	to	41+67	LT	50
41+62	to	41+62	RT	30
42+57	to	42+57	LT	30
42+62	to	42+62	RT	25
43+57	to	43+57	LT	30
43+62	to	43+62	RT	25
44+57	to	44+57	LT	30
45+57	to	45+57	LT	30
46+42	to	46+52	LT	30
47+58	to	52+65	RT	547
50+00	to	50+00	LT	40
51+00	to	51+00	LT	38
51+50	to	51+50	LT	38
52+00	to	52+00	LT	25
53+04	to	53+33	RT	80
54+80	to	54+80	LT	45
55+30	to	55+30	LT	45
			TOTAL	**2093**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
55+97	to	56+36	LT	55
56+42	to	56+42	RT	25
57+40	to	57+40	LT	40
57+42	to	57+42	RT	25
58+34	to	58+83	LT	60
59+05	to	60+80	LT	175
61+25	to	61+25	RT	40
62+75	to	62+75	RT	40
64+25	to	64+25	RT	40
65+25	to	65+25	RT	40
66+25	to	66+25	RT	40
66+75	to	66+75	RT	40
67+00	to	67+00	LT	30
67+25	to	67+25	RT	40
67+91	to	69+98	RT	212
68+00	to	68+00	LT	25
68+95	to	69+38	LT	50
69+95	to	70+38	LT	50
70+49	to	70+87	LT	45
70+99	to	71+37	LT	45
71+49	to	71+87	LT	45
71+92	to	72+11	RT	35
72+03	to	72+37	LT	40
72+85	to	73+36	LT	60
72+89	to	73+11	RT	40
73+87	to	74+11	RT	45
74+47	to	74+67	LT	40
74+82	to	75+16	RT	45
75+67	to	75+67	LT	30
75+82	to	76+16	RT	45
76+67	to	76+67	LT	30
77+57	to	77+74	RT	40
77+67	to	77+67	LT	30
78+57	to	78+74	RT	40
78+67	to	78+67	LT	25
79+61	to	79+74	RT	50
79+67	to	79+67	LT	30
80+60	to	80+74	RT	56
80+66	to	80+67	LT	25
			TOTAL	**1868**

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		2+40 to 28+20	3325	LF
		28+70 to 55+30	2093	LF
		55+97 to 80+67	1868	LF

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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	24

PERMANENT EROSION CONTROL - DITCH CHECKS, CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
81+66	to	81+67	LT	25
82+66	to	82+67	LT	25
82+97	to	90+84	RT	812
95+74	to	95+74	LT	25
96+74	to	96+74	LT	25
97+74	to	97+74	LT	25
99+27	to	99+56	RT	63
100+25	to	100+25	RT	30
100+25	to	100+25	LT	30
101+25	to	101+25	RT	25
101+25	to	101+25	LT	25
102+25	to	102+25	RT	25
102+25	to	102+25	LT	25
103+25	to	103+25	RT	25
103+25	to	103+25	LT	30
103+41	to	104+70	RT	156
103+60	to	105+05	LT	151
114+44	to	118+08	LT	366
115+00	to	115+00	LT	30
115+50	to	115+50	LT	25
115+67	to	116+33	RT	69
115+79	to	116+20	RT	65
116+50	to	116+50	LT	25
117+00	to	117+00	LT	30
117+50	to	117+50	LT	40
118+00	to	118+00	LT	45
118+50	to	118+50	LT	50
119+00	to	119+00	LT	50
119+50	to	119+50	LT	40
125+00	to	125+00	RT	60
127+50	to	127+50	RT	60
128+50	to	128+50	RT	60
129+30	to	129+55	RT	56
			TOTAL	**2593**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
141+50	to	141+50	RT	40
142+51	to	142+53	RT	26
147+88	to	148+46	RT	60
147+90	to	148+59	LT	70
147+94	to	148+34	RT	40
148+09	to	148+49	LT	40
152+44	to	155+39	RT	319
153+41	to	154+40	LT	100
153+47	to	154+06	LT	60
153+96	to	154+54	RT	60
154+21	to	154+54	RT	40
155+33	to	155+87	RT	80
155+40	to	155+70	LT	80
156+08	to	156+69	RT	107
156+27	to	156+59	LT	70
157+84	to	159+63	RT	195
158+32	to	159+63	LT	138
161+28	to	162+89	LT	181
161+30	to	163+15	RT	227
163+75	to	163+75	LT	60
164+00	to	164+00	RT	60
165+41	to	165+47	LT	20
166+50	to	166+50	RT	40
168+50	to	168+50	RT	45
175+85	to	176+45	RT	160
176+32	to	176+45	RT	54
176+35	to	177+12	RT	87
177+12	to	177+23	RT	71
177+23	to	178+94	RT	220
177+91	to	178+24	RT	54
178+30	to	180+46	LT	237
179+92	to	181+03	LT	114
180+41	to	180+61	LT	65
180+81	to	185+34	LT	551
183+71	to	185+77	RT	230
			TOTAL	**4001**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
184+11	to	185+41	RT	132
186+32	to	186+54	LT	38
186+39	to	186+50	RT	30
186+60	to	186+68	LT	28
186+64	to	186+64	RT	25
186+89	to	186+89	RT	30
186+89	to	186+89	LT	35
187+14	to	187+14	RT	30
187+14	to	187+14	LT	30
187+39	to	187+39	LT	30
187+39	to	187+39	RT	25
187+89	to	187+89	LT	30
187+89	to	187+89	RT	20
188+39	to	188+39	LT	30
188+39	to	188+39	RT	25
190+79	to	192+19	LT	140
191+00	to	191+00	RT	40
191+02	to	191+17	LT	40
191+50	to	191+50	RT	40
192+00	to	192+00	RT	40
192+03	to	192+17	LT	40
192+50	to	192+50	RT	40
193+00	to	193+00	RT	40
193+10	to	193+10	LT	40
193+50	to	193+50	RT	40
194+00	to	194+00	RT	40
194+10	to	194+10	LT	40
194+50	to	194+50	RT	40
195+00	to	195+00	RT	40
195+10	to	195+10	LT	40
195+50	to	195+50	RT	40
195+78	to	197+18	LT	140
198+50	to	198+50	LT	40
199+50	to	199+50	LT	35
200+50	to	200+50	LT	30
201+00	to	201+00	LT	35
201+50	to	201+50	LT	35
202+00	to	202+00	LT	40
202+50	to	202+50	LT	40
			TOTAL	**1673**

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		81+66 to 129+55	2593	LF
		141+50 to 185+77	4001	LF
		184+11 to 202+50	1673	LF

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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	25

PERMANENT EROSION CONTROL - DITCH CHECKS, CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
203+00	to	203+00	LT	40
203+50	to	203+50	LT	40
203+62	to	204+38	RT	202
204+00	to	204+00	LT	30
204+08	to	204+58	LT	60
206+55	to	206+92	LT	51
206+65	to	206+89	RT	56
227+95	to	228+65	LT	145
228+83	to	230+09	LT	289
229+15	to	230+78	LT	163
229+76	to	232+95	RT	326
229+76	to	230+00	RT	28
230+24	to	230+67	LT	50
230+28	to	231+60	RT	139
230+74	to	231+39	LT	148
232+00	to	232+00	LT	35
232+24	to	232+51	RT	30
232+50	to	232+50	LT	35
233+00	to	233+00	LT	35
233+18	to	233+33	RT	30
233+50	to	233+50	LT	35
233+67	to	233+82	RT	30
234+00	to	234+00	LT	40
234+17	to	234+32	RT	30
234+50	to	234+50	LT	40
234+67	to	234+82	RT	30
235+00	to	235+00	LT	40
235+17	to	235+32	RT	30
235+50	to	235+50	LT	40
235+67	to	235+82	RT	30
236+00	to	236+00	LT	40
236+17	to	236+32	RT	30
236+50	to	236+50	LT	40
236+67	to	236+82	RT	30
237+17	to	237+32	RT	30
237+50	to	237+50	LT	40
237+65	to	237+65	RT	20
238+50	to	238+50	LT	40
238+65	to	238+65	RT	30
			TOTAL	**2577**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
239+50	to	239+50	LT	40
239+65	to	239+65	RT	30
240+50	to	240+50	LT	40
240+65	to	240+65	RT	28
241+15	to	241+15	RT	30
241+50	to	241+50	LT	40
241+65	to	241+65	RT	30
242+00	to	242+00	LT	40
242+15	to	242+15	RT	40
242+50	to	242+50	LT	25
243+15	to	243+15	RT	40
246+00	to	246+00	RT	30
252+07	to	252+11	LT	40
254+73	to	254+92	LT	40
258+95	to	261+29	LT	235
259+46	to	260+61	LT	115
259+59	to	260+29	LT	70
259+60	to	260+75	RT	118
259+84	to	260+00	RT	35
260+00	to	260+76	RT	88
260+62	to	266+37	RT	583
269+18	to	269+30	LT	40
270+25	to	270+25	LT	40
272+30	to	272+30	LT	45
273+30	to	273+30	LT	55
274+30	to	274+30	LT	55
275+30	to	275+30	LT	55
276+30	to	276+30	LT	55
277+30	to	277+30	LT	40
280+27	to	280+31	LT	40
281+00	to	281+04	RT	40
281+70	to	283+16	RT	149
282+00	to	282+00	LT	50
283+00	to	283+00	LT	60
284+00	to	284+00	LT	40
286+48	to	286+50	LT	20
			TOTAL	**2521**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
286+98	to	287+00	LT	20
288+05	to	288+08	LT	20
288+40	to	290+39	RT	200
288+55	to	288+58	LT	20
288+85	to	290+97	RT	215
292+25	to	292+25	LT	40
292+75	to	292+75	LT	40
293+25	to	293+25	LT	40
293+75	to	293+75	LT	40
294+75	to	294+75	LT	40
296+90	to	297+69	RT	160
297+00	to	297+00	LT	40
297+50	to	297+50	LT	40
298+00	to	298+00	LT	40
298+50	to	298+50	LT	40
299+00	to	299+00	LT	40
299+50	to	299+50	LT	40
300+00	to	300+00	LT	40
300+50	to	300+50	LT	40
301+00	to	301+00	LT	35
301+50	to	301+50	LT	35
302+00	to	302+00	LT	35
302+50	to	302+50	LT	35
303+50	to	306+78	RT	345
306+00	to	306+00	LT	40
307+00	to	307+00	LT	40
308+00	to	308+00	LT	40
309+00	to	309+00	LT	40
310+00	to	310+00	LT	40
311+00	to	311+00	LT	40
311+10	to	311+81	RT	115
312+09	to	312+50	RT	102
312+50	to	312+50	LT	40
313+00	to	313+00	RT	35
313+50	to	313+50	LT	40
313+50	to	313+50	RT	35
314+00	to	314+00	RT	30
314+50	to	314+50	RT	25
			TOTAL	**2302**

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		203+00 to 238+65	2577	LF
		239+50 to 286+50	2521	LF
		286+98 to 314+50	2302	LF

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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	26

PERMANENT EROSION CONTROL - DITCH CHECKS, CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
314+61	to	314+70	LT	25
315+00	to	315+00	RT	20
315+11	to	315+20	LT	25
315+50	to	315+50	RT	20
315+61	to	315+69	LT	25
316+00	to	316+00	RT	30
316+11	to	316+19	LT	25
316+50	to	316+50	RT	30
316+60	to	316+69	LT	25
317+00	to	317+00	RT	35
317+10	to	317+19	LT	25
317+50	to	317+50	RT	40
317+60	to	317+69	LT	25
318+00	to	318+00	RT	40
318+10	to	318+18	LT	25
318+60	to	318+68	LT	25
318+60	to	318+85	RT	30
319+10	to	319+35	RT	30
319+12	to	319+12	LT	20
319+59	to	319+71	LT	35
319+60	to	319+85	RT	30
320+08	to	320+24	LT	45
320+10	to	320+35	RT	30
320+58	to	320+73	LT	45
320+60	to	320+85	RT	30
321+08	to	321+24	LT	45
321+10	to	321+35	RT	30
321+60	to	321+85	RT	30
321+90	to	321+90	LT	45
322+10	to	322+35	RT	30
322+40	to	322+40	LT	40
322+60	to	322+85	RT	30
322+90	to	322+90	LT	35
323+10	to	323+35	RT	30
323+40	to	323+40	LT	30
323+60	to	323+85	RT	30
324+82	to	331+40	LT	670
325+75	to	325+75	RT	20
326+25	to	326+25	RT	20
326+75	to	326+75	RT	20
			TOTAL	**1840**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
327+25	to	327+25	RT	20
327+75	to	327+75	RT	20
328+25	to	328+25	RT	20
328+75	to	328+75	RT	20
329+25	to	329+25	RT	20
329+75	to	329+75	RT	20
330+25	to	330+25	RT	20
330+75	to	330+75	RT	20
331+25	to	331+25	RT	20
331+75	to	331+75	RT	20
331+81	to	331+90	LT	25
332+25	to	332+25	RT	20
332+31	to	332+40	LT	25
332+75	to	332+75	RT	25
332+81	to	332+90	LT	25
333+25	to	333+25	RT	35
333+31	to	333+40	LT	25
333+75	to	333+75	RT	35
333+81	to	333+90	LT	25
334+25	to	334+25	RT	35
334+31	to	334+40	LT	25
334+75	to	334+75	RT	40
334+81	to	334+90	LT	25
335+25	to	335+25	RT	30
335+86	to	337+66	LT	180
336+07	to	337+57	RT	150
338+74	to	338+86	RT	25
339+23	to	339+36	RT	25
339+73	to	339+85	RT	25
340+22	to	340+35	RT	25
340+25	to	340+25	LT	20
340+72	to	340+84	RT	25
340+75	to	340+75	LT	20
341+22	to	341+34	RT	25
341+25	to	341+25	LT	20
341+71	to	341+84	RT	25
341+75	to	341+75	LT	20
342+21	to	342+33	RT	25
342+25	to	342+25	LT	30
342+70	to	342+83	RT	25
			TOTAL	**1260**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
342+75	to	342+75	LT	40
343+20	to	343+33	RT	25
343+25	to	343+25	LT	35
343+58	to	345+87	RT	247
343+75	to	343+75	LT	30
344+25	to	344+25	LT	25
344+75	to	344+75	LT	25
345+25	to	345+25	LT	25
345+75	to	345+75	LT	25
346+25	to	346+25	LT	25
346+53	to	346+84	RT	40
346+75	to	346+75	LT	25
347+19	to	347+31	RT	25
347+25	to	347+25	LT	25
347+69	to	347+82	RT	25
347+75	to	347+75	LT	25
348+20	to	348+32	RT	25
348+37	to	348+40	LT	25
348+70	to	348+82	RT	25
348+75	to	348+75	LT	20
349+20	to	349+33	RT	25
349+25	to	349+25	LT	20
349+71	to	349+83	RT	25
349+75	to	349+75	LT	20
350+21	to	350+33	RT	25
350+25	to	350+25	LT	20
350+71	to	350+84	RT	25
350+75	to	350+75	LT	20
351+22	to	351+34	RT	25
351+25	to	351+25	LT	20
351+75	to	351+75	LT	20
352+25	to	352+25	LT	20
352+80	to	352+80	RT	30
352+80	to	352+80	LT	35
353+30	to	353+30	RT	40
353+30	to	353+30	LT	40
353+80	to	353+80	RT	40
353+80	to	353+80	LT	40
354+42	to	360+10	LT	582
			TOTAL	**1834**

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		314+61 to 326+75	1840	LF
		327+25 to 342+83	1260	LF
		342+75 to 360+10	1834	LF

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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	27

PERMANENT EROSION CONTROL - DITCH CHECKS, CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
360+24	to	360+47	LT	35
360+57	to	360+70	RT	20
360+72	to	360+84	LT	30
361+07	to	361+23	RT	25
361+24	to	361+24	LT	20
361+57	to	361+73	RT	25
361+74	to	361+74	LT	20
362+24	to	362+24	LT	20
362+74	to	362+74	LT	20
363+50	to	364+74	RT	180
363+55	to	363+55	LT	25
364+55	to	364+77	LT	45
364+91	to	365+13	LT	102
365+50	to	365+62	RT	30
366+00	to	366+00	RT	30
366+50	to	366+50	RT	30
366+69	to	367+84	LT	115
370+35	to	372+95	LT	260
373+65	to	374+63	LT	150
374+75	to	374+75	RT	20
375+25	to	375+25	RT	20
375+42	to	375+55	LT	25
375+75	to	375+75	RT	20
375+92	to	376+04	LT	25
376+25	to	376+25	RT	20
376+42	to	376+54	LT	25
376+75	to	376+75	RT	20
376+92	to	377+04	LT	25
377+25	to	377+25	RT	20
377+42	to	377+54	LT	25
377+75	to	377+75	RT	20
377+89	to	378+04	LT	30
378+25	to	378+25	RT	20
378+39	to	378+54	LT	30
378+75	to	378+75	RT	20
378+89	to	379+04	LT	30
379+25	to	379+25	RT	20
379+39	to	379+54	LT	30
			TOTAL	**1627**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
379+75	to	379+75	RT	20
379+91	to	380+04	LT	25
380+25	to	380+25	RT	20
380+41	to	380+54	LT	25
380+75	to	380+75	RT	20
380+91	to	381+04	LT	25
381+25	to	381+25	RT	20
381+41	to	381+54	LT	25
381+75	to	381+75	RT	20
381+91	to	382+04	LT	25
382+25	to	382+25	RT	30
382+41	to	382+54	LT	25
382+75	to	382+75	RT	30
383+41	to	383+54	LT	25
383+75	to	383+75	RT	25
384+80	to	384+80	RT	35
385+80	to	385+80	RT	35
386+80	to	386+80	RT	30
387+52	to	388+30	RT	102
387+98	to	387+98	LT	39
388+70	to	389+45	LT	75
388+92	to	390+44	RT	178
389+56	to	391+15	LT	193
391+32	to	393+62	RT	265
397+62	to	400+18	LT	256
404+21	to	404+25	RT	25
405+25	to	405+25	RT	45
406+25	to	406+25	RT	35
408+17	to	408+17	RT	25
409+17	to	409+17	RT	42
410+75	to	415+08	LT	445
413+25	to	413+25	RT	30
419+00	to	419+00	RT	20
			TOTAL	**2235**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
419+50	to	419+50	RT	20
419+78	to	419+78	LT	40
420+00	to	420+00	RT	20
420+28	to	420+28	LT	40
420+50	to	420+50	RT	20
420+78	to	420+78	LT	40
421+00	to	421+00	RT	20
421+28	to	421+28	LT	40
421+50	to	421+50	RT	20
421+78	to	421+78	LT	40
422+00	to	422+00	RT	20
422+28	to	422+28	LT	40
422+60	to	422+60	RT	30
422+78	to	422+78	LT	40
423+10	to	423+10	RT	30
423+28	to	423+28	LT	40
423+78	to	423+78	LT	40
424+28	to	424+28	LT	40
424+60	to	424+60	RT	30
424+78	to	424+78	LT	30
425+06	to	425+14	RT	25
425+28	to	425+28	LT	30
425+56	to	425+64	RT	25
425+78	to	425+78	LT	30
426+06	to	426+14	RT	25
426+28	to	426+28	LT	35
426+56	to	426+65	RT	25
426+78	to	426+78	LT	30
427+06	to	427+15	RT	25
427+27	to	427+27	LT	30
427+56	to	427+65	RT	25
427+75	to	427+75	LT	20
428+06	to	428+15	RT	25
428+25	to	428+25	LT	20
428+56	to	428+65	RT	25
428+75	to	428+75	LT	20
429+06	to	429+15	RT	25
429+25	to	429+25	LT	20
429+56	to	429+65	RT	25
			TOTAL	**1125**

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		360+24 to 379+54	1627	LF
		379+75 to 419+00	2235	LF
		419+50 to 429+65	1125	LF

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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	28

PERMANENT EROSION CONTROL - DITCH CHECKS, CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
429+75	to	429+75	LT	20
430+06	to	430+15	RT	25
430+25	to	430+25	LT	20
430+56	to	430+65	RT	25
430+75	to	430+75	LT	20
431+06	to	431+15	RT	25
431+25	to	431+25	LT	20
431+56	to	431+65	RT	25
431+93	to	431+93	LT	30
432+56	to	432+65	RT	25
432+75	to	432+75	LT	20
433+57	to	433+65	RT	25
433+75	to	433+75	LT	20
434+57	to	434+65	RT	25
434+75	to	434+75	LT	20
435+57	to	435+65	RT	25
435+75	to	435+75	LT	20
436+57	to	436+65	RT	25
436+75	to	436+75	LT	20
440+32	to	443+02	RT	270
443+75	to	443+75	LT	35
444+25	to	444+25	LT	35
444+75	to	444+75	LT	40
445+25	to	445+25	LT	40
445+75	to	445+75	LT	45
446+13	to	446+13	RT	30
446+88	to	447+92	LT	106
449+77	to	450+08	LT	40
450+00	to	450+00	RT	35
450+77	to	451+08	LT	40
451+00	to	451+00	RT	35
451+77	to	452+08	LT	40
452+00	to	452+00	RT	35
452+77	to	453+08	LT	40
453+00	to	453+00	RT	35
453+77	to	454+08	LT	40
454+00	to	454+00	RT	40
455+00	to	455+00	RT	40
456+00	to	456+00	RT	40
457+00	to	457+00	RT	35
			TOTAL	**1531**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
458+00	to	458+00	RT	35
458+00	to	458+00	LT	25
459+00	to	459+00	LT	25
459+00	to	459+00	RT	25
459+91	to	462+08	LT	217
464+08	to	464+08	RT	30
464+14	to	464+14	LT	25
464+58	to	464+58	RT	30
464+64	to	464+64	LT	25
465+08	to	465+08	RT	40
465+14	to	465+14	LT	25
465+46	to	465+68	RT	35
465+64	to	465+64	LT	25
465+92	to	466+18	RT	40
466+08	to	466+18	LT	30
466+42	to	466+68	RT	40
466+53	to	469+53	LT	300
472+00	to	472+00	RT	30
472+95	to	473+05	LT	30
473+00	to	473+00	RT	35
473+95	to	474+05	LT	30
474+00	to	474+00	RT	40
474+95	to	475+05	LT	30
475+00	to	475+00	RT	40
475+95	to	476+05	LT	30
476+00	to	476+00	RT	40
477+00	to	477+00	RT	35
477+50	to	477+50	LT	40
478+00	to	478+00	RT	35
478+50	to	478+50	LT	45
479+00	to	479+00	RT	40
479+50	to	479+50	LT	50
480+05	to	480+10	RT	40
480+50	to	480+50	LT	50
481+50	to	481+50	LT	50
482+50	to	482+50	LT	50
483+50	to	483+50	LT	50
484+50	to	484+50	LT	50
			TOTAL	**1812**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
485+50	to	485+50	LT	40
486+50	to	486+50	LT	40
487+50	to	487+50	LT	50
488+50	to	488+50	LT	50
489+50	to	489+50	LT	50
490+50	to	490+50	LT	50
491+50	to	491+50	LT	50
492+04	to	496+77	LT	515
496+62	to	497+62	LT	145
501+40	to	501+40	LT	35
501+40	to	501+40	RT	30
502+40	to	502+40	LT	35
502+40	to	502+40	RT	25
502+90	to	502+90	LT	35
502+90	to	502+90	RT	25
503+40	to	503+40	LT	35
503+40	to	503+40	RT	30
503+90	to	503+90	LT	35
503+90	to	503+90	RT	30
504+40	to	504+40	LT	35
504+40	to	504+40	RT	30
504+90	to	504+90	LT	35
504+90	to	504+90	RT	30
505+40	to	505+40	LT	35
505+40	to	505+40	RT	30
506+40	to	506+40	LT	35
506+40	to	506+40	RT	35
508+40	to	508+40	RT	40
508+40	to	508+40	LT	35
510+40	to	510+40	RT	35
510+40	to	510+40	LT	40
512+40	to	512+40	RT	35
512+40	to	512+40	LT	40
514+40	to	514+40	RT	40
514+40	to	514+40	LT	41
516+36	to	517+20	LT	84
516+40	to	516+40	RT	30
516+40	to	516+40	LT	35
517+55	to	517+98	LT	68
			TOTAL	**2093**

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		429+75 to 457+00	1531	LF
		458+00 to 484+50	1812	LF
		485+50 to 517+98	2093	LF

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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	29

PERMANENT EROSION CONTROL - DITCH CHECKS, CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
522+86	to	523+22	LT	40
531+19	to	531+19	RT	35
531+56	to	532+68	RT	268
532+32	to	532+39	LT	31
532+58	to	533+33	LT	75
533+19	to	533+30	LT	36
534+26	to	534+26	RT	30
534+42	to	534+42	LT	40
534+76	to	534+76	RT	35
535+26	to	535+26	RT	25
535+76	to	535+76	RT	24
535+77	to	537+48	RT	175
538+24	to	538+24	RT	25
538+74	to	538+74	RT	30
539+24	to	539+24	RT	35
546+68	to	550+57	LT	390
557+24	to	559+07	LT	190
558+50	to	558+50	RT	20
559+00	to	559+00	RT	20
559+50	to	559+50	RT	20
560+00	to	560+00	RT	20
560+50	to	560+50	LT	30
560+50	to	560+50	RT	20
561+00	to	561+00	LT	25
561+00	to	561+00	RT	20
561+50	to	561+50	LT	20
562+00	to	562+00	LT	20
562+00	to	562+00	RT	20
562+50	to	562+50	LT	20
562+50	to	562+50	RT	20
563+00	to	563+00	LT	20
563+00	to	563+00	RT	20
563+50	to	563+50	LT	20
563+50	to	563+50	RT	20
564+00	to	564+00	LT	20
564+00	to	564+00	RT	40
			TOTAL	**1899**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
564+50	to	564+50	LT	20
564+50	to	564+50	RT	40
565+00	to	565+00	LT	20
565+00	to	565+00	RT	40
565+50	to	565+50	LT	20
565+50	to	565+50	RT	40
566+00	to	566+00	LT	20
566+00	to	566+00	RT	40
566+50	to	566+50	LT	20
566+50	to	566+50	RT	35
567+00	to	567+00	LT	20
567+00	to	567+00	RT	35
567+50	to	567+50	LT	20
567+50	to	567+50	RT	35
568+00	to	568+00	LT	20
568+00	to	568+00	RT	40
568+50	to	568+50	LT	20
568+50	to	568+50	RT	40
569+00	to	569+00	LT	20
569+00	to	569+00	RT	40
569+50	to	569+50	LT	20
569+50	to	569+50	RT	40
570+00	to	570+00	LT	20
570+00	to	570+00	RT	40
570+50	to	570+50	LT	20
570+50	to	570+50	RT	40
571+00	to	571+00	LT	20
571+00	to	571+00	RT	40
571+46	to	571+54	LT	20
571+50	to	571+50	RT	40
571+96	to	572+04	LT	20
572+00	to	572+00	RT	35
572+46	to	572+54	LT	20
572+50	to	572+50	RT	35
572+96	to	573+04	LT	20
573+00	to	573+00	RT	35
575+18	to	577+05	LT	281
583+00	to	583+00	RT	25
583+25	to	583+25	LT	20
583+50	to	583+50	RT	25
			TOTAL	**1401**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
583+75	to	583+75	LT	20
584+00	to	584+00	RT	25
584+25	to	584+25	LT	20
584+50	to	584+50	RT	25
584+75	to	584+75	LT	30
585+00	to	585+00	RT	25
585+25	to	585+25	LT	40
586+25	to	586+25	LT	45
586+75	to	586+75	LT	45
586+85	to	586+85	RT	25
587+25	to	587+25	LT	45
587+35	to	587+35	RT	25
587+75	to	587+75	LT	45
587+85	to	587+85	RT	25
588+35	to	588+35	RT	25
588+75	to	588+75	LT	45
588+85	to	588+85	RT	25
589+75	to	589+75	LT	45
589+79	to	589+90	RT	30
590+75	to	590+75	LT	45
590+78	to	590+89	RT	30
591+70	to	591+89	RT	30
591+75	to	591+75	LT	45
592+75	to	592+75	LT	40
593+74	to	593+74	LT	40
595+20	to	595+49	RT	40
595+20	to	595+49	LT	40
596+20	to	596+49	RT	40
596+20	to	596+49	LT	40
597+20	to	597+49	RT	40
597+20	to	597+49	LT	40
598+20	to	598+49	LT	40
599+20	to	599+49	LT	40
599+60	to	599+75	RT	30
600+20	to	600+49	LT	40
600+60	to	600+75	RT	30
601+20	to	601+49	LT	40
			TOTAL	**1300**

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		522+86 to 564+00	1899	LF
		564+50 to 583+50	1401	LF
		583+75 to 601+49	1300	LF

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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	30

PERMANENT EROSION CONTROL - DITCH CHECKS, CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
601+58	to	601+75	RT	35
603+35	to	603+35	RT	26
603+85	to	603+85	RT	20
604+00	to	604+00	LT	40
604+35	to	604+35	RT	25
604+50	to	604+50	LT	35
604+85	to	604+85	RT	25
605+00	to	605+00	LT	25
605+35	to	605+35	RT	25
605+50	to	605+50	LT	25
605+85	to	605+85	RT	25
606+00	to	606+00	LT	25
606+35	to	606+35	RT	25
606+50	to	606+50	LT	25
606+85	to	606+85	RT	25
607+00	to	607+00	LT	20
607+35	to	607+35	RT	25
607+50	to	607+50	LT	20
607+85	to	607+85	RT	20
608+00	to	608+00	LT	20
608+35	to	608+35	RT	20
608+50	to	608+50	LT	20
608+85	to	608+85	RT	20
609+00	to	609+00	LT	20
609+35	to	609+35	RT	20
609+50	to	609+50	LT	20
609+85	to	609+85	RT	20
610+35	to	610+35	RT	25
610+50	to	610+50	LT	20
610+85	to	610+85	RT	25
611+00	to	611+00	LT	30
611+35	to	611+35	RT	25
611+50	to	611+50	LT	35
611+85	to	611+85	RT	20
612+00	to	612+00	LT	30
612+35	to	612+35	RT	20
612+50	to	612+50	LT	30
612+85	to	612+85	RT	20
			TOTAL	**931**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
613+00	to	613+00	LT	30
613+35	to	613+35	RT	20
613+50	to	613+50	LT	30
613+85	to	613+85	RT	20
614+00	to	614+00	LT	20
614+20	to	614+20	RT	30
615+00	to	615+69	RT	147
615+08	to	615+82	LT	109
615+92	to	618+51	RT	503
616+87	to	618+99	LT	218
617+72	to	620+65	LT	300
618+24	to	618+94	RT	167
618+29	to	618+54	LT	45
625+75	to	625+75	LT	30
625+80	to	625+80	RT	35
626+75	to	626+75	LT	30
626+80	to	626+80	RT	30
627+25	to	627+25	LT	30
627+30	to	627+30	RT	30
627+75	to	627+75	LT	30
627+80	to	627+80	RT	30
628+25	to	628+25	LT	30
628+30	to	628+30	RT	40
629+75	to	629+75	RT	35
629+75	to	629+75	LT	30
630+25	to	630+25	RT	35
630+25	to	630+25	LT	30
630+75	to	630+75	RT	35
630+75	to	630+75	LT	30
631+25	to	631+25	RT	35
631+25	to	631+25	LT	30
631+75	to	631+75	RT	35
631+75	to	631+75	LT	30
632+25	to	632+25	RT	35
632+25	to	632+25	LT	30
642+40	to	642+40	LT	30
			TOTAL	**2374**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
642+75	to	642+75	RT	25
642+90	to	642+90	LT	20
643+25	to	643+25	RT	20
643+40	to	643+40	LT	20
643+75	to	643+75	RT	20
643+90	to	643+90	LT	20
644+25	to	644+25	RT	20
644+40	to	644+40	LT	20
644+75	to	644+75	RT	20
645+40	to	645+40	LT	20
645+75	to	645+75	RT	25
646+40	to	646+40	LT	20
646+75	to	646+75	RT	25
647+75	to	647+75	RT	25
650+96	to	653+42	LT	271
653+90	to	654+76	RT	90
654+50	to	654+50	LT	25
655+50	to	655+50	LT	20
655+58	to	655+66	RT	30
656+00	to	656+00	LT	20
656+08	to	656+16	RT	30
656+50	to	656+50	LT	20
656+58	to	656+66	RT	30
657+00	to	657+00	LT	20
657+08	to	657+16	RT	30
657+50	to	657+50	LT	20
657+58	to	657+66	RT	30
658+00	to	658+00	LT	20
658+08	to	658+16	RT	30
658+50	to	658+50	LT	20
658+58	to	658+66	RT	30
659+00	to	659+00	LT	20
659+08	to	659+16	RT	30
659+50	to	659+50	LT	20
659+58	to	659+66	RT	30
660+00	to	660+00	LT	45
660+08	to	660+16	RT	30
660+50	to	660+50	LT	45
660+58	to	660+66	RT	30
			TOTAL	**1286**

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		601+58 to 612+85	931	LF
		613+00 to 642+40	2374	LF
		642+75 to 660+66	1286	LF

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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	31

PERMANENT EROSION CONTROL - DITCH CHECKS, CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
661+00	to	661+00	LT	40
661+08	to	661+16	RT	30
661+50	to	661+50	LT	35
661+58	to	661+66	RT	30
663+50	to	663+50	LT	25
663+58	to	663+66	RT	30
664+50	to	664+50	LT	30
664+58	to	664+66	RT	30
665+50	to	665+50	LT	30
665+58	to	665+66	RT	30
668+91	to	668+91	LT	25
669+21	to	669+70	RT	58
669+35	to	669+71	LT	56
670+95	to	671+09	RT	30
671+34	to	671+40	LT	30
698+30	to	698+75	RT	63
698+33	to	698+33	LT	30
698+85	to	698+85	LT	25
698+95	to	699+40	RT	50
699+85	to	699+85	LT	30
699+95	to	700+40	RT	50
700+85	to	700+85	LT	35
700+95	to	701+40	RT	50
701+85	to	701+85	LT	40
701+95	to	706+34	RT	444
702+85	to	702+85	LT	40
703+35	to	703+35	LT	40
703+85	to	703+85	LT	40
704+35	to	704+35	LT	35
704+85	to	704+85	LT	30
705+35	to	705+35	LT	30
705+85	to	705+85	LT	30
708+12	to	710+70	RT	275
717+05	to	717+31	RT	77
717+50	to	718+18	RT	70
			TOTAL	1993

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
721+50	to	721+50	LT	30
721+59	to	721+78	RT	30
722+50	to	722+50	LT	35
722+59	to	722+78	RT	30
723+50	to	723+50	LT	40
723+59	to	723+78	RT	30
724+50	to	724+50	LT	35
724+59	to	724+78	RT	30
725+50	to	725+50	LT	40
725+59	to	725+78	RT	30
726+50	to	726+50	LT	30
726+59	to	726+78	RT	30
727+50	to	727+50	LT	20
727+59	to	727+78	RT	30
728+50	to	728+50	LT	20
728+59	to	728+78	RT	30
729+50	to	729+50	LT	20
729+59	to	729+78	RT	30
730+19	to	732+19	RT	222
730+50	to	730+50	LT	25
731+50	to	731+50	LT	20
732+02	to	732+25	RT	45
732+48	to	733+25	RT	155
732+85	to	732+95	LT	40
733+37	to	733+44	LT	30
733+86	to	733+94	LT	30
734+36	to	734+44	LT	30
734+87	to	734+94	LT	25
734+88	to	734+93	RT	20
735+37	to	735+44	LT	25
735+38	to	735+43	RT	20
735+87	to	735+94	LT	25
735+88	to	735+93	RT	20
736+37	to	736+44	LT	25
736+38	to	736+43	RT	20
736+87	to	736+94	LT	25
736+88	to	736+93	RT	20
			TOTAL	1362

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
737+37	to	737+44	LT	25
737+83	to	737+93	RT	40
738+22	to	738+45	LT	35
738+85	to	738+93	RT	30
739+23	to	743+24	LT	403
744+76	to	744+86	LT	25
745+00	to	745+00	RT	30
745+76	to	745+86	LT	25
746+00	to	746+00	RT	30
746+76	to	746+86	LT	25
747+00	to	747+00	RT	25
747+76	to	747+86	LT	25
748+00	to	748+00	RT	30
748+67	to	748+86	LT	45
749+00	to	749+00	RT	30
749+86	to	749+87	LT	40
750+00	to	750+00	RT	25
750+83	to	754+34	RT	358
753+83	to	756+62	LT	568
756+48	to	760+83	RT	464
759+80	to	759+80	LT	26
760+80	to	760+80	LT	20
761+17	to	761+70	RT	60
761+80	to	761+80	LT	20
762+01	to	762+96	RT	100
762+80	to	762+80	LT	20
763+17	to	763+70	RT	60
763+80	to	763+80	LT	20
764+17	to	764+70	RT	60
764+80	to	764+80	LT	20
766+50	to	766+50	LT	20
767+50	to	767+50	LT	20
768+50	to	768+50	LT	20
771+00	to	771+00	RT	20
771+00	to	771+00	LT	20
771+50	to	771+50	RT	20
771+50	to	771+50	LT	20
772+00	to	772+00	LT	20
			TOTAL	2844

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		661+00 to 718+18	1993	LF
		721+50 to 736+93	1362	LF
		737+37 to 772+00	2844	LF

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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	32

PERMANENT EROSION CONTROL - DITCH CHECKS, CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
772+00	to	772+00	RT	20
772+50	to	772+50	RT	20
772+50	to	772+50	LT	20
772+96	to	773+07	LT	30
773+09	to	773+19	RT	30
773+50	to	773+50	LT	25
773+79	to	774+05	RT	40
774+00	to	774+00	LT	25
774+50	to	774+50	LT	20
774+79	to	775+05	RT	40
775+00	to	775+00	LT	20
775+79	to	776+05	RT	40
776+00	to	776+00	LT	20
776+79	to	777+05	RT	40
777+00	to	777+00	LT	20
777+79	to	778+05	RT	40
778+00	to	778+00	LT	20
778+50	to	778+50	LT	20
778+79	to	779+05	RT	40
779+00	to	779+00	LT	20
779+50	to	779+50	LT	20
779+79	to	780+05	RT	40
780+00	to	780+00	LT	20
780+50	to	780+50	LT	20
780+79	to	781+05	RT	40
781+00	to	781+00	LT	20
781+50	to	781+50	LT	25
781+79	to	782+05	RT	40
782+00	to	782+00	LT	25
782+50	to	782+50	LT	25
782+79	to	783+05	RT	40
783+00	to	783+00	LT	25
783+50	to	783+50	LT	25
783+79	to	784+05	RT	40
784+00	to	784+00	LT	25
784+50	to	784+50	LT	25
784+79	to	785+05	RT	40
785+00	to	785+00	LT	25
785+28	to	787+77	RT	326
			TOTAL	**1396**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
788+03	to	788+54	RT	105
788+24	to	788+31	RT	20
793+00	to	793+00	RT	30
793+00	to	793+00	LT	20
793+50	to	793+50	RT	30
793+50	to	793+50	LT	20
794+00	to	794+00	RT	30
794+00	to	794+00	LT	20
794+50	to	794+50	RT	30
794+50	to	794+50	LT	20
795+00	to	795+00	RT	30
795+00	to	795+00	LT	20
795+50	to	795+50	RT	30
795+50	to	795+50	LT	20
796+00	to	796+00	RT	30
796+00	to	796+00	LT	20
796+50	to	796+50	RT	20
796+50	to	796+50	LT	20
797+00	to	797+00	RT	20
797+00	to	797+00	LT	20
797+00	to	797+00	RT	20
797+50	to	797+50	LT	20
798+00	to	798+00	RT	20
798+00	to	798+00	LT	20
798+50	to	798+50	RT	20
798+50	to	798+50	LT	20
799+00	to	799+00	RT	20
799+00	to	799+00	LT	20
799+50	to	799+50	RT	20
799+50	to	799+50	LT	20
800+00	to	800+00	RT	20
800+00	to	800+00	LT	20
800+39	to	800+54	RT	30
800+50	to	800+50	LT	20
800+89	to	801+04	RT	30
801+00	to	801+00	LT	20
801+39	to	801+54	RT	30
801+50	to	801+50	LT	20
801+89	to	802+04	RT	30
			TOTAL	**975**

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
802+00	to	802+00	LT	20
802+50	to	802+50	LT	20
802+61	to	803+04	RT	50
803+00	to	803+00	LT	20
803+50	to	803+50	LT	20
803+60	to	804+04	RT	50
804+00	to	804+00	LT	20
804+50	to	804+50	LT	20
805+00	to	805+00	LT	20
805+50	to	805+50	LT	20
806+00	to	806+00	LT	20
806+22	to	806+54	RT	39
806+50	to	806+50	LT	20
806+72	to	807+04	RT	39
807+00	to	807+00	LT	20
807+12	to	807+64	RT	60
807+50	to	807+50	LT	20
807+62	to	808+14	RT	60
808+00	to	808+00	LT	20
808+21	to	808+64	RT	50
808+50	to	808+50	LT	20
808+74	to	812+09	RT	347
809+00	to	809+00	LT	20
810+70	to	810+70	LT	30
811+20	to	811+20	LT	35
811+70	to	811+70	LT	35
812+20	to	812+20	LT	30
812+70	to	812+70	LT	25
813+20	to	813+20	LT	30
813+70	to	813+70	LT	30
814+20	to	814+20	LT	30
816+29	to	818+42	RT	240
820+74	to	821+10	RT	40
820+98	to	821+34	RT	40
821+01	to	824+35	LT	335
			TOTAL	**1895**

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		772+00 to 787+77	1396	LF
		788+03 to 802+04	975	LF
		802+00 to 824+35	1895	LF

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Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	77	33

PERMANENT EROSION CONTROL - DITCH CHECKS, CULVERT PROTECTION & RUNOFF PROTECTION

12" Fiber Rolls

Station	to	Station	Offset	Length (LF)
821+21	to	821+56	RT	40
821+52	to	821+80	RT	30
822+23	to	822+40	RT	20
822+45	to	823+44	LT	110
822+45	to	822+88	RT	50
822+75	to	823+18	RT	50
826+71	to	828+49	LT	260
828+06	to	830+28	RT	295
828+95	to	831+32	LT	320
			TOTAL	**1175**

12" Fiber Rolls(Highway 85)

Station	to	Station	Offset	Length (LF)
2640+27	to	2644+79	LT	478
2640+35	to	2641+71	RT	160
2641+32	to	2641+64	RT	40
2642+55	to	2642+55	RT	20
2642+61	to	2644+77	RT	340
2645+40	to	2649+03	LT	400
2645+75	to	2648+81	LT	310
2647+24	to	2650+37	RT	336
2650+01	to	2650+02	LT	35
2651+01	to	2651+02	LT	35
2651+02	to	2651+02	RT	35
2652+02	to	2652+02	LT	30
2652+02	to	2652+02	RT	35
2653+01	to	2653+02	LT	35
2653+02	to	2653+02	RT	35
2654+01	to	2654+02	LT	35
2654+02	to	2654+02	RT	35
2655+01	to	2655+02	LT	35
2655+02	to	2655+02	RT	35
2656+01	to	2656+02	LT	35
2655+02	to	2655+02	RT	35
2656+01	to	2656+02	LT	35
2656+02	to	2656+02	RT	35
2657+01	to	2657+02	LT	35
2657+02	to	2657+02	RT	35
			TOTAL	**2604**

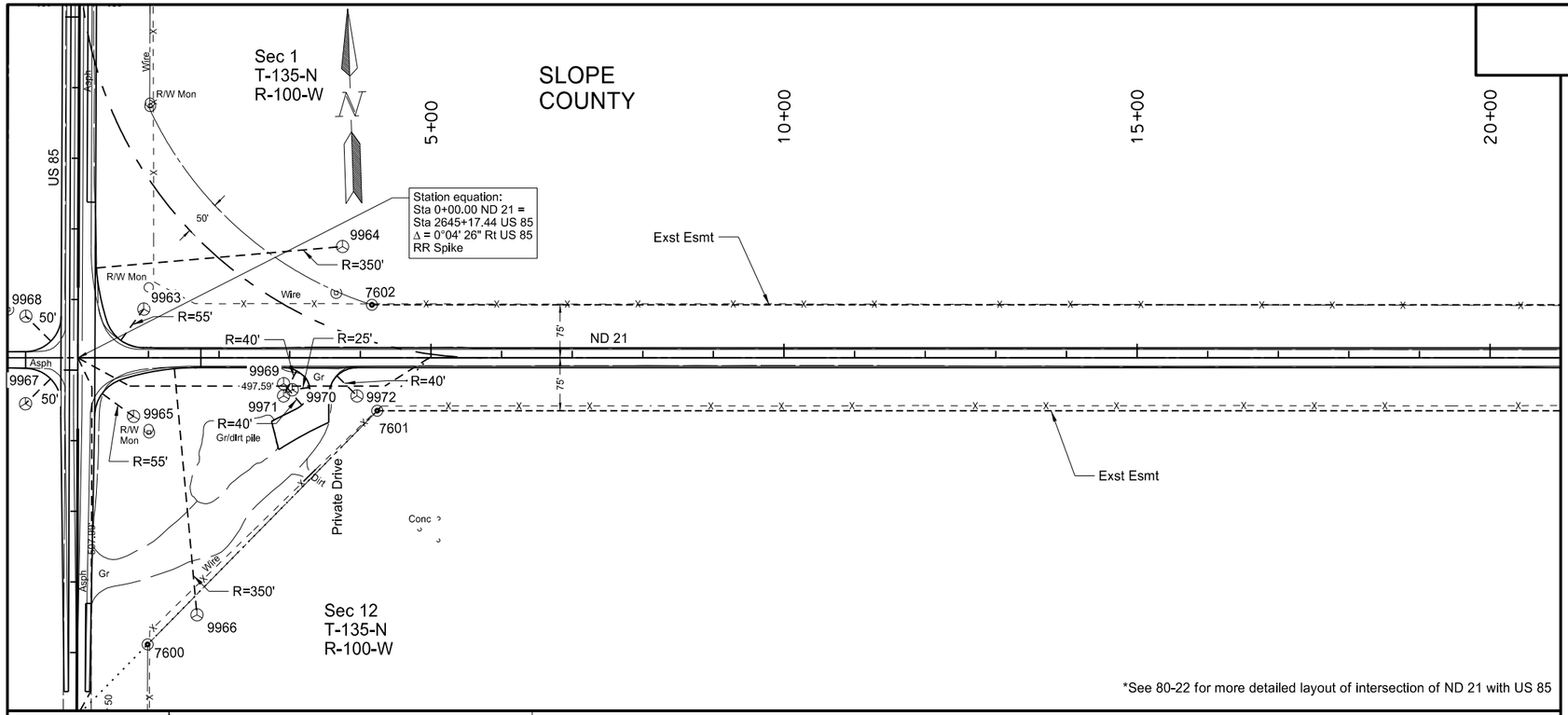
SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		821+21 to 831+32	1175	LF
		2640+27 to 2657+02 (Hwy 85)	2604	LF

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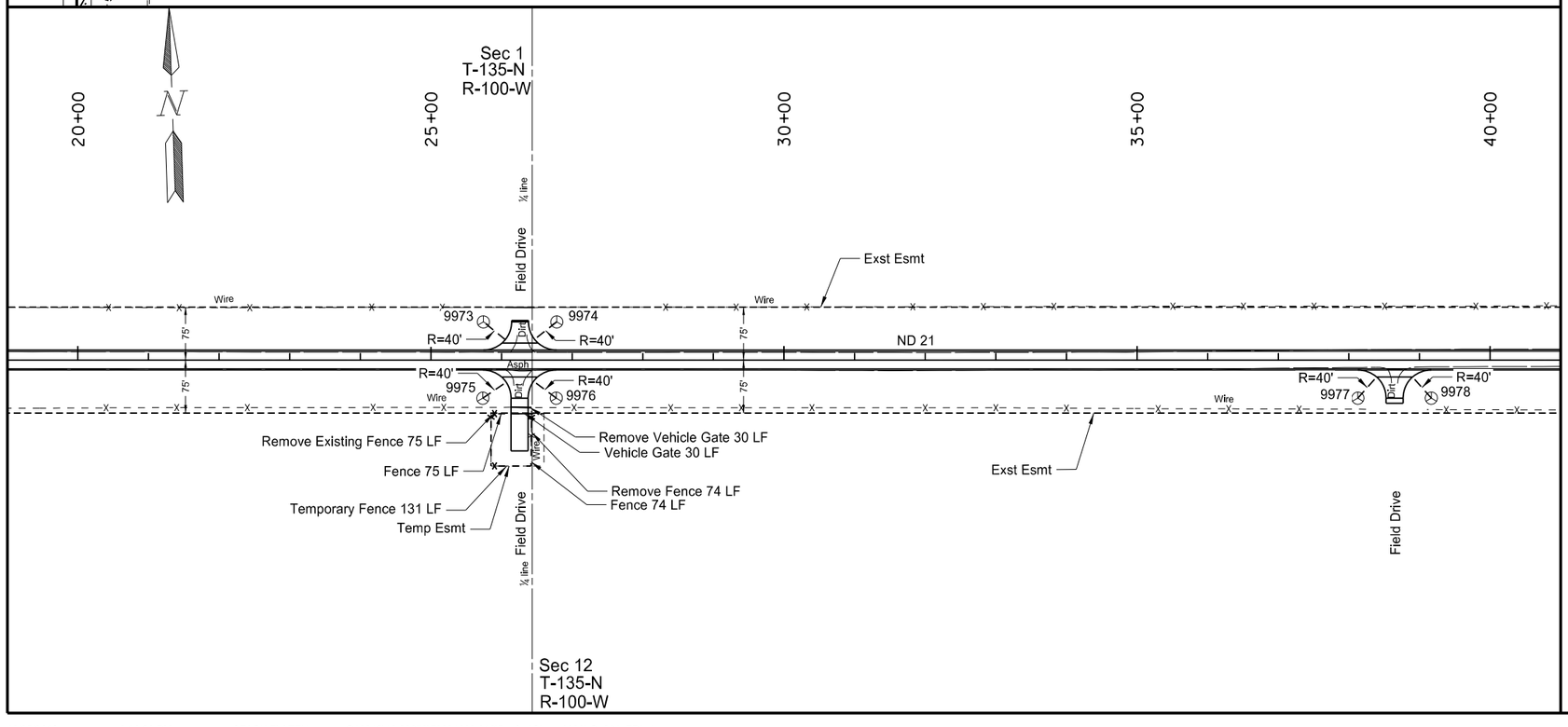
Permanent Erosion Control

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	1



*See 80-22 for more detailed layout of intersection of ND 21 with US 85



SPEC	CODE	BID ITEM	QTY	UNIT
202	0312	REMOVE EXISTING FENCE		
		25+85 - 76' Rt to 26+60 - 76' Rt	75	LF
		26+42 - 76' Rt to 26+42 - 150' Rt	74	LF
752	0300	FENCE BARBED WIRE 4 STRAND-WOOD POST		
		25+85 - 76' Rt to 26+60 - 76' Rt	75	LF
		26+42 - 76' Rt to 26+42 - 150' Rt	74	LF
752	0905	TEMPORARY FENCE		
		25+85 - 76' Rt to 25+85 - 150' Rt		
		25+85 - 150' Rt to 26+42 - 150' Rt	131	LF
752	0993	FENCE TERMINAL		
		25+85 - 76' Rt	1	EA
		26+60 - 76' Rt	1	EA
		26+42 - 150' Rt	1	EA
752	2100	VEHICLE GATE		
		26+12 - 76' Rt to 26+42 - 76' Rt	1	EA
752	2120	REMOVE VEHICLE GATE		
		26+12 - 76' Rt to 26+42 - 76' Rt	1	EA
752	4140	DOUBLE BRACE ASSEMBLY BARBED WIRE-WOOD POST		
		26+12 - 76' Rt	1	EA
		26+42 - 76' Rt	1	EA

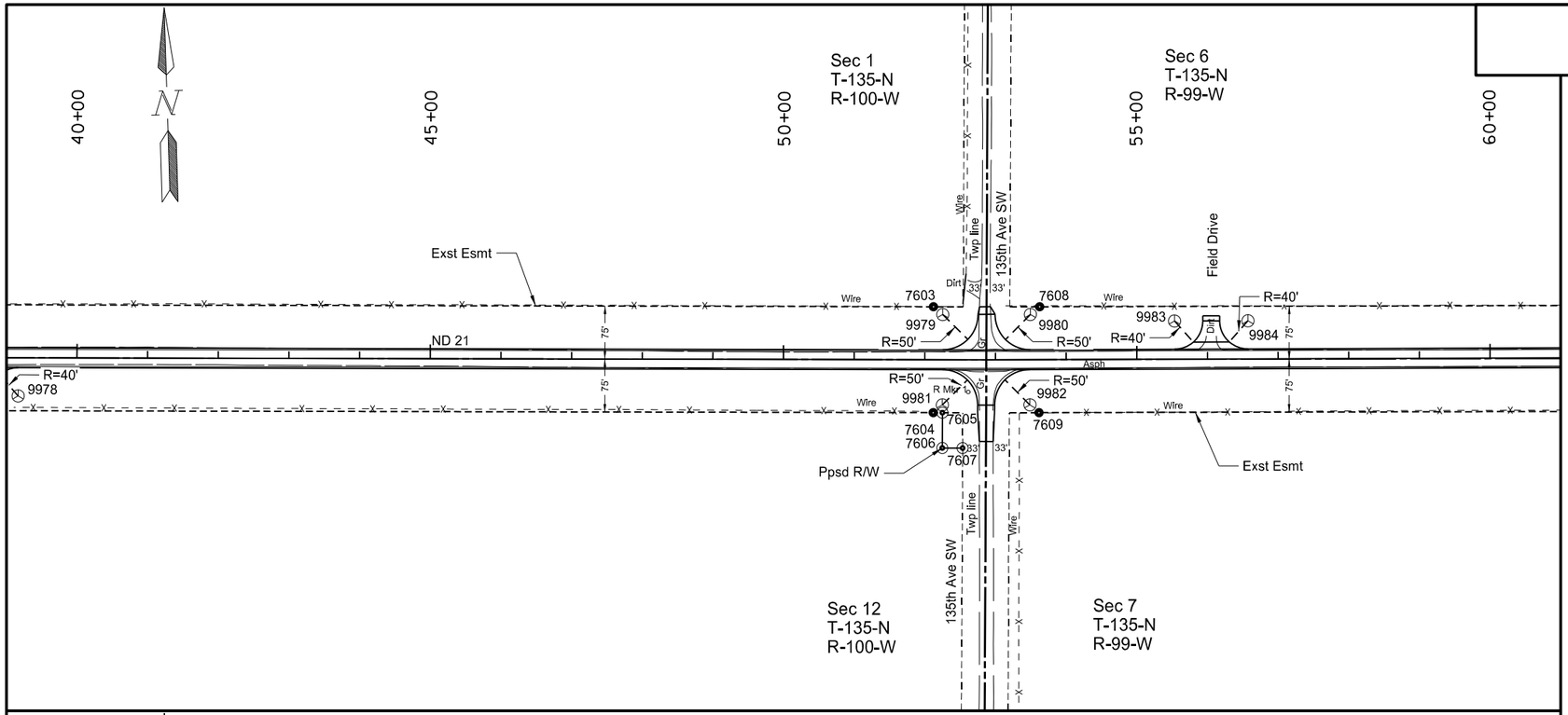
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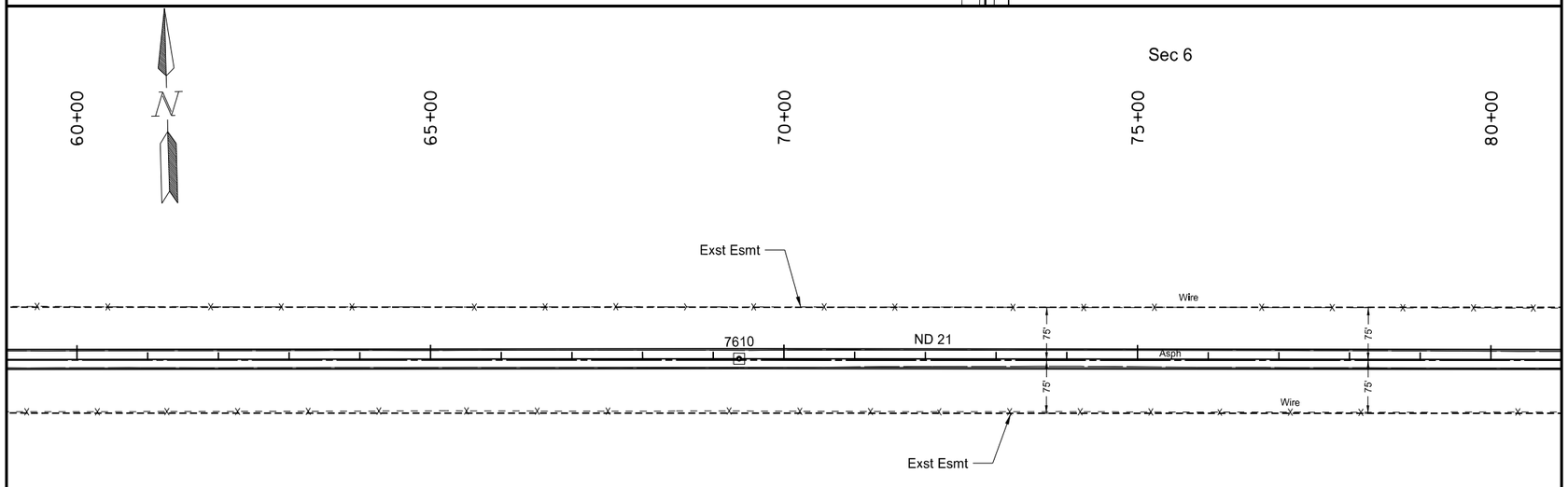
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

0+24 to 40+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	2





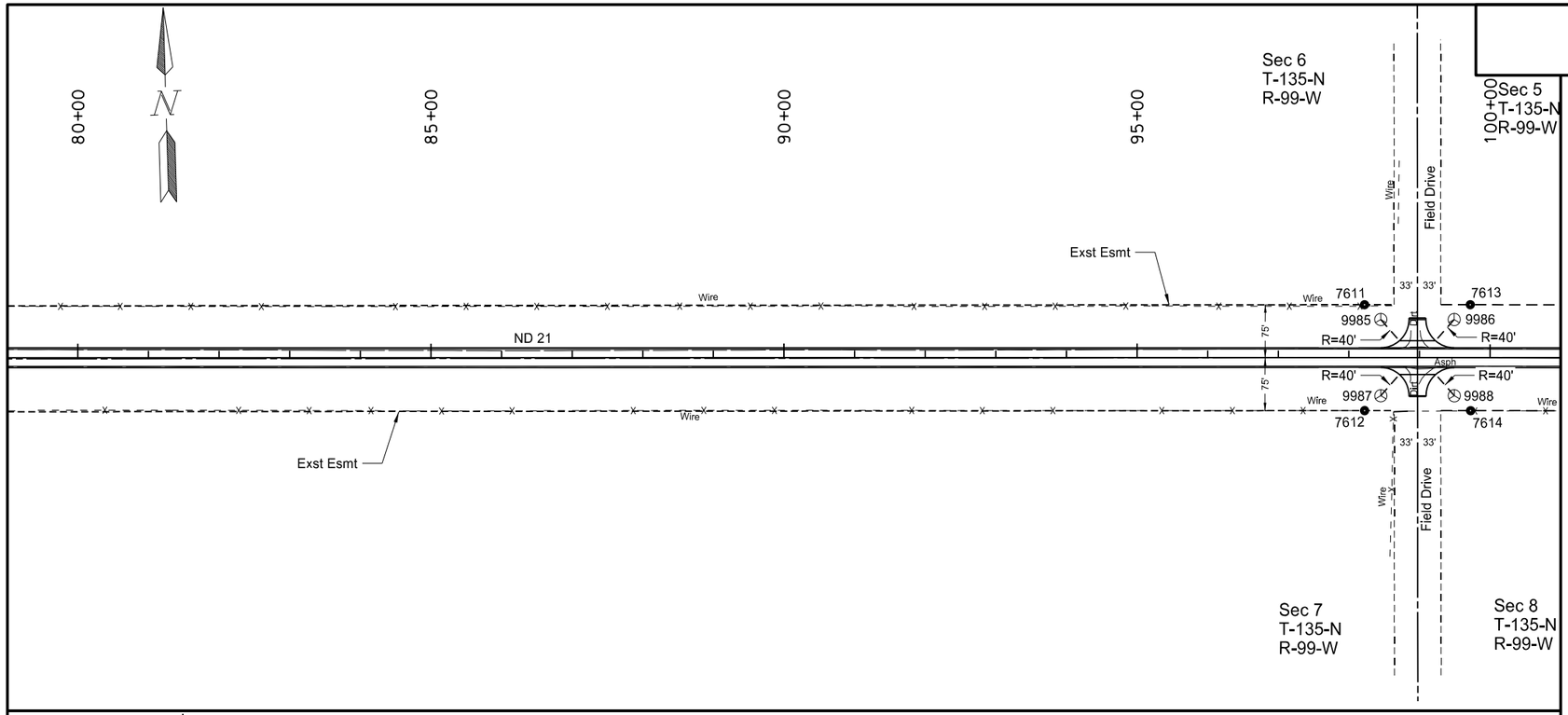
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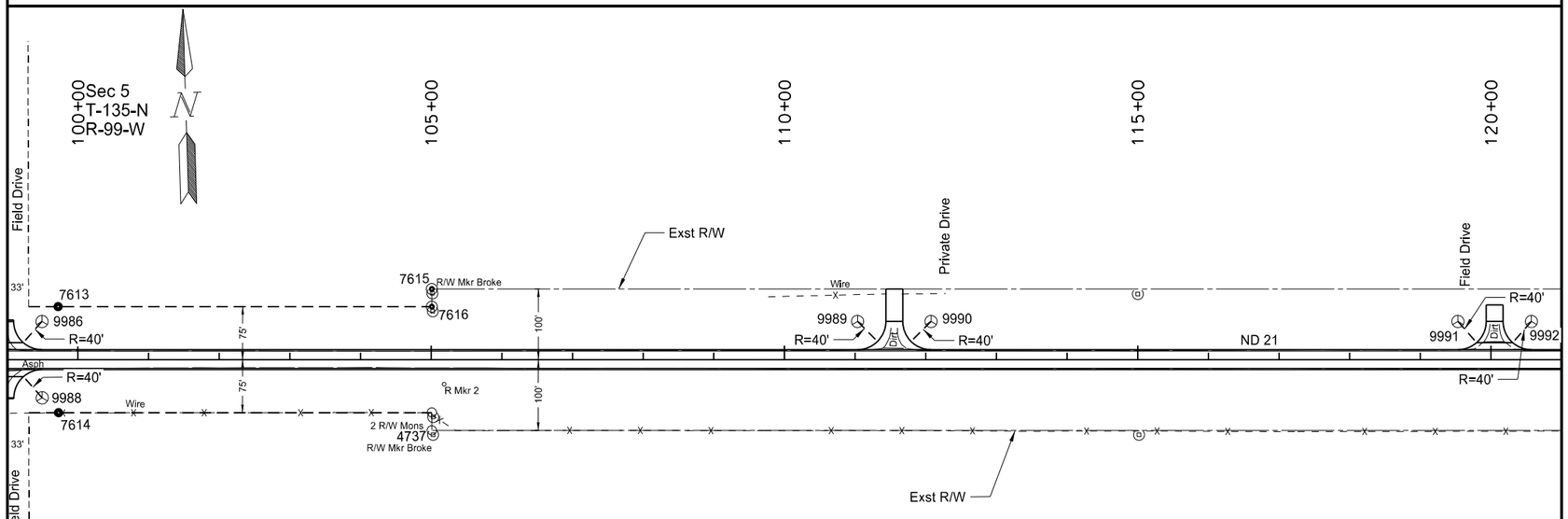
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

40+00 to 80+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	3





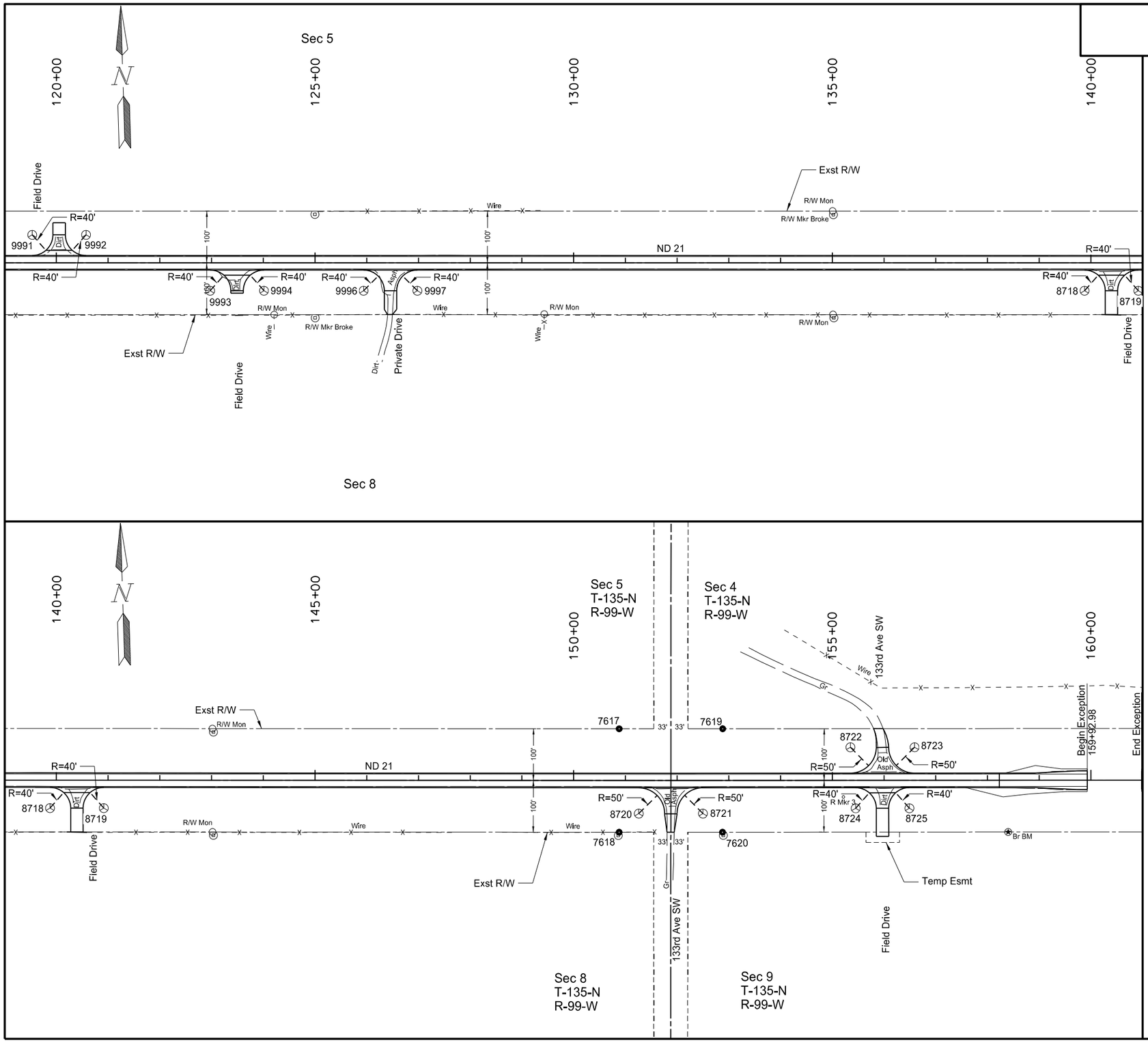
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Survey Data

ND 21
Jct 85 to N Jct 22 - New England

80+00 to 120+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	4



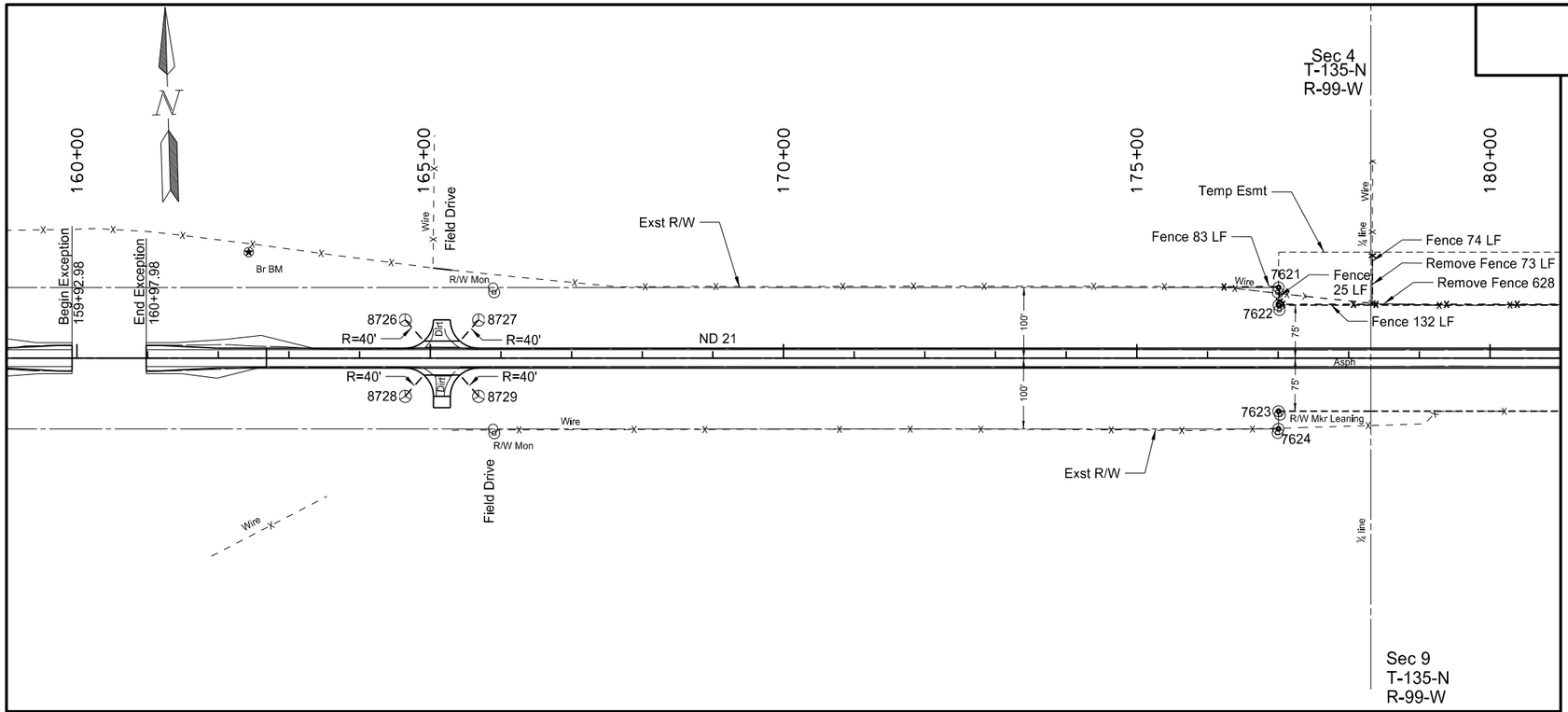
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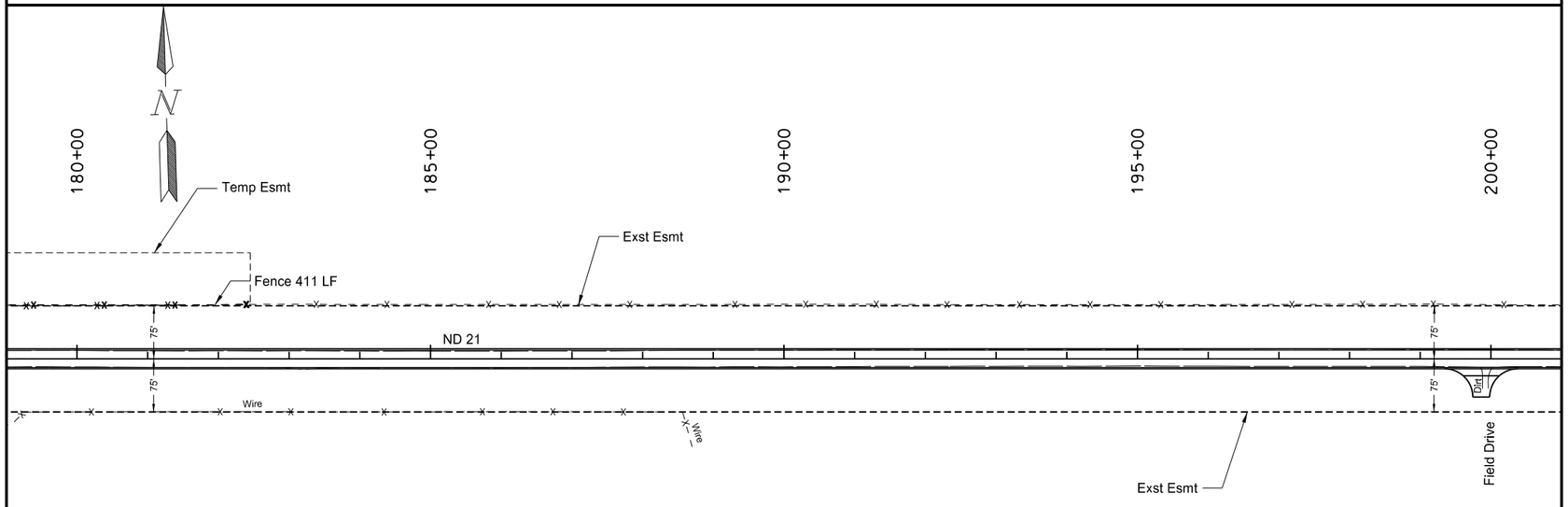
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

120+00 to 159+92.98

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	5





SPEC	CODE	BID ITEM	QTY	UNIT
202	0312	REMOVE EXISTING FENCE		
		176+19 - 101' Lt to 182+45 - 77' Lt	628	LF
		178+33 - 77' Lt to 178+33 - 150' Lt	73	LF
752	0320	FENCE BARBED WIRE 4 STRAND-STEEL POST		
		176+19 - 101' Lt to 177+02 - 101' Lt	83	LF
		177+02 - 101' Lt to 177+02 - 76' Lt	25	LF
		177+02 - 76' Lt to 178+33 - 76' Lt	132	LF
		178+33 - 76' Lt to 178+33 - 150' Lt	74	LF
752	0110	FENCE BARBED WIRE 3 STRAND-STEEL POST		
		178+33 - 76' Lt to 182+45 - 77' Lt	411	LF
752	0993	FENCE TERMINAL		
		176+19 - 101' Lt	1	EA
		182+45 - 77' Lt	1	EA
		178+33 - 150' Lt	1	EA
752	3150	CORNER ASSEMBLY BARBED WIRE-WOOD POST		
		177+02 - 101' Lt	1	EA
		177+02 - 76' Lt	1	EA
		178+33 - 76' Lt	1	EA

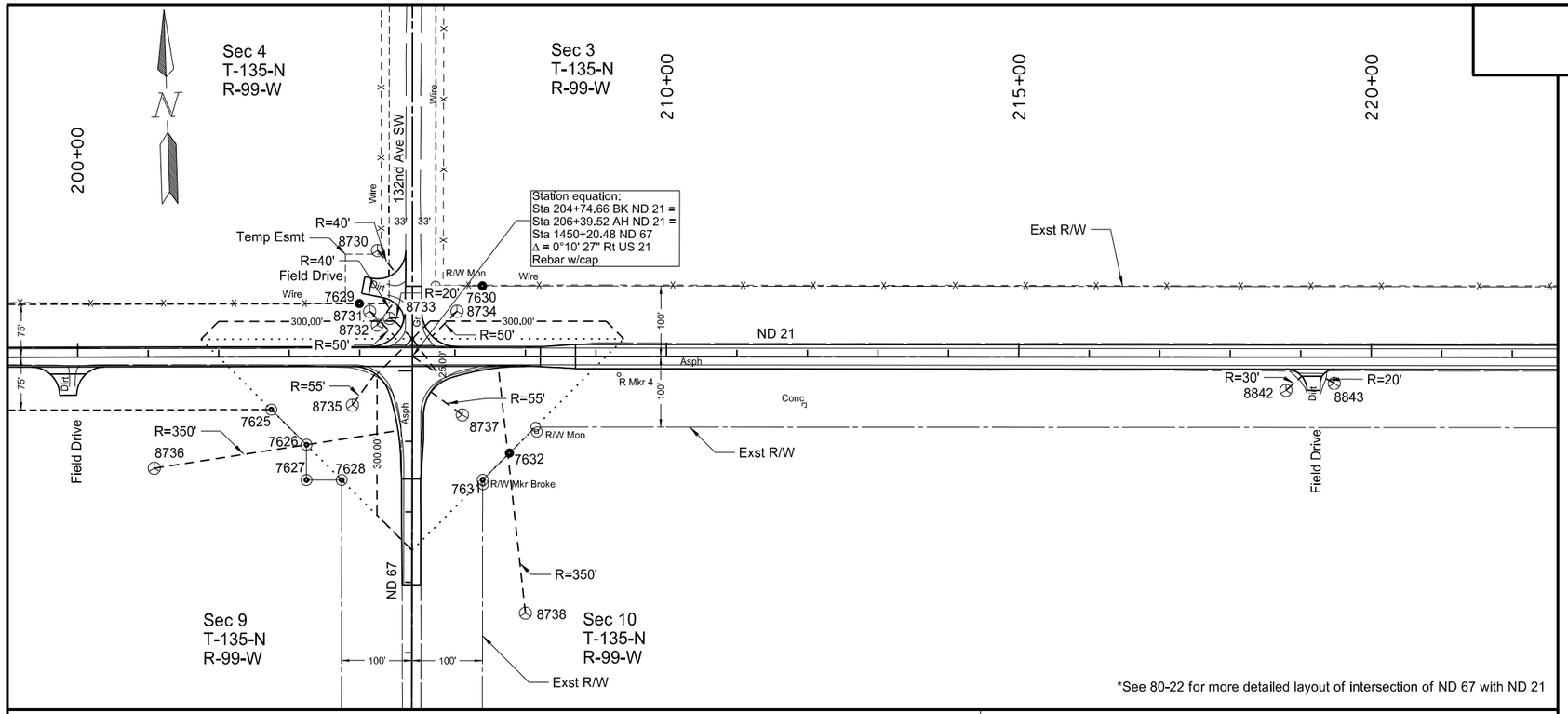
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Survey Data

ND 21
Jct 85 to N Jct 22 - New England

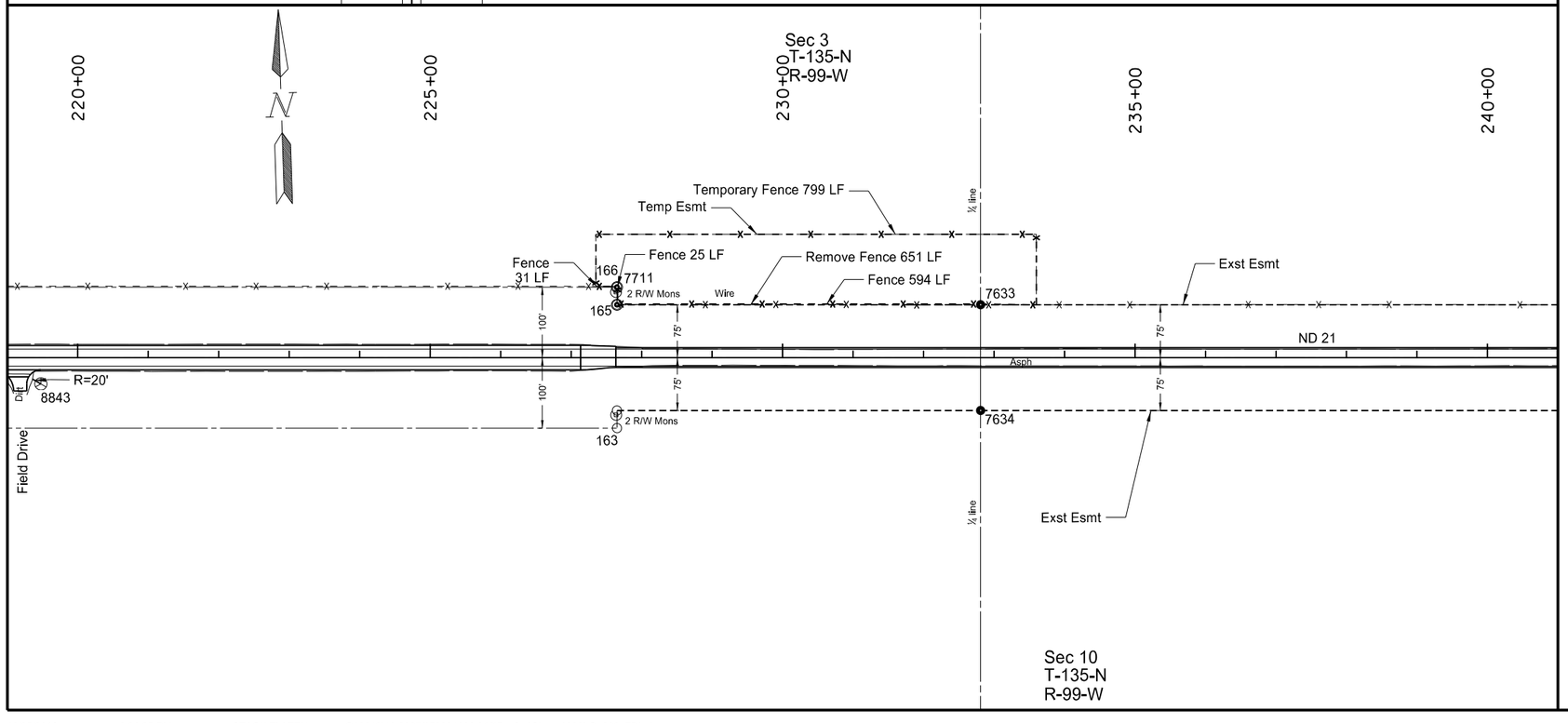
160+97.98 to 200+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	6



*See 80-22 for more detailed layout of intersection of ND 67 with ND 21

SPEC	CODE	BID ITEM	QTY	UNIT
202	0312	REMOVE EXISTING FENCE		
		227+35 - 101' Lt to 233+60 - 75' Lt	651	LF
752	0320	FENCE BARBED WIRE 4 STRAND-STEEL POST		
		227+35 - 101' Lt to 227+66 - 101' Lt	31	LF
		227+66 - 101' Lt to 227+66 - 76' Lt	25	LF
		227+66 - 76' Lt to 233+60 - 75' Lt	594	LF
752	0905	TEMPORARY FENCE		
		227+35 - 101' Lt to 227+35 - 175' Lt		
		227+35 - 175' Lt to 233+60 - 175' Lt		
		233+60 - 175' Lt to 233+60 - 75' Lt	799	LF
752	0993	FENCE TERMINAL		
		227+35 - 101' Lt	1	EA
		233+60 - 75' Lt	1	EA
752	3150	CORNER ASSEMBLY BARBED WIRE-WOOD POST		
		227+66 - 101' Lt	1	EA
		227+66 - 76' Lt	1	EA



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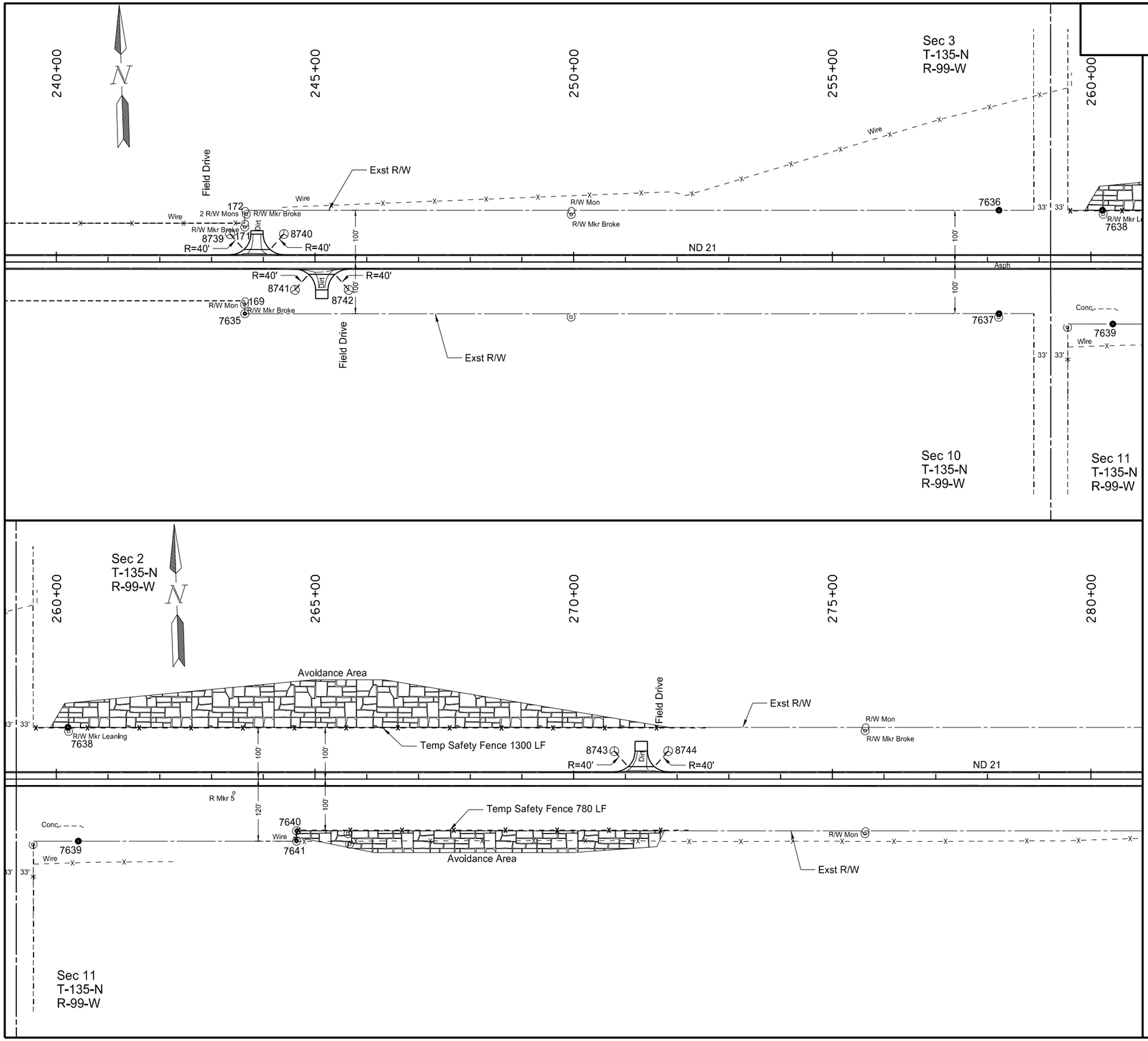
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

200+00 to 209+71.17
226+13.42 to 240+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	7

SPEC	CODE	BID ITEM	QTY	UNIT
752	0911	TEMPORARY SAFETY FENCE		
		259+55 - 99' Lt to 272+55 - 99' Lt	1300	LF
		264+63 - 120' Rt to 264+63 - 99' Rt		
		264+63 - 99' Rt to 272+22 - 99' Rt	780	LF



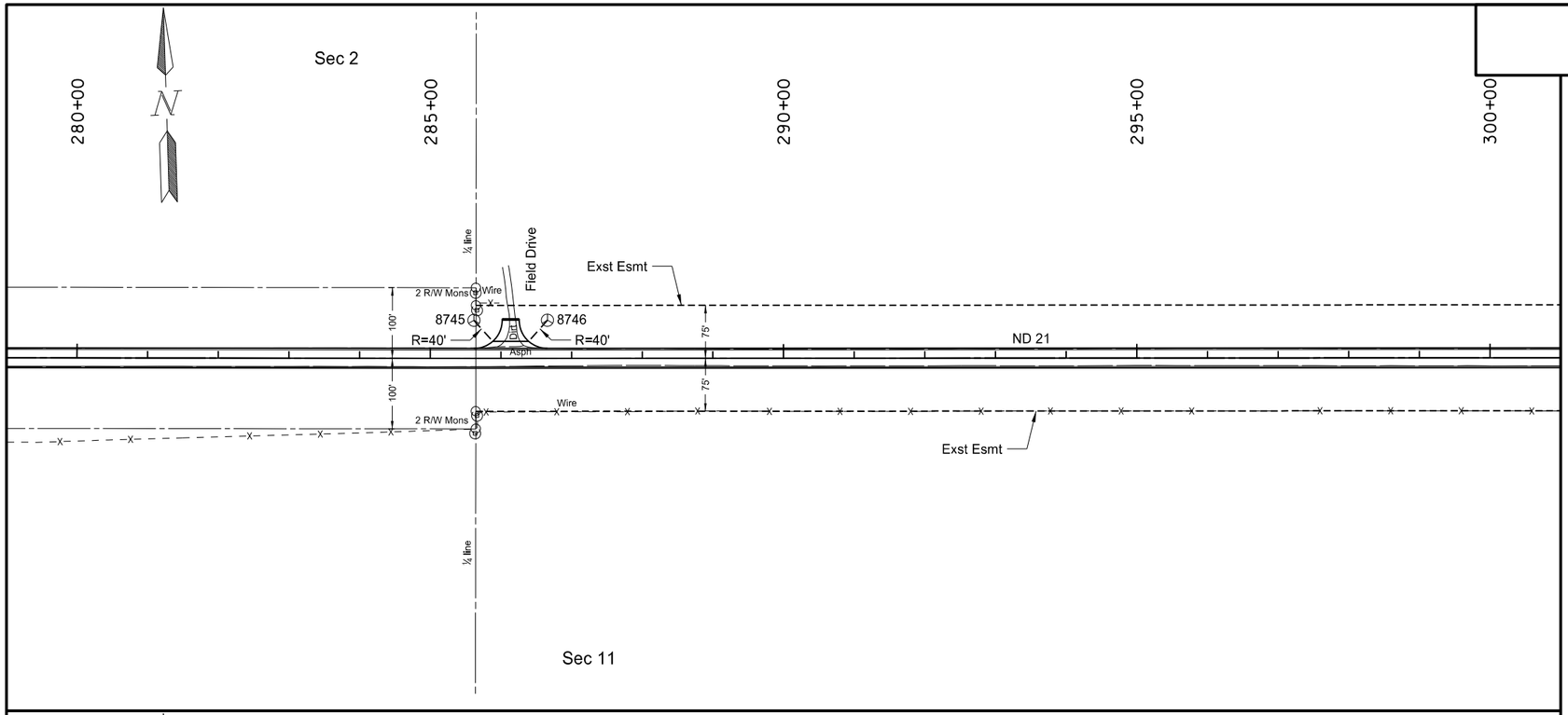
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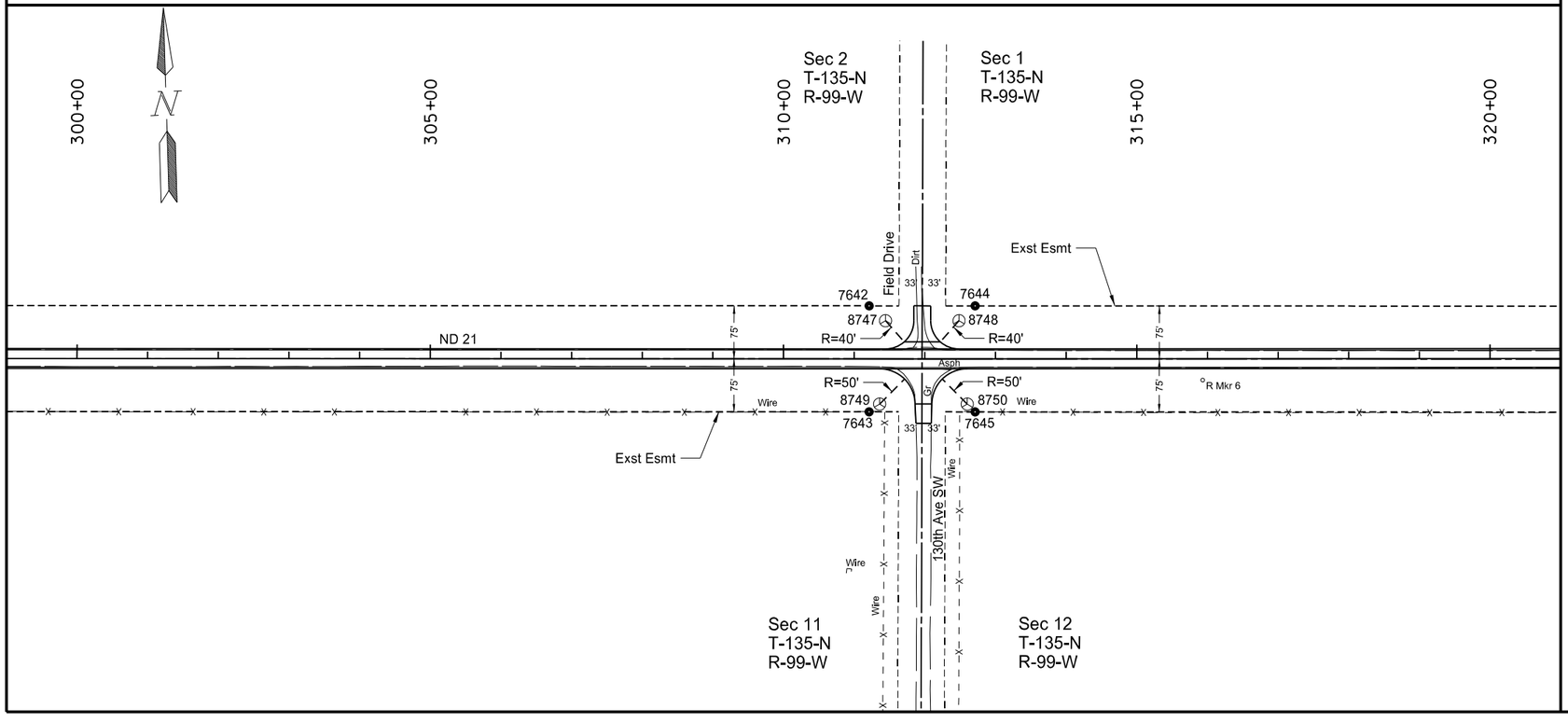
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

240+00 to 280+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	8





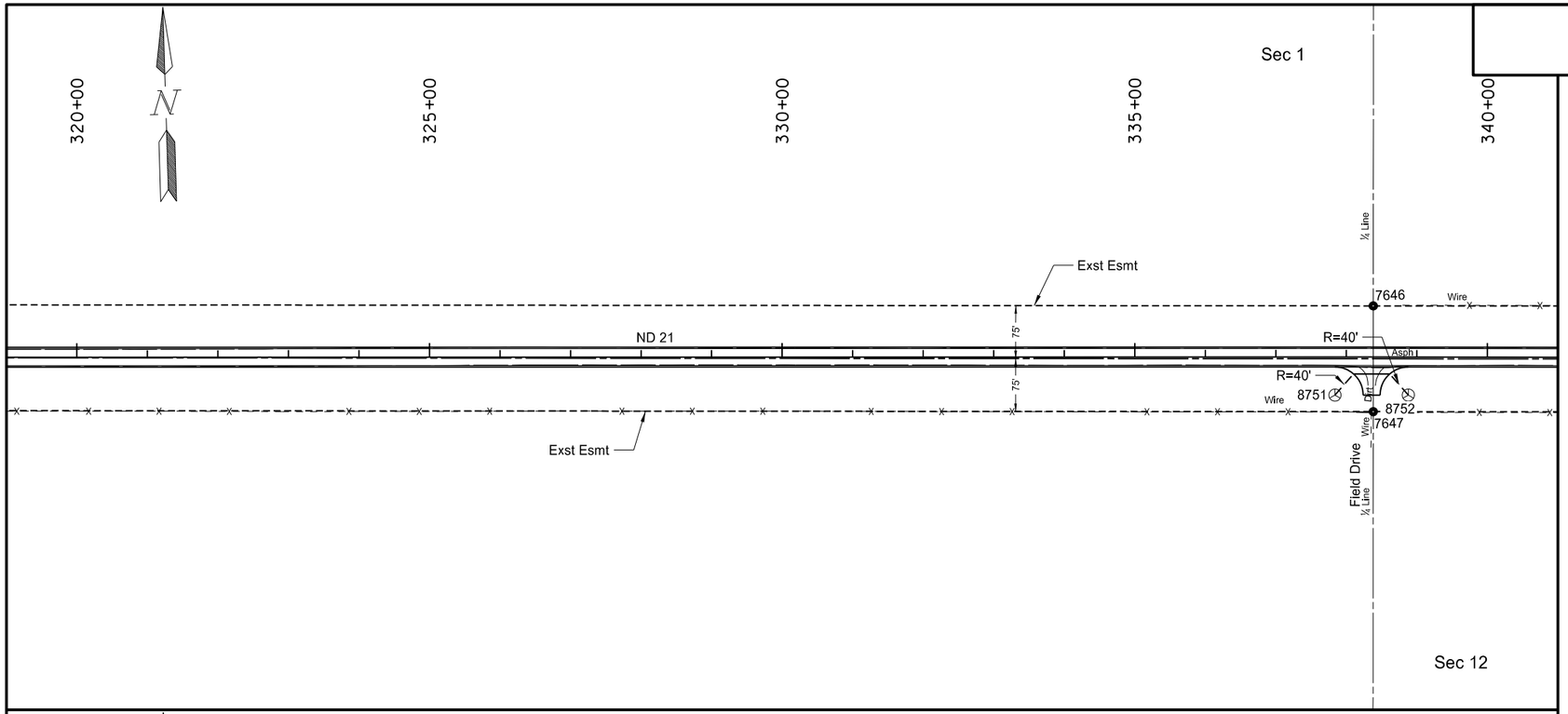
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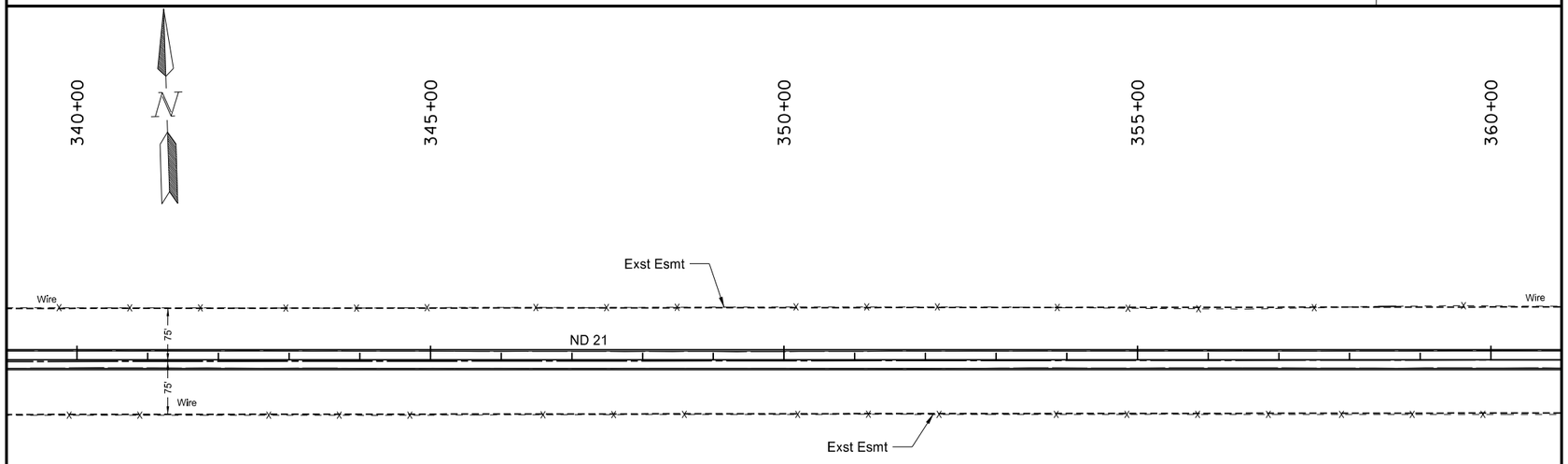
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

280+00 to 320+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	9





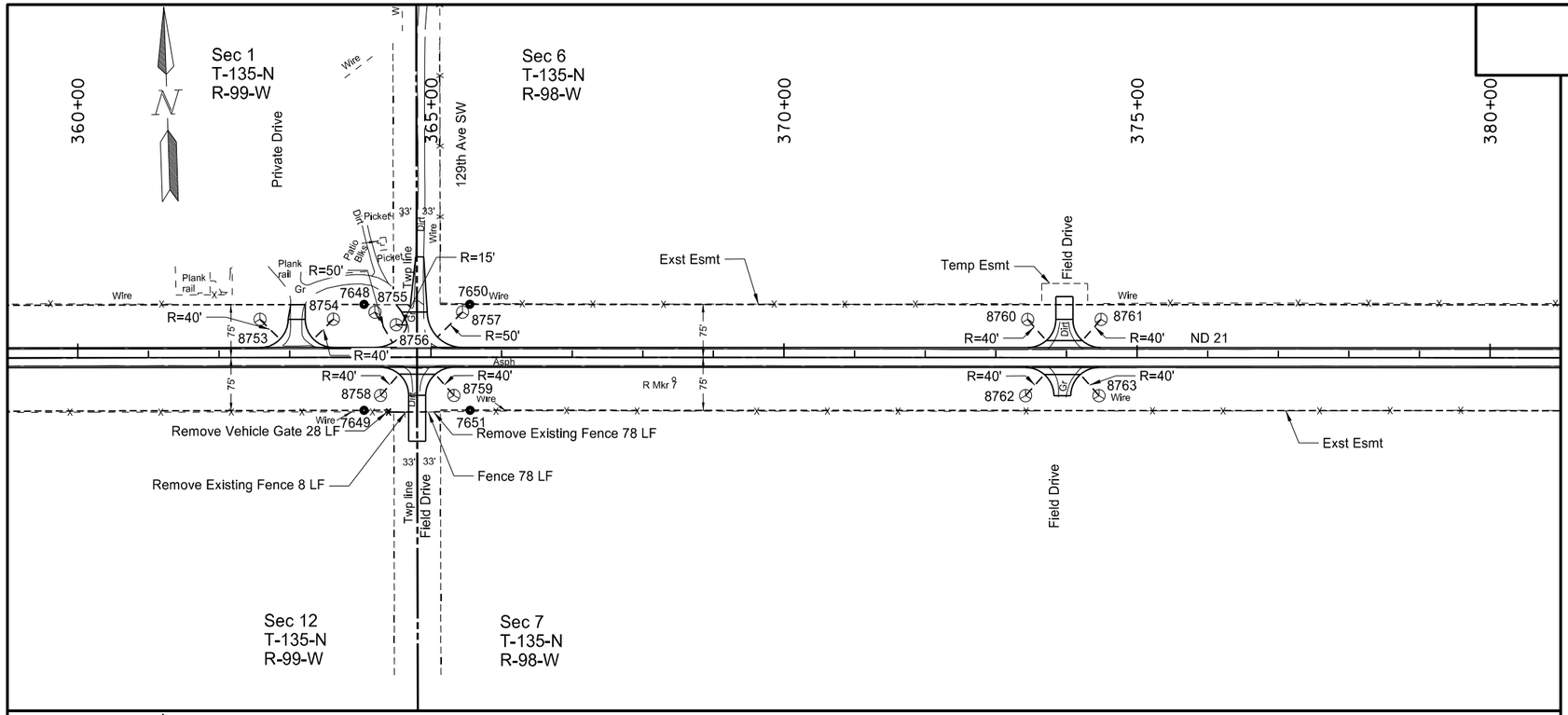
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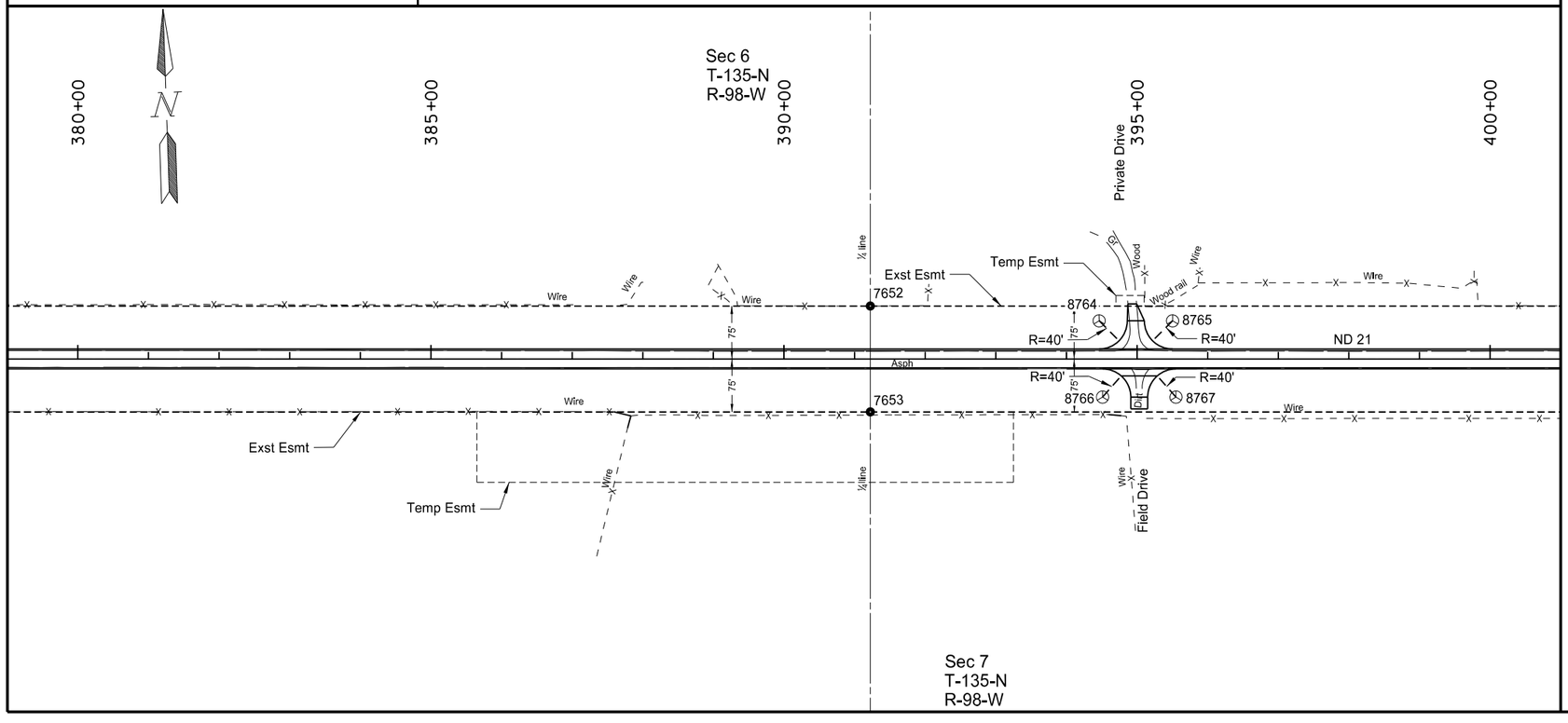
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

320+00 to 360+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	10





SPEC	CODE	BID ITEM	QTY	UNIT
202	0312	REMOVE EXISTING FENCE		
		364+35 - 77' Rt to 365+13 - 77' Rt	78	LF
		364+63 - 78' Rt to 364+63 - 86' Rt	8	LF
752	0320	FENCE BARBED WIRE 4 STRAND-STEEL POST		
		364+35 - 77' Rt to 365+13 - 77' Rt	78	LF
752	0993	FENCE TERMINAL		
		364+35 - 77' Rt	1	EA
		365+13 - 77' Rt	1	EA
752	2120	REMOVE VEHICLE GATE		
		364+35 - 77' Rt to 364+63 - 78' Rt	1	EA

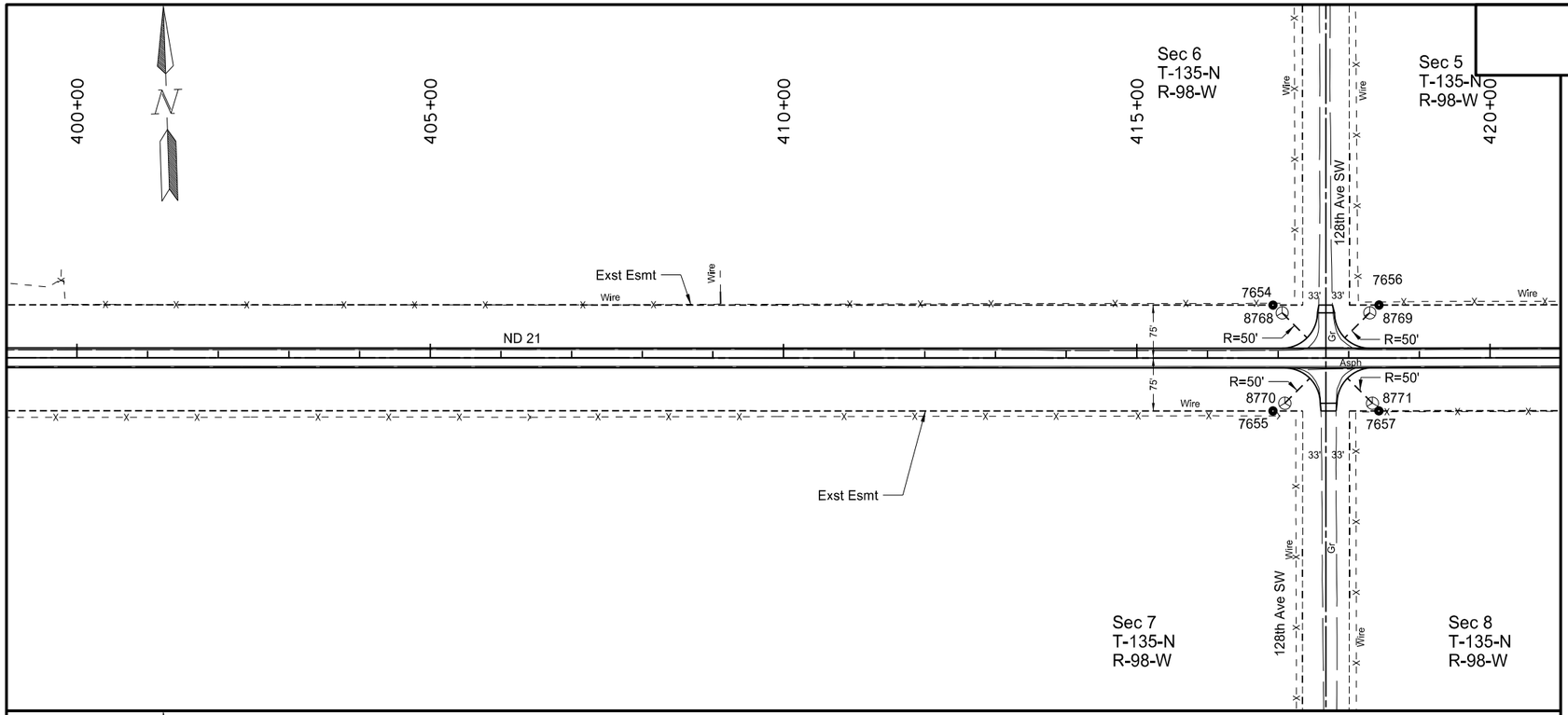
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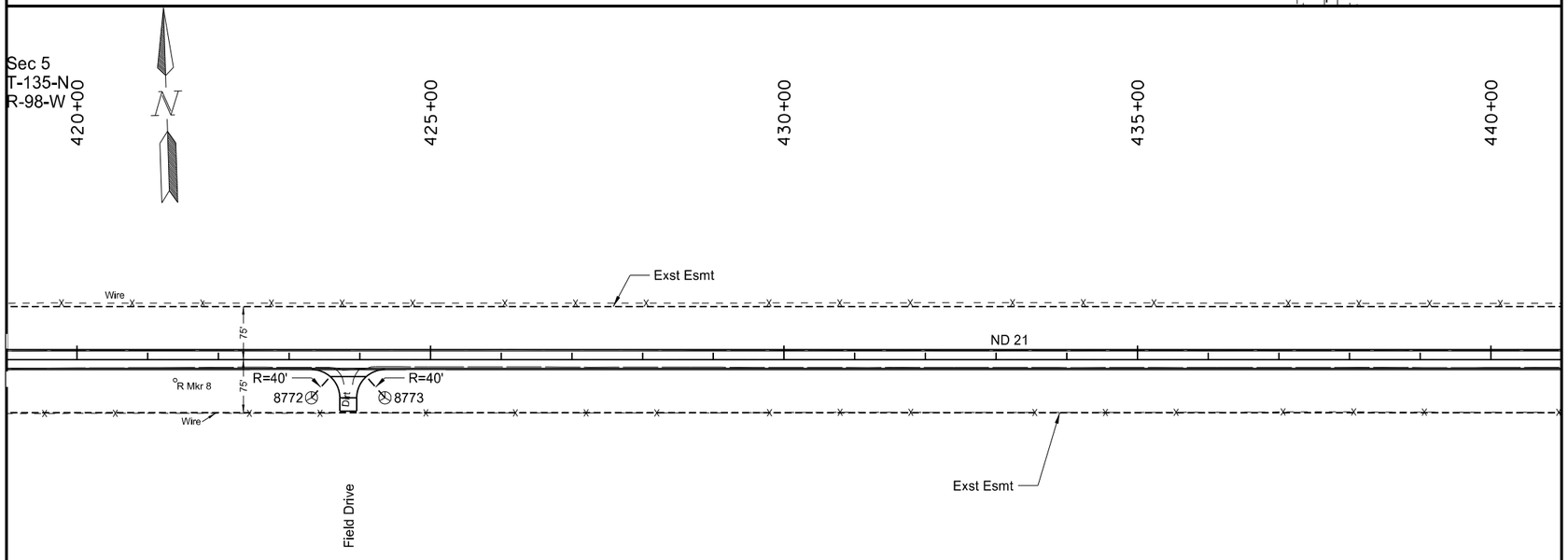
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

360+00 to 400+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	11





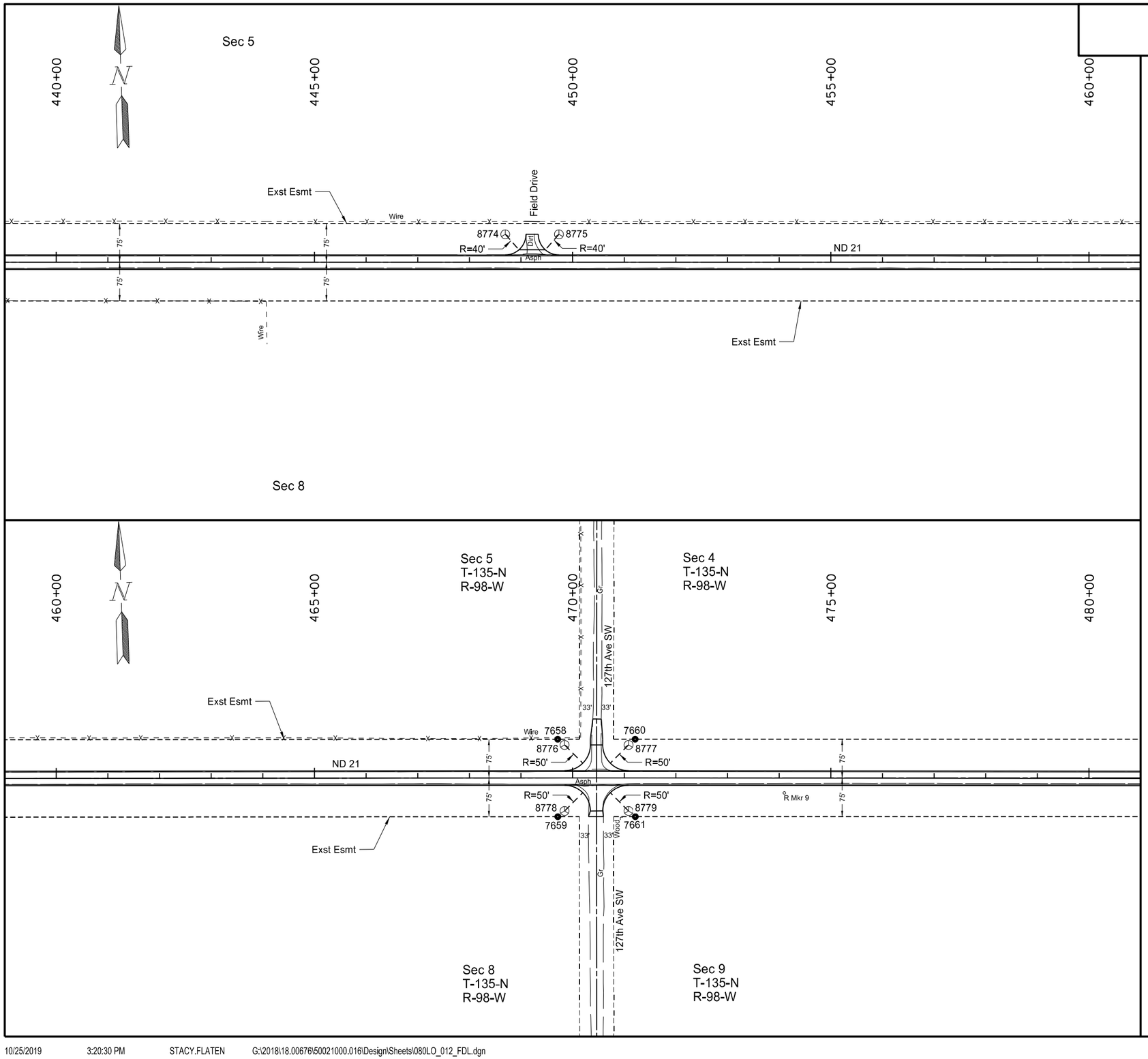
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Survey Data

ND 21
Jct 85 to N Jct 22 - New England

400+00 to 440+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	12



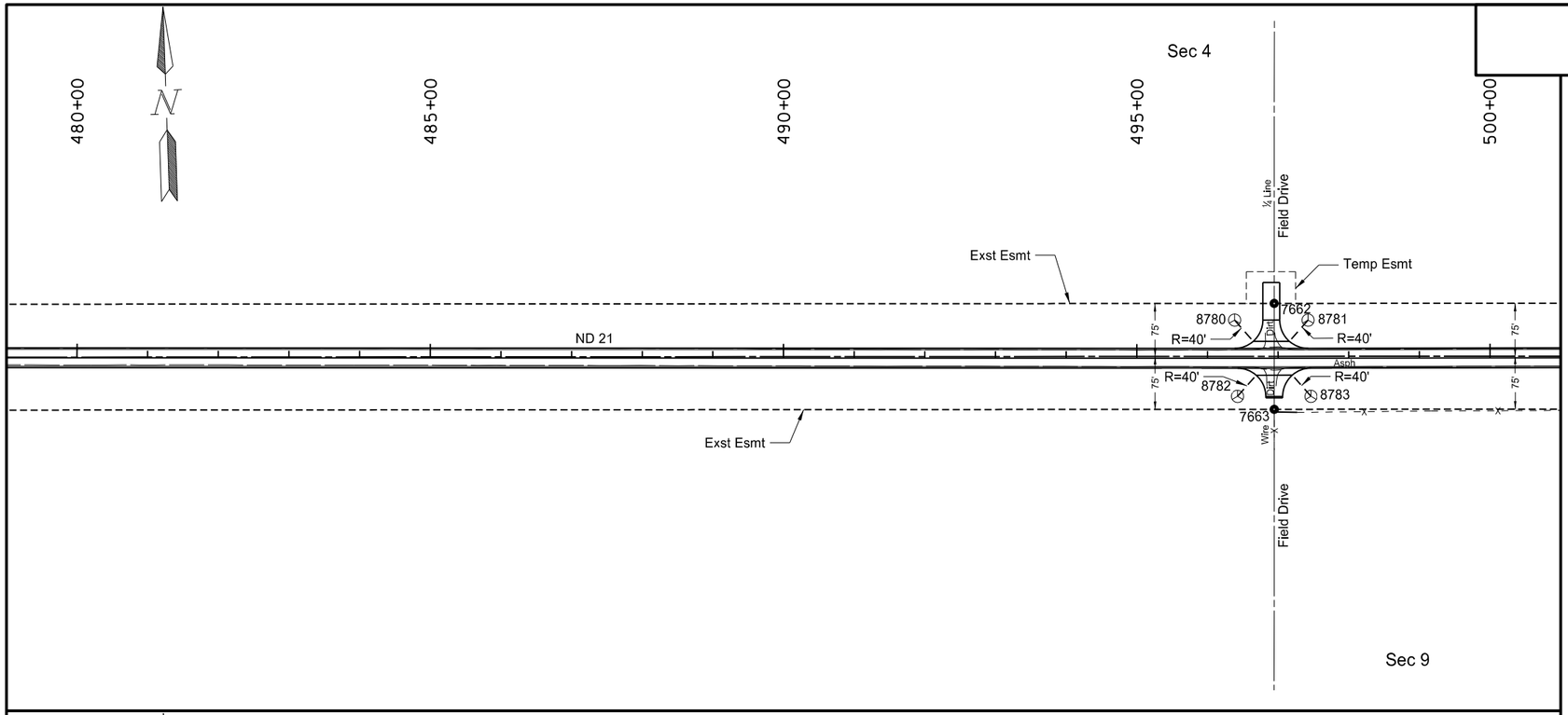
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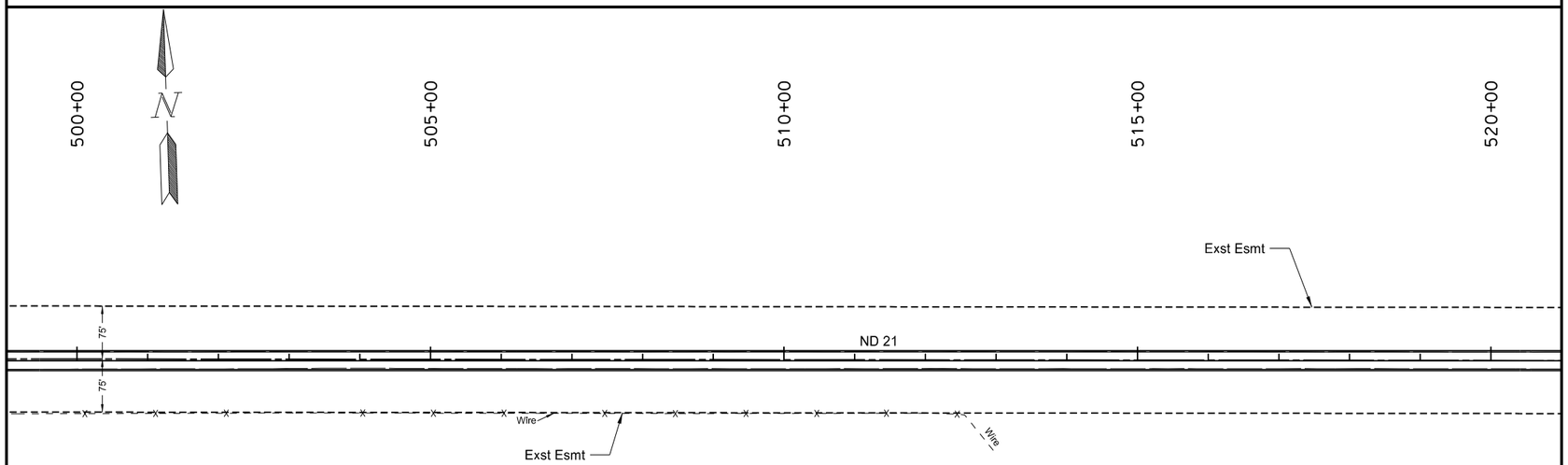
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

440+00 to 480+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	13





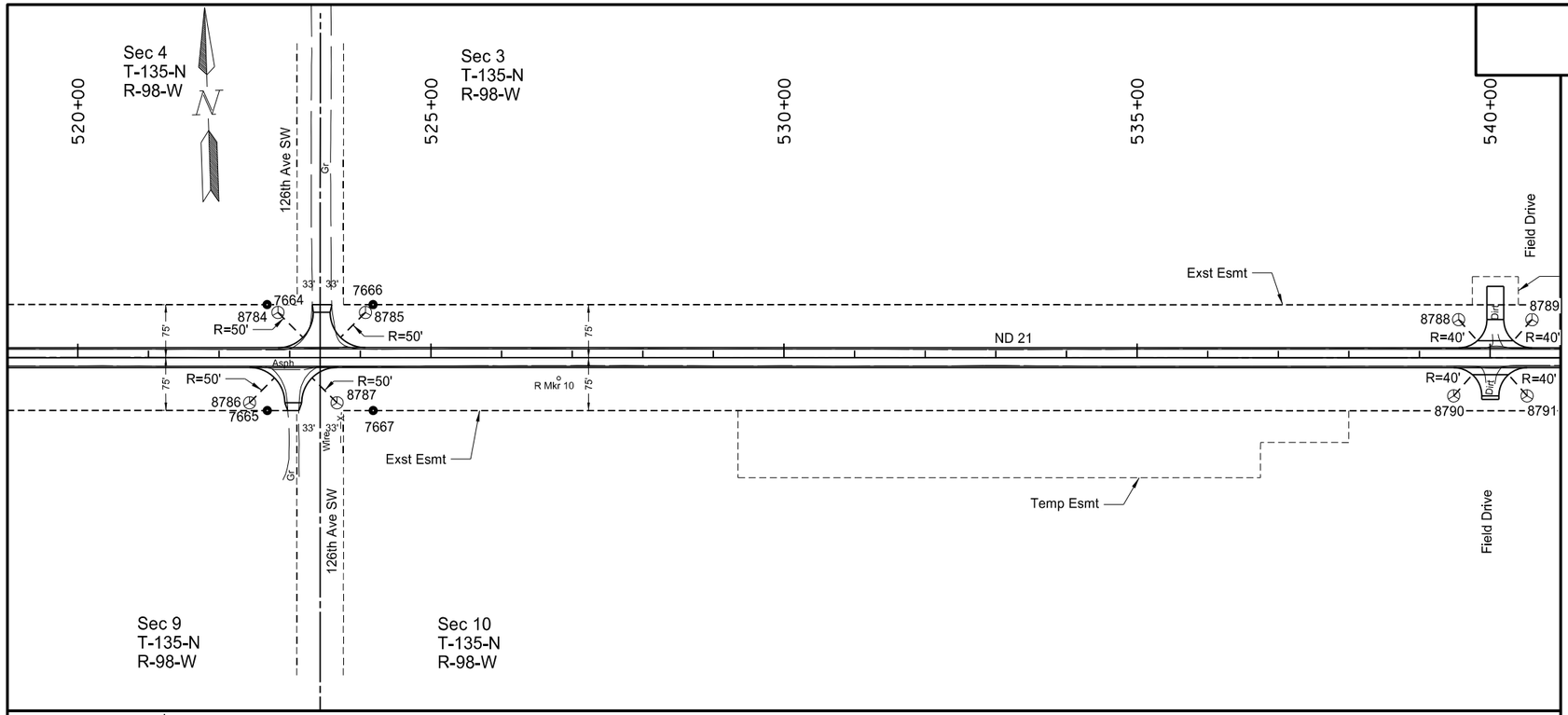
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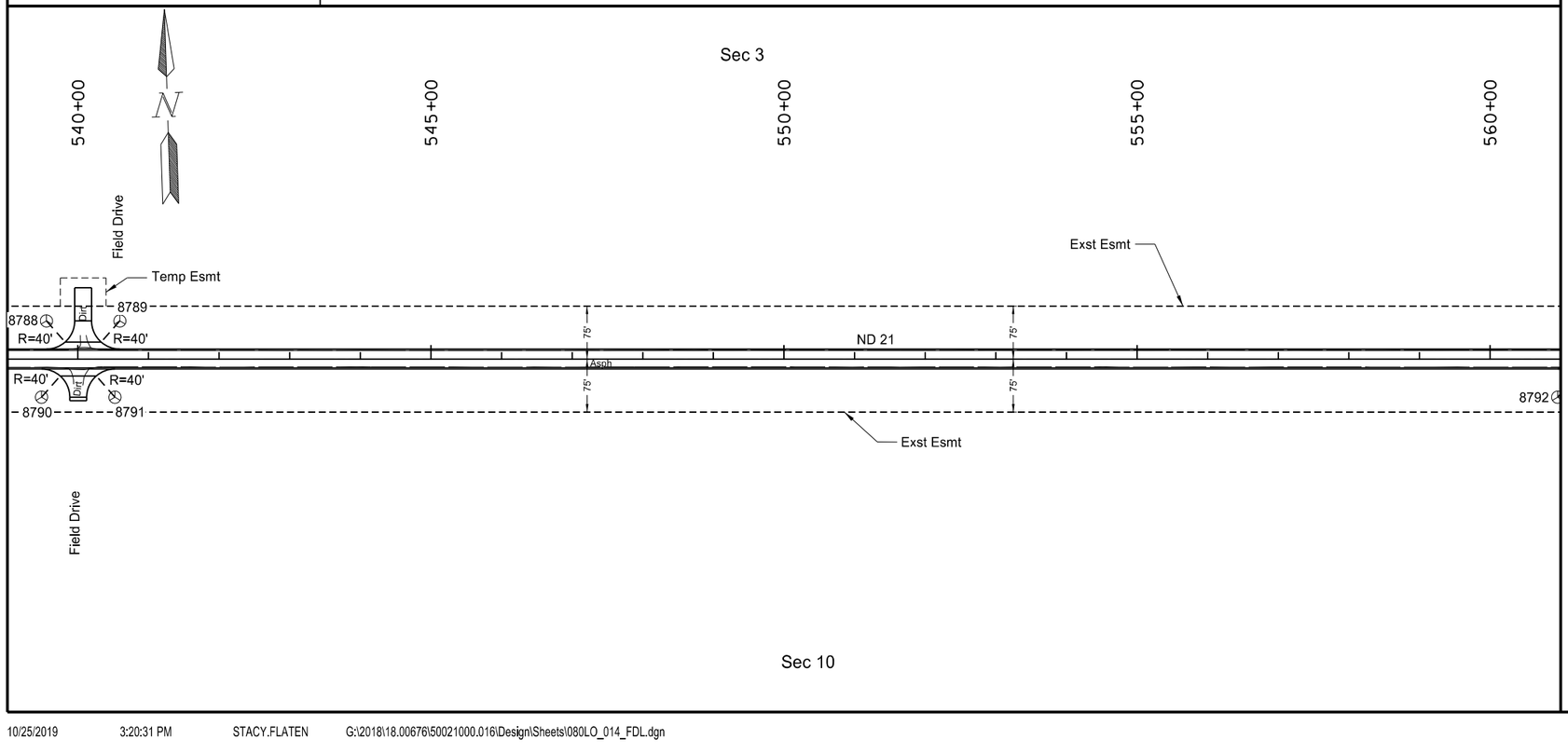
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

480+00 to 520+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	14





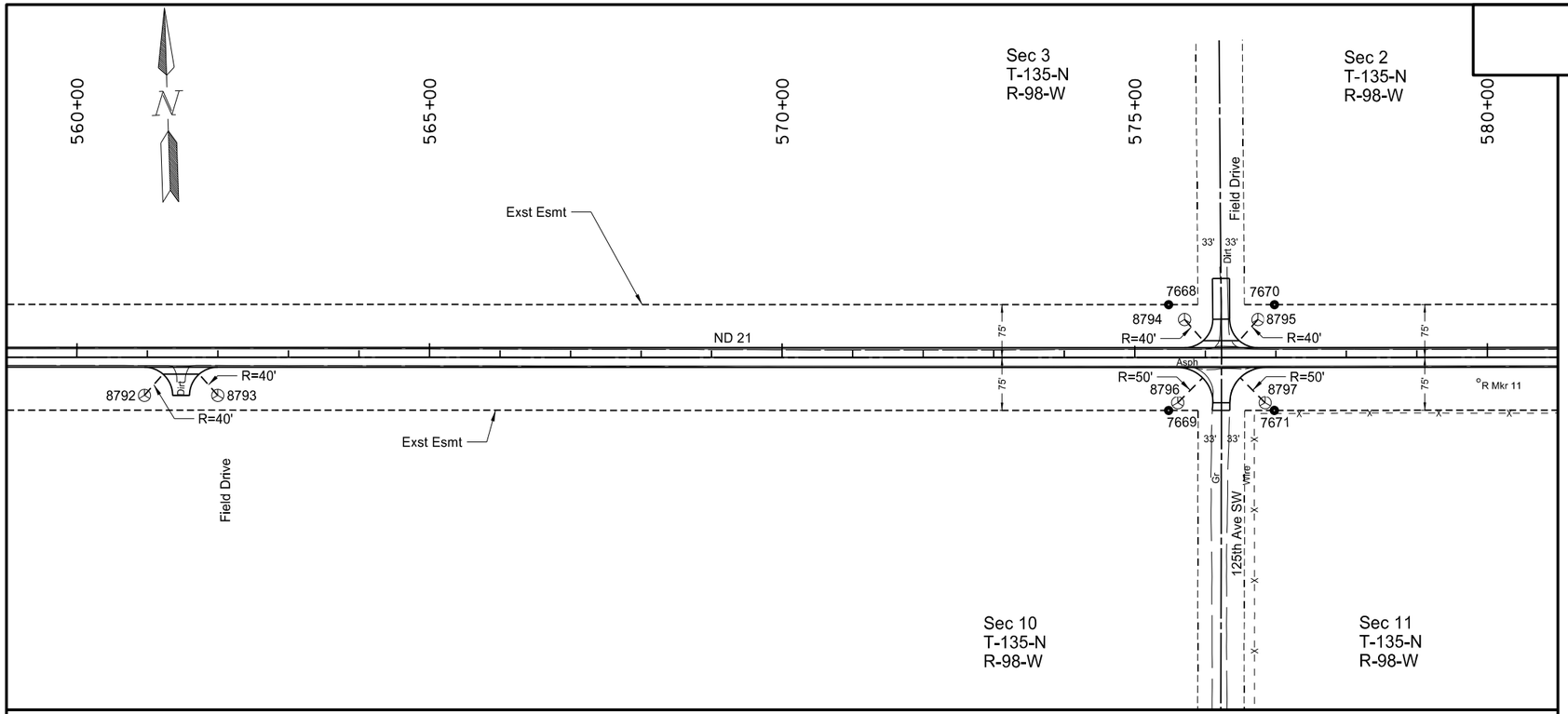
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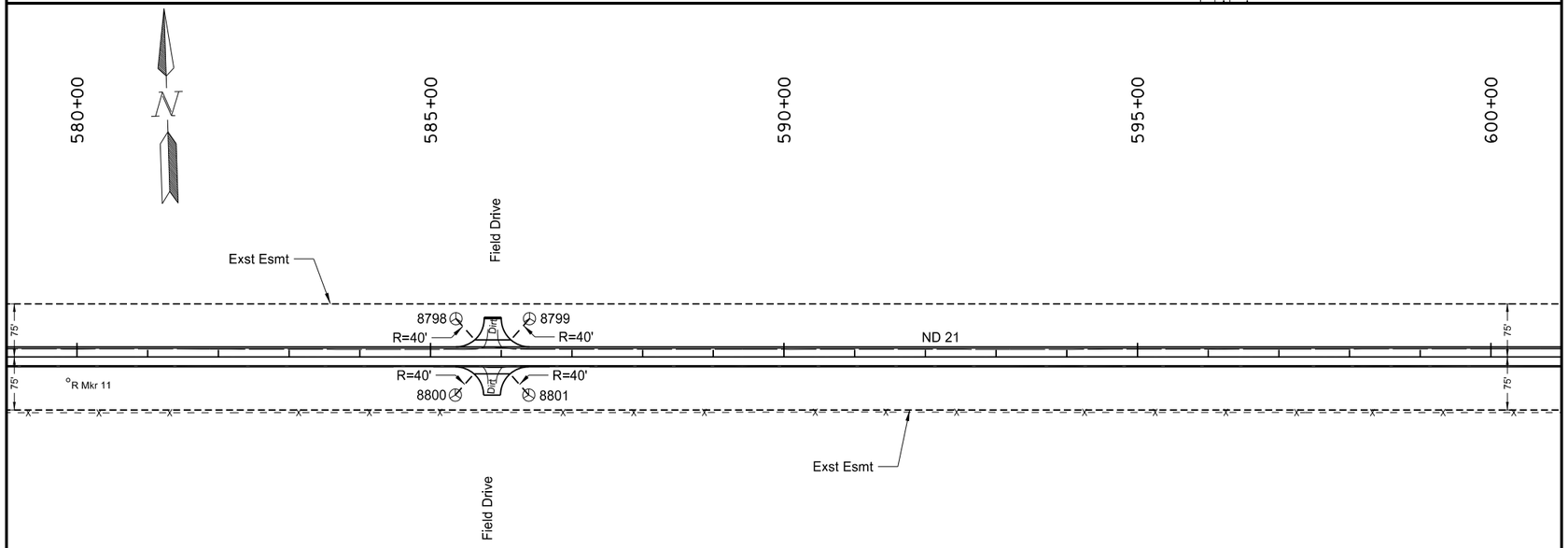
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

520+00 to 560+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	15





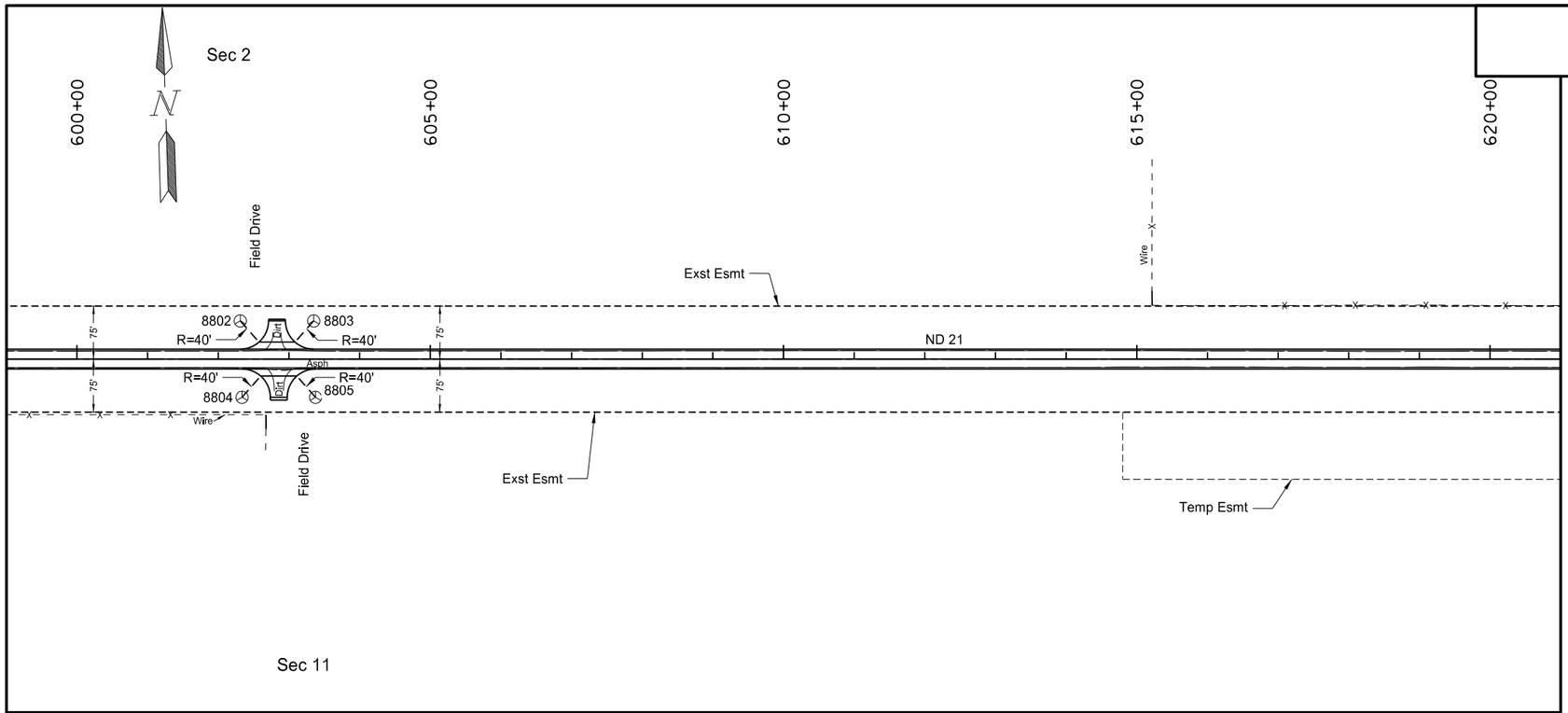
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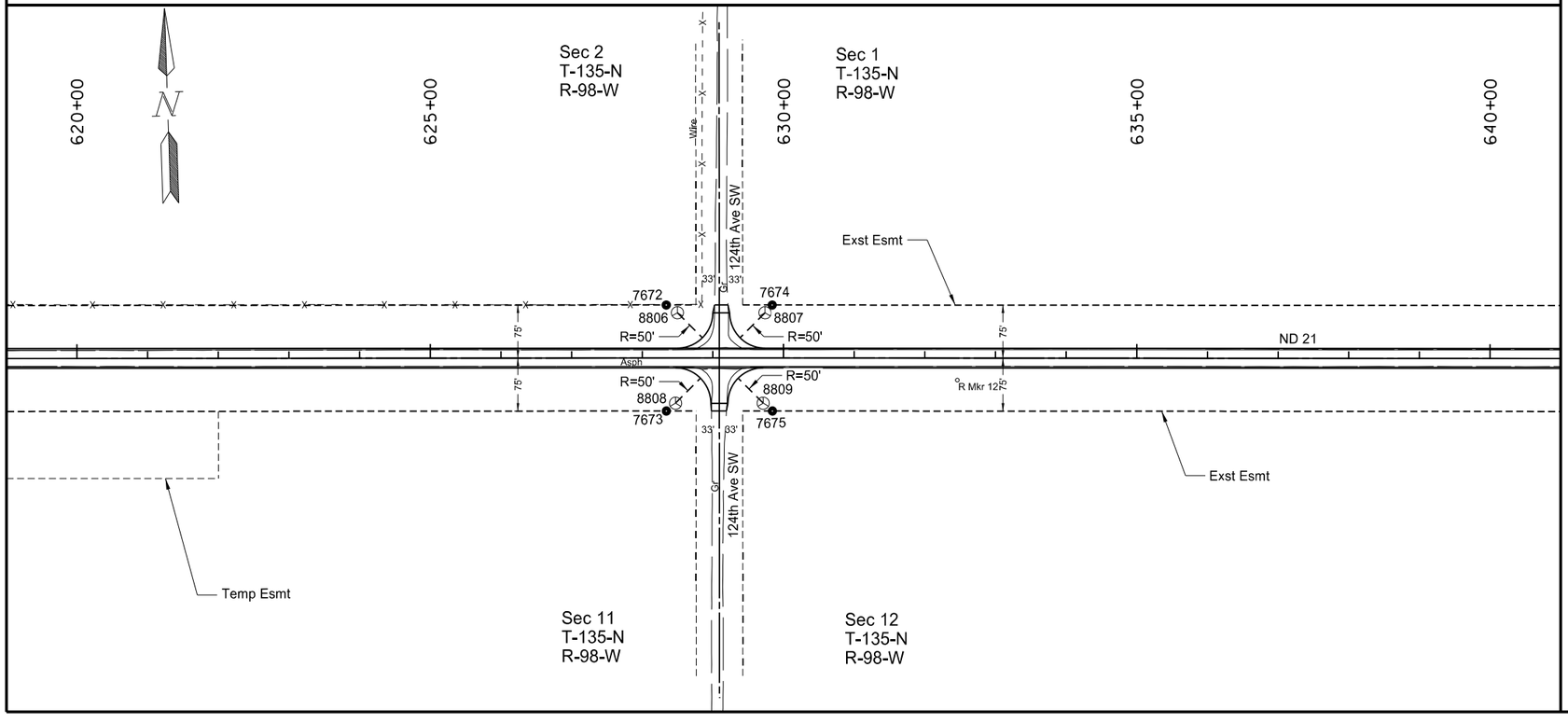
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

560+00 to 600+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	16





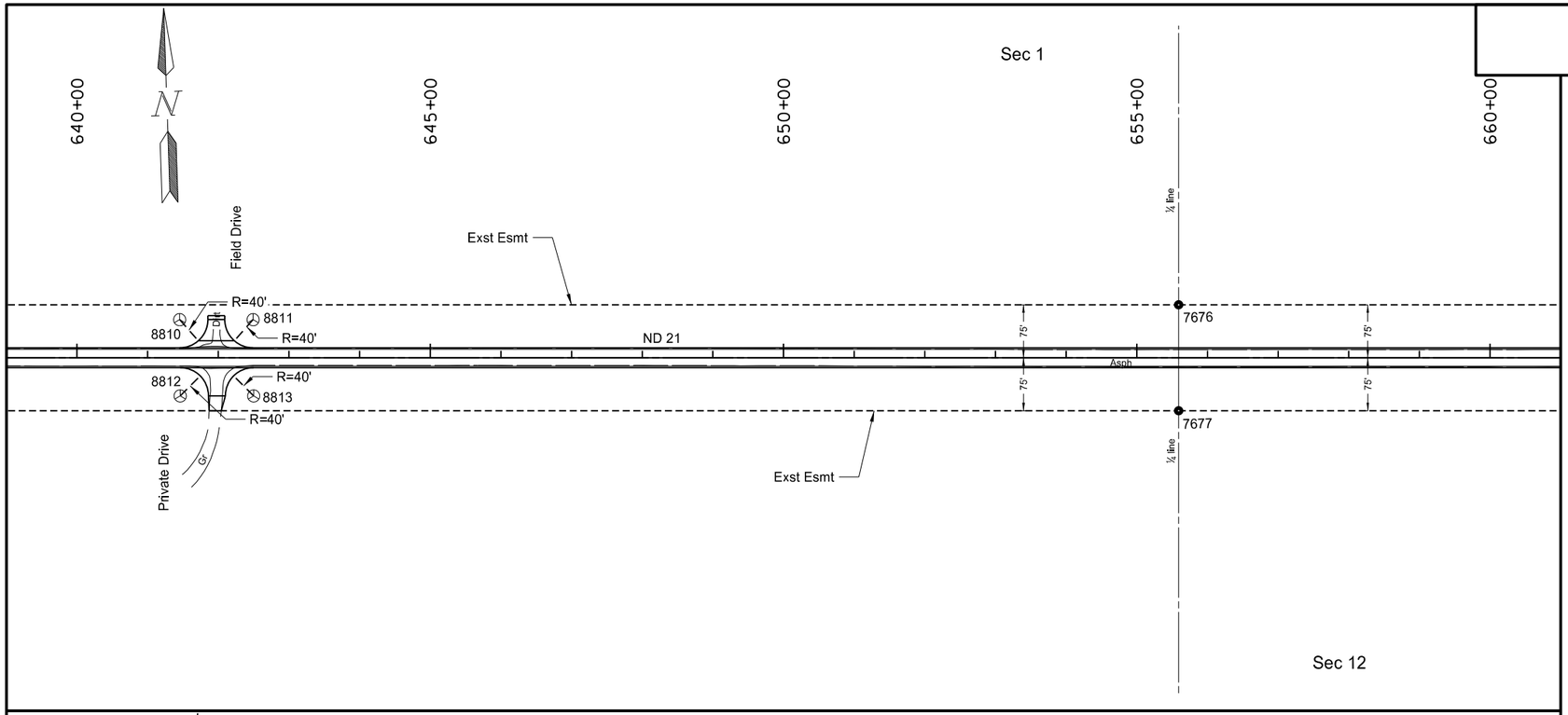
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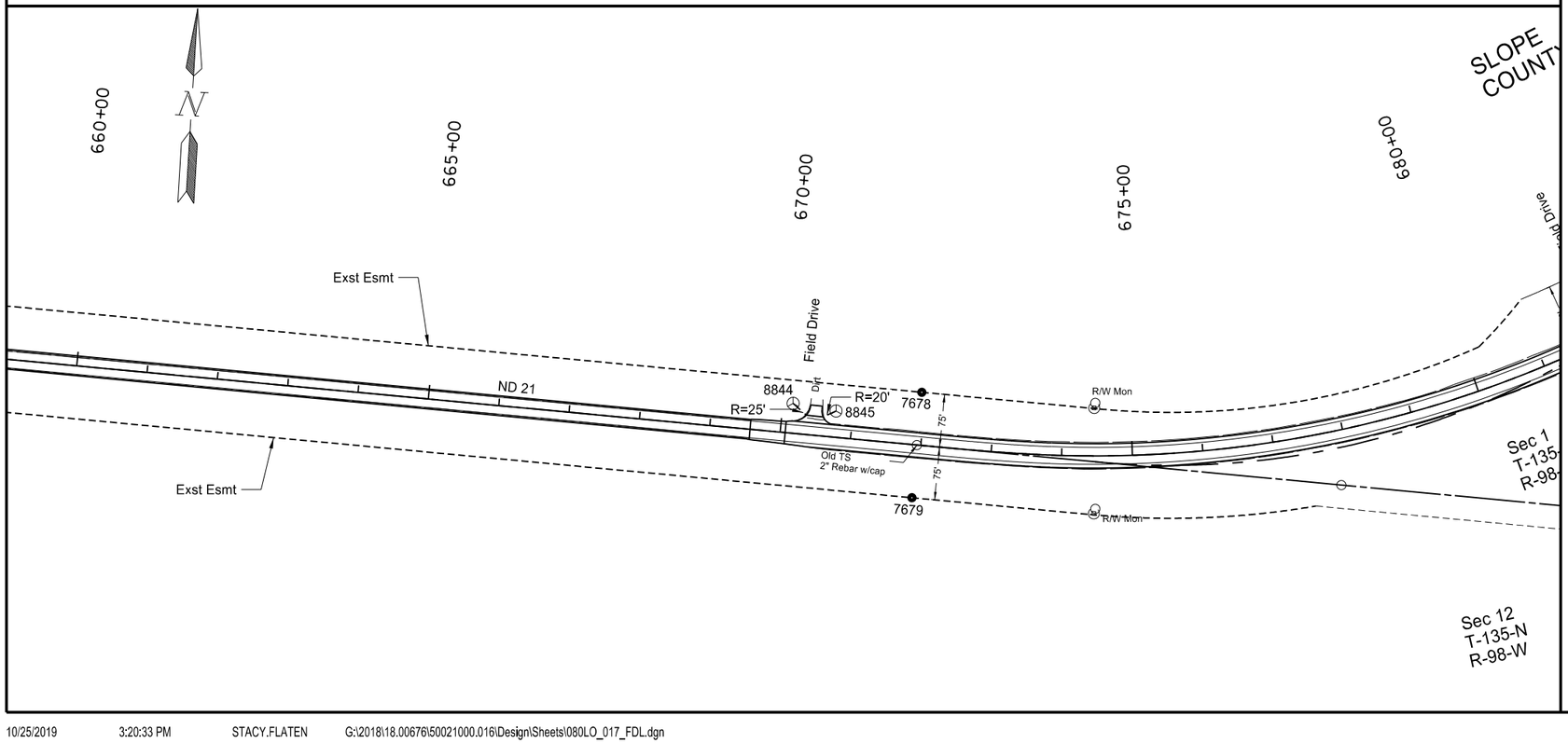
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

600+00 to 640+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	17





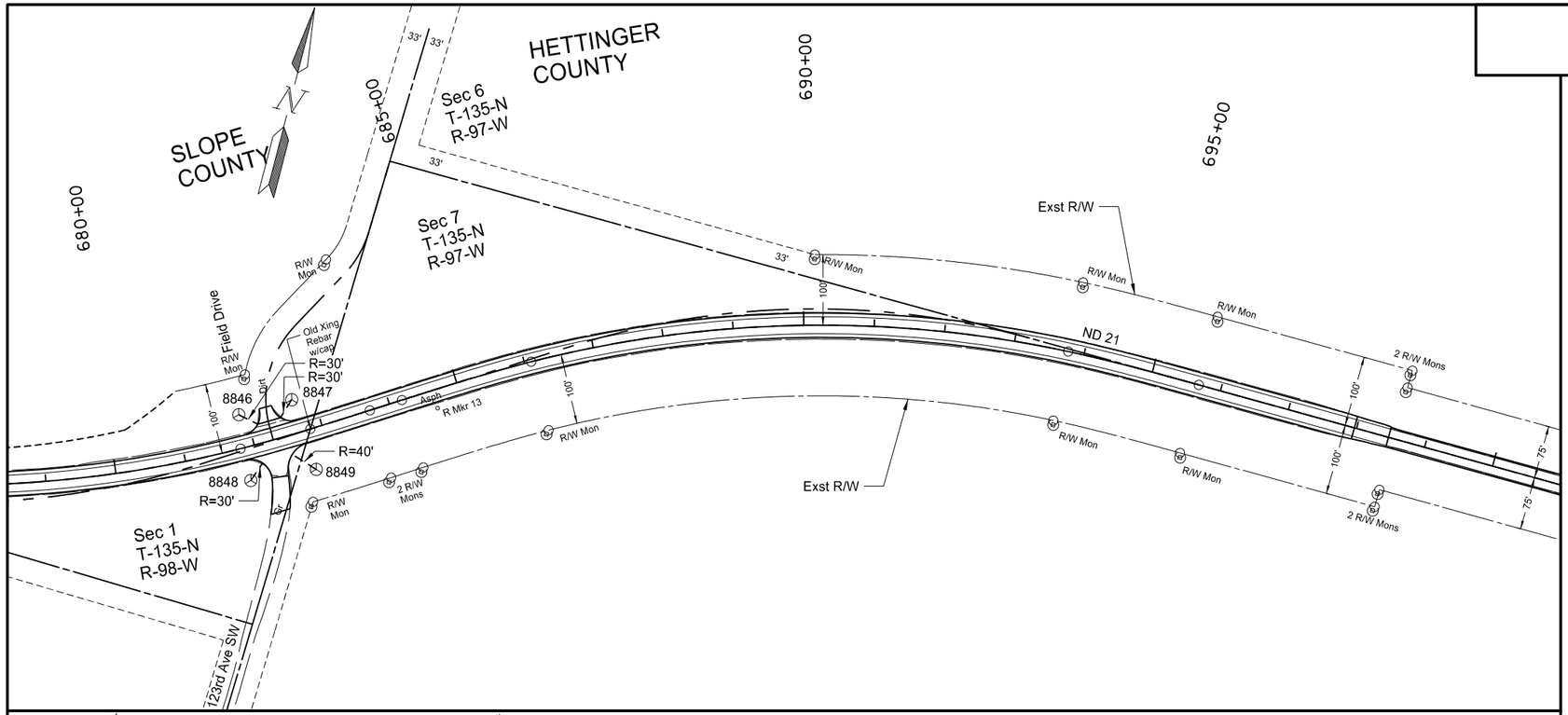
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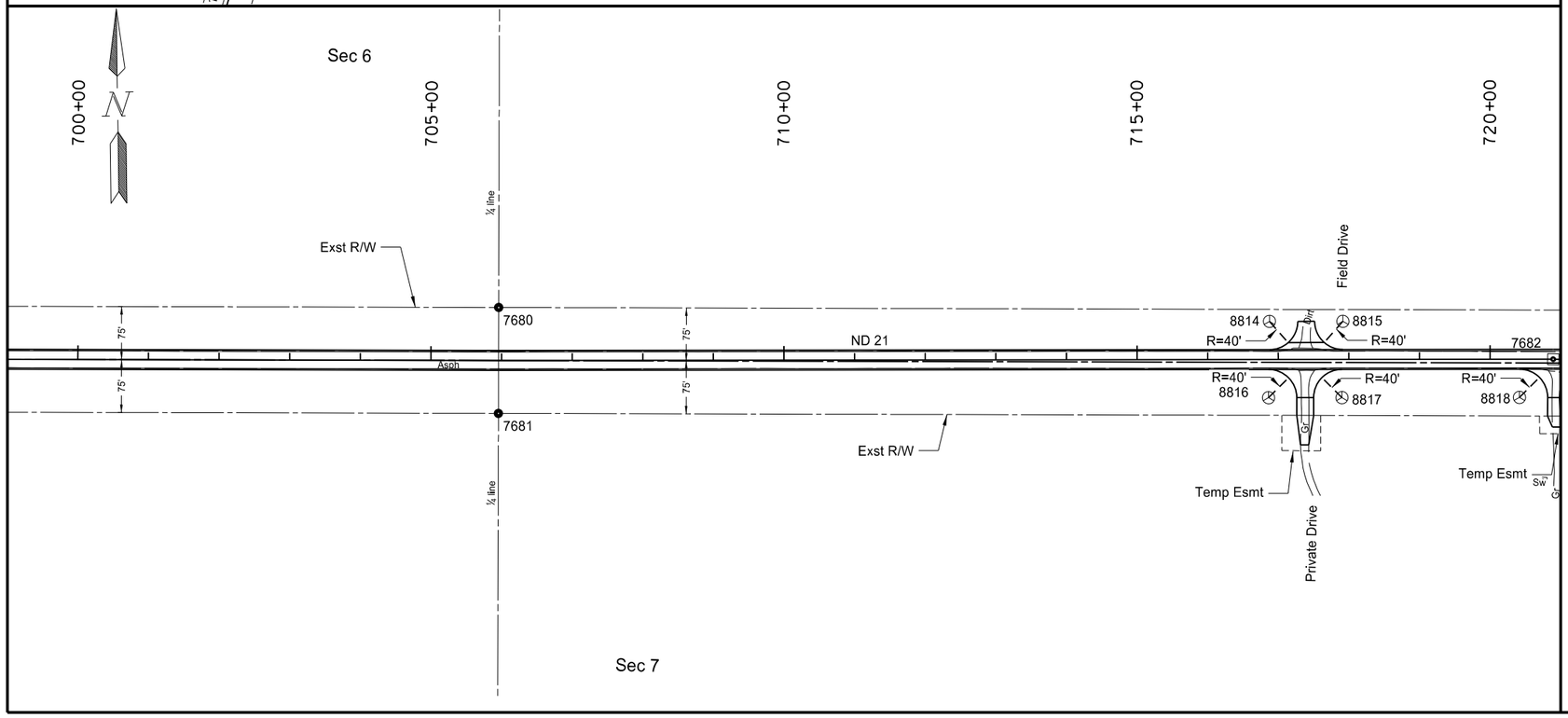
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

640+00 to 671+07.23

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	80	18





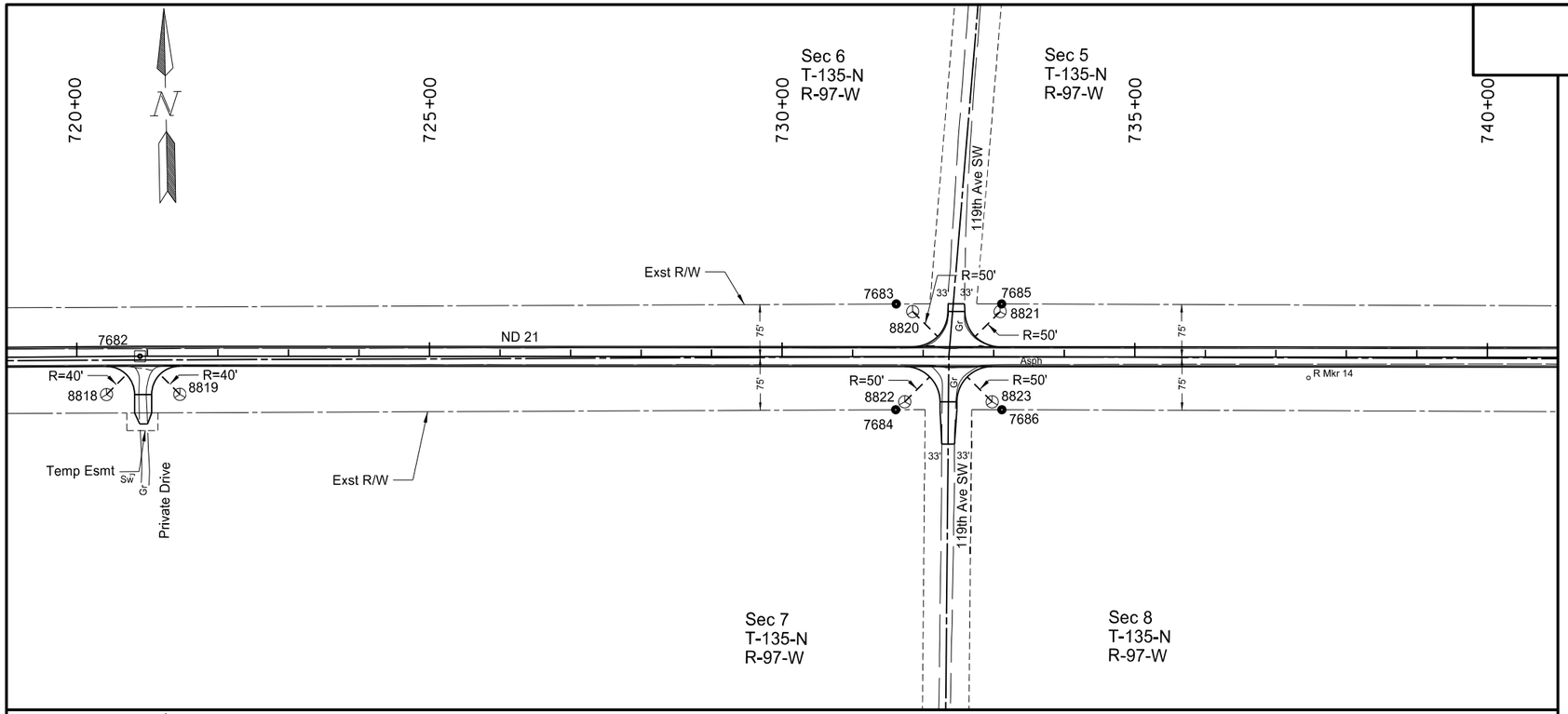
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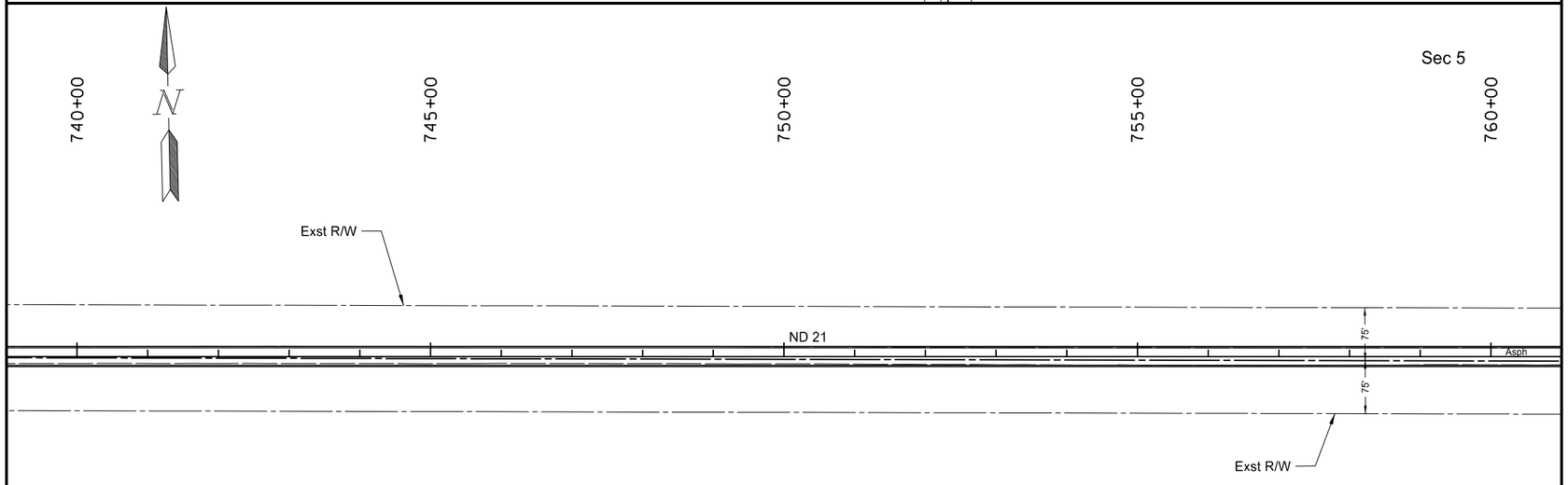
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

696+96.95 to 720+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	19





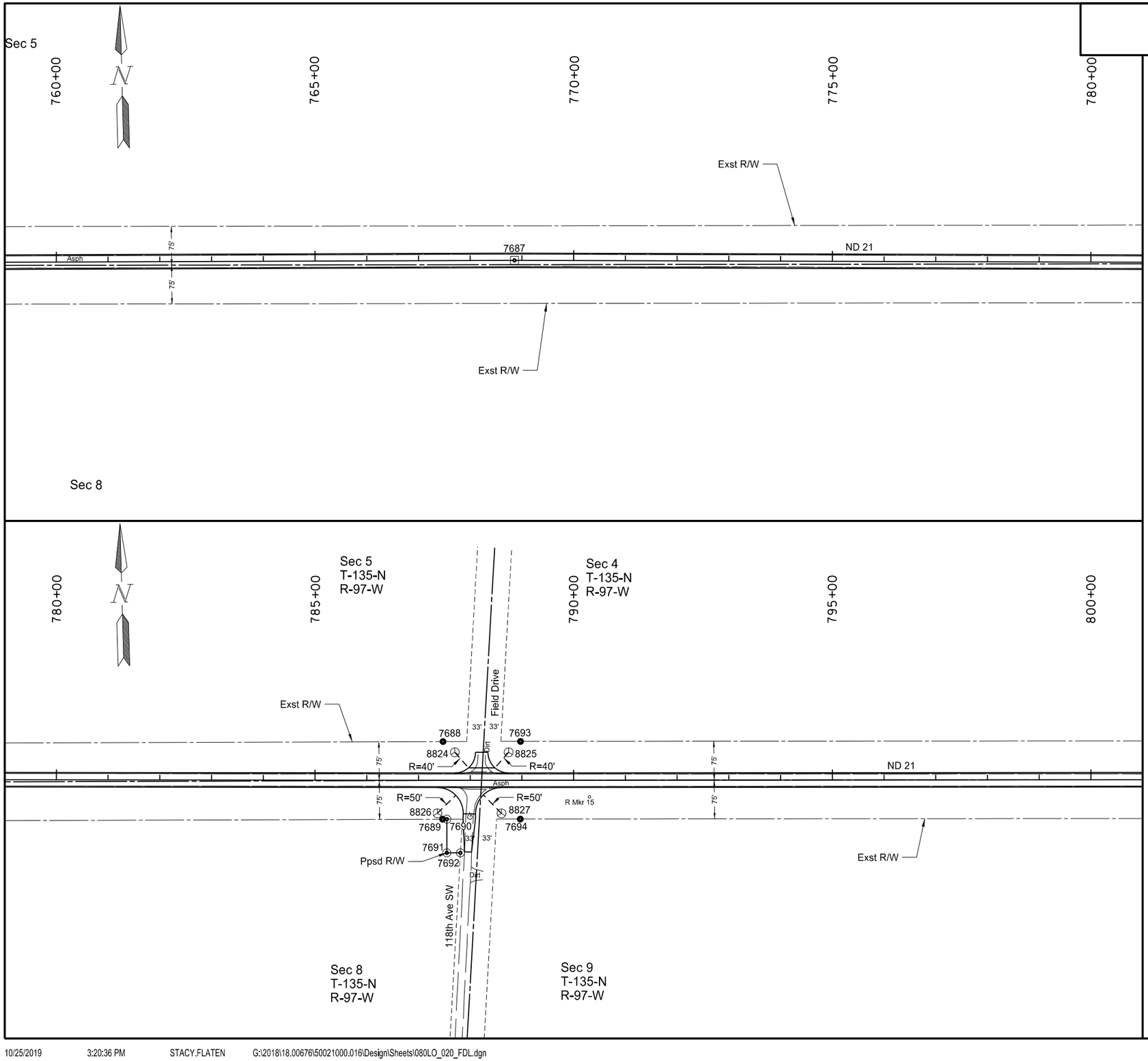
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Survey Data

ND 21
Jct 85 to N Jct 22 - New England

720+00 to 760+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	20



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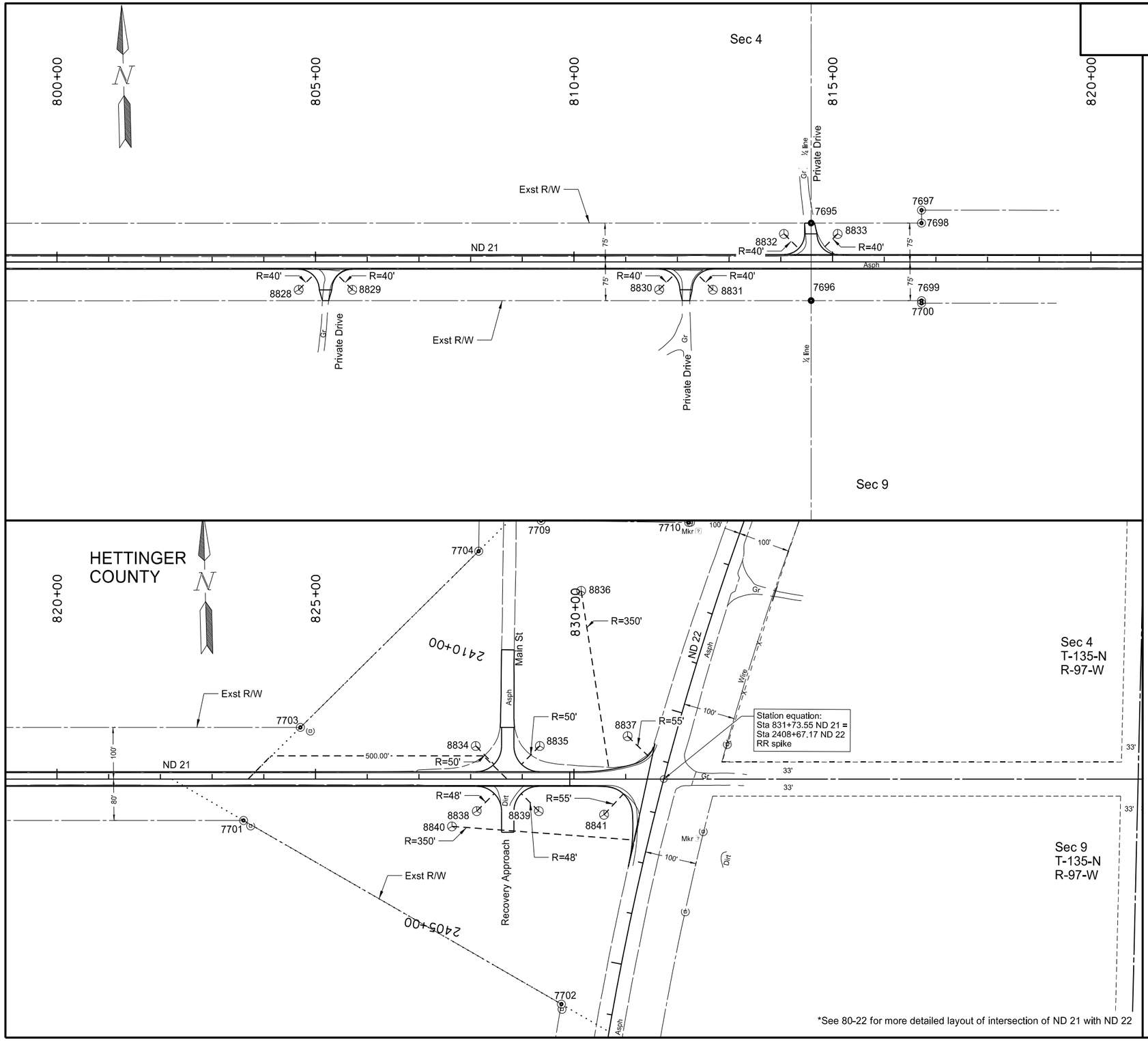
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

760+00 to 800+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	21



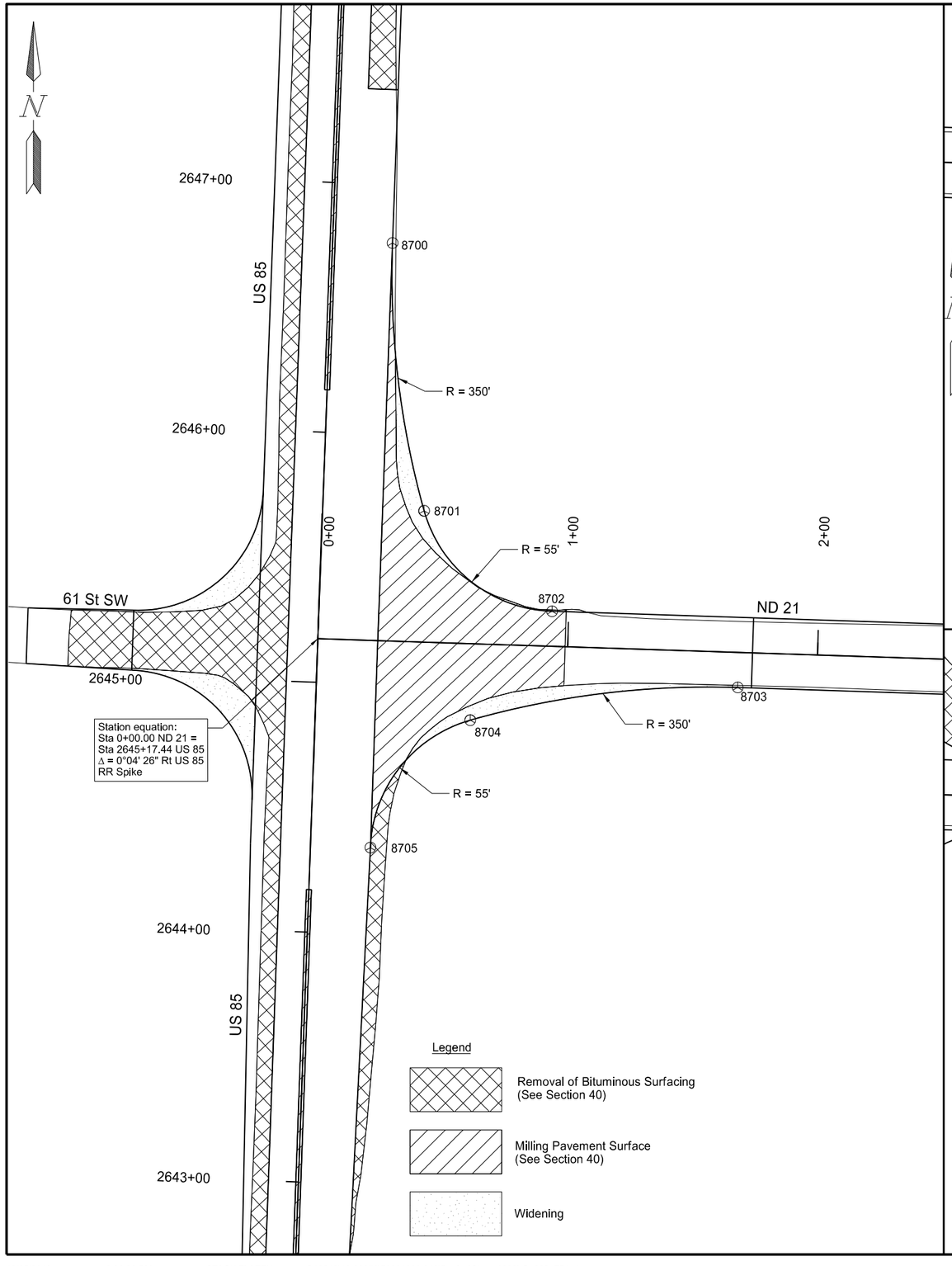
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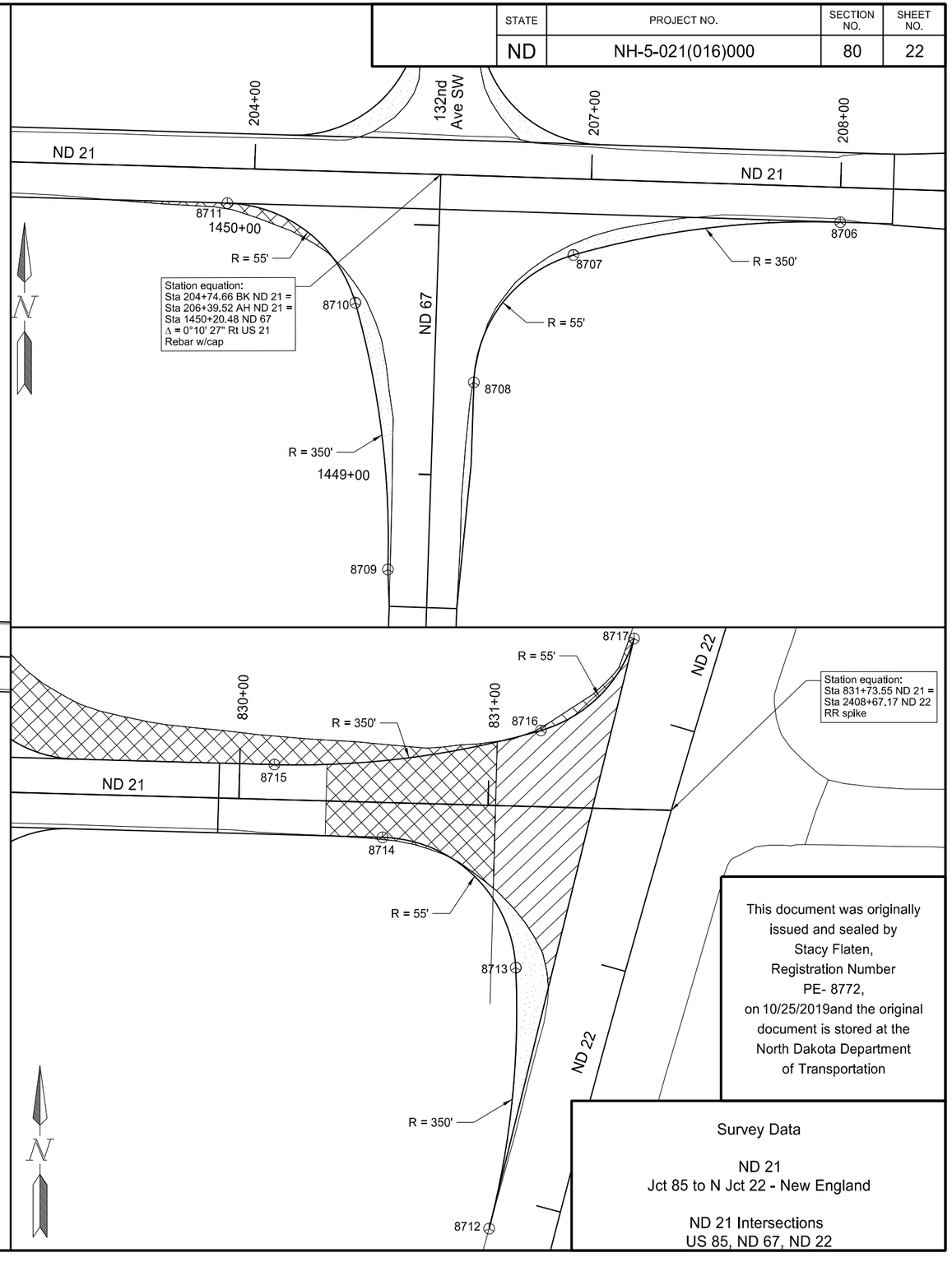
Survey Data

ND 21
Jct 85 to N Jct 22 - New England

800+00 to 831+41.88

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	22





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Survey Data

ND 21
Jct 85 to N Jct 22 - New England

ND 21 Intersections
US 85, ND 67, ND 22

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	23

Point	Northing	Easting	Station	Offset	Iron Pin R/W Monument	R/W Marker (witness post)	Iron Pin Reference Monument
7600	324655.13	1290269.44	0+98.73	405.90	X	X	
7601	324975.20	1290605.25	4+23.89	75.00	X	X	
7602	325125.37	1290602.63	4+16.35	-75.00	X	X	
7603	324968.38	1295395.77	52+12.06	-75.00		X	X
7604	324818.46	1295390.86	52+12.06	75.00		X	X
7605	324818.03	1295403.79	52+25.00	75.00	X	X	
7606	324768.06	1295402.15	52+25.00	125.00	X	X	
7607	324767.12	1295430.87	52+53.73	125.00	X	X	
7609	324813.88	1295540.47	53+61.33	75.10		X	X
7608	324963.78	1295546.02	53+62.81	-74.90		X	X
7611	324836.87	1300003.73	98+22.17	-74.95		X	X
7612	324686.93	1299999.46	98+22.28	75.05		X	X
7613	324832.45	1300153.51	99+71.91	-75.00		X	X
7614	324682.50	1300149.55	99+72.54	75.00		X	X
7615	324841.27	1300682.94	105+00.82	-100.00	X	X	
7616	324816.28	1300682.18	105+00.82	-75.00	X		
4737	324641.43	1300676.89	105+00.89	99.93		X	
7617	324701.12	1305267.93	150+87.95	-100.00		X	X
7618	324501.21	1305261.82	150+87.95	100.00			X
7620	324495.24	1305461.59	152+87.68	100.00			X
7619	324695.14	1305467.97	152+88.22	-100.00		X	X
7624	324424.76	1307873.40	177+00.52	100.00	X		
7623	324449.75	1307874.16	177+00.55	75.00	X	X	
7622	324599.68	1307878.75	177+00.76	-75.00	X	X	
7621	324624.67	1307879.51	177+00.79	-100.00	X		
7625	324374.57	1310446.89	202+74.38	75.00	X	X	
7627	324273.16	1310493.60	203+24.03	175.00	X	X	
7626	324323.13	1310495.24	203+24.21	125.01	X	X	
7628	324271.70	1310543.58	203+74.03	175.00	X	X	
7629	324520.85	1310576.50	203+99.66	-75.00		X	X
7630	324540.43	1310751.84	207+38.91	-100.00		X	X
7631	324265.57	1310743.49	207+39.42	174.99	X	X	
7632	324302.27	1310782.66	207+77.39	137.04		X	X
163	324275.22	1312770.46	227+65.03	99.98		X	
7711	324475.10	1312776.88	227+65.00	-100.00	X	X	
165	324450.17	1312776.02	227+64.95	-75.06	X	X	
7633	324433.48	1313291.72	232+80.92	-75.00		X	X
7634	324283.55	1313286.88	232+80.92	75.00		X	X
7635	324223.61	1314368.87	243+64.28	100.00	X	X	
171	324397.74	1314375.19	243+64.97	-74.25		X	
169	324247.86	1314370.40	243+65.02	75.71		X	
172	324422.69	1314376.06	243+65.04	-99.21		X	
7636	324376.45	1315832.56	258+22.28	-100.00		X	X
7637	324176.55	1315826.11	258+22.28	100.00			X
7638	324369.95	1316032.42	260+22.19	-100.00		X	X
7639	324149.41	1316045.40	260+42.38	120.00		X	X
7640	324155.61	1316467.73	264+64.28	100.00	X	X	
7641	324135.62	1316467.07	264+64.28	120.00	X	X	
7642	324182.92	1321127.88	311+21.18	-75.00		X	X
7643	324032.99	1321123.24	311+21.18	75.00		X	X
7645	324028.36	1321273.17	312+71.11	75.07		X	X
7644	324178.29	1321277.80	312+71.26	-74.93		X	X
7647	323949.07	1323839.02	338+38.18	77.58		X	X
7646	324099.01	1323843.50	338+38.18	-72.42		X	X
7649	323869.83	1326404.57	364+05.11	75.07		X	X
7648	324019.75	1326409.49	364+05.25	-74.93		X	X

Point	Northing	Easting	Station	Offset	Iron Pin R/W Monument	R/W Marker (witness post)	Iron Pin Reference Monument
7650	324014.92	1326559.21	365+54.92	-75.00		X	X
7651	323864.99	1326554.70	365+55.44	75.00		X	X
7652	323928.66	1329125.10	391+22.25	-75.00		X	X
7653	323778.74	1329120.06	391+22.25	75.00		X	X
7654	323842.19	1331694.17	416+92.78	-75.00		X	X
7655	323692.28	1331689.13	416+92.78	75.00		X	X
7657	323687.33	1331838.95	418+42.58	75.00		X	X
7656	323837.24	1331844.19	418+42.98	-75.00		X	X
7658	323671.60	1336969.74	469+71.20	-75.00		X	X
7659	323521.68	1336964.89	469+71.20	75.00		X	X
7660	323666.70	1337119.60	471+21.01	-75.07		X	X
7661	323516.78	1337114.87	471+21.39	74.93		X	X
7662	323581.64	1339691.75	496+94.57	-77.63		X (50' Bk)	X
7663	323431.72	1339686.64	496+94.57	72.37		X	X
7665	323346.65	1342258.96	522+68.14	74.93		X	X
7664	323496.58	1342263.62	522+68.00	-75.07		X	X
7667	323341.71	1342408.86	524+18.19	75.00		X	X
7666	323491.64	1342413.55	524+17.95	-75.00		X	X
7668	323323.09	1347540.85	575+48.02	-75.00		X	X
7669	323173.17	1347535.92	575+48.02	75.00		X	X
7671	323168.33	1347685.76	576+97.84	75.00		X	X
7670	323318.25	1347690.86	576+98.20	-75.00		X	X
7672	323155.59	1352824.19	628+34.10	-75.00		X	X
7673	323005.66	1352819.44	628+34.10	75.00		X	X
7674	323150.74	1352974.00	629+83.89	-75.00		X	X
7675	323000.81	1352969.46	629+84.31	75.00		X	X
7676	323065.59	1355547.97	655+59.26	-75.00		X	X
7677	322915.67	1355543.00	655+59.26	75.00		X	X
7678	323011.52	1357182.27	671+94.46	-75.03		X	X
7679	322861.60	1357177.31	671+94.46	74.97		X	X
7681	323473.83	1360448.05	705+95.74	75.00		X	X
7680	323623.80	1360450.56	705+95.74	-75.00		X	X
7684	323430.73	1363012.66	731+61.09	75.36		X	X
7683	323580.68	1363016.59	731+61.79	-74.65		X	X
7685	323577.61	1363166.00	733+11.20	-74.83		X	X
7686	323427.63	1363163.19	733+11.69	75.17		X	X
7689	323295.56	1368596.08	787+46.71	75.32		X	X
7688	323445.48	1368601.01	787+47.35	-74.68		X	X
7690	323295.36	1368604.37	787+55.00	75.29	X	X	
7691	323230.38	1368602.51	787+55.00	140.29	X	X	
7692	323229.74	1368628.78	787+81.28	140.18	X	X	
7694	323291.73	1368746.21	788+96.73	75.00		X	X
7693	323441.67	1368750.80	788+97.33	-75.00		X	X
7695	323373.51	1371311.29	814+58.68	-75.00		X (50' Bk)	X
7696	323223.56	1371307.25	814+58.68	75.00		X	X
7697	323392.67	1371525.39	816+72.18	-100.00	X	X	
7698	323367.68	1371524.73	816+72.20	-75.00	X	X	
7699	323217.73	1371520.74	816+72.30	75.00	X	X	
7700	323212.73	1371520.60	816+72.30	80.00	X	X	
7701	323193.93	1372208.76	823+60.72	80.00	X	X	
7703	323370.86	1372323.66	824+70.74	-100.00	X	X	
7704	323702.06	1372677.69	828+15.59	-440.75	X	X	
7705	324611.49	1372715.08	828+28.13	-1350.86	X	X	
7706	324610.38	1372742.06	828+55.13	-1350.48	X	X	
7707	324607.67	1372808.00	829+21.12	-1349.57	X	X	
7709	323758.02	1372800.09	829+36.42	-500.03	X	X	

Notes:
1. See Standard Drawing D-720-1 for additional
2. Station and offsets based on Alignment SCL21

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Survey Data

ND 21
Jct 85 to N Jct 22 - New England

R/W Pins and Monuments

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	24

Point	Northing	Easting	Station	Offset	Iron Pin R/W Monument	R/W Marker (witness post)	Iron Pin Reference Monument
7708	324606.56	1372834.98	829+48.12	-1349.20	X	X	
7702	322822.01	1372813.73	829+75.62	435.26	X		
*7710	323746.29	1373085.34	2413+51.43	-100.00	X		
				Total	39	107	71

Alignment Monuments						
Point	Northing	Easting	Station	Offset	Description	Monument per Standard
7610	324846.18	1297117.17	69+36.57	0	PI	X
7682	323529.13	1361942.88	720+89.44	0	PI	X
7687	323424.07	1366737.95	768+85.66	0	PI	X
					Total	3

Remove Iron Pin R/W Monuments and R/W Markers						
Point	Northing	Easting	Station	Offset	Iron Pin R/W Monument	R/W Marker (witness post)
7615	324841.27	1300682.94	105+00.82	-100.00		X
4737	324641.43	1300676.89	105+00.89	99.93		X
7623	324449.75	1307874.16	177+00.55	75.00		X
7622	324599.68	1307878.75	177+00.76	-75.00		X
7631	324265.57	1310743.49	207+39.42	174.99		X
166	324475.12	1312776.80	227+64.92	-100.02	X	X
165	324450.17	1312776.02	227+64.95	-75.06	X	
169	324247.86	1314370.40	243+65.02	75.71		X
171	324397.74	1314375.19	243+64.97	-74.25		X
172	324422.69	1314376.06	243+65.04	-99.21		X
7638	324369.95	1316032.42	260+22.19	-100.00		X
				Total	2	10

720	0110	RIGHT OF WAY MARKERS	107	EA
720	0125	ALIGNMENT MONUMENTS	3	EA
720	0130	IRON PIN R/W MONUMENTS	39	EA
720	0135	IRON PIN REFERENCE MONUMENTS	71	EA
		REMOVE IRON PIN R/W MONUMENTS - not a pay item	2	EA
		REMOVE RIGHT OF WAY MARKERS - not a pay item	10	EA

Notes:

1. See Standard Drawing D-720-1 for additional
2. Station and offsets based on Alignment SCL21
3. *Station and offset based on Alignment SCL22
4. Removal of Iron Pin R/W Monuments and removal of Right of Way Markers are included in unit price bid for "Iron Pin R/W Monuments" and "Right of Way Markers"

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R/W Pins and Monuments

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	80	25

Point	Northing	Easting	Station	Offset	Chain
8700	325222.25	1290213.94	0+24.70	-159.10	SCL21
8701	325115.16	1290226.58	0+40.84	-52.49	SCL21
8702	325074.98	1290277.76	0+93.31	-14.00	SCL21
8703	325044.53	1290352.04	1+68.54	14.00	SCL21
8704	325031.42	1290245.01	0+62.00	30.61	SCL21
8705	324980.48	1290205.06	0+23.74	82.83	SCL21
8706	324424.51	1310809.50	208+00.27	14.00	SCL21
8707	324411.35	1310702.47	206+93.73	30.61	SCL21
8708	324360.25	1310662.55	206+55.47	82.97	SCL21
8709	324285.19	1310628.07	204+58.09	159.05	SCL21
8710	324392.22	1310614.96	204+41.86	52.45	SCL21
8711	324432.19	1310563.66	203+89.41	14.00	SCL21
8712	323083.88	1372950.39	831+05.07	169.75	SCL21
8713	323188.60	1372961.06	831+12.88	64.79	SCL21
8714	323240.86	1372907.63	830+58.04	14.00	SCL21
8715	323270.06	1372864.24	830+13.87	-14.00	SCL21
8716	323283.75	1372971.20	831+20.42	-30.61	SCL21
8717	323320.60	1373008.52	831+56.72	-68.47	SCL21
8718	324580.81	1304163.44	139+87.66	54.00	SCL21
8719	324577.63	1304267.39	140+91.66	54.00	SCL21
8720	324536.03	1305300.85	151+25.91	64.00	SCL21
8721	324532.33	1305424.80	152+49.83	64.00	SCL21
8722	324651.94	1305713.67	155+35.07	-64.00	SCL21
8723	324648.32	1305837.61	156+59.07	-64.00	SCL21
8724	324533.70	1305720.22	155+45.07	54.00	SCL21
8725	324530.66	1305824.17	156+49.07	54.00	SCL21
8726	324614.80	1306642.34	164+64.43	-54.00	SCL21
8727	324611.76	1306746.29	165+68.43	-54.00	SCL21
8728	324506.85	1306639.18	164+64.43	54.00	SCL21
8729	324503.81	1306743.14	165+68.43	54.00	SCL21
8730	324595.24	1310604.61	204+25.59	-150.18	SCL21
8731	324509.43	1310590.71	204+14.20	-64.00	SCL21
8732	324489.35	1310600.89	204+24.96	-44.23	SCL21
8733	324498.53	1310618.66	204+42.45	-53.93	SCL21
8734	324505.61	1310714.65	207+02.86	-64.00	SCL21
8735	324377.21	1310562.05	203+89.41	69.00	SCL21
8736	324296.67	1310278.26	201+08.09	157.79	SCL21
8737	324358.44	1310717.52	207+10.47	83.00	SCL21
8738	324074.69	1310798.21	208+00.27	364.00	SCL21
8739	324378.44	1314345.38	243+35.80	-54.00	SCL21
8740	324375.09	1314449.32	244+39.80	-54.00	SCL21
8741	324266.46	1314467.12	244+61.10	54.00	SCL21
8742	324263.10	1314571.07	245+65.10	54.00	SCL21
8743	324289.44	1317086.78	270+78.62	-54.00	SCL21
8744	324286.04	1317190.72	271+82.62	-54.00	SCL21
8745	324240.95	1318569.09	285+61.73	-54.00	SCL21
8746	324237.73	1318673.04	286+65.83	-54.00	SCL21
8747	324161.22	1321150.35	311+44.32	-54.00	SCL21
8748	324158.06	1321254.31	312+48.37	-54.00	SCL21
8749	324043.53	1321138.42	311+36.02	64.00	SCL21
8750	324039.76	1321262.36	312+59.96	64.00	SCL21
8751	323974.27	1323785.39	337+83.82	54.00	SCL21
8752	323971.06	1323889.34	338+87.92	54.00	SCL21
8753	324003.53	1326261.56	362+57.91	-54.00	SCL21
8754	324000.22	1326365.51	363+61.91	-54.00	SCL21
8755	324008.34	1326424.61	364+20.72	-64.00	SCL21
8756	323989.54	1326454.14	364+50.83	-46.16	SCL21

Point	Northing	Easting	Station	Offset	Chain
8757	324004.27	1326548.54	365+44.61	-64.00	SCL21
8758	323890.15	1326428.53	364+28.41	54.00	SCL21
8759	323886.75	1326532.48	365+32.50	54.00	SCL21
8760	323967.39	1327348.18	373+45.04	-54.00	SCL21
8761	323963.89	1327452.12	374+49.04	-54.00	SCL21
8762	323859.54	1327341.65	373+42.14	54.00	SCL21
8763	323856.05	1327445.59	374+46.14	54.00	SCL21
8764	323896.77	1329448.26	394+46.30	-54.00	SCL21
8765	323893.27	1329552.20	395+50.30	-54.00	SCL21
8766	323788.67	1329449.45	394+51.12	54.00	SCL21
8767	323785.17	1329553.39	395+55.12	54.00	SCL21
8768	323830.76	1331706.75	417+05.74	-64.00	SCL21
8769	323826.67	1331830.69	418+29.82	-64.00	SCL21
8770	323702.70	1331706.26	417+09.56	64.00	SCL21
8771	323698.62	1331830.20	418+33.47	64.00	SCL21
8772	323692.53	1332328.32	423+31.53	54.00	SCL21
8773	323689.17	1332432.27	424+35.53	54.00	SCL21
8774	323718.50	1334868.42	448+69.46	-54.00	SCL21
8775	323715.14	1334972.36	449+73.46	-54.00	SCL21
8776	323660.18	1336982.52	469+84.34	-64.00	SCL21
8777	323656.07	1337106.45	471+08.23	-64.00	SCL21
8778	323532.26	1336978.24	469+84.20	64.00	SCL21
8779	323528.14	1337102.18	471+08.32	64.00	SCL21
8780	323559.93	1339634.84	496+38.43	-54.00	SCL21
8781	323556.48	1339738.78	497+42.54	-54.00	SCL21
8782	323451.85	1339635.31	496+42.57	54.00	SCL21
8783	323448.41	1339739.25	497+46.47	54.00	SCL21
8784	323485.02	1342278.54	522+83.28	-64.00	SCL21
8785	323481.00	1342402.47	524+07.23	-64.00	SCL21
8786	323358.38	1342234.17	522+42.99	64.00	SCL21
8787	323354.39	1342358.10	523+67.04	64.00	SCL21
8788	323420.14	1343949.47	539+55.39	-54.00	SCL21
8789	323416.72	1344053.41	540+59.39	-54.00	SCL21
8790	323312.42	1343938.95	539+48.41	54.00	SCL21
8791	323309.01	1344042.89	540+52.41	54.00	SCL21
8792	323241.87	1346085.16	560+95.78	54.00	SCL21
8793	323238.46	1346189.10	561+99.78	54.00	SCL21
8794	323301.36	1347562.72	575+70.59	-54.00	SCL21
8795	323298.00	1347666.67	576+74.66	-54.00	SCL21
8796	323183.74	1347549.17	575+60.91	64.00	SCL21
8797	323179.74	1347673.11	576+84.84	64.00	SCL21
8798	323270.72	1348527.57	585+36.00	-54.00	SCL21
8799	323267.43	1348631.52	586+40.00	-54.00	SCL21
8800	323162.81	1348523.21	585+35.05	54.00	SCL21
8801	323159.51	1348627.16	586+39.05	54.00	SCL21
8802	323217.04	1350221.71	602+30.98	-54.00	SCL21
8803	323213.75	1350325.66	603+34.98	-54.00	SCL21
8804	323109.02	1350220.86	602+33.55	54.00	SCL21
8805	323105.72	1350324.80	603+37.55	54.00	SCL21
8806	323144.10	1352839.54	628+49.81	-64.00	SCL21
8807	323140.08	1352963.48	629+73.72	-64.00	SCL21
8808	323016.25	1352832.78	628+47.10	64.00	SCL21
8809	323012.23	1352956.71	629+71.19	64.00	SCL21
8810	323091.35	1354134.00	641+45.21	-54.00	SCL21
8811	323087.91	1354237.94	642+49.21	-54.00	SCL21
8812	322983.38	1354131.21	641+46.00	54.00	SCL21
8813	322979.95	1354235.16	642+50.00	54.00	SCL21

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Approach Radius Points

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	80	26

Point	Northing	Easting	Station	Offset	Chain
8814	323588.42	1361541.79	716+87.60	-54.00	SCL21
8815	323587.05	1361645.78	717+91.60	-54.00	SCL21
8816	323480.45	1361538.94	716+86.18	54.00	SCL21
8817	323479.08	1361642.93	717+90.18	54.00	SCL21
8818	323475.77	1361894.28	720+41.55	54.00	SCL21
8819	323473.93	1361998.27	721+46.00	54.00	SCL21
8820	323569.54	1363039.62	731+85.06	-64.00	SCL21
8821	323566.83	1363163.59	733+09.03	-64.00	SCL21
8822	323441.81	1363025.71	731+73.90	64.00	SCL21
8823	323439.11	1363149.68	732+97.93	64.00	SCL21
8824	323424.16	1368623.25	787+70.19	-54.00	SCL21
8825	323421.29	1368727.21	788+74.29	-54.00	SCL21
8826	323307.17	1368586.25	787+36.55	64.00	SCL21
8827	323303.70	1368710.22	788+60.44	64.00	SCL21
8828	323270.94	1370316.79	804+67.31	54.00	SCL21
8829	323268.17	1370420.76	805+71.31	54.00	SCL21
8830	323252.38	1371013.86	811+64.63	54.00	SCL21
8831	323249.61	1371117.83	812+68.63	54.00	SCL21
8832	323353.92	1371258.09	814+06.07	-54.00	SCL21
8833	323351.11	1371362.06	815+10.04	-54.00	SCL21
8834	323325.61	1372661.66	828+09.85	-64.00	SCL21
8835	323322.22	1372785.62	829+33.85	-64.00	SCL21
8836	323619.93	1372873.80	830+13.87	-364.00	SCL21
8837	323336.58	1372955.89	831+03.67	-83.00	SCL21
8838	323199.60	1372660.22	828+11.85	62.00	SCL21
8839	323196.32	1372780.17	829+31.85	62.00	SCL21
8840	323171.32	1372611.48	827+63.91	91.60	SCL21
8841	323185.88	1372906.13	830+58.04	69.00	SCL21
8842	324356.47	1311886.65	218+79.06	47.27	SCL21
8843	324364.26	1311955.48	219+47.61	37.27	SCL21
8844	322984.73	1357001.32	670+14.50	-42.27	SCL21
8845	322977.70	1357062.59	670+75.96	-37.27	SCL21
8846	323185.07	1358116.01	681+89.76	-47.27	SCL21
8847	323224.36	1358183.35	682+69.41	-47.27	SCL21
8848	323099.05	1358155.85	681+82.84	47.27	SCL21
8849	323137.49	1358241.69	682+74.24	57.27	SCL21

Point	Northing	Easting	Station	Offset	Chain
9963	325129.95	1290279.56	0+93.31	-69.00	SCL21
9964	325209.25	1290563.70	3+74.70	-157.56	SCL21
9965	324978.51	1290260.03	0+78.74	83.00	SCL21
9966	324694.72	1290340.58	1+68.54	364.00	SCL21
9967	325001.45	1290107.75	1246+26.00	62.00	PR61STSTSW
9968	325125.37	1290112.27	1246+26.08	-62.00	PR61STSTSW
9969	325017.85	1290473.95	2+91.27	36.67	SCL21
9970	325008.79	1290485.91	3+03.51	45.34	SCL21
9971	325000.53	1290473.39	2+91.27	54.00	SCL21
9972	324997.13	1290577.33	3+95.27	54.00	SCL21
9973	325033.74	1292758.65	25+74.22	-54.00	SCL21
9974	325030.34	1292862.60	26+78.22	-54.00	SCL21
9975	324925.82	1292754.38	25+73.48	54.00	SCL21
9976	324922.42	1292858.32	26+77.48	54.00	SCL21
9977	324885.25	1293992.98	38+12.75	54.00	SCL21
9978	324881.85	1294096.93	39+16.75	54.00	SCL21
9979	324956.95	1295408.54	52+25.20	-64.00	SCL21
9980	324953.24	1295532.48	53+49.56	-64.00	SCL21
9981	324829.03	1295404.04	52+24.89	64.00	SCL21
9982	324825.32	1295527.99	53+48.54	64.00	SCL21
9983	324937.71	1295736.18	55+53.60	-54.00	SCL21
9984	324934.88	1295840.14	56+57.60	-54.00	SCL21
9985	324815.26	1300026.12	98+45.18	-54.00	SCL21
9986	324812.15	1300130.08	99+49.11	-54.00	SCL21
9987	324707.30	1300023.05	98+45.26	54.00	SCL21
9988	324704.19	1300127.00	99+49.34	54.00	SCL21
9989	324776.88	1301283.88	111+03.46	-54.00	SCL21
9990	324773.70	1301387.83	112+07.46	-54.00	SCL21
9991	324750.92	1302133.30	119+53.27	-54.00	SCL21
9992	324747.74	1302237.25	120+57.27	-54.00	SCL21
9993	324632.46	1302473.85	122+97.28	54.00	SCL21
9994	324629.28	1302577.80	124+01.28	54.00	SCL21
9996	324623.39	1302770.27	125+93.84	54.00	SCL21
9997	324620.22	1302874.22	126+97.84	54.00	SCL21

This document was originally issued and sealed by Stacy Flaten, Registration Number PE- 8772, on 10/25/2019and the original document is stored at the North Dakota Department of Transportation

Survey Data

ND 21
Jct 85 to N Jct 22 - New England

Approach Radius Points

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - ND 21; Jct US 85 to N Jct 22

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
ND 21 - SCL21 - SLOPE Station Equation ND 21 (SCL21) at US 85 (SCL85)			
ND 21 BEG Rec Sec Cor	0+00.00	325064.04	1290184.04
US 85 Rec Sec Cor	2645+17.44	325064.04	1290184.04
Rec ¼ Cor	26+43.53	324977.50	1292826.16
Rec Sec Cor	52+87.06	324890.96	1295468.28
PI	69+36.57	324846.18	1297117.17
Rec Sec Cor	98+97.22	324759.76	1300076.56
Rec Sec Cor	151+87.95	324598.11	1305364.82
Rec ¼ Cor	178+31.31	324520.90	1308007.05
Station Equation ND 21 (SCL21) at ND 67 (SCL67)			
ND 21 BK Rec Sec Cor	204+74.66	324443.69	1310649.28
ND 21 AHD Rec Sec Cor	206+39.52	324443.69	1310649.28
ND 67 Rec Sec Cor	1450+20.48	324443.69	1310649.28
Rec ¼ Cor	232+80.92	324358.51	1313289.31
Rec Sec Cor	259+22.28	324273.28	1315929.29
Rec ¼ Sec	285+64.53	324186.89	1318570.12
Rec Sec Cor	311+96.19	324105.64	1321200.52
PI	338+38.18	324026.62	1323841.34
Rec Sec Cor	364+80.18	323942.48	1326482.00
Rec ¼ Cor	391+22.25	323853.70	1329122.58
Rec Sec Cor	417+67.78	323764.71	1331766.61
Rec Sec Cor	470+46.20	323594.22	1337042.28
PI	496+94.57	323504.05	1339689.11
Rec Sec Cor	523+43.07	323419.14	1342336.25
Rec Sec Cor	576+23.02	323245.67	1347613.35
Rec Sec Cor	629+09.10	323078.25	1352896.77
Rec ¼ Cor	655+59.26	322990.63	1355545.48
TS	671+94.46	322936.53	1357179.79
SC	673+85.46	322933.88	1357370.74
PI SCS222	677+97.98	322916.57	1357782.98
CS	681+79.96	323139.04	1358130.47
Co line Xing SCS222	682+82.65	323190.50	1358219.34
ST	683+70.96	323237.45	1358294.13
TS	684+18.81	323262.89	1358334.66

NOTES: Sheet 1 of 2 (Slope County)

CURVE DATA

ARC DEFINITION

SCS222		SCS361	
PI Sta =	677+97.98	PI Sta =	690+07.55
Delta =	34° 00' 54.56"	Delta =	33° 04' 49.17"
Da =	3° 27' 05.59"	Da =	3° 27' 05.59"
R =	1660.00	R =	1660.00
LS =	191.00	LS =	191.00
SC =	3° 17' 46.44"	SC =	3° 17' 46.44"
TS =	603.52	TS =	588.74
L =	794.50	L =	767.42

Date Survey Completed 08/28/17

US PUBLIC LAND SURVEY DATA

DESC.	SEC-TWP-RGE	NORTHING	EASTING
SW Cor Sec 12	T-135-N R-100-W	319785.15	1289994.64
SW Cor Sec 1	T-135-N R-100-W	325064.04	1290184.04
NW Cor Sec 1	T-135-N R-100-W	330351.71	1290380.60
N ¼ Cor Sec 12	T-135-N R-100-W	324977.50	1292826.16
SW Cor Sec 7	T-135-N R-99-W	319612.51	1295281.32
SW Cor Sec 6	T-135-N R-99-W	324890.96	1295468.28
W ¼ Cor Sec 6	T-135-N R-99-W	327532.12	1295560.26
SW Cor Sec 5	T-135-N R-99-W	324759.76	1300076.56
SW Cor Sec 4	T-135-N R-99-W	324598.11	1305364.82
S ¼ Cor Sec 4	T-135-N R-99-W	324520.90	1308007.05
SW Cor Sec 10	T-135-N R-99-W	319161.99	1310476.00
SW Cor Sec 3	T-135-N R-99-W	324443.69	1310649.28
NW Cor Sec 3	T-135-N R-99-W	329709.02	1310816.91
S ¼ Cor Sec 3	T-135-N R-99-W	324358.51	1313289.31
SW Cor Sec 2	T-135-N R-99-W	324273.28	1315929.29
S ¼ Cor Sec 2	T-135-N R-99-W	324186.89	1318570.12
W ¼ Cor Sec 12	T-135-N R-99-W	321467.38	1321112.31
SW Cor Sec 1	T-135-N R-99-W	324105.64	1321200.52
S ¼ Cor Sec 1	T-135-N R-99-W	324024.04	1323841.26
SW Cor Sec 6	T-135-N R-98-W	323942.48	1326482.00
S ¼ Cor Sec 6	T-135-N R-98-W	323853.70	1329122.58
W ¼ Cor Sec 8	T-135-N R-98-W	321126.72	1331677.22
SW Cor Sec 5	T-135-N R-98-W	323764.71	1331766.61
W ¼ Cor Sec 5	T-135-N R-98-W	326408.02	1331853.77
SW Cor Sec 9	T-135-N R-98-W	318308.14	1336871.71
SW Cor Sec 4	T-135-N R-98-W	323594.22	1337042.28
NW Cor Sec 4	T-135-N R-98-W	328877.48	1337224.75
S ¼ Cor Sec 4	T-135-N R-98-W	323506.68	1339689.20
SW Cor Sec 3	T-135-N R-98-W	323419.14	1342336.25
SW Cor Sec 11	T-135-N R-98-W	317958.59	1347430.92
SW Cor Sec 2	T-135-N R-98-W	323245.67	1347613.35
SW Cor Sec 1	T-135-N R-98-W	323078.25	1352896.77

☐ Assumed Coordinates

☒ All coordinates on this sheet are Slope County ground coordinates.
They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = 0.9998600

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
CONTROL POINT DESCRIPTION					
Primary Control					
GPS1	325119.81	1289239.62	2767.13	2645+38	946' Lt
#5 Rebar & Cap 21-1					
GPS 2	324591.94	1302500.81	2749.78	123+25	94' Rt
#5 Rebar & Cap 21-2					
GPS 3	324256.62	1318643.22	2830.82	286+35	72' Lt
#5 Rebar & Cap 21-3					
GPS 4	323676.06	1332403.08	2774.52	424+07	68' Rt
#5 Rebar & Cap 21-4					
GPS 5	323315.97	1347590.59	2716.68	575+98	70' Lt
#5 Rebar & Cap 21-5					
GPS 6	323126.92	1358264.58	2648.43	682+88	78' Rt
#5 Rebar & Cap 21-6					
GPS 7	323284.00	1373128.80	2582.67	831+73	34' Lt
#5 Rebar & Cap 21-7					

REFERENCE MARKERS

R Mkr #	NORTHING	EASTING	STATION	O\S	ALIGNMENT
1	324846.24	1295441.27	52+62	46' RT	SCL21
2	324706.12	1300696.28	105+18	35' RT	SCL21
3	324556.38	1305697.26	155.21	32' RT	SCL21
4	324408.54	1310941.50	209+33	26' RT	SCL21
5	324232.99	1316349.02	263+43	27' RT	SCL21
6	324063.49	1321596.53	315+93	30' RT	SCL21
7	323899.66	1326844.63	368+44	31' RT	SCL21
8	323723.66	1332136.44	421+39	29' RT	SCL21
9	323553.08	1337404.90	474+10	29' RT	SCL21

All coordinates and measurements on this document derived from the International Foot definition.

INITIALIZING BENCH MARK
NDGPS Stations (OPUS)

☒ NAVD-88
☐ NGVD-29

☐ GEOID 09 ☒ GEOID 12B
☐ GEOID 12A

This document was originally issued and sealed by David Nasset, Registration Number LS- 4432 , on 10/3/18 and the original document is stored at the North Dakota Department of Transportation

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - ND 21; Jct US 85 to N Jct 22

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	81	2

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
SC	686+09.81	323361.31	1358498.32
PI SCS361	690+07.55	323575.92	1358833.29
CS	693+77.23	323565.59	1359230.97
ST	695+68.23	323566.05	1359421.95
Rec ¼ Cor	705+95.74	323548.82	1360449.31
PI	720+89.44	323529.13	1361942.88
Rec Sec Cor	732+36.44	323504.45	1363089.62
PI	768+85.66	323424.07	1366737.95
Rec Sec Cor	788+22.03	323368.70	1368673.53
Rec ¼ Cor	814+58.68	323298.54	1371309.24
Station Equation ND 22 (SCL22) at ND 21 (SCL21)			
ND 22	2408+67.17	323251.70	1373023.48
END @ ND 21	831+73.55	323251.70	1373023.48
US 85 - SCL85 - SLOPE			
Rec Sec Cor BEG	2592+35.15	319785.15	1289994.64
Rec Sec Cor @ ND 21	2645+17.44	325064.04	1290184.04
Rec Sec Cor END	2698+08.76	330351.71	1290380.60
ND 67 - SCL67 - SLOPE			
Rec Sec Cor BEG	1397+35.94	319161.99	1310476.00
Rec Sec Cor END @ ND 21	1450+20.48	324443.69	1310649.28
ND 22 - SCL22 - HETTINGER (SLOPE COUNTY COORDINATES)			
BEG PC	2375+30.02	319961.50	1373046.23
PI C360	2404+48.33	322751.32	1372189.81
END PT	2429+29.09	325085.90	1373940.88
MAINSTREET - HETTINGER (SLOPE COUNTY COORDINATES)			
BEG @ ND 21	0+00.00	323260.91	1372719.60
PI CL BRIDGE SOUTH	13+69.16	324628.91	1372775.85
END @ CL BRIDGE NORTH	15+16.76	324776.38	1372782.13

CURVE DATA

ARC DEFINITION

C360

PI Sta	=	2404+48.33
Delta	=	53° 56' 15.43"
Da	=	0° 59' 56.46"
R	=	5,735.22
T	=	2,918.31
L	=	5,399.07

US PUBLIC LAND SURVEY DATA

DESC.	SEC-TWP-RGE	NORTHING	EASTING
S ¼ Cor Sec 1	T-135-N R-98-W	322990.63	1355545.48
SE Cor Sec 1	T-135-N R-98-W	322902.51	1358209.16
W ¼ Cor Sec 7	T-135-N R-97-W	320930.84	1358136.06
SW Cor Sec 6	T-135-N R-97-W	323585.98	1358233.31
S ¼ Cor Sec 6	T-135-N R-97-W	323548.82	1360449.31
W ¼ Cor Sec 8	T-135-N R-97-W	320860.90	1363010.34
SW Cor Sec 5	T-135-N R-97-W	323504.45	1363089.62
NW Cor Sec 5	T-135-N R-97-W	328799.35	1363640.08
SW Cor Sec 9	T-135-N R-97-W	318074.23	1368230.45
SW Cor Sec 4	T-135-N R-97-W	323368.70	1368673.53
S ¼ Cor Sec 4	T-135-N R-97-W	323298.54	1371309.24
SW Cor Sec 3	T-135-N R-97-W	323226.64	1373940.81

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
CONTROL POINT DESCRIPTION					

REFERENCE MARKERS

R Mkr #	NORTHING	EASTING	STATION	O\S	ALIGNMENT
10	323378.78	1342672.97	526+81	29' RT	SCL21
11	323201.41	1347976.51	579+87	33' RT	SCL21
12	323036.00	1353232.41	632+46	31' RT	SCL21
13	323264.51	1358386.39	684+64	26' RT	SCL21
14	323460.05	1363605.03	737+47	28' RT	SCL21
15	323330.87	1368881.25	790+31	32' RT	SCL21
50	324528.25	1290202.18	2639+83	37' RT	SCL85

NOTES: Sheet 2 of 2 (Slope County)

Date Survey Completed 08/28/17

☐ Assumed Coordinates

☒ All coordinates on this sheet are Slope County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = 0.9998600

All coordinates and measurements on this document derived from the International Foot definition.

INITIALIZING BENCH MARK
NDGPS Stations (OPUS)

☒ NAVD-88
☐ NGVD-29

☐ GEOID 09 ☒ GEOID 12B
☐ GEOID 12A

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1	2	3		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE						35	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**1**	**1**	**1**		**1**	**28**	**28**
G20-1b-60	**60"x24"**	**NO WORK IN PROGRESS (Sign and installation only)**		**4**			**4**	**18**	**72**
G20-2-48	**48"x24"**	**END ROAD WORK**	**4**	**4**	**4**		**4**	**26**	**104**
G20-4-36	**36"x18"**	**PILOT CAR FOLLOW ME (Mounted to back of pilot car)**	**1**	**1**	**1**		**1**	**18**	**18**
G20-10-108	**108"x48"**	**CONTRACTOR SIGN**	**2**	**2**	**2**		**2**	**70**	**140**
G20-50a-72	**72"x36"**	**ROAD WORK NEXT __ MILES RT & LT ARROWS**	**4**	**4**	**4**		**4**	**43**	**172**
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**4**	**4**	**4**		**4**	**36**	**144**
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**4**	**4**	**4**		**4**	**59**	**236**
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 (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)						7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)						7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)						9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)						7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)						9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)						7	
R1-1-48	**48"x48"**	**STOP**	**4**	**4**			**4**	**32**	**128**
R1-1a-18	**18"x18"**	**STOP and SLOW PADDLE Back to Back**	**6**	**6**	**6**		**6**	**5**	**30**
R1-2-60	60"x60"	YIELD						29	
R1-50P-24	**24"x24"**	**TAKE TURNS**	**4**	**4**			**4**	**14**	**56**
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**12**	**12**	**12**		**12**	**30**	**360**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**10**	**10**	**4**		**10**	**39**	**390**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**14**	**14**	**8**		**14**	**10**	**140**
R3-2-48	48"x48"	NO LEFT TURN						35	
R4-1-48	**48"x60"**	**DO NOT PASS**	**2**	**2**	**2**		**2**	**39**	**78**
R4-7-48	48"x60"	KEEP RIGHT						39	
R5-1-48	48"x48"	DO NOT ENTER						35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)						14	
R7-1-12	12"x18"	NO PARKING ANY TIME						11	
R10-6-24	24"x36"	STOP HERE ON RED						16	
R11-2-48	**48"x30"**	**ROAD CLOSED (Mounted on barricade)**	**4**	**4**			**4**	**12**	**48**
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)						12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)						15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)						15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)						15	
R12-1-24	**24"x30"**	**WEIGHT LIMIT 40 TONS**	**2**	**2**	**2**		**2**	**15**	**30**
W1-3-48	**48"x48"**	**REVERSE TURN RIGHT or LEFT**	**8**	**8**			**8**	**35**	**280**
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**	**4**	**4**	**4**		**4**	**35**	**140**
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT						35	
W1-6-48	**48"x24"**	**ONE DIRECTION LARGE ARROW**	**8**	**8**			**8**	**26**	**208**
W3-1-48	**48"x48"**	**STOP AHEAD**	**2**	**2**			**2**	**35**	**70**
W3-3-48	48"x48"	SIGNAL AHEAD						35	
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**6**	**6**	**6**		**6**	**35**	**210**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**10**	**10**	**8**		**10**	**35**	**350**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT						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						35	
W8-1-48	**48"x48"**	**BUMP**	**4**	**4**	**4**		**4**	**35**	**140**
W8-3-48	48"x48"	PAVEMENT ENDS						35	
W8-7-48	48"x48"	LOOSE GRAVEL						35	
W8-11-48	**48"x48"**	**UNEVEN LANES**			**2**		**2**	**35**	**70**
W8-12-48	**48"x48"**	**NO CENTER LINE**			**2**		**2**	**35**	**70**
W8-17-48	**48"x48"**	**SHOULDER DROP-OFF SYMBOL**	**2**	**2**			**2**	**35**	**70**
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY						35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT or _ MILE**	**2**	**2**	**2**		**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT or _ MILE**	**2**	**2**	**2**		**2**	**35**	**70**
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						35	
W13-1P-30	**30"x30"**	**__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)**	**8**	**8**			**8**	**14**	**112**
W14-3-64	**64"x48"**	**NO PASSING ZONE**	**2**	**2**			**2**	**28**	**56**
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)						10	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**10**	**10**	**10**		**10**	**35**	**350**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE						35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE						35	
W20-4-48	**48"x48"**	**ONE LANE ROAD AHEAD or __ FT or _ MILE**	**6**	**6**			**6**	**35**	**210**
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE						35	
W20-7-48	**48"x48"**	**FLAGGER**	**6**	**6**	**6**		**6**	**35**	**210**
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back						5	
W20-52P-54	**54"x12"**	**NEXT __ MILES (Mounted on warning sign post)**	**2**	**2**	**2**		**2**	**12**	**24**
W21-1-48	48"x48"	WORKERS						35	
W21-2-48	**48"x48"**	**FRESH OIL**			**2**		**2**	**35**	**70**

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1	2	3		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE						35	
W21-5-48	**48"x48"**	**SHOULDER WORK**	**2**	**2**	**2**		**2**	**35**	**70**
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED						35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE						35	
W21-6-48	48"x48"	SURVEY CREW						35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT						35	
W21-51-48	**48"x48"**	**MATERIAL ON ROADWAY**	**1**	**1**			**1**	**35**	**35**
W21-52-48	**48"x48"**	**PAVEMENT BREAKS**	**2**	**2**	**2**		**2**	**35**	**70**
W21-53-48	**48"x48"**	**RUMBLE STRIPS AHEAD**	**4**	**4**	**4**		**4**	**35**	**140**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK						35	
	18"x18"	**ORANGE BLANK SIGN**	**82**	**82**	**82**		**82**	**12**	**984**

SPECIAL SIGNS

SIGN NUMBER	SIGN SIZE	DESCRIPTION							

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS 6253**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. 1	2	3		TOTAL QUANTITY
704-0100	**FLAGGING**	MHR	**1750**	**1750**	**500**		**4000**
704-1041	**ATTENUATION DEVICE-TYPE B-55**	EA	**3**	**3**			**3**
704-1048	**PORTABLE RUMBLE STRIPS**	EACH	**4**	**4**	**4**		**4**
704-1050	TYPE I BARRICADES	EACH					
704-1052	**TYPE III BARRICADES**	EACH	**20**	**20**			**20**
704-1060	**DELINEATOR DRUMS**	EACH	**74**	**74**	**65**		**74**
704-1065	TRAFFIC CONES	EACH					
704-1067	**TUBULAR MARKERS**	EACH	**108**	**108**	**43**		**108**
704-1070	DELINEATOR	EACH					
704-1072	FLEXIBLE DELINEATORS	EACH					
704-1080	**STACKABLE VERTICAL PANELS**	EACH	**200**	**200**			**200**
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					
704-1185	**PILOT CAR**	HR	**875**	**875**	**250**		**2000**
704-1500	**OBLITERATION OF PVMT MK**	SF	**2249**	**884**			**3133**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF					
704-3510	**PRECAST CONCRETE MED BARRIER - STATE FURNISHED**	EACH	**92**	**115**			**115**
762-0200	RAISED PAVEMENT MARKERS	EACH					
762-0420	SHORT TERM 4IN LINE - TYPE R	LF					
762-0430	**SHORT TERM 4IN LINE - TYPE NR**	LF			**154689**		**154689**

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
http://www.dot.nd.gov/

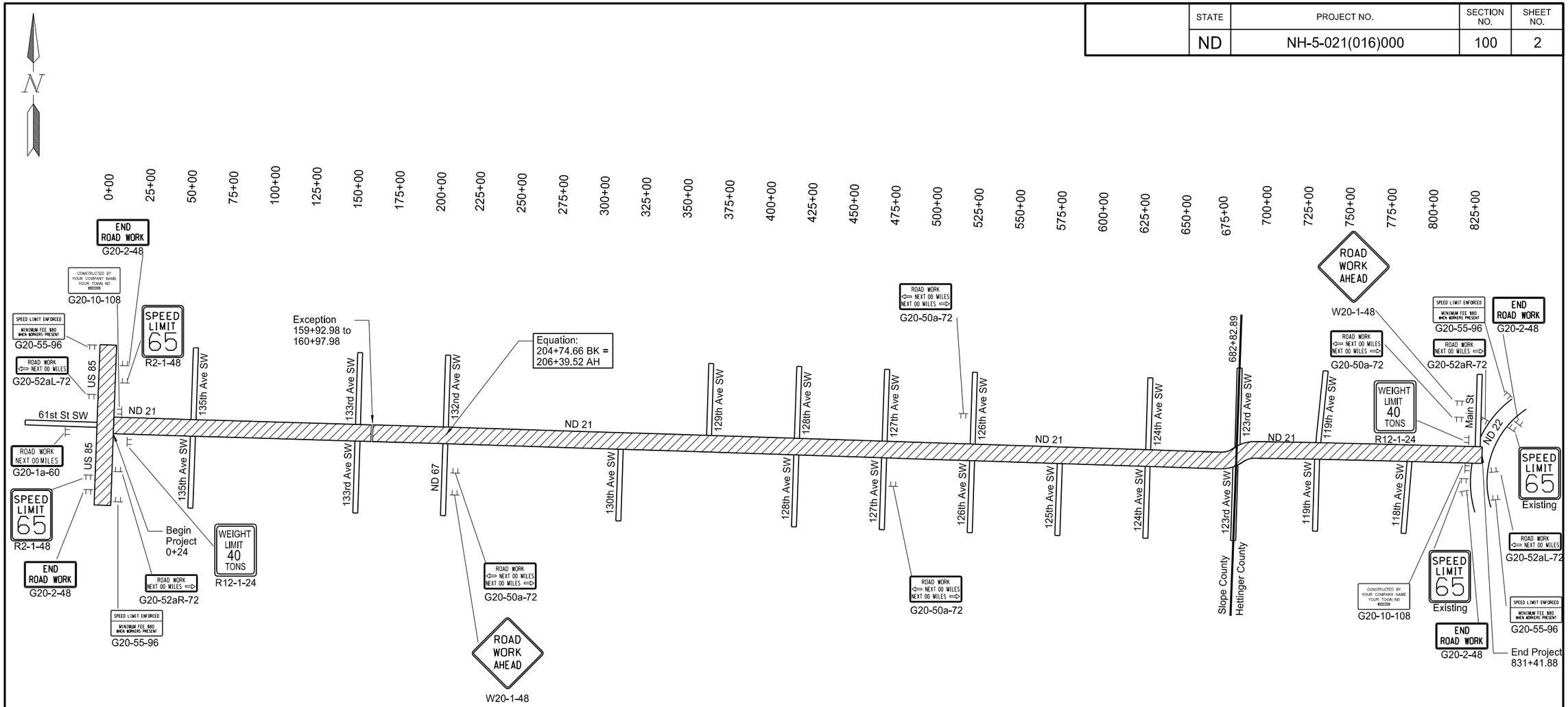
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Traffic Control Devices List

ND 21

Jct 85 to N Jct 22 - New England

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	100	2



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LEGEND

Work Zone

Work Zone Traffic Control

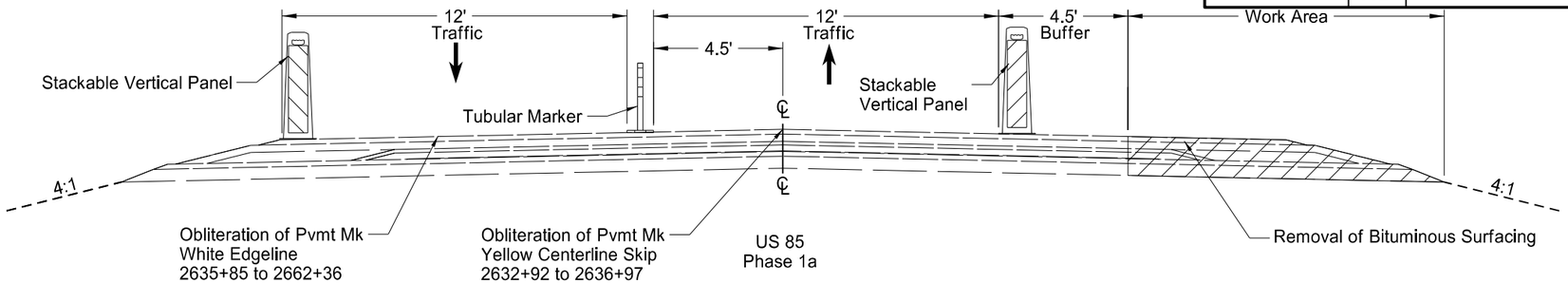
ND 21

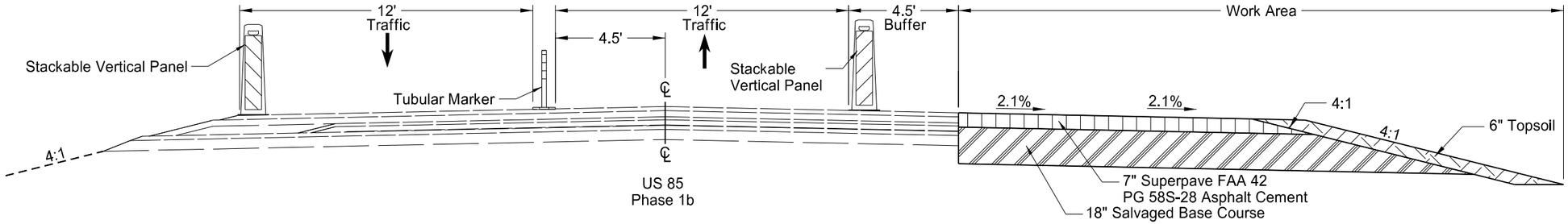
Jct 85 to N Jct 22 - New England

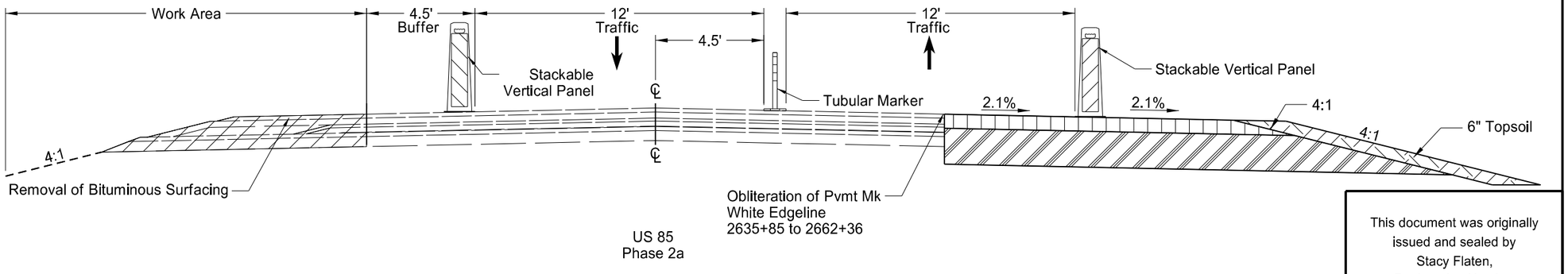
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	100	3







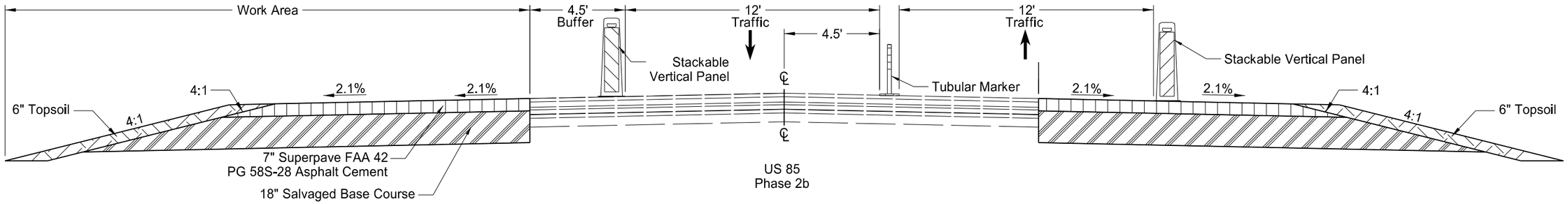
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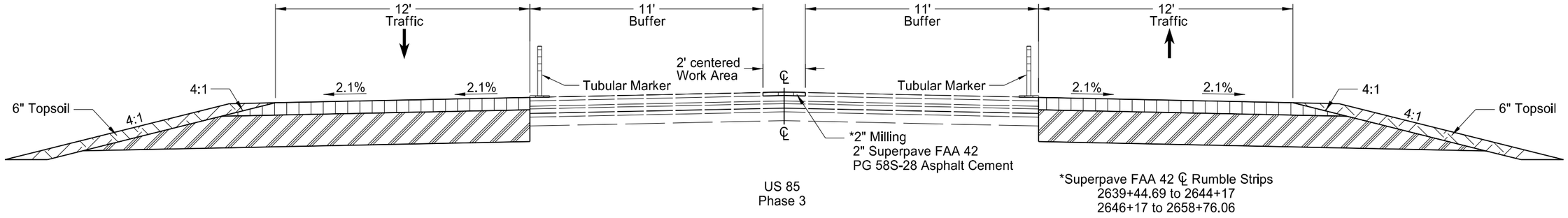
Work Zone Traffic Control
Typical Sections

ND 21
Jct 85 to N Jct 22 - New England

US 85 and ND 21 Intersection
Phases 1a, 1b, and 2a

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	100	4





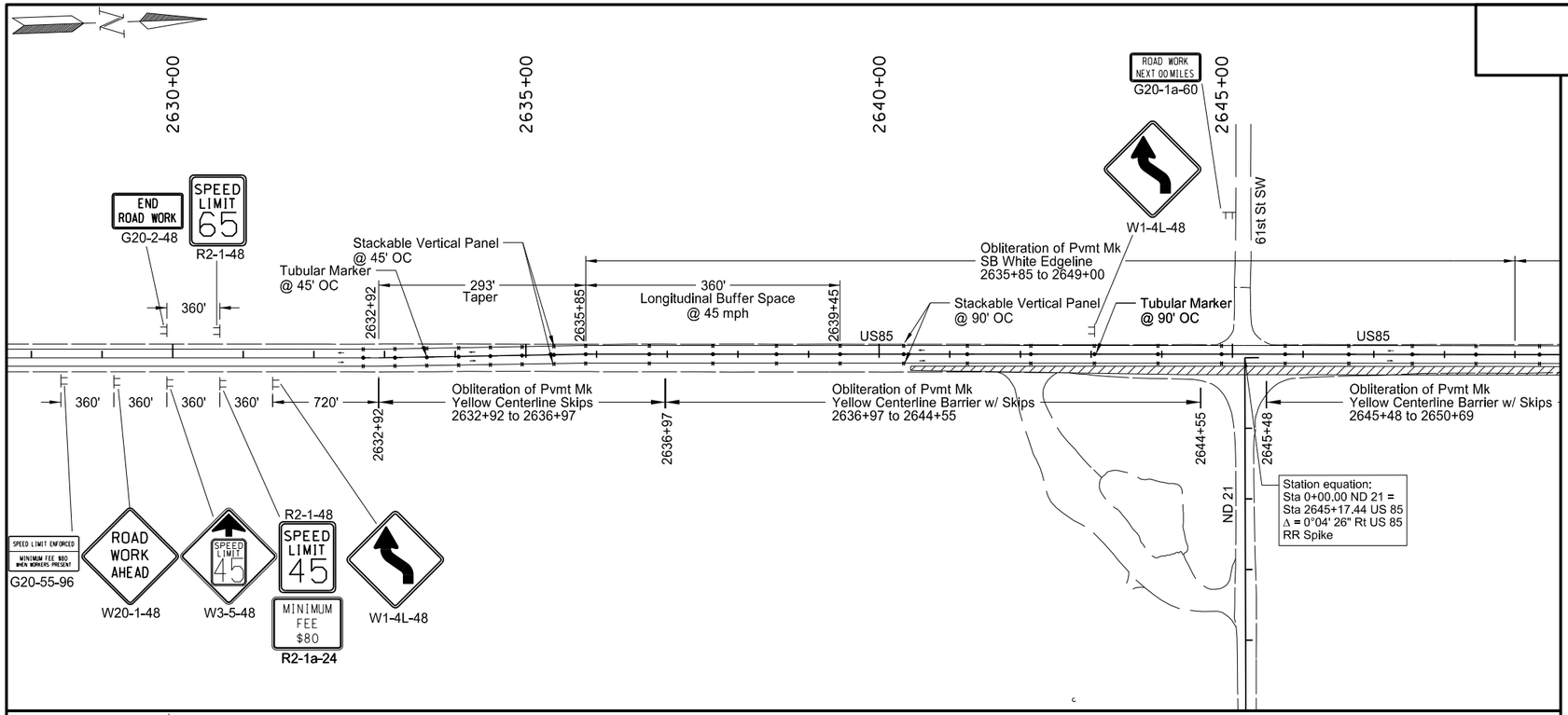
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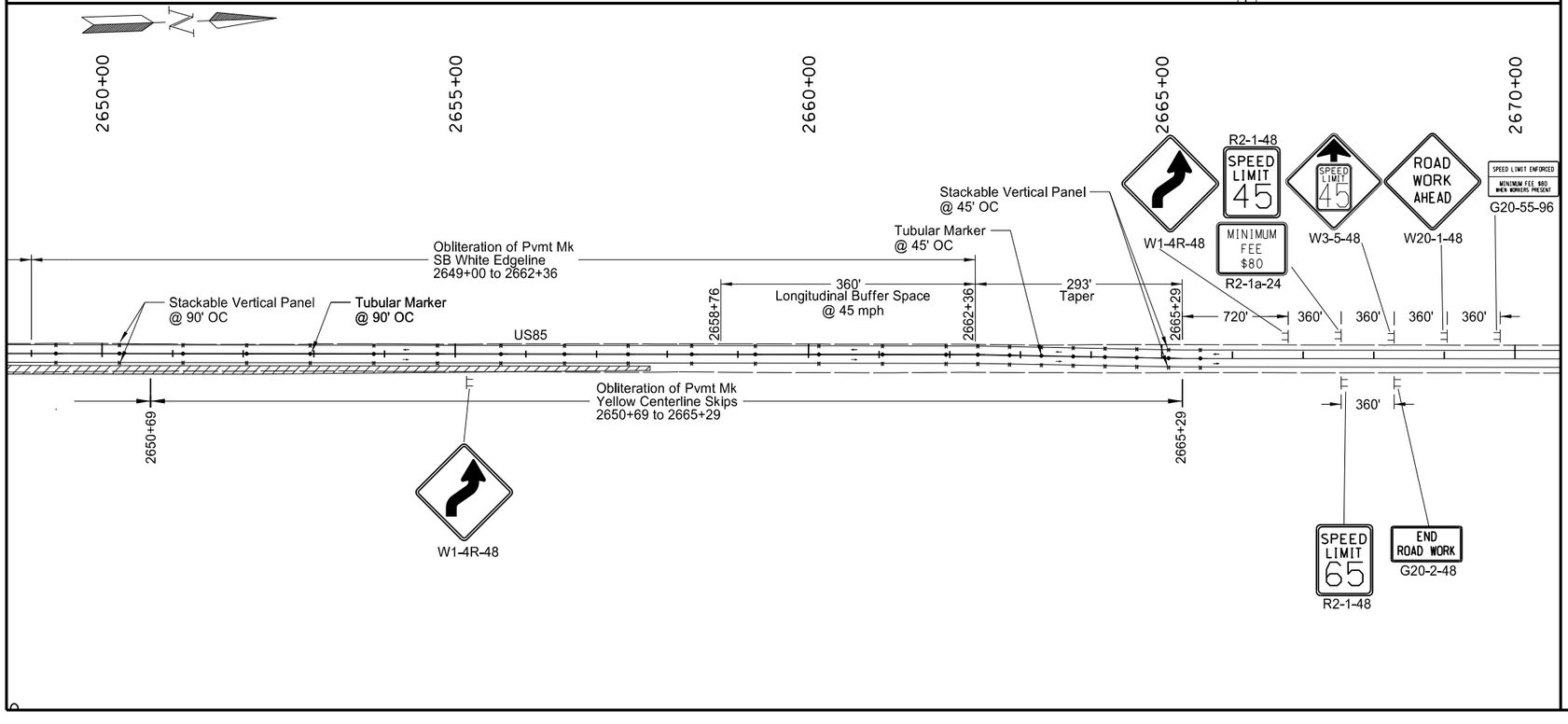
Work Zone Traffic Control
Typical Section

ND 21
Jct 85 to N Jct 22 - New England

US 85 and ND 21 Intersection
Phases 2b & 3

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	100	5





SPEC	CODE	BID ITEM	QTY	UNIT
704	1500	OBLITERATION OF PAVEMENT MARKING		
		2632+92 to 2636+97 Yellow Skips	34	SF
		2636+97 to 2644+55 Yellow Barrier w/ Skip	316	SF
		2645+48 to 2650+69 Yellow Barrier w/ Skip	218	SF
		2650+69 to 2665+29 Yellow Skips	122	SF
		2635+85 to 2662+36 White Edgeline (SB)	884	SF

Legend

Work Area

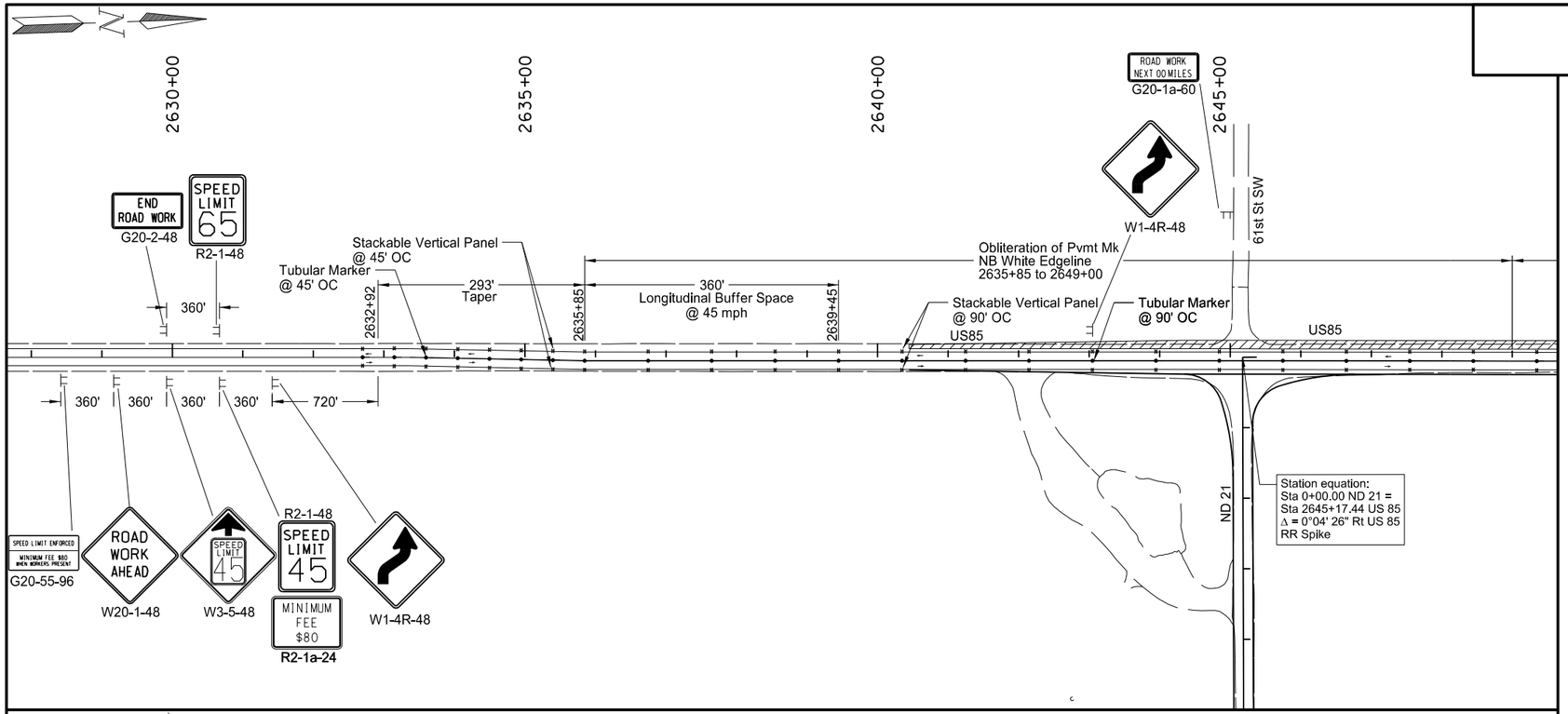
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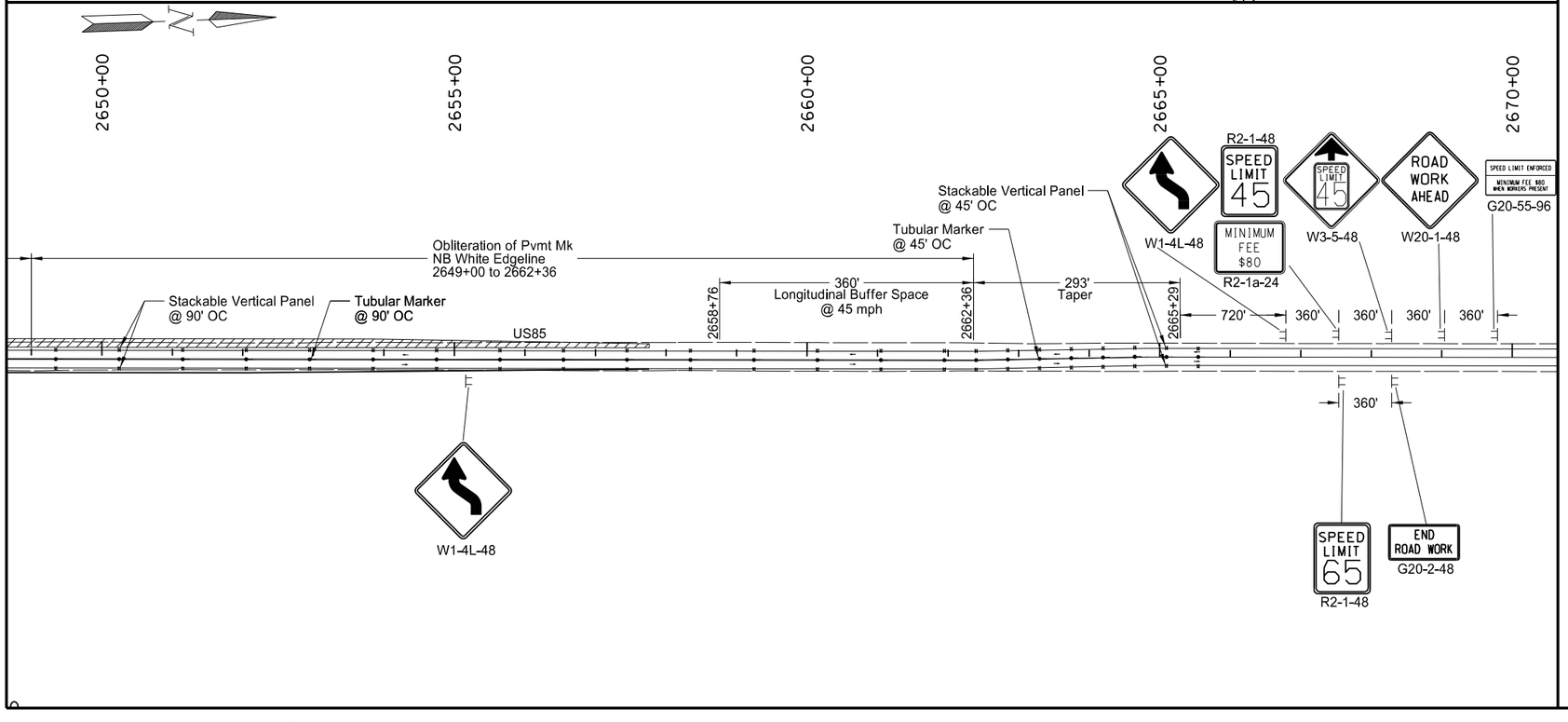
Work Zone Traffic Control

ND 21
Jct 85 to N Jct 22 - New England

US 85 and ND 21 Intersection
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	100	6





SPEC	CODE	BID ITEM	QTY	UNIT
704	1500	OBLITERATION OF PAVEMENT MARKING		
		2635+85 to 2662+36 White Edgeline (NB)	884	SF

Legend

Work Area

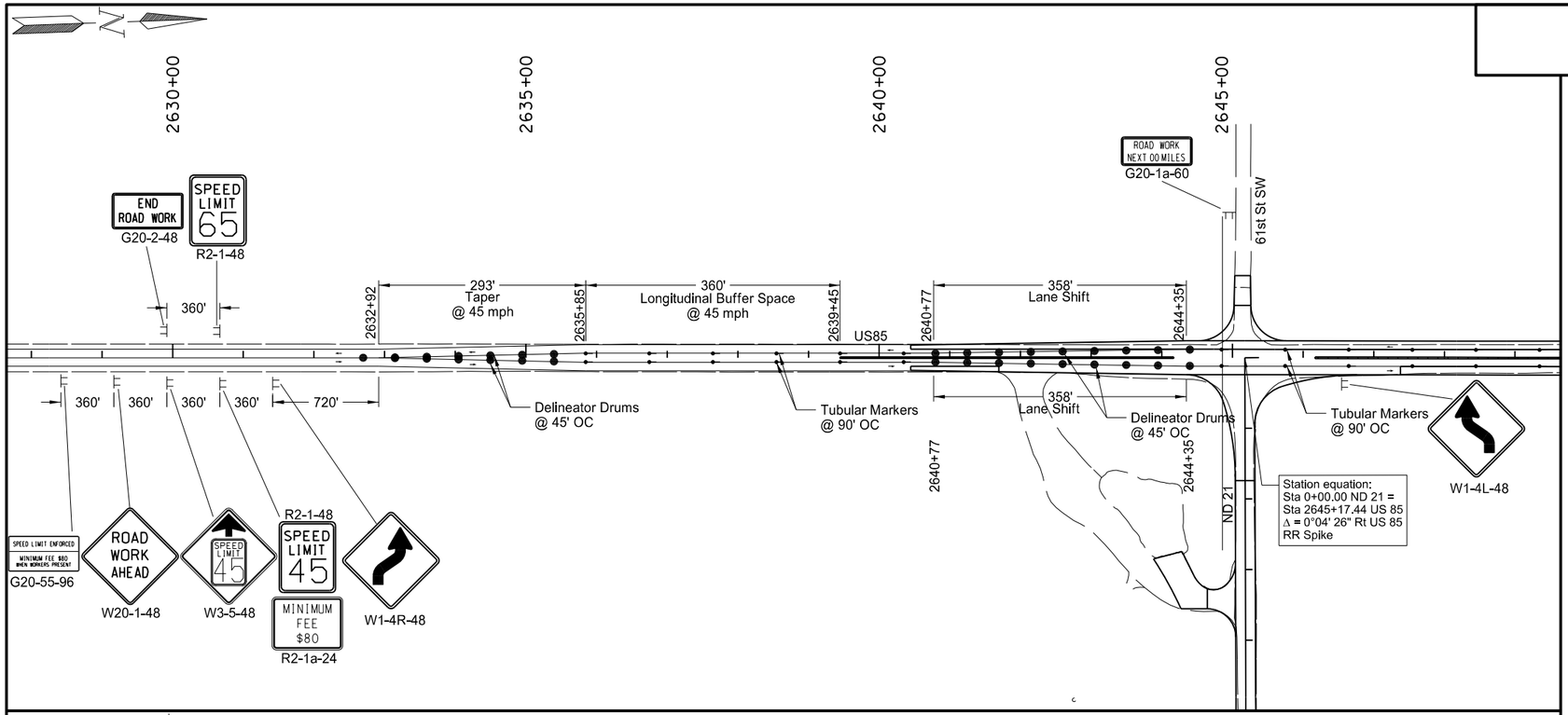
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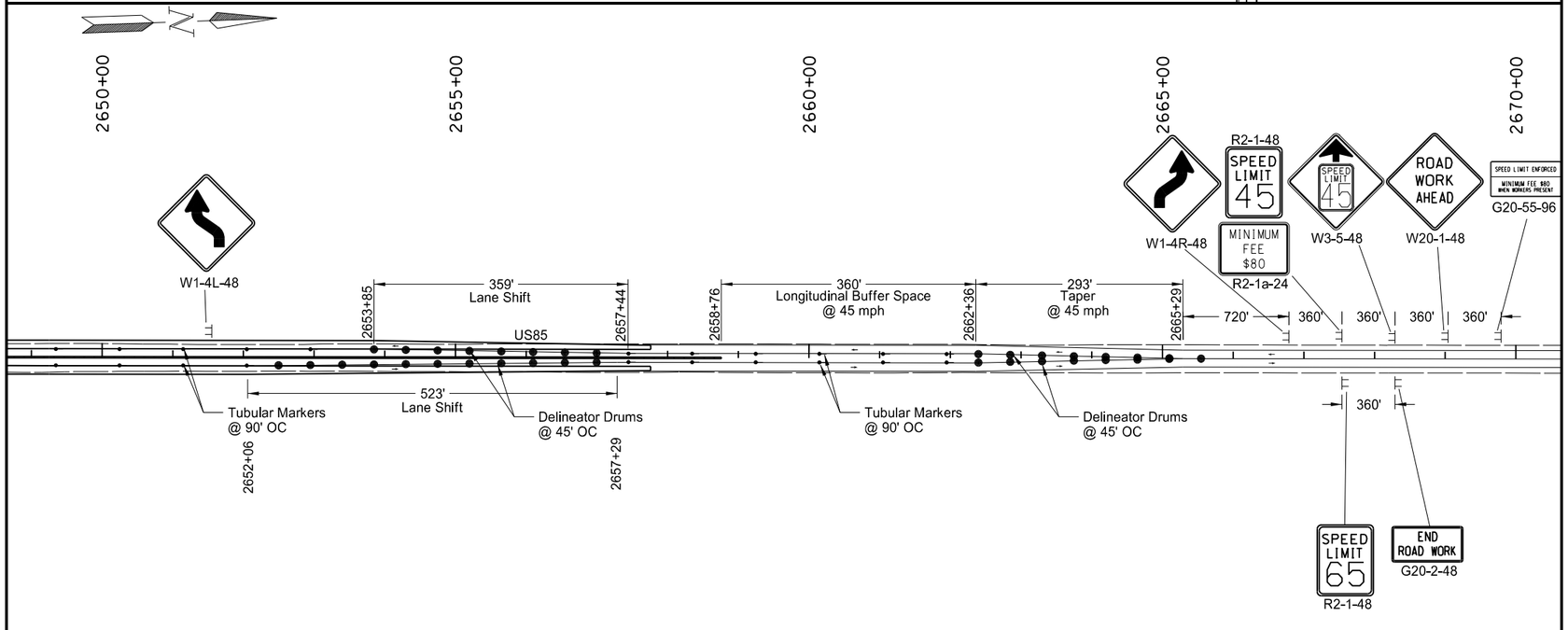
Work Zone Traffic Control

ND 21
Jct 85 to N Jct 22 - New England

US 85 and ND 21 Intersection
Phase 2

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	100	7





Legend

Work Area

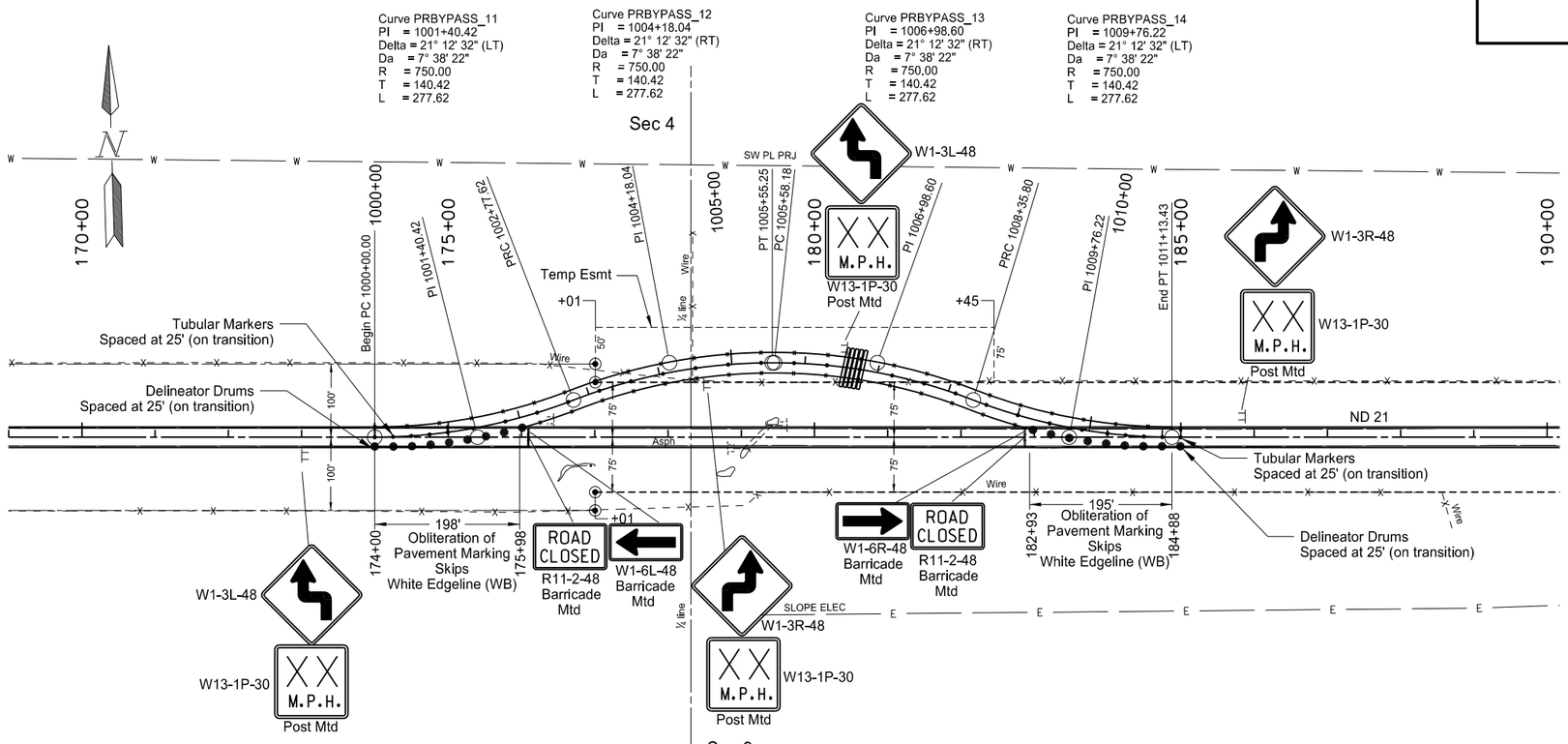
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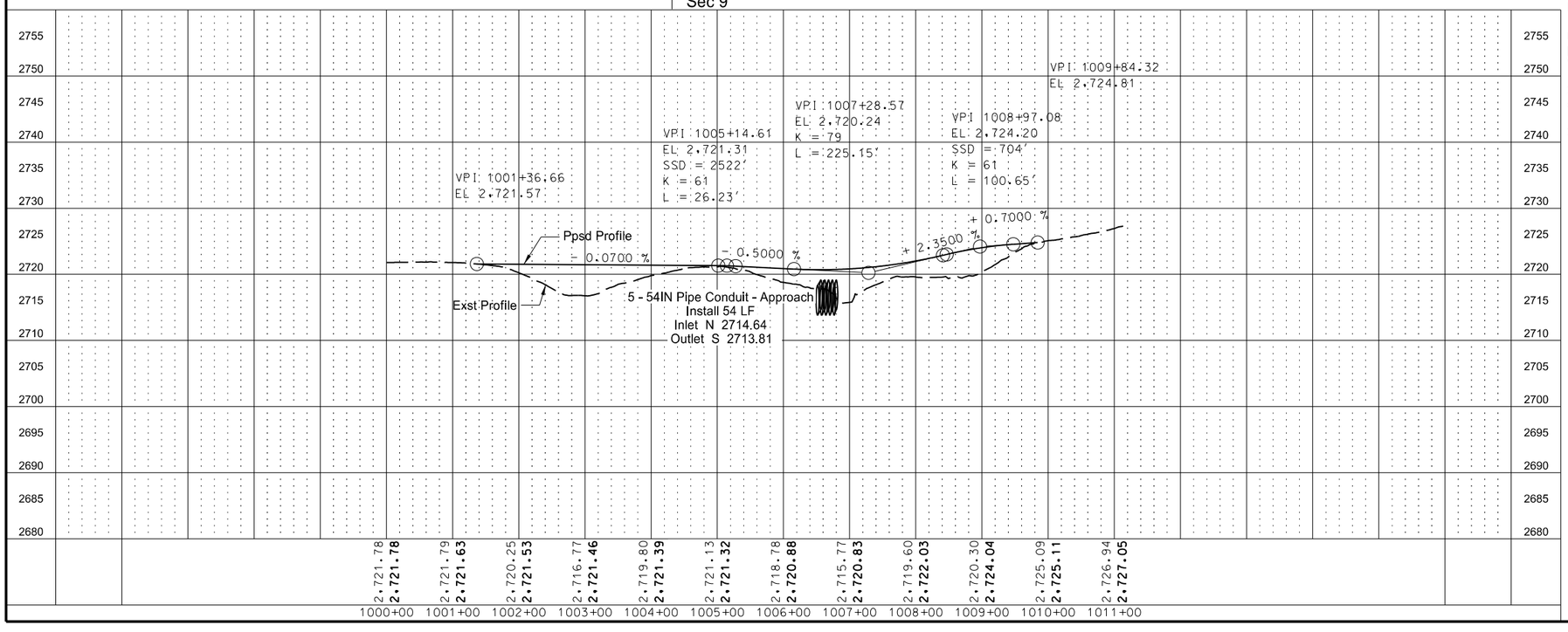
Work Zone Traffic Control

ND 21
Jct 85 to N Jct 22 - New England

US 85 and ND 21 Intersection
Phase 3

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	100	8





SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		1006+52 - 27' Rt to 1006+57 - 27' Lt	54	LF
		1006+58 - 27' Rt to 1006+62 - 27' Lt	54	LF
		1006+64 - 27' Rt to 1006+68 - 27' Lt	54	LF
		1006+70 - 27' Rt to 1006+74 - 27' Lt	54	LF
		1006+77 - 27' Rt to 1006+80 - 27' Lt	54	LF
302	0050	TRAFFIC SERVICE AGGREGATE		
		Temporary Bypass 1	1253	Ton
704	1500	OBLITERATION OF PAVEMENT MARKING		
		174+00 to 175+98 Skips	17	SF
		174+00 to 175+98 White Edgeline (WB)	66	SF
		182+93 to 184+88 Skips	17	SF
		182+93 to 184+88 White Edgeline (WB)	65	SF
714	4132	PIPE CONDUIT 54IN-APPROACH		
		1006+52 - 27' Rt to 1006+57 - 27' Lt	54	LF
		1006+58 - 27' Rt to 1006+62 - 27' Lt	54	LF
		1006+64 - 27' Rt to 1006+68 - 27' Lt	54	LF
		1006+70 - 27' Rt to 1006+74 - 27' Lt	54	LF
		1006+77 - 27' Rt to 1006+80 - 27' Lt	54	LF
900	1000	TEMPORARY STREAM DIVERSION		
		Temporary Bypass 1	1	EA

Note:
1. Quantities for Borrow-Excavation and Common Excavation-Type B required to construct the temporary bypass have been provided for in the plans. Quantities for work zone traffic control devices are listed on the WZTC Device List.

2. Reuse embankment placed for construction of the temporary bypass to construct final roadway section.

3. Determine the exact speed limit in the field, dependent on conditions. Temporary bypass is designed for 45mph speed limit.

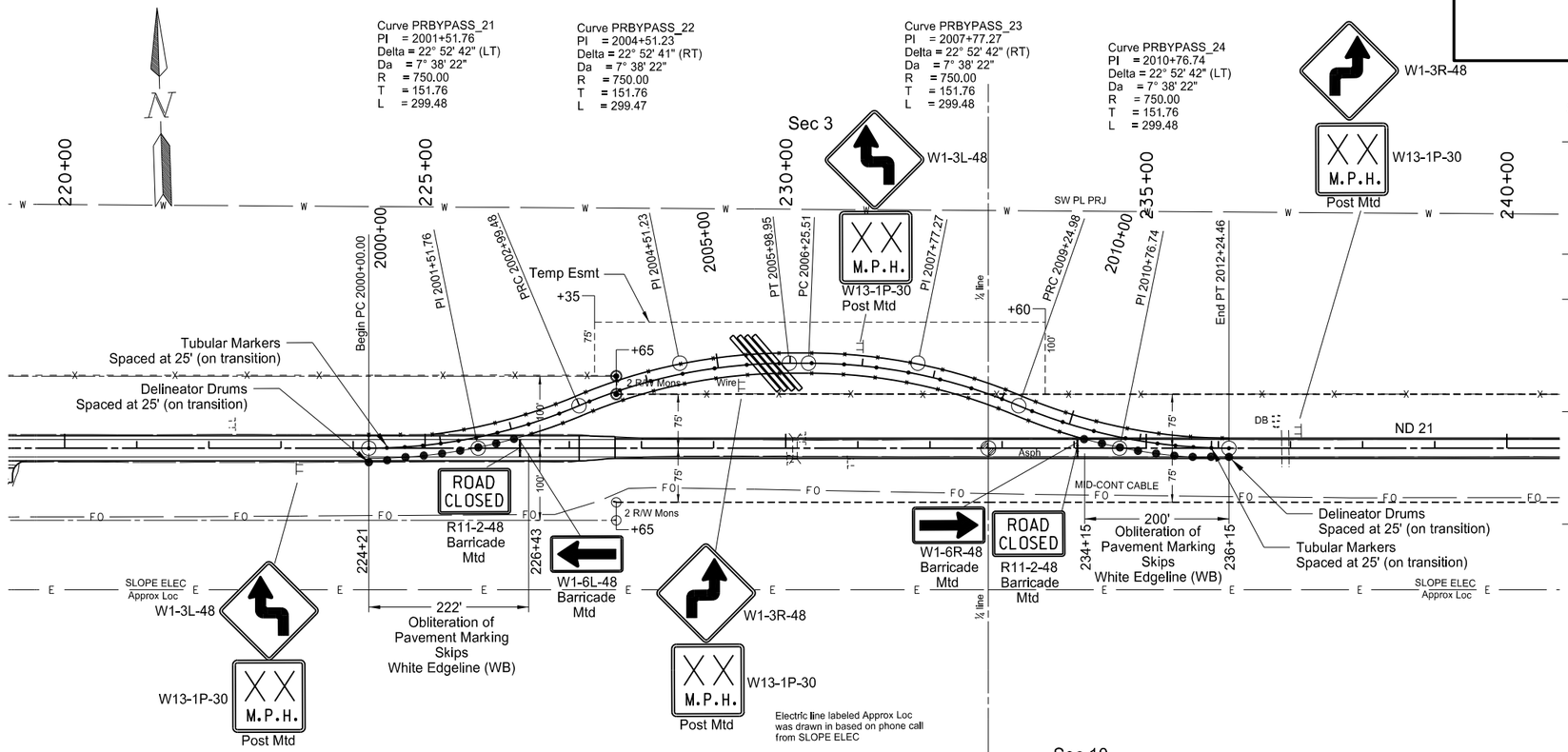
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Work Zone Traffic Control

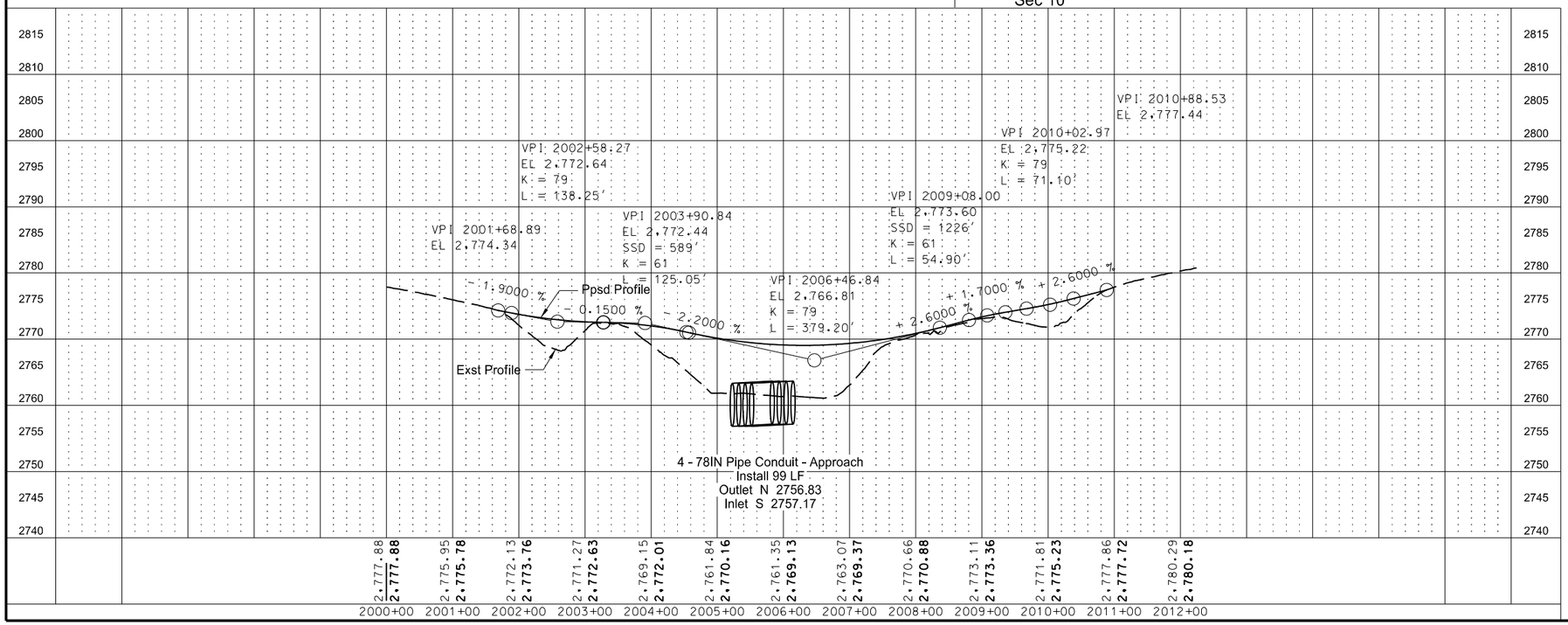
ND 21
Jct 85 to N Jct 22 - New England

Temporary Bypass 1
Plan & Profile

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	100	9



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		2005+23 - 41' Lt to 2005+83 - 38' Rt	99	LF
		2005+32 - 40' Lt to 2005+94 - 37' Rt	99	LF
		2005+42 - 40' Lt to 2006+04 - 37' Rt	99	LF
		2005+52 - 40' Lt to 2006+15 - 37' Rt	99	LF
302	0050	TRAFFIC SERVICE AGGREGATE		
		Temporary Bypass 2	1343	Ton
704	1500	OBLITERATION OF PAVEMENT MARKING		
		224+21 to 226+43 Skips	19	SF
		224+21 to 226+43 White Edgeline (WB)	74	SF
		234+15 to 236+15 Skips	17	SF
		234+15 to 236+15 White Edgeline (WB)	67	SF
714	4152	PIPE CONDUIT 78IN-APPROACH		
		2005+23 - 41' Lt to 2005+83 - 38' Rt	99	LF
		2005+32 - 40' Lt to 2005+94 - 37' Rt	99	LF
		2005+42 - 40' Lt to 2006+04 - 37' Rt	99	LF
		2005+52 - 40' Lt to 2006+15 - 37' Rt	99	LF
900	1000	TEMPORARY STREAM DIVERSION		
		Temporary Bypass 2	1	EA



Note:
1. Quantities for Borrow-Excavation and Common Excavation-Type B required to construct the temporary bypass have been provided for in the plans. Quantities for work zone traffic control devices are listed on the WZTC Device List.

2. Reuse embankment placed for construction of the temporary bypass to construct final roadway section.

3. Determine the exact speed limit in the field, dependent on conditions. Temporary bypass is designed for 45mph speed limit.

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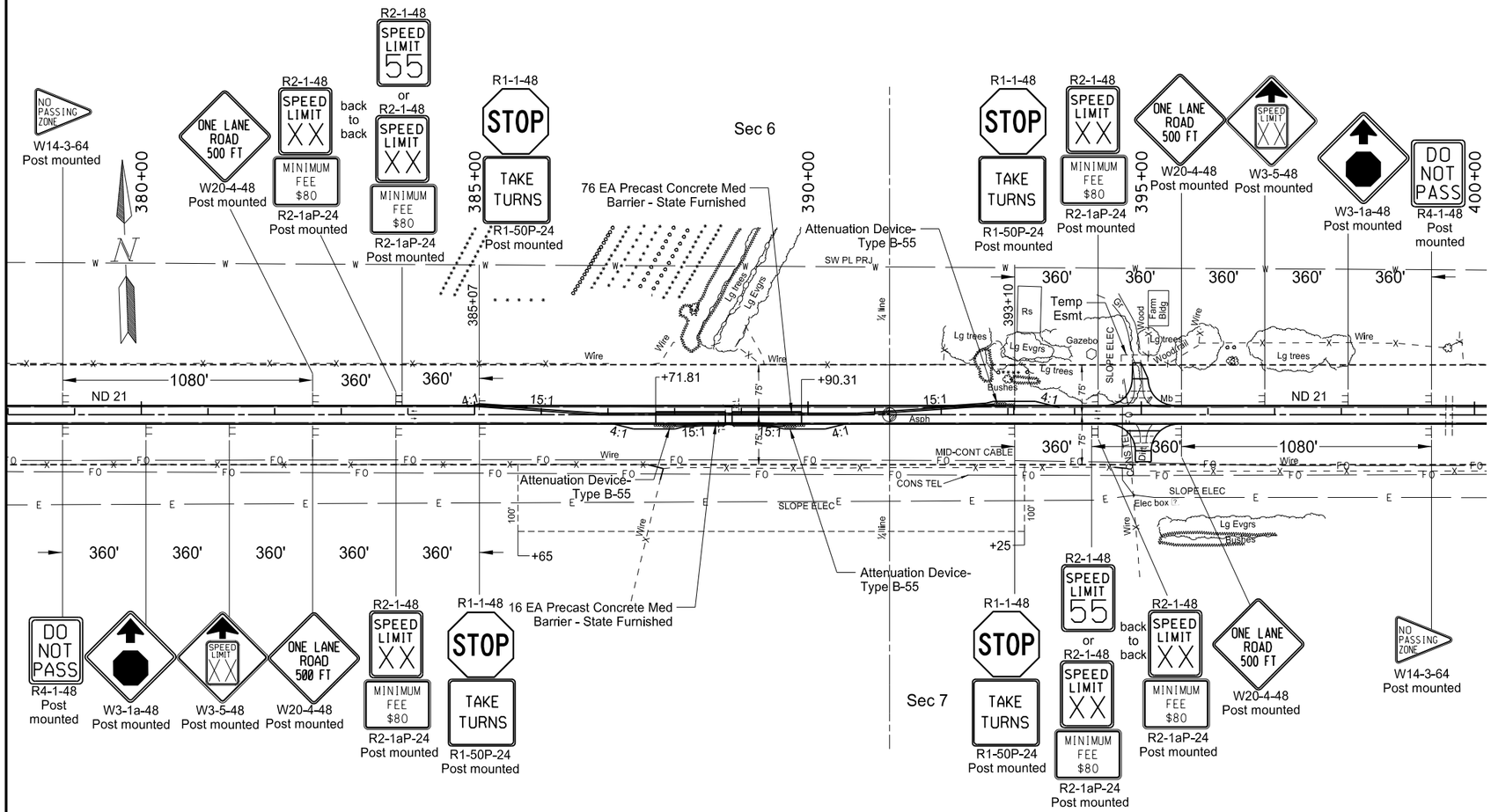
Work Zone Traffic Control

ND 21
Jct 85 to N Jct 22 - New England

Temporary Bypass 2
Plan & Profile

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)100	100	10

SPEC	CODE	BID ITEM	QTY	UNIT
302	0050	TRAFFIC SERVICE AGGREGATE		
		Temporary Bypass 3 - Phase 1	272	Ton
900	1000	TEMPORARY STREAM DIVERSION		
		Temporary Bypass 3	1	EA



Note:
1. Reuse embankment placed for construction of the temporary bypass to construct final roadway section.

2. Determine the exact speed limit in the field, dependent on conditions. Temporary bypass is designed for 45mph speed limit.

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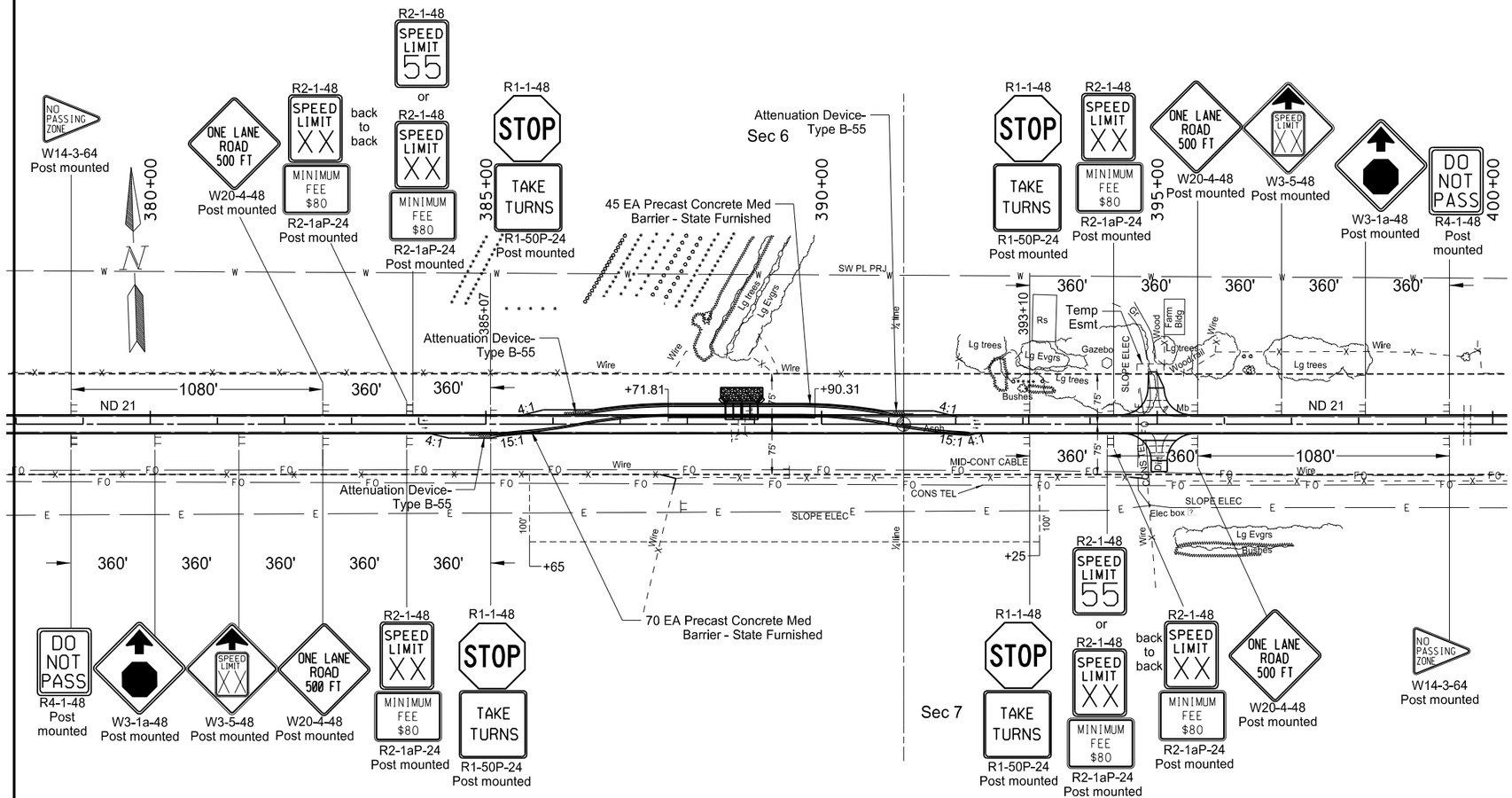
Work Zone Traffic Control

ND21
Jct 85 to N Jct 22 - New England

Temporary Bypass 3 - Phase 1
Plan View

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)100	100	11

SPEC	CODE	BID ITEM	QTY	UNIT
302	0050	TRAFFIC SERVICE AGGREGATE		
		Temporary Bypass 3 - Phase 2	465	Ton



Note:
1. Reuse embankment placed for construction of the temporary bypass to construct final roadway section.

2. Determine the exact speed limit in the field, dependent on conditions. Temporary bypass is designed for 45mph speed limit.

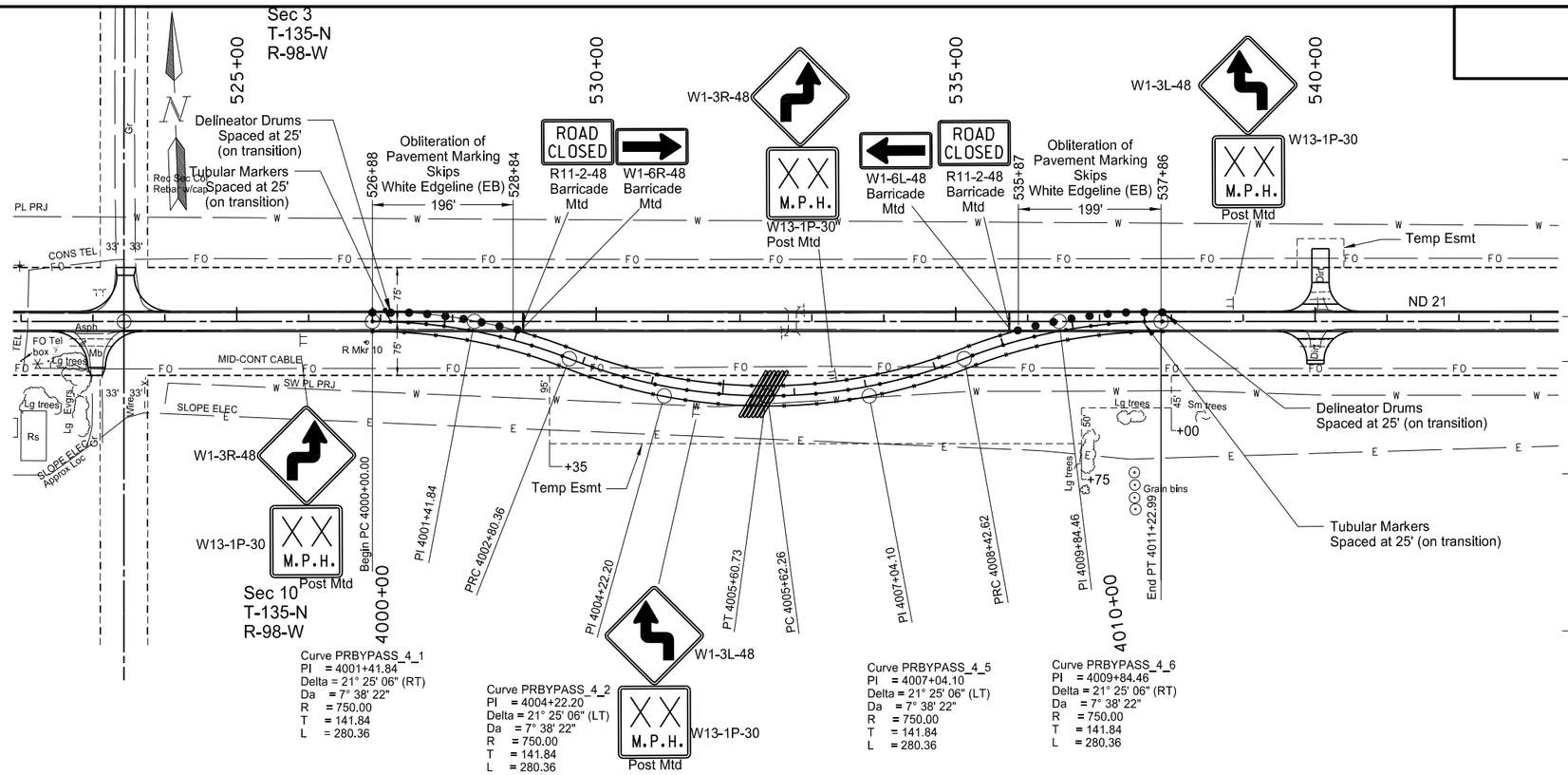
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Work Zone Traffic Control

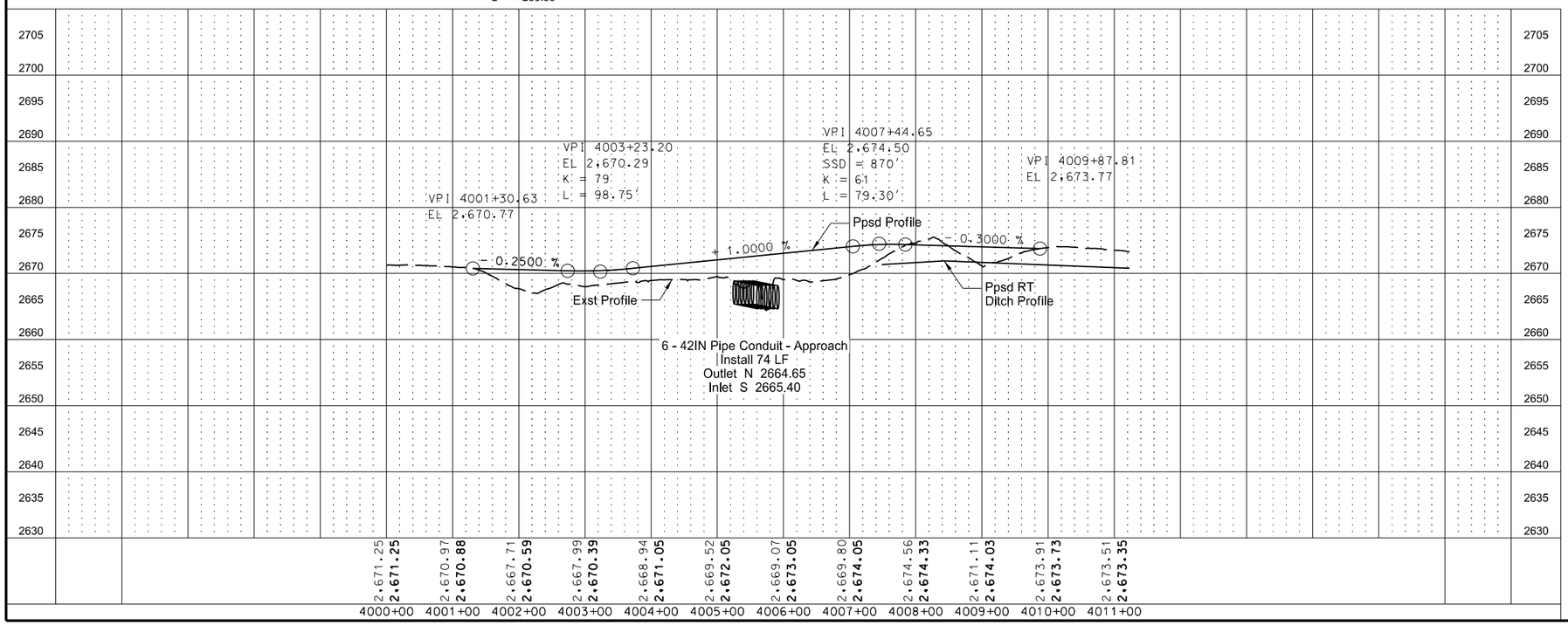
ND21
Jct 85 to N Jct 22 - New England

Temporary Bypass 3 - Phase 2
Plan View

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	100	12



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		4005+26 - 30' Rt to 4005+61 - 35' Lt	74	LF
		4005+31 - 30' Rt to 4005+67 - 34' Lt	74	LF
		4005+37 - 30' Rt to 4005+73 - 34' Lt	74	LF
		4005+42 - 30' Rt to 4005+79 - 34' Lt	74	LF
		4005+48 - 30' Rt to 4005+86 - 34' Lt	74	LF
		4005+53 - 29' Rt to 4005+92 - 34' Lt	74	LF
302	0050	TRAFFIC SERVICE AGGREGATE		
		Temporary Bypass 4	1225	Ton
704	1500	OBLITERATION OF PAVEMENT MARKING		
		526+88 to 528+84 Skips	17	SF
		526+88 to 528+84 White Edgeline (EB)	66	SF
		535+87 to 537+86 Skips	17	SF
		535+87 to 537+86 White Edgeline (EB)	67	SF
714	4122	PIPE CONDUIT 42IN-APPROACH		
		4005+26 - 30' Rt to 4005+61 - 35' Lt	74	LF
		4005+31 - 30' Rt to 4005+67 - 34' Lt	74	LF
		4005+37 - 30' Rt to 4005+73 - 34' Lt	74	LF
		4005+42 - 30' Rt to 4005+79 - 34' Lt	74	LF
		4005+48 - 30' Rt to 4005+86 - 34' Lt	74	LF
		4005+53 - 29' Rt to 4005+92 - 34' Lt	74	LF
900	1000	TEMPORARY STREAM DIVERSION		
		Temporary Bypass 4	1	EA



Note:
1. Quantities for Borrow-Excavation and Common Excavation-Type B required to construct the temporary bypass have been provided for in the plans. Quantities for work zone traffic control devices are listed on the WZTC Device List.

2. Reuse embankment placed for construction of the temporary bypass to construct final roadway section.

3. Determine the exact speed limit in the field, dependent on conditions. Temporary bypass is designed for 45mph speed limit.

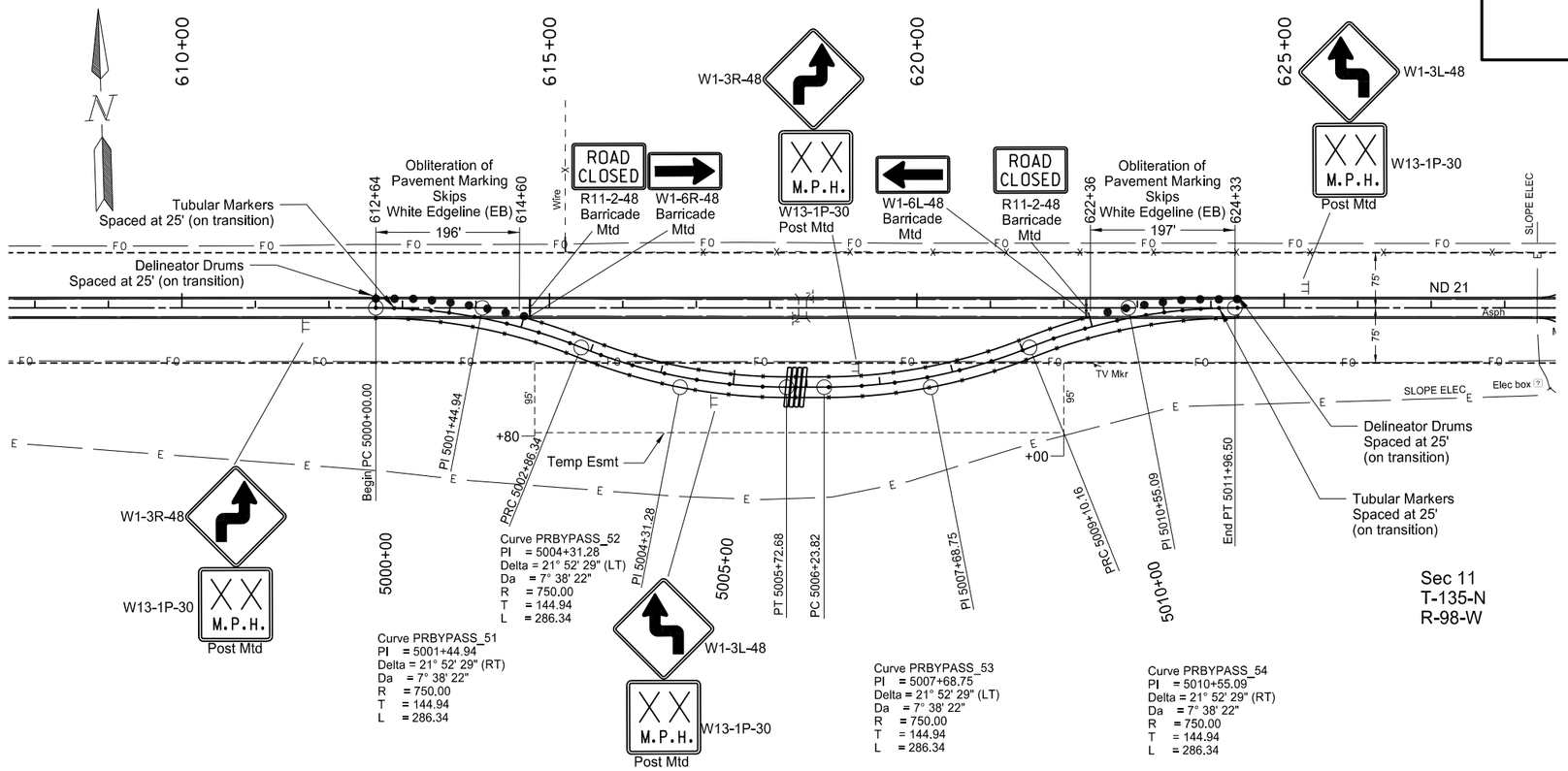
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Work Zone Traffic Control

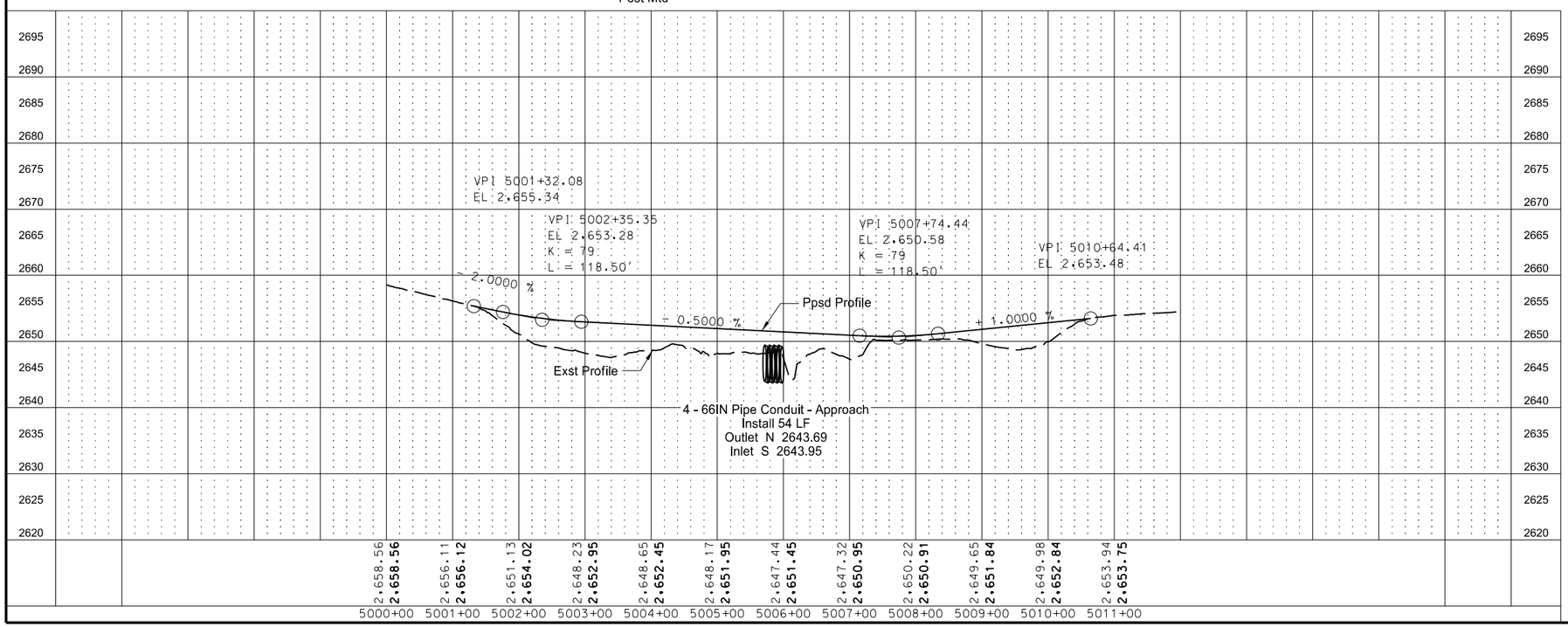
ND 21
Jct 85 to N Jct 22 - New England

Temporary Bypass 4
Plan & Profile

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	100	13



SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		5005+72 - 27' Rt to 5005+77 - 27' Lt	54	LF
		5005+79 - 27' Rt to 5005+84 - 27' Lt	54	LF
		5005+86 - 27' Rt to 5005+91 - 27' Lt	54	LF
		5005+93 - 27' Rt to 5005+98 - 27' Lt	54	LF
302	0050	TRAFFIC SERVICE AGGREGATE		
		Temporary Bypass 5	1375	Ton
704	1500	OBLITERATION OF PAVEMENT MARKING		
		612+64 to 614+60 Skips	17	SF
		612+64 to 614+60 White Edgeline (EB)	66	SF
		622+36 to 624+33 Skips	17	SF
		622+36 to 624+33 White Edgeline (EB)	66	SF
714	4142	PIPE CONDUIT 66IN-APPROACH		
		5005+72 - 27' Rt to 5005+77 - 27' Lt	54	LF
		5005+79 - 27' Rt to 5005+84 - 27' Lt	54	LF
		5005+86 - 27' Rt to 5005+91 - 27' Lt	54	LF
		5005+93 - 27' Rt to 5005+98 - 27' Lt	54	LF
900	1000	TEMPORARY STREAM DIVERSION		
		Temporary Bypass 5	1	EA



Note:
1. Quantities for Borrow-Excavation and Common Excavation-Type B required to construct the temporary bypass have been provided for in the plans. Quantities for work zone traffic control devices are listed on the WZTC Device List.

2. Reuse embankment placed for construction of the temporary bypass to construct final roadway section.

3. Determine the exact speed limit in the field, dependent on conditions. Temporary bypass is designed for 45mph speed limit.

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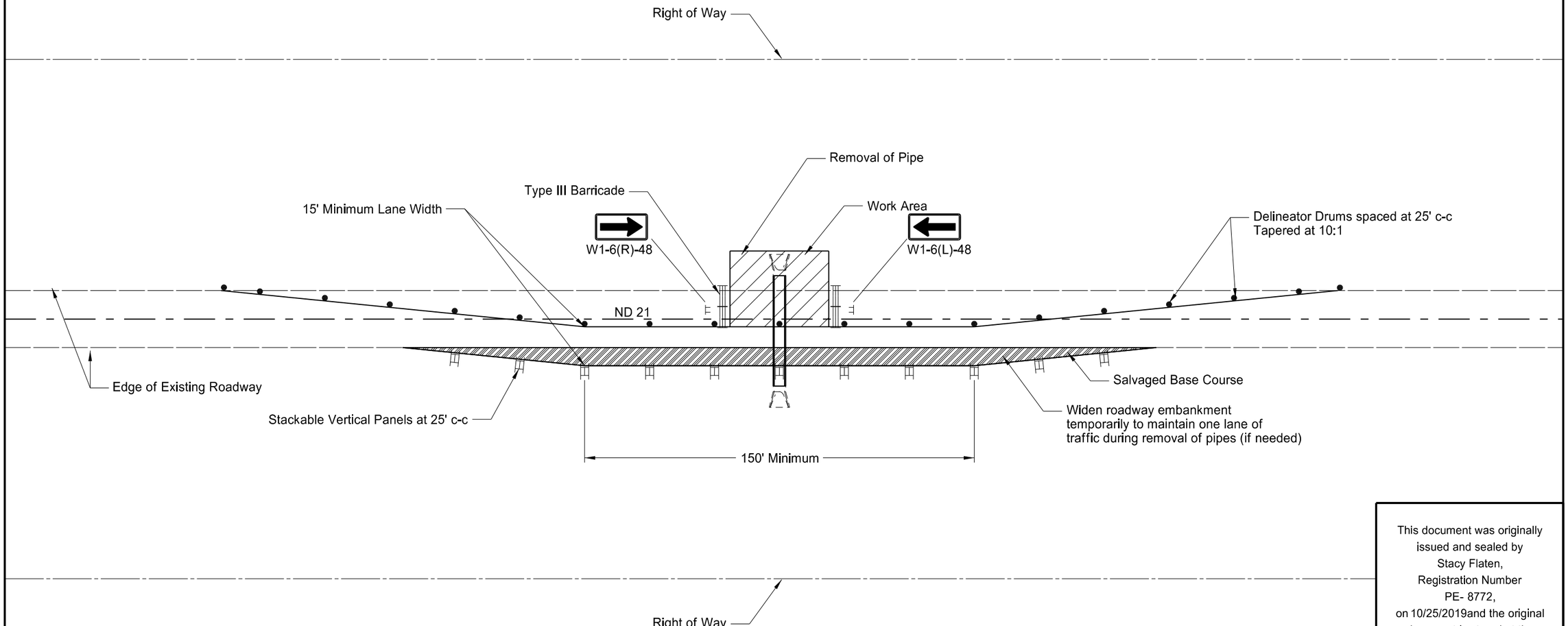
Work Zone Traffic Control

ND 21
Jct 85 to N Jct 22 - New England

Temporary Bypass 5
Plan & Profile

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	100	14

SPEC	CODE	BID ITEM	QTY	UNIT
302	0100	SALVAGED BASE COURSE		
		Centerline Pipe Replacements	365	Ton



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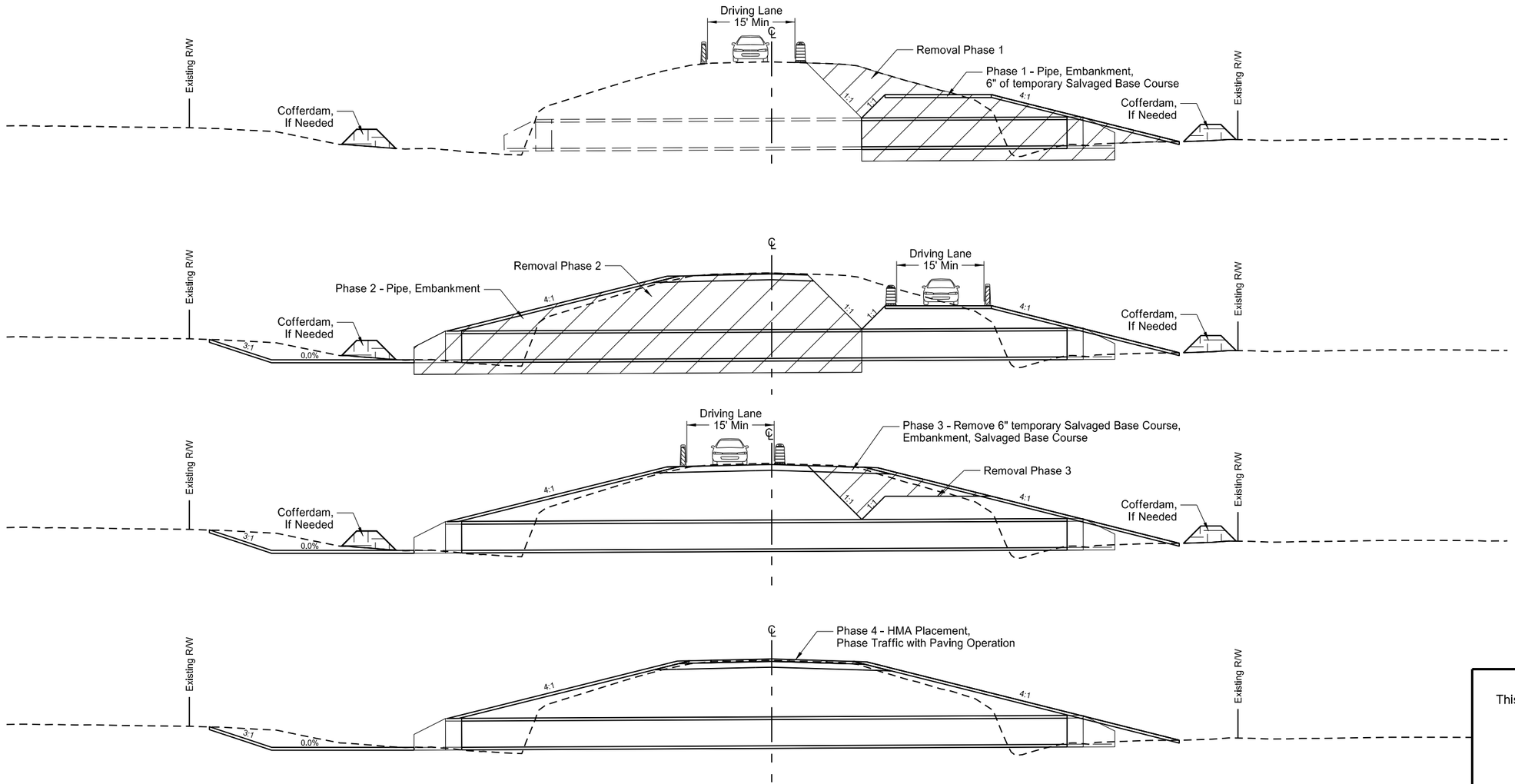
Work Zone Traffic Control

ND 21
Jct 85 to N Jct 22 - New England

Temporary Widening for
Pipe Replacements

Notes:
1. During non working hours, provide a 30' minimum top surface width and 4:1 inslopes to maintain two way traffic or continue flagging operations

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	100	15



Note:
1. During non working hours, provide a 30' minimum top surface width and 4:1 inslopes to maintain two way traffic or continue flagging operations

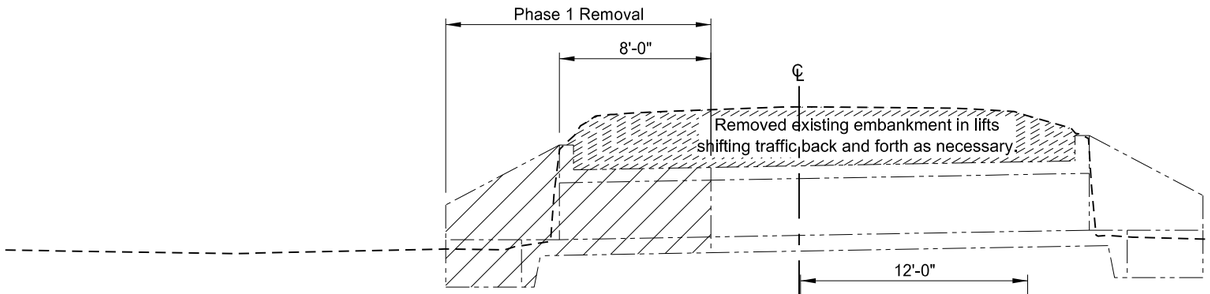
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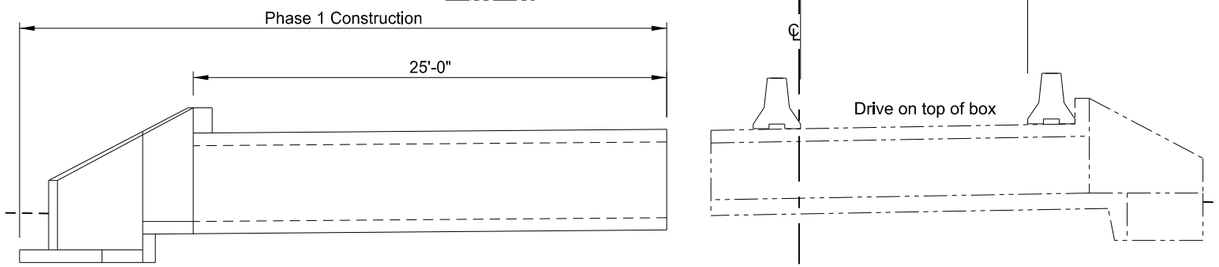
Work Zone Traffic Control

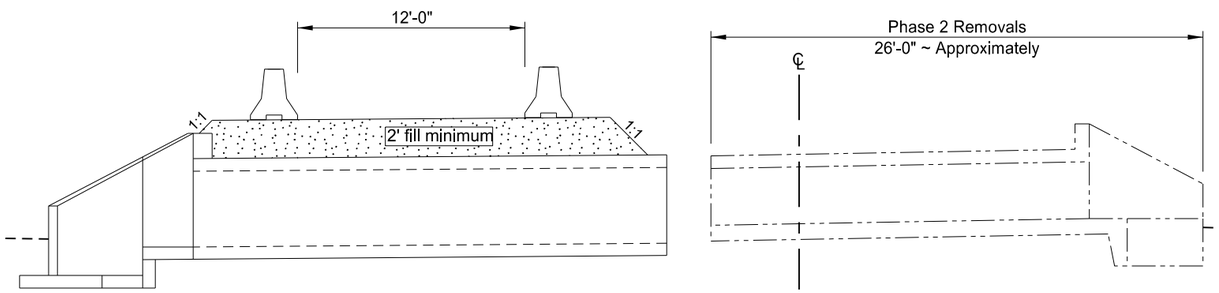
ND 21
Jct 85 to N Jct 22 - New England

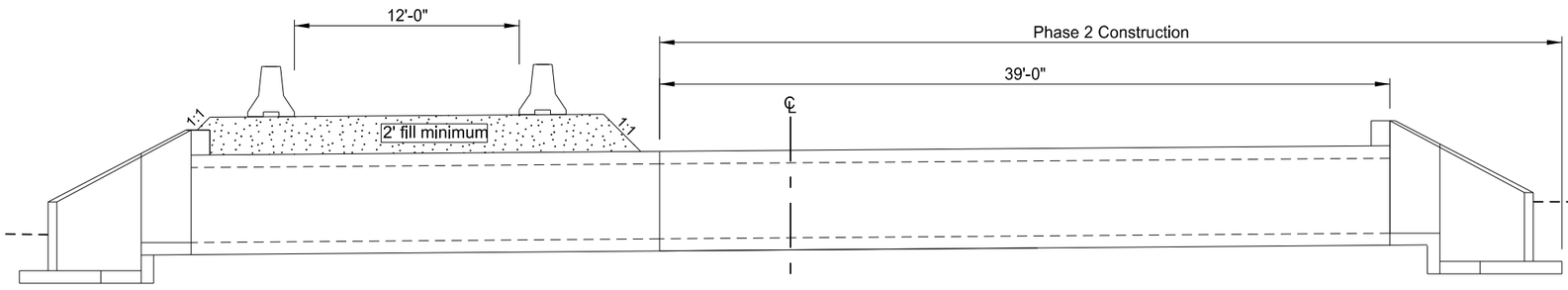
Centerline Culvert Replacement Phasing

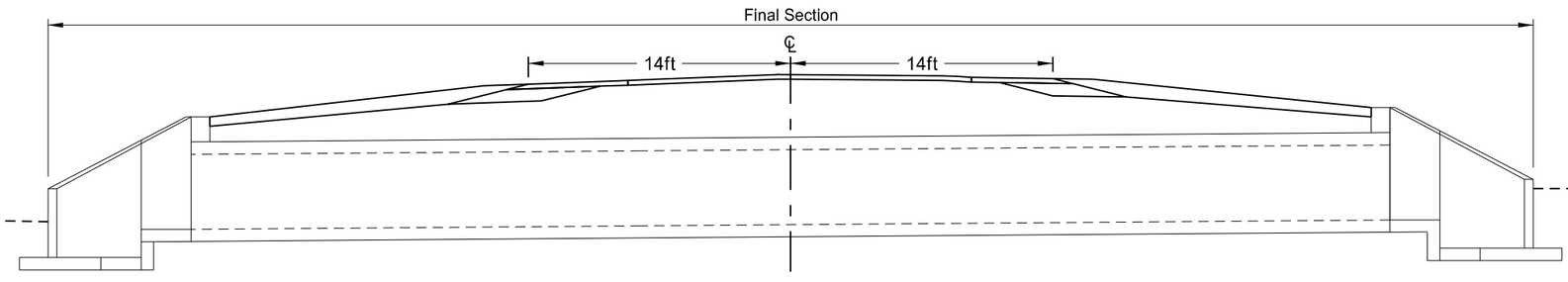
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	100	16











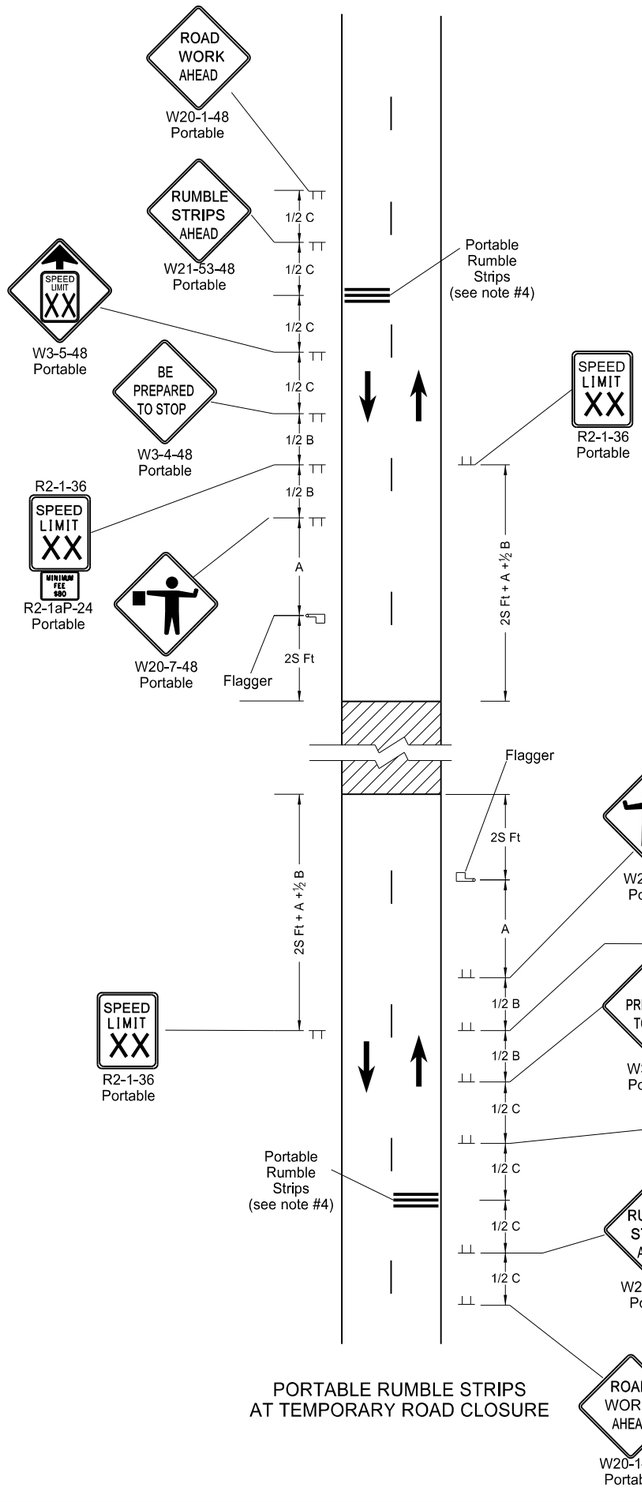
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Work Zone Traffic Control

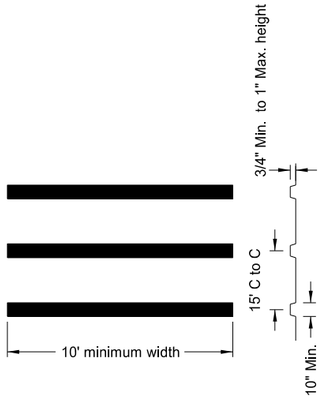
ND 21
Jct 85 to N Jct 22 - New England

Structure #21-007.381 Phasing

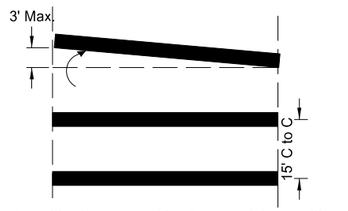
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	100	17



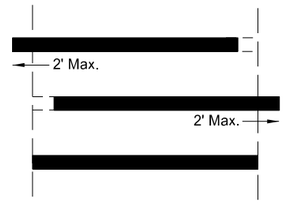
PORTABLE RUMBLE STRIPS AT TEMPORARY ROAD CLOSURE



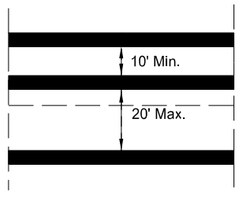
PORTABLE RUMBLE STRIPS ARRAY DETAIL



Reposition if movement is >3' from original position.
Skewing



Reposition if movement is >2' from original position.
Lateral



Reposition if distance between strips is <10' or >20'.
Perpendicular to Travel with or against traffic

PORTABLE RUMBLE STRIPS ARRAY
TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

Notes:
1. Number of devices were calculated using 40 mph. Speed determined in the field based on location and conditions.
2. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
3. Sign R2-1aP-24 is not required when pilot car operation is used.
4. Rumble strips are not used on a non paved surface or in a pre-construction speed zone of 25 mph or less.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720

KEY
- Work area
- Flagger
- Sign

S = Numerical value of speed limit or 85th percentile.

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Work Zone Traffic Control

ND 21
Jct 85 to N Jct 22 - New England

TWO-LANE PORTABLE RUMBLE STRIPS

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NH-5-021(016)000	110	1

Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
0+64 Lt		3		13.3	9.7				5.0	2.5 x 2.5 12 ga	12.4	2.2				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga			1	Sign Post Reflective Strip
2+24 Rt		371			12.0				5.0	2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga	1			
4+64 Lt	SN 1		24.5		12.4	13.2	14.1		5.0	2.25 x 2.25 12 ga	14.9	3.3	4.2	5.0		2 x 2 12 ga	3	12	3 x 3 7 ga			3	
8+24 Rt		9			11.5				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga	1			
8+64 Lt		399	6.2		13.6				5.0	2.5 x 2.5 12 ga	15.9						1	4	3 x 3 7 ga				
12+64 Lt		391	6.2		12.1				5.0	2.25 x 2.25 12 ga	12.7						1	4	2.5 x 2.5 12 ga				
16+64 Lt		20		9.0	11.8				5.0	2.5 x 2.5 10 ga	12.9						1	4	3 x 3 7 ga			1	
53+31 Rt	S.A. 2B				9.9				5.0	2 x 2 12 ga	11.0						1	4	2.25 x 2.25 12 ga	1			
192+59 Rt		391	6.2		12.2				5.0	2.25 x 2.25 12 ga	12.7						1	4	2.5 x 2.5 12 ga				
196+59 Rt					11.2	12.0			5.0	2.5 x 2.5 12 ga	12.5	3.7	4.5			2.25 x 2.25 12 ga	2	8	3 x 3 7 ga	1		2	
196+64 Lt		9			11.4				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga	1			
200+59 Rt	405		4.4		12.0				5.0	2.5 x 2.5 12 ga	13.5	3.7				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga	1		1	
202+64 Lt		371	6.0		12.0				5.0	2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				
204+32 Lt	S.A. 2B			5.2	9.8				5.0	2 x 2 12 ga	11.0						1	4	2.25 x 2.25 12 ga	1			
206+71 Rt		3			10.8				5.0	2.5 x 2.5 12 ga	12.4	3.3				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga	1		1	Sign Post Reflective Strip
208+55 Rt		371	6.0		12.7				5.0	2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				
210+53 Lt		387			12.0				5.0	2.5 x 2.5 10 ga	13.7	3.3				2.19 x 2.19 10 ga	1	4	3 x 3 7 ga	1		1	
214+53 Lt	SN 4		17.5		10.0	10.8			5.0	2.5 x 2.5 10 ga	12.5						2	8	3 x 3 7 ga			2	
312+42 Rt	S.A. 2B				9.9				5.0	2 x 2 12 ga	11.0						1	4	2.25 x 2.25 12 ga	1			
417+23 Lt	S.A. 2B				9.9				5.0	2 x 2 12 ga	11.0						1	4	2.25 x 2.25 12 ga	1			
418+16 Rt		1			9.4				5.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga	1			
425+83 Lt		19			12.2				5.0	2.5 x 2.5 12 ga	14.6						1	4	3 x 3 7 ga	1			
470+91 Rt	S.A. 2B			5.2	9.9				5.0	2 x 2 12 ga	11.0						1	4	2.25 x 2.25 12 ga	1			
523+01 Lt	S.A. 2B				9.9				5.0	2 x 2 12 ga	11.0						1	4	2.25 x 2.25 12 ga	1			
568+21 Rt		19			12.2				5.0	2.5 x 2.5 12 ga	14.6						1	4	3 x 3 7 ga	1			
576+67 Rt	S.A. 2B			5.2	9.8				5.0	2 x 2 12 ga	11.0						1	4	2.25 x 2.25 12 ga	1			
628+68 Lt	S.A. 2B				9.8				5.0	2 x 2 12 ga	11.0						1	4	2.25 x 2.25 12 ga	1			
629+53 Rt		1			9.5				5.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga	1			
637+16 Lt		19			12.2				5.0	2.5 x 2.5 12 ga	14.6						1	4	3 x 3 7 ga	1			
669+02 Rt		19		6.3	12.2				5.0	2.5 x 2.5 12 ga	14.6						1	4	3 x 3 7 ga				
671+94 Rt	8			3.0	9.7				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
673+94 Rt	8			6.0	9.7				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
675+94 Rt	8			6.0	9.4				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
677+94 Rt	8			6.0	8.0				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
679+94 Rt	8			6.0	8.3				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
681+86 Rt	8			6.0	8.6				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
682+48 Rt	S.A. 2B																			1			
683+71 Rt	8			3.0	9.6				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
684+18 Lt	8			3.0	9.9				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
685+69 Lt	8			6.0	10.1				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
687+69 Lt	8			6.0	10.2				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
689+69 Lt	8			6.0	10.2				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				

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Sign Summary
Perforated Tube

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NH-5-021(016)000	110	2

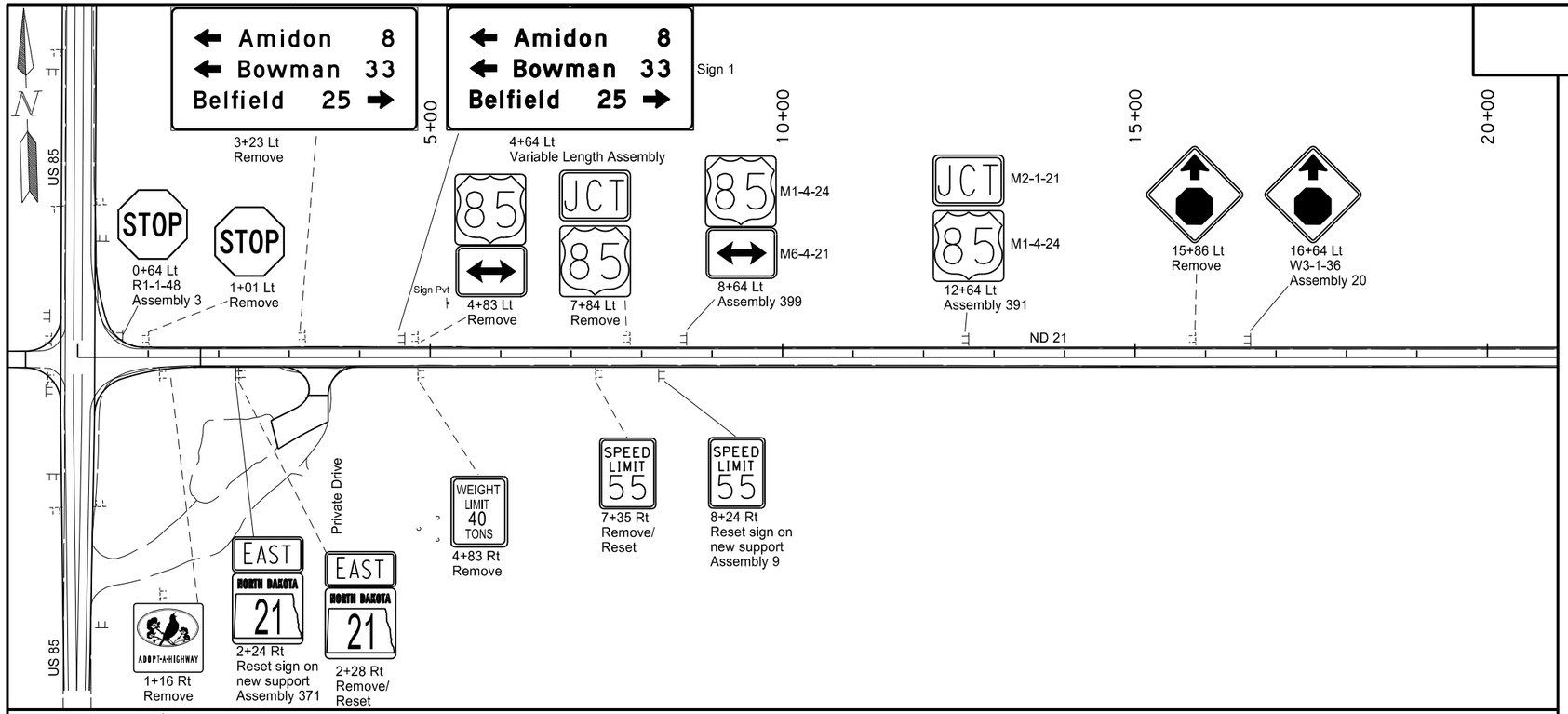
Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
691+69 Lt	8			6.0	10.0				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
693+69 Lt	8			6.0	9.3				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
695+69 Lt	8			3.0	9.7				5.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
699+09 Lt		19		6.3	12.1				5.0	2.5 x 2.5 12 ga	14.6						1	4	3 x 3 7 ga				
732+03 Lt		1		5.2	9.2				5.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga				
732+80 Rt	S.A. 2E			5.2	10.4				5.0	2.25 x 2.25 12 ga	13.2						1	4	2.5 x 2.5 12 ga	1			
788+43 Rt	S.A. 2E				10.4				5.0	2.25 x 2.25 12 ga	13.2						1	4	2.5 x 2.5 12 ga	1			
814+88 Rt		20			12.5				5.0	2.5 x 2.5 10 ga	12.9						1	4	3 x 3 7 ga	1		1	
818+88 Rt		391			12.3				5.0	2.25 x 2.25 12 ga	12.7						1	4	2.5 x 2.5 12 ga	1			
822+88 Rt		379			12.8				5.0	2.5 x 2.5 10 ga	15.3						1	4	3 x 3 7 ga	1		1	
823+42 Lt		9			11.5				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga	1			
824+88 Rt		399			12.3				5.0	2.25 x 2.25 12 ga	12.7						1	4	2.5 x 2.5 12 ga	1			
825+61 Lt		371			12.0				5.0	2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga	1			
826+88 Rt	S.A. A				11.7	12.6			5.0	2.5 x 2.5 12 ga	13.7						2	8	3 x 3 7 ga	1		2	
828+28 Lt		1			9.4				5.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga	1			
828+43 Lt		7			10.5				5.0	2 x 2 12 ga	25.5						1	4	2.25 x 2.25 12 ga	1			
828+93 Lt	S.A. B			9.0	13.4				5.0	2.5 x 2.5 10 ga	14.2						1	4	3 x 3 7 ga			1	
829+32 Rt	SN 2		18.8		8.9	10.9			5.0	2.5 x 2.5 10 ga	11.7						2	8	3 x 3 7 ga			2	
830+12 Lt		399			12.3				5.0	2.25 x 2.25 12 ga	12.7						1	4	2.5 x 2.5 12 ga	1			
830+85 Lt	S.A. C				12.3				5.0	2.5 x 2.5 10 ga	13.3						1	4	3 x 3 7 ga	1		1	
830+88 Rt		3			9.0				5.0	2.25 x 2.25 12 ga	9.7	2.9				2 x 2 12 ga	1	4	3 x 3 7 ga	1		1	Sign Post Reflective Strip
831+07 Rt	S.A. C				9.9				5.0	2.5 x 2.5 12 ga	11.3						1	4	3 x 3 7 ga	1			
Sub Total			95.8	141.9		**Total**	753.2										**Total**	276		36	0	21	
US 85																							
2641+34 Rt	405		4.4		12.1				5.0	2.5 x 2.5 12 ga	13.5	3.8				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga	1		1	
2643+52 Lt		371	6.0		12.2				5.0	2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				
2644+70 Lt	S.A. 2B				9.9				5.0	2 x 2 12 ga	11.0						1	4	2.25 x 2.25 12 ga	1			
2645+76 Lt		399	6.2		12.5				5.0	2.25 x 2.25 12 ga	12.7						1	4	2.5 x 2.5 12 ga				
2646+82 Rt		371	6.0		12.6				5.0	2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				
2649+26 Lt	405		8.4		12.2				5.0	2.5 x 2.5 12 ga	13.5	3.9				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga	1		1	
2653+26 Lt	SN 3		29.8		11.9	12.5	13.0		5.0	2.5 x 2.5 12 ga	16.0	2.4	2.9	3.5		2.25 x 2.25 12 ga	3	12	3 x 3 7 ga			3	
2657+26 Lt		391	6.2		12.3				5.0	2.25 x 2.25 12 ga	12.7						1	4	2.5 x 2.5 12 ga				
2657+32 Rt		9			11.5				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga	1			
Sub Total			67.0	0.0		**Total**	132.7										**Total**	44		4	0	5	
Grand Total			**162.8**	**141.9**		**Total**	**885.9**										**Total**	**320**	**0**	**40**	**0**	**26**	

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Sign Summary
Perforated Tube

ND 21
Jct 85 to N Jct 22 - New England

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	3



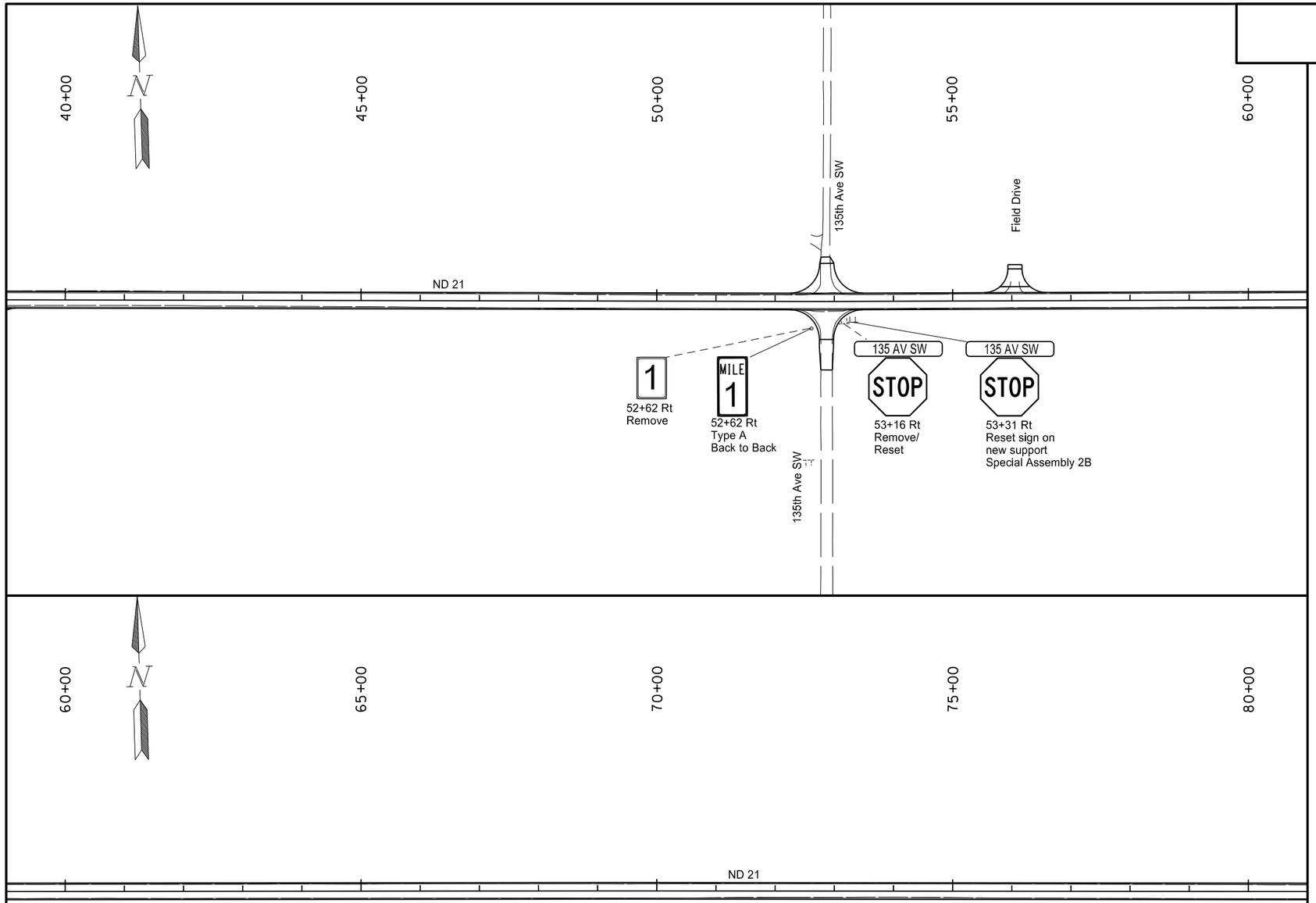
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Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

0+24 to 40+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	4



SPEC	CODE	BID ITEM	QTY	UNIT
754	0561	REFERENCE MARKER - TYPE A		
		52+62 Rt	1	EA

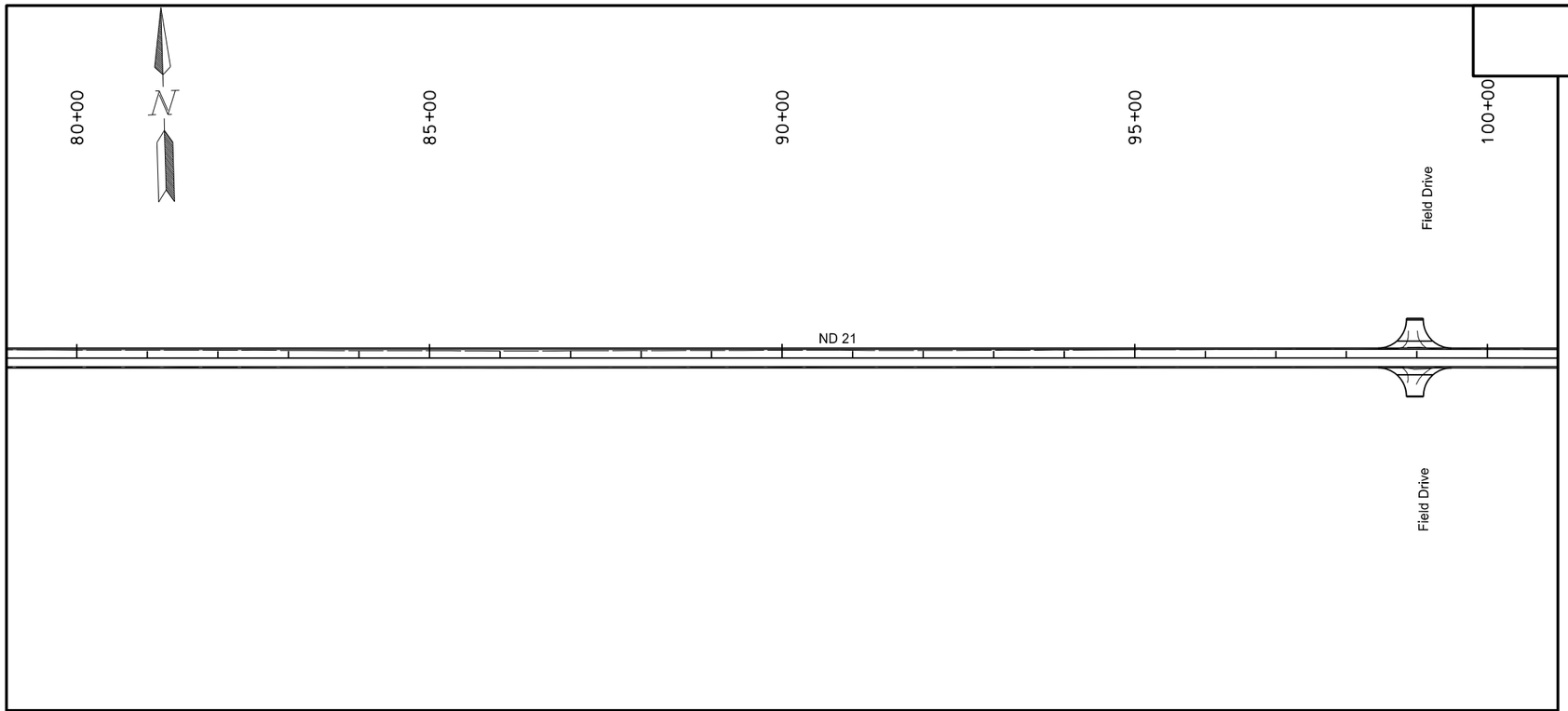
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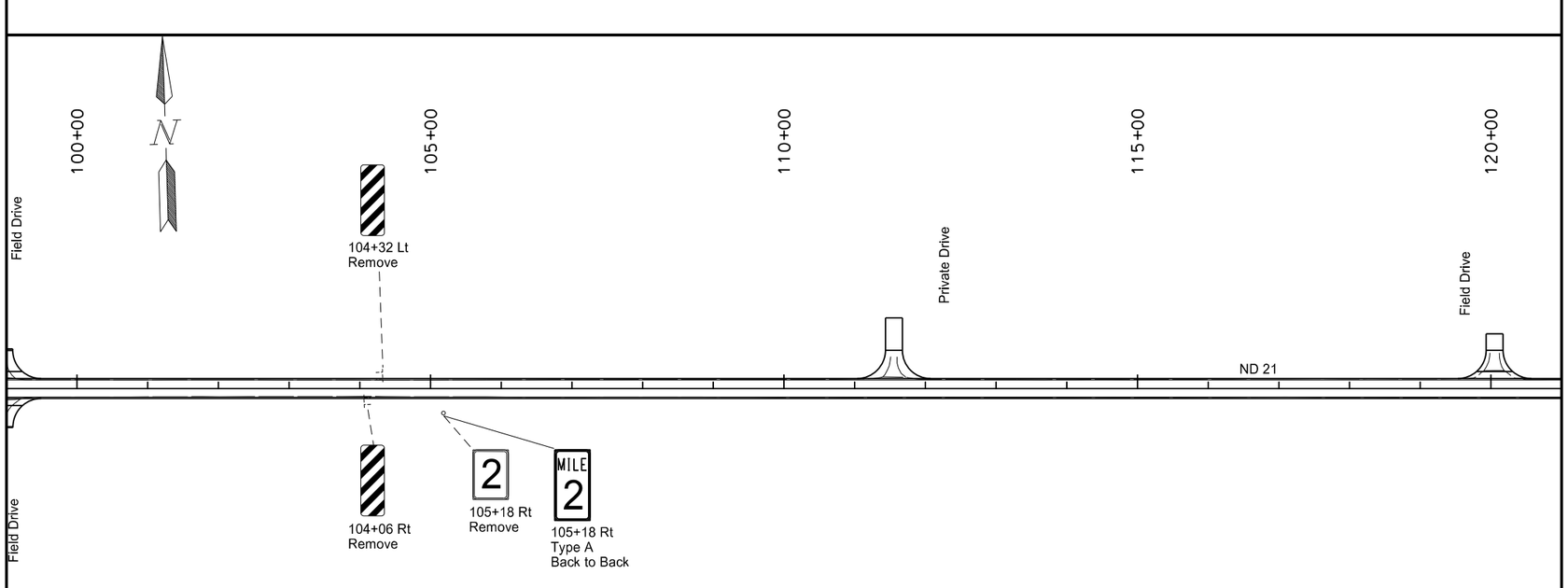
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

40+00 to 80+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	5





SPEC	CODE	BID ITEM	QTY	UNIT
754	0561	REFERENCE MARKER - TYPE A		
		105+18 Rt	1	EA

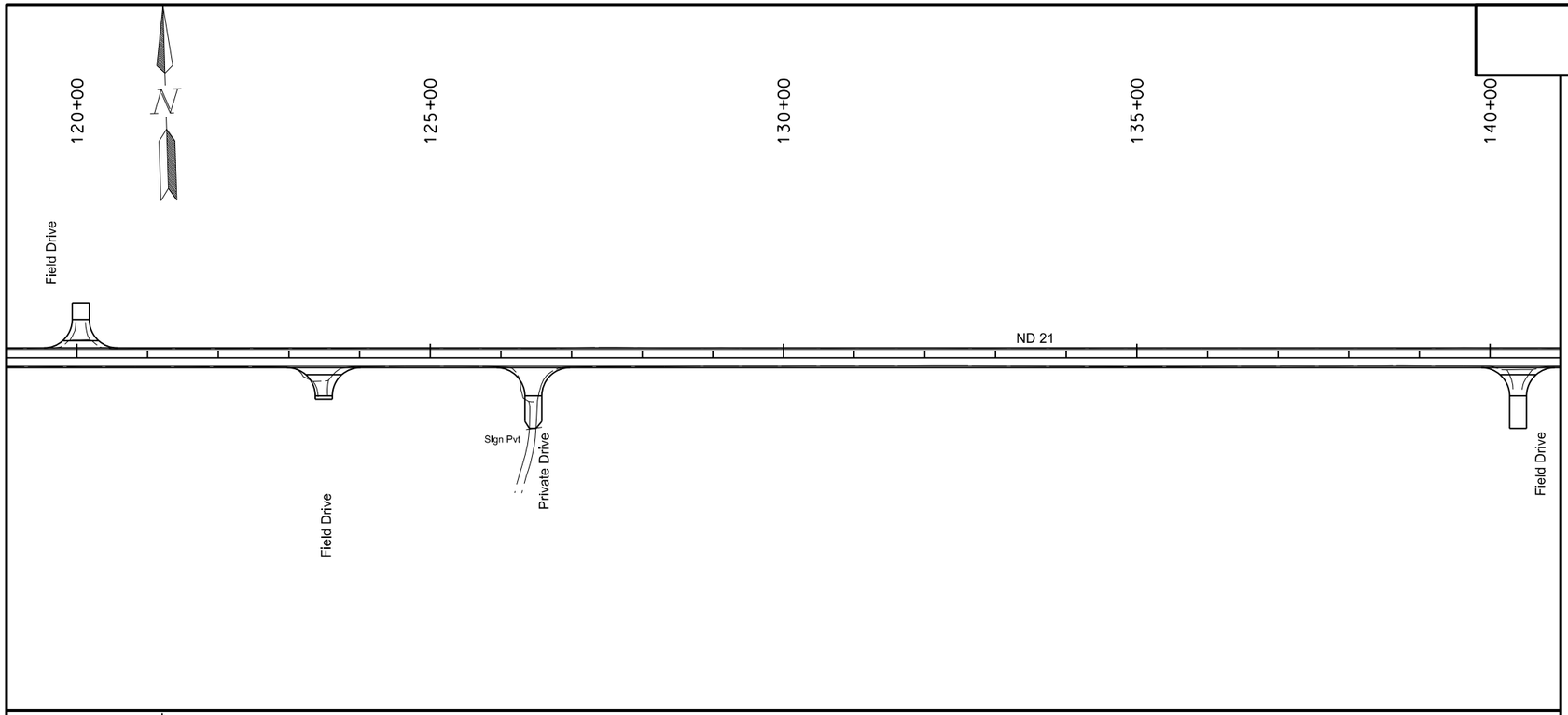
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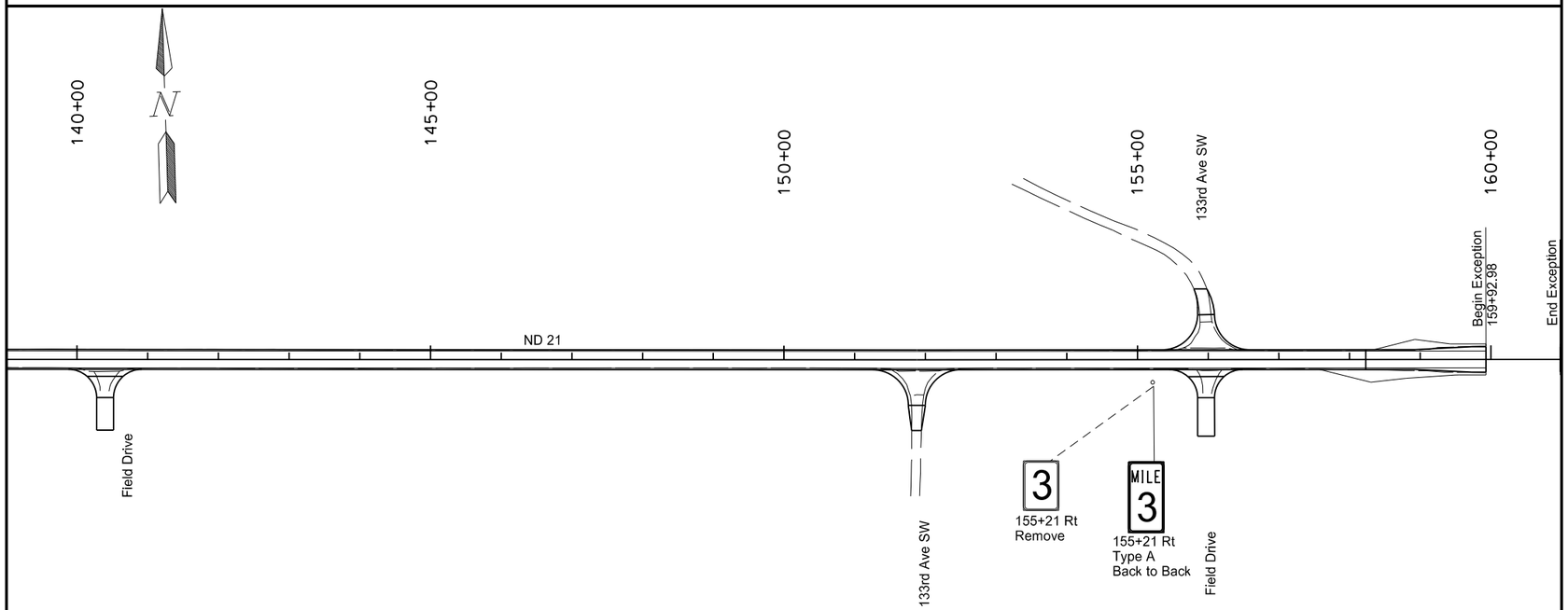
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

80+00 to 120+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	6





SPEC	CODE	BID ITEM	QTY	UNIT
754	0561	REFERENCE MARKER - TYPE A		
		155+21 Rt	1	EA

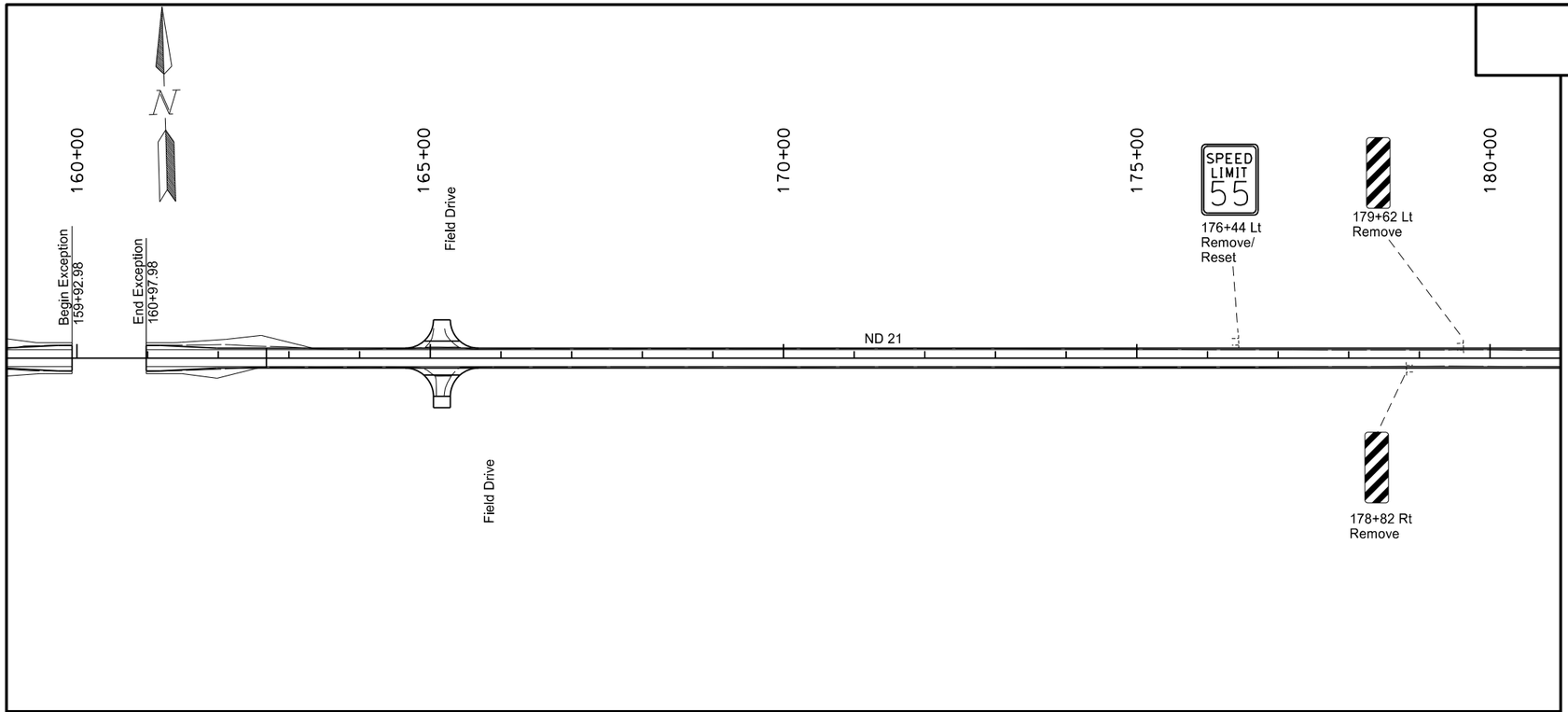
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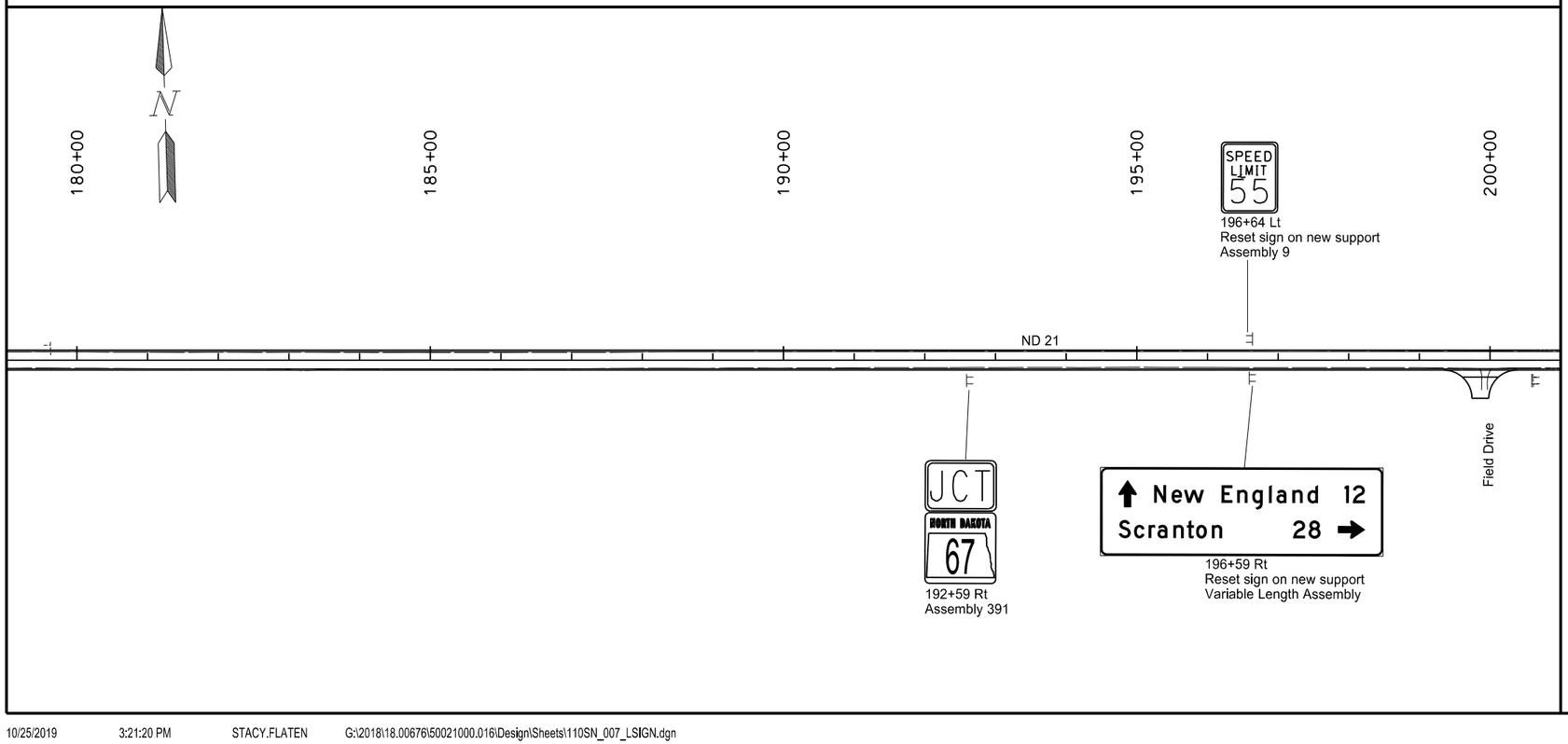
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

120+00 to 159+92.98

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	7





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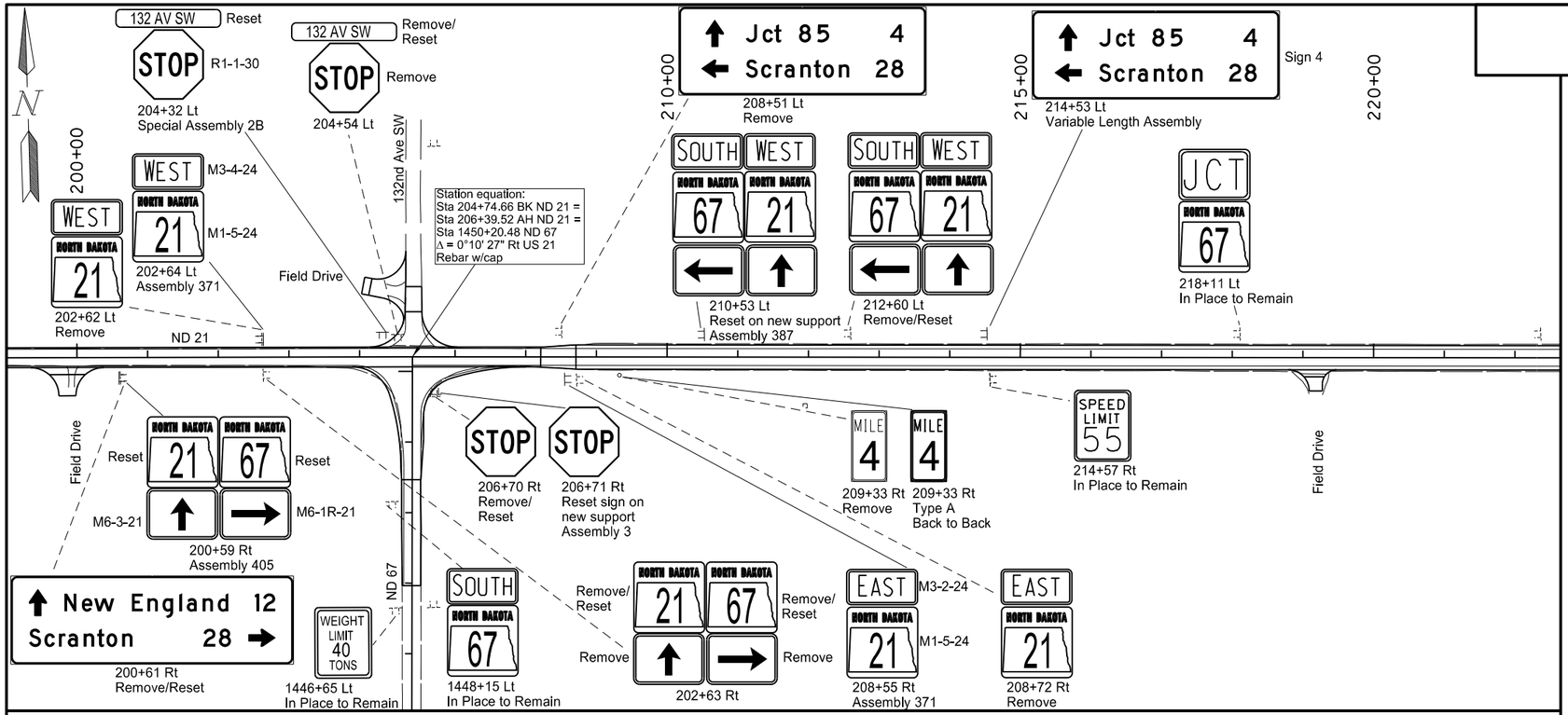
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

160+97.98 to 200+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	8

SPEC	CODE	BID ITEM	QTY	UNIT
754	0561	REFERENCE MARKER - TYPE A		
		209+33 Rt	1	EA



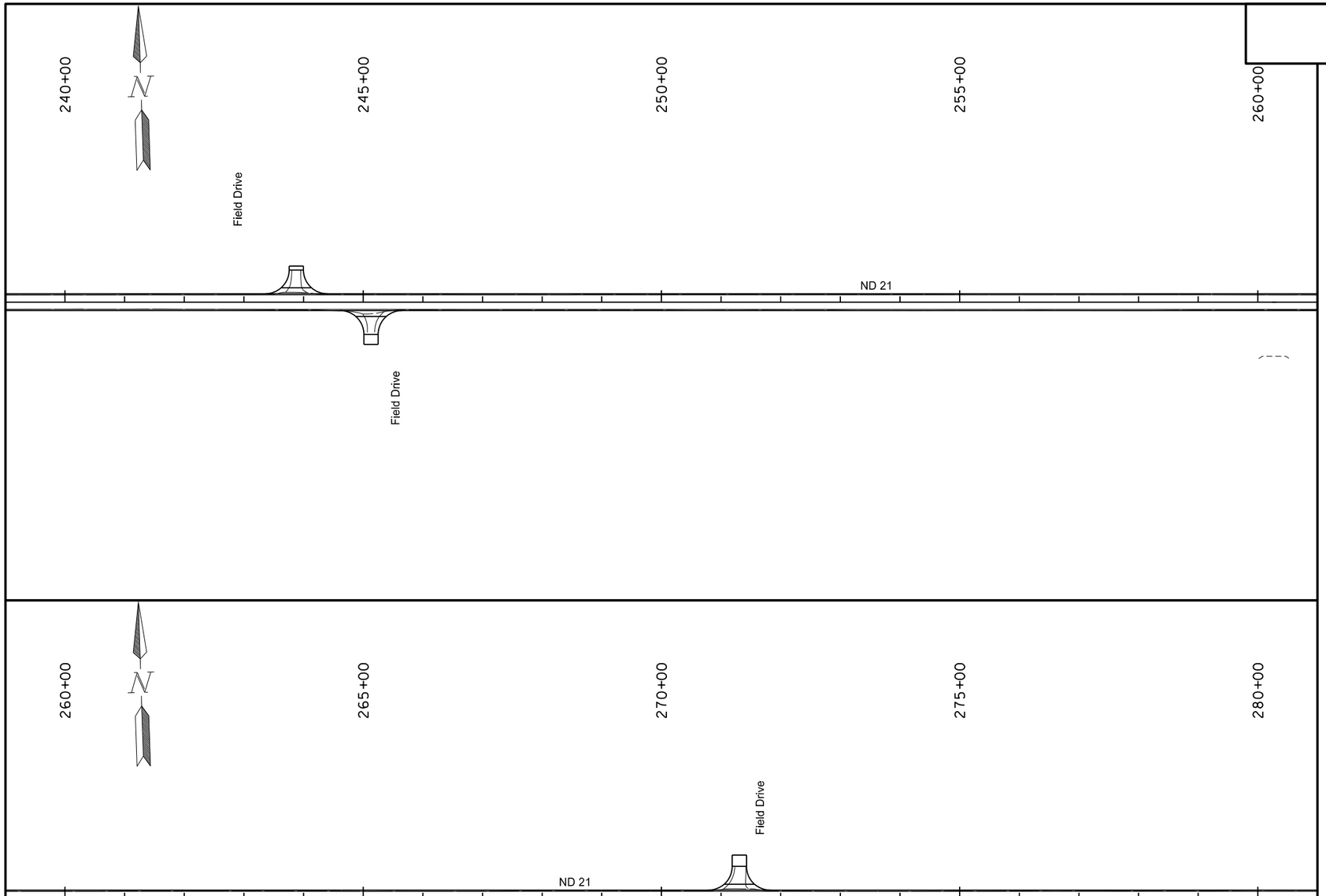
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Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

200+00 to 240+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	9



SPEC	CODE	BID ITEM	QTY	UNIT
754	0561	REFERENCE MARKER - TYPE A		
		263+43 Rt	1	EA

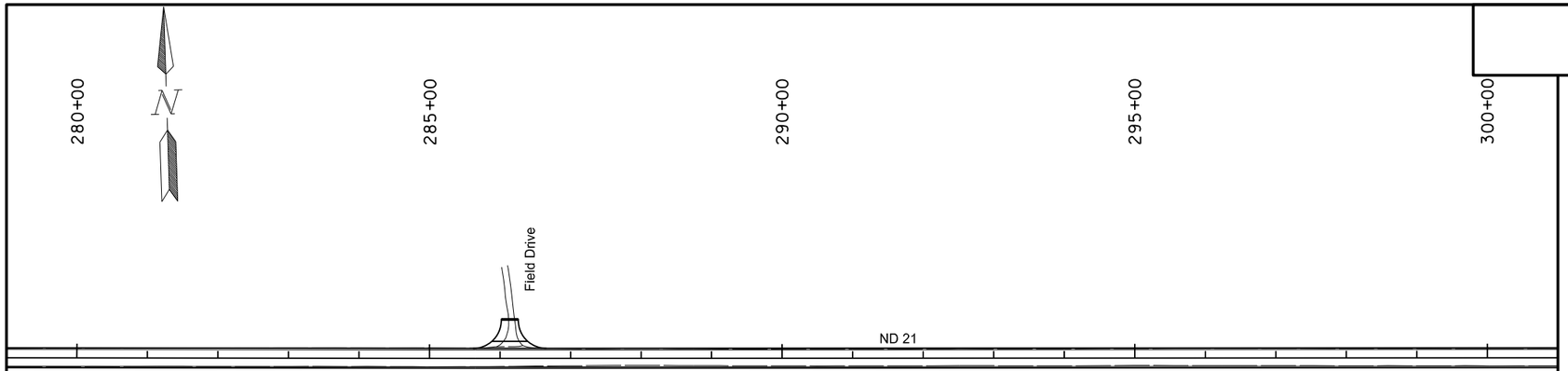
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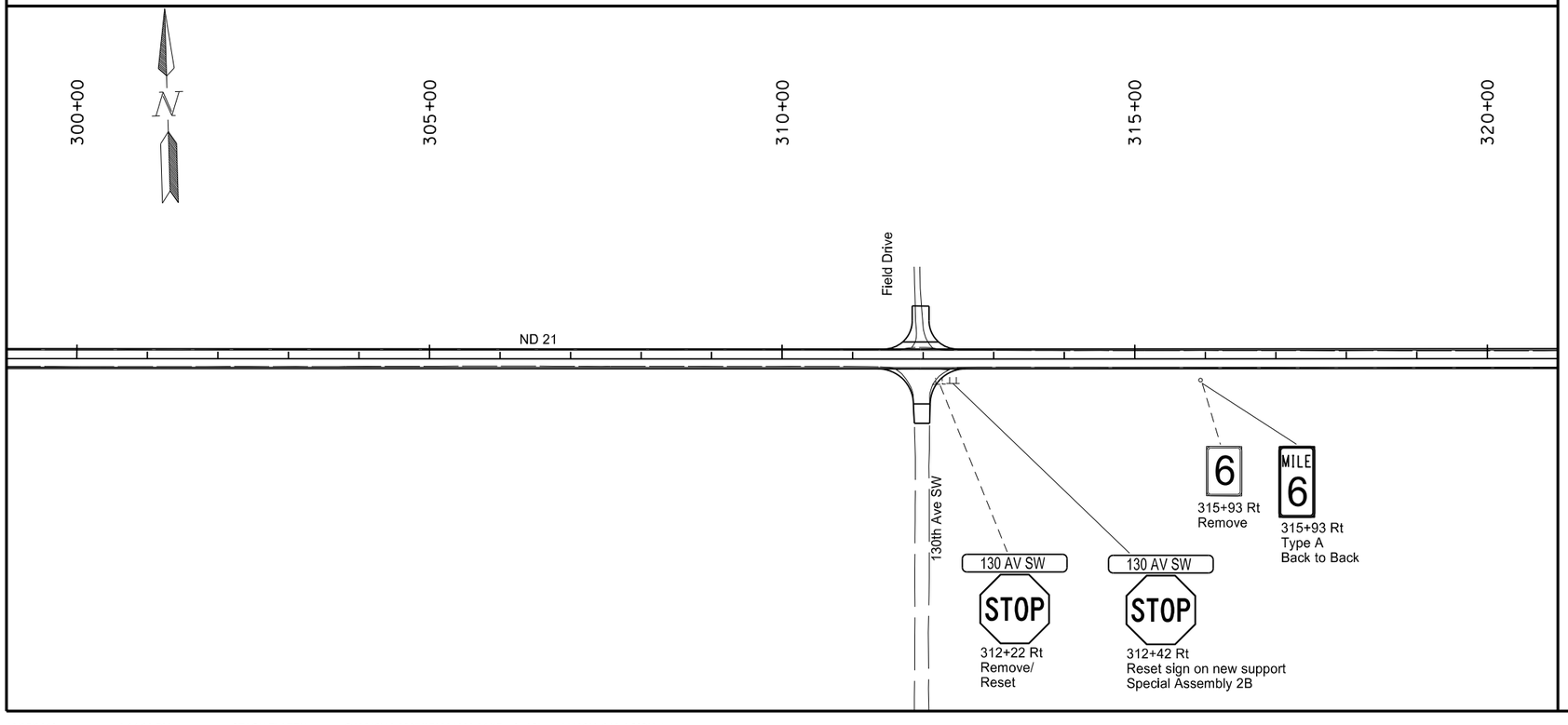
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

240+00 to 280+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	10





SPEC	CODE	BID ITEM	QTY	UNIT
754	0561	REFERENCE MARKER - TYPE A		
		315+93 Rt	1	EA

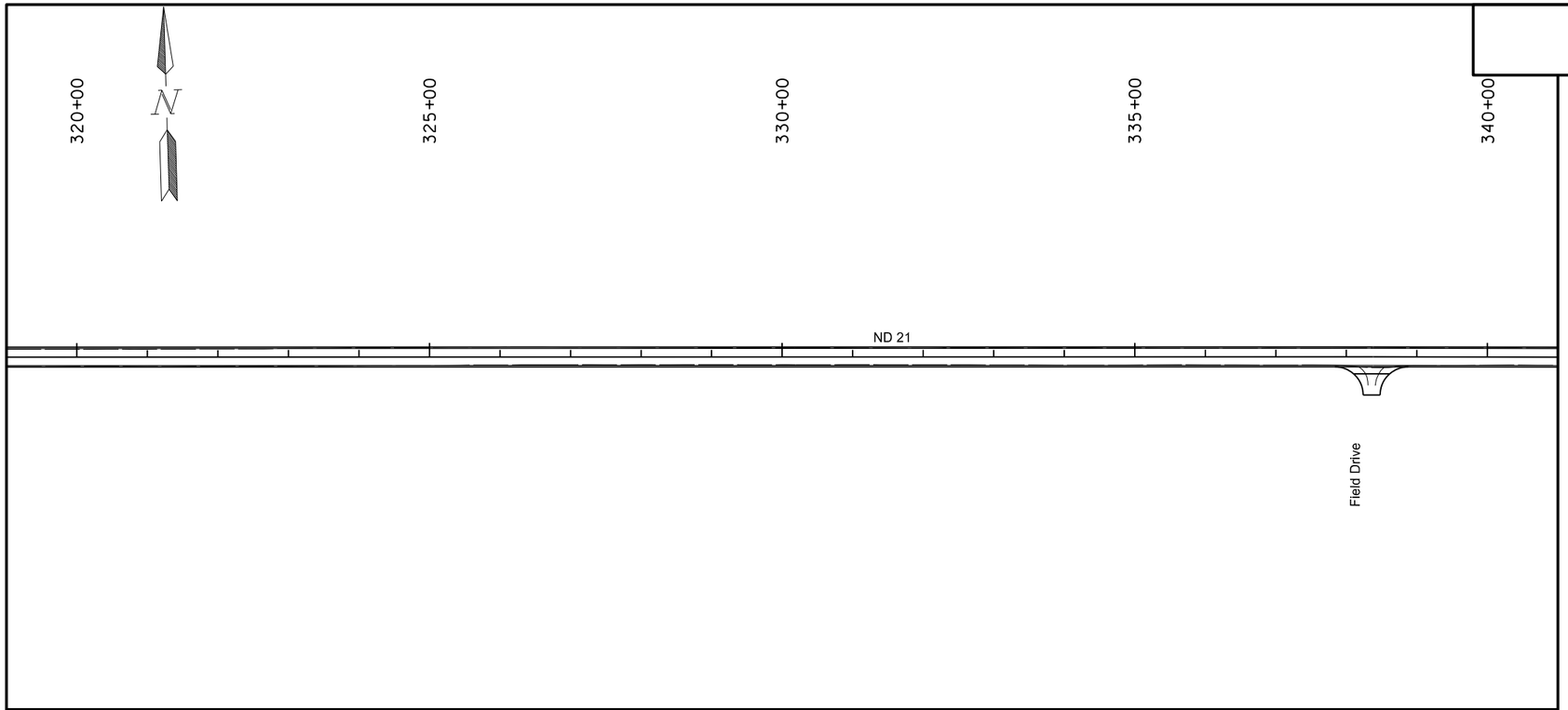
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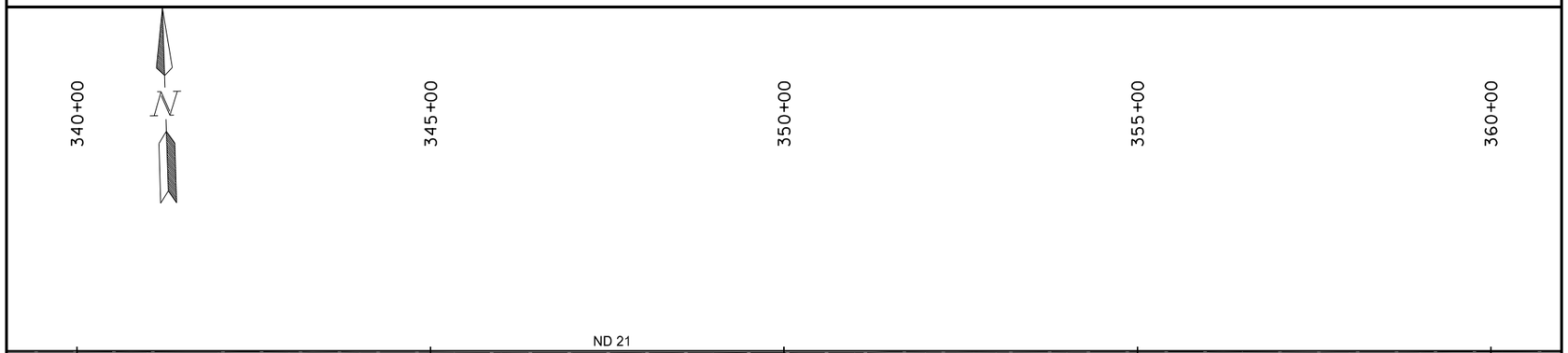
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

280+00 to 320+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	11





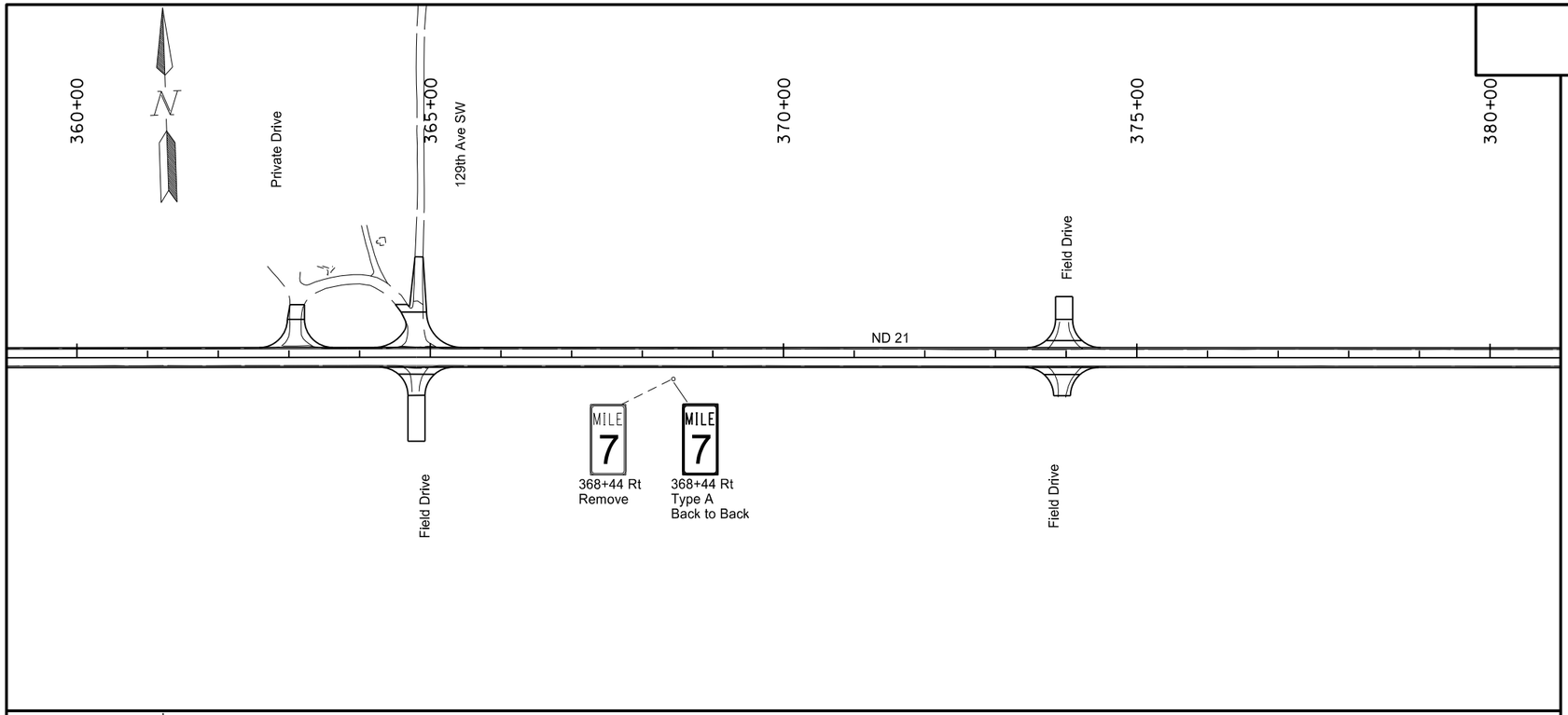
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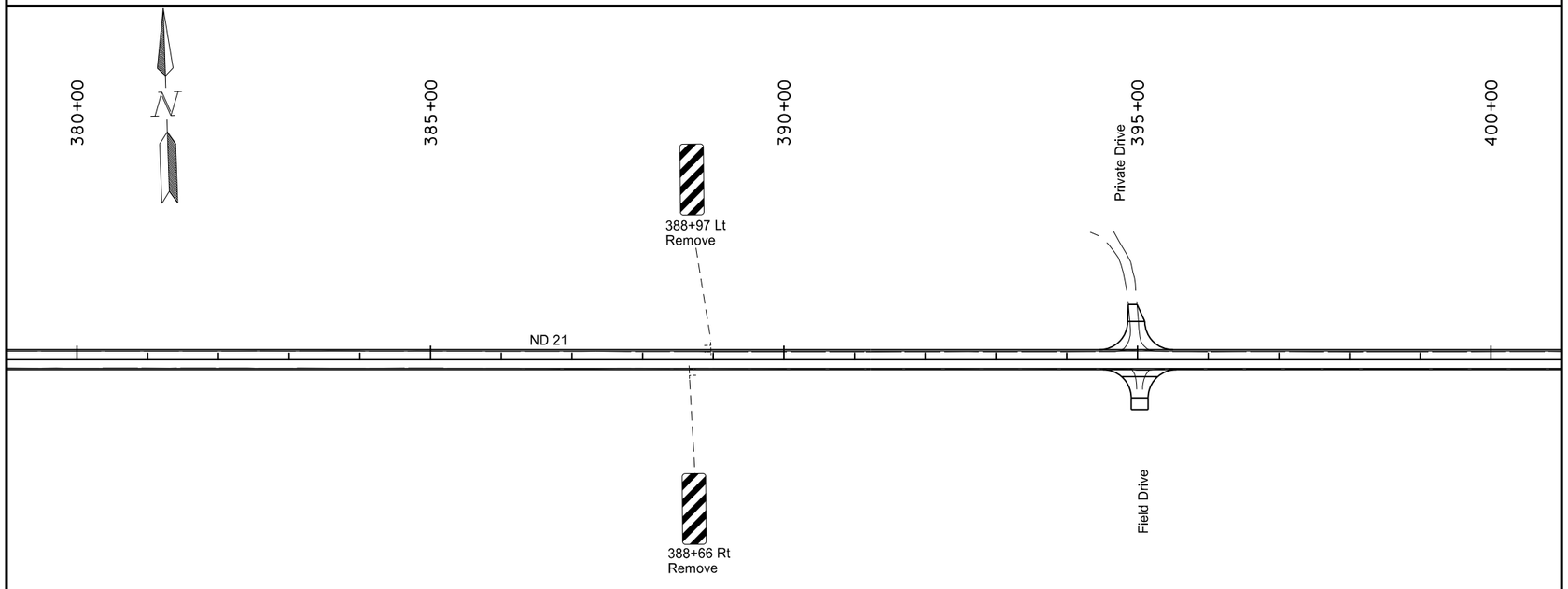
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

320+00 to 360+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	12





SPEC	CODE	BID ITEM	QTY	UNIT
754	0561	REFERENCE MARKER - TYPE A		
		368+44 Rt	1	EA

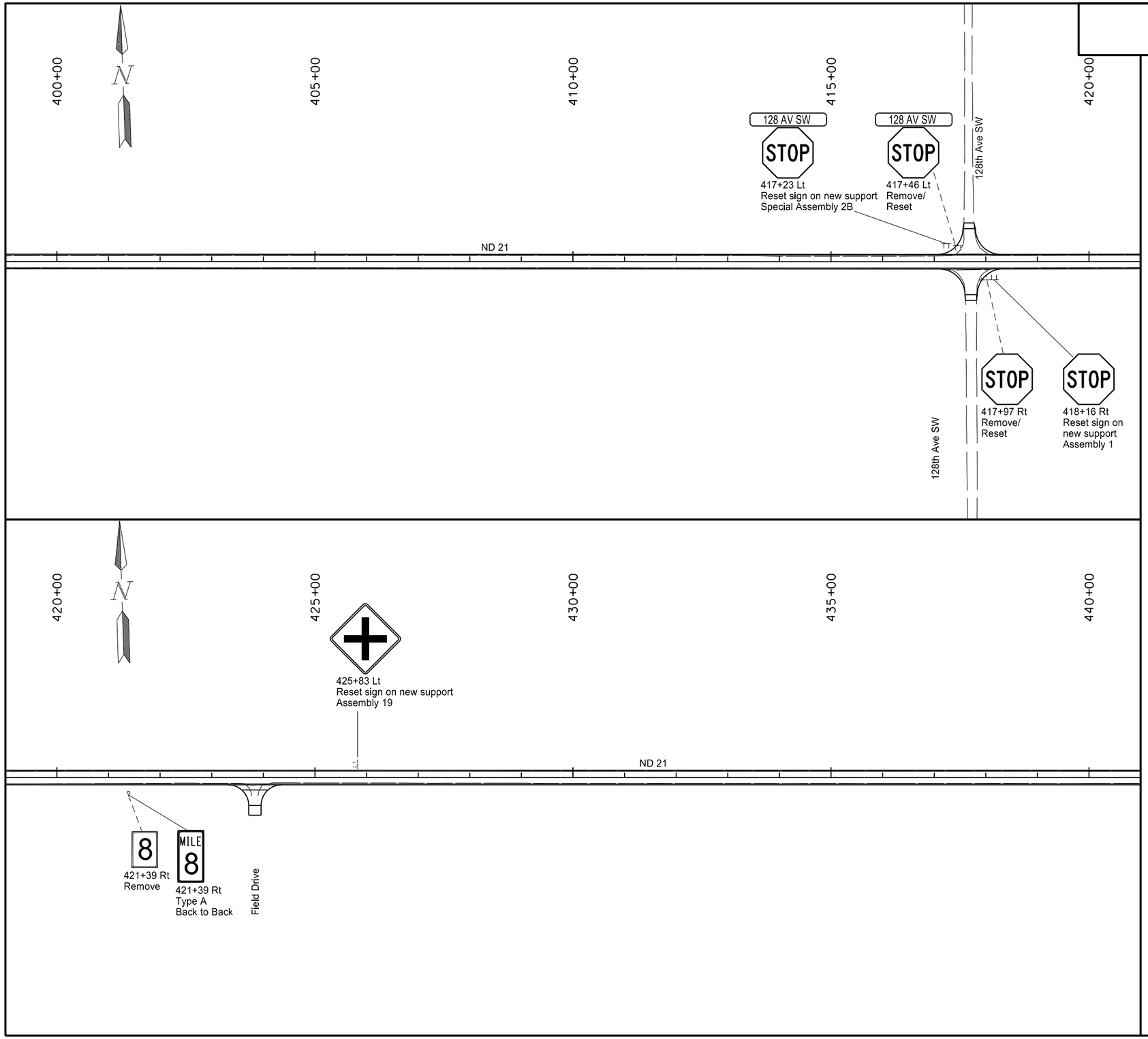
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Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

360+00 to 400+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	13



SPEC	CODE	BID ITEM	QTY	UNIT
754	0561	REFERENCE MARKER - TYPE A		
		421+39 Rt	1	EA

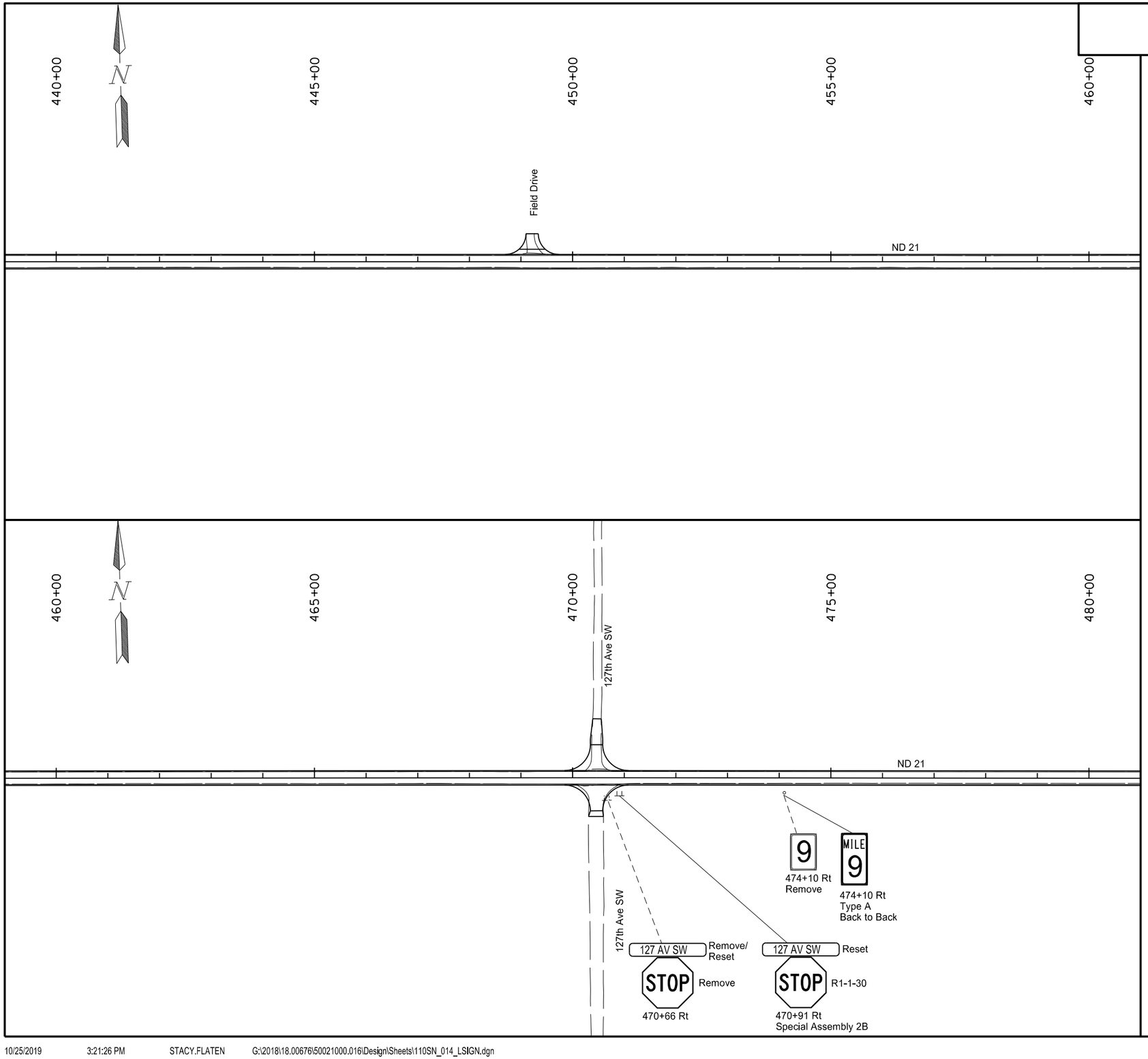
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Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

400+00 to 440+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	14



SPEC	CODE	BID ITEM	QTY	UNIT
754	0561	REFERENCE MARKER - TYPE A		
		474+10 Rt	1	EA

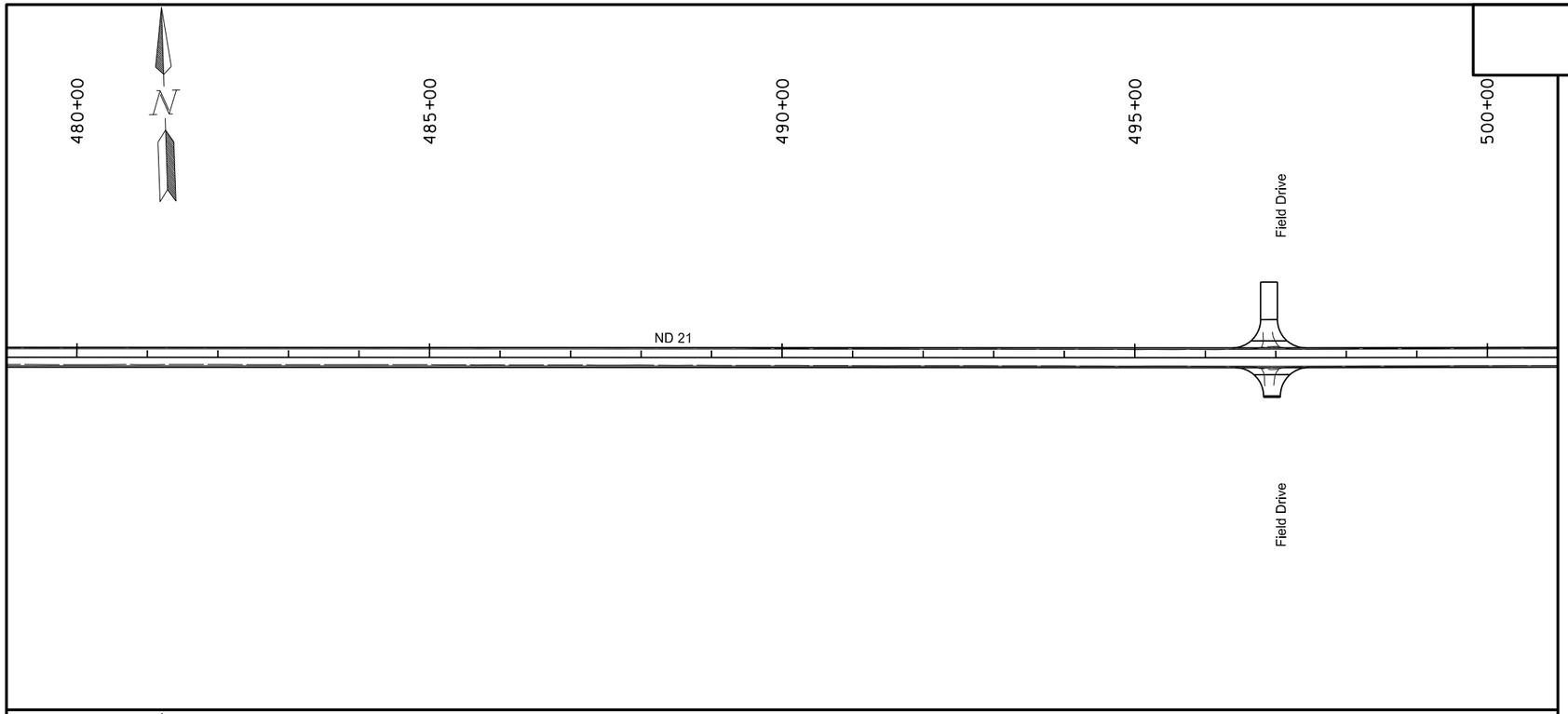
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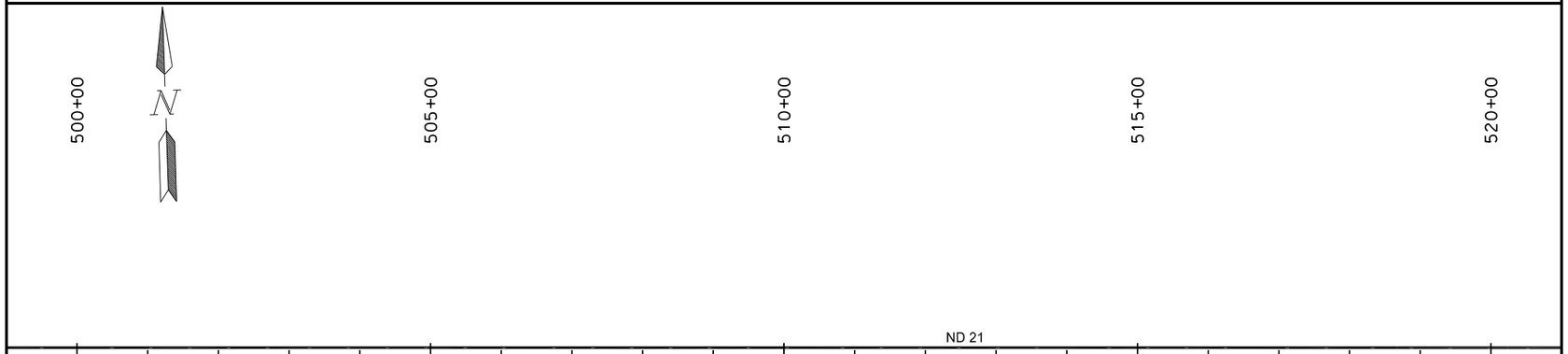
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

440+00 to 480+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	15





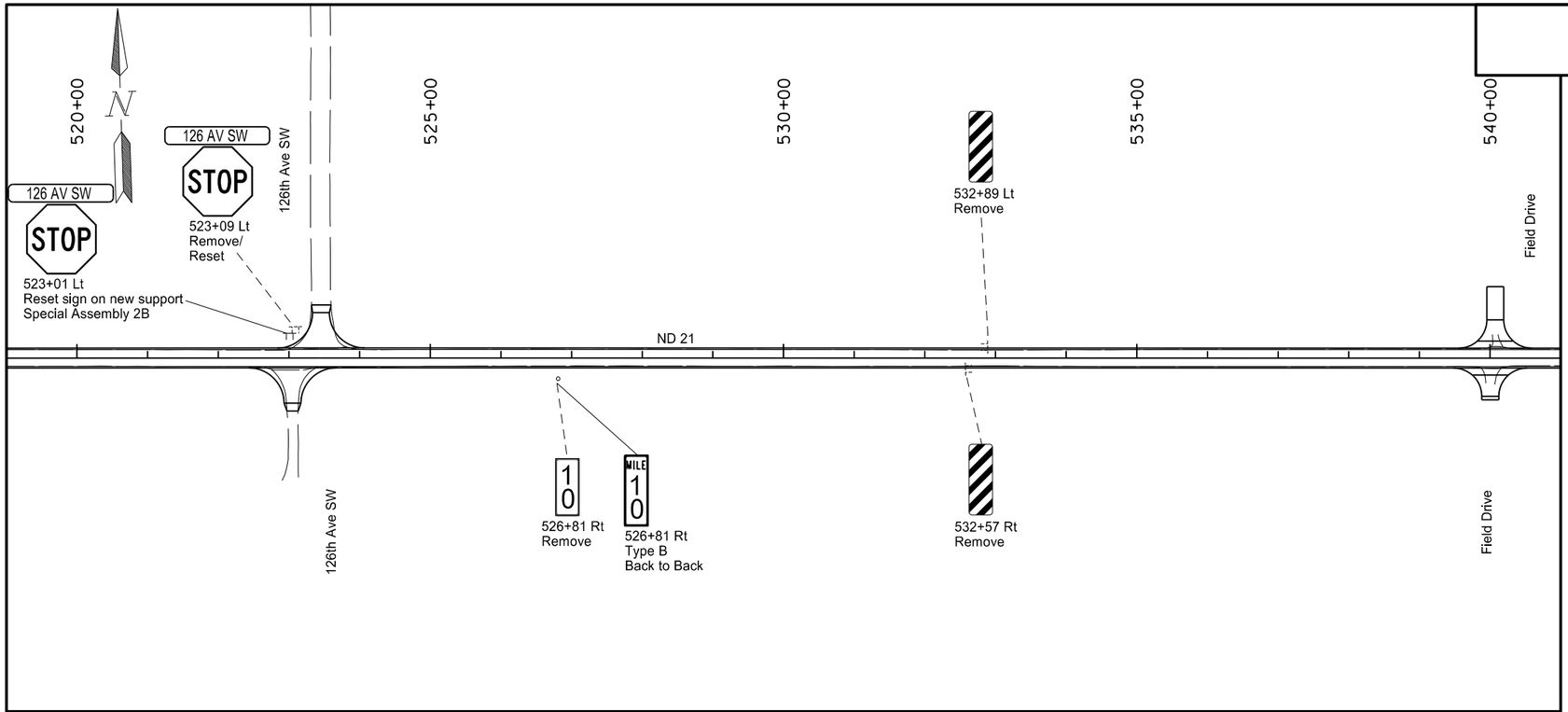
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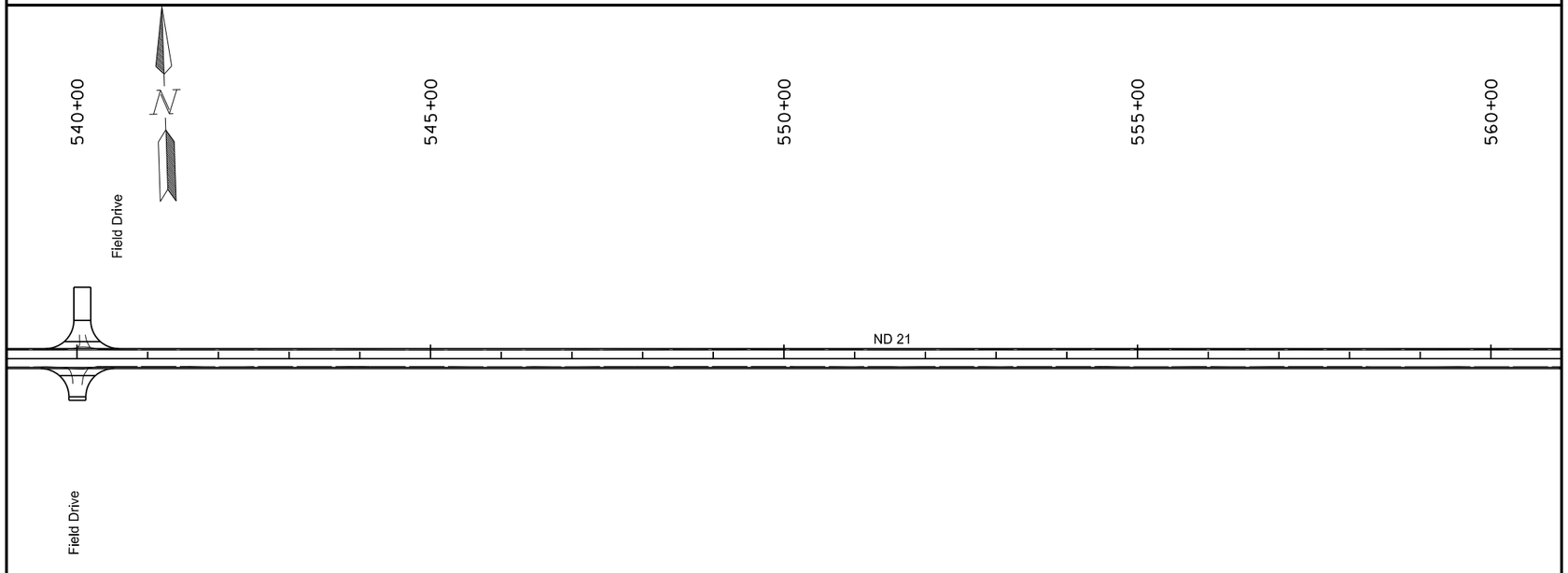
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

480+00 to 520+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	16





SPEC	CODE	BID ITEM	QTY	UNIT
754	0562	REFERENCE MARKER - TYPE B		
		526+81 Rt	1	EA

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Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

520+00 to 560+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	17

560+00 565+00 570+00 575+00 580+00

N

Field Drive

ND 21

Field Drive

568+21 Rt
Reset sign on new support
Assembly 19

125th Ave SW

125 AV SW Remove/ Reset

STOP Remove

576+49 Rt

125 AV SW Reset

STOP R1-1-30

576+67 Rt
Special Assembly 2B

1 1

579+87 Rt
Remove

MILE 1 1

579+87 Rt
Type B
Back to Back

580+00 585+00 590+00 595+00 600+00

N

Field Drive

ND 21

Field Drive

SPEC	CODE	BID ITEM	QTY	UNIT
754	0562	REFERENCE MARKER - TYPE B		
		579+87 Rt	1	EA

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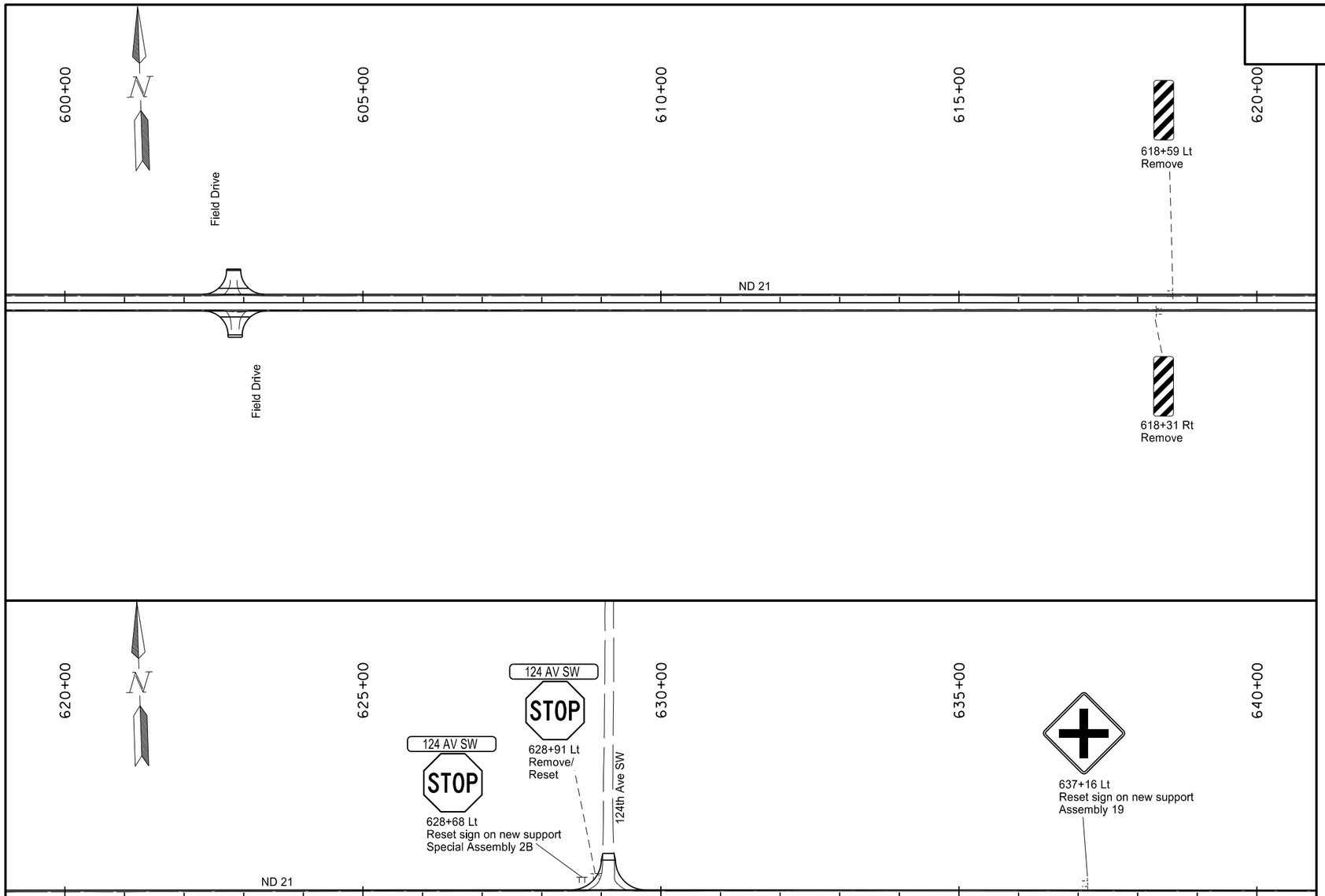
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

560+00 to 600+00

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	18



SPEC	CODE	BID ITEM	QTY	UNIT
754	0562	REFERENCE MARKER - TYPE B		
		632+46 Rt	1	EA

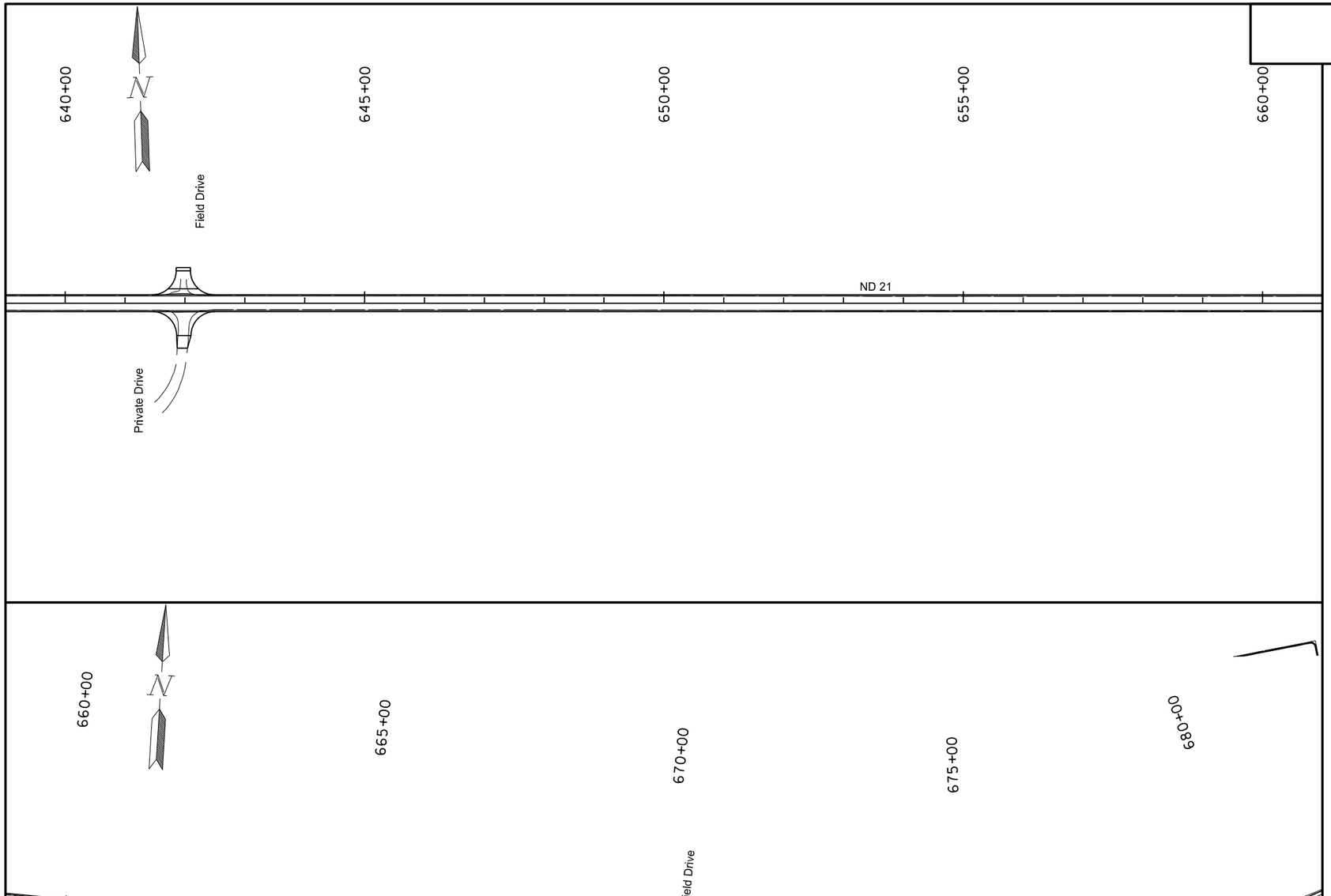
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Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

600+00 to 640+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	19



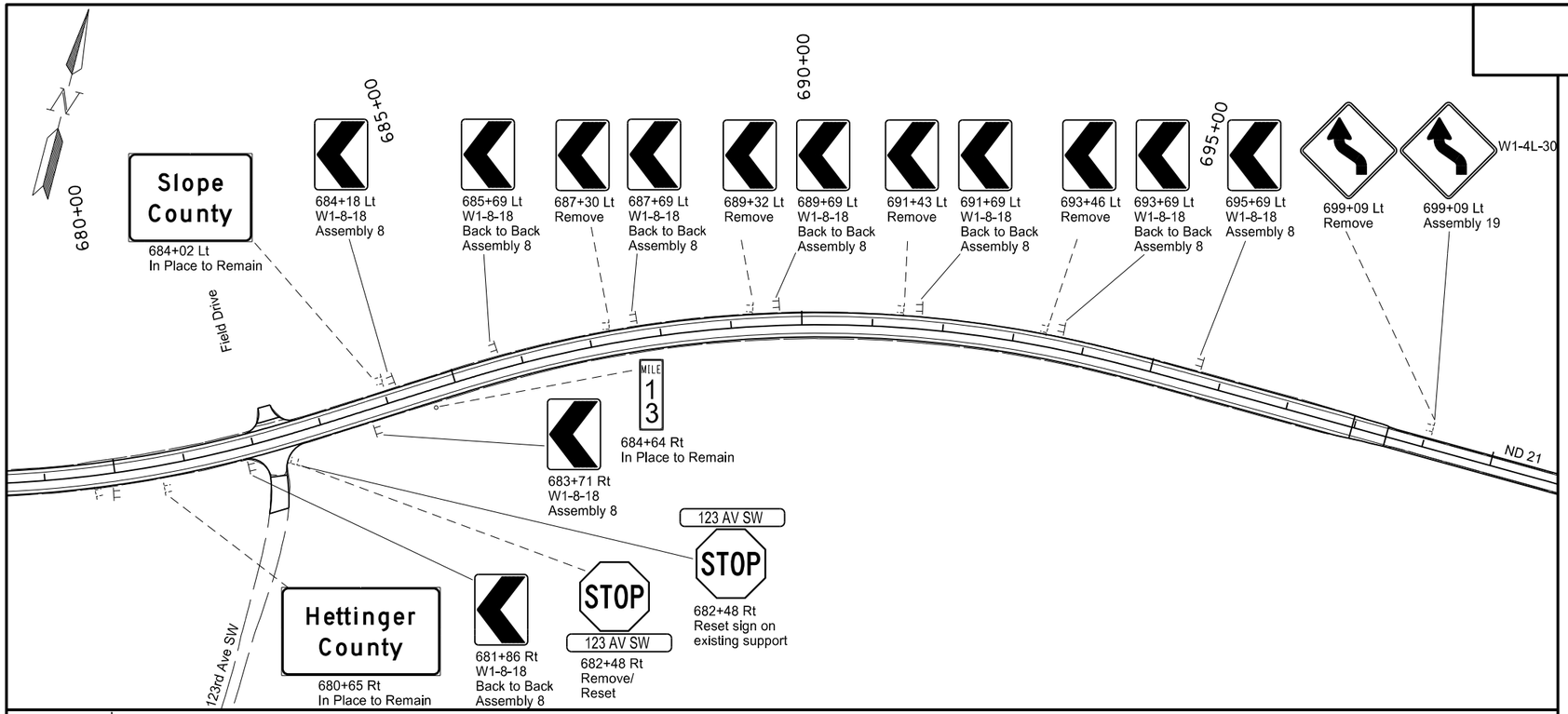
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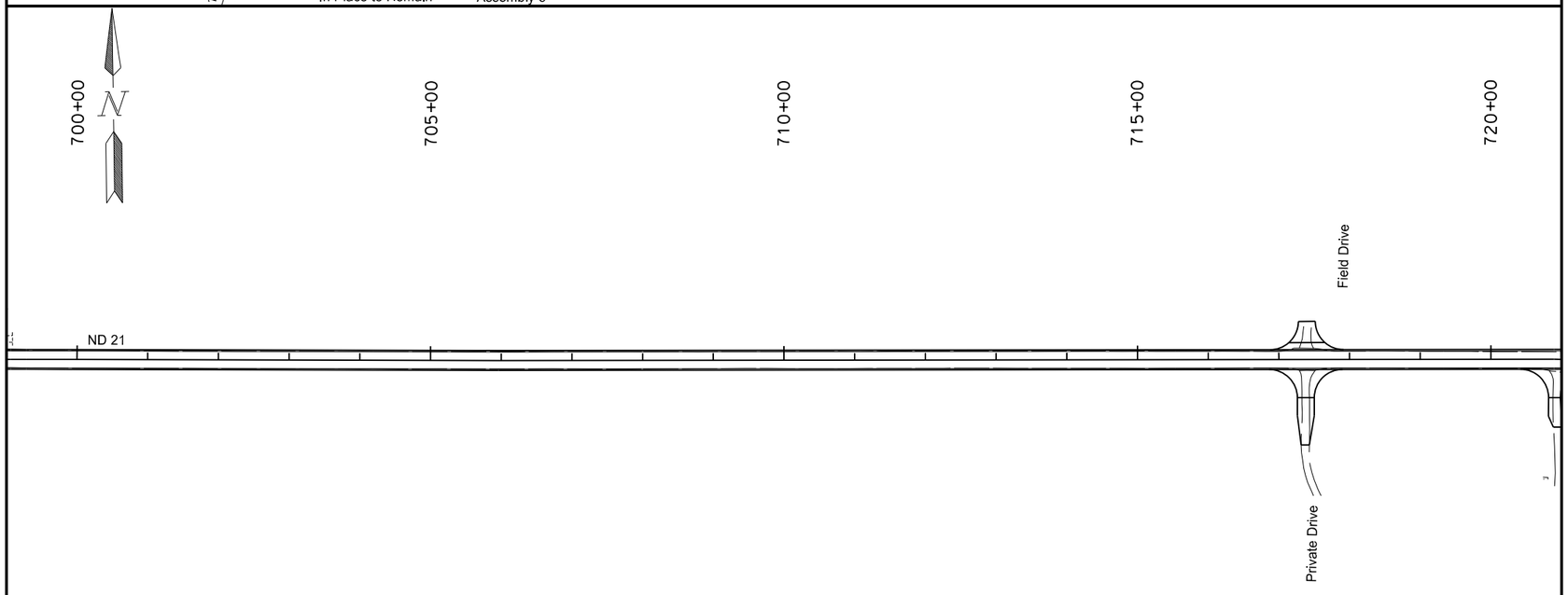
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

640+00 to 680+00

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	110	20





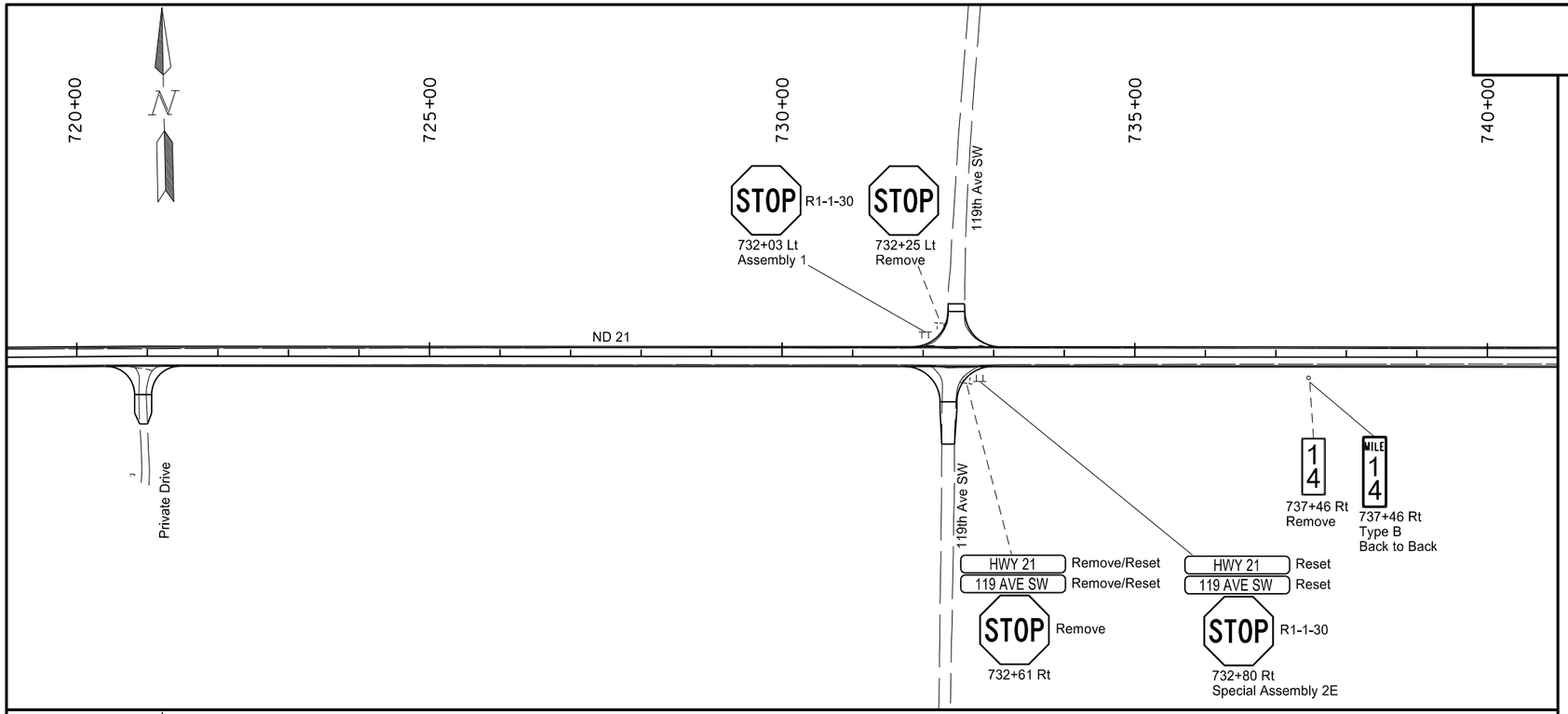
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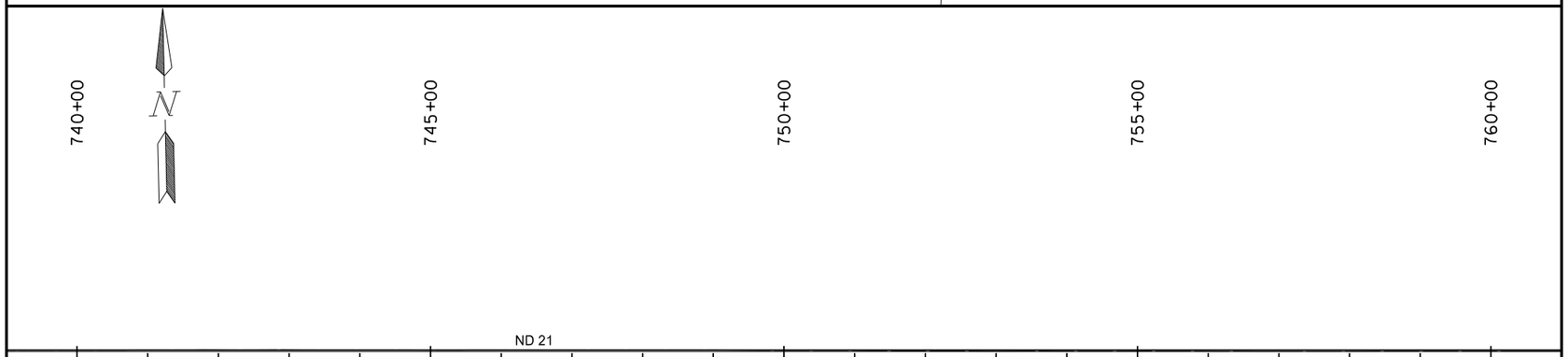
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

680+00 to 720+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	21





SPEC	CODE	BID ITEM	QTY	UNIT
754	0562	REFERENCE MARKER - TYPE B		
		737+46 Rt	1	EA

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Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

720+00 to 760+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	22

760+00 765+00 770+00 775+00 780+00

N

ND 21

780+00 785+00 790+00 795+00 800+00

N

Field Drive

ND 21

118th Ave SW

HWY 21
118 AVE SW
STOP
788+25 Rt
Remove/
Reset

HWY 21
118 AVE SW
STOP
788+43 Rt
Reset sign on new support
Special Assembly 2E

15
790+31 Rt
Remove

MILE
15
790+31 Rt
Type B
Back to Back

SPEC	CODE	BID ITEM	QTY	UNIT
754	0562	REFERENCE MARKER - TYPE B		
		790+31 Rt	1	EA

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Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

760+00 to 800+00

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	110	23

800+00 805+00 810+00 815+00 820+00

N

ND 21

Private Drive

Private Drive

Signs Pvt

Private Drive

814+88 Rt
Reset sign on new support
Assembly 20

JCT
NORTH DAKOTA
22

818+88 Rt
Reset sign on
new support
Assembly 391

820+00

N

WEST
NORTH DAKOTA
21

825+61 Lt
Reset sign on
new support
Assembly 371

WEIGHT LIMIT 40 TONS

827+42 Lt
Remove

STOP

828+28 Lt
Reset sign on
new support
Assembly 1

825+00

STOP

GREEN RIVER ORDINANCE IN EFFECT

828+44 Lt
Remove/
Reset

R2-1-24
SPEED LIMIT 35

R5-2-24

828+93 Lt
Special
Assembly
B

GREEN RIVER ORDINANCE IN EFFECT

828+43 Lt
Reset sign on
new support
Assembly 7

Main St

SPEED LIMIT 35
NO TRUCKS

828+93 Lt
Remove

830+00

830+12 Lt
Reset sign on
new support
Assembly 399

2410+00

ND 22

Billboard

ADOPT-A-HIGHWAY
DWCRC

Remove/
Reset

830+85 Lt

ADOPT-A-HIGHWAY
DWCRC

ADOPT
installed by NDDOT

Reset

830+85 Lt
Special Assembly C

HWY 22
61 ST SW

STOP

2409+15 Rt
In Place to Remain

SPEED LIMIT 55

821+55 Lt
Remove/
Reset

SPEED LIMIT 55

823+42 Lt
Reset sign on
new support
Assembly 9

ND 21

NORTH DAKOTA 22

NORTH DAKOTA 21

2408+57 Rt
In Place to Remain

STOP

830+88 Rt
Reset sign on
new support
Assembly 3

Sign Pvt

ADOPT-A-HIGHWAY
NEW ENGLAND LIONS CLUB

Remove/
Reset

831+07 Rt

ADOPT-A-HIGHWAY
NEW ENGLAND LIONS CLUB

ADOPT
installed by NDDOT

Reset

831+07 Rt
Special Assembly C

821+14 Rt
Remove/
Reset

EAST
NORTH DAKOTA
21

822+88 Rt
Reset sign on
new support
Assembly 379

JCT
NORTH DAKOTA
22

823+82 Rt
Remove/
Reset

824+88 Rt
Reset sign on
new support
Assembly 399

825+07 Rt
Remove/
Reset

EAST
NORTH DAKOTA
21

826+94 Rt
Remove/
Reset

Recovery Approach

2405+00

Billboard
w/Lht

ND 22

New England

826+88 Rt
Reset sign on
new support
Special Assembly A

New England

828+24 Rt
Remove/
Reset

Dickinson 25
Reeder 32

Sign 2

829+32 Rt
Variable Length Assembly

Dickinson 25
Reeder 32

829+42 Rt
Remove

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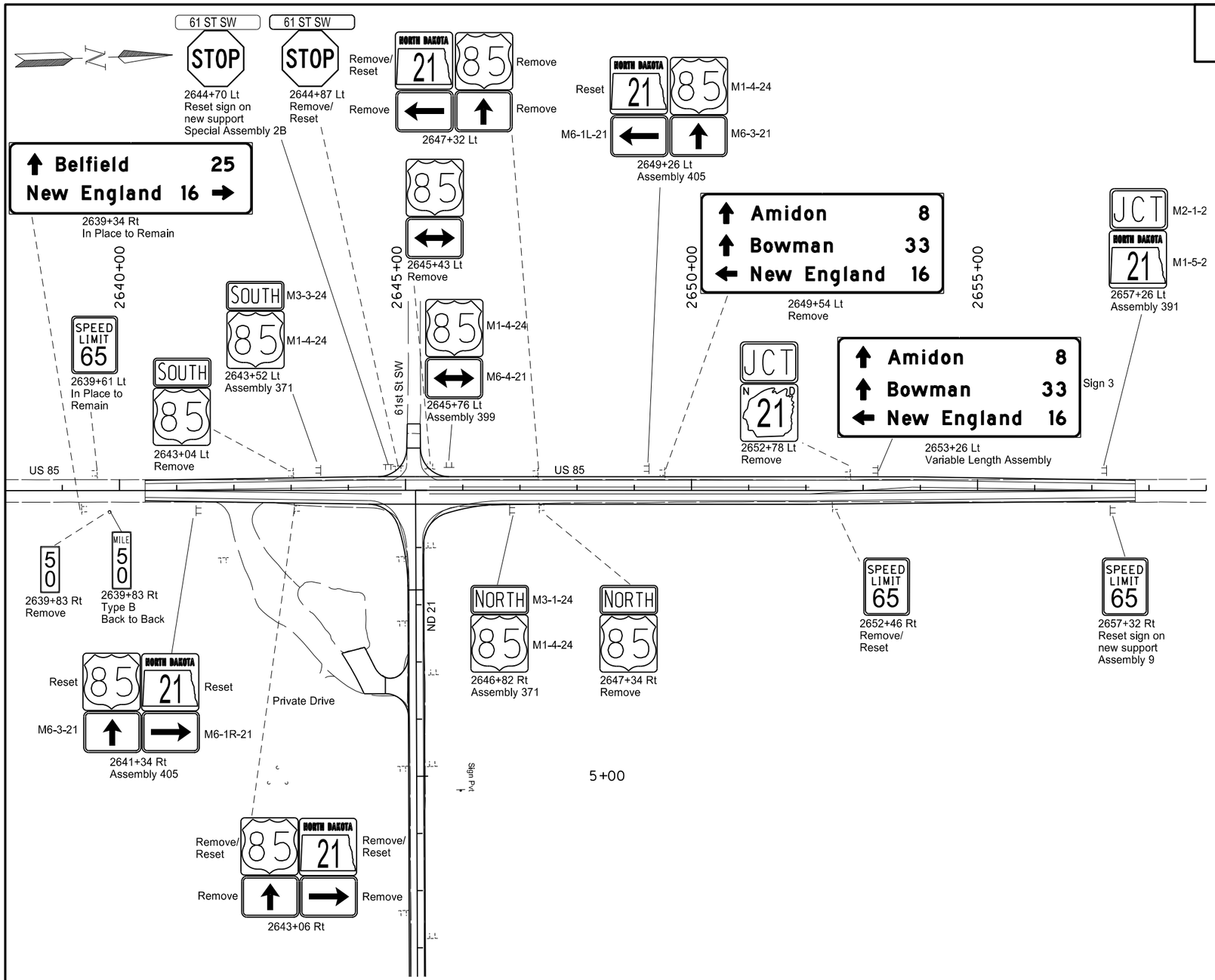
Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

800+00 to 831+41.88

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	110	24

SPEC	CODE	BID ITEM	QTY	UNIT
754	0562	REFERENCE MARKER - TYPE B		
		2639+83 Rt	1	EA



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Signing Layout

ND 21
Jct 85 to N Jct 22 - New England

US 85

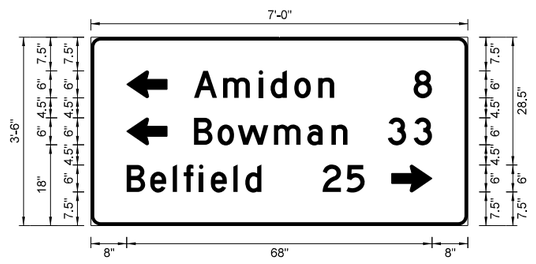
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	110	25

SIGN NUMBER	Sign 1
WIDTH X HEIGHT	7'-0" x 3'-6"
BORDER WIDTH	0.75" (inset 0")
CORNER RADIUS	2.25"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ND_6IN_TYPE D	8	28.5	6	9	90
ND_6IN_TYPE D	8	18	6	9	90
ND_6IN_TYPE D	67	7.5	6	9	270

STATION(S):
4+64 Lt

AREA: 24.5 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.sst

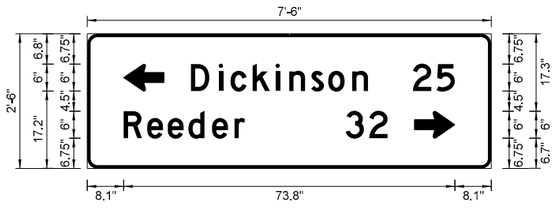
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
A	m	i	d	o	n															31.2	6/4.5	D 2000
23	29.5	37.4	40	45.3	50.7																	
8																				4.1	6	D 2000
71.9																						
B	o	w	m	a	n															34.1	6/4.5	D 2000
23	28.2	32.7	40.8	48.2	53.6																	
3	3																			9.8	6	D 2000
66.2	71.9																					
B	e	l	f	i	e	l	d													30	6/4.5	D 2000
8	13.2	18.3	20.7	24.1	26.7	31.8	34.4															
2	5																			9.4	6	D 2000
51.6	56.9																					

SIGN NUMBER	Sign 2
WIDTH X HEIGHT	7'-6" x 2'-6"
BORDER WIDTH	0.75" (inset 0")
CORNER RADIUS	2.25"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ND_6IN_TYPE D	8.1	17.3	6	9	90
ND_6IN_TYPE D	72.9	6.8	6	9	270

STATION(S):
829+32 Rt

AREA: 18.8 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.sst

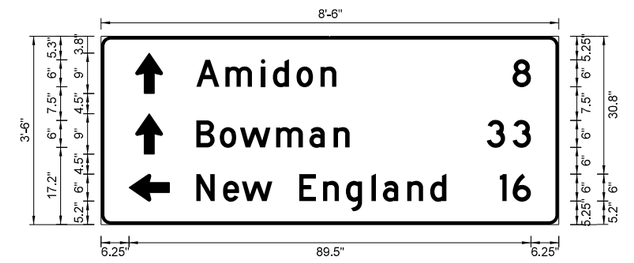
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
D	i	c	k	i	n	s	o	n												39.4	6/4.5	D 2000
23.1	29.3	31.9	36.8	41.9	45	49.9	53.7	59														
2	5																			9.4	6	D 2000
72.5	77.8																					
R	e	e	d	e	r															27	6/4.5	D 2000
8.1	13.3	17.9	22.5	27.8	32.8																	
3	2																			9.4	6	D 2000
57.5	62.8																					

SIGN NUMBER	Sign 3
WIDTH X HEIGHT	8'-6" x 3'-6"
BORDER WIDTH	0.75" (inset 0")
CORNER RADIUS	2.25"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ND_6IN_TYPE D	7.7	29.3	6	9	0
ND_6IN_TYPE D	7.7	15.8	6	9	0
ND_6IN_TYPE D	6.2	5.3	6	9	90

STATION(S):
2653+26 Lt

AREA: 29.8 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.sst

LETTER POSITION (X)																				LENGTH	SIZE	SERIES
A	m	i	d	o	n															31.2	6/4.5	D 2000
21.2	27.7	35.6	38.3	43.6	48.9																	
8																				4.1	6	D 2000
91.7																						
B	o	w	m	a	n															34.1	6/4.5	D 2000
21.2	26.5	31	39	46.4	51.8																	
3	3																			9.8	6	D 2000
85.9	91.7																					
N	e	w		E	n	g	l	a	n	d										55.7	6/4.5	D 2000
21.2	27.2	31.4	38.2	44.2	49.4	54.6	60.3	62.8	68.2	73.3												
1	6																			6.9	6	D 2000
88.9	91.7																					

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Signing Details

ND 21
Jct 85 to N Jct 22 - New England

Signs 1 to 3

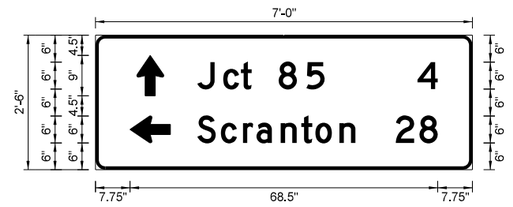
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	110	26

SIGN NUMBER	Sign 4
WIDTH X HEIGHT	7'-0" x 2'-6"
BORDER WIDTH	0.75" (inset 0")
CORNER RADIUS	2.25"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ND_6IN_TYPE D	9.2	16.5	6	9	0
ND_6IN_TYPE D	7.7	6	6	9	90

STATION(S):
214+53 Lt

AREA: 17.5 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssl

LETTER POSITION (X)																		LENGTH	SIZE	SERIES
J	c	t		8	5													28.4	6/4.5	D 2000
22.7	28.5	32.4	34.8	40.8	47															
4																		4.5	6	D 2000
71.8																				
S	c	r	a	n	t	o	n											35.2	6/4.5	D 2000
22.7	28	32.9	35.9	41.3	45.9	49	54.4													
2	8																	9.4	6	D 2000
66.9	72.2																			

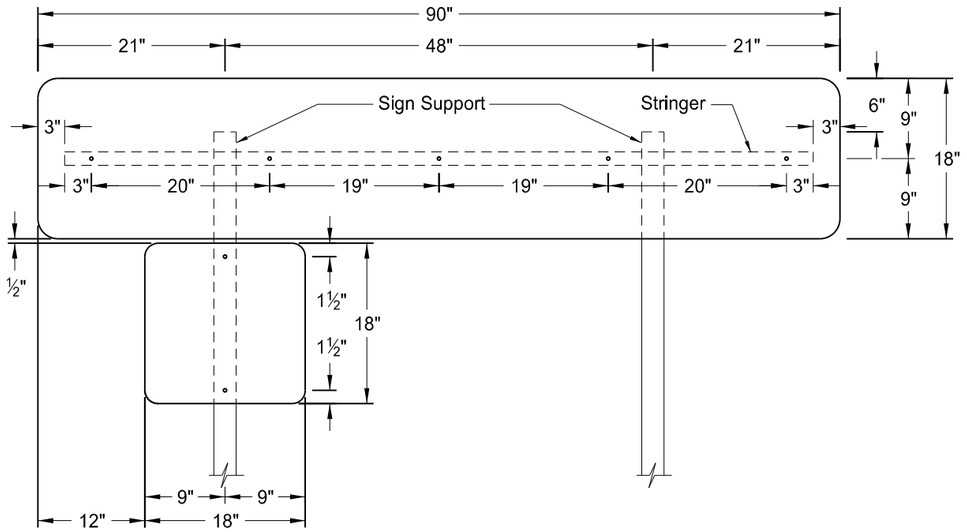
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Signing Details

ND 21
Jct 85 to N Jct 22 - New England

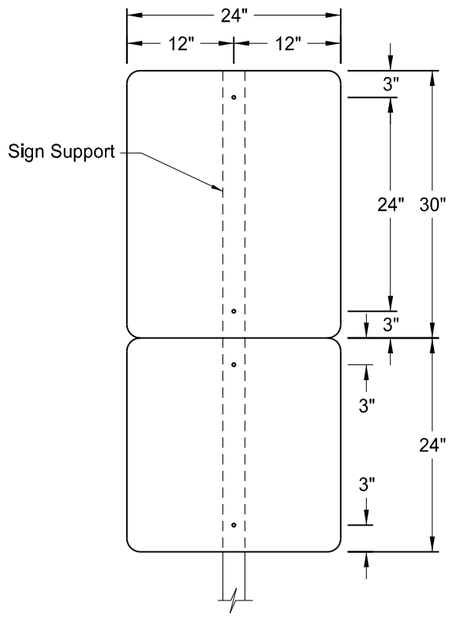
Sign 4

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	110	27



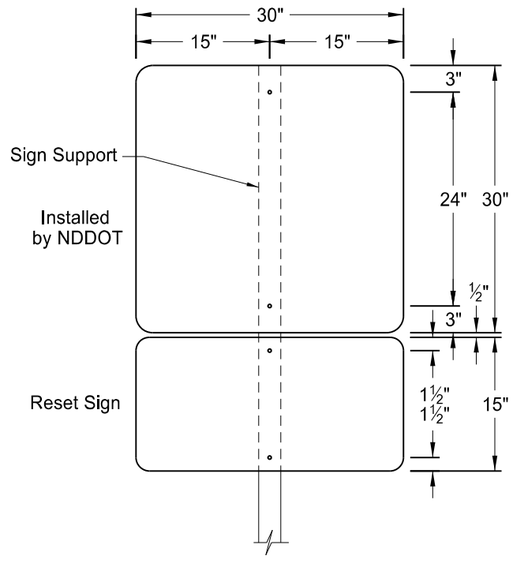
Special Assembly A
826+88 Rt

Design Area: 13.5 SF
Reset Sign



Special Assembly B
828+93 Lt

Design Area: 9 SF
Pay Area: 9 SF



Special Assembly C
830+85 Lt
831+07 Rt

Design Area: 9.4 SF
Reset Sign

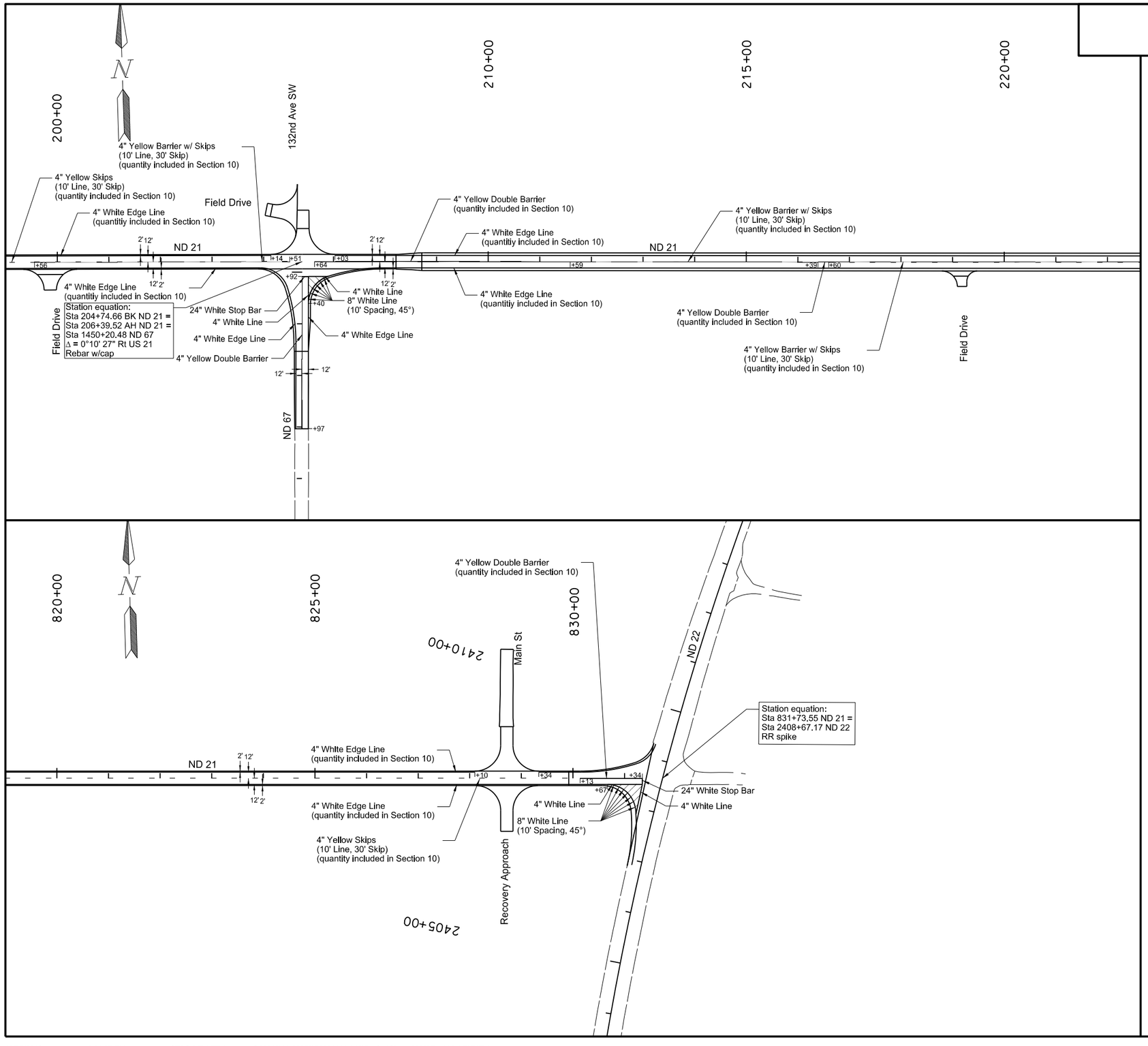
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Signing Details

ND 21
Jct 85 to N Jct 22 - New England

Special Assemblies

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	120	1



SPEC	CODE	BID ITEM	QTY	UNIT
762	1104	PVMT MK PAINTED 4IN LINE		
		White Edge Line (ND 67 & ND 21)	718	LF
		White Edge Line (ND 21 & ND 22)	98	LF
		White Line (ND 67 & ND 21)	90	LF
		White Line (ND 21 & ND 22)	127	LF
		Yellow Double Barrier (ND 67 & ND 21)	590	LF
		Yellow Double Barrier (ND 21 & ND 22)	234	LF
762	1108	PVMT MK PAINTED 8IN LINE		
		White Line (ND 67 & ND 21)	54	LF
		White Line (ND 21 & ND 22)	102	LF
762	1124	PVMT MK PAINTED 24IN LINE		
		Stop Bar (ND 67 & ND 21)	12	LF
		Stop Bar (ND 21 & ND 22)	12	LF

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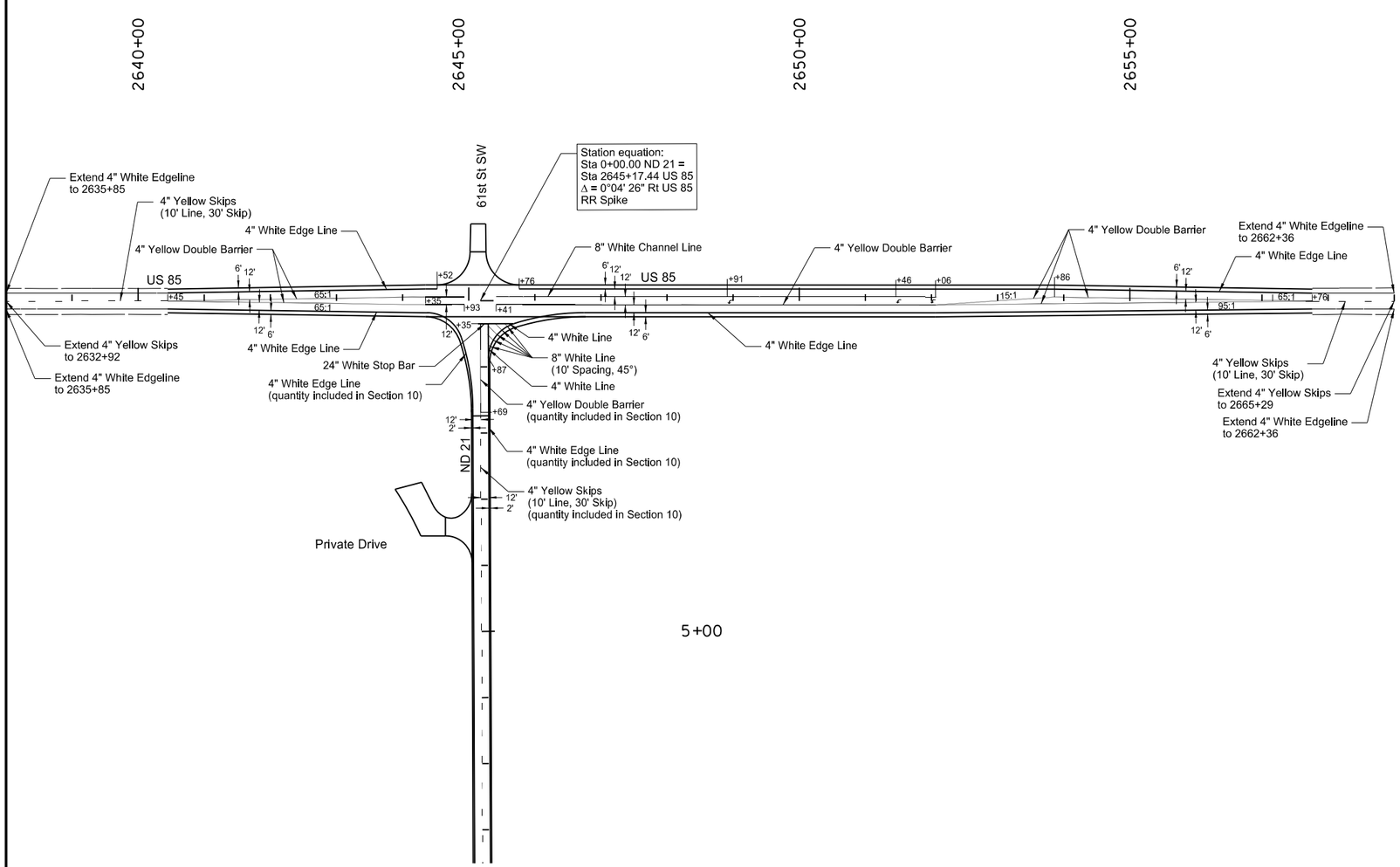
Pavement Marking

ND 21
Jct 85 to N Jct 22 - New England

200+00 to 222+00
820+00 to 831+41.88

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	120	2

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE		
		Arrow (LT) 16 SF x 3 EA	48	SF
762	1104	PVMT MK PAINTED 4IN LINE		
		White Edge Line	5034	LF
		White Line	91	LF
		Yellow Double Barrier	5406	LF
		Yellow Skips	377	LF
762	1108	PVMT MK PAINTED 8IN LINE		
		White Channel Line	665	LF
		White Line	53	LF
762	1124	PVMT MK PAINTED 24IN LINE		
		Stop Bar	12	LF



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Pavement Marking

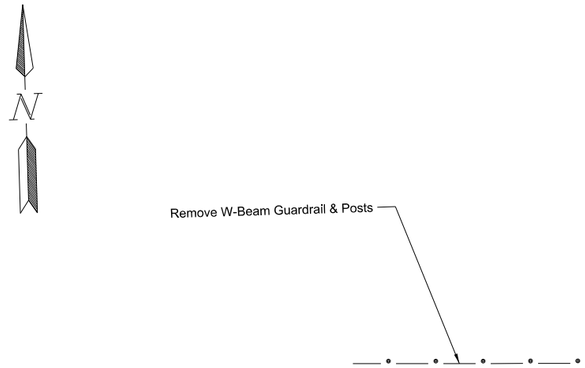
ND 21
Jct 85 to N Jct 22 - New England

US 85
2632+92 to 2665+29

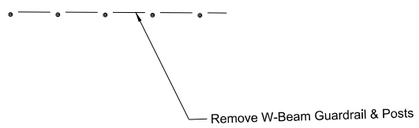
23 USC § 409 Documents
NDDOT Reserves All Objections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	130	1

SPEC	CODE	BID ITEM	QTY	UNIT
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		104+12 to 104+27 Lt	15	LF
		104+12 to 104+27 Rt	15	LF
		Total	30	LF



ND 21



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Remove W-Beam Guardrail

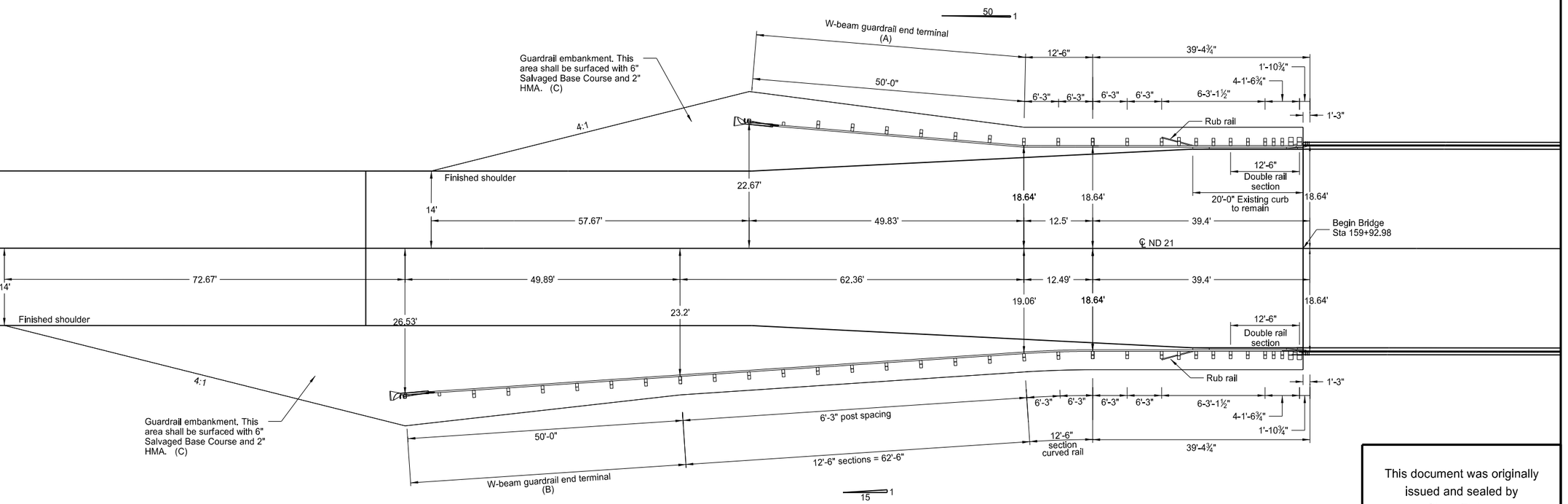
Box Culvert
Structure # 21-001.974

ND 21
Jct 85 to N Jct 22 - New England

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23 USC § 409 Documents
NDDOT Reserves All Objections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	130	2



(A) Reset a FLEAT end terminal at this location. Use the flare shown on Standard D-764-6.

(B) Reset a FLEAT end terminal at this location.

(C) Embankment included in Section 11 earthwork summary. See Section 10 for paving quantities. See Standard D-764-22 for additional grading details.

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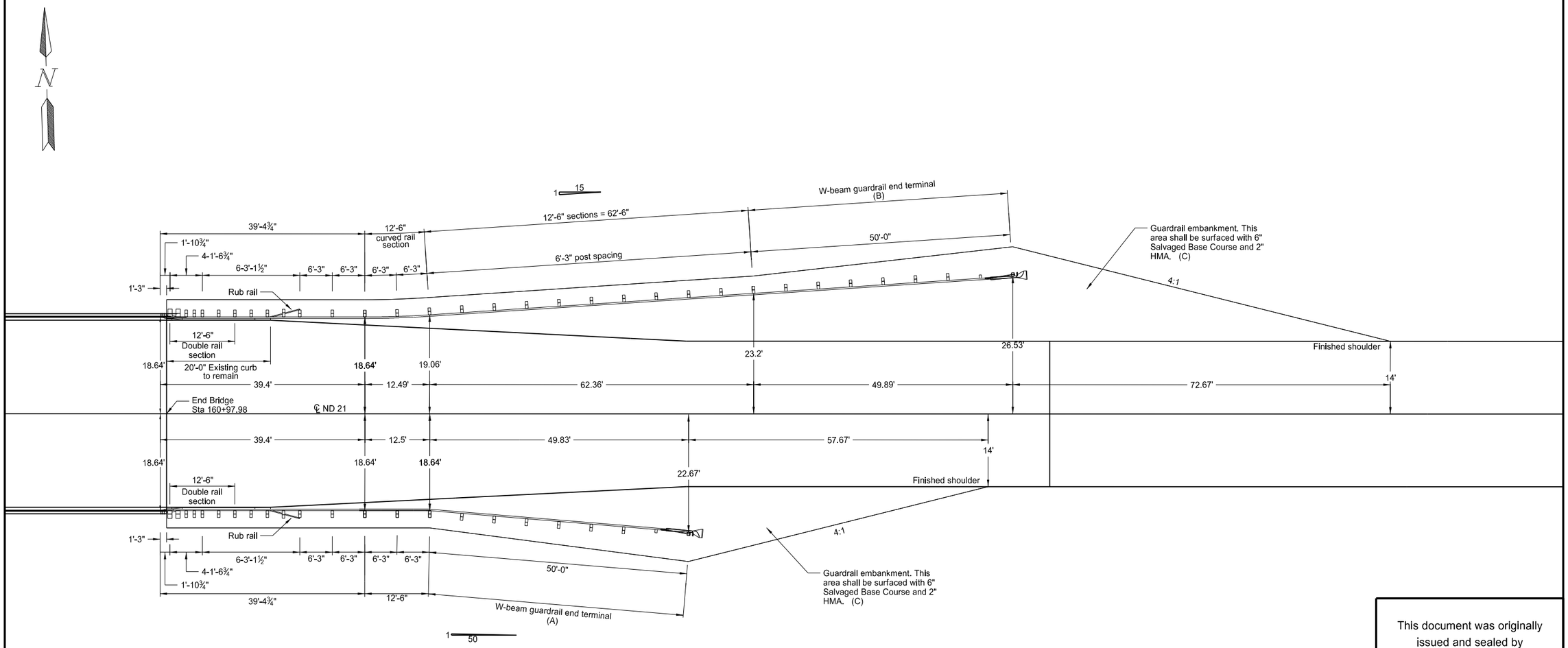
W-Beam Guardrail Layout
At Beginning of Bridge

Cannonball River Bridge
Structure # 21-003.078

ND 21
Jct 85 to N Jct 22 - New England

23 USC § 409 Documents
NDDOT Reserves All Objections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	130	3



(A) Reset a FLEAT end terminal at this location. Use the flare shown on Standard D-764-6.

(B) Reset a FLEAT end terminal at this location.

(C) Embankment included in Section 11 earthwork summary. See Section 10 for paving quantities. See Standard D-764-22 for additional grading details.

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W-Beam Guardrail Layout
At End of Bridge

Cannonball River Bridge
Structure # 21-003.078

ND 21
Jct 85 to N Jct 22 - New England

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23 USC § 409 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	130	4

W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

W-BEAM GUARDRAIL AT BRIDGE ENDS

LOCATION	(A) 5/8" ø X 1 1/4" LONG GUARD-RAIL BOLT EACH	(A) 6" X 8" X 6'-0 TIMBER POST EACH	(A) 6" X 8" X 14" TIMBER BLOCK EACH	(A) 5/8" ø X 1 1/4" LONG GUARD-RAIL BOLT EACH	(A) 12'-6" STRAIGHT W-BEAM RAIL SECTION EACH	(A) 12'-6" CURVED W-BEAM RAIL SECTION EACH	(A) REFL-ECTOR-IZED PLATES EACH
Sta 159+42.33 to 159+54.83 LT	3	3	3	8		1	1
Sta 159+42.34 to 159+54.83 RT	3	3	3	8		1	1
Sta 161+36.13 to 162+10.98 LT	13	13	13	48	5	1	3
Sta 161+36.13 to 161+48.63 RT	3	3	3	8		1	1
TOTAL	22	22	22	80	5	4	6

(A) These items are not to be bid separately but shall be included in the price bid for the item "W-Beam Guardrail".

SPEC	CODE	BID ITEM	QTY	UNIT
764	0131	W-BEAM GUARDRAIL		
		Sta 159+42.33 to 159+54.83 Lt	12.5	LF
		Sta 159+42.34 to 159+54.83 Rt	12.5	LF
		Sta 161+36.13 to 162+10.98 Lt	75.0	LF
		Sta 161+36.13 to 161+48.63 Rt	12.5	LF
		Total	112.5	LF
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 159+42.33 to 159+94.23 Lt	51.9	LF
		Sta 158+79.98 to 159+94.23 Rt	114.4	LF
		Sta 160+96.73 to 162+10.98 Lt	114.4	LF
		Sta 160+96.73 to 161+48.63 Rt	51.9	LF
		Total	332.6	LF
764	1050	RESET W-BEAM GUARDRAIL		
		Sta 159+54.83 to 159+94.23 Lt	39.4	LF
		Sta 158+79.98 to 159+42.34 Rt	62.5	LF
		Sta 159+54.83 to 159+94.23 Rt	39.4	LF
		Sta 160+96.73 to 161+36.13 Lt	39.4	LF
		Sta 160+96.73 to 161+36.13 Rt	39.4	LF
		Total	220.1	LF

SPEC	CODE	BID ITEM	QTY	UNIT
764	1059	RESET W-BEAM GUARDRAIL END TERMINAL		
		Sta 158+30.09 to 158+79.98 Rt	1	EA
		Sta 158+92.50 to 159+42.33 Lt	1	EA
		Sta 161+48.63 to 161+98.46 Rt	1	EA
		Sta 162+10.98 to 162+60.87 Lt	1	EA
		Total	4	EA
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 158+30.09 to 158+79.98 Rt	1	EA
		Sta 158+92.50 to 159+42.33 Lt	1	EA
		Sta 161+48.63 to 161+98.46 Rt	1	EA
		Sta 162+10.98 to 162+60.87 Lt	1	EA
		Total	4	EA

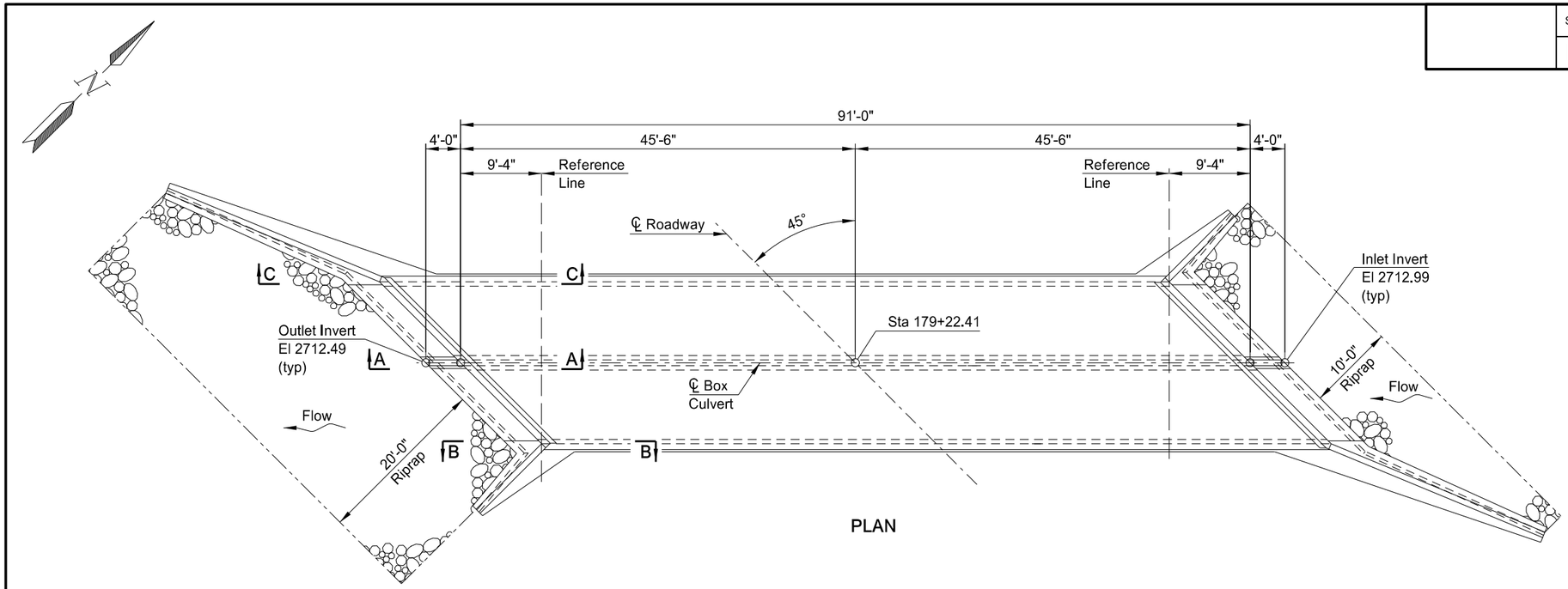
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W-Beam Guardrail Quantities

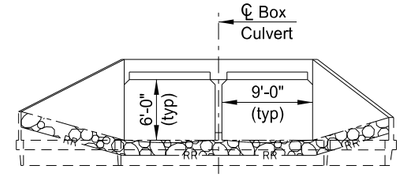
Cannonball River Bridge
Structure # 21-003.078

ND 21
Jct 85 to N Jct 22 - New England

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	1



PLAN



END VIEW

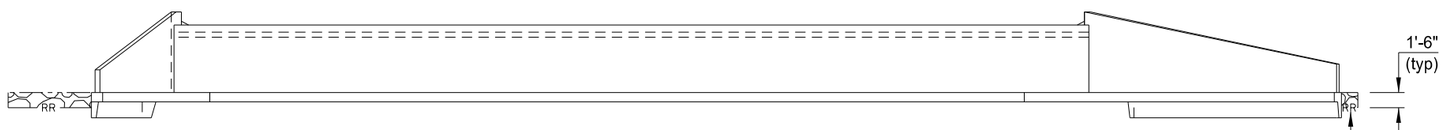
NOTE:

See Dwg 21-003.425-10 for Sections A-A.
See Dwg 21-003.425-11 for Sections B-B and C-C.

DESIGN STRENGTHS:

f'c = 3,000 psi ~ Class AE-3 Concrete
fy = 60,000 psi ~ Reinforcing Steel

Load & Resistance Factor Design



ELEVATION

HYDRAULIC DATA:

Drainage Area	2.72	sq mi
Stream Gradient	0.0045	ft/ft
Design Frequency	50	yr
Design Discharge	816	cfs
Design Headwater Stage	2720.27	ft
Design Tailwater Stage	2718.78	ft
Velocity Through Culvert	7.56	fps
100-Year Frequency Discharge	1008	cfs
100-Year Frequency Headwater	2721.34	ft
Overtopping Stage	2721.8	ft
Overtopping Discharge	1083	cfs

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0104	REMOVAL OF STRUCTURE	EA	1
210	0050	BOX CULVERT EXCAVATION	EA	1
210	0210	FOUNDATION FILL	CY	1,305
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
256	0200	RIPRAP GRADE II	CY	80
602	1131	CLASS AE-3 CONCRETE-BOX CULVERT	CY	174.5
612	0114	REINFORCING STEEL-GRADE 60-BOX CULVERT	LBS	26,762
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	260
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	160

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SPECIAL PROVISIONS	
SP 4(14)	MIGRATORY BIRD TREATY ACT

HL-93 DESIGN LOADING

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
CREEK
1 WEST JCT ND 67
45° SKEW

REINFORCED CONCRETE DOUBLE BOX CULVERT LAYOUT

CLEAR SPAN 2 x 9' CLEAR HEIGHT 6'
MAXIMUM FILL 5'

PROJECT: NH-5-021(016)000
STATION: 179+22.41
SLOPE COUNTY

11/22/19 DATE — Jon Ketterling BRIDGE ENGINEER

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	170	2

NOTES

100 SCOPE OF WORK: Work at this site consists of removing an existing structure and building a new double barrel 9' x 6' x 91'-0" reinforced concrete box culvert.

202 REMOVAL OF STRUCTURE: The existing structure is a single 6’ x 6’ x 45’ reinforced concrete box culvert. Include all work required to remove the existing structure in the contract unit price for “Removal of Structure”.

210 ORDINARY BACKFILL: Compact material as specified in Section 203.04 E.2.a, “ND T 180.”

602 CONCRETE: Cast the following elements of each section in one continuous run:

1. Floor slab and wing footings
2. Each intermediate wall up to the bottom of fillets
3. Each sidewall up to the bottom of fillets with its adjacent wings complete to the top
4. Roof slab and parapets

Allow the concrete in the walls to set at least two hours before the roof slab is poured.

602 CURING CONCRETE: Wet cure all concrete surfaces not covered by forms. Cover the concrete with a double thickness of burlap. Maintain surface moisture between the final finish and placement of burlap by periodic applications of a light fog spray of water. Keep the burlap continuously moist until the end of the curing period.

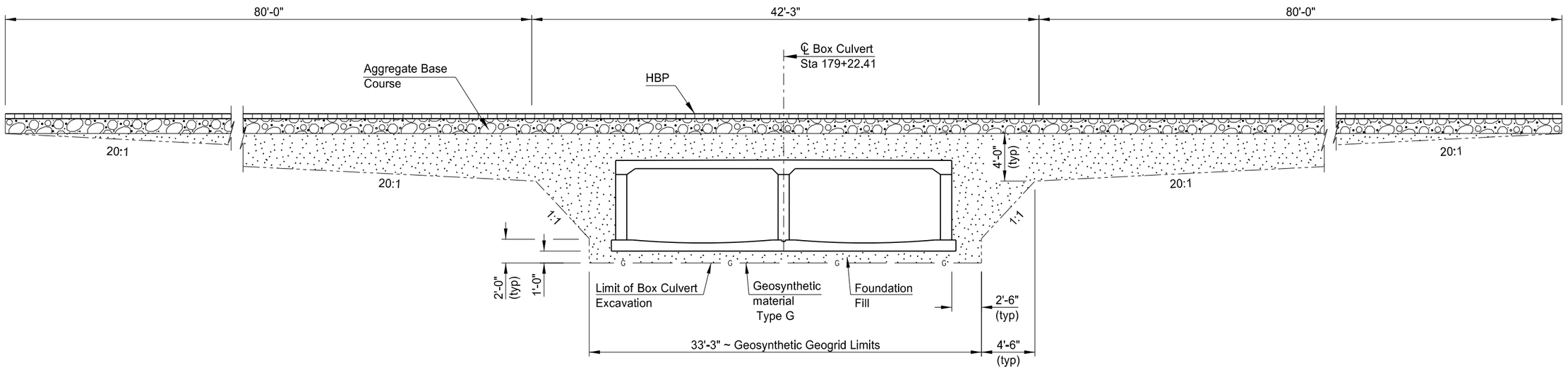
612 REINFORCING STEEL: When the distance between end bars is not evenly divisible by bar spacing, adjust the odd distance by a few irregular spaces near the center, not at the ends of the culvert.

Place bolsters and bar supports for the roof steel at a maximum of 4 foot spacing.

Dimensions of bent bars are given out to out.

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	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	3



(SHOWING SECTION ALONG ℄ ROADWAY)

GEOSYNTHETIC GEOGRID PLACEMENT AND FOUNDATION FILL THROUGH EXISTING EMBANKMENT

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NOTES:

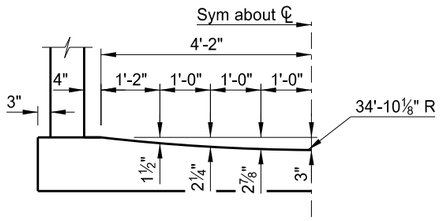
Provide a 1'-0" minimum depth of foundation fill under the floor. Remove and replace all unsound material under the box with foundation fill. The Engineer will determine the depth required.

Extend the geosynthetic material and foundation fill to the end of the apron.

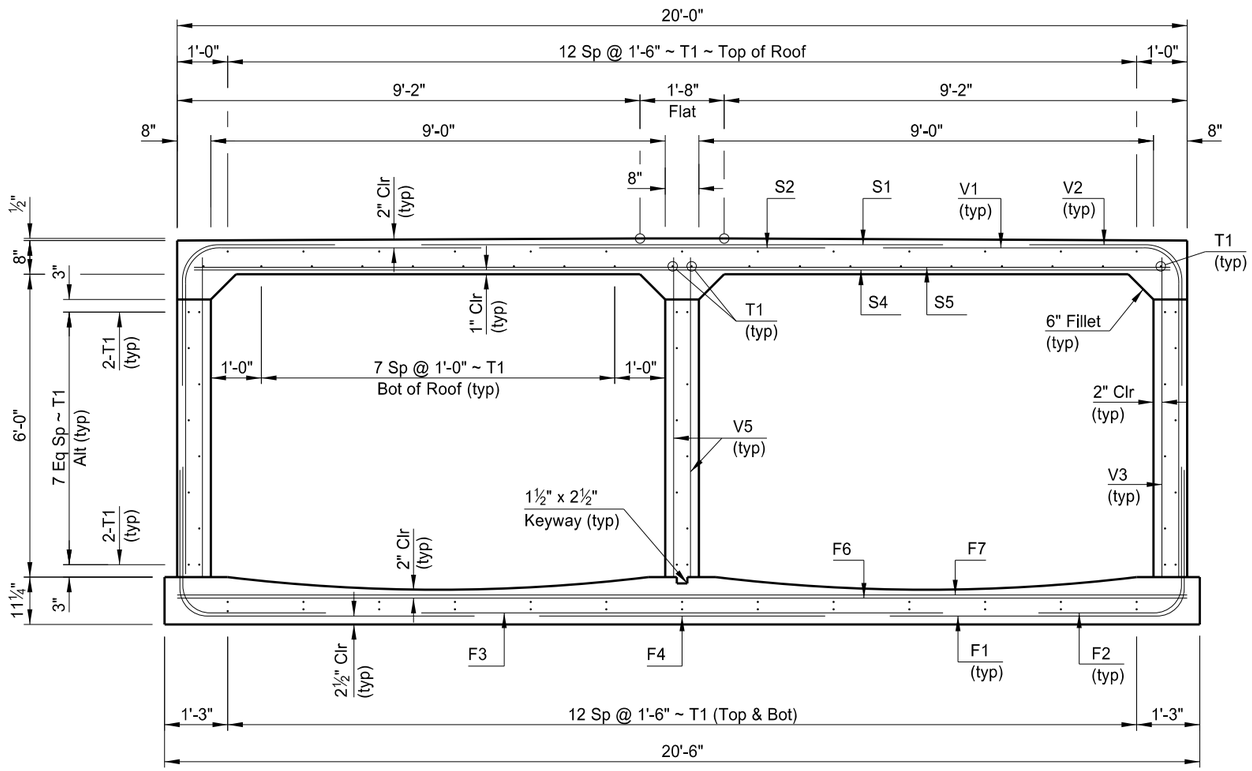
CREEK
1 WEST JCT ND 67

ELEVATION & FOUNDATION FILL DETAIL

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	4



CURVED FLOOR OFFSETS



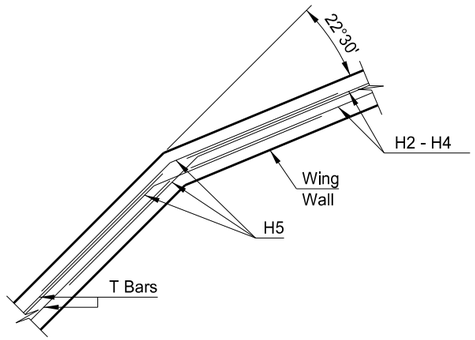
SECTION OF BARREL

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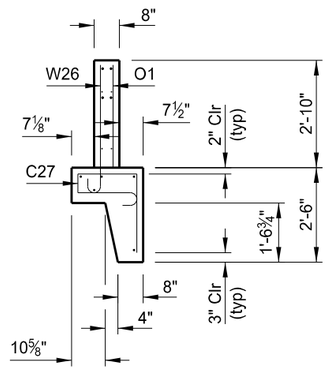
CREEK
1 WEST JCT ND 67

BARREL SECTION

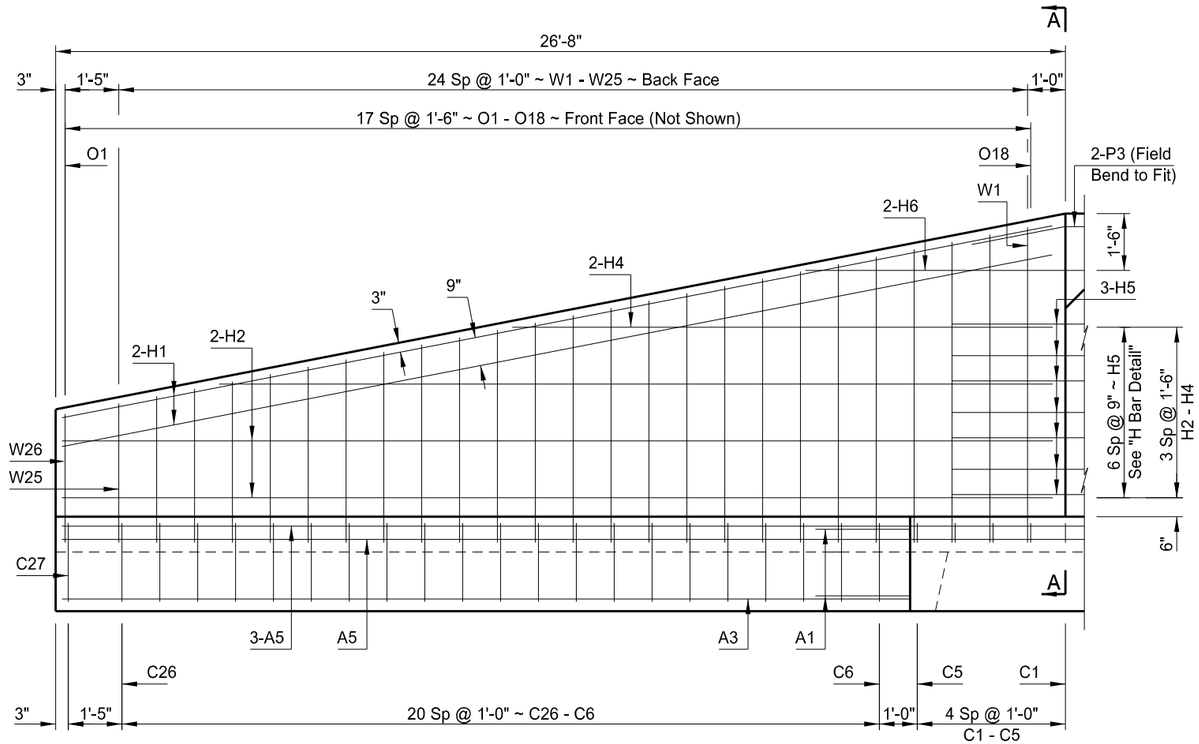
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	5



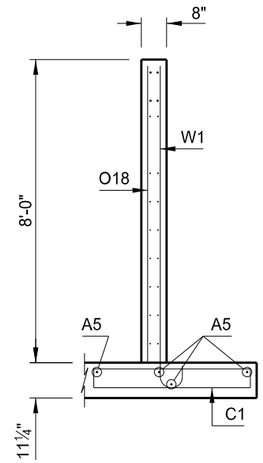
H BAR DETAIL



END VIEW



LONG WING ELEVATION



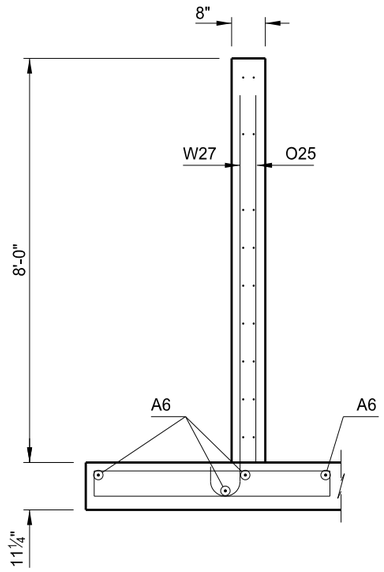
A-A

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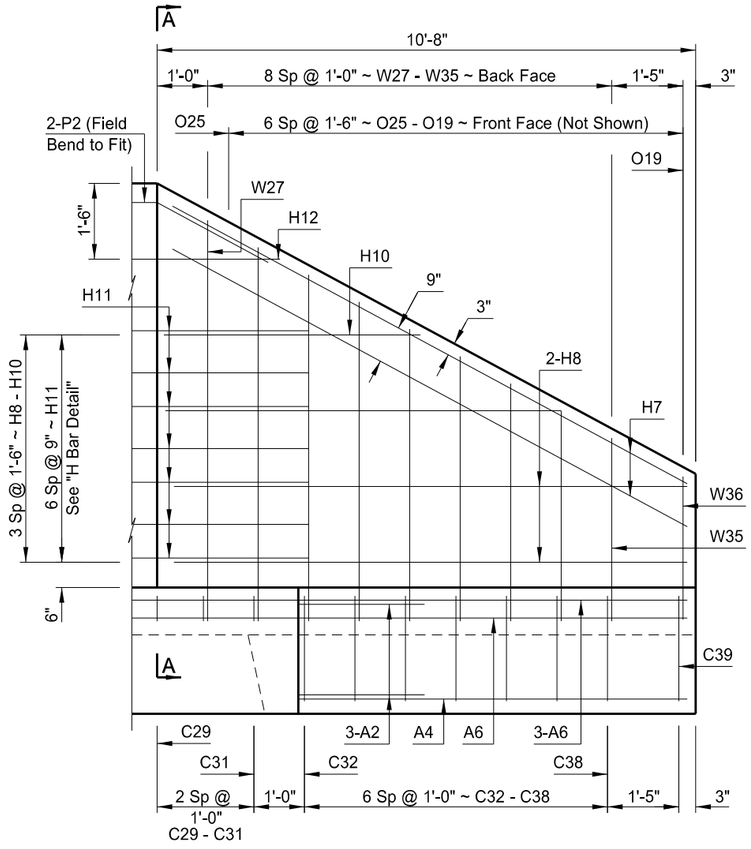
CREEK
1 WEST JCT ND 67

LONG WING DETAILS

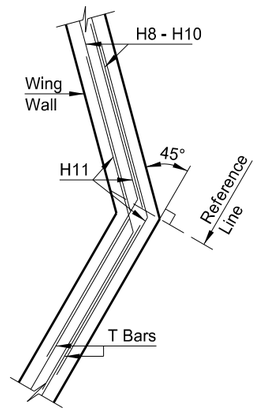
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	6



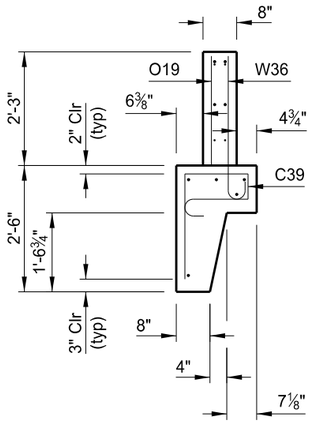
A-A



SHORT WING ELEVATION



H BAR DETAIL



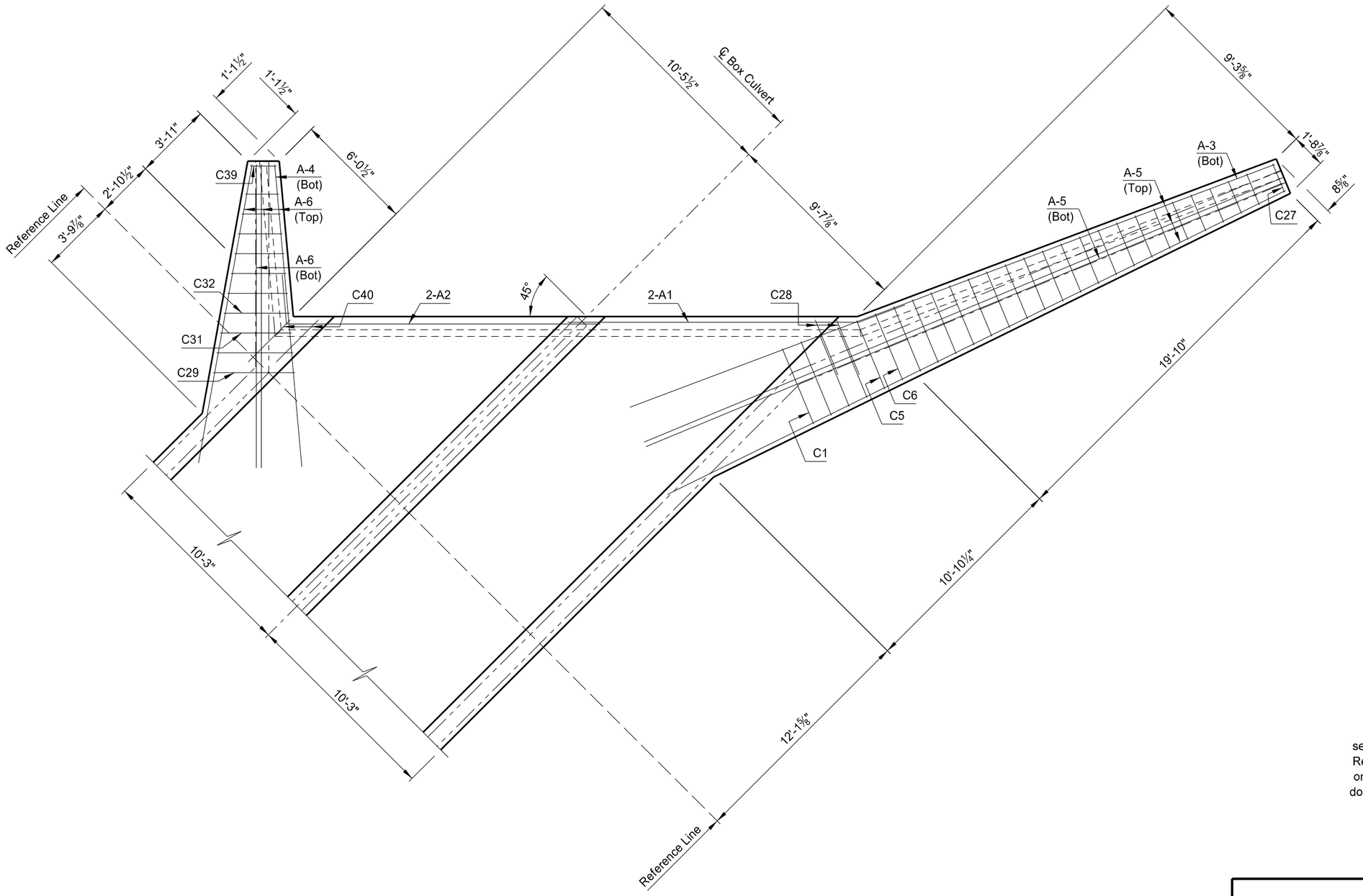
END VIEW

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CREEK
1 WEST JCT ND 67

SHORT WING DETAILS

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	7



FLOOR PLAN

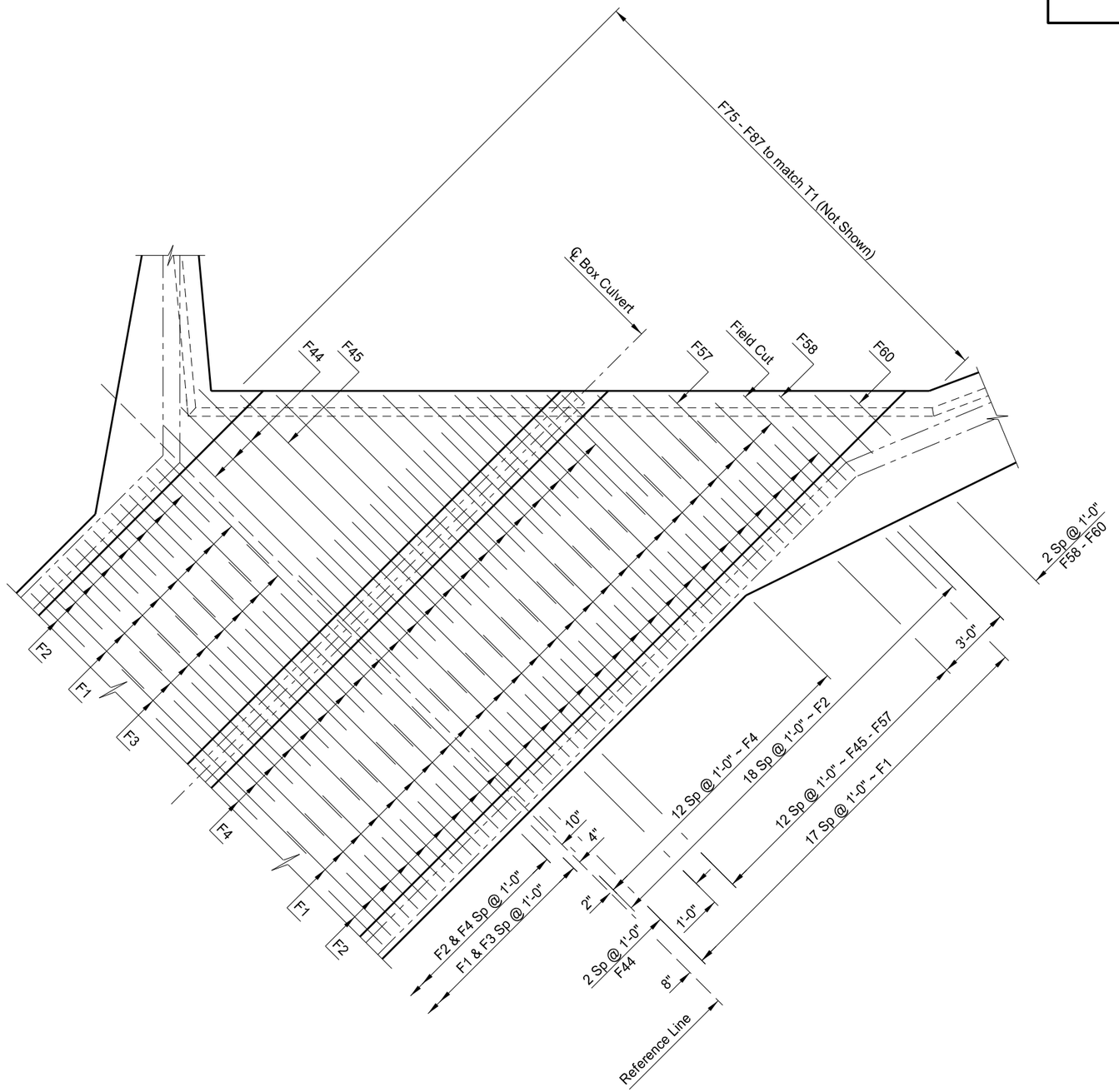
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CREEK
1 WEST JCT ND 67

(SHOWING DIMENSIONS & WING FOOTING REINFORCING)

FLOOR DETAIL

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	8



FLOOR PLAN

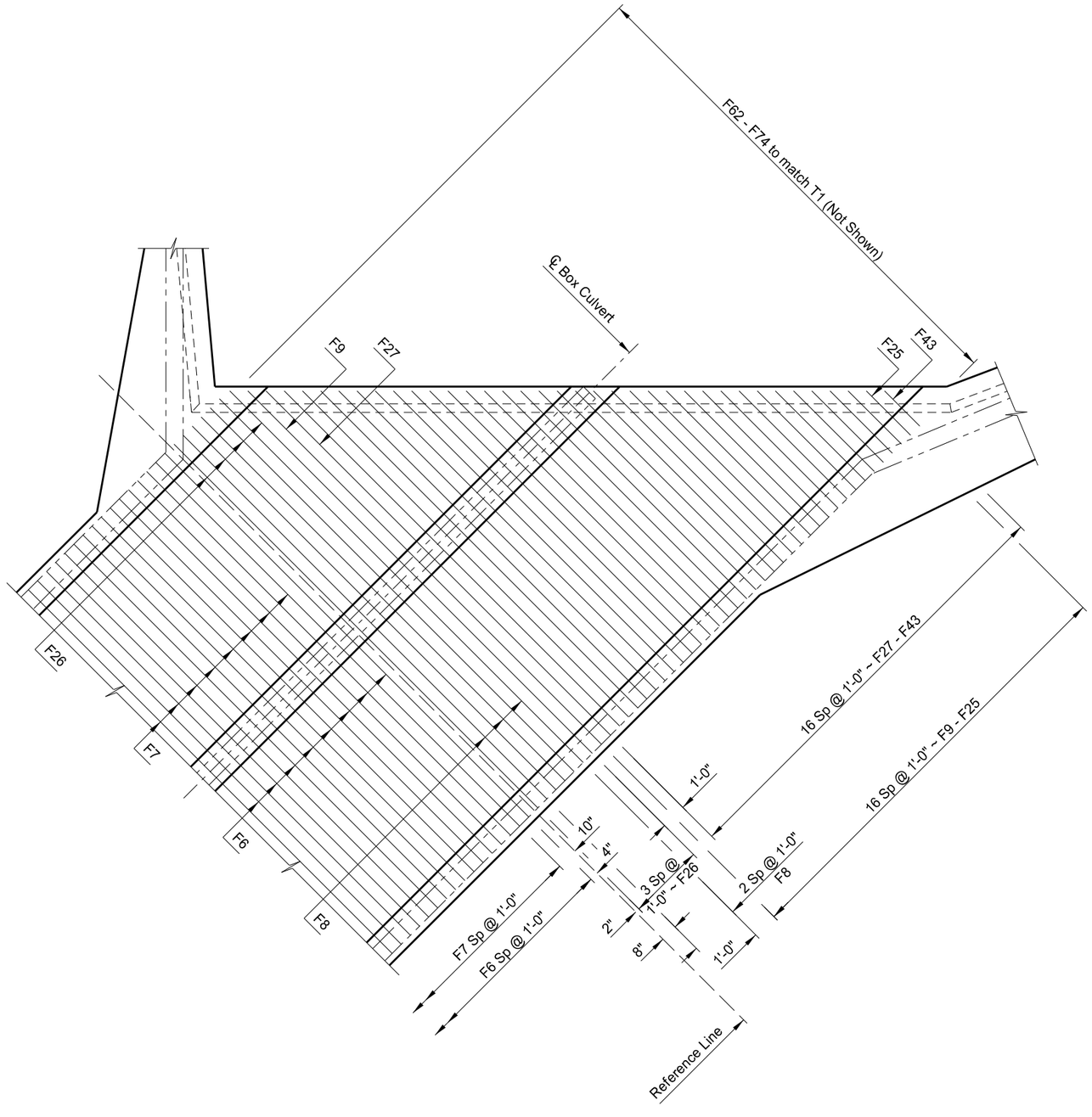
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CREEK
1 WEST JCT ND 67

(SHOWING BOTTOM MAT REINFORCING)

FLOOR DETAIL

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	9



FLOOR PLAN

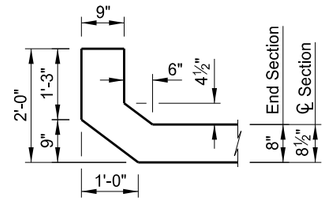
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CREEK
1 WEST JCT ND 67

(SHOWING TOP MAT REINFORCING)

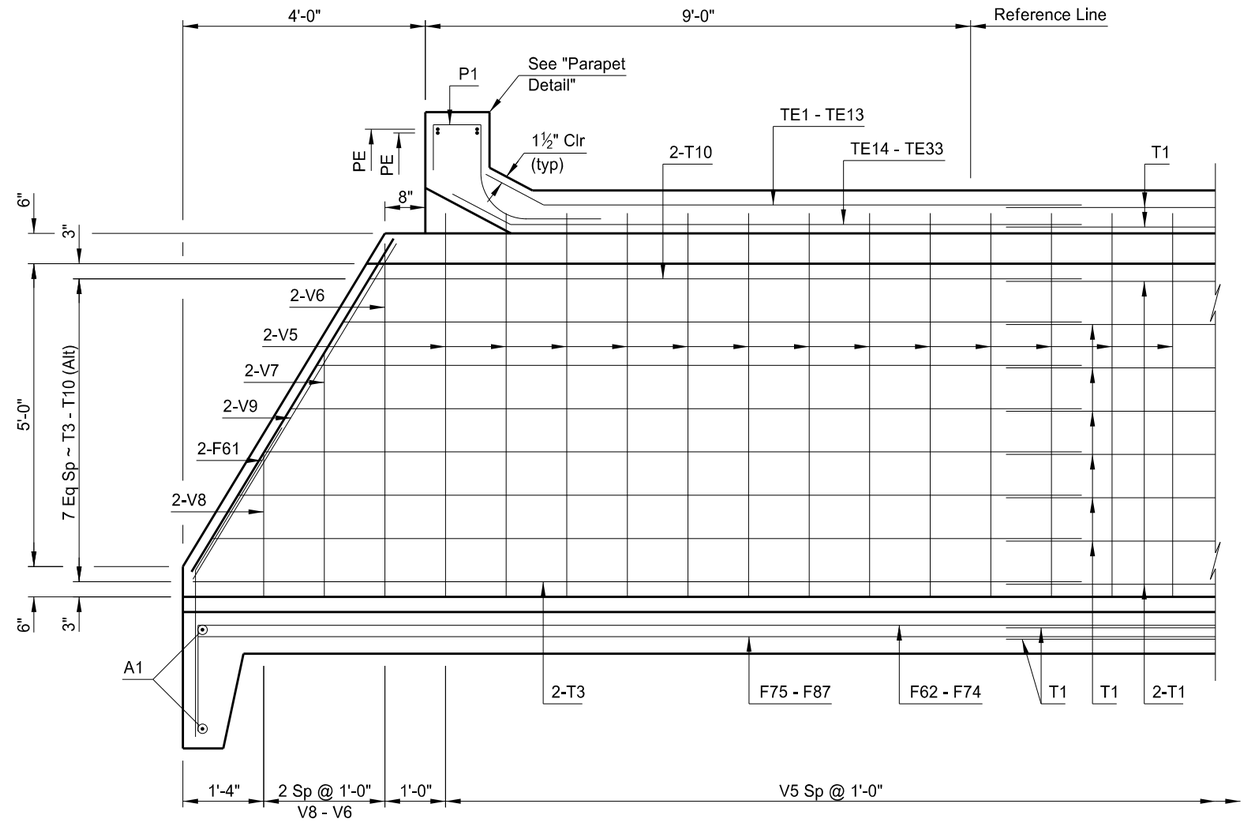
FLOOR DETAIL

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	10



PARAPET DETAIL

NOTE:
Section taken perpendicular to face of parapet.



(INNER WALL)
A-A
LONGITUDINAL SECTIONS

NOTE:
See Dwg 21-003.425-1 for location of Sections A-A.

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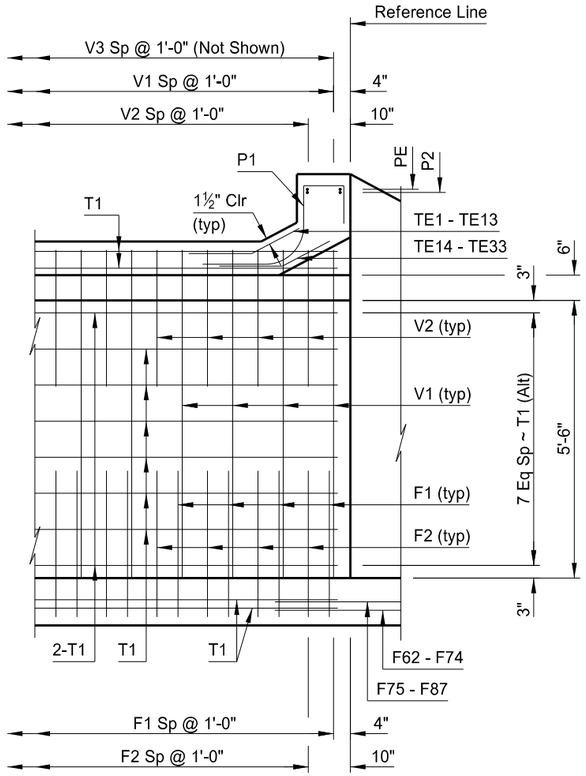
CREEK
1 WEST JCT ND 67

INNER WALL DETAILS & PARAPET DETAIL

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	11

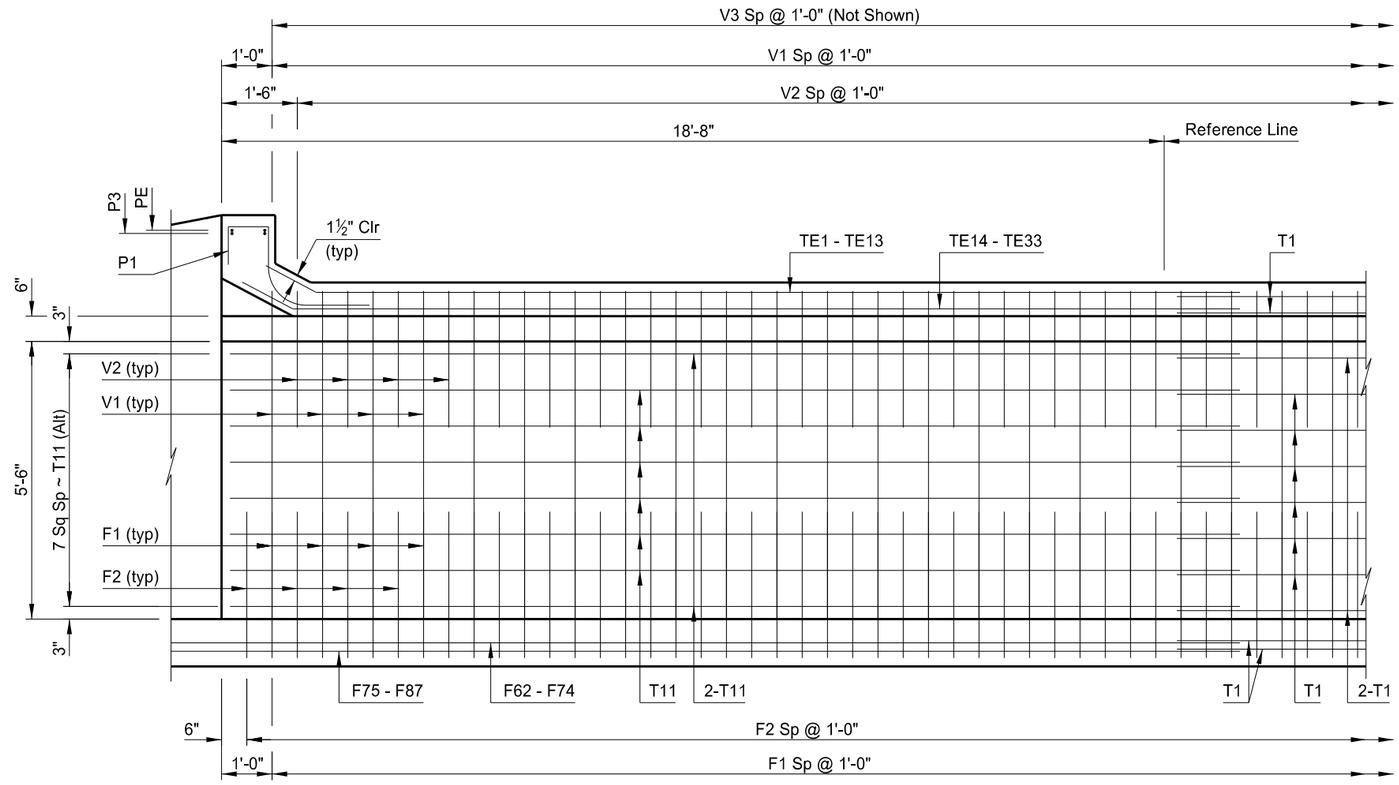
NOTE:

See Dwg 21-033.425-1 for location of Sections B-B and C-C.



(OUTER WALL)

B-B



(OUTER WALL)

C-C

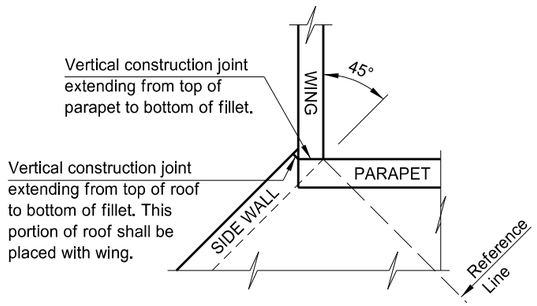
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LONGITUDINAL SECTIONS

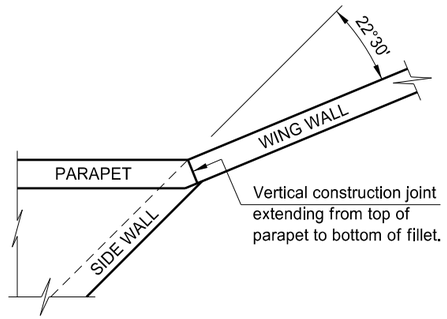
CREEK
1 WEST JCT ND 67

OUTER WALL DETAILS

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	12



SHORT WING DETAIL



LONG WING DETAIL

ROOF PLAN

NOTE:

See Dwg 21-003.425-10 for location of Sections A-A.
See Dwg 21-003.425-11 for location of Sections B-B and C-C.

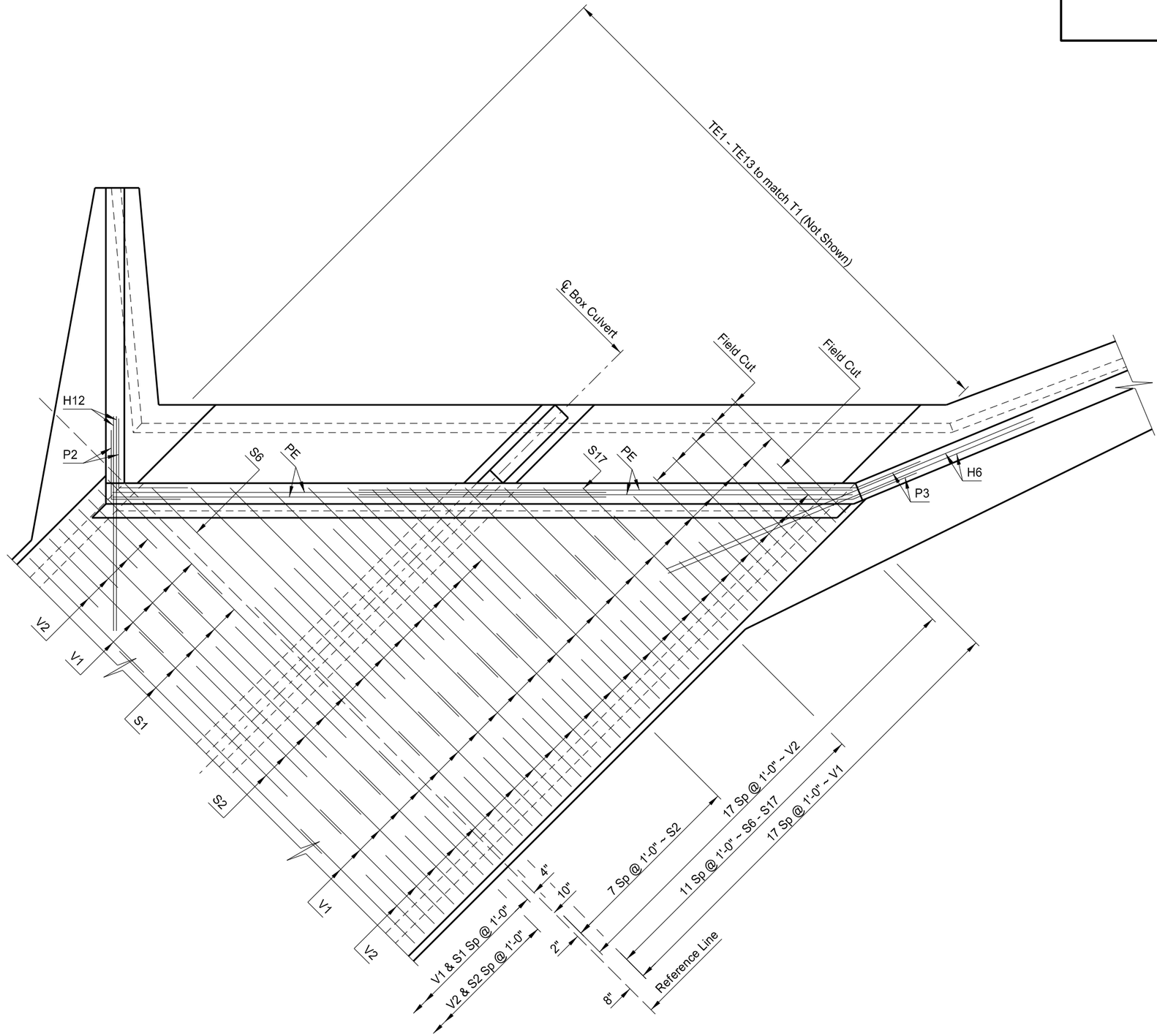
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CREEK
1 WEST JCT ND 67

(SHOWING BOTTOM MAT REINFORCING)

ROOF DETAIL

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	13



ROOF PLAN

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CREEK
1 WEST JCT ND 67

(SHOWING TOP MAT & PARAPET REINFORCING)

ROOF DETAIL

BAR LIST (CONSTANT)				
MARK	SIZE	NO.	LENGTH	SHAPE
W1	5	2	8'-11"	BENT
W2	5	2	8'-9"	BENT
W3	5	2	8'-6"	BENT
W4	4	2	8'-3"	BENT
W5	4	2	8'-1"	BENT
W6	4	2	7'-10"	BENT
W7	4	2	7'-8"	BENT
W8	4	2	7'-6"	BENT
W9	4	2	7'-3"	BENT
W10	4	2	7'-1"	BENT
W11	4	2	6'-11"	BENT
W12	4	2	6'-8"	BENT
W13	4	2	6'-6"	BENT
W14	4	2	6'-4"	BENT
W15	4	2	6'-1"	BENT
W16	4	2	5'-11"	BENT
W17	4	2	5'-9"	BENT
W18	4	2	5'-6"	BENT
W19	4	2	5'-4"	BENT
W20	4	2	5'-2"	BENT
W21	4	2	4'-11"	BENT
W22	4	2	4'-9"	BENT
W23	4	2	4'-7"	BENT
W24	4	2	4'-4"	BENT
W25	4	2	4'-2"	BENT
W26	4	2	3'-11"	BENT
C1	4	2	10'-0"	BENT
C2	4	2	9'-10"	BENT
C3	4	2	9'-8"	BENT
C4	4	2	9'-6"	BENT
C5	4	2	9'-2"	BENT
C6	4	2	10'-5"	BENT
C7	4	2	10'-3"	BENT
C8	4	2	9'-11"	BENT
C9	4	2	9'-9"	BENT
C10	4	2	9'-7"	BENT
C11	4	2	9'-5"	BENT
C12	4	2	9'-3"	BENT
C13	4	2	9'-1"	BENT
C14	4	2	8'-11"	BENT
C15	4	2	8'-7"	BENT
C16	4	2	8'-5"	BENT
C17	4	2	8'-3"	BENT
C18	4	2	8'-1"	BENT
C19	4	2	7'-11"	BENT
C20	4	2	7'-9"	BENT
C21	4	2	7'-5"	BENT
C22	4	2	7'-3"	BENT
C23	4	2	7'-1"	BENT
C24	4	2	6'-11"	BENT
C25	4	2	6'-9"	BENT
C26	4	2	6'-7"	BENT
C27	4	2	6'-3"	BENT
C28	4	4	5'-1"	BENT
H1	6	8	26'-8"	STR.
H2	4	8	26'-2"	STR.
H3	4	4	22'-1"	STR.
H4	4	4	14'-4"	STR.
H5	4	42	6'-0"	BENT
H6	6	4	14'-4"	STR.
O1-O18	4	2 SETS	93'-9"	STR.

BAR LIST (CONSTANT)				
MARK	SIZE	NO.	LENGTH	SHAPE
W27	5	2	8'-7"	BENT
W28	4	2	7'-11"	BENT
W29	4	2	7'-5"	BENT
W30	4	2	6'-10"	BENT
W31	4	2	6'-4"	BENT
W32	4	2	5'-9"	BENT
W33	4	2	5'-3"	BENT
W34	4	2	4'-8"	BENT
W35	4	2	4'-2"	BENT
W36	4	2	3'-5"	BENT
C29	4	2	10'-0"	BENT
C30	4	2	9'-6"	BENT
C31	4	2	9'-0"	BENT
C32	4	2	9'-9"	BENT
C33	4	2	9'-3"	BENT
C34	4	2	8'-7"	BENT
C35	4	2	8'-1"	BENT
C36	4	2	7'-7"	BENT
C37	4	2	7'-1"	BENT
C38	4	2	6'-7"	BENT
C39	4	2	5'-7"	BENT
C40	4	4	5'-1"	BENT
H7	6	8	11'-7"	STR.
H8	4	8	10'-2"	STR.
H9	4	4	7'-10"	STR.
H10	4	4	5'-1"	STR.
H11	4	42	6'-0"	BENT
H12	6	4	7'-9"	STR.
O19-O25	4	2 SETS	32'-8"	STR.
A1	6	4	17'-2"	BENT
A2	6	4	18'-4"	BENT
A3	6	2	34'-9"	STR.
A4	6	2	15'-4"	STR.
A5	6	8	34'-9"	STR.
A6	6	8	15'-4"	STR.
P1	4	40	4'-9"	BENT
P2	6	4	5'-0"	BENT
P3	6	4	5'-0"	BENT
PE	6	8	17'-10"	STR.
V6	4	4	5'-8"	STR.
V7	4	4	4'-0"	STR.
V8	4	4	2'-4"	STR.
V9	6	4	6'-2"	STR.
F8	5	6	20'-0"	STR.
F9-F25	5	2 SETS	194'-1"	STR.
F26	4	8	20'-0"	STR.
F27-F43	4	2 SETS	185'-7"	STR.
F44	5	6	16'-0"	STR.
F45-F57	5	2 SETS	118'-1"	STR.
F58-F60	5	2 SETS	11'-9"	STR.
F61	6	4	5'-6"	BENT
F62-F74	4	2 SETS	219'-11"	BENT
F75-F87	4	2 SETS	197'-2"	STR.
S6-S17	6	2 SETS	107'-0"	STR.
S18-S33	5	2 SETS	153'-4"	STR.
S34-S49	5	2 SETS	161'-4"	STR.

BAR LIST (CONSTANT)				
MARK	SIZE	NO.	LENGTH	SHAPE
T3	4	4	14'-7"	STR.
T4-T9	4	2 SETS	79'-0"	STR.
T10	4	4	11'-8"	STR.
T11	4	20	20'-0"	STR.
TE1-TE13	4	2 SETS	143'-7"	BENT
TE14-TE33	4	2 SETS	230'-10"	BENT

BAR LIST (VARIABLE)				
V1	5	182	12'-0"	BENT
V2	4	180	4'-9"	BENT
V3	4	182	6'-4"	STR.
V5	4	182	6'-4"	STR.
F1	4	182	8'-6"	BENT
F2	4	182	5'-6"	BENT
F3	5	73	10'-4"	STR.
F4	6	98	5'-8"	STR.
F6	5	73	20'-0"	STR.
F7	4	72	20'-0"	STR.
S1	6	73	10'-4"	STR.
S2	6	88	5'-8"	STR.
S4	5	73	19'-4"	STR.
S5	5	72	19'-4"	STR.
T1	4	89	73'-1"	STR.

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
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NOTE:

Verify the quantity, size, and shape of the bar reinforcement against the structure drawings and immediately notify the Engineer of any discrepancies. Discrepancies in the bar list will not be cause for adjustment of the contract unit price.

NOTE:

Unless construction requirements dictate otherwise, the Contractor has the option to construct the box culvert using construction joints or as one continuous unit. If construction joints are used, the longitudinal bar lengths may be adjusted, but a minimum lap length of 1'-3" must be maintained.

CONCRETE FORMULAS				
ENTIRE FLOOR	"L" x 0.60885	+ 18.45893	=	73.9 CY
TWO OUTSIDE WALLS & FOUR WINGS	"L" x 0.27160	+ 9.72163	=	34.4 CY
INSIDE WALLS	"L" x 0.13580	+ 0.63374	=	13.0 CY
ENTIRE ROOF	"L" x 0.56610	+ 1.64643	=	53.2 CY
TOTAL	"L" x 1.58235	+ 30.46073	=	174.5 CY

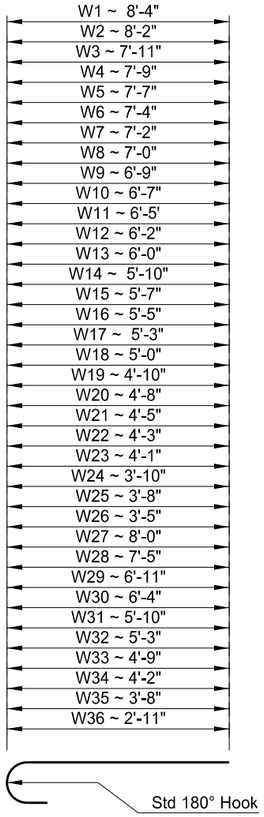
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QUANTITIES	
CLASS AE-3 CONCRETE	174.5 CY
REINFORCING STEEL	26,762 LBS

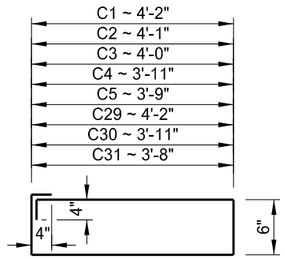
CREEK
1 WEST JCT ND 67

REINFORCING BAR LIST

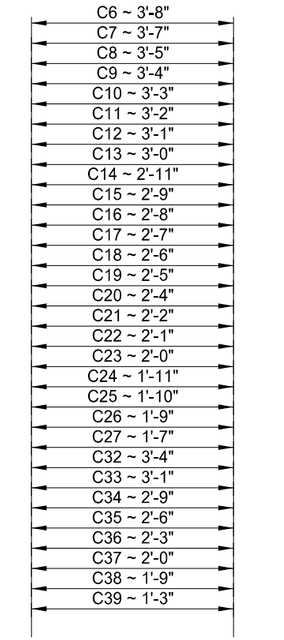
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	15

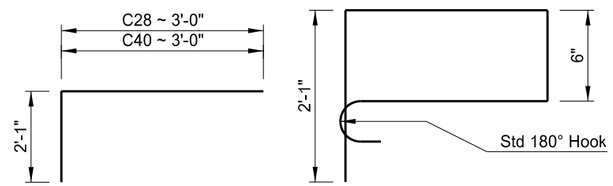


W1 - W36

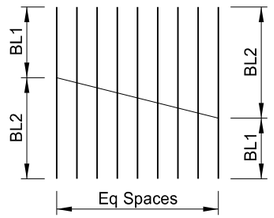


C1 - C5 & C29 - C31

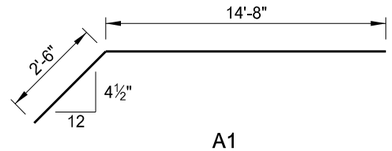




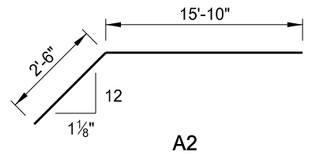
C28 & C40 C6 - C27 & C32 - C39



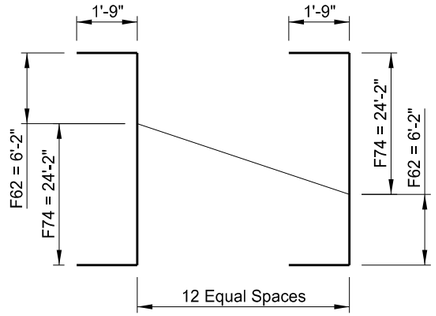
2 SETS SHOWN



A1

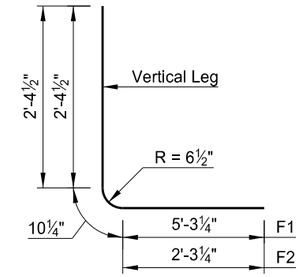


A2



F62 - F74

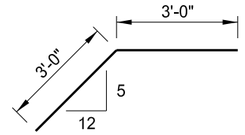
2 SETS SHOWN
2 SETS REQUIRED
LENGTH 1 SET = 219'-11"



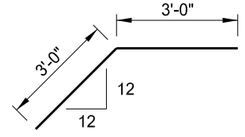
F1 & F2

MARK	LENGTH 1 SET	BL1	BL2	SPACES
O1-O18	93'-9"	2'-9"	7'-8"	17
O19-O25	32'-8"	2'-3"	7'-1"	6
F9-F25	194'-1"	19'-5"	3'-5"	16
F27-F43	185'-7"	18'-11"	2'-11"	16
F45-F57	118'-1"	3'-1"	15'-1"	12
F58-F60	11'-9"	2'-11"	4'-11"	2
F75-F87	197'-2"	6'-2"	24'-2"	12
S6-S17	99'-8"	3'-5"	14'-5"	11
S18-S33	153'-4"	17'-1"	2'-1"	15
S34-S49	161'-4"	17'-7"	2'-7"	15
T4-T9	79'-0"	12'-1"	14'-3"	5

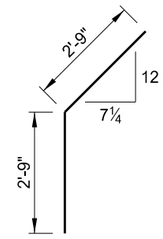
BAR CUTTING DETAILS



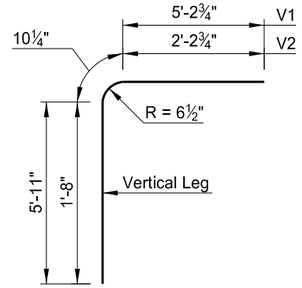
H5



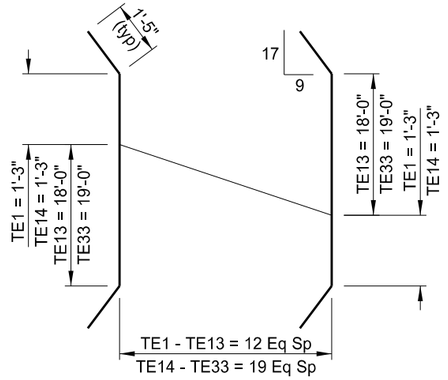
H11



F61

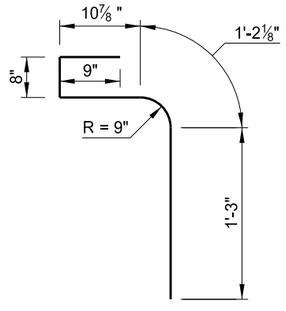


V1 & V2

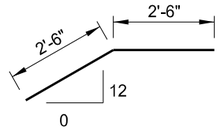


TE1-TE13
TE14-TE33

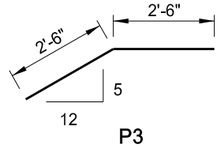
2 SETS SHOWN
2 SETS REQUIRED
LENGTH 1 SET TE1-TE13 = 143'-7"
LENGTH 1 SET TE14-TE33 = 230'-10"



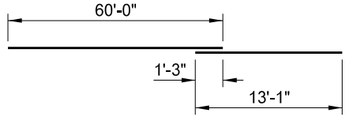
P1



P2



P3



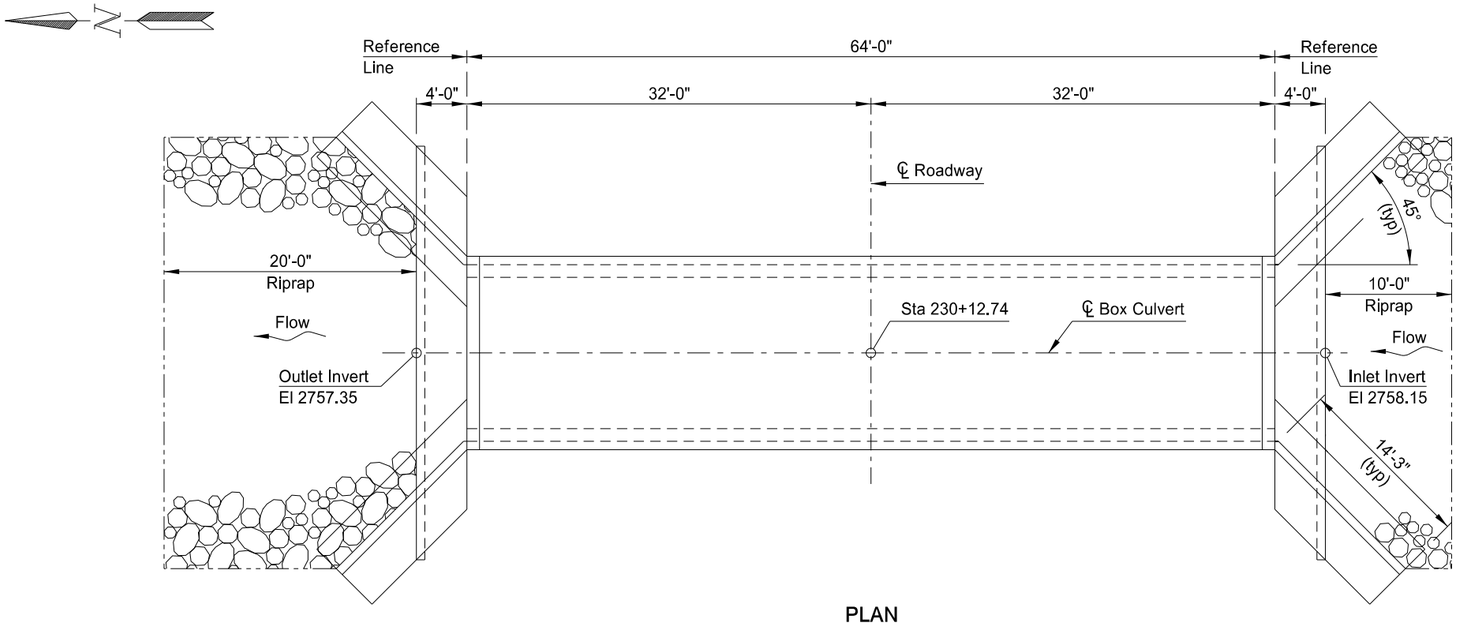
T1

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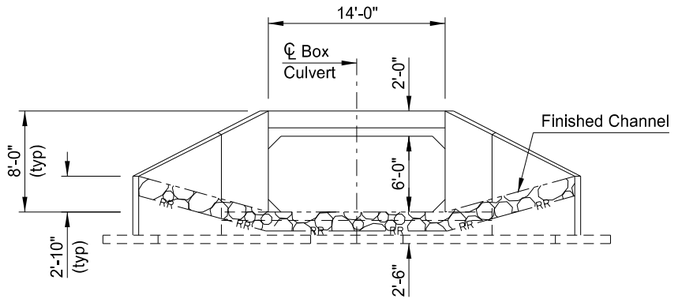
CREEK
1 WEST JCT ND 67

BAR DETAILS

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	16



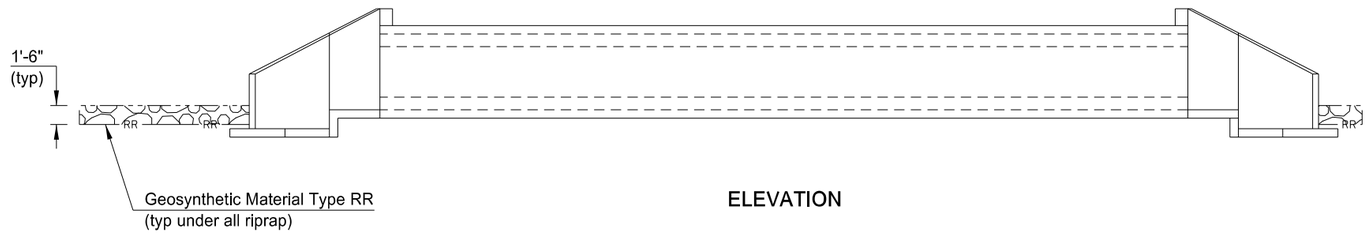
PLAN



END VIEW

For a single barrel box culvert with 8" thick roof, 8" floor and 8" walls, the following total factored moments and shears would result from the application of the required loads:

FACTORED DESIGN MOMENTS (SINGLE)		FACTORED DESIGN SHEARS (SINGLE)	
WALL MOMENT	0 ft-lbs	WALL SHEAR	2,272 lbs
ROOF MOMENTS		ROOF SHEARS	
CORNER	23,420 ft-lbs	CORNER	11,254 lbs
BOTTOM	32,898 ft-lbs	FLOOR SHEARS	
FLOOR MOMENTS		CORNER	13,674 lbs
CORNER	25,230 ft-lbs		
TOP	28,225 ft-lbs		



ELEVATION

HYDRAULIC DATA:

Drainage Area	2.17	sq mi
Stream Gradient	0.0051	ft/ft
Design Frequency	50	yr
Design Discharge	693	cfs
Design Headwater Stage	2765.53	ft
Design Tailwater Stage	2763.74	ft
Velocity Through Culvert	8.25	fps
100-Year Frequency Discharge	857	cfs
100-Year Frequency Headwater	2766.98	ft
Overtopping Stage	2767.79	ft
Overtopping Discharge	936	cfs

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0104	REMOVAL OF STRUCTURE	EA	1
210	0050	BOX CULVERT EXCAVATION	EA	1
210	0210	FOUNDATION FILL	CY	1,225
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
256	0200	RIPRAP GRADE II	CY	55
606	1406	14FT X 6FT PRECAST RCB CULVERT	LF	64
606	5406	14FT X 6FT PRECAST RCB END SECTION	EA	2
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	165
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	110

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SPECIAL PROVISIONS	
SP 4(14)	MIGRATORY BIRD TREATY ACT

STANDARD DRAWINGS
D-714-22

HL-93 DESIGN LOADING

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
CREEK
EAST OF JCT 67

PRECAST CONCRETE
SINGLE BOX CULVERT LAYOUT

CLEAR SPAN 14' CLEAR HEIGHT 6'
MAXIMUM FILL 6'

PROJECT: NH-5-021(016)000
STATION: 230+12.74
SLOPE COUNTY

11/22/19 DATE — Jon Ketterling BRIDGE ENGINEER

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	170	17

NOTES

100 SCOPE OF WORK: Work at this site consists of removing an existing structure and building a new single barrel 14' x 6' x 64'-0" precast concrete box culvert.

105 WORK DRAWINGS: Submit work drawings for the precast concrete box culvert to the Engineer for review.

202 REMOVAL OF STRUCTURE: The existing structure is a single barrel 6’ x 6’ x 30’ reinforced concrete box culvert. Include all work required to remove the existing structure in the contract unit price for “Removal of Structure.”

210 ORDINARY BACKFILL: Compact material as specified in Section 203.04 E.2.a, “ND T 180.”

606 PRECAST SECTION: Tie the barrel sections together with prestressing strands or 1"ϕ tie bolts as shown on Standard Drawing D-714-22. Use a minimum of 6 - 0.5" diameter 270K strands for double box sections and 4 - 0.5" diameter 270K strands for single box sections, with one strand in each corner. Stress prestressing strands from opposite ends to a force of 20 kips. Use corrosion protected prestressing cables with their ends grouted. If tie bolts are used, place two ties per exterior wall at each joint located at third points of the wall clear height.

Payment for “14Ft X 6Ft Precast RCB End Section” includes the apron, cutoff wall, parapet and wingwalls. Attach the apron to the last barrel section, the wingwalls and the cutoff wall. Attach the wingwalls to the last barrel section. Provide a welded tie type system for the connections of the apron to the box and wingwalls. Connect the wingwalls to the last barrel section by the use of tie bolts, steel-bolted plates or other approved method so the inside corner surface is smooth.

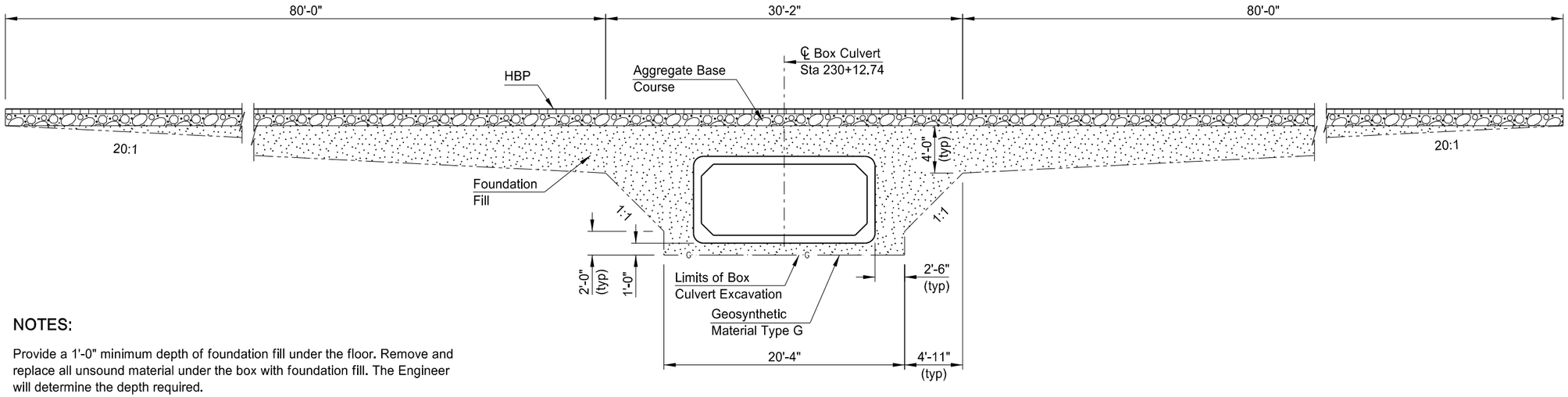
Use ASTM A36 steel for bolts, plates, angles, and studs. Use heavy hex nuts meeting the requirements of ASTM A563 and washers meeting ASTM F436, Type 1. Provide welded pipe sleeves meeting the requirements of ASTM A53, Grade B. Galvanize hardware and structural steel according to Section 854.

Welders are to meet the requirements of Section 105.06 D. Galvanize field welds according to Section 854.02.

Cast holes at 3'-0" centers through the apron and into the cutoff wall to receive ¾" diameter reinforcing bars. Cast holes in the last barrel section at 1'-0" centers for ½" diameter reinforcing bars to attach the parapet. Cast parapet against the section. Install the bars according to the manufacturer’s recommendations, with a high strength adhesive specifically intended for concrete anchorage, in accordance with Section 806.02.

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	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	18



NOTES:

Provide a 1'-0" minimum depth of foundation fill under the floor. Remove and replace all unsound material under the box with foundation fill. The Engineer will determine the depth required.

Extend the geosynthetic material and foundation fill to the end of the apron.

(SHOWING SECTION ALONG ℄ ROADWAY)

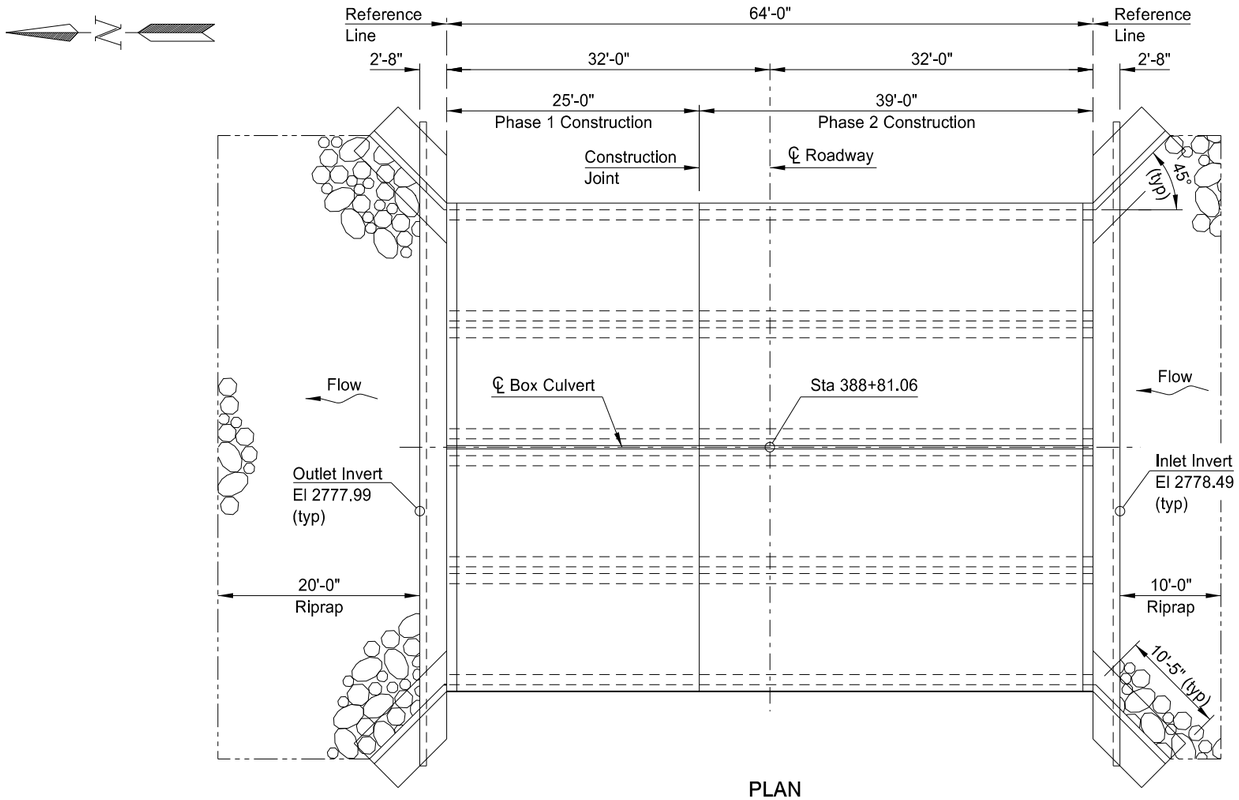
GEOSYNTHETIC GEOGRID PLACEMENT AND FOUNDATION FILL
THROUGH EXISTING EMBANKMENT

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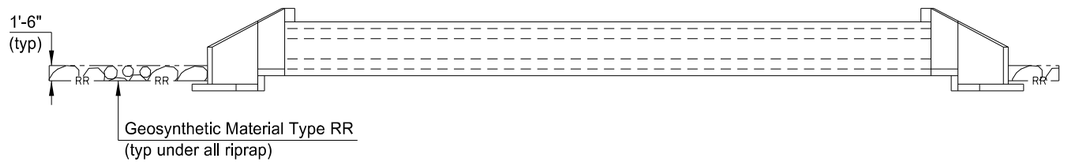
CREEK
EAST OF JCT ND 67

EXCAVATION & FOUNDATION
FILL DETAIL

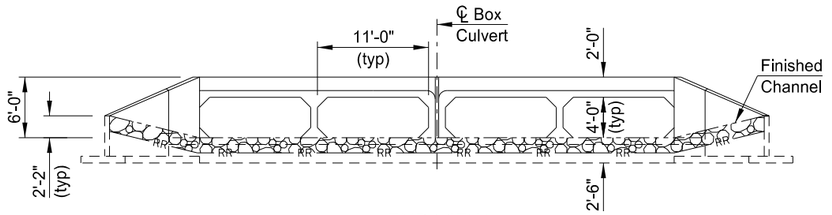
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	19



PLAN



ELEVATION



END VIEW

For a single barrel box culvert with 8" thick roof, 8" floor and 8" walls, the following total factored moments and shears would result from the application of the required loads:

FACTORED DESIGN MOMENTS (SINGLE)		FACTORED DESIGN SHEARS (SINGLE)	
WALL MOMENT	0 ft-lbs	WALL SHEAR	1,449 lbs
ROOF MOMENTS		ROOF SHEARS	
CORNER	15,941 ft-lbs	CORNER	8,509 lbs
BOTTOM	22,757 ft-lbs	FLOOR SHEARS	
FLOOR MOMENTS		CORNER	10,692 lbs
CORNER	16,347 ft-lbs		
TOP	17,379 ft-lbs		

For a double barrel box culvert with 8" thick roof, 8" floor and 8" walls, the following total factored moments and shears would result from the application of the required loads:

FACTORED DESIGN MOMENTS (DOUBLE)		FACTORED DESIGN SHEARS (DOUBLE)	
WALL MOMENT	0 ft-lbs	WALL SHEAR	1,178 lbs
ROOF MOMENTS		ROOF SHEARS	
CORNER	15,290 ft-lbs	CORNER	7,499 lbs
BOTTOM	21,594 ft-lbs	WALL	9,518 lbs
TOP	26,182 ft-lbs	FLOOR SHEARS	
FLOOR MOMENTS		CORNER	9,423 lbs
CORNER	13,596 ft-lbs	WALL	11,691 lbs
TOP	14,210 ft-lbs		
BOTTOM	26,825 ft-lbs		

HYDRAULIC DATA:

Drainage Area	2.8	sq mi
Stream Gradient	0.0499	ft/ft
Design Frequency	50	yr
Design Discharge	920	cfs
Design Headwater Stage	2783.68	ft
Design Tailwater Stage	2781.18	ft
Velocity Through Culvert	8.79	fps
100-Year Frequency Discharge	1146	cfs
100-Year Frequency Headwater	2784.96	ft
Overtopping Stage	2785.02	ft
Overtopping Discharge	1157	cfs

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0104	REMOVAL OF STRUCTURE	EA	1
210	0050	BOX CULVERT EXCAVATION	EA	1
210	0210	FOUNDATION FILL	CY	1,335
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
256	0200	RIPRAP GRADE II	CY	100
606	3104	DBL 11FT X 4FT PRECAST RCB CULVERT	LF	128
606	7104	DBL 11FT X 4FT PRECAST RCB END SECTION	EA	2
618	0120	TREATED TIMBER STRUCTURE	LS	1
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	420
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	200
930	8230	SHORING	EA	4

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SPECIAL PROVISIONS	
SP 4(14)	MIGRATORY BIRD TREATY ACT

STANDARD DRAWINGS
D-714-22

HL-93 DESIGN LOADING

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
CREEK
4 EAST OF JCT ND 67

PRECAST CONCRETE QUAD BOX CULVERT LAYOUT

CLEAR SPAN 4 x 11' CLEAR HEIGHT 4'
MAXIMUM FILL 6'

PROJECT: NH-5-021(016)000
STATION: 388+81.06
SLOPE COUNTY

11/22/19 — DATE
Jon Ketterling — BRIDGE ENGINEER

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	170	20

NOTES

100 SCOPE OF WORK: Work at this site consists of removing an existing structure and building a new quad barrel 11' x 4' x 64'-0" precast concrete box culvert in 2 phases.

105 WORK DRAWINGS: Submit work drawings for the precast concrete box culvert to the Engineer for review.

202 REMOVAL OF STRUCTURE: The existing structure is a single barrel 10’ x 3’ x 30’ reinforced concrete box culvert. Remove the structure in two phases to accommodate the construction of the new structure in segments, and the Work Zone Traffic Control as shown in the plans. Include all work required to remove the existing structure in phases in the contract unit price for “Removal of Structure.”

606 PRECAST SECTION: Tie the barrel sections together with prestressing strands or 1"ϕ tie bolts as shown on Standard Drawing D-714-22. Use a minimum of 6 - 0.5" diameter 270K strands for double box sections and 4 - 0.5" diameter 270K strands for single box sections, with one strand in each corner. Stress prestressing strands from opposite ends to a force of 20 kips. Use corrosion protected prestressing cables with their ends grouted. If tie bolts are used, place two ties per exterior wall at each joint located at third points of the wall clear height.

Payment for “Dbl 11Ft X 4Ft Precast RCB End Section” includes the apron, cutoff wall, parapet and wingwalls. Attach the apron to the last barrel section, the wingwalls and the cutoff wall. Attach the wingwalls to the last barrel section. Provide a welded tie type system for the connections of the apron to the box and wingwalls. Connect the wingwalls to the last barrel section by the use of tie bolts, steel-bolted plates or other approved method so the inside corner surface is smooth.

Use ASTM A36 steel for bolts, plates, angles, and studs. Use heavy hex nuts meeting the requirements of ASTM A563 and washers meeting ASTM F436, Type 1. Provide welded pipe sleeves meeting the requirements of ASTM A53, Grade B. Galvanize hardware and structural steel according to Section 854.

Welders are to meet the requirements of Section 105.06 D. Galvanize field welds according to Section 854.02.

Cast holes at 3'-0" centers through the apron and into the cutoff wall to receive ¾" diameter reinforcing bars. Cast holes in the last barrel section at 1'-0" centers for ½" diameter reinforcing bars to attach the parapet. Cast parapet against the section. Install the bars according to the manufacturer’s recommendations, with a high strength adhesive specifically intended for concrete anchorage, in accordance with Section 806.02.

Separate single or double cell precast units may be used as alternates to a multi cell culvert. Provide a minimum distance of 3" between separate precast units and a maximum distance of 1'-0". Fill this gap with a controlled density backfill. Use a controlled density backfill consisting of cement, water, pozzolanic materials, and fillers. Use a material that is fluid on placement to flow around and fill voids in the backfill area. Use a material that is able to support normal loads after 6 hours and have a compressive strength in the range of 75 psi to 125 psi at 28 days. If the mix design shown is used, no further testing will be required. The mix design yields approximately one cubic yard of flowable mortar.

MIX DESIGNS

Mix Design 1		Mix Design 2 (No Fly Ash)	
Cement	100 lbs	Cement	165 lbs
Fly Ash	300 lbs	Fly Ash	NA
Fine Aggregate	2600 lbs	Fine Aggregate	2600 lbs
Water	70 gals	Water	50 gals

For the 12" cap, use a weatherproof and freeze/thaw resistant, non-shrink cement grout material such as SikaGrout® 212, BASF Masterflow® 928, Euclid NS Grout, or an approved equal which complies with ASTM C1107.

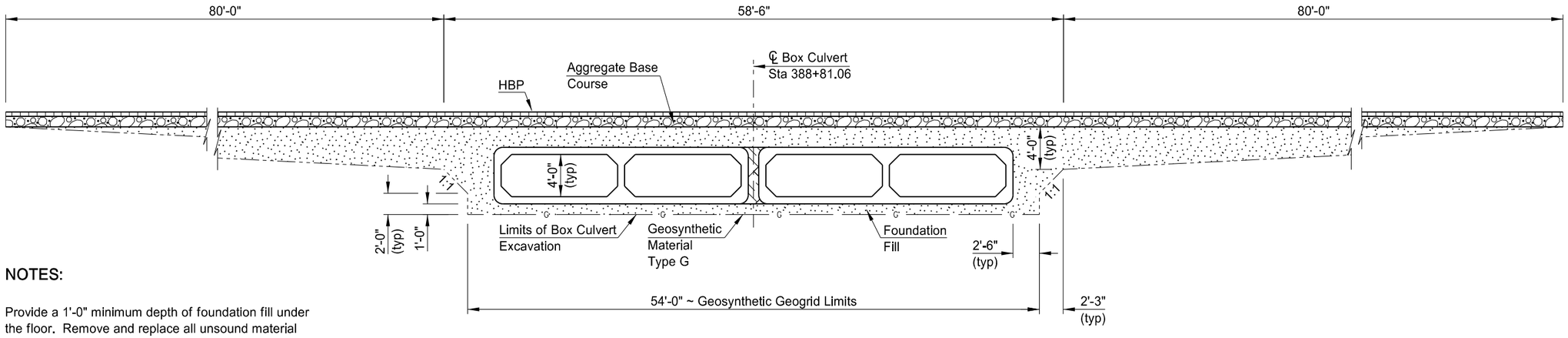
The controlled density backfill will require temporary forms at the box culvert construction joint in order to pour the controlled density backfill in the two construction phases.

Include the controlled density backfill, costs for phased placement of the controlled density backfill, and the materials used for the 12” cap in the price bid for “Dbl 11Ft X 4Ft Precast RCB Culvert.”

930 SHORING: Temporary shoring is required as shown on the plans for construction of both segments of the box culvert. The Contractor is responsible to design, construct, maintain, and remove temporary shoring. All labor, equipment and material needed for this work shall be included in the bid item, “Shoring”, with a quantity of 2 EA per phase of box culvert construction.

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	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	21



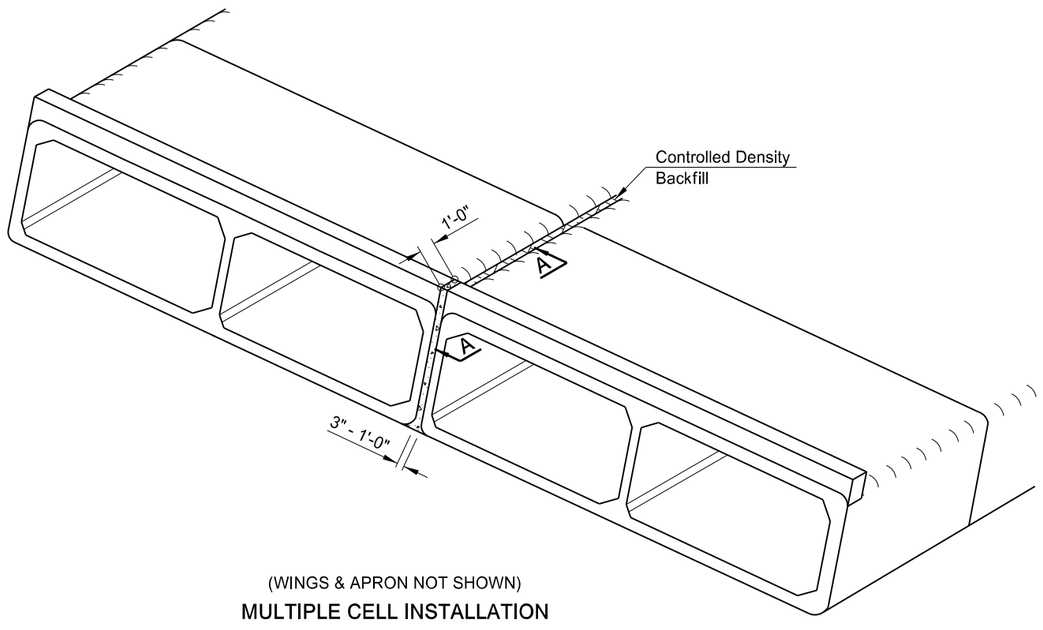
(SHOWING SECTION ALONG ℄ ROADWAY)

GEOSYNTHETIC GEOGRID PLACEMENT AND FOUNDATION FILL THROUGH EXISTING EMBANKMENT

NOTES:

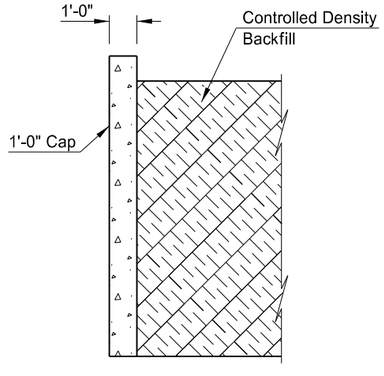
Provide a 1'-0" minimum depth of foundation fill under the floor. Remove and replace all unsound material under the box with foundation fill. The Engineer will determine the depth required.

Extend the geosynthetic material and foundation fill to the end of the apron.



(WINGS & APRON NOT SHOWN)

MULTIPLE CELL INSTALLATION



SECTION A-A

The intent of this drawing is to show only the placement of the controlled density backfill between adjacent barrels. The representation of the number of barrels is arbitrary.

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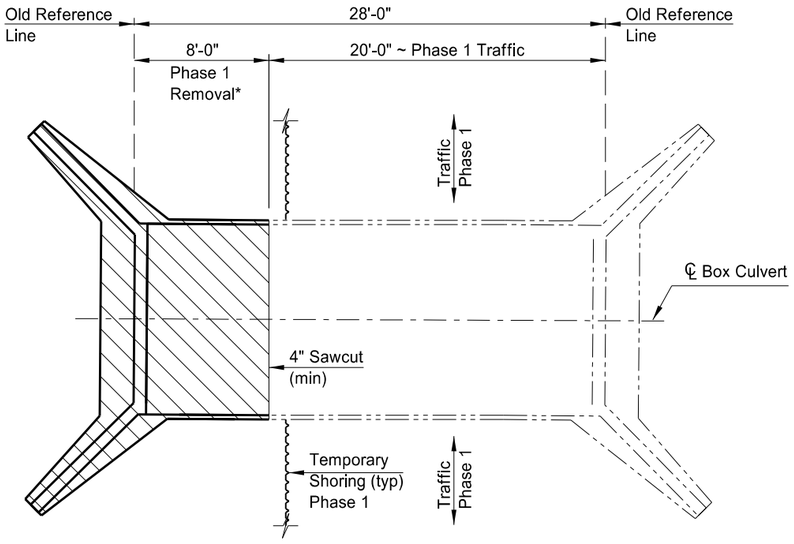
CREEK
4 EAST OF JCT 67

EXCAVATION & FOUNDATION FILL DETAIL

23 U.S.C. 409
NDDOT Reserves All Objections

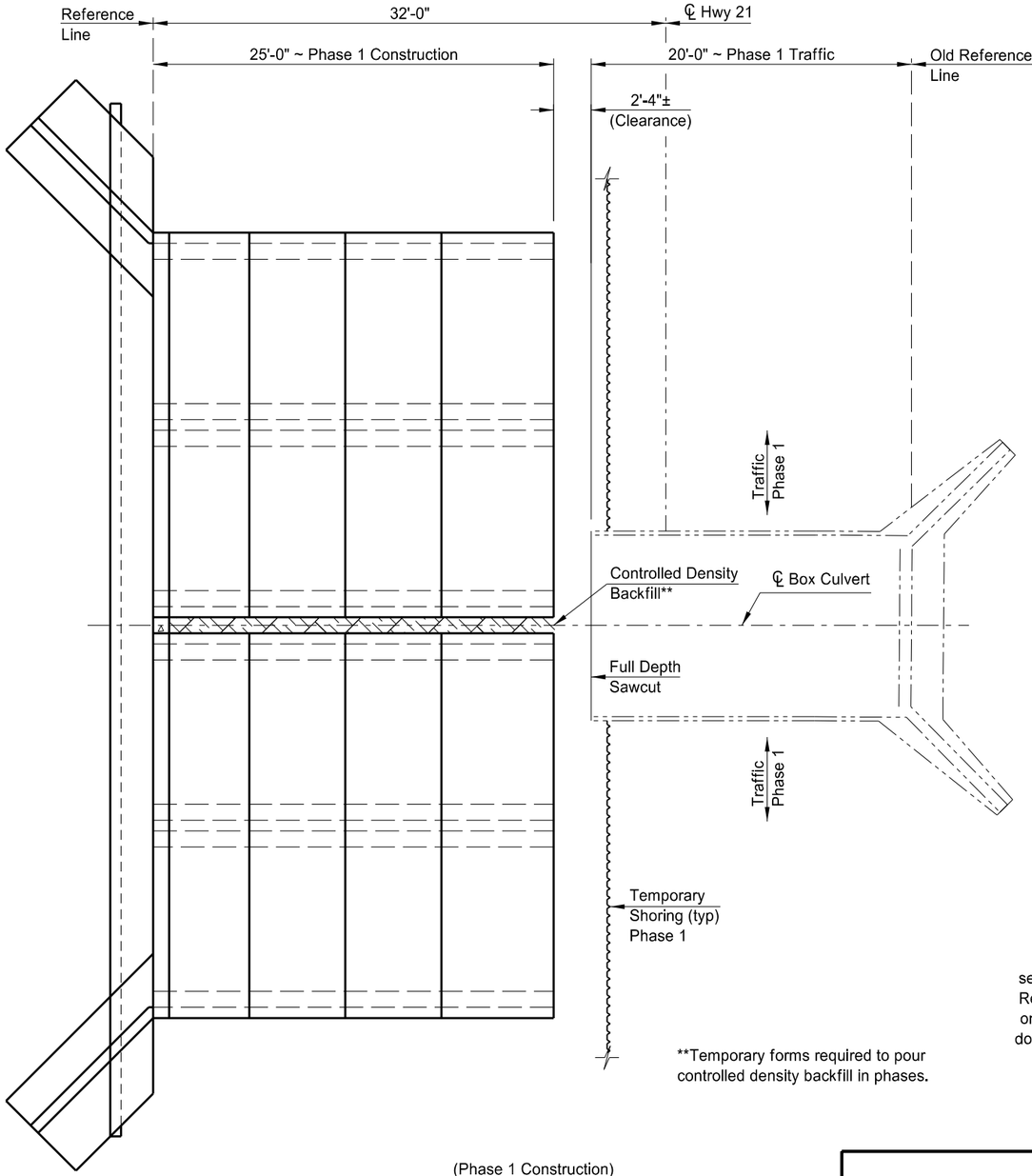
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	22

Hatched area indicates concrete to be removed.



*Prior to removals, verify field conditions and assess feasibility of Phasing as shown.

(Phase 1 Removal)
PLAN



**Temporary forms required to pour controlled density backfill in phases.

(Phase 1 Construction)
PLAN

This document was originally issued and sealed by Dustin Wing, Registration Number PE 7128, on 11/20/19 and the original document is stored at the North Dakota Department of Transportation

NOTES:

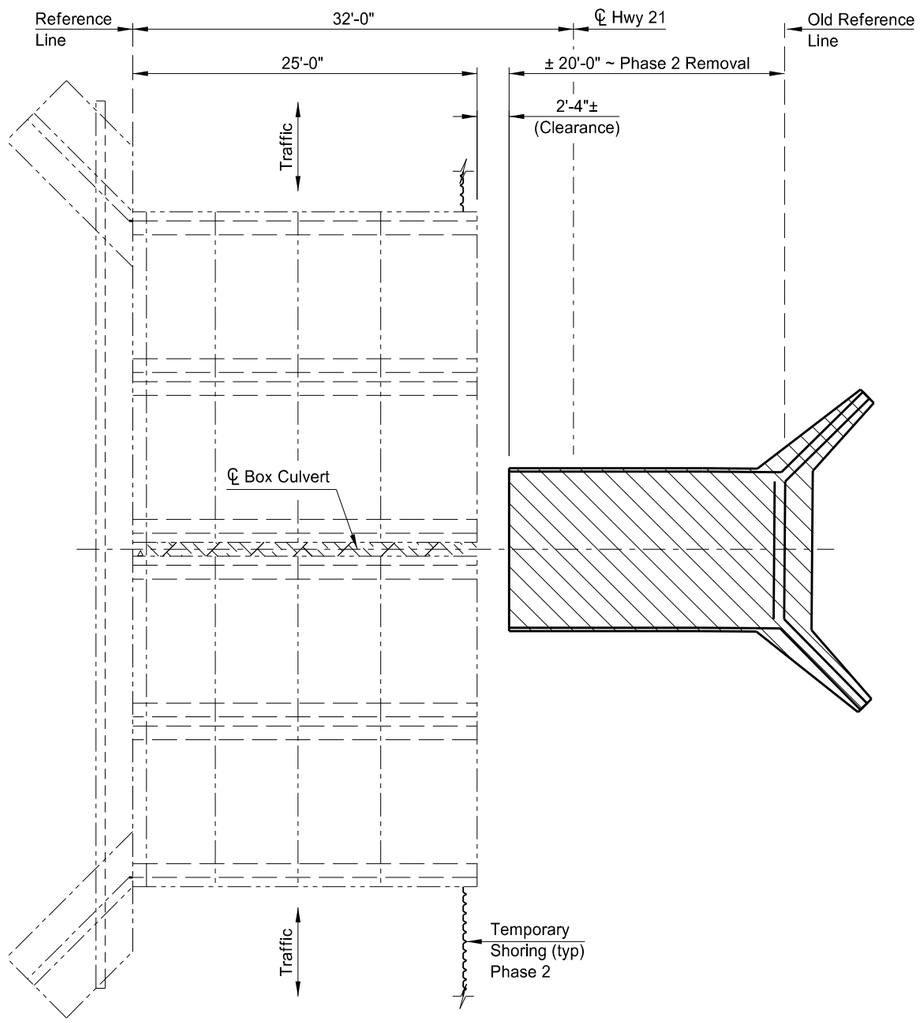
618 TREATED TIMBER STRUCTURE: Prior to removing earthen fill above the box culvert for Phase 1 traffic control as shown in Sec 100, construct a strut along the centerline of the existing box culvert. Center the strut underneath the Phase 1 traffic lane. Provide 17- 4x4 treated timber posts (#2 southern pine or better) spaced at 12 inches along the centerline of the existing box culvert. Cut the posts for a tight fit and frame with 16 foot lengths of treated 2x4 for the top and bottom wall plate. Toenail the posts to the top and bottom wall plates with 4 - 3 inch 10D galvanized nails. Attach the wall plates to the floor and roof of the box culvert with 4 inch x $\frac{3}{8}$ inch concrete screws at 24 inch spacing. Include the costs for all material, equipment, and labor to complete the work as specified in the price bid for "Treated Timber Structure."

4 EAST OF JCT ND 67

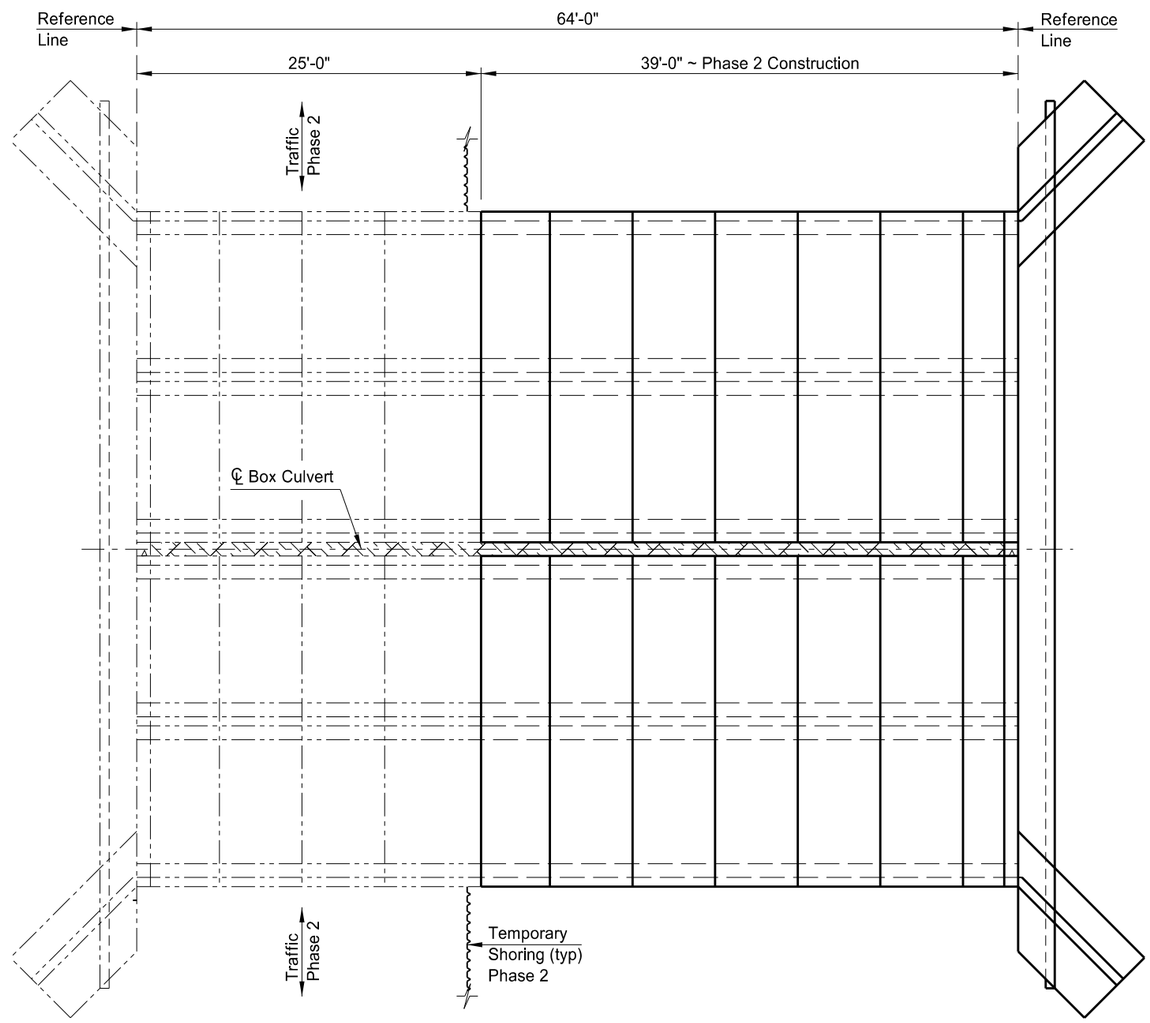
PHASE 1 CONSTRUCTION
PRECAST CONCRETE QUAD BOX CULVERT

23 U.S.C. 409
NDDOT Reserves All Objections

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	23



(Phase 2 Removal)
PLAN



(Phase 2 Construction)
PLAN

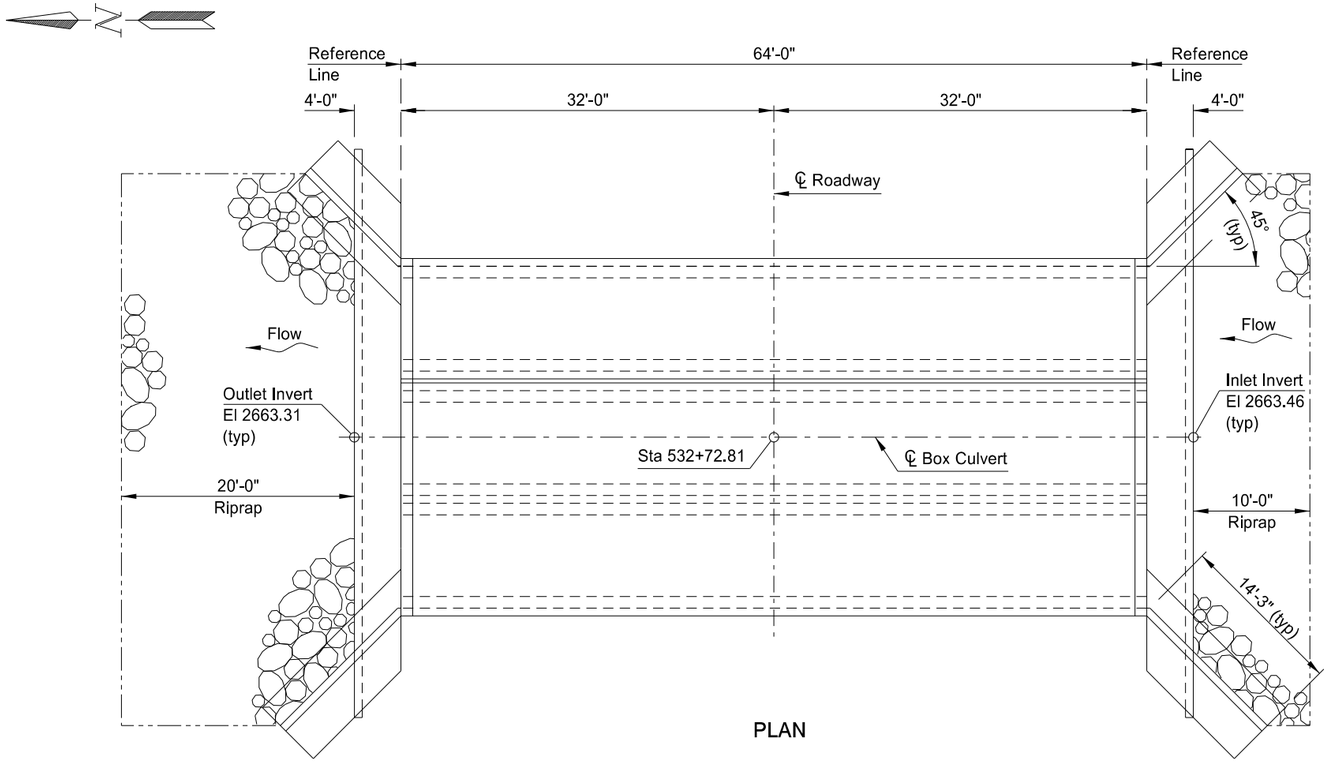
Hatched area indicates concrete to be removed.

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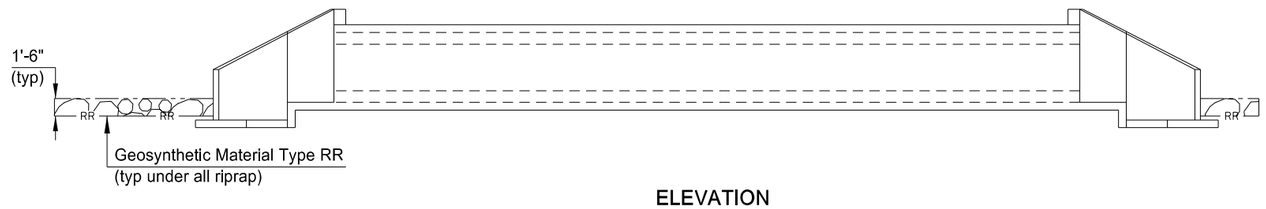
4 EAST OF ND 67

PHASE 2 CONSTRUCTION
PRECAST CONCRETE QUAD BOX CULVERT

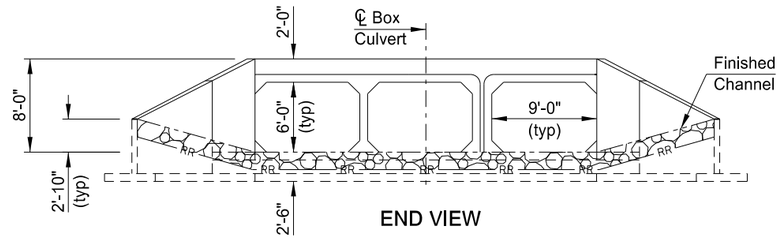
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	24



PLAN



ELEVATION



END VIEW

For a single barrel box culvert with 8" thick roof, 8" floor and 8" walls, the following total factored moments and shears would result from the application of the required loads:

FACTORED DESIGN MOMENTS (SINGLE)		FACTORED DESIGN SHEARS (SINGLE)	
WALL MOMENT	0 ft-lbs	WALL SHEAR	1,991 lbs
ROOF MOMENTS		ROOF SHEARS	
CORNER	10,176 ft-lbs	CORNER	7,123 lbs
BOTTOM	19,137 ft-lbs	FLOOR SHEARS	
FLOOR MOMENTS		CORNER	9,646 lbs
CORNER	10,915 ft-lbs		
TOP	14,883 ft-lbs		

For a double barrel box culvert with 8" thick roof, 8" floor and 8" walls, the following total factored moments and shears would result from the application of the required loads:

FACTORED DESIGN MOMENTS (DOUBLE)		FACTORED DESIGN SHEARS (DOUBLE)	
WALL MOMENT	852 ft-lbs	WALL SHEAR	1,825 lbs
ROOF MOMENTS		ROOF SHEARS	
CORNER	9,712 ft-lbs	CORNER	5,984 lbs
BOTTOM	17,789 ft-lbs	WALL	8,262 lbs
TOP	19,999 ft-lbs	FLOOR SHEARS	
FLOOR MOMENTS		CORNER	8,175 lbs
CORNER	8,741 ft-lbs	WALL	10,739 lbs
TOP	11,523 ft-lbs		
BOTTOM	21,133 ft-lbs		

HYDRAULIC DATA:

Drainage Area	2.64	sq mi
Stream Gradient	0.0034	ft/ft
Design Frequency	50	yr
Design Discharge	1061	cfs
Design Headwater Stage	2669.31	ft
Design Tailwater Stage	2667.62	ft
Velocity Through Culvert	9.12	fps
100-Year Frequency Discharge	1319	cfs
100-Year Frequency Headwater	2670.73	ft
Overtopping Stage	2670.88	ft
Overtopping Discharge	1352	cfs

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0104	REMOVAL OF STRUCTURE	EA	1
210	0050	BOX CULVERT EXCAVATION	EA	1
210	0210	FOUNDATION FILL	CY	1,290
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
256	0200	RIPRAP GRADE II	CY	80
606	0906	9FT X 6FT PRECAST RCB CULVERT	LF	64
606	2906	DBL 9FT X 6FT PRECAST RCB CULVERT	LF	64
606	6906	DBL 9FT X 6FT PRECAST RCB END SECTION	EA	2
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	295
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	160

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SPECIAL PROVISIONS	
SP 4(14)	MIGRATORY BIRD TREATY ACT

STANDARD DRAWINGS
D-714-22

HL-93 DESIGN LOADING

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
CREEK
6 EAST OF JCT ND 67

REINFORCED CONCRETE
TRIPLE BOX CULVERT LAYOUT

CLEAR SPAN 3 x 9' CLEAR HEIGHT 6'
MAXIMUM FILL 5'

PROJECT: NH-5-021(016)000
STATION: 532+72.81
SLOPE COUNTY

11/22/19 — DATE
Jon Ketterling — BRIDGE ENGINEER

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	170	25

NOTES

100 SCOPE OF WORK: Work at this site consists of removing an existing structure and building a new triple barrel 9' x 6' x 64'-0" precast concrete box culvert.

105 WORK DRAWINGS: Submit work drawings for the precast concrete box culvert to the Engineer for review.

202 REMOVAL OF STRUCTURE: The existing structure is a double barrel 5’ x 5’ x 29’ reinforced concrete box culvert. Include all work required to remove the existing structure in the contract unit price for “Removal of Structure.”

210 ORDINARY BACKFILL: Compact material as specified in Section 203.04 E.2.a, “ND T 180.”

606 PRECAST SECTION: Tie the barrel sections together with prestressing strands or 1"ϕ tie bolts as shown on Standard Drawing D-714-22. Use a minimum of 6 - 0.5" diameter 270K strands for double box sections and 4 - 0.5" diameter 270K strands for single box sections, with one strand in each corner. Stress prestressing strands from opposite ends to a force of 20 kips. Use corrosion protected prestressing cables with their ends grouted. If tie bolts are used, place two ties per exterior wall at each joint located at third points of the wall clear height.

Payment for “Dbl 9Ft X 6Ft Precast RCB End Section” includes the apron, cutoff wall, parapet and wingwalls. Attach the apron to the last barrel section, the wingwalls and the cutoff wall. Attach the wingwalls to the last barrel section. Provide a welded tie type system for the connections of the apron to the box and wingwalls. Connect the wingwalls to the last barrel section by the use of tie bolts, steel-bolted plates or other approved method so the inside corner surface is smooth.

Use ASTM A36 steel for bolts, plates, angles, and studs. Use heavy hex nuts meeting the requirements of ASTM A563 and washers meeting ASTM F436, Type 1. Provide welded pipe sleeves meeting the requirements of ASTM A53, Grade B. Galvanize hardware and structural steel according to Section 854.

Welders are to meet the requirements of Section 105.06 D. Galvanize field welds according to Section 854.02.

Cast holes at 3'-0" centers through the apron and into the cutoff wall to receive ¾" diameter reinforcing bars. Cast holes in the last barrel section at 1'-0" centers for ½" diameter reinforcing bars to attach the parapet. Cast parapet against the section. Install the bars according to the manufacturer’s recommendations, with a high strength adhesive specifically intended for concrete anchorage, in accordance with Section 806.02.

Separate single or double cell precast units may be used as alternates to a multi cell culvert. Provide a minimum distance of 3" between separate precast units and a maximum distance of 1'-0". Fill this gap with a controlled density backfill. Use a controlled density backfill consisting of cement, water, pozzolanic materials, and fillers. Use a material that is fluid on placement to flow around and fill voids in the backfill area. Use a material that is able to support normal loads after 6 hours and have a compressive strength in the range of 75 psi to 125 psi at 28 days. If the mix design shown is used, no further testing will be required. The mix design yields approximately one cubic yard of flowable mortar.

MIX DESIGNS

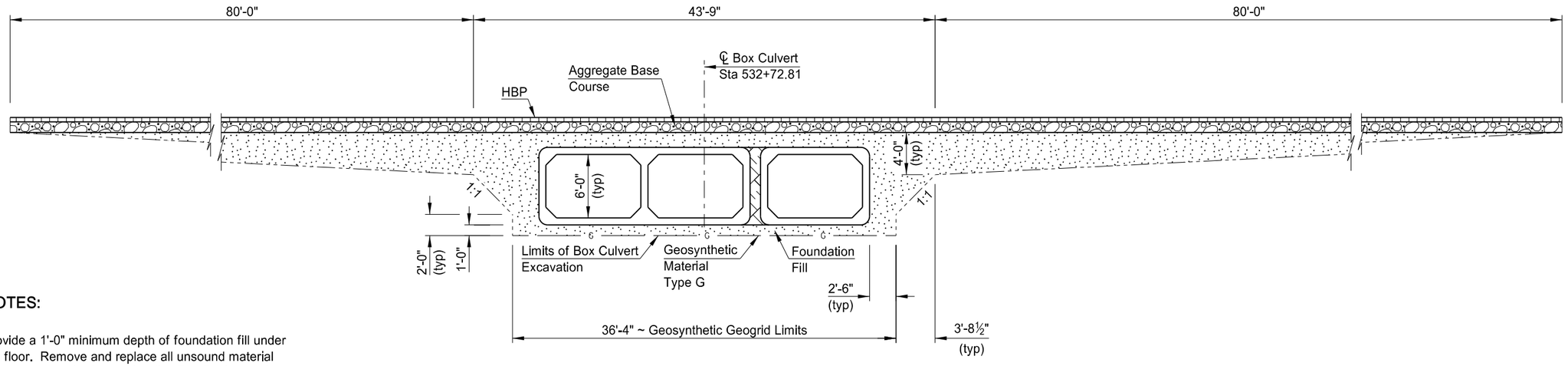
Mix Design 1		Mix Design 2 (No Fly Ash)	
Cement	100 lbs	Cement	165 lbs
Fly Ash	300 lbs	Fly Ash	NA
Fine Aggregate	2600 lbs	Fine Aggregate	2600 lbs
Water	70 gals	Water	50 gals

For the 12" cap, use a weatherproof and freeze/thaw resistant, non-shrink cement grout material such as SikaGrout® 212, BASF Masterflow® 928, Euclid NS Grout, or an approved equal which complies with ASTM C1107.

Include the controlled density backfill and materials used for the 12” cap in the price bid for “Dbl 9Ft X 6Ft Precast RCB Culvert.”

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	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	26



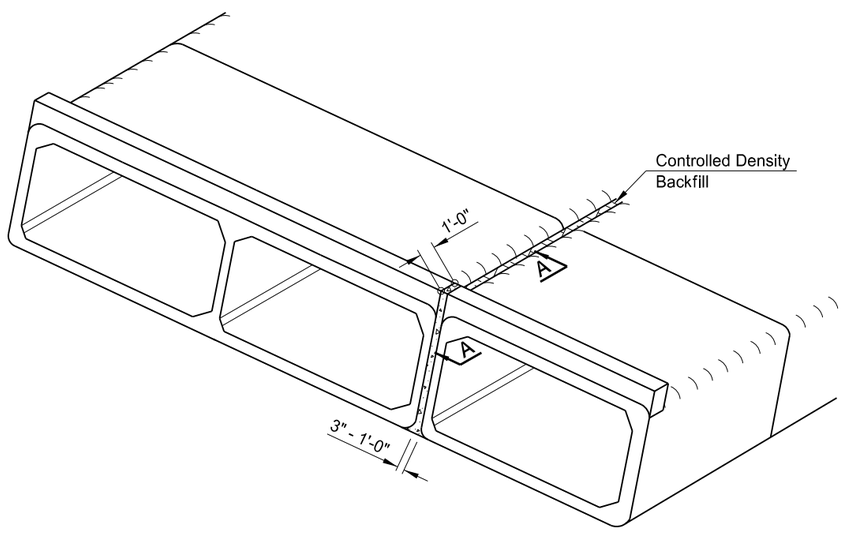
(SHOWING SECTION ALONG ℄ ROADWAY)

GEOSYNTHETIC GEOGRID PLACEMENT AND FOUNDATION FILL THROUGH EXISTING EMBANKMENT

NOTES:

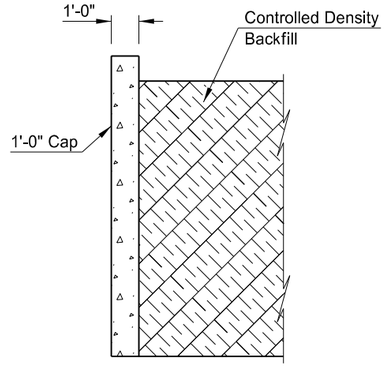
Provide a 1'-0" minimum depth of foundation fill under the floor. Remove and replace all unsound material under the box with foundation fill. The Engineer will determine the depth required.

Extend the geosynthetic material and foundation fill to the end of the apron.



(WINGS & APRON NOT SHOWN)

MULTIPLE CELL INSTALLATION



SECTION A-A

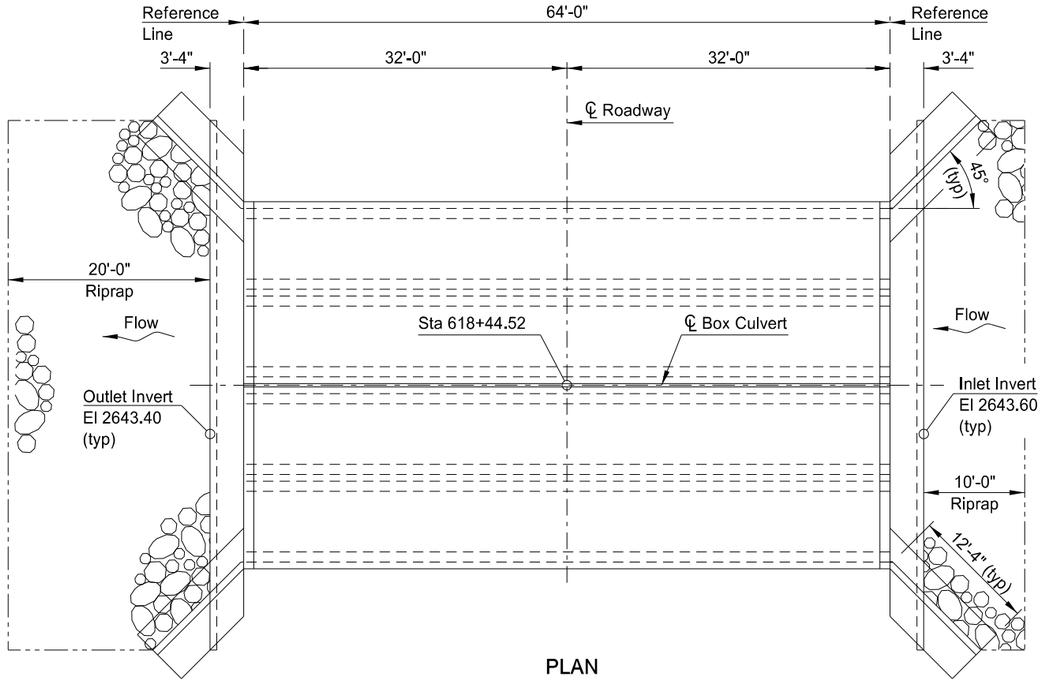
The intent of this drawing is to show only the placement of the controlled density backfill between adjacent barrels. The representation of the number of barrels is arbitrary.

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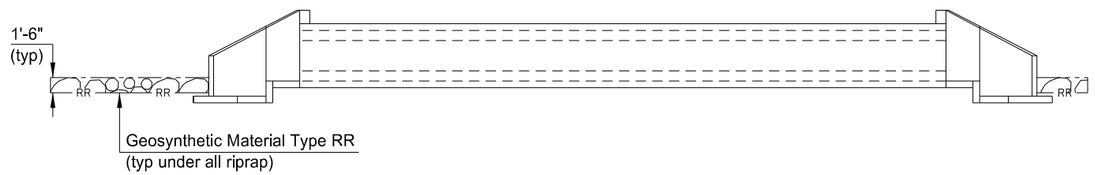
CREEK
6 EAST OF JCT 67

EXCAVATION & FOUNDATION FILL DETAIL

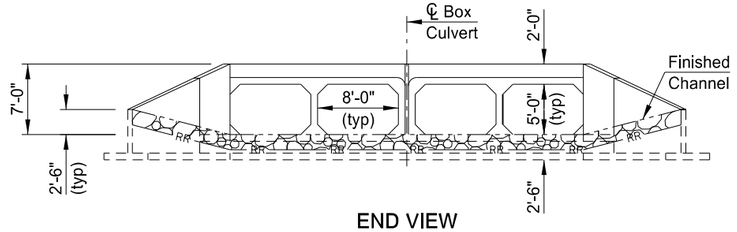
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	27



PLAN



ELEVATION



END VIEW

For a single barrel box culvert with 8" thick roof, 8" floor and 8" walls, the following total factored moments and shears would result from the application of the required loads:

FACTORED DESIGN MOMENTS (SINGLE)		FACTORED DESIGN SHEARS (SINGLE)	
WALL MOMENT	0 ft-lbs	WALL SHEAR	1,598 lbs
ROOF MOMENTS		ROOF SHEARS	
CORNER	8,980 ft-lbs	CORNER	6,115 lbs
BOTTOM	16,792 ft-lbs	FLOOR SHEARS	
FLOOR MOMENTS		CORNER	9,496 lbs
CORNER	8,806 ft-lbs		
TOP	11,812 ft-lbs		

For a double barrel box culvert with 8" thick roof, 8" floor and 8" walls, the following total factored moments and shears would result from the application of the required loads:

FACTORED DESIGN MOMENTS (DOUBLE)		FACTORED DESIGN SHEARS (DOUBLE)	
WALL MOMENT	656 ft-lbs	WALL SHEAR	1,442 lbs
ROOF MOMENTS		ROOF SHEARS	
CORNER	8,633 ft-lbs	CORNER	5,107 lbs
BOTTOM	15,764 ft-lbs	WALL	7,122 lbs
TOP	17,430 ft-lbs	FLOOR SHEARS	
FLOOR MOMENTS		CORNER	7,225 lbs
CORNER	7,054 ft-lbs	WALL	9,496 lbs
TOP	9,202 ft-lbs		
BOTTOM	16,897 ft-lbs		

HYDRAULIC DATA:

Drainage Area	7.35	sq mi
Stream Gradient	0.0021	ft/ft
Design Frequency	50	yr
Design Discharge	1282	cfs
Design Headwater Stage	2650.30	ft
Design Tailwater Stage	2648.65	ft
Velocity Through Culvert	8.01	fps
100-Year Frequency Discharge	1593	cfs
100-Year Frequency Headwater	2651.48	ft
Overtopping Stage	2651.57	ft
Overtopping Discharge	1610	cfs

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0104	REMOVAL OF STRUCTURE	EA	1
210	0050	BOX CULVERT EXCAVATION	EA	1
210	0210	FOUNDATION FILL	CY	1,275
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
256	0200	RIPRAP GRADE II	CY	85
606	2805	DBL 8FT X 5FT PRECAST RCB CULVERT	LF	128
606	6805	DBL 8FT X 5FT PRECAST RCB END SECTION	EA	2
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	330
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	170

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SPECIAL PROVISIONS

SP 4(14)	MIGRATORY BIRD TREATY ACT

STANDARD DRAWINGS

D-714-22

HL-93 DESIGN LOADING

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
CREEK
8 EAST OF JCT ND 67

PRECAST CONCRETE
QUAD BOX CULVERT LAYOUT

CLEAR SPAN 4 x 8' CLEAR HEIGHT 5'
MAXIMUM FILL 5'

PROJECT: NH-5-021(016)000
STATION: 618+44.52
SLOPE COUNTY

11/22/19 Jon Ketterling
DATE BRIDGE ENGINEER

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	170	28

NOTES

100 SCOPE OF WORK: Work at this site consists of removing an existing structure and building a new quad barrel 8' x 5' x 64'-0" precast concrete box culvert.

105 WORK DRAWINGS: Submit work drawings for the precast concrete box culvert to the Engineer for review.

202 REMOVAL OF STRUCTURE: The existing structure is a double barrel 5’ x 5’ x 30’ reinforced concrete box culvert. Include all work required to remove the existing structure in the contract unit price for “Removal of Structure.”

210 ORDINARY BACKFILL: Compact material as specified in Section 203.04 E.2.a, “ND T 180.”

606 PRECAST SECTION: Tie the barrel sections together with prestressing strands or 1"ϕ tie bolts as shown on Standard Drawing D-714-22. Use a minimum of 6 - 0.5" diameter 270K strands for double box sections and 4 - 0.5" diameter 270K strands for single box sections, with one strand in each corner. Stress prestressing strands from opposite ends to a force of 20 kips. Use corrosion protected prestressing cables with their ends grouted. If tie bolts are used, place two ties per exterior wall at each joint located at third points of the wall clear height.

Payment for “Dbl 8Ft X 5Ft Precast RCB End Section” includes the apron, cutoff wall, parapet and wingwalls. Attach the apron to the last barrel section, the wingwalls and the cutoff wall. Attach the wingwalls to the last barrel section. Provide a welded tie type system for the connections of the apron to the box and wingwalls. Connect the wingwalls to the last barrel section by the use of tie bolts, steel-bolted plates or other approved method so the inside corner surface is smooth.

Use ASTM A36 steel for bolts, plates, angles, and studs. Use heavy hex nuts meeting the requirements of ASTM A563 and washers meeting ASTM F436, Type 1. Provide welded pipe sleeves meeting the requirements of ASTM A53, Grade B. Galvanize hardware and structural steel according to Section 854.

Welders are to meet the requirements of Section 105.06 D. Galvanize field welds according to Section 854.02.

Cast holes at 3'-0" centers through the apron and into the cutoff wall to receive ¾" diameter reinforcing bars. Cast holes in the last barrel section at 1'-0" centers for ½" diameter reinforcing bars to attach the parapet. Cast parapet against the section. Install the bars according to the manufacturer’s recommendations, with a high strength adhesive specifically intended for concrete anchorage, in accordance with Section 806.02.

Separate single or double cell precast units may be used as alternates to a multi cell culvert. Provide a minimum distance of 3" between separate precast units and a maximum distance of 1'-0". Fill this gap with a controlled density backfill. Use a controlled density backfill consisting of cement, water, pozzolanic materials, and fillers. Use a material that is fluid on placement to flow around and fill voids in the backfill area. Use a material that is able to support normal loads after 6 hours and have a compressive strength in the range of 75 psi to 125 psi at 28 days. If the mix design shown is used, no further testing will be required. The mix design yields approximately one cubic yard of flowable mortar.

MIX DESIGNS

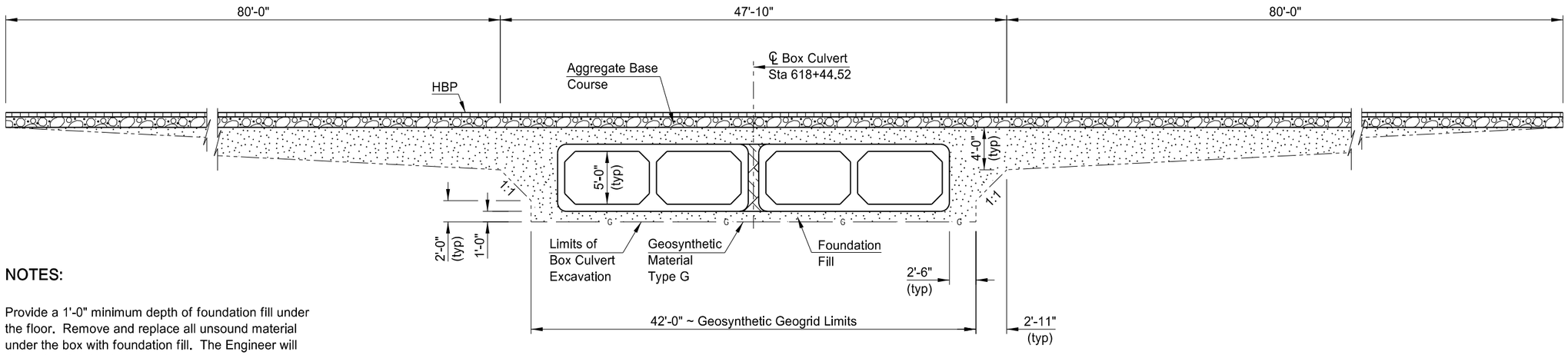
Mix Design 1		Mix Design 2 (No Fly Ash)	
Cement	100 lbs	Cement	165 lbs
Fly Ash	300 lbs	Fly Ash	NA
Fine Aggregate	2600 lbs	Fine Aggregate	2600 lbs
Water	70 gals	Water	50 gals

For the 12" cap, use a weatherproof and freeze/thaw resistant, non-shrink cement grout material such as SikaGrout® 212, BASF Masterflow® 928, Euclid NS Grout, or an approved equal which complies with ASTM C1107.

Include the controlled density backfill and materials used for the 12” cap in the price bid for “Dbl 8Ft X 5Ft Precast RCB Culvert.”

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	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	170	29



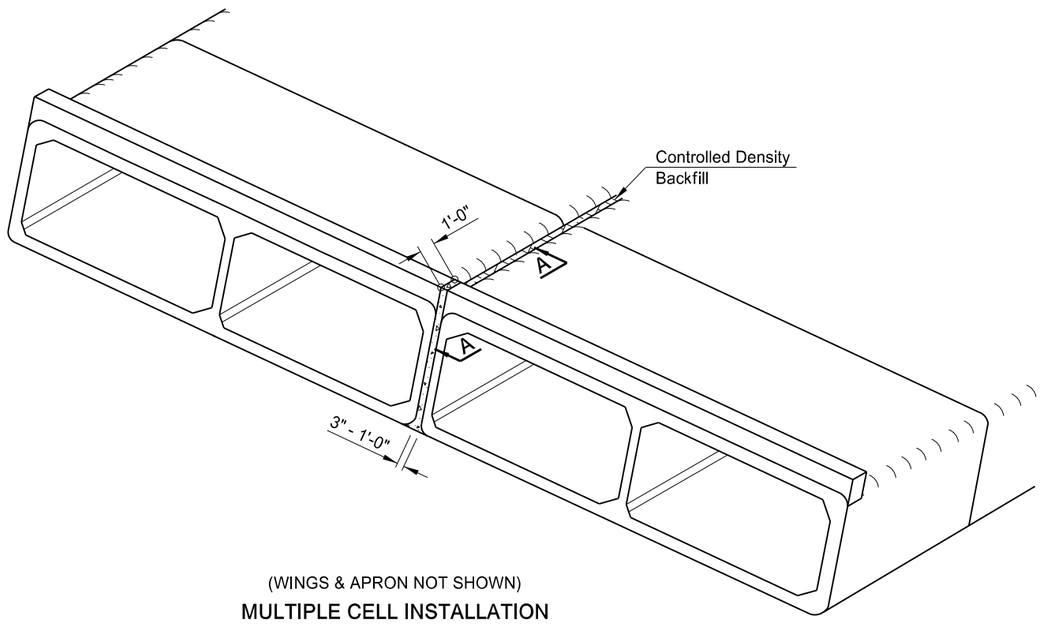
(SHOWING SECTION ALONG ℄ ROADWAY)

GEOSYNTHETIC GEOGRID PLACEMENT AND FOUNDATION FILL THROUGH EXISTING EMBANKMENT

NOTES:

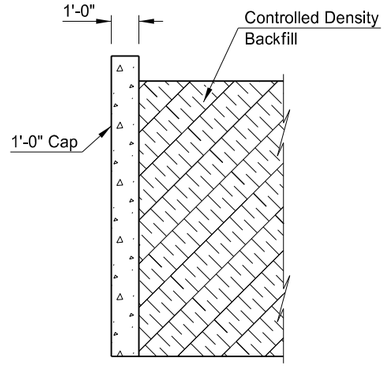
Provide a 1'-0" minimum depth of foundation fill under the floor. Remove and replace all unsound material under the box with foundation fill. The Engineer will determine the depth required.

Extend the geosynthetic material and foundation fill to the end of the apron.



(WINGS & APRON NOT SHOWN)

MULTIPLE CELL INSTALLATION



SECTION A-A

The intent of this drawing is to show only the placement of the controlled density backfill between adjacent barrels. The representation of the number of barrels is arbitrary.

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CREEK
8 EAST OF JCT 67

EXCAVATION & FOUNDATION FILL DETAIL

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	180	1

N

US 85

2655+00

2650+00

2645+00

2640+00

2635+00

2630+00

2625+00

2620+00

2615+00

2610+00

2605+00

2600+00

Sec 2
T-135-N
R-100-W

Sec 1
T-135-N
R-100-W

5+00

10+00

15+00

20+00

25+00

30+00

35+00

ND 21

Sec 11
T-135-N
R-100-W

Sec 12
T-135-N
R-100-W

1129'

754'

754'

1129'

US 85

E½of the NW¼12-135-100
Borrow Pit Clue #1
Marc Wolf and Anne Wolf
11175 64th St SW
New England, ND 58647
(701)290-4221

Borrow Pit Clue #1

N

605+00

610+00

615+00

Sec 2
T-135-N
R-98-W

ND 21

Sec 1
T-135-N
R-98-W

ND 21

Sec 11
T-135-N
R-98-W

Sec 12
T-135-N
R-98-W

124th Ave SW

SE¼of the SE¼11-135-98
Borrow Pit Clue #2
Orlin E. Erickson Family Trust
James Erickson, Trustee
Roberta Erickson, Trustee
6204 123rd Ave SW
New England, ND 58647
(701)290-6321

938'

620'

614'

1027'

Borrow Pit Clue #2

LEGEND

Borrow Site

Borrow Pit Clues

ND 21
Jct 85 to N Jct 22 - New England

Borrow Pit Clues #1 & #2

12/27/2018 11:09:48 PM STACY.FLATEN G:\2018\18.00676\50021000.016\Design\Sheets\180PT_001_BORROW.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-021(016)000	180	2

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

TEST HOLE PLAT

Location: 2-132-99 County: Bowman

Ownership: John Nelson

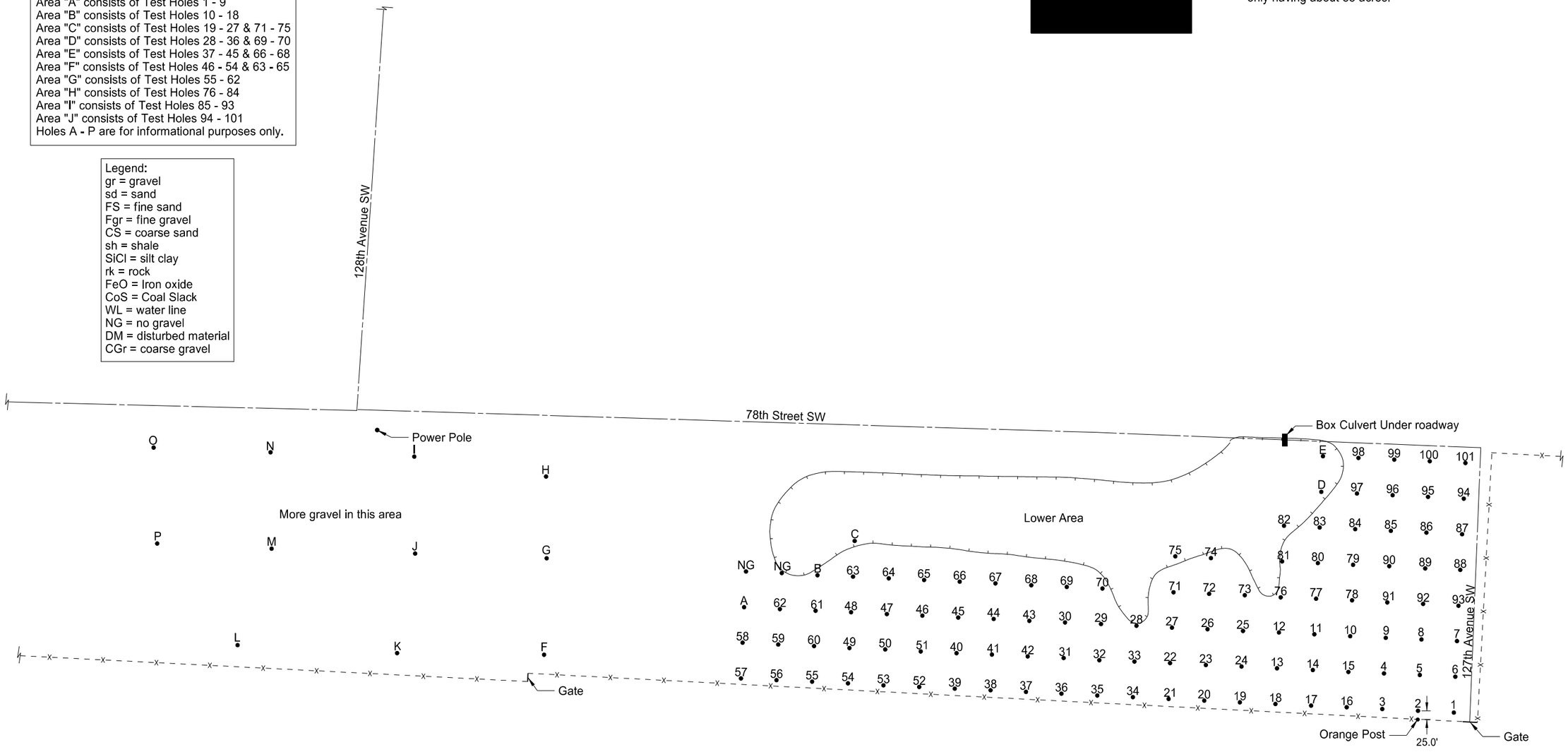
Area "A" consists of Test Holes 1 - 9
Area "B" consists of Test Holes 10 - 18
Area "C" consists of Test Holes 19 - 27 & 71 - 75
Area "D" consists of Test Holes 28 - 36 & 69 - 70
Area "E" consists of Test Holes 37 - 45 & 66 - 68
Area "F" consists of Test Holes 46 - 54 & 63 - 65
Area "G" consists of Test Holes 55 - 62
Area "H" consists of Test Holes 76 - 84
Area "I" consists of Test Holes 85 - 93
Area "J" consists of Test Holes 94 - 101
Holes A - P are for informational purposes only.

Legend:
gr = gravel
sd = sand
FS = fine sand
Fgr = fine gravel
CS = coarse sand
sh = shale
SiCl = silt clay
rk = rock
FeO = Iron oxide
CoS = Coal Slack
WL = water line
NG = no gravel
DM = disturbed material
CGr = coarse gravel

LOCATION OF PIT IN SECTION



We leased up the entire Section 2 which has a correction factor resulting in the entire section only having about 88 acres.



Scale 1"=300'

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	180	3

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
1	1.0	2.5 Fgr	0	1	5	13	SiCl
		0.5 gr CoS					
		1.0 Fgr					
		1.0 FgrSiCl					
		1.0 Fgr					
2	2.0	4.0 Fgr	0	2	8	15	SiCl
		1.0 gr					
		1.0 Fgr					
3	2.0	2.0 FgrSiCl	0	6	12	23	SiCl
		6.0 Fgr					
		1.0 FgrSiCl					
4	2.0	2.0 gr	0	8	16	27	SiCl
		4.0 Fgr					
5	0.5	5.0 Fgr	1	9	18	30	SiCl
		1.5 FS					
		3.0 Fgr					
6	1.0	3.0 Fgr	0	6	14	27	SiCl
		1.0 gr					
		1.0 Fgr					
		2.0 gr					
7	1.0	2.0 Fgr	0	4	11	20	SiCl
		1.0 SiCl					
		1.5 Fgr					
		0.5 FS					
		1.0 Fgr					
8	2.0	2.0 Fgr	0	8	14	25	SiCl
		1.0 CS					
		2.0 Fgr					
		0.5 sd CoS					
		0.5 Fgr					
		2.0 gr					
		2.5 Fgr					
9	2.5	0.5 FgrSiCl	0	3	8	17	SiCl
		2.0 Fgr					
		1.0 FS					
		2.0 Fgr					
		1.0 FgrSiCl					
		3.0 Fgr					
10	2.0	2.0 gr	1	10	18	27	SiCl
		5.0 Fgr					
		1.0 FS					
		2.0 Fgr					
11	3.5	3.5 FgrSiCl	1	9	17	29	SiCl
		3.0 Fgr					
		1.0 FS					
		3.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
12	2.0	1.0 Fgr	2	10	19	31	SiCl
		3.0 gr					
		3.0 Fgr					
		2.0 FS					
		1.0 Fgr					
		1.0 gr					
13	3.0	1.0 FgrSiCl	0	5	12	23	SiCl
		2.0 Fgr					
		1.0 FgrSiCl					
		2.0 Fgr					
		1.0 FS					
		3.0 Fgr					
14	2.5	3.5 Fgr	0	5	13	24	SiCl
		2.0 gr					
		2.0 Fgr					
		1.0 FS					
		1.0 Fgr					
		1.0 FgrSiCl					
		1.0 FS					
		1.0 Fgr					
15	3.0	2.0 Fgr	0	2	8	18	SiCl
		1.0 CS					
		3.0 Fgr					
		1.0 FgrSiCl					
		1.5 Fgr					
16	2.0	3.0 Fgr	0	7	14	24	SiCl
		1.0 FgrSiCl					
		1.0 FS					
		6.0 Fgr					
17	1.5	3.5 Fgr	0	8	15	25	SiCl
		1.0 FS					
		7.0 Fgr					
18	1.0	5.0 Fgr	0	2	8	17	SiCl
		1.0 sd					
		1.5 FgrSiCl					
		0.5 FS					
		4.0 Fgr					
19	2.0	6.0 fgr	0	3	8	16	SiCl
		3.0 sd					
		1.0 FgrSiCl					
		1.0 Fgr					
20	2.0	3.0 Fgr	0	3	9	17	SiCl
		2.0 FS					
		7.0 Fgr					
21	3.0	1.0 FgrSiCl	0	2	5	12	SiCl
		2.0 Fgr					
		1.0 FS					
		1.0 sd					
		1.0 FS					
		1.0 Fgr					
		2.0 FS					
		1.0 FgrSiCl					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
22	3.0	3.0 Fgr	0	5	12	24	SiCl
		1.0 FgrSiCl					
		2.0 Fgr					
		1.0 FS					
		3.5 Fgr					
23	3.0	1.0 Fgr	0	5	15	31	SiCl
		5.0 FgrSiCl					
		1.0 Fgr					
		1.0 gr CoS					
		4.0 Fgr					
24	4.0	1.0 FgrSiCl	0	3	8	17	SiCl
		8.0 Fgr					
25	2.0	2.0 FgrSiCl	0	2	8	17	SiCl
		1.0 Fgr					
		1.0 FgrSiCl					
		1.0 FS					
		3.0 Fgr					
26	3.0	3.0 Fgr	0	7	13	22	SiCl
		1.0 FS					
		6.0 Fgr					
27	2.0	1.0 Fgr	0	3	8	14	SiCl
		1.0 CS					
		2.0 Fgr					
		1.0 FS					
		1.5 Fgr					
28	5.0	2.0 Fgr	0	3	7	12	SiCl
		1.0 FS					
		2.0 Fgr					
29	3.0	3.0 Fgr	0	3	8	16	SiCl
		0.5 SiCl					
		2.5 FS					
		2.0 Fgr					
30	1.5	3.5 Fgr	0	1	5	13	SiCl
		1.5 FS					
		1.5 Fgr					
		1.0 FS					
		2.0 Fgr					
31	2.5	1.5 Fgr	0	3	8	16	SiCl
		2.0 FgrSiCl					
		1.0 Fgr					
		2.0 FS					
		1.0 CS					
		3.0 FS					
		1.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	
32	2.0	2.0 FgrSiCl	0	2	7	14	SiCl
		2.0 Fgr					
		1.0 FS					
		2.0 Fgr					
		1.0 FS					
		3.0 Fgr					
33	3.0	2.0 Fgr	0	3	8	15	SiCl
		1.0 FgrSiCl					
		2.5 FS					
		3.5 Fgr					
34	3.0	2.0 gr	0	3	8	16	FS
		1.5 Fgr					
35	4.0	7.0 Fgr	0	5	12	21	SiCl
36	3.0	2.0 Fgr	0	3	9	17	SiCl
		1.0 FgrSiCl					
		1.0 FS					
		1.0 sd					
		1.0 FgrSiCl					
37	3.0	4.0 Fgr	0	4	12	23	SiCl
		1.0 FgrSiCl					
		3.5 Fgr					
		0.5 FS					
		1.0 Fgr					
38	3.0	6.0 Fgr	0	5	13	24	SiCl
		1.5 sd CoS					
		0.5 FS					
		1.0 Fgr					
		1.0 CS					
		1.0 Fgr					

RANGE 99 **TWP** 132 **SEC** 2

COUNTY Bowman Nov-17

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Jan-18

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	180	4

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
39	3.0	1.0 Fgr	0	5	12	25	SiCl
		1.0 FgrSiCl					
		2.5 Fgr					
		0.5 FS					
		6.0 Fgr					
40	3.0	4.0 Fgr	0	3	10	19	SiCl
		1.0 FS					
		2.0 Fgr					
		1.0 FS					
		3.0 Fgr					
41	3.0	4.0 Fgr	0	4	11	23	WL
		1.0 FgrSiCl					
		4.0 Fgr					
		1.0 FS					
		1.0 Fgr					
		1.0 FS					
42	3.0	5.0 Fgr	0	4	10	22	SiCl
		2.0 FS					
		1.0 Fgr					
		1.0 FS					
		2.0 Fgr					
43	2.5	3.5 Fgr	0	3	6	12	SiCl
		2.0 FS					
		2.0 Fgr					
		2.0 FS					
		1.0 Fgr					
44	3.0	3.0 Fgr	0	0	4	9	SiCl
		3.0 FS					
		3.0 Fgr					
		1.0 sd					
		1.0 Fgr					
45	3.0	3.0 Fgr	0	2	7	16	SiCl
		2.0 FS					
		1.5 sd					
		0.5 CS					
		2.0 FS					
		1.0 Fgr					
		1.0 FgrSiCl					
46	3.0	3.0 FgrSiCl	0	1	7	14	WL
		2.0 Fgr					
		3.0 FS					
47	3.0	6.0 Fgr	0	7	15	26	SiCl
		1.0 sd					
		1.0 FS					
		1.0 SiCl					
		2.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
48	2.0	5.0 Fgr	0	8	15	24	SiCl
		4.0 FS					
		1.0 Fgr					
		2.0 FS					
		1.0 Fgr					
49	4.0	2.0 Fgr	0	4	9	16	SiCl
		1.0 FgrSiCl					
		2.0 sd					
		1.0 SiCl					
		1.0 FgrSiCl					
		2.0 sd					
		2.0 Fgr					
50	4.0	4.5 Fgr	0	5	11	23	FS
		0.5 FS					
		1.0 Fgr					
		1.0 sd					
51	4.0	1.0 Fgr	0	3	8	16	SiCl
		2.0 FgrSiCl					
		1.0 Fgr					
		1.0 sd					
		1.0 FS					
52	2.5	9.5 Fgr	0	5	12	23	SiCl
		1.0 FS					
		1.0 Fgr					
53	4.0	2.0 Fgr	0	0	5	13	SiCl
		1.0 FgrSiCl					
		1.0 sd					
		3.0 Fgr					
		0.5 sd					
		2.0 Fgr					
		0.5 sd					
54	3.0	1.0 FgrSiCl	0	6	14	25	SiCl
		3.0 Fgr					
		4.0 gr					
		4.0 Fgr					
55	4.0	2.0 Fgr	o	2	8	19	SiCl
		1.0 FgrSiCl					
		1.0 SiCl					
		1.0 FgrSiCl					
56	3.0	2.0 Fgr	0	5	14	27	FS
		2.0 FgrSiCl					
		2.0 Fgr					
57	3.0	2.0 FgrSiCl	0	7	17	30	SiCl
		3.5 Fgr					
58	2.0	2.0 Fgr	2	10	18	29	SiCl
		1.0 FgrSiCl					
		1.5 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
59	3.0	4.5 Fgr	0	6	15	30	SiCl
60	3.0	5.0 Fgr	0	8	19	35	FS
61	2.0	4.0 Fgr	0	2	10	24	SiCl
62	2.5	2.5 Fgr	0	6	17	31	SiCl
63	3.0	3.0 Fgr	1	10	20	33	SiCl
64	2.0	3.0 Fgr	2	14	28	43	SiCl
65	1.5	3.5 Fgr	0	6	14	32	SiCl
66	1.0	3.0 Fgr	0	5	11	21	SiCl
		1.0 FS					
		2.0 Fgr					
67	1.5	2.5 FgrSiCl	0	3	8	17	SiCl
		1.0 Fgr					
		2.0 FgrSiCl					
		2.0 Fgr					
68	1.0	2.0 Fgr	0	1	7	18	SiCl
		1.0 FgrSiCl					
		4.0 Fgr					
69	1.0	4.0 Fgr	0	1	7	19	SiCl
		1.0 sd					
		1.0 gr CoS					
		1.0 Fgr					
		1.0 FS					
70	0.5	3.5 Fgr	0	3	9	17	SiCl
		3.0 FS					
		2.0 Fgr					
71	1.0	4.0 Fgr	0	3	13	27	SiCl
		2.5 FgrSiCl					
72	1.0	3.0 Fgr	0	4	10	17	SiCl
		1.0 FS					
		2.0 Fgr					
		2.0 FS					
		2.0 Fgr					
73	1.0	6.0 Fgr	0	2	5	11	SiCl
		1.0 sd					
		1.0 FgrSiCl					
		1.0 CS					
		3.0 sd					
74	1.0	3.0 Fgr	0	3	8	16	SiCl
		1.0 FS					
		2.0 Fgr					
		1.0 sd					
75	1.0	3.0 Fgr	0	1	7	16	SiCl
		1.0 FS					
		3.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
76	1.5	1.5 Fgr	0	4	12	25	SiCl
		1.0 FgrSiCl					
		1.0 SiCl					
		0.5 FS					
		2.5 Fgr					
		1.0 sd					
		2.5 Fgr					
77	1.0	8.0 Fgr	1	8	15	27	SiCl
78	2.0	6.0 Fgr	0	4	12	23	SiCl
		1.5 FS					
		4.5 Fgr					
79	2.0	6.0 Fgr	0	4	10	22	SiCl
		0.5 SiCl					
		3.5 Fgr					
		1.0 FS					
		1.0 Fgr					
80	2.0	4.0 Fgr	0	7	16	30	SiCl
		2.0 FgrSiCl					
		3.0 Fgr					
81	1.0	8.0 Fgr	0	6	16	28	SiCl
82	1.0	5.0 Fgr	2	5	12	24	SiCl
83	0.5	3.5 Fgr	1	6	23	41	SiCl
		5.0 FgrSiCl					
		1.0 Fgr					
84	4.0	1.0 CS	0	5	11	19	SiCl
		2.0 Fgr					
		2.0 sd					
		4.0 Fgr					
85	2.0	3.0 Fgr	0	3	8	16	SiCl
		1.0 FS					
		2.0 Fgr					
		1.0 FS					
		3.0 Fgr					
86	4.0	1.0 CS	0	1	7	18	SiCl
		1.0 FgrSiCl					
		1.0 Fgr					
		1.0 FgrSiCl					
		3.0 Fgr					

RANGE 99 **TWP** 132 **SEC** 2

COUNTY Bowman Nov-17

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Jan-18

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-021(016)000	180	5

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
87	1.0	6.0 Fgr	0	6	16	27	SiCl
		1.0 gr CoS					
		1.0 Fgr					
88	2.0	4.0 Fgr	0	6	15	28	SiCl
		1.0 CS					
		1.0 FS					
		4.0 Fgr					
89	2.0	3.0 Fgr	0	6	13	24	SiCl
		1.0 FgrSiCl					
		7.0 Fgr					
90	2.0	4.0 Fgr	1	8	19	37	SiCl
		3.0 FgrSiCl					
		2.5 Fgr					
91	4.0	4.0 Fgr	1	6	13	23	SiCl
		1.0 FgrSiCl					
		4.0 Fgr					
92	2.0	6.0 Fgr	0	7	15	27	SiCl
		1.0 sd					
		4.0 Fgr					
93	2.0	2.0 Fgr	0	8	14	24	SiCl
		1.0 FS					
		3.0 Fgr					
		1.0 SiCl					
		3.0 Fgr					
94	5.5	1.5 Fgr	0	2	9	21	SiCl
		1.0 sd					
		2.0 Fgr					
95	1.0	2.0 Fgr	0	2	8	16	SiCl
		1.0 SiCl					
		3.0 Fgr					
		1.0 FS					
		2.0 Fgr					
96	1.5	0.5 FgrSiCl	0	6	13	25	SiCl
		1.0 Fgr					
		2.0 FgrSiCl					
		1.0 FS					
		1.0 sd					
		1.0 Fgr					
		1.0 gr CoS					
		1.0 CS					
		1.0 Fgr					
		1.0 CS					
		1.0 Fgr					
97	1.0	6.0 Fgr	0	7	14	25	SiCl
		1.0 FS					
		3.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
98	0.5	2.5 Fgr	0	2	6	14	SiCl
		2.0 sd					
		1.0 SiCl					
		1.5 FS					
		2.5 CS					
		0.5 Fgr					
99	1.0	5.0 Fgr	0	1	5	12	SiCl
		2.0 FS					
		2.0 Fgr					
100	0.5	3.5 Fgr	0	4	10	19	SiCl
		1.5 FgrSiCl					
		0.5 FS					
		2.0 Fgr					
		1.0 grCos					
		1.0 Fgr					
		1.0 FS					
		1.0 Fgr					
101	0.5	2.5 Fgr	0	0	5	11	SiCl
		2.0 sd					
		2.0 Fgr					
		1.0 FS					
		2.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
A	3.0	1.0 Fgr	0	4	10	19	SiCl
B	3.0	1.0 Fgr	0	8	18	28	SiCl
		1.0 FgrSiCl					
C	1.5	2.5 FgrSiCl	0	8	14	19	FS
D	3.0	1.0 Fgr	0	4	8	11	SiCl
		1.5 FS					
E	3.0	2.0 Fgr	0	2	8	15	SiCl
F	4.0	1.0 FgrSiCl	0	7	14	25	SiCl
		1.0 Fgr					
		1.0 FgrSiCl					
		2.0 Fgr					
G	3.0	4.0 gr	0	6	14	27	SiCl
		1.0 Fgr					
		1.0 gr					
H	4.0	6.0 Fgr	0	4	15	29	SiCl
I	4.0	6.0 Fgr	0	1	7	18	SiCl
J	4.0	4.0 Fgr	0	2	10	24	SiCl
K	4.0	4.0 Fgr	0	6	14	26	SiCl
		1.0 FS					
		2.0 Fgr					
L	4.5	3.5 Fgr	0	4	13	28	SiCl
		1.0 FgrSiCl					
		2.0 Fgr					
M	5.0	2.0 Fgr	0	6	14	25	SiCl
		3.0 FgrSiCl					
N	7.0	4.0 Fgr	0	3	11	27	SiCl
		0.5 FgrSiCl					
O	9.0	3.0 FgrSiCl	0	3	11	27	SiCl
P	3.0	3.0 FgrSiCl	0	1	9	20	SiCl
		3.0 Fgr					
		2.0 FgrSiCl					

Letter Holes A-P are for informational purposes only and are not included in the pit quantities

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole

RANGE 99 **TWP** 132 **SEC** 2

COUNTY Bowman Nov-17

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Jan-18

NDDOT ABBREVIATIONS

D-101-1

?	This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.
Abn	abandoned
Abut	abutment
Ac	acres
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
ADA	Americans with Disabilities Act
A	ampere
&	and
Appr	approach
Approx	approximate
ACP	asbestos cement pipe
Asph	asphalt
AC	asphalt cement
Assmd	assumed
@	at
Atten	attenuation
ATR	automatic traffic recorder
Ave	Avenue
Avg	average
ADT	average daily traffic
Az	azimuth
Bk	back
BF	back face
Bs	backsight
Balc	balcony
B Wire	barbed wire
Barr	barricade
Btry	battery
Brg	bearing
BI	beehive inlet
Beg	begin
BG	below grade
BM	bench mark
Bkwy	bikeway
Bit	bituminous
Blk	block
Bd Ft	board feet
BH	bore hole
BS	both sides
Bot	bottom
Blvd	Boulevard
Bndry	boundary
BC	brass cap
Brkwy	breakaway
Br	bridge
Bldg	building
BV	butterfly valve
Byp	bypass
C Gdrl	cable guardrail
Calc	calculate
Cd	candela
CIP	cast iron pipe
CB	catch basin
CRS	cationic rapid setting
C Gd	cattle guard
C To C	center to center
CI or ℄	centerline
Cm	centimeter
Ch	chain
Chnlk	chain-link
Ch Blk	channel block
Ch Ch	channel change
Chk	check
Chsld	chiseled
Cir	circle
Cl	class
Cl	clay
Cl F	clay fill
Cl Hvy	clay heavy
Cl Lm	clay loam
Clnt	clean-out
Clr	clear
Cl&gr	clearing & grubbing
Co S	coal slack
C Gr	coarse gravel
CS	coarse sand
Comb.	combination
Coml	commercial
Compr	compression
CADD	computer aided drafting & design
Conc	concrete
CECB	concrete erosion control blanket
Cond	conductor
Const	construction
Cont	continuous
CSB	continuous split barrel sample
Contr	contraction
Contr	contractor
CP	control point
Coord	coordinate
Cor	corner
Corr	corrected
CAES	corrugated aluminum end section
CAP	corrugated aluminum pipe
CMES	corrugated metal end section
CMP	corrugated metal pipe
CPVCP	corrugated poly-vinyl chloride pipe
CSES	corrugated steel end section
CSFES	corrugated steel flared end section
CSP	corrugated steel pipe
CSTES	corrugated steel traversable end section
C	coulomb
Co	County
Crse	course
Ct	Court
Xarm	cross arm
Xbuck	cross buck
Xsec	cross sections
Xing	crossing
Xrd	Crossroad
Crn	crown
CF	cubic feet
M3	cubic meter
M3/s	cubic meters per second
CY	cubic yard
Cy/mi	cubic yards per mile
Culv	culvert
C&G	curb & gutter
CI	curb inlet
CR	curb ramp
CS	curve to spiral
C	cut
Dd Ld	dead load
Defl	deflection
Defm	deformed
Deg or D	degree
Dlnt	delineate
Dlntr	delineator
Depr	depression
Desc	description
Det	detail
DWP	detectable warning panel
Dtr	detour
Dia or ø	diameter
Dir	direction
Dist	distance
DM	disturbed material
DB	ditch block
DG	ditch grade
Dbl	double
Dn	down
Dwg	drawing
Dr	drive
Drwy	driveway
DI	drop inlet
D	dry density
DSDS	dynamic speed display sign
Ea	each
Esmt	easement
E	East
EB	Eastbound
Elast	elastomeric
EL	electric locker
E Mtr	electric meter
Elec	electric/al
EDM	electronic distance meter
Elev or El	elevation
Ellipt	elliptical
Emb	embankment
Emuls	emulsion/emulsified
ES	end section
Engr	engineer
ESS	environmental sensor station
Eq	equal
Eq	equation
Evgr	evergreen
Exc	excavation
Exst	existing
Exp	expansion
Expy	Expressway
E	external of curve
Extru	extruded
FOS	factor of safety
F	Fahrenheit
FS	far side
F	farad
Fed	Federal
FP	feed point
Ft	feet/foot
Fn	fence
Fn P	fence post
FO	fiber optic
FB	field book
FD	field drive
F	fill
FAA	fine aggregate angularity
FS	fine sand
FH	fire hydrant
Fl	flange
Flrd	flared
FES	flared end section
F Bcn	flashing beacon
FA	flight auger sample
FL	flow line
Ftg	footing
FM	force main
Fs	foresight

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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NDDOT ABBREVIATIONS

D-101-2

Fnd	found
Fdn	foundation
Frac	fractional
Frwy	freeway
Frt	front
FF	front face
F Disp	fuel dispenser
FFP	fuel filler pipes
FLS	fuel leak sensor
Furn	furnish/ed
Gal	gallon
Galv	galvanized
Gar	garage
Gs L	gas line
G Reg	gas line regulator
GMV	gas main valve
G Mtr	gas meter
GSV	gas service valve
GVP	gas vent pipe
GV	gate valve
Ga	gauge
Geod	geodetic
GIS	Geographical Information System
G	giga
GPS	Global Positioning System
Gov	government
Grd	graded/grade
Gr	gravel
Grnd	ground
GWM	ground water monitor
Gdrl	guardrail
Gtr	gutter
H Plg	H piling
Hdwl	headwall
Ha	hectare
Ht	height
HI	height of instrument
Hel	helical
H	henry
Hz	hertz
HDPE	high density polyethylene
HM	high mast
HP	high pressure
HPS	high pressure sodium
Hwy	highway
Hor	horizontal
HBP	hot bituminous pavement
HMA	hot mix asphalt
Hr	hour(s)
Hyd	hydrant
Ph	hydrogen ion content
Id	identification
In or "	inch
Incl	inclinometer tube
IMH	inlet manhole
ID	inside diameter
Inst	instrument
Intchg	interchange
Intmdt	intermediate
Intscn	intersection
Inv	invert
IM	iron monument
I Pn	Iron Pin
IP	iron Pipe
Jt	joint
J	joule
Jct	junction
K	kelvin
Kn	kilo newton
Kpa	kilo pascal
Kg	kilogram
Kg/m3	kilogram per cubic meter
Km	kilometer
K	Kip(s)
LS	Land Surveyor (licensed)
LSIT	Land Surveyor In Training
Ln	lane
Lg	large
Lat	latitude
Lt	left
L	length of curve
Lens	lenses
Lvl	level
LB	level book
Lvlng	leveling
Lht	light
LP	light pole
Ltg	lighting
Lig Co	lignite coal
Lig Sl	lignite slack
LF	linear foot
Liq	liquid
LL	liquid limit
L	litre
Lm	loam
Loc	location
LC	long chord
Long.	longitude
Lp	loop
LD	loop detector
Lm	lumen
Lum	luminaire
L Sum	lump sum
Lx	lux
Mb	mailbox
ML	main line
M Hr	man hour
MH	manhole
Mkd	marked
Mkr	marker
Mkg	marking
MA	mast arm
Matl	material
Max	maximum
MC	meander corner
Meas	measure
Mdn	median
MD	median drain
MC	medium curing
M	mega
Mer	meridian
M	meter
M/s	meters per second
M	mid ordinate of curve
MGS	Midwest Guardrail System
Mi	mile
MM	mile marker
MP	mile post
Ml	milliliter
Mm	millimeter
Mm/hr	millimeters per hour
Min	minimum
Misc	miscellaneous
Mon	monument
Mnd	mound
Mtbl	mountable
Mtd	mounted
Mtg	mounting
Mk	muck
Mun	municipal
N	nano
NGS	National Geodetic Survey
NS	near side
Neop	neoprene
Ntwk	network
N	newton
N	North
NE	North East
NW	North West
NB	Northbound
No. or #	number
Obsc	obscure(d)
Obsn	observation
Ocpd	occupied
Ocpy	occupy
Off Loc	office location
O/s	offset
OC	on center
C	one dimensional consolidation
OC	organic content
Orig	original
O To O	out to out
OD	outside diameter
OH	overhead
PMT	pad mounted transformer
Pg	pages
Pntd	painted
Pr	pair
Pnl	panel
Pk	park
PK	Parker-Kalon nail
Pa	pascal
PSD	passing sight distance
Pvmt	pavement
Ped	pedestal
Ped	pedestrian
PPP	pedestrian pushbutton post
Pen.	penetration
Perf	perforated
Per.	perimeter
PL	pipeline
Pl	place
P&P	plan & profile
PL	plastic limit
P Cap	plastic cap
Pl or ℙ	plate
Pt	point
PCC	point of compound curve
PC	point of curve
PI	point of intersection
PRC	point of reverse curvature
PT	point of tangent
POC	point on curve
POT	point on tangent
PE	polyethylene
PVC	polyvinyl chloride
PCC	Portland Cement concrete
Lb or #	pounds
PP	power pole
Preempt	preemption
Prefab	prefabricated
Prfmd or Pref	preformed
Prep	preperation
Press.	pressure

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NDDOT ABBREVIATIONS

D-101-3

PRV	pressure relief valve
Prestr	prestressed
Pvt	private
PD	private drive
Prod.	production/produce
Prog	programmed
Prop.	property
Prop Ln	property line
Ppsd	proposed
PB	pull box
Qty	quantity
Qtr	quarter
Rad or R	radius
RR	railroad
Rlwy	railway
Rsd	raised
RTP	random traverse point
Rge or R	range
RC	rapid curing
Rec	record
Rcy	recycle
RAP	recycled asphalt pavement
RPCC	recycled portland cement concrete
Ref	reference
R Mkr	reference marker
RM	reference monument
RP	reference point
Refl	reflectorized
RCB	reinforced concrete box
RCES	reinforced concrete end section
RCFES	reinforced concrete flared end section
RCTES	reinforced concrete traversable end section
RCP	reinforced concrete pipe
RCPS	reinforced concrete pipe sewer
Reinf	reinforcement
Res	reservation
Rs	residence
Ret	retaining
Rev	reverse
Rt	right
R/W	right of way
Riv	river
Rd	road
Rdbd	road bed
Rdwy	roadway
RWIS	roadway weather information system
Rk	rock
Rt	route
Salv	salvage(d)
Sd	sand
Sdy Cl	sandy clay
Sdy Cl Lm	sandy clay loam
Sdy Fl	sandy fill
Sdy Lm	sandy loam
San	sanitary sewer line
Sc	scoria
Sec	seconds
Sec	section
SL	section line
Sep	separation
Seq	sequence
Serv	service
Sh	shale
Sht	sheet
Shtng	sheeting
Shldr	shoulder
Sw or Sdwk	sidewalk
S	siemens
SD	sight distance
SN	sign number
Sig	signal
Si Cl	silt clay
Si Cl Lm	silty clay loam
Si Lm	silty loam
Sgl	single
SRCP	slotted reinforced concrete pipe
SC	slow curing
SS	slow setting
Sm	small
S	South
SE	South East
SW	South West
SB	Southbound
Sp	spaces
Spcl	special
SA	special assembly
SP	special provisions
G	specific gravity
Spk	spike
SC	spiral to curve
ST	spiral to tangent
SB	split barrel sample
SH	sprinkler head
SV	sprinkler valve
Sq	square
SF	square feet
Km2	square kilometer
M2	square meter
SY	square yard
Stk	stake
Std	standard
N	standard penetration test
Std Specs	standard specifications
Sta	station
Sta Yd	station yards
Stm L	steam line
SEC	steel encased concrete
SMA	stone matrix asphalt
SSD	stopping sight distance
SD	storm drain
St	street
SPP	structural plate pipe
SPPA	structural plate pipe arch
Str	structure
Subd	subdivision
Sub	subgrade
Sub Prep	subgrade preperation
Ss	subsoil
SE	superelevation
SS	supplement specification
Supp	supplemental
Surf	surfacing
Surv	survey
Sym	symmetrical
SI	systems international
Tan	tangent
T	tangent (semi)
TS	tangent to spiral
Tel	telephone
Tel B	Telephone Booth
Tel P	telephone pole
Tv	television
Temp	temperature
Temp	temporary
TBM	temporary bench mark
T	tesla
T	thinwall tube sample
T/mi	tons per mile
Ts	topsoil
Twp or T	township
Traf	traffic
TSCB	traffic signal control box
Tr	trail
Transf	transformer
TB	transit book
Trans	transition
TT	transmission tower
TES	traversable end section
Trans	transverse
Trav	traverse
TP	traverse point
Trtd	treated
Trmt	treatment
Qc	triaxial compression
TERO	tribal employment rights ordinance
Tpl	triple
TP	turning point
Typ	typical
Qu	unconfined compressive strength
Ugrnd	underground
USC&G	US Coast & Geodetic Survey
USGS	US Geologic Survey
Util	utility
VG	valley gutter
Vap	vapor
Vert	vertical
VC	vertical curve
VCP	vitrified clay pipe
V	volt
Vol	volume
Wkwy	walkway
W	water content
WGV	water gate valve
WL	water line
WM	water main
WMV	water main valve
W Mtr	water meter
WSV	water service valve
WW	water well
W	watt
Wrng	wearing
Wb	weber
WIM	weigh in motion
W	west
WB	westbound
Wrng	wiring
W/	with
W/o	without
WC	witness corner
WGS	world geodetic system
Z	zenith

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM	702 Communications
ACCENT	Accent Communications
AGASSIZ WU	Agassiz Water Users Incorporated
AGC	Assiociated General Contractors of America
All PI	Alliance Pipeline
ALL SEAS WU	All Seasons Water Users Association
AMOCO PI	Amoco Pipeline Company
AMRDA HESS	Amerada Hess Corporation
AT&T	AT&T Corporation
B PAW	Bear Paw Energy Incorporated
BAKER ELEC	Baker Electric
BASIN ELEC	Basin Electric Cooperative Incorporated
BEK TEL	Bek Communications Cooperative
BELLE PL	Belle Fourche Pipeline Company
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe Railway
BOEING	Boeing
BRNS RWD	Barnes Rural Water District
BURK-DIV ELEC	Burke-Divide Electric Cooperative
BURL WU	Burleigh Water Users
Cable One	Cable One
CABLE SERV	Cable Services
CAP ELEC	Capital Electric Cooperative Incorporat
CASS CO ELEC	Cass County Electric Cooperative
CASS RWU	Cass Rural Water Users Incorporated
CAV ELEC	Cavalier Rural Electric Cooperative
CBLCOM	Cablecom Of Fargo
CENEX PL	Cenex Pipeline
CENT PL WATER DIST	Central Pipe Line Water District
CENT PWR ELEC	Central Power Electric Cooperative
COE	Corps of Engineers
CONS TEL	Consolidated Telephone
CONT RES	Continental Resource Inc
CPR	Canadian Pacific Railway
D O E	Department Of Energy
DAK CARR	Dakota Carrier Network
DAK CENT TEL	Dakota Central Telephone
DAK RWD	Dakota Rural Water District
DGC	Dakota Gasification Company
DICKEY R NET	Dickey Rural Networks
DICKEY RWU	Dickey Rural Water Users Association
DICKEY TEL	Dickey Telephone
DNRR	Dakota Northern Railroad
DOME PL	Dome Pipeline Company
DVELEC	Dakota Valley Electric Cooperative
DVMW	Dakota, Missouri Valley & Western
ENBRDG	Enbridge Pipelines Incorporated
ENVENTIS	Enventis Telephone
FALK MNG	Falkirk Mining Company
FHWA	Federal Highway Administration
G FKS-TRL WD	Grand Forks-traill Water District
GETTY TRD & TRAN	Getty Trading & Transportation
GLDN W ELEC	Golden West Electric Cooperative
GRGS CO TEL	Griggs County Telephone
GTR RAMSEY WD	Greater Ramsey Water District
GT PLNS NAT GAS	Great Plains Natural Gas Company
HALS TEL	Halstad Telephone Company
IDEA1	Idea1
INT-COMM TEL	Inter-Community Telephone Company
KANEB PL	Kaneb Pipeline Company
KEM ELEC	Kem Electric Cooperative Incorporated
KOCH GATH SYS	Koch Gathering Systems Incorporated
LKHD PL	Lakehead Pipeline Company
LNGDN RWU	Langdon Rural Water Users Incorporated
LWR YELL R ELEC	Lower Yellowstone Rural Electric
MCKNZ CON	McKenzie Consolidated Telcom
MCKNZ ELEC	McKenzie Electric Cooperative
MCKNZ WRD	McKenzie County Water Resource District
MCLEOD	McLeod USA
MCLN ELEC	McLean Electric Cooperative
MCLN-SHRDN R WAT	McLean-Sheridan Rural Water
MDU	Montana-dakota Utilities
MID-CONT CABLE	Mid-Continent Cable
MIDSTATE TEL	Midstate Telephone Company
MINOT CABLE	Minot Cable Television
MINOT TEL	Minot Telephone Company
MISS VALL COMM	Missouri Valley Communications
MISS W W S	Missouri West Water System
MNKOTA PWR	Minnkota Power
MOR-GRAN-SOU ELEC	Mor-gran-sou Electric Cooperative
MOUNT-WILLI ELEC	Mountrail-williams Electric Cooperative
MRE LBTY TEL	Moore & Liberty Telephone
MUNICIPAL	City Water And Sewer
MUNICIPAL	City Of '.....'
N CENT ELEC	North Central Electric Cooperative
N VALL W DIST	North Valley Water District
ND PKS & REC	North Dakota Parks And Recreation
ND TEL	North Dakota Telephone Company
NDDOT	North Dakota Department of Transportation
NDSU SOIL SCI DEPT	NDSU Soil Science Department
NEMONT TEL	Nemont Telephone
NODAK R ELEC	Nodak Rural Electric Cooperative
NOON FRMS TEL	Noonan Farmers Telephone Company
NPR	Northern Plains Railroad
NSP	Northern States Power
NTH PRAIR RW	Northern Prairie Rural Water Association
NTHN BRDR PL	Northern Border Pipeline
NTHN PLNS ELEC	Northern Plains Electric Cooperative Incorporated
NTHWSTRN REF	Northwestern Refinery Company
NW COMM	Northwest Communication Cooperation
NWRWD	Northwest Rural Water District
ONEOK	Oneok gas
OSHA	Occupational Safety and Health Administration
OTTR TL PWR	Otter Tail Power Company
P L E M	Prairielands Energy Marketing
POLAR COM	Polar Communications
PVT ELEC	Private Electric
QWEST	Qwest Communications
R&T W SUPPLY	R & T Water Supply Association
RED RIV TEL	Red River Rural Telephone
RESVTN TEL	Reservation Telephone
ROBRTS TEL	Roberts Company Telephone
R-RIDER ELEC	Roughrider Electric Cooperative
RRVW	Red River Valley & Western Railroad
S CENT REG WD	South Central Regional Water District
S E W U	South East Water Users Incorporated
SCOTT CABLE	Scott Cable Television Dickinson
SHERDN ELEC	Sheridan Electric Cooperative
SHEYN VLY ELEC	Sheyenne Valley Electric Cooperative
SKYTECH	Skyland Technologies Incorporated
SLOPE ELEC	Slope Electric Cooperative Incorporated
SOURIS RIV TELCOM	Souris River Telecommunications
ST WAT COMM	State Water Commission
STATE LN WATER	State Line Water Cooperative
STER ENG	Sterling Energy
STUT RWU	Stutsman Rural Water Users
SW PL PRJ	Southwest Pipeline Project
T M C	Turtle Mountain Communications
TCI	TCI of North Dakota
TESORO HGH PLNS PL	Tesoro High Plains Pipeline
TRI-CNTY WU	Tri-County Water Users Incorporated
TRL CO RWU	Traill County Rural Water Users
UNTD TEL	United Telephone
UPPR SOUR WUA	Upper Souris Water Users Association
US SPRINT	U.S. Sprint
USAF MSL CABLE	U.S.A.F. Missile Cable
USFWS	US Fish and Wildlife Service
USW COMM	U.S. West Communications
VRNDRY ELEC	Verendrye Electric Cooperative
W RIV TEL	West River Telephone Incorporated
WEB	W. E. B. Water Development Association
WILLI RWA	Williams Rural Water Association
WILSTN BAS PL	Williston Basin Interstate Pipeline Company
WLSH RWD	Walsh Water Rural Water District
WOLVRTN TEL	Wolverton Telephone
XLENER	Xcel Energy
YSVR	Yellowstone Valley Railroad

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Line Styles

D-101-20

Existing Topography

- Existing Ground Void
- Existing Cemetary Boundary
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Existing Gravel Surface
- Existing Riprap
- Existing Dirt Surface
- Existing Asphalt Surface
- Existing Tie Point Line
- Existing Railroad Centerline
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Existing Fence
- Existing Railroad
- Existing Field Line
- Exst Flow
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter

- Existing 3-Cable w Posts
- Site Boundary
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Existing Tree Boundary
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Existing W-Beam Guardrail with Posts
- Existing Railroad Switch
- Gravel Pit - Borrow Area
- Existing Wet Area-Vegetation Break

Proposed Topography

- 3-Cable w Posts
- Flow
- Fence
- Remove Line
- Wall
- Retaining Wall (Plan View)
- W-Beam w Posts

Existing Utilities

- Existing Electrical
- Existing Fiber Optic Line
- Existing TV Fiber Optic
- Existing Gas Pipe
- Existing Overhead Utility Line
- Existing Power
- Existing Fuel Pipeline
- Existing Undefined Above Ground Pipe Line
- Existing Sanitary Sewer
- Existing Sanitary Force Main
- Existing Storm Drain
- Existing Storm Drain Force Main
- Existing Culvert
- Existing Telephone Line
- Existing TV Line
- Existing Water or Steam Line
- Existing Under Drain
- Existing Slotted Drain
- Existing Conduit
- Existing Conductor
- Existing Down Guy Wire Down Guy
- Existing Underground Vault or Lift Station

Proposed Utilities

- 24 Inch Pipe
- Reinforced Concrete Pipe
- Under Drain
- Edge Drain

Traffic Utilities

- Conductor
- Fiber Optic
- Existing Loop Detector
- Existing Double Micro Loop Detector
- Micro Loop Detector Double
- Existing Micro Loop Detector
- Micro Loop Detector
- Signal Head with Mast Arm
- Existing Signal Head with Mast Arm

Sign Structures

- Existing Overhead Sign Structure
- Existing Overhead Sign Structure Cantilever
- Overhead Sign Structure Cantilever

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Line Styles

D-101-21

Right Of Way

- Easement
- Existing Easement
- Right of Way
- Existing Right of Way
- Existing Right of Way Railroad
- Existing Right of Way Not State Owned
- Existing Government Lot Line
- Existing Adjacent Block Lines
- Existing Adjacent Lot Lines
- Existing Adjacent Property Line
- Existing Adjacent Subdivision Lines
- Sight Distance Triangle Line
- Dimension Leader

Boundary Control

- Existing City Corporate Limits or Reservation Boundary
- Existing State or International Line
- Existing Township
- Existing County
- Existing Section Line
- Existing Quarter Section Line
- Existing Sixteenth Section Line
- Existing Centerline
- Tangent Line

Cross Sections and Typicals

- Existing Ground
- Existing Topsoil (Cross Section View)
- Existing Ground Void (Not Surveyed) (void — void — void — v)
- Existing Concrete
- Existing Aggregate (Cross Section View)
- Existing Curb and Gutter (Cross Section View)
- Existing Asphalt (Cross Section View)
- Existing Reinforcement Rebar

Geotechnical

- Geotextile Fabric Type D (D — D)
- Geogrid (Geo — Geo)
- Geotextile Fabric Type R (R — R)
- Geotextile Fabric Type R1 (R — R)
- Geotextile Fabric Type RR (RR — RR)
- Geotextile Fabric Type S (S — S)
- Subgrade Reinforcement
- Failure Line

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

- Centerline Pavement Marking
- Barrier with Centerline Pavement Marking
- Barrier Pavement Marking
- Stripe 4 IN Dotted Extension White
- Stripe 8 IN Dotted Extension White
- Stripe 8 IN Lane Drop

Pavement Joints

- Doweled Joint
- Tie Bar 30 Inch 4 Foot Center to Center
- Tie Bar 18 Inch 3 Foot Center to Center
- Tie Bar at Random Spacing

Bridge Details

- Hidden Object
- Small Hidden Object
- Large Hidden Object
- Phantom Object
- Centerline Main
- Centerline
- Existing Ground (Details)
- Existing Conditions
- Sheet Piling

Erosion Control

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Floating Silt Curtain (S — S)
- Silt Fence (SF — SF)
- Excavation Limits
- Fiber Rolls

Environmental

- Wetland Mitigation
- Existing Wetland Easement USFWS
- Existing Wetland Jurisdictional
- Existing Wetland
- Tree Row

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Symbols

D-101-30

North Arrow (Half Scale)

Truck Mounted Attenuator

Type I Barricade

Type II Barricade

Type III Barricade

Catch Basin

Cairn or Stone Circle

Video Detection Camera

Storm Drain Cap or Stub

Corrugated Metal End Section 18 Inch

Corrugated Metal End Section 24 Inch

Corrugated Metal End Section 30 Inch

Corrugated Metal End Section 36 Inch

Corrugated Metal End Section 42 Inch

Corrugated Metal End Section 48 Inch

Concrete Foundation

Ground Connection Conductor

Neutral Connection Conductor

Phase 1 Connection Conductor

Phase 2 Connection Conductor

Traffic Cone

Signal Controller

Pad Mounted Signal Controller

Alignment Data Point

Emergency Vehicle Detector

Attenuation Device

Diamond Grade Delineator Type A

Diamond Grade Delineator Type B

Diamond Grade Delineator Type C

Diamond Grade Delineator Type D

Diamond Grade Delineator Type E

Flexible Delineator

Flexible Delineator Type A

Flexible Delineator Type B

Flexible Delineator Type C

Flexible Delineator Type D

Flexible Delineator Type E

Delineator Type A

Delineator Type A Reset

Delineator Type B

Delineator Type B Reset

Delineator Type C

Delineator Type D

Delineator Type E

Delineator Drums

Spot Elevation

Existing Access Control Arrow

Existing Artifact

Existing Flashing Beacon

Existing Benchmark

Existing Railroad Battery Box

Existing Bush or Shrub

Existing Gas Cap or Stub

Existing Sanitary Cap or Stub

Existing Storm Drain Cap or Stub

Existing Water Cap or Stub

Existing Sanitary Cleanout

Existing Concrete Foundation

Existing Traffic Signal Controller

Existing Pad Mounted Signal Controller

Existing Sixteenth Section Corner

Existing Quarter Section Corner

Existing Section Corner

Existing Railroad Crossbuck

Existing Satellite Dish

Existing Fuel Dispensers

Existing Flexible Delineator Type A

Existing Flexible Delineator Type B

Existing Flexible Delineator Type C

Existing Flexible Delineator Type D

Existing Flexible Delineator Type E

Existing Delineator Type A

Existing Delineator Type B

Existing Delineator Type C

Existing Delineator Type D

Existing Delineator Type E

Existing EFB Misc

Existing Flashing Beacon

Existing Pipe Mounted Flasher

Existing Pad Mounted Feed Point

Existing Pipe Mounted Feed Point with Pad

Existing Pole Mounted Feed Point

Existing Railroad Frog

Existing Snow Gate 18

Existing Snow Gate 28

Existing Snow Gate 40

Existing Headwall

Existing Pedestrian Head with Number

Existing Signal Head

Existing Sprinkler Head

Existing Fire Hydrant

Existing Catch Basin Drop Inlet

Existing Curb Inlet

Existing Manhole Inlet

Existing Junction Box

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 07/01/14 and the original document is stored at the North Dakota Department of Transportation

Symbols

D-101-31

- Existing Light Standard
- Existing High Mast Light Standard 10 Luminaire
- Existing High Mast Light Standard 3 Luminaire
- Existing High Mast Light Standard 4 Luminaire
- Existing High Mast Light Standard 5 Luminaire
- Existing High Mast Light Standard 6 Luminaire
- Existing High Mast Light Standard 7 Luminaire
- Existing High Mast Light Standard 8 Luminaire
- Existing High Mast Light Standard 9 Luminaire
- Existing Overhead Sign Structure Load Center
- Existing Luminaire
- Existing Light Standard Luminaire
- Existing Federal Mailbox
- Existing Private Mailbox
- Existing Meander Section Corner
- Existing Meter
- Existing Electrical Manhole
- Existing Gas Manhole
- Existing Sanitary Manhole
- Existing Sanitary Force Main Manhole
- Existing Sanitary Manhole with Valve
- Existing Storm Drain Manhole
- Existing Force Main Storm Drain Manhole
- Existing Force Main Storm Drain Manhole with Valve
- Existing Telephone Manhole
- Existing Manhole with Valve Water
- Existing Water Manhole
- Existing Mile Post Type A
- Existing Mile Post Type B
- Existing Mile Post Type C
- Existing Reference Marker
- Existing RW Marker
- Existing Utility Marker
- Iron Monument Found
- Iron Pin R/W Monument
- Existing Object Marker Type I
- Existing Object Marker Type II
- Existing Object Marker Type III
- Existing Electrical Pedestal
- Existing Telephone Pedestal
- Existing Fiber Optic Telephone Pedestal
- Existing TV Pedestal
- Existing Fiber Optic TV Pedestal
- Existing Fuel Filler Pipes
- Existing Traverse PI Aerial Panel
- Existing Pole
- Existing Power Pole
- Existing Power Pole with Transformer
- Existing Telephone Pole
- Existing Wood Pole
- Existing Post
- Existing Pedestrian Push Button Post
- Existing Control Point CP
- Existing Control Point GPS-RTK
- Existing Control Point TRI
- Existing Reference Marker Point NGS
- Existing Pull Box
- Existing Intelligent Transportation Pull Box
- Existing Water Pump
- Existing Slotted Reinforced Concrete Pipe
- Existing RR Profile Spot
- Existing Fuel Leak Sensors
- Existing Highway Sign
- Existing Miscellaneous Spot
- Existing Lighting Standard Pole
- Existing Traffic Signal Standard
- Existing Transformer
- Existing Large Evergreen Tree
- Existing Small Evergreen Tree
- Existing Large Tree
- Existing Small Tree
- Existing Tree Trunk
- Existing Pad Mounted Traffic Signal Control Box
- Existing Undefined Manhole
- Existing Undefined Pull Box
- Existing Undefined Pedestal
- Existing Undefined Valve
- Existing Undefined Pipe Vent
- Existing Gas Valve
- Existing Water Valve
- Existing Fuel Pipe Vent
- Existing Gas Pipe Vent
- Existing Sanitary Pipe Vent
- Existing Storm Drain Pipe Vent
- Existing Water Pipe Vent
- Existing Weather Station
- Existing Ground Water Well Bore Hole
- Existing Windmill or Tower
- Existing Witness Corner
- Flashing Beacon
- Flagger
- Pipe Mounted Flasher
- Sanitary Force Main with Valve

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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Symbols

D-101-32

- Pad Mounted Feed Point
- Pipe Mounted Feed Point with Pad
- Pole Mounted Feed Point
- Headwall
- Double Headwall with Vegitation Barrier
- Single Headwall with Vegitation Barrier
- Pole Mounted Head
- Sprinkler Head
- Fire Hydrant
- Inlet Type 1
- Inlet Type 2
- Double Inlet Type 2
- Inlet Grate Type 2
- Junction Box
- High Mast Light Standard 10 Luminaire
- High Mast Light Standard 3 Luminaire
- High Mast Light Standard 4 Luminaire
- High Mast Light Standard 5 Luminaire
- High Mast Light Standard 6 Luminaire
- High Mast Light Standard 7 Luminaire
- High Mast Light Standard 8 Luminaire
- High Mast Light Standard 9 Luminaire
- Relocate Light Standard
- Overhead Sign Structure Load Center
- Light Standard 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 175 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 200 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 250 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 310 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 35 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 50 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 70 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Manhole
- Manhole 48 Inch
- Sanitary Force Main Manhole
- Sanitary Sewer Manhole
- Storm Drain Manhole
- Storm Drain Manhole with Inlet
- Reset Mile Post
- Mile Post Type A
- Mile Post Type B
- Mile Post Type C
- Right of Way Marker
- Tubular Marker
- Alignment Monument
- Iron Pin Reference Monument
- Object Marker Type I
- Object Marker Type II
- Object Marker Type III
- Caution Mode Arrow Panel
- Back to Back Vertical Panel Sign
- Double Direction Arrow Panel
- Left Directional Arrow Panel
- Right Directional Arrow Panel
- Sequencing Arrow Panel
- Truck Mounted Arrow Panel
- Power Pole
- Wood Pole
- Pedestrian Push Button Post
- Property Corner
- Pull Box
- Intelligent Transportation Pull Box
- Sanitary Pump
- Storm Drain Pump
- Reinforced Pavement
- Reinforced Concrete End Section 15 Inch
- Reinforced Concrete End Section 18 Inch
- Reinforced Concrete End Section 24 Inch
- Reinforced Concrete End Section 30 Inch
- Reinforced Concrete End Section 36 Inch
- Reinforced Concrete End Section 42 Inch
- Reinforced Concrete End Section 48 Inch
- Reinforced Concrete End Section 54 Inch
- Reset Right of Way Marker
- Reset USGS Marker
- Right of Way Markers
- Riser 30 Inch
- Continuous Split Barrel Sample (CSB)
- Flight Auger Sample (FA)
- Split Barrel Sample (SB)
- Thinwall Tube Sample
- Highway Sign
- SNOW GATE 18 FT
- SNOW GATE 28 FT
- SNOW GATE 40 FT
- Standard Penetration Test (N)
- Transformer
- Inclinometer Tube (Incl)
- Underdrain Cleanout
- Excavation Unit
- Water Valve

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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Cross Section Legend

D-101-40

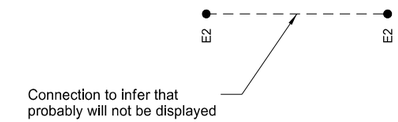
Description	Longitudinal Parallel to Roadway	Transverse Perpendicular to Roadway*
Cable Line	CBL1	CBL2
Conduit Line	CDU1	CDU2
Electric Line	E1	E2
Fiber Optic Line	F1	F2
Gas Main Line	GM1	GM2
Gas Service Line	GS1	GS2
Gas Transmission Line	GT1	GT2
Fuel Pipeline	PL1	PL2
Sanitary Sewer Force Main	SSF1	SSF2
Sanitary Sewer	SS1	SS2
Steam Line	STE1	STE2
Storm Drain (Assumed Depth)	SD1	SD2
Telephone Line	T1	T2
TV Line	TV1	TV2
Water Main Line	WM1	WM2
Water Service Line	WS1	WS2

Description	Longitudinal Parallel to Roadway	Transverse Perpendicular to Roadway*
Overhead Power Transmission Line	OHT1	OHT2
Overhead Line	OH1	OH2

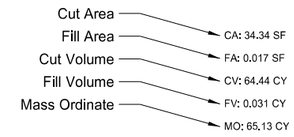
When storm drain invert elevations are NOT used to draw pipe, they will appear as shown to the left. When invert elevations are used to draw pipe, they will be a cross section similar to the graphics shown below.



* Usually the transverse utilities are shown on a cross section with 2 or more symbols. The utility runs from one symbol to the other, but the connection may not be shown.



On the right side of most cross sections there is a earthwork table. The following example (values not related to project) details the earthwork table layout.

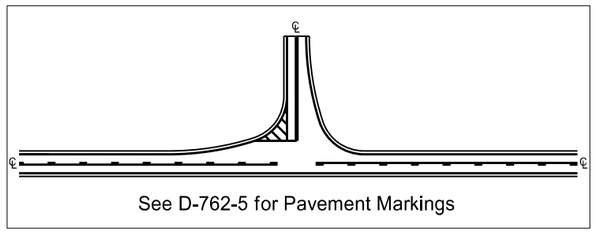


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-20-18	
REVISIONS	
DATE	CHANGE

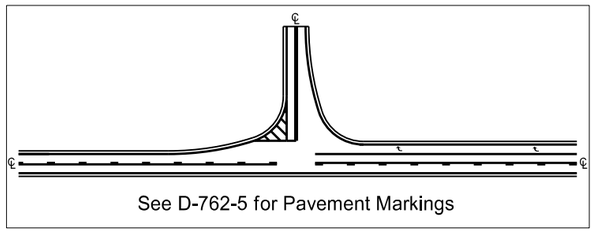
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STANDARD 90 DEGREE FLARED INTERSECTION

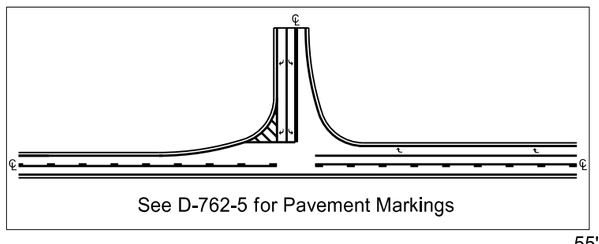
(No Center Left Turn Lane on Major Road)



Type A
(No turn lanes present)



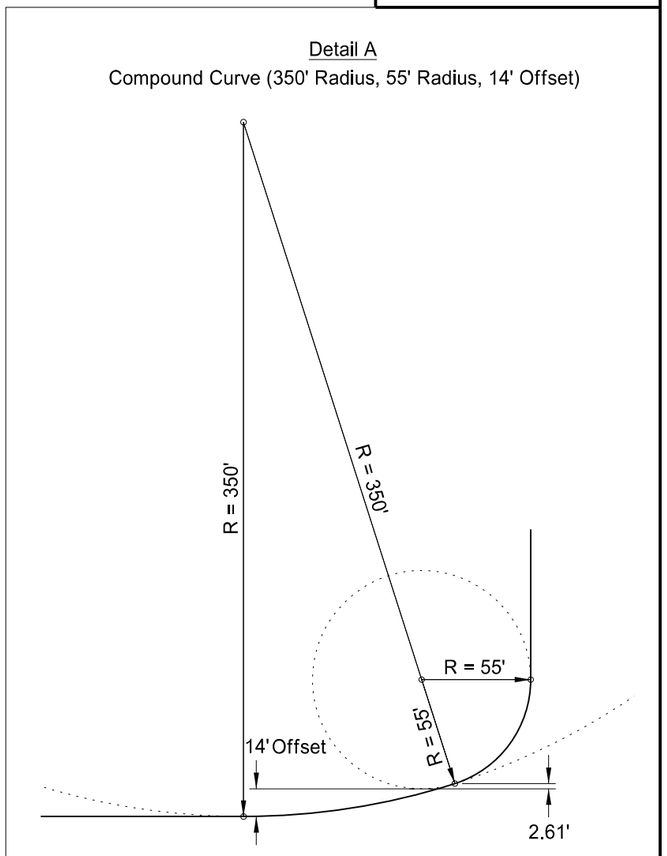
Type B
(Right Turn Lane on Major Road)



Type C
(Right Turn Lane on Major road, and Turn Lane on Minor Road)

Detail A

Compound Curve (350' Radius, 55' Radius, 14' Offset)



- ◦ Radius Tangent Point
- ⊢ xx.x' ⊣ Pavement widths
- ——— Proposed Pavement

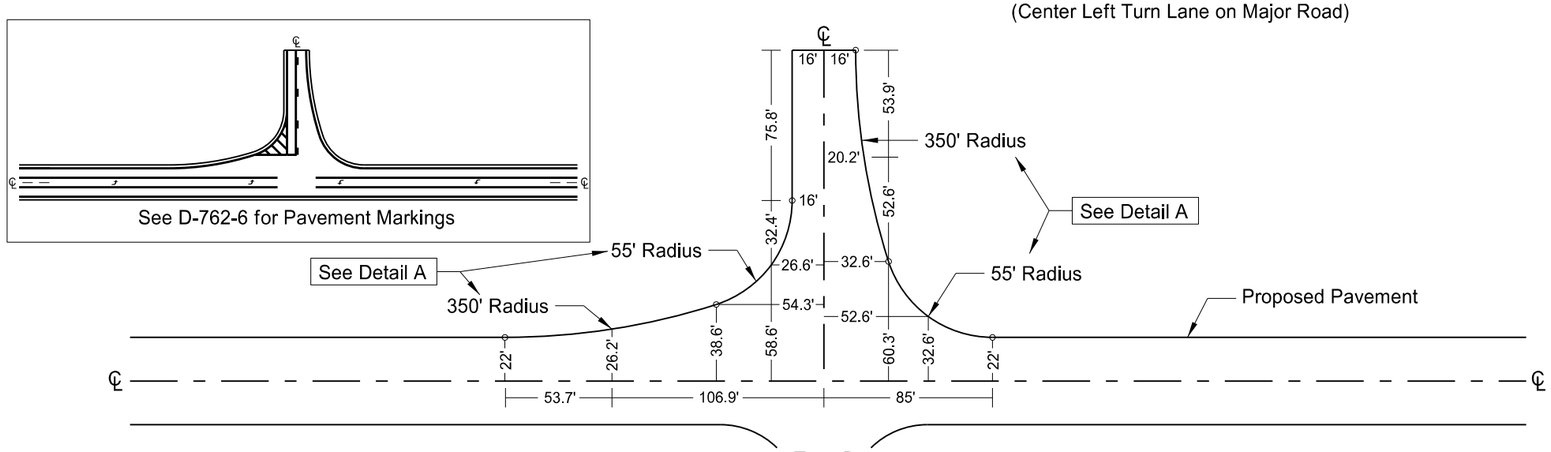
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-29-16	
REVISIONS	
DATE	CHANGE
8-17-17	Corrected Pvmt Mkg Std reference.
8-30-18	Corrected pvmt mkg layouts.
10-25-19	Added Detail A ref to appr left side

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STANDARD 90 DEGREE FLARED INTERSECTIONS

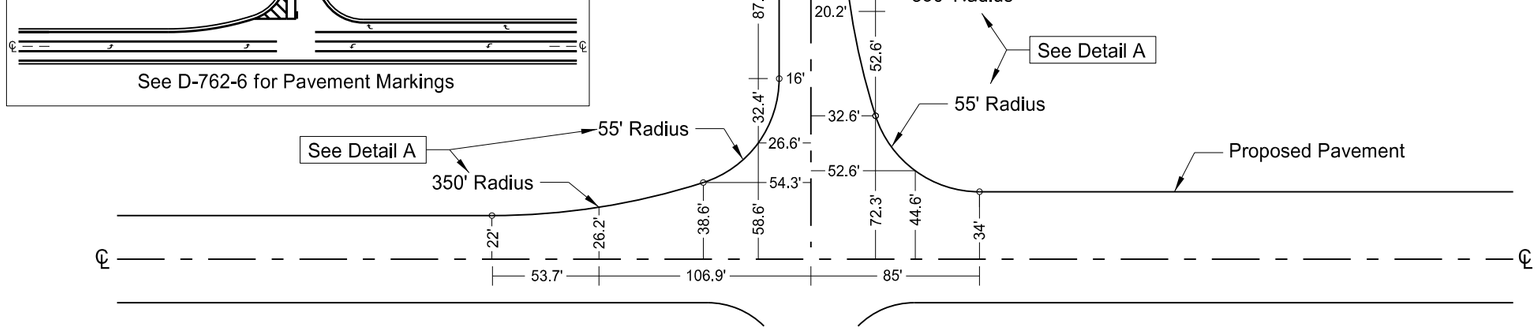
(Center Left Turn Lane on Major Road)

D-203-6



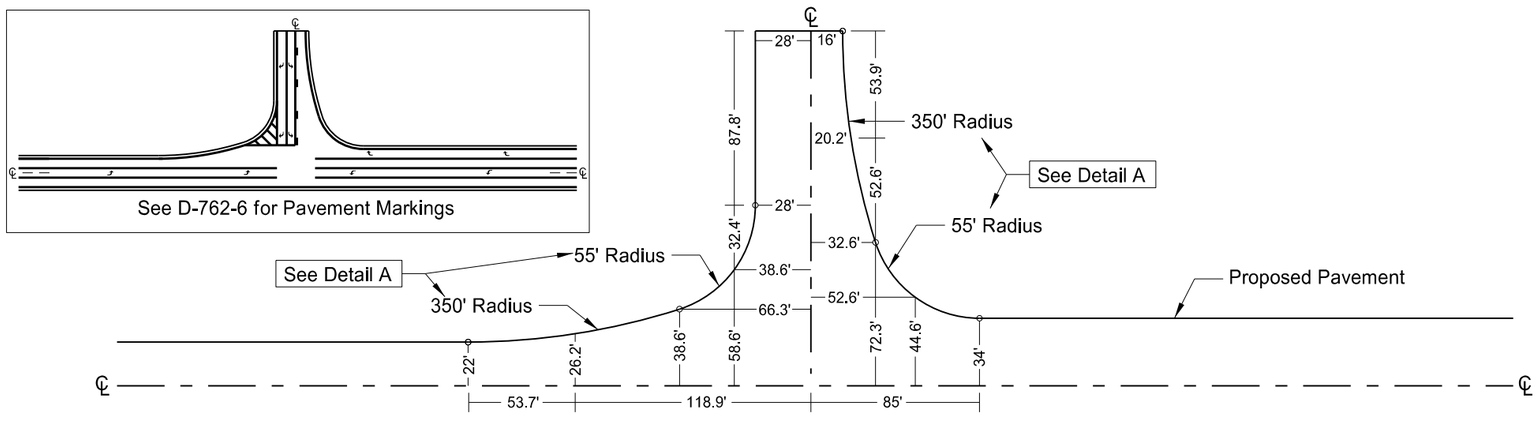
Type D

(Center Left Turn Lane on Major Road)



Type E

(Center Left & Right Turn Lane on Major Road)

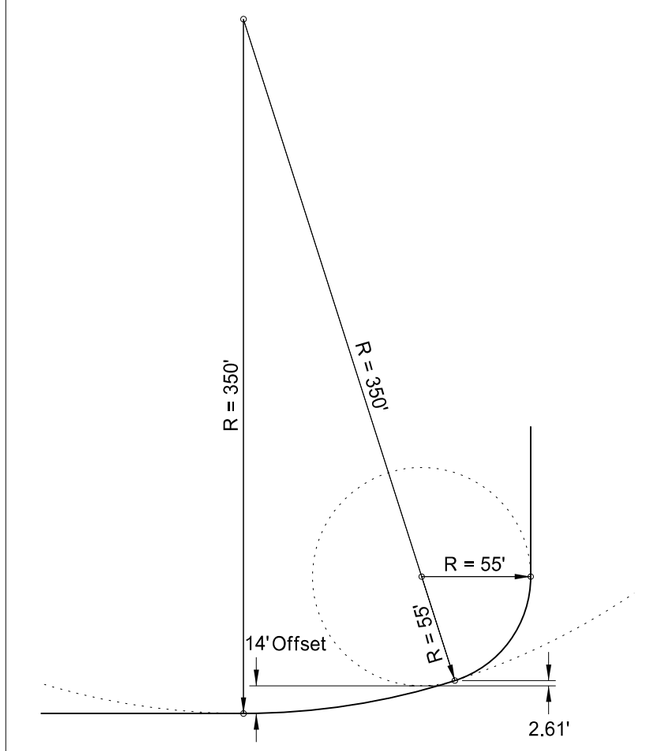


Type F

(Center Left & Right Turn Lane on Major Road, and Turn Lane on Minor Road)

Detail A

Compound Curve (350' Radius, 55' Radius, 14' Offset)



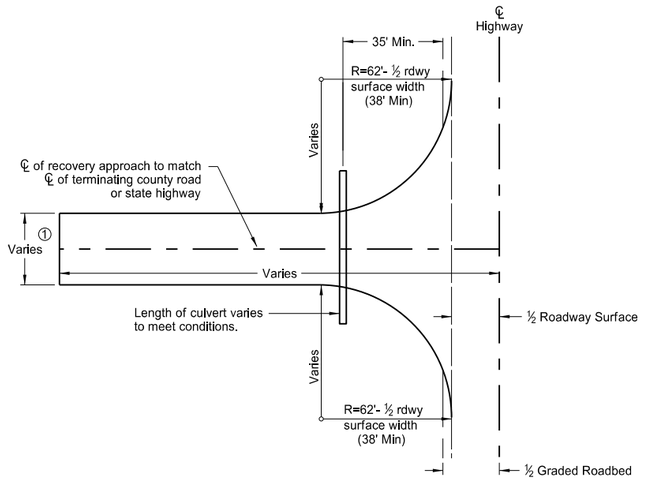
- ○ Radius Tangent Point
- ⊢ xx.x' ⊣ Pavement widths
- ——— Proposed Pavement

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-29-16	
REVISIONS	
DATE	CHANGE
8-17-17	Corrected Pvmt Mkg Std reference
10-25-19	Added Detail A ref to appr left side

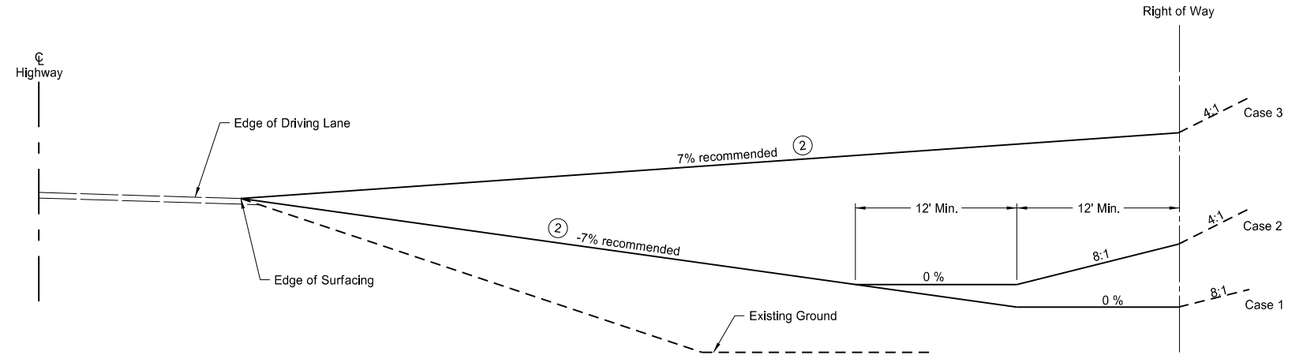
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RECOVERY APPROACHES AT T-INTERSECTIONS

D-203-7



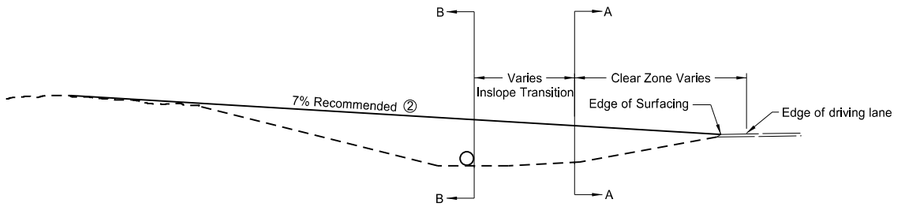
PLAN VIEW RECOVERY APPROACH



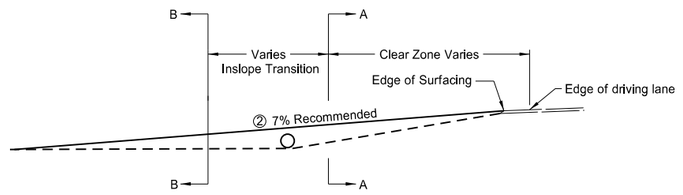
Case 1: Ties into existing back slope and within existing right of way. Existing Back Slope is 8:1 or flatter.

Case 2: Ties into existing back slope and within existing right of way. Existing Back Slope is 4:1 or flatter.

Case 3: Ties into existing back slope and within existing right of way. Existing Back Slope is 4:1 or flatter.



RECOVERY APPROACH GRADE ON CUT SECTION



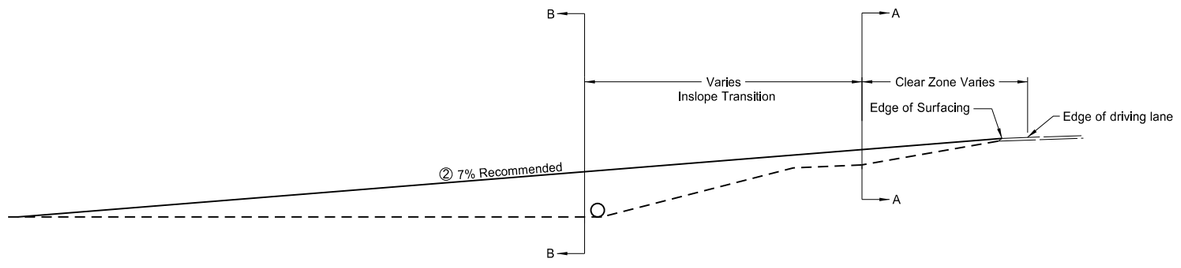
RECOVERY APPROACH GRADE ON FILL SECTON

FOOT NOTES

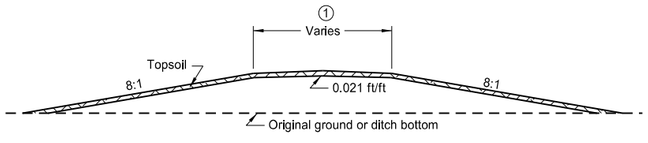
① width of recovery approach to match width of terminating county road or state highway

② 10% Max

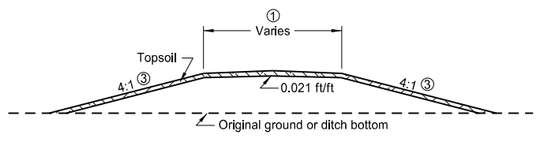
③ 3:1 Slope - 20' to 30' fill
2:1 Slope on fills over 30'



RECOVERY APPROACH GRADE ON DEEP FILL SECTON



SECTION A-A



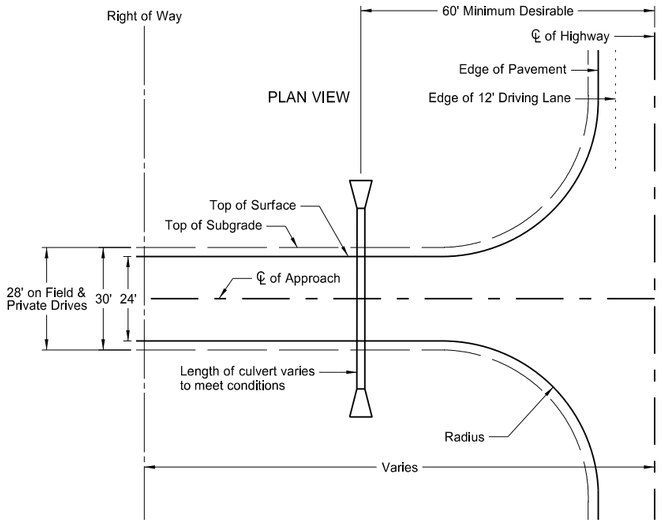
SECTION B-B

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE

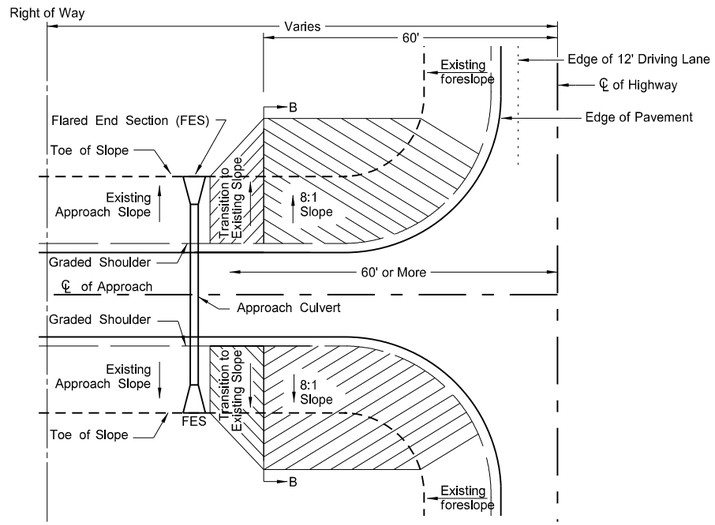
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STANDARD RURAL APPROACHES

D-203-8

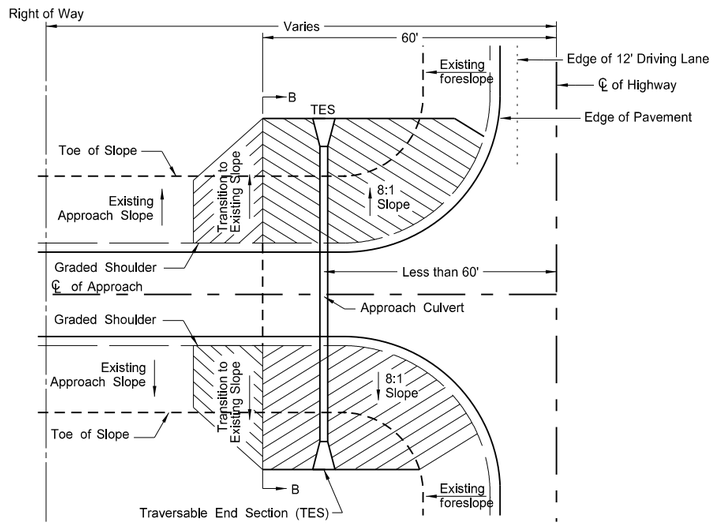


APPROACH INSLOPES



CASE 1

APPROACH PIPE LOCATED
60' OR MORE FROM ℄

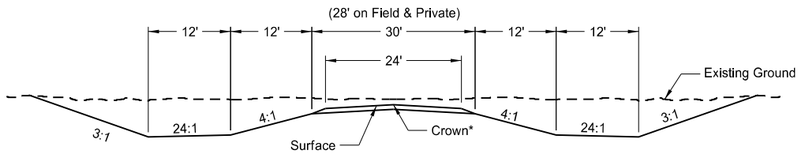


CASE 2

APPROACH PIPE LOCATED
LESS THAN 60' FROM ℄

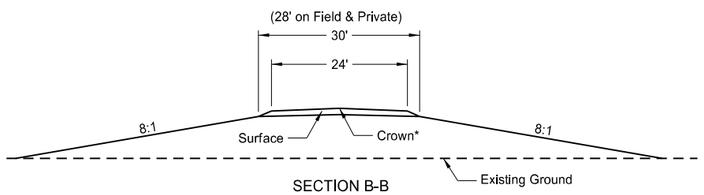
CRITERIA FOR RURAL APPROACH TYPES

	Field Drives	Private Drives	Low Volume Public Roads
Radius	R=40 ft	R=40 ft	R=50 ft
Maximum Grade	10%	7%	7%
Storage Platform	24 ft	24 ft	50 ft
Vertical Curve Length	10 ft	10 ft	Varies (Min. 20 mph)

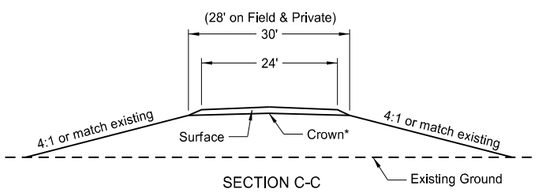


SECTION A-A

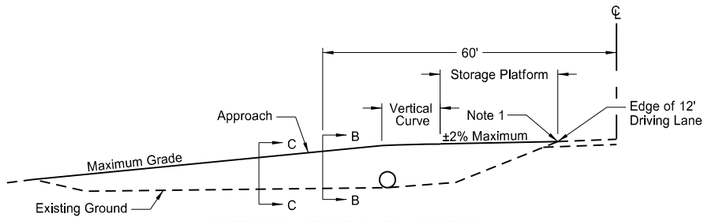
*2.1% crown for paved surface
*3.0% crown for gravel surface



SECTION B-B



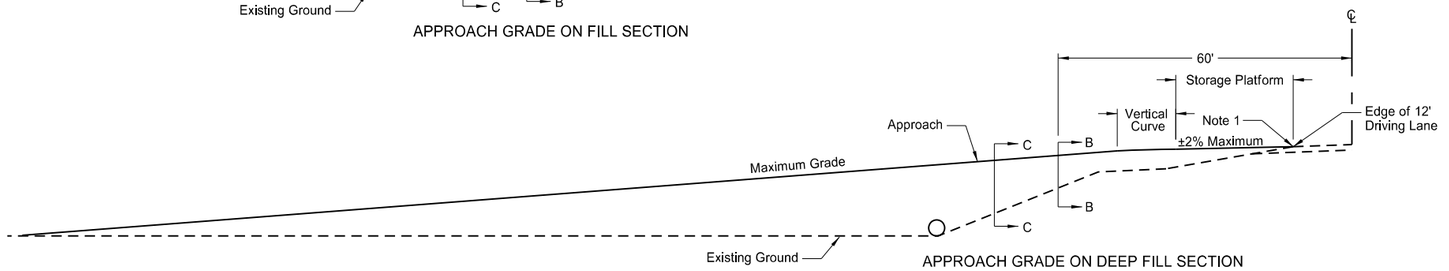
SECTION C-C



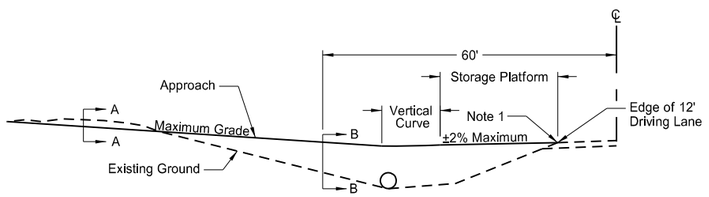
APPROACH GRADE ON FILL SECTION

NOTES:

1. 5% Max Rollover between approach storage platform and highway.



APPROACH GRADE ON DEEP FILL SECTION



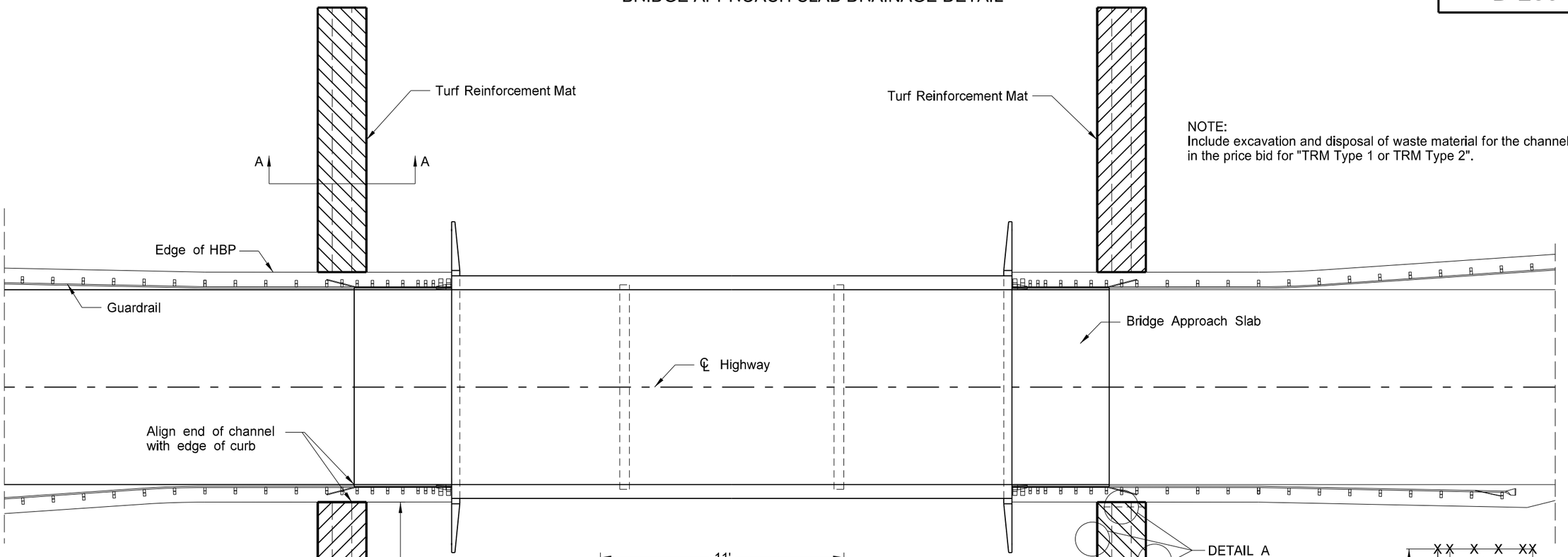
APPROACH GRADE ON CUT SECTION

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-25-14	
REVISIONS	
DATE	CHANGE
6-30-2017	Revised Radius, Storage Platform, Inslope dimensions, and Note 1.
10-25-2019	Changed "Inslope" to "Foreslope".

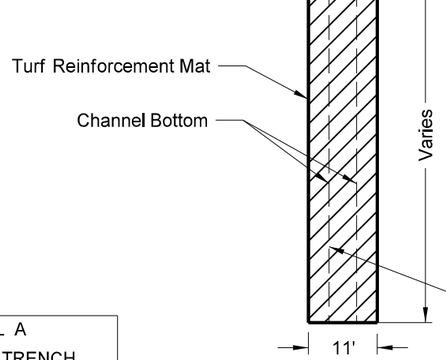
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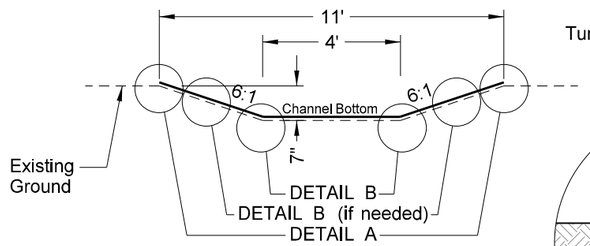
BRIDGE APPROACH SLAB DRAINAGE DETAIL

D-255-1

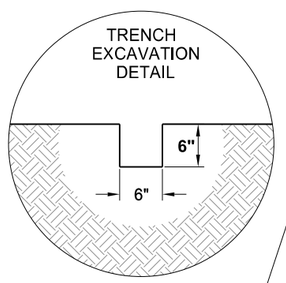


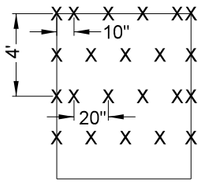
NOTE:
Include excavation and disposal of waste material for the channel in the price bid for "TRM Type 1 or TRM Type 2".



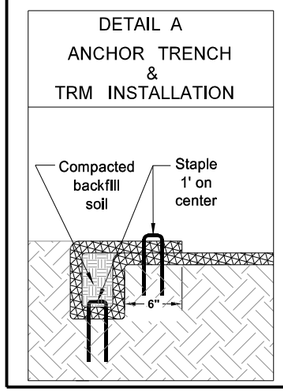


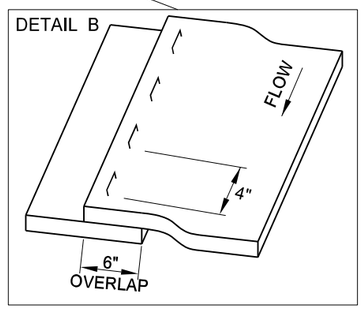
SECTION A-A

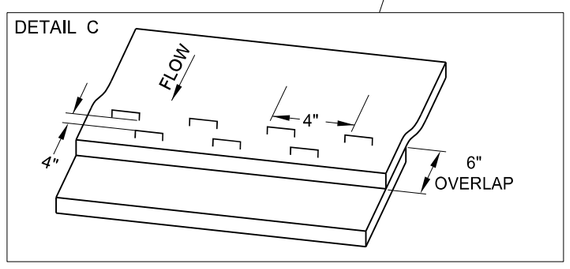




STAPLE PATTERN: 3.8 staples per square yard.







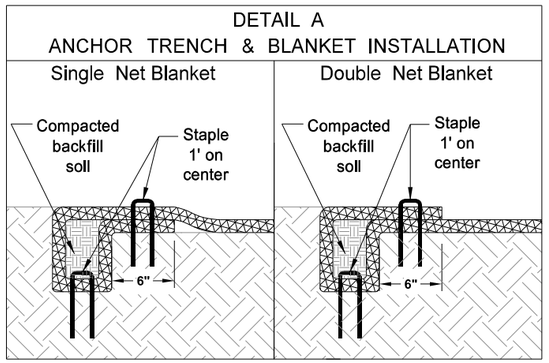
NOTES:
Don't place longitudinal seams along the channel bottom.
Top seam must be minimum 0.5' above the channel bottom.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-4 to D-255-1.
07-27-15	Changed installation details.
08-27-19	New Design Engineer PE Stamp.

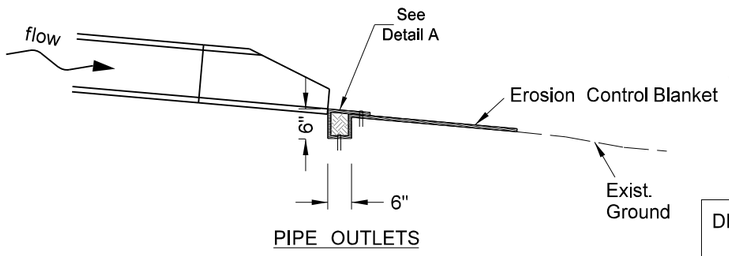
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D-255-2

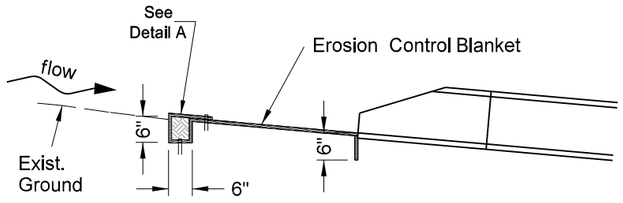
EROSION AND SILTATION CONTROL
EROSION CONTROL BLANKET INSTALLATION



NOTE:
If a Single Net Blanket is used the side with the netting should be on the top once the blanket is installed.

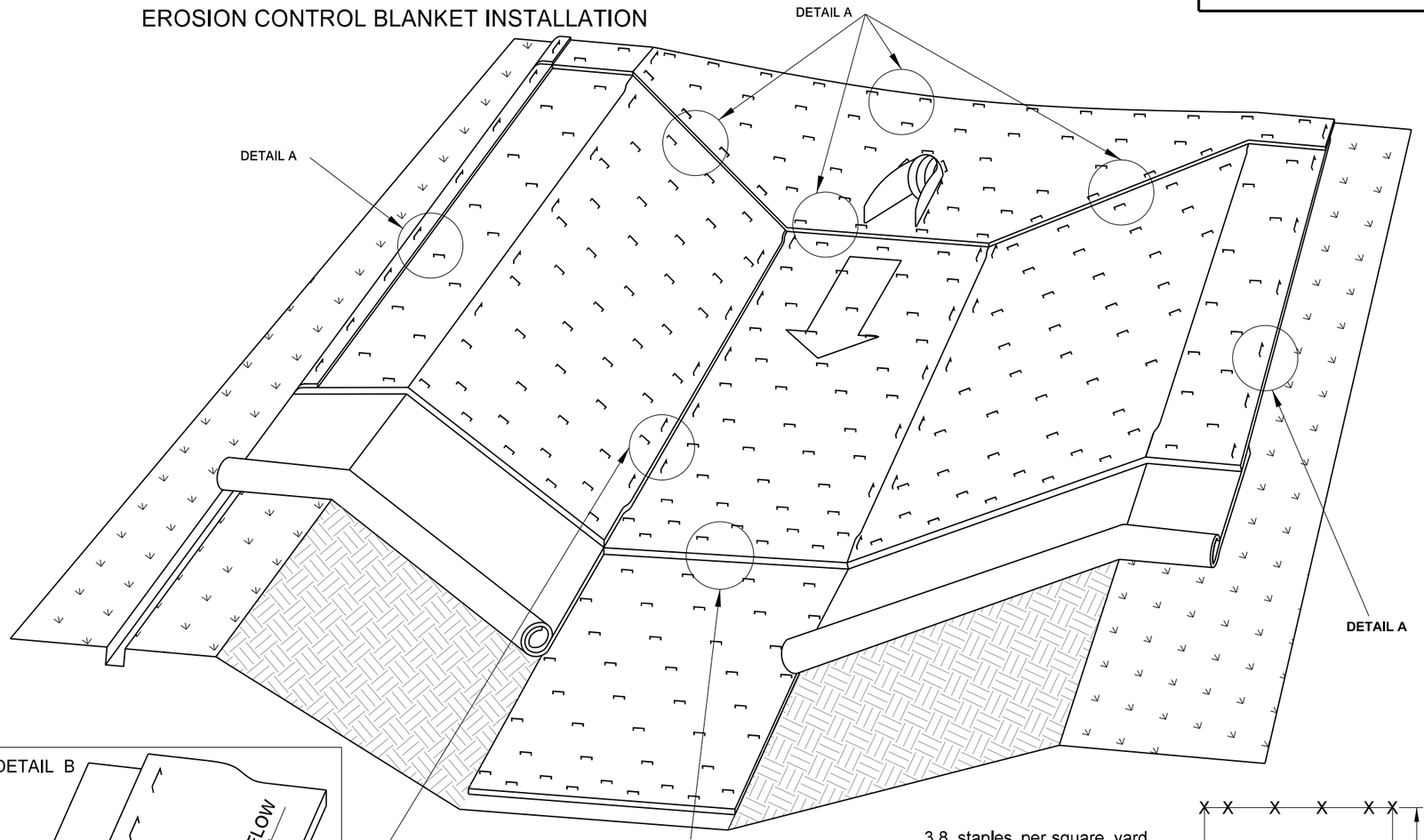


PIPE OUTLETS

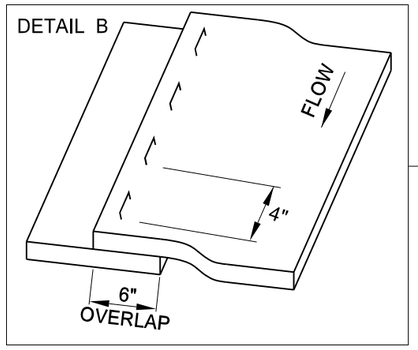


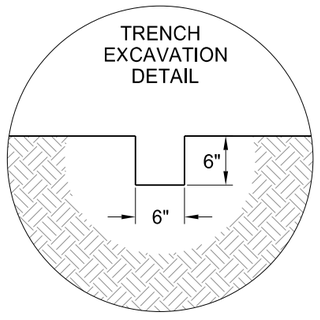
PIPE INLETS

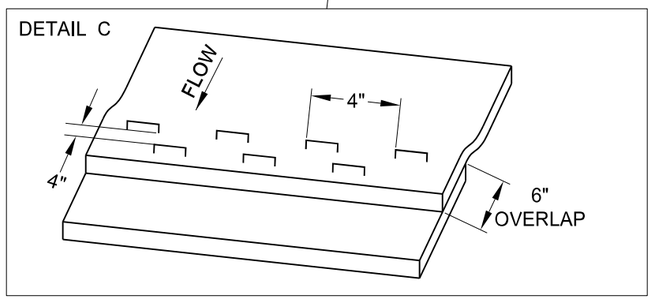
INSTALLATION AT PIPE ENDS



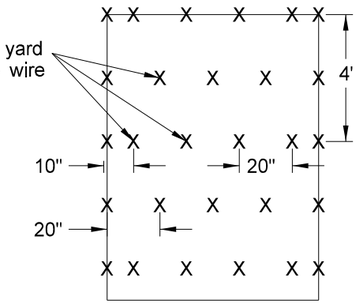
BLANKET LAYOUT
CHANNEL OR SLOPE INSTALLATION







3.8 staples per square yard using 8-inch 11 gauge wire "u" staples.



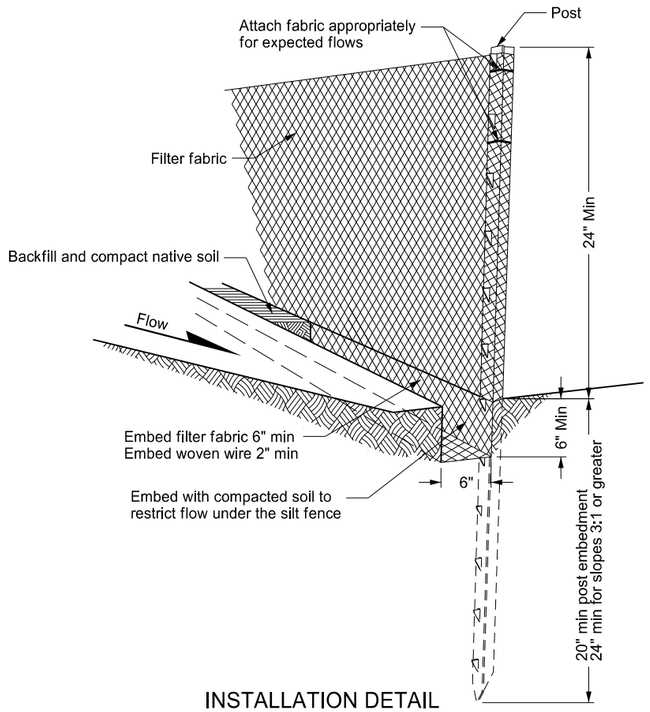
STAPLE PATTERN

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-5 to D-255-2.
07-27-15	Changed Installation details such as trench depth and overlap dimensions.
08-27-19	New Design Engineer PE Stamp.

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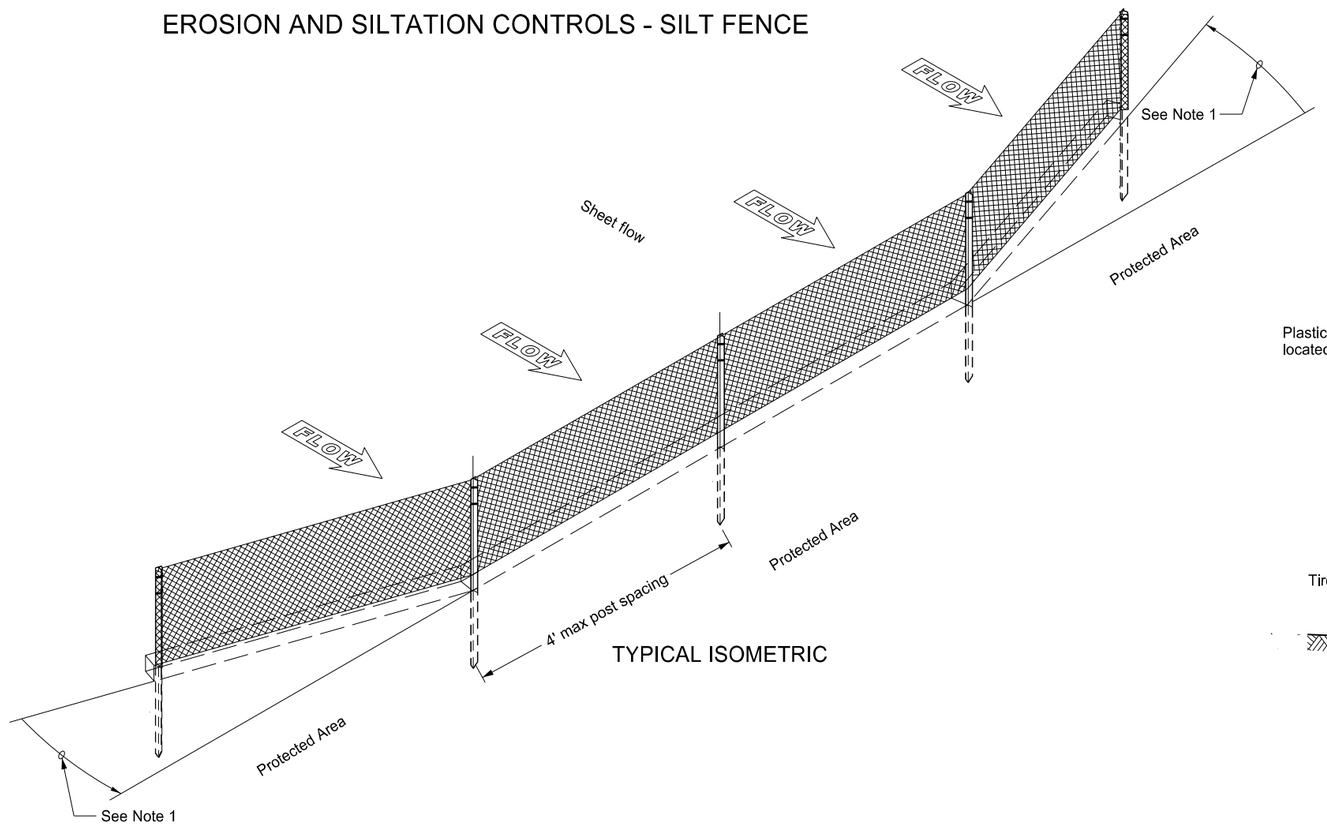
EROSION AND SILTATION CONTROLS - SILT FENCE

D-260-1

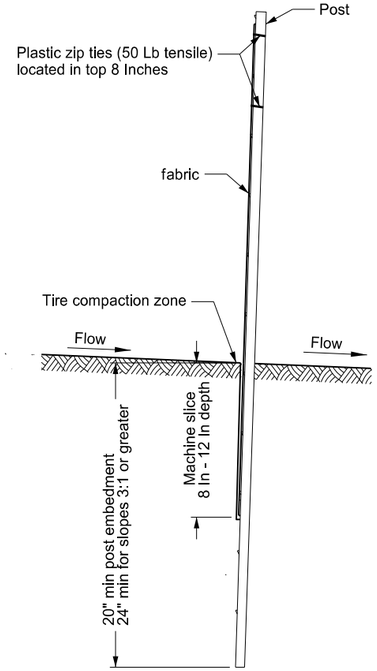


INSTALLATION DETAIL

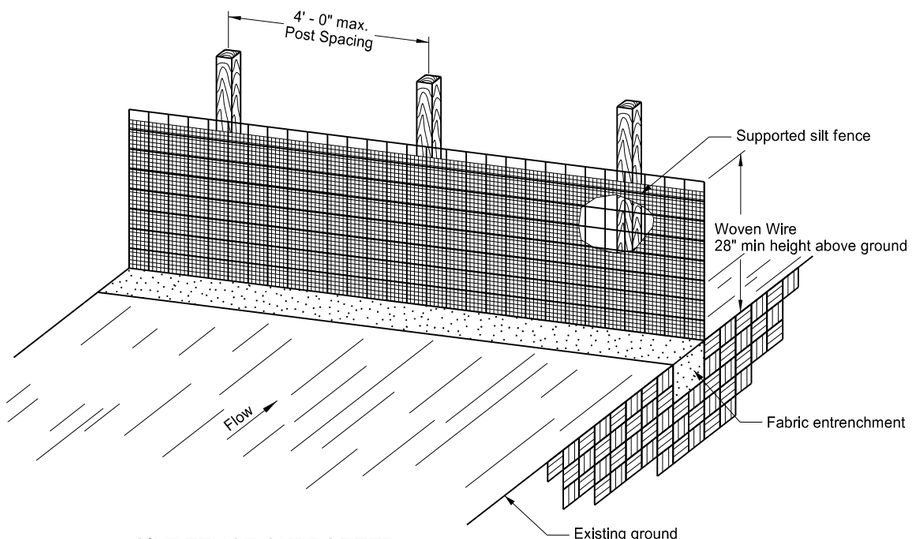
Minimize disturbance of ground around trench and smooth surface after excavation to avoid concentrating flows. Compact to prevent undercutting flows.



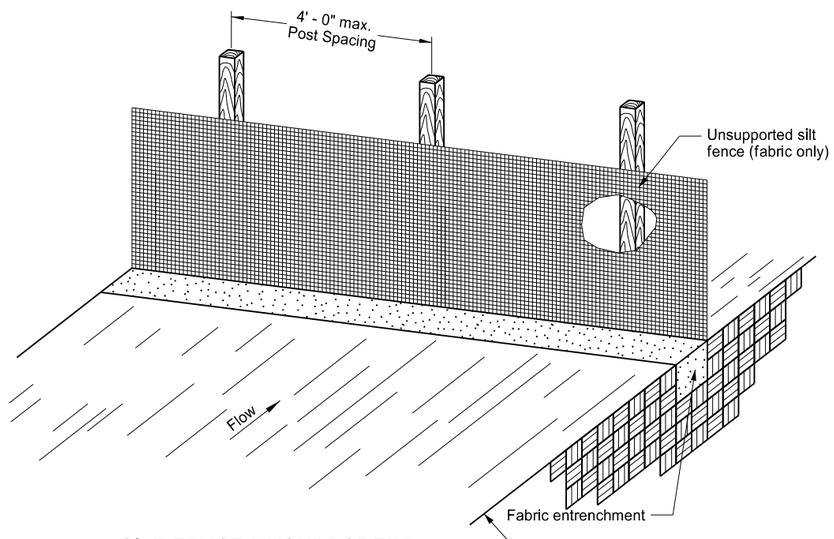
TYPICAL ISOMETRIC



MACHINE SLICED SILT FENCE



SILT FENCE SUPPORTED



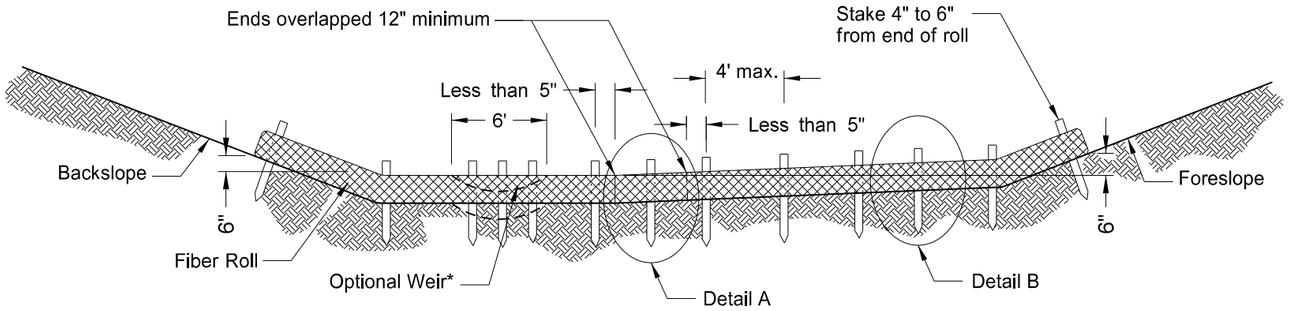
SILT FENCE UNSUPPORTED

NOTES:
1. Install the ends of the silt fence to point slightly upslope to prevent sediment from flowing around the ends of the fence.
2. Place splices outside low spots.
3. Install silt fencing parallel to contour lines.
4. Do not embed silt fence when placed in standing water.
5. Silt fence material does not need to reach the top of woven wire support.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Standard drawing resulted from splitting standard D-708-2.
06-27-16 08-27-19	Revised details & added new ones. New Design Engineer PE Stamp.

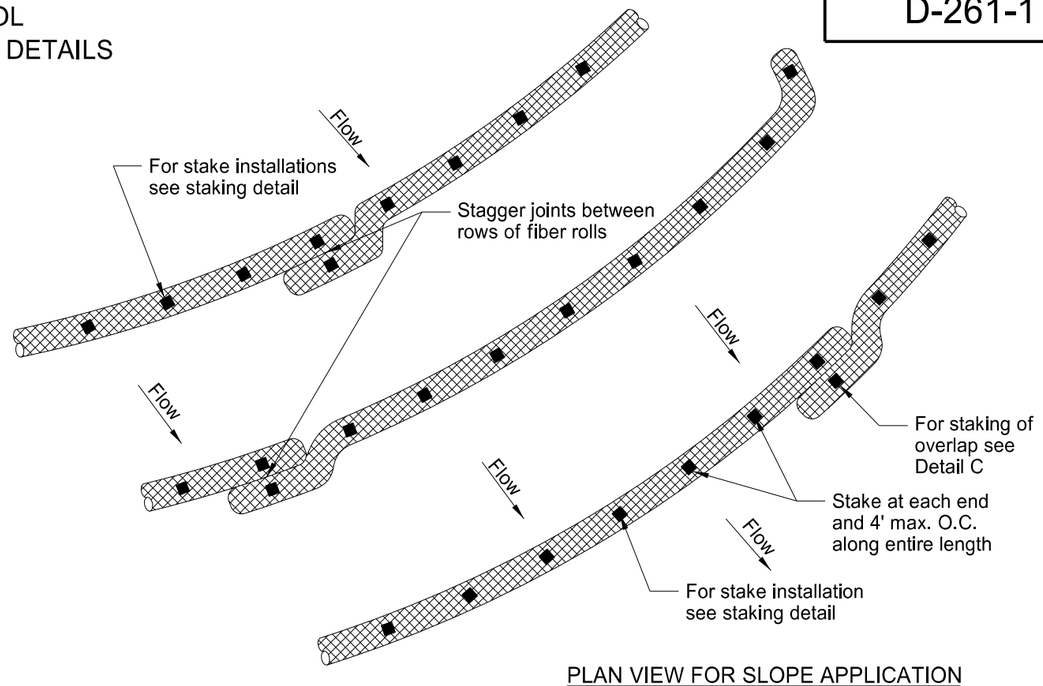
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EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

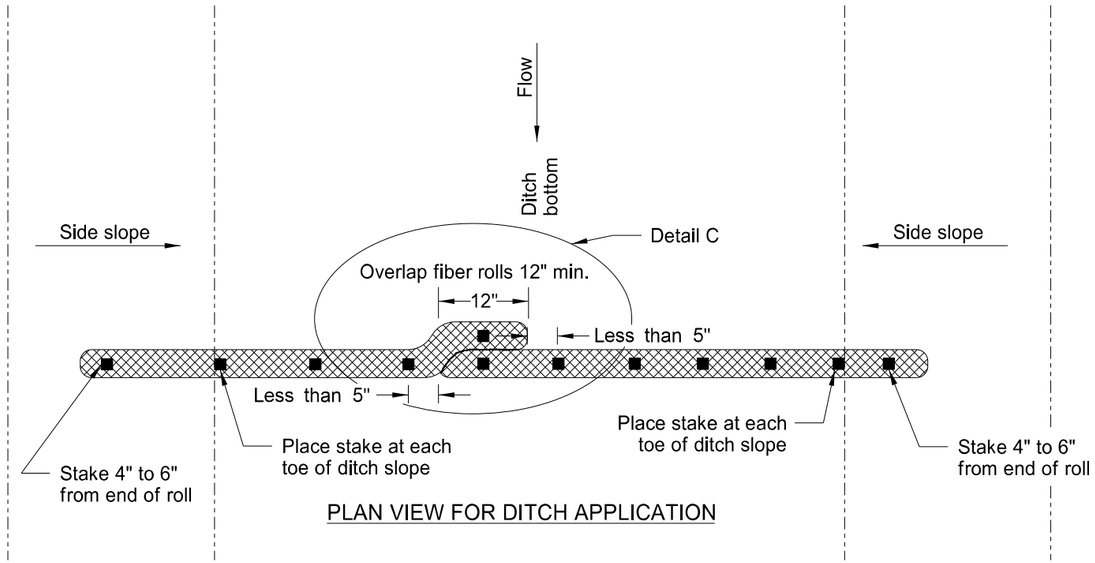


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

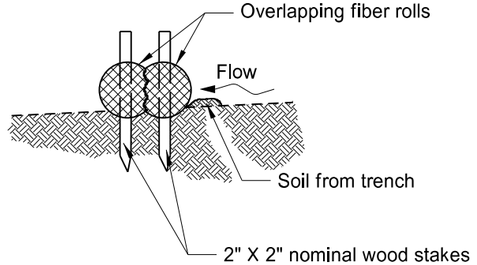
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



PLAN VIEW FOR SLOPE APPLICATION

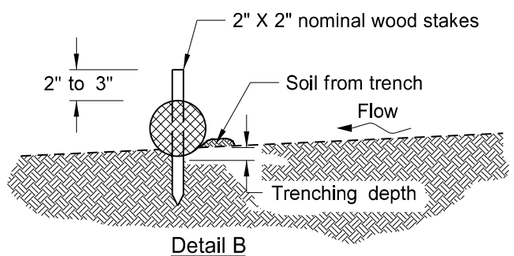


PLAN VIEW FOR DITCH APPLICATION



Detail A

Fiber Roll Overlapping Staking Detail



Detail B

Fiber Roll Staking Detail

FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	MINIMUM TRENCH DEPTH	MAXIMUM TRENCH DEPTH
6"	2" x 2"	18"	2"	2"
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

NOTE: Runoff must not be allowed to run under or around roll.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

11-18-10

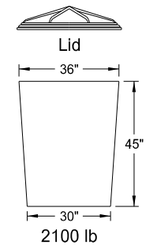
REVISIONS

DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1.
08-27-19	New Design Engineer PE Stamp

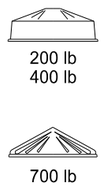
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ATTENUATION DEVICE

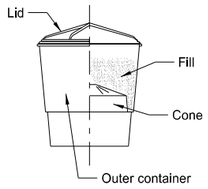
D-704-1



Outer Containers

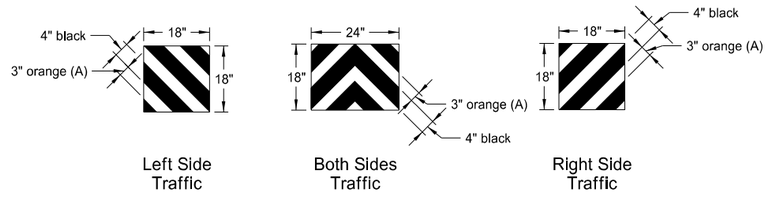


Cones



Typical Assembly

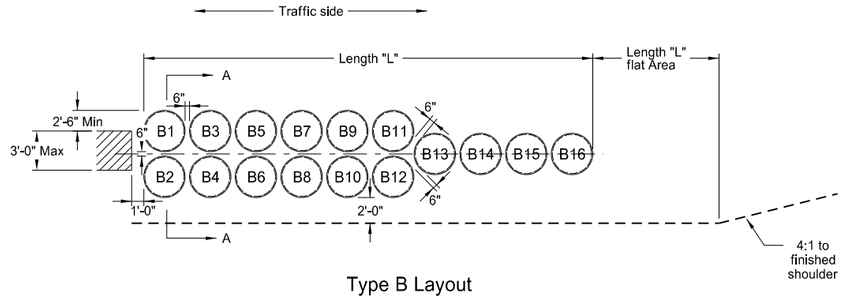
Typical Module
Construction Detail



Reflective Sheet Detail

Note:
Apply Type IV reflective sheeting (as specified in the NDDOT Standard Specifications) directly to the outer container of the last attenuation device facing traffic, following the details above. Or apply the sheet to a metallic sheet and attach it to the container with approved fasteners.

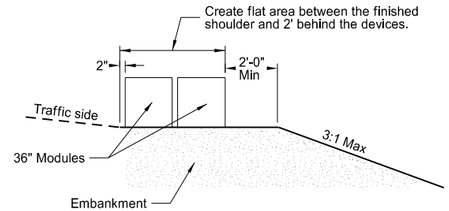
(A) Use 3" orange sheeting for temporary installations, and 3" yellow sheeting for permanent installations.



Type B Layout

Note:
Angle attenuation devices 10 degrees towards traffic when placed at piers offset from roadway.

Fill Chart					
	Module Weights (LBS)				
	200	400	700	1400	2100
Distance from top edge	8½"	5"	4"	3"	0"



Section A-A
(Type B Layout)

Type B Attenuation Device											
Module Number	Dash Number										
	75	70	65	60	55	50	45	40	35	30	25
	Module Weights (LBS)										
B1	2100										
B2	2100										
B3	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B4	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B5	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B6	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B7	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B8	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B9	700	700	700	700	700	700	700	700	700	700	700
B10	700	700	700	700	700	700	700	700	700	700	700
B11	700	700	700	700	700	700	700	700	700	700	700
B12	700	700	700	700	700	700	700	700	700	700	700
B13	700	700	700	700	700	700	700	700	700	700	700
B14	400	400	400	400	400	400	400	400	400	400	400
B15	400	400	400	400	400	400	400	400	400	400	400
B16	200	200	200	200	200	200	200	200	200	200	200
Length (L)	34.2'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	27.2'	27.2'
Module Weights (LBS)	Replacement Module										
2100	1	1	1	1	1	1	1	1	1		
1400	1	1	1	1	1	1	1	1	1	1	1
700	2	2	2	2	2	2	2	2	2	2	2
400	1	1	1	1	1	1	1	1	1	1	1
200	2	2	2	1	1	1	1	1	1	1	1

Notes:

1. Materials
   A) Use modules manufactured from frangible polyethylene material which shatters upon impact.
   B) Fill modules with class 43 aggregate meeting NDDOT Standard Specifications aggregate requirements. Use fill with a unit weight of at least 100 pounds per cubic foot. Use fill with a moisture content of 2% or less when left over winter.

2. Modules
   Provide modules in two sizes containing volumes of either 2, 4, 7, 14, or 21 cubic feet minimum.
   A) Provide three components for 2, 4, or 7 cubic foot module containers:
      1) A 14 C.F., yellow outer container.
      2) A black lid securely locking over the top lip of the container.
      3) A variable cone-shaped supporting insert capable of supporting 200, 400, or 700 pounds of sand mass to allow for three sizes of modules. Place cone inserts inside the 14 cubic foot container.
   B) Provide two components for the 14 cubic foot module container:
      1) A 14 C.F., yellow outer container.
      2) A black lid securely locking over the top lip of the container.
   C) Provide two components for the 21 cubic foot module container:
      1) A 36" height X 36" width yellow outer container.
      2) A black lid which locks securely over the top of the container.

3. For temporary installations use Energite or Fitch attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal modules. As an option, place attenuation devices on 3½" maximum thickness pallets to facilitate maintenance.

4. For permanent installations use Barrel Attenuation Device consisting of one-piece outer sand container modules with separate detachable lid. Energite attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal meet these requirements.

5. The Typical Module Construction Detail and Type B Layout are based on the Energite Crash Cushion manufactured by Energy Absorption. Provide any required layouts and details from other sand filled attenuation module manufacturers which differ from those shown here.

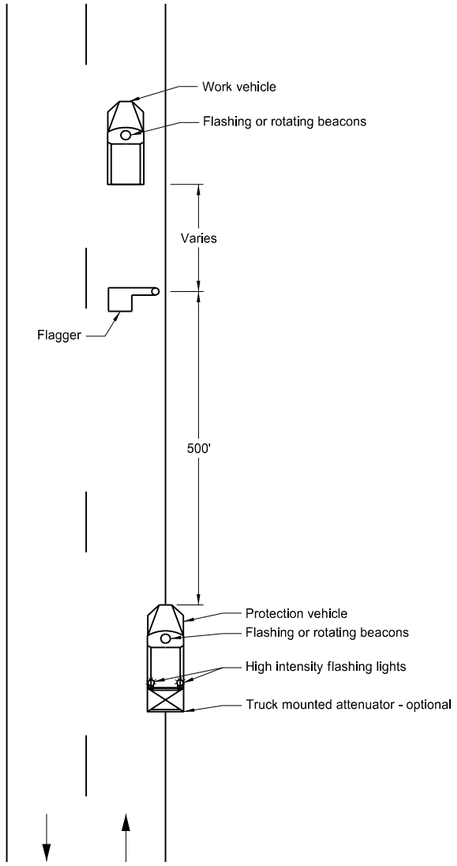
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
7-18-14	Revised sheeting in reflective sheet detail
9-27-17	Update to active voice
10-03-19	New Design Engr PE Stamp

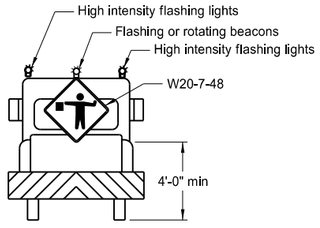
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TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

D-704-2

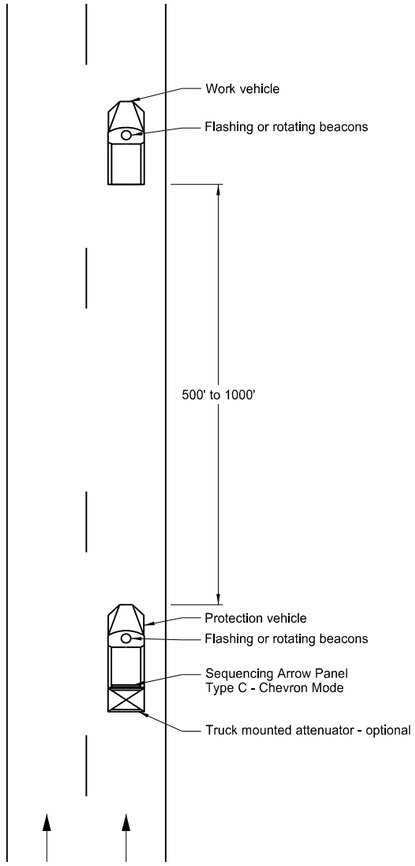
Two Lane, Two Way Roadways

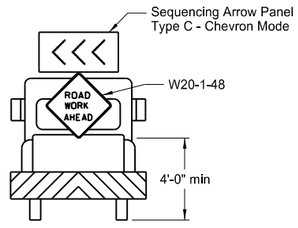




Typical Protection Vehicle

Multilane Roadways





Typical Protection Vehicle

Notes:

1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.

2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.

3. Use these layouts during daylight hours and in areas of good visibility only.

4. Use flagger to protect the work area and warn oncoming traffic for two lane, two way roadway.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

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CONSTRUCTION SIGN DETAIL

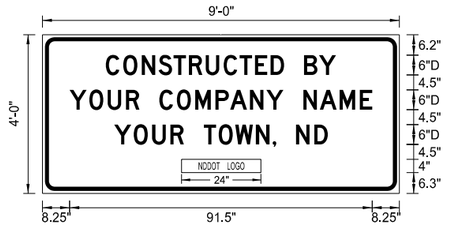
D-704-5

SIGN NUMBER	G20-10-108
WIDTH x HEIGHT	9'-0" x 4'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Refl
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
	42.1	6.2	24	4	0

STATION(S):

AREA: 36.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

LETTER POSITION (X)																		LENGTH	SIZE	SERIES
C	O	N	S	T	R	U	C	T	E	D		B	Y					69.7	6	D 2000
19.2	24.5	30	35.1	39.7	44.3	49.4	54.8	59.7	64.3	69	73.1	79.1	83.7							
Y	O	U	R		C	O	M	P	A	N	Y		N	A	M	E		91.5	6	D 2000
8.3	14.2	19.8	25.3	29.4	35.4	40.7	46.2	52.4	56.8	62.8	67.8	72.9	78.9	83.9	89.9	96				
Y	O	U	R		T	O	W	N	,		N	D						64.6	6	D 2000
21.7	27.6	33.2	38.7	42.8	48.8	53.3	58.4	64.6	69.6	70.7	76.7	82.2								

Notes:

1. Post mount sign a distance of ½A following the End Road Work (G20-2-48) sign (maximum 2 signs per project.)

2. Use sign on rural projects with a 30 day or longer duration (not required on seal coats or other short duration projects.)

3. Do not place sign in urban areas or within city limits.

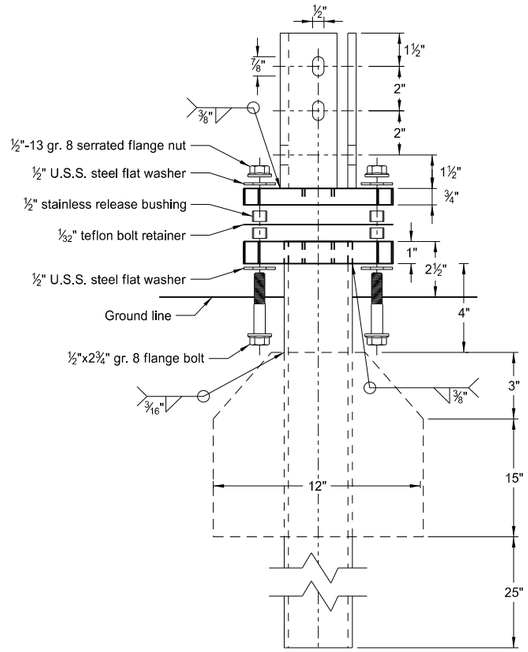
Advance Warning Sign Spacing (A)			
Road Type	Distance between signs min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
7-18-14	Revise sheeting to type IV.
9-27-17	Updated to active voice.
8-30-18	Updated sign number in note 1.
10-03-19	New Design Engineer PE Stamp.

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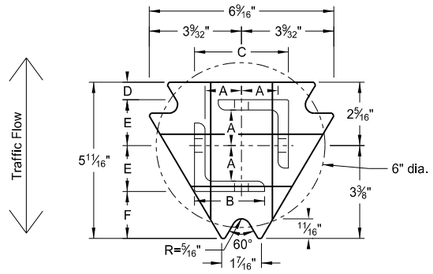
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

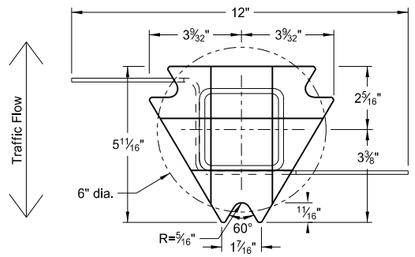


Multi-Directional
Slip Base Assembly

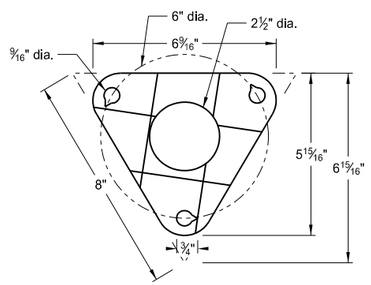
Perforated Tube



Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50



Bolt Retainer for Base Connection
Bolt Retainer- 1/32" Reprocessed Teflon

Notes:

1. Torque slip base bolts as specified by manufacturer.
2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
4. In concrete sidewalk, use same anchor without wings.
5. Provide more than 7' between the first and fourth posts of a four post sign.

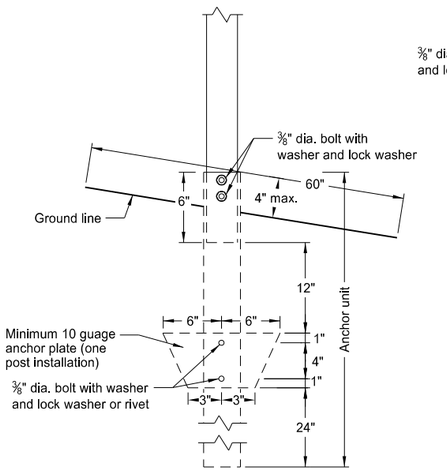
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	10	2³/16	10	Yes	

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in.⁴	Cross Sec. Area in.²	Section Modulus 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
2³/16 x 2³/16	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

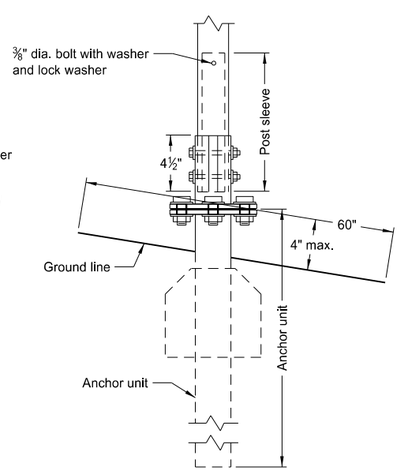
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2³/16"x10 ga.	1⁹/64"	2½"	3¹/32"	2⁵/32"	1³³/64"	1⅞"
2½"x10 ga.	1⁹/32"	2½"	3⁵/16"	⅝"	1²¹/32"	1¾"

(A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.

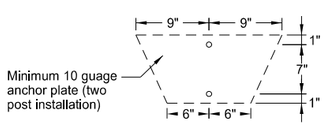
(B) For additional wind load, insert the 2³/16"x10 ga. into 2½"x10 ga.



Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly



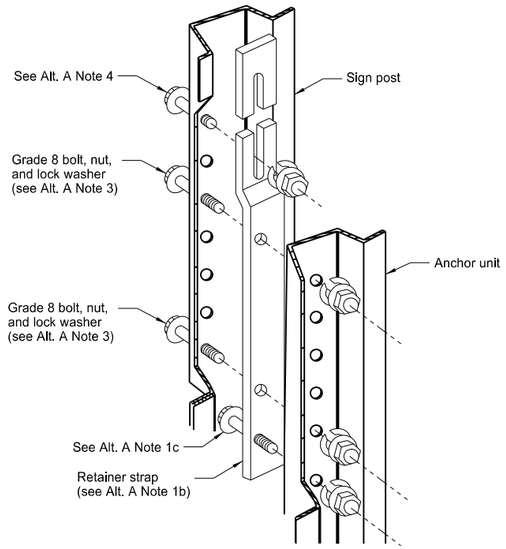
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

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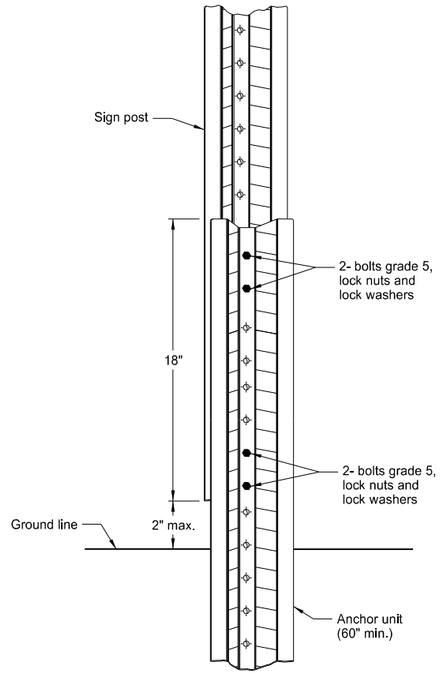
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post

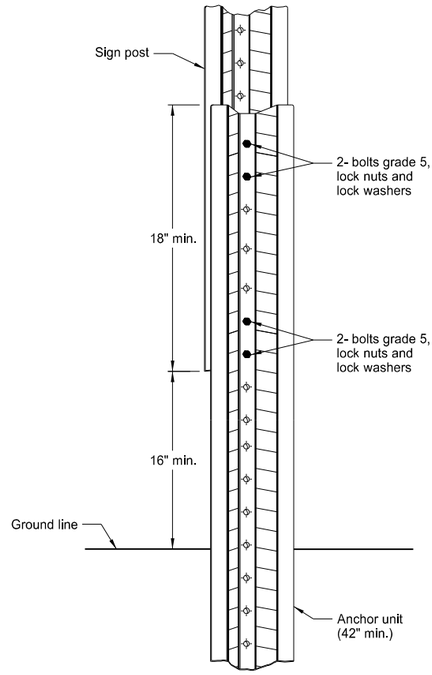


Detail A



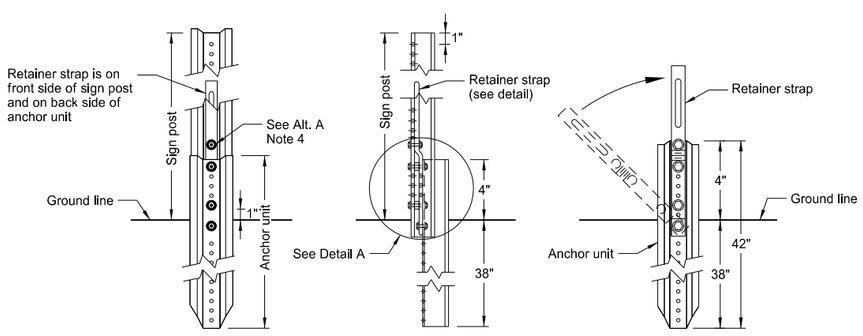
Breakaway U-Channel Splice Detail
Alternate B
(2.5 and 3 lb/ft)

Install a maximum of 3 posts within 7'.



Breakaway U-Channel Splice Detail
Alternate C
(2.5 and 3 lb/ft)

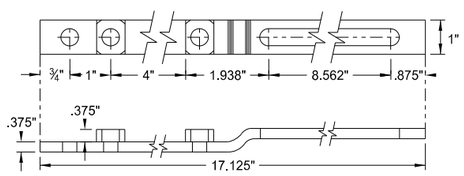
Install a maximum of 3 posts within 7'.



Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

Install a maximum of 2 posts within 7'.



Retainer Strap Detail

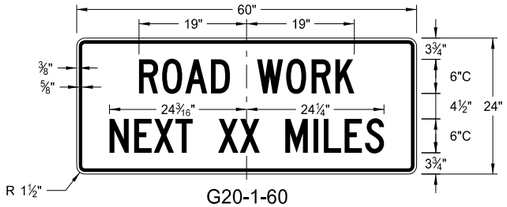
Alternate A Steps of Installation:

1. a) Drive anchor unit to within 12" of ground level.
   b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
   c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
   d) Rotate strap 90° to left.
2. a) Drive anchor unit to 4" above ground.
   b) Rotate strap to vertical position.
3. a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
   b) Alternately tighten two connector bolts.
4. Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
5. Properly nest base post, strap, and sign post. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

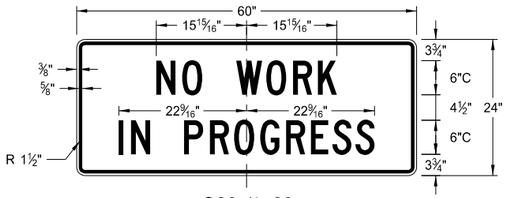
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

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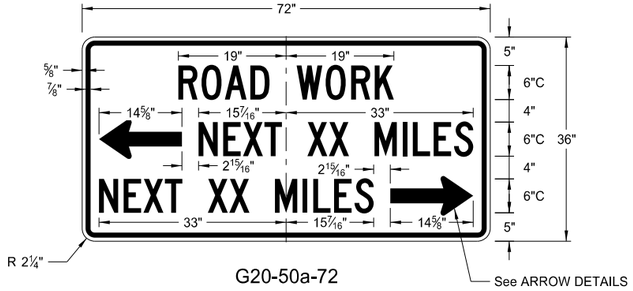
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



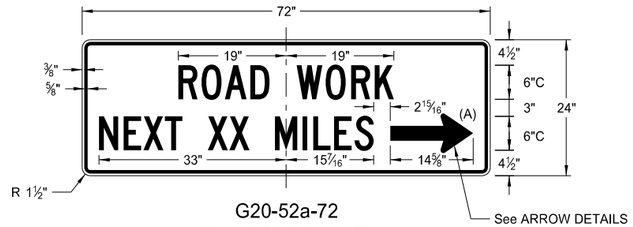
G20-1-60
Legend: black (non-refl)
Background: orange



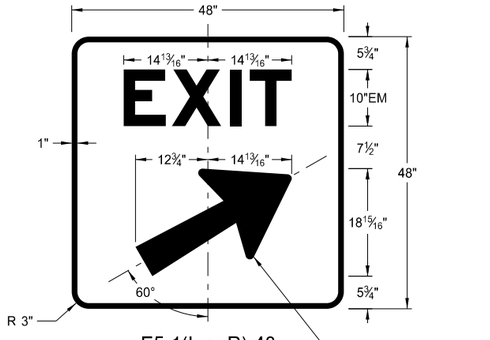
G20-1b-60
Legend: black (non-refl)
Background: orange



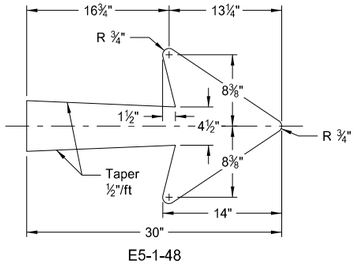
G20-50a-72
Legend: black (non-refl)
Background: orange



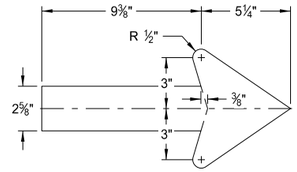
G20-52a-72
Legend: black (non-refl)
Background: orange



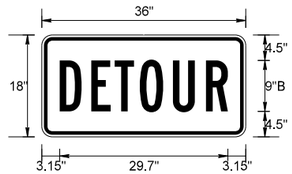
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



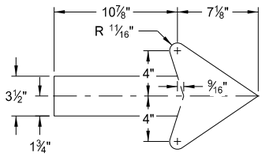
E5-1-48



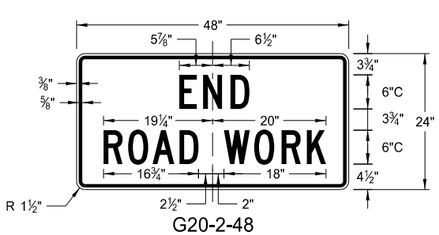
G20-50a-72
G20-52a-72



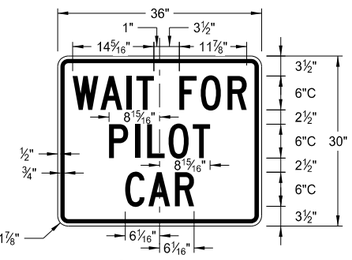
M4-8-36
Legend: black (non-refl)
Background: orange



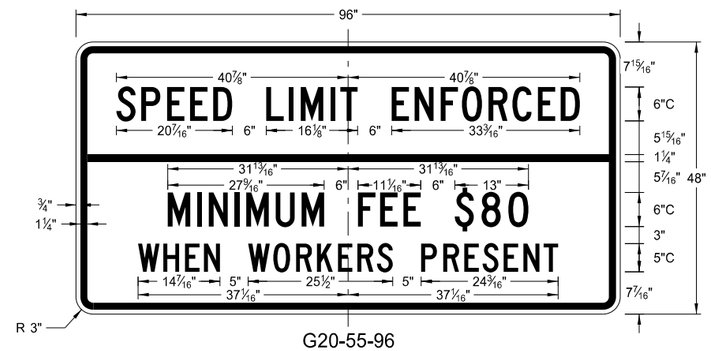
M4-9(L or R)-30
Right or Left



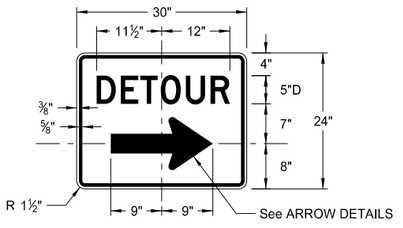
G20-2-48
Legend: black (non-refl)
Background: orange



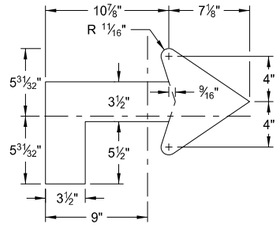
G20-4b-36
Legend: black (non-refl)
Background: orange



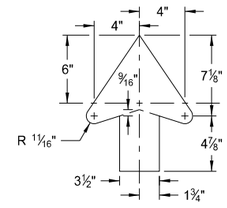
G20-55-96
Legend: black (non-refl)
Background: orange



M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight

ARROW DETAILS

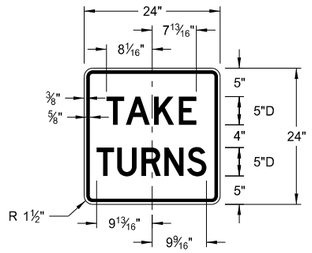
NOTES:

(A) Arrow may be right or left of the legend to indicate construction to the right or left.

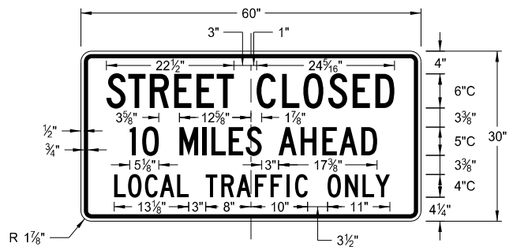
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp

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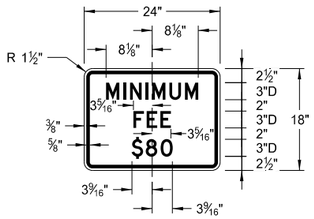
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



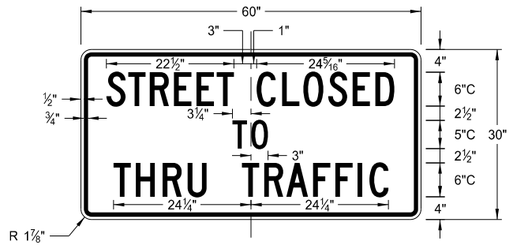
R1-50P-24
Legend: black (non-refl)
Background: white



R11-3c-60
Legend: black (non-refl)
Background: white



R2-1aP-24
Legend: black (non-refl)
Background: white



R11-4a-60
Legend: black (non-refl)
Background: white

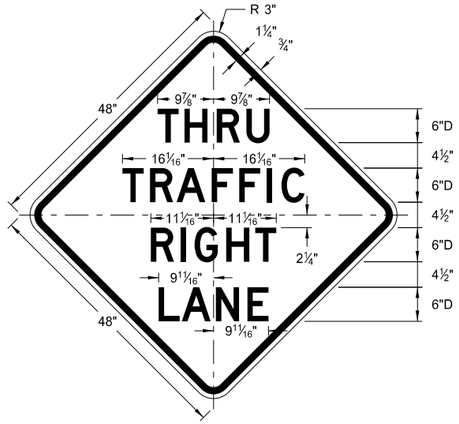


R11-2a-48
Legend: black (non-refl)
Background: white

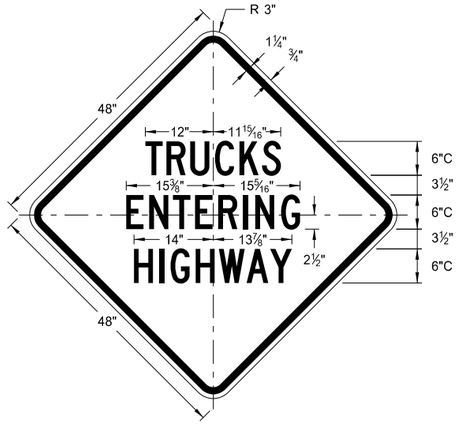
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp

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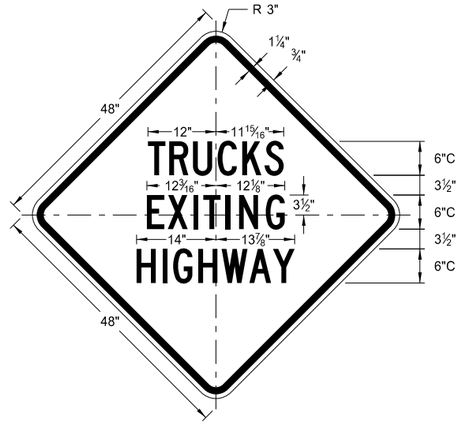
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



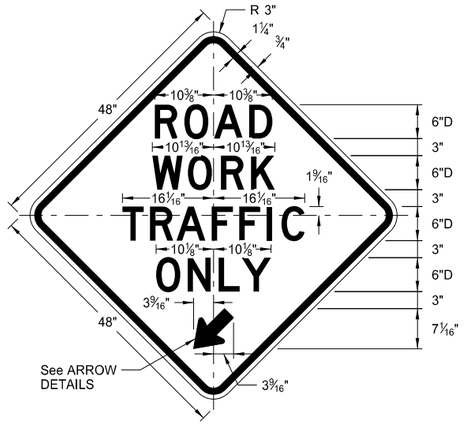
W5-8-48
Legend: black (non-refl)
Background: orange



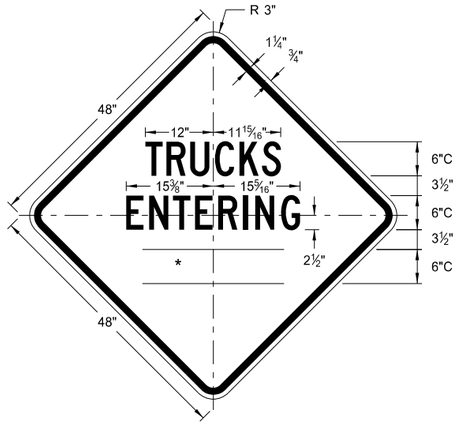
W8-53-48
Legend: black (non-refl)
Background: orange



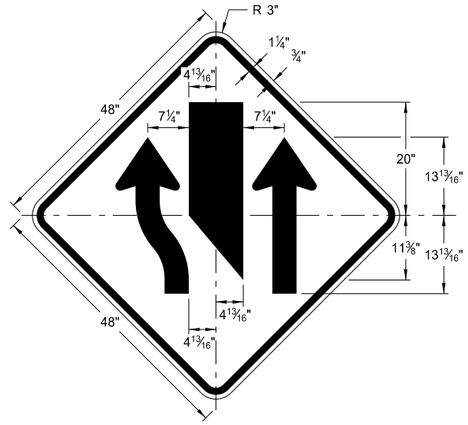
W8-56-48
Legend: black (non-refl)
Background: orange



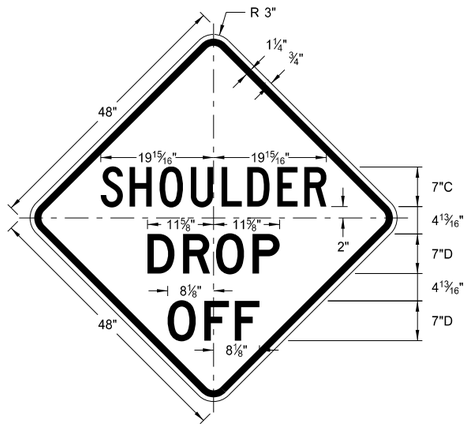
W5-9-48
Legend: black (non-refl)
Background: orange



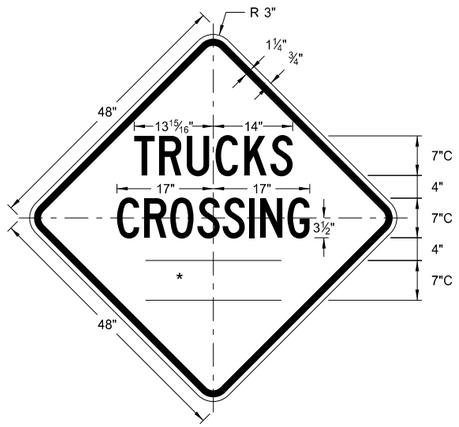
W8-54-48
Legend: black (non-refl)
Background: orange



W9-3a-48
Legend: black (non-refl)
Background: orange



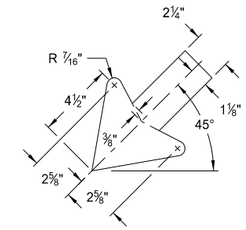
W8-9a-48
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Background: orange



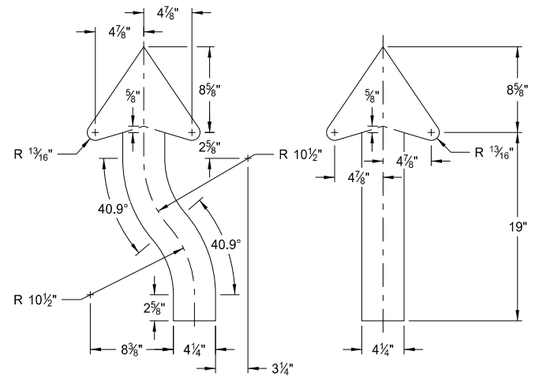
W8-55-48
Legend: black (non-refl)
Background: orange

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



W5-9-48



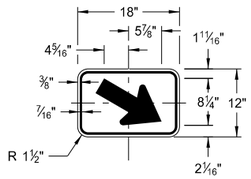
W9-3a-48

ARROW DETAILS

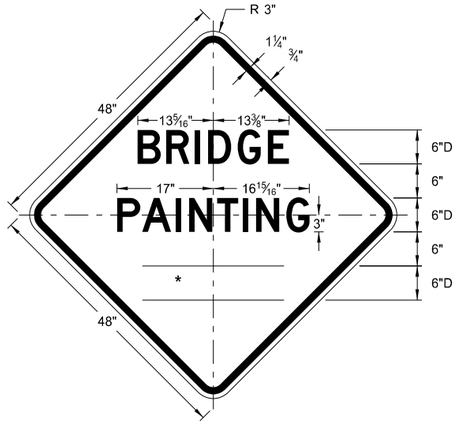
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp

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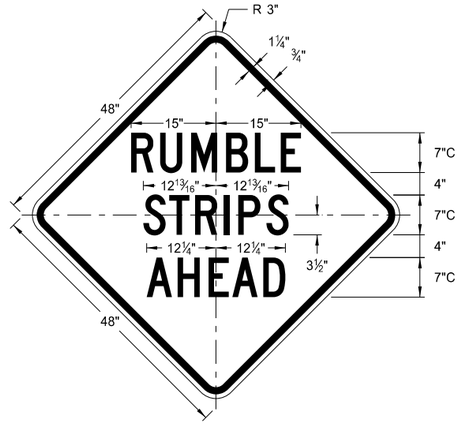
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



W16-7aP-18
Legend: black (non-refl)
Background: orange



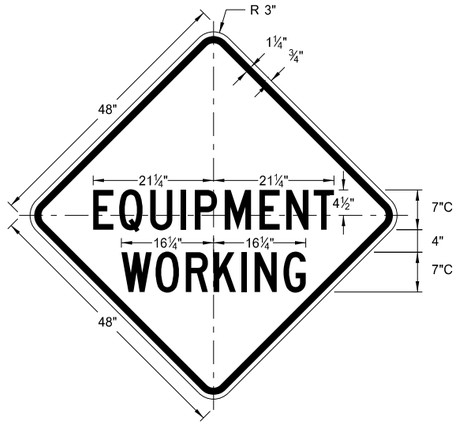
W21-50-48
Legend: black (non-refl)
Background: orange



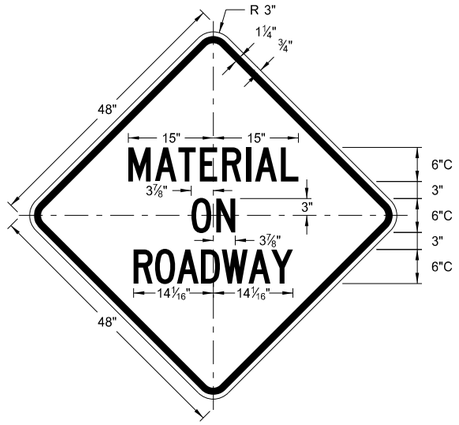
W21-53-48
Legend: black (non-refl)
Background: orange

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

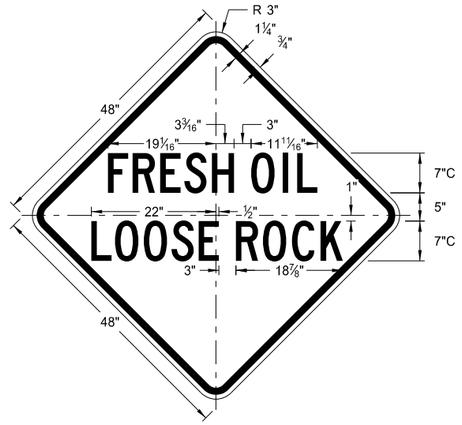
* DISTANCE MESSAGES



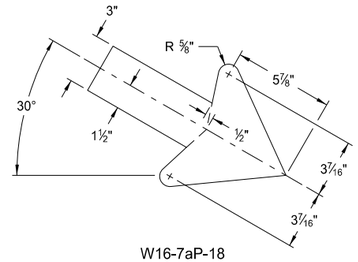
W20-51-48
Legend: black (non-refl)
Background: orange



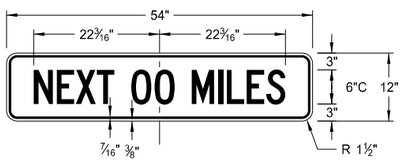
W21-51-48
Legend: black (non-refl)
Background: orange



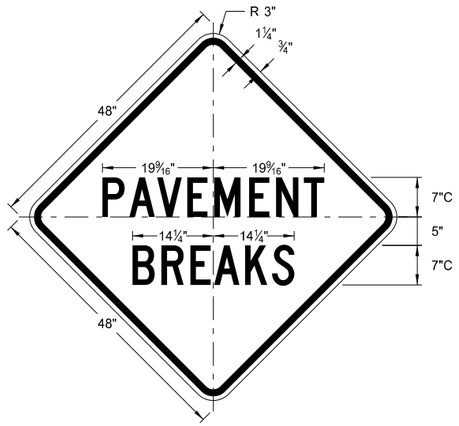
W22-8-48
Legend: black (non-refl)
Background: orange



W16-7aP-18



W20-52P-54
Legend: black (non-refl)
Background: orange



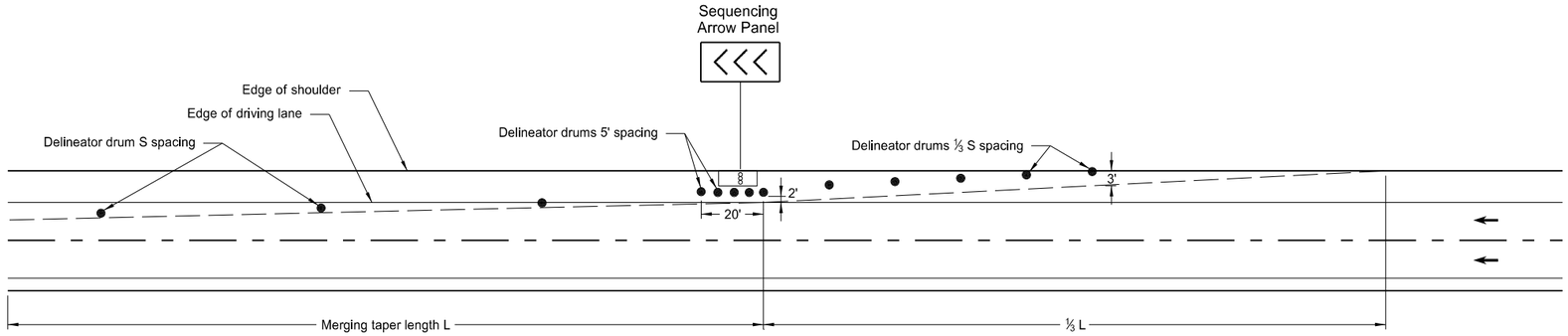
W21-52-48
Legend: black (non-refl)
Background: orange

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.

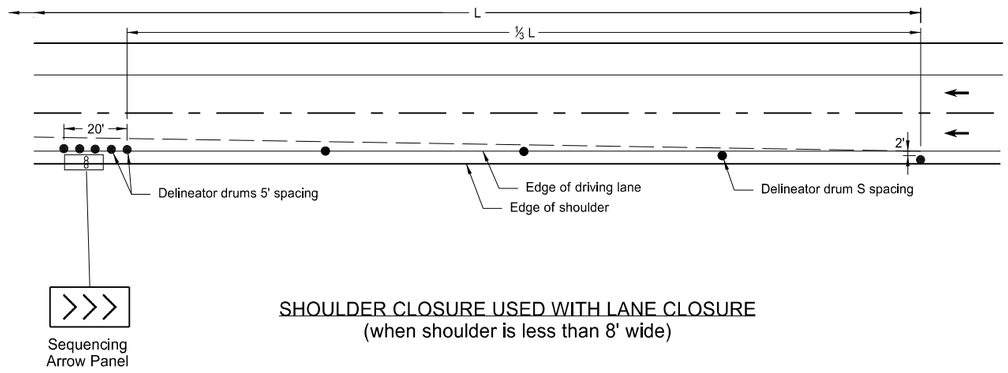
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SHOULDER CLOSURE TAPERS

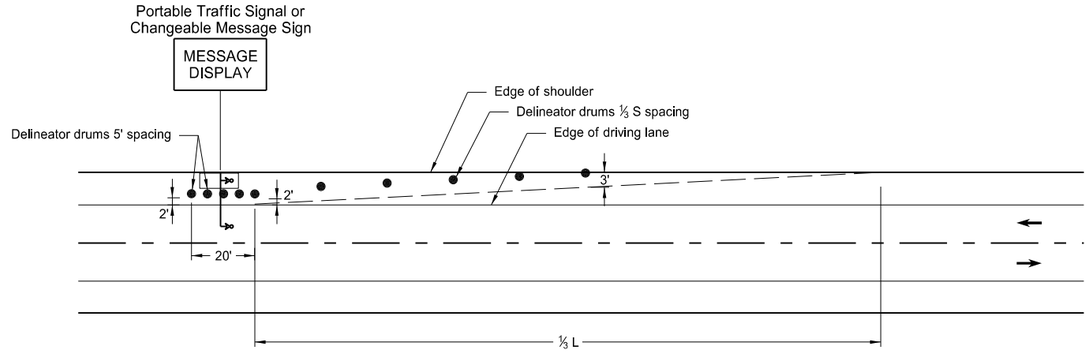
D-704-12



SHOULDER CLOSURE WITH LANE CLOSURE
(when shoulder is 8' or wider)



SHOULDER CLOSURE USED WITH LANE CLOSURE
(when shoulder is less than 8' wide)



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

KEY	
● Delineator Drum	∞ Sequencing Arrow Panel
° Message Display	Portable Traffic Signal

Notes:

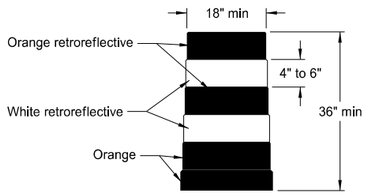
1. S = Posted Speed Limit in mph
   W = Width of offset in feet
   L = Taper length in feet
   L = $WS^2/60$ (40mph or less)
   L = WS (45mph or more)
2. If a shoulder taper is used, use a length of approximately ⅓L. If a shoulder is used as a travel lane, use a normal merging or shifting taper.
3. When paved shoulders of 8 foot width or more are closed, use channelizing devices to close shoulder in advance, to delineate beginning of work space, and to direct vehicular traffic to remain within the traveled way.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-25-19	Added L dimension to detail

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/25/19 and the original document is stored at the North Dakota Department of Transportation

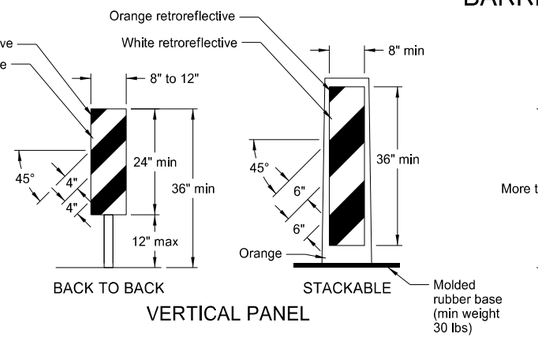
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



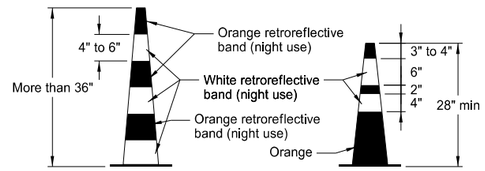
DELINEATOR DRUM

Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectorized spaces between the horizontal orange and white stripes. Avoid placement of stripes on drum ribs or indentations. Use closed top drums that will not allow collection of debris. Do not place ballast on the top of drum.



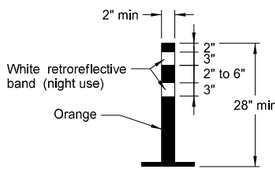
VERTICAL PANEL

Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, use a stripe width of 6 inches.



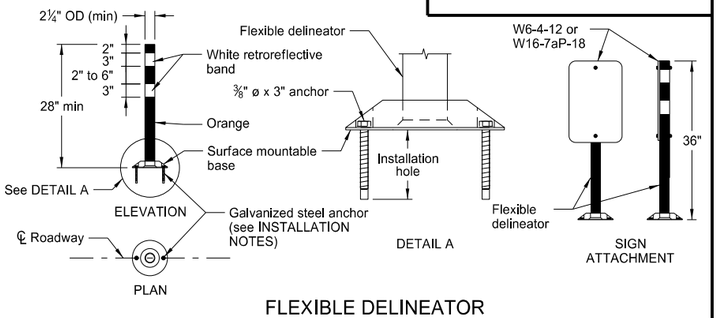
TRAFFIC CONE

Provide retroreflectorization of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflectorized space between the orange and white stripes.



TUBULAR MARKER

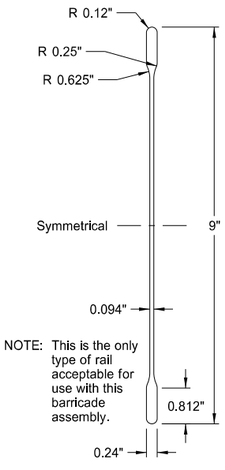
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

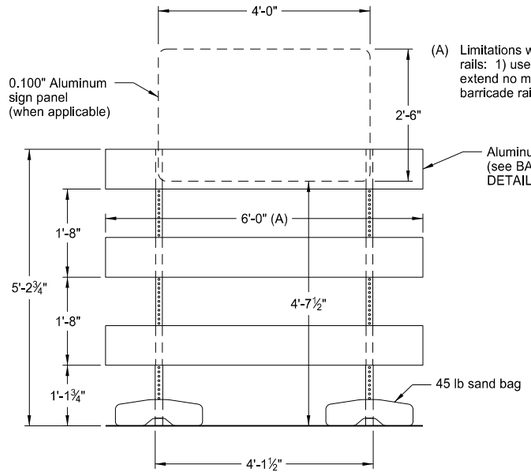
INSTALLATION NOTES:

1. Drill installation holes to diameter and depth required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl. Remove butyl as close as possible to pavement surface.



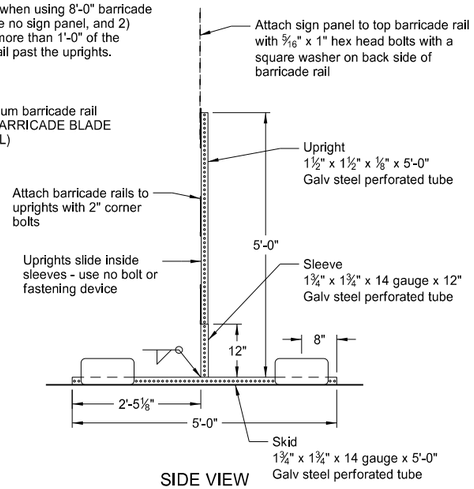
NOTE: This is the only type of rail acceptable for use with this barricade assembly.

BARRICADE BLADE DETAIL



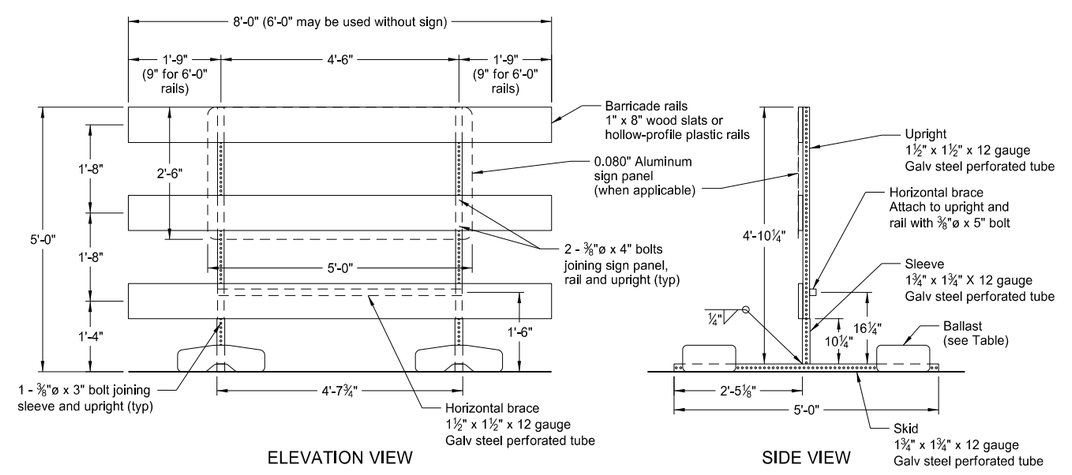
(A) Limitations when using 8'-0" barricade rails: 1) use no sign panel, and 2) extend no more than 1'-0" of the barricade rail past the uprights.

ELEVATION VIEW



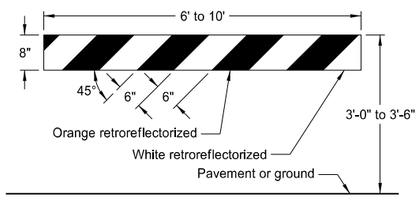
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

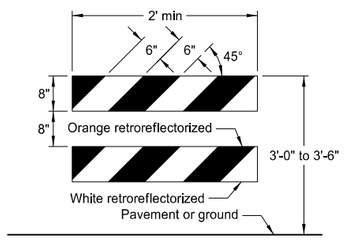


BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

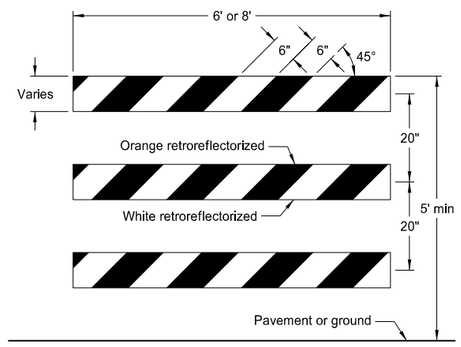
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", use a rail stripe width of 4".



TYPE I BARRICADE

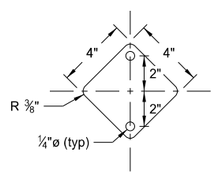


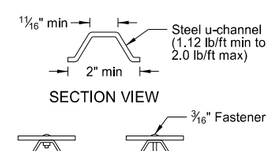
TYPE II BARRICADE

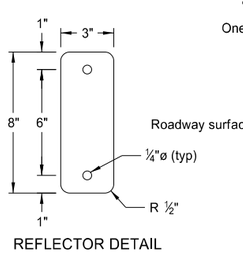


TYPE III BARRICADE

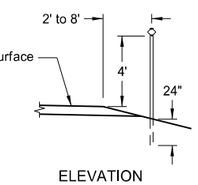
BARRICADE RAIL DETAILS







REFLECTOR DETAIL



ELEVATION

DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

Without Sign	4 - 25 lb sandbags
With Sign	6 - 25 lb sandbags

Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

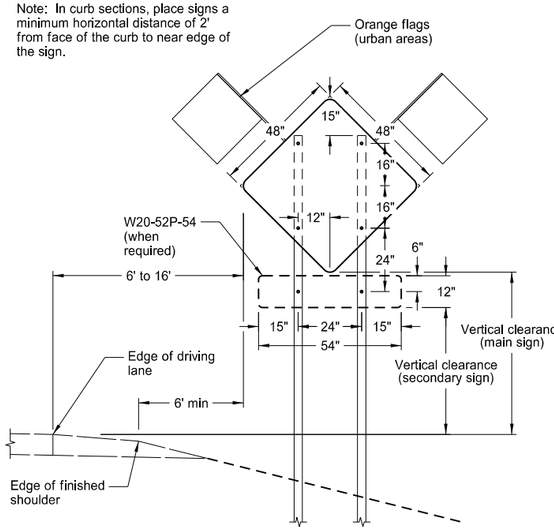
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17 11-01-19	Updated to active voice Revised details for Flexible Delineator

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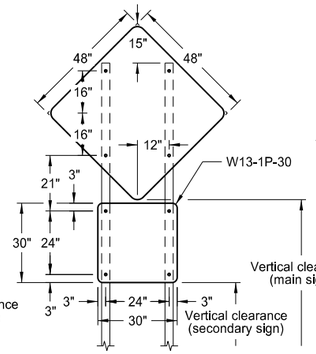
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

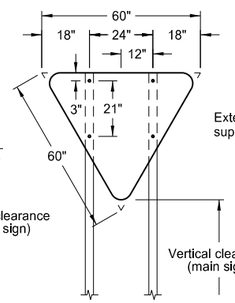
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



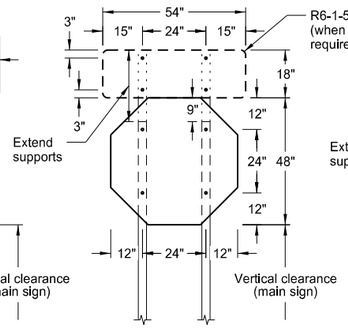
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



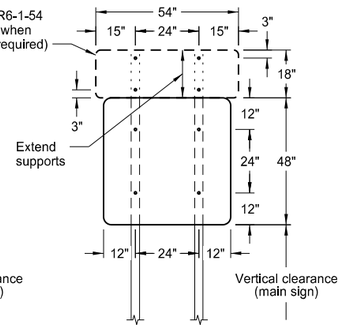
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



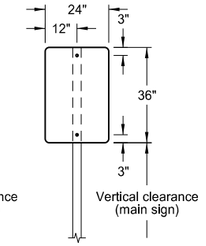
R1-2-60 - YIELD SIGN



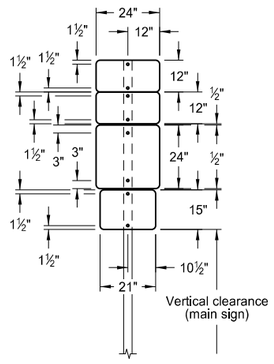
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



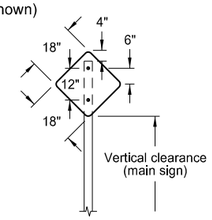
48" x 48" SIGN
(with R6-1-54 sign as required)



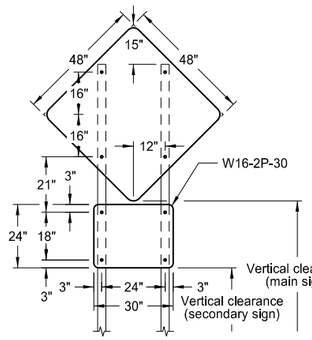
24" x 36" SIGN



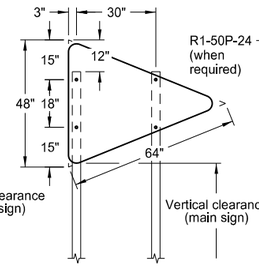
24" x 24"
ROUTE MARKER
ASSEMBLY



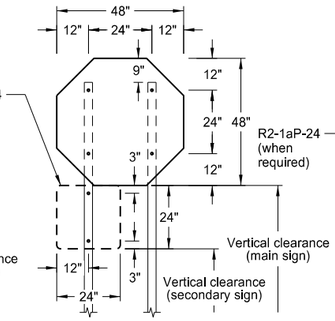
18" x 18"
DIAMOND SIGN



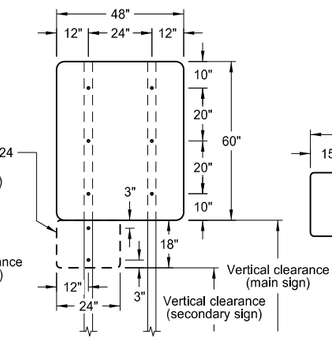
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



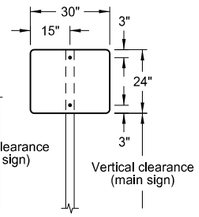
W14-3-64 - PENNANT SIGN



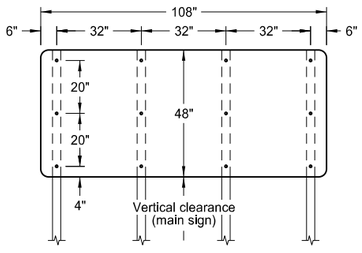
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



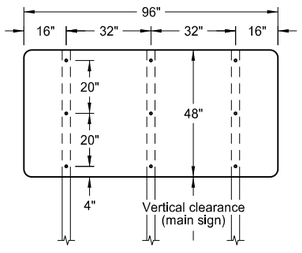
48" x 48" SIGN
(with R2-1aP-24 sign as required)



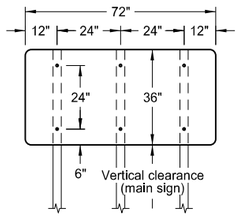
30" x 24" SIGN



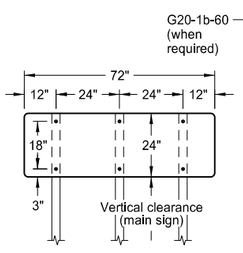
108" x 48" SIGN



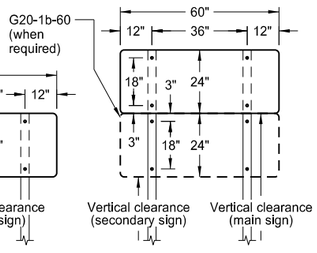
96" x 48" SIGN



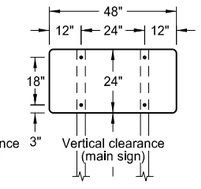
72" x 36" SIGN



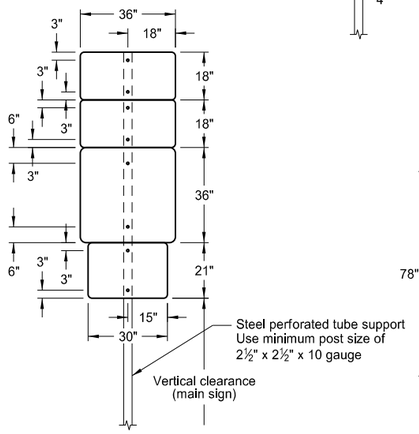
72" x 24" SIGN



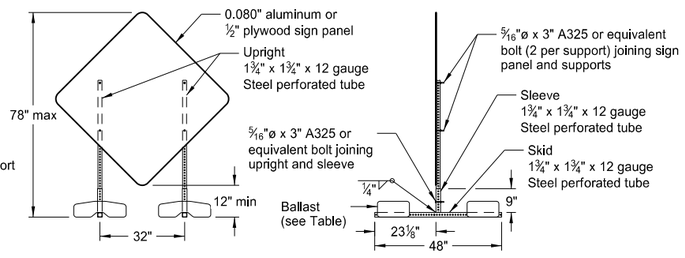
60" x 24" SIGN



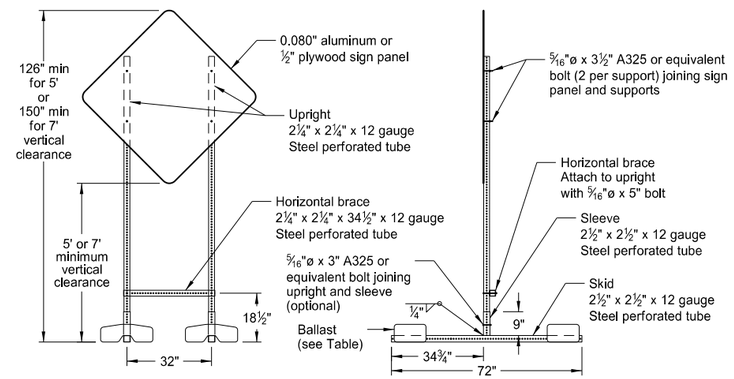
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: Galvanize or paint supports. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes based on a wind speed of 55 MPH.

   Place signs over 50 square feet on 2½" x 2½" perforated tube supports as a minimum.

   Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅜" bolts.

3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)

4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

   Interstate - white legend on blue background
   Interstate Business Loop - white legend on green background
   US and State - black legend on white background
   County - yellow legend on blue background

5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

   The vertical clearance to secondary signs is 1'-0" less than the vertical clearance stated above.

   Provide a minimum clearance of 7'-0" from the ground at the post for signs with an area exceeding 50 square feet.

6. Portable Signs: Provide portable signs that meet the vertical clearance stated above when it is necessary to place signs within the pavement surface.

   Use of low-mounting height (minimum 12" vertical clearance) portable signs for 5 days or less, is allowed as long as the view of the sign is not obstructed. Time delays caused by unforseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. Use of R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 is allowed for longer than 5 days.

   Restrict signs mounted on portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT details to a maximum surface area of 16 square feet.

MINIMUM BALLAST
(For each side of sign support base)

Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

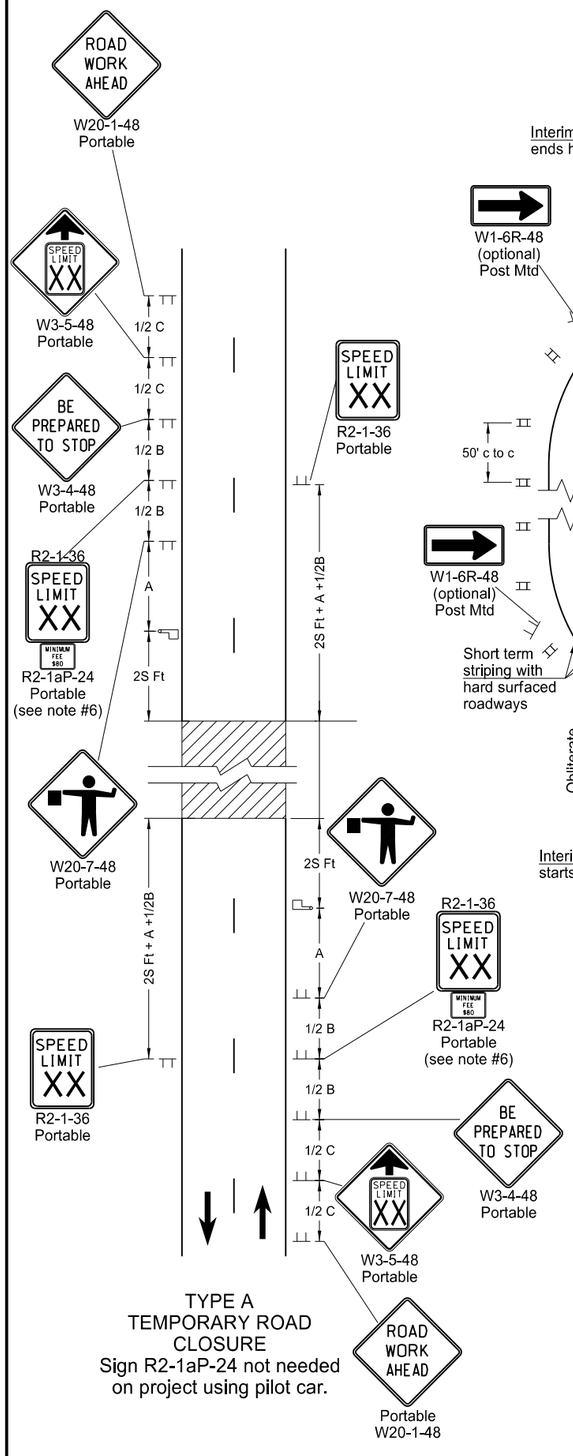
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail

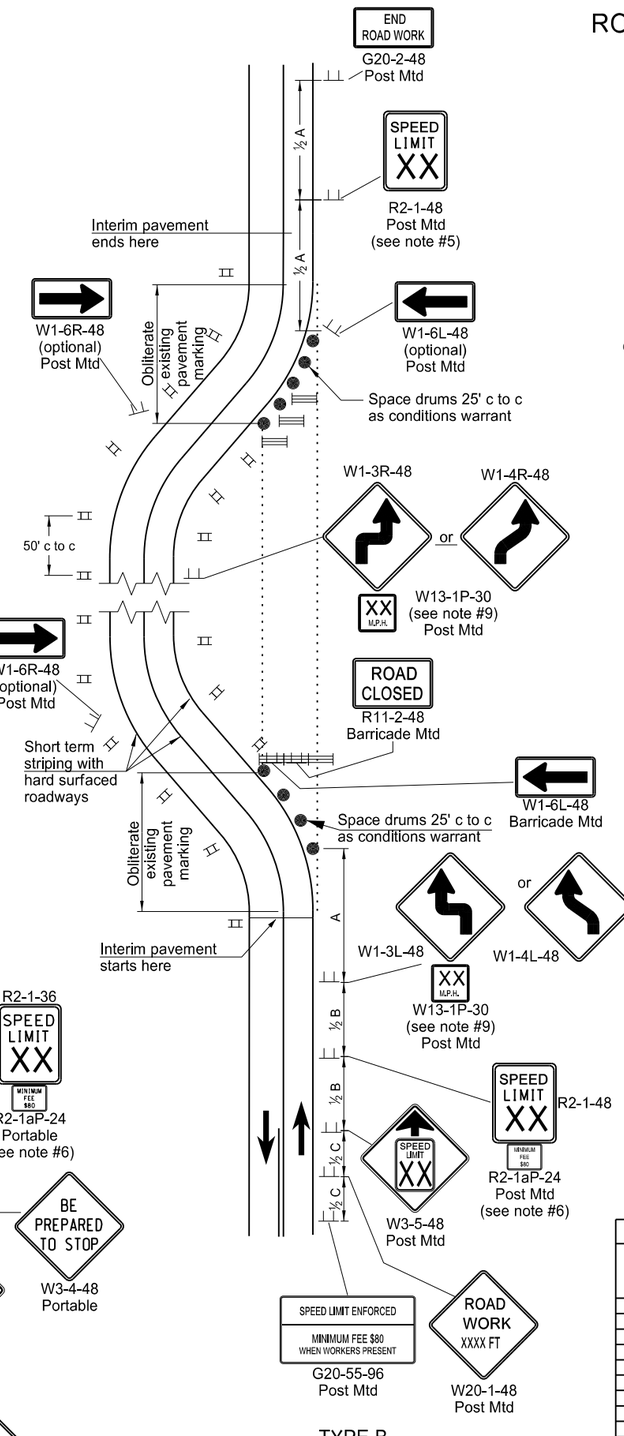
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ROAD CLOSURE LAYOUTS

D-704-15

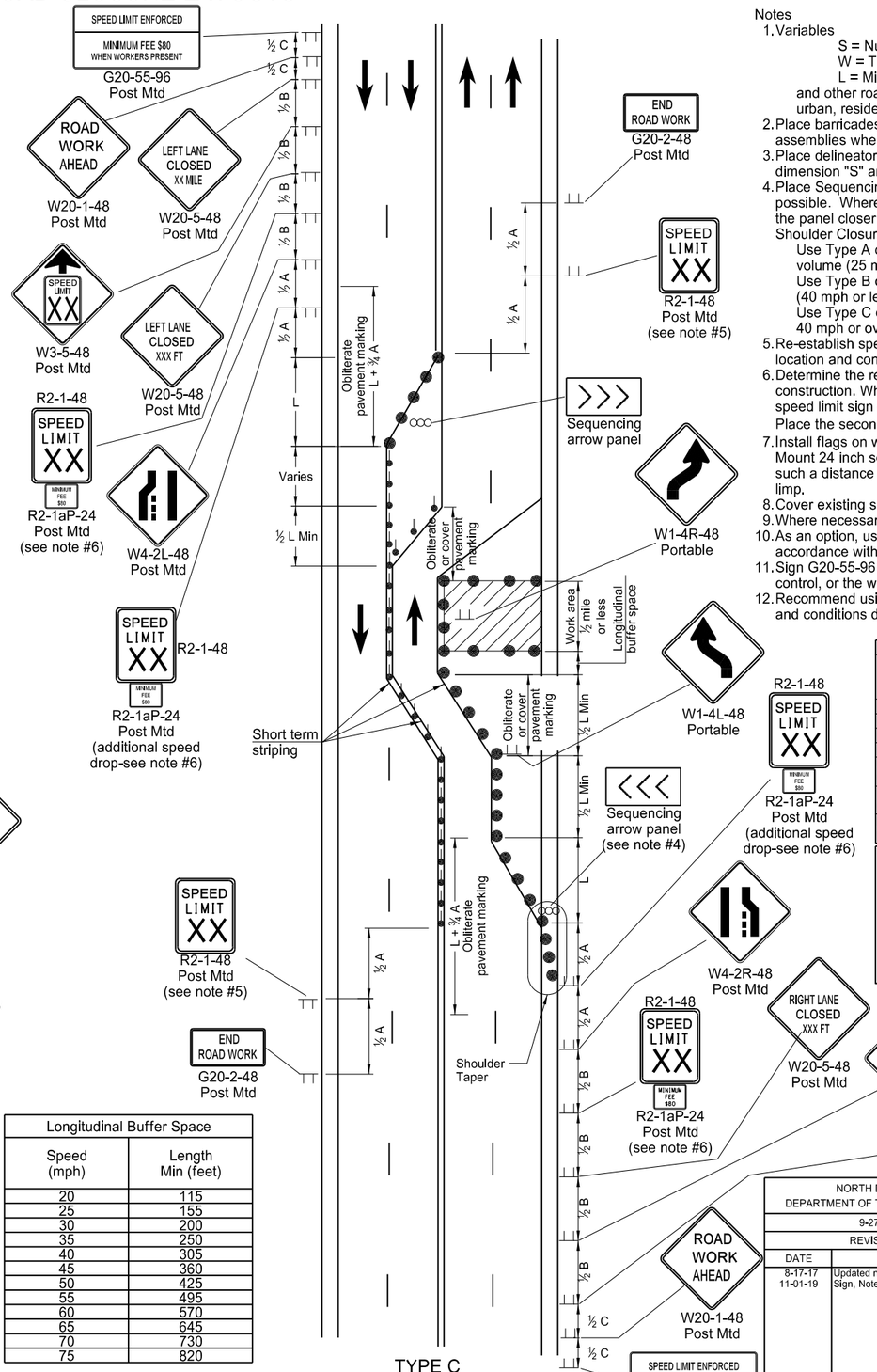


TYPE A
TEMPORARY ROAD CLOSURE
Sign R2-1aP-24 not needed on project using pilot car.



TYPE B
ROAD CLOSURE WITH A DIVERSION
Two lane highway where roadway is closed and detour provided (signing shown for one direction only). Use on bridge and culvert installation with ½ mile or less closure.

Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820



TYPE C
HALF ROAD CLOSURE ON A MULTI-LANE, HIGH SPEED HIGHWAY
4 lane undivided highway with half the roadway closed.

Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper in feet.
   L = Minimum length of taper, S x W for freeways, expressways, and other roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
4. Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
7. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
8. Cover existing speed limit signs within reduced speed zones.
9. Where necessary, engineer will determine safe speed.
10. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
11. Sign G20-55-96 is not required if this standard is part of other traffic control, or the work is less than 15 days.
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING

Road Type	Distance Between Signs Min. (ft) A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY

- Type III barricade
- Sign
- Delineator drum
- Tubular markers
- Work area
- Flagger
- Sequencing arrow panel
- Vertical panels back to back

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

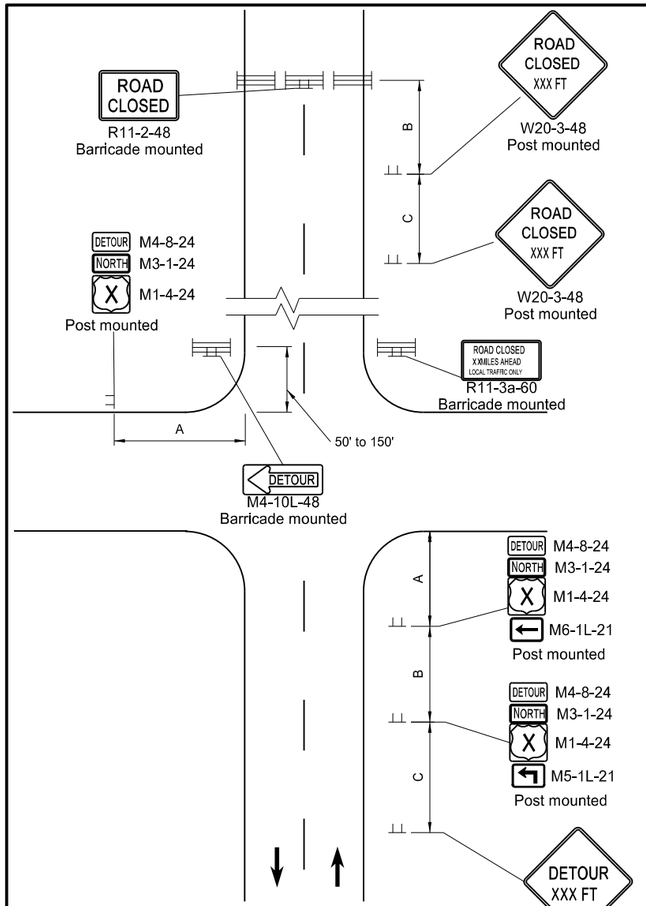
REVISIONS

DATE	CHANGE
8-17-17	Updated notes & Speed Limit signs
11-01-19	Sign, Notes, and Pvmt Mkg updates

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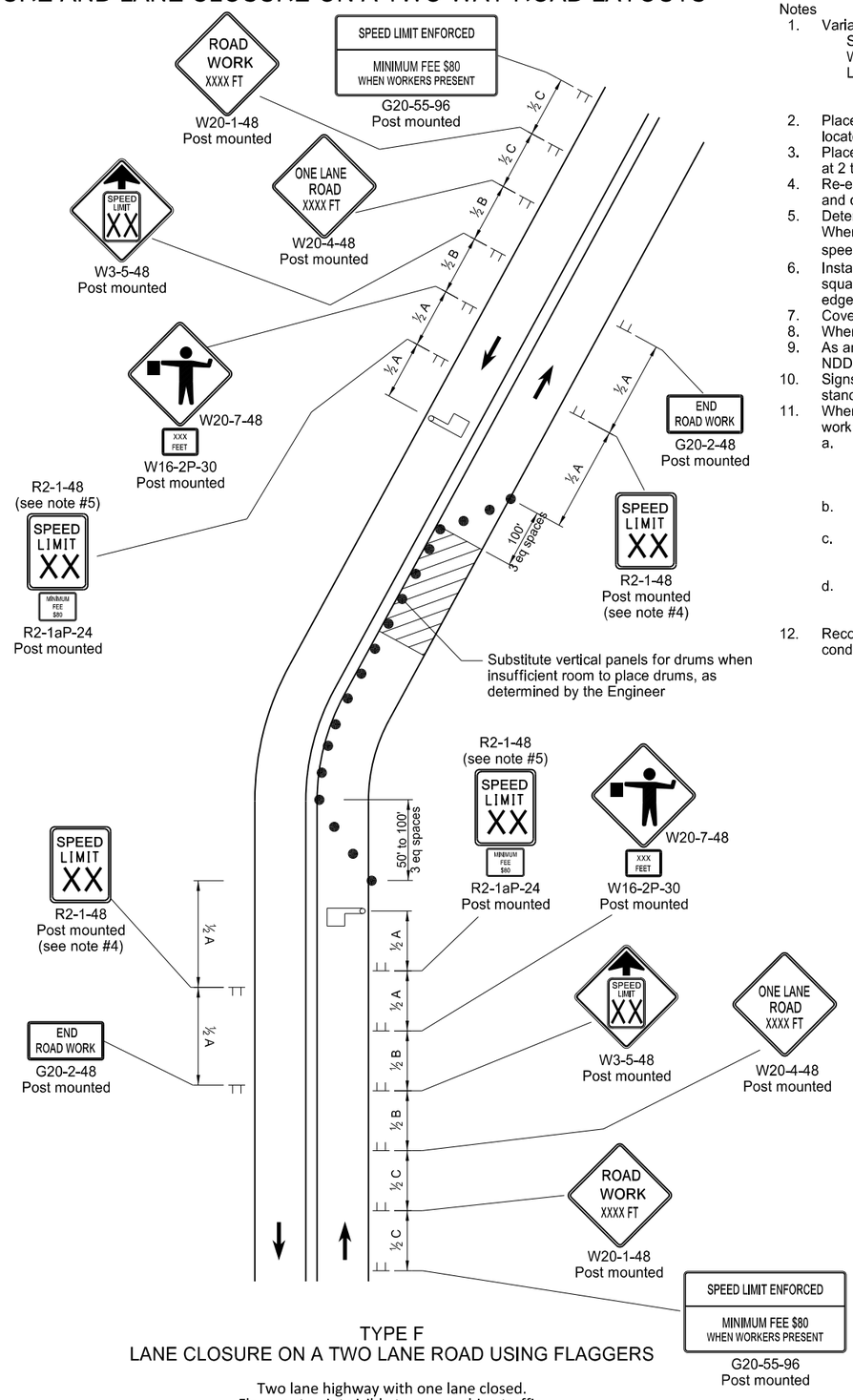
ROAD CLOSURE AND LANE CLOSURE ON A TWO WAY ROAD LAYOUTS

D-704-19



TYPE E
ROAD CLOSURE WITH OFF-SITE DETOUR

Road closed beyond detour point.
Signing shown for one direction only.
Install and maintain signs shown in plans.



TYPE F
LANE CLOSURE ON A TWO LANE ROAD USING FLAGGERS

Two lane highway with one lane closed.
Flagger at point visible to approaching traffic.

Notes
1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper in feet
   L = Minimum length of taper in feet. S x W for freeways, expressways, and roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on the roadway.
3. Place delineator drums for tapering traffic at 3 equal spaces and for tangents space them at 2 times dimension "S".
4. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
5. Determine the reduced speed limit based on the in place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place second speed limit sign at ½B.
6. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
7. Cover existing speed limit signs within a reduced speed zone.
8. Where necessary, safe speed to be determined by the Engineer.
9. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
10. Signs G20-55-96 or R2-1aP-24 are not required when pilot car operation is used, if this standard is part of other traffic control layouts, or if work is less than 15 days.
11. When highway-rail grade crossings exist either within or in the vicinity of the roadway work activities:
    a. Extra care shall be taken to minimize the probability of conditions being created, either by lane restrictions, flagging or other operations, where vehicles might be stopped within the highway-rail grade crossing (considered as being 15 feet on either side of the closest and farthest rail.)
    b. Place "Do Not Stop on Tracks" sign (R8-8-24) near cross buck in each direction while lane closure is near tracks.
    c. Extend buffer space between work zone and lane closure transition upstream of the highway-rail grade crossing to prevent flagging queue from extending across highway-rail grade crossing.
    d. If queuing extends across highway-rail crossing, provide flagger at crossing to prevent vehicles from stopping within the crossing (even when automatic warning devices are in place.)
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY

- Delineator Drum
- Type III Barricade
- Flagger
- Sign
- Work/Hazard Area

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

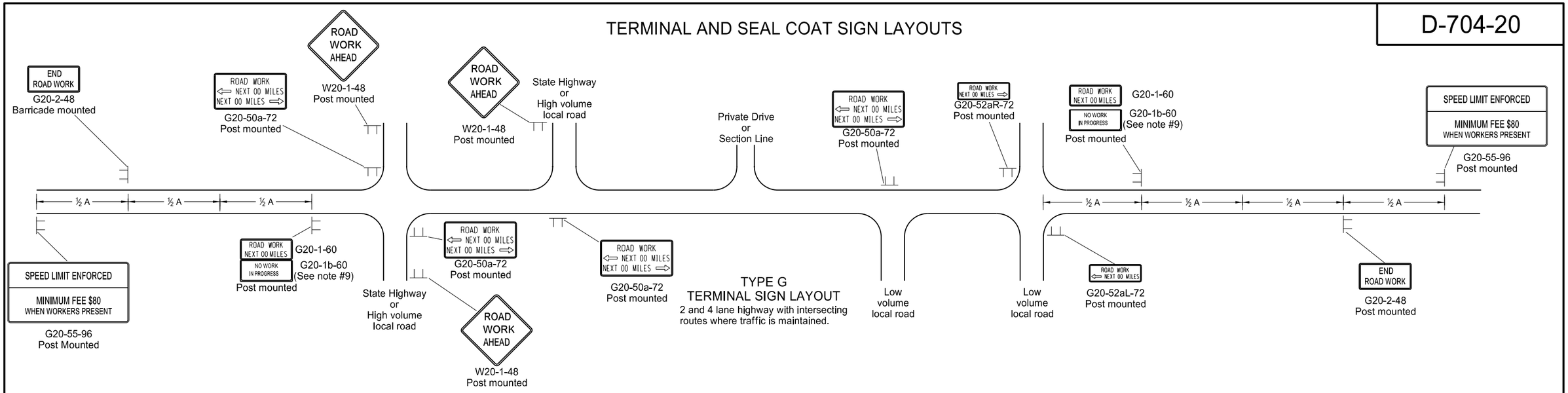
REVISIONS

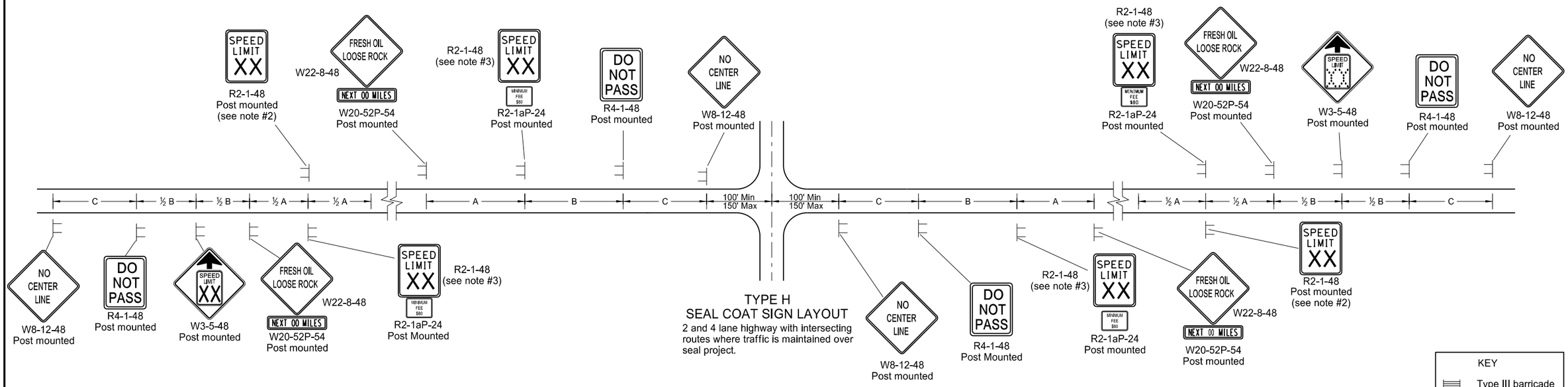
DATE	CHANGE
3-13-14	Revised Sign Cell "ROAD WORK XXX FT".
8-17-17	Update notes & sign numbers.
11-01-19	Revised signs, sign #s and notes.

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TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20





1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Determine the exact speed limit in the field, based on location and conditions.
3. Determine the reduced speed limit based on the in place speed limit before construction. Where speed limit reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½ B.
4. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
5. Cover existing speed limit signs within a reduced speed zone.
6. On seal coat projects, place signs R2-1-48, R2-1aP-24, R4-1-48, W22-8-48 and W20-52P-54 after all important intersections and at five mile intervals. Place sign W8-12-48 after all important intersections and at 2 mile intervals until short term center line pavement marking is placed.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Drawing D-704-14.
8. Cover or remove speed limit signs from layout Type H when loose aggregate is removed.
9. Install sign G20-1b-60 when work is suspended for winter.
10. Use other traffic control layouts in immediate work areas. Place sign R2-1aP-24 below speed limit signs in reduced speed limit work areas.
11. Sign G20-55-96 is not required if work is less than 15 days.
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

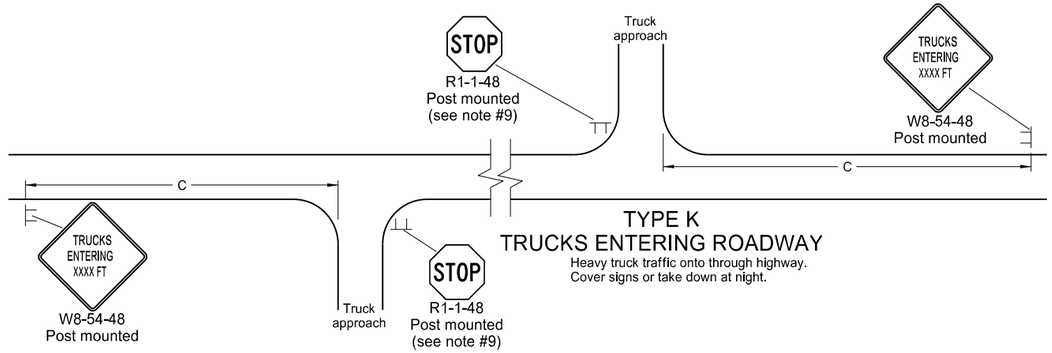
REVISIONS

DATE	CHANGE
8-17-17	Updated notes & sign numbers.
11-01-19	Note & sign updates.

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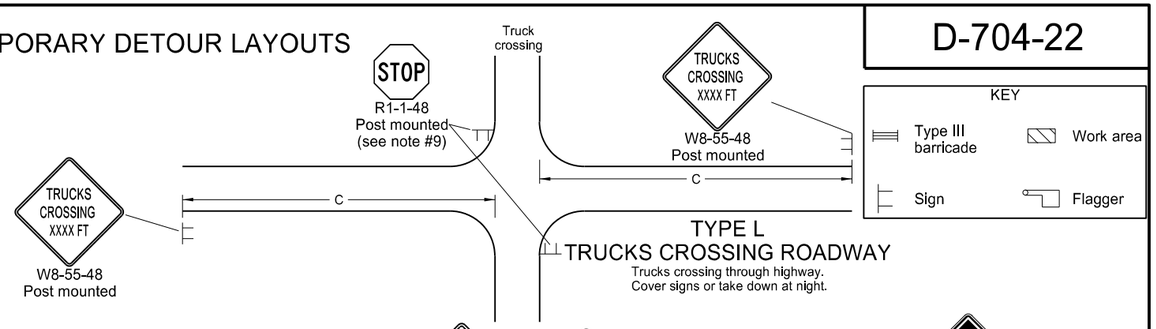
CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



TYPE K
TRUCKS ENTERING ROADWAY

Heavy truck traffic onto through highway.
Cover signs or take down at night.

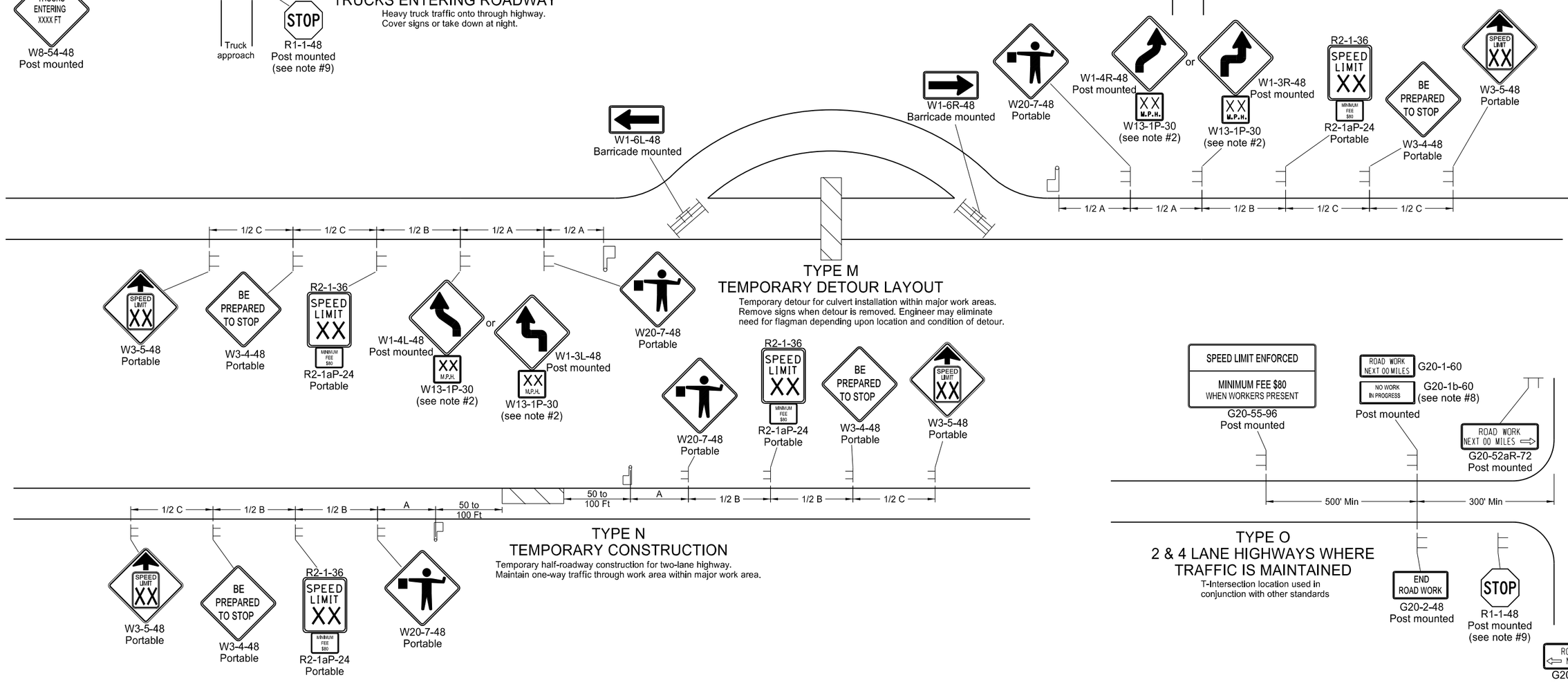


TYPE L
TRUCKS CROSSING ROADWAY

Trucks crossing through highway.
Cover signs or take down at night.

KEY

- Type III barricade
- Work area
- Sign
- Flagger



TYPE M
TEMPORARY DETOUR LAYOUT

Temporary detour for culvert installation within major work areas.
Remove signs when detour is removed. Engineer may eliminate need for flagman depending upon location and condition of detour.

TYPE N
TEMPORARY CONSTRUCTION

Temporary half-roadway construction for two-lane highway.
Maintain one-way traffic through work area within major work area.

TYPE O
2 & 4 LANE HIGHWAYS WHERE TRAFFIC IS MAINTAINED

T-Intersection location used in conjunction with other standards

Notes

1. Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
2. Where necessary, safe speed to be determined by the Engineer.
3. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
4. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
5. Cover existing speed limit signs within a reduced speed zone.
6. Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
8. Install sign G20-1b-60 when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. Sign G20-55-96 is not required if layout is part of other traffic control or if work is less than 15 days.
11. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING

Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

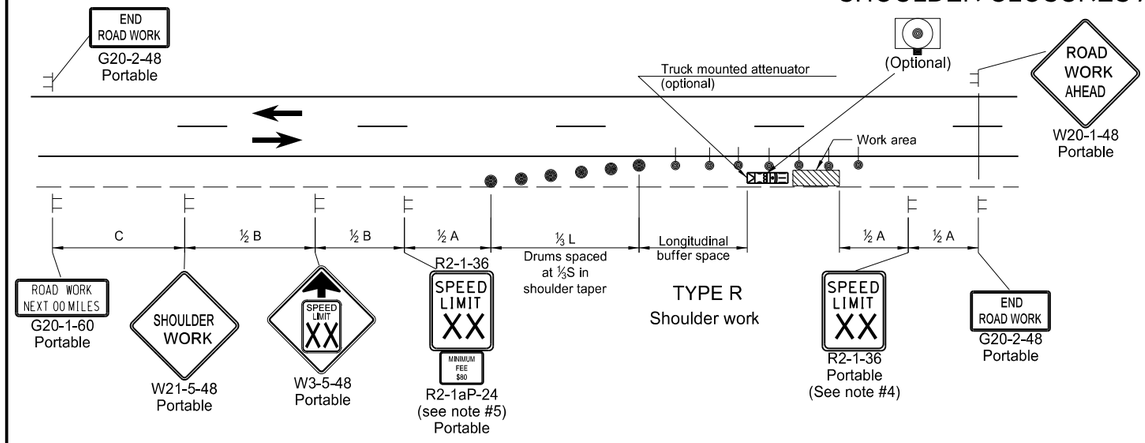
REVISIONS

DATE	CHANGE
8-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7

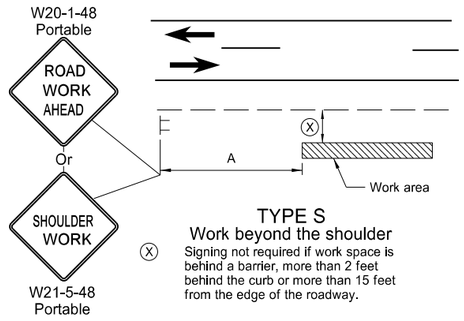
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SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

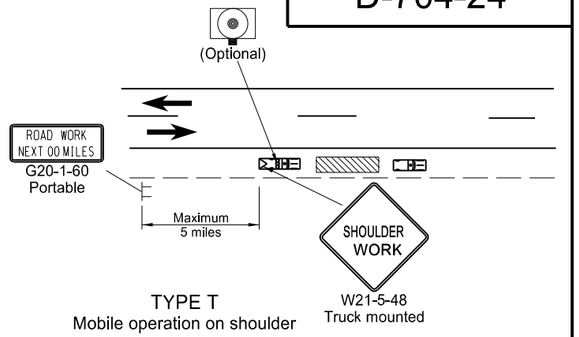
D-704-24



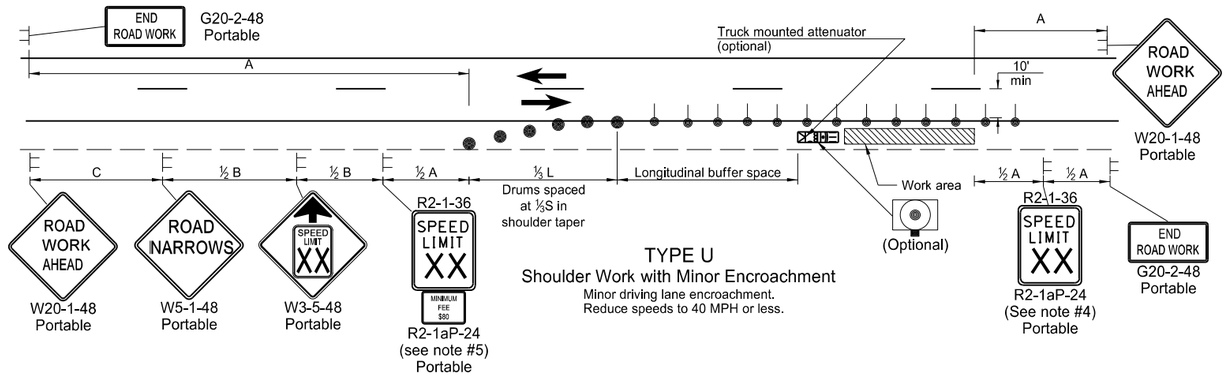
TYPE R
Shoulder work



TYPE S
Work beyond the shoulder
Signing not required if work space is behind a barrier, more than 2 feet behind the curb or more than 15 feet from the edge of the roadway.

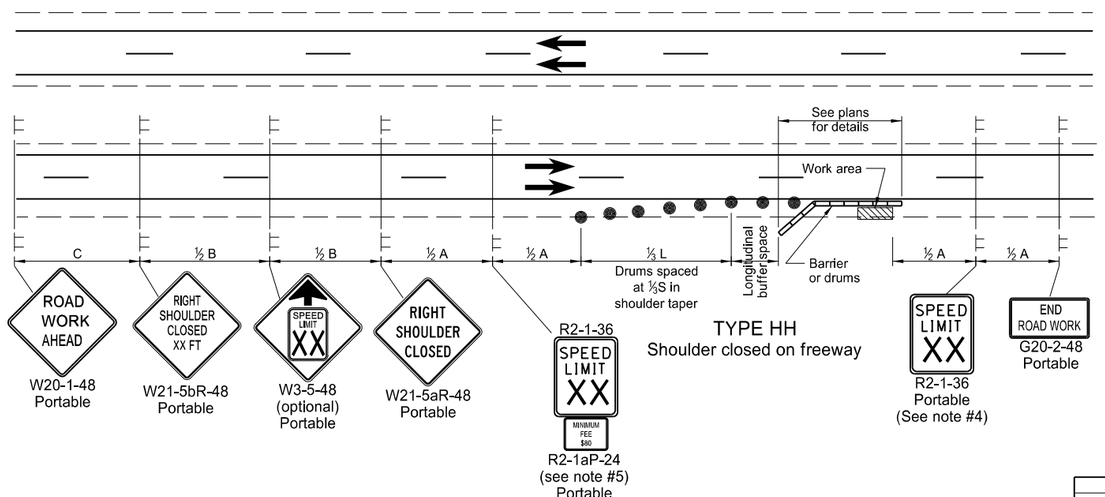


TYPE T
Mobile operation on shoulder

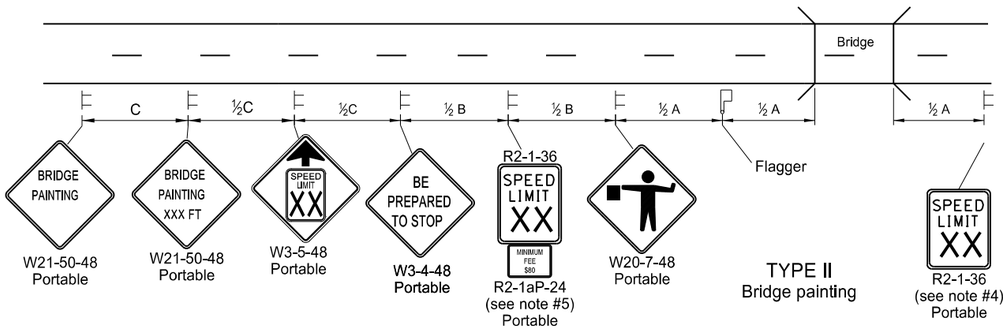


TYPE U
Shoulder Work with Minor Encroachment
Minor driving lane encroachment.
Reduce speeds to 40 MPH or less.

Notes
1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of the taper in feet.
   L = Minimum length of taper, S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x S^2 /60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
3. Sequencing Arrow Panels
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   UseType B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
4. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
5. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
6. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
7. Cover existing speed limit signs within a reduced speed zone.
8. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
9. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.



TYPE HH
Shoulder closed on freeway



TYPE II
Bridge painting

KEY

Sign	Work area
Delineator Drum	Tubular Marker
Sequencing Arrow Panel (Caution Mode)	

ADVANCE WARNING SIGN SPACING

Road Type	Distance Between Signs Min. (ft) A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Longitudinal Buffer Space

Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

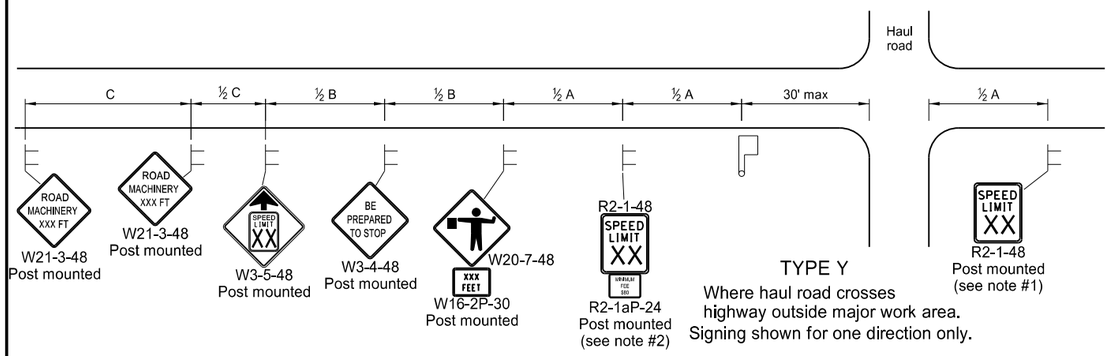
REVISIONS

DATE	CHANGE
8-17-17	Updated notes & revised signs
11-01-19	Revised drum spacing & signs nos.

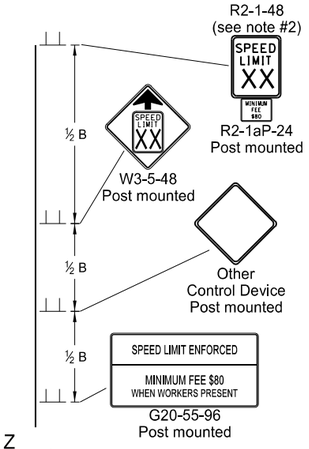
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MISCELLANEOUS SIGN LAYOUTS

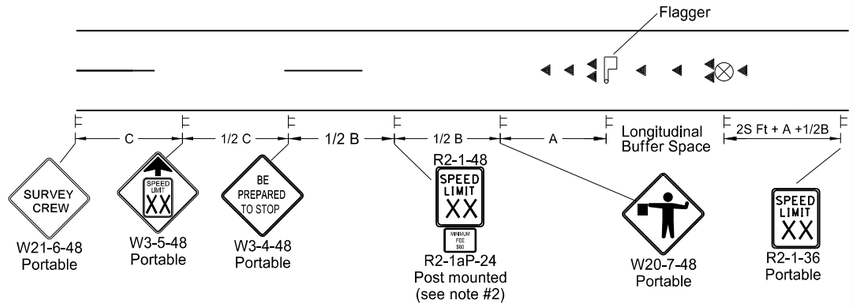
D-704-26



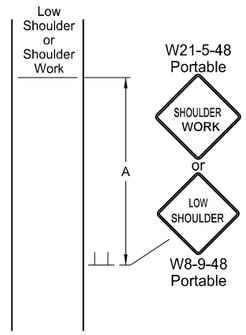
TYPE Y
Where haul road crosses highway outside major work area.
Signing shown for one direction only.



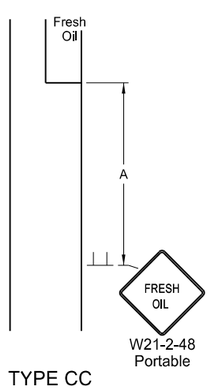
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



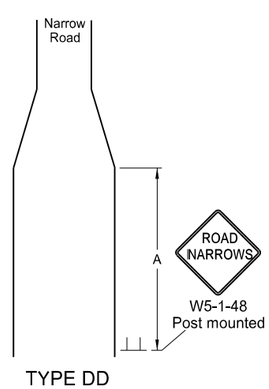
TYPE AA
Where survey crew is used
Signing shown for one direction only.



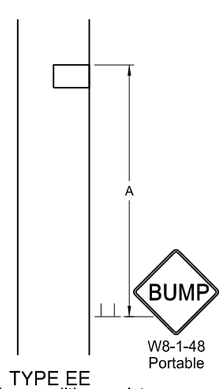
TYPE BB
Within major work area where sign conditions exist



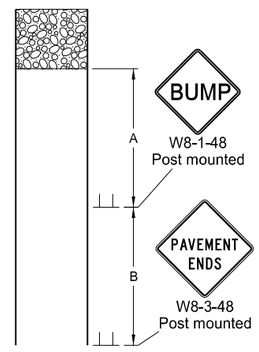
TYPE CC
Where sign conditions exist



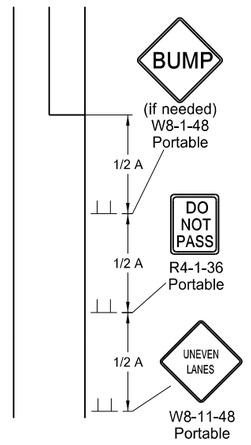
TYPE DD
Where sign conditions exist



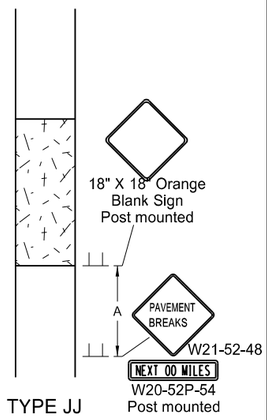
TYPE EE
Where sign conditions exist



TYPE FF
Where sign conditions exist
Signing shown for one direction only.



TYPE GG
Where elevation difference exists between lanes

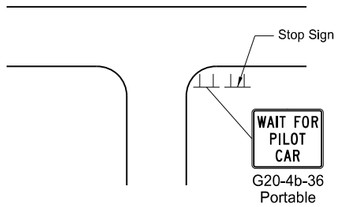


TYPE JJ
For break in pavement.
Install signs when conditions exist and remove when not applicable.
Signing shown for one direction only.

KEY

Flagger	Sign
Cones	Survey Equipment

S = Numerical value of speed limit or 85th percentile.



TYPE KK
At major intersections within pilot car control area

Notes
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
2. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
3. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
4. Cover existing speed limit signs within reduced speed zones.
5. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
6. Sign G20-55-96 is not required if this standard is part of other traffic control layouts, or work is less than 15 days.
7. When pilot car operation is used, place sign G20-4b-36 "Wait For Pilot Car" at major intersections within pilot car control area.
8. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
9. Layouts shown for one direction only.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

* Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

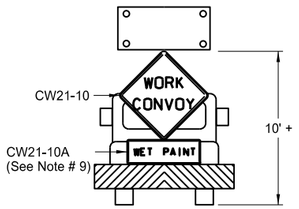
9-27-13

REVISIONS

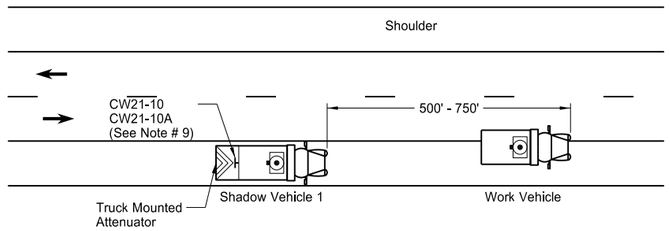
DATE	CHANGE
8-17-17	Added speed limit signs. Updated notes & sign numbers
11-01-19	Revised note 5 & sign numbers

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

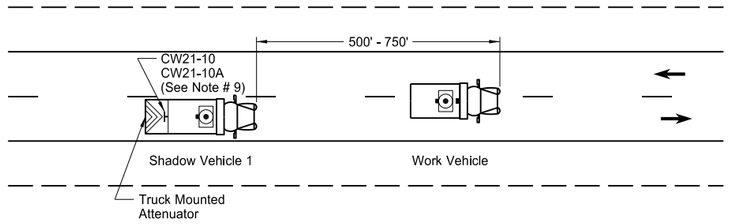
MOBILE OPERATION
(PAVEMENT MARKING)



Typical Shadow Vehicle 1
Two-Way Roaday

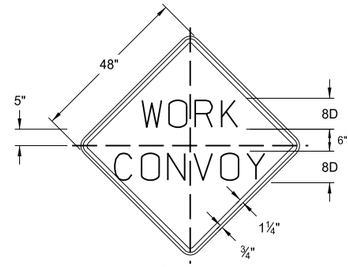


Two-Way Roadway with Paved Shoulders

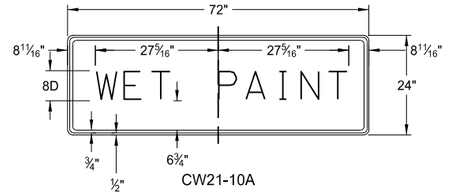


Two-Way Roadway without Paved Shoulders

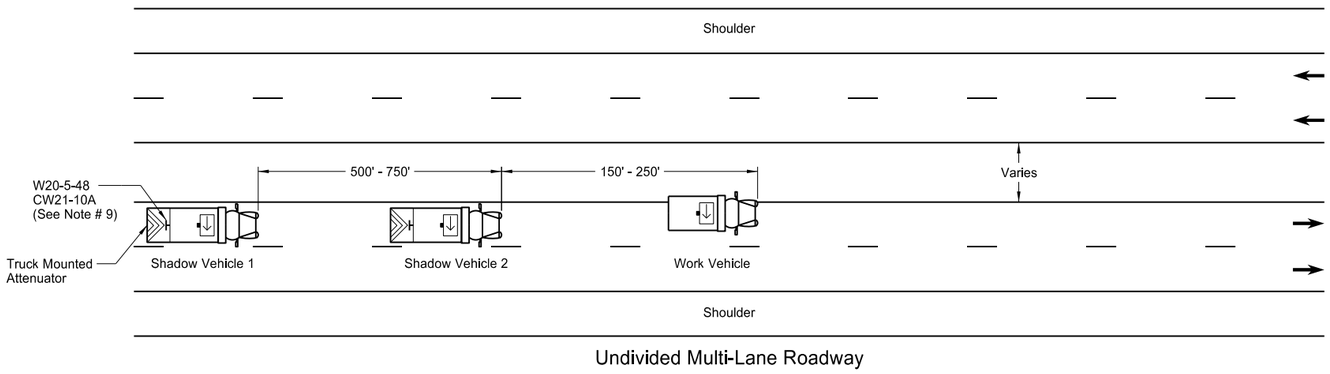
Sign Details



CW21-10

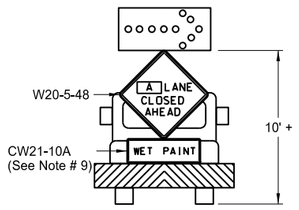


CW21-10A



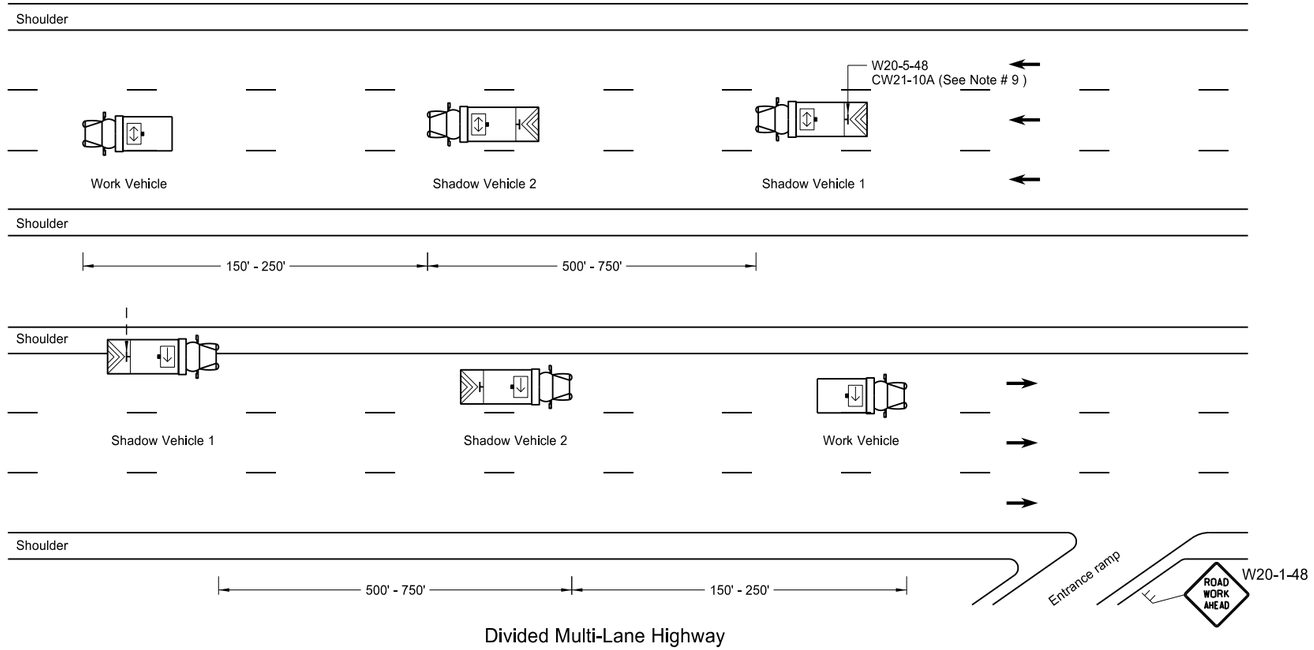
Undivided Multi-Lane Roadway

Notes
1. Use additional vehicles you choose to be in the convoy with truck mounted attenuators, at your own expense.
2. Display yellow rotating beacons or stobe lights on shadow and work vehicles, unless otherwise stated in the plans.
3. Use Type B or Type C flashing arrow panels controlled from inside the vehicle.
4. Provide each vehicle with two-way electronic communication capability.
5. Move shadow vehicle 1 first to shadow other convoy vehicles when convoy changes lane.
6. Vary vehicle spacing between shadow vehicle 1 and shadow vehicle 2 based on sight distance restrictions. Motorists approaching the work convoy need to see trail vehicle in time to slow down and/or change lanes as they approach shadow vehicle.
7. Sign Colors
   Letters = Black
   Border = Black
   Background = Orange
8. As an option, use shadow vehicle 2 the paint tender vehicle.
9. Use sign CW21-10A only during painting operation.
10. Pull over work and shadow vehicles periodically to allow motor vehicle traffic to pass on two lane - two way roadways.



Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center



Divided Multi-Lane Highway

KEY

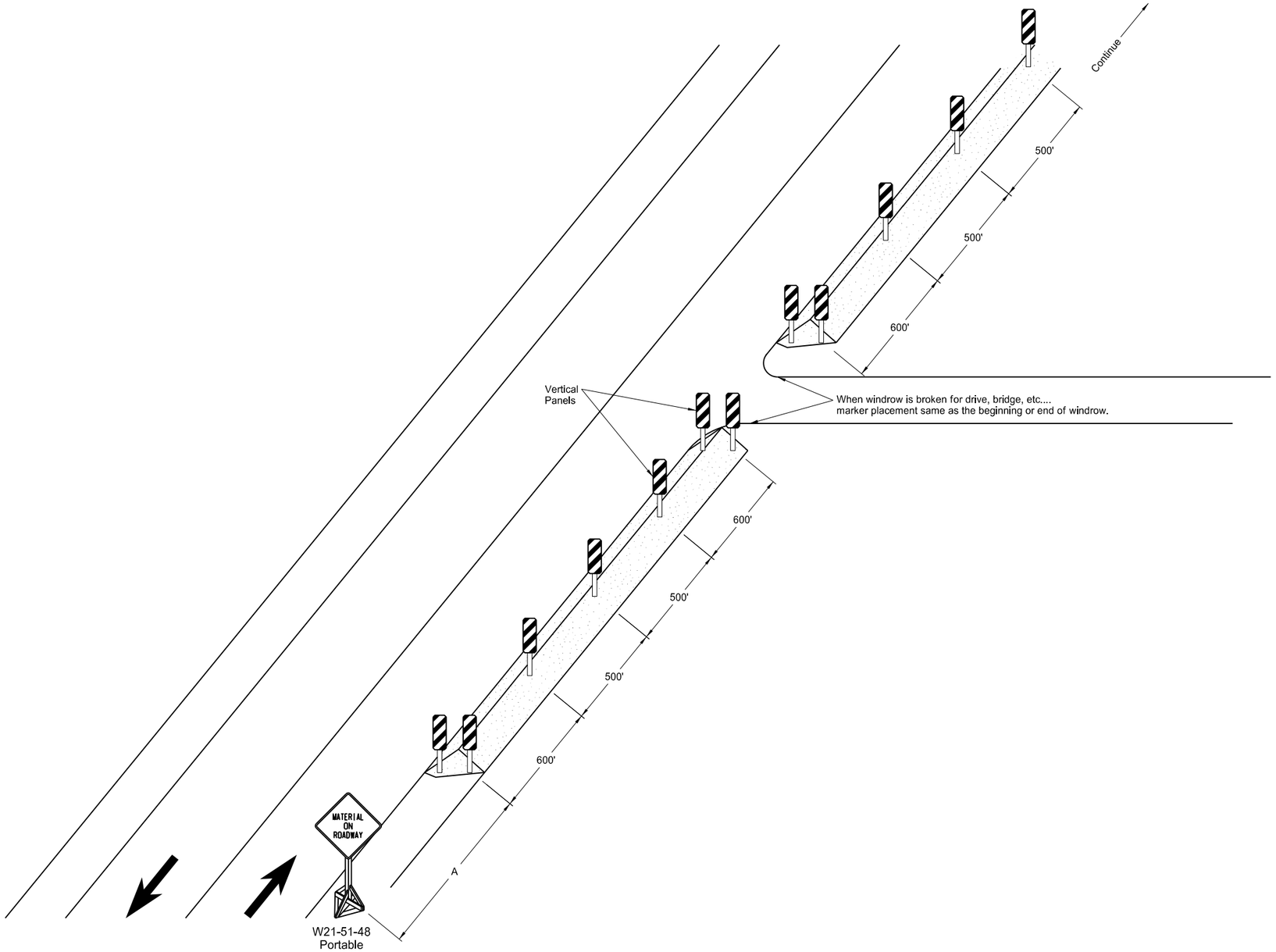
- Sign
- Truck mounted attenuator
- Flashing arrow panels:
  - Right directional
  - Left directional
  - Double arrow directional
  - Caution Mode

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/08/19 and the original document is stored at the North Dakota Department of Transportation

WINDROW MARKING

D-704-30



ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (55 mph to 60 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Notes:
As an option, use portable sign supports in lieu of post mounted sign in accordance with NDDOT Standard Drawing D-704-14.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

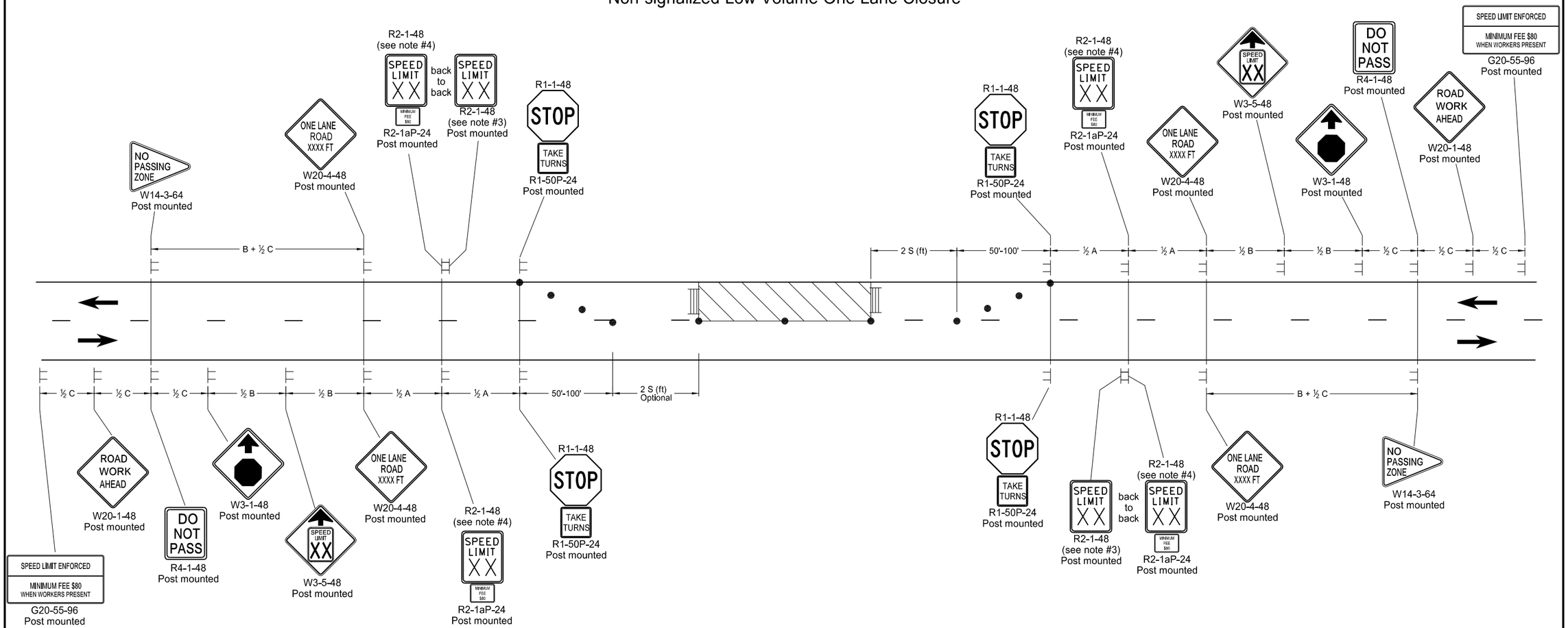
REVISIONS

DATE	CHANGE
6-24-14	Revised Note
8-17-17	Updated notes & sign support
11-01-19	Revised note

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

D-704-31

CONSTRUCTION SIGN LAYOUT
Non-signalized Low Volume One Lane Closure



KEY

Type III barricade | Work area | Sign | Delineator drum

Notes
1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Place delineator drums or cones used for tapering traffic at 3 equal spaces and delineator drums for tangents at dimension "S". "S" = the numerical value of speed limit.
3. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
4. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
5. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
6. Cover existing speed limit signs within a reduced speed zone.
7. Covered (when approved by engineer) or obliterated pavement marking measured as "Obliteration of Pavement Marking".
8. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
9. Sign G20-55-96 is not required if layout is part of other traffic control layouts, or work is less than 15 days.
10. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

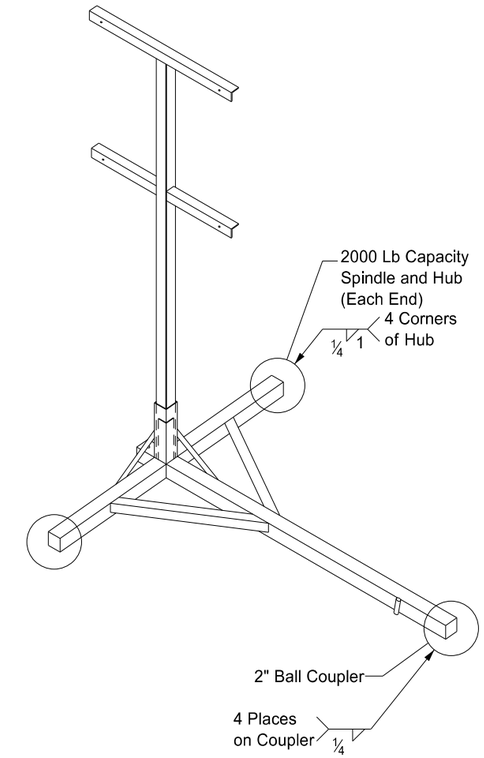
REVISIONS

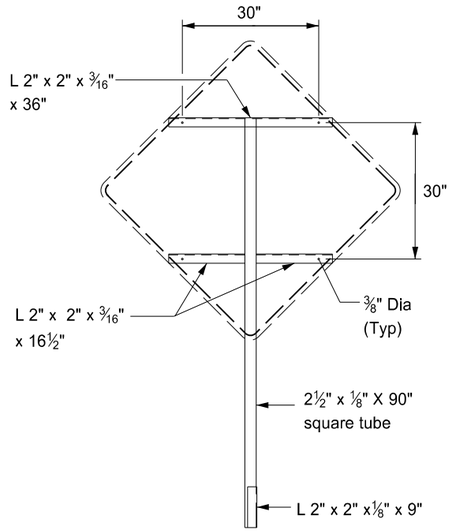
DATE	CHANGE
8-17-17	Updated notes & sign numbers.
11-01-19	Revised note 8 & sign numbers.
12-03-19	Corrected sign number.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 12/3/19 and the original document is stored at the North Dakota Department of Transportation

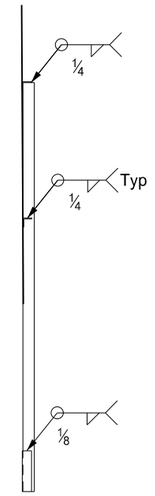
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



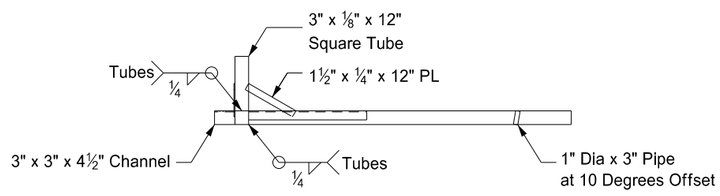


FRONT

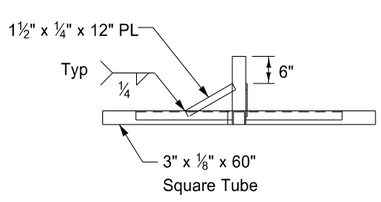


RIGHT

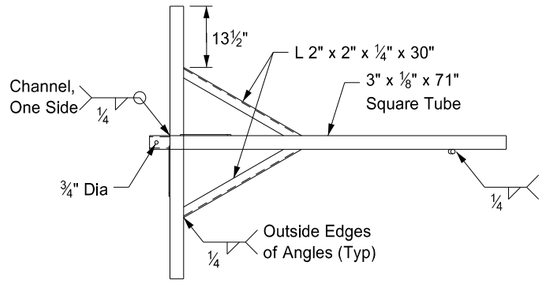
SIGN SUPPORT



FRONT



RIGHT



TOP

TRAILER

Notes:

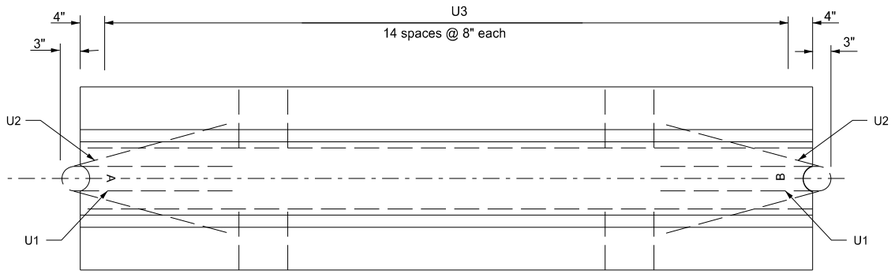
1. The maximum weight of the assembly is 250 pounds.
2. Use a 14" wheel and tire.
3. Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
4. Other NCHRP 350 crash tested assemblies are acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE

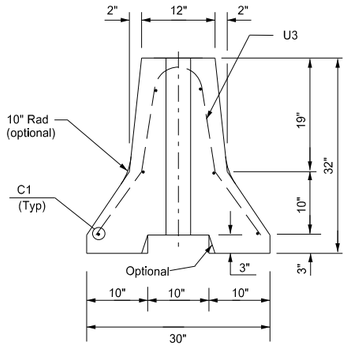
This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 11/23/10 and the original document is stored at the North Dakota Department of Transportation

PORTABLE PRECAST CONCRETE MEDIAN BARRIER
(TEMPORARY USAGE)

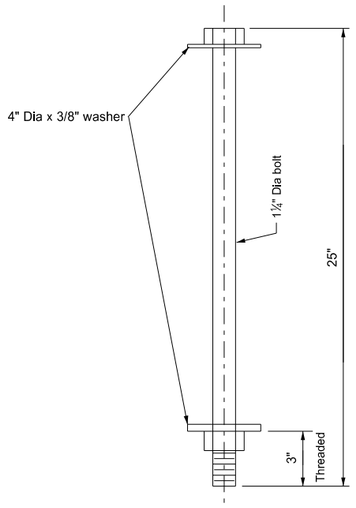
D-704-51



Plan View



End View

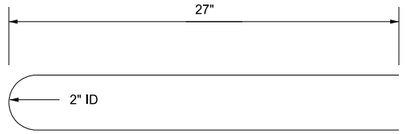


Connecting Bolt Detail

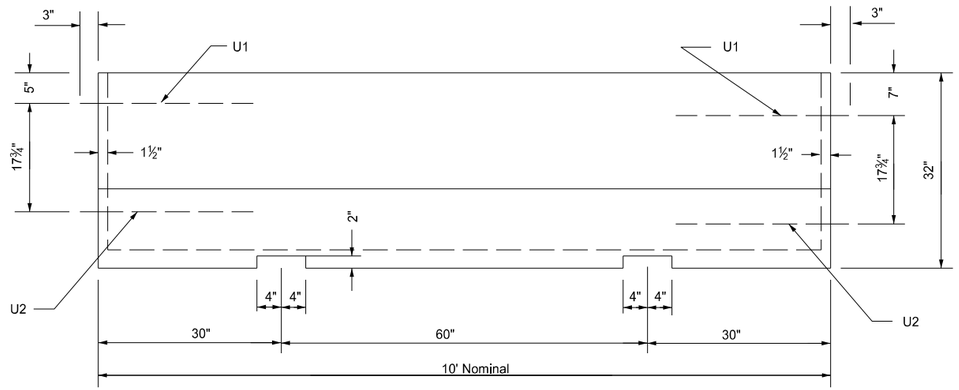
(One per 10 Ft section)

Notes:

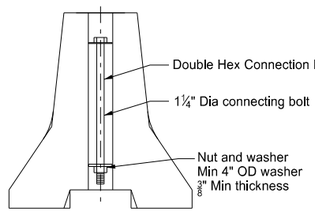
1. Galvanize all exposed hardware as per ASTM A153, except for the loop inserts.
2. Use AAE-3 Concrete.
3. Provide steel in accordance with Section 612 of NDDOT Standard Specifications.
4. Imprint barrier ends A and B as shown with 4 inch letters. Field match A end with B end.
5. Place barrier markers at the center of the barrier at 20' centers.
6. Connect barrier sections with 1 ¼" Dia A-307 double hex connecting bolt. Maintain bottom nut and washer connection for duration of barrier installation.
7. Place barrier to minimize openings between individual sections.



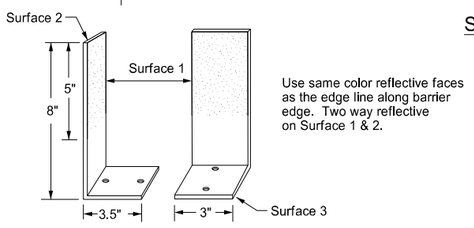
U1 Bar Detail



Side View

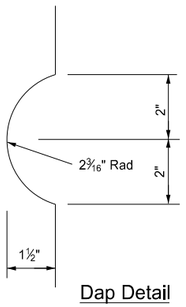


Bolt Connection Detail

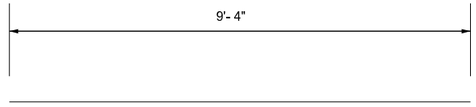


Use same color reflective faces as the edge line along barrier edge. Two way reflective on Surface 1 & 2.

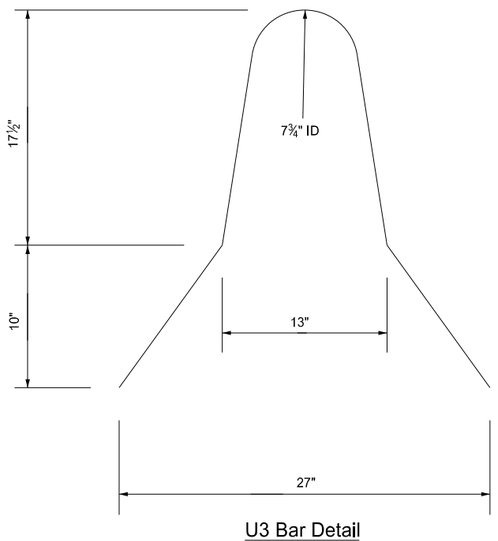
Barrier Marker Detail



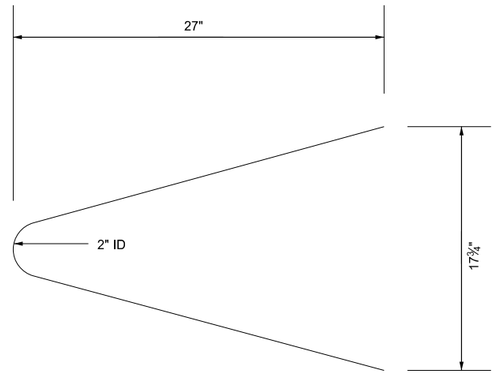
Dap Detail



C1 Bar Detail



U3 Bar Detail



U2 Bar Detail

Marker Body
Use high impact,weatherable engineering thermo-plastic material conforming to the following:

Property	Result	ASTM Test Method
Thickness (min)	.090"	——
Tensile strength (min psi) @ yield	5,500	D638
Impact strength @ -20°F (ft-lbs/in of notch)	3.2	D256 Method A
Impact strength @ 73°F (ft-lbs/in of notch)	14.0	D256 Method A
Flexural strength, PSI ¼" @ 73°F	8,000	D790
Flexural modulus, PSI ¼" @ 73°F	300,000	D790
Elongation @ yield	30%	D638

Reflective Tape
Use retroreflective, acrylic microprism material with acrylic backing, 3" wide, providing the following minimum optical performance with an observation angle of 0.1° measured in candlepower for the reflector:

Entrance Angle	Specific Intensity
Yellow - 4"	136
White - 4"	200

Adhesive
Use factory applied solid butyl rubber ⅛" thick, 2" wide on 2¼" wide release paper on surface 3 to temporarily mount markers to portable concrete barrier.

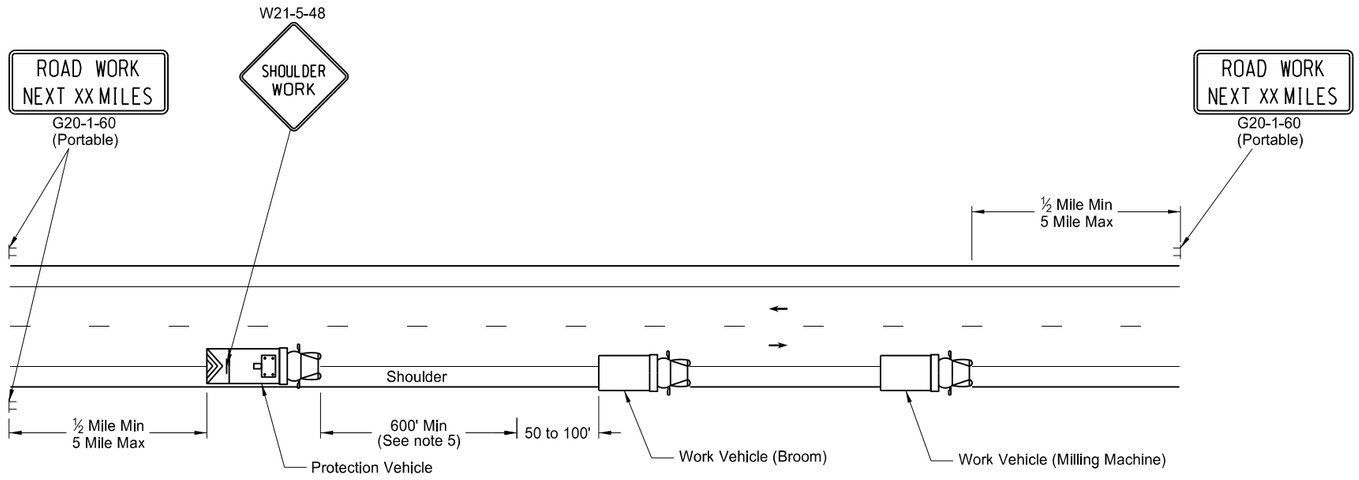
Bar List

Mark	Size	No.	Length	Shape
C1	4	6	9'- 4"	Straight
U1	4	2	4'- 8"	Bent
U2	4	2	4'- 10¼"	Bent
U3	4	15	5'- 4"	Bent

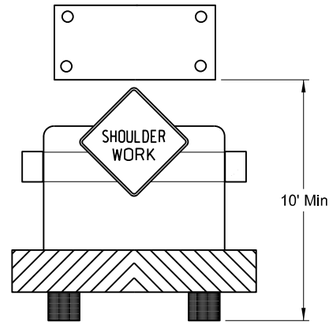
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-20-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	New Design Engr PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

MOBILE OPERATION
Grinding Shoulder Rumble Strips



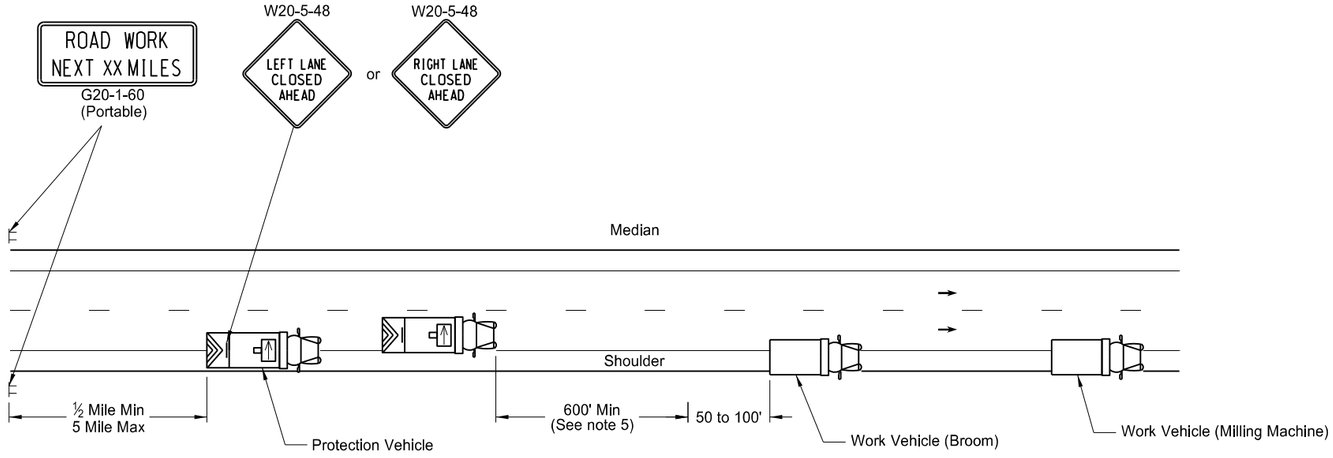
TWO LANE - TWO WAY ROADWAY



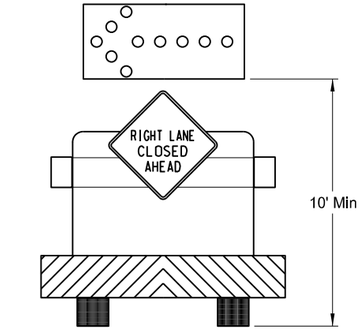
TWO LANE - TWO WAY ROADWAY

Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

Notes:
1. Provide truck mounted attenuators on additional vehicles in the convoy, at no additional cost.
2. Provide rotating, flashing, oscillating, or strobe lights on vehicles.
3. Provide Type B or Type C flashing arrow panels that are controlled from inside the vehicle.
4. Provide two - way electronic communication capability in each vehicle.
5. Vary vehicle spacing between the protection vehicle and work vehicle depending on sight distance restrictions. Keep the spacing of the convoy vehicles such that motorists approaching the work convoy can see the protection vehicle in time to slow down and safely pass the work vehicles.
6. Move advance Road Work Ahead signs as the work area moves through the construction zone.

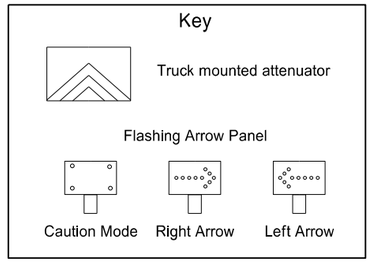


INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow Mode

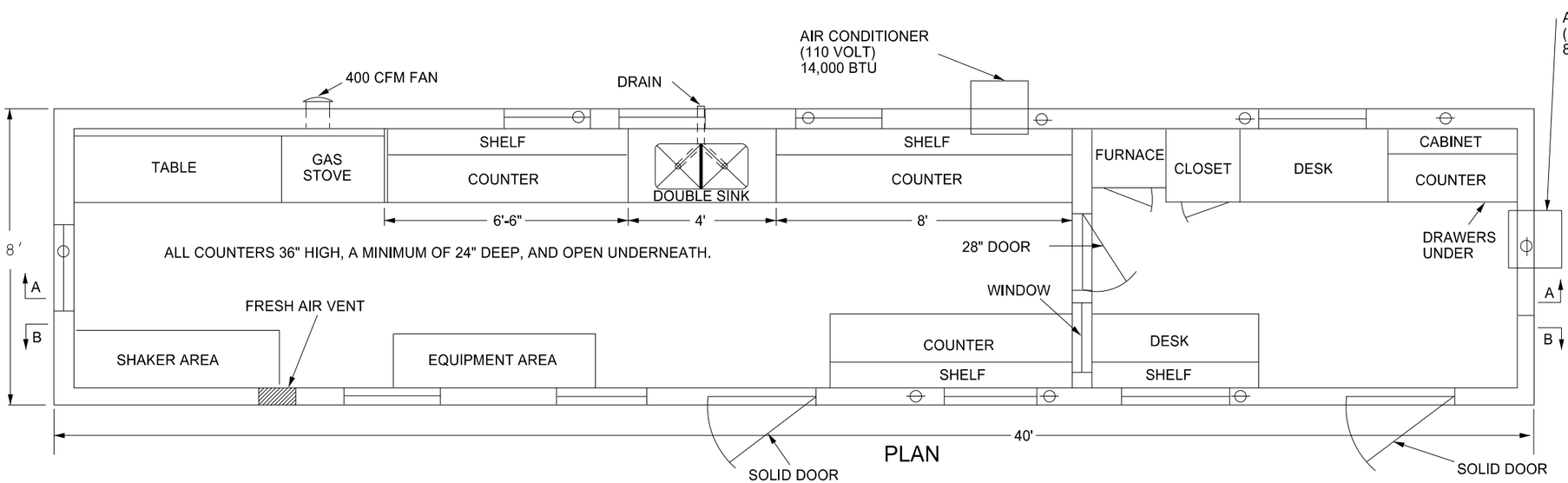


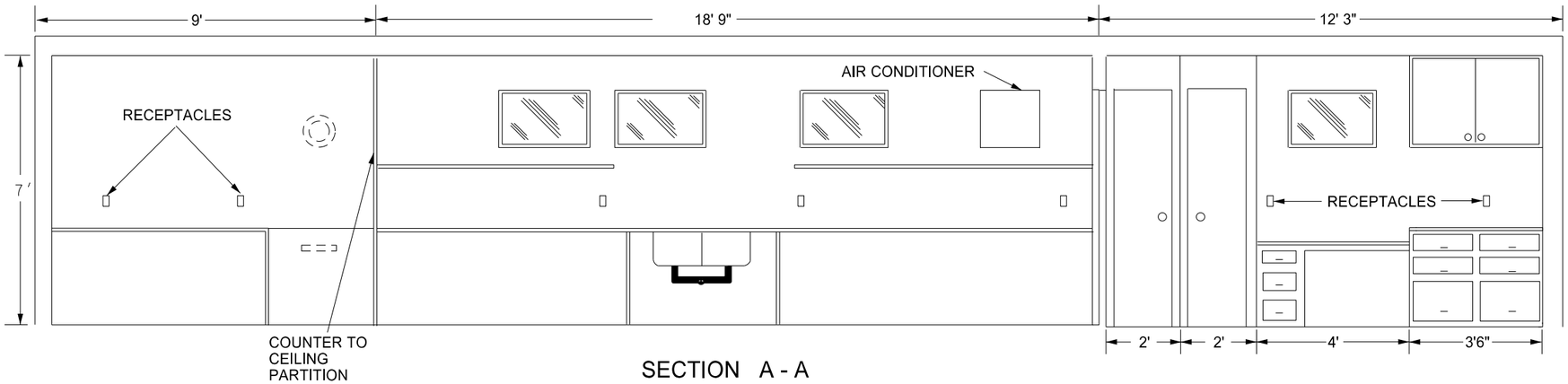
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & signs
10-03-19	New Design Engineer PE Stamp

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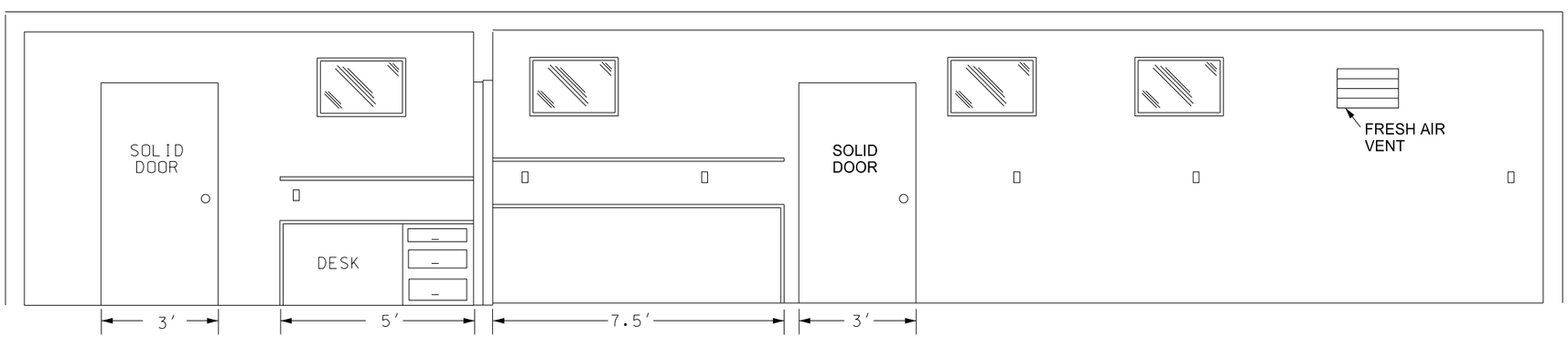
BITUMINOUS LABORATORY

D-706-1





SECTION A - A



SECTION B - B

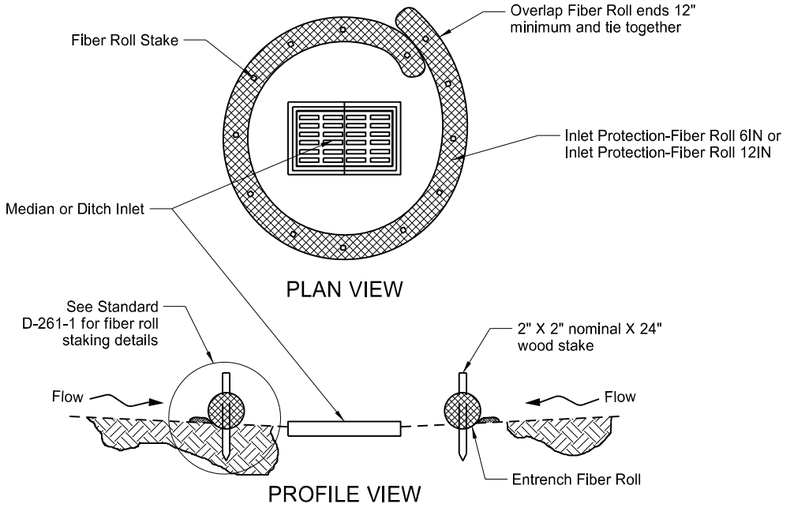
Provide a laboratory with the following:

1. A 1'x1' shelf at 36" above the regular countertop.
2. Double compartment stainless steel sink, with each compartment a minimum of 16"x14"x10" deep. Provide water service lines made of copper or plastic and a diameter of ½ inch.
3. An exhaust fan capable of removing inside air at a rate of 400 CFM.
4. Fresh air vent hinged to open or close manually.
5. 24" x 48" table capable of holding a 200 lb masonry saw with a minimum clearance of 36" above the table.
6. A water supply tank with a capacity of 500 gallons and a 20 gallon capacity pressure tank on the pump.
7. Heavy duty type locks, latches, and hinges for doors made to withstand the intense use in service.
8. A wall between the office and the work area properly insulated to prevent the transmission of heat and noise.
9. The steel cable tie downs and ground anchors at each corner of the lab.
10. Electrical service entrance wired for 100 amps and separate circuits for air conditioners. Space convenience outlets in counter areas a minimum of four feet apart.

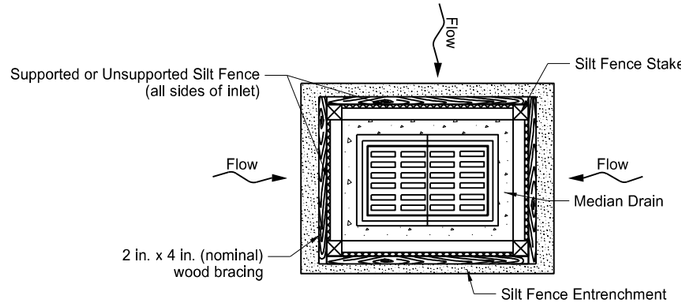
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.
08-27-19	New Design Engineer PE Stamp

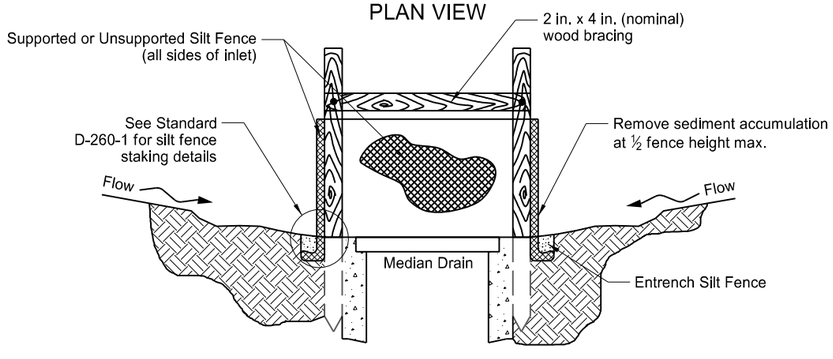
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EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION

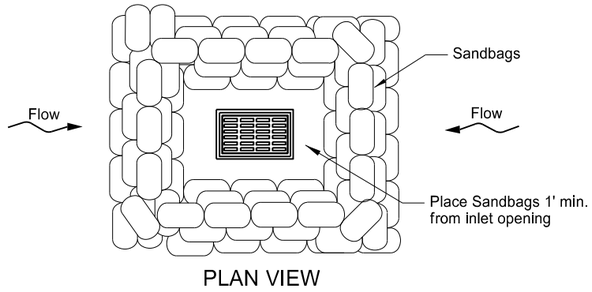


FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)

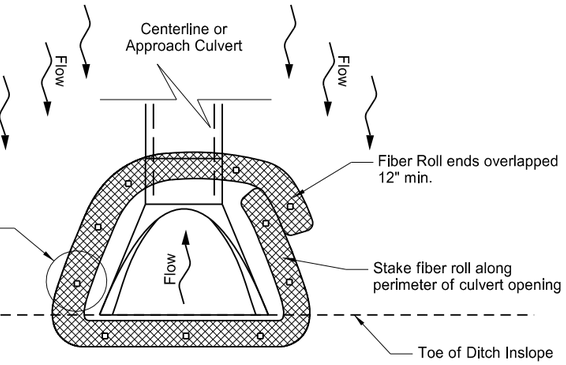




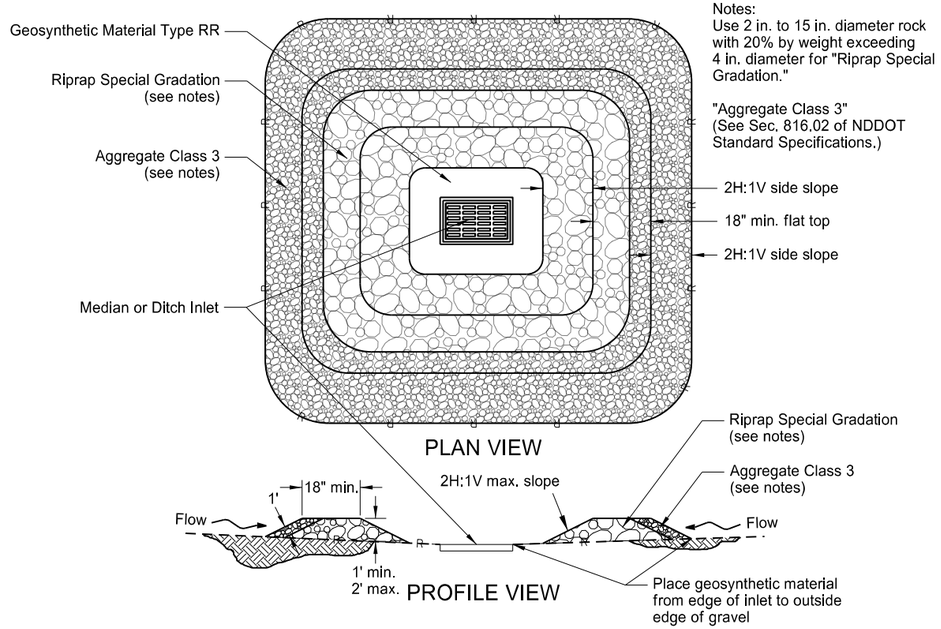
SILT FENCE PROTECTION (MEDIAN OR DITCH INLET)



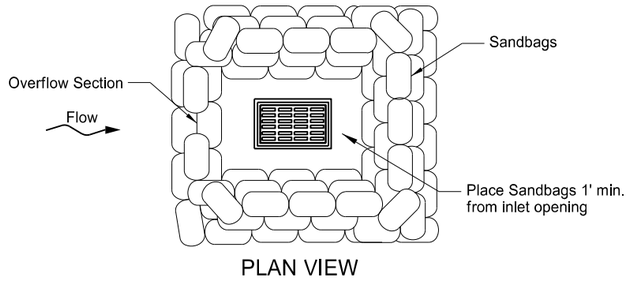
SANDBAG PROTECTION (LOW POINT)



FIBER ROLL PROTECTION (INLET OF CULVERT)



GRAVEL INLET PROTECTION (MEDIAN OR DITCH INLET)



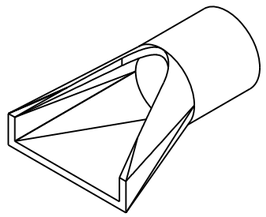
SANDBAG PROTECTION (ON SLOPE)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Updated reference to standard drawing number for fiber roll staking details.
10-01-14	Updated reference to standard drawing number for silt fence.
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.

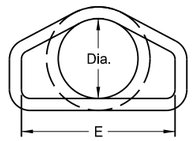
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REINFORCED CONCRETE PIPE CULVERTS AND END SECTIONS
(Round Pipe)

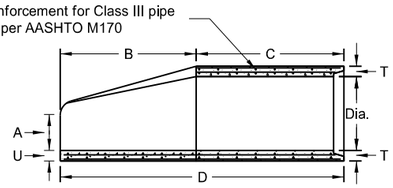
FLARED END SECTION						
TERMINAL DIMENSIONS						
DIA	A	B	C	D	E	U
12	0'-4"	2'-0"	4'-0⅞"	6'-0⅞"	2'-0"	2"
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2¼"
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2½"
21	0'-9"	3'-0"	3'-1"	6'-1"	3'-6"	2¾"
24	0'-9½"	3'-7½"	2'-6"	6'-1½"	4'-0"	3"
27	0'-10½"	4'-0"	2'-1½"	6'-1½"	4'-6"	3¼"
30	1'-0"	4'-6"	1'-7¾"	6'-1¾"	5'-0"	3½"
36	1'-3"	5'-3"	2'-9"	8'-0"	6'-0"	4"
42	1'-9"	5'-3"	2'-9"	8'-0"	6'-6"	4½"
48	2'-0"	6'-0"	2'-0"	8'-0"	7'-0"	5"
54	2'-3"	5'-5"	2'-9¼"	8'-2¼"	7'-6"	5½"
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	5"
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	5½"
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	6"
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	6½"
84	3'-0"	7'-6½"	1'-9"	9'-3½"	10'-0"	6½"
90	3'-5"	7'-3½"	2'-0"	9'-3½"	11'-0"	6½"



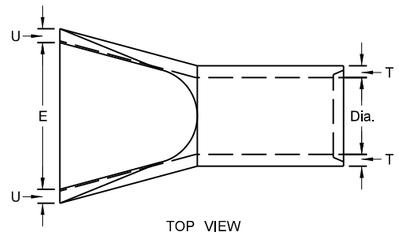
PERSPECTIVE



END VIEW



SIDE VIEW



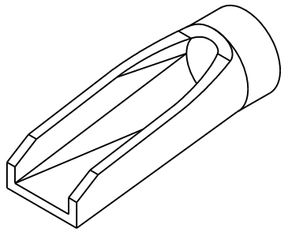
TOP VIEW

REINFORCED CONCRETE PIPE - FLARED END SECTION
Reinforcement to be equivalent to Class III RCP

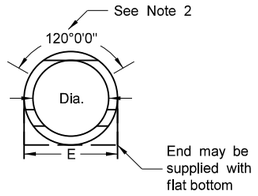
NOTES:

1. All reinforcing steel shall meet AASHTO M170 requirements.
2. All circular, longitudinal, and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms.
3. Laying length of pipe: 12" to 66" (incl.) = not less than 4 feet
   66" to 108" (incl.) = not less than 6 feet
4. Joints shall be sealed with rubber gaskets or with sealer approved by the engineer whenever pipe are specified for storm drain or sanitary sewers.
5. For Class IV and Class V reinforced concrete pipe and end section sizes which do not have reinforcement specified by AASHTO M170, shop drawings and design calculations shall be prepared and sealed by a Professional Engineer and submitted for the Engineer's review.

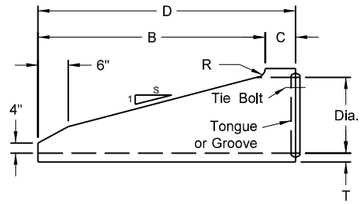
TRAVERSABLE END SECTION						
DIA	B	C	D	E	R	S
15"	4'	9"	4'-9"	1'-7½"	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	3"	6
24"	6'	1'	7'	2'-6"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3½"	4
36"	7'-3"	15"	8'-6"	3'-8"	3"	4



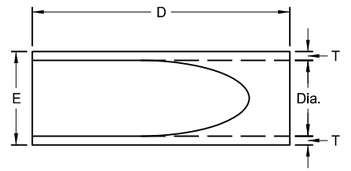
PERSPECTIVE



END VIEW



SIDE VIEW



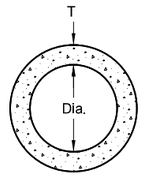
TOP VIEW

REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION
Reinforcement to be equivalent to Class III RCP

NOTES (Traversable End Section):

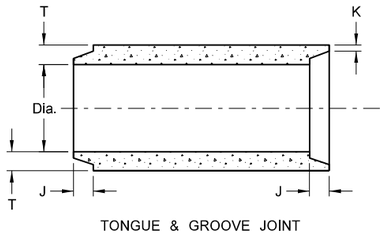
1. Manufactured in accordance with applicable portions of ASTM C76/AASHTO M170.
2. Reinforcement per Class III RCP with double reinforcement in the upper 120° of the full barrel portion.

All Classifications of Round Concrete Pipe					
Internal Dia. of pipe in Inches	Cross-Sectional Water Area	Weight per lin. foot of Pipe Std. Wall	Joint J Groove End Min./Max.	Joint K Tongue End Min.	Minimum Wall Thickness (T)
Dia	Sq. ft.	Lbs.	In.	In.	In.
12	0.79	92	1⅛-2⅛	¾	2
15	1.23	127	1⅛-2¼	⅞	2¼
18	1.77	168	1⅛-2⅛	1	2½
21	2.40	214	1⅛-3⅛	1⅛	2¾
24	3.14	265	2¾-3¾	1⅛	3
27	3.98	322	2¾-4	1¼	3¼
30	4.91	384	3¼-4¼	1¼	3½
33	5.94	452	3¼-4¼	1½	3¾
36	7.07	524	3¼-4¼	1½	4
42	9.62	685	3¾-4¾	1¾	4½
48	12.57	685	3⅞-4¾	1⅞	5
54	15.90	1070	4⅛-5¼	2	5½
60	19.63	1296	4½-5½	2¼	6
66	23.76	1542	5-6	2⅝	6½
72	28.27	1810	5⅛-6¾	2⅞	7
78	33.18	2098	6¼-7¼	2⅞	7½
84	38.48	2410	5⅛-7¾	3⅜	8
90	44.18	2793	6¾-8½	3⅛	8½
96	50.27	3092	7-8¼	3½	9
102	56.75	3466	7-8¼	3½	9½
108	63.62	3864	7¼-8½	3¾	10

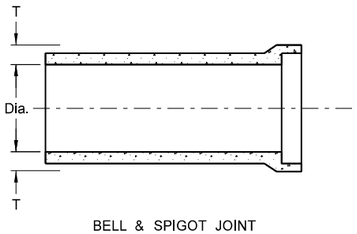


END VIEW

CIRCULAR PIPE

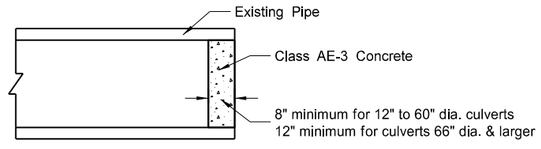


TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

JOINTS FOR REINFORCED CONCRETE PIPE



CONCRETE PIPE PLUG

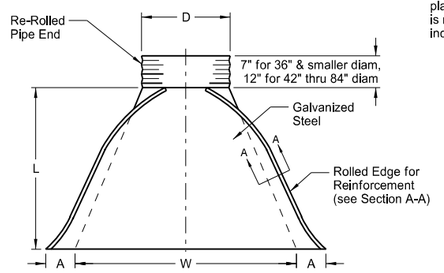
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-12-14	
REVISIONS	
DATE	CHANGE
01-21-15	Revised Note 5
11-21-16	Revised End Section Dimensions
09-18-19	Updated Perspective View Details

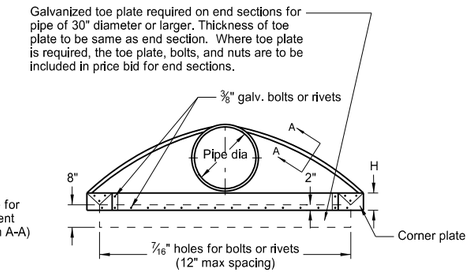
This document was originally issued and sealed by Jon Ketterling Registration Number PE-4684, on 9/18/19 and the original document is stored at the North Dakota Department of Transportation

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

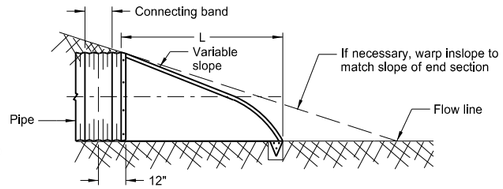
D-714-4



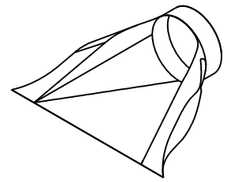
PLAN VIEW



ELEVATION VIEW



TYPICAL CROSS SECTION
(showing connector section)



PERSPECTIVE VIEW

* * PIPE DIA.	GALV. THICK.	END SECTION DIMENSIONS A	B	H	L	W	APPROX. SLOPE	BODY PIECE
IN	IN	IN	IN	IN	IN	IN	RATE	
15	0.064	7	8	6	26	30	2½:1	1
18	0.064	8	10	6	31	36	2½:1	1
24	0.064	10	13	6	41	48	2½:1	1
30	0.079	12	16	8	51	60	2½:1	1 or 2
36	0.079	14	19	9	60	72	2½:1	2
42	0.109	16	22	11	69	84	2½:1	2
48	0.109	18	27	12	78	90	2¼:1	2
54	0.109	18	30	12	84	102	2:1	2
* 60	0.109	18	33	12	87	114	1¾:1	3
* 66	0.109	18	36	12	87	120	1½:1	3
* 72	0.109	18	39	12	87	126	1 1/3 :1	3
* 78	0.109	18	42	12	87	132	1¼:1	3
* 84	0.109	18	45	12	87	138	1 1/6 :1	3

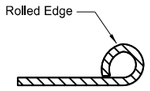
* These sizes have 0.109" sides and 0.138" center panels.

* * Pipe diameter is equal to dimension "D" of end section.

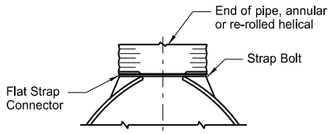
Manufacturers tolerances of above dimensions will be allowed.

Splices to be the lap riveted type.

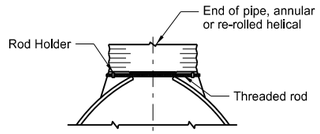
Multiple panel bodies shall have lap seams which are to be tightly joined with ⅜" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.



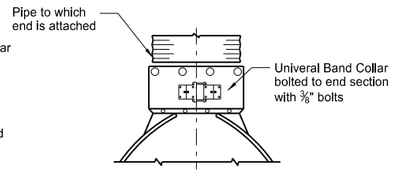
SECTION A-A



TYPE #1
For circular pipes with diameter 24" & smaller



TYPE #2
For circular pipes with diameter 30" through 36"

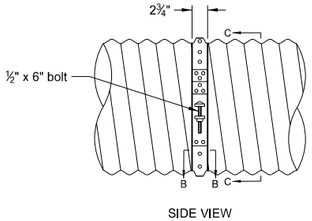


TYPE #3
For all pipe sizes

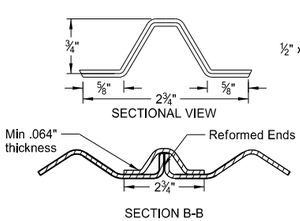
COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2⅔" x ½"	12" - 48"	2¾"	.064"
Annular Band	2⅔" x ½"	12" - 72"	12"	.052"
		78" - 84"	12"	.079"
	3" x 1"	48" - 120"	14"	.052"
Hugger Band	2⅔" x ½" Rerolled End	12" - 72"	10½"	.052"
		78" - 84"	10½"	.079"
	3" x 1" Rerolled End	48" - 120"	10½"	.052"
	5" x 1" Rerolled End	48" - 120"	12"	.064"

NOTES:

1. Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
2. Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" x ¼" galv. angle for 60" through 72" dia. and 2½" x 2½" x ¼" galv. angle for 78" and 84" dia.. Angles to be attached by galv. ⅜" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
3. Elongated pipes shall be factory preformed so that the vertical diameter shall be 5% greater and the horizontal diameter 5% less than a circular pipe.
4. Coupling bands shall be two-piece for pipes larger than 36" as shown in Section C-C & D-D details. For pipes 36" and smaller, a one-piece band is acceptable.
5. ½" x 8" bolts may be used as a substitute for the ½" x 6" bolts shown in the details.
6. Coupling bands wider than 14" may be used if a minimum of four ½" bolts with maximum spacing of 5½" are used for the connection.
7. Length of spot welds shall be minimum ½".

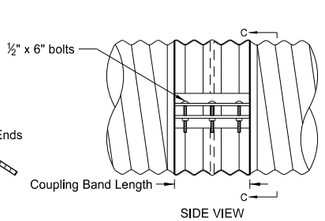


SIDE VIEW

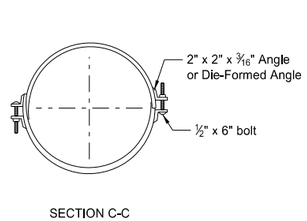


SECTION B-B

HAT BAND FOR FLANGED END PIPE

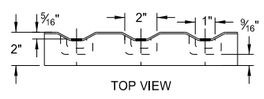


SIDE VIEW



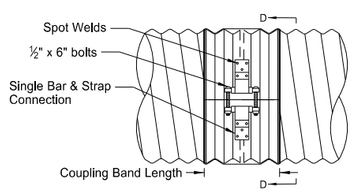
SECTION C-C
Angle Connection

ANNULAR BAND

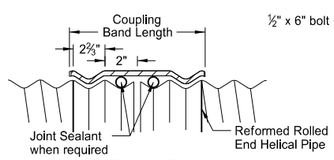


TOP VIEW

Die-Formed Angle Connector

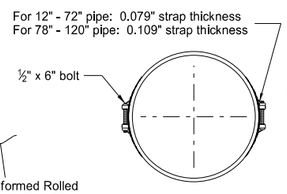


SIDE VIEW

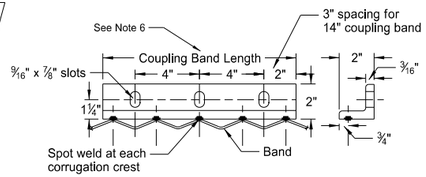


SECTIONAL VIEW

HUGGER COUPLING BAND

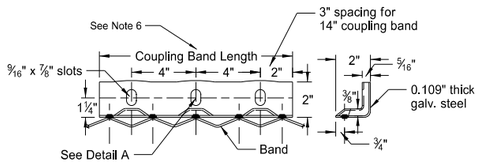


SECTION D-D
Bar & Strap Connection



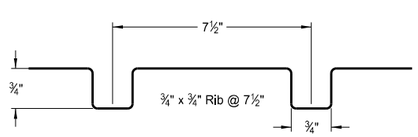
SIDE VIEW END VIEW

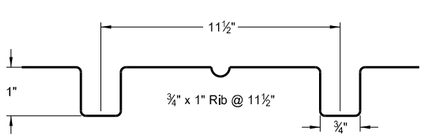
2" x 2" x 3/16" Angle Connector



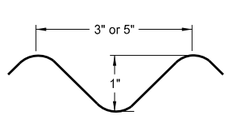
SIDE VIEW END VIEW

Die-Formed Angle Connector

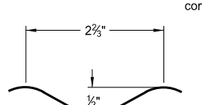




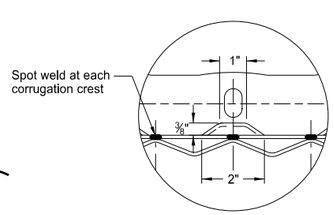
SPIRAL RIB CORRUGATIONS



3" x 1" CORRUGATIONS or
5" x 1" CORRUGATIONS



2⅔" x ½" CORRUGATIONS

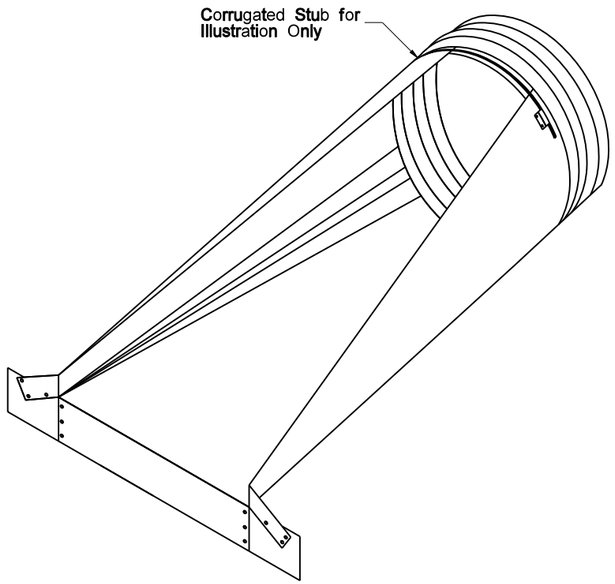


Detail A

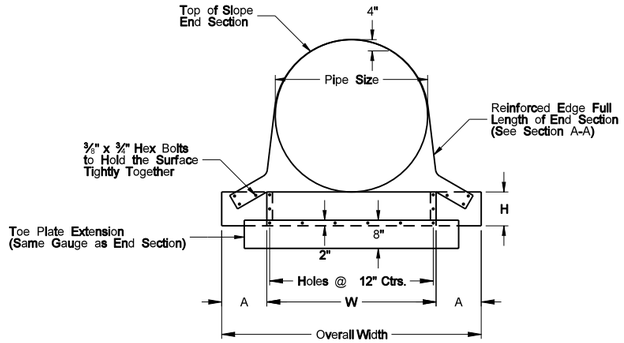
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
08-16-13	
REVISIONS	
DATE	CHANGE
01-07-14	End Section Plan View
02-27-14	3" x 1" Corrugation Detail
09-18-19	Added Perspective View Detail

This document was originally issued and sealed by Jon Ketterling Registration Number PE-4684, on 9/18/19 and the original document is stored at the North Dakota Department of Transportation

TRAVERSABLE END SECTIONS FOR CORRUGATED STEEL PIPE CULVERTS



ISOMETRIC VIEW



FRONT VIEW CIRCULAR PIPE

TRAVERSABLE END SECTIONS FOR CIRCULAR PIPES

Pipe Dia. (in.)	Min. Thick.		Dimensions (inches)				L Dimensions			
	in.	Gauge	A	H	W	Overall Width	Slope	Length (in.)	Slope	Length (in.)
15	.064	16	8	6	21	37	4:1	20	6:1	30
18	.064	16	8	6	24	40	4:1	32	6:1	48
24	.064	16	8	6	30	46	4:1	56	6:1	84
30	.109	12	12	9	36	60	4:1	80	6:1	120

TRAVERSABLE END SECTIONS FOR ARCHED PIPES

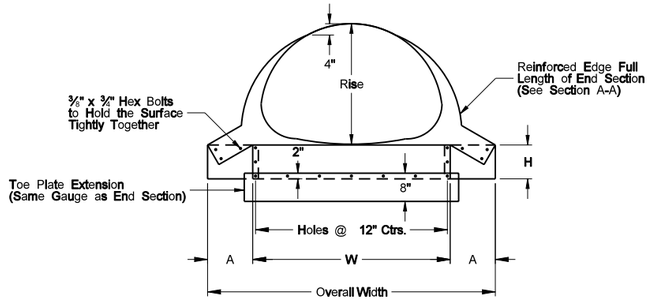
Equiv. Dia. (in.)	(inches)		Min. Thick.		Dimensions (inches)				L Dimensions			
	Span	Rise	in.	Gauge	A	H	W	Overall Width	Slope	Length (in.)	Slope	Length (in.)
18	21	15	.064	16	8	6	27	43	4:1	20	6:1	30
21	24	18	.064	16	8	6	30	46	4:1	32	6:1	48
24	28	20	.064	16	8	6	34	50	4:1	40	6:1	60

Note: See Standard Drawing D-714-04 for end section to pipe details.

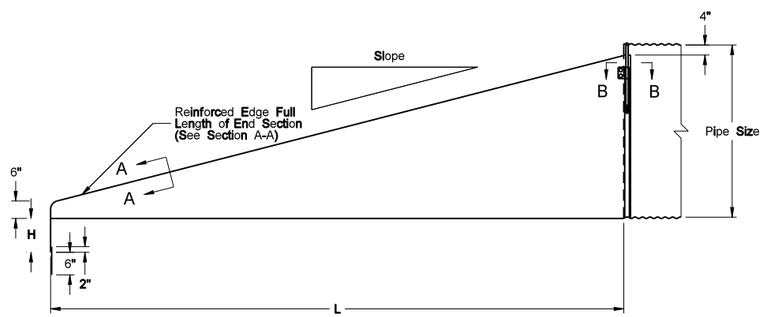
For 15", 18" and 24" diameter end sections, 1/2" diameter rod, or strap type connection to corrugated steel pipe shall be used.

For 30" diameter round end sections, rod type connection to corrugated steel pipe, using 5/8" diameter rod shall be used.

For arched pipe end sections (21" X 15" through 28" X 20"), rod type connection to corrugated steel pipe, using 1/2" diameter rod shall be used.



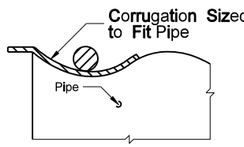
FRONT VIEW ARCHED PIPE



SIDE VIEW



SECTION A-A



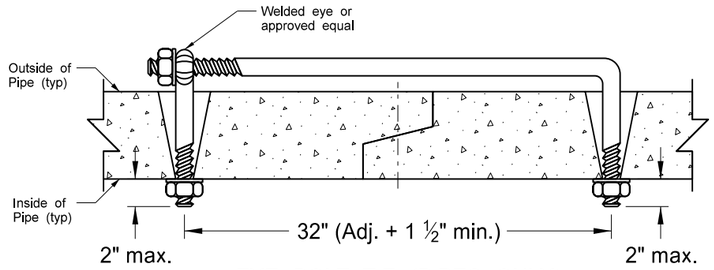
SECTION B-B

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-23-09	
REVISIONS	
DATE	CHANGE

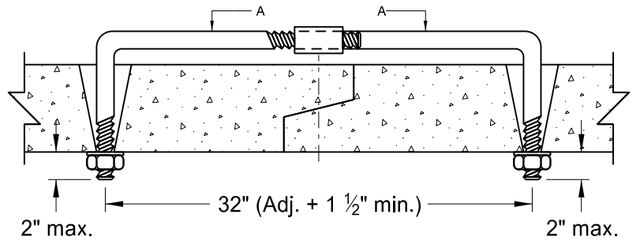
This document was originally issued and sealed by Terrence R. Udland, Registration Number PE- 2674, on 07/23/09 and the original document is stored at the North Dakota Department of Transportation

CONCRETE PIPE, CATTLE PASS, OR PRECAST CONCRETE BOX CULVERT TIES

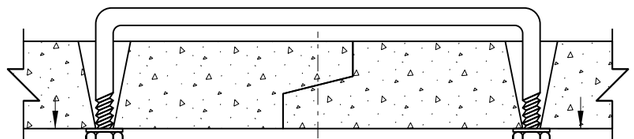
D-714-22



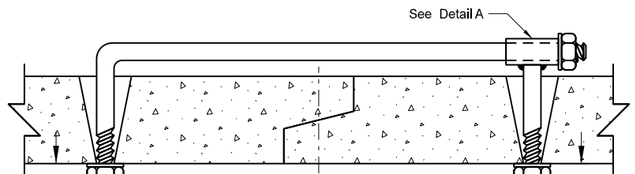
EYE BOLT TIE (PIPES ONLY)



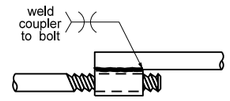
ADJUSTABLE TIE (RCB AND PIPES ONLY)



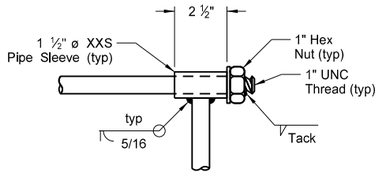
U BOLT TIE (RCB, PIPES, OR CATTLE PASSES)



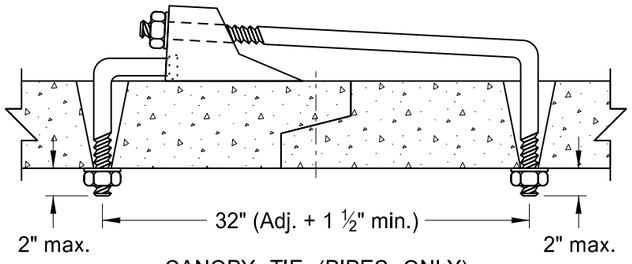
WELDED TIE (RCB AND PIPES ONLY)



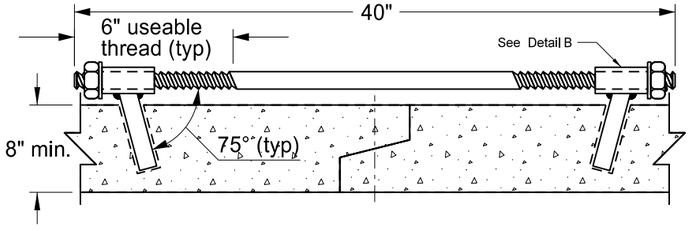
SECTION A-A



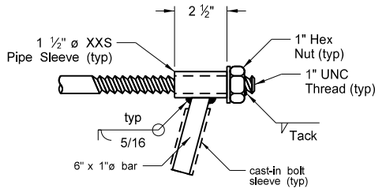
DETAIL A



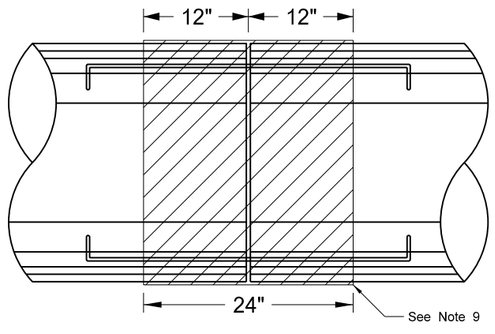
CANOPY TIE (PIPES ONLY)



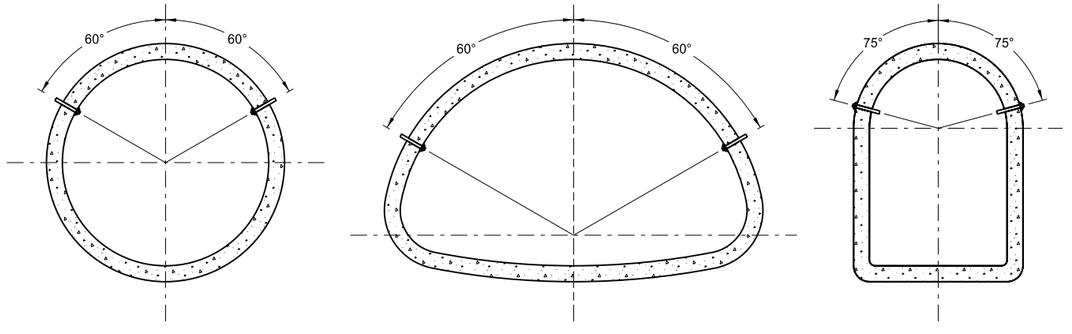
HIDDEN TIE (RCB ONLY)



DETAIL B



PLAN VIEW



END VIEW

REQUIRED SIZE OF TIE BOLTS		
Pipe Size	Thread ø	XXS Pipe Sleeve Inner ø
18" - 24"	⅝" See note 2	¾"
30" - 66"	¾"	1"
72" - 78"	1"	1 ¼"
RCB/Cattle Pass		

NOTES:

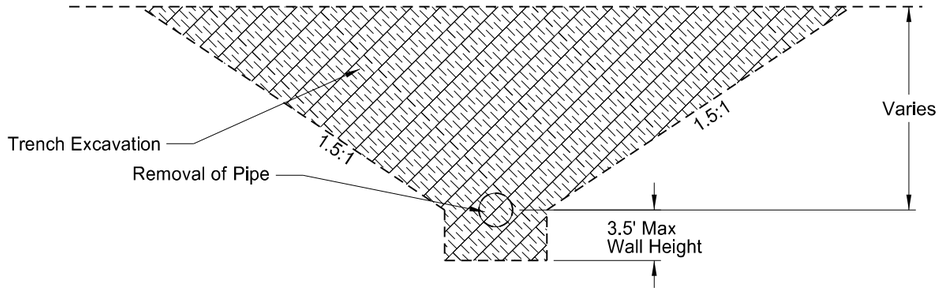
1. The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
2. Cattle Pass and Jacked and Bored pipes shall have pipe ties inserted from the inside of the pipes and grouted into place. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
3. Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Where nuts and washers are not used, the tie bars shall be inserted and grouted into place.
4. Ties are only for holding pipe or RCB sections together, not for pulling sections tight.
5. Tie bolt assembly shall be hot dip galvanized in accordance with AASHTO M232.
6. Holes in pipes to accommodate tie bolts can be precast or drilled. Tapered holes are permitted when precast. Holes shall have a diameter ¼" larger than the diameter of the thread. Holes in precast RCB's shall contain cast-in bolt sleeves with an inside diameter of 1 ¼".
7. The contractor has the option of selecting the type of tie bolt used from those shown.
8. The cost of precasting or drilling the required holes and furnishing and installing the tie bolts shall be included in the price bid for the appropriate conduit or RCB pay item.
9. All centerline and approach RCP culvert joints shall be tied. Storm drain systems shall have the first three joints including the end section of all free ends tied. Free ends are defined as any storm drain end which does not terminate at an inlet or manhole. Outfall culverts with end sections which drain adjacent ditches are examples of free ends.
10. Place joint wrap prior to installing ties. Overlap the joint by 12" in both directions.
11. Tie bolts shall conform to ASTM A 36. Nuts shall be be heavy hex and conform to ASTM A 563. Washers shall conform to ASTM F 436, Type 1. Welded pipe sleeves and cast-in bolt sleeves shall conform to ASTM A 53, Grade B.
12. RCB tie locations shall be as shown on the plans.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-18-14	
REVISIONS	
DATE	CHANGE
7-21-15	Note 8
6-6-17	Notes 2-11, Table, Title, Lables

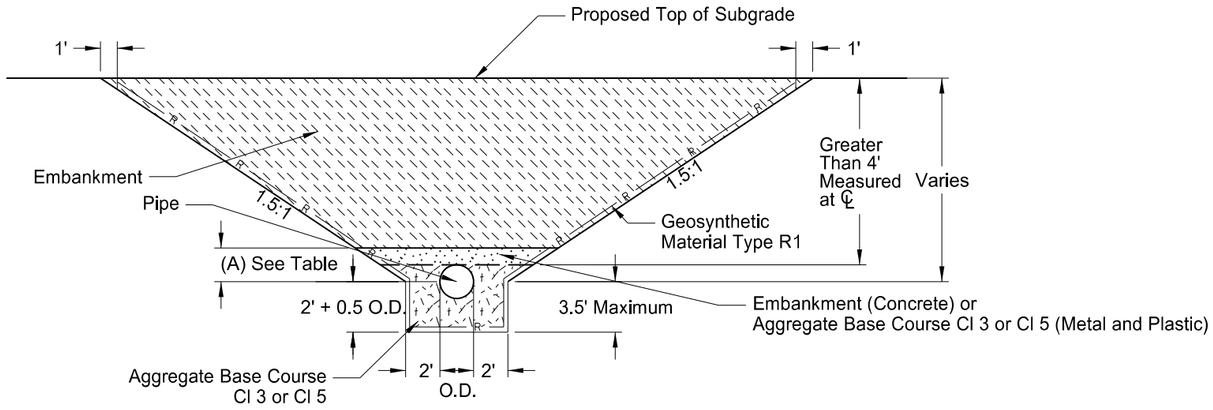
This document was originally issued and sealed by Jonathan David Ketterling, Registration Number PE-4684, on 6/6/2017 and the original document is stored at the North Dakota Department of Transportation

TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL
PIPES MORE THAN 4 FEET BELOW TOP OF SUBGRADE

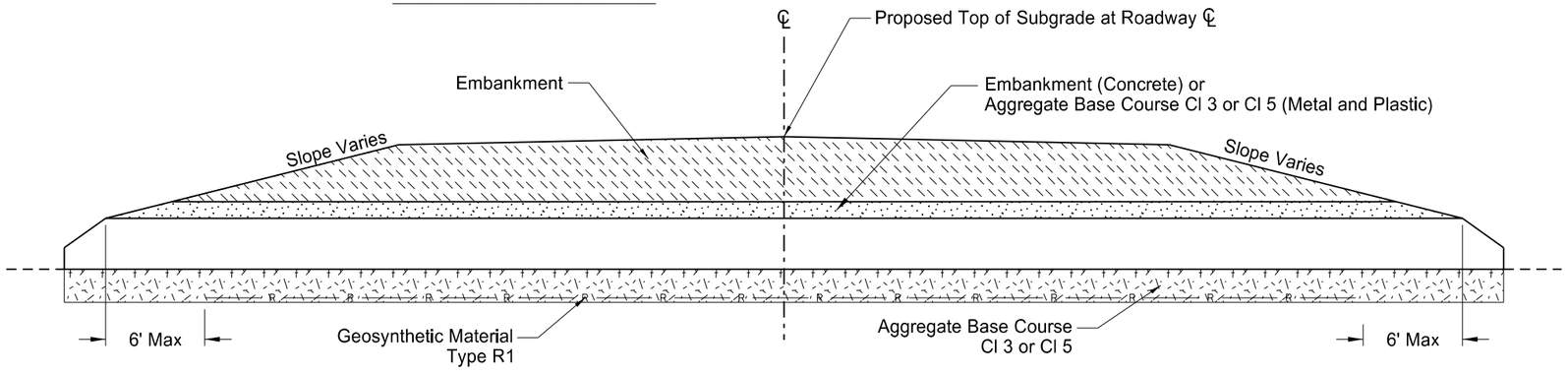
D-714-25



EXCAVATION DETAIL



INSTALLATION DETAIL



CROSS SECTION

Pay Items
1) Pipe*
2) Geosynthetic Material Type R1
3) Removal of Pipe (if required)

*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate Base Course Cl 3 or Cl 5
4) Embankment

NOTES:

1) This drawing applies to new/replaced mainline and paved intersection roadways (including ramps). It does not include pipes in approaches.
2) Embankment may be either Borrow Excavation or Common Excavation - Type A

Backfill Dimensions	
Pipe Materials	Dimension (A)
Concrete	0.5 O.D.
Metal and Plastic	0.5 O.D. + 1 Foot

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

7-26-13

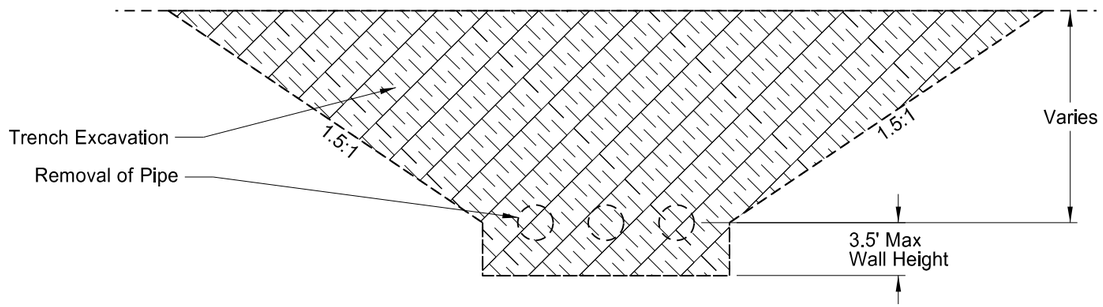
REVISIONS

DATE	CHANGE
10-15-13	Label Formatting
1-21-14	Nomenclature
9-18-15	Title Rewording
12-10-15	Added Plastic Pipe

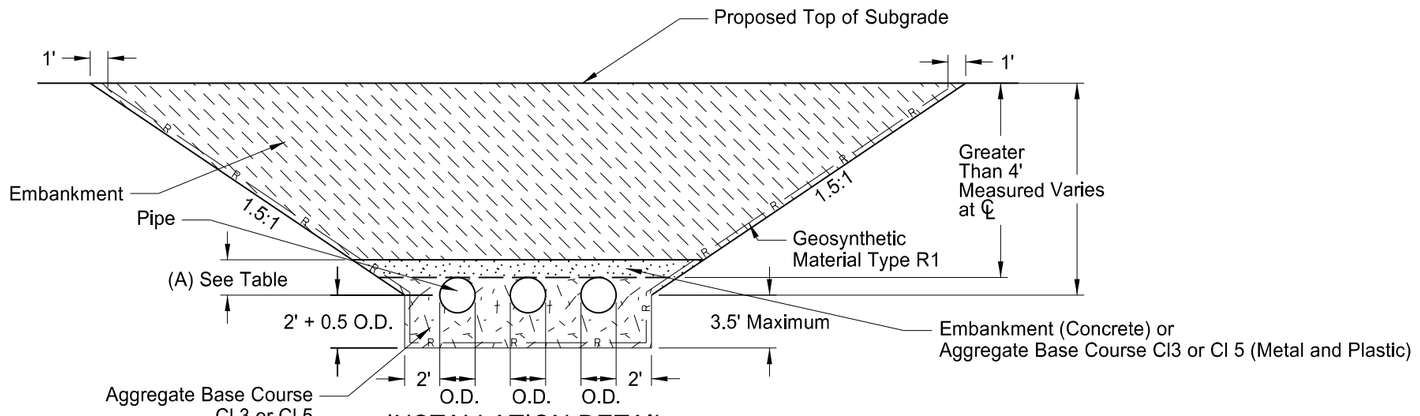
This document was originally issued and sealed by Ron Horner, Registration Number PE- 2087, on 12/10/2015 and the original document is stored at the North Dakota Department of Transportation

TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL
MULTIPLE PIPES MORE THAN 4 FEET BELOW TOP OF SUBGRADE

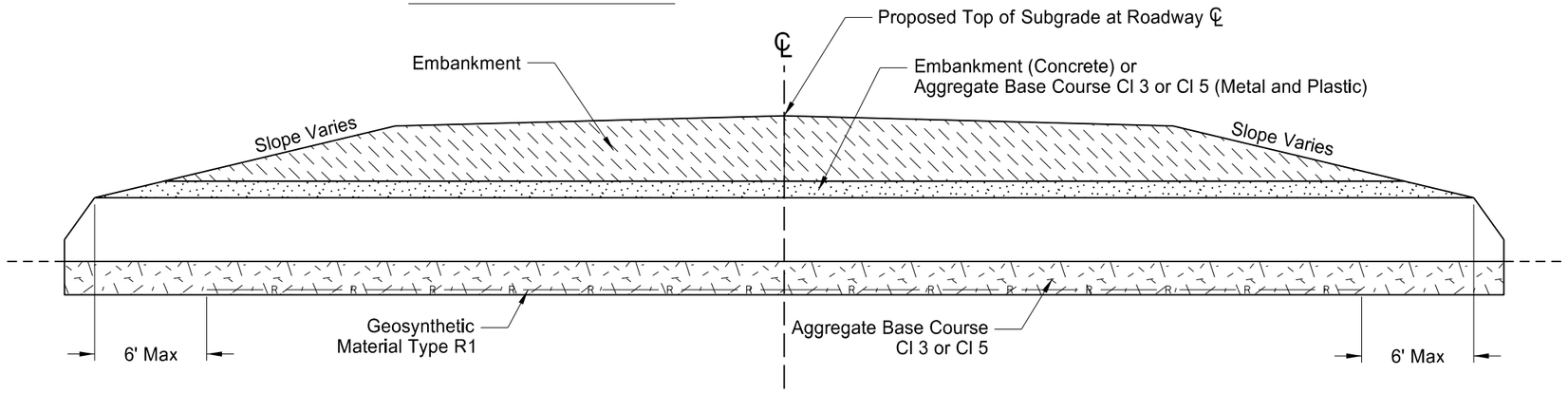
D-714-25M



EXCAVATION DETAIL



INSTALLATION DETAIL



CROSS SECTION

Pay Items
1) Pipe*
2) Geosynthetic Material Type R1
3) Removal of Pipe (if required)

*Included in Pipe Pay Items
1) Pipe
2) Trench Excavation
3) Aggregate Base Course Cl 3 or Cl 5
4) Embankment

NOTES:

1) This drawing applies to new/replaced mainline and paved intersection roadways (including ramps). It does not include pipes in approaches.
2) Embankment may be either Borrow Excavation or Common Excavation - Type A

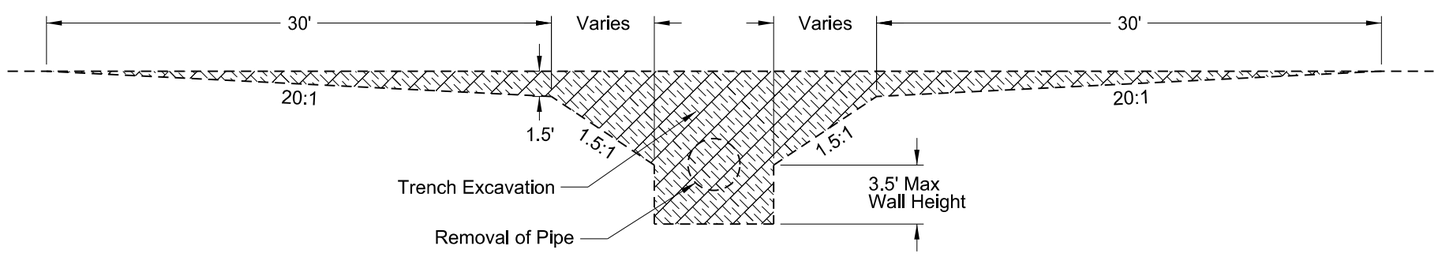
Backfill Dimensions	
Pipe Materials	Dimension (A)
Concrete	0.5 O.D.
Metal and Plastic	0.5 O.D. + 1 Foot

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-4-14	
REVISIONS	
DATE	CHANGE
3-3-14	Spelling
1-21-14	Nomenclature
9-18-15	Title Rewording
12-10-15	Added Plastic Pipe

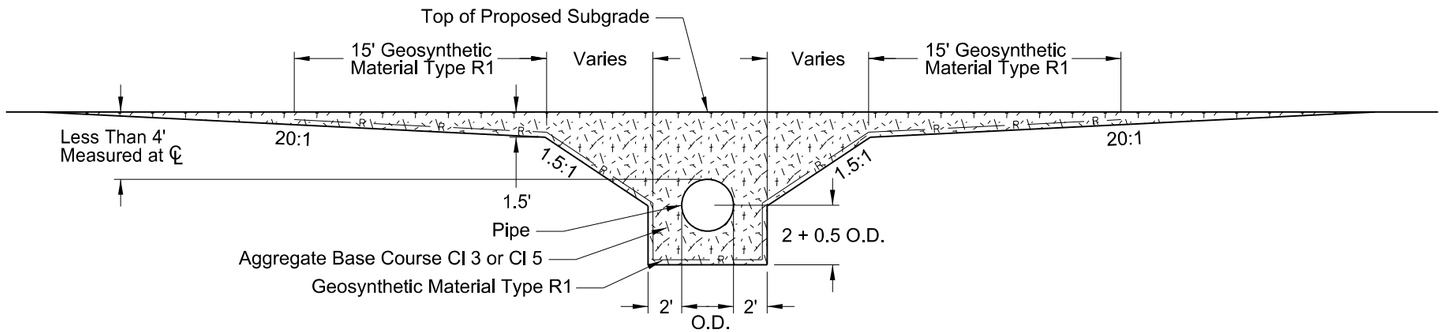
This document was originally issued and sealed by Ron Horner Registration Number PE-2087, on 12/10/2015 and the original document is stored at the North Dakota Department of Transportation

TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL
PIPES 4 FEET OR LESS BELOW TOP OF SUBGRADE

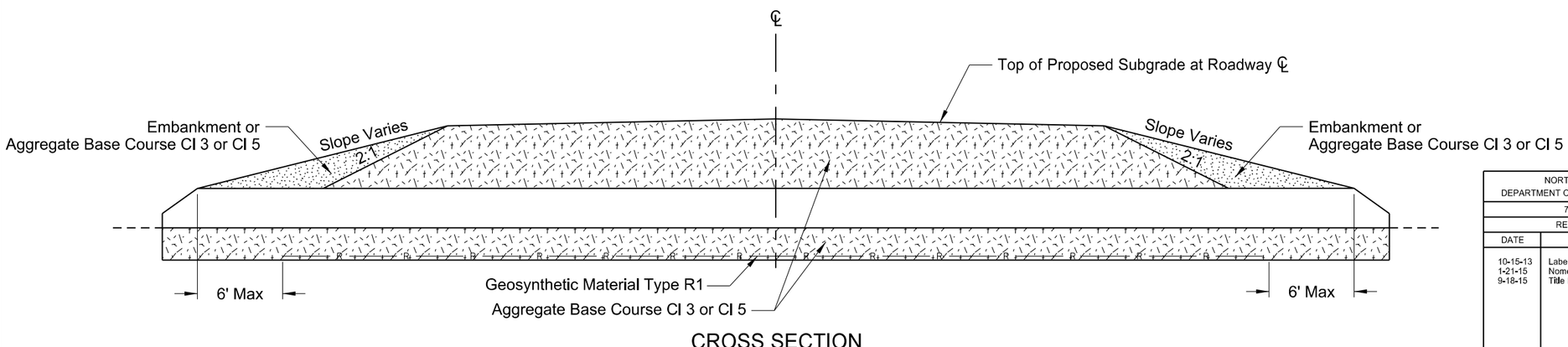
D-714-26



EXCAVATION DETAIL



INSTALLATION DETAIL



CROSS SECTION

Pay Items
1) Pipe*
2) Geosynthetic Material Type R1
3) Removal of Pipe (if required)

*Included in Pipe Pay Item
1) Pipe
2) Trench Excavation
3) Aggregate Base Course CI 3 or CI 5
4) Embankment

NOTES:

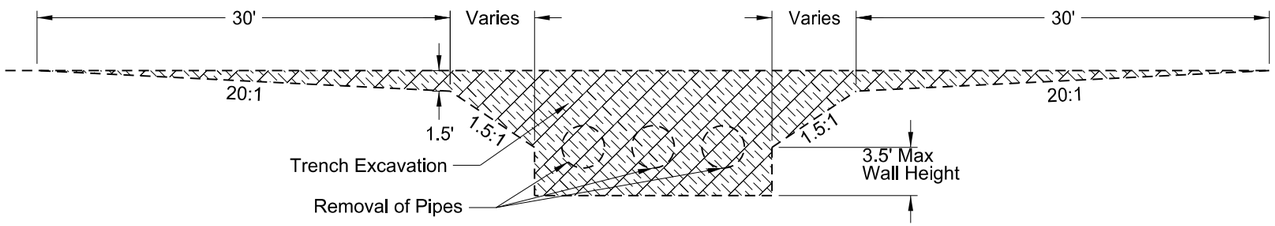
1) This drawing applies to new/replaced mainline and paved intersection roadway pipes only (including ramps). It does not include pipes in approaches.
2) Embankment may be either Borrow Excavation or Common Excavation - Type A

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-26-13	
REVISIONS	
DATE	CHANGE
10-15-13	Label Formatting
1-21-15	Nomenclature
9-18-15	Title Rewording

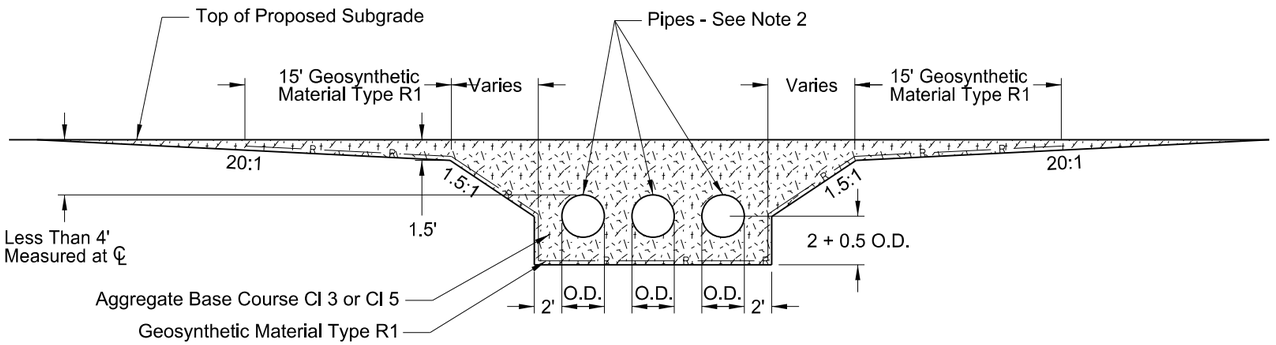
This document was originally issued and sealed by Ron Horner, Registration Number PE-2087, on 9/18/2015 and the original document is stored at the North Dakota Department of Transportation

TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL
MULTIPLE PIPES 4 FEET OR LESS BELOW TOP OF SUBGRADE

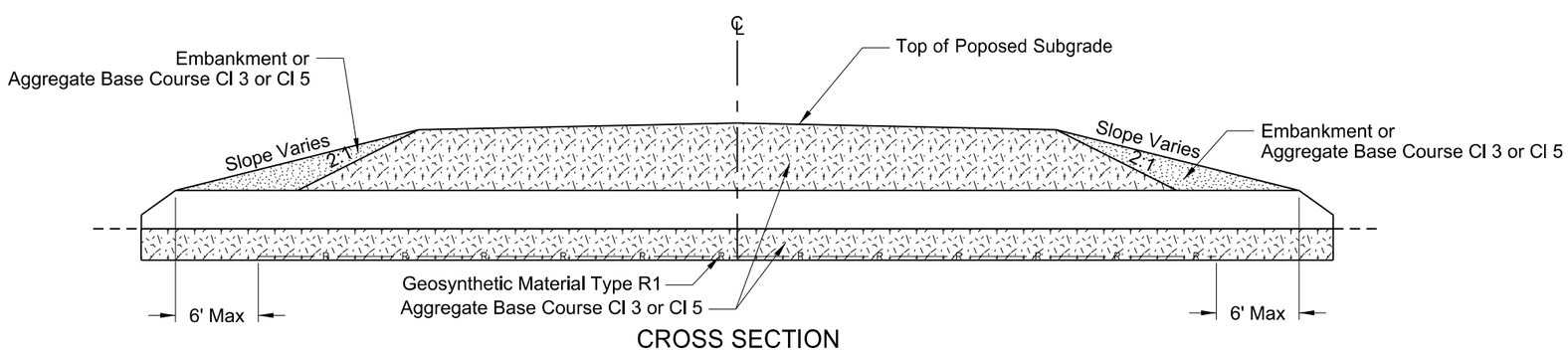
D-714-26M



EXCAVATION DETAIL



INSTALLATION DETAIL



CROSS SECTION

Pay Items
1) Pipe*
2) Geosynthetic Material Type R1
3) Removal of Pipe (if required)

*Included in Pipe Pay Item
1) Pipe
2) Trench Excavation
3) Aggregate Base Course CI 3 or CI 5
4) Embankment

NOTES:

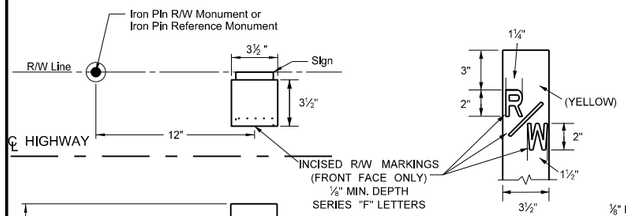
1) This drawing applies to new/replaced mainline and paved intersection roadway pipes only (including ramps). It does not include pipes in approaches.
2) Embankment may be either Borrow Excavation or Common Excavation - Type A

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-4-14	
REVISIONS	
DATE	CHANGE
1-21-15 9-18-15	Nomenclature Title Rewording

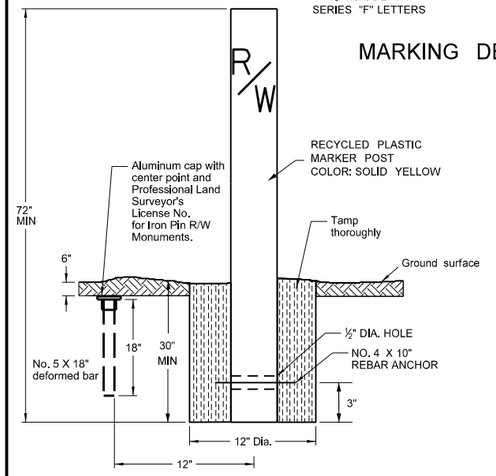
This document was originally issued and sealed by Ron Horner, Registration Number PE-2087, on 9/18/2015 and the original document is stored at the North Dakota Department of Transportation

STANDARD MONUMENTS AND RIGHT OF WAY MARKERS

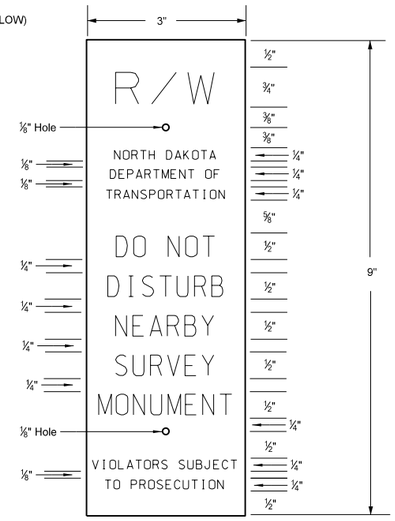
D-720-1



MARKING DETAIL



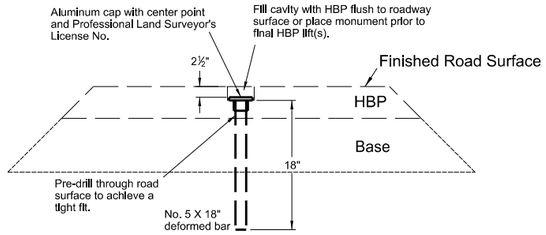
RECYCLED PLASTIC
RIGHT OF WAY MARKER
(WITNESS POST) DETAILS
&
IRON PIN REFERENCE AND R/W
MONUMENT DETAILS



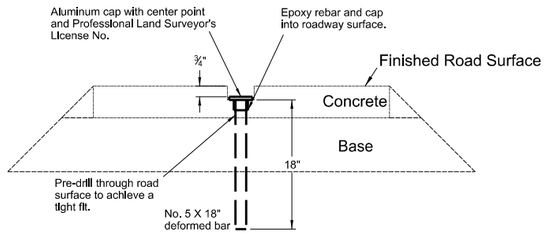
SIGN DETAIL

Black letters on orange high intensity background sheeting meeting ASTM D-4956 Type III or higher on 80 gauge 5052-H38 aluminum. Silk screen graphics. One color print. Attach sign by drilling two holes in the face of the post (side facing the private owner, away from the Department of Transportation right of way). Put inserts into the holes and mount the sign with #4 vandal proof screws. Install sign 2" from top of post.

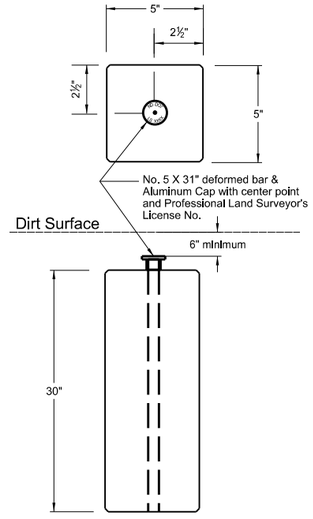
ALIGNMENT MONUMENT DETAILS



IRON PIN
(Within Finished Roadway Surface)



IRON PIN
(Within Finished Roadway Surface)



PRECAST CONCRETE
(Outside Finished Roadway Surface)
(Inside R/W Limits)

NOTES:

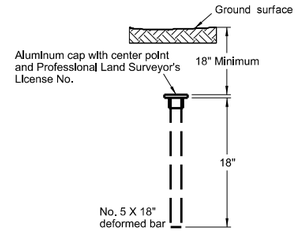
Construct and install Alignment Monuments, Iron Pin Reference Monuments, Iron Pin R/W Monuments, and Right of Way Markers (witness posts) according to Section 720 of the Standard Specifications.

ALIGNMENT MONUMENTS: Place Iron Pin or Precast Concrete Alignment Monuments with aluminum caps on the centerline alignment PI's, section corners, quarter corners, section line crossings, quarter line crossings, and at curve points (PC's, PT's, TS's, and ST's) on the centerline.

IRON PIN R/W MONUMENT: Place Iron Pns with aluminum caps (No. 5 X 18") at breaks on the Right of Way line, and at curve points (PC's, PT's, TS's and ST's) on the Right of Way line.

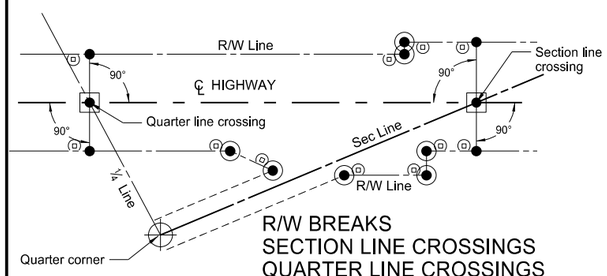
IRON PIN REFERENCE MONUMENT: Place Iron Pins without aluminum caps (No. 5 X 18") as reference monuments on the Right of Way line at section corners, quarter corners, section line crossings, and quarter line crossings.

R/W MARKERS (WITNESS POST) WITHIN DRIVEWAYS: If a single iron Pin R/W or Reference Monument is within a driveway, place right of way marker (witness post) 50 feet back, in stationing, from the Iron Pin Monument along the R/W line. If R/W break is within a driveway, place right of way markers (witness posts) 50 feet back, or ahead from respective Iron Pin R/W Monuments along the R/W lines. Maintain Iron Pin R/W or Reference Monument original position within driveway.

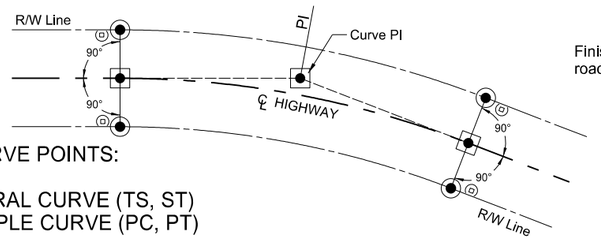


IRON PIN
(Outside Finished Roadway Surface)
(Outside R/W Limits)

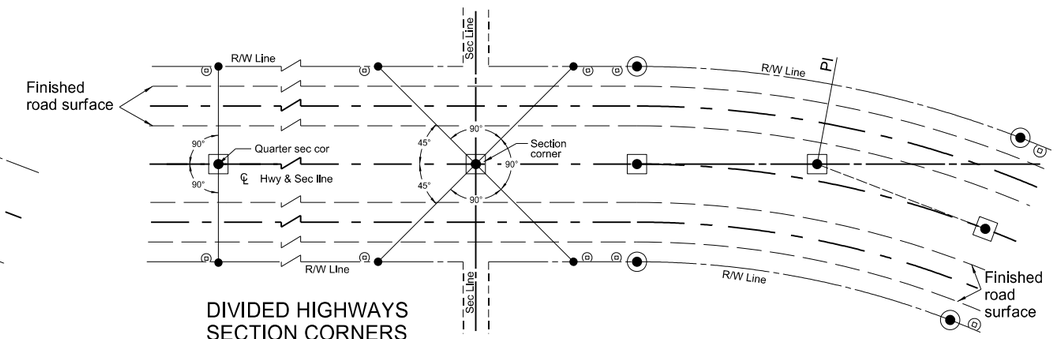
VARIOUS MONUMENT AND MARKER PLACEMENTS



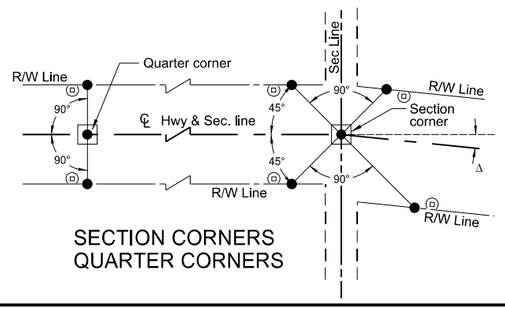
R/W BREAKS
SECTION LINE CROSSINGS
QUARTER LINE CROSSINGS



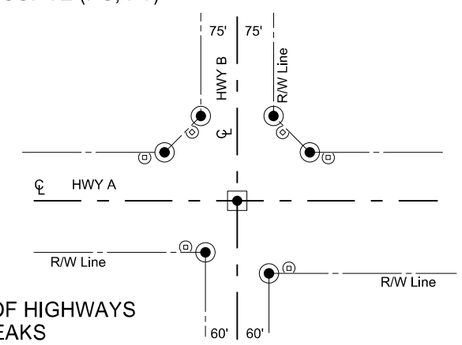
CURVE POINTS:
PI
SPIRAL CURVE (TS, ST)
SIMPLE CURVE (PC, PT)



DIVIDED HIGHWAYS
SECTION CORNERS
QUARTER CORNERS



SECTION CORNERS
QUARTER CORNERS



INTERSECTION OF HIGHWAYS
FLARED R/W BREAKS

LEGEND

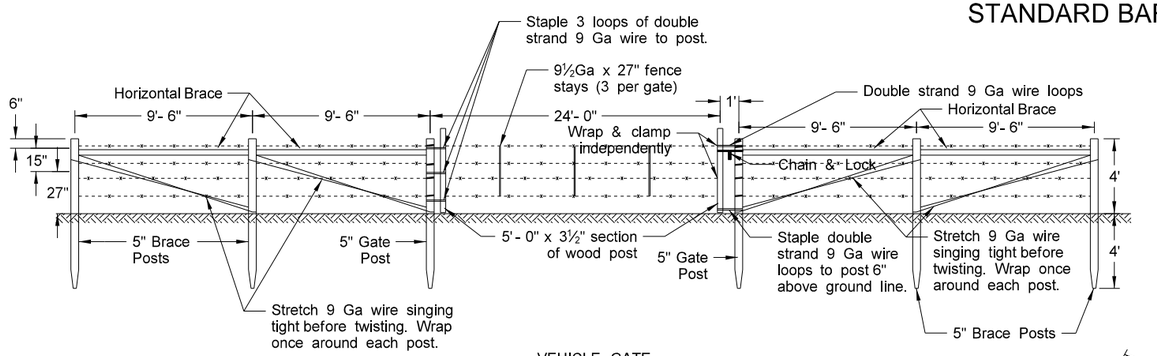
- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Pin R/W Monument

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
11/12/13	Note for SIGN DETAIL modified to meet ASTM D-4956 Type III or higher on 80 gauge 5052-H38
10/17/17	Updated to active voice.
08/27/19	New Design Engr PE Stamp.

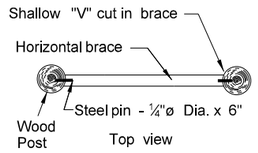
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/27/19 and the original document is stored at the North Dakota Department of Transportation

STANDARD BARBED WIRE FENCE

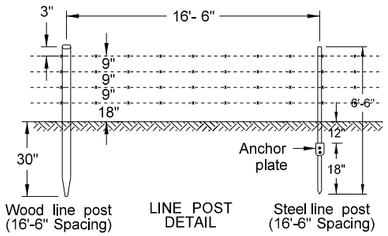
D-752-1



VEHICLE GATE



HORIZONTAL BRACE DETAIL



NOTES

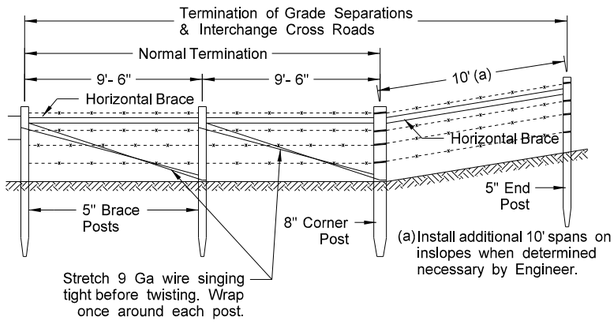
1. No deduction in measured pay length of cable fence made for gates, corner assemblies, double brace assemblies, fence terminals, or depression fencing. Include all costs for abutment fencing in the price bid for fencing bid items.

2. Install double brace assemblies at locations shown on the plans or established by the Engineer. Place adjacent fence terminals, corner assemblies, or double brace assemblies at a maximum spacing of 1,320 feet.

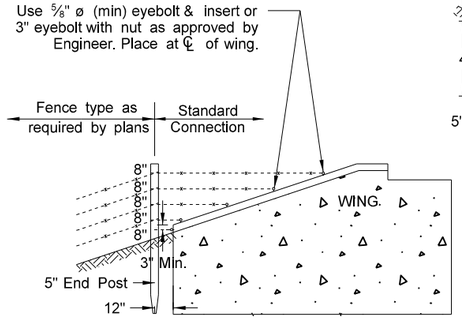
3. Include all costs of furnishing and installing inserts and eyebolts in the unit price bid for fencing bid items. Use eyebolts galvanized according to AASHTO designation M-30; inserts of corrosion resistant material do not require galvanization. Use concrete inserts capable of developing the full strength of the ⅝" diameter threaded eyebolt, when installed in concrete.

4. Determine post type used, either wood or steel, unless otherwise specified in the plans.

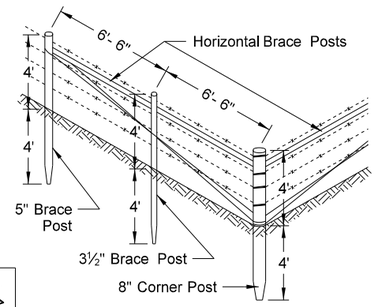
	POST SIZES				
	TREATED WOOD		STEEL		
USE OF POST	Post dia.	Post length	Post length	Post wt. Lbs/Ft	Anchor wt. Lbs.
Line post	3½"	6'-6"	6'-6"	1.33	0.67
Corner post	8"	8'	7'	4.10	(Conc.)
End post	5"	8'			
Brace post	5" / 3½"	8'	7'	3.19	(Conc.)
Gate post	5"	8'			
Horizontal brace	3½"	Var.	As appoved by the Engineer		



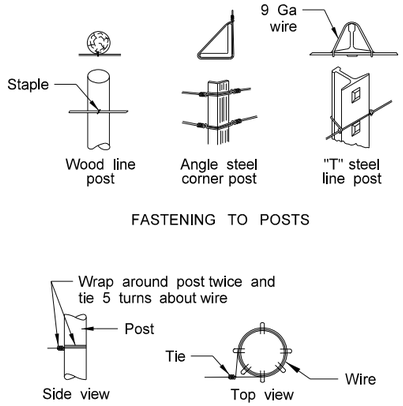
FENCE TERMINAL



DETAIL FOR TYING FENCE TO WINGS OF ABUTMENTS

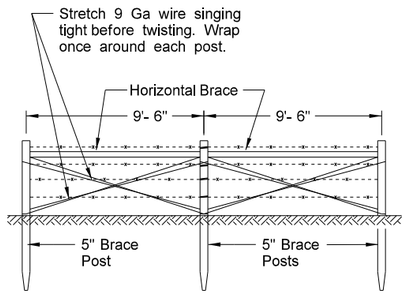


SHORT SPAN DETAIL
(FENCE LINE 100' OR LESS)

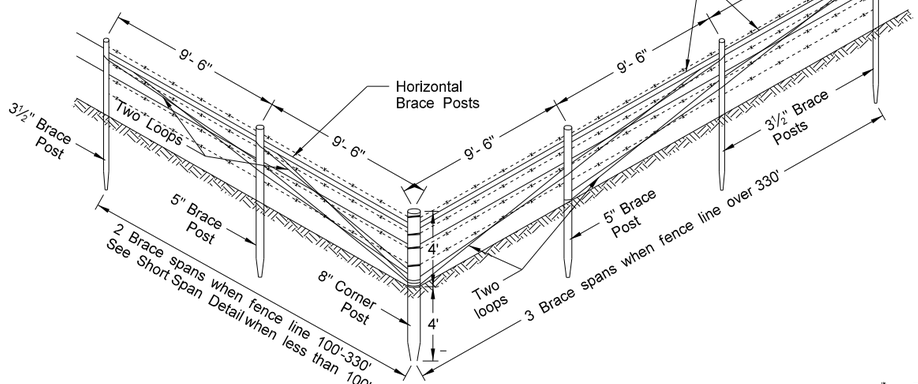


FASTENING TO POSTS

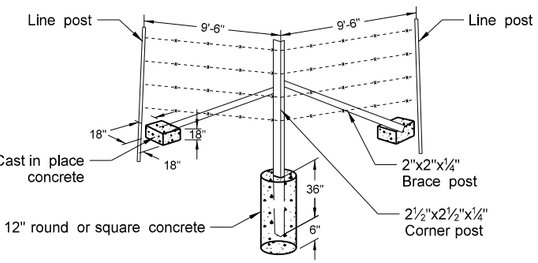
WRAP-AROUND DETAIL



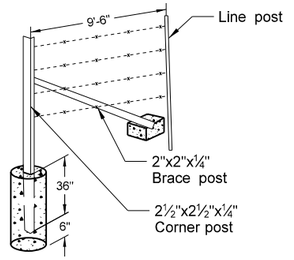
DOUBLE BRACE ASSEMBLY



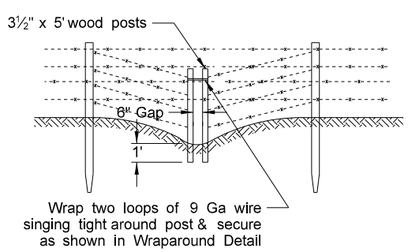
CORNER ASSEMBLY



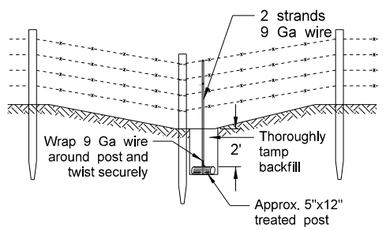
CORNER AND DOUBLE BRACE ASSEMBLY
STEEL POSTS



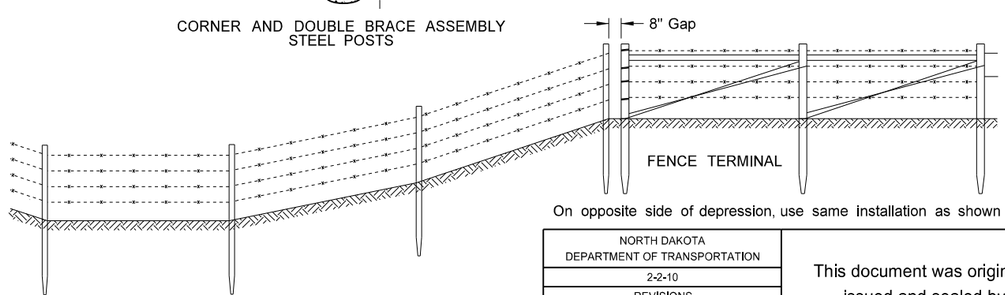
FENCE TERMINAL
STEEL POSTS



BREAK-AWAY FENCE FOR NARROW
DEPRESSIONS SUBJECT TO FLOODING



DETAIL FOR ANCHORING FENCES IN DEPRESSIONS*
*Determine locations in the field and include in price bid for fencing. Use other methods of anchoring fence if approved by the Engineer.



FENCE TERMINAL

On opposite side of depression, use same installation as shown

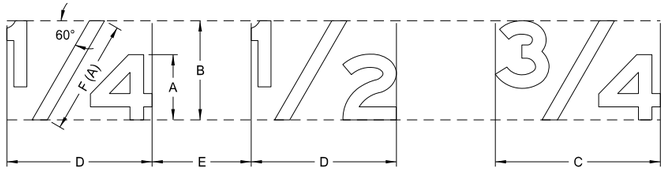
FENCING FOR WIDE DEPRESSIONS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-2-10	
REVISIONS	
DATE	CHANGE
10-02-12	Notes, steel assemblies/posts.
11-25-13	Revised Vehicle Gate.
10-17-17	Updated to active voice.

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 10-17-2017 and the original document is stored at the North Dakota Department of Transportation

LETTER AND ARROW DETAILS

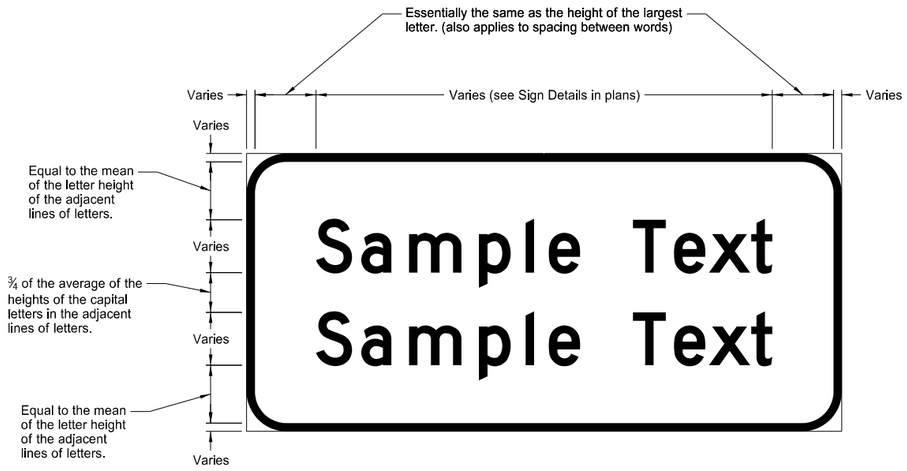
D-754-9



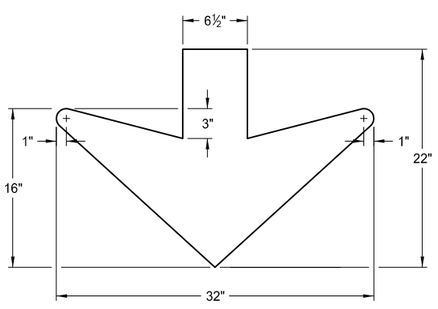
DETERMINE SIZE OF THE FRACTION AS FOLLOWS:

SYMBOL	TITLE	RATIO TO HEIGHT OF CAPITAL OR UPPER CASE
A	Letter height	1.0 of capital or upper case
B	Fraction height	1.5 X A
C	Fraction width	2.5 X A
D	Fraction width	2 X A
E	Space to next character	1 to 1.5 X A
F(A)	Length of diagonal	1.75 X A

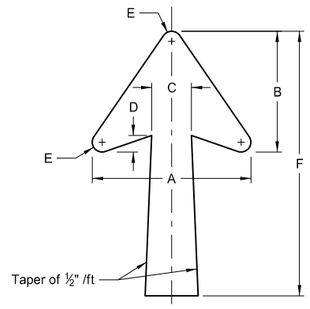
(A) Center diagonal stroke of fraction optically.



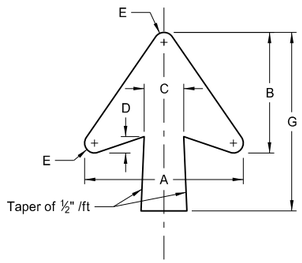
TYPICAL SPACING



DOWN ARROW



TYPE A

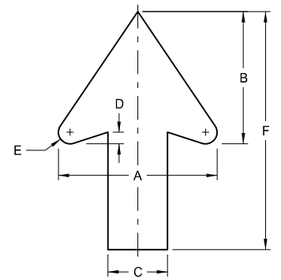


TYPE B

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F	G
ND_6IN	6"	12"	9.125"	3"	1"	0.625"	20"	13.5"
ND_8IN	8"	15.125"	11.563"	3.75"	1.313"	0.813"	25"	17"
ND_10IN	10"	18.25"	14"	4.5"	1.5"	0.75"	30"	20"
ND_12IN	12"							
ND_13IN	13.3"							
ND_16IN	16"	22.25"	17"	5.375"	1.75"	1"	35"	25"
ND_20IN	20"							

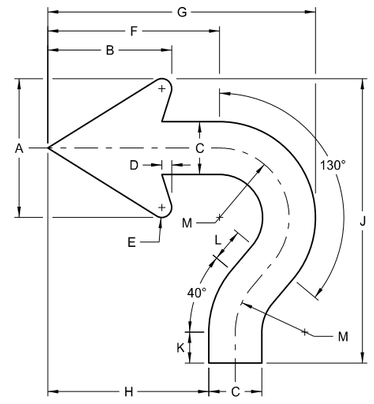
NOTE: Arrow size on gore signs is based on the letter size of "EXIT".

NOTE: Measure rotation angle of arrows counterclockwise from positions shown in details.



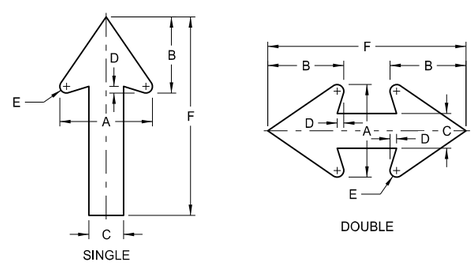
TYPE D

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F
ND_2IN	2"	2"	1.625"	0.75"	0.125"	0.125"	3"
ND_4IN	4"	4"	3.313"	1.5"	0.25"	0.25"	6"
ND_6IN	6"	6"	4.875"	2.25"	0.375"	0.375"	9"
ND_8IN	8"	8"	6.625"	3"	0.5"	0.5"	12"
ND_10IN	10"	10"	8.375"	3.75"	0.75"	0.75"	15"
ND_12IN	12"	12"	10"	4.5"	0.875"	0.875"	18"



ROUNDABOUT

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F	G	H	J	K	L	M
ND_6IN	6"	5.25"	4.688"	2"	0.375"	0.375"	6.5"	10.125"	6.094"	10.75"	1.168"	1.25"	2.625"
ND_8IN	8"	7"	5.75"	2.625"	0.5"	0.5"	8.688"	13.5"	8.166"	14.333"	1.557"	1.667"	3.5"



SPECIAL

DESIGNATION	A	B	C	D	E	F	USES
ND_0.75IN	2"	1.625"	0.75"	0.125"	0.125"	7.75"	Parking Signs (Regulatory)
ND_2.625IN	7"	5.75"	2.625"	0.5"	0.5"	15"	Frontage Road Signs

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

8-3-11

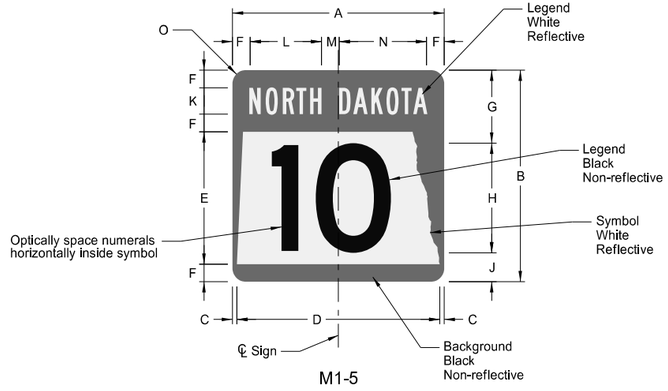
REVISIONS

DATE	CHANGE
7-8-14	Revised gore sign and added 4" D & D arrow
5-4-16	Revised Distance & Destination and Typical Spacing details
4-23-18	Revised arrow details
8-30-18	Updated notes to active voice.
8-29-19	New Design Engr PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/29/19 and the original document is stored at the North Dakota Department of Transportation

STATE HIGHWAY ROUTE SHIELD DETAIL

D-754-11

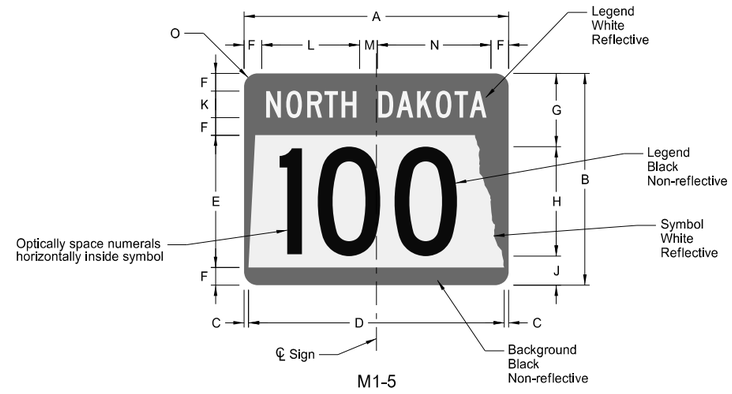


M1-5

STATE ROUTE MARKER

SIGN	DIMENSION (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	O
1, 2 digits	18*	18*	0.38	17.25	11.25	1.5	6.38	9 D**	2.63	2.25 B	6.1	1.5	7.4	1.5
1, 2 digits	24	24	0.5	23	15	2	8.5	12 D**	3.5	3 B	8.1	2	9.9	1.5
1, 2 digits	36	36	0.75	34.5	22.5	3	12.75	18 D**	5.25	4.5 B	12.1	3	14.9	2.25
1, 2 digits	48*	48*	1	46	30	4	17	24 D**	7	6 B	16.2	4	19.8	3

* Size not for independent use (only for use within a guide sign)
** Reduce numeral spacing by 25%

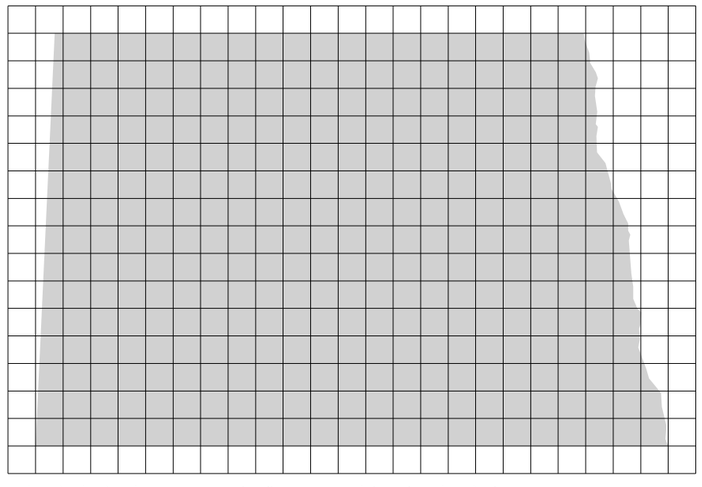


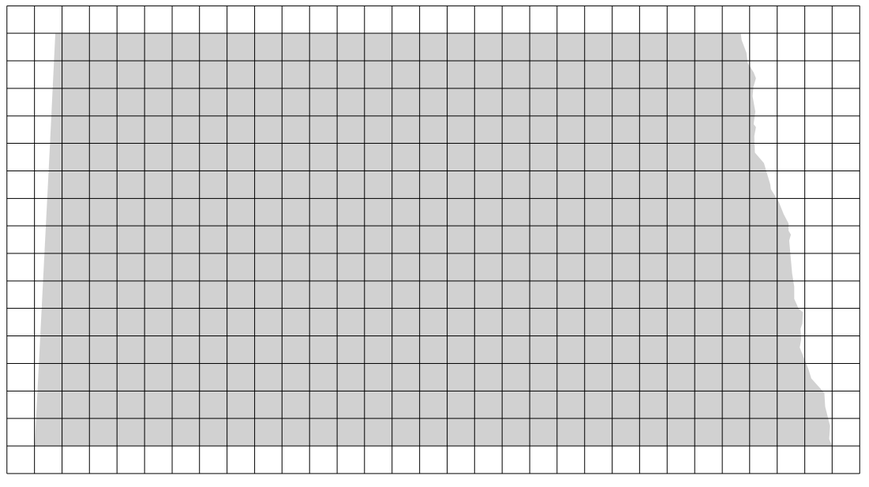
M1-5

STATE ROUTE MARKER

SIGN	DIMENSION (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	O
3 digits	24*	18*	1,13	21,75	11,25	1,5	6,38	9 C**	2,63	2,25 C	8,8	2	10,2	1,5
3 digits	30	24	0.5	29	15	2	8.5	12 C**	3.5	3 C	10.7	2.5	12.8	1.5
3 digits	45	36	0.75	43.5	22.5	3	12.75	18 C**	5.25	4.5 C	16.1	3.8	19.1	2.25
3 digits	60*	48*	1	58	30	4	17	24 C**	7	6 C	21.5	5	25.5	3
4 digits	24*	18*	1.13	21.75	11.25	1.5	6.38	9 B***	2.63	2.25 C	8.8	2	10.2	1.5
4 digits	30	24	0.5	29	15	2	8.5	12 B***	3.5	3 C	10.7	2.5	12.8	1.5
4 digits	45	36	0.75	43.5	22.5	3	12.75	18 B***	5.25	4.5 C	16.1	3.8	19.1	2.25
4 digits	60*	48*	1	58	30	4	17	24 B***	7	6 C	21.5	5	25.5	3

* Size not for independent use (only for use within a guide sign)
** Reduce numeral spacing by 25%
*** Reduce numeral spacing by 50%





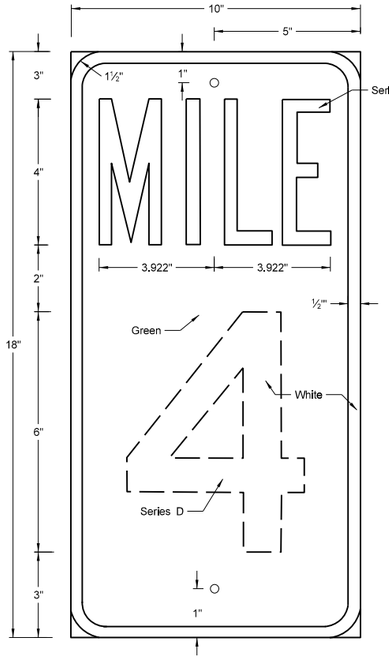
Note: North Dakota symbol graphics file may be obtained from the Design Division of North Dakota Department of Transportation.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
4-23-18	
REVISIONS	
DATE	CHANGE
8-29-19	New Design Engineer PE Stamp.

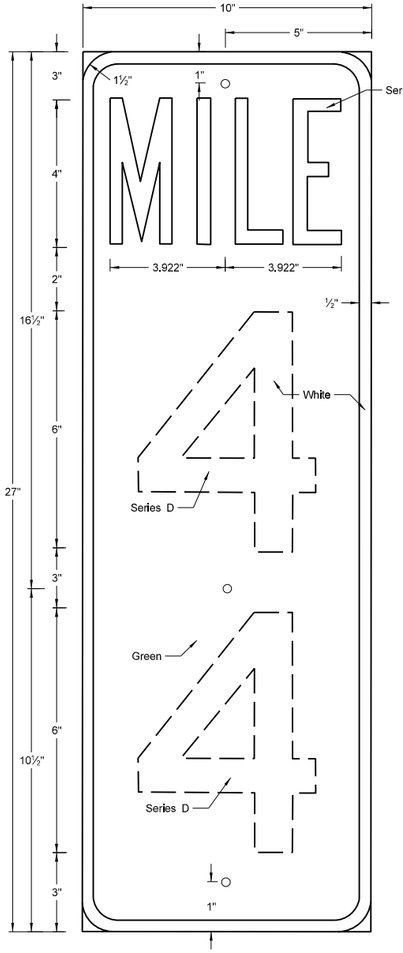
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(CONVENTIONAL USE) REFERENCE MARKERS

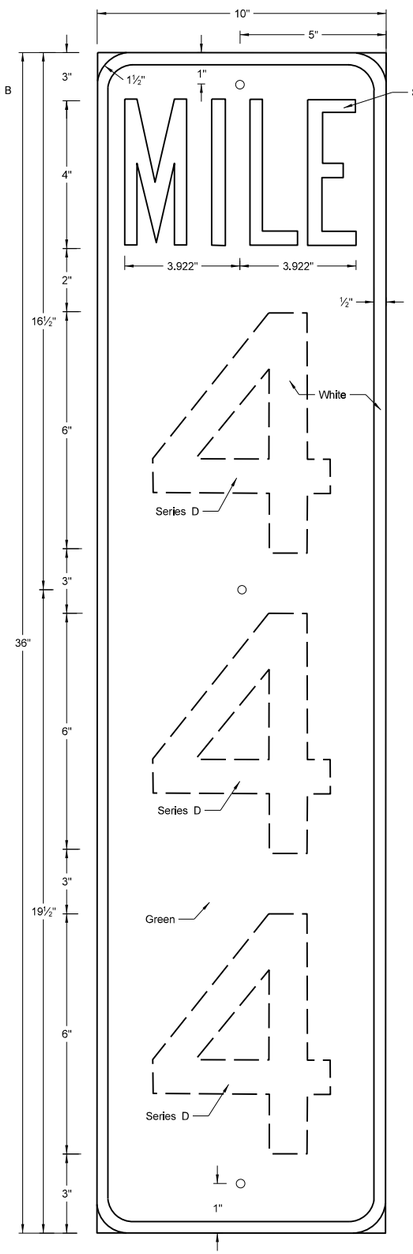
D-754-19



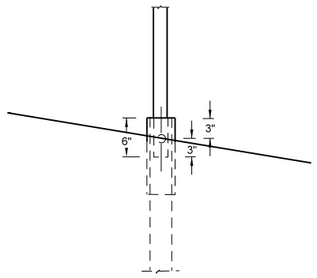
TYPE A
Area = 1.25 S.F.



TYPE B
Area = 1.88 S.F.

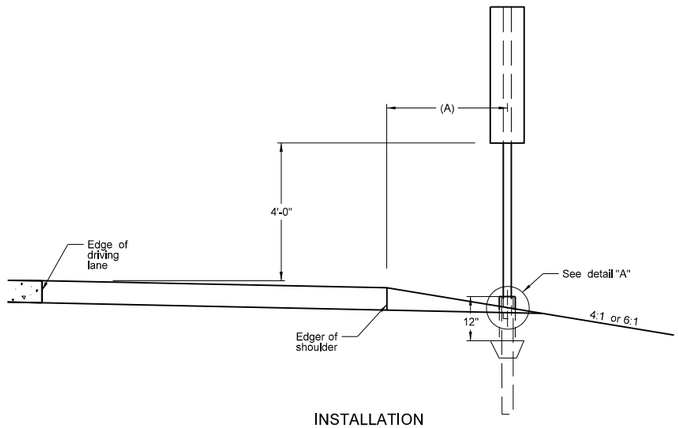


TYPE C
Area = 2.50 S.F.



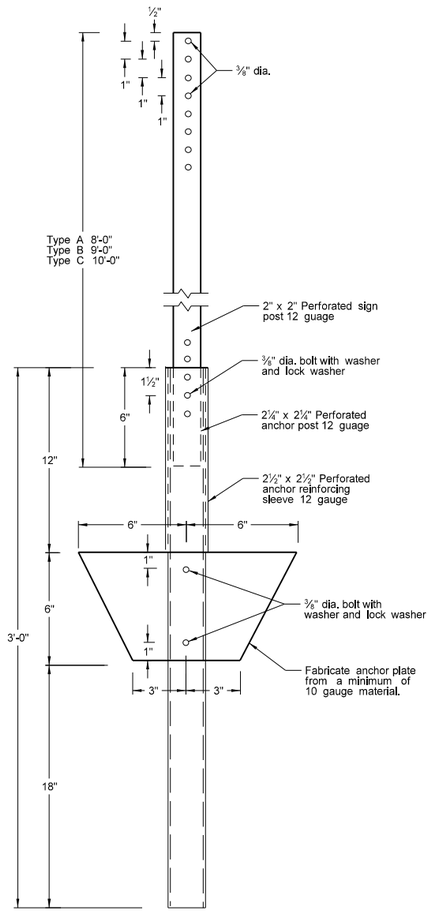
DETAIL "A"

(A) 8' Clearance to finished shoulder or in line with existing delineator posts.



INSTALLATION

ASSEMBLY DETAIL
(back to back)



POST AND ANCHOR PLATE DETAIL

NOTES:
Installation: Install posts along right shoulder.

Sign: Fabricate backing of 0.080 aluminum.

Fasteners: Attach signs to post with tension pin type fastener or other suitable vandal resistant non-rust fastener.

Reflective Sheeting: Use Type IV sheeting.

Numbers: Use screened or applied copy numbers of the series shown.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
7-8-14	Revised post and reflective sheeting notes
8-30-18	Updated to active voice.
8-29-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/29/19 and the original document is stored at the North Dakota Department of Transportation

PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

Notes:

1. Curbed Roadways: Use a 3' clearance from face of the curb except where right of way or sidewalk width is limited; Use a minimum 2' clearance. Increase the horizontal clearance if required to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.

2. Minimum vertical clearance: Provide at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane at the side of the road in rural districts. Provide at least 7' clearance to the bottom of the sign, where parking or pedestrian movements occur.

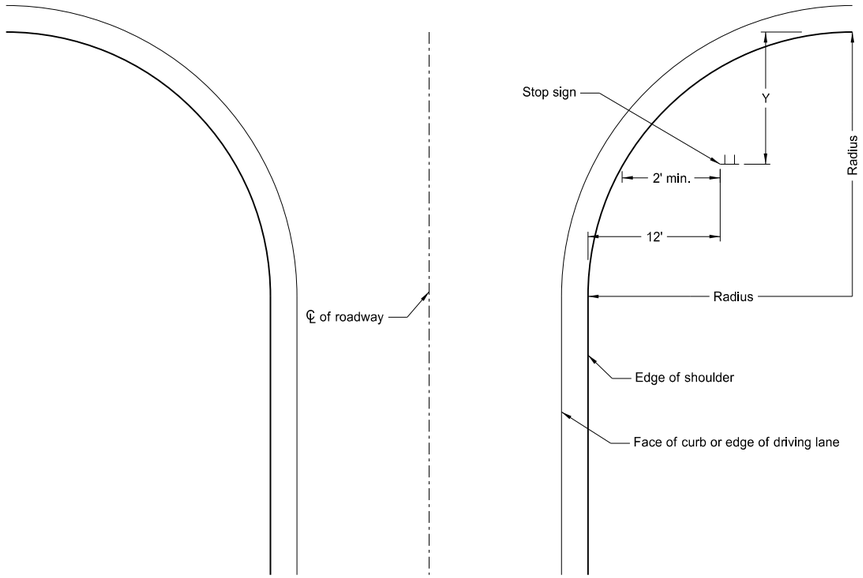
   Install signs on expressways a minimum height of 7'.

   Install adopt-a-highway signs on Freeways at least 7' above the edge of the driving lane.

   Maximum vertical clearance is 6" greater than the minimum vertical clearance.

3. Offset signs: Use a vertical clearance of 5' above the edge of the driving lane for signs placed 30 feet or more from the edge of the traveled way.

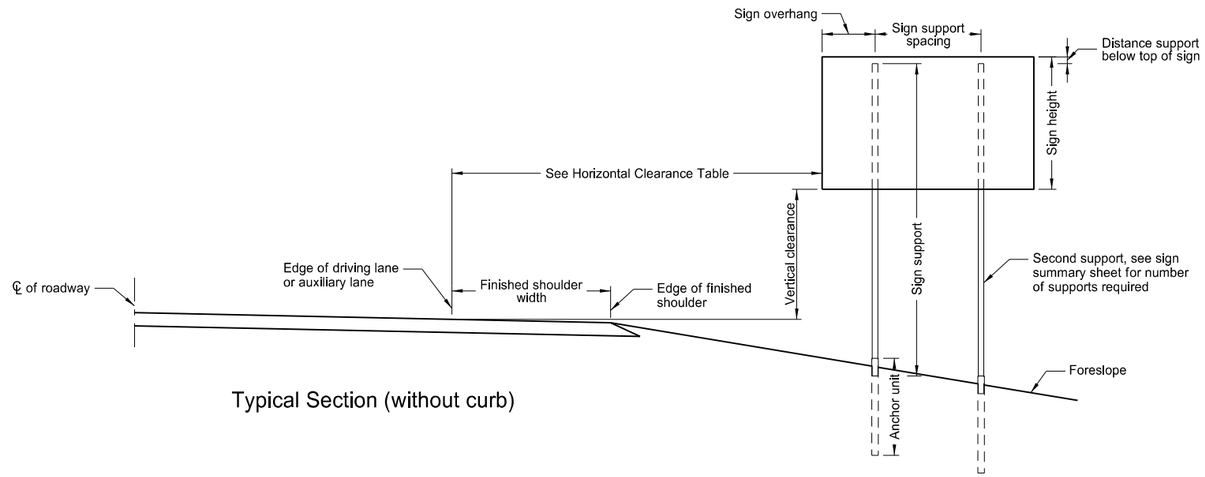
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.



Stop Sign Location
Wide Throat Intersection

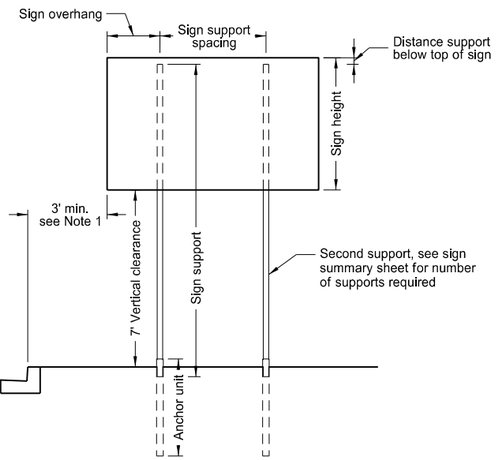
Use layout for the placement of "Stop" signs.

Radius ft.	Y-max. ft.	Y-min. ft.
40	50	15
45	50	18
50	50	21
55	50	25
60	50	28
65	50	32
70	50	35
75	50	39
80	50	43



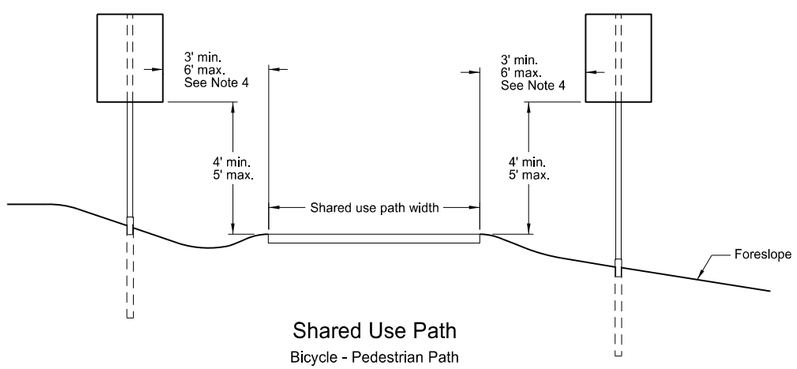
Typical Section (without curb)

Horizontal Clearance Table	
Shoulder Width ft	Offset ft
0 to 2	16
>2 to 4	18
>4 to 6	20
>6 to 8	22
>8 to 10	24



Typical Section (with curb)

Residential or Business District



Shared Use Path

Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.

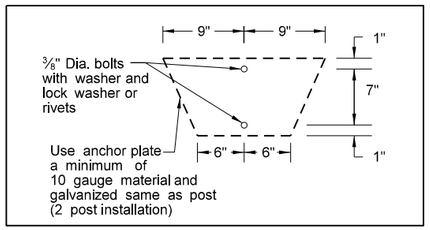
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/29/19 and the original document is stored at the North Dakota Department of Transportation

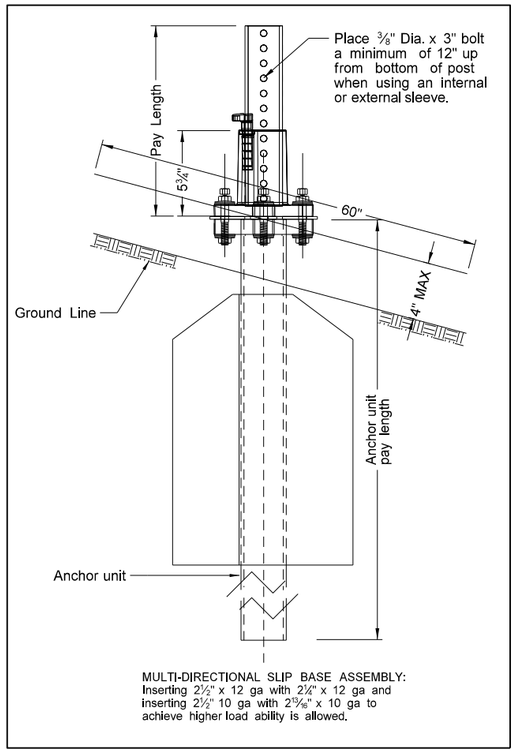
Mounting Details Perforated Tube

D-754-24

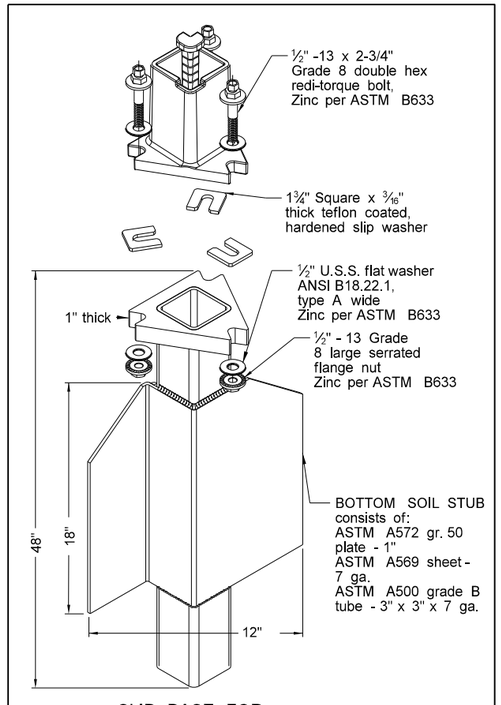
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2½(D)	12	Yes		7
3 & 4	2½	10	2⅜16	10	Yes		7

(B) - Provide a shim as specified by the manufacturer when placing 2½", 12 gauge posts in standard soils without breakaway bases. Provide breakaway base when placing the support in weak soils. The Engineer will determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.

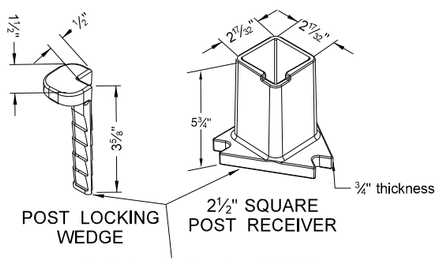




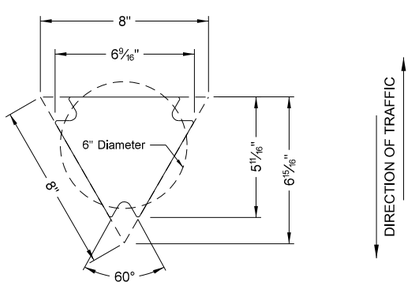
MULTI-DIRECTIONAL SLIP BASE ASSEMBLY:
Inserting 2½" x 12 ga with 2¼" x 12 ga and inserting 2½" 10 ga with 2⅜16" x 10 ga to achieve higher load ability is allowed.



SLIP BASE FOR 2½" POST



Ductile Iron Casting class 65-45-12.
Hot Dip Galvanize ASTM A153



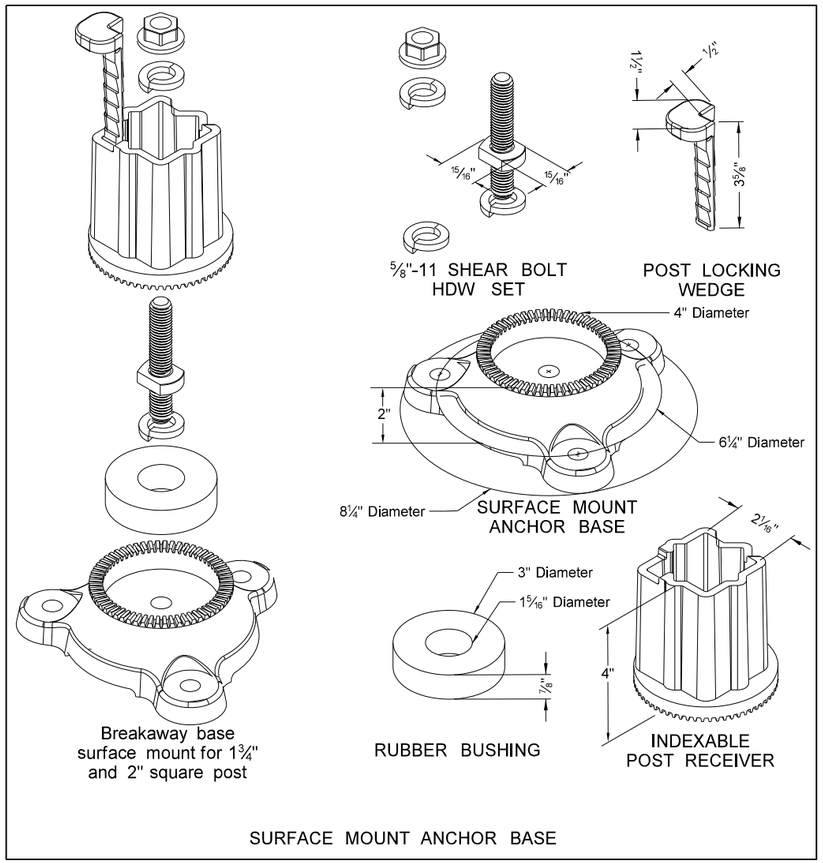
SLIP BASE DETAIL

Properties of 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 Modulud 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
2⅜16 x 2⅜16	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	0.783

The 2 ⅜16" size 10 gauge is shown as 2.19" size on the plans;
The 2½" size is shown as 2.51" size on the plans.

NOTE:

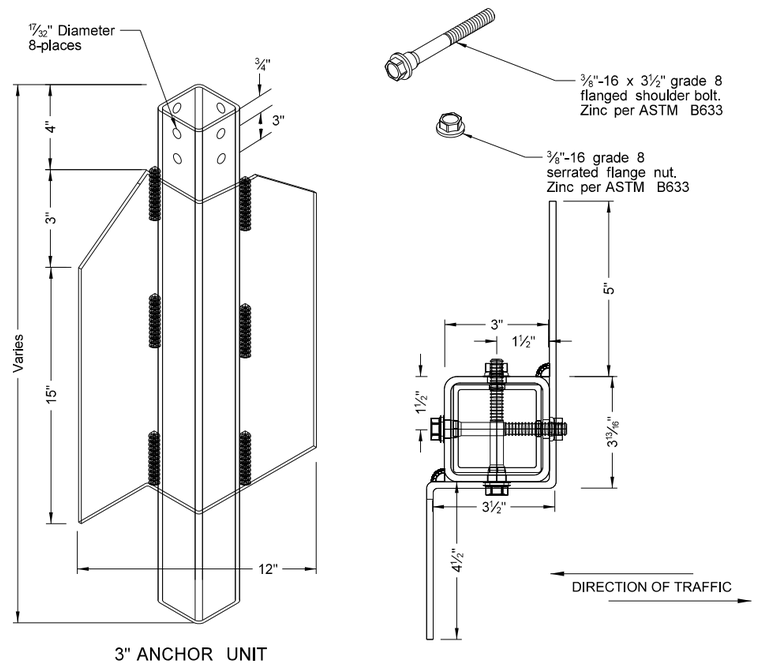
1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Provide 7 guage HRPO commmercial quality ASTM A569 and 3" x 3" x 7" guage ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanize anchor per ASTM A123/153. Tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless ortherwise noted.
3. Eliminate wings when anchor is used in concrete sidewalk.
4. Provide a minimum 8' distance between the first and fourth post on four post signs.
5. Install in accordance with manufacturers recommendation.
6. Use a minimum ½" diameter x 4" grade 8 concrete fastener for surface mount breakaway base.



SURFACE MOUNT ANCHOR BASE

SHOULDER BOLT

Shimming agent to reduce tolerance between 3" anchor unit and 2½" post.
(use standard ⅜" diameter grade 8 bolt with proper shim)



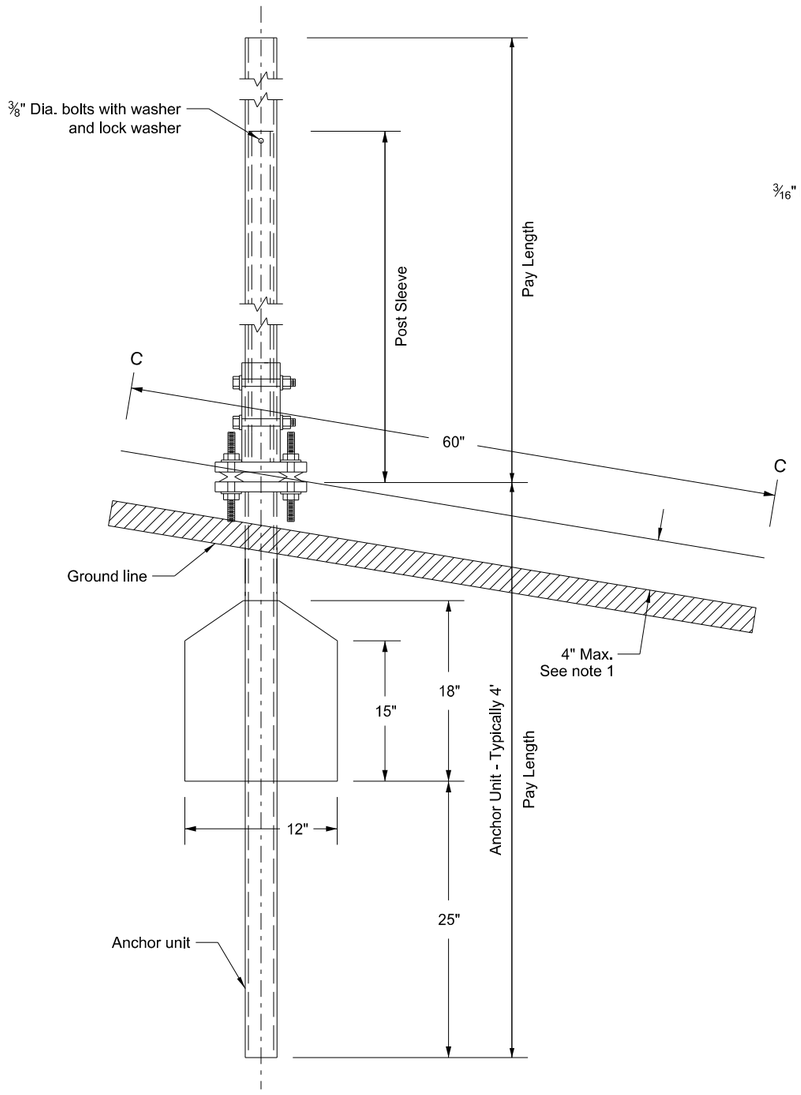
3" ANCHOR UNIT

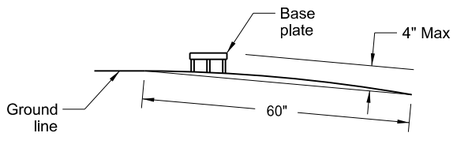
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683 on 8/29/19 and the original document is stored at the North Dakota Department of Transportation

Breakaway Coupler System for Perforated Tubes

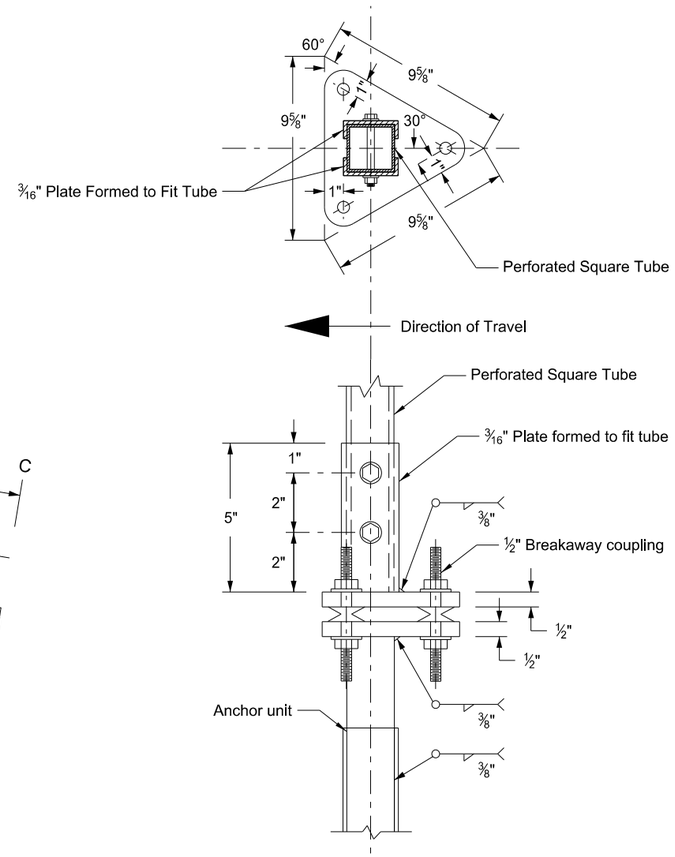
D-754-24A





Section C-C

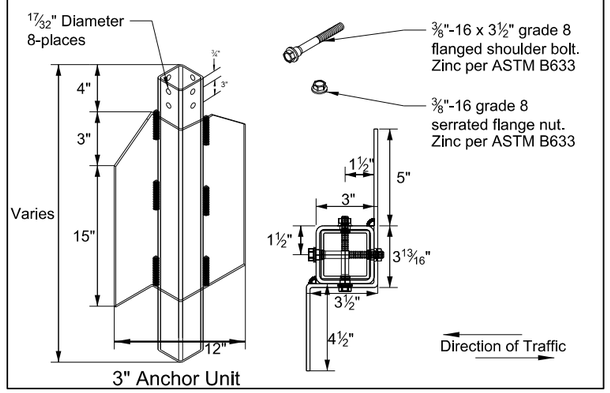
Max protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.



Base Plate with Breakaway Coupler

Shoulder Bolt

Shimming agent to reduce tolerance between 3" anchor unit with 2½" post. (use of standard ⅜" diameter grade 8 bolt allowed with proper shim)



3" Anchor Unit

Notes:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Use anchor unit of the same size and specification as the post.
3. Provide a minimum 8' distance between the first and fourth post on four post signs.
4. Use the breakaway base system on standard D-754-24 or the breakaway coupling system manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.

Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Guage
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

(B) - 2½" 12 gauge posts do not need breakaway bases unless support is placed in boggy, wet, or loose soil areas.

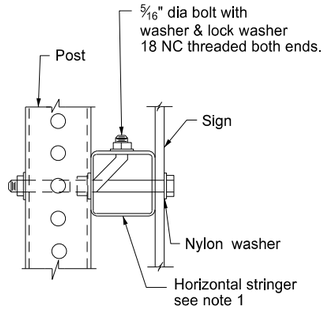
(C) - 3" anchor unit

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.

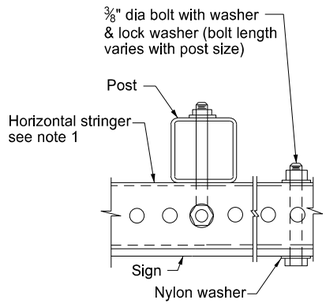
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/30/19 and the original document is stored at the North Dakota Department of Transportation

Mounting Details Perforated Tube

D-754-25

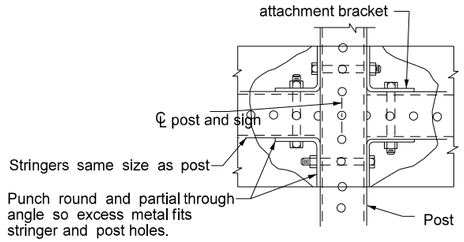


Side View



Top View

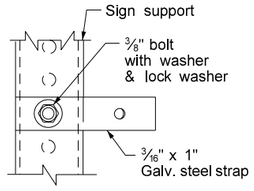
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



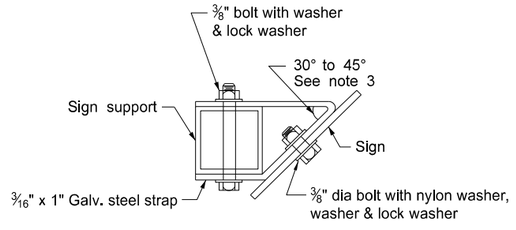
STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

Note:

1. Horizontal stringers - Use perforated tubes or 1¾" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
2. Use minimum outside diameter 15/16" ±1/16" and 10 gauge thick metal washers on sign face.
3. Place No Parking signs with directional arrows at a 30 to 45 degree angle with the line of traffic flow. Turning the support to the correct angle for No Parking signs requiring the above angles is allowed. If the No Parking sign is placed with another sign that requires placement at a 90 degree angle with the line of traffic flow, use the detailed angle strap to mount the No Parking sign. Use flat washers and lock washers with all nylon washers.
4. Punching the sign backing and placing the bolt through the sign, the stringer and the post is allowed in lieu of using the bent bolt to attach the post to the stringer.
5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.

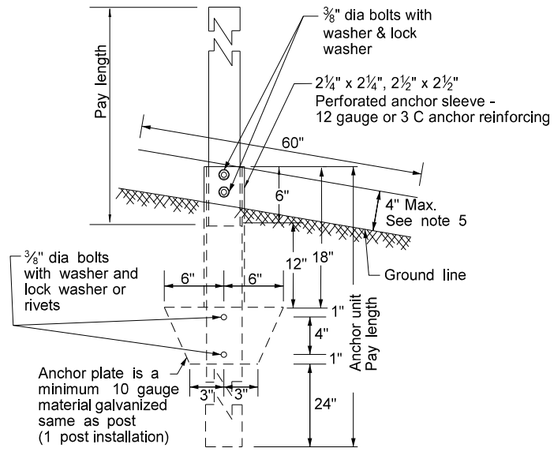


Side View



Top View

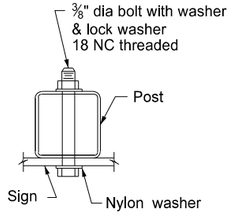
STRAP DETAIL



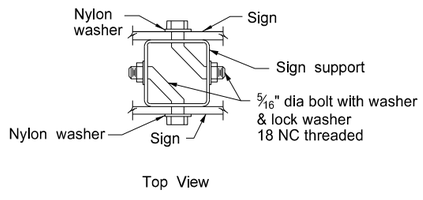
ANCHOR UNIT AND POST ASSEMBLY

Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2½(D)	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

(B) - When placing 2½", 12 gauge posts in standard soils without breakaway bases, provide a shim as specified by the manufacturer. Provide breakaway base when placing the support in weak soils. Engineer will determine if soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.

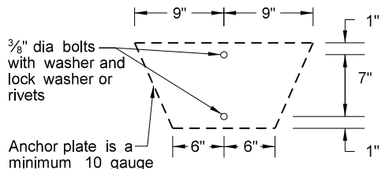


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



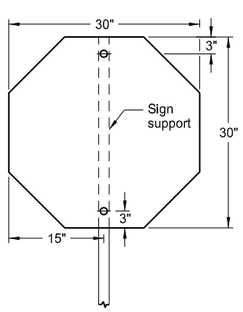
Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.4	Cross Sect. area In.2	Section Modulus In.3
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	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	0.783

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

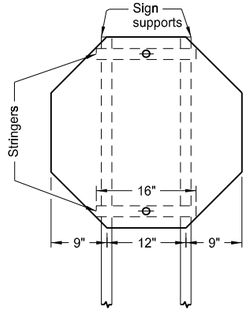
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
7-8-14	Revised Note 3.
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683 , on 8/30/19 and the original document is stored at the North Dakota Department of Transportation

SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

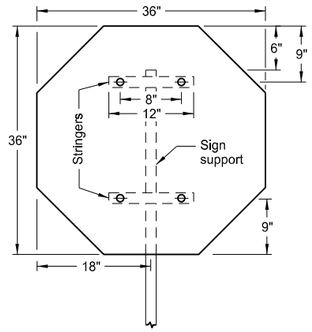


1 Post

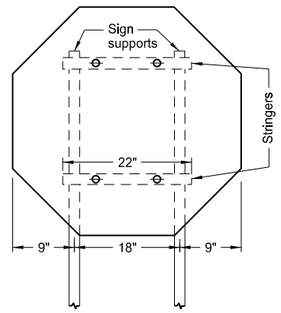


2 Posts

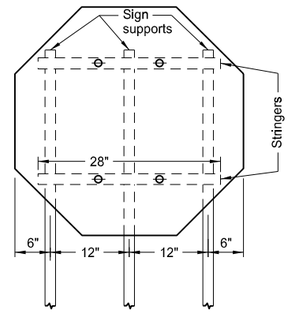
Assembly No. 1



1 Post



2 Posts

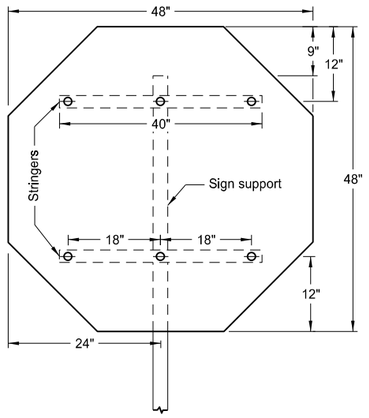


3 Posts

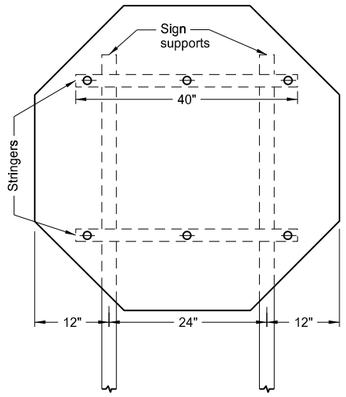
Assembly No. 2

Notes:

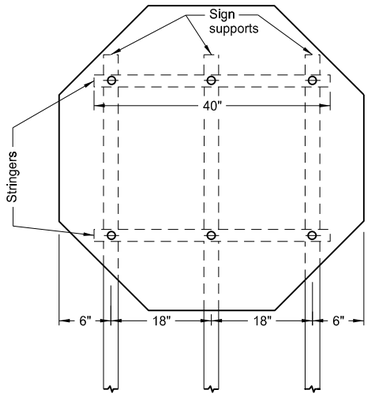
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.



1 Post

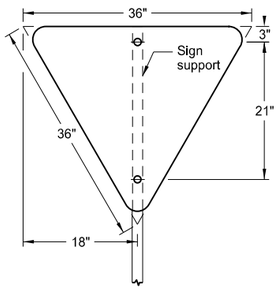


2 Posts

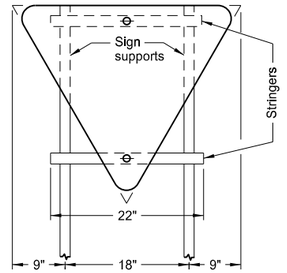


3 Posts

Assembly No. 3

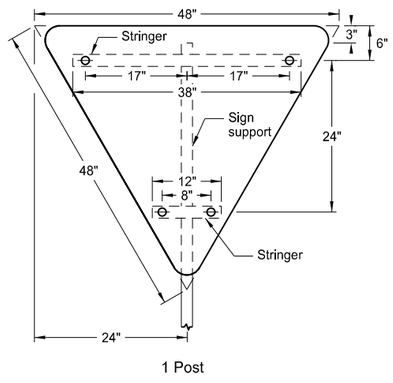


1 Post

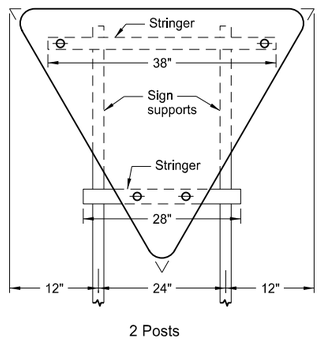


2 Posts

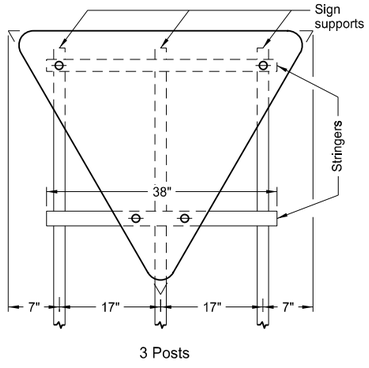
Assembly No. 4



1 Post



2 Posts



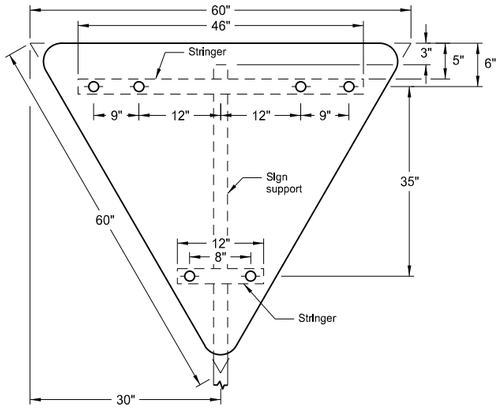
3 Posts

Assembly No. 5

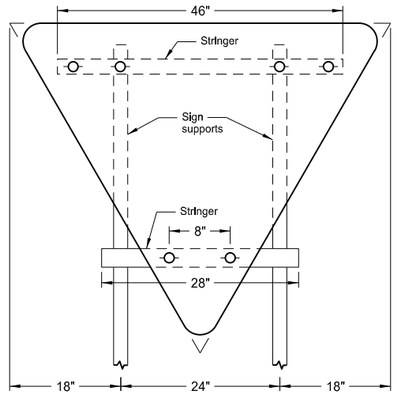
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18 8-30-19	Updated notes to active voice. New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/30/19 and the original document is stored at the North Dakota Department of Transportation

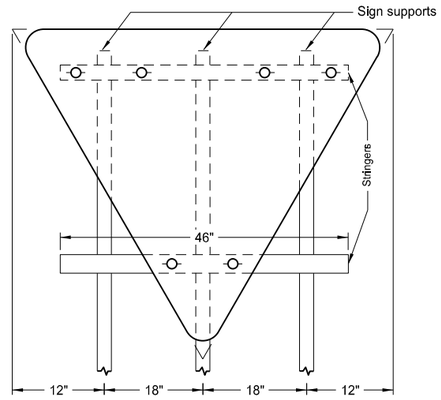
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS



1 Post



2 Posts

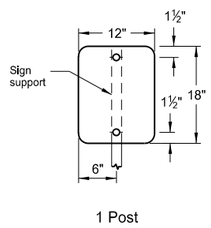


3 Posts

Assembly No. 6

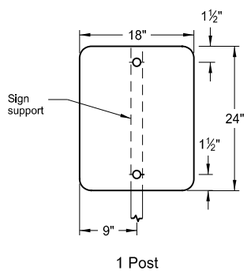
Notes:

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.



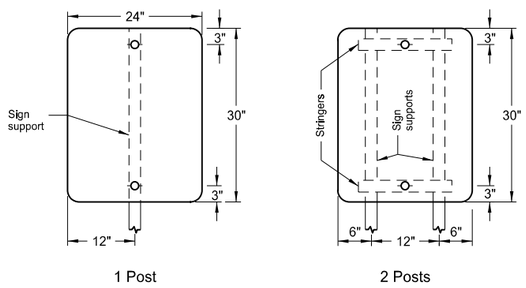
1 Post

Assembly No. 7



1 Post

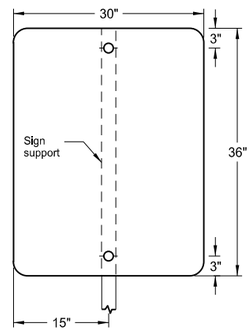
Assembly No. 8



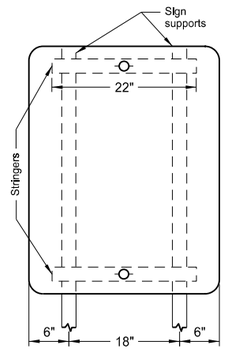
1 Post

2 Posts

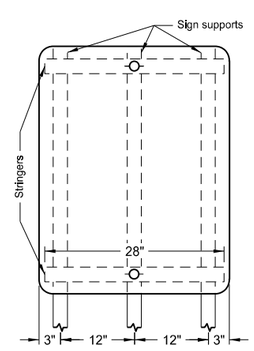
Assembly No. 9



1 Post

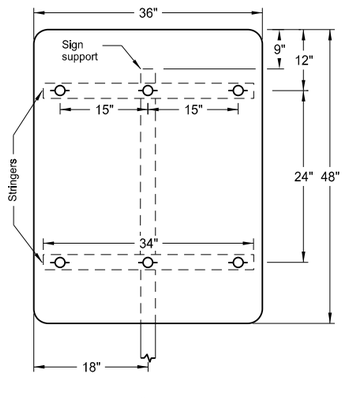


2 Posts

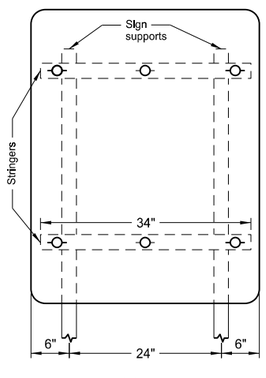


3 Posts

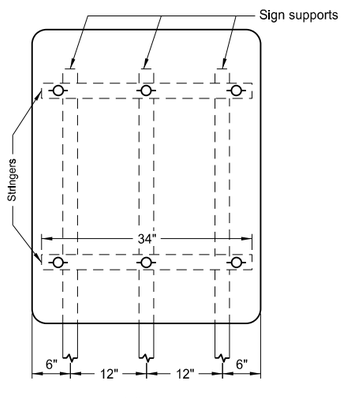
Assembly No. 10



1 Post



2 Posts



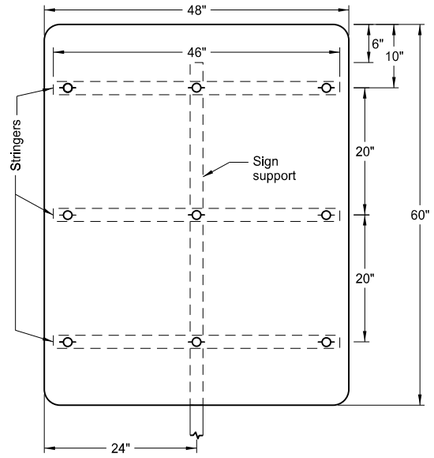
3 Posts

Assembly No. 11

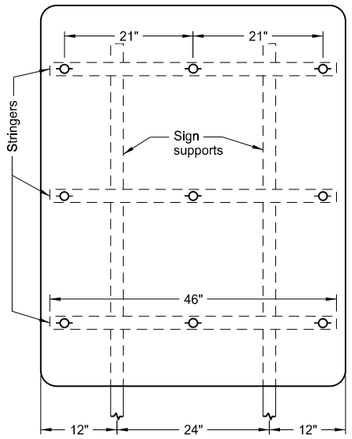
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18 8-30-19	Updated notes to active voice. New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/30/19 and the original document is stored at the North Dakota Department of Transportation

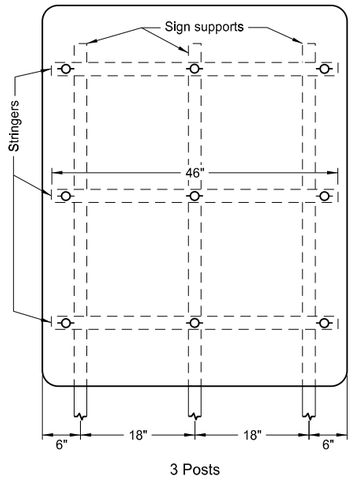
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



1 Post

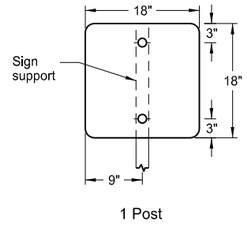


2 Posts



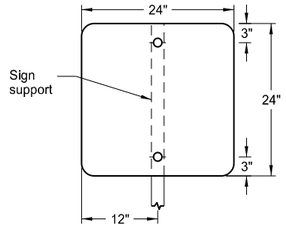
3 Posts

Assembly No. 12

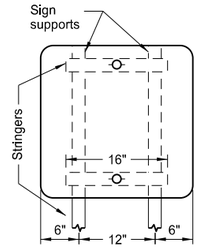


1 Post

Assembly No. 13

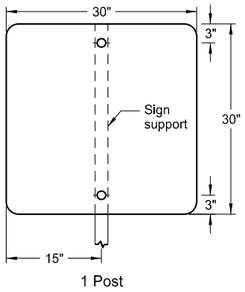


1 Post

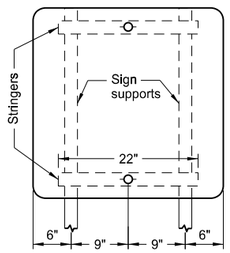


2 Posts

Assembly No. 14

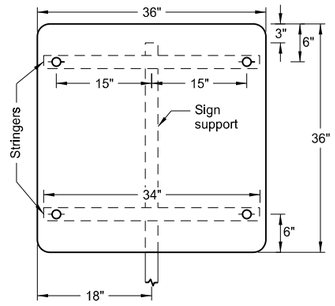


1 Post

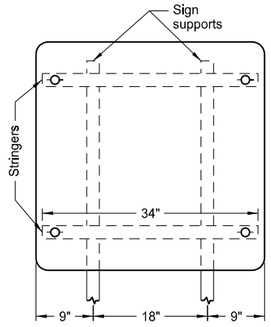


2 Posts

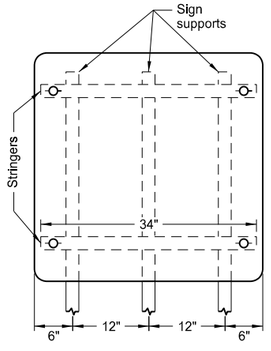
Assembly No. 15



1 Post

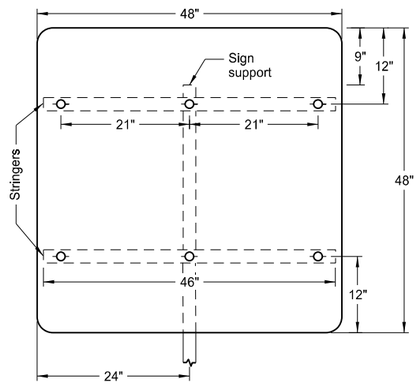


2 Posts

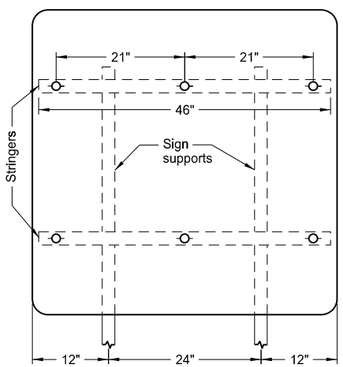


3 Posts

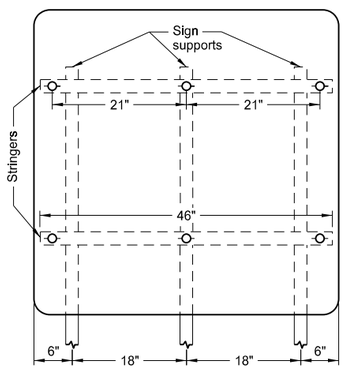
Assembly No. 16



1 Post



2 Posts



3 Posts

Assembly No. 17

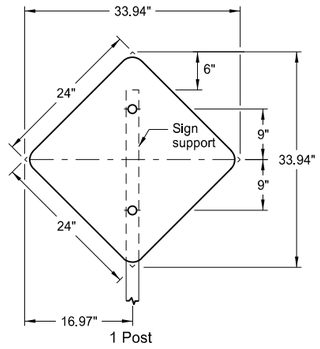
Notes:

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

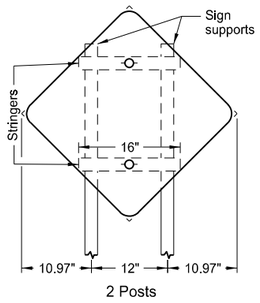
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated to active voice & changed Assembly 16 post spacing.
8-30-19	New Design Engineer PE Stamp.

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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS

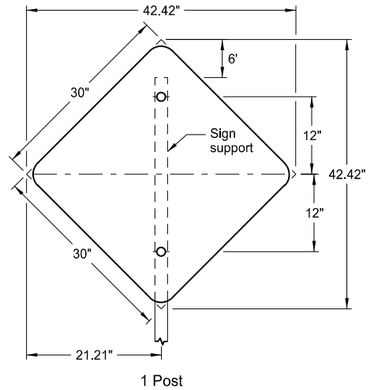


1 Post

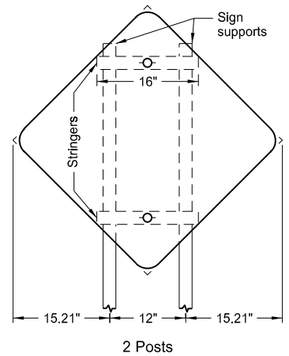


2 Posts

Assembly No. 18

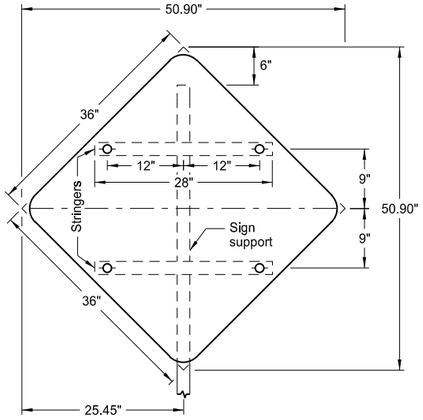


1 Post

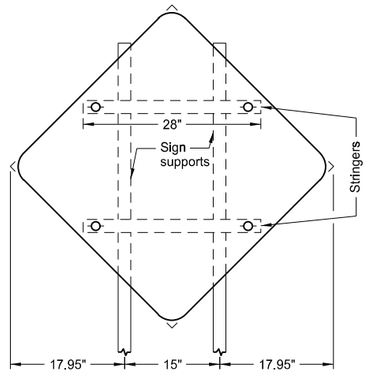


2 Posts

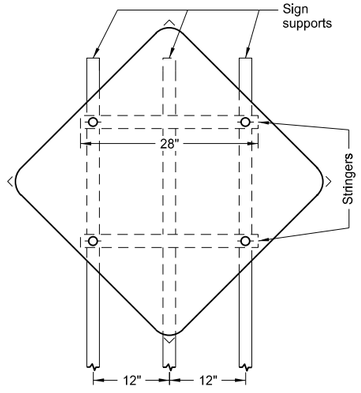
Assembly No. 19



1 Post

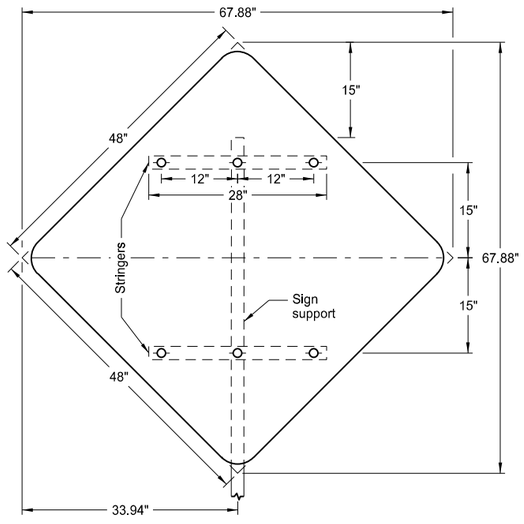


2 Posts

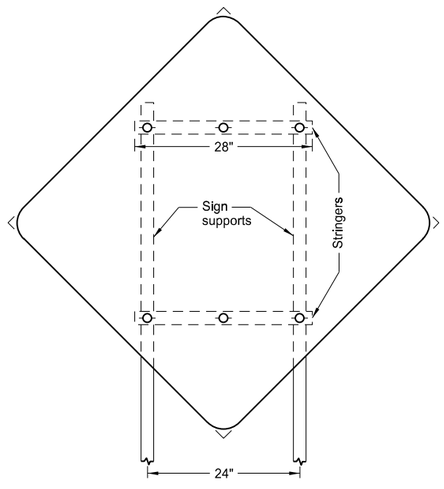


3 Posts

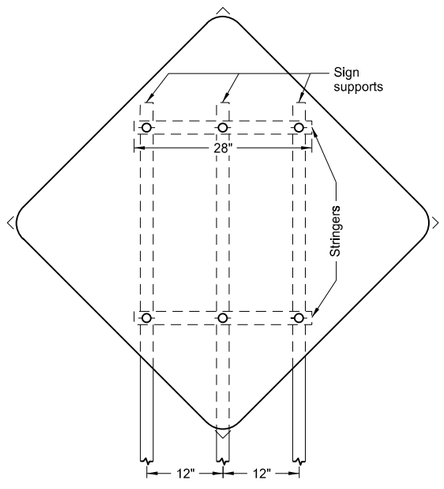
Assembly No. 20



1 Post



2 Posts



3 Posts

Assembly No. 21

Notes:

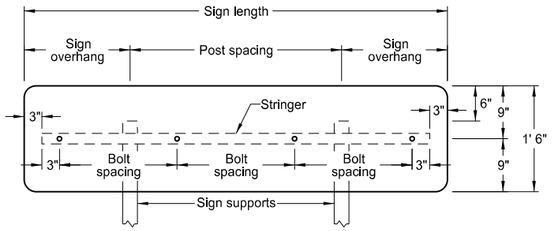
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.

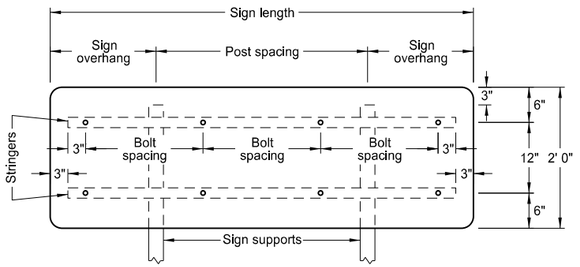
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/30/19 and the original document is stored at the North Dakota Department of Transportation

SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS

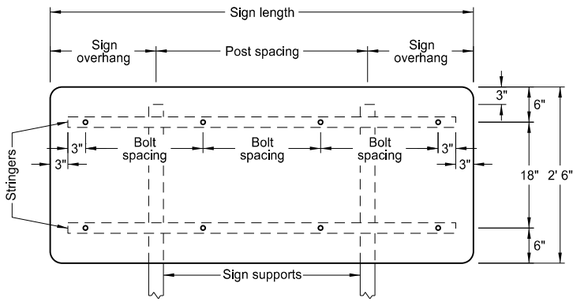
D-754-48



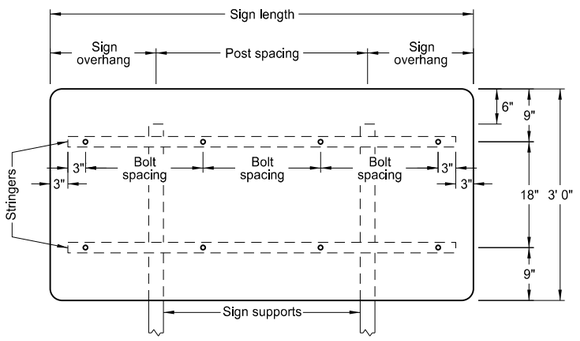
VARIES X 1'-6"



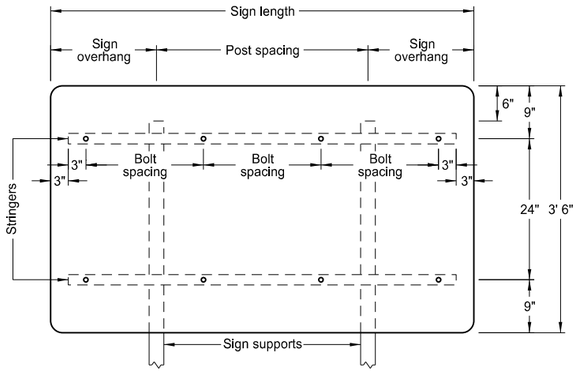
VARIES X 2'-0"



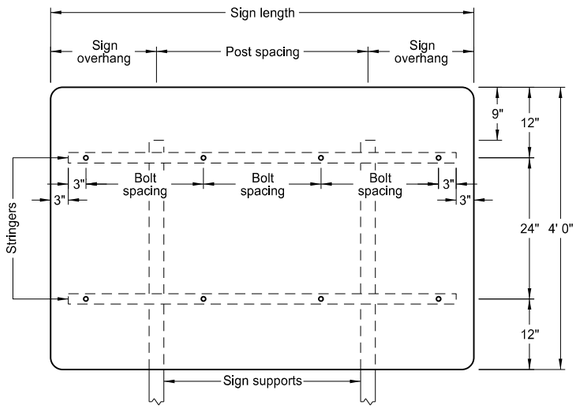
VARIES X 2'-6"



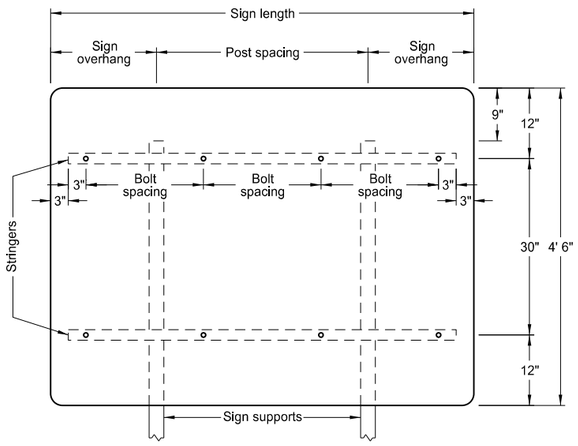
VARIES X 3'-0"



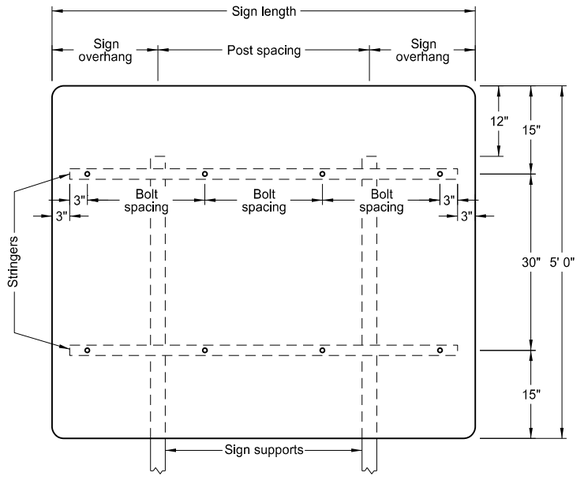
VARIES X 3'-6"



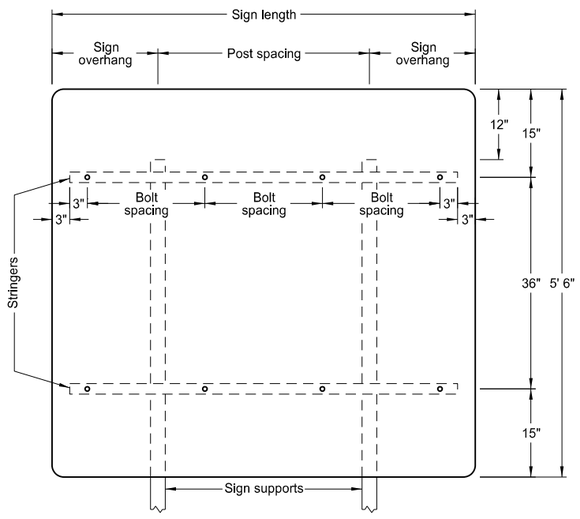
VARIES X 4'-0"



VARIES X 4'-6"



VARIES X 5'-0"



VARIES X 5'-6"

2 POSTS			
Sign Length	Sign Overhang	Post Spacing	Bolt Spacing
4'-0"	1'-0"	2'-0"	18"
4'-6"	1'-3"	2'-0"	21"
5'-0"	1'-0"	3'-0"	24"
5'-6"	1'-3"	3'-0"	18"
6'-0"	1'-6"	3'-0"	20"
6'-6"	1'-3"	4'-0"	22"
7'-0"	1'-6"	4'-0"	24"
7'-6"	1'-9"	4'-0"	2-20" & 2-19"
8'-0"	2'-0"	4'-0"	21"
8'-6"	1'-9"	5'-0"	2-22" & 2-23"
9'-0"	2'-0"	5'-0"	24"
9'-6"	1'-9"	6'-0"	4-20" & 1-22"
10'-0"	2'-0"	6'-0"	2-21" & 3-22"
10'-6"	2'-3"	6'-0"	4-23" & 1-22"
11'-0"	2'-6"	6'-0"	24"
11'-6"	2'-9"	6'-0"	21"
12'-0"	2'-0"	8'-0"	22"
12'-6"	2'-3"	8'-0"	23"
13'-0"	2'-6"	8'-0"	24"
13'-6"	2'-9"	8'-0"	3-22" & 4-21"
14'-0'	3'-0"	8'-0"	2-23" & 5-22"
14'-6"	3'-3"	8'-0"	6-23" & 1-24"
15'-0"	3'-6"	8'-0"	24"
15'-6"	2'-9"	10'-0"	6-22" & 2-21"
16'-0"	3'-0"	10'-0"	4-23" & 4-22"
16'-6"	3'-3"	10'-0"	6-23" & 2-24"
17'-0"	3'-6"	10'-0"	24"
17'-6"	3'-9"	10'-0"	22"
18'-0"	3'-0"	12'-0"	6-23" & 3-22"
18'-6"	3'-3"	12'-0"	6-23" & 3-24"
19'-0"	3'-6"	12'-0"	24"
19'-6"	3'-9"	12'-0"	8-22" & 2-23"
20'-0"	4'-0"	12'-0"	8-23" & 2-22"

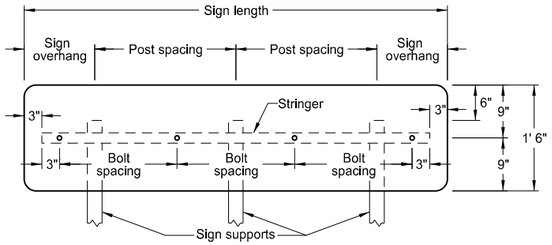
Notes:

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

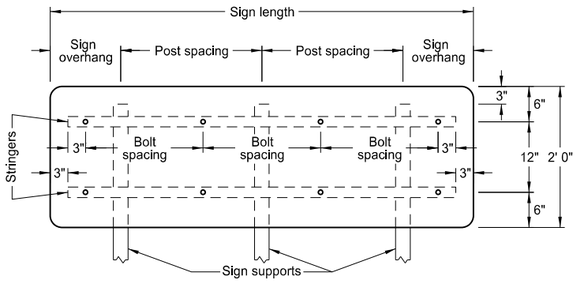
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
8-30-18 9-04-19	Updated notes to active voice. New Design Engineer PE Stamp.

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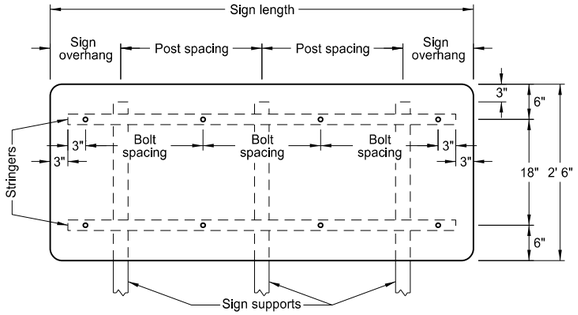
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS



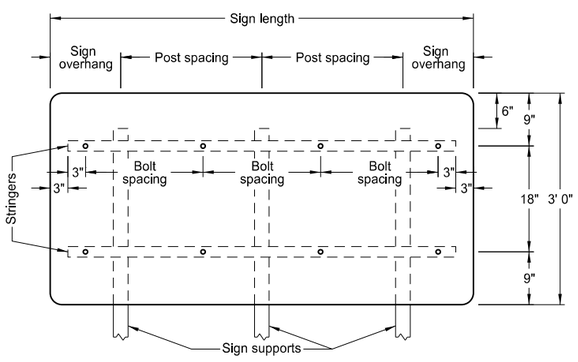
VARIES X 1'-6"



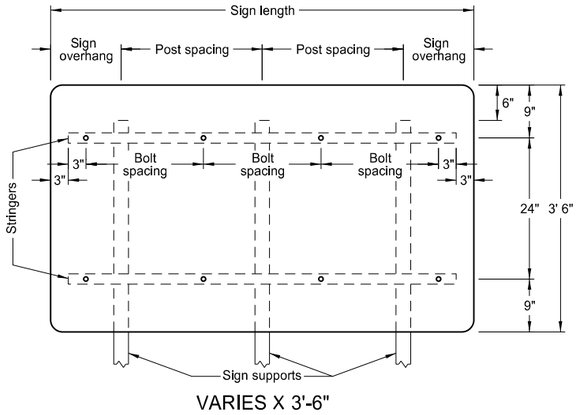
VARIES X 2'-0"



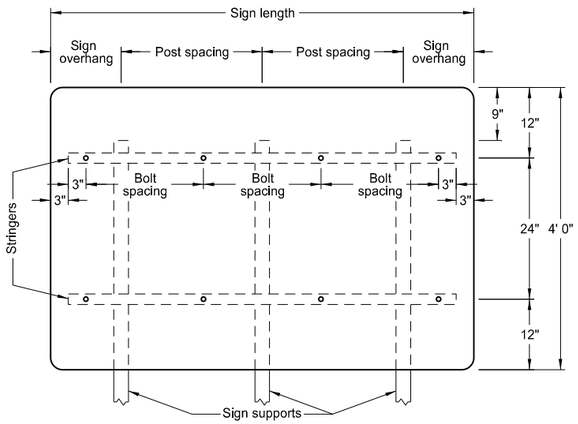
VARIES X 2'-6"



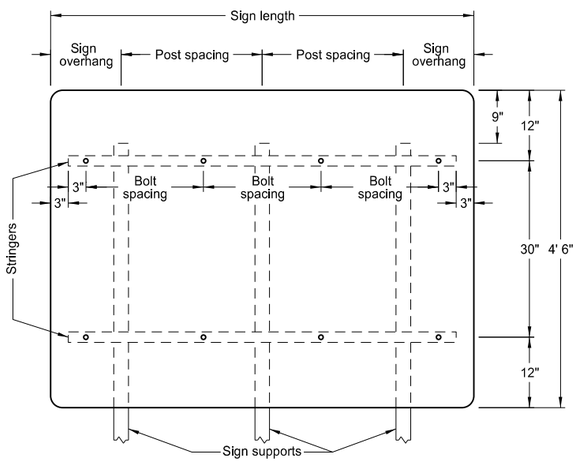
VARIES X 3'-0"



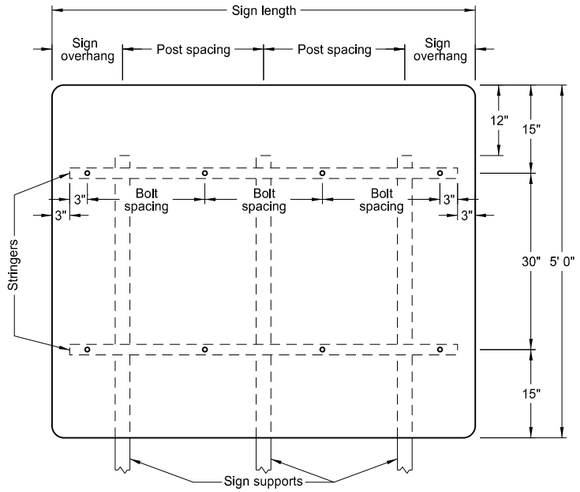
VARIES X 3'-6"



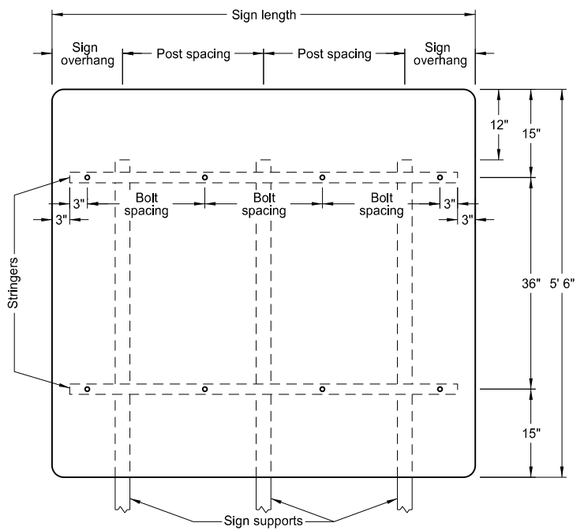
VARIES X 4'-0"



VARIES X 4'-6"



VARIES X 5'-0"



VARIES X 5'-6"

3 POSTS			
Sign Length	Sign Overhang	Post Spacing	Bolt Spacing
4'-0"	0'-6"	1'-6"	18"
4'-6"	0'-6"	1'-9"	21"
5'-0"	0'-6"	2'-0"	24"
5'-6"	1'-3"	1'-6"	18"
6'-0"	1'-0"	2'-0"	20"
6'-6"	1'-3"	2'-0"	22"
7'-0"	1'-6"	2'-0"	24"
7'-6"	1'-6"	2'-3"	2-20" & 2-19"
8'-0"	1'-9"	2'-3"	21"
8'-6"	2'-0"	2'-3"	2-22" & 2-23"
9'-0"	1'-6"	3'-0"	24"
9'-6"	1'-9"	3'-0"	4-20" & 1-22"
10'-0"	1'-9"	3'-3"	2-21" & 3-22"
10'-6"	1'-9"	3'-6"	4-23" & 1-22"
11'-0"	2'-0"	3'-6"	24"
11'-6"	2'-3"	3'-6"	21"
12'-0"	2'-4"	3'-8"	22"
12'-6"	2'-5"	3'-10"	23"
13'-0"	2'-6"	4'-0"	24"
13'-6"	2'-9"	4'-0"	3-22" & 4-21"
14'-0'	3'-0"	4'-0"	2-23" & 5-22"
14'-6"	3'-3"	4'-0"	6-23" & 1-24"
15'-0"	3'-6"	4'-0"	24"
15'-6"	2'-4"	5'-5"	6-22" & 2-21"
16'-0"	2'-5"	5'-7"	4-23" & 4-22"
16'-6"	2'-5"	5'-10"	6-23" & 2-24"
17'-0"	2'-6"	6'-0"	24"
17'-6"	3'-3"	5'-6"	22"
18'-0"	3'-6"	5'-6"	6-23" & 3-22"
18'-6"	3'-9"	5'-6"	6-23" & 3-24"
19'-0"	3'-6"	6'-0"	24"
19'-6"	4'-3"	5'-6"	8-22" & 2-23"
20'-0"	4'-4"	5'-8"	8-23" & 2-22"

Notes:

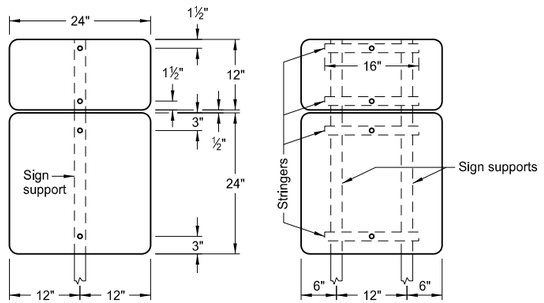
1. Use 0.100 minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-04-19	New Design Engineer PE Stamp.

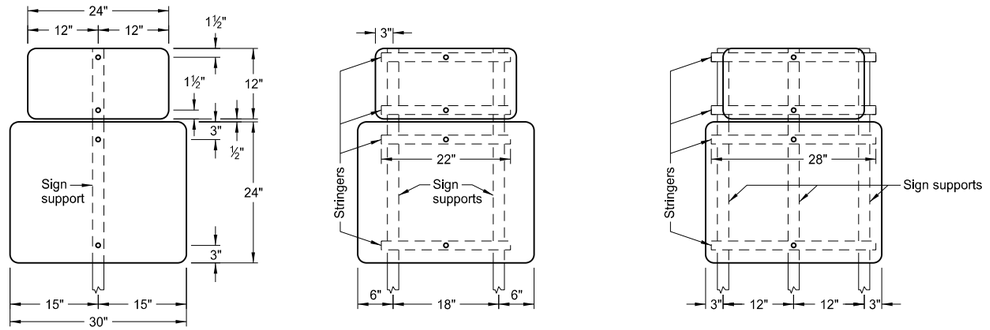
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

D-754-51



1 Post 2 Posts

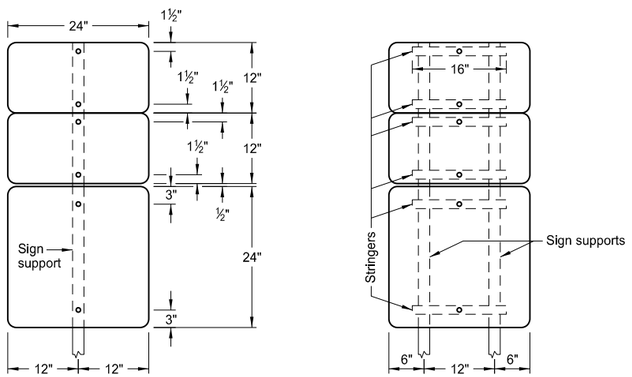


1 Post 2 Posts 3 Posts

ASSEMBLY NO. 371 ASSEMBLY NO. 372

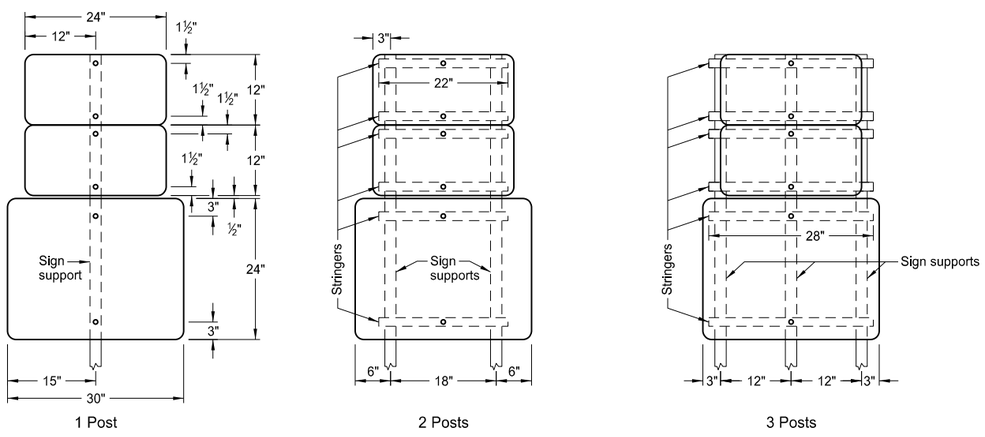
Notes:

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.



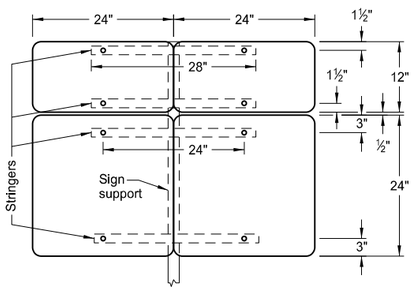
1 Post 2 Posts 3 Posts

ASSEMBLY NO. 373

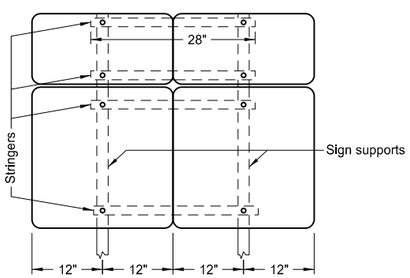


1 Post 2 Posts 3 Posts

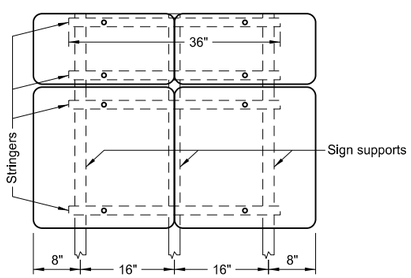
ASSEMBLY NO. 374



1 Post



2 Posts



3 Posts

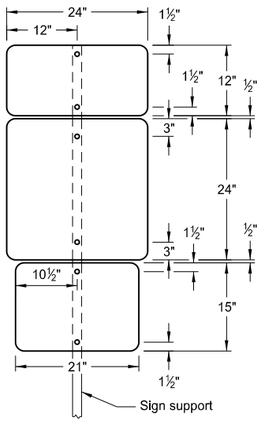
ASSEMBLY NO. 375

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18 9-04-19	Updated notes to active voice. New Design Engineer PE Stamp.

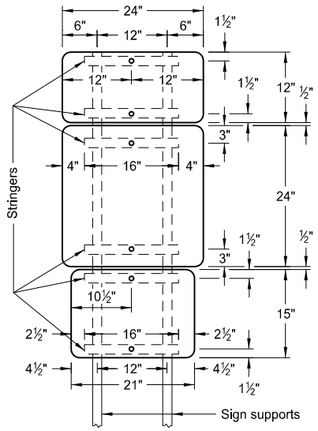
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

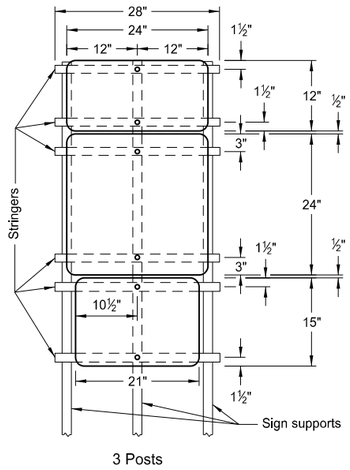
D-754-53



1 Post

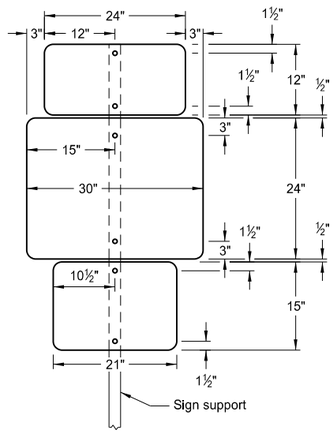


2 Posts

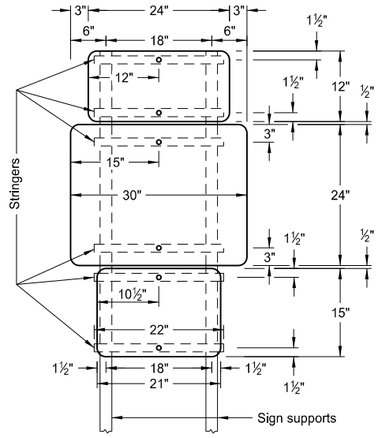


3 Posts

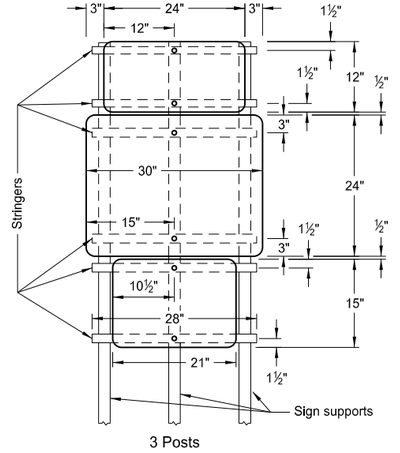
ASSEMBLY NO. 379



1 Post

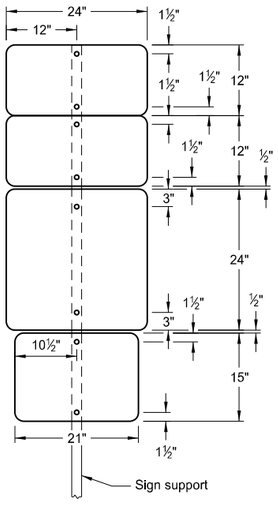


2 Posts

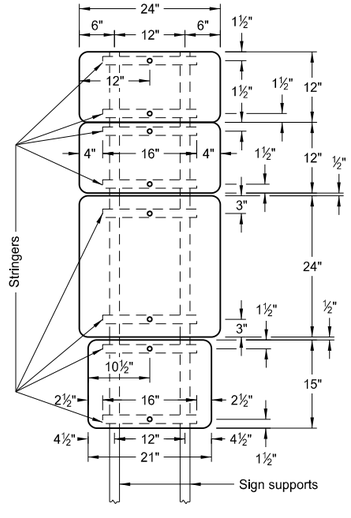


3 Posts

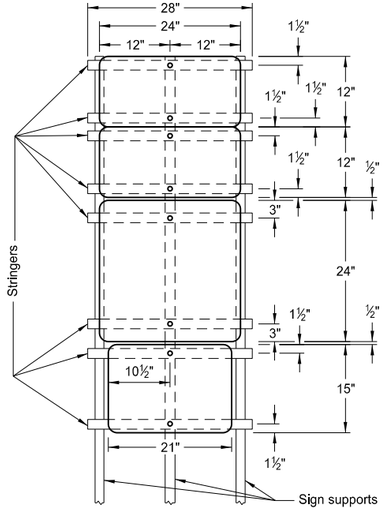
ASSEMBLY NO. 380



1 Post

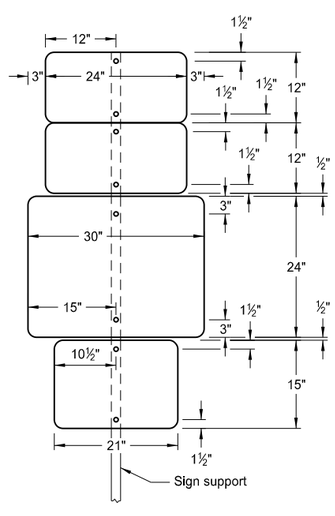


2 Posts

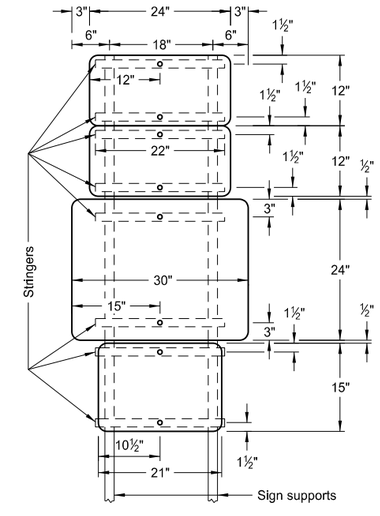


3 Posts

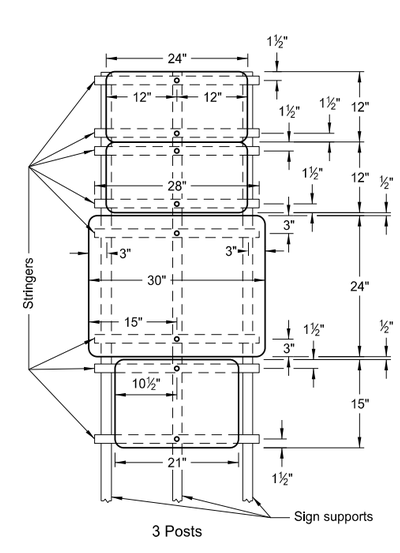
ASSEMBLY NO. 381



1 Post



2 Posts



3 Posts

ASSEMBLY NO. 382

Notes:

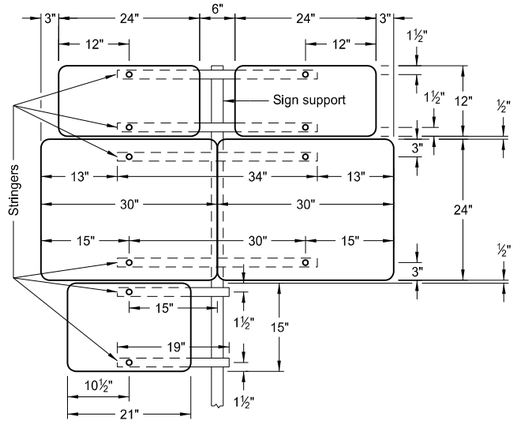
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-04-19	New Design Engineer PE Stamp.

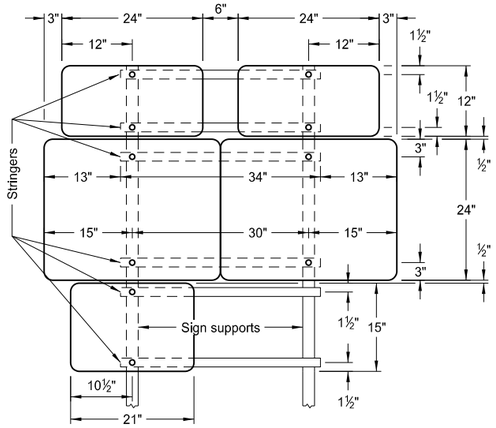
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

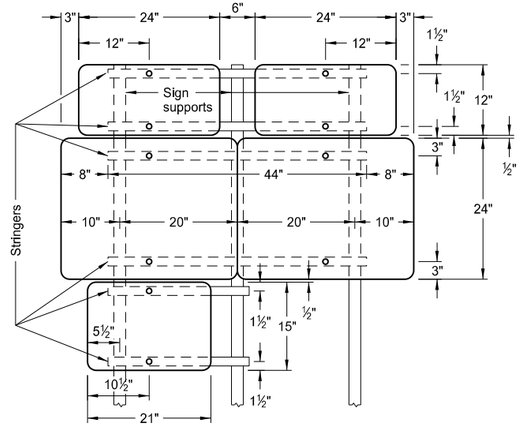
D-754-55



1 Post

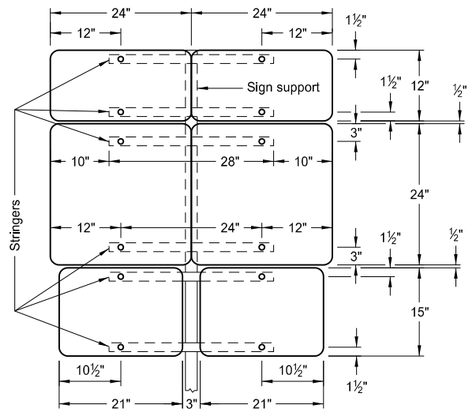


2 Posts

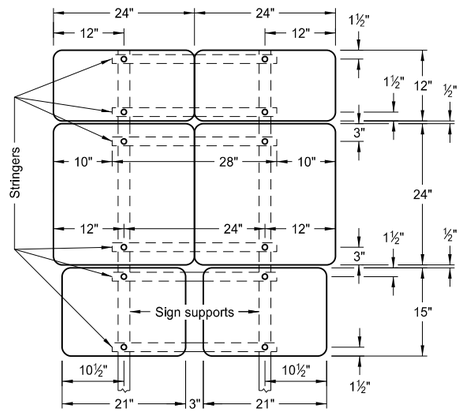


3 Posts

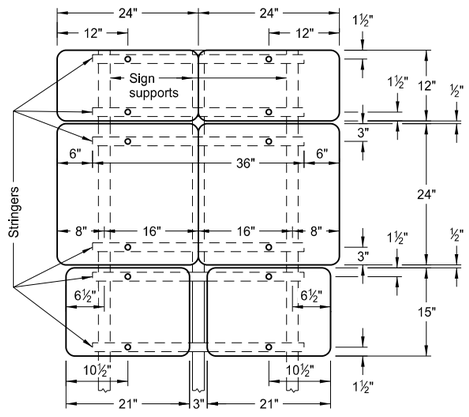
ASSEMBLY 386



1 Post

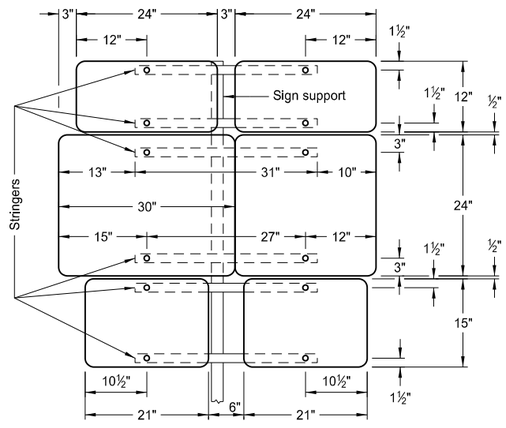


2 Posts

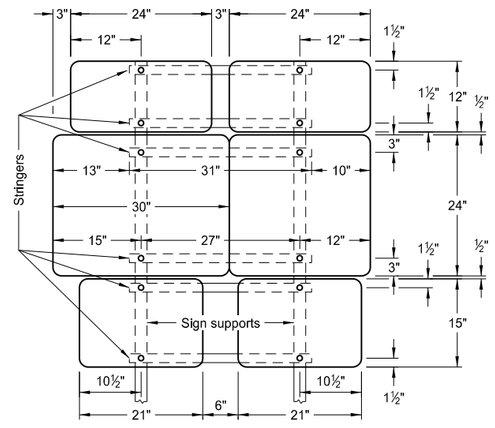


3 Posts

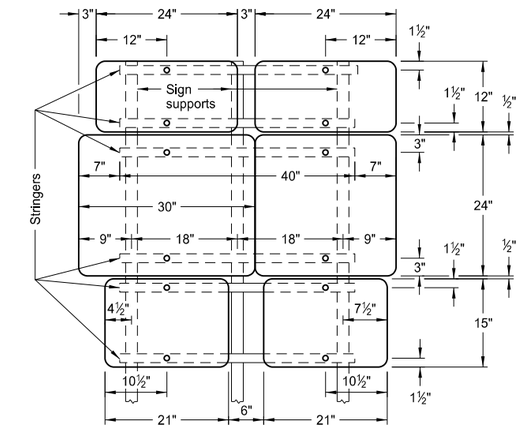
ASSEMBLY 387



1 Post



2 Posts



3 Posts

ASSEMBLY 388

Notes:

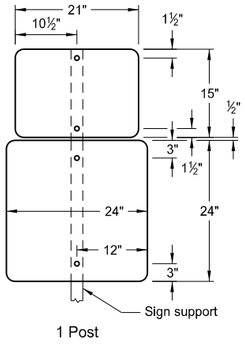
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18 9-04-19	Updated notes to active voice. New Design Engineer PE Stamp.

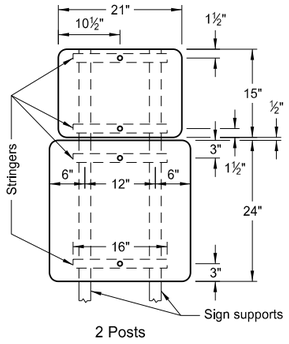
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

D-754-57

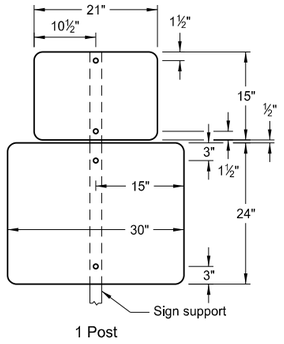


1 Post

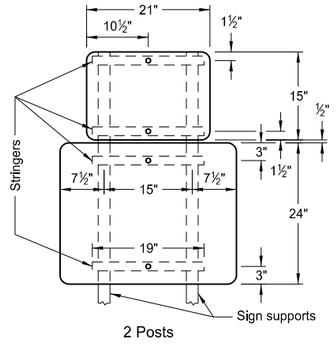


2 Posts

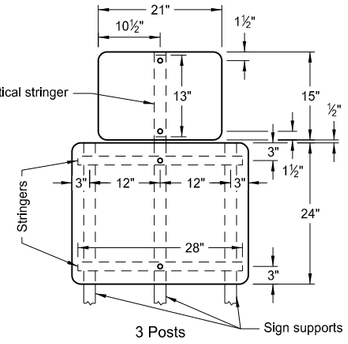
ASSEMBLY 391



1 Post

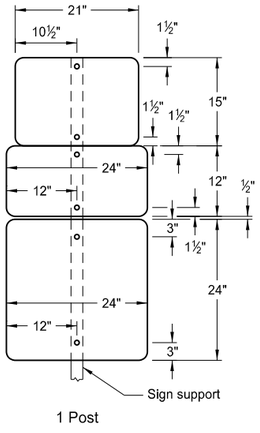


2 Posts

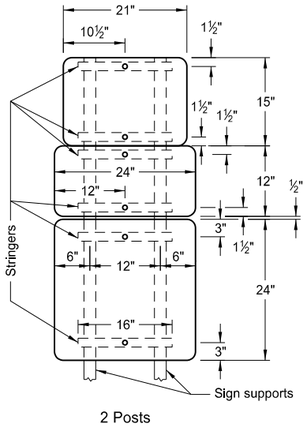


3 Posts

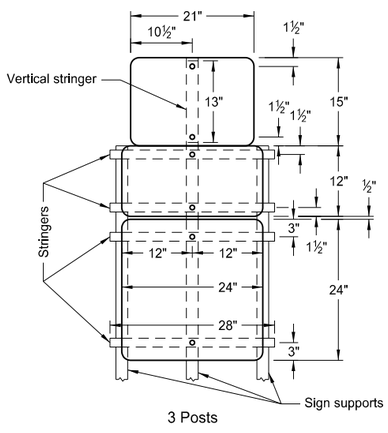
ASSEMBLY 392



1 Post

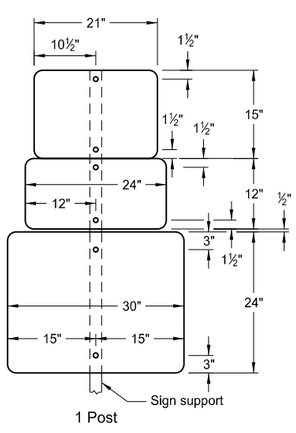


2 Posts

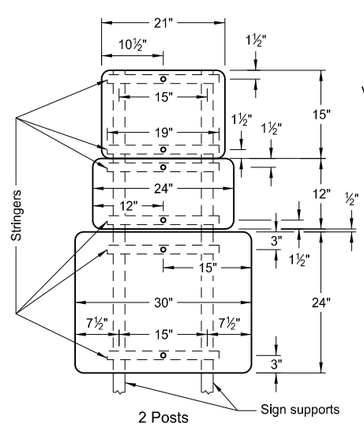


3 Posts

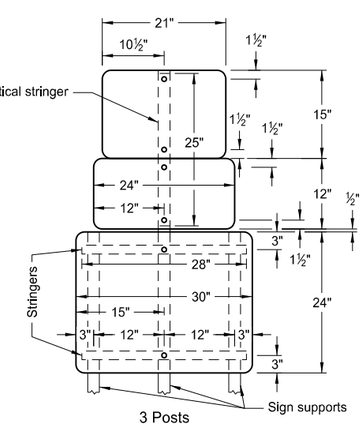
ASSEMBLY 393



1 Post

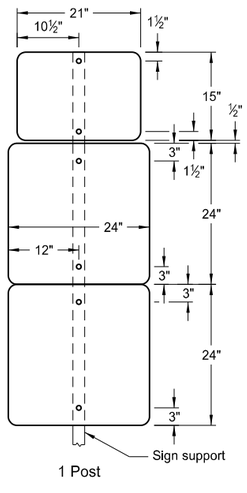


2 Posts

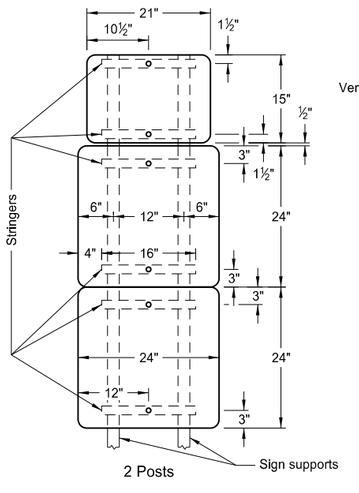


3 Posts

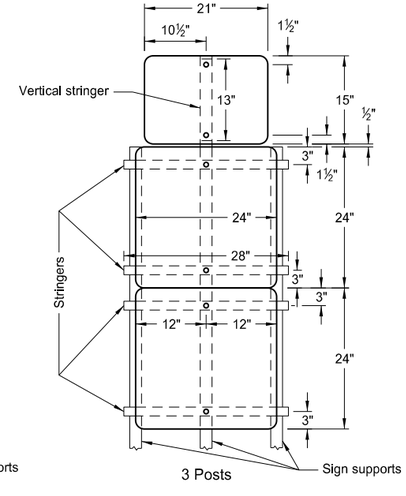
ASSEMBLY 394



1 Post



2 Posts



3 Posts

ASSEMBLY 395

Notes:

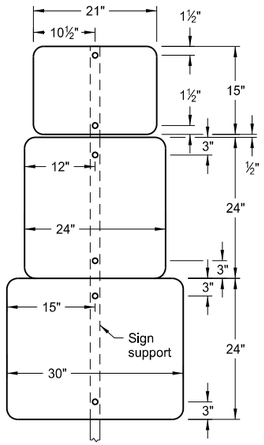
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated to active voice & added dimension to Assembly 393 & 394.
9-04-19	New Design Engineer PE Stamp.

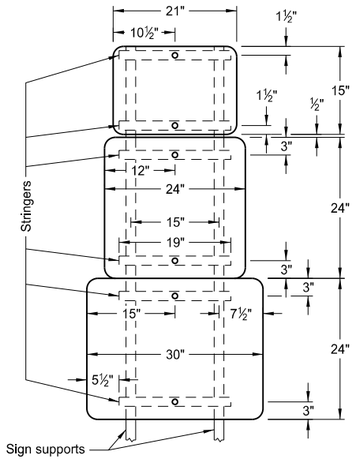
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 9/04/19 and the original document is stored at the North Dakota Department of Transportation

SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

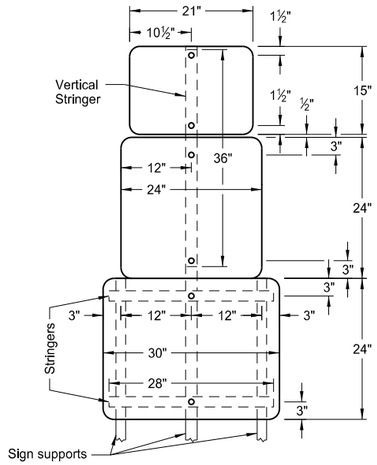
D-754-58



1 Post

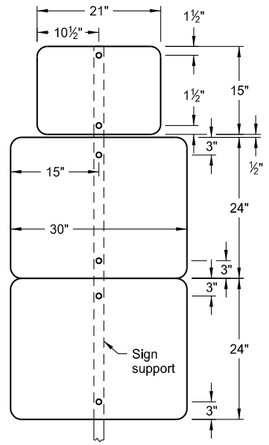


2 Posts

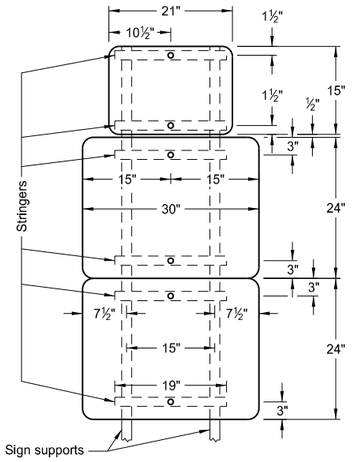


3 Posts

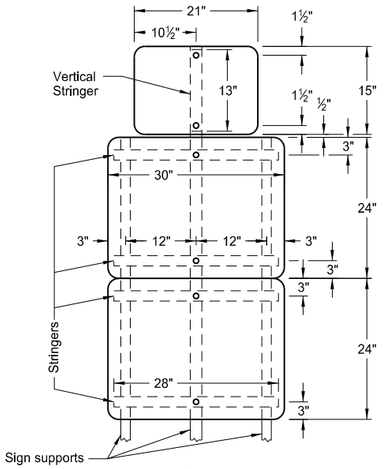
ASSEMBLY 396



1 Post

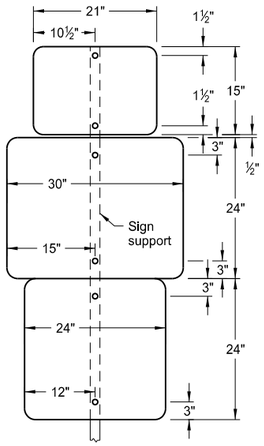


2 Posts

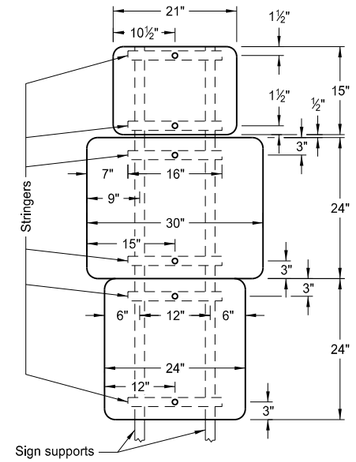


3 Posts

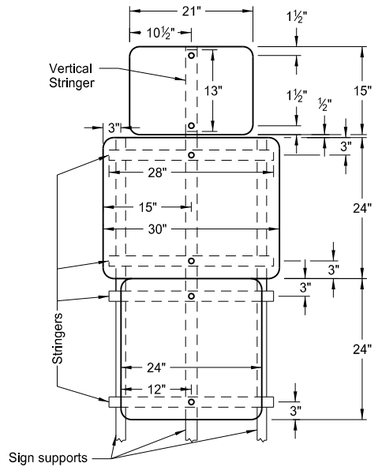
ASSEMBLY 397



1 Post

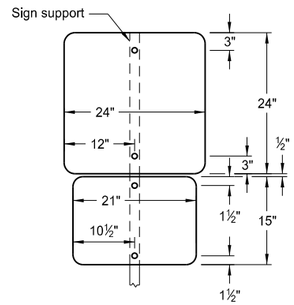


2 Posts

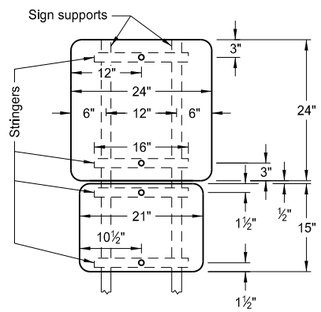


3 Posts

ASSEMBLY 398



1 Post



2 Posts

ASSEMBLY 399

Notes:

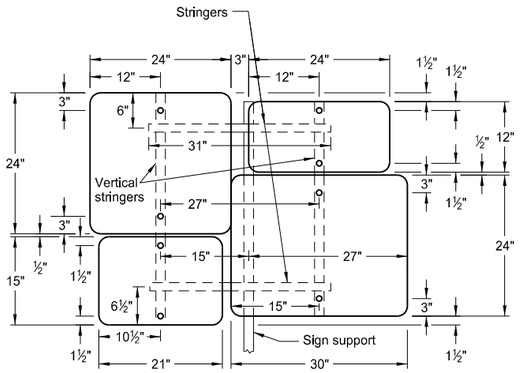
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated to active voice & added Assembly 398 dimension.
9-04-19	New Design Engineer PE Stamp.

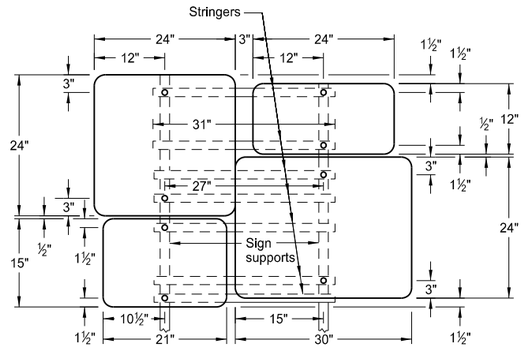
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

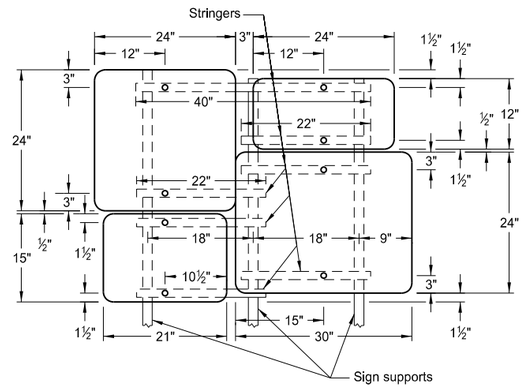
D-754-60



1 Post



2 Posts



3 Posts

ASSEMBLY NO. 403

Notes:

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

1 Post

2 Posts

3 Posts

ASSEMBLY NO. 404

1 Post

2 Posts

3 Posts

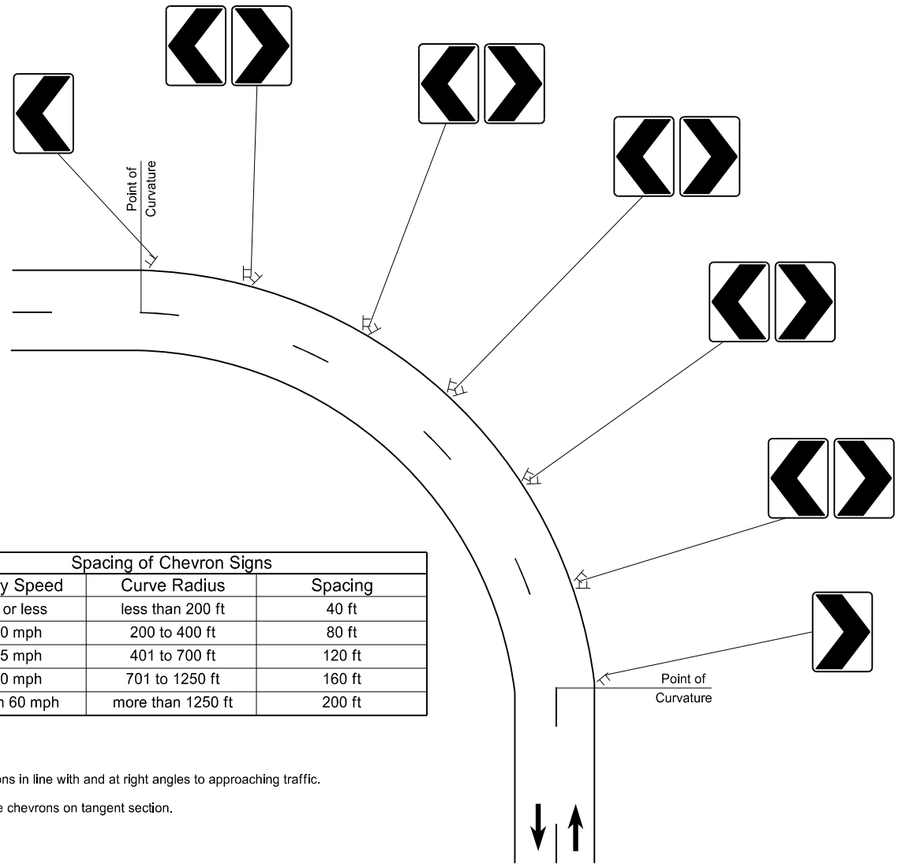
ASSEMBLY NO. 405

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-04-19	New Design Engineer PE Stamp.

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CHEVRON INSTALLATION DETAILS

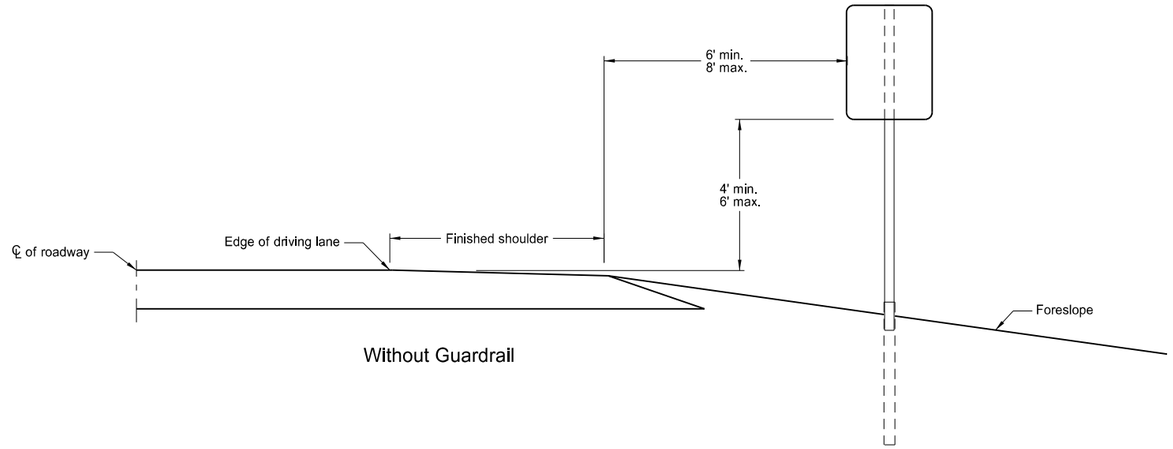
D-754-79



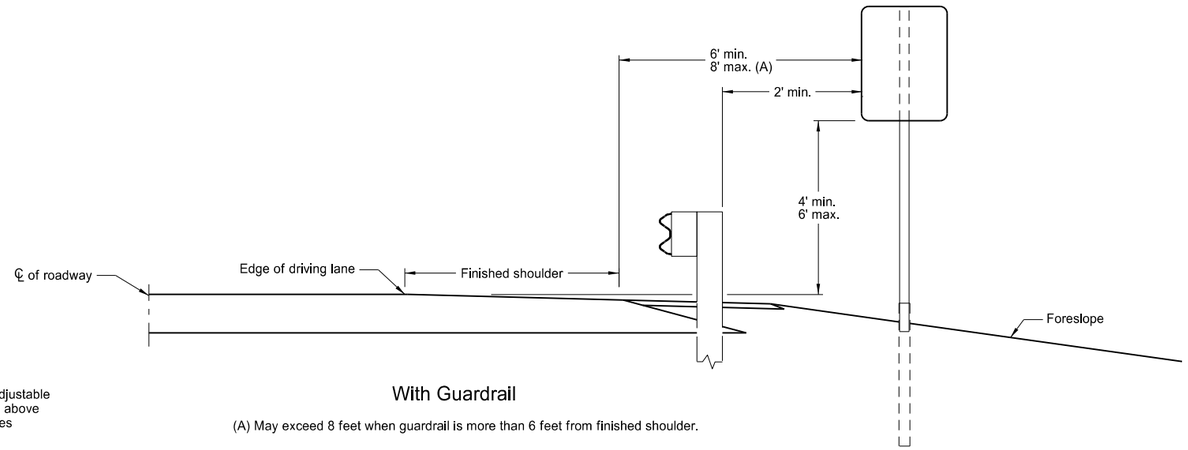
Spacing of Chevron Signs		
Advisory Speed	Curve Radius	Spacing
15 mph or less	less than 200 ft	40 ft
20 to 30 mph	200 to 400 ft	80 ft
35 to 45 mph	401 to 700 ft	120 ft
50 to 60 mph	701 to 1250 ft	160 ft
more than 60 mph	more than 1250 ft	200 ft

Notes:

1. Align chevrons in line with and at right angles to approaching traffic.
2. Do not place chevrons on tangent section.

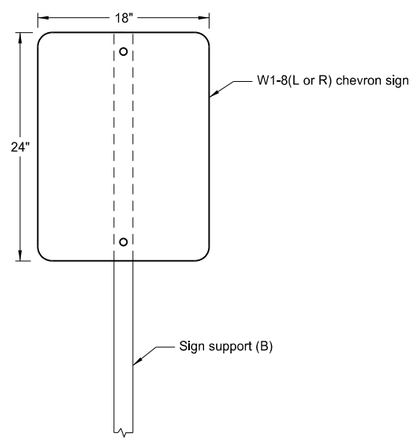


Without Guardrail



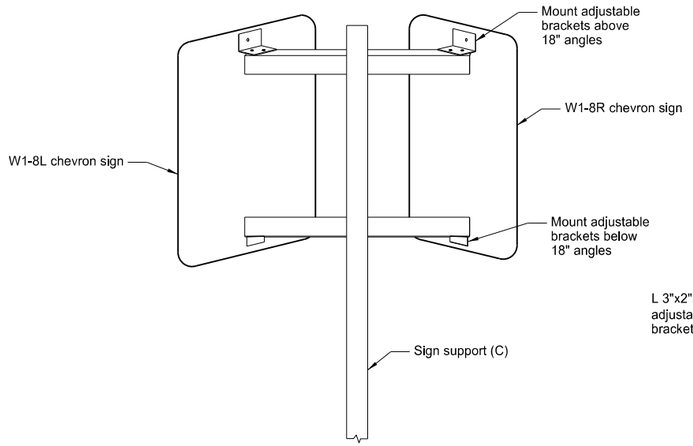
With Guardrail

(A) May exceed 8 feet when guardrail is more than 6 feet from finished shoulder.



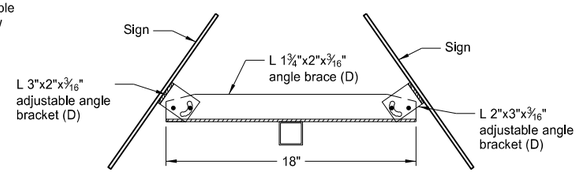
Chevron Single Sign Assembly

(B) Use 2x2x12ga. perforated tube single sign support and 2.25x2.25x12ga. perforated tube anchor unit.



Chevron Double Sign Assembly

(C) Use 2.25x2.25x12ga. perforated tube double sign support and 2.5x2.5x12ga. perforated tube anchor unit.



Top View

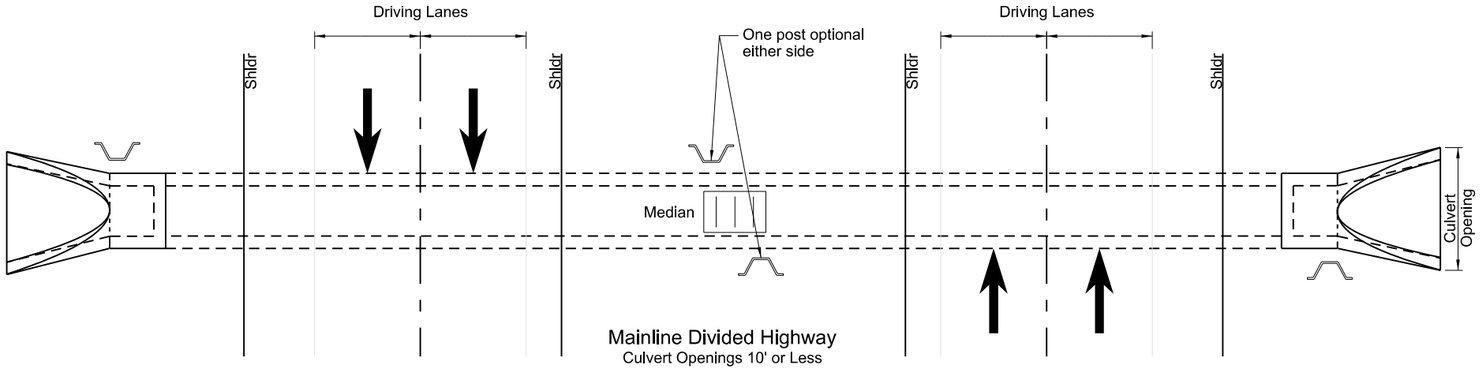
(D) Use aluminum or steel angles. Sizes are minimums, use larger sizes only when approved by the Engineer.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-10-13	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.

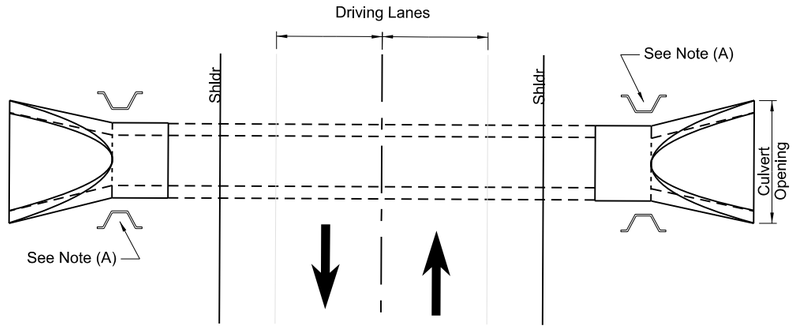
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OBJECT MARKERS - CULVERTS

D-754-83

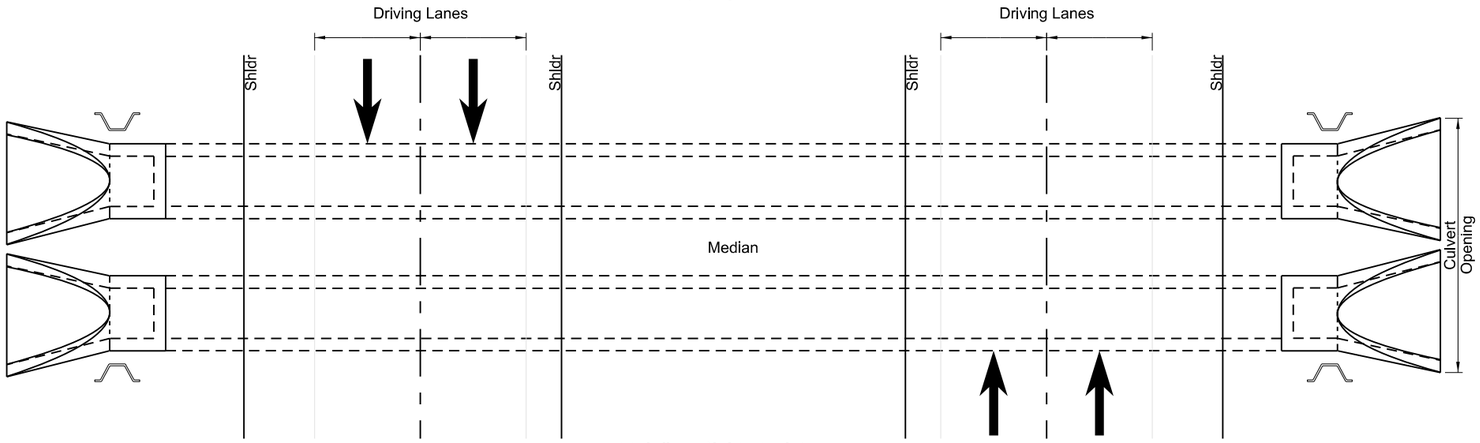


Mainline Divided Highway
Culvert Openings 10' or Less

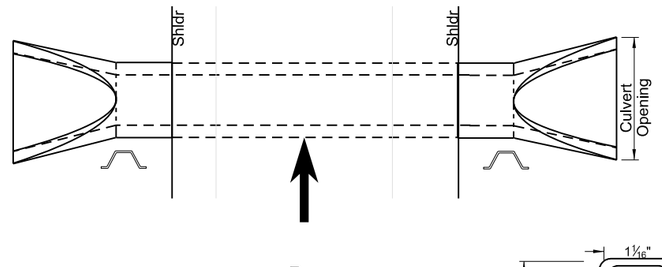


Two-Lane Highway

(A) Install additional marker where multiple pipe installations have a width of greater than 10'.

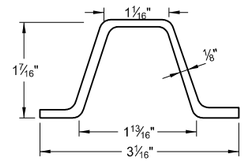


Mainline Divided Highway
Culvert Openings Greater than 10'
Multiple Installations

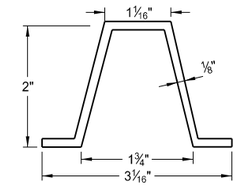


Ramp

Post Location



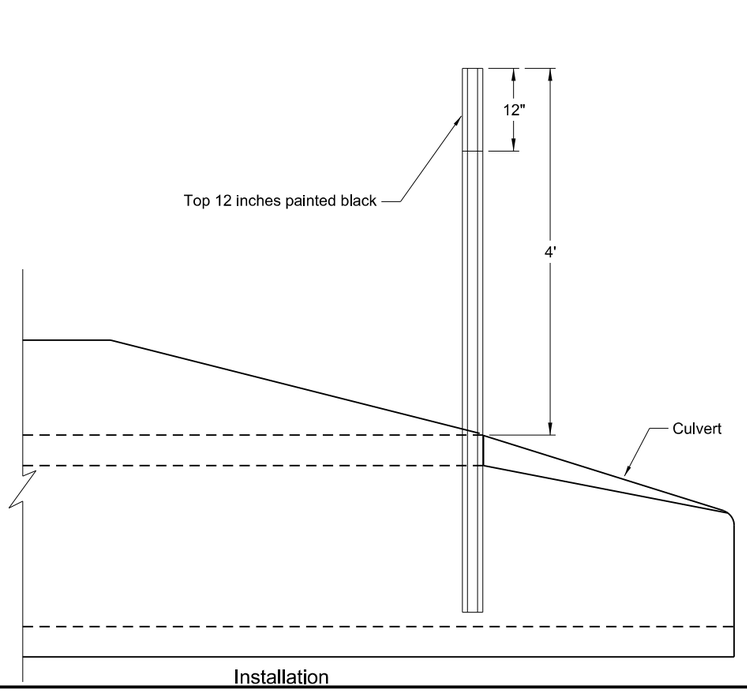
Steel Post Detail
Approx. 2.0 lbs/ft



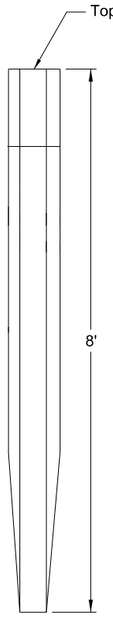
Aluminum Post Detail
Approx. 0.88 lbs/ft

Notes:

Mark each end of culverts crossing the roadway within the right-of-way with a post. Install posts in front of culvert in direction of travel along the side of culvert and one foot from culvert opening unless shown otherwise in plans.



Installation



U-Type Post

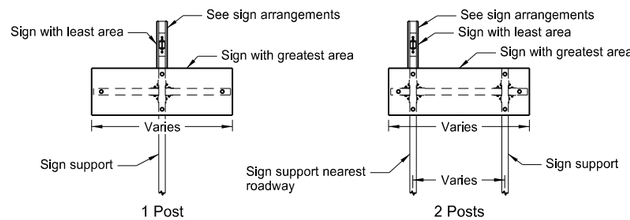
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-05-13	
REVISIONS	
DATE	CHANGE
7-7-14	Revised Notes
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.

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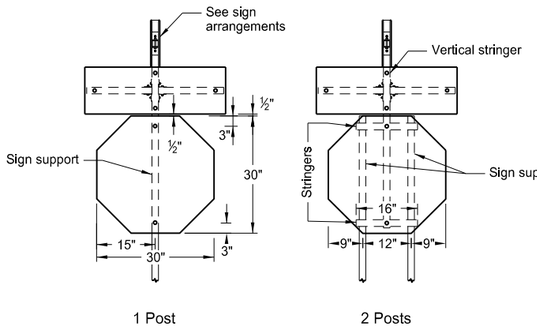
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR STREET NAME SIGNS AND 911 SIGNS

D-754-87

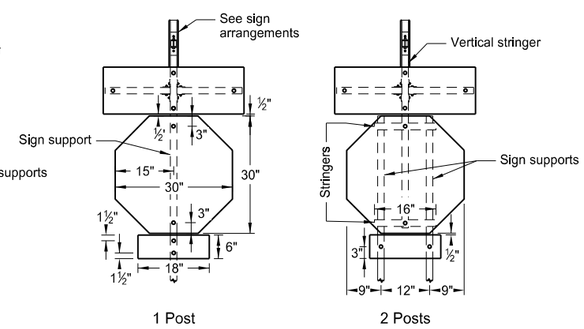
A - Single sign
B - Single sign back to back
C - Single sign each direction
D - Single sign one direction, back to back other direction
E - Back to back both directions



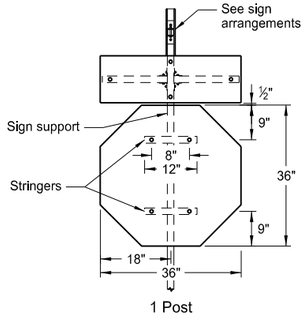
Special Assembly 1 (A, B, C, D or E)



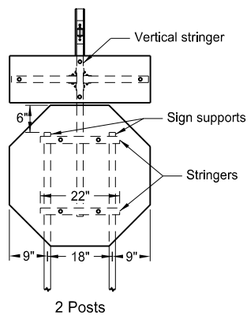
Special Assembly 2 (A, B, C, D or E)



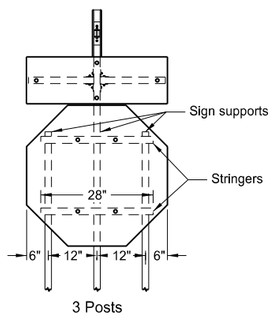
Special Assembly 3 (A, B, C, D or E)



1 Post

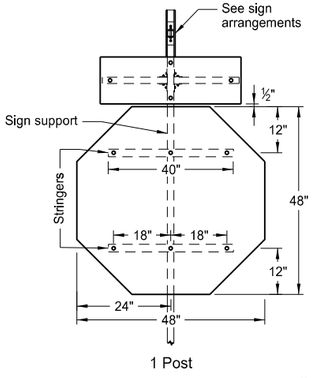


2 Posts

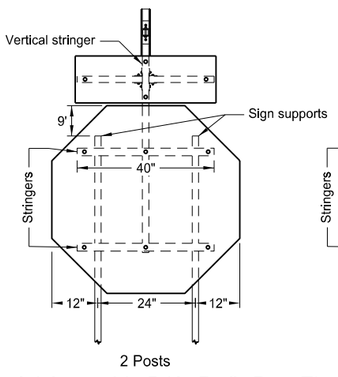


3 Posts

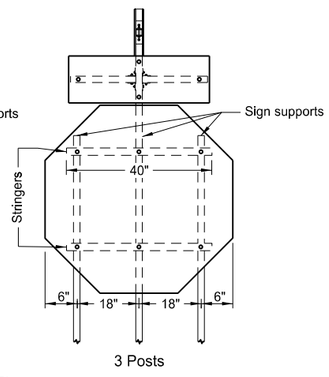
Special Assembly 4 (A, B, C, D or E)



1 Post

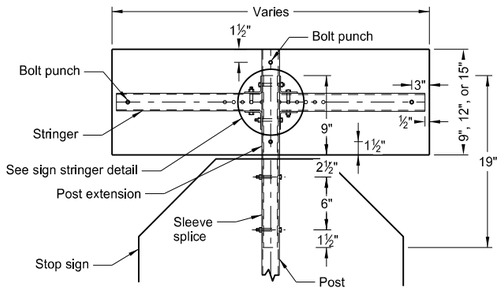


2 Posts



3 Posts

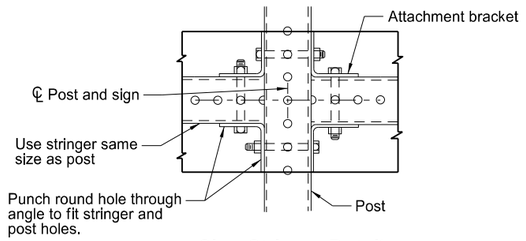
Special Assembly 5 (A, B, C, D or E)



Front View

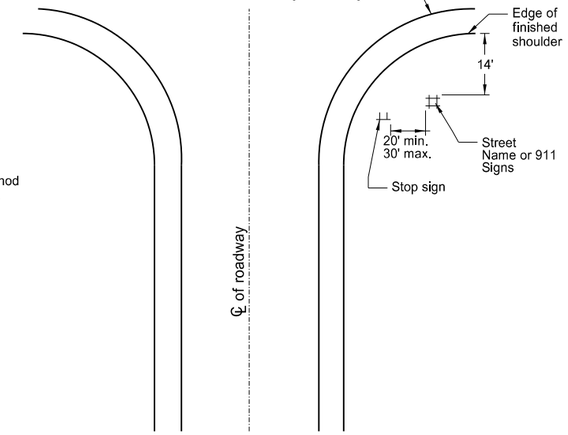
Sleeve Splice Detail

Note: Only use splice method with approval of engineer.



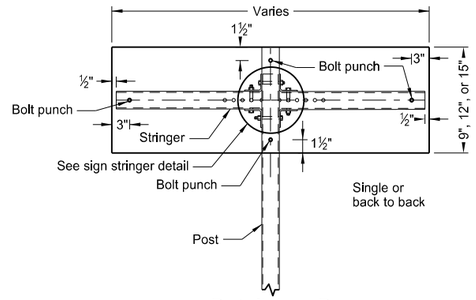
Sign Stringer Detail

Note: See Standard Drawing D-754-86 for 911 support information and sign layout details.

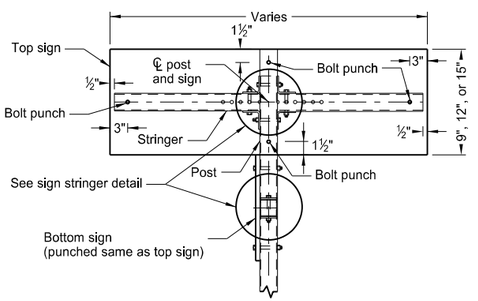


Intersection Layout

Note: Use layout for street name signs or 911 signs with Special Assembly 1 .

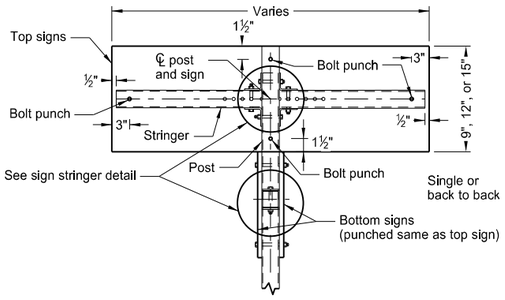


Detail A or B



Detail C

Sign Arrangements



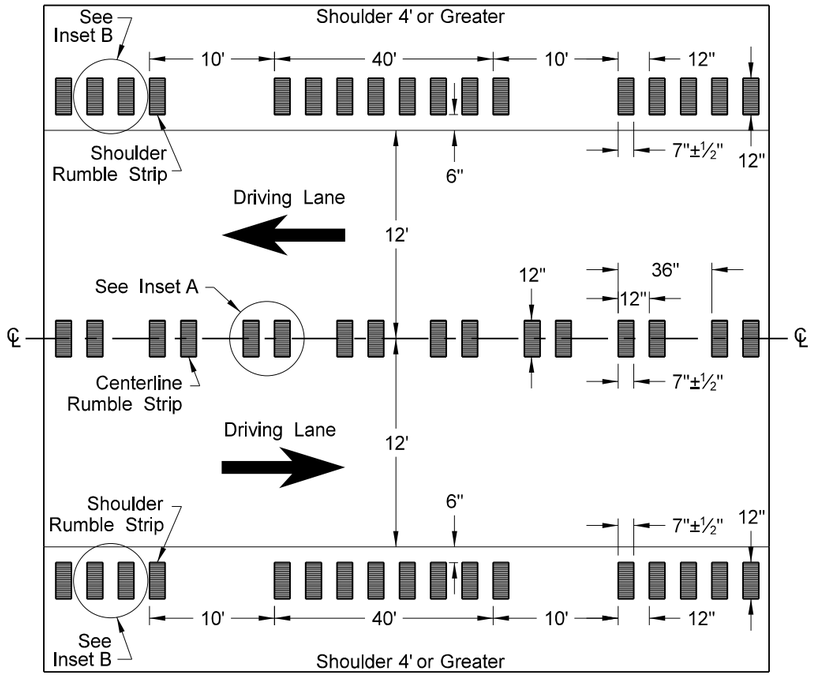
Detail D or E

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
8-30-18	Added 2 post layout for SA1 and Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.

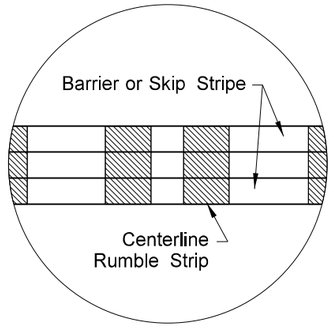
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RUMBLE STRIPS UNDIVIDED HIGHWAYS (SHOULDERS 4' OR GREATER)

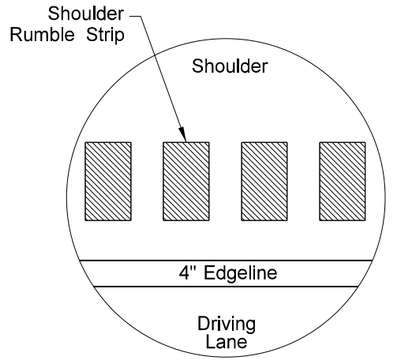
D-760-3



Undivided Highways (Shoulders 4' or Greater)



Inset A - Centerline Rumble Strip

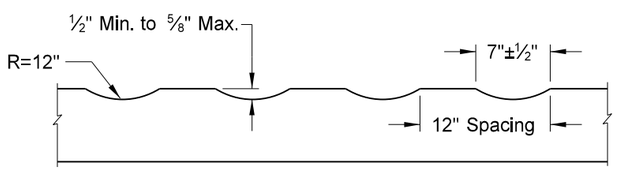


Inset B - Shoulder Rumble Strip

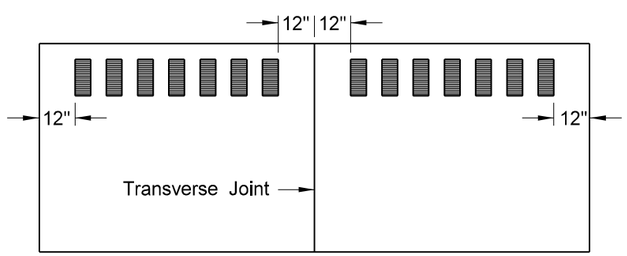
NOTES:

1) Discontinue shoulder rumble strips through the entire length of right turn lanes, 100' before right turn lane tapers, and at the radius of a paved or gravel highway, section line, approach, or private drive.

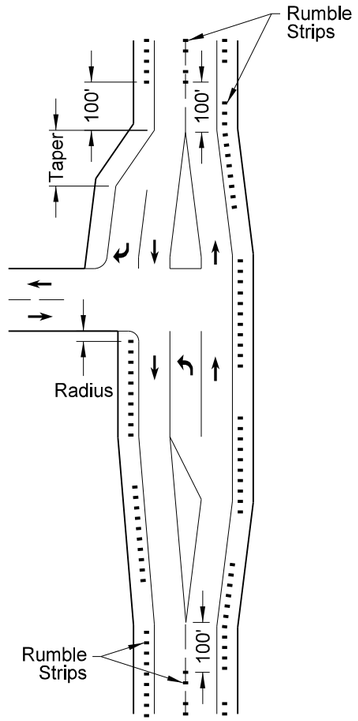
2) Discontinue centerline rumble strips through the entire length of left turn lanes, 100' before left turn lane tapers and median islands, and 100' before and after a paved or gravel highway, section line, approach, or private drive.



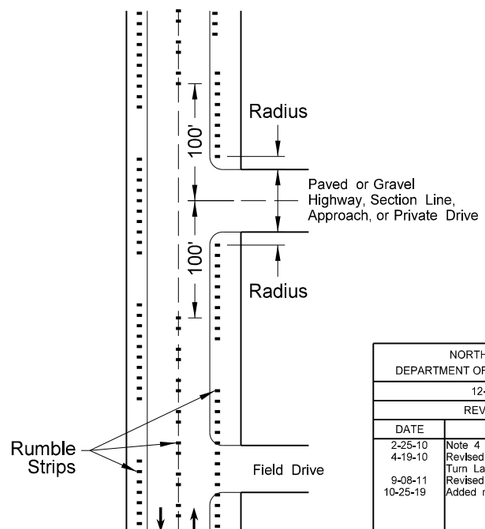
Profile of Rumble Strips - Bituminous and PCC Pavements



Discontinue rumble strip approx. 12" on both sides of PCC transverse joint



Turn Lane (Right & Left)

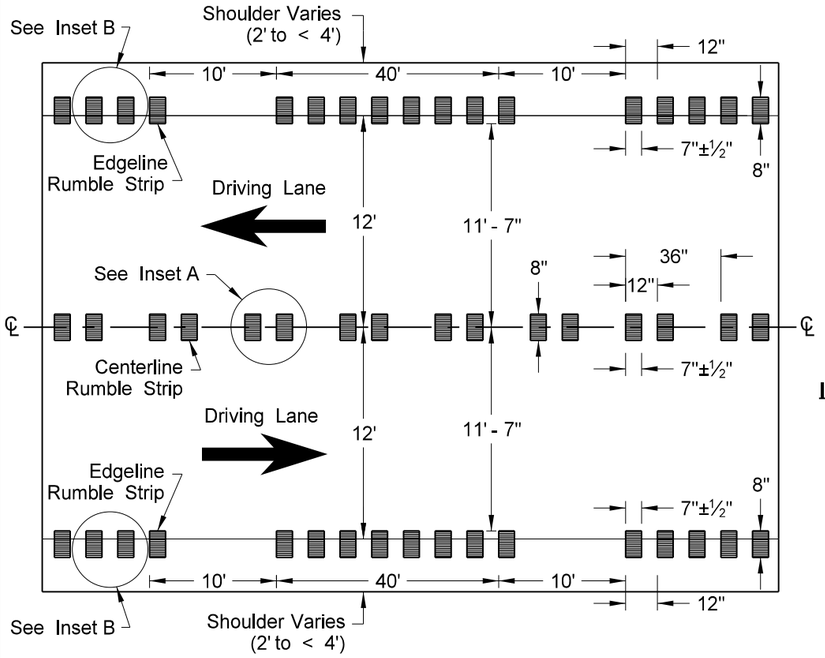


Entrance Roadways

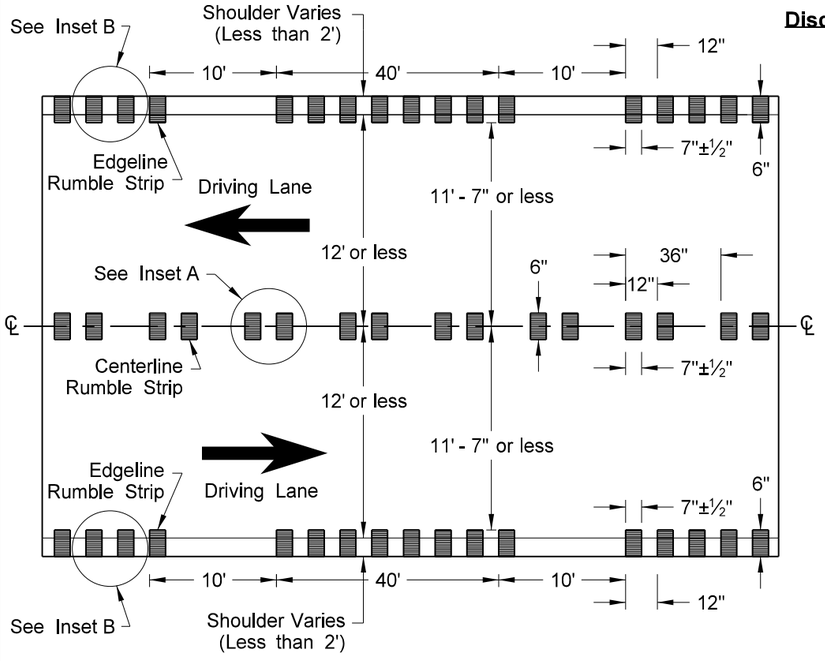
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-08-11	Revised Notes and D-760-3.
10-25-19	Added missing dimensions.

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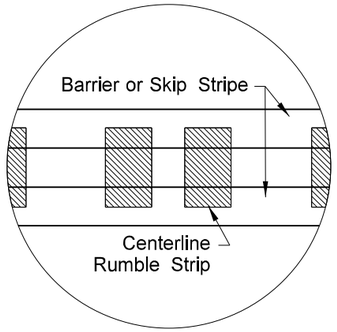
RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS LESS THAN 4')



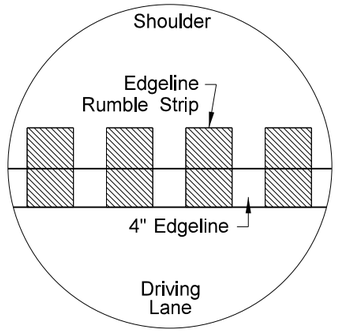
Undivided Highways (12' Driving Lanes & Shoulders 2' to < 4')



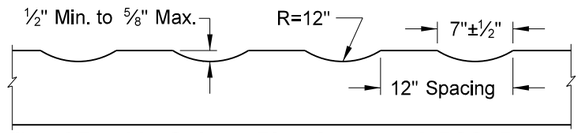
Undivided Highways (12' Driving Lanes or less & Shoulders Less than 2')



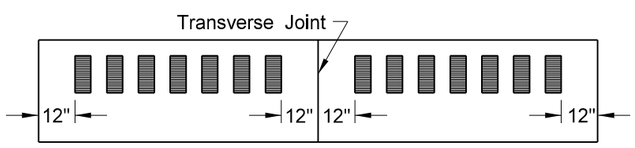
Inset A - Centerline Rumble Strip



Inset B - Edgeline Rumble Strip



Profile of Rumble Strips - Bituminous and PCC Pavements

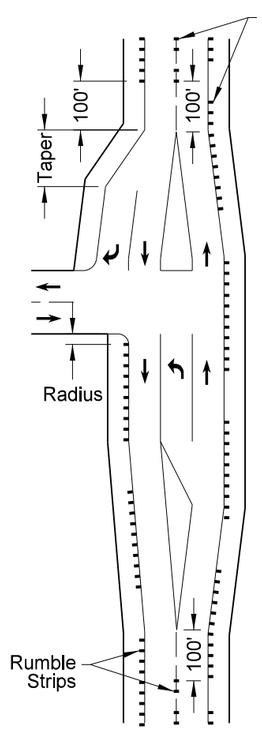


Discontinue rumble strip approx. 12" on both sides of PCC transverse joint

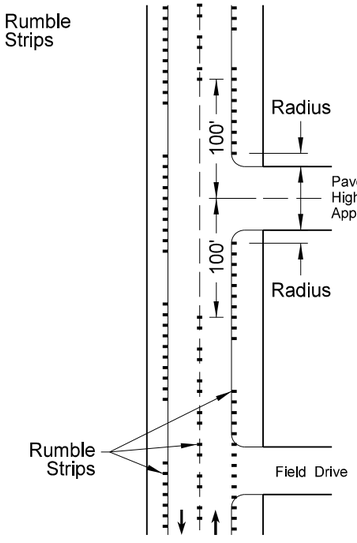
NOTES:

1) Discontinue edgeline rumble strips through the entire length of right turn lanes, 100' before right turn lane tapers, and at the radius of a paved or gravel highway, section line, approach, or private drive.

2) Discontinue centerline rumble strips through the entire length of left turn lanes, 100' before left turn lane tapers and median islands, 100' before and after a paved or gravel highway, section line, approach, or private drive.



Turn Lane
(Right & Left)

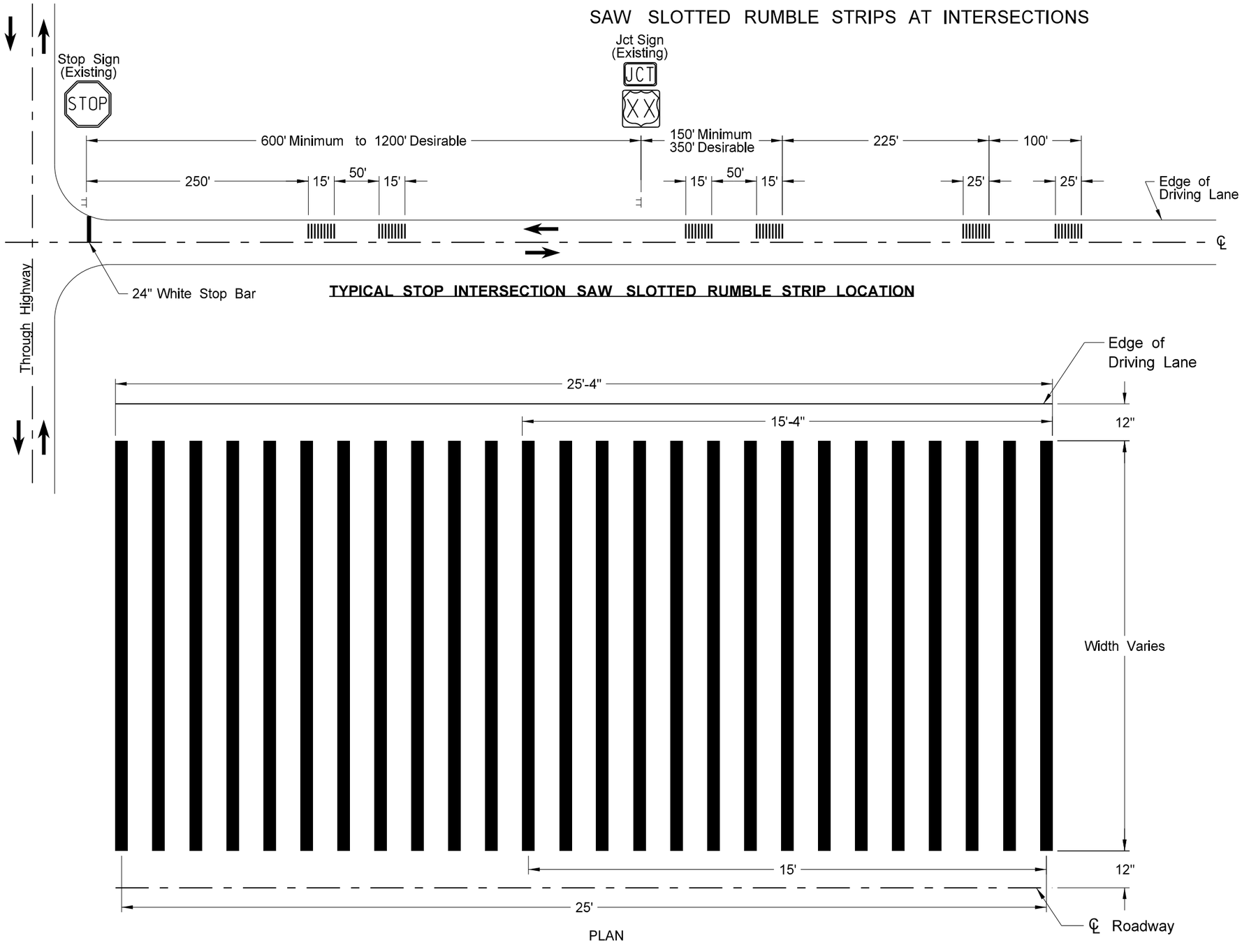


Entrance Roadways

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-08-11	Revised Notes and D-760-4.
1-26-12	Revised details for rumble strip widths and dimensions.
10-25-19	Added missing dimensions.

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SAW SLOTTED RUMBLE STRIPS AT INTERSECTIONS



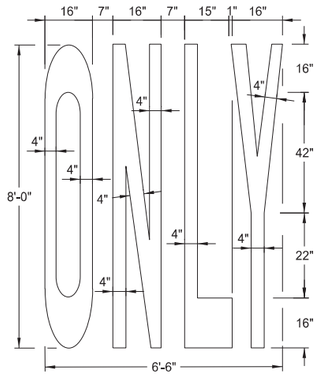
SAW SLOTTED RUMBLE STRIP DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-22-10	Saw Slotted width revised.
2-25-10	Note 7 was added.
9-8-11	Revised Notes and D-760-5.
7-7-14	Deleted Notes.
8-27-19	New Design Engr PE Stamp.

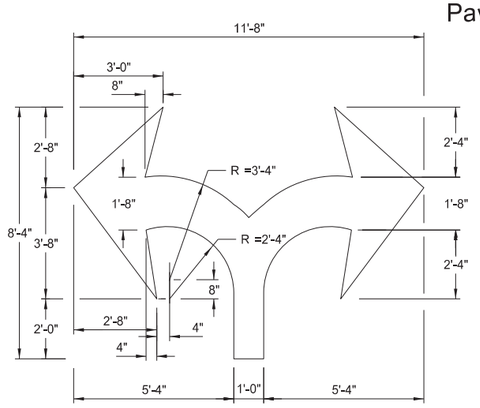
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683 , on 8/27/19 and the original document is stored at the North Dakota Department of Transportation

Pavement Marking Message Details

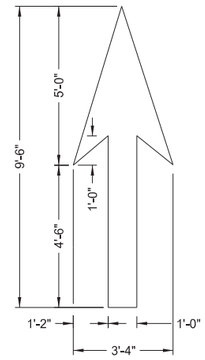
D-762-1



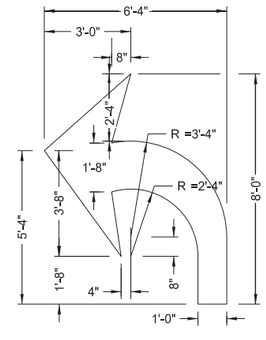
22 S. F.



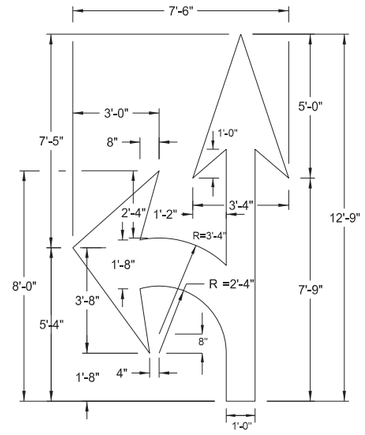
29 S. F.



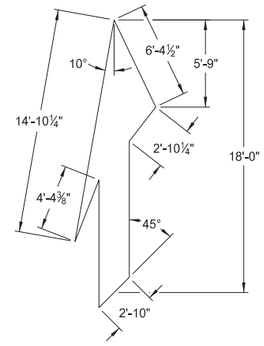
12 S. F.



16 S. F.

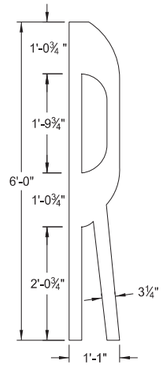


27 S. F.

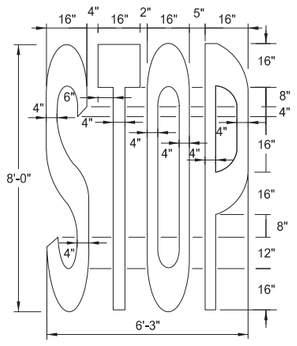


41 S. F.

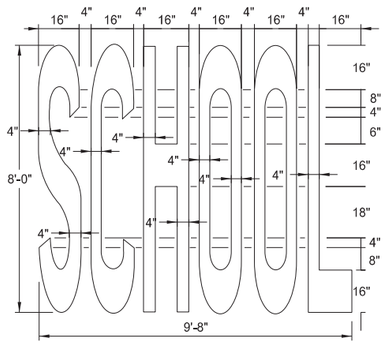
Note: Rotate merge arrow 20° from edge of roadway.



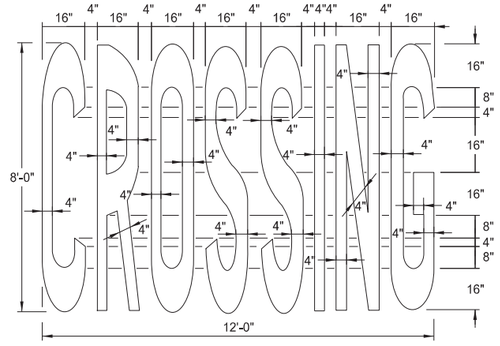
4 S. F.



22 S. F.



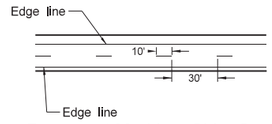
34.5 S. F.



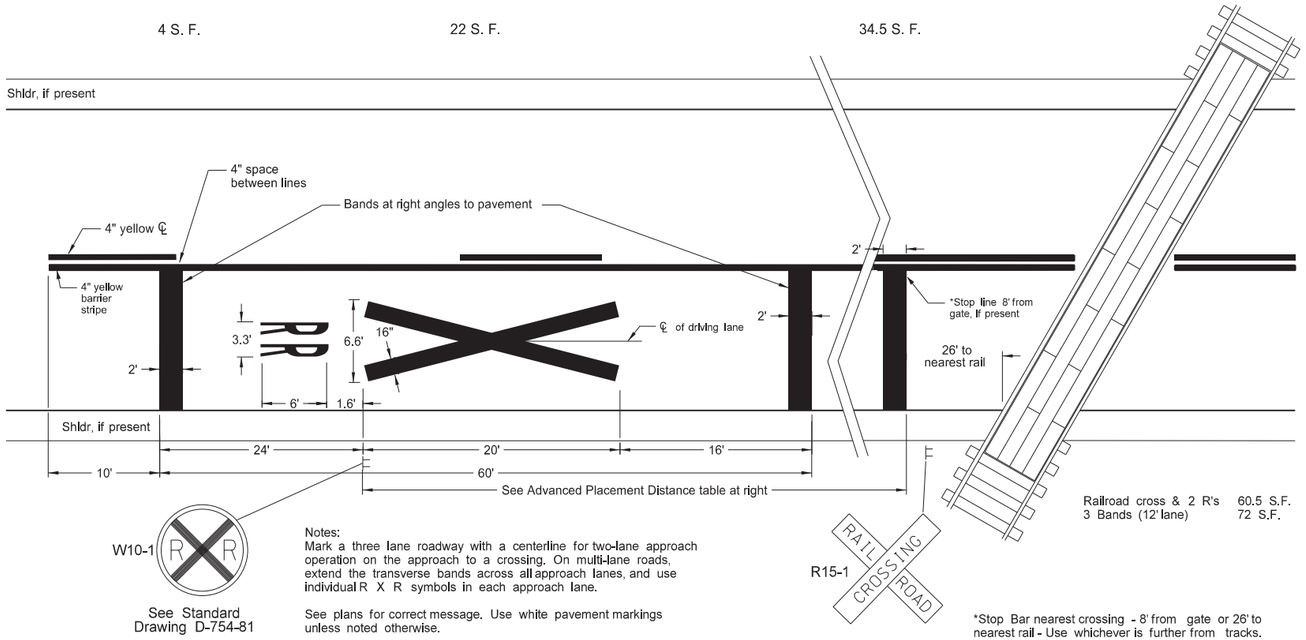
46 S. F.

Speed Limit	Chevron Width	Chevron Spacing 45° to Traffic
0-25 mph	8"	5'
30-40 mph	8"	15'
45 mph and above	12"	25'

Chevron Crosshatching Table



Centerline Pavement Marking Skip Spacing Detail

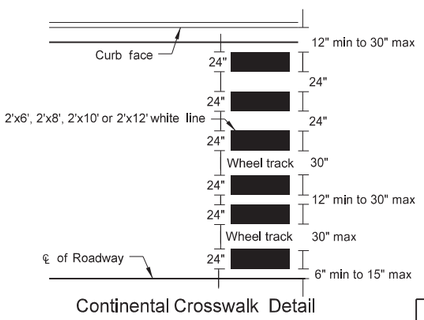


Notes:
Mark a three lane roadway with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, extend the transverse bands across all approach lanes, and use individual R X R symbols in each approach lane.

See plans for correct message. Use white pavement markings unless noted otherwise.

Railroad cross & 2 R's 60.5 S.F.
3 Bands (12' lane) 72 S.F.

*Stop Bar nearest crossing - 8' from gate or 26' to nearest rail - Use whichever is further from tracks.



Continental Crosswalk Detail

Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

12-6-11

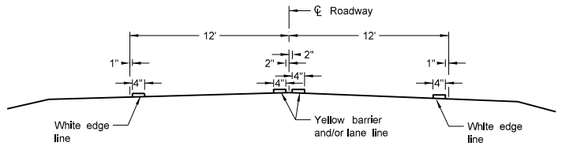
REVISIONS

DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
01-28-2020	Revised min Stop Bar distance to rail.

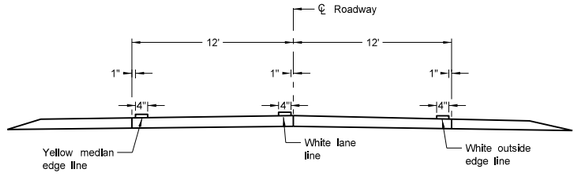
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 1/28/2020 and the original document is stored at the North Dakota Department of Transportation

PAVEMENT MARKING

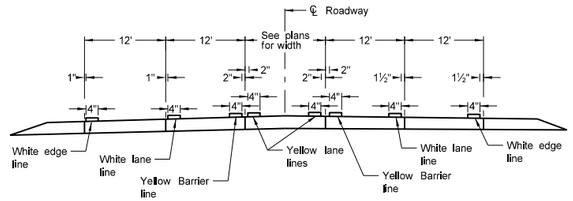
D-762-4



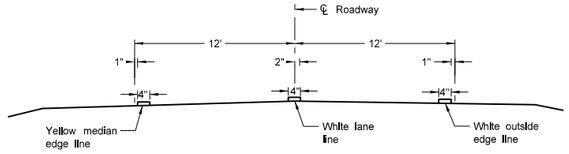
Two Lane Two Way
RURAL ROADWAY



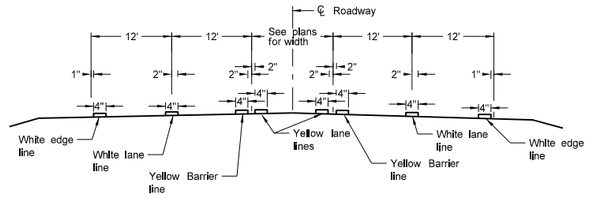
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



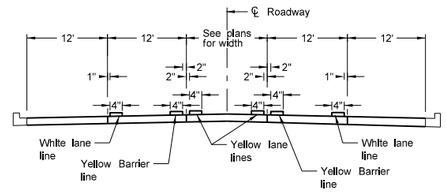
RURAL FIVE LANE ROADWAY
Concrete Section



Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



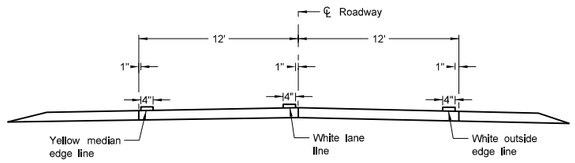
RURAL FIVE LANE ROADWAY
Asphalt Section



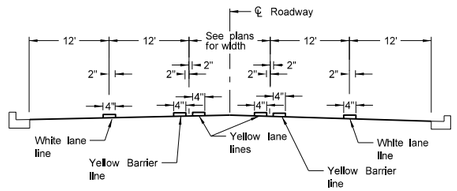
URBAN FIVE LANE SECTION
Concrete Section

NOTES:

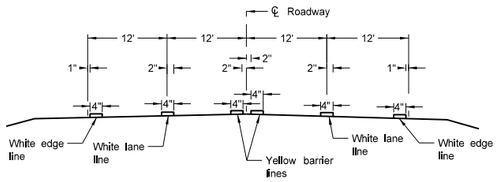
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.



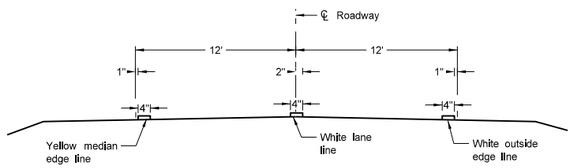
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



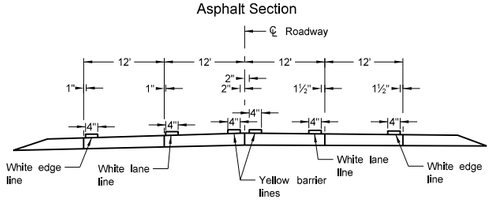
URBAN FIVE LANE SECTION
Asphalt Section



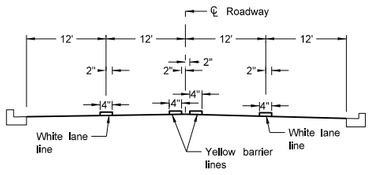
RURAL FOUR LANE ROADWAY
Asphalt Section



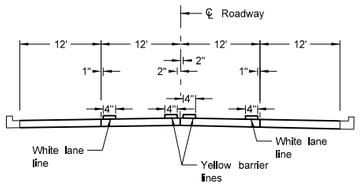
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



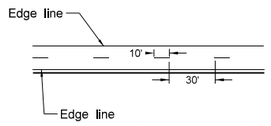
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



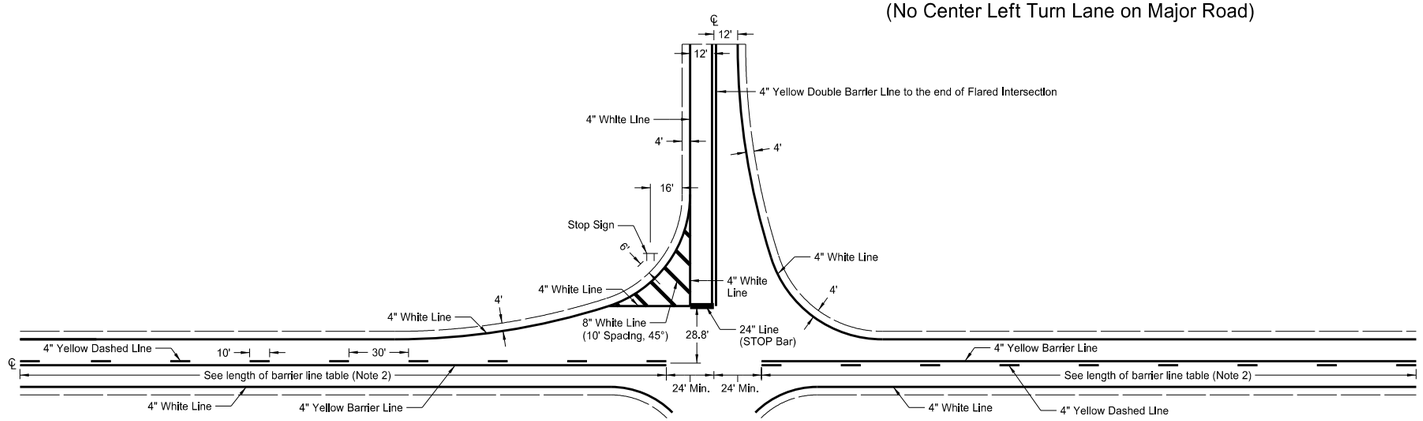
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17 08-27-19	Updated to active voice. New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/27/19 and the original document is stored at the North Dakota Department of Transportation

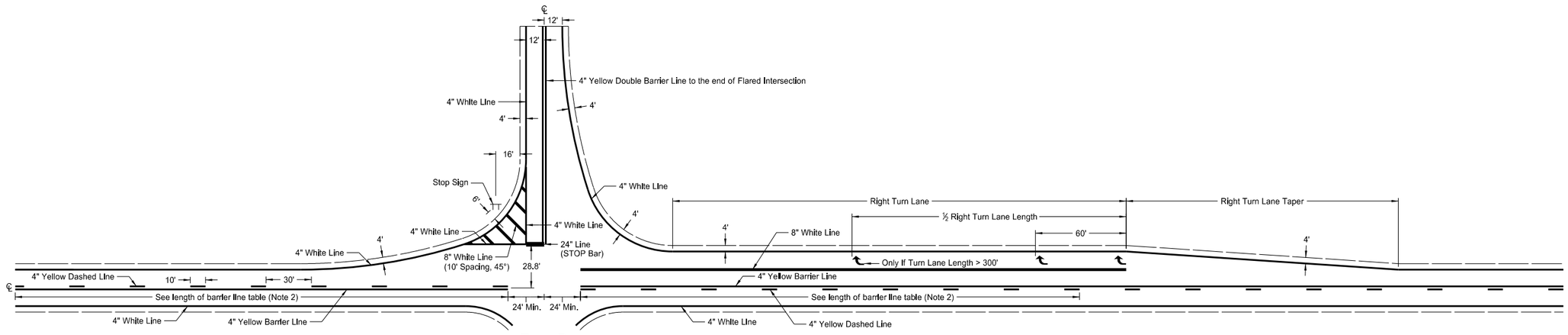
PAVEMENT MARKING FOR STANDARD 90 DEGREE FLARED INTERSECTION

(No Center Left Turn Lane on Major Road)



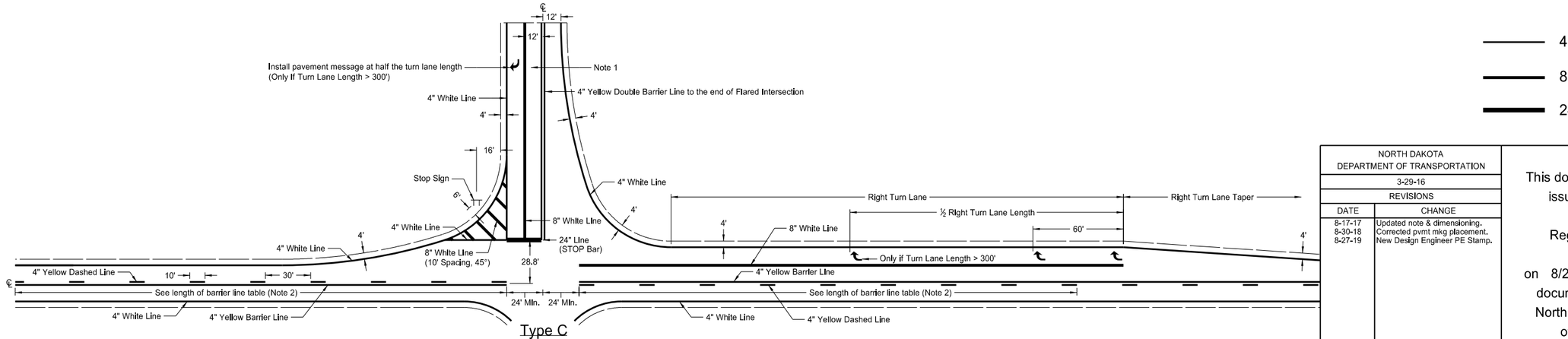
Type A

(No turn lanes present)



Type B

(Right Turn Lane on Major Road)



Type C

(Right Turn Lane on Major Road, and Turn Lane on Minor Road)

Notes

1. At "T" intersections (3-leg), additionally install left turn pavement marking message arrow.
2. The barrier lines have variable distances dependent on speed limit. Obtain barrier line length from table below (stopping sight distance.)

Table for Length of Barrier Line									
Speed Limit (mph)	30	35	40	45	50	55	60	65	70
Minimum Length	200'	250'	305'	360'	425'	495'	570'	645'	730'

4" Marking

8" Marking

24" Marking

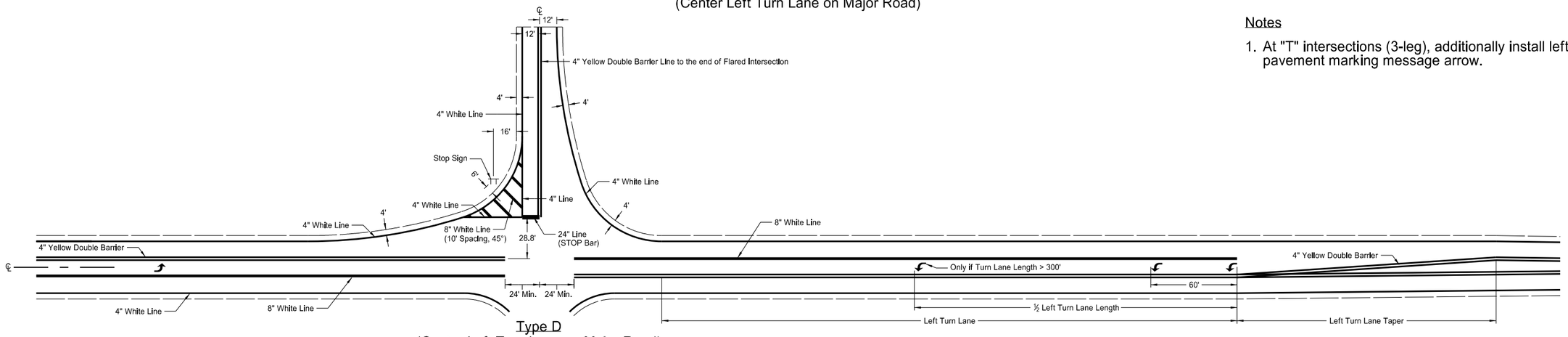
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-29-16	
REVISIONS	
DATE	CHANGE
8-17-17 8-30-18 8-27-19	Updated note & dimensioning. Corrected pvmt mkg placement. New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/27/19 and the original document is stored at the North Dakota Department of Transportation

PAVEMENT MARKING FOR STANDARD 90 DEGREE FLARED INTERSECTION

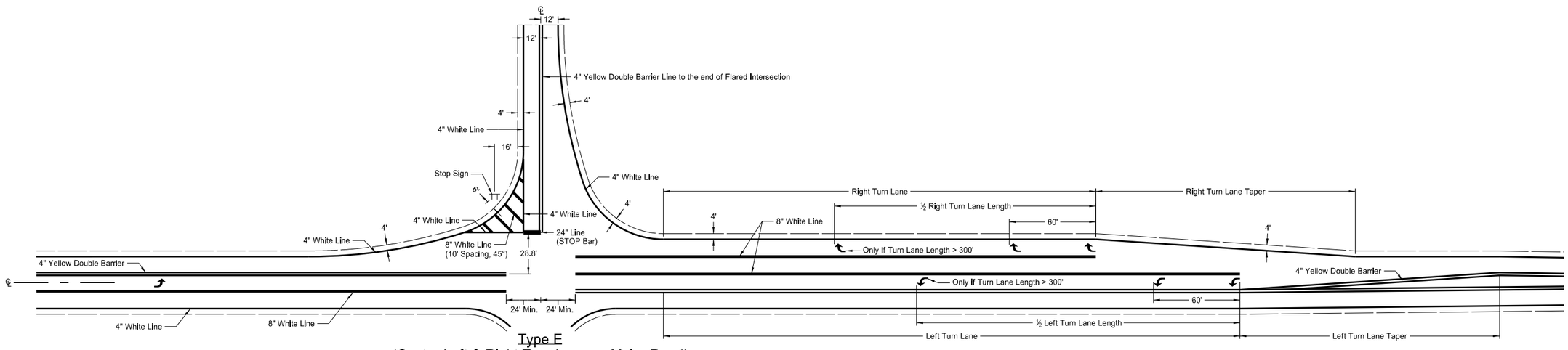
D-762-6

(Center Left Turn Lane on Major Road)



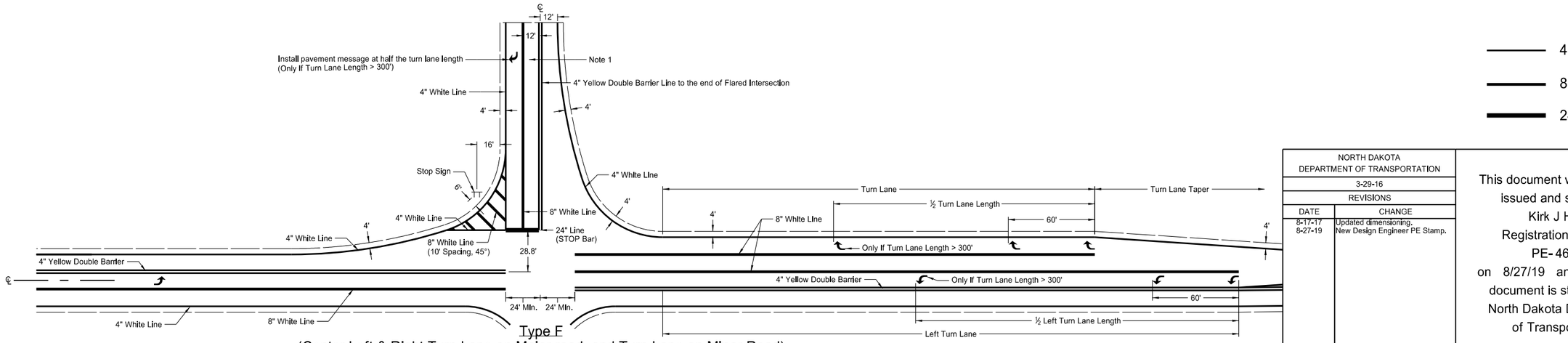
Type D

(Center Left Turn Lane on Major Road)



Type E

(Center Left & Right Turn Lane on Major Road)



Type F

(Center Left & Right Turn Lane on Major road, and Turn Lane on Minor Road)

Notes

1. At "T" intersections (3-leg), additionally install left turn pavement marking message arrow.

4" Marking

8" Marking

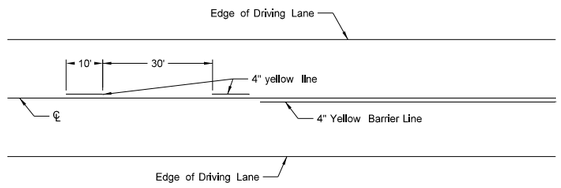
24" Marking

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-29-16	
REVISIONS	
DATE	CHANGE
8-17-17	Updated dimensioning.
8-27-19	New Design Engineer PE Stamp.

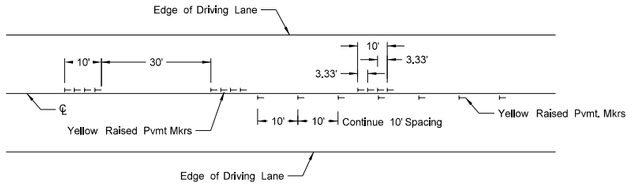
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/27/19 and the original document is stored at the North Dakota Department of Transportation

SHORT-TERM PAVEMENT MARKING

D-762-11

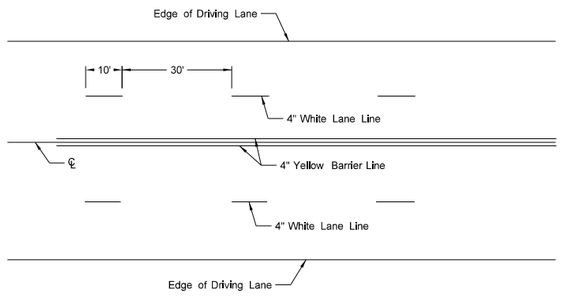


Painted or Tape Lines

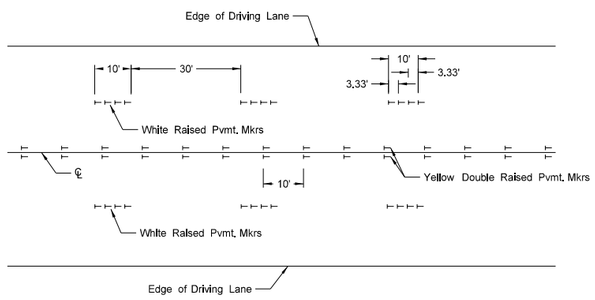


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

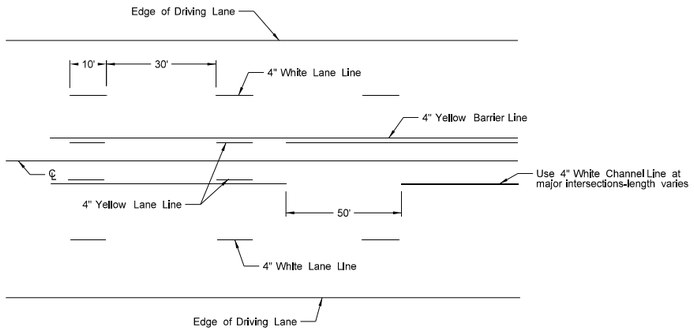


Painted or Tape Lines

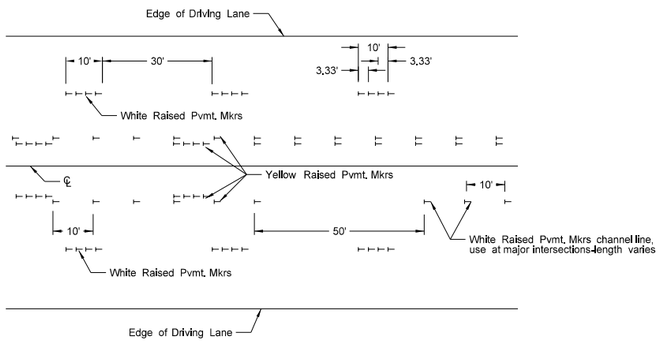


Raised Pavement Markers

FOUR LANE ROADWAY

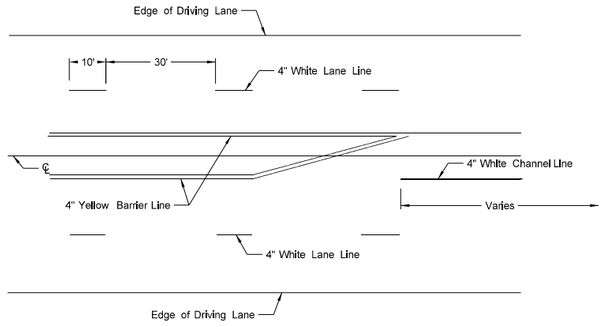


Painted or Tape Lines

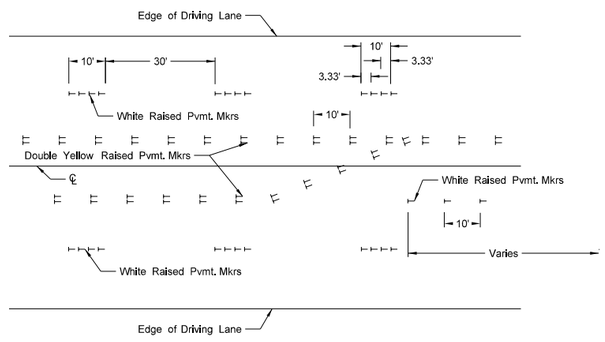


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

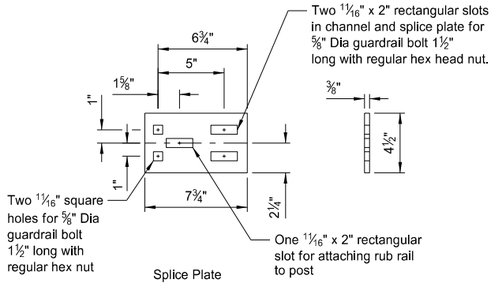
1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
3. Remove raised markers and tape markings after permanent pavement marking is installed.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)
10-17-17	Updated to active voice.
8-27-19	New Design Engineer PE Stamp.

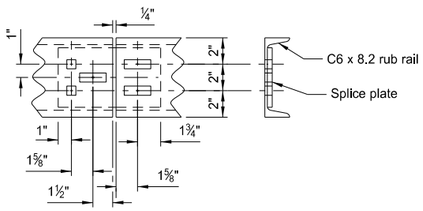
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/27/19 and the original document is stored at the North Dakota Department of Transportation

W-BEAM GUARDRAIL GENERAL DETAILS

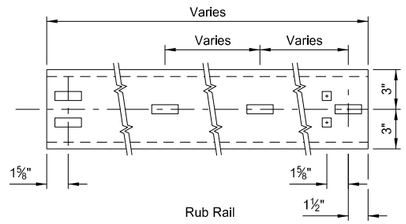
D-764-1



Splice Plate

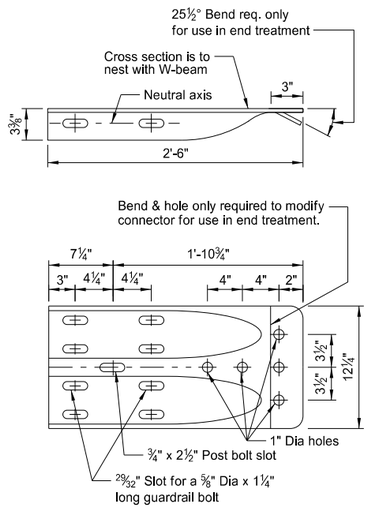


Splice Detail

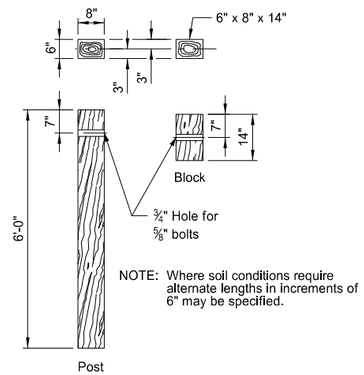


Rub Rail

C6x8 RUB RAIL AND SPLICE PLATE

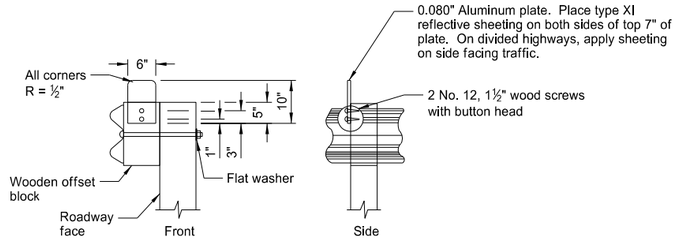


W BEAM TERMINAL CONNECTOR



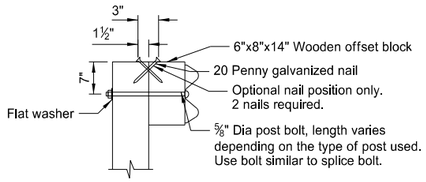
Post

6"x8" TIMBER POST & BLOCK

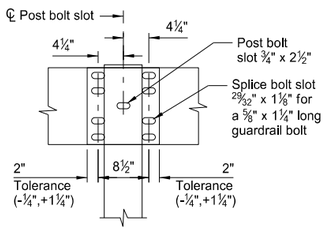


REFLECTORIZED PLATE DETAIL

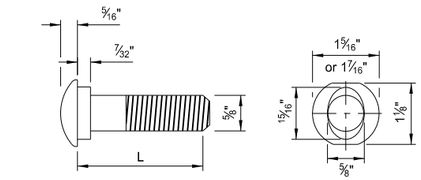
Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



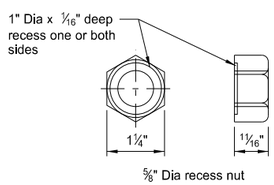
TYPICAL POST ATTACHMENT DETAIL



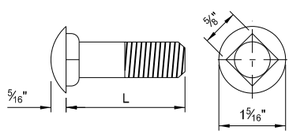
SPLICE DETAIL



5/8" Diameter Guardrail Bolt	
L	Thread Length
1¼"	Full length thread
2"	1¾" Min thread length
9½"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



5/8" GUARDRAIL BOLT & RECESS NUT

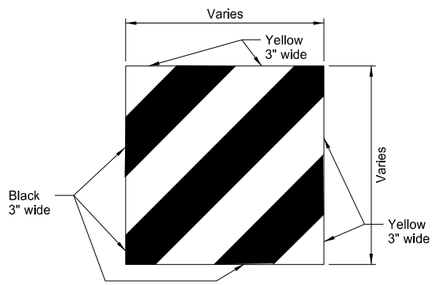


5/8" Diameter Carriage Bolt	
L	Thread Length
1½"	Full length thread
3"	1½" Min thread length
11"	1¾" Min thread length
13"	1¾" Min thread length

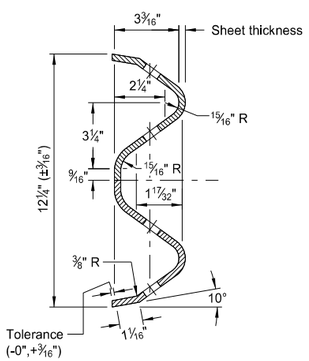


5/8" Hex nut

5/8" CARRIAGE BOLT & NUT



IMPACT HEAD OBJECT MARKER



W-BEAM CROSS SECTION

NOTES:

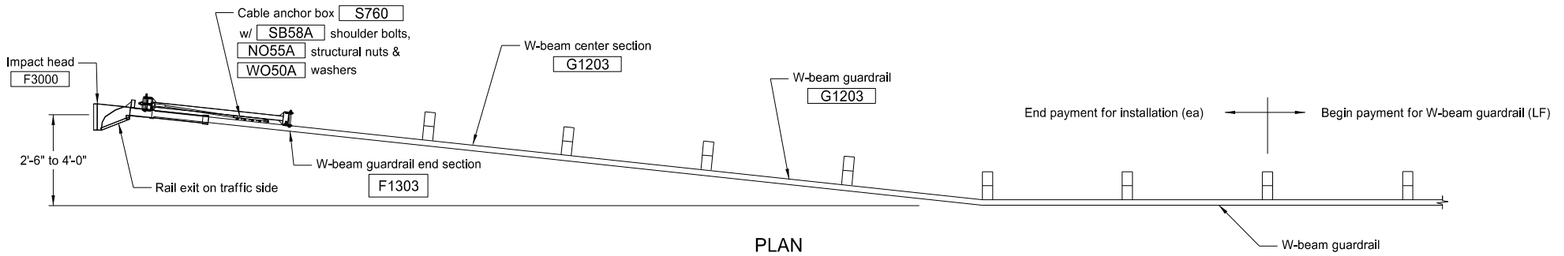
1. Place reflector plates at the first post and spaced at 25' centers on guardrail less than 250' in length and at 50' centers for guardrail over 250' in length. Use reflector the same color as the pavement marking adjacent to that reflector unless noted otherwise on the plans.
2. Dispose of excess earth from excavations for guard posts as directed by the engineer. Replace bituminous material where guardrail is installed after mat is placed. Include cost of excavation and replacing of bituminous material in the price bid for other items.
3. Place Object Marker within the vertical edges of the Impact Plate. Use type XI retroreflective sheeting meeting the requirements of Section 894.02.B of the standard specifications. Apply sheeting to 0.100 Aluminum sheeting meeting the requirements Section 894.01.A. Attach the Object Marker to the Impact Head Plate with non-rust rivets or some other non-rust attachment device. Slope stripes downward toward the roadway side.
4. Guardrail installation height tolerance = - ¼" , + 1".
5. Standard W-Beam rail post bolt slot spacing is 6'-3". Post bolt slot spacing of 3'-1½" is acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
10-25-19	Updated notes to active voice and added Note 5.

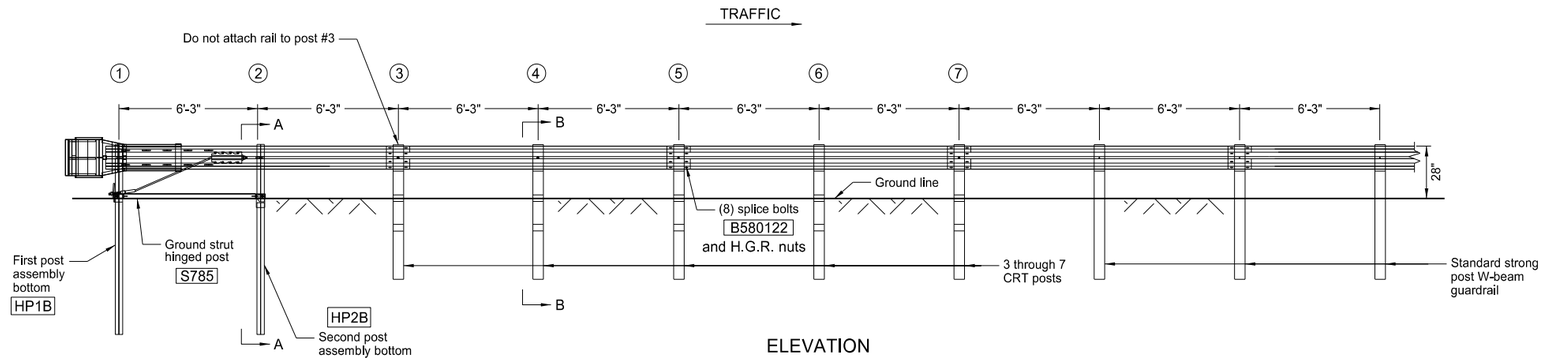
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/25/19 and the original document is stored at the North Dakota Department of Transportation

FLARED ENERGY ABSORBING TERMINAL

D-764-6



PLAN

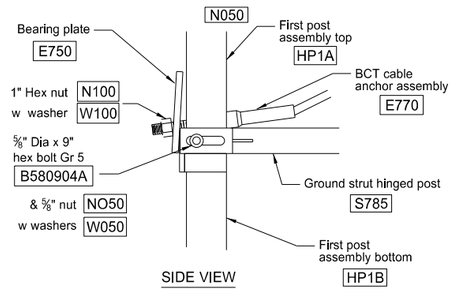


ELEVATION

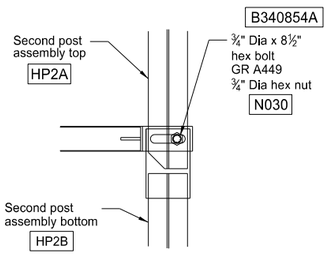
ITEM #	QTY	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA
G1203	2	W-BEAM GUARDRAIL, 12 GA
HP1A	1	FIRST POST ASSEMBLY TOP
HP1B	1	FIRST POST ASSEMBLY BOTTOM
HP2A	1	SECOND POST ASSEMBLY TOP
HP2B	1	SECOND POST ASSEMBLY BOTTOM
P671	5	WOOD CRT POST
P675	5	TIMBER BLOCKOUT OR RECYCLED EQUIVALENT
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
S785	1	GROUND STRUT HINGED POST
		HARDWARE (ALL DIMENSIONS IN INCHES)
B140404	2	¼ Dia x 4 HEX BOLT
WO14	4	¼ WASHER
N014	2	¼ HEX NUT
B580122	17	⅝ Dia x 1¼ SPLICE BOLT
B581802	4	⅝ Dia x 10 H.G.R. BOLT (POSTS 3 THRU 6)
B580904A	1	⅝ Dia x 9 HEX BOLT GR 5
W050	5	⅝ WASHER
N050	22	⅝ Dia H.G.R. NUT
B340854A	1	¾ Dia x 8½ HEX BOLT GR A449
NO30	1	¾ Dia HEX NUT
N100	2	1 ANCHOR CABLE HEX NUT
W100	2	1 ANCHOR CABLE WASHER
SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
N055A	8	½ A325 STRUCTURAL NUT
W050A	16	1 1/16 OD x 9/16 ID A325 STR. WASHER

GENERAL NOTES

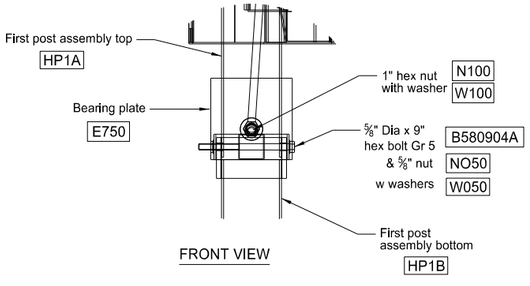
1. Wood posts are required with the Flared Energy Absorbing Terminal except posts #1 and #2.
2. All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
3. The lower sections of the posts shall not protrude more than 4 inches above the ground (measured along a 60 inch cord). Site grading may be necessary to meet this requirement.
4. Lower post sections shall not be driven with the upper post attached. If the the post is placed in a drilled hole, the backfill material must be satisfactory compacted to prevent settlement.
5. When rock is encountered during excavation, a 12" diameter post hole 20" deep may be used if approved by the Engineer. Granular material will be placed in the bottom of the hole approximately 2½" deep to provide drainage. The soil tubes shall be field cut to length, placed in the hole and back filled with adequately compacted material excavated from the hole.
6. The breakaway cable assembly shall be taut. A locking device (vice grips or channel lock pliers) should be used to prevent cable from twisting when tightening nuts.
7. The wood blockouts shall be "toe nailed" to the rectangular wood posts to prevent them from turning when wood shrinks. The nail shall be 20 penny and galvanized.
8. The Flared Energy Absorbing Terminal shall be flared only when the approach guardrail is parallel with the roadway. When the approach guardrail is flared at 16:1 to 10:1, the Flared Energy Absorbing Terminal shall have only the flare rate of the guardrail. When the guardrail flare is between 10:1 and 7:1, the Flared Energy Absorbing Terminal shall be turned parallel to the roadway.



SIDE VIEW

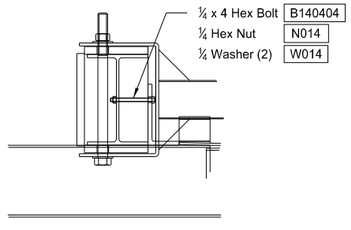


SIDE VIEW DETAIL OF POST #2

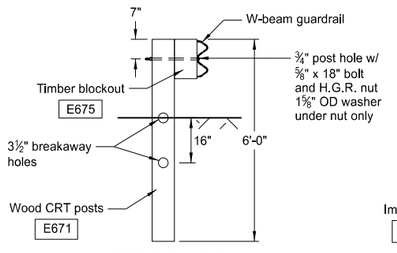


FRONT VIEW

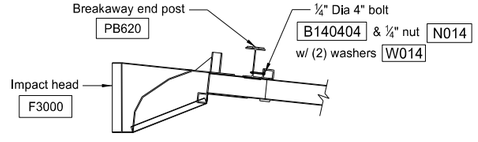
POST #1 CONNECTION DETAILS



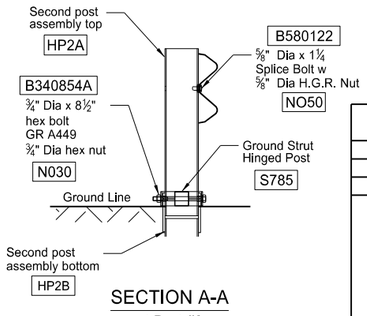
IMPACT HEAD CONNECTION DETAIL



SECTION B-B
POST 3 THRU 7



IMPACT HEAD CONNECTING DETAIL



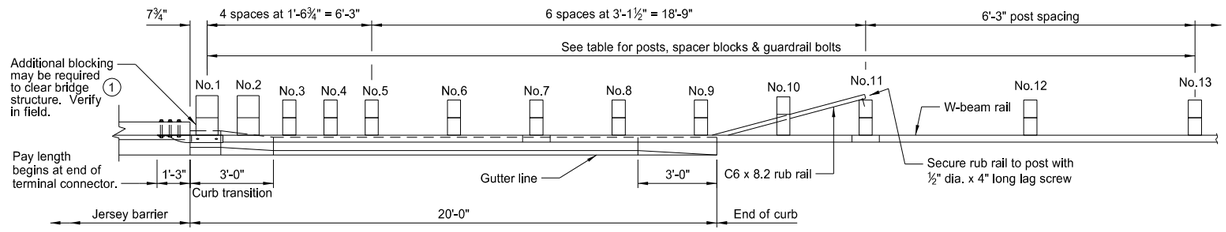
SECTION A-A
at Post #2

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE

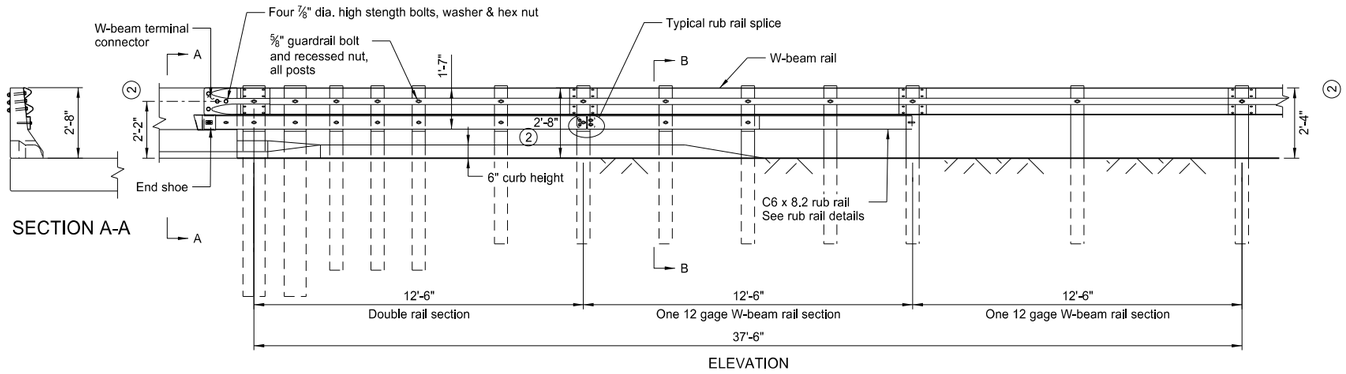
This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 10/11/13 and the original document is stored at the North Dakota Department of Transportation

W-BEAM TRANSITION TO CONCRETE JERSEY BARRIER WITH APPROACH CURB

D-764-9



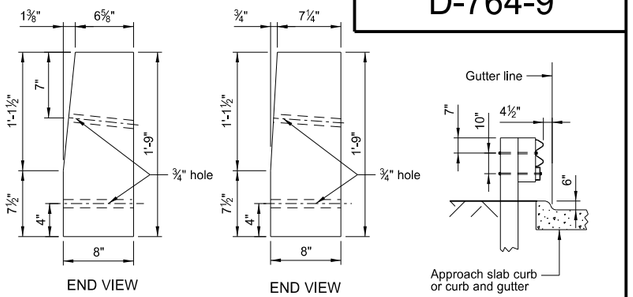
PLAN



SECTION A-A

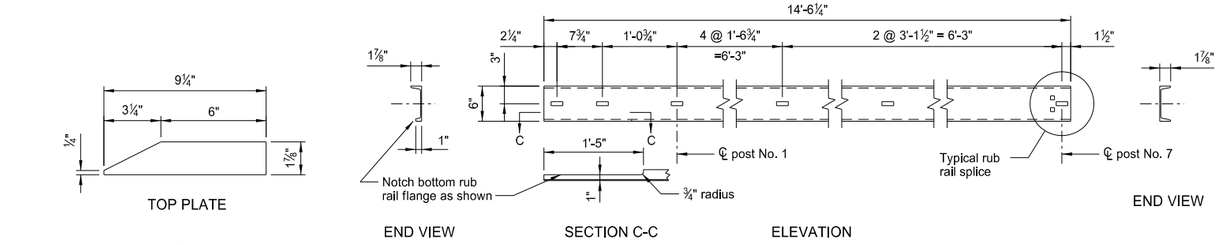
ELEVATION

GENERAL ASSEMBLY DETAILS

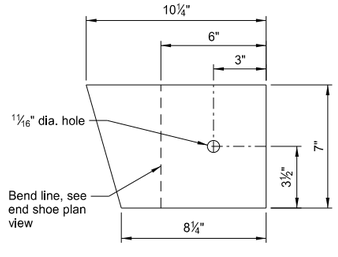


TAPERED TIMBER BLOCK DETAILS

POST, TIMBER BLOCK & BOLT TABLE		
DESCRIPTION	POST NO.	SIZE
Post	1 & 2	10" X 10" X 8'-0" min long
	3-5	6" X 8"X 7'-0" min long
	6-13	6" X 8"X 6'-0" min long
Spacer block	1-2	10" X 8" X 21" tapered block
	3-9	6" X 8" X 21"
	10	6" X 9 3/4" X 14"
	11-13	6" X 8" X 14"
Guardrail bolt & recessed nut	1 & 2 & 10	5/8" Dia X 20" - guardrail
	3-9,11-13	5/8" Dia X 18" - guardrail
	1-2	5/8" Dia X 22"- rub rail
	3-9	5/8" Dia X 20"- rub rail

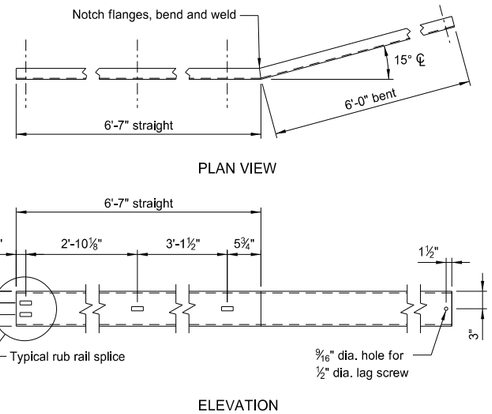


RUB RAIL STRAIGHT SECTION

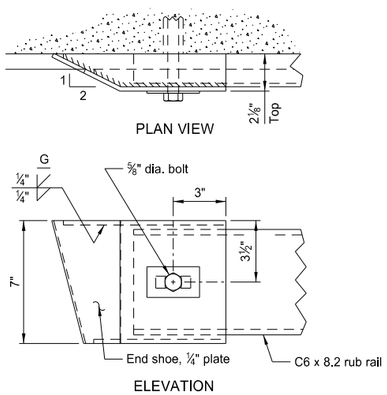


END SHOE PLATE DETAILS

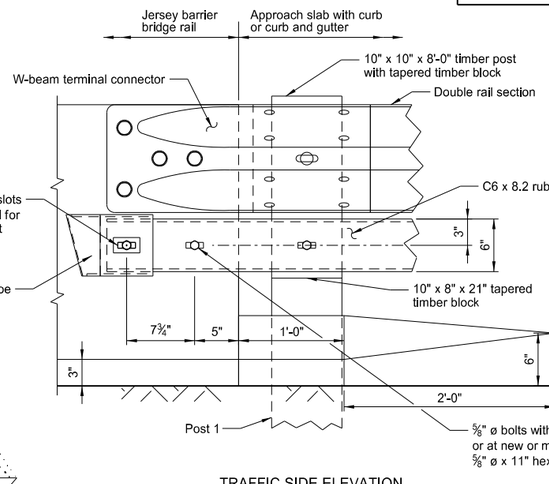
(¼" plate)

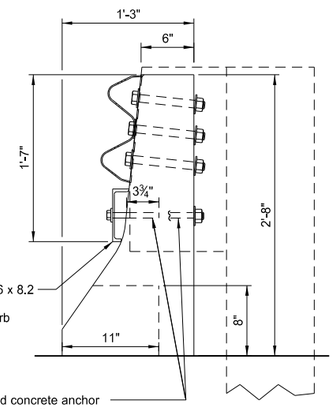


RUB RAIL BENT SECTION



RUB RAIL END SHOE ASSEMBLY





RAIL ATTACHMENT AND CURB DETAIL

(1) Additional blocking may be required at post No.1.

(2) Height is 2'-8" from 0' to 12'-6" from bridge. Height tapers from 2'-8" to 2'-4" between 12'-6" to 37'-6" from bridge.

NOTES:

C6 x 8.2 rub rail and structural steel shall be AASHTO 270M Grade 250, and shall be galvanized after fabrication in accordance with AASHTO M111.

All slotted holes are $^{1}\!/_{16}$" x 2".

All square holes are $^{1}\!/_{16}$".

Galvanize all hardware in accordance with AASHTO M232.

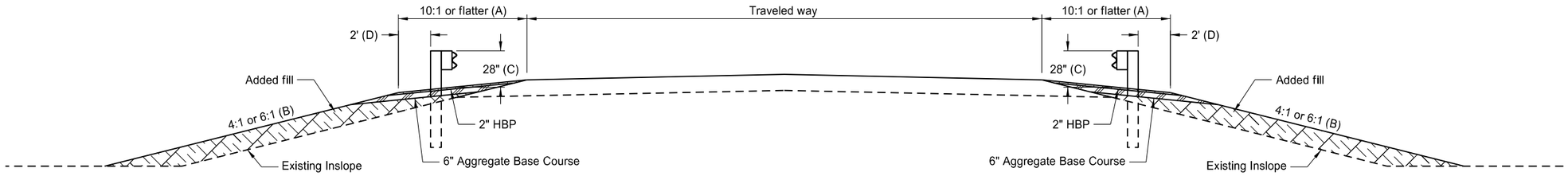
All posts and blocks for the W-beam guardrail shall be timber.

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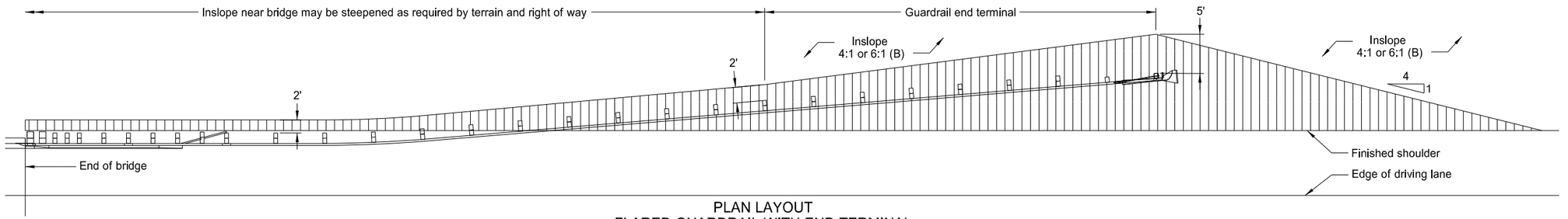
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D-764-22

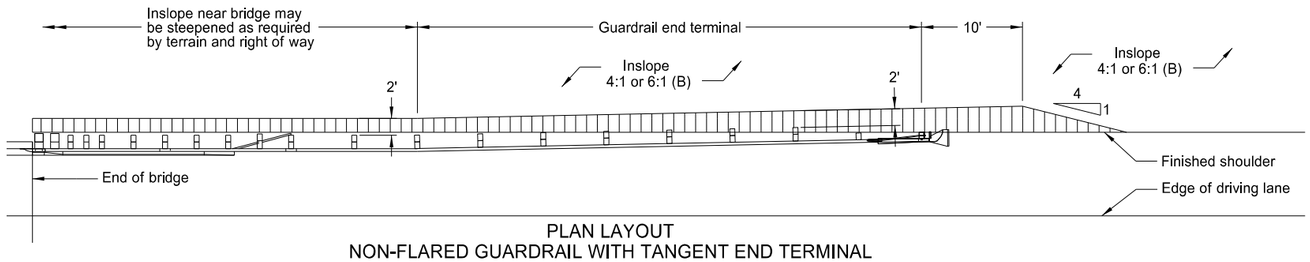
TYPICAL GRADING AT BRIDGE ENDS WITH W-BEAM GUARDRAIL



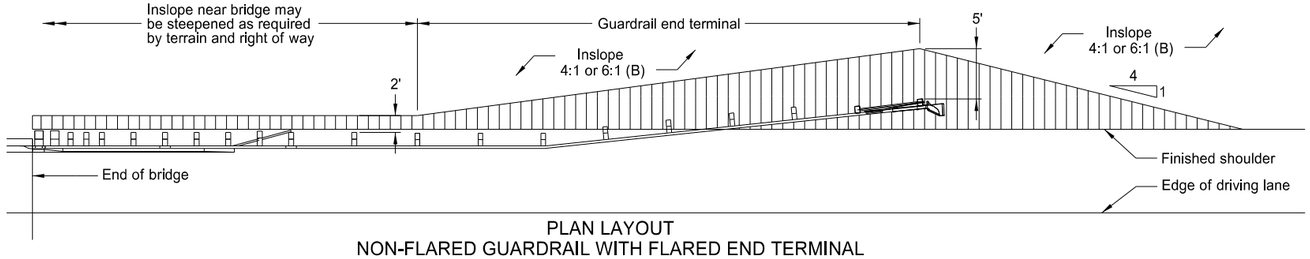
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

(A) Slope flatter than 10:1 may be required to provide proper guardrail height.

(B) Where normal inslope is 4:1 the added fill shall be 4:1. Where normal inslope is 6:1 the added fill shall be 6:1.

(C) Measured from top of guardrail to top of surfacing at front face of guardrail.

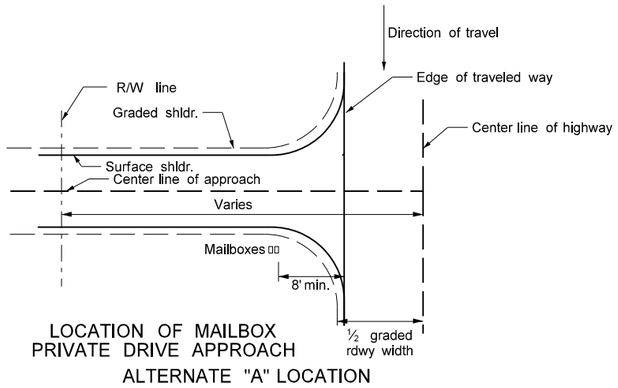
(D) Dimension at end terminals may vary per Plan Layouts shown on this sheet.

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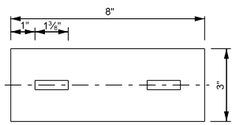
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MAILBOX LOCATION DETAILS

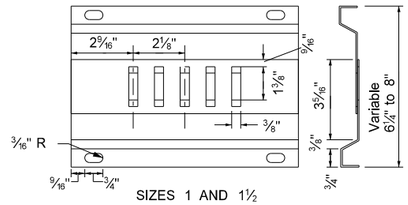
D-766-1



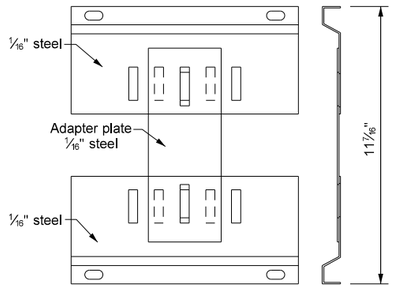
LOCATION OF MAILBOX
PRIVATE DRIVE APPROACH
ALTERNATE "A" LOCATION



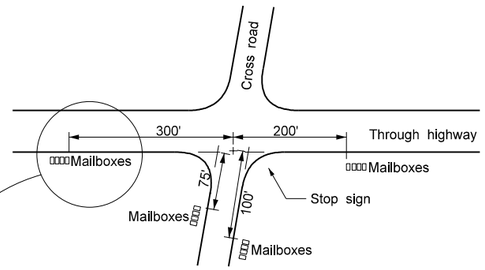
ADAPTOR PLATE



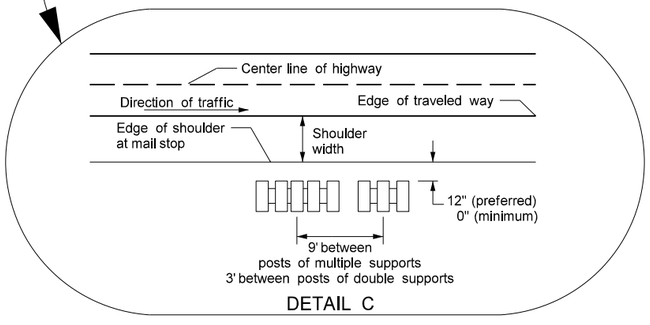
SIZES 1 AND 1½
MOUNTING BRACKET



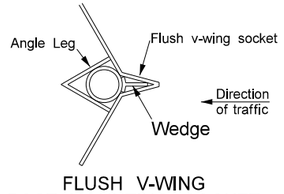
SIZE 2 WITH ADAPTOR PLATE
MOUNTING BRACKET



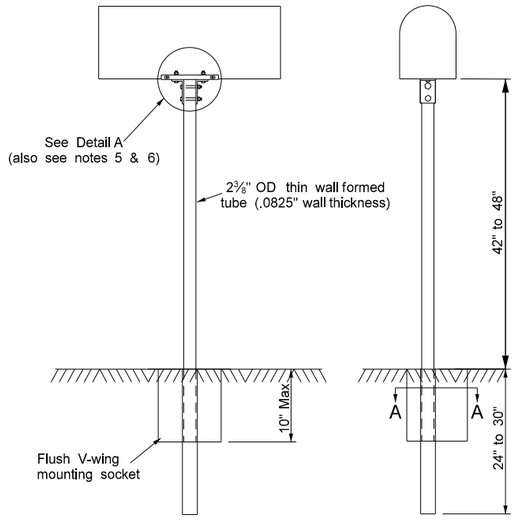
MINIMUM CLEARANCE DISTANCE TO NEAREST
MAILBOX ALONG ROADWAY AT INTERSECTIONS
ALTERNATE "B" LOCATION



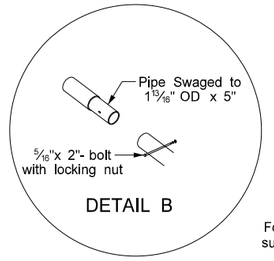
DETAIL C



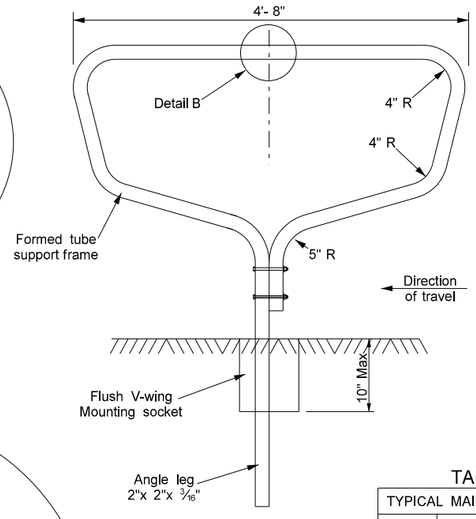
FLUSH V-WING
POST MOUNTING SOCKET
SECTION A-A



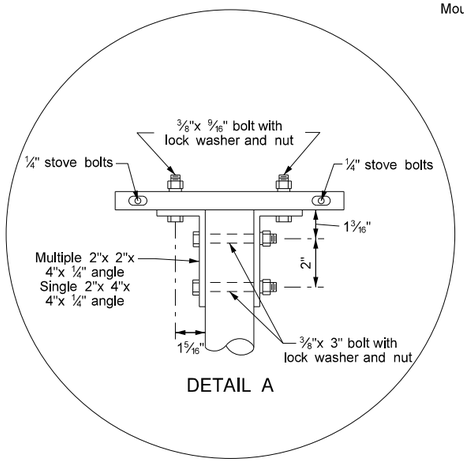
SIDE FRONT
SINGLE SUPPORT



DETAIL B



FRONT



DETAIL A

Notes:

1. The mailbox support and hardware details shall consist of the "V-Loc Mailbox Support System" manufactured by:

   Tapco
   Traffic & Parking Control Co. Inc.

   Any other equal support system meeting the requirements of NCHRP Report 350, which has been crash tested, and approved by the Federal Highway Administration may be used. Approved alternate mailbox assemblies shall be installed in the manner and arrangement crash tested.

2. The preferred location for all mailboxes is the Alternate "A" location. However, the Engineer may approve the Alternate "B" location if warranted by existing field conditions.

3. Postal regulations require that mailboxes must be located on the right-hand side of the road in the direction traveled by the carrier. Therefore, the Engineer shall contact the local carrier or postmaster before installing new mailboxes to verify the direction of travel.

4. Mailboxes installed on private drive approaches must always be located on the downstream side of the approach.

5. Install angle connection parallel to traffic flow for size 2 mailbox mounted on single posts.

6. Size 2 mailbox mounted on multiple support requires 2 each, ⅜" by ⁹⁄₁₆" bolts with lock washers and nuts to attach the adapter plate to mounting bracket. The unit will then require 4 angle connections to attach to the formed tube support frame. See Detail A.

7. Space multiple support frames a minimum of 4 feet apart. Space single support frames a minimum of 3 ft apart. Do not place more than five No. 1 mailboxes, three No. 2 mailboxes, or any combination of four No. 1-A and No. 2 mailboxes on multiple support frames.

TABLE A

TYPICAL MAILBOX DIMENSIONS			
Size	Width	Height	Length
1	6.5"	8.5"	19"
1A	8"	10.5"	21"
2	11.5"	13.5"	23.5"

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